COOLING

CO(SOHC)

1. General Description

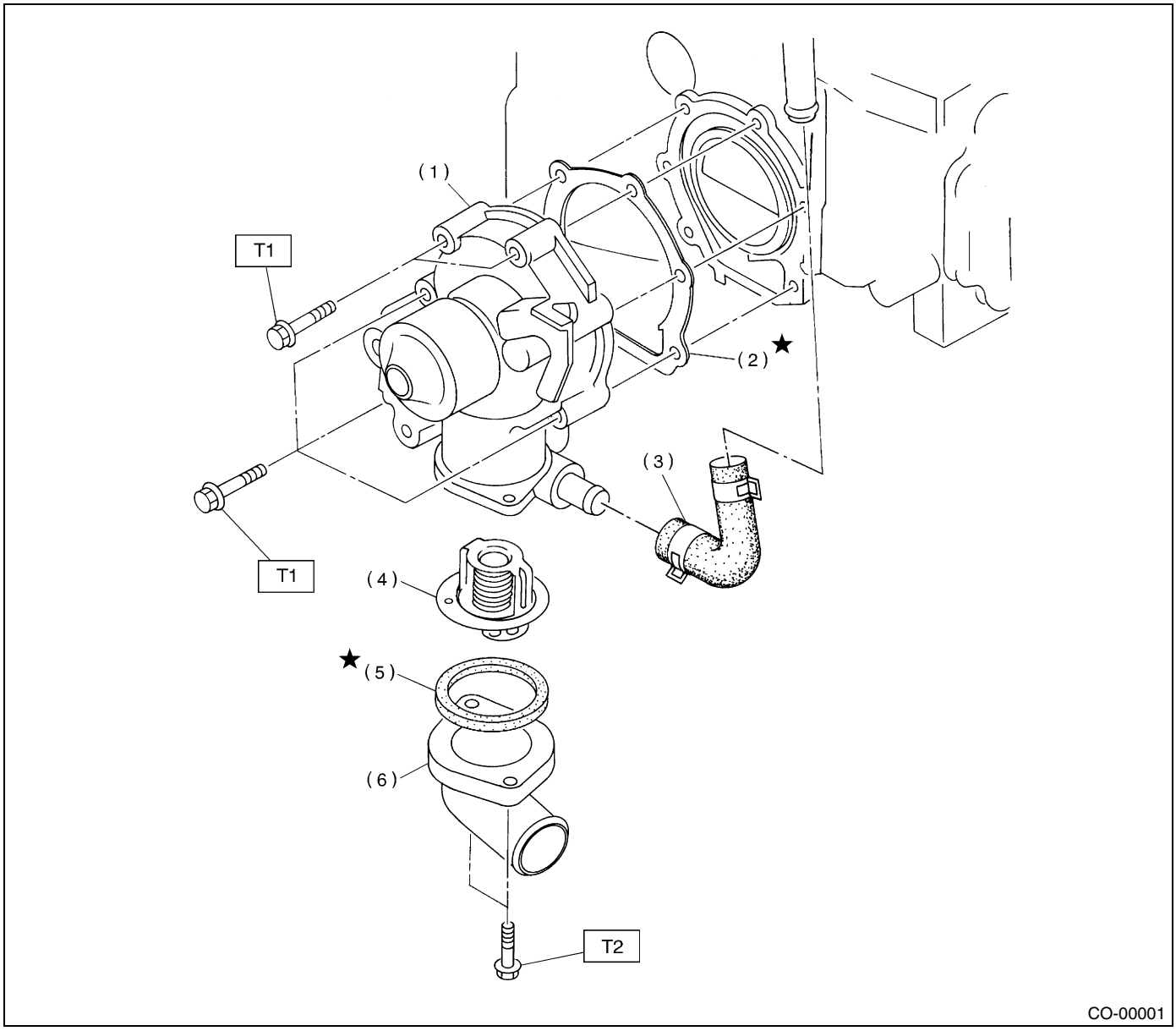
A: SPECIFICATIONS

Model			Non-turbo	Turbo
Cooling system			Electric fan + Forced engine coolant circulation system	
Total engine coolant capacity ℓ (US qt, Imp qt)			2.0L AT: Approx. 6.5 (6.87, 5.72) 2.0L MT: Approx. 6.6 (6.98, 5.81) 2.5L AT: Approx. 6.8 (7.19, 5.98) 2.5L MT: Approx. 6.9 (7.29, 6.07)	AT: Approx. 7.3 (7.71, 6.42) MT with oil cooler: Approx. 7.3 (7.71, 6.42) MT without oil cooler: Approx. 7.4 (7.82, 6.51)
Water pump	Type		Centrifugal impeller type	
	Discharge performance I	Discharge	20 ℓ (5.3 US gal, 4.4 Imp gal)/min.	
		Pump speed—Discharge pressure	760 rpm — 2.9 kPa (0.3 mAq)	
		Engine coolant temperature	85°C (185°F)	
	Discharge performance II	Discharge	100 ℓ (26.4 US gal, 22.0 Imp gal)/min.	
		Pump speed—Discharge pressure	3,000 rpm — 49.0 kPa (5.0 mAq)	
		Engine coolant temperature	85°C (185°F)	
	Discharge performance III	Discharge	200 ℓ (52.8 US gal, 44.0 Imp gal)/min.	
		Pump speed—Discharge pressure	6,000 rpm — 225.4 kPa (23.0 mAq)	
		Engine coolant temperature	85°C (185°F)	
	Impeller diameter		76 mm (2.99 in)	
	Number of impeller vanes		8	
	Pump pulley diameter		60 mm (2.36 in)	
	Clearance between impeller and case	Standard	0.5 — 0.7 mm (0.020 — 0.028 in)	
		Limit	1.0 mm (0.039 in)	
	"Thrust" runout of impeller end		0.5 mm (0.020 in)	
Thermostat	Type		Wax pellet type	
	Starts to open		80 — 84°C (176 — 183°F)	76 — 80°C (169 — 176°F)
	Fully opened		95°C (203°F)	91°C (196°F)
	Valve lift		9.0 mm (0.354 in) or more	
	Valve bore		35 mm (1.38 in)	
Radiator fan	Motor	Main fan	70 W	
		Sub fan	70 W	
	Fan diameter × Blade		320 mm (11.81 in) × 5 (main fan) 320 mm (11.81 in) × 7 (sub fan)	
Radiator	Type		Down flow, pressure type	
	Core dimensions	Width × Height × Thickness	691.5 × 360 × 16 mm (27.22 × 14.17 × 0.63 in)	
	Pressure range in which cap valve is open		Above: 108±15 kPa (1.1±0.15 kg/cm^2, 16±2 psi) Below: −1.0 to −4.9 kPa (−0.01 to −0.05 kg/cm^2, −0.1 to −0.7 psi)	
	Fins		Corrugated fin type	
Reservoir tank	Capacity		0.5 ℓ (0.5 US qt, 0.4 Imp qt)	

B: COMPONENT

1. WATER PUMP

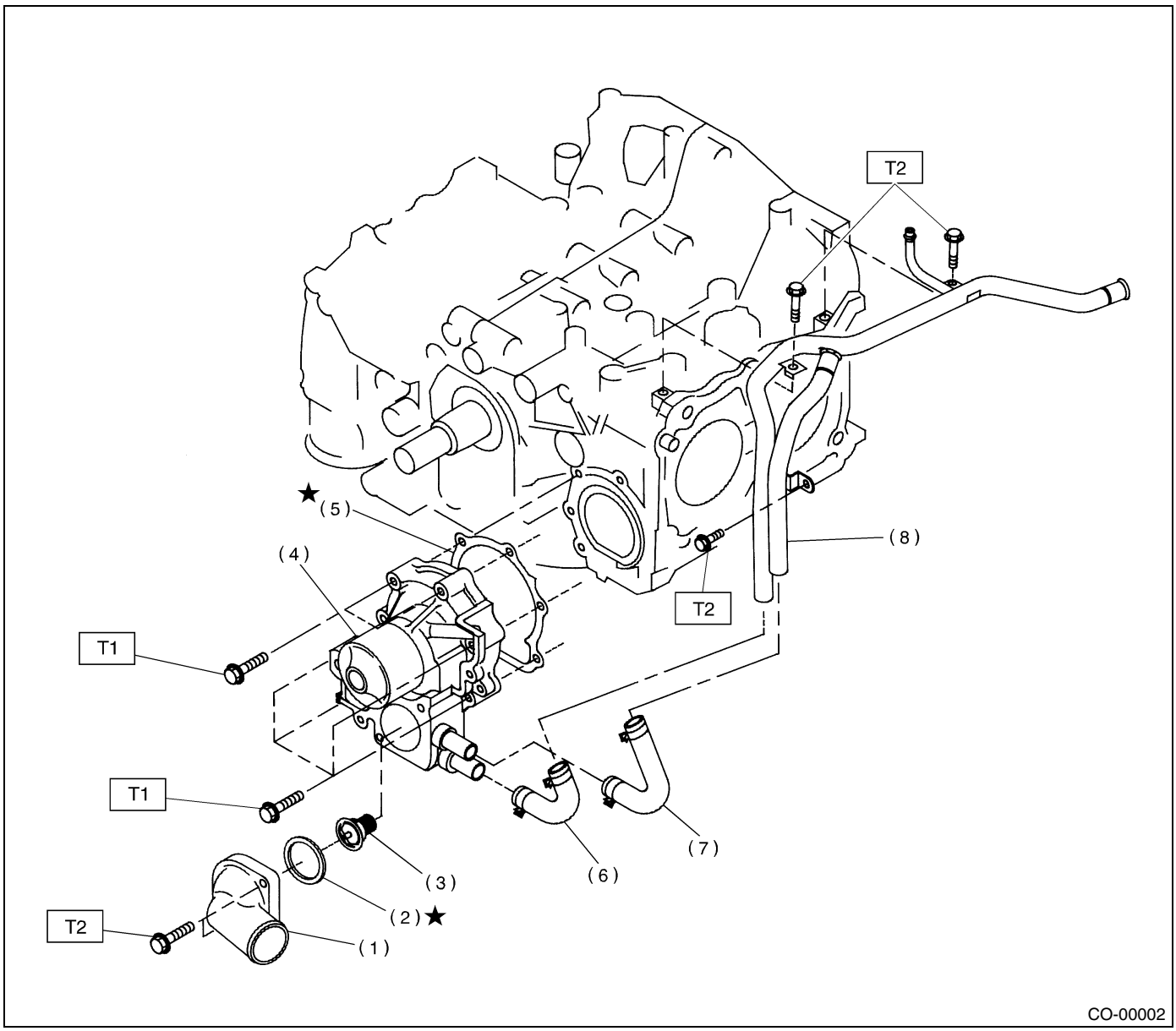
• NON-TURBO MODEL



(1) Water pump ASSY
(2) Gasket
(3) Heater by-pass hose
(4) Thermostat
(5) Gasket
(6) Thermostat cover

Tightening torque: N·m (kgf-m, ft-lb)
T1: First 12 (1.2, 8.7)
Second 12 (1.2, 8.7)
T2: 6.5 (0.66, 4.8)

• TURBO MODEL

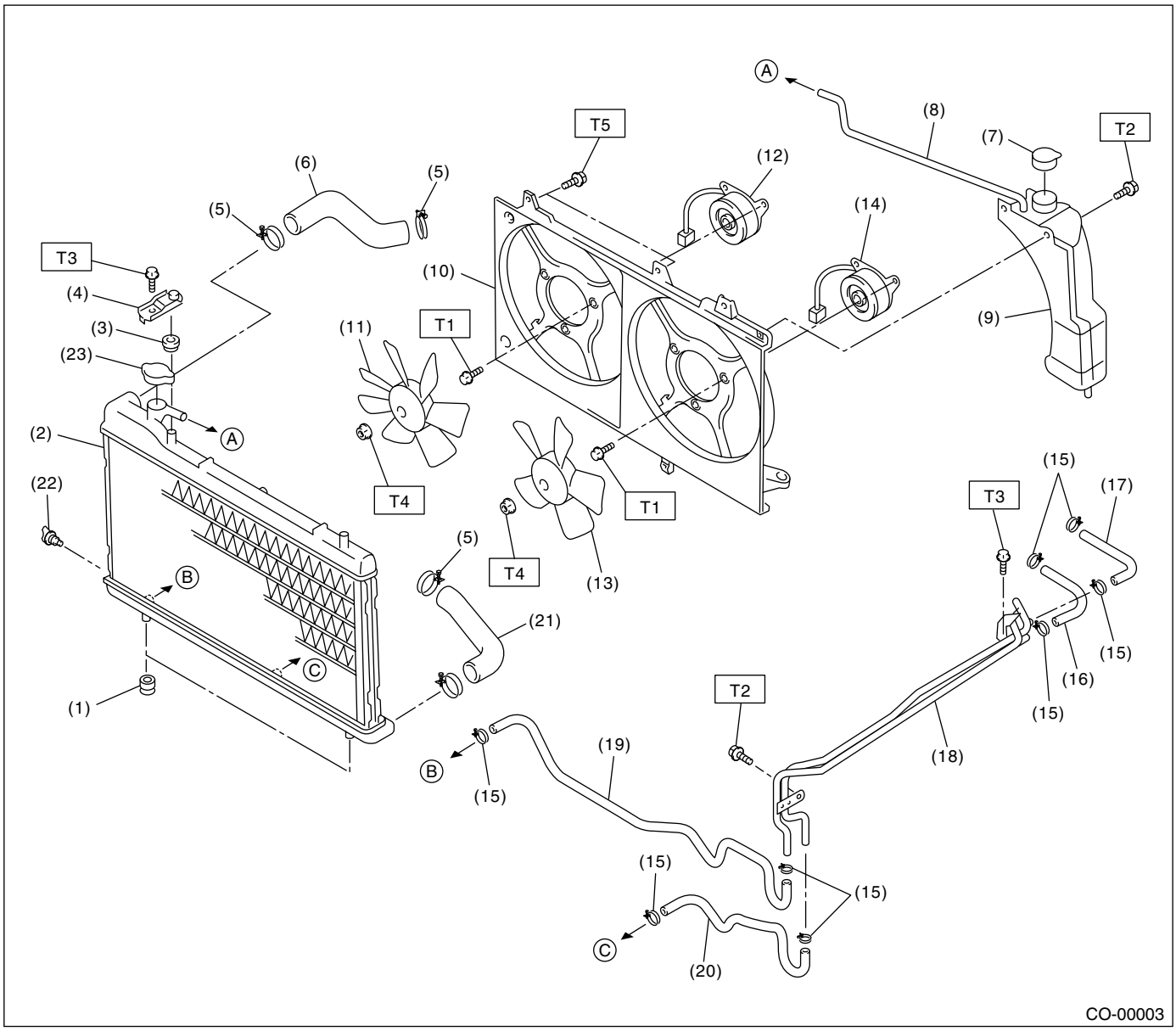


(1) Thermostat cover
(2) Gasket
(3) Thermostat
(4) Water pump ASSY
(5) Gasket
(6) Heater by-pass hose
(7) Coolant filler tank by-pass hose
(8) Water by-pass pipe

Tightening torque: N·m (kgf-m, ft-lb)
T1: First 12 (1.2, 8.7)
Second 12 (1.2, 8.7)
T2: 6.5 (0.66, 4.8)

2. RADIATOR AND RADIATOR FAN

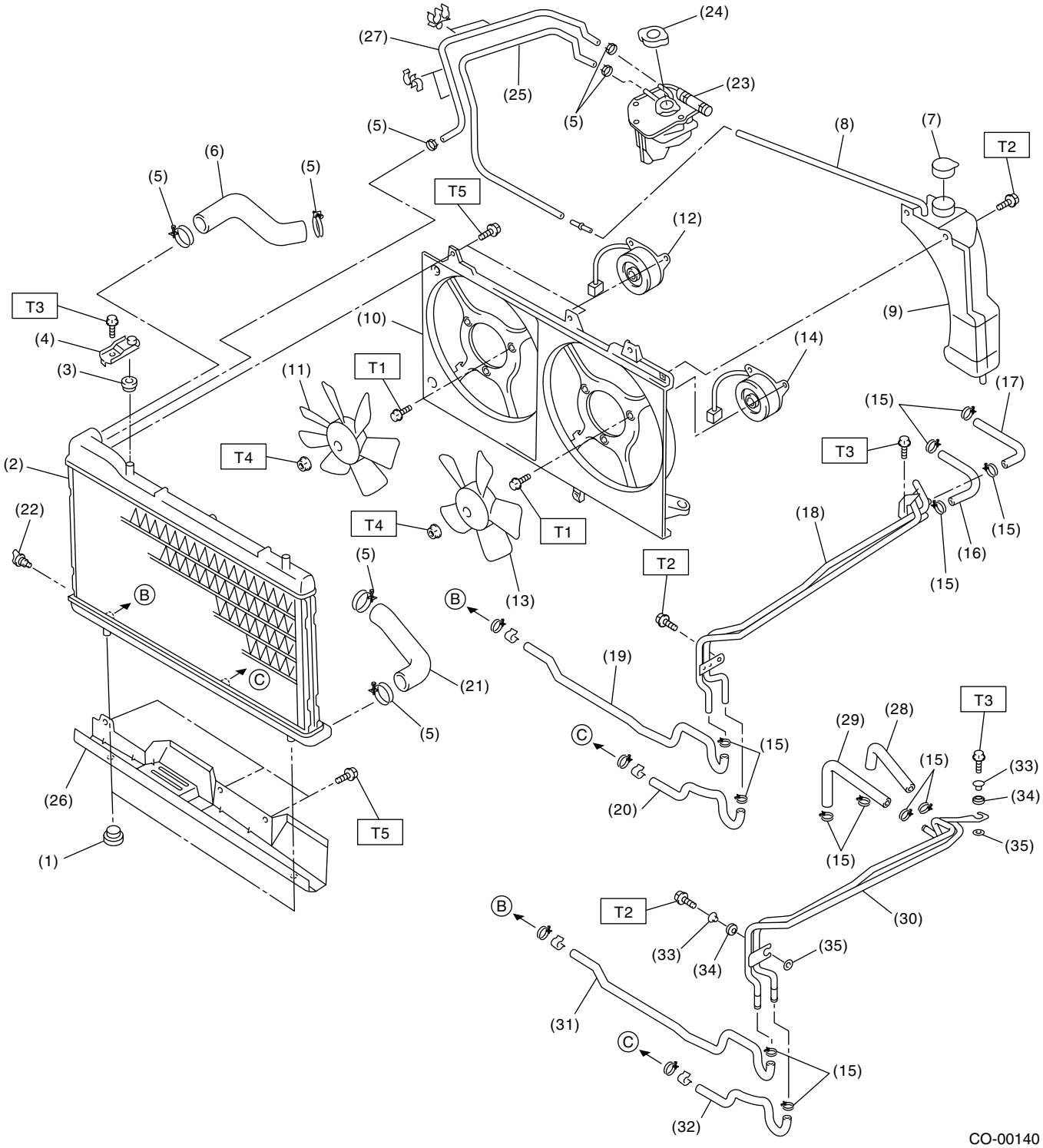
• NON-TURBO MODEL



(1)	Radiator lower cushion	(13)	Radiator main fan	(21)	Radiator outlet hose
(2)	Radiator	(14)	Radiator main fan motor	(22)	Radiator drain plug
(3)	Radiator upper cushion	(15)	ATF hose clamp (AT vehicles only)	(23)	Radiator cap
(4)	Radiator upper bracket				
(5)	Clamp	(16)	ATF inlet hose A (AT vehicles only)		
(6)	Radiator inlet hose				
(7)	Engine coolant reservoir tank cap	(17)	ATF outlet hose A (AT vehicles only)		
(8)	Over flow hose				
(9)	Engine coolant reservoir tank	(18)	ATF pipe (AT vehicles only)		
(10)	Radiator sub fan shroud	(19)	ATF inlet hose B (AT vehicles only)		
(11)	Radiator sub fan				
(12)	Radiator sub fan motor	(20)	ATF outlet hose B (AT vehicles only)		

