

# HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

# AC

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# BASIC DIAGNOSTIC PROCEDURE

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

## 1. Basic Diagnostic Procedure

### A: PROCEDURE

Step	Value	Yes	No
<b>1 START INSPECTIONS.</b> 1) Perform the pre-inspection. <Ref. to AC-3, INSPECTION, General Description.> 2) Perform the self-diagnosis. <Ref. to AC-10, OPERATION, Self-diagnosis.> Does the self-diagnosis operate?	Self-diagnosis operates.	Go to step 2.	<Ref. to AC-13, A/C AND/OR SELF-DIAGNOSIS SYSTEMS DO NOT OPERATE, Diagnostics for A/C System Failure.>
<b>2 CONFIRM MALFUNCTION PART.</b> Confirm the malfunction part with self-diagnosis. Can the malfunction part be confirmed?	Malfunction part can be confirmed.	Repair the malfunction part according to each diagnostics chart.	Go to step 3.
<b>3 CHECK COMPARTMENT TEMPERATURE.</b> 1) Turn the A/C switch ON. 2) Set the temperature at maximum cold position. 3) Check the compartment temperature changes. Is the compartment temperature changed?	Temperature changes.	Go to step 4.	<Ref. to AC-17, COMPARTMENT TEMPERATURE IS NOT CHANGED OR A/C SYSTEM DOES NOT RESPOND QUICKLY, Diagnostics for A/C System Failure.>
<b>4 CHECK A/C SYSTEM RESPONSE.</b> Change the temperature setting, and check the response of A/C system. Does the A/C system respond quickly?	A/C system responds.	A/C system is OK.	<Ref. to AC-17, COMPARTMENT TEMPERATURE IS NOT CHANGED OR A/C SYSTEM DOES NOT RESPOND QUICKLY, Diagnostics for A/C System Failure.>

# GENERAL DESCRIPTION

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

## 2. General Description

### A: CAUTION

- 1) Never connect the battery in reverse polarity.
  - The Auto A/C control module will be destroyed instantly.
- 2) Do not disconnect the battery cables while the engine is running.
  - A large counter electromotive force will be generated in the alternator, and this voltage may damage electronic parts such as A/C control module.
- 3) Before disconnecting the connectors of each sensor and the A/C control module, be sure to turn off the ignition switch.
  - Otherwise, the Auto A/C control module may be damaged.
- 4) Every Auto A/C-related part is a precision part. Do not drop them.
- 5) Airbag system wiring harness is routed near the A/C control panel (A/C control module) and junction box.

### CAUTION:

- All airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuits.
- Be careful not to damage the airbag system wiring harness when servicing the A/C control panel (A/C control module) and junction box.

### B: INSPECTION

Before performing diagnosis, check the following items which might affect A/C system problems.

#### 1. BATTERY

- 1) Measure the battery voltage and specific gravity of electrolyte.

**Standard voltage: 12 V**

**Specific gravity: Above 1.260**

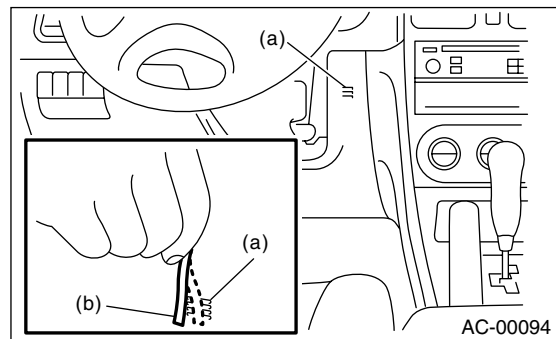
- 2) Check the condition of the fuses for A/C, heater and other fuses.
- 3) Check the condition of the harnesses and harness connectors connection.

#### 2. ASPIRATOR HOSE

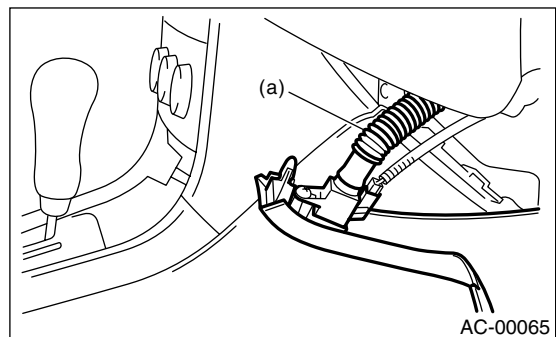
- 1) Turn the ignition switch to ON.
- 2) Turn the temperature control dial to maximum hot position.
- 3) Turn the air flow control dial to "DEF" position.
- 4) Turn the fan speed control dial to 4th position.
- 5) Firmly hold a thin thread (b) in front of the in-vehicle sensor suction port (a) for the auto A/C control unit and check that the thread moves towards the port indicating that air is being sucked into the port.

### NOTE:

Ensure the thread does not get sucked into the port.



- 6) If the thread does not move at all, remove the lower cover <Ref. to AC-36, REMOVAL, Control Unit.> and check for improper connection of the aspirator hose (a), lower cover and heater unit and secure as necessary.



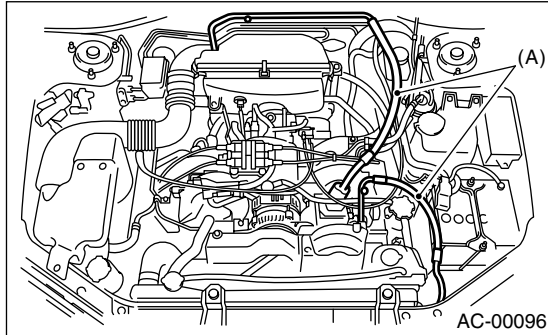
## GENERAL DESCRIPTION

### HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

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#### 3. REFRIGERANT LINE

Check contact for refrigerant line (A) and high-pressure pipe.



#### 4. CONTROL LINKAGE

- 1) Check the state of mode door linkage.
- 2) Check the state of air mix door linkage.
- 3) Check the state of intake door linkage.

# GENERAL DESCRIPTION

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

## 5. CONTROL SWITCHES

Start and warm up the engine completely.

### 1) Inspection using switches.

No.	Point to check	Switch operation	Judgement standard
1	Fan speed control dial	Turn the fan speed control dial clockwise.	Fan speed changes as dial turn.
2	AUTO switch and temperature control dial	A. AUTO switch: ON B. Temperature control dial maximum cold position	<ul style="list-style-type: none"> <li>• Outlet air: Cool</li> <li>• Fan speed: 4th</li> <li>• Compressor: AUTO</li> <li>• Outlet: VENT</li> <li>• Inlet: RECIRC</li> </ul>
		C. Turn the temperature control dial from maximum cold position to maximum hot position gradually.	<ul style="list-style-type: none"> <li>• Outlet air: Cool → Hot</li> <li>• Fan speed: AUTO</li> <li>• Compressor: AUTO</li> <li>• Outlet: AUTO</li> <li>• Inlet: AUTO</li> </ul>
		D. Temperature control dial maximum hot position	<ul style="list-style-type: none"> <li>• Outlet air: Hot</li> <li>• Fan speed: 4th</li> <li>• Compressor: AUTO</li> <li>• Outlet: HEAT</li> <li>• Inlet: FRESH</li> </ul>
3	Mode control dial	Turn the mode control dial clockwise.	Air flow outlet changes from VENT → BI-LEVEL → HEAT → DEF/HEAT.
4	FRESH/RECIRC switch	Push the FRESH/RECIRC.	Air flow inlet changes from RECIRC → FRESH, or FRESH → RECIRC.
5	DEF switch	Push the DEF.	<ul style="list-style-type: none"> <li>• Outlet air: AUTO</li> <li>• Fan speed: AUTO</li> <li>• Compressor: ON</li> <li>• Outlet: DEF</li> <li>• Inlet: FRE</li> </ul>

### 2) Compressor operation inspection

No.	Point to check	Switch operation	Judgement standard
1	Compressor	A. A/C switch ON B. Turn the fan speed control clockwise.	Compressor: ON

### 3) Illumination control inspection

No.	Point to check	Switch operation	Judgement standard
1	Illumination	A. Lighting switch ON	Illumination light illuminates.
		B. Press the OFF switch one second or more.	Illumination dimming is cancelled.

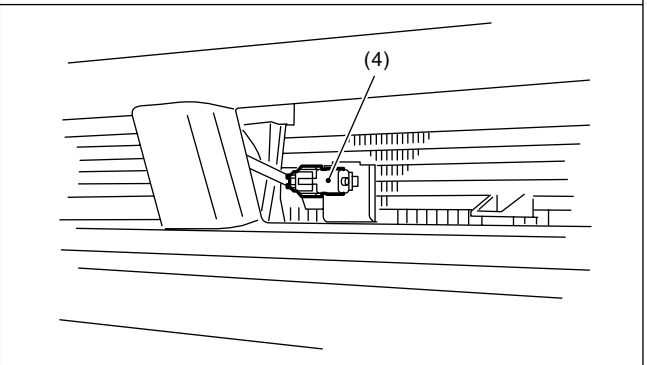
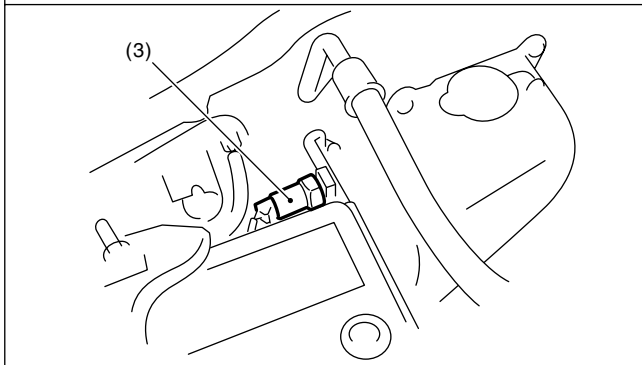
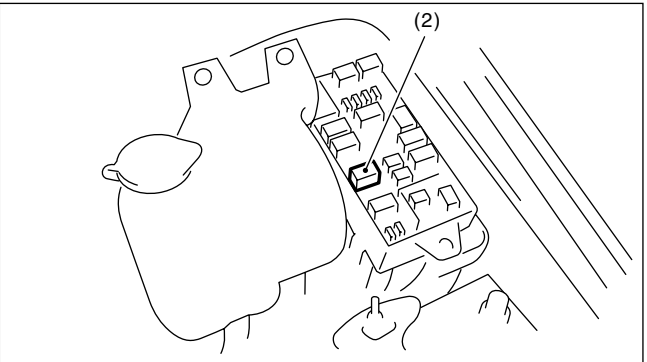
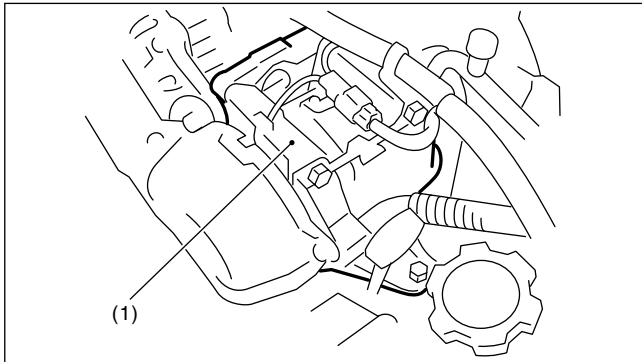
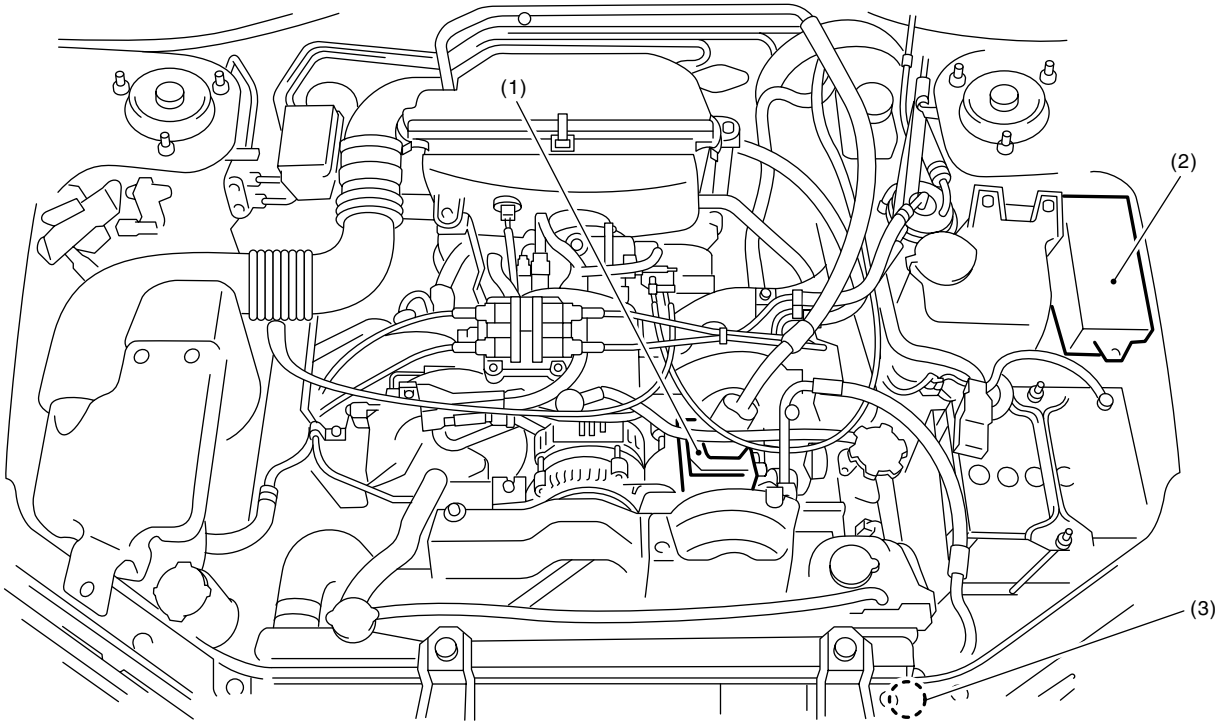
# ELECTRICAL COMPONENTS LOCATION

