ENGINE COOLING SYSTEM 2-5

1. Radiator Main Fan

A: OPERATION (WITHOUT A/C MODEL)

DETECTING CONDITION:

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

TROUBLE SYMPTOM:

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

1A1	**CHECK POWER SUPPLY TO MAIN FAN MOTOR.**

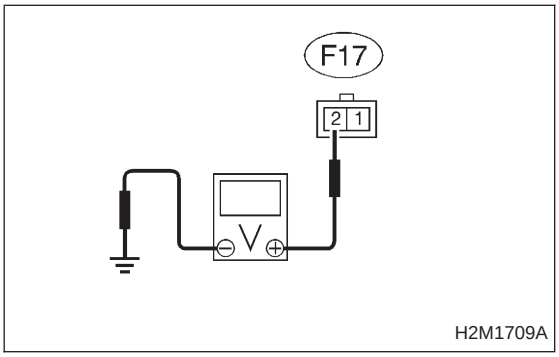
CAUTION:
Be careful not to overheat engine during repair.

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 chassis ground.

Connector & terminal
(F17) No. 2 (+) — Chassis ground (−):

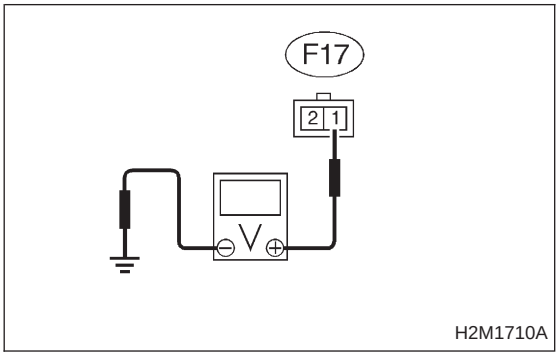
CHECK ***: Is the voltage more than 10 V?***

YES : Go to step **1A2**.

NO : Go to step **1A5**.

1A2	**CHECK GROUND CIRCUIT OF MAIN FAN MOTOR.**

1) Turn ignition switch to OFF.



2) Measure resistance between main fan motor connector and chassis ground.

Connector & terminal
(F17) No. 1 — Chassis ground:

CHECK ***: Is the resistance less than 5 Ω?***

YES : Go to step **1A3**.

NO : Repair open circuit in harness between main fan motor connector and chassis ground.

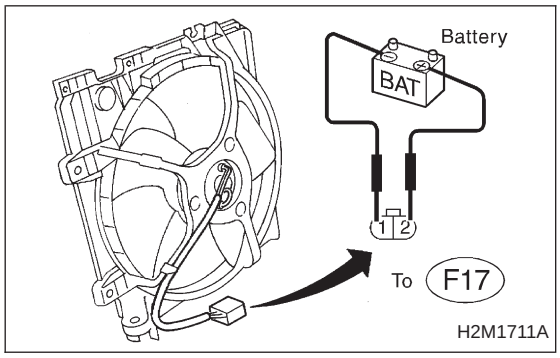
1A3	CHECK POOR CONTACT.

Check poor contact in main fan motor connector. <Ref. to FOREWORD [T3C1].>

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

YES : Repair poor contact in main fan motor connector.

NO : Go to step **1A4**.



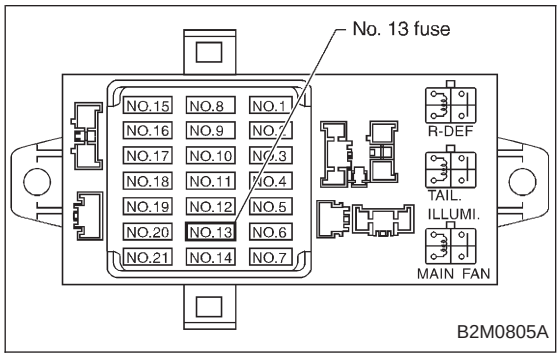
1A4	CHECK MAIN FAN MOTOR.

Connect battery positive (+) terminal to terminal No. 2 and negative (−) terminal to terminal No. 1 of main fan motor connector.

CHECK : ***Does the main fan rotate?***

YES : Repair poor contact in main fan motor connector.

NO : Replace main fan motor with a new one.