Tightening torque: N·m (kgf-m, ft-lb)
T1: 4.4 (0.45, 3.3)
T2: 7.5 (0.76, 5.5)
T3: 18 (1.8, 13.0)
T4: 3.4 (0.35, 2.5)
T5: 4.9 (0.50, 3.6)

• TURBO MODEL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C
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CO-00140

(1) Radiator lower cushion
(2) Radiator
(3) Radiator upper cushion
(4) Radiator upper bracket
(5) Clamp
(6) Radiator inlet hose
(7) Engine coolant reservoir tank cap
(8) Over flow hose
(9) Engine coolant reservoir tank
(10) Radiator fan shroud
(11) Radiator sub fan
(12) Radiator sub fan motor
(13) Radiator main fan
(14) Radiator main fan motor
(15) ATF hose clamp (AT vehicles only)
(16) ATF inlet hose A (AT vehicles only)
(17) ATF outlet hose A (AT vehicles only)
(18) ATF pipe (AT vehicles only)
(19) ATF inlet hose B (AT vehicles only)
(20) ATF outlet hose B (AT vehicles only)
(21) Radiator outlet hose
(22) Radiator drain plug
(23) Engine coolant filler tank
(24) Engine coolant filler tank cap
(25) Engine overflow hose
(26) Radiator under cover (AT vehicles only)
(27) Engine air breather hose
(28) Oil cooler inlet hose A (MT vehicles with oil cooler)
(29) Oil cooler outlet hose A (MT vehicles with oil cooler)
(30) Oil cooler pipe (MT vehicles with oil cooler)
(31) Oil cooler inlet hose B (MT vehicles with oil cooler)
(32) Oil cooler outlet hose B (MT vehicles with oil cooler)
(33) Spacer (MT vehicles with oil cooler)
(34) Cushion (MT vehicles with oil cooler)
(35) Setting washer (MT vehicles with oil cooler)

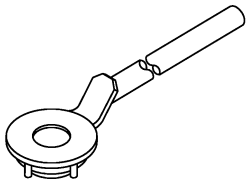
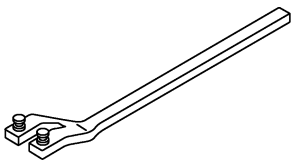
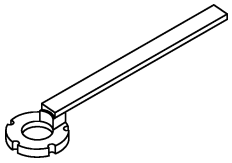
Tightening torque: N·m (kgf-m, ft-lb)
T1: 4.4 (0.45, 3.3)
T2: 7.5 (0.76, 5.5)
T3: 18 (1.8, 13.0)
T4: 3.4 (0.35, 2.5)
T5: 4.9 (0.50, 3.6)

C: CAUTION

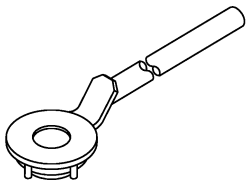
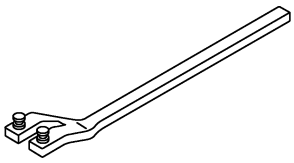
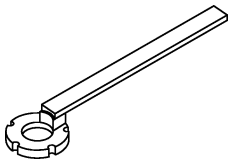
• Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
• Remove contamination including dirt and corrosion before removal, installation or disassembly.
• Keep the disassembled parts in order and protect them from dust or dirt.
• Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
• Be careful not to burn your hands, because each part in the vehicle is hot after running.
• Be sure to tighten fasteners including bolts and nuts to the specified torque.
• Place shop jacks or safety stands at the specified points.
• Before disconnecting electrical connectors of sensors or units, be sure to disconnect the ground cable from battery.

D: PREPARATION TOOL

1. NON-TURBO MODEL

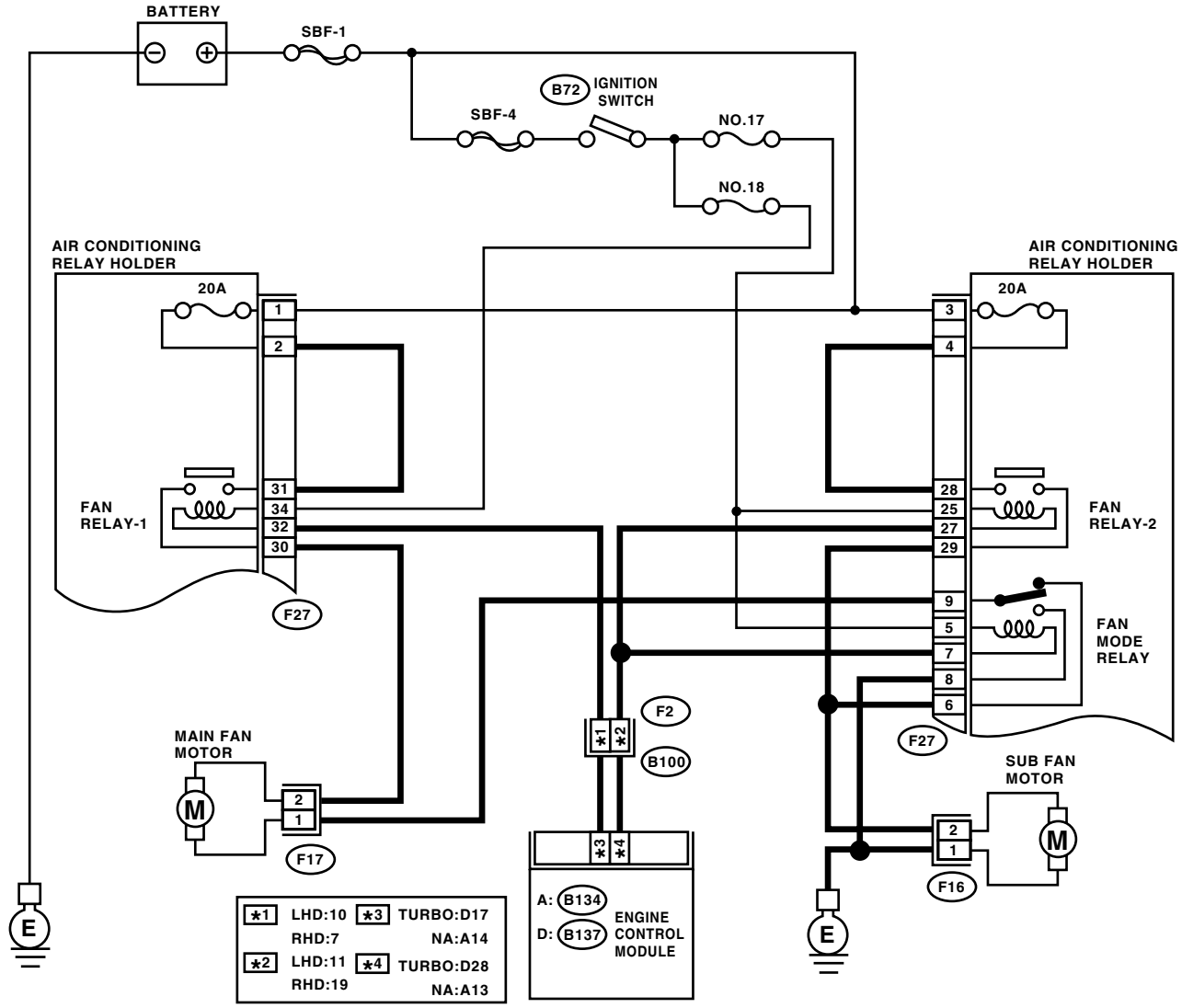
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499977400	499977400 (2000 cc model) 499977100 (2500 cc model)	CRANK PULLEY WRENCH	Used for stopping crankshaft pulley when loosening and tightening crankshaft pulley bolts.
 ST18231AA010	18231AA010	CAMSHAFT SPROCKET WRENCH (For left side)	• Used for removing and installing camshaft sprocket (LH). • Also the CAMSHAFT SPROCKET WRENCH (499207100) can be used.
 ST-499207400	499207400	CAMSHAFT SPROCKET WRENCH (For right side)	Used for removing and installing camshaft sprocket (RH).

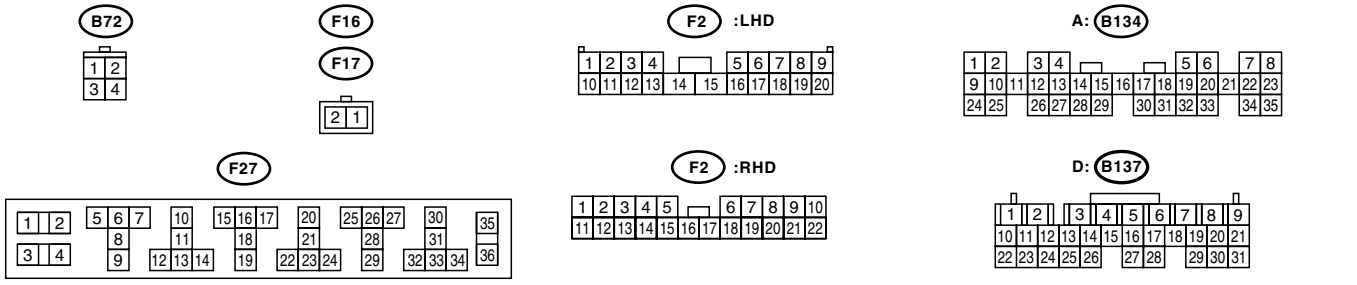
2. TURBO MODEL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499977400	499977400	CRANK PULLEY WRENCH	Used for stopping crankshaft pulley when loosening and tightening crankshaft pulley bolts.
 ST18231AA010	18231AA010	CAMSHAFT SPROCKET WRENCH	Used for removing and installing camshaft sprocket. (Intake)
 ST-499207400	499207400	CAMSHAFT SPROCKET WRENCH	Used for removing and installing camshaft sprocket. (Exhaust)

2. Radiator Fan System

A: SCHEMATIC





CO-00141

B: INSPECTION

DETECTING CONDITION:

- Engine coolant temperature is above 95°C (203°F).
- Vehicle speed is below 19 km/h (12 MPH).

TROUBLE SYMPTOM:

- Radiator main fan and sub fan does not rotate under the above conditions.

	Step	Value	Yes	No
1	**CHECK OPERATION OF RADIATOR FAN.** 1)Connect the test mode connector. 2)Turn the ignition switch to ON. 3)Using Subaru Select Monitor, check the compulsory operation of radiator fan relay. Do the radiator main and sub fan rotate at low speed? NOTE: •With Subaru Select Monitor When checking the compulsory operation of radiator fan, the radiator main and sub fan repeat the rotation in order of following: low speed rotation → high speed rotation → off. •Subaru Select Monitor Refer to Compulsory Valve Operation Check Mode for detail procedures. <Ref. to EN(SOHC)-48, Compulsory Valve Operation Check Mode.>	Main and sub radiator fan rotate at low speed.	Go to step **2.**	Go to step **3.**
2	**CHECK OPERATION OF RADIATOR FAN.** 1)Connect the test mode connector. 2)Turn the ignition switch to ON. 3)Using Subaru Select Monitor, check the compulsory operation of radiator fan relay. Do the radiator main and sub fan rotate at high speed? NOTE: •With Subaru Select Monitor When checking the compulsory operation of radiator fan, the radiator main and sub fan repeat the rotation in order of following: low speed rotation → high speed rotation → off. •Subaru Select Monitor Refer to Compulsory Valve Operation Check Mode for detail procedures. <Ref. to EN(SOHC)-48, Compulsory Valve Operation Check Mode.>	Main and sub radiator fans rotate faster at high speed.	Radiator main fan system is okay.	Go to step **32.**
3	**CHECK POWER SUPPLY TO FAN RELAY 1.** 1)Turn the ignition switch to OFF. 2)Remove the fan relay 1 from A/C relay holder. 3)Measure the voltage between fan relay 1 terminal and chassis ground. ***Connector & terminal*** ***(F27) No. 31 (+) — Chassis ground (–):*** Is the measured value more than specified value?	10 V	Go to step **4.**	Go to step **5.**

	Step	Value	Yes	No
4	**CHECK POWER SUPPLY TO FAN RELAY 1.** 1)Turn the ignition switch to ON. 2)Measure the voltage between fan relay 1 terminal and chassis ground. ***Connector & terminal*** ***(F27) No. 34 (+) — Chassis ground (–):*** Is the measured value more than specified value?	10 V	Go to step **8.**	Go to step **7.**
5	**CHECK FUSE.** 1)Remove the 20 A fuse from A/C relay holder. 2)Check the condition of fuse. Is the fuse blown out?	Fuse is blown out.	Replace the fuse.	Go to step **6.**
6	**CHECK HARNESS OF 20 A FUSE TERMINAL AND FAN RELAY 1 TERMINAL.** 1)Turn the ignition switch to OFF. 2)Measure the resistance between 20 A fuse terminal and fan relay 1 terminal. ***Terminal*** ***No. 2 — No. 31:*** Is the measured value less than specified value?	1 Ω	Repair the power supply line.	Repair the open harness.
7	**CHECK FUSE.** 1)Turn the ignition switch to OFF 2)Remove the fuse No. 18. 3)Check the condition of fuse. Is the fuse blown out?	Fuse is blown out.	Replace the fuse.	Repair the power supply line.
8	**CHECK FAN RELAY 1.** 1)Turn the ignition switch to OFF. 2)Measure the resistance between fan relay 1 terminals. ***Terminal*** ***No. 30 — No. 31:*** Is the measured value more than specified value?	1 MΩ	Go to step **9.**	Replace the fan relay 1.
9	**CHECK FAN RELAY 1.** 1)Connect the battery to fan relay terminals No. 32 and No. 34. 2)Measure the resistance between fan relay 1 terminals. ***Terminal*** ***No. 30 — No. 31:*** Is the measured value less than specified value?	1 Ω	Go to step **10.**	Replace the fan relay 1.
10	**CHECK HARNESS BETWEEN FAN RELAY 1 TERMINAL AND MAIN FAN MOTOR CONNECTOR.** 1)Disconnect the connector from main fan motor. 2)Measure the resistance between fan relay 1 terminal and main fan motor connector. ***Connector & terminal*** ***(F17) No. 2 — (F27) No. 30:*** Is the measured value less than specified value?	1 Ω	Go to step **11.**	Repair the open harness between fan relay 1 terminal and main fan motor connector.

	Step	Value	Yes	No
11	**CHECK HARNESS BETWEEN MAIN FAN MOTOR CONNECTOR AND FAN MODE RELAY CONNECTOR.** 1)Remove the fan mode relay from A/C relay holder. 2)Measure the resistance between main fan motor connector and fan mode relay connector. ***Connector & terminal*** ***(F17) No. 1 — (F27) No. 9:*** Is the measured value less than specified value?	1 Ω	Go to step **12.**	Repair the open harness between main fan motor connector and fan mode relay connector.
12	**CHECK POOR CONTACT.** Check poor contact in main fan motor connector. Is there poor contact in main fan motor connector?	There is poor contact.	Repair poor contact in main fan motor connector.	Go to step **13.**
13	**CHECK MAIN FAN MOTOR.** Connect the battery positive (+) terminal to terminal No.2, and ground (-) terminal to terminal No.1 of main fan motor. Does the main fan rotate?	Main fan rotates.	Go to step **14.**	Replace the main fan motor.
14	**CHECK FAN MODE RELAY.** Measure the resistance of fan mode relay. ***Terminal*** ***No. 6 — No. 9:*** Is the measured value less than specified value?	1 Ω	Go to step **15.**	Replace the fan mode relay.
15	**CHECK RESISTANCE BETWEEN FAN MODE RELAY TERMINAL AND SUB FAN MOTOR CONNECTOR.** 1)Disconnect the connector from sub fan motor. 2)Measure the resistance between fan mode relay terminal and sub fan motor connector. ***Connector & terminal*** ***(F16) No. 2 — (F27) No. 6:*** Is the measured value less than specified value?	1 Ω	Go to step **16.**	Repair the open harness between fan mode relay terminal and sub fan motor connector.
16	**CHECK SUB FAN MOTOR AND GROUND CIRCUIT.** Measure the resistance between sub fan motor connector and chassis ground. ***Connector & terminal*** ***(F16) No. 1 — Chassis ground:*** Is the measured value less than specified value?	5 Ω	Go to step **17.**	Repair the open harness between sub fan motor connector and chassis ground.
17	**CHECK POOR CONTACT.** Check poor contact in sub fan motor connector. Is there poor contact in sub fan motor connector?	There is poor contact.	Repair poor contact in sub fan motor connector.	Go to step **18.**
18	**CHECK SUB FAN MOTOR.** Connect the battery positive (+) terminal to terminal No. 2, and ground (-) terminal to terminal No. 1 of sub fan motor. Does the sub fan rotate?	Sub fan rotates.	Go to step **19.**	Replace the sub fan motor.

