ENGINE COOLING SYSTEM 2-5

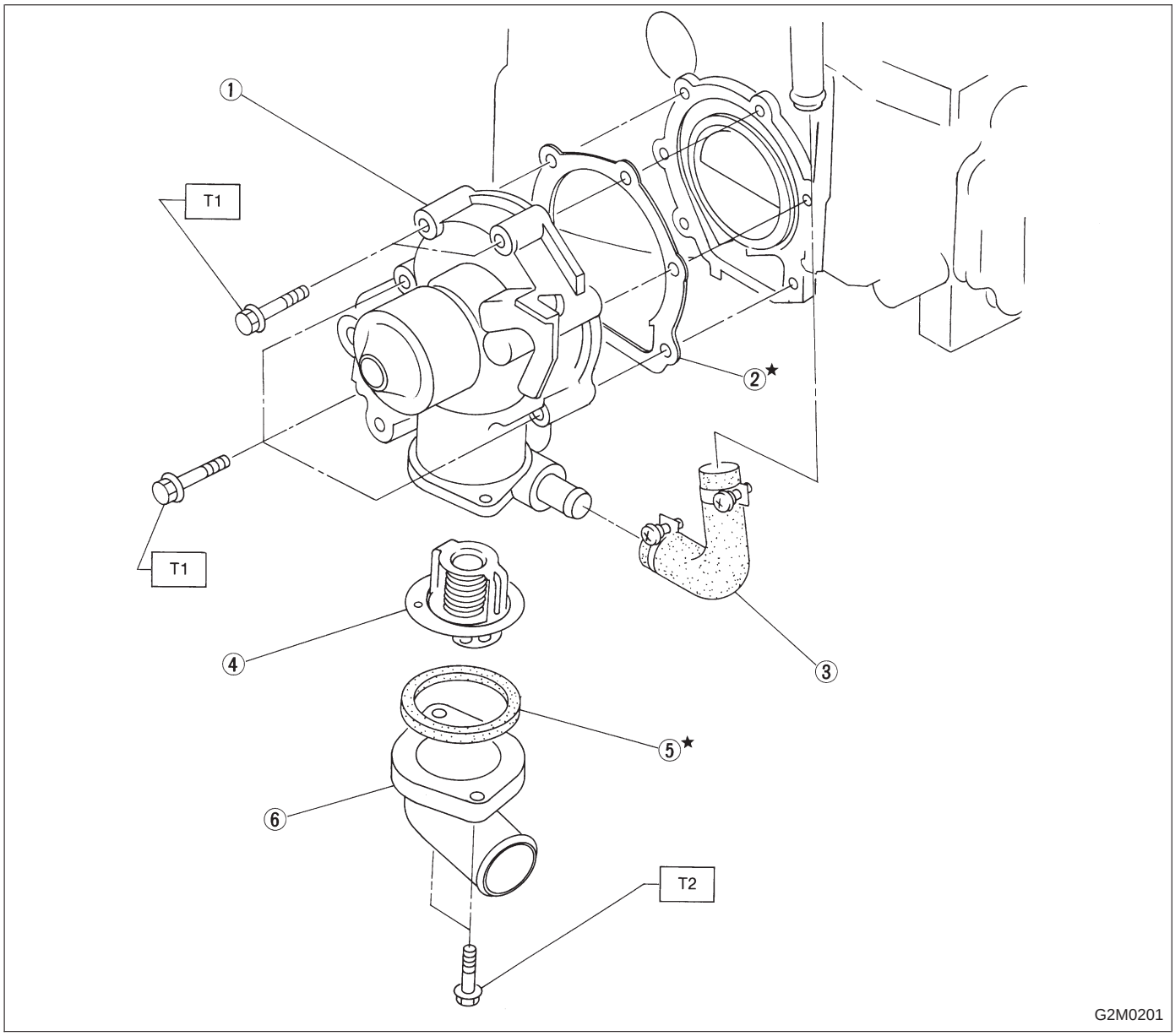
1. Specifications

Cooling system			Electric fan + Forced engine coolant circulation system
Total engine coolant capacity ℓ (US qt, Imp qt)		MT model	6.4 (6.8, 5.6)
		AT model	6.35 (6.7, 5.6)
Engine coolant pump	Type		Centrifugal impeller type
	Discharge performance I	Discharge	20 ℓ (5.3 US gal, 4.4 Imp gal)/min.
		Pump speed—total engine coolant head	760 rpm — 0.3 mAq (1.0 ftAq)
		Engine coolant temperature	85°C (185°F)
	Discharge performance II	Discharge	100 ℓ (26.4 US gal, 22.0 Imp gal)/min.
		Pump speed—total engine coolant head	3,000 rpm — 5.0 mAq (16.4 ftAq)
		Engine coolant temperature	85°C (185°F)
	Discharge performance III	Discharge	200 ℓ (52.8 US gal, 44.0 Imp gal)/min.
		Pump speed—total engine coolant head	6,000 rpm — 23.0 mAq (75.5 ftAq)
		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)
Thermostat	Type		Wax pellet type
	Starts to open		76 — 80°C (169 — 176°F)
	Fully opened		91°C (196°F)
	Valve lift		9.0 mm (0.354 in) or more
	Valve bore		35 mm (1.38 in)
Radiator fan	Motor		120 W
	Fan diameter x Blade		320 mm (12.60 in) x 4
Radiator	Type		Down flow, pressure type
	Core dimensions		670 x 361 x 16 mm (26.38 x 14.21 x 0.63 in)
	Pressure range in which cap valve is open		Above: 88±10 kPa (0.9±0.1 kg/cm^2, 12.8±1.4 psi) Below: − 4.9 to − 9.8 kPa (−0.05 to −0.1 kg/cm^2, −0.7 to −1.4 psi)
	Fins		Corrugated fin type
Reservoir tank	Capacity		0.55 ℓ (0.6 US qt, 0.5 Imp qt)

2. Service Data

Engine coolant pump	Clearance between impeller and case	Standard Limit	0.5 — 0.7 mm (0.020 — 0.028 in) 1.0 mm (0.039 in)
	“Thrust” runout of impeller end		0.5 mm (0.020 in)

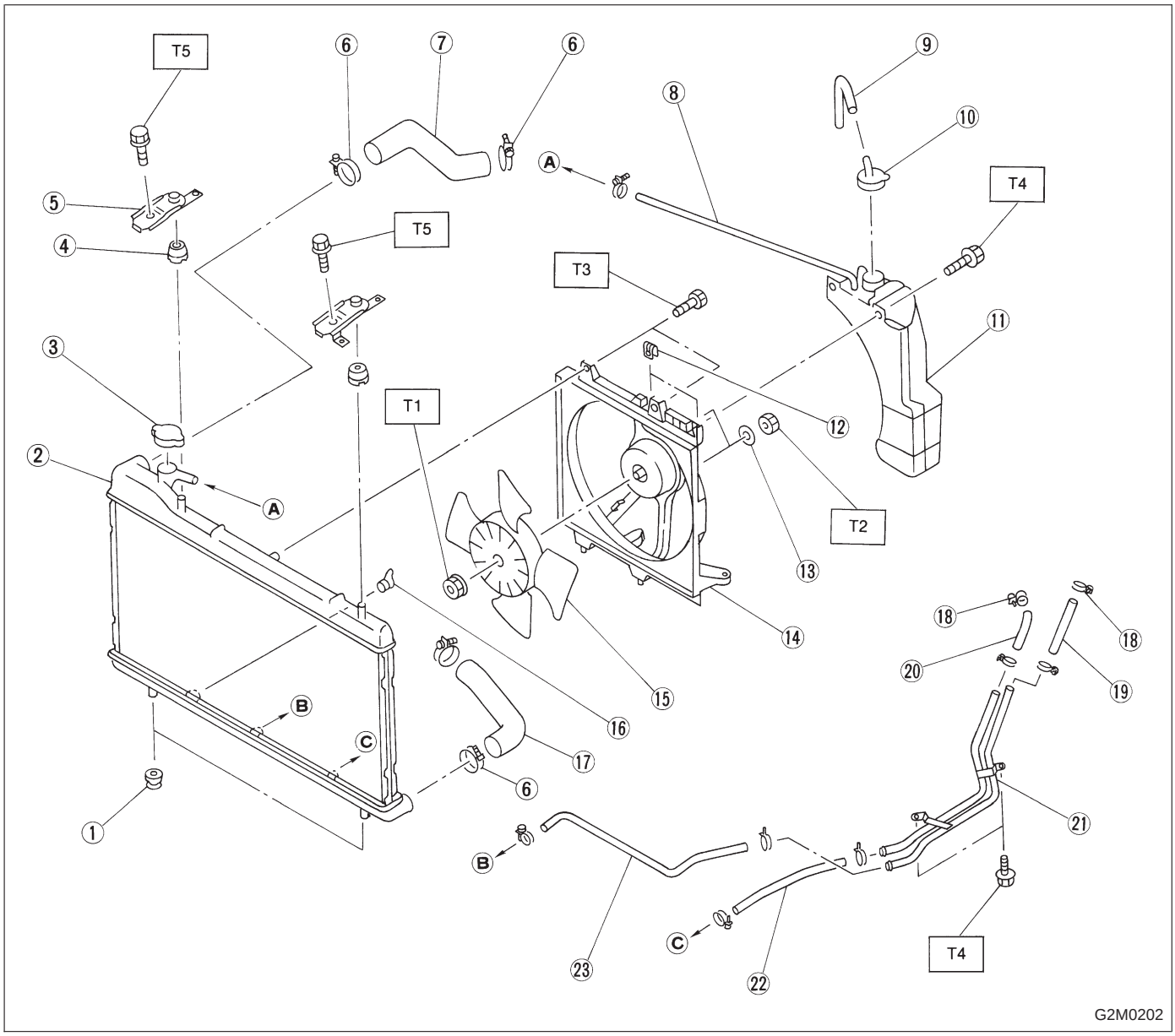
1. Engine Coolant Pump



① Engine coolant pump ASSY
② Gasket
③ Heater hose
④ Thermostat
⑤ Gasket
⑥ Thermostat case

Tightening torque: N·m (kg-m, ft-lb)
T1: First 10 — 14 (1.0 — 1.4, 7 — 10)
Second 10 — 14 (1.0 — 1.4, 7 — 10)
T2: 6 — 7 (0.6 — 0.7, 4.3 — 5.1)

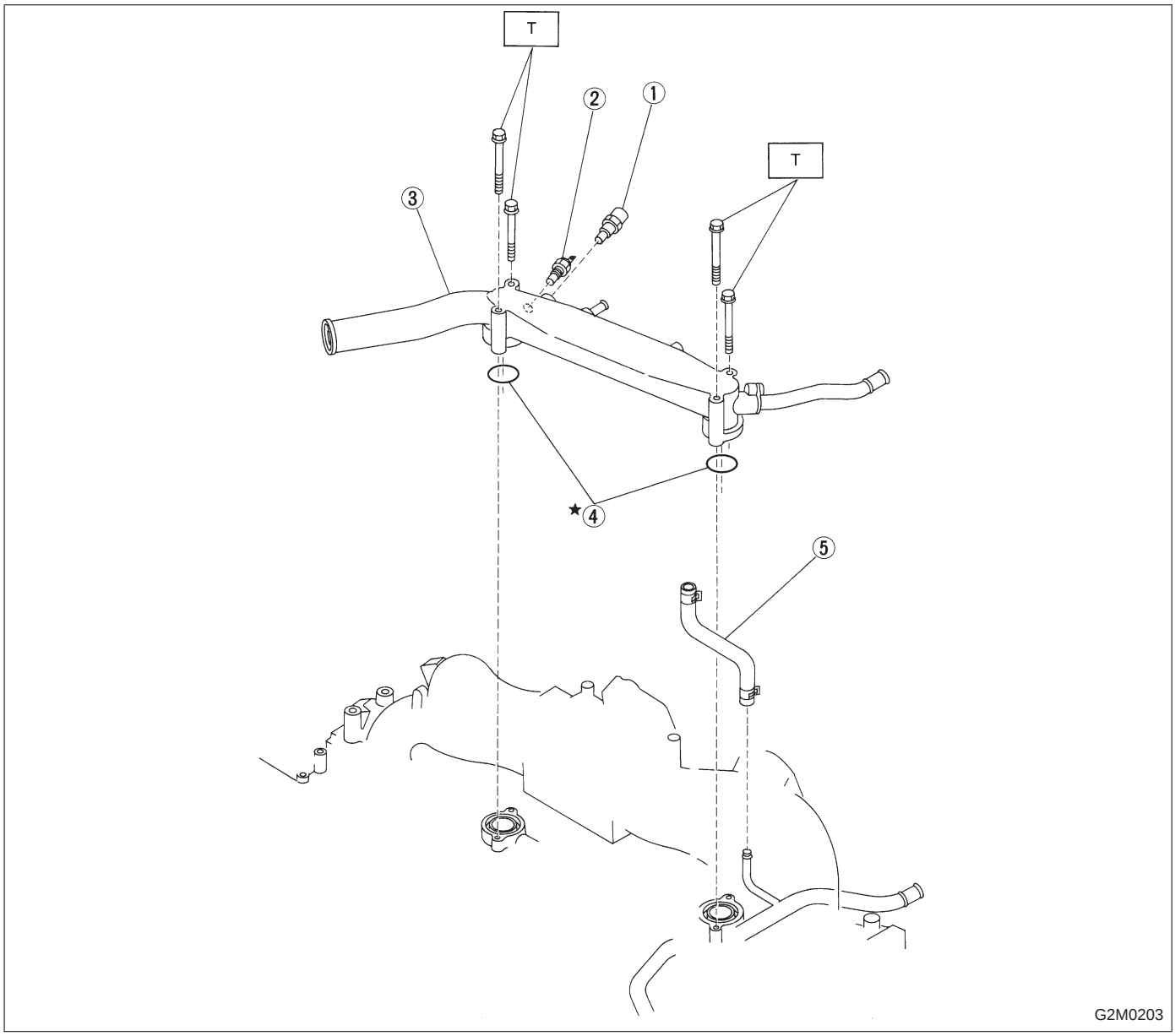
2. Radiator and Radiator Fan



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

Tightening torque: N·m (kg-m, ft-lb)
T1: 1.5 — 2.5 (0.15 — 0.25, 1.1 — 1.8)
T2: 3 — 4 (0.3 — 0.4, 2.2 — 2.9)
T3: 3 — 5 (0.3 — 0.5, 2.2 — 3.6)
T4: 5.4 — 9.3 (0.55 — 0.95, 4.0 — 6.9)
T5: 13 — 23 (1.3 — 2.3, 9 — 17)

3. Engine Coolant Pipe



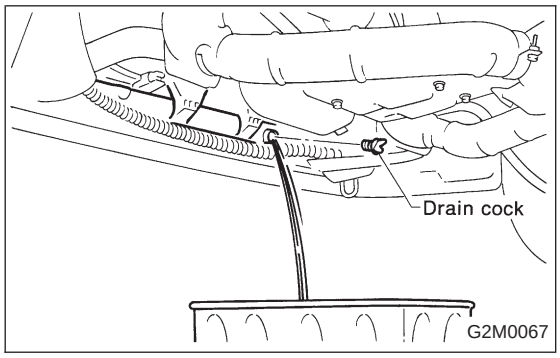
① Engine coolant temperature sensor
② Engine coolant temperature gauge
③ Engine coolant pipe
④ O-ring
⑤ By-pass hose

Tightening torque: N·m (kg-m, ft-lb)
T: 6 — 7 (0.6 — 0.7, 4.3 — 5.1)

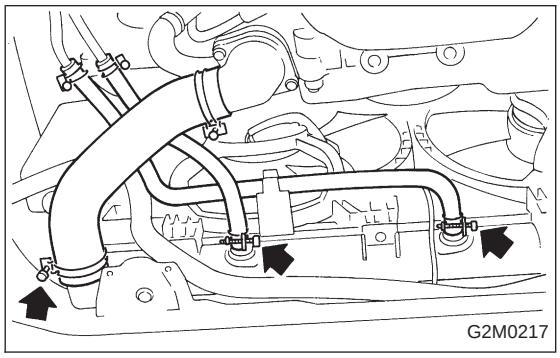
1. Engine Coolant Pump

A: REMOVAL

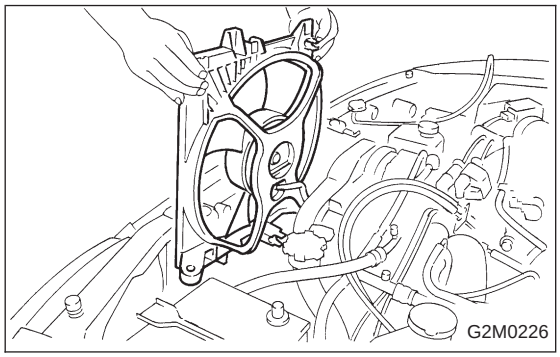
1) Open front hood.
2) Disconnect ground cable from the battery.