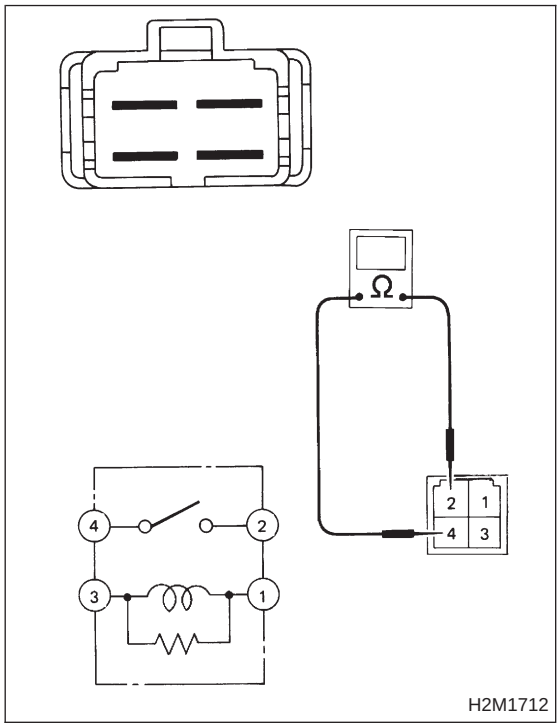
1A5	CHECK FUSE.

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

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

YES : Replace fuse.

NO : Go to step **1A6**.



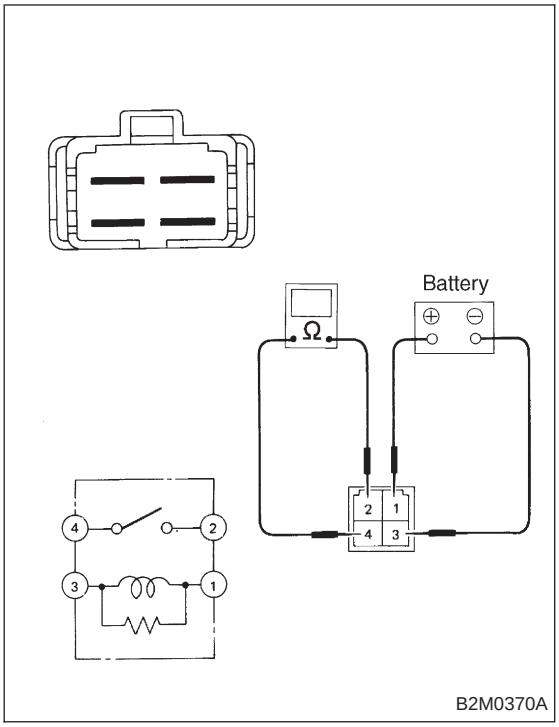
1A6	CHECK MAIN FAN RELAY.

1) Remove main fan relay from fuse and relay box.
2) Check continuity between main fan relay terminals.

CHECK : ***Does no continuity exist between terminals No. 2 and No. 4?***

YES : Go to step **1A7**.

NO : Replace main fan relay.



1A7	CHECK MAIN FAN RELAY.

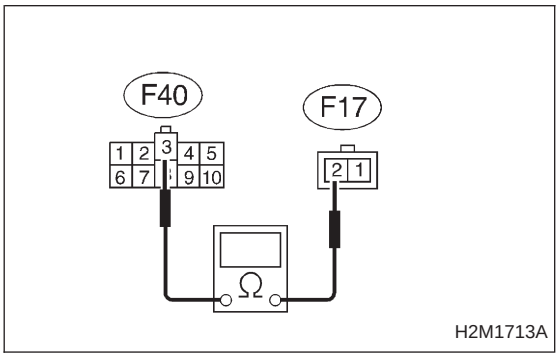
1) Connect battery positive (+) terminal to terminal No. 1 of main fan relay, and negative (−) terminal to terminal No. 3.

2) Check continuity between main fan relay terminals.

CHECK ***: Does continuity exist between terminals No. 2 and No. 4?***

YES : Go to step **1A8**.

NO : Replace main fan relay.



1A8	CHECK HARNESS CONNECTOR BETWEEN FUSE AND RELAY BOX AND MAIN FAN MOTOR.

1) Disconnect connector from fuse and relay box.

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

Connector & terminal
(F40) No. 3 — (F17) No. 2:

CHECK ***: Is the resistance less than 1 Ω?***

YES : Go to step **1A9**.

NO : Repair open circuit in harness between fuse and relay box and main fan motor connector.

1A9	CHECK POOR CONTACT.

Check poor contact in fuse and relay box connector. <Ref. to FOREWORD [T3C1].>

CHECK ***: Is there poor contact in fuse and relay box connector?***

YES : Repair poor contact in fuse and relay box connector.

NO : Go to step **1A10**.

1A10	CHECK POOR CONTACT.

Check poor contact in main fan motor connector. <Ref. to FOREWORD [T3C1].>

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

YES : Repair poor contact in main fan motor connector.

NO : Contact with SOA service.

NOTE:
Inspection by DTM is required, because probable cause is deterioration of multiple parts.