	Step	Value	Yes	No
19	**CHECK HARNESS BETWEEN FAN RELAY 1 AND ECM.** 1)Disconnect the connector from ECM. 2)Measure the resistance between fan relay 1 terminal and ECM connector. ***Connector & terminal*** ***Turbo: (B137) No. 17 — (F27) No. 32:*** ***Non-turbo: (B134) No. 14 — (F27) No. 32:*** Is the measured value less than specified value?	1 Ω	Go to step **20.**	Repair the open harness between fan relay 1 terminal and ECM.
20	**CHECK POOR CONTACT.** Check poor contact in ECM connector. Is there poor contact in ECM connector?	There is poor contact.	Repair poor contact in ECM connector.	Contact with SOA (distributor) service.
21	**CHECK POWER SUPPLY TO FAN RELAY 2.** 1)Turn the ignition switch to OFF. 2)Remove the fan relay 2 from A/C relay holder. 3)Measure the voltage between fan relay 2 terminal and chassis ground. ***Connector & terminal*** ***(F27) No. 28 (+) — Chassis ground (–):*** Is the measured value more than specified value?	10 V	Go to step **22.**	Go to step **23.**
22	**CHECK POWER SUPPLY TO FAN RELAY 2.** 1)Turn the ignition switch to ON. 2)Measure the voltage between fan relay 2 terminal and chassis ground. ***Connector & terminal*** ***(F27) No. 25 (+) — Chassis ground (–):*** Is the measured value more than specified value?	10 V	Go to step **26.**	Go to step **25.**
23	**CHECK FUSE.** 1)Remove the 20 A fuse from A/C relay holder. 2)Check the condition of fuse. Is the fuse blown out?	Fuse is blown out.	Replace the fuse.	Go to step **24.**
24	**CHECK HARNESS BETWEEN 20 A FUSE TERMINAL AND FAN RELAY 2 TERMINAL.** 1)Turn the ignition switch to OFF. 2)Measure the resistance between 20 A fuse terminal and fan relay 2 terminal. ***Terminal*** ***No. 4 — No. 28:*** Is the measured value less than specified value?	1 Ω	Repair the power supply line.	Repair the open harness.
25	**CHECK FUSE.** 1)Turn the ignition switch to OFF. 2)Remove the fuse No. 17. 3)Check the condition of fuse. Is the fuse blown out?	Fuse is blown out.	Replace the fuse.	Repair the power supply line.
26	**CHECK FAN RELAY 2.** 1)Turn the ignition switch to OFF. 2)Remove the fan relay 2 from A/C relay holder. 3)Measure the resistance of fan relay 2. ***Terminal*** ***No. 28 — No. 29:***	1 MΩ	Go to step **27.**	Replace the fan relay 2.

	Step	Value	Yes	No
27	**CHECK FAN RELAY 2.** 1)Connect the battery to terminals No. 25 and No. 27 of fan relay. 2)Measure the resistance of fan relay 2. ***Terminal*** ***No. 28 — No. 29:*** Is the measured value less than specified value?	1 Ω	Go to step **28.**	Replace the fan relay 2.
28	**CHECK HARNESS BETWEEN FAN RELAY 2 TERMINAL AND SUB FAN MOTOR CONNECTOR.** 1)Disconnect the connector from sub fan motor. 2)Measure the resistance between fan relay 2 terminal and sub fan motor connector. ***Connector & terminal*** ***(F16) No. 2 — (F27) No. 29:*** Is the measured value less than specified value?	1 Ω	Go to step **30.**	Repair the open harness between fan relay 2 terminal and sub fan motor connector.
29	**CHECK HARNESS BETWEEN FAN RELAY 2 AND ECM.** 1)Disconnect the connector from ECM. 2)Measure the resistance between fan relay 2 terminal and ECM connector. 3)Check the condition of fuse. ***Connector & terminal*** ***Turbo: (B137) No. 28 — (F27) No. 27:*** ***Non-turbo: (B134) No. 13 — (F27) No. 27:*** Is the measured value less than specified value?	1 Ω	Go to step **30.**	Repair the open harness between fan relay 2 terminal and ECM.
30	**CHECK HARNESS BETWEEN FAN MODE RELAY AND ECM.** Measure the resistance between fan mode relay terminal and ECM connector. ***Connector & terminal*** ***Turbo: (B137) No. 28 — (F27) No. 7:*** ***Non-turbo: (B134) No. 13 — (F27) No. 7:*** Is the measured value less than specified value?	1 Ω	Go to step **31.**	Repair the open harness between fan mode relay terminal and ECM.
31	**CHECK POOR CONTACT.** Check poor contact in ECM connector. Is there poor contact in ECM connector?	There is poor contact.	Repair the poor contact in ECM connector.	Contact with your SOA (distributor) service.
32	**CHECK OPERATION OF RADIATOR FAN.** Does the radiator main fan rotate when the radiator main and sub fan do not rotate at high speed?	The Radiator main fan rotates.	Go to step **21.**	Go to step **33.**
33	**CHECK GROUND CIRCUIT OF FAN MODE RELAY.** 1)Remove the fan mode relay from A/C relay holder. 2)Measure the resistance between fan mode relay terminal and chassis ground. ***Connector & terminal*** ***(F27) No. 8 — Chassis ground:*** Is the measured value less than specified value?	1 Ω	Go to step **34.**	Repair the open harness between fan mode relay and chassis ground.

	Step	Value	Yes	No
34	**CHECK POWER SUPPLY TO FAN MODE RELAY.** 1)Turn the ignition switch to ON. 2)Measure the voltage between fan mode relay terminal and chassis ground. ***Connector & terminal*** ***(F27) No. 5 (+) — Chassis ground (–):*** Is the measured value more than specified value?	10 V	Go to step **35.**	Repair the power supply line.
35	**CHECK FAN MODE RELAY.** 1)Turn the ignition switch to OFF. 2)Remove the fan mode relay. 3)Measure the resistance of fan mode relay. ***Terminal*** ***(F27) No. 8 — (F27) No. 9:*** Is the measured value more than specified value?	1 MΩ	Go to step **36.**	Replace the fan mode relay.
36	**CHECK FAN MODE RELAY.** 1)Connect the battery to terminals No. 5 and No. 7 of fan mode relay. 2)Measure the resistance of fan mode relay. ***Terminal*** ***(F27) No. 8 — (F27) No. 9:*** Is the measured value less than specified value?	1 Ω	Go to step **29.**	Replace the fan mode relay.

NOTE:
Inspection by your Subaru distributor is required, because probable cause is deterioration of multiple parts.

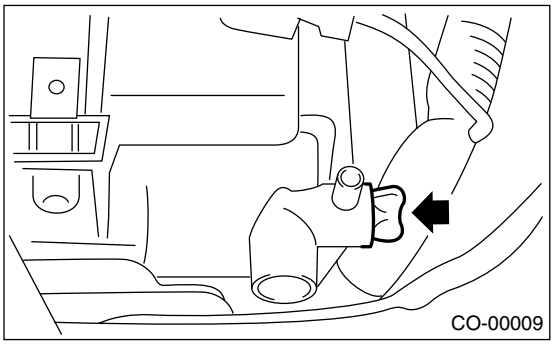
3. Engine Coolant

A: REPLACEMENT

1. DRAINING OF ENGINE COOLANT

1) Lift-up the vehicle.
2) Remove the under cover.
3) Remove the drain cock to drain engine coolant into container.

NOTE:
Remove the radiator cap so that engine coolant will drain faster.



4) Install the drain cock.

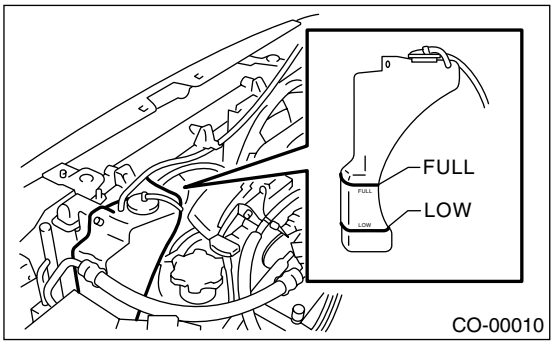
2. FILLING OF ENGINE COOLANT

1) For Turbo model, remove the rubber cap of air bleeding pipe at compressor left side in front of engine, and then install the vinyl hose.
For Non-turbo model (RHD), remove the air bleeding valve cap of heater hose.
2) Fill engine coolant.
3) When engine coolant is filled up to the air bleeding pipe (valve), install the cap.
4) Fill engine coolant into the radiator up to filler neck position.

Coolant capacity (fill up to "FULL" level):
2.0 L Non-turbo (AT) model
Approx. 6.5 ℓ (6.87 US qt, 5.72 Imp qt)
2.0 L Non-turbo (MT) model
Approx. 6.6 ℓ (6.98 US qt, 6.14 Imp qt)
2.5 L Non-turbo (AT) model
Approx. 6.8 ℓ (7.19 US qt, 5.98 Imp qt)
2.5 L Non-turbo (MT) model
Approx. 6.9 ℓ (7.29 US qt, 6.07 Imp qt)
2.0 L Turbo (AT and MT with oil cooler) model
Approx. 7.3 ℓ (7.72 US qt, 6.42 Imp qt)
2.0 L Turbo (MT without oil cooler) model
Approx. 7.4 ℓ (7.82 US qt, 6.51 Imp qt)

NOTE:
The SUBARU Genuine Coolant containing anti-freeze and anti-rust agents is especially made for SUBARU engine, which has an aluminum crank-case. Always use SUBARU Genuine Coolant, since other coolant may cause corrosion.

5) Fill engine coolant into the reservoir tank up to Full level.

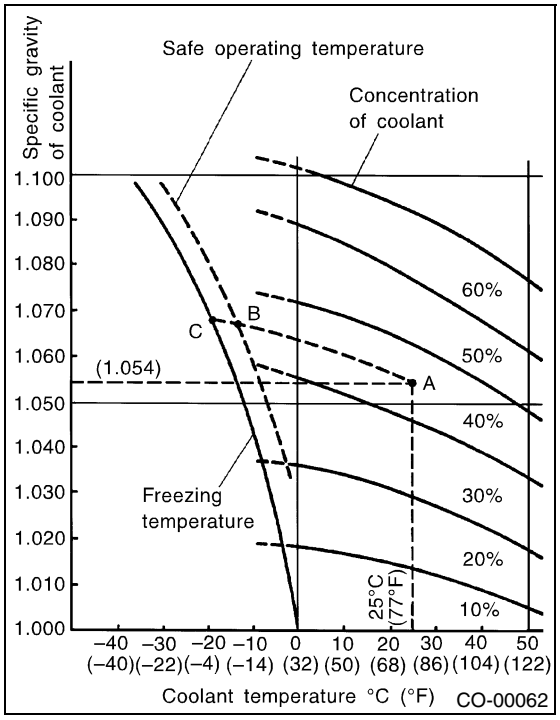


6) Warm-up the engine completely for more than 5 minutes at 2,000 to 3,000 rpm.
7) If the engine coolant level drops in radiator, add engine coolant to filler neck position.
8) If the engine coolant level drops from Full level of reservoir tank, add engine coolant to Full level.
9) Attach the radiator cap and reservoir tank cap properly.

B: INSPECTION

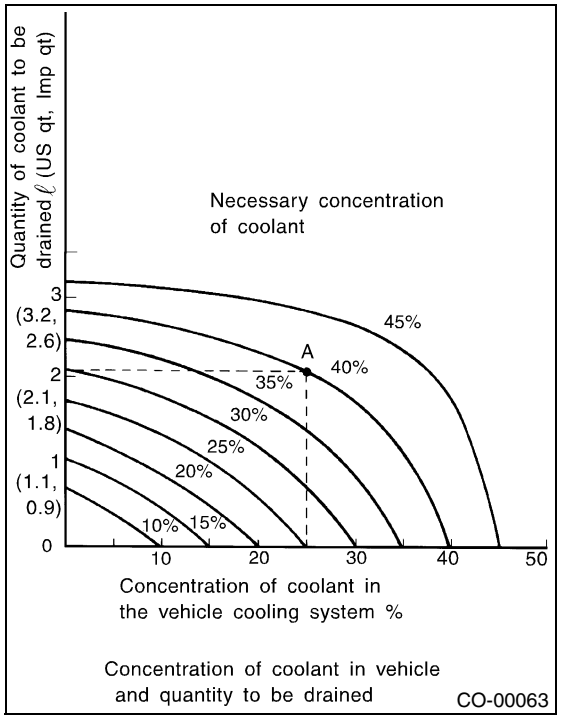
1. RELATIONSHIP OF SUBARU COOLANT CONCENTRATION AND FREEZING TEMPERATURE

The concentration and safe operating temperature of the SUBARU coolant is shown in the diagram. Measuring the temperature and specific gravity of the coolant will provide this information.
[Example]
If the coolant temperature is 25°C (77°F) and its specific gravity is 1.054, the concentration is 35% (point A), the safe operating temperature is –14°C (7°F) (point B), and the freezing temperature is –20°C (–4°F) (point C).



2. PROCEDURE TO ADJUST THE CONCENTRATION OF THE COOLANT

To adjust the concentration of the coolant according to temperature, find the proper fluid concentration in the above diagram and replace the necessary amount of coolant with an undiluted solution of SUBARU genuine coolant (concentration 50%).
The amount of coolant that should be replaced can be determined using the diagram.
[Example]
Assume that the coolant concentration must be increased from 25% to 40%. Find point A, where the 25% line of coolant concentration intersects with the 40% curve of the necessary coolant concentration, and read the scale on the vertical axis of the graph at height A. The quantity of coolant to be drained is 2.1 ℓ (2.2 US qt, 1.8 Imp qt). Drain 2.1 ℓ (2.2 US qt, 1.8 Imp qt) of coolant from the cooling system and add 2.1 ℓ (2.2 US qt, 1.8 Imp qt) of the undiluted solution of SUBARU coolant.
If a coolant concentration of 50% is needed, drain all the coolant and refill with the undiluted solution only.

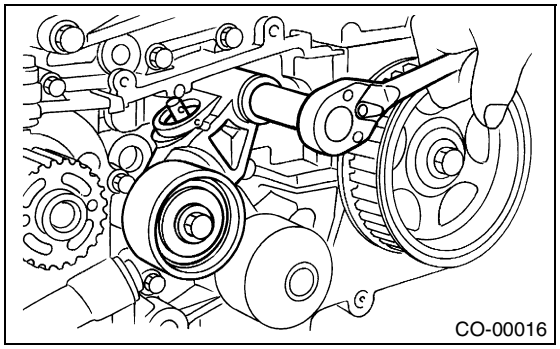


4. Water Pump

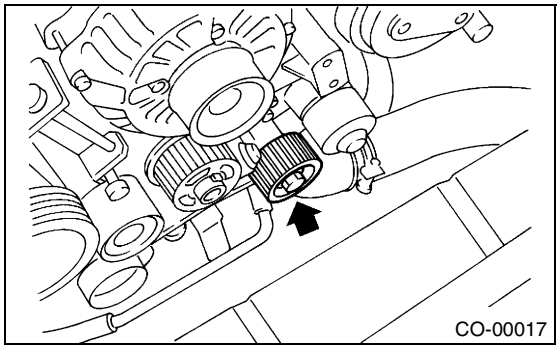
A: REMOVAL

1. NON-TURBO MODEL

1) Remove the radiator. <Ref. to CO(SOHC)-27, REMOVAL, Radiator.>
2) Remove the V-belts. <Ref. to ME(SOHC)-41, REMOVAL, V-belt.>
3) Remove the timing belt. <Ref. to ME(SOHC)-46, TIMING BELT, REMOVAL, Timing Belt Assembly.>
4) Remove the automatic belt tension adjuster.


CO-00016

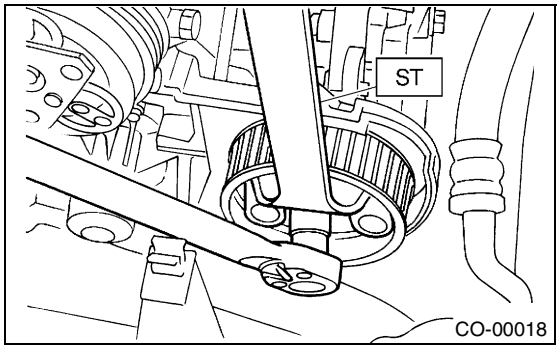
5) Remove the belt idler No. 2.


CO-00017

6) Remove the camshaft sprocket (LH) by using ST.

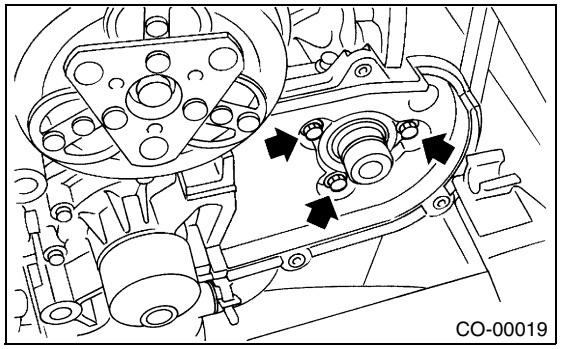
ST 18231AA010 CAMSHAFT SPROCKET WRENCH

NOTE:
Also the CAMSHAFT SPROCKET WRENCH (499207100) can be used.