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

## 3. Electrical Components Location

### A: LOCATION

#### 1. ENGINE COMPARTMENT



AC-0097

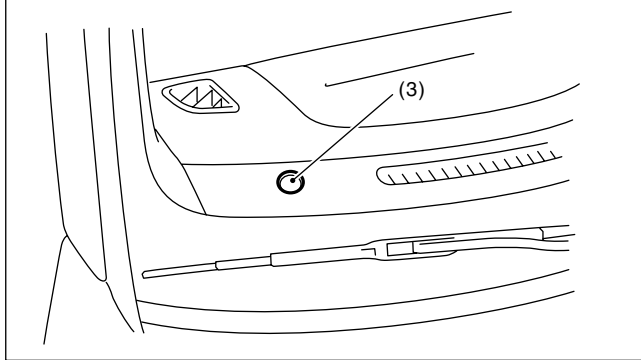
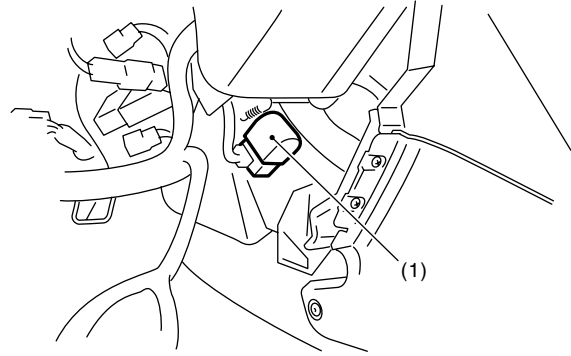
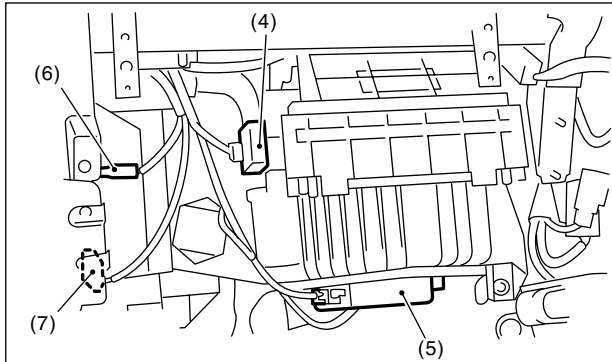
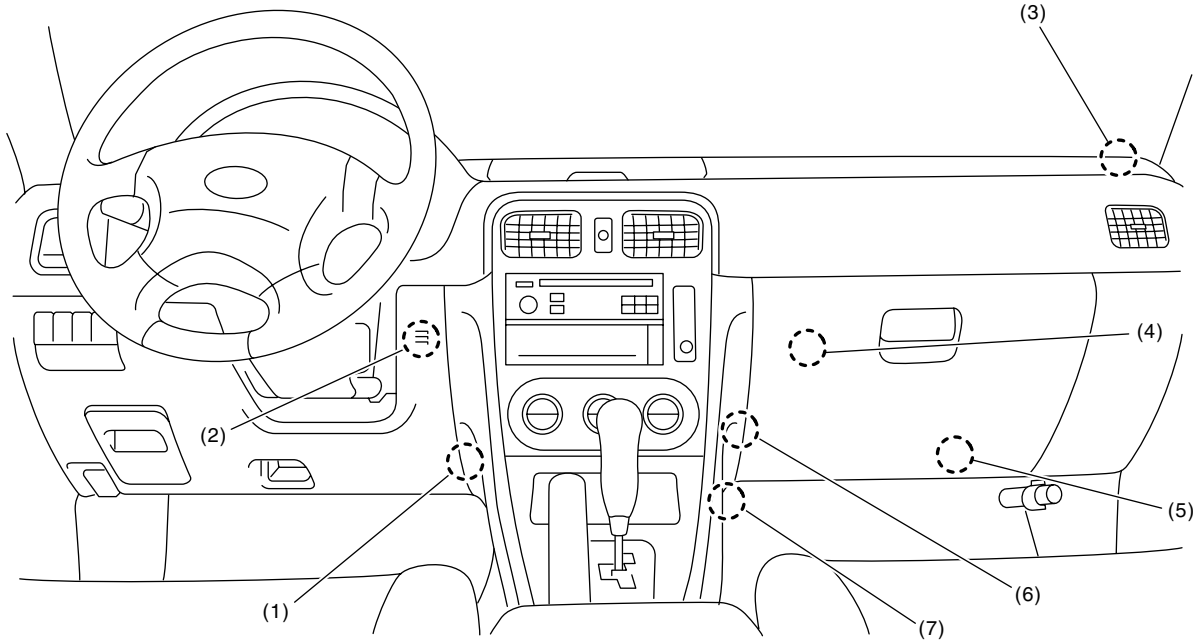
- (1) A/C compressor
- (2) A/C relay

- (3) Pressure switch
- (4) Ambient sensor

# ELECTRICAL COMPONENTS LOCATION

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

## 2. PASSENGER COMPARTMENT



AC-00098

- (1) Mode door actuator
- (2) In-vehicle sensor
- (3) Sunload sensor

- (4) Intake door actuator
- (5) Blower motor
- (6) Evaporator sensor

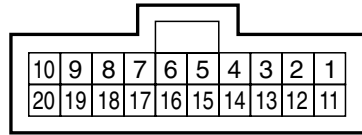
- (7) Air mix door actuator

# A/C CONTROL MODULE I/O SIGNAL

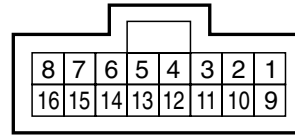
HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

## 4. A/C Control Module I/O Signal

### A: ELECTRICAL SPECIFICATION



To B: **i49**



To A: **i48**

AC-00099

Connector & Terminal No.	Content	Measuring condition	Specified value	
B9	Mode door actuator power supply	Changes outlet from VENT to DEF.	*2	
B8		Changes outlet from DEF to VENT.		
B7	Air mix door actuator power supply	Changes air mix door from COOL to HOT.	*1	
B6		Changes air mix door from COOL to HOT.		
B5	IGN power supply	Ignition switch: ON	Battery voltage	
B4	Battery power supply	Ignition switch: OFF, ACC, ON	Battery voltage	
B3	Sunload sensor	Ignition switch: ON and under normal sunload (without sunload: 5 V)	3 V	
B2	Evaporator sensor	Ignition switch: ON	5 V or less	
B1	Air mix door actuator P.B.R. signal	Air mix door: COOL position	0.5 V	
		Air mix door: HOT position	4.5 V	
B20	Intake door actuator signal	Air inlet: FRESH (other positions: 12V)	0 V	
B19		Air inlet: MIX (other positions: 12 V)	0 V	
B18		Air inlet: RECIRC (other positions: 12 V)	0 V	
B17	A/C ON signal	A/C: ON (A/C OFF: 0 V)	8 — 10 V	
B16	Blower motor control	*3	*3	
B15	Blower fan ON signal	When blower fan running (when blower fan not running: 12 V)	0 V	
B13	Engine coolant temperature sensor	When the engine coolant is at 49°C (120°F)	8.9 V	
B12	In-vehicle sensor	—	—	
B11	Ground	When there is continuity to chassis ground	0 Ω	
A7	Air mix door actuator P.B.R. reference voltage	Ignition switch: ON	5 V	
A5	Mode door actuator position detection signal	Outlet	BI-LEVEL, DEF	5 V
			VENT, HEAT, DEF/HEAT	0 V
A4	Mode door actuator position detection signal	Outlet	HEAT, DEF/HEAT, DEF	5 V
			VENT, BI-LEVEL	0 V
A1	Illumination power supply	Ignition switch: ON, light switch: ON	Battery voltage	
		Ignition switch: ON, light switch: OFF	0 V	
A16	Sensor ground	When there is continuity to chassis ground	0 Ω	



# A/C CONTROL MODULE I/O SIGNAL

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

Connector & Terminal No.	Content	Measuring condition		Specified value
A14	Combination meter (ambient temperature signal)	*3		*3
A13	Mode door actuator position detection signal	Outlet	VENT, BI-LEVEL, HEAT	5 V
			DEF/HEAT, DEF	0 V
A12	Mode door actuator position detection signal	Outlet	VENT, DEF/HEAT	5 V
			BI-LEVEL, HEAT, DEF	0 V
A10	A/C cutout signal	A/C: ON		Battery voltage
		Pressure switch operated		0 V
A9	Illumination ground	When there is continuity to chassis ground		0 Ω

\*1: Battery voltage is indicated when motor running, 0 V or battery voltage pulse signal is output when motor stops.

\*2: Battery voltage is indicated when motor running, 0 V is indicated when motor stops.

\*3: Voltage can not be measured because of pulse signal.

## **B: SCHEMATIC**

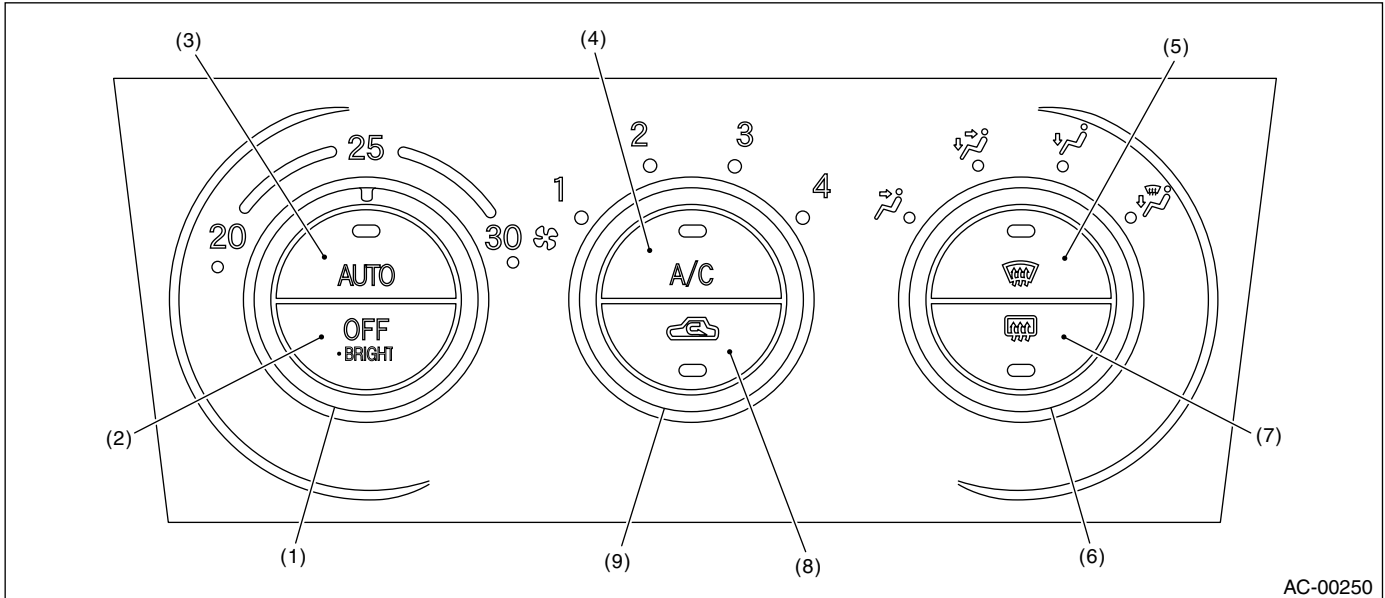
<Ref. to WI-54, SCHEMATIC, Air Conditioning System.>

# SELF-DIAGNOSIS

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

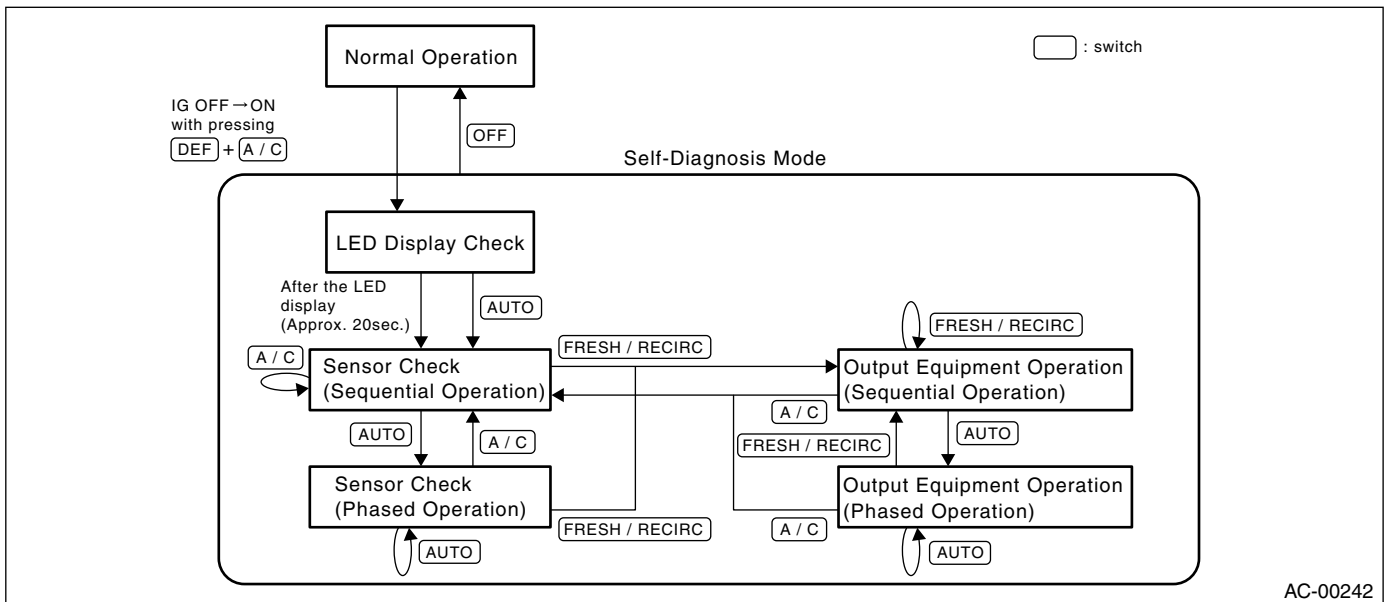
## 5. Self-diagnosis

### A: OPERATION



AC-00250

- |                              |                       |                                 |
|------------------------------|-----------------------|---------------------------------|
| (1) Temperature control dial | (4) A/C switch        | (7) Rear window defogger switch |
| (2) OFF/BRIGHT switch        | (5) DEF switch        | (8) FRESH/RECIRC switch         |
| (3) AUTO switch              | (6) Mode control dial | (9) Fan speed control dial      |



AC-00242

Step	Value	Yes	No
<b>1 SELECT CONTROL PANEL TO SELF-DIAGNOSIS MODE.</b> Start the engine while pressing DEF switch and A/C switch. Does the self-diagnosis mode operate?	Self-diagnosis mode operates.	Go to step 2.	<Ref. to AC-13, A/C AND/OR SELF-DIAGNOSIS SYSTEMS DO NOT OPERATE, Diagnostics for A/C System Failure.>

# SELF-DIAGNOSIS

## HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

Step	Value	Yes	No
<b>2 CHECK LED ILLUMINATION.</b> Make sure that three LED blink in turn on control panel (5 patterns are repeated 2 times). Do all LED blink?	LED blink.	Go to step 3.	Go to step 5.
<b>3 CHECK SENSORS MALFUNCTION.</b> 1)After completing the LED check or when AUTO switch is pressed, the A/C switch LED illuminates, and then the sensor check is started. 2)Check the input signal of each sensor in turn. If there are any trouble for each sensor, DEF, MODE and fan speed LEDs are blinked. Also check for each sensor is possible respectively every time AUTO switch is pressed. (At this time, the AUTO switch LED illuminates.) 3)If there is no trouble, DEF, MODE and fan speed LEDs are turned off. <b>NOTE:</b> Rear window defogger LED illuminates in case of stored malfunction but does not illuminate in case of present malfunction. Does each DEF, MODE and fan speed LED turn off?	LED is turned off.	Go to step 4.	Confirm the combination of illuminating LEDs by using Sensor Check Table, and identify the malfunctioning sensor before repairing. <Ref. to AC-12, SENSOR CHECK TABLE, OPERATION, Self-diagnosis.>
<b>4 CHECK OPERATION OF EACH ACTUATOR, COMPRESSOR AND FAN MOTOR.</b> 1)Press the FRESH/RECIRC switch (FRESH/RECIRC switch LED illuminates at this time.). 2)Refer to OPERATING MODE TABLE to check the operation of each actuator, compressor and fan motor.<Ref. to AC-12, OPERATING MODE TABLE, OPERATION, Self-diagnosis.> Also check for each step is possible respectively every time AUTO switch pressed. (At this time, the AUTO switch LED illuminates.) Does each actuator, compressor and fan motor operate according to operating mode table?	Operates according to operating mode table.	Press the OFF switch or turn the ignition switch to OFF and finish the self-diagnosis mode.	Refer to each diagnostics chart for actuator, compressor and fan motor, and repair the malfunctioning part as necessary.
<b>5 CHECK POOR CONTACT.</b> Check the A/C control module connector for poor contact. Is there a poor contact in connector?	There is not poor contact.	Replace the A/C control module.	Repair the connector.