B: OPERATION (WITH A/C MODEL)

DETECTING CONDITION:

Condition (1):

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

Condition (2):

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

TROUBLE SYMPTOM:

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

1B1	**CHECK POWER SUPPLY TO MAIN FAN MOTOR.**

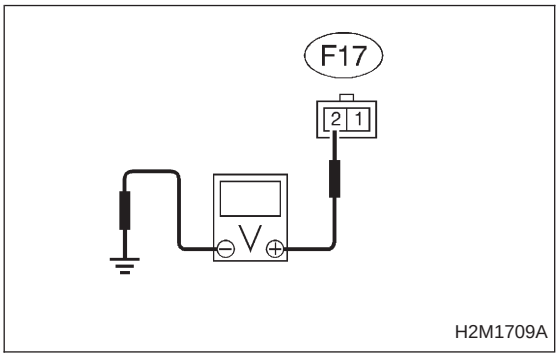
CAUTION:
Be careful not to overheat engine during repair.

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.



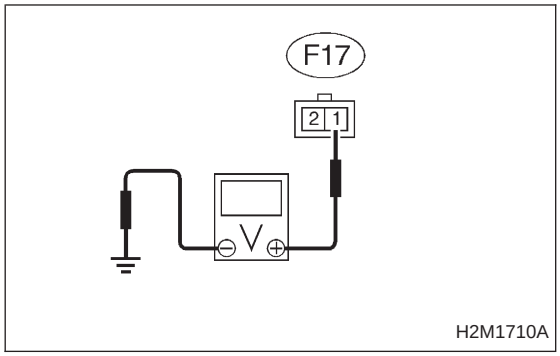
5) Measure voltage between main fan motor connector and chassis ground.

Connector & terminal
(F17) No. 2 (+) — Chassis ground (−):

CHECK ***: Is the voltage more than 10 V?***

YES : Go to step **1B2**.

NO : Go to step **1B5**.

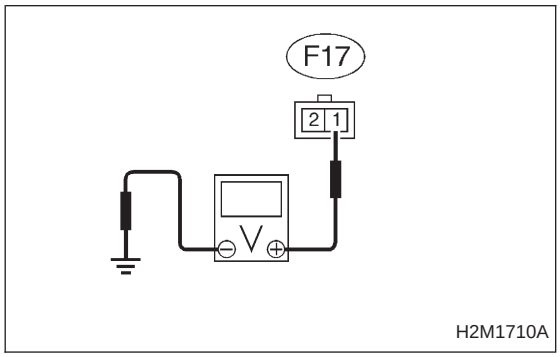


1B2	CHECK GROUND CIRCUIT OF MAIN FAN MOTOR.

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

Connector & terminal
(F17) No. 1 — Chassis ground:

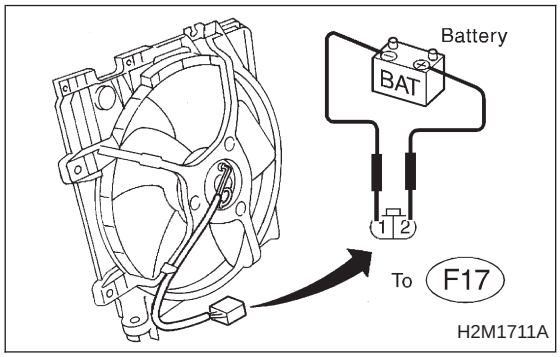
CHECK ***: Is the resistance less than 5 Ω?***
YES : Go to step **1B3**.
NO : Repair open circuit in harness between main fan motor connector and chassis ground.



1B3	CHECK POOR CONTACT.

Check poor contact in main fan motor connector. <Ref. to FOREWORD [T3C1].>

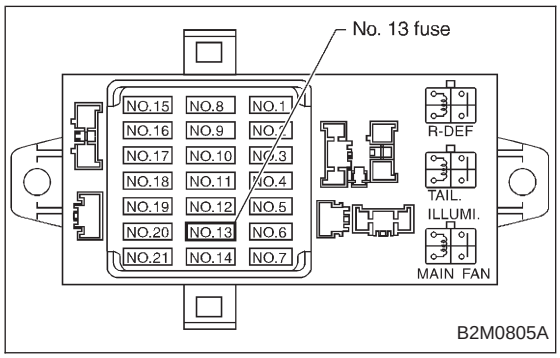
CHECK ***: Is there poor contact in main fan motor connector?***
YES : Repair poor contact in main fan motor connector.
NO : Go to step **1B4**.



1B4	CHECK MAIN FAN MOTOR.

Connect battery positive (+) terminal to terminal No. 2, and negative (−) terminal to terminal No. 1 of main fan motor connetor.