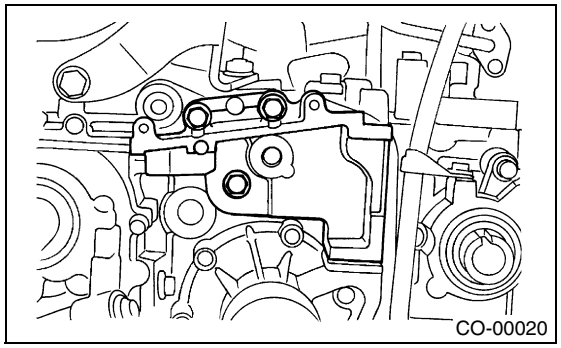


CO-00018

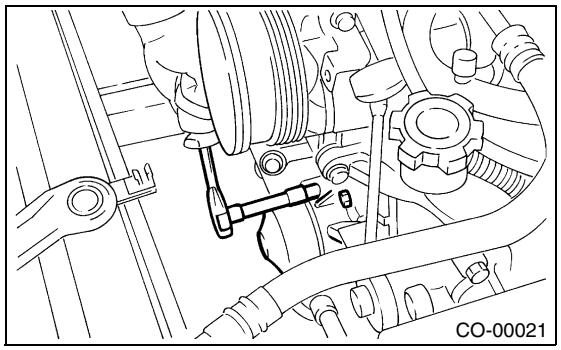
7) Remove the belt cover No. 2 (LH).


CO-00019

8) Remove the tensioner bracket.

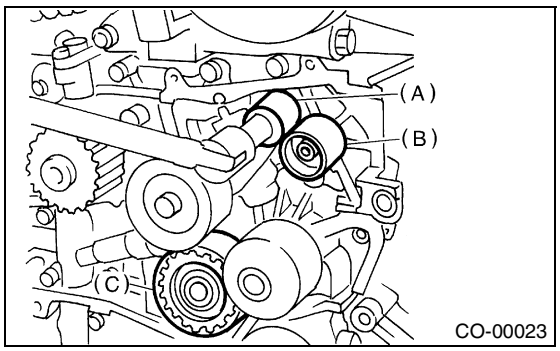

CO-00020

9) Disconnect the hose from water pump.
10) Remove the water pump.


CO-00021

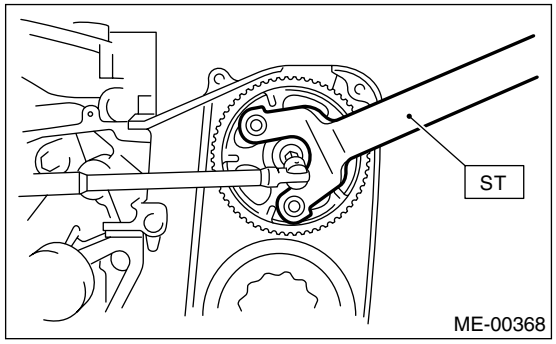
2. TURBO MODEL

1) Remove the radiator. <Ref. to CO(SOHC)-27, REMOVAL, Radiator.>
2) Remove the V-belts. <Ref. to ME(TURBO)-44, REMOVAL, V-belt.>
3) Remove the timing belt. <Ref. to ME(TURBO)-48, REMOVAL, Timing Belt Assembly.>
4) Remove the automatic belt tension adjuster (A).
5) Remove the belt idler (B).
6) Remove the belt idler No. 2 (C).

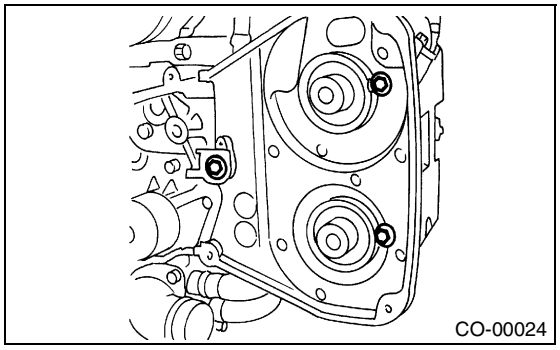


7) Remove the camshaft position sensor. <Ref. to FU(TURBO)-30, REMOVAL, Camshaft Position Sensor.>
8) Remove the camshaft sprockets (LH) by using ST.

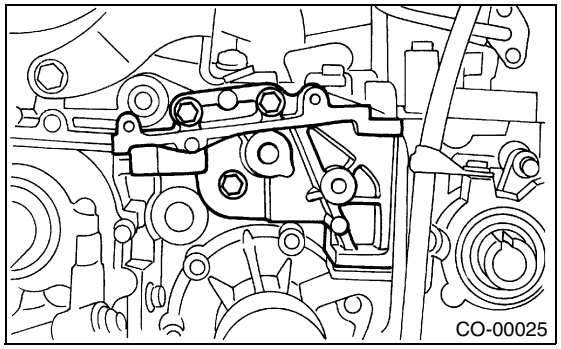
ST	18231AA010	CAMSHAFT SPROCKET WRENCH (Intake)
ST	499207400	CAMSHAFT SPROCKET WRENCH (Exhaust)



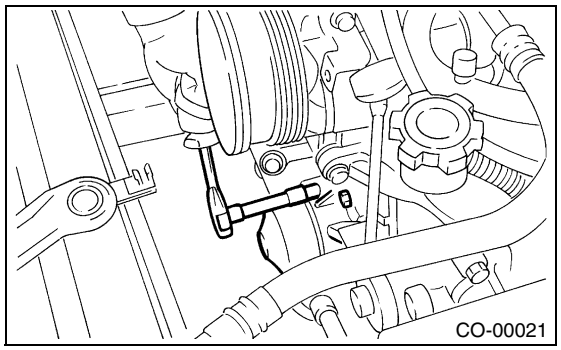
9) Remove the belt cover No. 2 (LH).



10) Remove the tensioner bracket.



11) Disconnect the hose from water pump.
12) Remove the water pump.



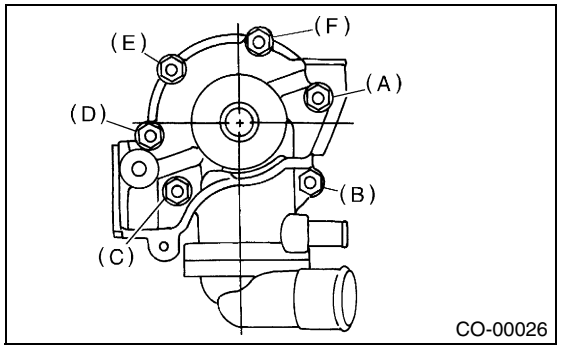
B: INSTALLATION

1. NON-TURBO MODEL

1) Install water pump onto cylinder block (LH).

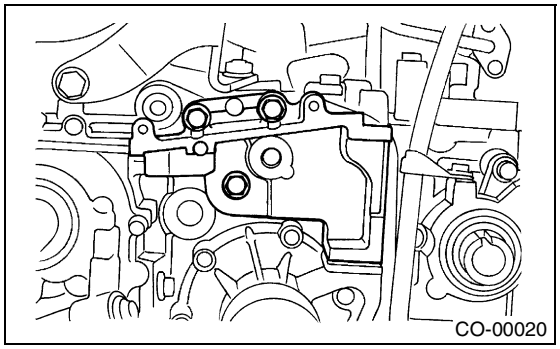
NOTE:
- Replace the gasket with a new one.
- When installing the water pump, tighten bolts in two stages in alphabetical sequence as shown in the figure.

Tightening torque:
First:
12 N·m (1.2 kgf-m, 8.7 ft-lb)
Second:
12 N·m (1.2 kgf-m, 8.7 ft-lb)



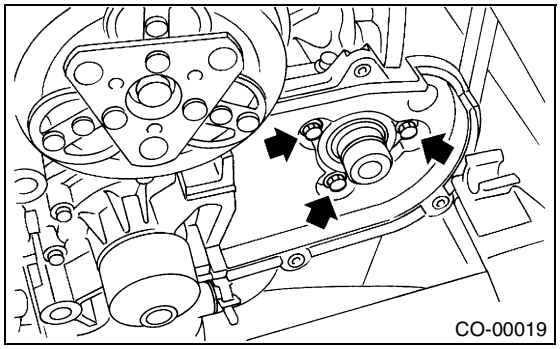
2) Connect the hose to water pump.
3) Install the tensioner bracket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)



4) Install the belt cover No. 2 (LH).

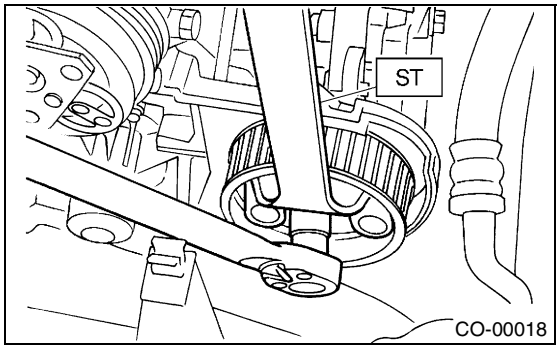
Tightening torque:
5 N·m (0.5 kgf-m, 3.6 ft-lb)



5) Install the camshaft sprockets (LH) by using ST.
ST 18231AA010 CAMSHAFT SPROCKET WRENCH

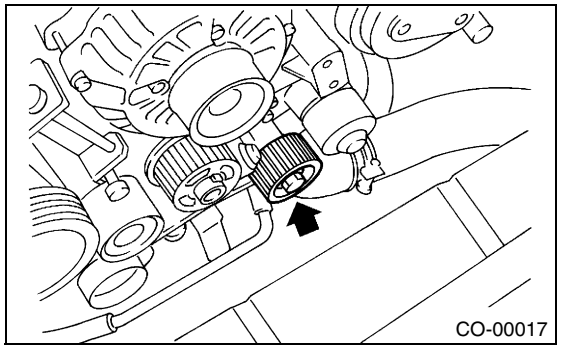
NOTE:
Also the CAMSHAFT SPROCKET WRENCH (499207100) can be used.

Tightening torque:
78 N·m (8.0 kgf-m, 57.9 ft-lb)



6) Install the belt idler No. 2.

Tightening torque:
39 N·m (4.0 kgf-m, 28.9 ft-lb)



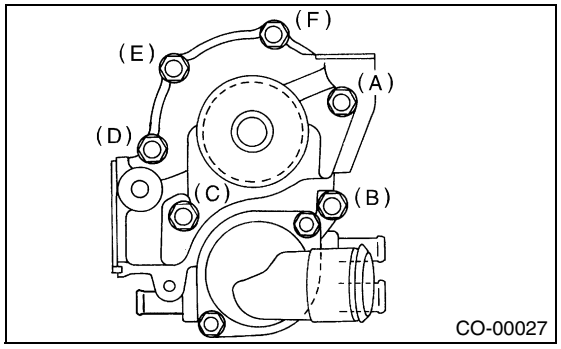
7) Install the automatic belt tension adjuster which tension rod is holded with pin. <Ref. to ME(SOHC)-47, AUTOMATIC BELT TENSION ADJUSTER ASSEMBLY AND BELT IDLER, INSTALLATION, Timing Belt Assembly.>
8) Install the timing belt. <Ref. to ME(SOHC)-48, TIMING BELT, INSTALLATION, Timing Belt Assembly.>
9) Install the V-belts. <Ref. to ME(SOHC)-41, INSTALLATION, V-belt.>
10) Install the radiator. <Ref. to CO(SOHC)-29, INSTALLATION, Radiator.>

2. TURBO MODEL

1) Install the water pump onto cylinder block (LH).

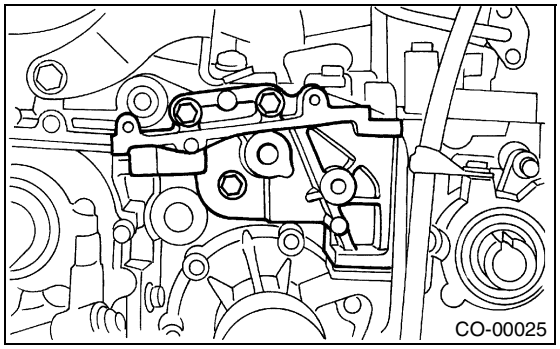
NOTE:
- Replace the gasket with a new one.
- When installing the water pump, tighten bolts in two stages in alphabetical sequence as shown in the figure.

Tightening torque:
First:
12 N·m (1.2 kgf-m, 8.7 ft-lb)
Second:
12 N·m (1.2 kgf-m, 8.7 ft-lb)



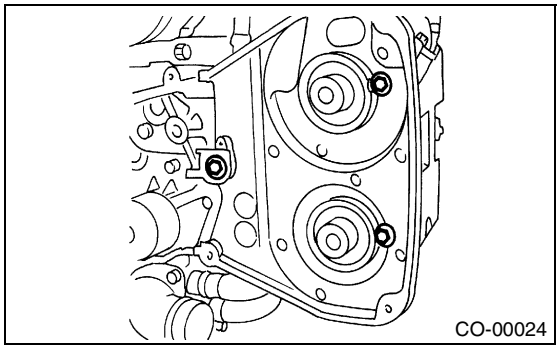
2) Connect the hose to water pump.
3) Install the tensioner bracket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)



4) Install the belt cover No. 2 (LH).

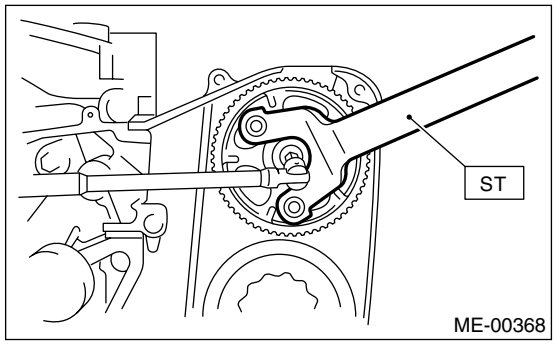
Tightening torque:
5 N·m (0.5 kgf-m, 3.6 ft-lb)



5) Install the camshaft sprockets (LH) by using ST.

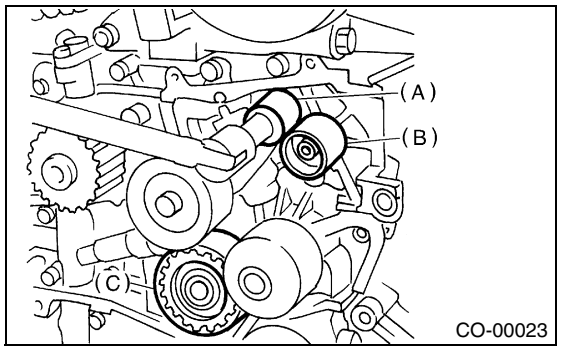
ST	18231AA010	CAMSHAFT SPROCKET WRENCH (Intake)
ST	499207400	CAMSHAFT SPROCKET WRENCH (Exhaust)

Tightening torque:
98 N·m (10.0 kgf-m, 72.4 ft-lb)



6) Install the camshaft position sensor. <Ref. to FU(TURBO)-30, INSTALLATION, Camshaft Position Sensor.>
7) Install the belt idler No. 2 (C).
8) Install the belt idler (B).
9) Install the automatic belt tension adjuster (A) which has tension rod held by pin. <Ref. to ME(TURBO)-50, AUTOMATIC BELT TENSION ADJUSTER ASSEMBLY AND BELT IDLER, INSTALLATION, Timing Belt Assembly.>

Tightening torque:
39 N·m (4.0 kgf-m, 28.9 ft-lb)

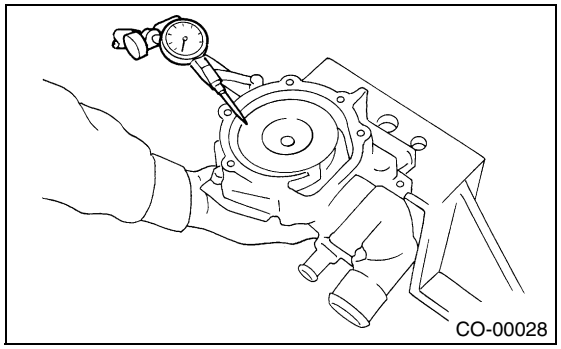


10) Install the timing belt. <Ref. to ME(TURBO)-51, TIMING BELT, INSTALLATION, Timing Belt Assembly.>
11) Install the V-belts. <Ref. to ME(TURBO)-44, INSTALLATION, V-belt.>
12) Install the radiator. <Ref. to CO(SOHC)-29, INSTALLATION, Radiator.>

C: INSPECTION

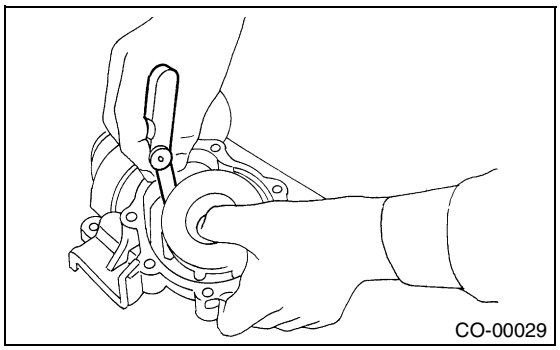
1) Check the water pump bearing for smooth rotation.
2) Check the water pump pulley for abnormalities.
3) Using a dial gauge, measure the impeller runout in thrust direction while rotating the pulley.

"Thrust" runout limit:
0.5 mm (0.020 in)



4) Check the clearance between impeller and pump case.

Clearance between impeller and pump case:
Standard
0.5 — 0.7 mm (0.020 — 0.028 in)
Limit
1.0 mm (0.039 in)

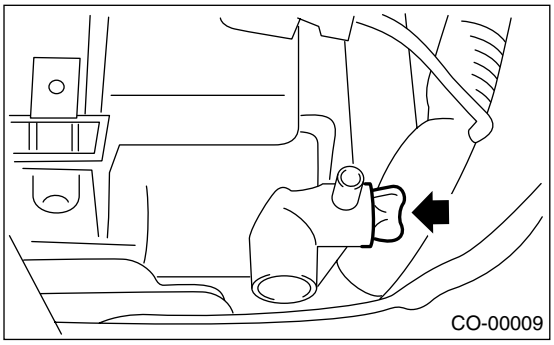


5) After water pump installation, check the pulley shaft for engine coolant leaks. If leaks are noted, replace the water pump assembly.