# SELF-DIAGNOSIS

## HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

### 1. SENSOR CHECK TABLE

NOTE:

When the sunload sensor is checked indoors or in the shade, open circuit might be indicated. Always check the sunload sensor at a place where sun shines directly on it.

Diagnostic steps	Checked sensor	Open circuit		Short circuit		Present malfunction	Stored malfunction
		DEF LED	MODE/FAN LED	DEF LED	MODE/FAN LED		
1	In-vehicle sensor	Turn off	VENT LED blinks	Illuminate	VENT LED blinks	Turn off	Illuminate
2	Ambient sensor		BI-LEVEL LED blinks		BI-LEVEL LED blinks		
3	Evaporator sensor		HEAT LED blinks		HEAT LED blinks		
4	Sunload sensor*1		DEF/HEAT LED blinks		DEF/HEAT LED blinks		
5	Air mix door actuator P.B.R.		Fan speed 1st LED blinks		Fan speed 1st LED blinks		
6	Combination meter communication (Ambient sensor)		Fan speed 2nd LED blinks		Fan speed 2nd LED blinks		
	When all parts are in good condition	Turn off					

\*1: Only present malfunction is indicated for open circuit of sunload sensor. (However, stored malfunction can be indicated for short circuit of sunload sensor.)

### 2. OPERATING MODE TABLE

Step	1	2	3	4	5	6	7	8
Illuminating LED	VENT LED	BI-LEVEL VENT	HEAT LED	DEF/HEAT LED	Fan speed 1st LED	Fan speed 2nd LED	Fan speed 3rd LED	Fan speed 4th LED
Fan speed	LO	LO	ML	ML	ML	MH	MH	HI
Mode actuator	VENT	VENT	VENT	BI-LEVEL	HEAT	HEAT	DEF/HEAT	DEF
Intake actuator	FRESH	RECIRC	RECIRC	FRESH	FRESH	FRESH	FRESH	FRESH
Air mix door actuator (%)	FULL COOL (0%)	FULL COOL (0%)	FULL COOL (0%)	MEDIUM (50%)	MEDIUM (50%)	FULL HOT (100%)	FULL HOT (100%)	FULL HOT (100%)
Compressor	OFF	ON	ON	ON	ON	ON	ON	ON

# DIAGNOSTICS FOR A/C SYSTEM FAILURE

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

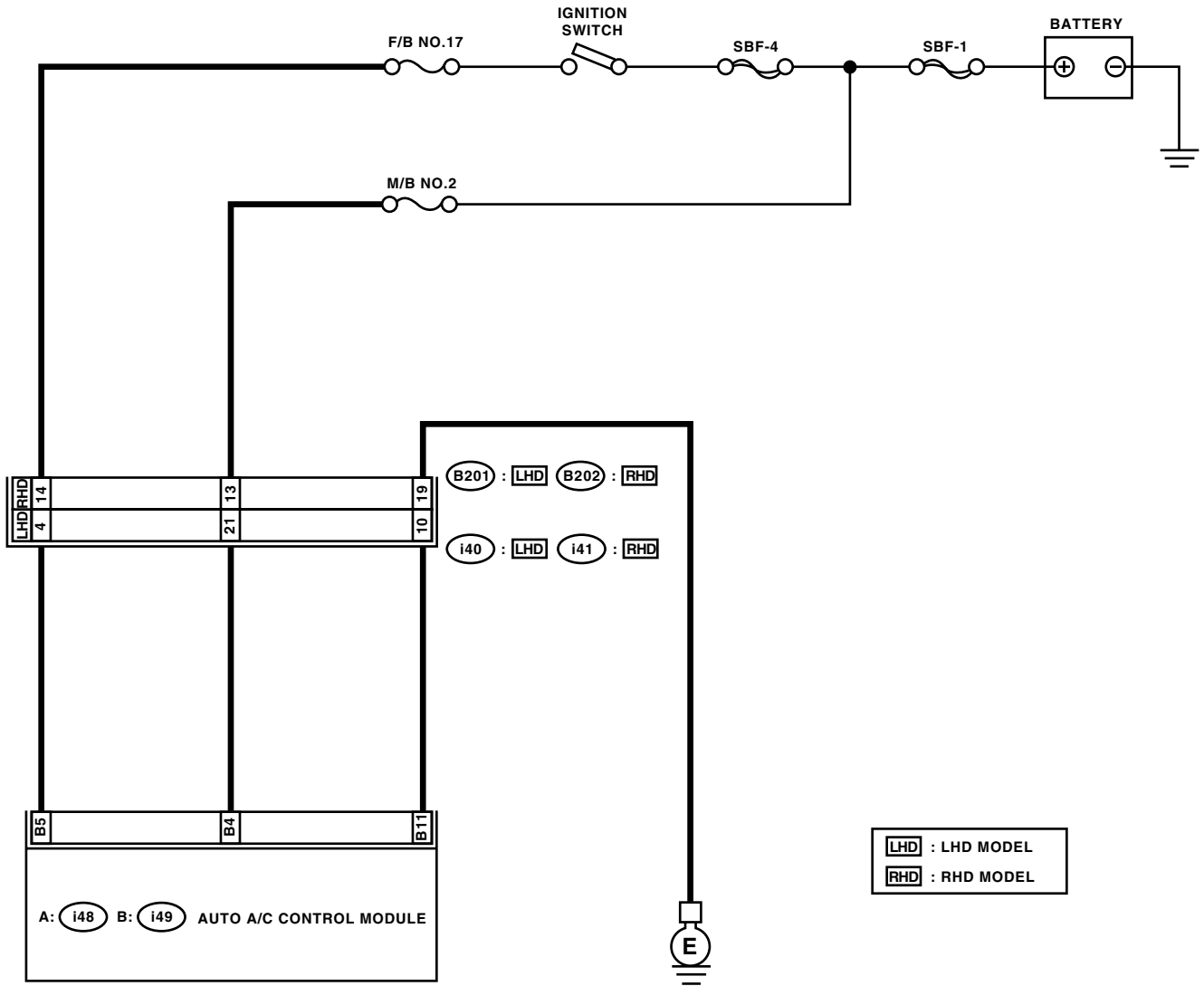
## 6. Diagnostics for A/C System Failure

### A: A/C AND/OR SELF-DIAGNOSIS SYSTEMS DO NOT OPERATE

#### TROUBLE SYMPTOM:

- Switch LEDs are faulty and switches do not operate.
- Self-diagnosis system does not operate.

#### WIRING DIAGRAM:



A: i48

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16

B: i49

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

B201

1	2	3	4	5	6	7	8	9	10	11		
12	13	14	15	16	17	18	19	20	21	22	23	24

B202

1	2	3	4	5	6	7	8	9	10	11		
12	13	14	15	16	17	18	19	20	21	22	23	24

AC-00149

## DIAGNOSTICS FOR A/C SYSTEM FAILURE

### HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

Step	Value	Yes	No
<b>1 CHECK FUSE.</b> 1) Turn the ignition switch to OFF. 2) Remove the fuse No. 2 from main fuse box. 3) Check the condition of fuse. Is the fuse blown out?	Fuse is not blown out.	Go to step 2.	Replace the fuse.
<b>2 CHECK FUSE.</b> 1) Turn the ignition switch to OFF. 2) Remove the fuses No. 17 from fuse & relay box. 3) Check the condition of fuse. Is the fuse blown out?	Fuse is not blown out.	Go to step 3.	Replace the fuse.
<b>3 CHECK A/C CONTROL MODULE POWER CIRCUIT.</b> 1) Pull out the A/C control module connector. 2) Measure the voltage between A/C control module connector terminal and chassis ground when turning ignition switch to OFF. <i><b>Connector &amp; terminal</b></i> <i><b>(i49) No. 4 (+) — Chassis ground (-):</b></i> Is the measured value more than specified value?	10 V	Go to step 4.	Repair the short circuit in harness for power supply line.
<b>4 CHECK A/C CONTROL MODULE POWER CIRCUIT.</b> Measure the voltage between A/C control module connector terminal and chassis ground when turning ignition switch to ON. <i><b>Connector &amp; terminal</b></i> <i><b>(i49) No. 5 (+) — Chassis ground (-):</b></i> Is the measured value more than specified value?	10 V	Go to step 5.	Repair the short circuit in harness for power supply line.
<b>5 CHECK A/C CONTROL MODULE GROUND CIRCUIT.</b> Measure the resistance of harness between A/C control module and chassis ground. <i><b>Connector &amp; terminal</b></i> <i><b>(i49) No. 11 — Chassis ground:</b></i> Is the measured value less than specified value?	1 $\Omega$	Go to step 6.	Repair the short circuit in harness for ground line.
<b>6 CHECK POOR CONTACT.</b> Check poor contact in A/C control module. Is there poor contact in connector?	There is no poor contact.	Repair the A/C control module.	Repair the connector.

# DIAGNOSTICS FOR A/C SYSTEM FAILURE

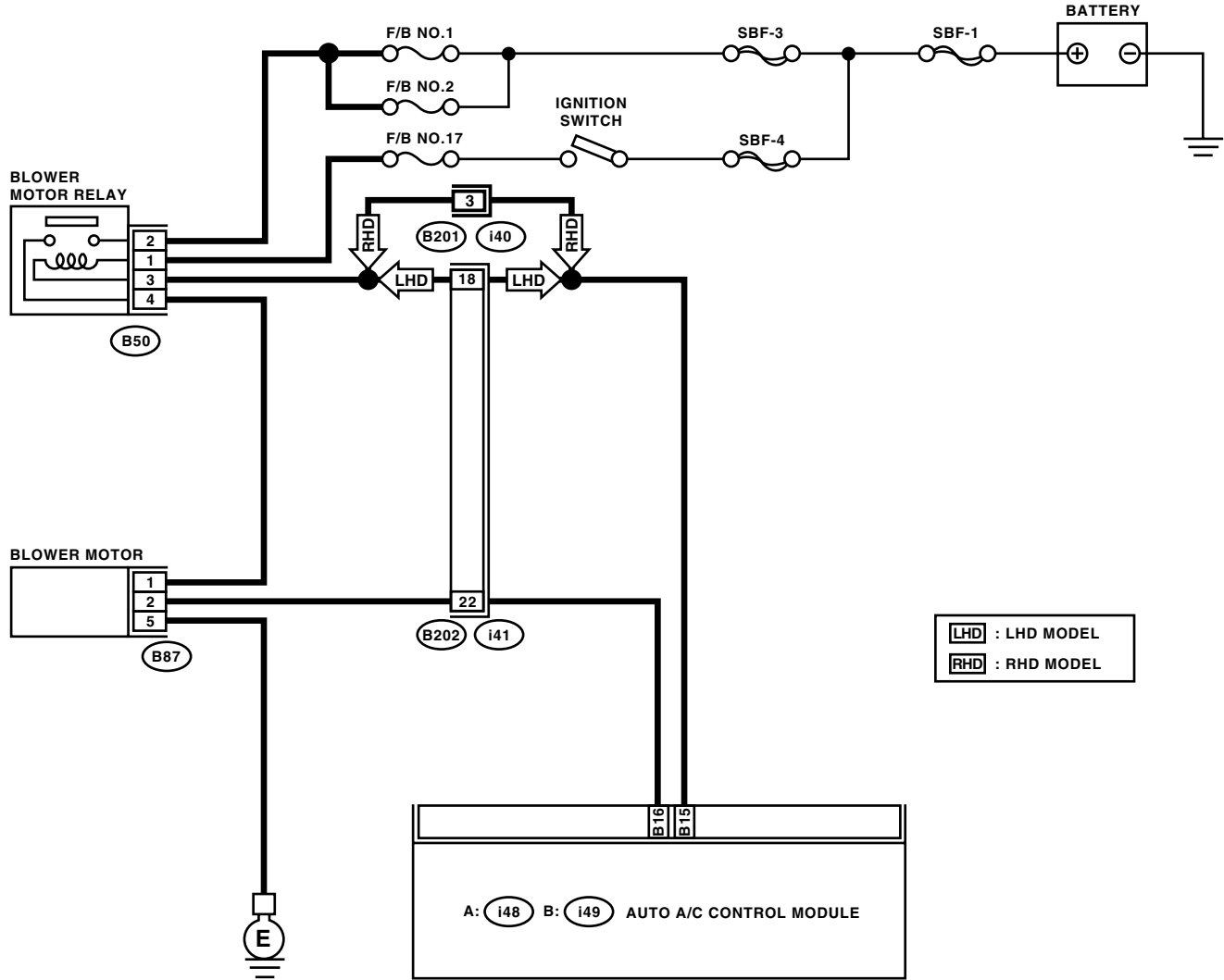
HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

## B: BLOWER MOTOR IS NOT ROTATED

### TROUBLE SYMPTOM:

- Blower motor is not rotated.
- Blower motor is not shifted.

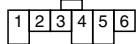
### WIRING DIAGRAM:



B50



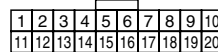
B87



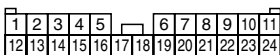
A: i48



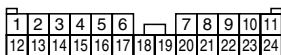
B: i49



B202



B201



AC-00150

# DIAGNOSTICS FOR A/C SYSTEM FAILURE

## HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

Step	Value	Yes	No
<b>1 CHECK FUSE.</b> 1) Remove the No. 1, No. 2 and No. 17 fuses in fuse & relay box. 2) Check the condition of fuses. Are any of the fuses blown out?	Fuse is not blown out.	Go to step 2.	Replace the fuse.
<b>2 CHECK POWER SUPPLY TO BLOWER FAN MOTOR.</b> 1) Turn the ignition switch to ON. 2) Turn the fan speed control dial clockwise. 3) Measure the voltage between blower fan motor and chassis ground. <b>Connector &amp; terminal</b> <b>(B87) No. 1 (+) — Chassis ground (-):</b> Is the measured value more than specified value?	8 V (At normal temperature)	Go to step 3.	Repair the open circuit in harness for blower fan motor power supply line.
<b>3 CHECK BLOWER FAN MOTOR RELAY.</b> 1) Turn the ignition switch to OFF. 2) Remove the blower fan motor relay. 3) Connect the battery positive (+) terminal to terminal No. 1 and ground (-) terminal to No. 3 of blower motor connector. 4) Measure the resistance between No. 2 and No. 4 terminals. <b>Terminals:</b> <b>No. 2 — No. 4</b> Is the measured value less than specified value?	1 $\Omega$	Go to step 4.	Replace the blower fan motor relay.
<b>4 CHECK BLOWER FAN MOTOR.</b> 1) Disconnect the connector from blower fan motor. 2) Connect the battery positive (+) terminal to terminal No. 1 and ground (-) terminal to No. 2 and No. 5 of blower motor connector. 3) Make sure that the blower fan motor is operated. Does the blower fan motor operate?	Fan motor operates.	Go to step 5.	Replace the blower fan motor.
<b>5 CHECK POOR CONTACT.</b> Check poor contact in A/C control module. Is there poor contact in connector?	There is no poor contact.	Repair the A/C control module.	Repair the connector.