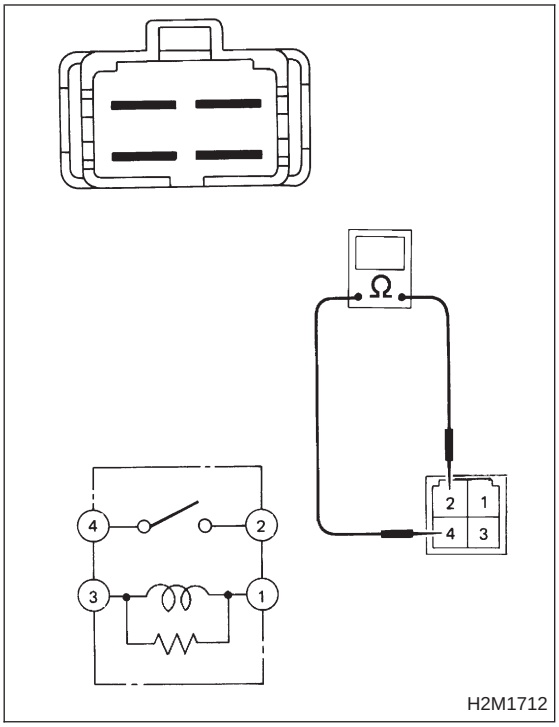
CHECK ***: Does the main fan rotate?***
YES : Repair poor contact in main fan motor connector.
NO : Replace main fan motor with a new one.



1B5	CHECK FUSE.

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

CHECK ***: Is the fuse blown-out?***
YES : Replace fuse.
NO : Go to step **1B6**.



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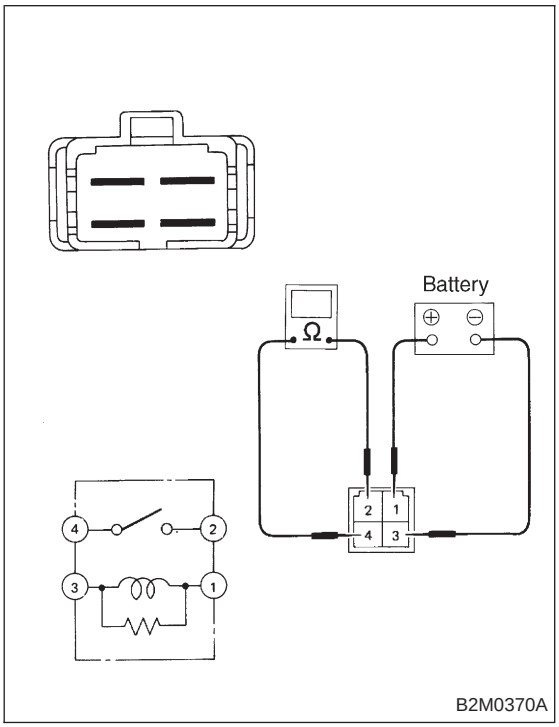
1B6	CHECK MAIN FAN RELAY.

1) Remove main fan relay from fuse and relay box.
2) Check continuity between main fan relay terminals.

CHECK : ***Does no continuity exist between terminals No. 2 and No. 4?***

YES : Go to step **1B7**.
NO : Replace main fan relay.



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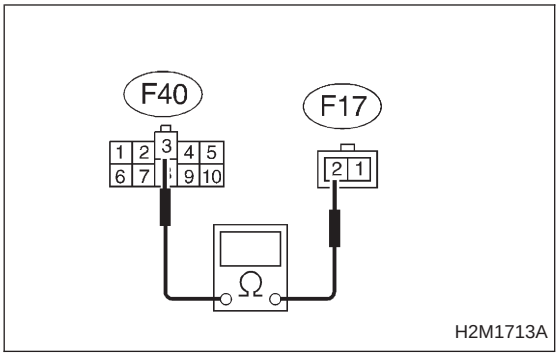
1B7	CHECK MAIN FAN RELAY.

1) Connect battery to terminals No. 1 and No. 3 of main fan relay.
2) Check continuity between main fan relay terminals.

CHECK : ***Does continuity exist between terminals No. 2 and No. 4?***

YES : Go to step **1B8**.
NO : Replace main fan relay.



1B8	CHECK HARNESS CONNECTOR BETWEEN FUSE AND RELAY BOX AND MAIN FAN MOTOR.

1) Disconnect connector from fuse and relay box.

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

Connector & terminal
(F40) No. 3 — (F17) No. 2:

CHECK ***: Is the resistance less than 1 Ω?***

YES : Go to step **1B9**.

NO : Repair open circuit in harness between fuse and relay box and main fan motor connector.

1B9	CHECK POOR CONTACT.

Check poor contact in fuse and relay box connector. <Ref. to FOREWORD [T3C1].>

CHECK ***: Is there poor contact fuse and relay box connector?***

YES : Repair poor contact in fuse and relay box connector.

NO : Go to step **1B10**.

1B10	CHECK POOR CONTACT.