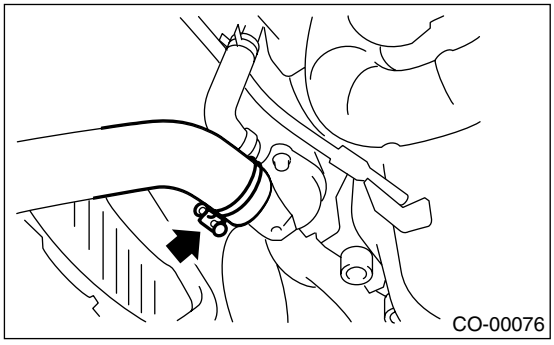
5. Thermostat

A: REMOVAL

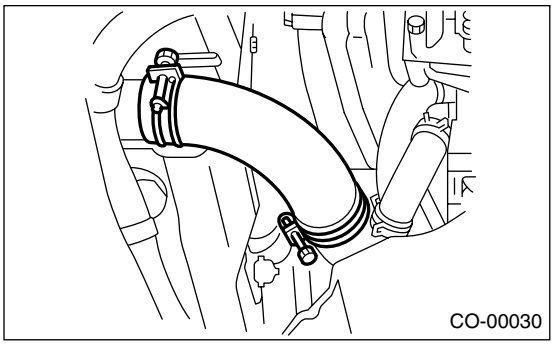
1) Set the vehicle on a lift.
2) Lift-up the vehicle.
3) Remove the under cover.
4) Drain the engine coolant completely. <Ref. to CO(SOHC)-18, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>


CO-00009

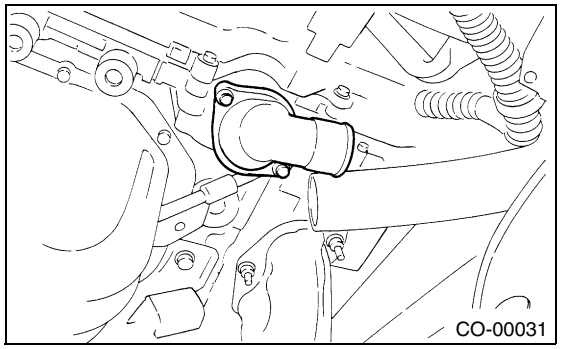
5) Disconnect the radiator outlet hose from thermostat cover.
• NON-TURBO MODEL


CO-00076

6) Disconnect the radiator outlet hose.
• TURBO MODEL


CO-00030

7) Remove the thermostat cover and gasket, and pull out the thermostat.

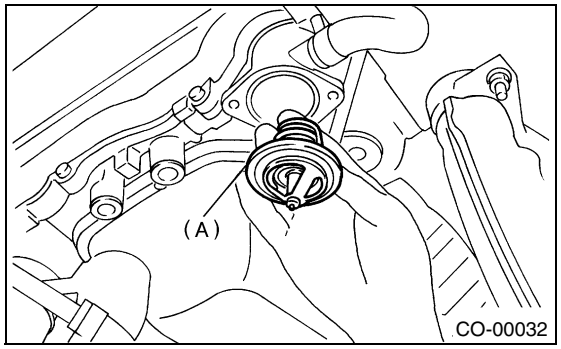

CO-00031

B: INSTALLATION

1) Install the thermostat in the water pump, and then install the thermostat cover together with a gasket.

NOTE:
• When reinstalling the thermostat, use a new gasket.
• The thermostat must be installed with the jiggle pin (A) facing to front side.

Tightening torque:
6.5 N·m (0.65 kgf-m, 4.7 ft-lb)



CO-00032

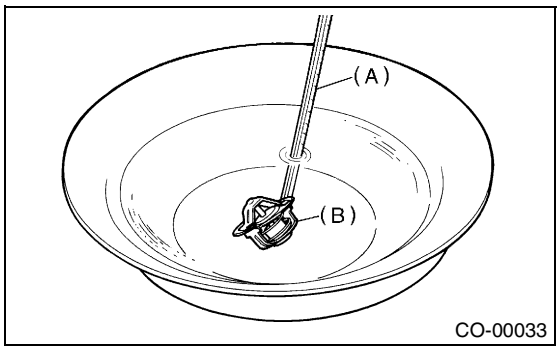
2) Fill engine coolant. <Ref. to CO(SOHC)-18, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

C: INSPECTION

Replace the thermostat if the valve does not close completely at an ambient temperature or if the following test shows unsatisfactory results.
Immerse the thermostat and thermometer in water. Raise water temperature gradually, and measure the temperature and valve lift when the valve begins to open and when the valve is fully opened. During the test, agitate the water for even temperature distribution. The measurement should be to the specification.

Starts to open:
Non-turbo model
80 — 84°C (176 — 183°F)
Turbo model
76 — 80°C (169 — 176°F)

Fully opens:
Non-turbo model
95°C (203°F)
Turbo model
91°C (196°F)



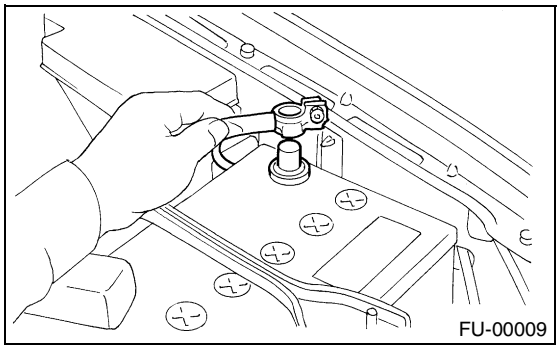
(A) Thermometer
(B) Thermostat

6. Radiator

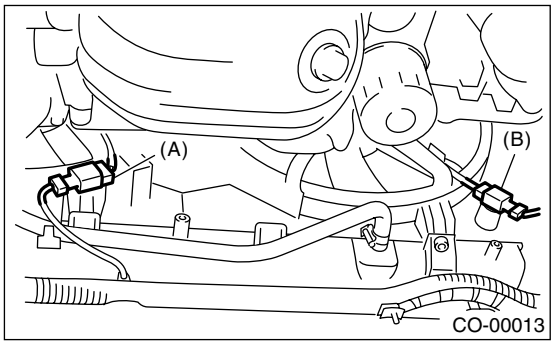
A: REMOVAL

1. NON-TURBO MODEL

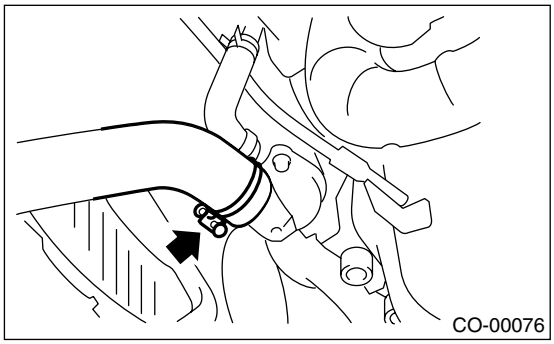
1) Set the vehicle on a lift.
2) Disconnect the ground cable from battery.



3) Lift-up the vehicle.
4) Remove the under cover.
5) Drain the engine coolant completely. <Ref. to CO(SOHC)-18, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
6) Disconnect the connectors of radiator main fan motor (A) and sub fan motor (B).

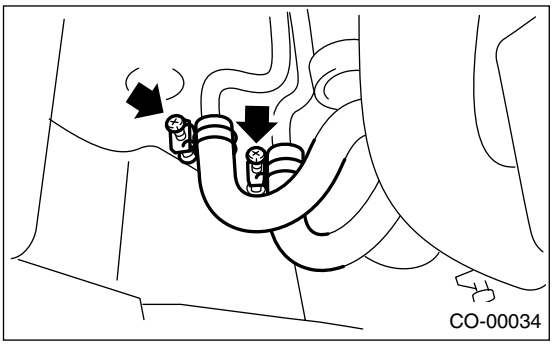


7) Disconnect the radiator outlet hose from water pump.

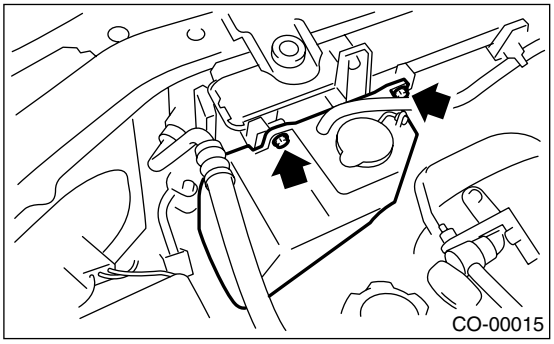


8) Disconnect the ATF cooler hoses from ATF pipe. (AT vehicles)

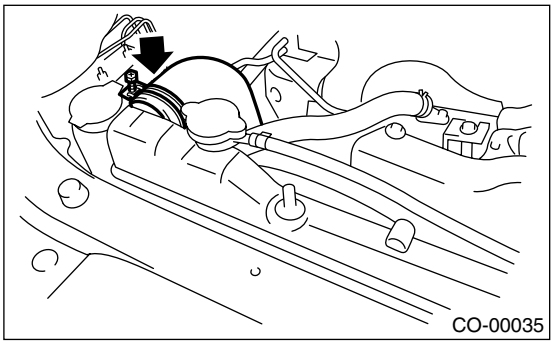
Plug the openings in the hose and radiator with caps in order to prevent ATF from leaking.



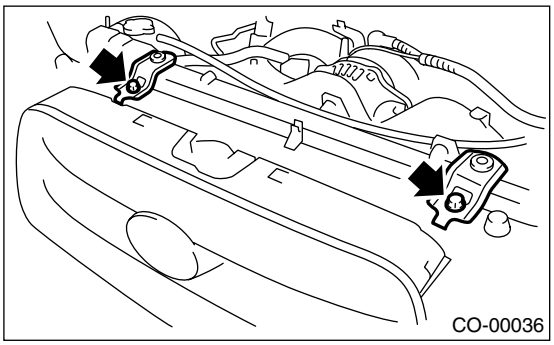
9) Lower the vehicle.
10) Disconnect the over flow hose.
11) Remove the reservoir tank.



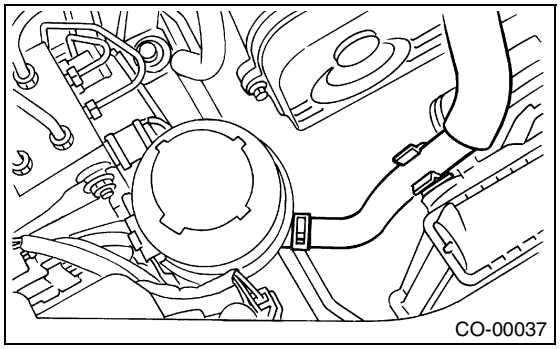
12) Disconnect the radiator inlet hose from engine.



13) Remove the radiator upper brackets.



14) Detach the power steering hose from clip on radiator.

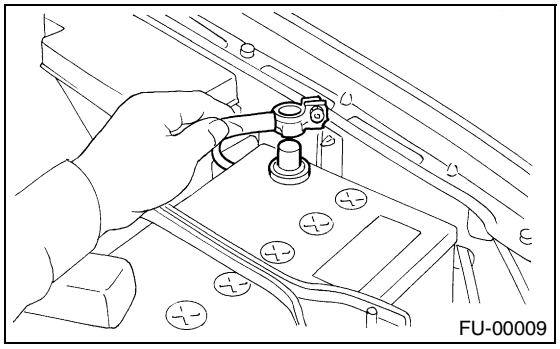


15) Lift the radiator up and away from the vehicle.

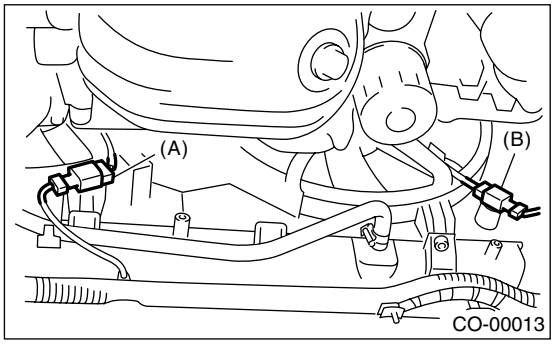
2. TURBO MODEL

WARNING:
The radiator is pressurized. Wait until the engine cools down before working on the radiator.

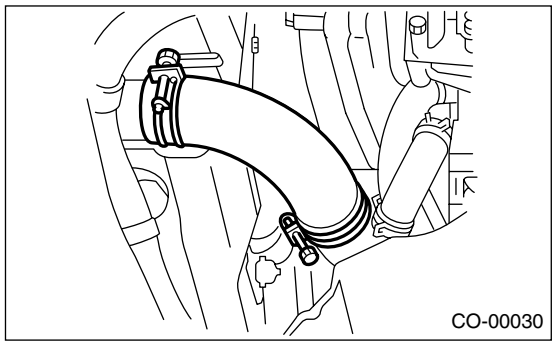
1) Set the vehicle on a lift.
2) Disconnect the ground cable from battery.



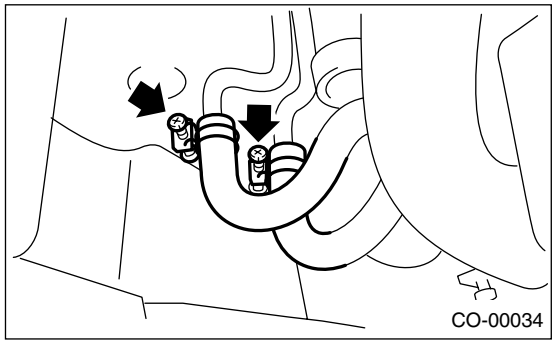
3) Lift-up the vehicle.
4) Remove the under cover.
5) Drain the engine coolant completely. <Ref. to CO(SOHC)-18, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
6) Disconnect the connectors of radiator main fan motor (A) and sub fan motor (B).



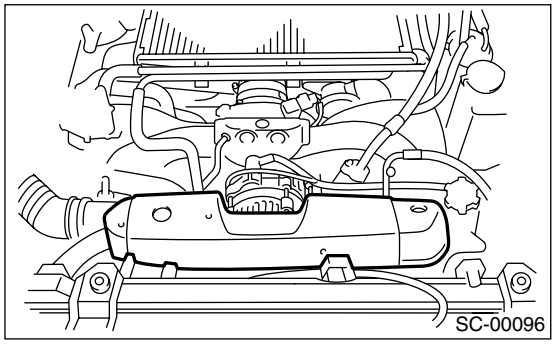
7) Disconnect the radiator outlet hose from thermostat cover.



8) Disconnect the ATF cooler hose from ATF pipe. (AT vehicles)
Plug the openings in the hose and radiator with caps in order to prevent ATF from leaking.
9) Disconnect the oil cooler hose from oil cooler pipe. (MT vehicles with oil cooler)
Install the cap to prevent oil from leaking.

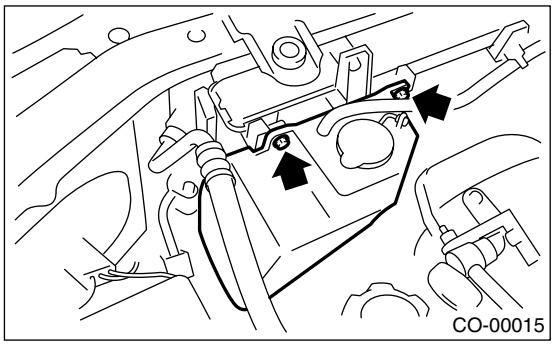


10) Lower the vehicle.
11) Remove the V-belt covers.

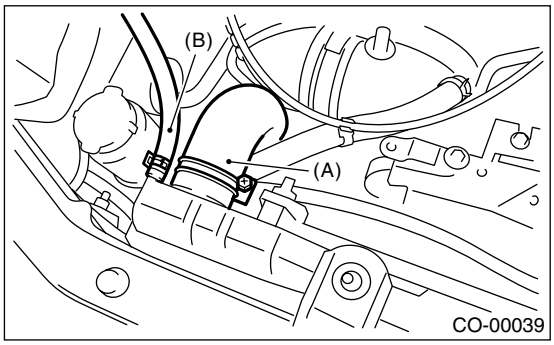


12) Disconnect the overflow hose.

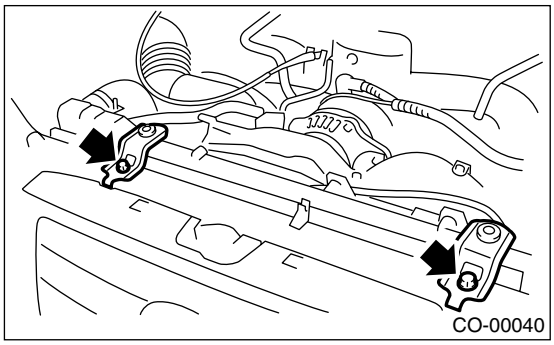
13) Remove the reservoir tank.



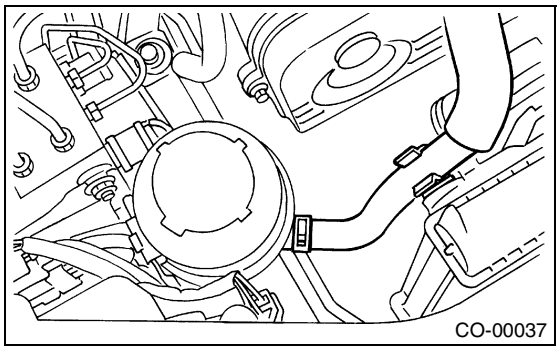
14) Disconnect the radiator inlet hose (A) and water tank hose (B) from radiator.



15) Remove the radiator upper brackets.

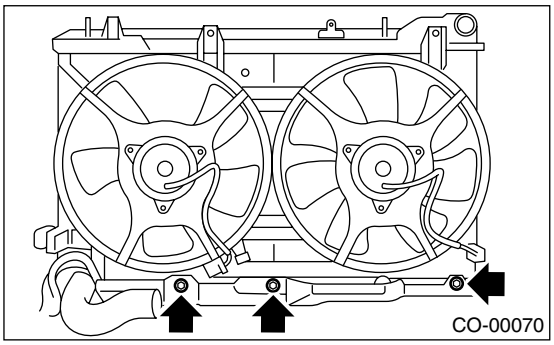


16) Disconnect the power steering hose from clips on radiator.



