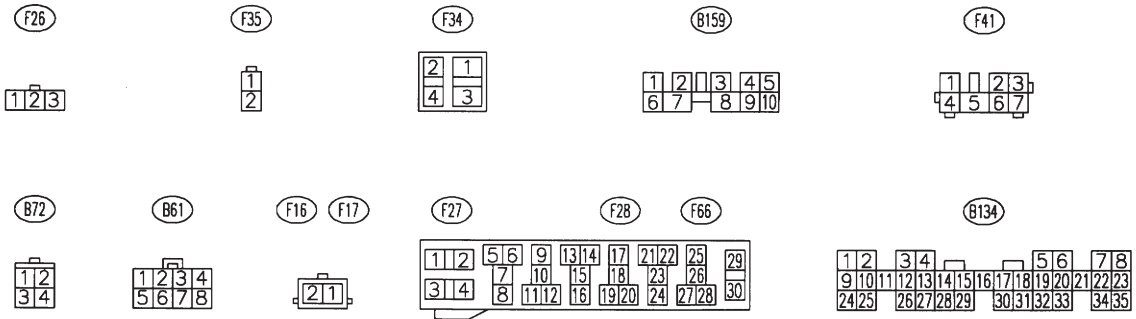
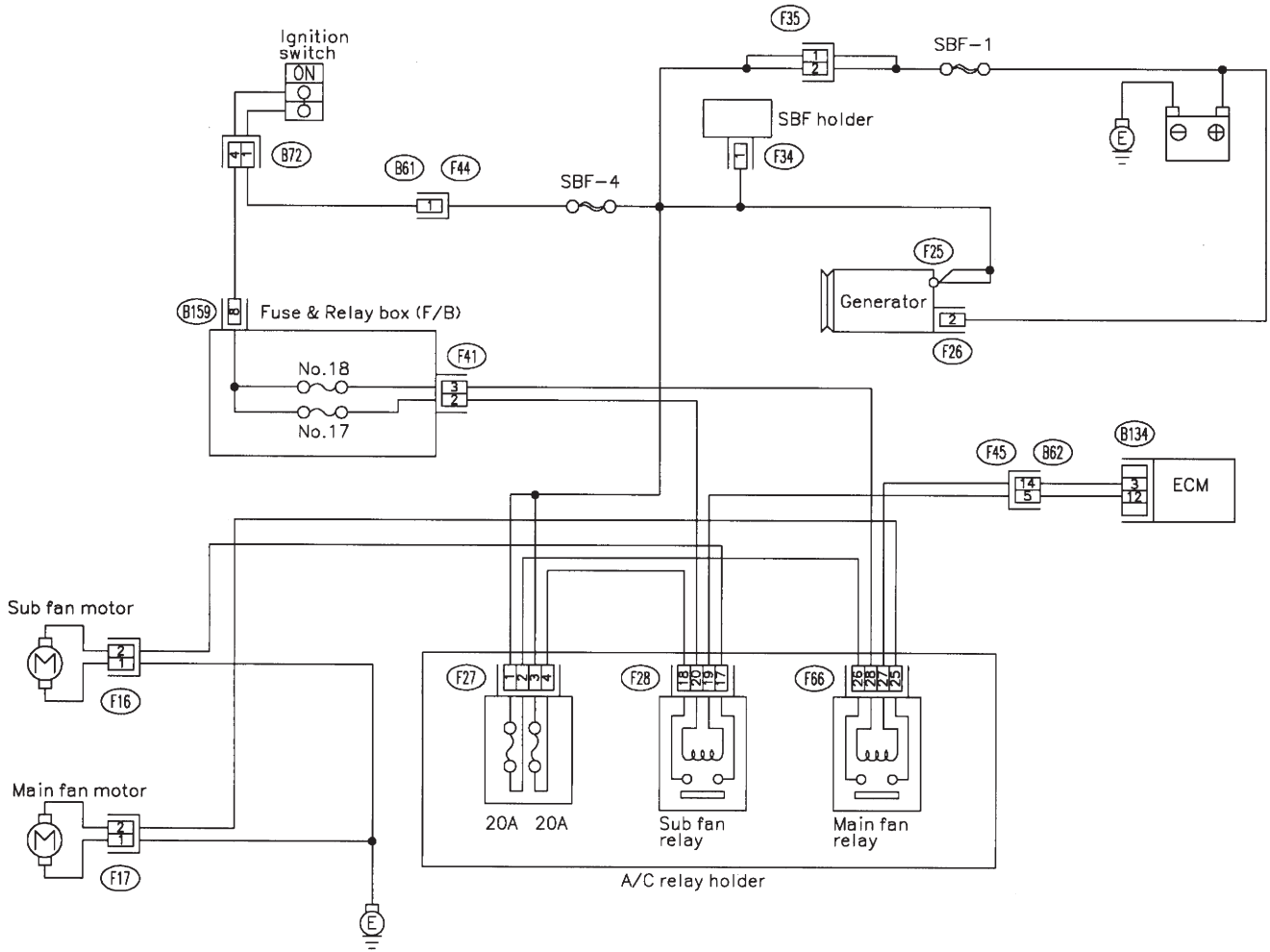