# DIAGNOSTICS FOR A/C SYSTEM FAILURE

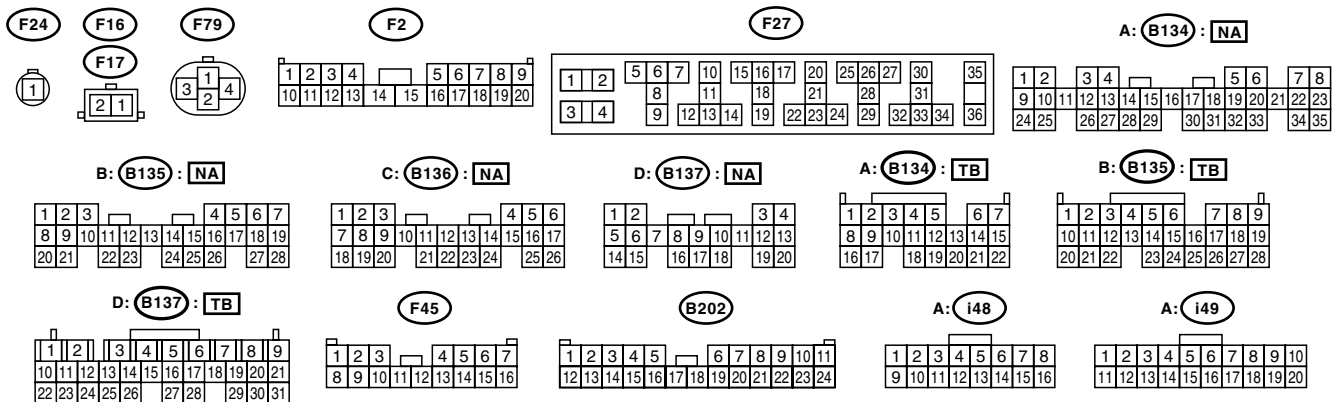
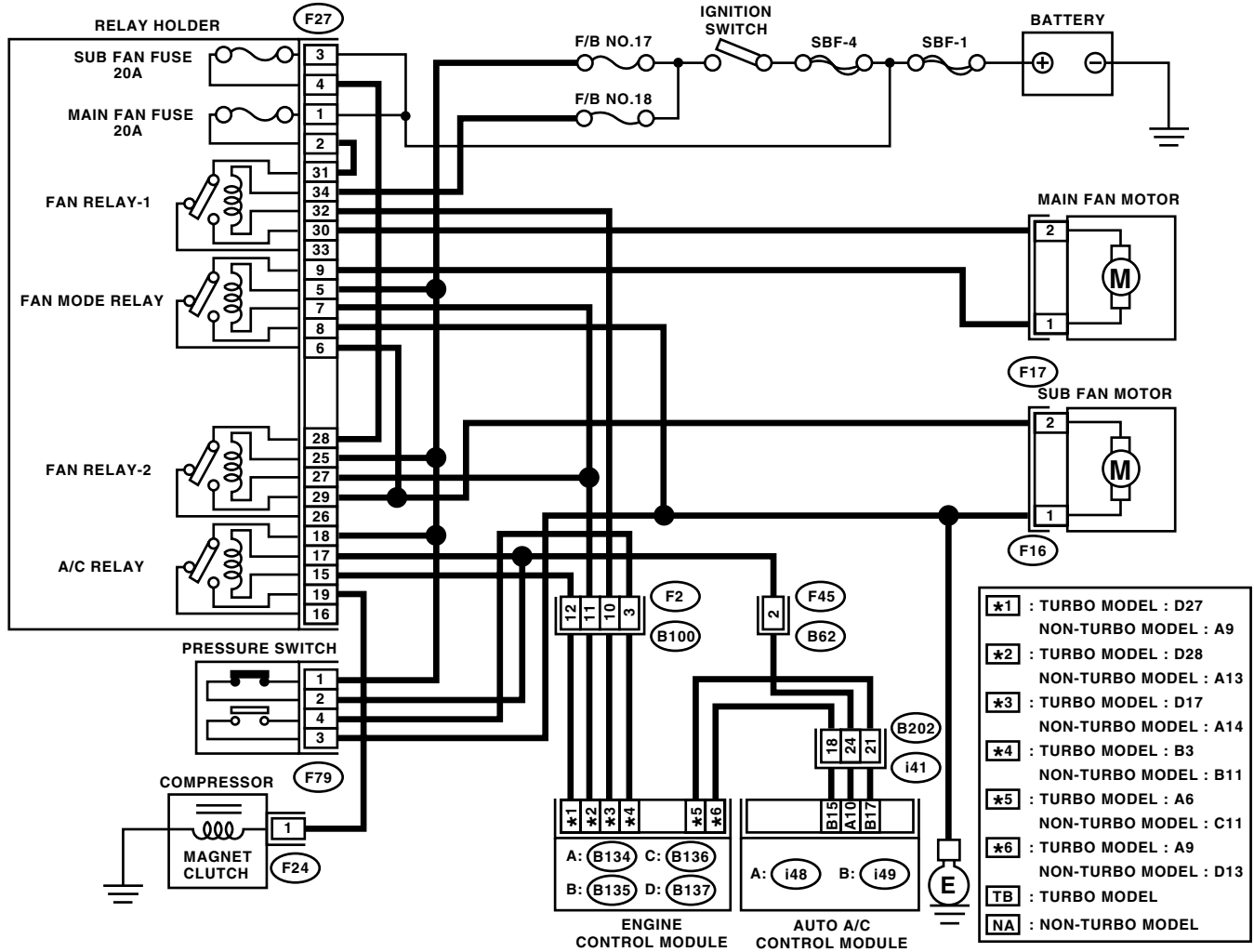
HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

## C: COMPARTMENT TEMPERATURE IS NOT CHANGED OR A/C SYSTEM DOES NOT RESPOND QUICKLY

### TROUBLE SYMPTOM:

- Compartment temperature is not changed.
- A/C system does not respond quickly.

### WIRING DIAGRAM FOR LHD MODEL:

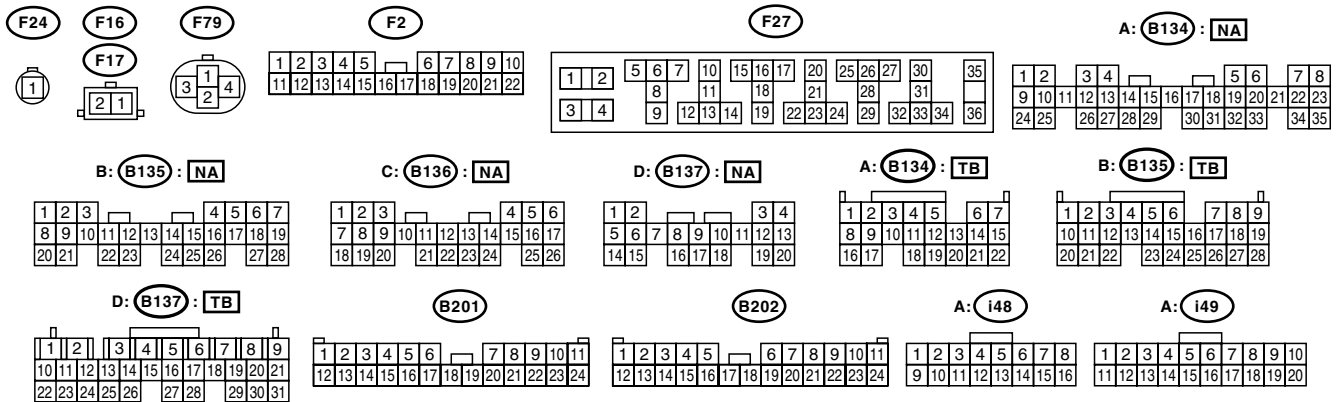
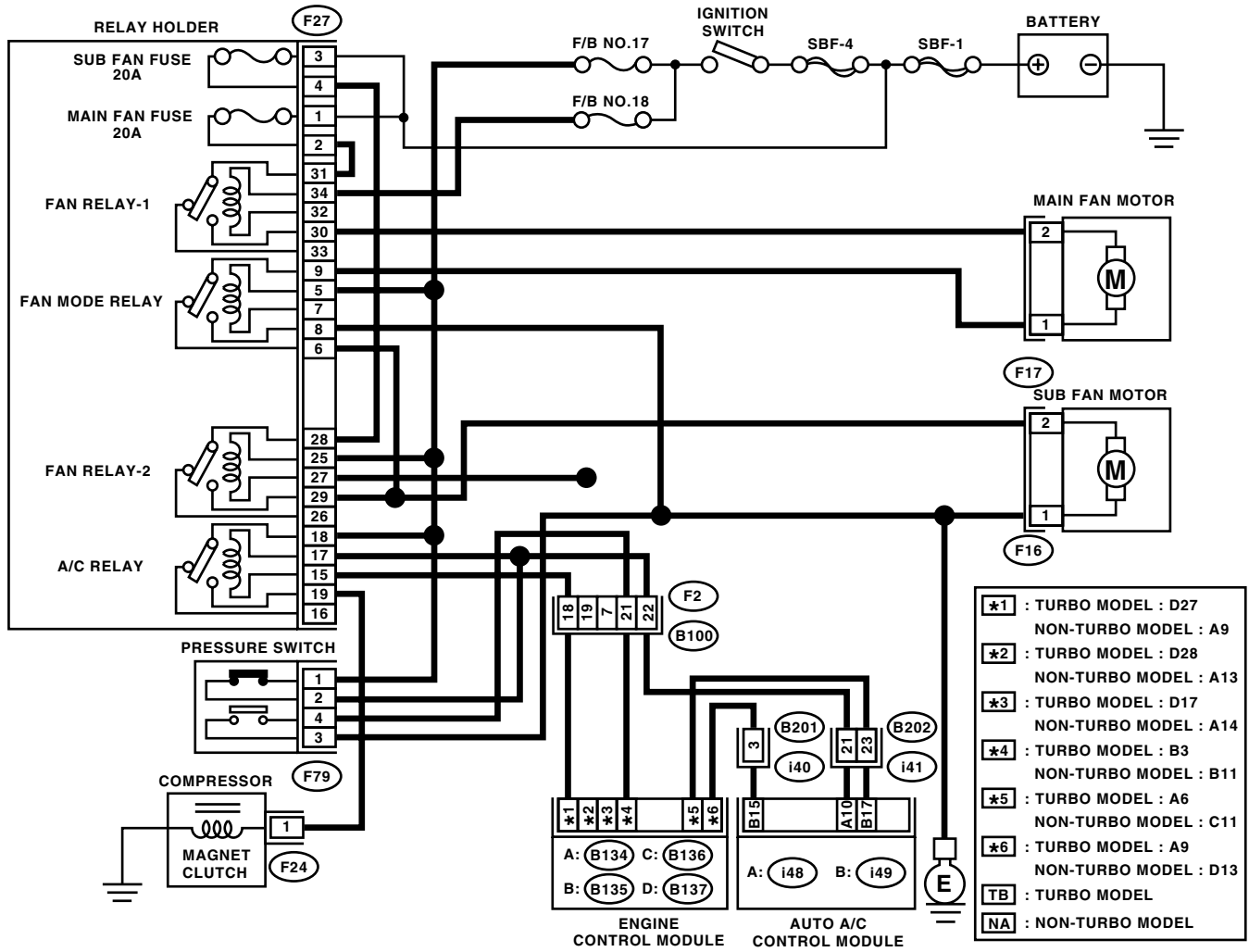


AC-00151

# DIAGNOSTICS FOR A/C SYSTEM FAILURE

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

## WIRING DIAGRAM FOR RHD MODEL:



AC-00152

# DIAGNOSTICS FOR A/C SYSTEM FAILURE

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

Step	Value	Yes	No
<b>1 CHECK FUSE.</b> 1) Turn the ignition switch to OFF. 2) Remove the main fan fuse and sub fan fuse in main fuse box. 3) Check the condition of fuse. Is the fuse blown out?	No fuse blown out.	Go to step 2.	Replace the fuse.
<b>2 CHECK THE POWER SUPPLY TO PRESSURE SWITCH.</b> 1) Disconnect the connector from pressure switch. 2) Turn the ignition switch to OFF. 3) Measure the voltage between harness connector and chassis ground. <i><b>Connector &amp; terminal</b></i> <i><b>(F79) No.1 (+) — Chassis ground (-):</b></i> Is the measured value more than specified value?	10 V	Go to step 3.	Repair the harness for pressure switch power supply circuit.
<b>3 CHECK THE HARNESS BETWEEN PRESSURE SWITCH AND A/C RELAY HARNESS.</b> 1) Turn the ignition switch to OFF. 2) Remove the A/C relay in the main fuse box. 3) Measure the resistance between A/C relay and pressure switch connector. <i><b>Connector &amp; terminal</b></i> <i><b>(F27) No.17 — (F79) No.2:</b></i> Is the measured value less than specified value?	1 Ω	Go to step 4.	Repair the harness between A/C relay and pressure switch.
<b>4 CHECK THE PRESSURE SWITCH.</b> Measure the resistance between pressure switch terminals. <i><b>Terminals</b></i> <i><b>No. 1 — No.2:</b></i> Is the measured value less than specified value?	1 Ω	Go to step 5.	Replace the pressure switch.
<b>5 CHECK THE A/C CUT SIGNAL CIRCUIT.</b> 1) Disconnect the connector from A/C control module. 2) Measure the resistance between A/C control module and pressure switch connector. <i><b>Connector &amp; terminal</b></i> <i><b>(i48) No.10 — (F79) No.2:</b></i> Is the measured value less than specified value?	1 Ω	Go to step 6.	Repair the harness between A/C control module and pressure switch.
<b>6 CHECK THE A/C ON SIGNAL CIRCUIT.</b> 1) Disconnect the connector from engine control module. 2) Measure the resistance between engine control module and A/C control module connector. <i><b>Connector &amp; terminal</b></i> <i><b>Turbo model</b></i> <i><b>(B134) No.6 — (i49) No.17:</b></i> <i><b>Non-turbo model</b></i> <i><b>(B136) No.11 — (i49) No.17:</b></i> Is the measured value less than specified value?	1 Ω	Go to step 7.	Repair the harness between A/C control module and engine control module.

## DIAGNOSTICS FOR A/C SYSTEM FAILURE

### HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

Step	Value	Yes	No
<b>7 CHECK A/C RELAY.</b> 1)Remove the A/C relay in main fuse box. 2)Check the A/C relay. <Ref. to AC-44, INSPECTION, Relay and Fuse.> Is the operation of the relay OK?	Relay operates normally.	Go to step <b>8</b> .	Replace the A/C relay.
<b>8 CHECK POWER SUPPLY TO MAGNET CLUTCH OF A/C COMPRESSOR.</b> 1)Turn the ignition switch to OFF, and then connect the A/C relay connector and all removed connector. 2)Start the engine, and turn A/C switch to ON. 3)Set the temperature control dial to maximum cold position. 4)Measure the voltage between magnet clutch harness connector and chassis ground. <b>Connector &amp; terminal</b> <b>(F24) No. 1 (+) — Chassis ground (-):</b> Is the measured value more than specified value?	10.5 V (At normal temperature)	Go to step <b>9</b> .	Repair the harness for power supply line of A/C compressor.
<b>9 CHECK OPERATION OF MAIN FAN MOTOR.</b> 1)Start the engine and turn the A/C switch to ON. 2)Check the operation of main fan motor. Does the main fan motor operate?	Fan motor operates.	Go to step <b>14</b> .	Go to step <b>10</b> .
<b>10 CHECK POWER SUPPLY TO MAIN FAN MOTOR.</b> <b>CAUTION:</b> <b>Be careful not to overheat the engine during repair.</b> 1)Turn the ignition switch to OFF. 2)Disconnect the connector from main 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 the voltage between main fan motor harness connector and chassis ground. <b>Connector &amp; terminal</b> <b>Turbo engine model:</b> <b>(F17) No. 2 (+) — Chassis ground (-):</b> Is the measured value more than specified value?	10 V	Go to step <b>11</b> .	Repair the harness for main fan motor power supply circuit.
<b>11 CHECK GROUND CIRCUIT OF MAIN FAN MOTOR.</b> 1)Measure the resistance between main fan motor harness connector and chassis ground. <b>Connector &amp; terminal</b> <b>(F17) No. 1 — Chassis ground:</b> Is the measured value less than specified value?	1 Ω	Go to step <b>12</b> .	Repair the harness for main fan motor ground circuit.
<b>12 CHECK MAIN FAN MOTOR.</b> Connect the battery positive (+) terminal to terminal No. 2, and ground (-) terminal to terminal No. 1 of main fan motor connector to make sure that main fan motor rotate. Does the main fan rotate?	Fan motor operates.	Go to step <b>13</b> .	Replace the main fan motor.

# DIAGNOSTICS FOR A/C SYSTEM FAILURE

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

Step	Value	Yes	No
<b>13 CHECK POOR CONTACT IN MAIN FAN MOTOR CONNECTOR.</b> Check poor contact in main fan motor harness connector. Is there poor contact in connector?	There is no poor contact.	Go to step <b>14</b> .	Repair the poor contact in main fan motor connector.
<b>14 CHECK OPERATION OF SUB FAN MOTOR.</b> 1)Start the engine and turn the A/C switch to ON. 2)Check the operation of sub fan motor. Does the sub fan motor operate normally?	Fan motor operates.	Go to step <b>19</b> .	Go to step <b>15</b> .
<b>15 CHECK POWER SUPPLY TO SUB FAN MOTOR.</b> <b>CAUTION:</b> <b>Be careful not to overheat the engine during repair.</b> 1)Turn the ignition switch to OFF. 2)Disconnect the 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 the voltage between sub fan motor harness connector and chassis ground. <b>Connector &amp; terminal</b> <b>(F16) No. 2 (+) — Chassis ground (-):</b> Is the measured value more than specified value?	10 V	Go to step <b>16</b> .	Repair the harness for sub fan motor power supply circuit.
<b>16 CHECK GROUND CIRCUIT OF SUB FAN MOTOR.</b> Measure the resistance between sub fan motor harness connector and chassis ground. <b>Connector &amp; terminal</b> <b>(F16) No. 1 — Chassis ground:</b> Is the measured value less than specified value?	1 Ω	Go to step <b>17</b> .	Repair the harness for sub fan motor ground circuit.
<b>17 CHECK SUB FAN MOTOR.</b> Connect the battery positive (+) terminal to terminal No. 2, and ground (-) terminal to terminal No. 1 of sub fan motor connector to make sure that sub fan motor rotate. Does the sub fan motor rotate?	Fan motor rotates.	Go to step <b>18</b> .	Replace the sub fan motor.
<b>18 CHECK POOR CONTACT IN SUB FAN MOTOR CONNECTOR.</b> Check poor contact in sub fan motor connector. Is there poor contact in connector?	There is no poor contact.	Go to step <b>19</b> .	Repair the poor contact in sub fan motor connector.
<b>19 CHECK POOR CONTACT IN AUTO A/C CONTROL MODULE CONNECTOR.</b> Check poor contact in auto A/C control module connector. Is there poor contact in connector?	There is no poor contact.	Replace the auto A/C control module.	Repair the connector.

# DIAGNOSTIC PROCEDURE FOR ACTUATORS

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

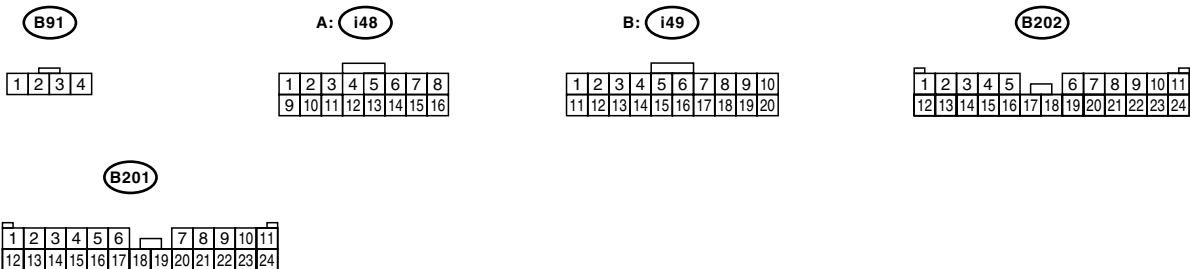
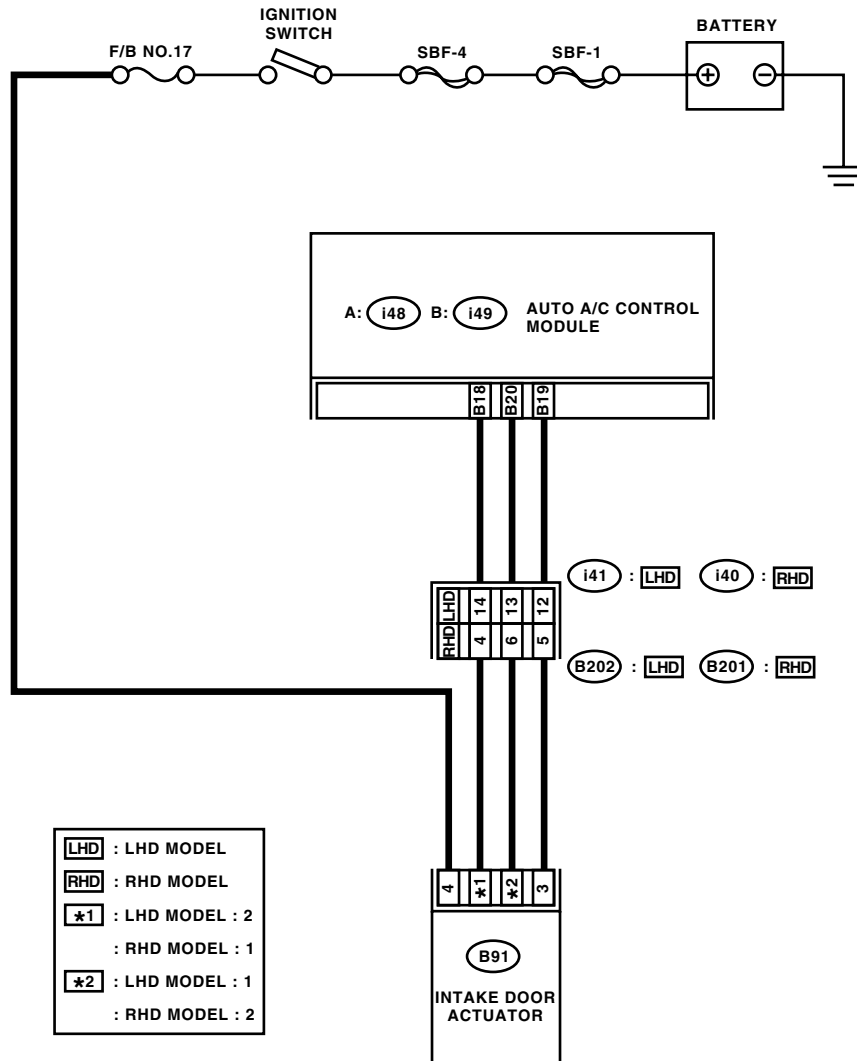
## 7. Diagnostic Procedure for Actuators

### A: INTAKE DOOR ACTUATOR

TROUBLE SYMPTOM:

FRESH/RECIRC mode is not changed.

WIRING DIAGRAM:



AC-00153

# DIAGNOSTIC PROCEDURE FOR ACTUATORS

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

Step	Value	Yes	No
<p><b>1 CHECK POWER SUPPLY TO INTAKE DOOR ACTUATOR.</b>                      1) Turn the ignition switch to OFF.                      2) Disconnect the intake door actuator connector.                      3) Turn the ignition switch to ON.                      4) Measure the voltage between intake door actuator connector and chassis ground.</p> <p><b>Connector &amp; terminal</b>  <b>(B91) No. 4 (+) — Chassis ground (-):</b>                      Is the measured value more than specified value?</p>	7 V (At normal temperature)	Go to step 2.	Check the harness for open or short between intake door actuator and fuse.
<p><b>2 CHECK HARNESS BETWEEN A/C CONTROL MODULE AND INTAKE DOOR ACTUATOR.</b>                      1) Turn the ignition switch to OFF.                      2) Disconnect the auto A/C control module connector.                      3) Measure the resistance between intake door actuator connector and auto A/C control module connector.</p> <p><b>Connector &amp; terminal</b>  <b>LHD model:</b>  <b>(i49) No. 18 — (B91) No. 2:</b>  <b>(i49) No. 20 — (B91) No. 1:</b>  <b>(i49) No. 19 — (B91) No. 3:</b>  <b>RHD model:</b>  <b>(i49) No. 18 — (B91) No. 1:</b>  <b>(i49) No. 20 — (B91) No. 2:</b>  <b>(i49) No. 19 — (B91) No. 3:</b>                      Is the measured value less than specified value?</p>	1 Ω	Go to step 3.	Repair the harness between auto A/C control module and intake door actuator.
<p><b>3 CHECK INTAKE DOOR ACTUATOR OPERATION.</b>                      1) Connect the intake door actuator connector.                      2) Ground the auto A/C control module connector with a suitable wire.                      3) Turn the ignition switch to ON and check movement of intake door actuator.</p> <p><b>Connector &amp; terminal</b>  <b>(i49) No. 20 — Chassis ground:</b>                      Is the intake door actuator moved to FRESH?</p>	Door actuator moves to FRESH.	Go to step 4.	Replace the intake door actuator.
<p><b>4 CHECK INTAKE DOOR ACTUATOR OPERATION.</b>                      1) Turn the ignition switch to OFF.                      2) Ground the auto A/C control module connector with a suitable wire.                      3) Turn the ignition switch to ON and check movement of intake door actuator.</p> <p><b>Connector &amp; terminal</b>  <b>(i49) No. 18 — Chassis ground:</b>                      Is the intake door actuator moved to RECIRC?</p>	Door actuator moves to RECIRC.	Replace the auto A/C control module.	Replace the intake door actuator.

# DIAGNOSTIC PROCEDURE FOR ACTUATORS

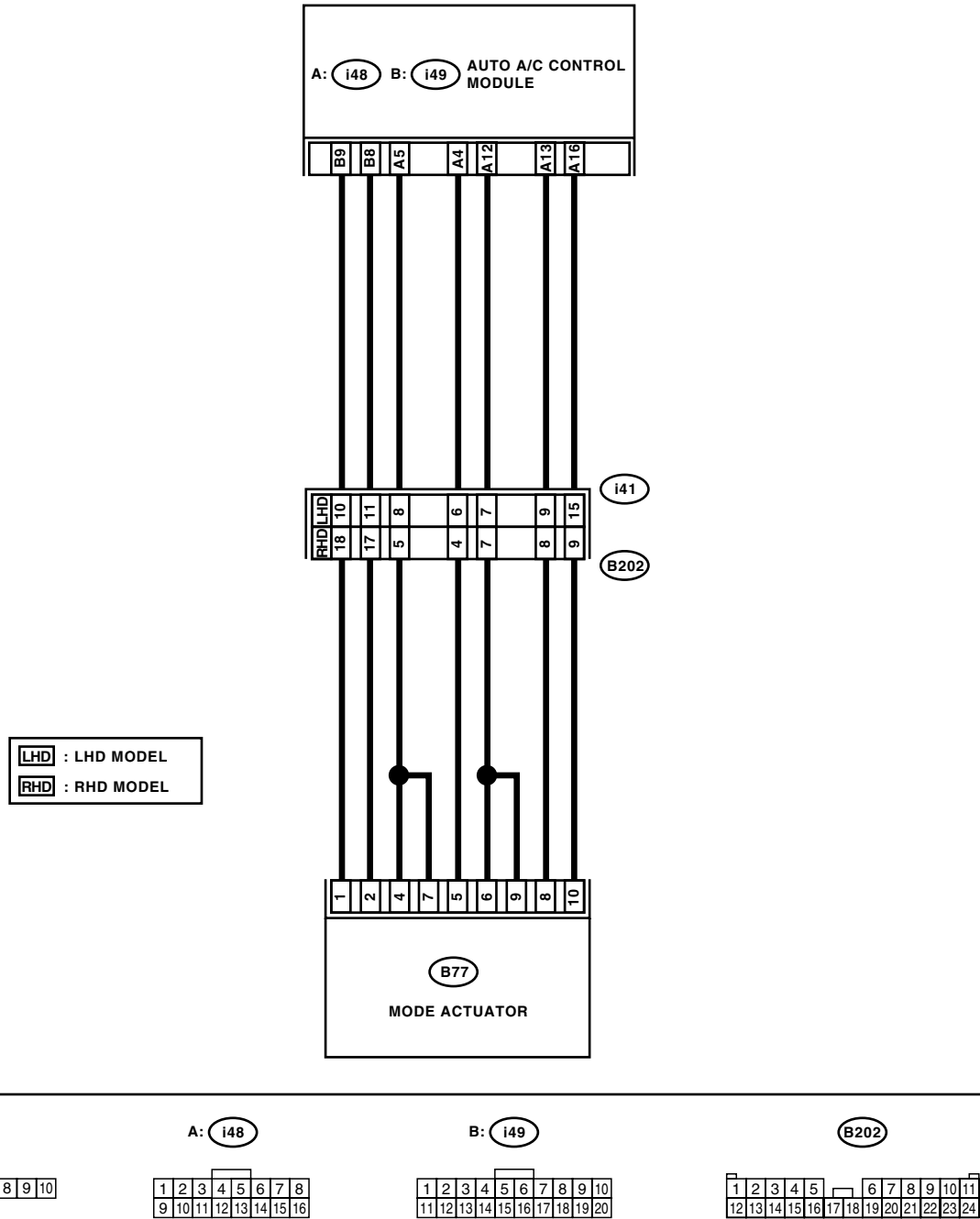
HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

## B: MODE DOOR ACTUATOR

### TROUBLE SYMPTOM:

Air flow outlet is not changed.