17) Lift the radiator up and away from the vehicle.

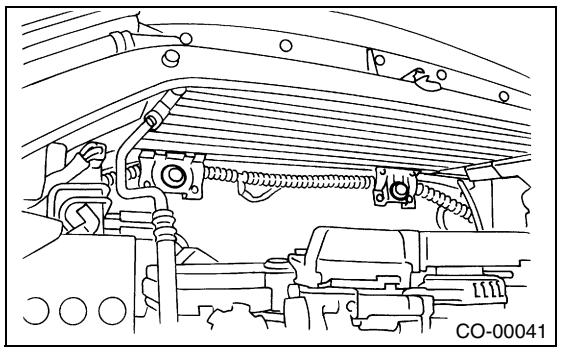
18) Remove the radiator under cover (AT vehicles).



B: INSTALLATION

1. NON-TURBO MODEL

1) Attach the radiator mounting cushions to holes on the vehicle.

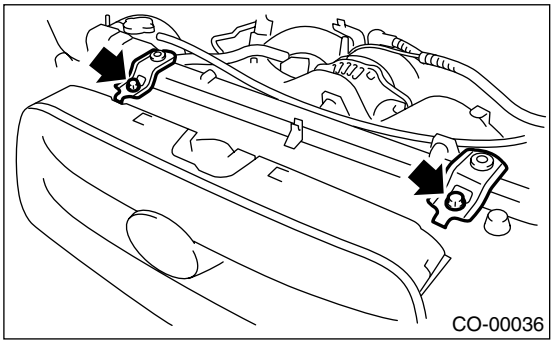


2) Install the radiator to vehicle.

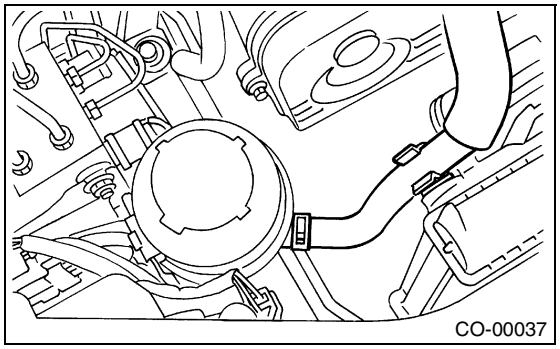
NOTE:
Fit pins on the lower side of radiator into cushions on the body side.

3) Install the radiator brackets and tighten bolts.

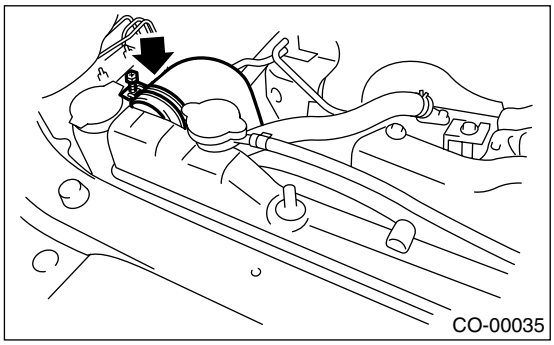
Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)



4) Attach the power steering hose to radiator.

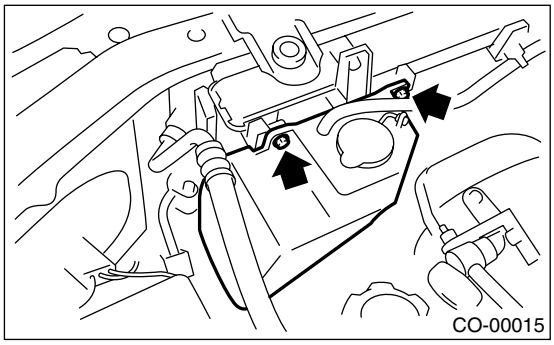


5) Connect the radiator inlet hose.

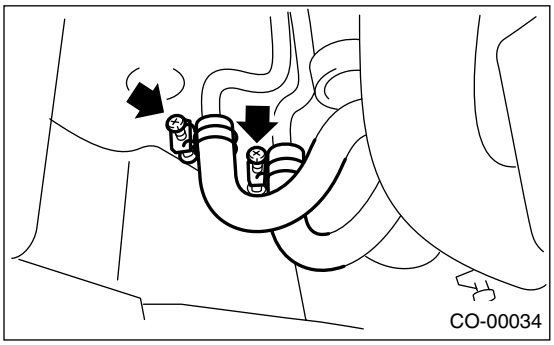


6) Install the reservoir tank.

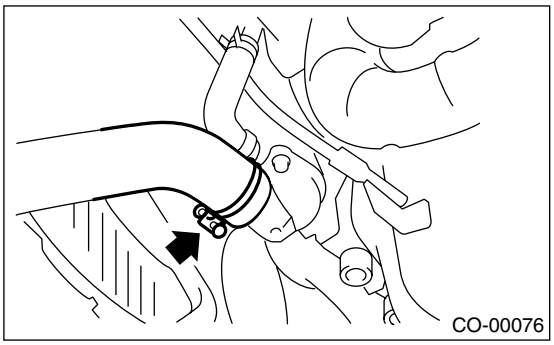
Tightening torque:
4.9 N·m (0.50 kgf-m, 3.6 ft-lb)



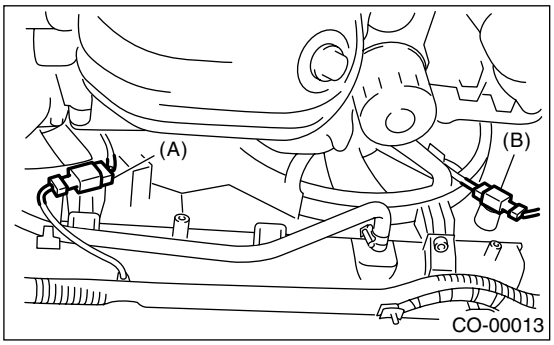
7) Connect the overflow hose.
8) Lift-up the vehicle.
9) Connect the ATF cooler hoses. (AT vehicles)



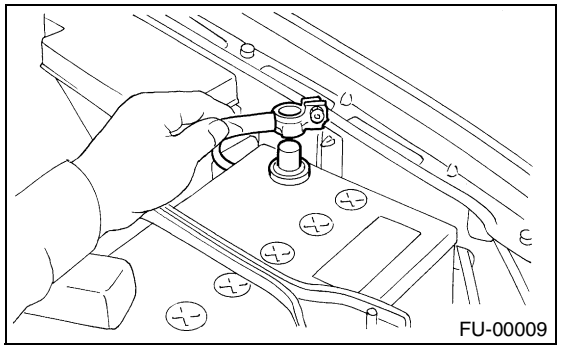
10) Connect the radiator outlet hose.



11) Connect the connectors to radiator main fan motor (A) and sub fan motor (B).



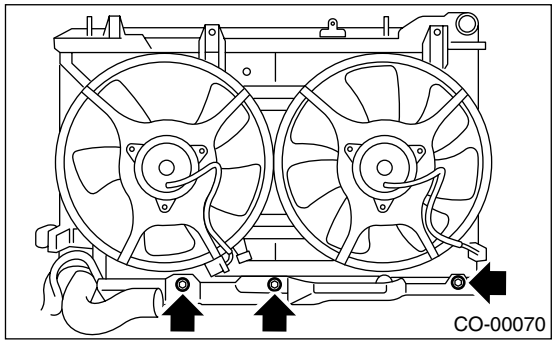
12) Install the under cover.
13) Lower the vehicle.
14) Connect the battery ground cable to battery.



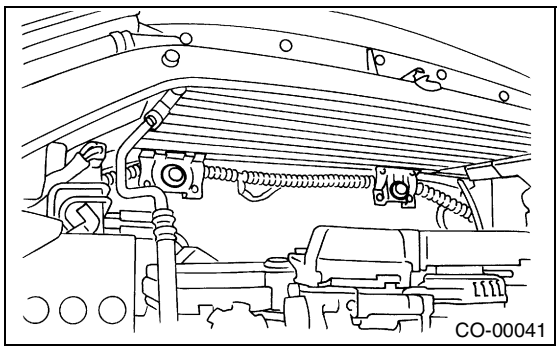
15) Fill engine coolant. <Ref. to CO(SOHC)-18, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
16) Check the ATF level. <Ref. to AT-29, INSPECTION, Automatic Transmission Fluid.>

2. TURBO MODEL

1) Install the radiator under cover to radiator.



2) Attach the radiator mounting cushions to holes on the vehicle.

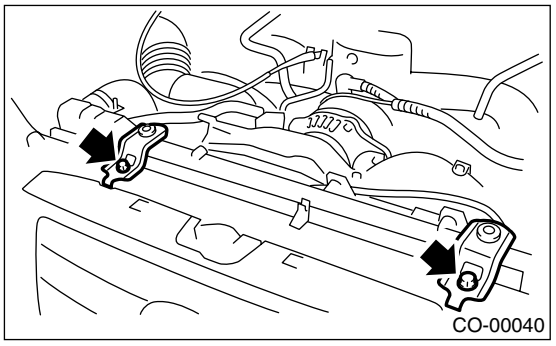


3) Install the radiator to vehicle.

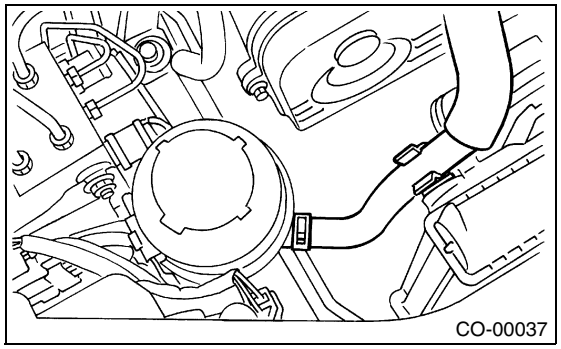
NOTE:
Fit pins on the lower side of radiator into cushions on body side.

4) Install the radiator brackets, and then tighten the bolts.

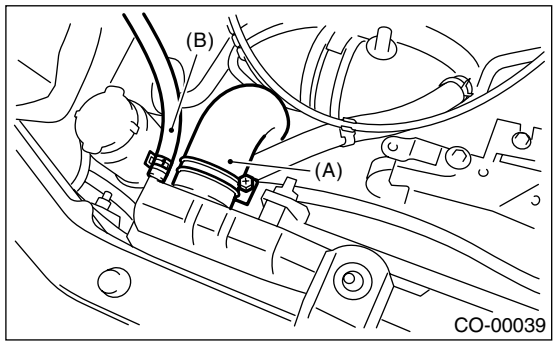
Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)



5) Connect the power steering hose to radiator.

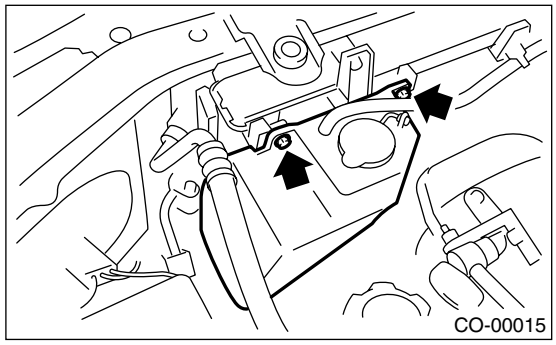


6) Connect the radiator inlet hose (A) and water tank hose (B).

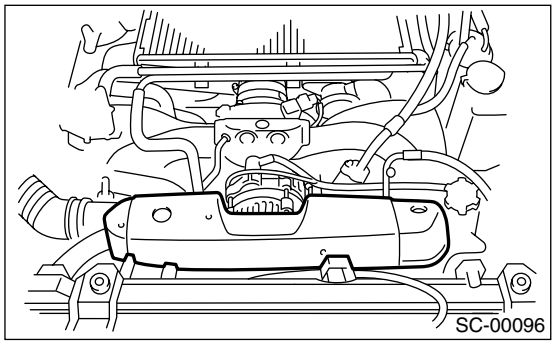


7) Install the reservoir tank.

Tightening torque:
4.9 N·m (0.50 kgf-m, 3.6 ft-lb)

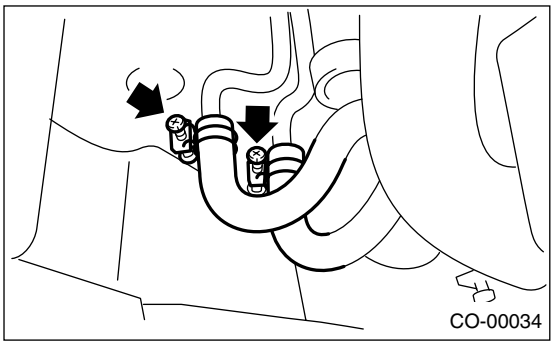


8) Connect the over flow hose.
9) Install the V-belt cover.

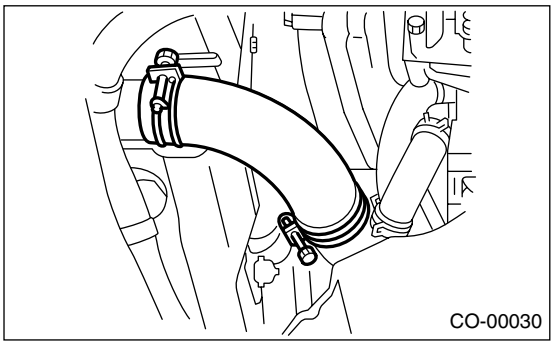


10) Lift-up the vehicle.
11) Connect the ATF cooler hoses. (AT vehicles).

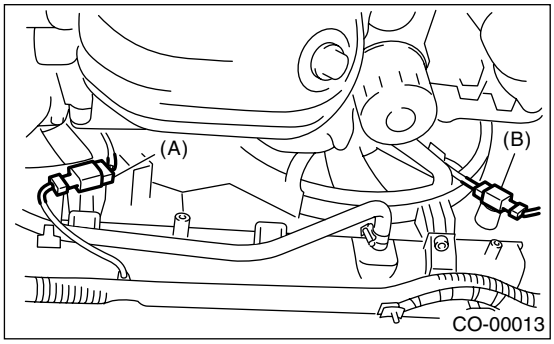
12) Connect the oil cooler hose. (MT vehicles with oil cooler)



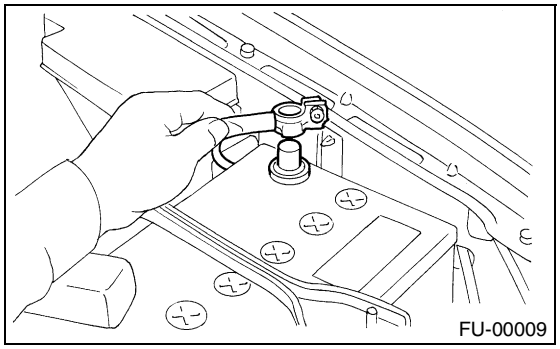
13) Connect the radiator outlet hose.



14) Connect the connectors to radiator main fan motor (A) and sub fan motor (B).



15) Install the under cover.
16) Lower the vehicle.
17) Connect the battery ground cable to battery.



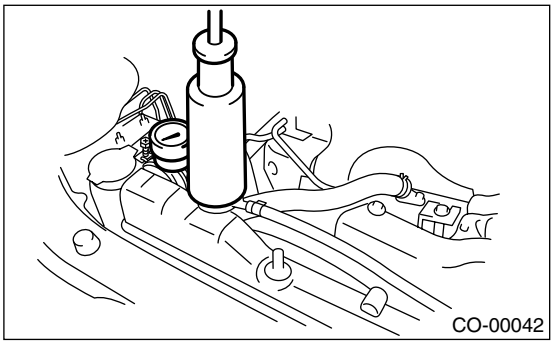
18) Fill engine coolant. <Ref. to CO(SOHC)-18, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

19) Check the ATF level. <Ref. to AT-29, INSPECTION, Automatic Transmission Fluid.>

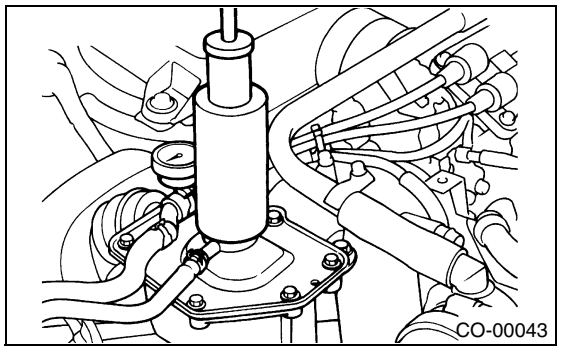
C: INSPECTION

1) Remove the radiator cap, top off radiator, and then attach the tester to radiator in place of cap.

- NON-TURBO MODEL



- TURBO MODEL



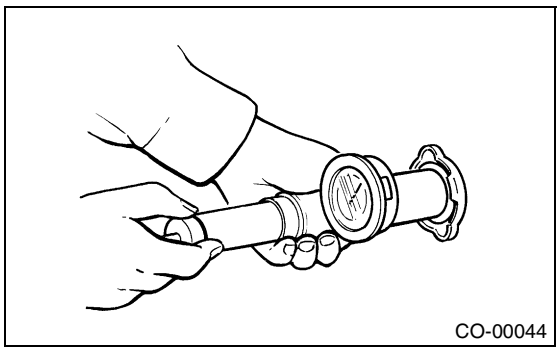
2) Apply a pressure of 157 kPa (1.6 kg/cm^2, 23 psi) to the radiator to check if:
   (1) Engine coolant leaks at/around radiator.
   (2) Engine coolant leaks at/around hoses or connections.

CAUTION:
- **Engine should be off.**
- **Wipe engine coolant from check points in advance.**
- **Be careful to prevent engine coolant from spurting out when removing the tester.**
- **Be careful also not to deform the filler neck of radiator when installing or removing tester.**

7. Radiator Cap

A: INSPECTION

1) Attach the radiator cap to tester.