Check poor contact in main fan motor connector. <Ref. to FOREWORD [T3C1].>

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

YES : Repair poor contact in main fan motor connector.

NO : Contact with SOA service.

NOTE:
Inspection by DTM is required, because probable cause is deterioration of multiple parts.

2. Radiator Sub Fan (With A/C model only)

A: OPERATION

DETECTING CONDITION:

Condition (1):

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

Condition (2):

- Engine coolant temperature is above 100°C (212°F).
- A/C switch is turned OFF.
- Vehicle speed is below 19 km/h (12 MPH).

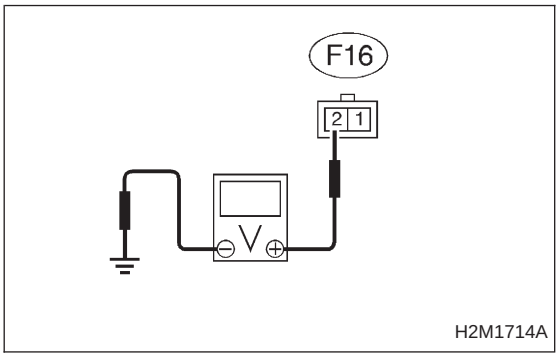
TROUBLE SYMPTOM:

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

2A1	**CHECK POWER SUPPLY TO SUB FAN MOTOR.**

CAUTION:
Be careful not to overheat engine during repair.

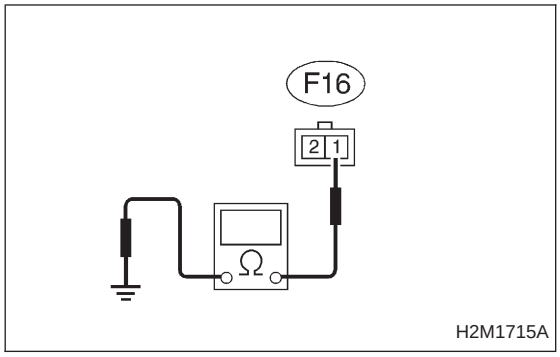
1) Turn ignition switch to OFF.
2) Disconnect connector from sub fan motor.
3) Warm-up the engine until engine coolant temperature increases over 100°C (212°F).
4) Stop the engine and turn ignition switch to ON.



5) Measure voltage between sub fan motor connector and chassis ground.

Connector & terminal
(F16) No. 2 (+) — Chassis ground (−):

CHECK ***: Is the voltage more than 10 V?***
YES : Go to step **2A2**.
NO : Go to step **2A5**.



2A2	CHECK GROUND CIRCUIT OF SUB FAN MOTOR.

1) Turn ignition switch to OFF.

2) Measure resistance between sub fan motor connector and chassis ground.

Connector & terminal
(F16) No. 1 — Chassis ground:

CHECK ***: Is the resistance less than 5 Ω?***

YES : Go to step **2A3**.

NO : Repair open circuit in harness between sub fan motor connector and chassis ground.

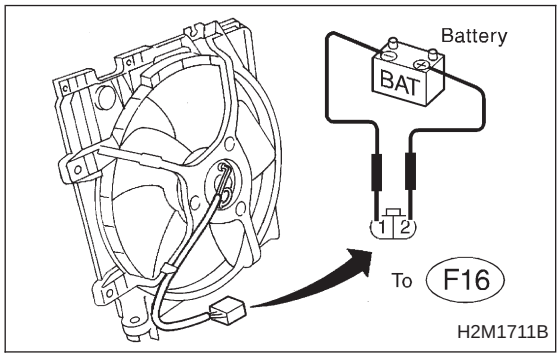
2A3	CHECK POOR CONTACT.

Check poor contact in sub fan motor connector. <Ref. to FOREWORD [T3C1].>

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

YES : Repair poor contact in sub fan motor connector.

NO : Go to step **2A4**.



2A4	CHECK SUB FAN MOTOR.

Connect battery positive (+) terminal to terminal No. 2, and negative (−) terminal to terminal No. 1 of sub fan motor connector.

CHECK ***: Does the sub fan rotate?***

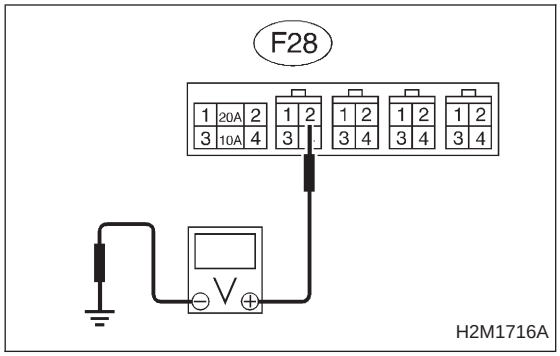
YES : Repair poor contact in sub fan motor connector.