3) Drain engine coolant completely.
Set container under the vehicle, and remove drain cock from radiator.

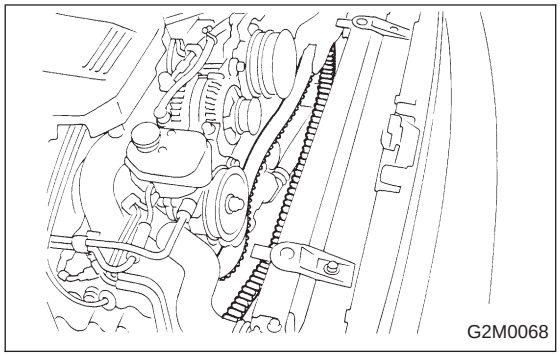


4) Disconnect radiator outlet hose from engine coolant pump.

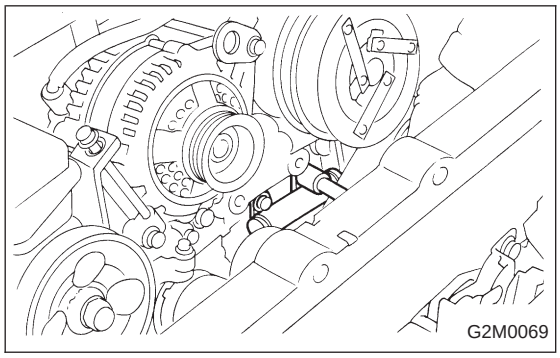


5) Remove radiator fan motor assembly.
<Ref. to 2-5 [W5A0].>

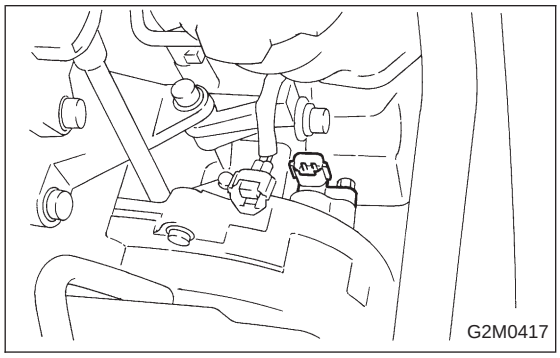
6) Remove V-belt(s).
<Ref. to 1-5 [01A0].>



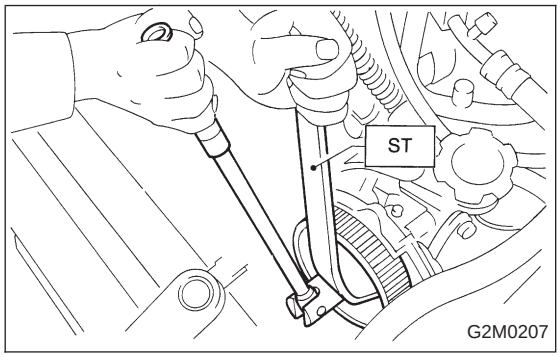
7) Remove timing belt.
<Ref. to 1-5 [02A0].>



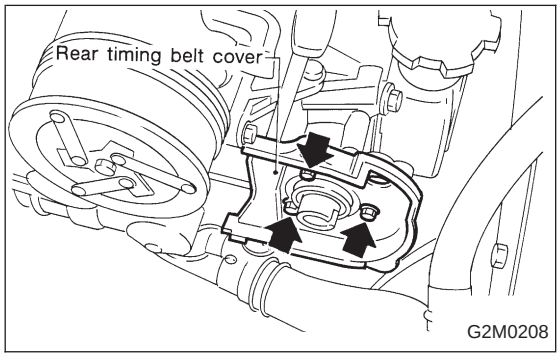
8) Remove belt tension adjuster.



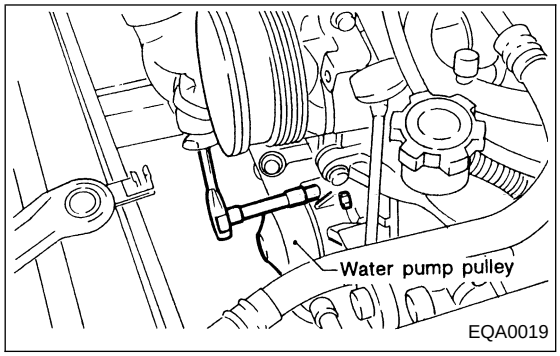
9) Remove camshaft position sensor.



10) Remove left side camshaft pulley by using ST.
ST 499207100 CAMSHAFT SPROCKET WRENCH



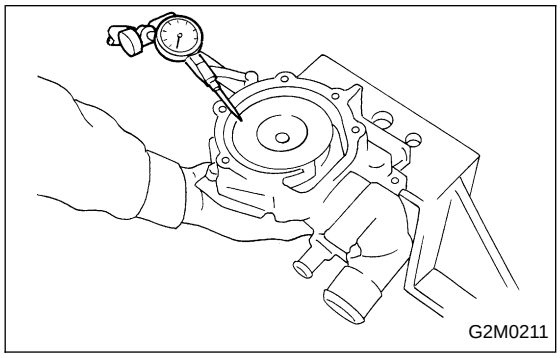
11) Remove left side rear timing belt cover.



12) Remove tensioner bracket.
13) Disconnect heater hose from engine coolant pump.
14) Remove engine coolant pump.

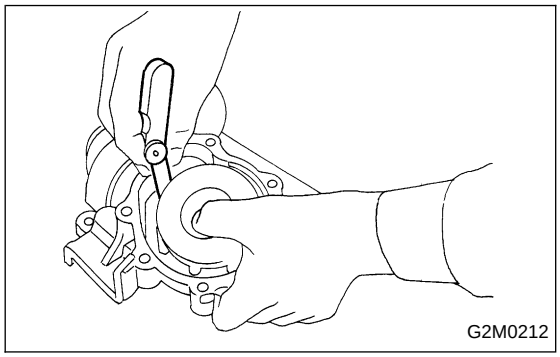
B: INSPECTION

1) Check engine coolant pump bearing for smooth rotation.
2) Check engine coolant pump pulley for abnormalities.



3) Using a dial gauge, measure impeller runout in thrust direction while rotating the pulley.

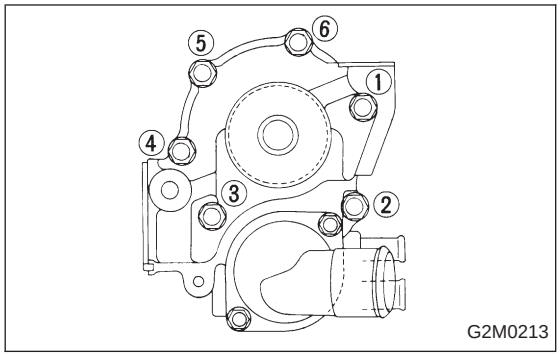
"Thrust" runout limit:
0.5 mm (0.020 in)



4) Check 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 engine coolant pump installation, check pulley shaft for engine coolant leaks. If leaks are noted, replace engine coolant pump assembly.



G2M0213

C: INSTALLATION

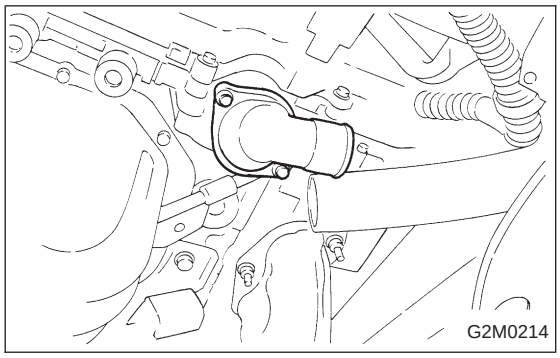
Installation is in the reverse order of removal.

CAUTION:
- **Replace gasket with a new one.**
- **When installing engine coolant pump, tighten bolts in two stages in numerical sequence as shown in figure.**

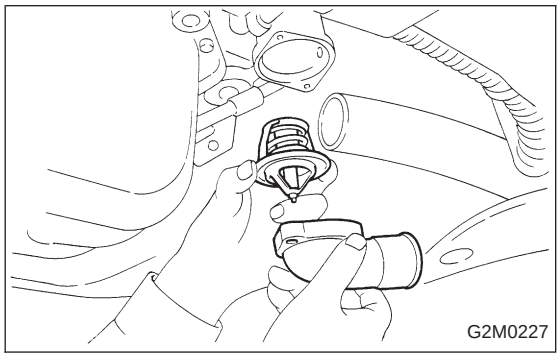
Tightening torque:
10 — 14 N·m (1.0 — 1.4 kg-m, 7 — 10 ft-lb)

2. Thermostat

A: REMOVAL AND INSTALLATION


G2M0214

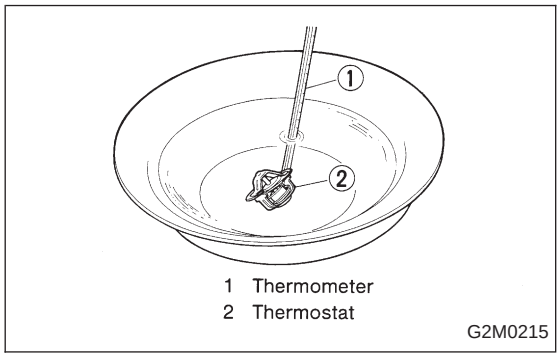
1) Drain engine coolant.
Set container under the vehicle, and remove drain cock from radiator.
2) Disconnect radiator outlet hose from thermostat cover.
3) Remove thermostat cover and gasket, and pull out the thermostat.


G2M0227

4) Install the thermostat in the intake manifold, and install the thermostat cover together with a gasket.

CAUTION:
- **When reinstalling the thermostat, use a new gasket.**
- **The thermostat must be installed with the jiggle pin upward.**
- **In this time, set the jiggle pin of thermostat for front side.**

B: INSPECTION



1 Thermometer
2 Thermostat
G2M0215

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 a 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:
76.0 — 80.0°C (169 — 176°F)

Fully opens:
91°C (196°F)

3. Radiator

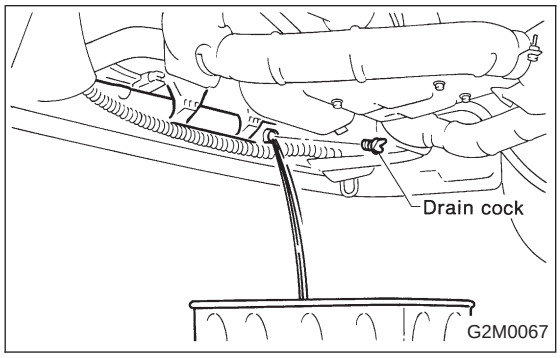
A: ON-CAR SERVICE

1) Remove radiator cap, top off radiator, and attach tester to radiator in place of cap.
2) Apply a pressure of 157 kPa (1.6 kg/cm^2, 23 psi) to radiator to check if:

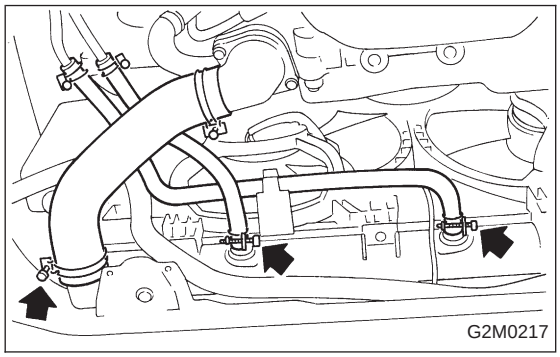
(1) Engine coolant leaks at/around radiator.
(2) Engine coolant leaks at/around hoses or connections.

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

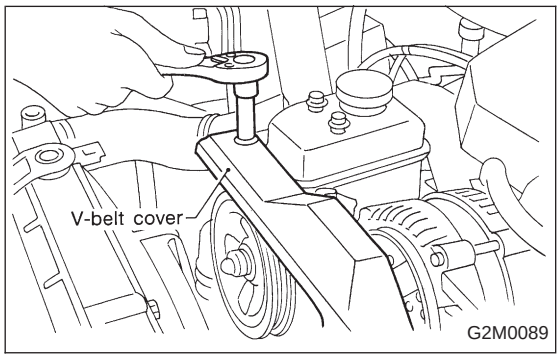
B: REMOVAL



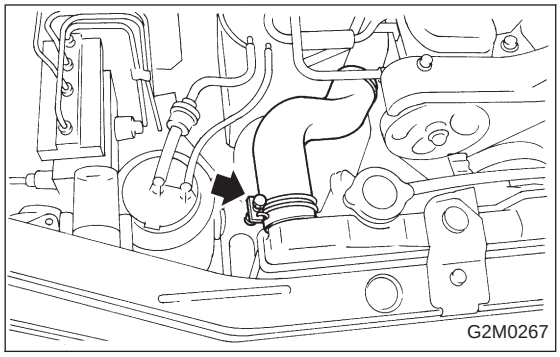
1) Disconnect battery cables and remove battery from body.
2) Drain engine coolant.
Set container under the vehicle, and remove drain cock from radiator.



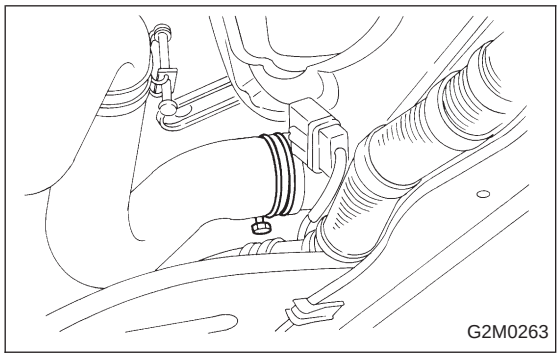
3) Disconnect radiator outlet hose from thermostat cover.
4) Disconnect ATF cooler hoses from radiator. (AT model)



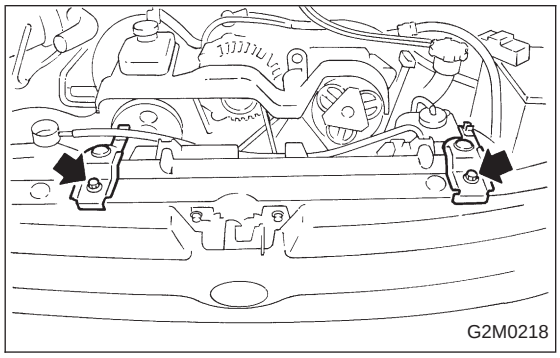
5) Remove V-belt cover.



6) Disconnect inlet hose from radiator.



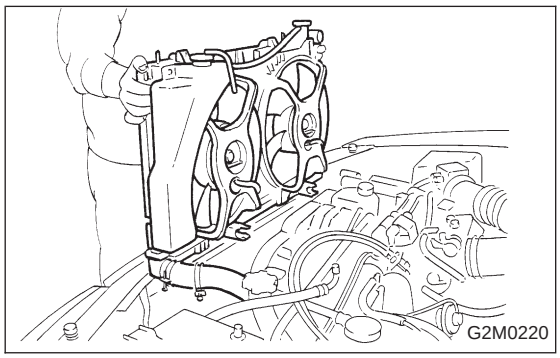
7) Disconnect connectors of radiator main fan and sub fan motor.



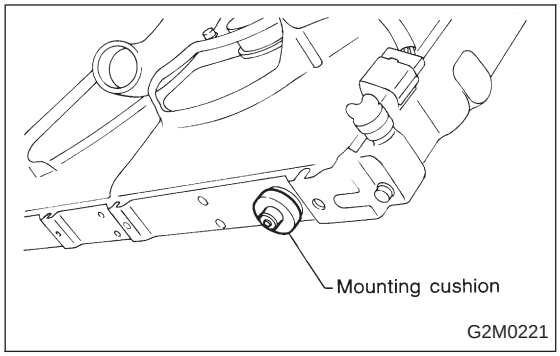
8) Remove radiator upper brackets.