2) Increase the pressure until tester gauge pointer stops. Radiator cap is functioning properly if it holds the service limit pressure for 5 to 6 seconds.

Standard pressure:
93 — 123 kPa (0.95 — 1.25 kg/cm^2, 14 — 18 psi)

Service limit pressure:
83 kPa (0.85 kg/cm^2, 12 psi)

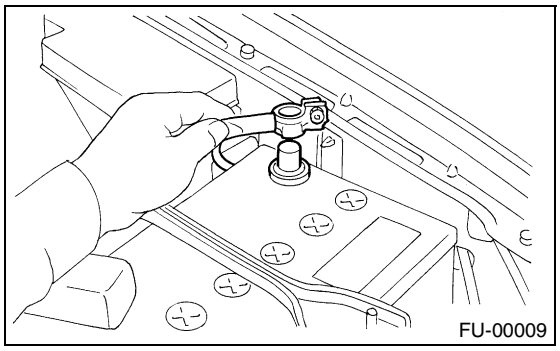
CAUTION:
Be sure to remove foreign matter and rust from the cap in advance otherwise, results of pressure test will be incorrect.

8. Radiator Main Fan and Fan Motor

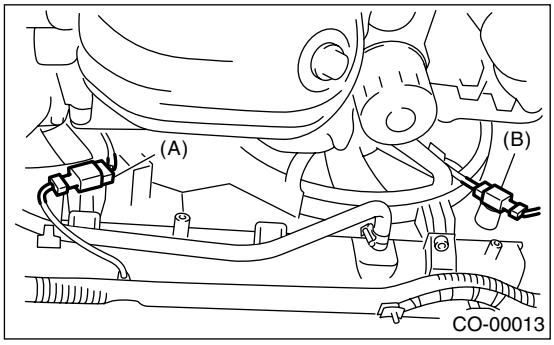
A: REMOVAL

1. NON-TURBO MODEL

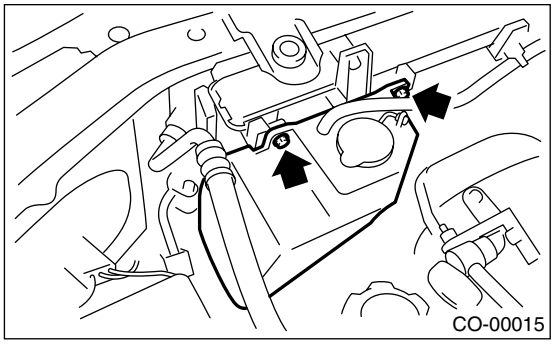
1) Set the vehicle on a lift.
2) Disconnect the ground cable from battery.



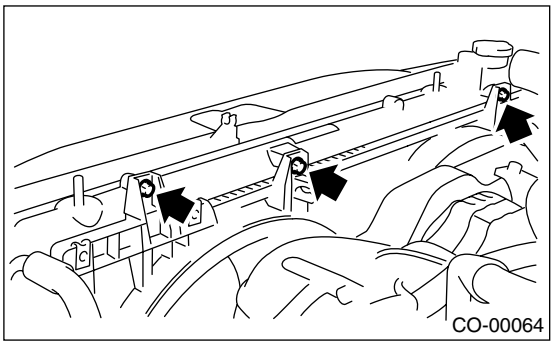
3) Lift-up the vehicle.
4) Remove the under cover.
5) Drain the coolant aprrox. 1 ℓ (1.06 US qt, 0.88 Imp qt). <Ref. to CO(SOHC)-18, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
6) Disconnect the connector of main fan motor (A) and sub fan motor (B).



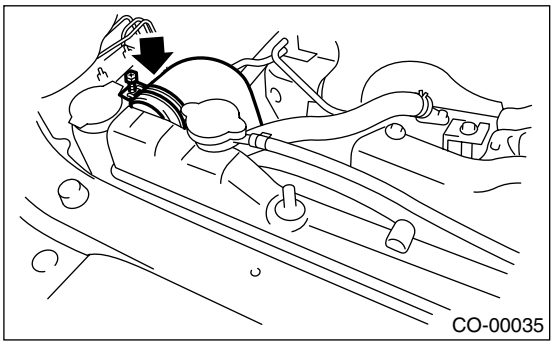
7) Remove the ATF hose from two clips of radiator fan motor assembly. (AT vehicles)
8) Lower the vehicle.
9) Disconnect the over flow hose.
10) Remove the reservoir tank.



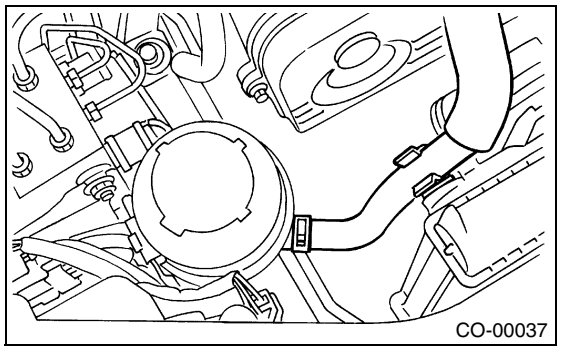
11) Remove the radiator fan motor assembly mounting bolts.



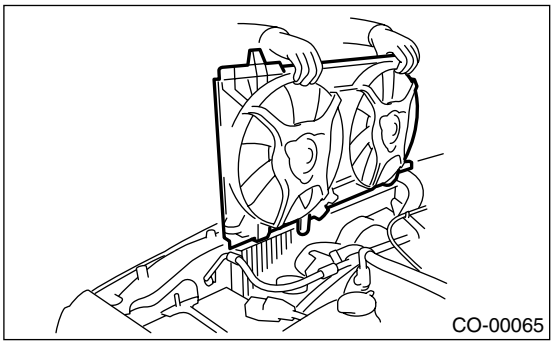
12) Disconnect the radiator inlet hose from engine.



13) Detach the power steering hose from clip on radiator.

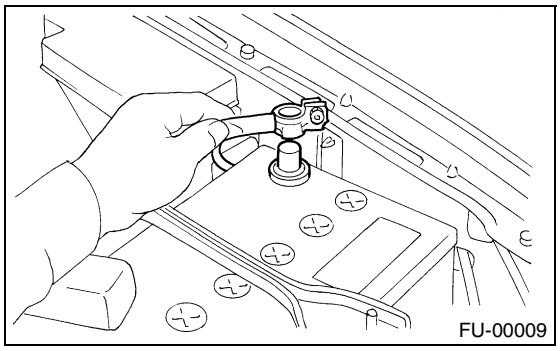


14) Rise up the radiator fan motor assembly to remove it from vehicle.

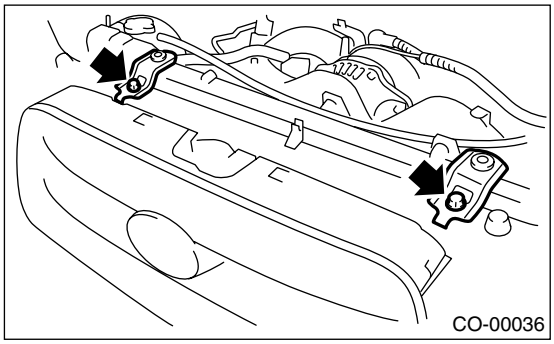


2. TURBO MODEL

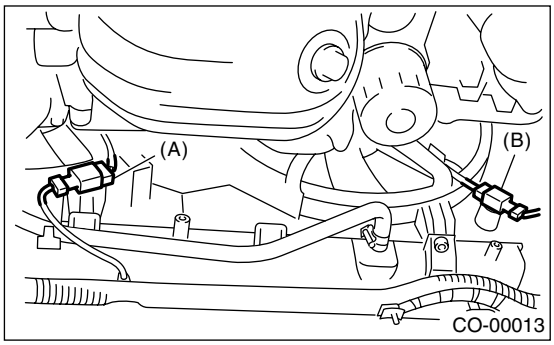
1) Set the vehicle on a lift.
2) Disconnect the ground cable from battery.



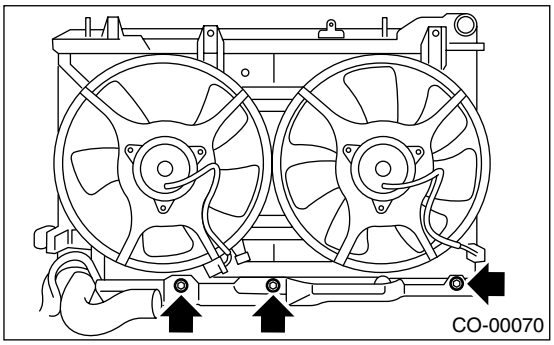
3) Remove the radiator upper bracket. (AT vehicles)



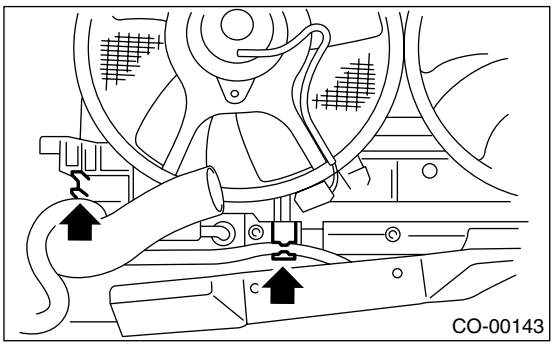
4) Lift-up the vehicle.
5) Remove the under cover.
6) Drain the engine coolant approx. 1 ℓ (1.06 US qt, 0.88 Imp qt). <Ref. to CO(SOHC)-18, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
7) Disconnect the radiator main fan motor connector (A) and sub fan motor connector (B).



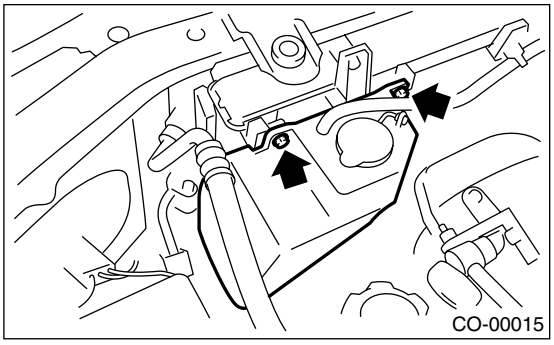
8) Remove the radiator under cover securing bolt. (AT vehicles)



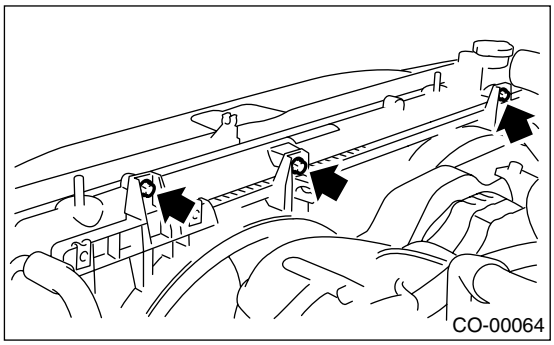
9) Pull the radiator lower hose upward to space radiator from radiator under cover. Remove the ATF hose to radiator fan motor assembly two clips. (AT vehicles)



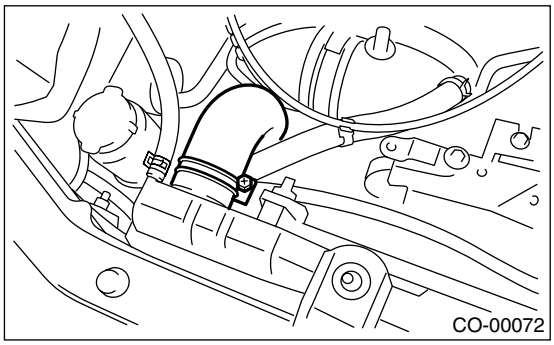
10) Lower the vehicle.
11) Remove the V-belt cover.
12) Disconnect the overflow hose.
13) Remove the reservoir tank.



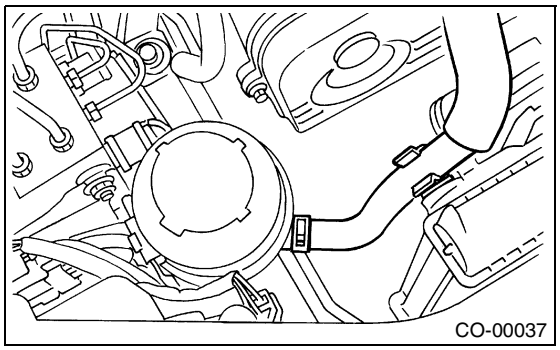
14) Remove the radiator fan motor assembly securing bolt.



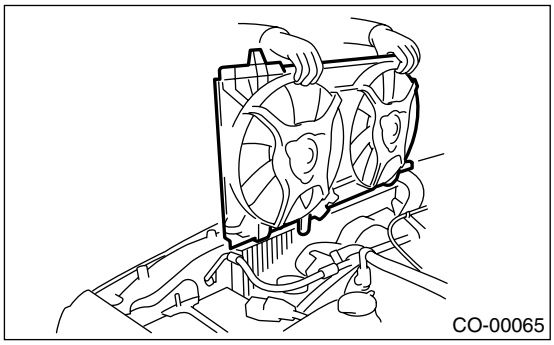
15) Disconnect the radiator inlet hose.



16) Disconnect the power steering hose from radiator clip.



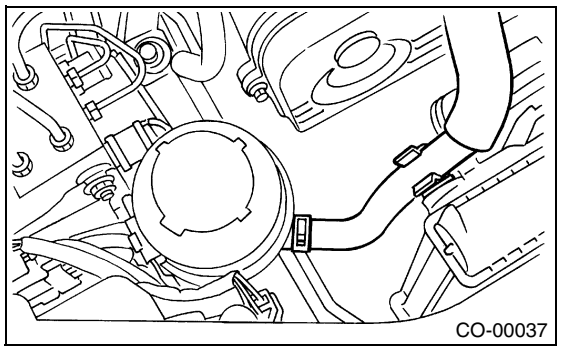
17) Remove the radiator fan motor assembly from vehicle.



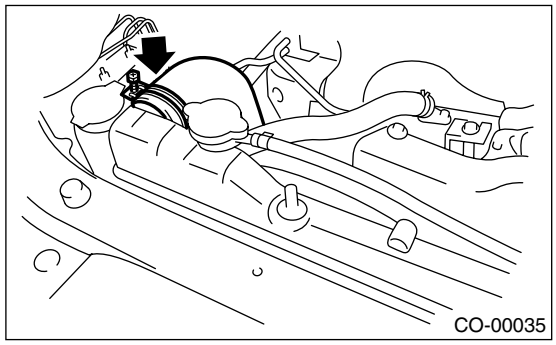
B: INSTALLATION

1. NON-TURBO MODEL

1) install the radiator fan motor assembly to radiator.
2) Connect the power steering hose to radiator.

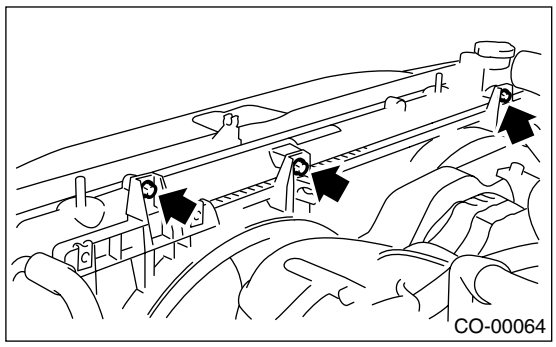


3) Connect the radiator inlet hose.



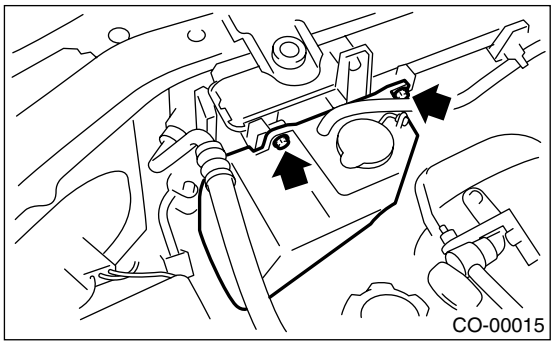
4) Install the radiator fan motor assembly mounting bolts.

Tightening torque:
4.9 N·m (0.50 kgf-m, 3.6 ft-lb)

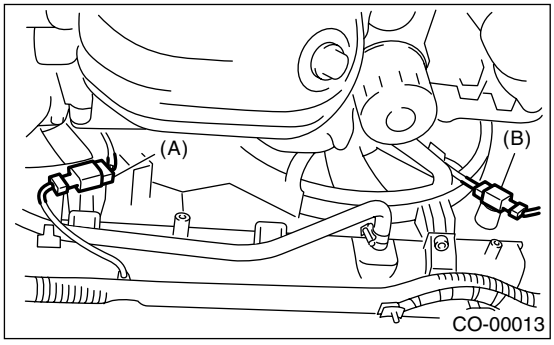


5) Install the reservoir tank.

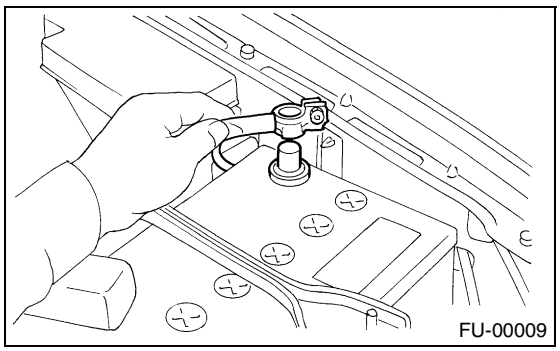
Tightening torque:
4.9 N·m (0.50 kgf-m, 3.6 ft-lb)



6) Install the over-flow hose.
7) Lift-up the vehicle.
8) Install the ATF hose to two clips of radiator fan motor assembly. (AT vehicles)
9) Connect the main fan motor (A) and sub fan motor (B).



10) Install the under cover.
11) Lower the vehicle.
12) Connect the battery ground cable to battery.