ENGINE COOLING SYSTEM

2-5

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1. Wiring Diagram



2. Radiator Main Fan

A: OPERATION

DETECTING CONDITION:

Condition:

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

TROUBLE SYMPTOM:

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

2A1 : CHECK POWER SUPPLY TO MAIN FAN MOTOR.

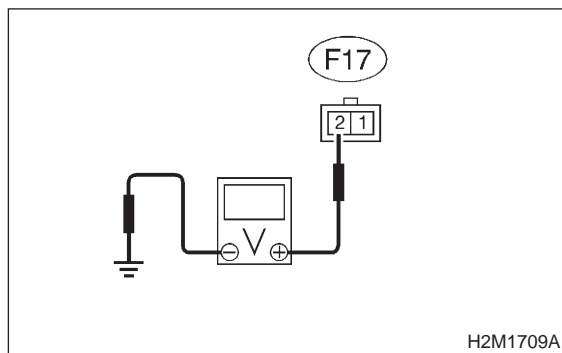
CAUTION:

Be careful not to overheat engine during repair.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from main fan motor.
- 3) Start the engine, and warm it up 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 (-):



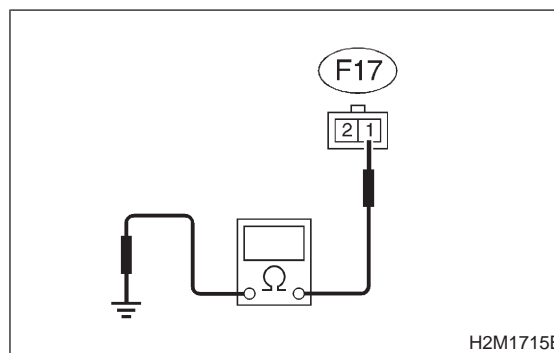
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Go to step **2A2**.
- NO** : Go to step **2A5**.

2A2 : 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 **2A3**.
- NO** : Repair open circuit in harness between main fan motor connector and chassis ground.

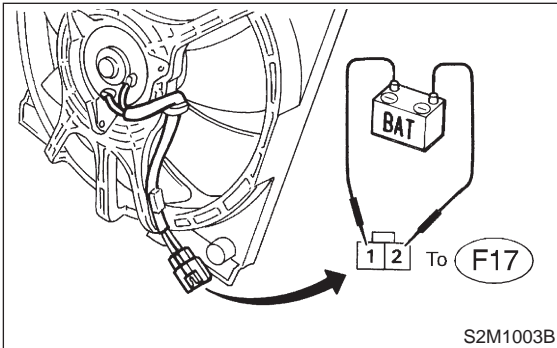
2A3 : CHECK POOR CONTACT.

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 **2A4**.

2A4 : CHECK MAIN FAN MOTOR.

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

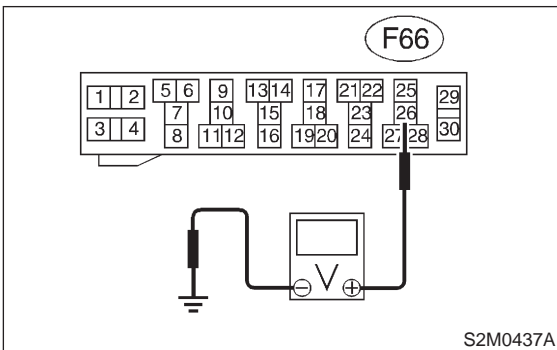


- CHECK** : *Does the main fan rotate?*
- YES** : Repair poor contact in main fan motor connector.
- NO** : Replace main fan motor with a new one.