NOTE:
Place left upper radiator bracket between grille and body.

9) While slightly lifting radiator, slide it to left.

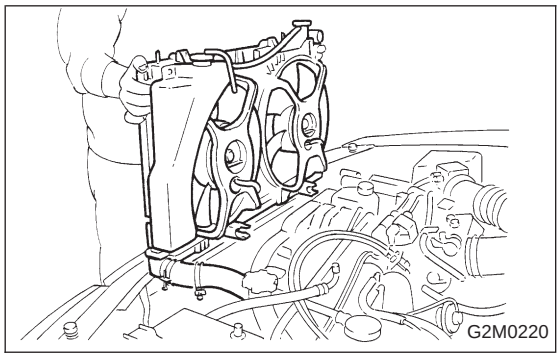


10) Lift radiator up and away from vehicle.

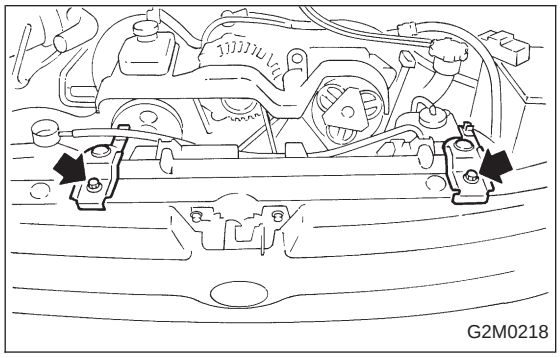


C: INSTALLATION

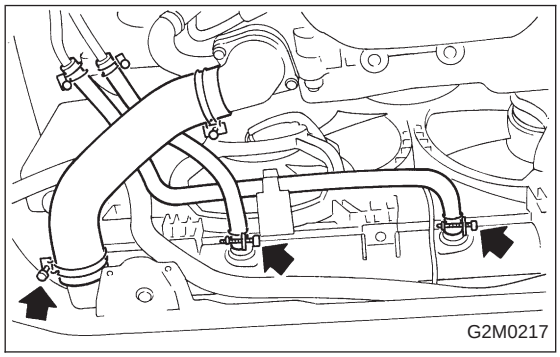
1) Attach radiator mounting cushions to pins on the lower side of radiator.



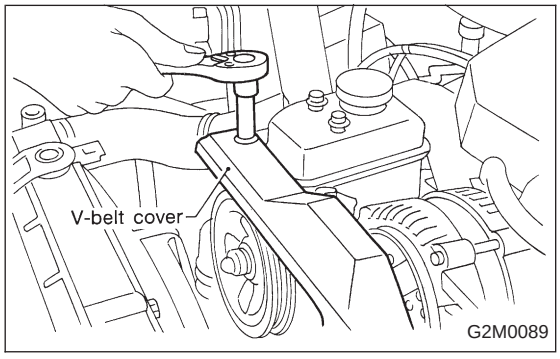
2) Fit cushions on lower side of radiator, into holes on body side and install radiator.



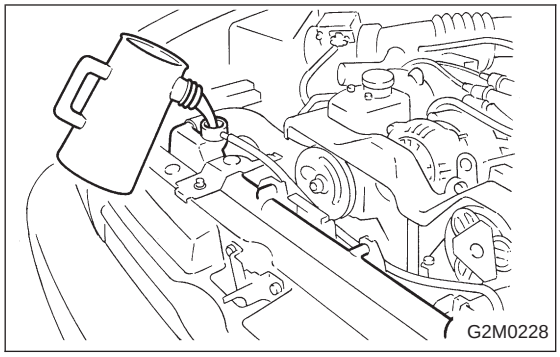
3) Install radiator brackets and tighten bolts.
4) Connect radiator main fan motor and sub fan motor connectors.



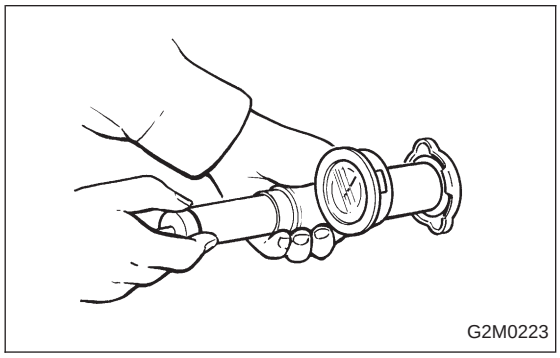
5) Connect radiator inlet and outlet hoses.
6) Connect ATF cooler hoses. (AT model)



7) Install V-belt cover.


G2M0228

8) Pour engine coolant.
(1) Pour engine coolant into radiator up to filler neck position.
(2) Pour engine coolant into reservoir tank up to upper level.
(3) Attach radiator cap and reservoir tank cap properly.
(4) Warm-up engine completely for more than five minutes at 2,000 to 3,000 rpm.
(5) Stop engine and wait until temperature drops to a safe level.
(6) If engine coolant level drops in radiator, add engine coolant to filler neck position.
(7) If engine coolant level drops from upper level of reservoir tank, add engine coolant to upper level.
(8) Attach radiator cap, air vent plug and reservoir tank cap properly.
9) Connect ground cable to battery terminal.


G2M0223

4. Radiator Cap

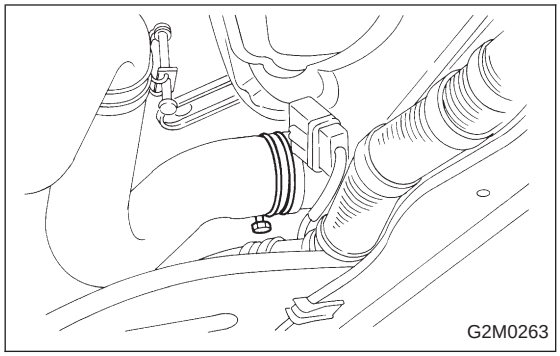
A: INSPECTION

1) Attach radiator cap to tester.
2) Increase pressure until tester gauge pointer stops. Radiator cap is functioning properly if it holds the service limit pressure for five to six seconds.

Standard pressure:
78 — 98 kPa (0.8 — 1.0 kg/cm^2, 11 — 14 psi)

Service limit pressure:
69 kPa (0.7 kg/cm^2, 10 psi)

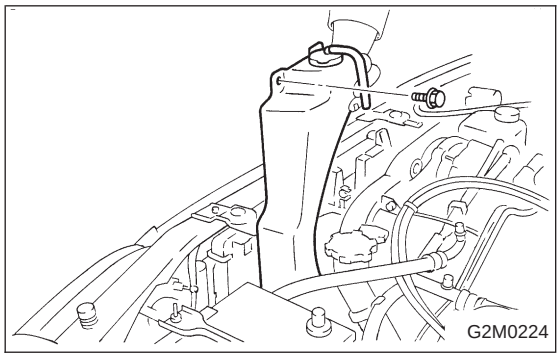
CAUTION:
Be sure to remove foreign matter and rust from the cap in advance; otherwise, results of pressure test will be incorrect.



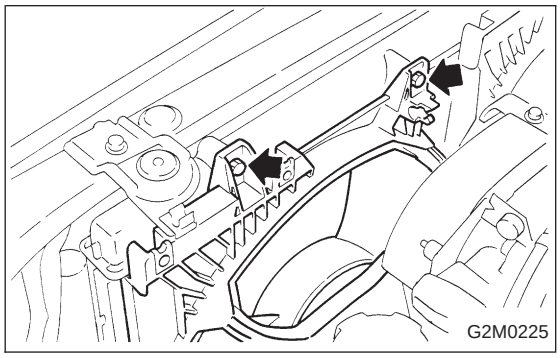
5. Radiator Fan and Fan Motor

A: REMOVAL

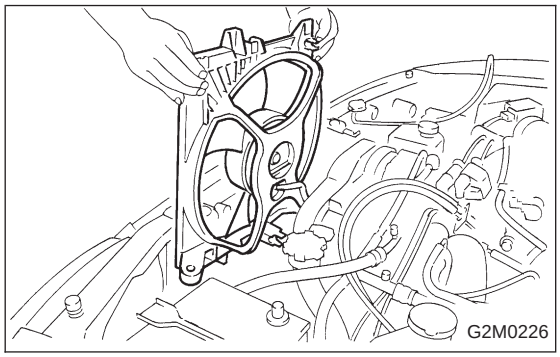
1) Disconnect ground cable from battery terminal.
2) Disconnect connector from fan motor.



3) Remove reservoir tank.



4) Remove two bolts holding shroud to radiator upper side.



5) Remove radiator fan motor assembly.
6) Remove fan motor from shroud.

B: INSTALLATION

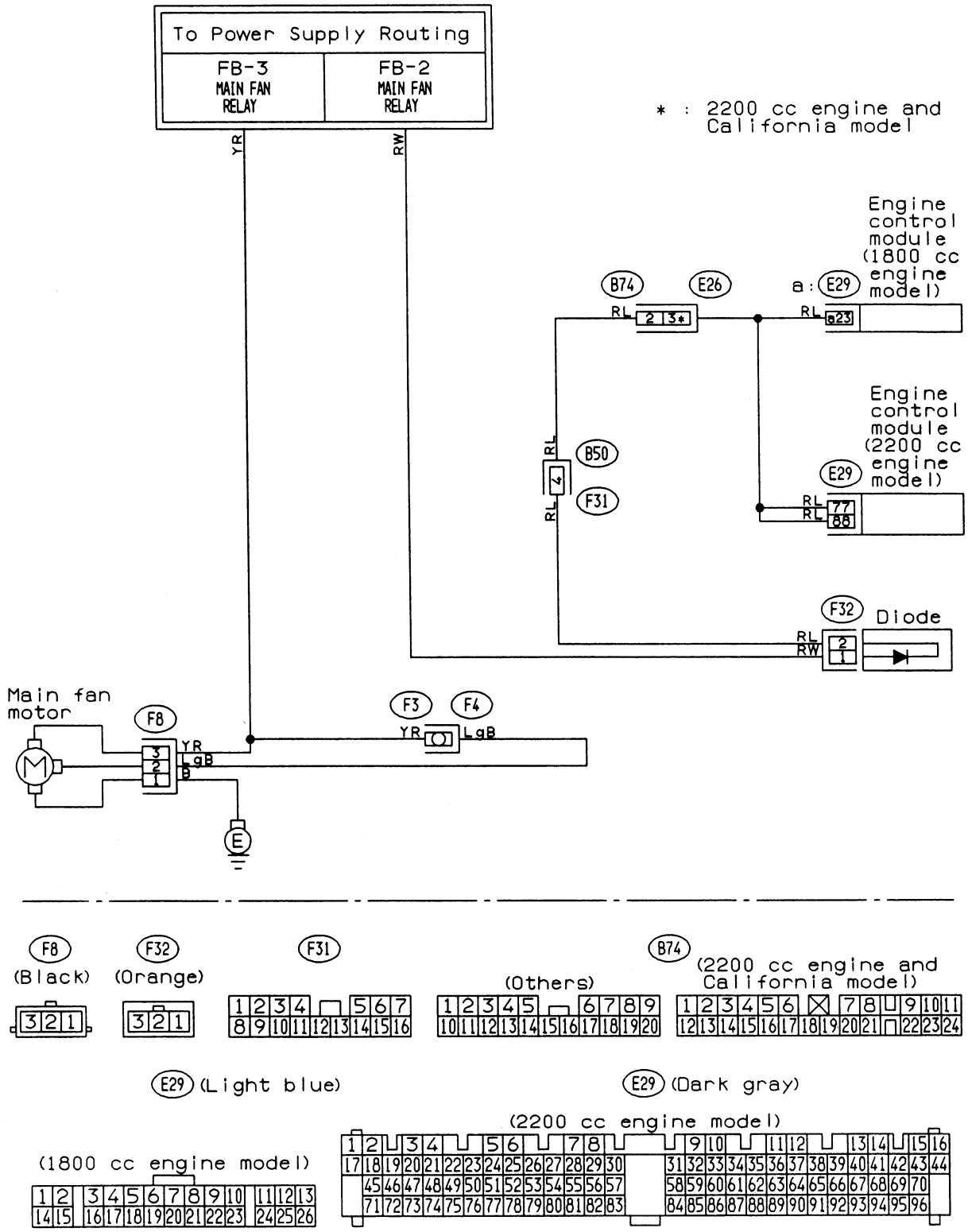
Installation is in the reverse order of removal procedures. Observe the following:
1) Before installing radiator fan motor, apply a coat of sealant to threads and tighten nuts.
2) Make sure radiator fan does not come into contact with shroud when installed.
3) After installation, make sure there is no unusual noise or vibration when fan is rotated.

1. Engine Cooling System

Trouble	Possible cause	Corrective action
Over-heating	a. Insufficient engine coolant.	Replenish engine coolant, inspect for leakage, and repair.
	b. Loose timing belt.	Repair or replace timing belt tensioner.
	c. Oil on drive belt.	Replace.
	d. Malfunction of thermostat.	Replace.
	e. Malfunction of engine coolant pump.	Replace.
	f. Clogged engine coolant passage.	Clean.
	g. Improper ignition timing.	Inspect and repair ignition control system. <On 1800 cc model, ref. to 2-7 [T7C0].> <On 2200 cc model, ref. to 2-7b [T8D0].>
	h. Clogged or leaking radiator.	Clean or repair, or replace.
	i. Improper engine oil in engine coolant.	Replace engine coolant.
	j. Air/fuel mixture ratio too lean.	Inspect and repair fuel injection system. <On 1800 cc model, ref. to 2-7 [T8O0].> <On 2200 cc model, ref. to 2-7b [T10P0].>
	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. Improper transmission oil.	Replace.
	p. Defective thermostat.	Replace.
	q. Malfunction of electric fan.	Inspect radiator fan relay, engine coolant temperature sensor or radiator motor and replace there.
Over-cooling	a. Atmospheric temperature extremely low.	Partly cover radiator front area.
	b. Defective thermostat.	Replace.
Engine coolant leaks	a. Loosened or damaged connecting units on hoses.	Repair or replace.
	b. Leakage from engine coolant pump.	Replace.
	c. Leakage from engine coolant pipe.	Repair or replace.
	d. Leakage around cylinder head gasket.	Retighten cylinder head nuts 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 engine coolant pump bearing.	Replace engine coolant pump.
	d. Defective engine coolant pump mechanical seal.	Replace engine coolant pump.