NO : Replace sub fan motor with a new one.

2A5	CHECK POWER SUPPLY TO SUB FAN RELAY.

1) Turn ignition switch to OFF.

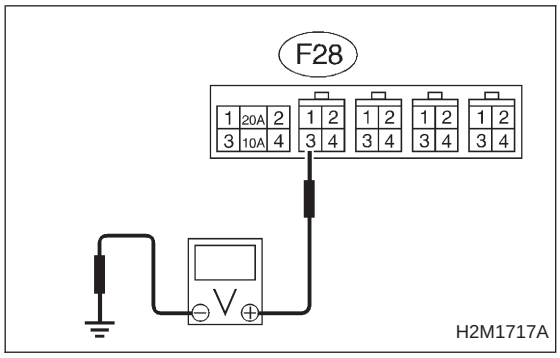
2) Remove sub fan relay from A/C relay holder.



3) Measure voltage between sub fan relay terminal and chassis ground.

Connector & terminal
(F28) No. 2 (+) — Chassis ground (−):

CHECK ***: Is the voltage more than 10 V?***
YES : Go to step **2A6**.
NO : Go to step **2A7**.

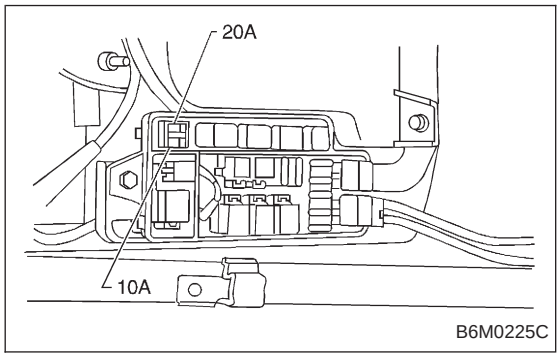


2A6	CHECK POWER SUPPLY TO SUB FAN RELAY.

1) Turn ignition swith to ON.
2) Measure voltage between sub fan relay terminal and chassis ground.

Connector & terminal
(F28) No. 3 (+) — Chassis ground (−):

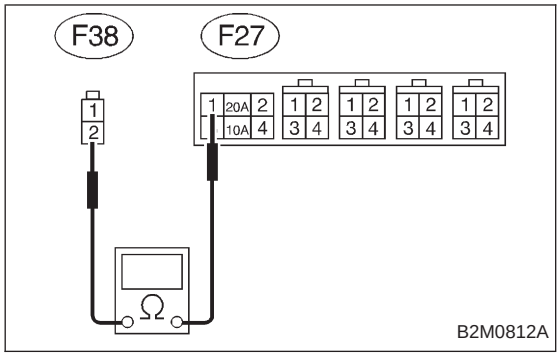
CHECK ***: Is the voltage more than 10 V?***
YES : Go to step **2A17**.
NO : Go to step **2A12**.



2A7	CHECK 20 A FUSE.

1) Remove 20 A fuse from A/C relay holder.
2) Check condition of fuse.

CHECK ***: Is the fuse blown-out?***
YES : Replace fuse.
NO : Go to step **2A8**.



2A8	CHECK HARNESS CONNECTOR BETWEEN MAIN FUSE BOX AND A/C RELAY HOLDER 20 A FUSE.

1) Disconnect connector from main fuse box.

2) Disconnect connectors (F25) and (F26) from generator, and (F34) from SBF holder.

3) Measure resistance of harness connector between main fuse box connector and A/C relay holder 20 A fuse terminal.

Connector & terminal
(F38) No. 2 — (F27) No. 1:

CHECK ***: Is the resistance less than 1 Ω?***

YES : Go to step **2A9**.

NO : Repair open circuit in harness between main fuse box connector and 20 A fuse terminal.

2A9	CHECK POOR CONTACT.

Check poor contact in main fuse box connector. <Ref. to FOREWORD [T3C1].>

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

YES : Repair poor contact in main fuse box connector.

NO : Go to step **2A10**.

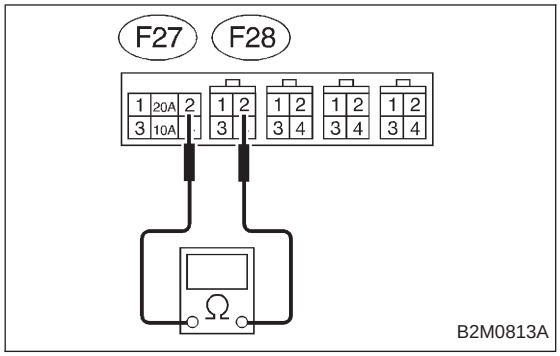
2A10	CHECK POOR CONTACT.