2A5 : CHECK POWER SUPPLY TO MAIN FAN RELAY.

- 1) Turn ignition switch to OFF.
- 2) Remove main fan relay from A/C relay holder.
- 3) Measure voltage between main fan relay terminal and chassis ground.

Connector & terminal
(F66) No. 26 (+) — Chassis ground (-):

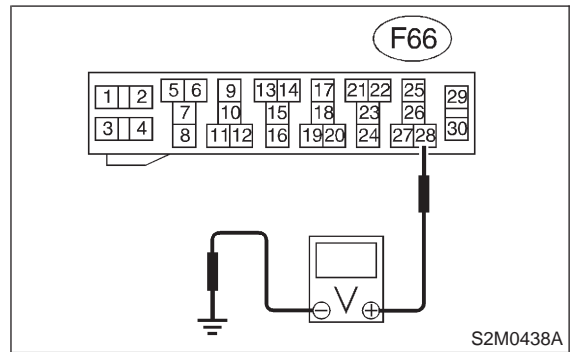


- CHECK** : *Is the voltage more than 10 V?*
- YES** : Go to step 2A6.
- NO** : Go to step 2A7.

2A6 : CHECK POWER SUPPLY TO MAIN FAN RELAY.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between main fan relay terminal and chassis ground.

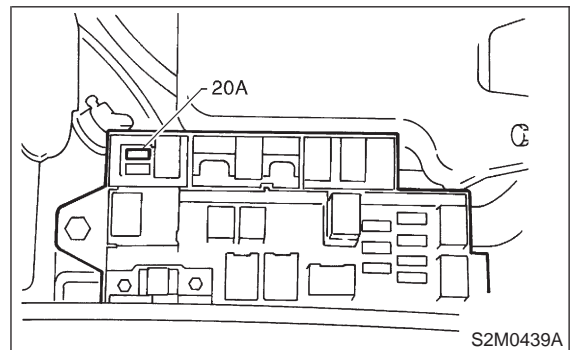
Connector & terminal
(F66) No. 28 (+) — Chassis ground (-):



- CHECK** : *Is the voltage more than 10 V?*
- YES** : Go to step 2A16.
- 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.

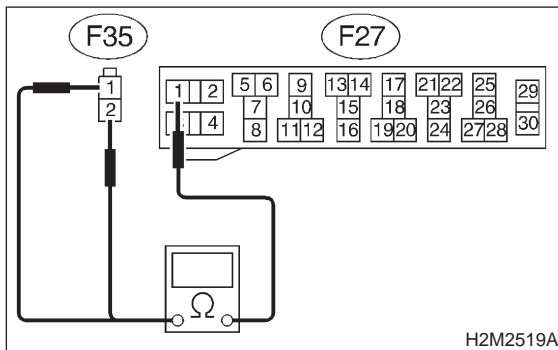
2A8 : CHECK HARNESS CONNECTOR BETWEEN MAIN FUSE BOX AND A/C RELAY HOLDER 20 A FUSE.

- 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 terminals.

Connector & terminal

(F35) No. 1 — (F27) No. 1:

(F35) 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].>

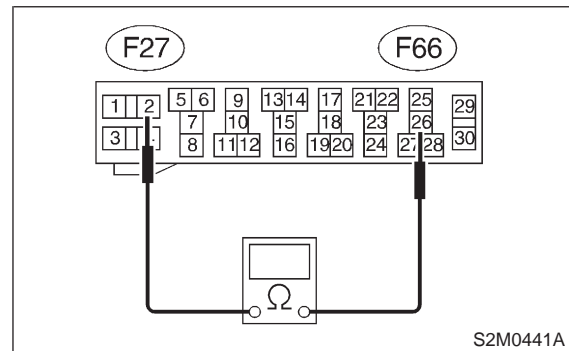
- CHECK** : **Is there poor contact in A/C relay holder 20 A fuse connector?**
- YES** : Repair poor contact in 20 A fuse
- NO** : Go to step **2A11**.