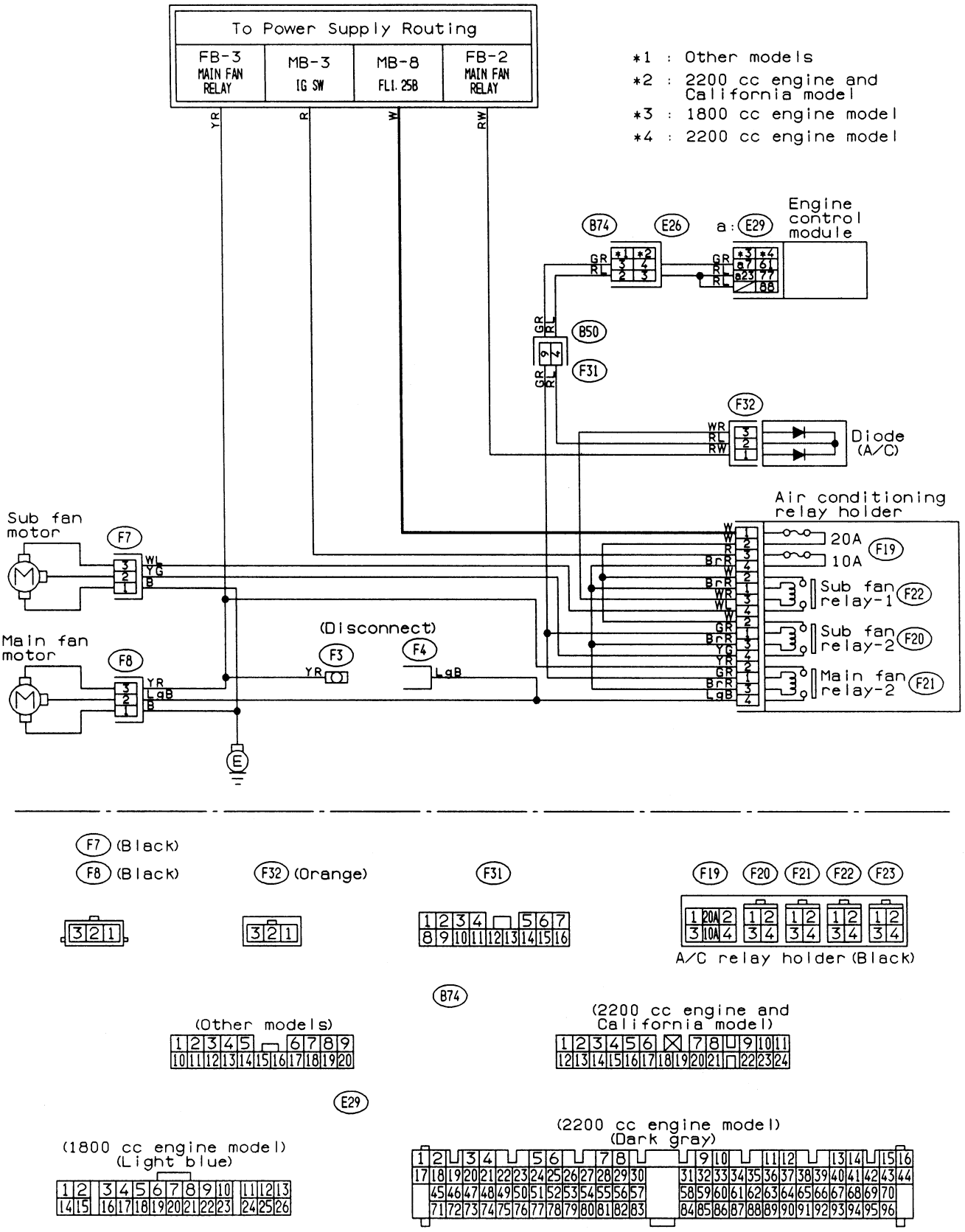
2. Radiator Main Fan (2200 cc Model)

1. WITHOUT A/C MODEL



GU14-04

2. WITH A/C MODEL



GU14-03

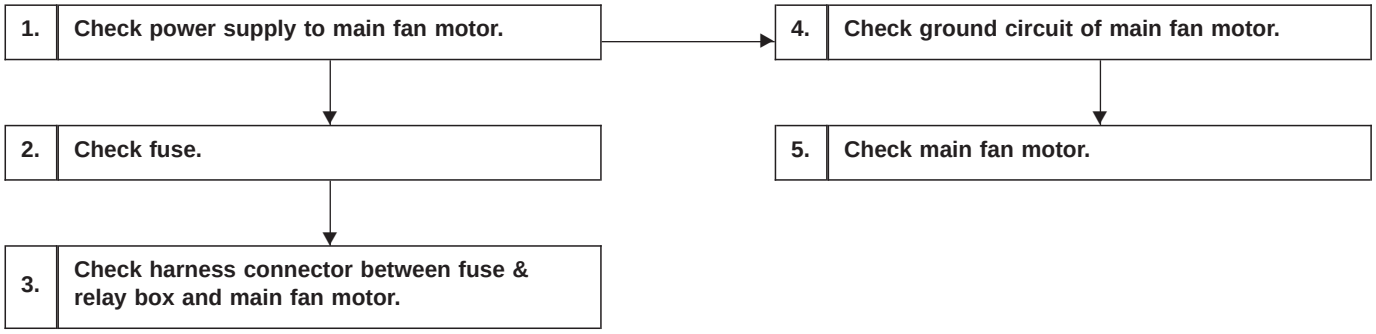
A: OPERATION (WITHOUT A/C MODEL)

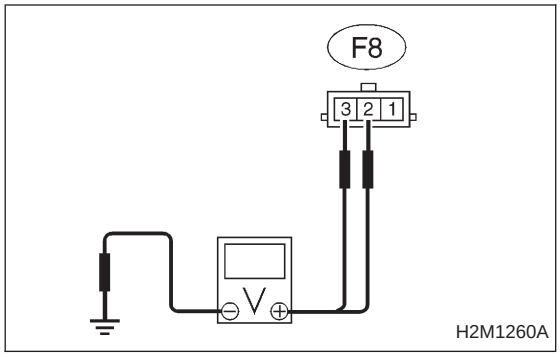
CONDITION:

- Engine coolant temperature is above 95°C (203°F).

TROUBLE SYMPTOM:

- Radiator main fan does not operate under the above condition.





1	CHECK POWER SUPPLY TO MAIN FAN MOTOR.

CAUTION:
Be careful not to overheat engine during repair.

1) Turn ignition switch to OFF.
2) Disconnect connector from main fan motor.
3) Warm-up the engine until engine coolant temperature increases over 95°C (203°F).
4) Stop the engine and turn ignition switch to ON.
5) Measure voltage between main fan motor connector and body.

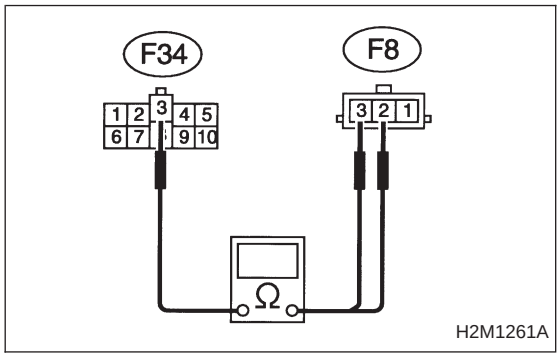
CHECK ***: Connector & terminal***
(F8) No. 3 — Body/10 V, or more
(F8) No. 2 — Body/10 V, or more

YES : Go to step 4.
NO : Go to step 2.

2	CHECK FUSE.

1) Turn ignition switch to OFF.
2) Remove fuse No. 13 from fuse & relay box.
3) Check condition of fuse.

CHECK ***: Does the fuse blown-out?***
YES : Replace fuse.
NO : Go to step 3.

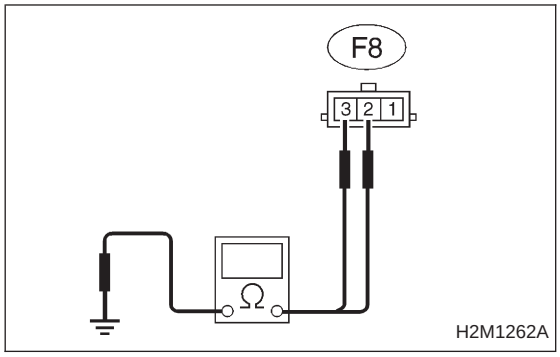


3	CHECK HARNESS CONNECTOR BETWEEN FUSE & RELAY BOX AND MAIN FAN MOTOR.

1) Disconnect connector from fuse & relay box.
2) Measure resistance of harness connector between fuse & relay box and main fan motor.

CHECK ***: Connector & terminal***
(F34) No. 3 — (F8) No. 2/1 Ω, or less
(F34) No. 3 — (F8) No. 3/1 Ω, or less

YES : Go to next step.
NO : In this case, repair the following items:
- Open circuit of harness between fuse & relay box and main fan motor connector
- Open circuit of harness between fuse & relay box connector and coupling connector (F3)
- Open circuit of harness between coupling connector (F4) and main fan motor connector
- Poor contact in coupling connector (F3)



3) Measure resistance between main fan motor connector and body.

CHECK ***: Connector & terminal***
(F8) No. 2 — Body/1 MΩ, or more
(F8) No. 3 — Body/1 MΩ, or more

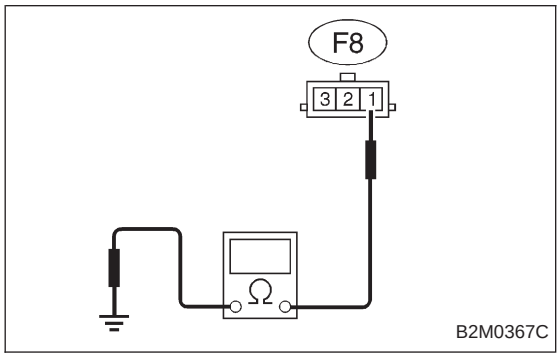
YES : Go to next CHECK .

NO : Repair short circuit between fuse & relay box and main fan motor connector.

CHECK ***: Is there poor contact in fuse & relay box or main fan motor connector?***

YES : Repair poor contact in fuse & relay box or main fan motor connector.

NO : Refer to 2-7b “On-Board Diagnostics II System” diagnostics procedure.



4	**CHECK GROUND CIRCUIT OF MAIN FAN MOTOR.**

1) Turn ignition switch to OFF.
2) Measure resistance between main fan motor connector and body.

CHECK ***: Connector & terminal***
(F8) No. 1 — Body/5 Ω, or less

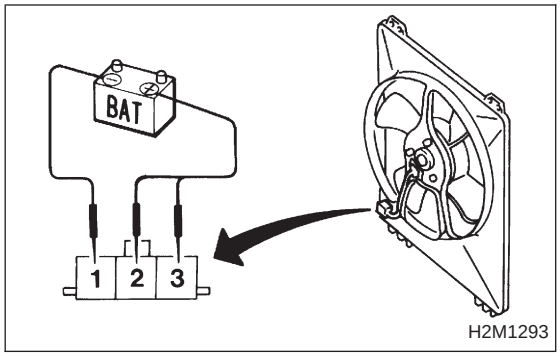
YES : Go to next CHECK .

NO : Repair open circuit of harness between main fan motor connector and body.

CHECK ***: Is there poor contact in main fan motor connector?***

YES : Repair poor contact in main fan motor connector.

NO : Go to step 5.



5	CHECK MAIN FAN MOTOR.

1) Turn ignition switch to OFF.
2) Disconnect connector from main fan motor.

CHECK ***: Does the main fan rotate while connecting battery positive (+) terminal to terminals Nos. 2 and 3, and connecting battery negative (−) terminal to terminal No. 1 of main fan motor connector?***

YES : Repair poor contact in main fan motor connector.

NO : Replace main fan motor with a new one.

B: LO MODE OPERATION (WITH A/C MODEL)

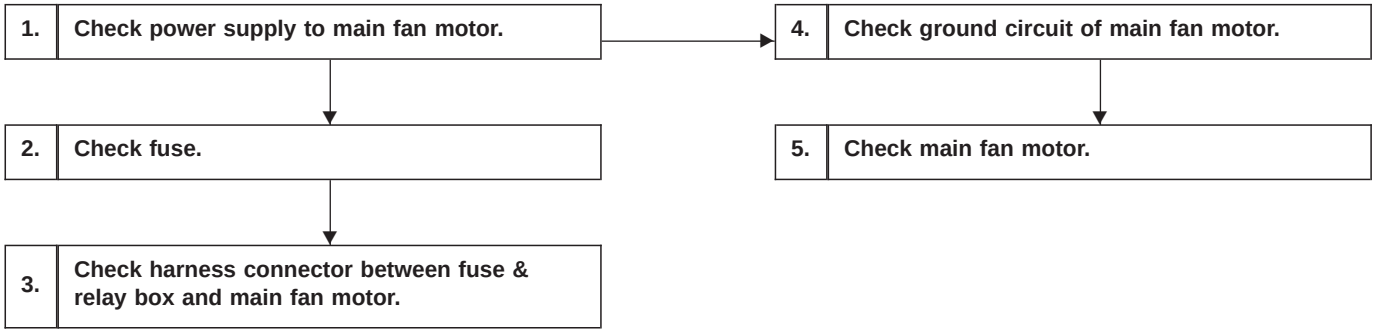
CONDITION:

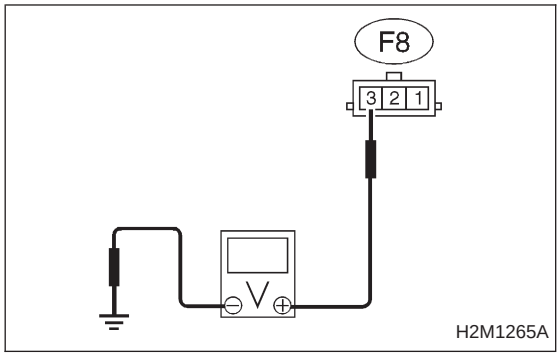
Condition (1) :
- Engine coolant temperature is below 89°C (192°F).
- A/C switch is turned ON.
- Vehicle speed is below 10 km/h (6 MPH).

Condition (2) :
- Engine coolant temperature is above 95°C (203°F).
- A/C switch is turned OFF.
- Vehicle speed is below 10 km/h (6 MPH).

TROUBLE SYMPTOM:

- Radiator main fan does not rotate at LO speed under conditions (1) and (2) above.





1	CHECK POWER SUPPLY TO MAIN FAN MOTOR.

CAUTION:
Be careful not to overheat engine during repair.

1) Turn ignition switch to OFF.
2) Disconnect connector from main fan motor.
3) Warm-up the engine until engine coolant temperature increases over 95°C (203°F).
4) Stop the engine and turn ignition switch to ON.
5) Turn A/C switch to OFF.
6) Measure voltage between main fan motor connector and body.

CHECK : ***Connector & terminal (F8) No. 3 — Body/10 V, or more***

YES : Go to step 4.

NO : Go to step 2.

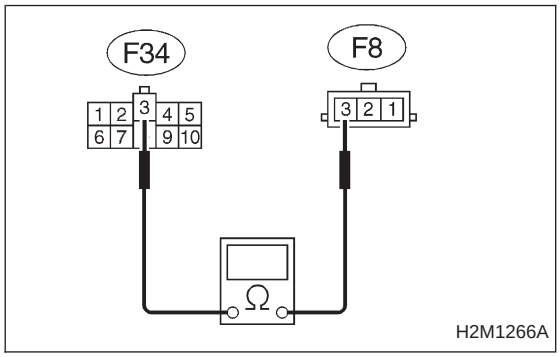
2	CHECK FUSE.

1) Turn ignition switch to OFF.
2) Remove fuse No. 13 from fuse & relay box.
3) Check condition of fuse.

CHECK : ***Is the fuse blown-out?***

YES : Replace fuse.

NO : Go to step 3.



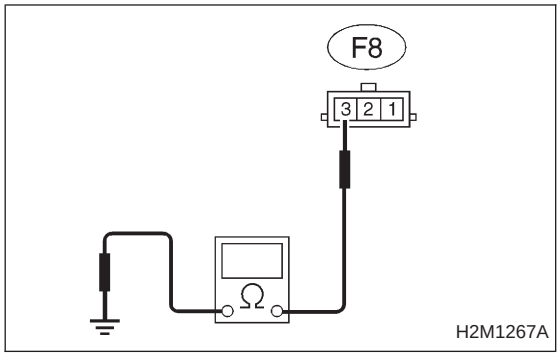
3	CHECK HARNESS CONNECTOR BETWEEN FUSE & RELAY BOX AND MAIN FAN MOTOR.

1) Disconnect connector from fuse & relay box.
2) Measure resistance of harness connector between fuse & relay box and main fan motor.

CHECK : ***Connector & terminal (F34) No. 3 — (F8) No. 3/1 Ω, or less***

YES : Go to next step.

NO : In this case, repair open circuit of harness between fuse & relay box and main fan motor connector.



3) Measure resistance between main fan motor connector and body.

CHECK ***: Connector & terminal (F8) No. 3 — Body/1 MΩ, or more***

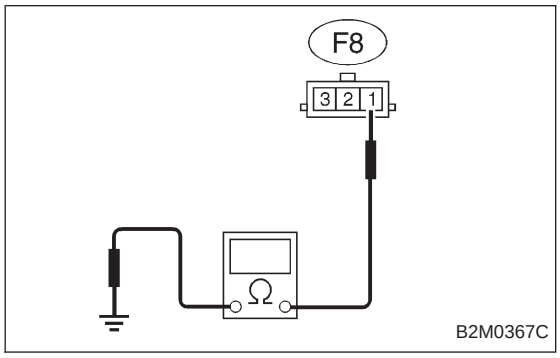
YES : Go to next CHECK .