Check poor contact in A/C relay holder 20 A fuse connector. <Ref. to FOREWORD [T3C1].>

CHECK ***: Is there poor contact in A/C relay holder 20 A fuse connector?***

YES : Repair poor contact in 20 A fuse connector.

NO : Go to step **2A11**.

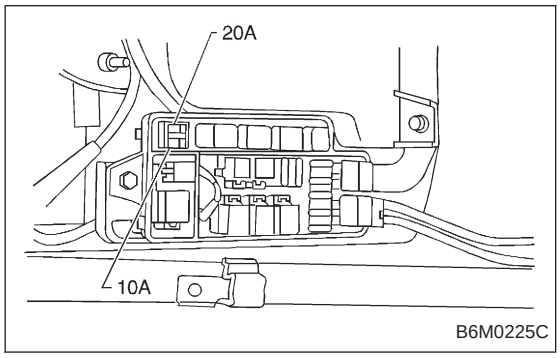


2A11	**CHECK HARNESS CONNECTOR BETWEEN 20 A FUSE AND SUB FAN RELAY IN A/C RELAY HOLDER.**

Measure resistance of harness between 20 A fuse and sub fan relay terminal.

Connector & terminal
(F27) No. 2 — (F28) No. 2:

CHECK ***: Is the resistance less than 1 Ω?***
YES : Repair poor contact in sub fan relay connector.
NO : Repair open circuit in harness between 20 A fuse and sub fan relay connector.



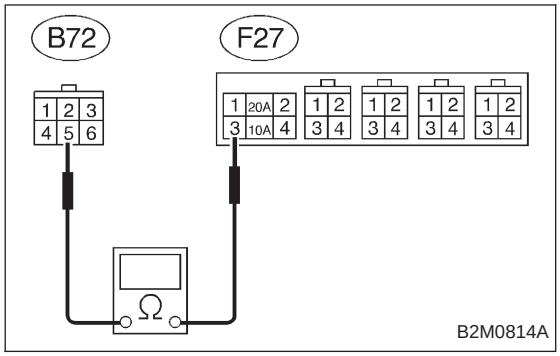
2A12	**CHECK 10 A FUSE.**

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 **2A13**.

2A13	**CHECK HARNESS CONNECTOR BETWEEN IGNITION SWITCH AND A/C RELAY HOLDER 10 A FUSE.**

1) Disconnect connector from ignition switch.
2) Disconnect connectors (F42) and (B52) from fuse and relay box, and (F39) from main fuse box.



3) Measure resistance of harness between ignition switch connector and A/C relay holder 10 A fuse terminal.

Connector & terminal
(B72) No. 5 — (F27) No. 3:

CHECK ***: Is the resistance less than 1 Ω?***
YES : Go to step **2A14**.
NO : Repair harness and connector.

NOTE:
In this case, repair the following:

- Open circuit in harness between ignition switch connector and 10 A fuse terminal.
- Poor contact in coupling connector (B61).

2A14	CHECK POOR CONTACT.

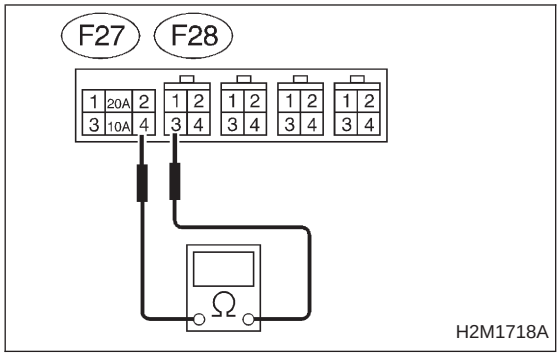
Check poor contact in ignition switch connector. <Ref. to FOREWORD [T3C1].>

CHECK ***: Is there poor contact in ignition switch connector?***
YES : Repair poor contact in ignition switch connector.
NO : Go to step **2A15**.

2A15	CHECK POOR CONTACT.

Check poor contact in A/C relay holder 10 A fuse connector. <Ref. to FOREWORD [T3C1].>

CHECK ***: Is there poor contact in A/C relay holder 10 A fuse connector?***
YES : Repair poor contact in 10 A fuse connector.
NO : Go to step **2A16**.



2A16	CHECK HARNESS CONNECTOR BETWEEN 10 A FUSE AND SUB FAN RELAY IN A/C RELAY HOLDER.