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

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

Connector & terminal

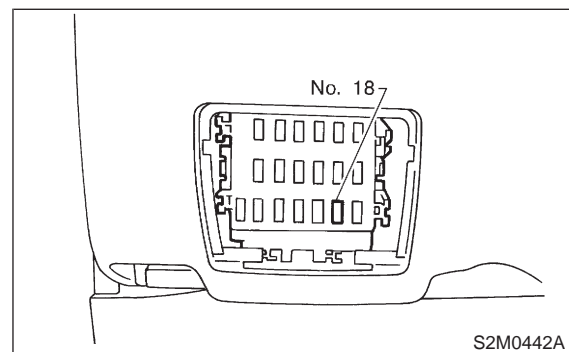
(F27) No. 2 — (F66) No. 26:



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

2A12 : CHECK FUSE.

- 1) Turn ignition switch to OFF.
- 2) Remove fuse No. 18 from joint box.
- 3) Check condition of fuse.



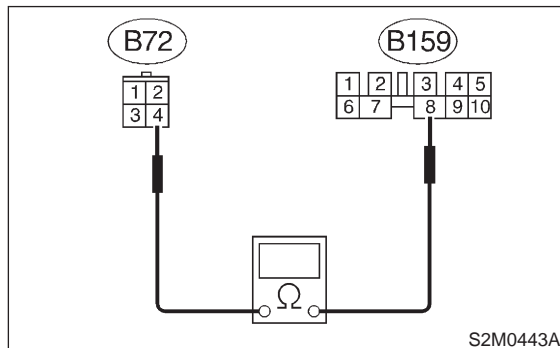
- CHECK** : **Is the fuse blown-out?**
- YES** : Replace fuse.
- NO** : Go to step **2A13**.

2A13 : CHECK HARNESS CONNECTOR BETWEEN IGNITION SWITCH AND JOINT BOX.

- 1) Disconnect connector from ignition switch.
- 2) Separate connectors (F44) and (B61).
- 3) Disconnect connector (B159) from joint box.
- 4) Measure resistance of harness between ignition switch connector and joint box.

Connector & terminal

(B72) No. 4 — (B159) No. 8:



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 joint box.
- 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 joint box 10 A fuse connector. <Ref. to FOREWORD [T3C1].>

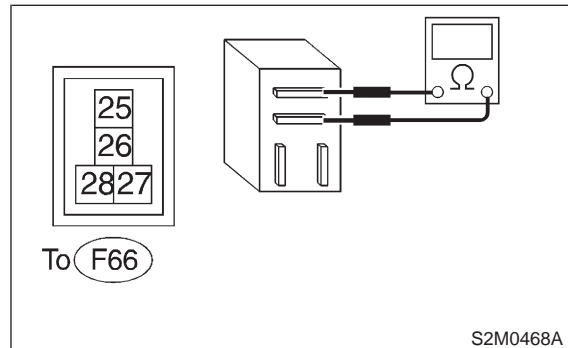
CHECK : Is there poor contact in joint box 10 A fuse connector?

YES : Repair poor contact in joint box connector.

NO : Go to step 2A16.

2A16 : CHECK MAIN FAN RELAY.

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



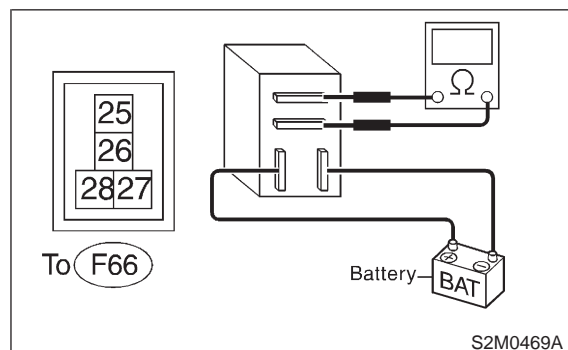
CHECK : Does no continuity exist between terminals No. 25 and No. 26?

YES : Go to step 2A17.

NO : Replace main fan relay.

2A17 : CHECK MAIN FAN RELAY.

- 1) Connect battery to terminals No. 27 and No. 28 of main fan relay.
- 2) Check continuity between main fan relay terminals.



CHECK : Does continuity exist between terminals No. 25 and No. 26?

YES : Go to step 2A18.

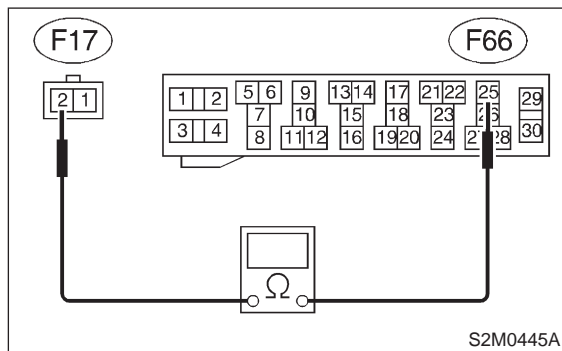
NO : Replace main fan relay.