NO : Repair short circuit between fuse & relay box and main fan motor connector.

CHECK ***: Is there poor contact in fuse & relay box or main fan motor connector?***

YES : Repair poor contact in fuse & relay box or main fan motor connector.

NO : Refer to 2-7b “On-Board Diagnostics II System” diagnostics procedure.



4	**CHECK GROUND CIRCUIT OF MAIN FAN MOTOR.**

1) Turn ignition switch to OFF.
2) Measure resistance between main fan motor connector and body.

CHECK ***: Connector & terminal (F8) No. 1 — Body/5 Ω, or less***

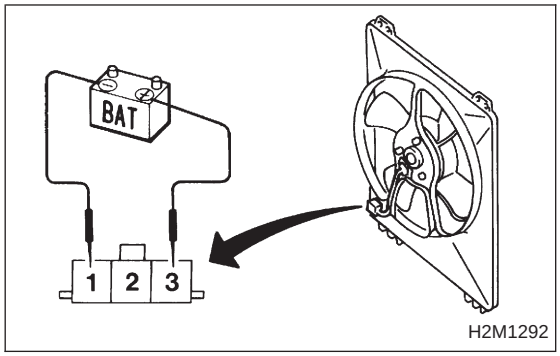
YES : Go to next CHECK .

NO : Repair open circuit of harness between main fan motor connector and body.

CHECK ***: Is there poor contact in main fan motor connector?***

YES : Repair poor contact in main fan motor connector.

NO : Go to step 5.



5	CHECK MAIN FAN MOTOR.

1) Turn ignition switch to OFF.
2) Disconnect connector from main fan motor.

CHECK ***: Does the main fan rotate at LO speed while connecting battery positive (+) terminal to terminal No. 3, and connecting battery negative (−) terminal to terminal No. 1 of main fan motor connector?***

YES : Repair poor contact in main fan motor connector.

NO : Replace main fan motor with a new one.

C: HI MODE OPERATION (WITH A/C MODEL)

CONDITION:

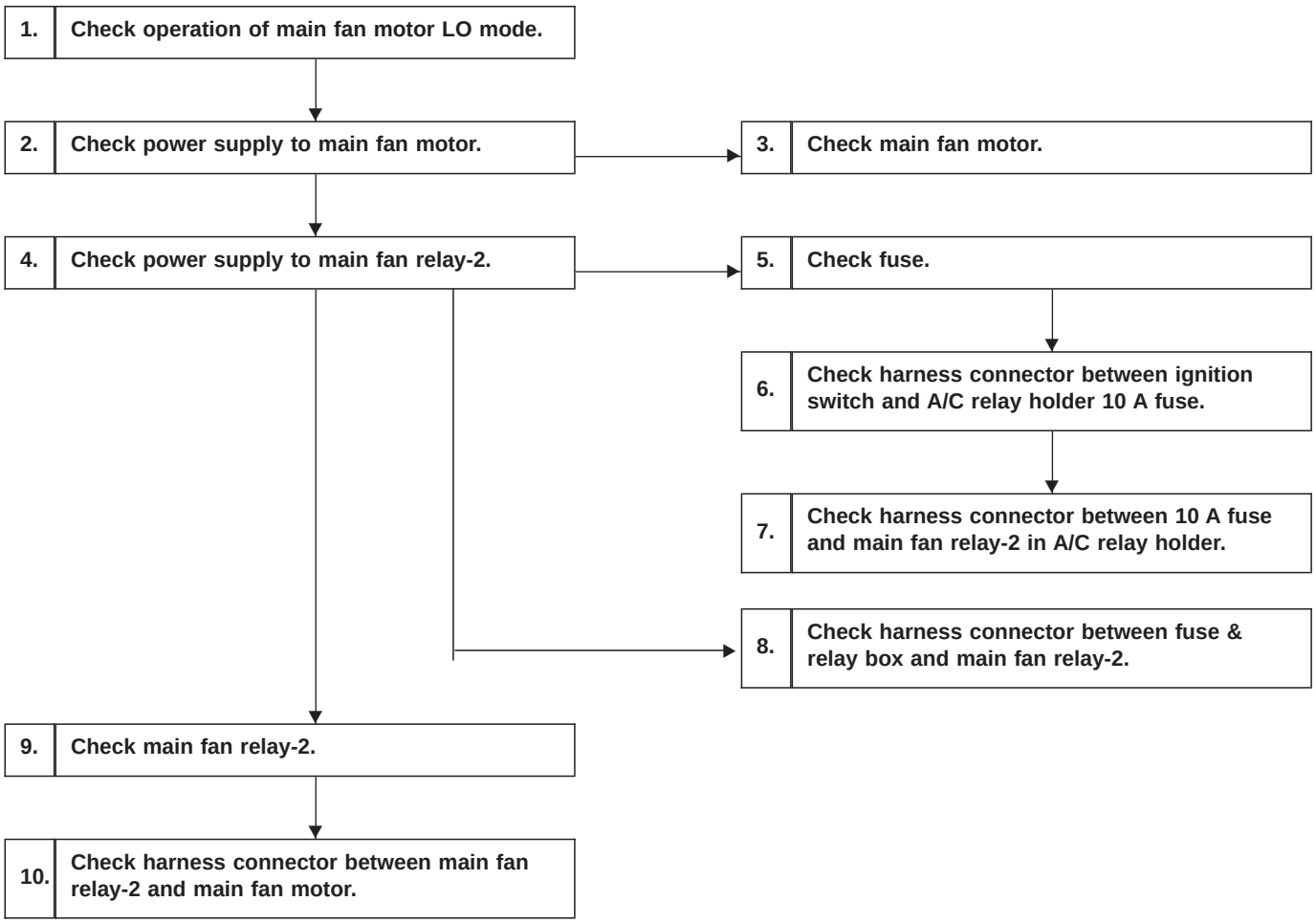
Condition (1) :
- Engine coolant temperature is below 89°C (192°F).
- A/C switch is turned ON.
- Vehicle speed is over 20 km/h (12 MPH).

Condition (2) :
- Engine coolant temperature is above 95°C (203°F).
- A/C switch is turned OFF.
- Vehicle speed is over 20 km/h (12 MPH).

Condition (3) :
- Engine coolant temperature is above 95°C (203°F).
- A/C switch is turned ON.

TROUBLE SYMPTOM:

- Radiator main fan does not rotate at HI speed under conditions (1), (2) and (3) above.



1	CHECK OPERATION OF MAIN FAN MOTOR LO MODE.

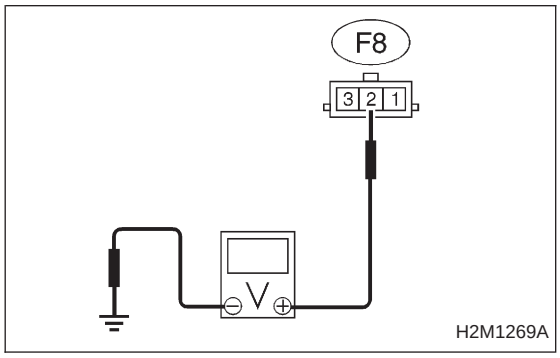
CAUTION:
Be careful not to overheat engine during repair.

1) Warm-up the engine until engine coolant temperature increases over 95°C (203°F).
2) Stop the engine and turn ignition switch to ON.
3) Turn A/C switch to OFF.

CHECK ***: Does the main fan operate at LO MODE?***

YES : Go to step 2.

NO : Go to LO MODE OPERATION diagnostics chart. <Ref. to 2-5 [T2B0].>



2	CHECK POWER SUPPLY TO MAIN FAN MOTOR.

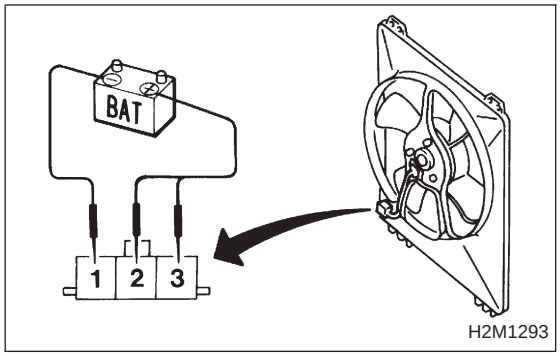
CAUTION:
Be careful not to overheat engine during repair.

1) Turn ignition switch to OFF.
2) Disconnect connector from main fan motor.
3) Warm-up the engine until engine coolant temperature increases over 95°C (203°F).
4) Stop the engine and turn ignition switch to ON.
5) Turn A/C switch to ON.
6) Measure voltage between main fan motor connector and body.

CHECK ***: Connector & terminal***
(F8) No. 2 — Body/10 V, or more

YES : Go to step 3.

NO : Go to step 4.



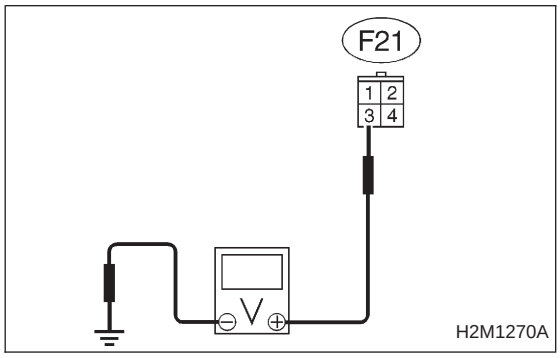
3	CHECK MAIN FAN MOTOR.

1) Turn ignition switch to OFF.
2) Disconnect connector from main fan motor.

CHECK ***: Does the main fan rotate at HI speed while connecting battery positive (+) terminal to terminals Nos. 2 and 3, and connecting battery negative (−) terminal to terminal No. 1 of main fan motor connector?***

YES : Repair poor contact in main fan motor connector.

NO : Replace main fan motor with a new one.



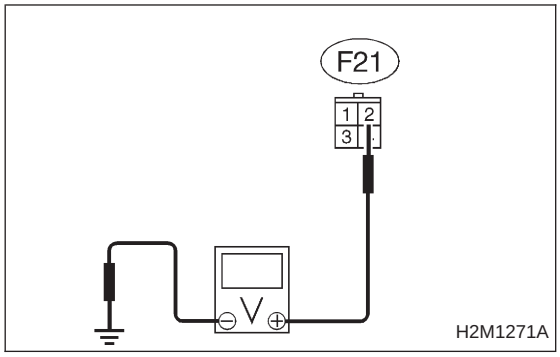
4	CHECK POWER SUPPLY TO MAIN FAN RELAY-2.

1) Turn ignition switch to OFF.
2) Remove main fan relay-2 from A/C relay holder.
3) Turn ignition switch to ON.
4) Measure voltage between main fan relay-2 connector and body.

CHECK ***: Connector & terminal (F21) No. 3 — Body/10 V, or more***

YES : Go to next step.

NO : Go to step 5.



CAUTION:
Be careful not to overheat engine during repair.

5) Start and warm-up the engine until engine coolant temperature increases over 95°C (203°F).
6) Stop the engine and turn ignition switch to ON.
7) Turn A/C switch to ON.
8) Measure voltage between main fan relay-2 connector and body.

CHECK ***: Connector & terminal (F21) No. 2 — Body/10 V, or more***

YES : Go to step 9.

NO : Go to step 8.

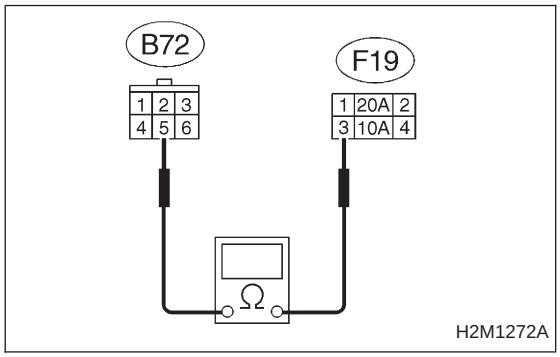
5	**CHECK FUSE.**

1) Turn ignition switch to OFF.
2) Remove 10 A fuse from A/C relay holder.
3) Check condition of fuse.

CHECK ***: Is the fuse blown-out?***

YES : Replace fuse.

NO : Go to step 6.



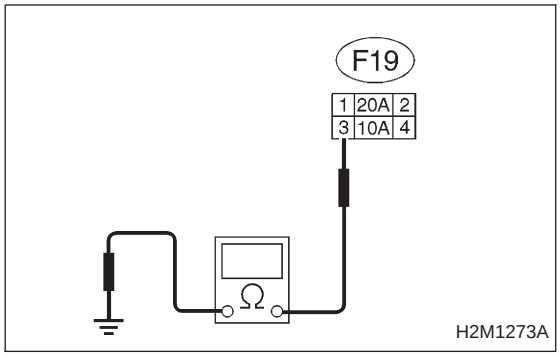
6	**CHECK HARNESS CONNECTOR BETWEEN IGNITION SWITCH AND A/C RELAY HOLDER 10 A FUSE.**

1) Turn ignition switch to OFF.
2) Disconnect connector from ignition switch.
3) Disconnect connectors (F36) and (B35) from fuse & relay box.
4) Measure resistance of harness connector between ignition switch and A/C relay holder 10 A fuse.

CHECK ***: Connector & terminal (B72) No. 5 — (F19) No. 3/1 Ω, or less***

YES : Go to next step.

NO : In this case, repair the following items:
- Open circuit of harness between ignition switch connector and coupling connector (B49)
- Open circuit of harness between coupling connector (F30) and A/C relay holder 10 A fuse connector
- Poor contact in coupling connector (B49)



5) Measure resistance between A/C relay holder 10 A fuse connector and body.

CHECK ***: Connector & terminal (F19) No. 3 — Body/1 MΩ, or more***

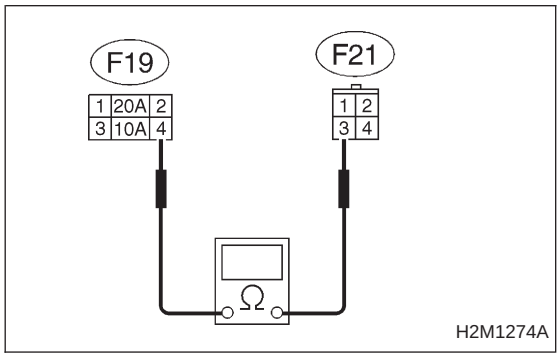
YES : Go to next CHECK .

NO : Repair short circuit between ignition switch and A/C relay holder 10 A fuse connector.

CHECK ***: Is there poor contact in ignition switch or A/C relay holder 10 A fuse connector?***

YES : Repair poor contact in ignition switch or 10 A fuse connector.

NO : Go to step 7.



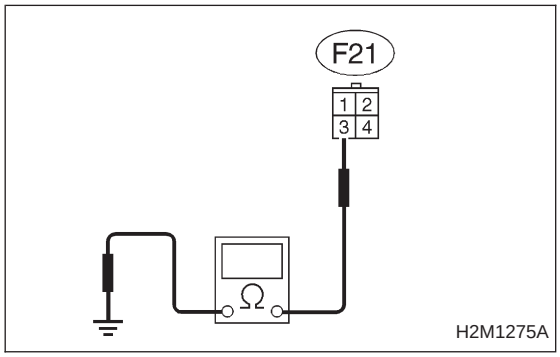
7	**CHECK HARNESS CONNECTOR BETWEEN 10 A FUSE AND MAIN FAN RELAY-2 IN A/C RELAY HOLDER.**

1) Turn ignition switch to OFF.
2) Measure resistance of harness connector between 10 A fuse and main fan relay-2.

CHECK ***: Connector & terminal (F19) No. 4 — (F21) No. 3/1 Ω, or less***

YES : Go to next step.

NO : In this case, repair open circuit of harness between 10 A fuse and main fan relay-2 connector.

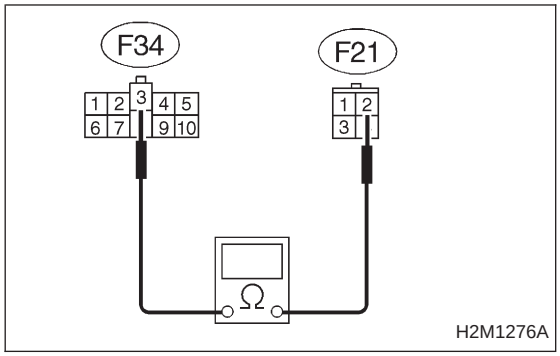


3) Measure resistance between main fan relay-2 connector and body.