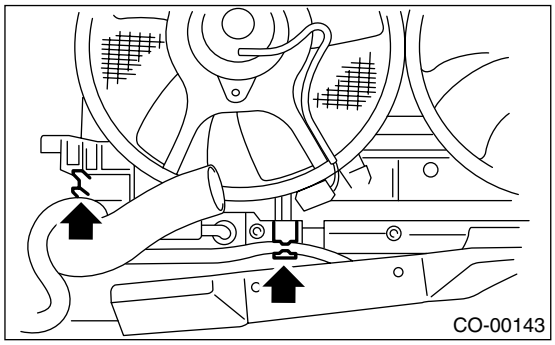


13) Fill the engine coolant. <Ref. to CO(SOHC)-18, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

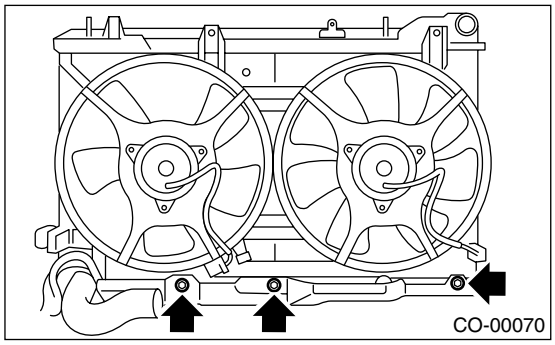
2. TURBO MODEL

1) Install the radiator fan motor assembly.
2) Lift-up the vehicle.
3) Pull the radiator lower hose upward to space radiator from radiator under cover. Install the ATF hose to radiator fan motor assembly two clips. (AT vehicles)

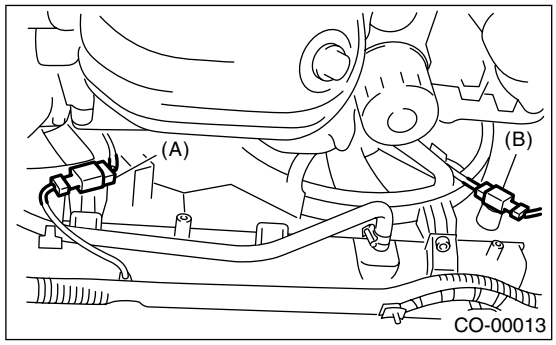
NOTE:
Fit securely the pins on lower side of radiator into body side.



4) Tighten the radiator under cover securing bolt. (AT vehicles)

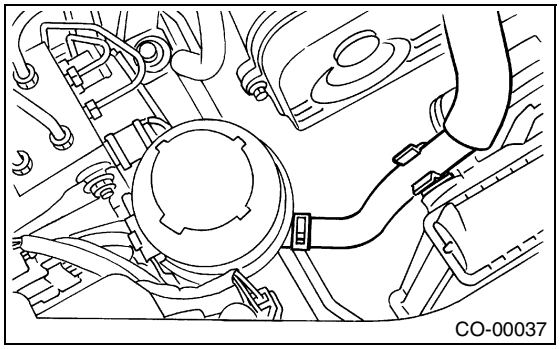


5) Connect the radiator main fan motor connector (A) and sub fan motor connector (B).

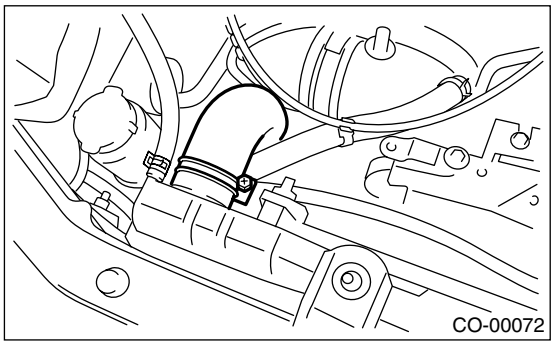


6) Install the under cover.
7) Lower the vehicle.

8) Connect the power steering hose to radiator clip.

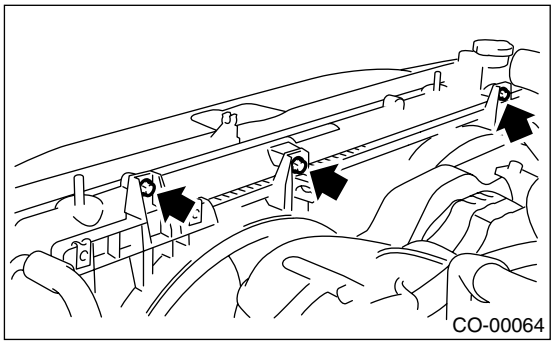


9) Connect the radiator inlet hose to radiator.

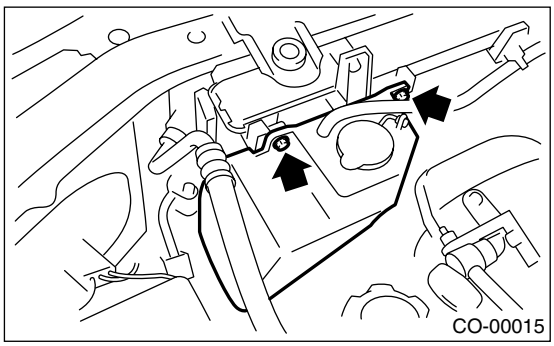


10) Install the radiator fan motor assembly mounting bolts.

Tightening torque:
4.9 N·m (0.5 kgf-m, 3.6 ft-lb)

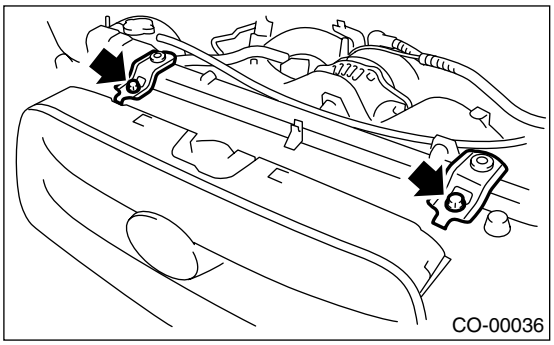


11) Install the reservoir tank.

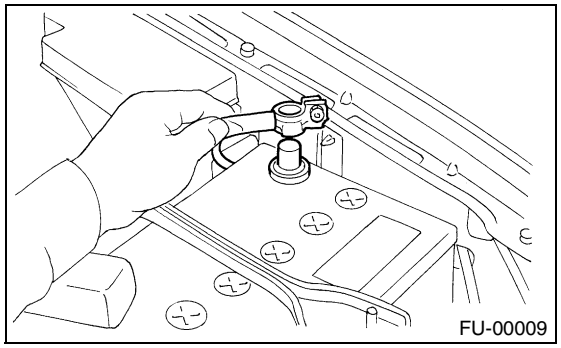


12) Connect the overflow hose.
13) Install the V-belt cover.

14) Install the radiator upper bracket. (AT vehicles)



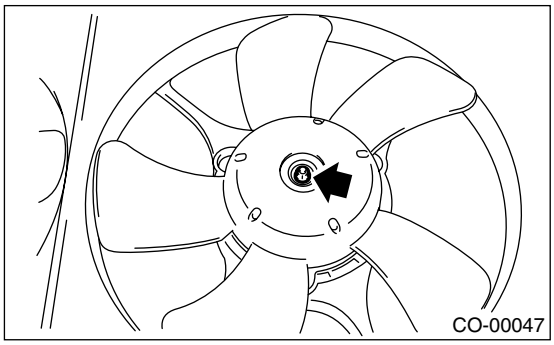
15) Connect the battery ground cable to battery.



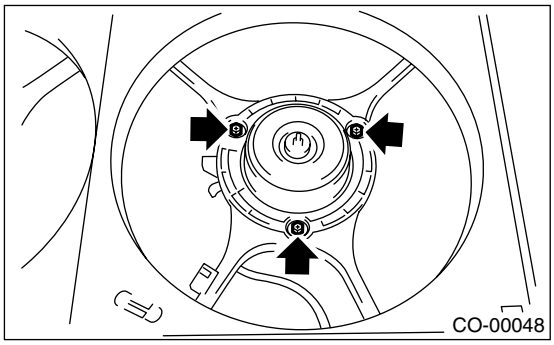
16) Fill the engine coolant. <Ref. to CO(SOHC)-18, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

C: DISASSEMBLY

1) Remove the clip which holds motor connector onto shroud.
2) Remove the nut which holds fan itself onto fan motor and shroud assembly.



3) Remove the bolts which install fan motor onto shroud.



D: ASSEMBLY

Assemble in the reverse order of disassembly.

NOTE:
Refer to COMPONENT for tightening torque. <Ref. to CO(SOHC)-3, COMPONENT, General Description.>

9. Radiator Sub Fan and Fan Motor

A: REMOVAL

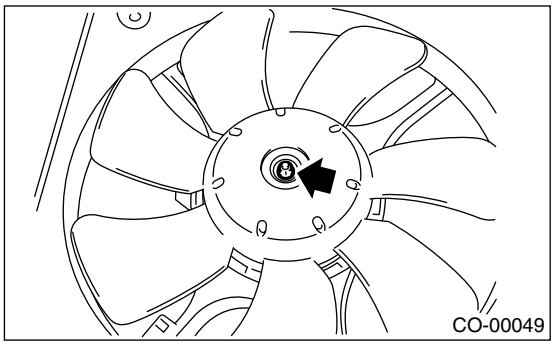
Refer to Radiator Main Fan and Fan Motor. <Ref. to CO(SOHC)-34, REMOVAL, Radiator Main Fan and Fan Motor.>

B: INSTALLATION

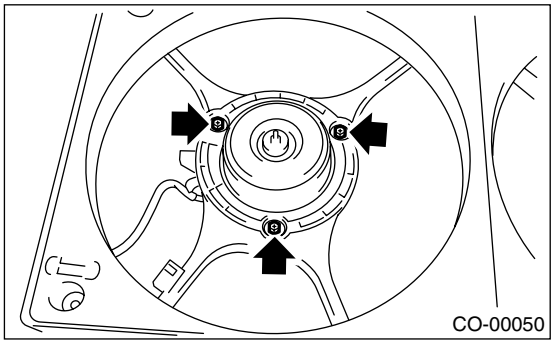
Refer to Radiator Main Fan and Fan Motor. <Ref. to CO(SOHC)-36, INSTALLATION, Radiator Main Fan and Fan Motor.>

C: DISASSEMBLY

1) Remove the clip which holds motor connector onto shroud.
2) Remove the nut which holds fan itself onto fan motor and shroud assembly.



3) Remove the bolts which install fan motor onto shroud.



D: ASSEMBLY

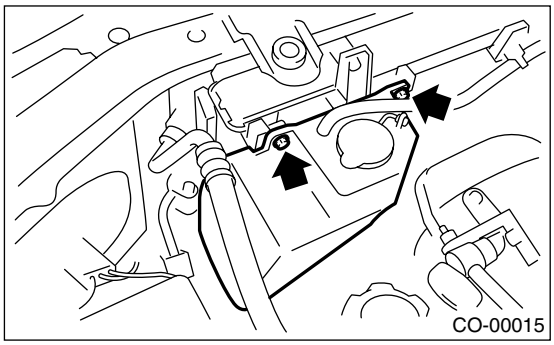
Assemble in the reverse order of disassembly.

NOTE:
Refer to COMPONENT for tightening torque. <Ref. to CO(SOHC)-3, COMPONENT, General Description.>

10.Reservoir Tank

A: REMOVAL

1) Disconnect the over flow hose from radiator filler neck position.
2) Remove the bolts which install reservoir tank onto radiator main fan shroud.
3) Remove the reservoir tank.



B: INSTALLATION

Install in the reverse order of removal.

NOTE:
Refer to COMPONENT for tightening torque. <Ref. to CO(SOHC)-3, COMPONENT, General Description.>

C: INSPECTION

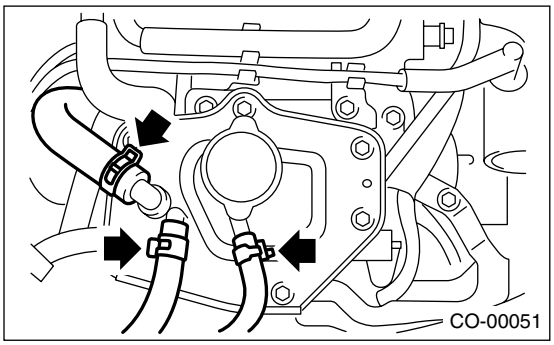
Make sure the engine coolant level is between full and low.

11.Coolant Filler Tank

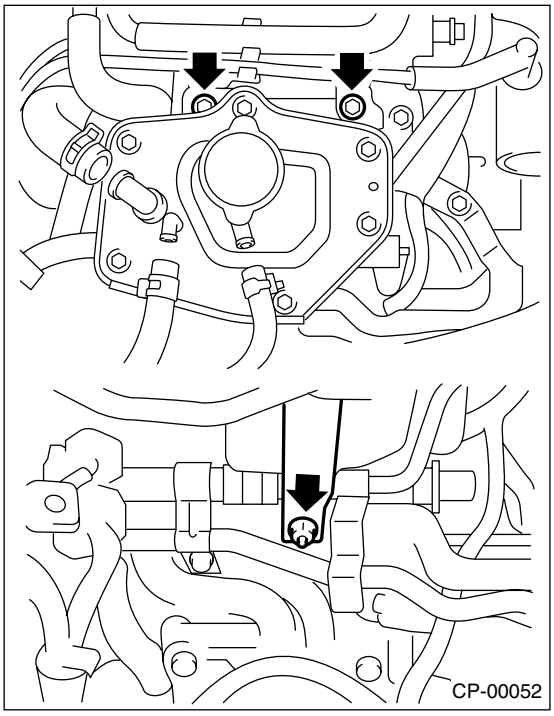
A: REMOVAL

WARNING:
The radiator is pressurized. Wait until the engine cools down before working on the radiator.

1) Drain the coolant about 3.0 ℓ (3.2 US qt, 2.6 Imp qt). <Ref. to CO(SOHC)-18, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
2) Remove the air cleaner upper cover and air intake boot. <Ref. to IN(TURBO)-7, REMOVAL, Air Cleaner.>
3) Remove the air cleaner element.
4) Disconnect the engine coolant hoses from coolant filler tank.



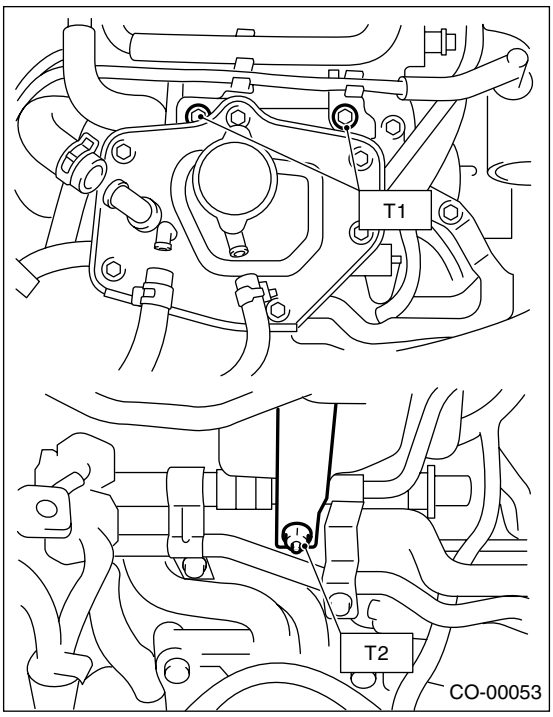
5) Remove the bolts and nut which install coolant filler tank.
6) Disconnect the engine coolant hose which connects under side of coolant filler tank.
7) Remove the coolant filler tank.



B: INSTALLATION

1) Install in the reverse order of removal.

Tightening torque:
T1: 19 N·m (1.9 kgf-m, 13.7 ft-lb)
T2: 21 N·m (2.1 kgf-m, 15.2 ft-lb)



2) Fill engine coolant. <Ref. to CO(SOHC)-18, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

12.Engine Cooling System Trouble in General

A: INSPECTION

Trouble	Possible cause	Corrective action
Over-heating	a. Insufficient engine coolant	Replenish the engine coolant, inspect for leakage, and repair.
	b. Loose timing belt	Repair or replace the timing belt tensioner.
	c. Oil on drive belt	Replace.
	d. Malfunction of thermostat	Replace.
	e. Malfunction of water pump	Replace.
	f. Clogged engine coolant passage	Clean.
	g. Improper ignition timing	Inspect and repair the ignition control system. <Ref. to EN(SOHC)-2, Basic Diagnostic Procedure.> or <Ref. to EN(TURBO)-2, PROCEDURE, Basic Diagnostic Procedure.>
	h. Clogged or leaking radiator	Clean or repair, or replace.
	i. Improper engine oil in engine coolant	Replace the engine coolant.
	j. Air/fuel mixture ratio too lean	Inspect and repair the fuel injection system. <Ref. to EN(SOHC)-2, Basic Diagnostic Procedure.> or <Ref. to EN(TURBO)-2, PROCEDURE, Basic Diagnostic Procedure.>
	k. Excessive back pressure in exhaust system	Clean or replace.
	l. Insufficient clearance between piston and cylinder	Adjust or replace.
	m. Slipping clutch	Repair or replace.
	n. Dragging brake	Adjust.
	o. Defective thermostat	Replace.
	p. Malfunction of electric fan	Inspect the radiator fan relay, engine coolant temperature sensor or radiator motor and replace there.
Over-cooling	a. Atmospheric temperature extremely low	Partly cover the radiator front area.
	b. Defective thermostat	Replace.
Engine coolant leaks.	a. Loosened or damaged connecting units on hoses	Repair or replace.
	b. Leakage from water pump	Replace.
	c. Leakage from water pipe	Repair or replace.
	d. Leakage around cylinder head gasket	Retighten the cylinder head bolts or replace gasket.
	e. Damaged or cracked cylinder head and crankcase	Repair or replace.
	f. Damaged or cracked thermostat case	Repair or replace.
	g. Leakage from radiator	Repair or replace.
Noise	a. Defective drive belt	Replace.
	b. Defective radiator fan	Replace.
	c. Defective water pump bearing	Replace the water pump.
	d. Defective water pump mechanical seal	Replace the water pump.