2A18 : CHECK HARNESS CONNECTOR BETWEEN MAIN FAN RELAY AND MAIN FAN MOTOR.

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

Connector & terminal

(F17) No. 2 — (F66) No. 25:



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

YES : Go to step 2A19.

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

2A19 : CHECK POOR CONTACT.

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

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

YES : Repair poor contact in main fan relay connector.

NO : Go to step 2A20.

2A20 : CHECK POOR CONTACT.

Check poor contact in main fan relay 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.

3. 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.

3A1 : CHECK POWER SUPPLY TO SUB FAN MOTOR.

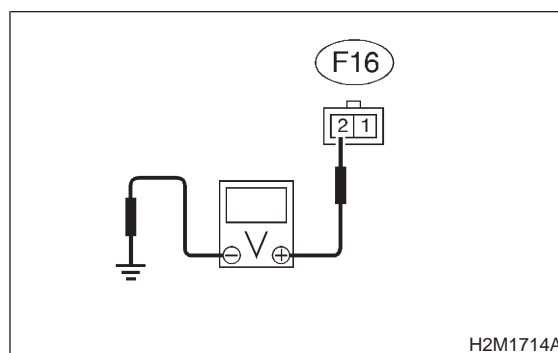
CAUTION:

Be careful not to overheat engine during repair.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from sub fan motor.
- 3) Start the engine, and warm it up 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?*

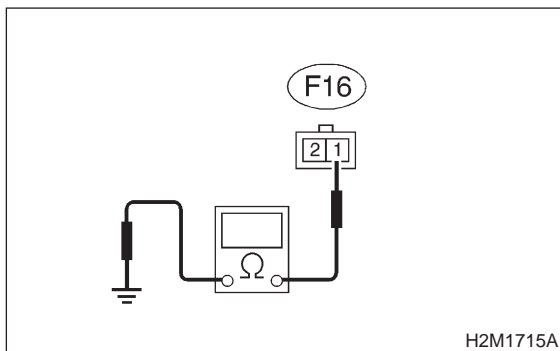
YES : Go to step 3A2.

NO : Go to step 3A5.

3A2 : 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 **3A3**.
- NO** : Repair open circuit in harness between sub fan motor connector and chassis ground.

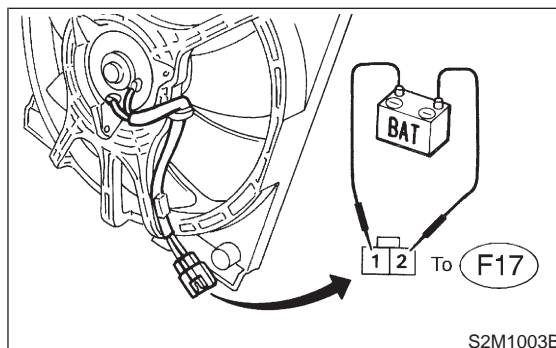
3A3 : CHECK POOR CONTACT.

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 **3A4**.

3A4 : CHECK SUB FAN MOTOR.

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

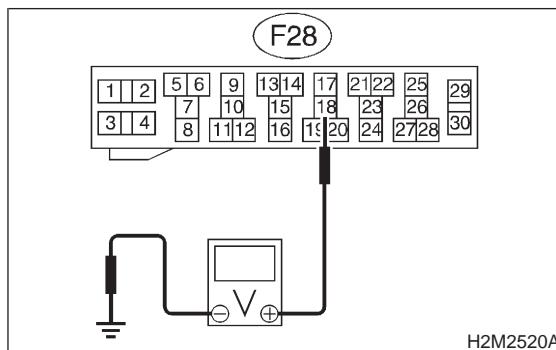


- CHECK** : **Does the sub fan rotate?**
- YES** : Repair poor contact in sub fan motor connector.
- NO** : Replace sub fan motor with a new one.