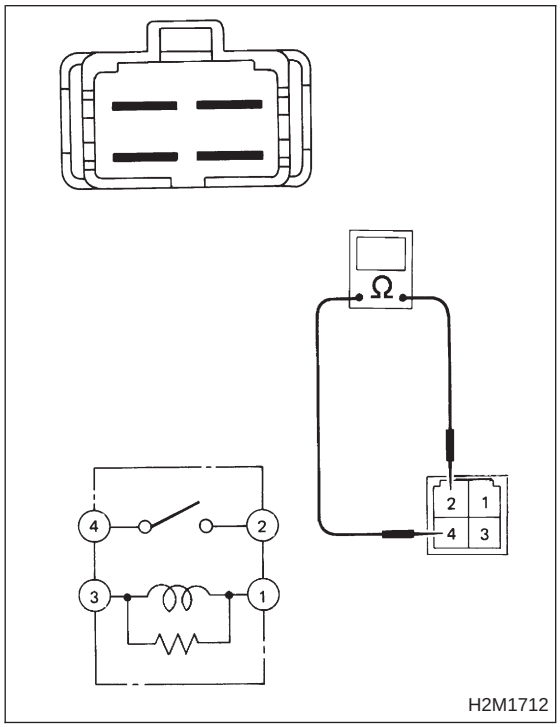
Measure resistance of harness between 10 A fuse and sub fan relay terminal.

Connector & terminal
(F27) No. 4 — (F28) No. 3:

CHECK ***: Is the resistance less than 1 Ω?***

YES : Repair poor contact in sub fan relay connector.

NO : Repair open circuit in harness between 10 A fuse and sub fan relay connector.



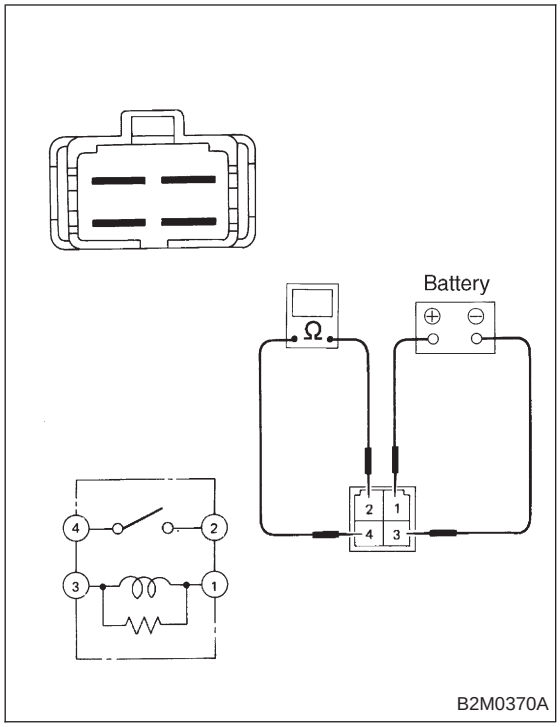
2A17	CHECK SUB FAN RELAY.

1) Turn ignition switch to OFF.
2) Check continuity between sub fan relay terminals.

CHECK ***: Does no continuity exist between terminals No. 2 and No. 4?***

YES : Go to step **2A18**.

NO : Replace sub fan relay.



2A18	CHECK SUB FAN RELAY.

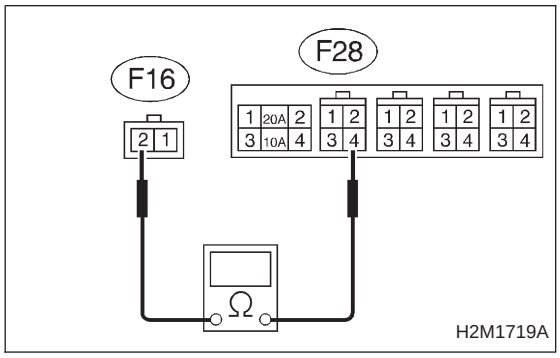
1) Connect battery to terminals No. 1 and No. 3 of sub fan relay.

2) Check continuity between sub fan relay terminals.

CHECK : ***Does continuity exist between terminals No. 2 and No. 4?***

YES : Go to step **2A19**.

NO : Replace sub fan relay.



2A19	CHECK HARNESS CONNECTOR BETWEEN SUB FAN RELAY AND SUB FAN MOTOR.

Measure resistance of harness between sub fan motor connector and sub fan relay terminal.

Connector & terminal
(F16) No. 2 — (F28) No. 4:

CHECK : ***Is the resistance less than 1 Ω?***

YES : Go to step **2A20**.

NO : Repair open circuit in harness between sub fan motor and sub fan relay connector.

2A20	CHECK POOR CONTACT.

Check poor contact in sub fan relay connector. <Ref. to FOREWORD [T3C1].>

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

YES : Repair poor contact in sub fan relay connector.

NO : Go to step **2A21**.

2A21	CHECK POOR CONTACT.

Check poor contact in sub fan relay connector. <Ref. to FOREWORD [T3C1].>

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

YES : Repair poor contact in sub fan motor connector.

NO : Contact with SOA service.

NOTE:
Inspection by DTM is required, because probable cause is deterioration of multiple parts.