CHECK ***: Connector & terminal (F21) No. 3 — Body/1 MΩ, or more***

YES : Repair poor contact in 10 A fuse or main fan relay-2 connector.

NO : Repair short circuit between 10 A fuse and main fan relay-2 connector.



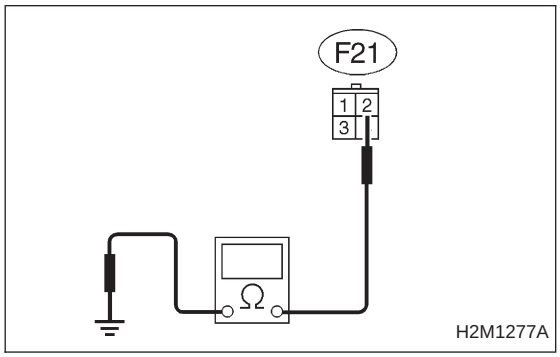
8	CHECK HARNESS CONNECTOR BETWEEN FUSE & RELAY BOX AND MAIN FAN RELAY-2.

1) Turn ignition switch to OFF.
2) Disconnect connector from fuse & relay box.
3) Measure resistance of harness connector between fuse & relay box and main fan relay-2.

CHECK : ***Connector & terminal***
(F34) No. 3 — (F21) No. 2/1 Ω, or less

YES : Go to next step.

NO : In this case, repair open circuit of harness between fuse & relay box and main fan relay-2.

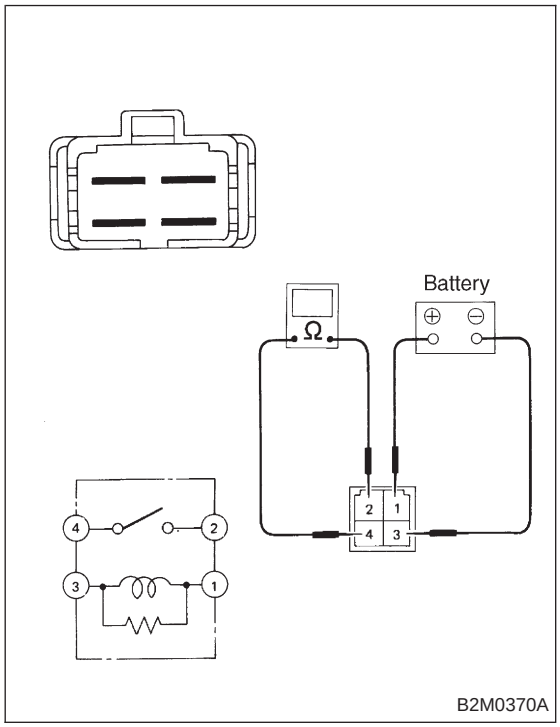


4) Measure resistance between main fan relay-2 connector and body.

CHECK : ***Connector & terminal***
(F21) No. 2 — Body/1 MΩ, or more

YES : Repair poor contact in main fan relay-2 connector.

NO : Repair short circuit between fuse & relay box and main fan relay-2 connector.



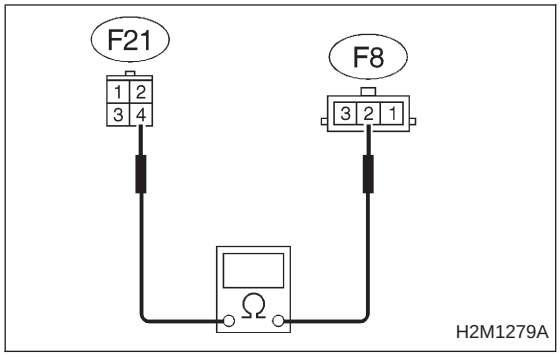
9	CHECK MAIN FAN RELAY-2.

1) Turn ignition switch to OFF.
2) Remove main fan relay-2 from A/C relay holder.
3) Check continuity between main fan relay-2 terminals.

CHECK : ① ***Does continuity exist between terminals (2) and (4) while connecting battery to terminals (1) and (3)?***
② ***Does no continuity exist between terminals (2) and (4) when battery is disconnected?***

YES : Go to step 10.

NO : Replace main fan relay-2.



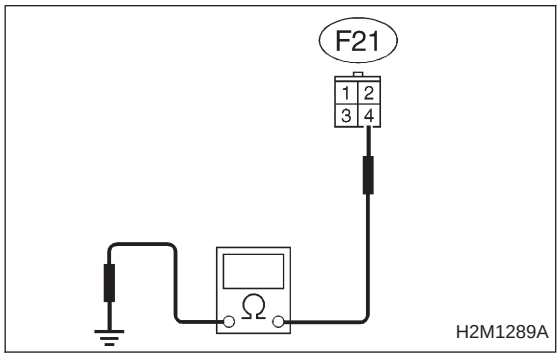
10	CHECK HARNESS CONNECTOR BETWEEN MAIN FAN RELAY-2 AND MAIN FAN MOTOR.

1) Turn ignition switch to OFF.
2) Measure resistance of harness connector between main fan relay-2 and main fan motor.

CHECK ***: Connector & terminal (F21) No. 4 — (F8) No. 2/1 Ω, or less***

YES : Go to next step.

NO : In this case, repair open circuit of harness between main fan relay-2 and main fan motor connector.



3) Measure resistance between main fan relay-2 connector and body.

CHECK ***: Connector & terminal (F21) No. 4 — Body/1 MΩ, or more***

YES : Go to next CHECK .

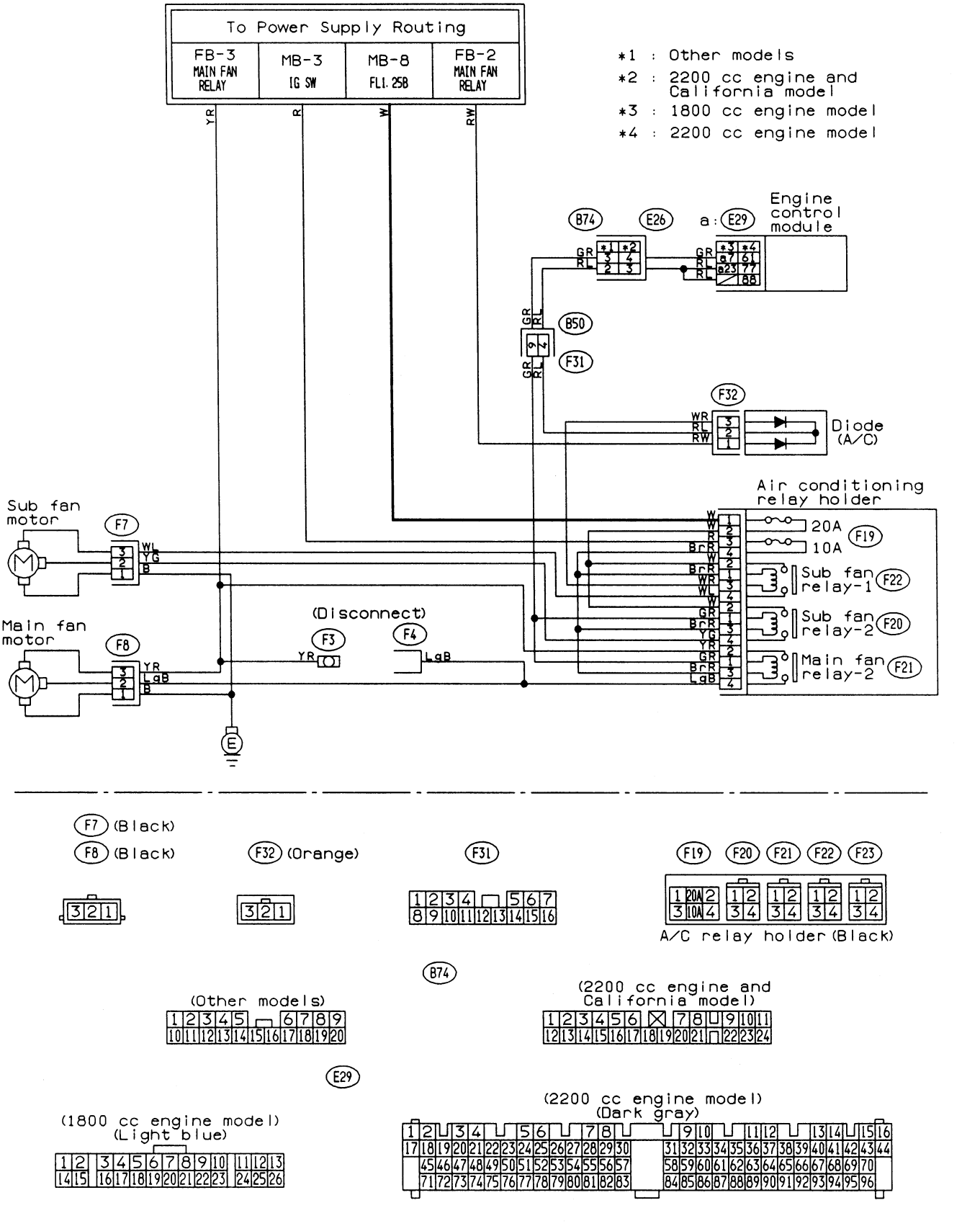
NO : Repair short circuit between main fan relay-2 and main fan motor connector.

CHECK ***: Is there poor contact in main fan relay-2 or main fan motor connector?***

YES : Repair poor contact in main fan relay-2 or main fan motor connector.

NO : Refer to 2-7b “On-Board Diagnostics II System” diagnostics procedure.

3. Radiator Sub Fan (With A/C model only) (2200 cc Model)



GU14-03

A: LO MODE OPERATION

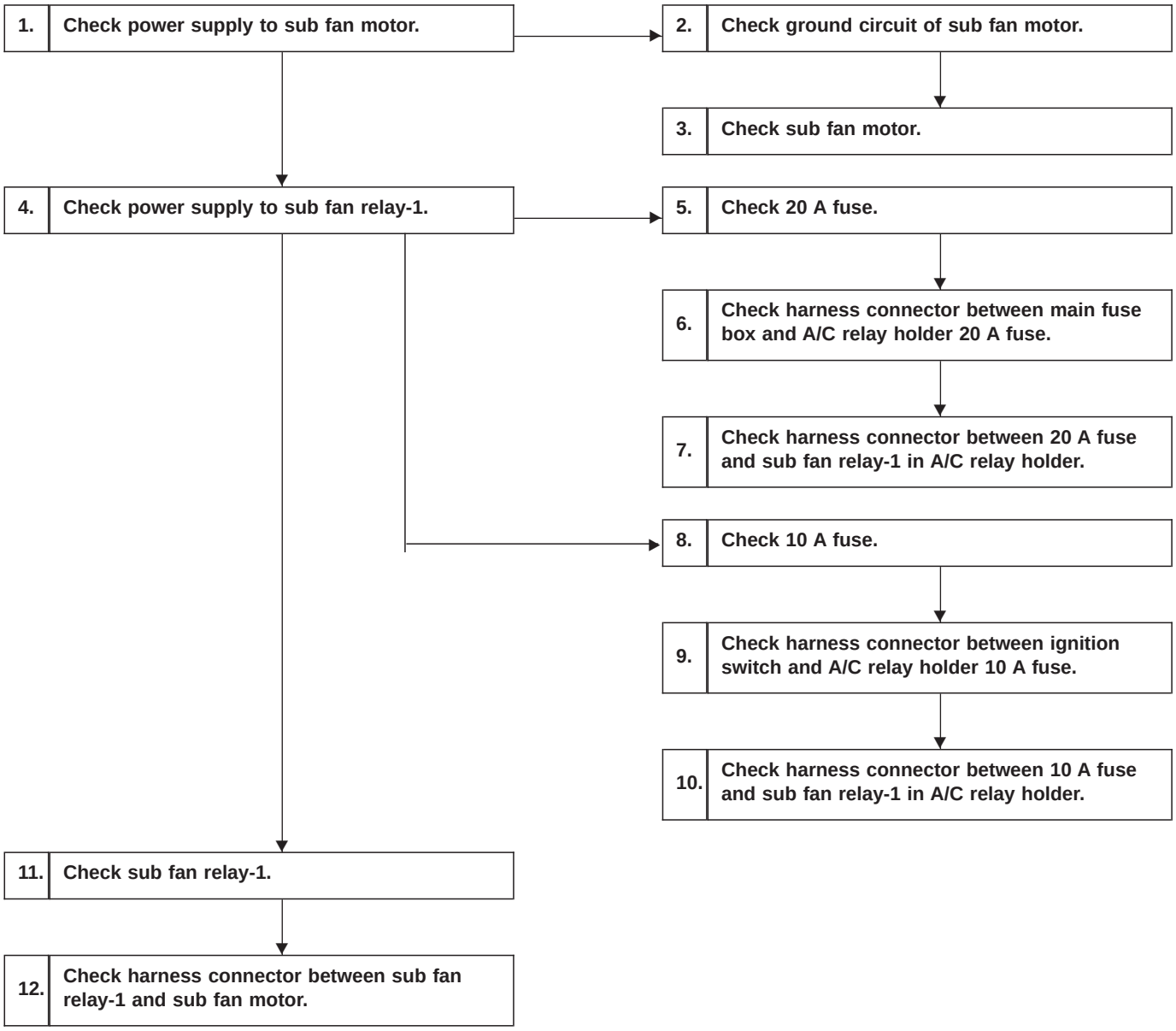
CONDITION:

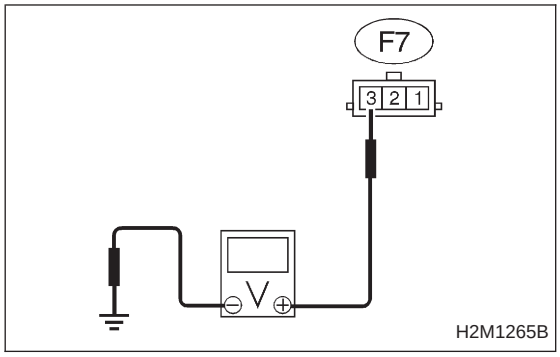
Condition (1) :
- Engine coolant temperature is below 89°C (192°F).
- A/C switch is turned ON.
- Vehicle speed is below 10 km/h (6 MPH).

Condition (2) :
- Engine coolant temperature is above 95°C (203°F).
- A/C switch is turned OFF.
- Vehicle speed is below 10 km/h (6 MPH).

TROUBLE SYMPTOM:

- Radiator sub fan does not rotate at LO speed under conditions (1) and (2) above.





1	CHECK POWER SUPPLY TO SUB FAN MOTOR.

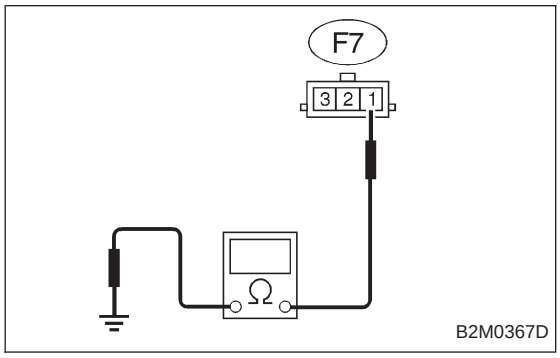
CAUTION:
Be careful not to overheat engine during repair.

1) Turn ignition switch to OFF.
2) Disconnect connector from sub fan motor.
3) Warm-up the engine until engine coolant temperature increases over 95°C (203°F).
4) Stop the engine and turn ignition switch to ON.
5) Turn A/C switch to OFF.
6) Measure voltage between sub fan motor connector and body.

CHECK ***: Connector & terminal (F7) No. 3 — Body/10 V, or more***

YES : Go to step 2.

NO : Go to step 4.



2	CHECK GROUND CIRCUIT OF SUB FAN MOTOR.

1) Turn ignition switch to OFF.
2) Measure resistance between sub fan motor connector and body.

CHECK ***: Connector & terminal (F7) No. 1 — Body/5 Ω, or less***

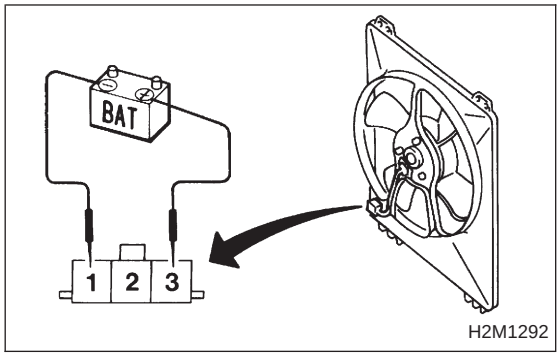
YES : Go to next CHECK .

NO : Repair open circuit of harness between sub fan motor connector and body.

CHECK ***: Is there poor contact in sub fan motor connector?***

YES : Repair poor contact in sub fan motor connector.

NO : Go to step 3.



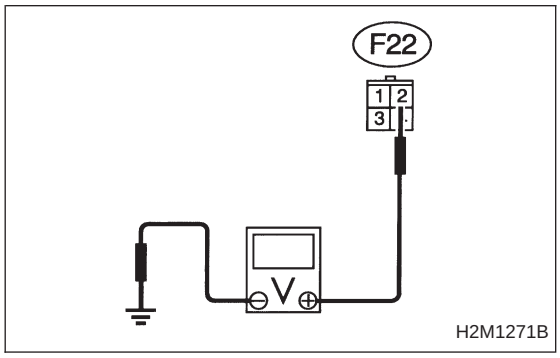
3	CHECK SUB FAN MOTOR.

1) Turn ignition switch to OFF.
2) Disconnect connector from sub fan motor.

CHECK : ***Does the sub fan rotate at LO speed while connecting battery positive (+) terminal to terminal No. 3, and connecting battery negative (−) terminal to terminal No. 1 of sub fan motor connector?***

YES : Repair poor contact in sub fan motor connector.

NO : Replace sub fan motor with a new one.



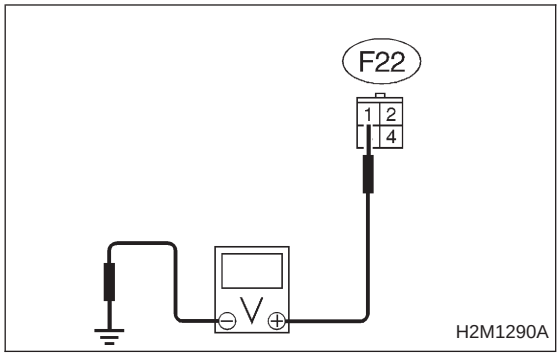
4	CHECK POWER SUPPLY TO SUB FAN RELAY-1.

1) Turn ignition switch to OFF.
2) Remove sub fan relay-1 from A/C relay holder.
3) Measure voltage between sub fan relay-1 connector and body.

CHECK : ***Connector & terminal (F22) No. 2 — Body/10 V, or more***

YES : Go to next step.

NO : Go to step 5.



CAUTION:
Be careful not to overheat engine during repair.

4) Start and warm-up the engine until engine coolant temperature increases over 95°C (203°F).
5) Stop the engine and turn ignition switch to ON.
6) Turn A/C switch to OFF.
7) Measure voltage between sub fan relay-1 connector and body.

CHECK ***: Connector & terminal (F22) No. 1 — Body/10 V, or more***

YES : Go to step 11.

NO : Go to step 8.

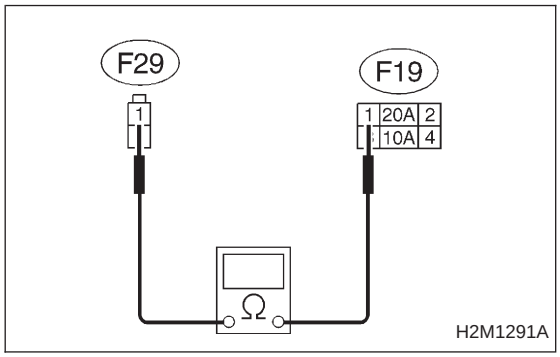
5	CHECK 20 A FUSE.

1) Turn ignition switch to OFF.
2) Remove 20 A fuse from A/C relay holder.
3) Check condition of fuse.

CHECK ***: Is the fuse blown-out?***

YES : Replace fuse.

NO : Go to step 6.



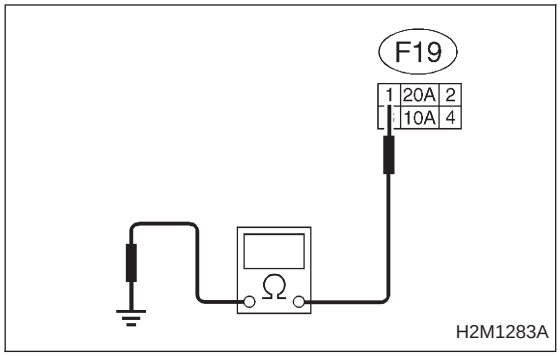
6	CHECK HARNESS CONNECTOR BETWEEN MAIN FUSE BOX AND A/C RELAY HOLDER 20 A FUSE.

1) Turn ignition switch to OFF.
2) Disconnect connector from main fuse box.
3) Measure resistance of harness connector between main fuse box and A/C relay holder 20 A fuse connector.

CHECK ***: Connector & terminal (F29) No. 1 — (F19) No. 1/1 Ω, or less***

YES : Go to next step.

NO : In this case, repair open circuit of harness between main fuse box and 20 A fuse connector.



4) Disconnect connector (F18) from SBF holder, and disconnect connectors (F16) and (F17) from generator.
5) Measure resistance between 20 A fuse connector and body.

CHECK ***: Connector & terminal (F19) No. 1 — Body/1 MΩ, or more***

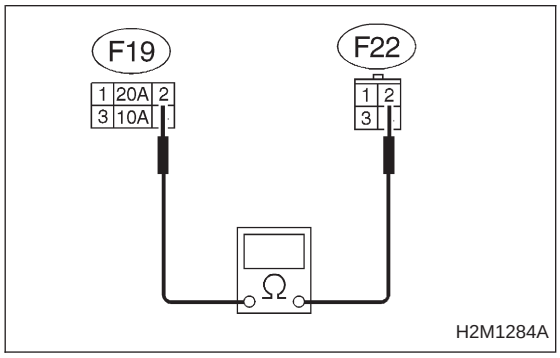
YES : Go to next CHECK .

NO : Repair short circuit between main fuse box and 20 A fuse connector.

CHECK ***: Is there poor contact in main fuse box or 20 A fuse connector?***

YES : Repair poor contact in main fuse box or 20 A fuse connector.

NO : Go to step 7.



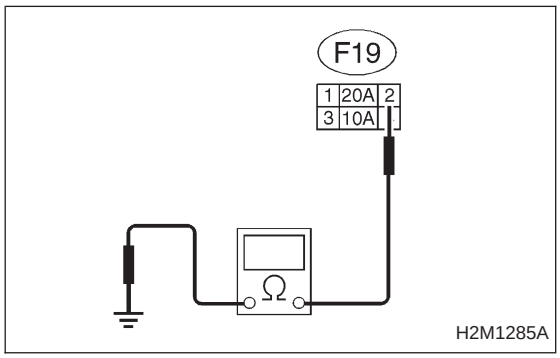
7	**CHECK HARNESS CONNECTOR BETWEEN 20 A FUSE AND SUB FAN RELAY-1 IN A/C RELAY HOLDER.**

1) Measure resistance of harness connector between 20 A fuse and sub fan relay-1.

CHECK ***: Connector & terminal (F19) No. 2 — (F22) No. 2/1 Ω, or less***

YES : Go to next step.

NO : In this case, repair open circuit of harness between 20 A fuse and sub fan relay-1 connector.



2) Measure resistance between 20 A fuse connector and body.

CHECK ***: Connector & terminal (F19) No. 2 — Body/1 MΩ, or more***

YES : Repair poor contact in 20 A fuse or sub fan relay-1 connector.

NO : Repair short circuit between 20 A fuse and sub fan relay-1 connector.

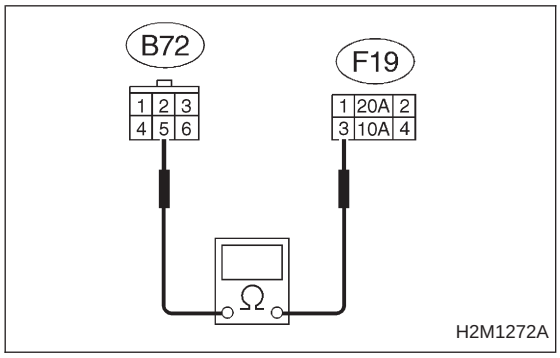
8	CHECK 10 A FUSE.

1) Turn ignition switch to OFF.
2) Remove 10 A fuse from A/C relay holder.
3) Check condition of fuse.

CHECK ***: Is the fuse blown-out?***

YES : Replace fuse.

NO : Go to step 9.



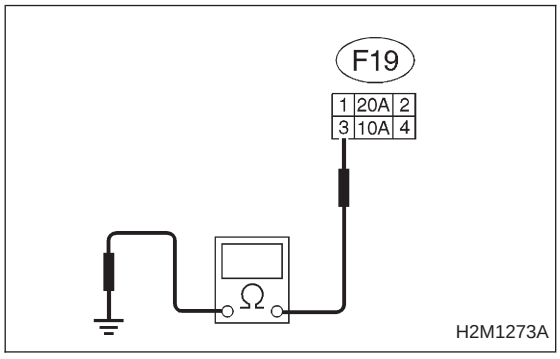
9	CHECK HARNESS CONNECTOR BETWEEN IGNITION SWITCH AND A/C RELAY HOLDER 10 A FUSE.

1) Turn ignition switch to OFF.
2) Disconnect connector from ignition switch.
3) Disconnect connectors (F36) and (B35) from fuse & relay box.
4) Measure resistance of harness connector between ignition switch and A/C relay holder 10 A fuse connector.

CHECK ***: Connector & terminal***
(B72) No. 5 — (F19) No. 3/1 Ω, or less

YES : Go to next step.

NO : In this case, repair the following items:
- Open circuit of harness between ignition switch connector and coupling connector (B49)
- Open circuit of harness between coupling connector (F30) and A/C relay holder 10 A fuse connector
- Poor contact in coupling connector (B49)



5) Measure resistance between A/C relay holder 10 A fuse connector and body.

CHECK ***: Connector & terminal***
(F19) No. 3 — Body/1 MΩ, or more

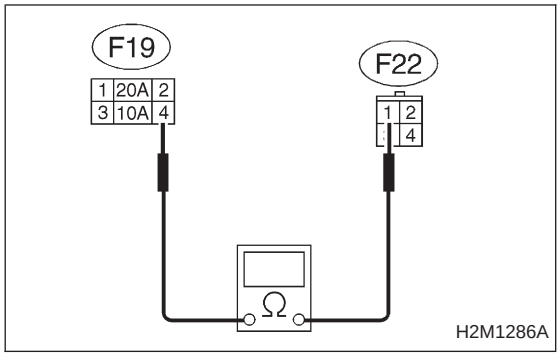
YES : Go to next CHECK .

NO : Repair short circuit between ignition switch and 10 A fuse connector.

CHECK ***: Is there poor contact in ignition switch or 10 A fuse connector?***

YES : Repair poor contact in ignition switch or 10 A fuse connector.

NO : Go to step 10.



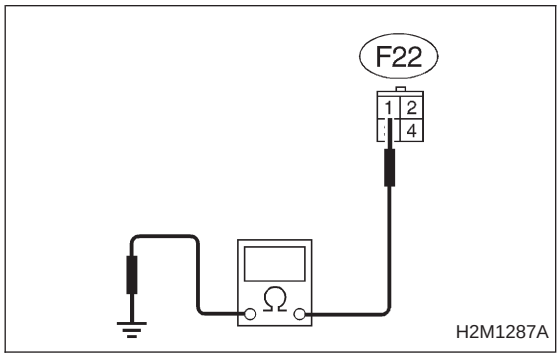
10	CHECK HARNESS CONNECTOR BETWEEN 10 A FUSE AND SUB FAN RELAY-1 IN A/C RELAY HOLDER.

1) Measure resistance of harness connector between 10 A fuse and sub fan relay-1.

CHECK : ***Connector & terminal (F19) No. 4 — (F22) No. 1/1 Ω, or less***

YES : Go to next step.

NO : In this case, repair open circuit of harness between 10 A fuse and sub fan relay-1 connector in A/C relay holder.

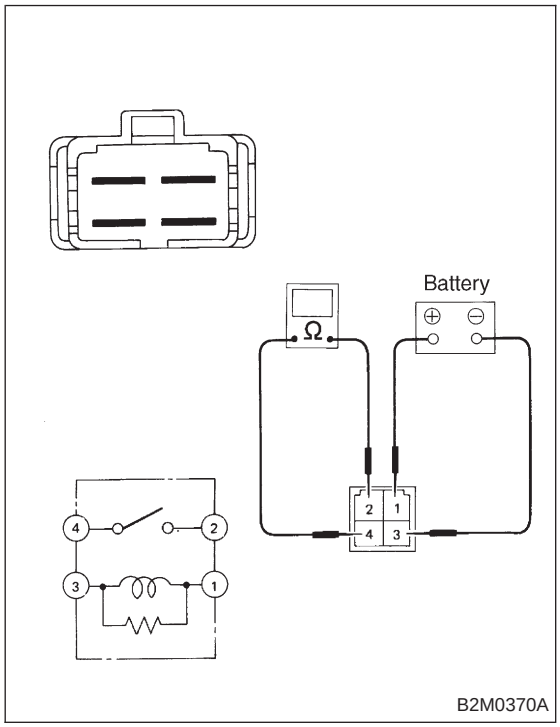


2) Measure resistance between sub fan relay-1 connector and body.

CHECK : ***Connector & terminal (F22) No. 1 — Body/1 MΩ, or more***

YES : Repair poor contact in 10 A fuse or sub fan relay-1 connector.

NO : Repair short circuit between 10 A fuse and sub fan relay-1 connector.



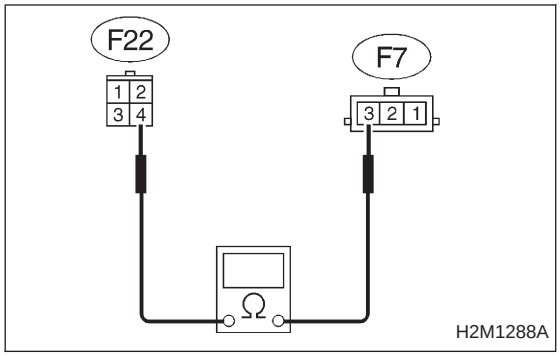
11	CHECK SUB FAN RELAY-1.

Check continuity between sub fan relay-1 terminals.

CHECK : ① ***Does continuity exist between terminals (2) and (4) while connecting battery to terminals (1) and (3)?***
② ***Does no continuity exist between terminals (2) and (4) when battery is disconnected?***

YES : Go to step 12.

NO : Replace sub fan relay-1.



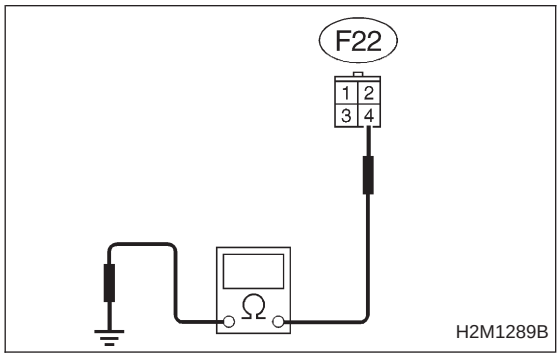
12	CHECK HARNESS CONNECTOR BETWEEN SUB FAN RELAY-1 AND SUB FAN MOTOR.

1) Turn ignition switch to OFF.
2) Disconnect connector from sub fan motor.
3) Measure resistance of harness connector between sub fan relay-1 and sub fan motor.

CHECK ***: Connector & terminal (F22) No. 4 — (F7) No. 3/1 Ω, or less***

YES : Go to next step.

NO : In this case, repair open circuit of harness between sub fan relay-1 and sub fan motor connector.



4) Measure resistance between sub fan relay-1 connector and body.

CHECK ***: Connector & terminal (F22) No. 4 — Body/1 MΩ, or more***

YES : Go to next CHECK .

NO : Repair short circuit between sub fan relay-1 and sub fan motor connector.

CHECK ***: Is there poor contact in sub fan relay-1 or sub fan motor connector?***

YES : Repair poor contact in sub fan relay-1 or sub fan motor connector.

NO : Refer to 2-7b “On-Board Diagnostics II System” diagnostics procedure.

B: HI MODE OPERATION

CONDITION:

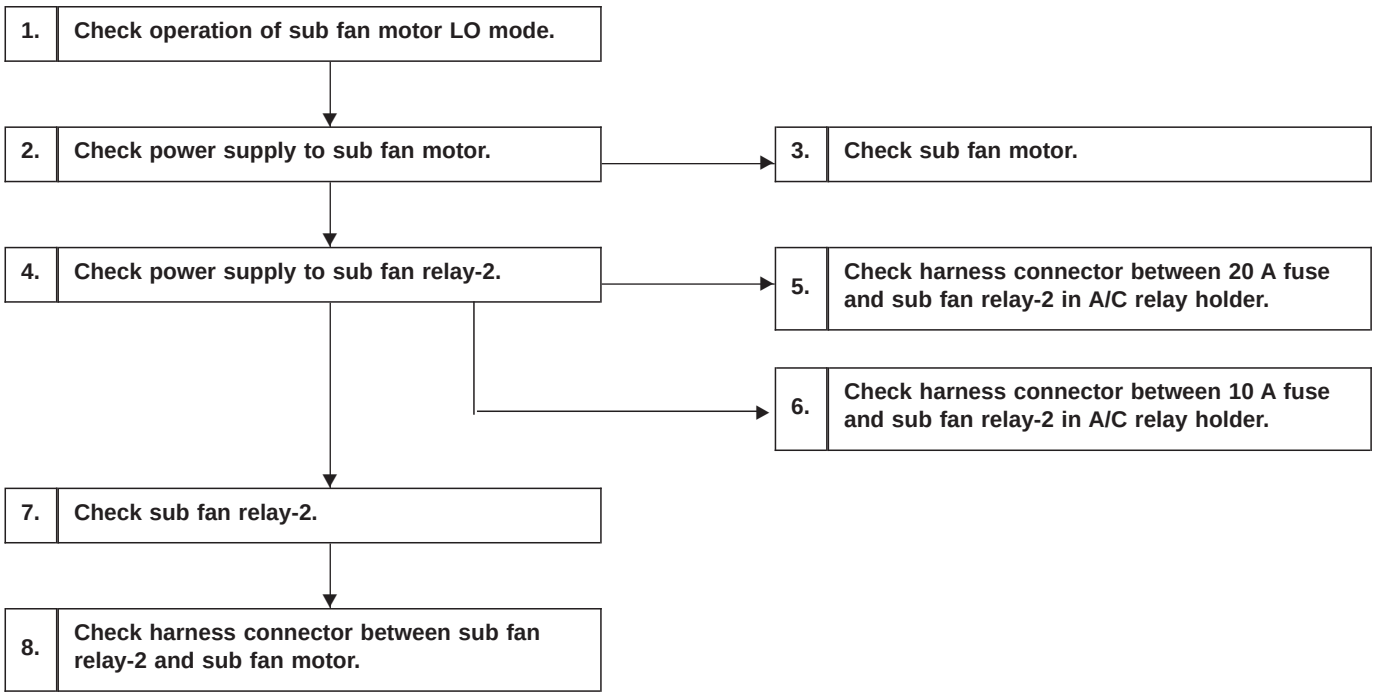
Condition (1) :
- Engine coolant temperature is below 89°C (192°F).
- A/C switch is turned ON.
- Vehicle speed is over 20 km/h (12 MPH).

Condition (2) :
- Engine coolant temperature is above 95°C (203°F).
- A/C switch is turned OFF.
- Vehicle speed is over 20 km/h (12 MPH).

Condition (3) :
- Engine coolant temperature is above 95°C (203°F).
- A/C switch is turned ON.

TROUBLE SYMPTOM:

- Radiator sub fan does not rotate at HI speed under conditions (1), (2) and (3) above.



1	CHECK OPERATION OF SUB FAN MOTOR LO MODE.

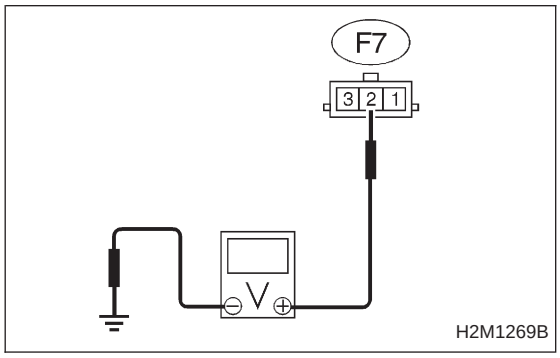
CAUTION:
Be careful not to overheat engine during repair.

1) Warm-up the engine until engine coolant temperature increases over 95°C (203°F).
2) Stop the engine and turn ignition switch to ON.
3) Turn A/C switch to OFF.

CHECK ***: Does the sub fan operate at LO MODE?***

YES : Go to step 2.

NO : Go to LO MODE OPERATION diagnostics chart. <Ref. to 2-5 [T3A0].>



2	CHECK POWER SUPPLY TO SUB FAN MOTOR.

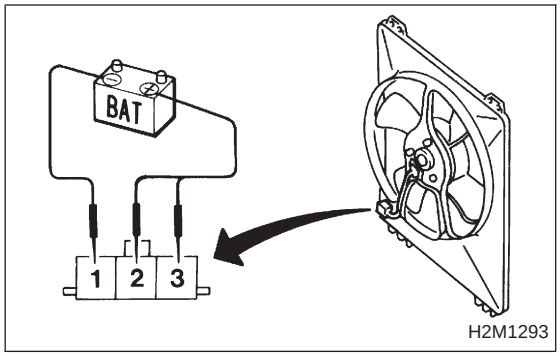
CAUTION:
Be careful not to overheat engine during repair.

1) Turn ignition switch to OFF.
2) Disconnect connector from sub fan motor.
3) Warm-up the engine until engine coolant temperature increases over 95°C (203°F).
4) Stop the engine and turn ignition switch to ON.
5) Turn A/C switch to ON.
6) Measure voltage between sub fan motor connector and body.

CHECK ***: Connector & terminal***
(F7) No. 2 — Body/10 V, or more

YES : Go to step 3.

NO : Go to step 4.



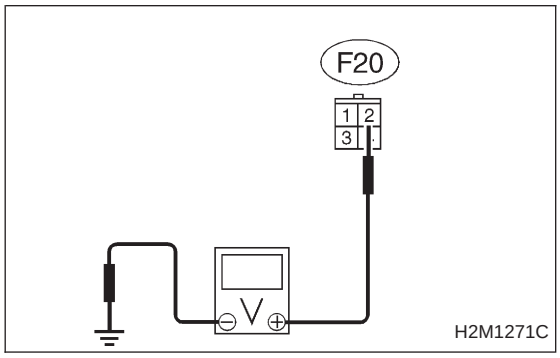
3	CHECK SUB FAN MOTOR.

1) Turn ignition switch to OFF.
2) Disconnect connector from sub fan motor.

CHECK : ***Does the sub fan rotate at HI speed while connecting battery positive (+) terminal to terminals Nos. 2 and 3, and connecting battery negative (−) terminal to terminal No. 1 of sub fan motor connector?***

YES : Repair poor contact in sub fan motor connector.

NO : Replace sub fan motor with a new one.



4	CHECK POWER SUPPLY TO SUB FAN RELAY-2.

1) Turn ignition switch to OFF.
2) Remove sub fan relay-2 from A/C relay holder.
3) Measure voltage between sub fan relay-2 connector and body.

CHECK : ***Connector & terminal (F20) No. 2 — Body/10 V, or more***

YES : Go to next step.

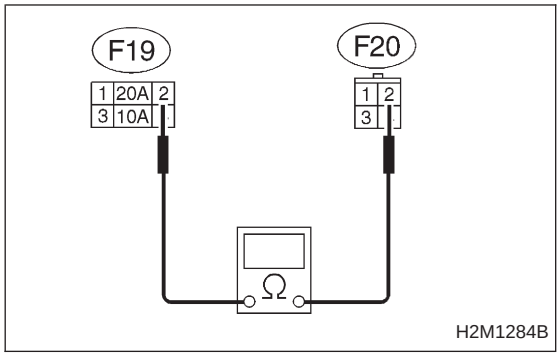
NO : Go to step 5.

4) Turn ignition switch to ON.
5) Measure voltage between sub fan relay-2 connector and body.

CHECK : ***Connector & terminal (F20) No. 3 — Body/10 V, or more***

YES : Go to step 7.

NO : Go to step 6.



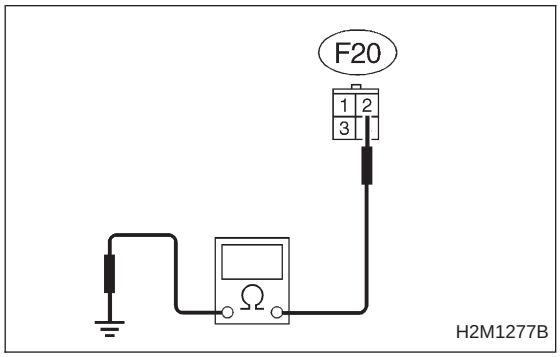
5	CHECK HARNESS CONNECTOR BETWEEN 20 A FUSE AND SUB FAN RELAY-2 IN A/C RELAY HOLDER.

1) Turn ignition switch to OFF.
2) Remove 20 A fuse from A/C relay holder.
3) Measure resistance of harness connector between 20 A fuse and sub fan relay-2.

CHECK : ***Connector & terminal***
(F19) No. 2 — (F20) No. 2/1 Ω, or less

YES : Go to next step.

NO : In this case, repair open circuit of harness between 20 A fuse and sub fan relay-2 connector.

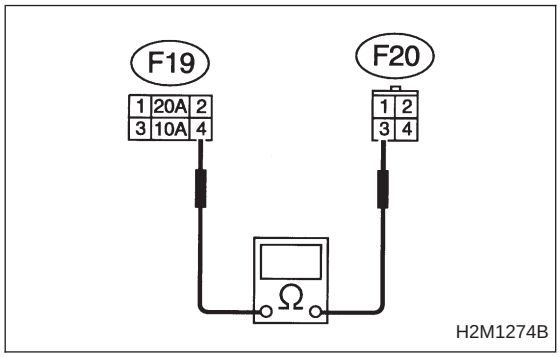


4) Measure resistance between sub fan relay-2 connector and body.

CHECK : ***Connector & terminal***
(F20) No. 2 — Body/1 MΩ, or more

YES : Repair poor contact in 20 A fuse or sub fan relay-2 connector.

NO : Repair short circuit between 20 A fuse and sub fan relay-2 connector.



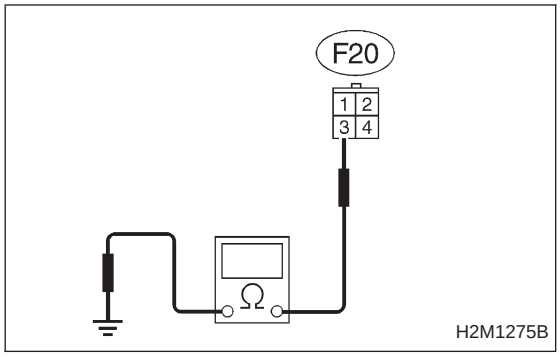
6	CHECK HARNESS CONNECTOR BETWEEN 10 A FUSE AND SUB FAN RELAY-2 IN A/C RELAY HOLDER.

1) Turn ignition switch to OFF.
2) Remove 10 A fuse from A/C relay holder.
3) Measure resistance of harness connector between 10 A fuse and sub fan relay-2.

CHECK : ***Connector & terminal***
(F19) No. 4 — (F20) No. 3/1 Ω, or less

YES : Go to next step.

NO : In this case, repair open circuit of harness between 10 A fuse and sub fan relay-2 connector.

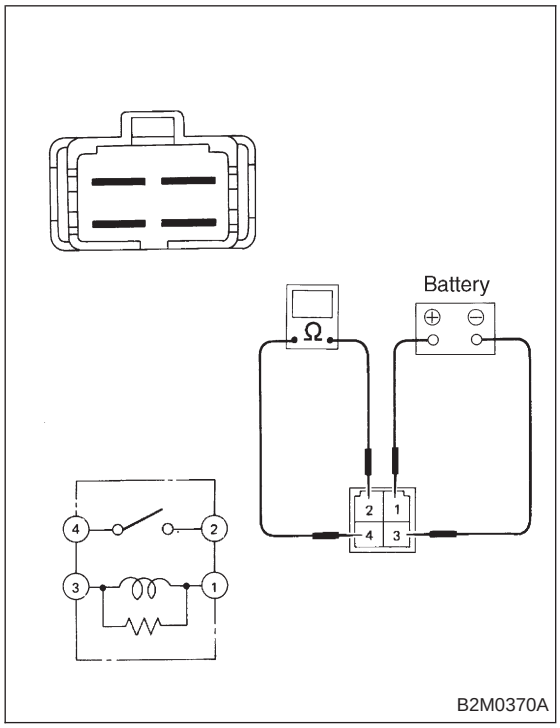


4) Measure resistance between sub fan relay-2 connector and body.

CHECK ***: Connector & terminal (F20) No. 3 — Body/1 MΩ, or more***

YES : Repair poor contact in 10 A fuse or sub fan relay-2 connector.

NO : Repair short circuit between 10 A fuse and sub fan relay-2 connector.



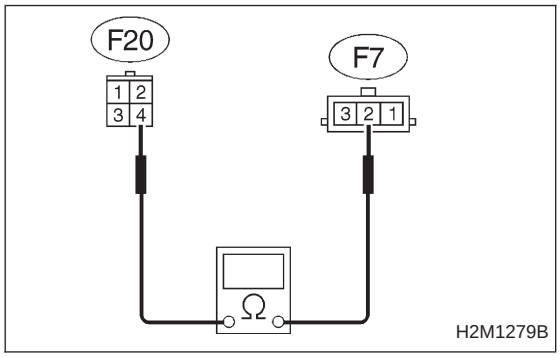
7	CHECK SUB FAN RELAY-2.

Check continuity between sub fan relay-2 terminals.

CHECK ***: ① Does continuity exist between terminals (2) and (4) while connecting battery to terminals (1) and (3)?***
② Does no continuity exist between terminals (2) and (4) when battery is disconnected?

YES : Go to step 8.

NO : Replace sub fan relay-2.



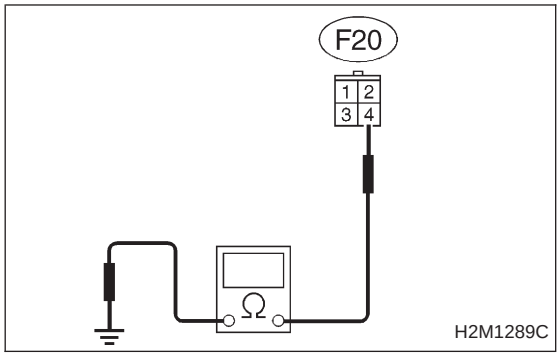
8	CHECK HARNESS CONNECTOR BETWEEN SUB FAN RELAY-2 AND SUB FAN MOTOR.

1) Turn ignition switch to OFF.
2) Disconnect connector from sub fan motor.
3) Measure resistance of harness connector between sub fan relay-2 and sub fan motor.

CHECK ***: Connector & terminal (F20) No. 4 — (F7) No. 2/1 Ω, or less***

YES : Go to next step.

NO : In this case, repair open circuit of harness between sub fan relay-2 and sub fan motor connector.



4) Measure resistance between sub fan relay-2 connector and body.

CHECK ***: Connector & terminal (F20) No. 4 — Body/1 MΩ, or more***

YES : Go to next CHECK .

NO : Repair short circuit between sub fan relay-2 and sub fan motor connector.

CHECK ***: Is there poor contact in sub fan relay-2 or sub fan motor connector?***

YES : Repair poor contact in sub fan relay-2 or sub fan motor connector.

NO : Refer to 2-7b “On-Board Diagnostics II System” diagnostics procedure.