3A5 : 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. 18 (+) — Chassis ground (-):



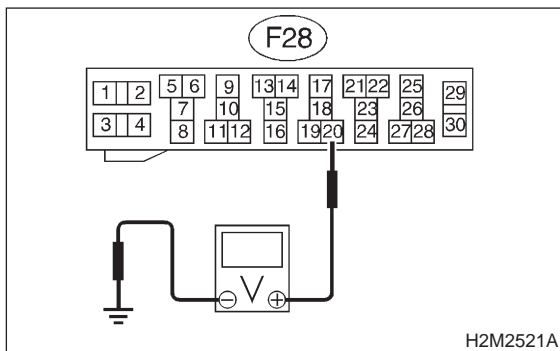
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Go to step **3A6**.
- NO** : Go to step **3A7**.

3A6 : CHECK POWER SUPPLY TO SUB FAN RELAY.

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

Connector & terminal

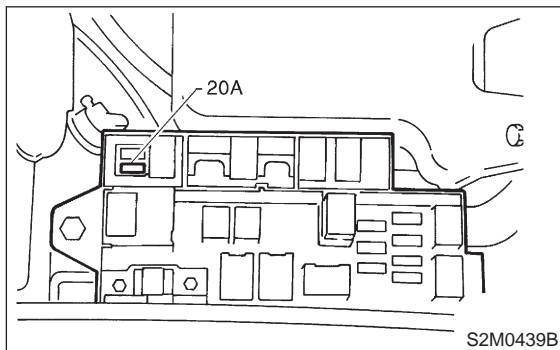
(F28) No. 20 (+) — Chassis ground (-):



- CHECK** : **Is the voltage more than 10 V?**
- YES** : Go to step **3A16**.
- NO** : Go to step **3A12**.

3A7 : 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 **3A8**.

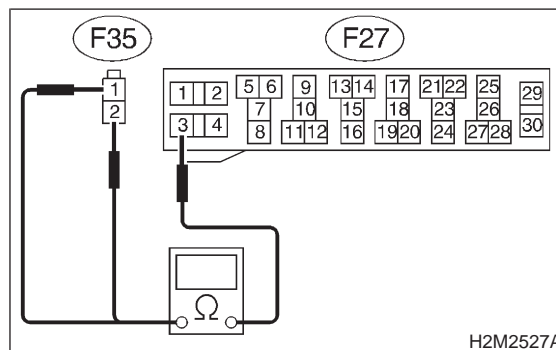
3A8 : CHECK HARNESS CONNECTOR BETWEEN MAIN FUSE BOX AND A/C RELAY HOLDER 20 A FUSE.

- 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 terminals.

Connector & terminal

(F35) No. 1 — (F27) No. 3:

(F35) No. 2 — (F27) No. 3:



- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Go to step **3A9**.
- NO** : Repair open circuit in harness between main fuse box connector and 20 A fuse terminal.

3A9 : 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 **3A10**.

3A10 : CHECK POOR CONTACT.

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

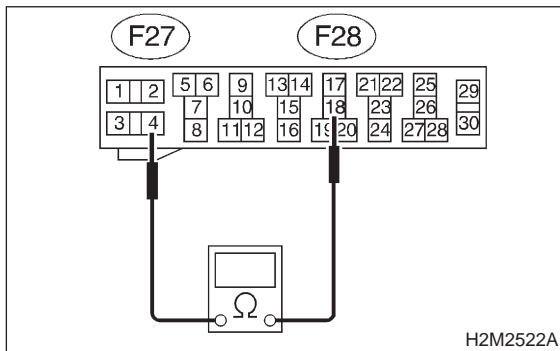
- CHECK** : **Is there poor contact in A/C relay holder 20 A fuse connector?**
- YES** : Repair poor contact in 20 A fuse
- NO** : Go to step **3A11**.

3A11 : 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

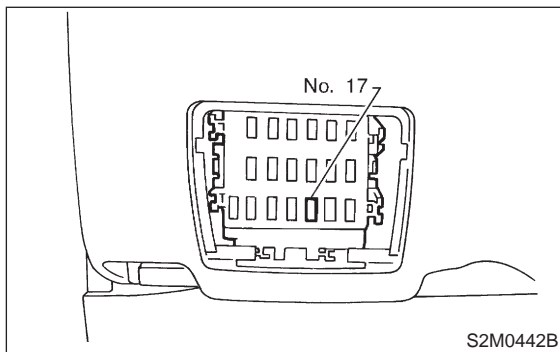
(F27) No. 4 — (F28) No. 18:



- 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.

3A12 : CHECK FUSE.

- 1) Turn ignition switch to OFF.
- 2) Remove fuse No. 17 from joint box.
- 3) Check condition of fuse.