### WIRING DIAGRAM:





# DIAGNOSTIC PROCEDURE FOR ACTUATORS

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

Step	Value	Yes	No
<p><b>1 CHECK POWER SUPPLY FOR AUTO A/C CONTROL MODULE SIDE.</b>                      1) Turn the ignition switch to ON.                      2) Turn the mode control dial to VENT position.                      3) Press the DEF switch and measure the voltage between auto A/C control module and chassis ground when VENT is changed to DEF position.</p> <p><b>Connector &amp; terminal</b>  <b>(i49) No. 9 (+) — Chassis ground (-):</b>                      Is the measured value more than specified value?</p>	12 V	Go to step 2.	Replace the auto A/C control module.
<p><b>2 CHECK POWER SUPPLY FOR ACTUATOR SIDE.</b>                      1) Turn the mode control dial to VENT position.                      2) Press the DEF switch and measure the voltage between mode door actuator harness connector and chassis ground when VENT is changed to DEF position.</p> <p><b>Connector &amp; terminal</b>  <b>(B77) No. 1 (+) — Chassis ground (-):</b>                      Is the measured value more than specified value?</p>	7 V (At normal temperature)	Go to step 3.	Repair the harness between auto A/C control module and mode door actuator.
<p><b>3 CHECK POWER SUPPLY FOR AUTO A/C CONTROL MODULE SIDE.</b>                      1) Press the DEF switch.                      2) Turn the mode control dial to VENT position and measure the voltage between auto A/C control module and chassis ground when DEF is changed to VENT position.</p> <p><b>Connector &amp; terminal</b>  <b>(i49) No. 8 (+) — Chassis ground (-):</b>                      Is the measured value more than specified value?</p>	12 V	Go to step 4.	Replace the auto A/C control module.
<p><b>4 CHECK POWER SUPPLY FOR ACTUATOR SIDE.</b>                      1) Press the DEF switch.                      2) Turn the mode control dial to VENT position and measure the voltage between mode door actuator harness connector and chassis ground when DEF is changed to VENT position.</p> <p><b>Connector &amp; terminal</b>  <b>(B77) No. 2 (+) — Chassis ground (-):</b>                      Is the measured value more than specified value?</p>	7 V (At normal temperature)	Go to step 5.	Repair the harness between auto A/C control module and mode door actuator.
<p><b>5 CHECK ACTUATOR.</b>                      1) Turn the ignition switch to OFF.                      2) Disconnect the connector from mode door actuator.                      3) Connect the battery positive (+) terminal to terminal No. 1 and ground (-) terminal to terminal No. 2 of mode door actuator to make sure that actuator operates.                      4) Connect the battery positive (+) terminal to terminal No. 2 and ground (-) terminal to terminal No. 1 of mode door actuator to make sure that actuator operates.                      Does the motor operate normally?</p>	The motor operates normally.	Go to step 6.	Replace the mode door actuator.

# DIAGNOSTIC PROCEDURE FOR ACTUATORS

## HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

Step	Value	Yes	No
<p><b>6 CHECK AUTO A/C CONTROL MODULE SIGNAL VOLTAGE.</b>                      1) Turn the ignition switch to ON.                      2) Turn the mode control dial and measure voltage between auto A/C control module harness connector and chassis ground for each mode.  <b>Connector &amp; terminal</b>  <i>(i48) No. 4 (+) — Chassis ground (-):</i>                      Is the measured value within specified value?</p>	HEAT, D/H, DEF: 5 V, VENT, BI-LEVEL: 0 V	Go to step 9.	Go to step 7.
<p><b>7 CHECK AUTO A/C CONTROL MODULE SIGNAL POWER SUPPLY.</b>                      1) Turn the ignition switch to OFF.                      2) Disconnect the connector from mode door actuator.                      3) Turn the ignition switch to ON.                      4) Measure the voltage between mode door actuator harness connector and chassis ground.  <b>Connector &amp; terminal</b>  <i>(B77) No. 5 (+) — Chassis ground (-):</i>                      Is the measured value within specified value?</p>	5 V	Go to step 9.	Go to step 8.
<p><b>8 CHECK HARNESS BETWEEN AUTO A/C CONTROL MODULE AND MODE DOOR ACTUATOR.</b>                      1) Turn the ignition switch to OFF.                      2) Disconnect the connectors from auto A/C control module and mode door actuator.                      3) Measure the resistance of harness between auto A/C control module and mode door actuator.  <b>Connector &amp; terminal</b>  <i>(i48) No. 4 (+) — Chassis ground (-):</i>                      Is the measured value less than specified value?</p>	1 $\Omega$	Replace the auto A/C control module.	Repair the harness between auto A/C control module and mode door actuator.
<p><b>9 CHECK AUTO A/C CONTROL MODULE SIGNAL VOLTAGE.</b>                      1) Turn ignition switch to ON.                      2) Turn the mode control dial and measure voltage between auto A/C control module harness connector and chassis ground for each mode.  <b>Connector &amp; terminal</b>  <i>(i48) No. 12 (+) — Chassis ground (-):</i>                      Is the measured value within specified value?</p>	VENT, D/H: 5 V, BI-LEVEL, HEAT, DEF: 0 V	Go to step 12.	Go to step 10.
<p><b>10 CHECK AUTO A/C CONTROL MODULE SIGNAL POWER SUPPLY.</b>                      1) Turn the ignition switch to OFF.                      2) Disconnect the connector from mode door actuator.                      3) Turn the ignition switch to ON.                      4) Measure the voltage between mode door actuator harness connector and chassis ground.  <b>Connector &amp; terminal</b>  <i>(B77) No. 6, 9 (+) — Chassis ground (-):</i>                      Is the measured value within specified value?</p>	5 V	Go to step 12.	Go to step 11.

# DIAGNOSTIC PROCEDURE FOR ACTUATORS

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

Step	Value	Yes	No
<p><b>11 CHECK HARNESS BETWEEN AUTO A/C CONTROL MODULE AND MODE DOOR ACTUATOR.</b>                      1) Turn the ignition switch to OFF.                      2) Disconnect the connectors from auto A/C control module and mode door actuator.                      3) Measure the resistance of harness between auto A/C control module and mode door actuator.  <b>Connector &amp; terminal</b>  <b>(i48) No. 12 — (B77) No. 6, 9:</b>                      Is the measured value less than specified value?</p>	1 Ω	Replace the auto A/C control module.	Repair the harness between auto A/C control module and mode door actuator.
<p><b>12 CHECK AUTO A/C CONTROL MODULE SIGNAL VOLTAGE.</b>                      1) Turn ignition switch to ON.                      2) Turn the mode control dial and measure voltage between auto A/C control module harness connector and chassis ground for each mode.  <b>Connector &amp; terminal</b>  <b>(i48) No. 5 (+) — Chassis ground (-):</b>                      Is the measured value within specified value?</p>	BI-LEVEL, DEF: 5 V, VENT, HEAT, D/H: 0 V	Go to step 15.	Go to step 13.
<p><b>13 CHECK AUTO A/C CONTROL MODULE SIGNAL POWER SUPPLY.</b>                      1) Turn the ignition switch to OFF.                      2) Disconnect the connector from mode door actuator.                      3) Turn the ignition switch to ON.                      4) Measure the voltage between mode door actuator harness connector and chassis ground.  <b>Connector &amp; terminal</b>  <b>(B77) No. 4, 7 (+) — Chassis ground (-):</b>                      Is the measured value within specified value?</p>	5 V	Go to step 15.	Go to step 14.
<p><b>14 CHECK HARNESS BETWEEN AUTO A/C CONTROL MODULE AND MODE DOOR ACTUATOR.</b>                      1) Turn the ignition switch to OFF.                      2) Disconnect the connectors from auto A/C control module and mode door actuator.                      3) Measure the resistance of harness between auto A/C control module and mode door actuator.  <b>Connector &amp; terminal</b>  <b>(i48) No. 5 — (B77) No. 4, 7:</b>                      Is the measured value less than specified value?</p>	1 Ω	Replace the auto A/C control module.	Repair the harness between auto A/C control module and mode door actuator.
<p><b>15 CHECK AUTO A/C CONTROL MODULE SIGNAL VOLTAGE.</b>                      1) Turn ignition switch to ON.                      2) Turn the mode control dial and measure voltage between auto A/C control module harness connector and chassis ground for each mode.  <b>Connector &amp; terminal</b>  <b>(i48) No. 13 (+) — Chassis ground (-):</b>                      Is the measured value within specified value?</p>	VENT, BI-LEVEL, HEAT: 5V, D/H, DEF: 0 V	Go to step 19.	Go to step 16.

# DIAGNOSTIC PROCEDURE FOR ACTUATORS

## HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

Step	Value	Yes	No
<b>16 CHECK AUTO A/C CONTROL MODULE SIGNAL POWER SUPPLY.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connector from mode door actuator. 3) Turn the ignition switch to ON. 4) Measure the voltage between mode door actuator harness connector and chassis ground. <b>Connector &amp; terminal</b> <b>(B77) No. 8 (+) — Chassis ground (-):</b> Is the measured value within specified value?	5 V	Go to step 18.	Go to step 17.
<b>17 CHECK HARNESS BETWEEN AUTO A/C CONTROL MODULE AND MODE DOOR ACTUATOR.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from auto A/C control module and mode door actuator. 3) Measure the resistance of harness between auto A/C control module and mode door actuator. <b>Connector &amp; terminal</b> <b>(i48) No. 13 — (B77) No. 8:</b> Is the measured value less than specified value?	1 $\Omega$	Replace the auto A/C control module.	Repair the harness between auto A/C control module and mode door actuator.
<b>18 CHECK ACTUATOR GROUND CIRCUIT.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connector from auto A/C control module. 3) Measure the resistance of harness between auto A/C control module and mode door actuator. <b>Connector &amp; terminal</b> <b>(i48) No. 16 — (B77) No. 10:</b> Is the measured value less than specified value?	1 $\Omega$	Replace the mode door actuator.	Repair the harness between auto A/C control module and mode door actuator.
<b>19 CHECK POOR CONTACT.</b> Check poor contact in auto A/C control module connector. Is there poor contact in connector?	There is no poor contact.	Repair the poor contact in auto A/C control module.	Repair the connector.

# DIAGNOSTIC PROCEDURE FOR ACTUATORS

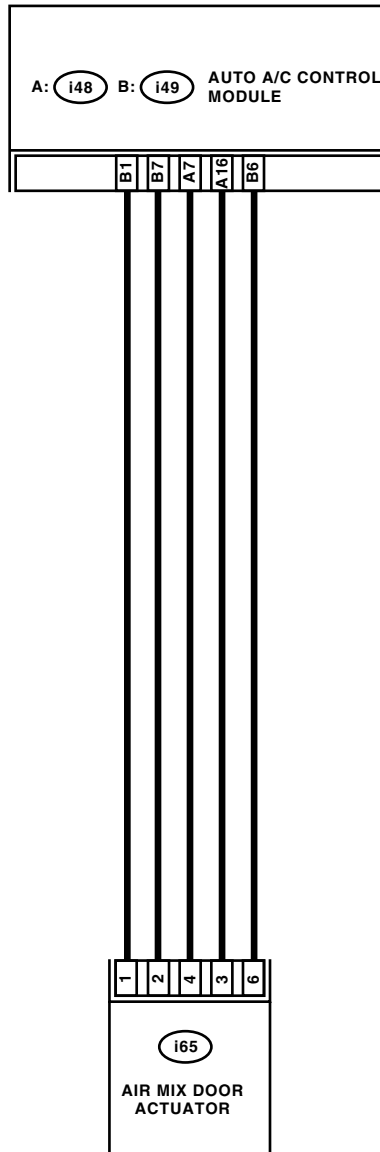
HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

## C: AIR MIX DOOR ACTUATOR

### TROUBLE SYMPTOM:

Outlet air temperature is not changed.

### WIRING DIAGRAM FOR LHD MODEL:



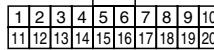
i65



A: i48



B: i49

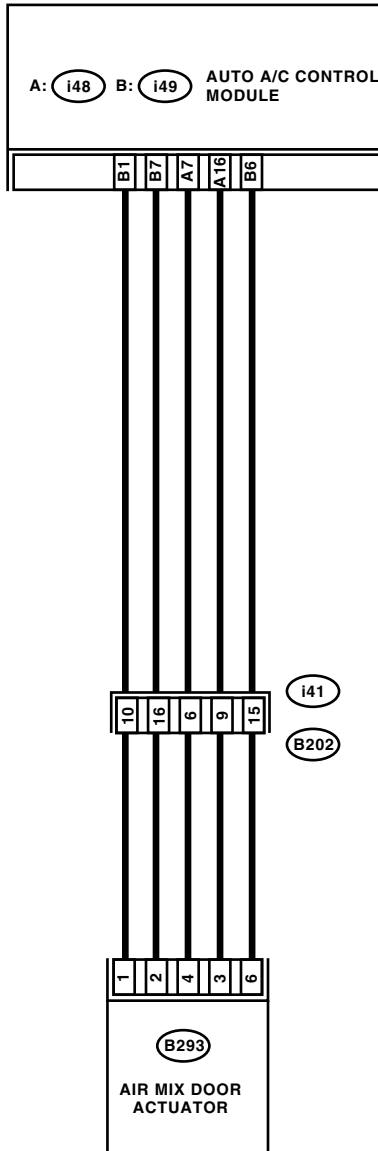


AC-00106

# DIAGNOSTIC PROCEDURE FOR ACTUATORS

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

## WIRING DIAGRAM FOR RHD MODEL:



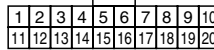
**B293**



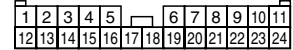
**A: i48**



**B: i49**



**B202**



AC-00155

# DIAGNOSTIC PROCEDURE FOR ACTUATORS

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

Step	Value	Yes	No
<p><b>1 CHECK POWER SUPPLY TO AIR MIX DOOR ACTUATOR PBR.</b>                      1) Turn the ignition switch to OFF.                      2) Disconnect the air mix door actuator connector.                      3) Turn the ignition switch and AUTO switch to ON.                      4) Measure the voltage between A/C control module connector terminals.  <b>Connector &amp; terminal</b>  <i>(i48) No. 7 (+) — (i48) No. 16 (-):</i>                      Is the measured value within specified value?</p>	Approx. 5 V	Go to step 2.	Replace the auto A/C control module.
<p><b>2 CHECK POWER SUPPLY TO AIR MIX DOOR ACTUATOR.</b>                      Measure the voltage between auto A/C control module connector and chassis ground when setting temperature control dial to FULL COOL.  <b>Connector &amp; terminal</b>  <i>(i49) No. 6 (+) — Chassis ground (-):</i>                      Is the measured value more than specified value?</p>	7 V (At normal temperature)	Go to step 3.	Replace the auto A/C control module.
<p><b>3 CHECK POWER SUPPLY TO AIR MIX DOOR ACTUATOR.</b>                      Measure the voltage between auto A/C control module connector and chassis ground when setting temperature control dial to FULL HOT.  <b>Connector &amp; terminal</b>  <i>(i49) No. 7 (+) — Chassis ground (-):</i>                      Is the measured value more than specified value?</p>	7 V (At normal temperature)	Go to step 4.	Replace the auto A/C control module.
<p><b>4 CHECK HARNESS BETWEEN AUTO A/C CONTROL MODULE AND AIR MIX DOOR ACTUATOR.</b>                      1) Turn the A/C and ignition switch to OFF.                      2) Disconnect the auto A/C control module connector.                      3) Measure the resistance between auto A/C control module and air mix door actuator connector.  <b>Connector &amp; terminal</b>  <b>LHD model:</b>  <i>(i65) No. 1 — (i49) No. 1:</i>  <i>(i65) No. 2 — (i49) No. 7:</i>  <i>(i65) No. 3 — (i48) No. 16:</i>  <i>(i65) No. 4 — (i48) No. 7:</i>  <i>(i65) No. 6 — (i49) No. 6:</i>  <b>RHD model:</b>  <i>(B293) No. 1 — (i49) No. 1:</i>  <i>(B293) No. 2 — (i49) No. 7:</i>  <i>(B293) No. 3 — (i48) No. 16:</i>  <i>(B293) No. 4 — (i48) No. 7:</i>  <i>(B293) No. 6 — (i49) No. 6:</i>                      Is the measured value less than specified value?</p>	1 Ω	Go to step 5.	Repair the open circuit in harness between auto A/C control module and air mix door actuator.

# DIAGNOSTIC PROCEDURE FOR ACTUATORS

## HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

Step	Value	Yes	No
<b>5</b> <b>CHECK AIR MIX DOOR ACTUATOR PBR SIGNAL.</b> 1) Connect the auto A/C control module and air mix door actuator connector. 2) Turn the ignition switch and AUTO switch to ON. 3) Change the set temperature between FULL COOL and FULL HOT, check voltage between auto A/C control module connector terminals. <b>Connector &amp; terminal</b> <i>(i49) No. 1 — (i48) No. 16 (-):</i> Is the measured value within specified value?	0.5 V (FULL COOL) — 4.5 V (FULL HOT)	Go to step 6.	Replace the air mix door actuator.
<b>6</b> <b>CHECK POOR CONTACT.</b> Check poor contact in the auto A/C control module connector. Is there poor contact in the connector?	There is no poor contact.	Replace the auto A/C control module.	Repair the connector.



# DIAGNOSTIC PROCEDURE FOR SENSORS

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

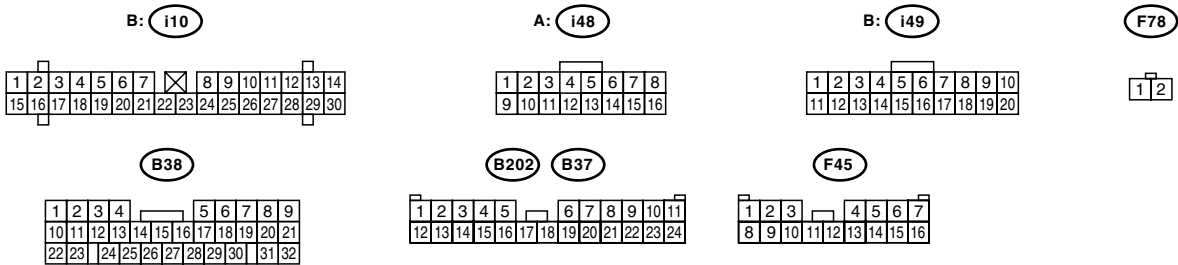
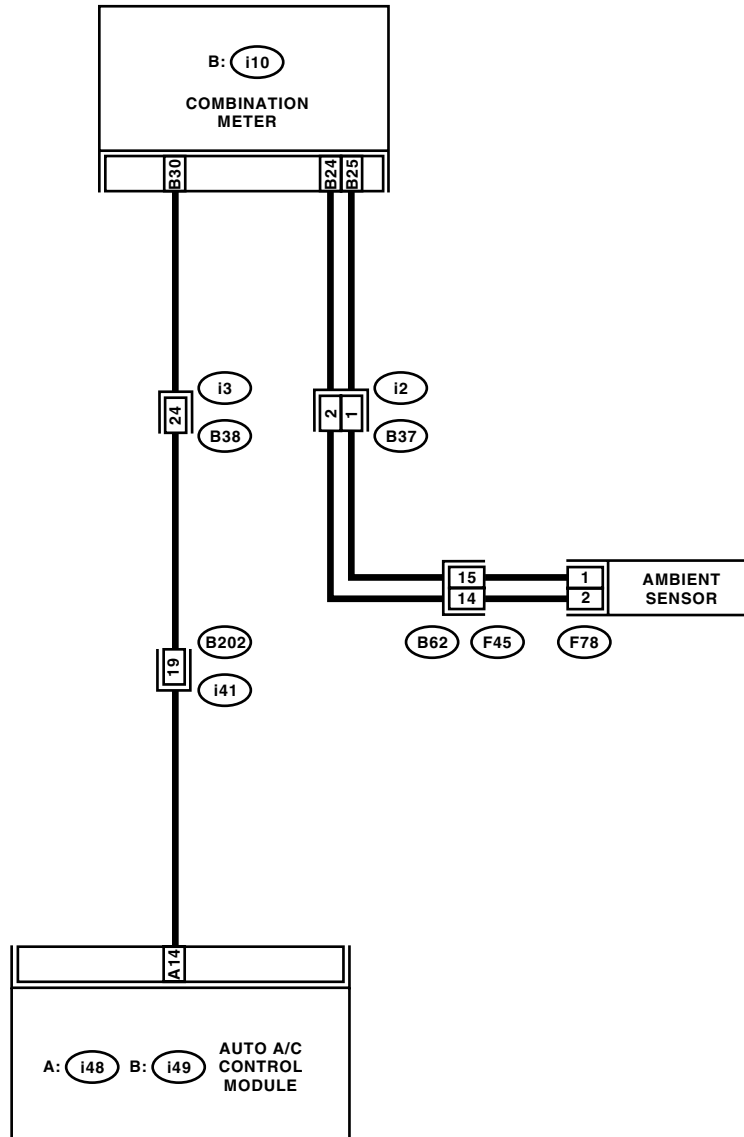
## 8. Diagnostic Procedure for Sensors

### A: AMBIENT SENSOR

#### TROUBLE SYMPTOM:

- Fan speed is not switched when the fan speed control dial is in AUTO position.
- Malfunction related to ambient sensor is indicated in self diagnosis.

#### WIRING DIAGRAM FOR LHD MODEL:

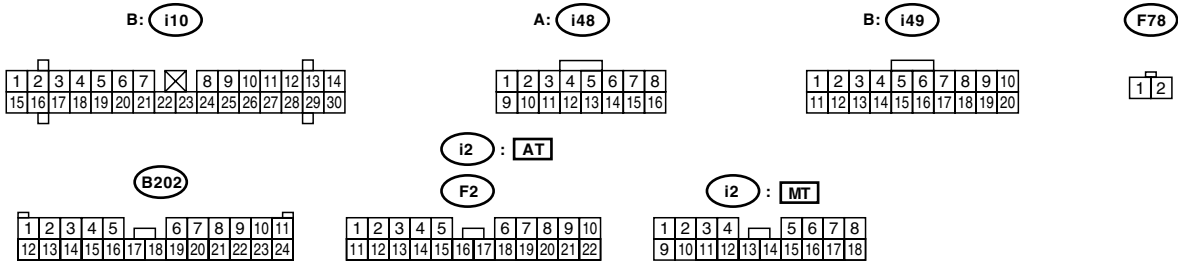
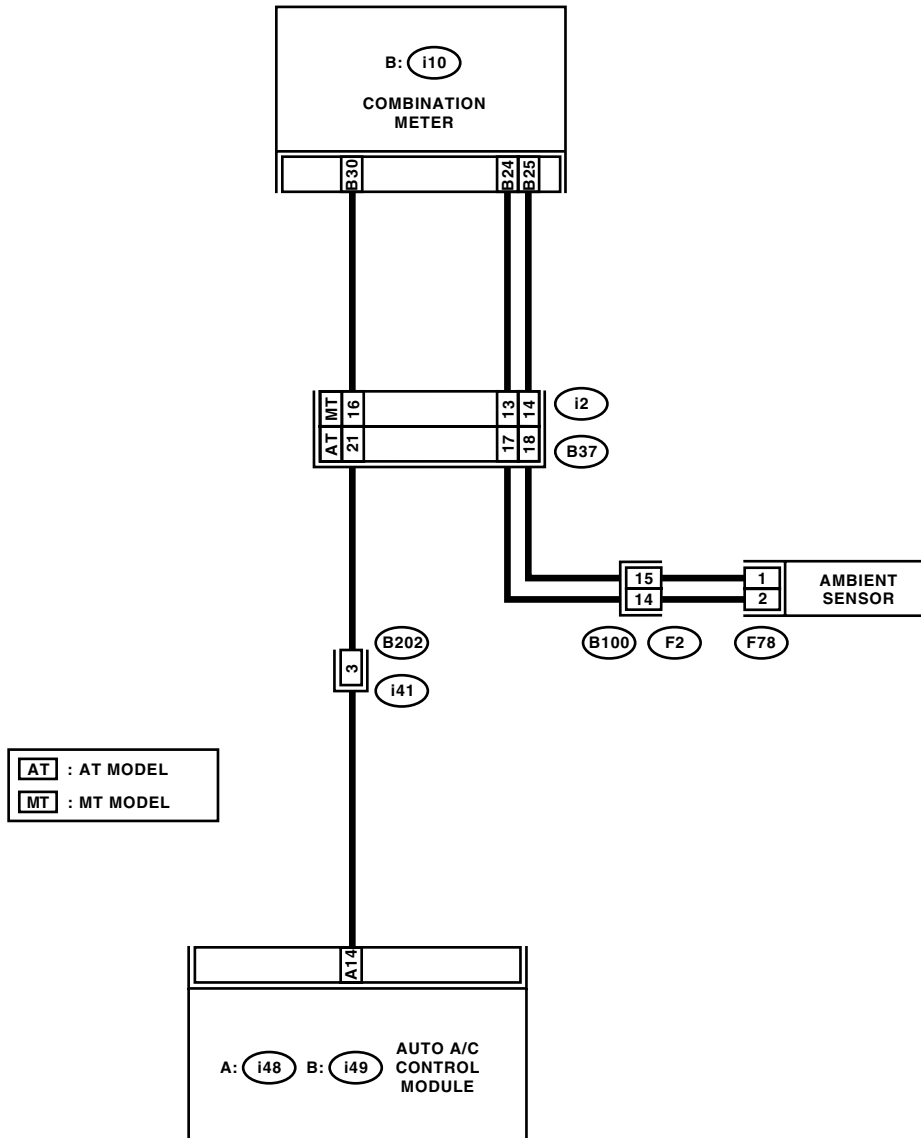


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# DIAGNOSTIC PROCEDURE FOR SENSORS

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

## WIRING DIAGRAM FOR RHD MODEL:



AC-00156

# DIAGNOSTIC PROCEDURE FOR SENSORS

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

Step	Value	Yes	No
<p><b>1 CHECK HARNESS BETWEEN A/C CONTROL MODULE AND COMBINATION METER .</b>                      1)Turn the ignition switch to OFF.                      2)Disconnect the connectors from A/C control module and combination meter.                      3)Measure the resistance of harness between A/C control module and combination meter.  <b>Connector &amp; terminal</b>  <b>(i10) No. 30 — (i48) No. 14:</b>                      Is the measured value less than specified value?</p>	1 Ω	Go to step 2.	Repair the harness between A/C control module and combination meter.
<p><b>2 CHECK AMBIENT SENSOR CIRCUIT.</b>                      Check the ambient sensor circuit. &lt;Ref. to IDI-11, CHECK OUTSIDE TEMPERATURE INDICATOR, INSPECTION, Combination Meter System.&gt;                      Is the ambient sensor circuit normal?</p>	Sensor circuit is normal.	Go to step 3.	Repair the ambient sensor circuit.
<p><b>3 CHECK POOR CONTACT.</b>                      Check poor contact in A/C control module connector.                      Is there poor contact in connector?</p>	There is no poor contact.	Replace the A/C control module.	Repair the connector.

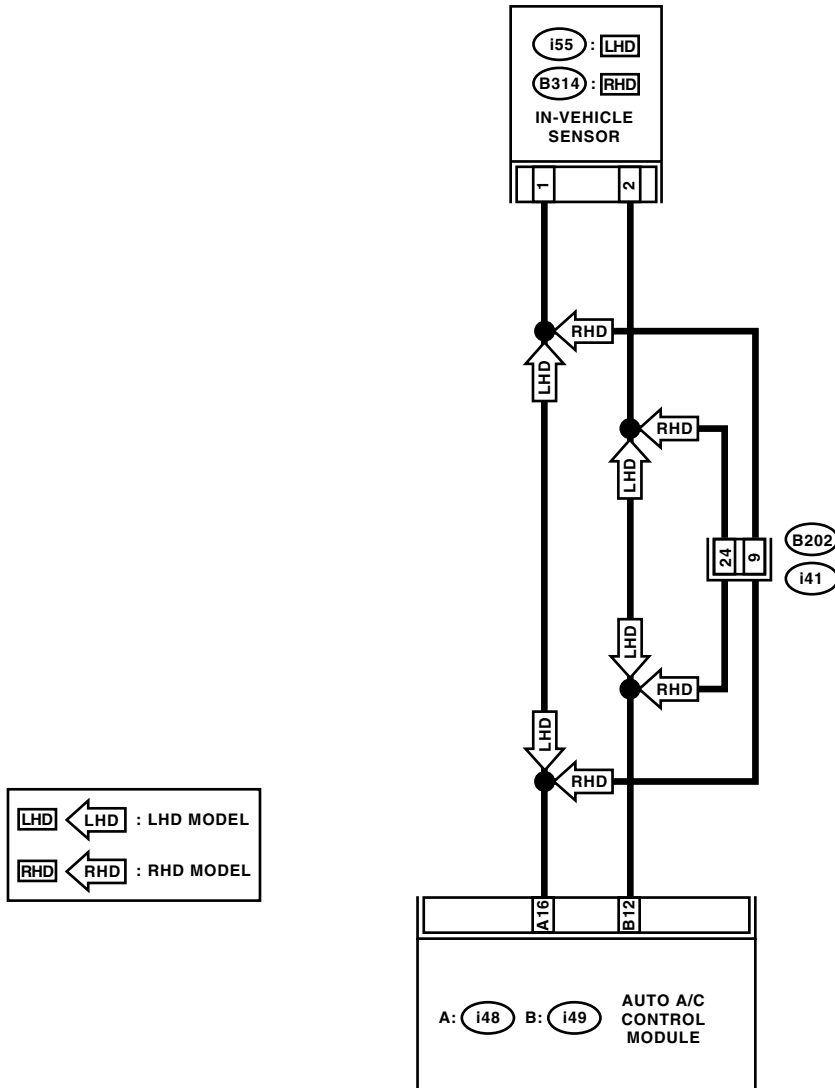
# DIAGNOSTIC PROCEDURE FOR SENSORS

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

## B: IN-VEHICLE SENSOR

### TROUBLE SYMPTOM:

- When turning the AUTO switch to ON, blower fan speed, outlet port and inlet port is not changed.
- Malfunction related to ambient sensor is indicated in self diagnosis.



# DIAGNOSTIC PROCEDURE FOR SENSORS

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

Step	Value	Yes	No
<p><b>1 CHECK IN-VEHICLE SENSOR.</b>                      1) Turn the ignition switch to OFF.                      2) Remove the lower cover at driver side.                      3) Disconnect the connector from in-vehicle sensor.                      4) Measure the resistance between connector terminals of in-vehicle sensor.</p> <p><b>Terminals</b>  <b>No. 1 — No. 2:</b>                      Is the measured value within specified value?</p>	Approx. 2.7 kΩ at 20°C (68°F)	Go to step 2.	Replace the in-vehicle sensor.
<p><b>2 CHECK INPUT SIGNALS FOR IN-VEHICLE SENSOR.</b>                      1) Turn the ignition to ON.                      2) Measure the voltage between in-vehicle sensor harness connector terminals and chassis ground.</p> <p><b>Connector &amp; terminal</b>  <b>LHD model:</b>  <i>(i55) No. 2 (+) — Chassis ground (-):</i>  <b>RHD model:</b>  <i>(B314) No. 2 (+) — Chassis ground (-):</i>                      Is the measured value within specified value?</p>	Approx. 5 V	Go to step 5.	Go to step 3.
<p><b>3 CHECK OUTPUT SIGNALS FROM A/C CONTROL MODULE.</b>                      1) Turn the ignition switch to OFF.                      2) Pull out the A/C control module.                      3) Turn the ignition switch to ON.                      4) Measure the voltage between A/C control module connector terminals.</p> <p><b>Connector &amp; terminal</b>  <i>(i49) No. 12 (+) — (i48) No. 16 (-):</i>                      Is the measured value within specified value?</p>	Approx. 5 V	Go to step 4.	Go to step 6.
<p><b>4 CHECK HARNESS BETWEEN A/C CONTROL MODULE AND IN-VEHICLE SENSOR.</b>                      1) Turn the ignition switch to OFF.                      2) Disconnect the connectors from A/C control module.                      3) Measure the resistance of harness between A/C control module and in-vehicle sensor.</p> <p><b>Connector &amp; terminal</b>  <b>LHD model:</b>  <i>(i55) No. 2 — (i49) No. 12:</i>  <b>RHD model:</b>  <i>(B314) No. 2 — (i49) No. 12:</i>                      Is the measured value less than specified value?</p>	1 Ω	Go to step 5.	Repair the harness between A/C control module and in-vehicle sensor.
<p><b>5 CHECK HARNESS BETWEEN A/C CONTROL MODULE AND IN-VEHICLE SENSOR.</b>                      Measure the resistance of harness between A/C control module and in-vehicle sensor.</p> <p><b>Connector &amp; terminal</b>  <b>LHD model:</b>  <i>(i55) No. 1 — (i48) No. 16:</i>  <b>RHD model:</b>  <i>(B314) No. 1 — (i48) No. 16:</i>                      Is the measured value less than specified value?</p>	1 Ω	Go to step 6.	Repair the harness between A/C control module and in-vehicle sensor.

# DIAGNOSTIC PROCEDURE FOR SENSORS

## HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

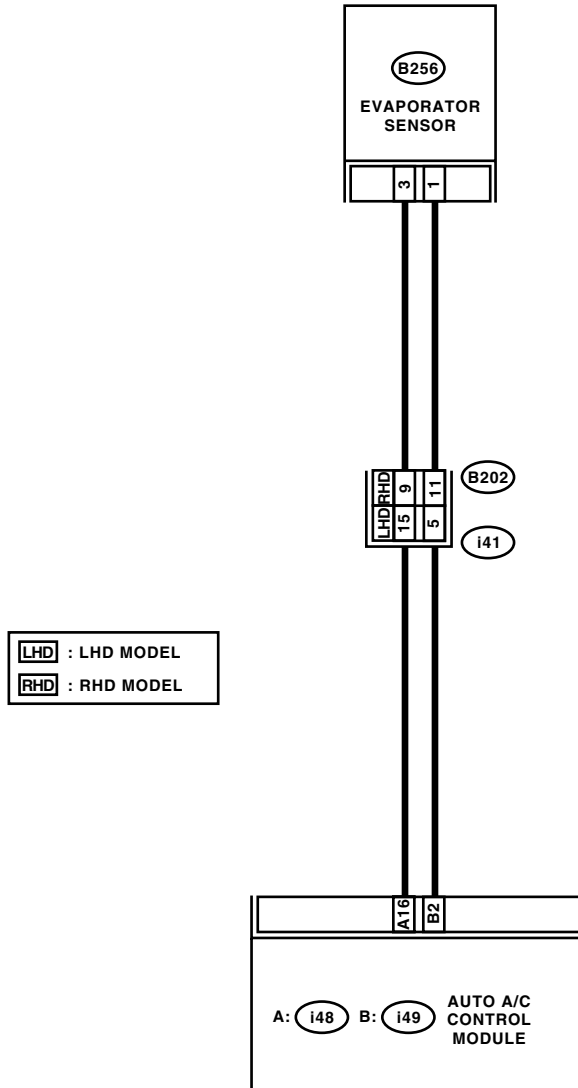
Step	Value	Yes	No
<b>6</b> <b>CHECK POOR CONTACT.</b> Check poor contact in A/C control module connector. Is there poor contact in connector ?	There is no poor contact.	Replace the A/C control module.	Repair the connector.

# DIAGNOSTIC PROCEDURE FOR SENSORS

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

## C: EVAPORATOR SENSOR

WIRING DIAGRAM:



B256

1
2
3

B202

1	2	3	4	5	6	7	8	9	10	11		
12	13	14	15	16	17	18	19	20	21	22	23	24

A: i48

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16

B: i49

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

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# DIAGNOSTIC PROCEDURE FOR SENSORS

## HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

Step	Value	Yes	No
<p><b>1 CHECK EVAPORATOR SENSOR.</b>                      1) Turn the ignition switch to OFF.                      2) Remove the glove box.                      3) Disconnect the connector from evaporator sensor.                      4) Measure the resistance between connector terminals of evaporator sensor.</p> <p><b>Terminals</b>  <b>No. 1 — No. 2:</b>                      Is the measured value within specified value?</p>	Approx. 2.7 kΩ at 20°C (68°F)	Go to step 2.	Replace the evaporator sensor.
<p><b>2 CHECK INPUT SIGNALS FOR EVAPORATOR SENSOR.</b>                      1) Turn the ignition switch to ON.                      2) Measure the voltage between evaporator sensor harness connector terminal and chassis ground.</p> <p><b>Connector &amp; terminal</b>  <b>(B256) No. 1 (+) — Chassis ground (-):</b>                      Is the measured value within specified value?</p>	Approx. 5 V	Go to step 5.	Go to step 3.
<p><b>3 CHECK OUTPUT SIGNALS FROM A/C CONTROL MODULE.</b>                      1) Turn the ignition switch to OFF.                      2) Pull out the A/C control module.                      3) Turn the ignition switch to ON.                      4) Measure the voltage between A/C control module connector terminals.</p> <p><b>Connector &amp; terminal</b>  <b>(i49) No. 2 (+) — (i48) No. 16 (-):</b>                      Is the measured value within specified value?</p>	Approx. 5 V	Go to step 4.	Go to step 6.
<p><b>4 CHECK HARNESS CONNECTOR BETWEEN A/C CONTROL MODULE AND EVAPORATOR SENSOR.</b>                      1) Turn the ignition switch to OFF.                      2) Disconnect the connectors from A/C control module.                      3) Measure the resistance of harness between A/C control module and evaporator sensor.</p> <p><b>Connector &amp; terminal</b>  <b>(B256) No. 1 — (i49) No. 2:</b>                      Is the measured value less than specified value?</p>	1 Ω	Go to step 5.	Repair the harness between A/C control module and evaporator sensor.
<p><b>5 CHECK HARNESS CONNECTOR BETWEEN A/C CONTROL MODULE AND EVAPORATOR SENSOR.</b>                      Measure the resistance of harness between A/C control module and evaporator sensor.</p> <p><b>Connector &amp; terminal</b>  <b>(B256) No. 3 — (i48) No. 16:</b>                      Is the measured value less than specified value?</p>	1 Ω	Go to step 6.	Repair the harness between A/C control module and evaporator sensor.
<p><b>6 CHECK POOR CONTACT.</b>                      Check poor contact in A/C control module connector.                      Is there poor contact in connector?</p>	There is no poor contact.	Replace the A/C control module.	Repair the connector.



# DIAGNOSTIC PROCEDURE FOR SENSORS

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

## D: SUNLOAD SENSOR

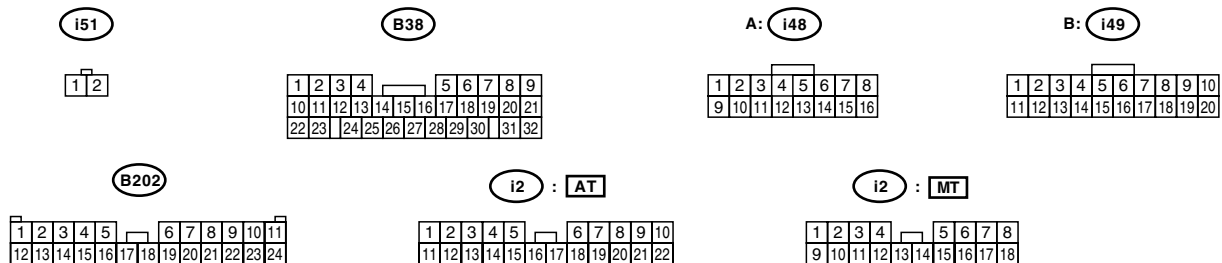
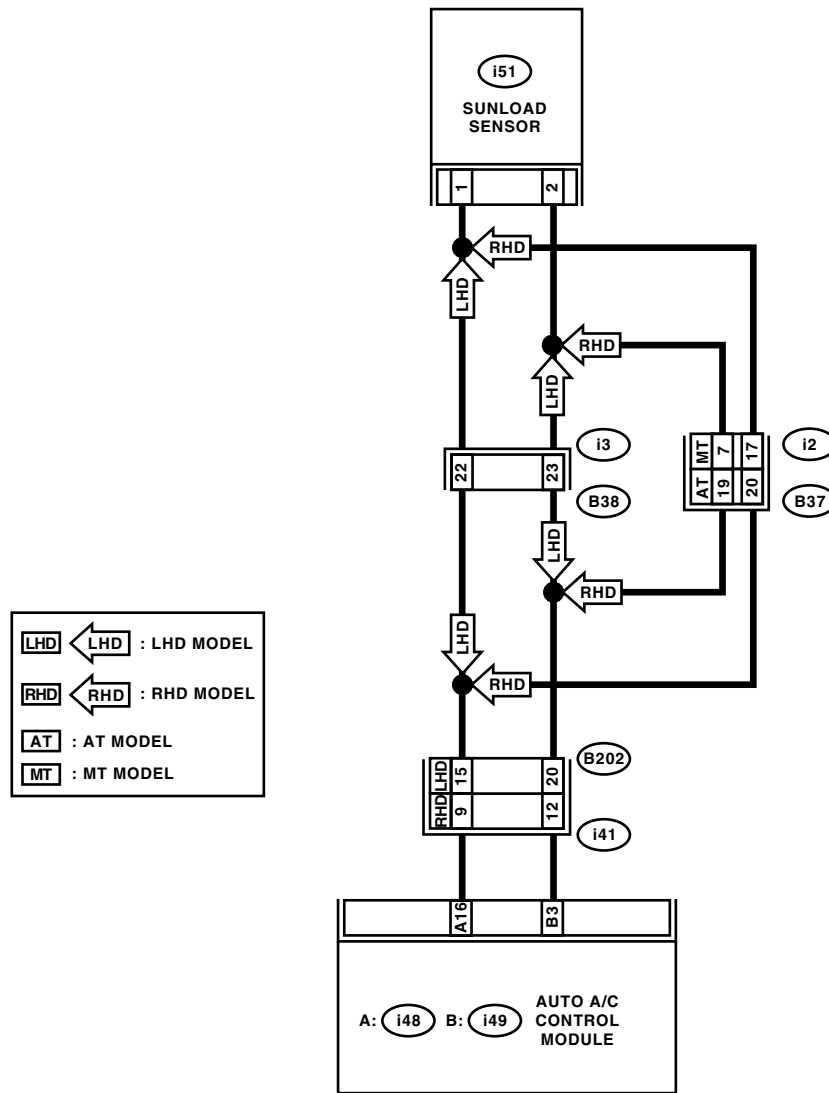
### TROUBLE SYMPTOM:

- Sensor identified that sunlight is at maximum. Then, A/C system is controlled to COOL side.
- Sensor identified that sunlight is at minimum. Then, A/C system is controlled to HOT side.

### NOTE:

When the sunload sensor is checked indoors or in the shade, open circuit might be indicated. Always check the sunload sensor at a place where sun shines directly on it.

### WIRING DIAGRAM:



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## DIAGNOSTIC PROCEDURE FOR SENSORS

### HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

Step	Value	Yes	No
<b>1 CHECK INPUT VOLTAGE TO SUNLOAD SENSOR.</b> 1) Turn the ignition switch to ON. 2) Measure the input voltage to sunload sensor. <b>Connector &amp; terminal</b> <b>(i51) No. 2 (+) — Chassis ground (-):</b> Is the measured value within specified value?	Approx. 5 V	Go to step 3.	Go to step 2.
<b>2 CHECK HARNESS CONNECTOR BETWEEN A/C CONTROL MODULE AND SUNLOAD SENSOR.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from A/C control module. 3) Measure the resistance of harness between A/C control module and sunload sensor. <b>Connector &amp; terminal</b> <b>(i51) No. 2 — (i49) No. 3:</b> Is the measured value less than specified value?	1 $\Omega$	Go to step 3.	Repair the harness between A/C control module and sunload sensor.
<b>3 CHECK HARNESS CONNECTOR BETWEEN A/C CONTROL MODULE AND SUNLOAD SENSOR.</b> Measure the resistance of harness between A/C control module and sunload sensor. <b>Connector &amp; terminal</b> <b>(i51) No. 1 — (i48) No. 16:</b> Is the measured value less than specified value?	1 $\Omega$	Go to step 4.	Repair the harness between A/C control module and sunload sensor.
<b>4 CHECK THE INPUT VOLTAGE TO A/C CONTROL MODULE.</b> 1) Connect the A/C control module connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between A/C control module connector terminals. <b>Connector &amp; terminal</b> <b>(i49) No.3 (+) — (i48) No.16 (-):</b> Is the measured value within specified value?	Approx. 2.5 V	Go to step 5.	Replace the sunload sensor.
<b>5 CHECK POOR CONTACT.</b> Check poor contact in A/C control module connector. Is there poor contact in connector?	There is no poor contact.	Replace the A/C control module.	Repair the connector.

# SYMPTOM RELATED DIAGNOSTIC

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

## 9. Symptom Related Diagnostic

### A: GENERAL DIAGNOSTICS TABLE

Symptom	A/C system does not operate.	Fuse is blown.	Illumination cannot be dim.	Blower fan does not operate or fan speed cannot be adjusted.	Air inlet ( FRESH/RECIRC ) cannot be switched.	Air outlet cannot be switched.	Compartment temperature does not increase (No hot air is discharged).	Compartment temperature does not decrease (No cool air is discharged).	Compartment temperature is higher than or lower than the set value.	Compartment temperature does not quickly respond to the set value.	Radiator fan does not rotate during A/C operation.
Malfunction Parts											
Fuse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>							
Connector ( Poor contact )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
Ground	<input type="radio"/>			<input type="radio"/>							
Auto A/C control module	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
Air mix door actuator							<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Mode door actuator						<input type="radio"/>					
Intake door actuator					<input type="radio"/>						
Blower fan motor	<input type="radio"/>			<input type="radio"/>							
Blower fan relay	<input type="radio"/>			<input type="radio"/>							
A/C relay	<input type="radio"/>							<input type="radio"/>			
Compressor ( Magnet clutch )	<input type="radio"/>							<input type="radio"/>			
Radiator fan motor								<input type="radio"/>			<input type="radio"/>
Radiator fan relay								<input type="radio"/>			<input type="radio"/>
Sensors ( In-vehicle, ambient temperature, evaporator and sunload )	*1 <input type="radio"/>						<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
In-vehicle sensor aspirator hose							<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

\*1 : Evaporator sensor only

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# SYMPTOM RELATED DIAGNOSTIC

HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS)

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