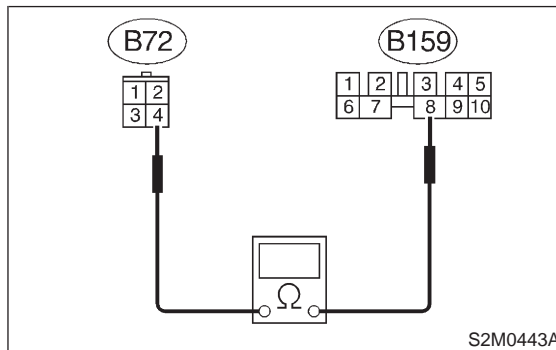
- CHECK** : *Is the fuse blown-out?*
- YES** : Replace fuse.
- NO** : Go to step 3A13.

3A13 : CHECK HARNESS CONNECTOR BETWEEN IGNITION SWITCH AND JOINT BOX.

- 1) Disconnect connector from ignition switch.
- 2) Separate connectors (F44) and (B61).
- 3) Disconnect connector (B159) from joint box.
- 4) Measure resistance of harness between ignition switch connector and joint box.

Connector & terminal

(B72) No. 4 — (B159) No. 8:



- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step 3A14.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ignition switch connector and joint box.
- Poor contact in coupling connector (B61).

3A14 : 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 3A15.

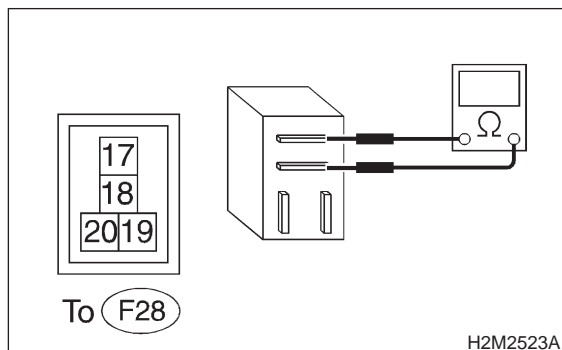
3A15 : CHECK POOR CONTACT.

Check poor contact in joint box 10 A fuse connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in joint box 10 A fuse connector?*
- YES** : Repair poor contact in joint box connector.
- NO** : Go to step 3A16.

3A16 : CHECK SUB FAN RELAY.

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



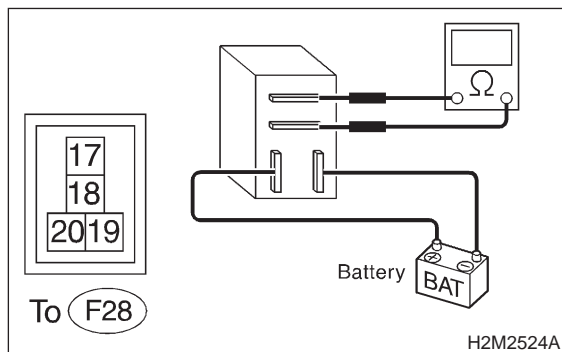
CHECK : Does no continuity exist between terminals No. 17 and No. 18?

YES : Go to step 3A17.

NO : Replace sub fan relay.

3A17 : CHECK SUB FAN RELAY.

- 1) Connect battery to terminals No. 19 and No. 20 of sub fan relay.
- 2) Check continuity between sub fan relay terminals.



CHECK : Does continuity exist between terminals No. 17 and No. 18?

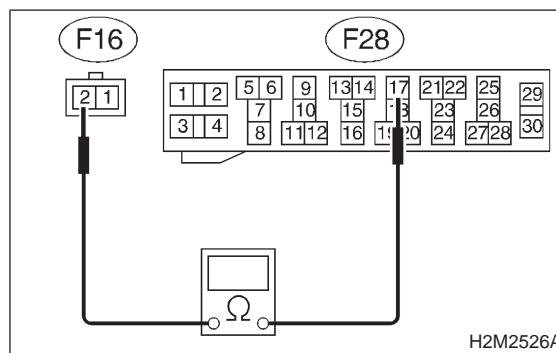
YES : Go to step 3A18.

NO : Replace sub fan relay.

3A18 : 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. 17:



CHECK : Is the resistance less than 1 Ω?

YES : Go to step 3A19.

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

3A19 : 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 3A20.

3A20 : 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.

MEMO: