

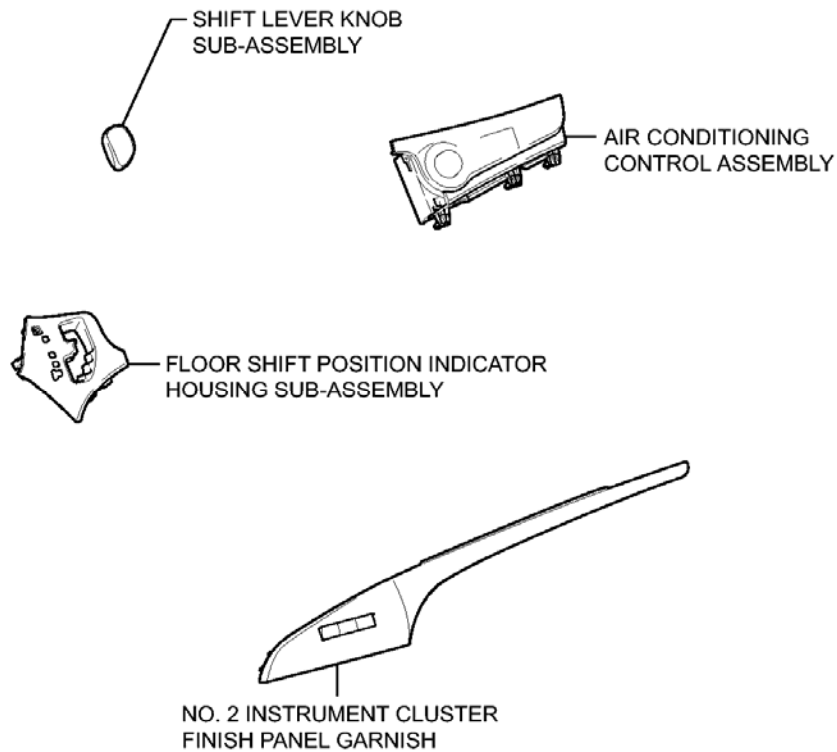
ACCESSORIES & EQUIPMENT

Air Conditioning Panel (Auto A/C) (Service Information) - Sienna

AIR CONDITIONING PANEL (FOR AUTOMATIC AIR CONDITIONING SYSTEM)

COMPONENTS

ILLUSTRATION



P

Fig. 1: Air Conditioning Panel Replacement Components (Auto A/C Systems)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REMOVAL

REMOVAL

1. **REMOVE NO. 2 INSTRUMENT CLUSTER FINISH PANEL GARNISH** . Refer to **REMOVAL - Step 23**
2. **REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY**
3. **REMOVE FLOOR SHIFT POSITION INDICATOR HOUSING SUB-ASSEMBLY** . Refer to **REMOVAL - Step 25**
4. **REMOVE AIR CONDITIONING CONTROL ASSEMBLY**

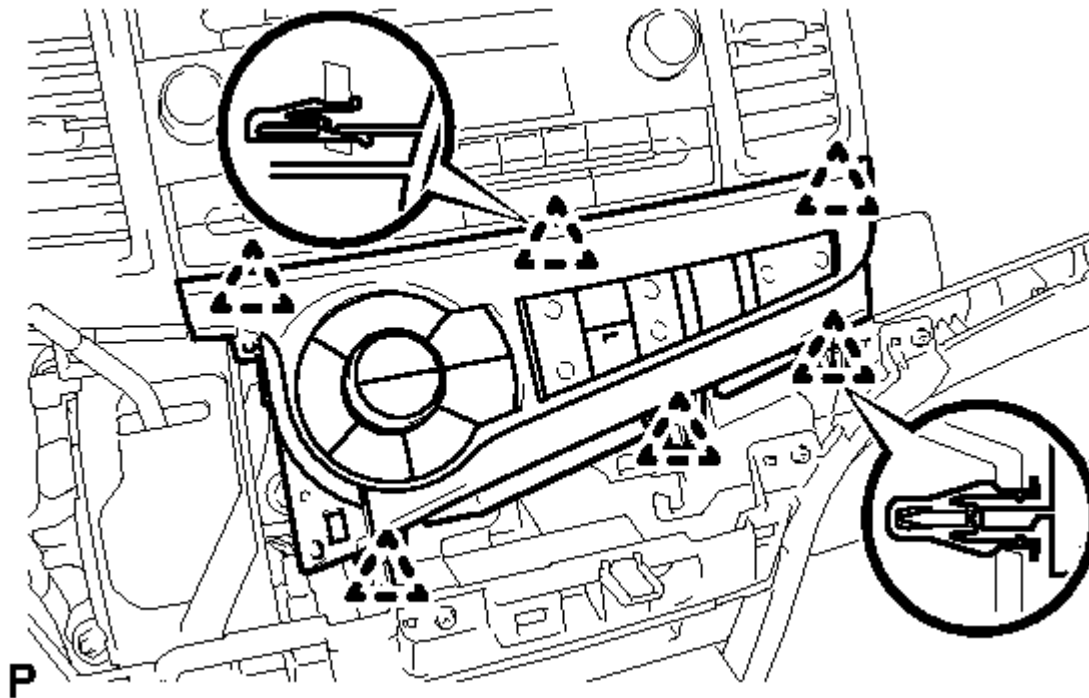


Fig. 2: Identifying Air Conditioning Control Assembly
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- a. Disengage the 6 clips and separate the air conditioning control.
- b. Disconnect the connector and remove the air conditioning control.

INSTALLATION

INSTALLATION

1. **INSTALL AIR CONDITIONING CONTROL ASSEMBLY**
 - a. Connect the connector.
 - b. Engage the 6 clips and install the air conditioning control.
2. **INSTALL FLOOR SHIFT POSITION INDICATOR HOUSING SUB-ASSEMBLY** . Refer to **INSTALLATION - Step 33**
3. **INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY**
4. **INSTALL NO. 2 INSTRUMENT CLUSTER FINISH PANEL GARNISH** . Refer to **INSTALLATION - Step 35**

ACCESSORIES & EQUIPMENT

Air Conditioning System (Auto A/C) (Diagnostic Codes & Circuit Tests) - Sienna

AIR CONDITIONING SYSTEM (FOR AUTOMATIC AIR CONDITIONING SYSTEM)

DTC B1411/11: ROOM TEMPERATURE SENSOR CIRCUIT

DESCRIPTION

The room temperature sensor is installed in the instrument panel. It detects the cabin temperature to control the air conditioning AUTO mode. The resistance of the room temperature sensor changes in accordance with the cabin temperature. As the temperature decreases, the resistance increases. As the temperature increases, the resistance decreases.

The air conditioning amplifier applies voltage (5 V) to the room temperature sensor and reads voltage changes as the resistance of the room temperature sensor changes. This sensor also sends appropriate signals to the air conditioning amplifier.

DTC Code	DTC Detection condition	Trouble Area
B1411/11	Open or short in room temperature sensor circuit	- Room temperature sensor - Harness or connector between room temperature sensor and air conditioning amplifier - Air conditioning amplifier

WIRING DIAGRAM

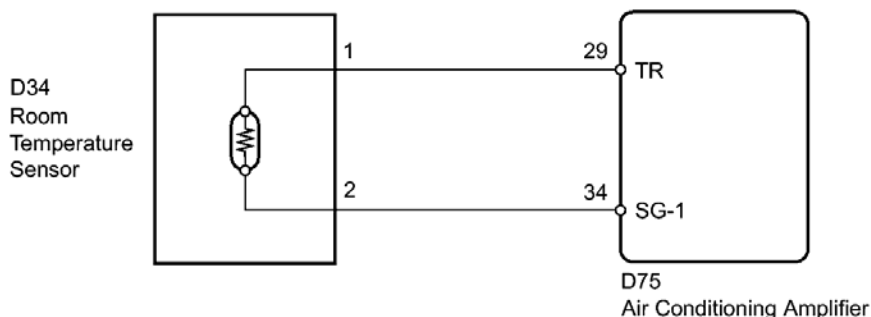


Fig. 1: Room Temperature Sensor Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. READ VALUE USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Air Conditioner / Data List.
- Check the value(s) by referring to the table below.

AIR CONDITIONER

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Room Temperature Sensor	Room temperature sensor / Min.: -6.5°C (20.3°F) Max.: 57.25°C (135.05°F)	Actual cabin temperature displayed	-

OK

The display is as specified in the Normal Condition column.

RESULT

Result	Proceed to
NG	A
OK (When troubleshooting according to Problem Symptoms Table)	B
OK (When troubleshooting according to the DTC)	C

B --> See step 4

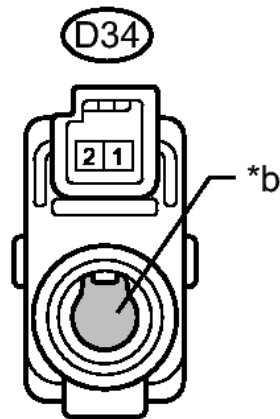
C --> See step 5

A: Go to next step

2. INSPECT ROOM TEMPERATURE SENSOR

- a. Remove the room temperature sensor.
- b. Disconnect the room temperature sensor connector.

*a



Resistance (k Ω)

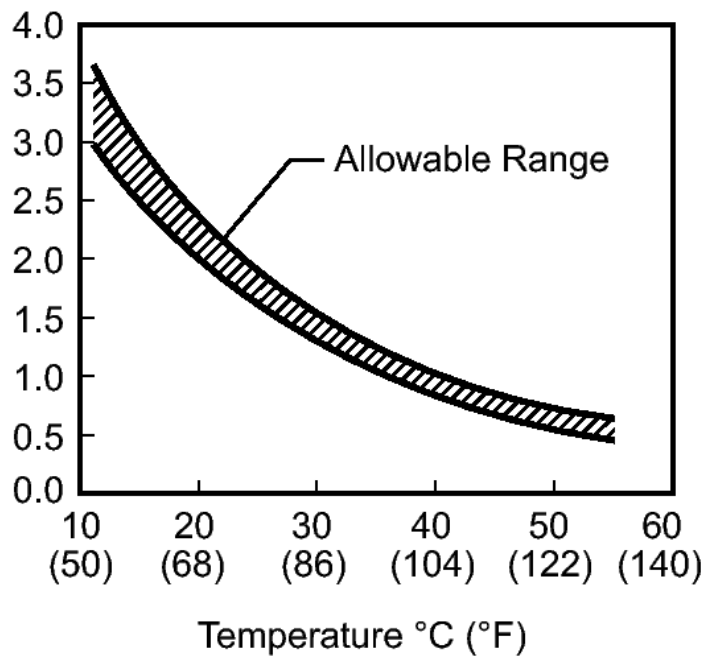


Fig. 2: Inspecting Room Temperature Sensor With Resistance Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D34-1 - D34-2	10°C (50° F)	3.00 to 3.73 kohms
D34-1 - D34-2	15°C (59° F)	2.45 to 2.88 kohms
D34-1 - D34-2	20°C (68° F)	1.95 to 2.30 kohms
D34-1 - D34-2	25°C (77° F)	1.60 to 1.80 kohms
D34-1 - D34-2	30°C (86° F)	1.28 to 1.47 kohms
D34-1 - D34-2	35°C (95° F)	1.00 to 1.22 kohms
D34-1 - D34-2	40°C (104°F)	0.80 to 1.00 kohms
D34-1 - D34-2	45°C (113°F)	0.65 to 0.85 kohms
D34-1 - D34-2	50°C (122°F)	0.50 to 0.70 kohms
D34-1 - D34-2	55°C (131°F)	0.44 to 0.60 kohms
D34-1 - D34-2	60°C (140°F)	0.36 to 0.50 kohms

NOTE:

- Hold the sensor only by its connector. Touching the sensor may change the resistance value.

- When measuring, the sensor temperature must be the same as the ambient temperature.

HINT:

As the temperature increases, the resistance decreases (see **Fig. 2**).

TEXT IN ILLUSTRATION

*a	Component without harness connected (Room Temperature Sensor)
*b	Sensing Portion

NG --> See step 6

OK: Go to next step

3. CHECK HARNESS AND CONNECTOR (ROOM TEMPERATURE SENSOR - AIR CONDITIONING AMPLIFIER)

- Disconnect the air conditioning amplifier connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D75-29 (TR) - D34-1	Always	Below 1 ohms
D75-34 (SG-1) - D34-2	Always	Below 1 ohms
D75-29 (TR) - Body ground	Always	10 kohms or higher
D75-34 (SG-1) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 5

4. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
5. **REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL**
6. **REPLACE ROOM TEMPERATURE SENSOR. Refer to REMOVAL**

DTC B1412/12: AMBIENT TEMPERATURE SENSOR CIRCUIT

DESCRIPTION

The ambient temperature sensor is installed in front of the condenser. It detects the ambient temperature to control air conditioning AUTO mode. This sensor is connected to the air conditioning amplifier and detects fluctuations in the ambient temperature. This data is used for controlling the cabin temperature. The sensor sends a signal to the air conditioning amplifier. The resistance of the ambient temperature sensor changes in accordance with the ambient temperature. As the temperature decreases, the resistance increases. As the temperature increases, the resistance decreases.

The air conditioning amplifier applies voltage (5 V) to the ambient temperature sensor and reads voltage changes as the resistance of the ambient temperature sensor changes.

DTC Code	DTC Detection Condition	Trouble Area
B1412/12	Open or short in ambient temperature sensor circuit	• Ambient temperature sensor • Harness or connector between ambient temperature sensor and air conditioning amplifier • Air conditioning amplifier

WIRING DIAGRAM

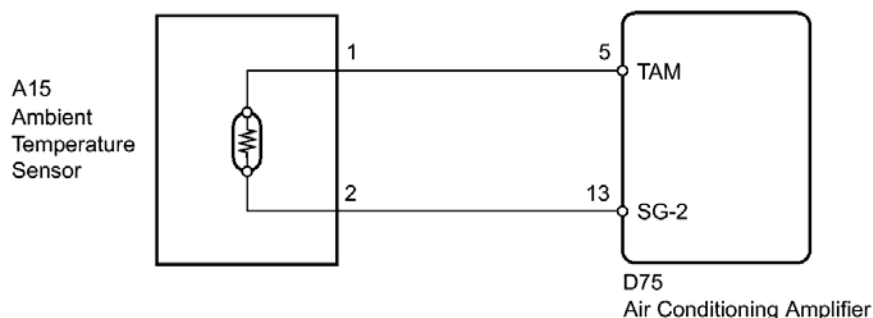


Fig. 3: Ambient Temperature Sensor Circuit - Wiring Diagram

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. READ VALUE USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Air Conditioner / Data List.
- Check the value(s) by referring to the table below.

AIR CONDITIONER

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Ambient Temp Sensor	Ambient temperature sensor / Min: -23.3°C (-9.94°F) Max: 65.95°C (150.71°F)	Actual ambient temperature displayed	-

OK

The display is as specified in the Normal Condition column.

RESULT

Result	Proceed to
NG	A
OK (When troubleshooting according to Problem Symptoms Table)	B
OK (When troubleshooting according to the DTC)	C

B --> See step 4

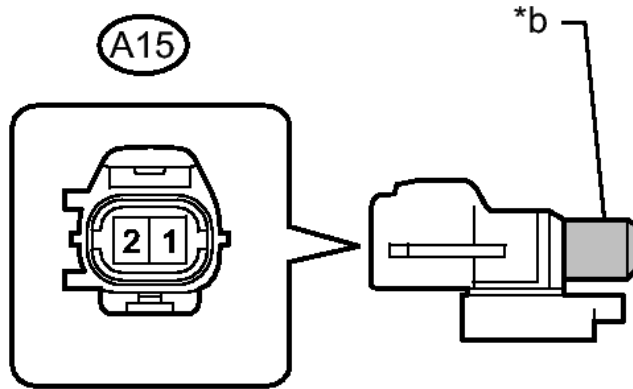
C --> See step 5

A: Go to next step

2. INSPECT AMBIENT TEMPERATURE SENSOR

- a. Remove the ambient temperature sensor.
- b. Disconnect the ambient temperature sensor connector.

*a



Resistance (k Ω)

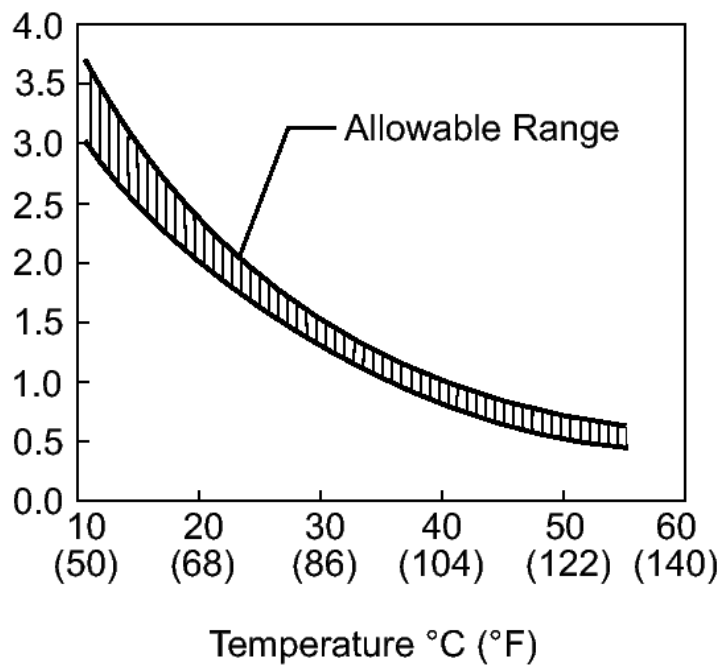


Fig. 4: Inspecting Ambient Temperature Sensor With Resistance Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A15-1 - A15-2	10°C (50°F)	3.00 to 3.73 kohms
	15°C (59°F)	2.45 to 2.88 kohms
	20°C (68°F)	1.95 to 2.30 kohms
	25°C (77°F)	1.60 to 1.80 kohms
	30°C (86°F)	1.28 to 1.47 kohms
	35°C (95°F)	1.00 to 1.22 kohms
	40°C (104°F)	0.80 to 1.00 kohms
	45°C (113°F)	0.65 to 0.85 kohms
	50°C (122°F)	0.50 to 0.70 kohms
	55°C (131°F)	0.44 to 0.60 kohms
	60°C (140°F)	0.36 to 0.50 kohms

NOTE:

- Hold the sensor only by its connector. Touching the sensor may change the resistance value.
- When measuring, the sensor temperature must be the same as the ambient temperature.

HINT:

As the temperature increases, the resistance decreases (see **Fig. 4**).

TEXT IN ILLUSTRATION

*a	Component without harness connected (Ambient Temperature Sensor)
*b	Sensing Portion

NG --> See step 6

OK: Go to next step

3. CHECK HARNESS AND CONNECTOR (AMBIENT TEMPERATURE SENSOR - AIR CONDITIONING AMPLIFIER)

- Disconnect the air conditioning amplifier connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D75-5 (TAM) - A15-1	Always	Below 1 ohms
D75-13 (SG-2) - A15-2	Always	Below 1 ohms
D75-5 (TAM) - Body ground	Always	10 kohms or higher
D75-13 (SG-2) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 5

4. PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer

to **PROBLEM SYMPTOMS TABLE**

5. **REPLACE AIR CONDITIONING AMPLIFIER.** Refer to **REMOVAL**

6. **REPLACE AMBIENT TEMPERATURE SENSOR.** Refer to **REMOVAL**

DTC B1413/13: EVAPORATOR TEMPERATURE SENSOR CIRCUIT

DESCRIPTION

The evaporator temperature sensor is installed on the evaporator in the air conditioning unit to detect the cooled air temperature that has passed through the evaporator and to control the air conditioning. It sends appropriate signals to the air conditioning amplifier. The resistance of the evaporator temperature sensor changes in accordance with the cooled air temperature that has passed through the evaporator. As the temperature decreases, the resistance increases. As the temperature increases, the resistance decreases.

The air conditioning amplifier applies voltage (5 V) to the evaporator temperature sensor and reads voltage changes as the resistance of the evaporator temperature sensor changes. This sensor is used for frost prevention.

DTC Code	DTC Detection Condition	Trouble Area
B1413/13	Open or short in evaporator temperature sensor circuit	• Evaporator temperature sensor • Air conditioning harness • Air conditioning amplifier

WIRING DIAGRAM

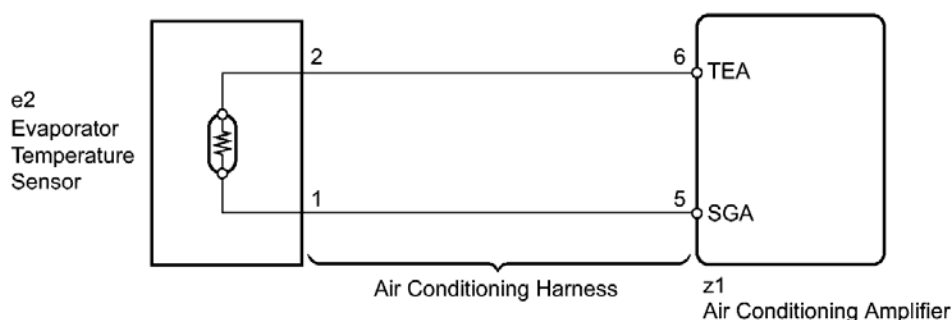


Fig. 5: Evaporator Temperature Sensor Circuit - Wiring Diagram

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. **READ VALUE USING TECHSTREAM**

a. Connect the Techstream to the DLC3.

- b. Turn the ignition switch to ON.
- c. Turn the Techstream on.
- d. Enter the following menus: Body Electrical / Air Conditioner / Data List.
- e. Check the value(s) by referring to the table below.

AIR CONDITIONER

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Evaporator Fin Thermistor	Evaporator temperature sensor / Min.: -30°C (-22°F) Max.: 59.6°C (139.28°F)	Actual evaporator temperature displayed	-

OK

The display is as specified in the Normal Condition column.

RESULT

Result	Proceed to
NG	A
OK (When troubleshooting according to Problem Symptoms Table)	B
OK (When troubleshooting according to the DTC)	C

B --> See step 5

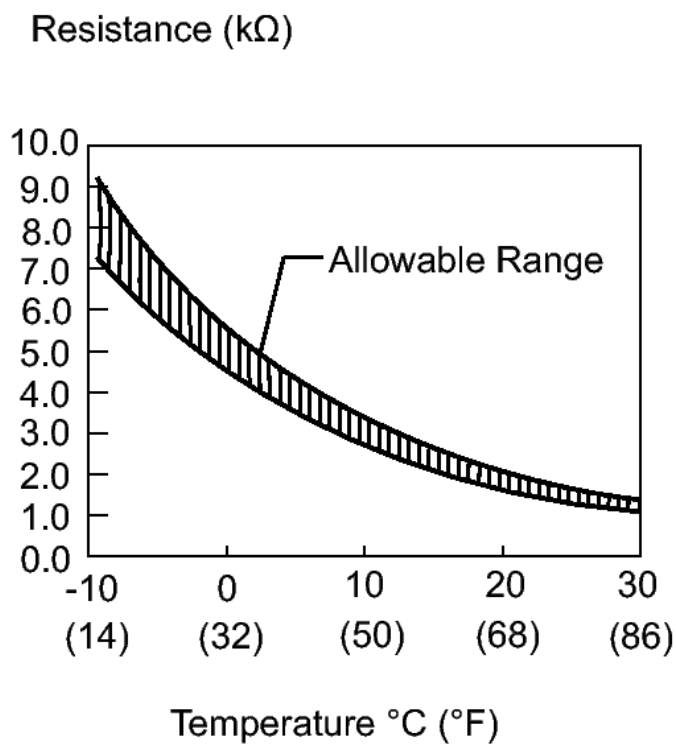
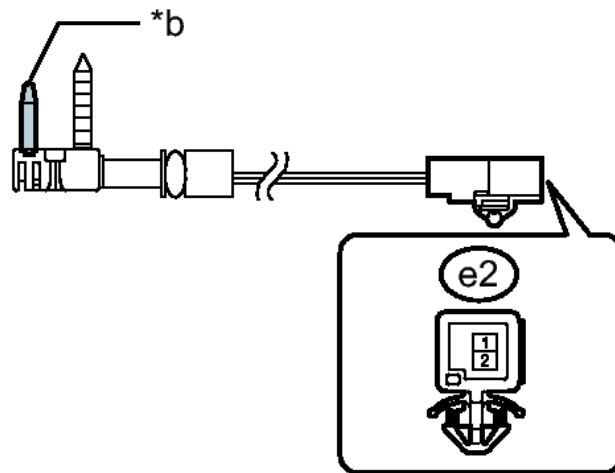
C --> See step 4

A: Go to next step

2. INSPECT EVAPORATOR TEMPERATURE SENSOR

- a. Remove the evaporator temperature sensor.
- b. Disconnect the evaporator temperature sensor connector.

*a



H

Fig. 6: Inspecting Evaporator Temperature Sensor With Resistance Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
e2-1 - e2-2	-10°C (14°F)	7.30 to 9.10 kohms
e2-1 - e2-2	-5°C (23°F)	5.65 to 6.95 kohms
e2-1 - e2-2	0°C (32°F)	4.40 to 5.35 kohms
e2-1 - e2-2	5°C (41°F)	3.40 to 4.15 kohms
e2-1 - e2-2	10°C (50°F)	2.70 to 3.25 kohms
e2-1 - e2-2	15°C (59°F)	2.14 to 2.58 kohms
e2-1 - e2-2	20°C (68°F)	1.71 to 2.05 kohms
e2-1 - e2-2	25°C (77°F)	1.38 to 1.64 kohms
e2-1 - e2-2	30°C (86°F)	1.11 to 1.32 kohms

NOTE:

- Hold the sensor only by its connector. Touching the sensor may change the resistance value.
- When measuring, the sensor temperature must be the same as the ambient temperature.

HINT:

As the temperature increases, the resistance decreases (see **Fig. 6**).

TEXT IN ILLUSTRATION

Component without harness

*a	connected (Evaporator Temperature Sensor)
*b	Sensing Portion

NG --> See step 7

OK: Go to next step

3. INSPECT AIR CONDITIONING HARNESS (AIR CONDITIONING AMPLIFIER - EVAPORATOR TEMPERATURE SENSOR)

- a. Remove the air conditioning harness.
- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
z1-6 (TEA) - e2-2	Always	Below 1 ohms
z1-5 (SGA) - e2-1	Always	Below 1 ohms
z1-6 (TEA) - Body ground	Always	10 kohms or higher
z1-5 (SGA) - Body ground	Always	10 kohms or higher

NG --> See step 8

OK --> See step 6

4. **REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL**
5. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
6. **REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL**
7. **REPLACE EVAPORATOR TEMPERATURE SENSOR. Refer to REMOVAL**
8. **REPLACE AIR CONDITIONING HARNESS. Refer to DISASSEMBLY**

DTC B1417/17: REAR EVAPORATOR TEMPERATURE SENSOR CIRCUIT

DESCRIPTION

The rear evaporator temperature sensor is installed on the rear evaporator. It detects the rear evaporator temperature. The sensor sends a signal to the air conditioning amplifier. The resistance of the rear evaporator temperature sensor changes in accordance with the rear evaporator temperature. As the temperature decreases, the resistance increases. As the temperature increases, the resistance decreases.

The air conditioning amplifier applies voltage (5 V) to the rear evaporator temperature sensor and reads voltage changes as the resistance of the rear evaporator temperature sensor changes.

DTC Code	DTC Detection Condition	Trouble Area
B1417/17	Open or short in rear evaporator temperature sensor circuit	• Rear evaporator temperature sensor • Harness or connector between rear evaporator temperature sensor and air conditioning amplifier • Air conditioning amplifier

WIRING DIAGRAM

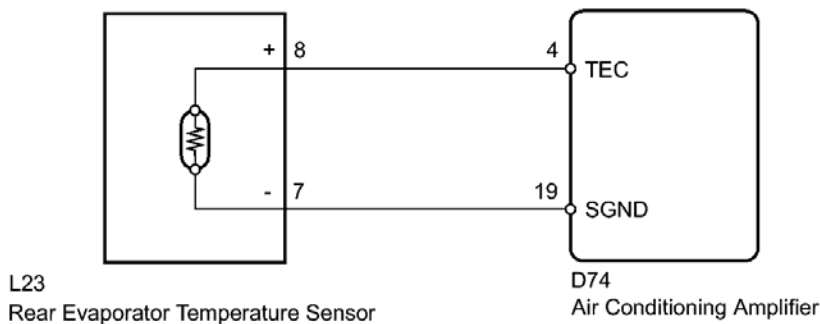


Fig. 7: Rear Evaporator Temperature Sensor Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

- 1. **READ VALUE USING TECHSTREAM**
 - a. Connect Techstream to the DLC3.
 - b. Turn the ignition switch to ON.
 - c. Turn the Techstream on.
 - d. Enter the following menus: Body Electrical / Air Conditioner / Data List.
 - e. Check the value(s) by referring to the table below.

AIR CONDITIONER			

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Ambient Temp Sens (Rear)	Rear evaporator temperature sensor / Min.: -29.7°C (-21.46°F) Max.: 59.55°C (139.19°F)	Actual rear evaporator temperature is displayed	Open in the circuit: -29.7°C (-21.46°F) Short in the circuit: 59.55°C (139.19°F)

OK

The display is as specified in the normal condition column.

RESULT

Result	Proceed to
NG	A
OK (When troubleshooting according to the PROBLEM SYMPTOMS TABLE)	B
OK (When troubleshooting according to the DTC)	C

B --> See step 4

C --> See step 5

A: Go to next step

2. INSPECT REAR EVAPORATOR TEMPERATURE SENSOR

- Remove the rear evaporator temperature sensor.

*a

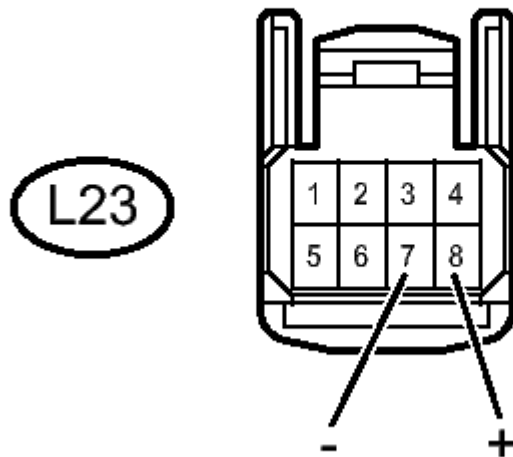


Fig. 8: Measuring Resistance Of Rear Evaporator Temperature Sensor
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Rear Evaporator Temperature Sensor)
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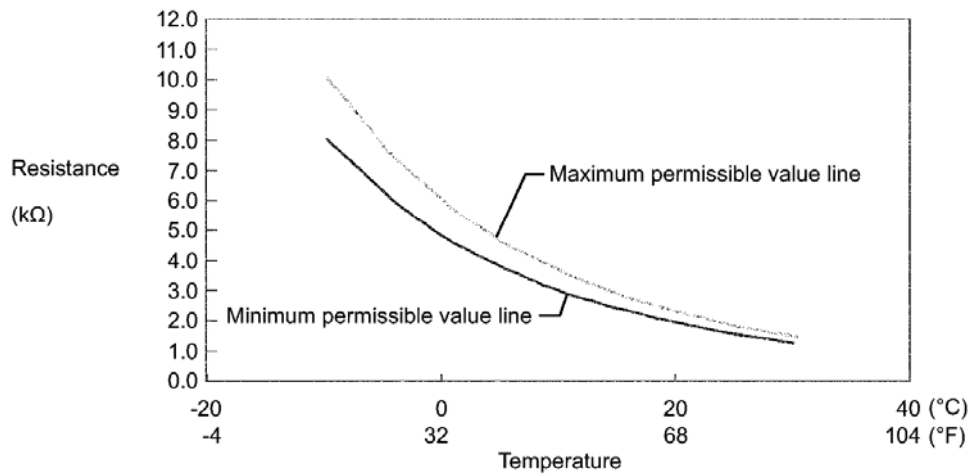


Fig. 9: Resistance And Temperature Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Resistance

Tester Connection	Condition	Specified Condition
L23-7 (-) - L23-8 (+)	-10°C (14°F)	7.40 to 9.20 kohms
L23-7 (-) - L23-8 (+)	-5°C (23°F)	5.65 to 7.00 kohms
L23-7 (-) - L23-8 (+)	0°C (32°F)	4.35 to 5.40 kohms
L23-7 (-) - L23-8 (+)	5°C (41°F)	3.40 to 4.20 kohms
L23-7 (-) - L23-8 (+)	10°C (50°F)	2.68 to 3.30 kohms
L23-7 (-) - L23-8 (+)	15°C (59°F)	2.10 to 2.60 kohms
L23-7 (-) - L23-8 (+)	20°C (68°F)	1.66 to 2.10 kohms
L23-7 (-) -	25°C (77°F)	1.32 to 1.66

L23-8 (+)	F)	kohms
L23-7 (-) - L23-8 (+)	30°C (86° F)	1.05 to 1.35 kohms

NOTE:

- Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.
- When measuring, the sensor temperature must be the same as the rear evaporator temperature.

HINT:

As the temperature increases, the resistance decreases (see **Fig. 9**).

NG --> See step 6

OK: Go to next step

3. CHECK HARNESS AND CONNECTOR (REAR EVAPORATOR TEMPERATURE SENSOR - AIR CONDITIONING AMPLIFIER)

- Disconnect the rear evaporator temperature sensor connector.
- Disconnect the air conditioning amplifier connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
L23-8 (+) - D74-4 (TEC)	Always	Below 1 ohms
L23-7 (-) - D74-19 (SGND)	Always	Below 1 ohms
D74-4 (TEC) - Body ground	Always	10 kohms or higher
D74-19 (SGND) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 5

4. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
5. **REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL**
6. **REPLACE REAR EVAPORATOR TEMPERATURE SENSOR. Refer to REMOVAL**

DTC B1419/19: REAR ROOM TEMPERATURE SENSOR CIRCUIT

DESCRIPTION

This sensor detects the rear cabin temperature that is used as the basis for temperature control and sends a signal to the air conditioning amplifier.

DTC Code	DTC Detection Condition	Trouble Area
B1419/19	Rear room temperature sensor circuit (Open or short)	• Rear room temperature sensor • Harness or connector between rear air conditioning room temperature sensor and air conditioning amplifier • Air conditioning amplifier

WIRING DIAGRAM

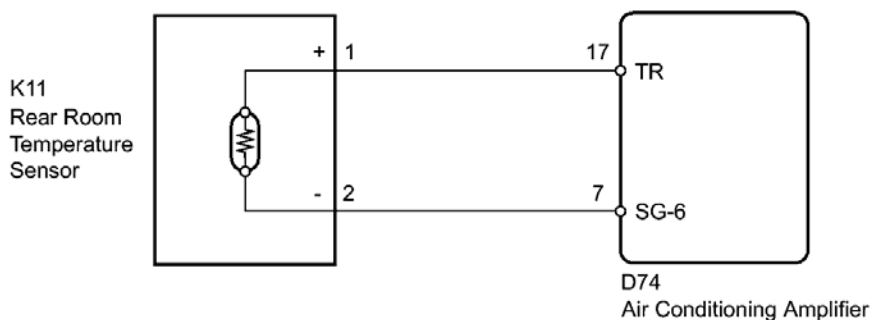


Fig. 10: Rear Room Temperature Sensor Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. **READ VALUE USING TECHSTREAM**
 - a. Connect Techstream to the DLC3.
 - b. Turn the ignition switch to ON.

- c. Turn the Techstream on.
- d. Enter the following menus: Body Electrical / Air Conditioner / Data List.
- e. Check the value(s) by referring to the table below.

AIR CONDITIONER

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Room Temp Sensor (Rear)	Rear room temperature sensor / Min.: -6.5°C (20.3°F) Max.: 57.25°C (135.05°F)	Actual cabin temperature is displayed	Open in the circuit: -6.5°C (20.3°F) Short in the circuit: 57.25°C (135.05°F)

OK

The display is as specified in the normal condition column.

RESULT

Result	Proceed to
NG	A
OK (When troubleshooting according to the PROBLEM SYMPTOMS TABLE)	B
OK (When troubleshooting according to the DTC)	C

B --> See step 4

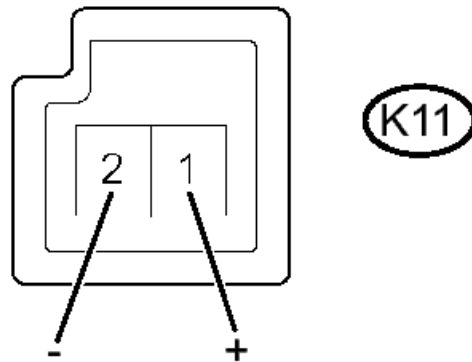
C --> See step 5

A: Go to next step

2. INSPECT REAR ROOM TEMPERATURE SENSOR

- a. Remove the rear room temperature sensor.

*a



Resistance (k Ω)

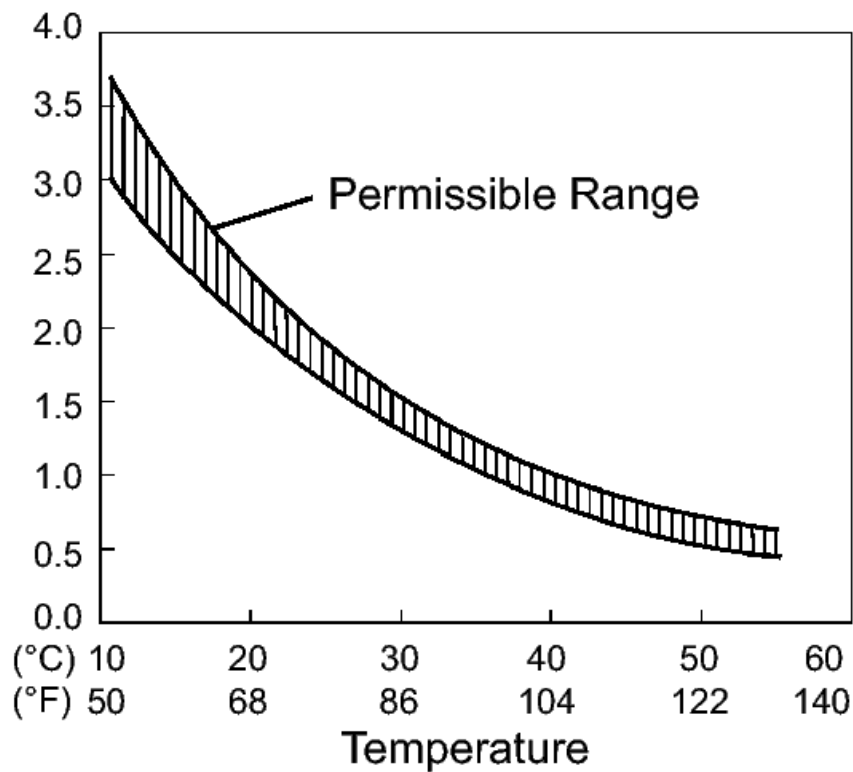


Fig. 11: Inspecting Rear Room Temperature Sensor With Resistance Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
K11-1 (+) - K11-2 (-)	10°C (50° F)	3.00 to 3.73 kohms
	15°C (59° F)	2.45 to 2.88 kohms
	20°C (68° F)	1.95 to 2.30 kohms
	25°C (77° F)	1.60 to 1.80 kohms
	30°C (86° F)	1.28 to 1.47 kohms
	35°C (95° F)	1.00 to 1.22 kohms
	40°C (104°F)	0.80 to 1.00 kohms
	45°C (113°F)	0.65 to 0.85 kohms
	50°C (122°F)	0.50 to 0.70 kohms
	55°C (131°F)	0.44 to 0.60 kohms
	60°C (140°F)	0.36 to 0.50 kohms

TEXT IN ILLUSTRATION

*a	Component without harness connected (to Rear Room Temperature)
----	--

|Sensor)

NOTE:

- Hold the sensor only by its connector. Touching the sensor may change the resistance value.
- When measuring, the sensor temperature must be the same as the rear cabin temperature.

HINT:

As the temperature increases, the resistance decreases (see **Fig. 11**).

NG --> See step 6

OK: Go to next step

3. CHECK HARNESS AND CONNECTOR (REAR ROOM TEMPERATURE SENSOR - AIR CONDITIONING AMPLIFIER)

- Disconnect the connector from the air conditioning amplifier.
- Disconnect the connector from the rear room temperature sensor.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D74-17 (TR) - K11-1 (+)	Always	Below 1 ohms
D74-7 (SG-6) - K11-2 (-)	Always	Below 1 ohms
D74-17 (TR) - Body ground	Always	10 kohms or higher
D74-7 (SG-6) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 5

4. PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE

5. **REPLACE AIR CONDITIONING AMPLIFIER.** Refer to REMOVAL
6. **REPLACE REAR ROOM TEMPERATURE SENSOR.** Refer to REMOVAL

DTC B1422/22: COMPRESSOR LOCK SENSOR CIRCUIT

SYSTEM DESCRIPTION

The ECM sends the engine speed signal to the air conditioning amplifier via CAN communication.

The air conditioning amplifier reads the difference between compressor speed and engine speed. When the difference becomes too large, the air conditioning amplifier determines that the compressor is locked, and turns the magnetic clutch off.

DTC Code	DTC Detection Condition	Trouble Area
B1422/22	Open or short in compressor lock sensor circuit	- Compressor and magnetic clutch (A/C lock sensor) - Compressor drive belt - Harness or connector between compressor and magnetic clutch and air conditioning amplifier - Air conditioning amplifier - CAN communication system

WIRING DIAGRAM

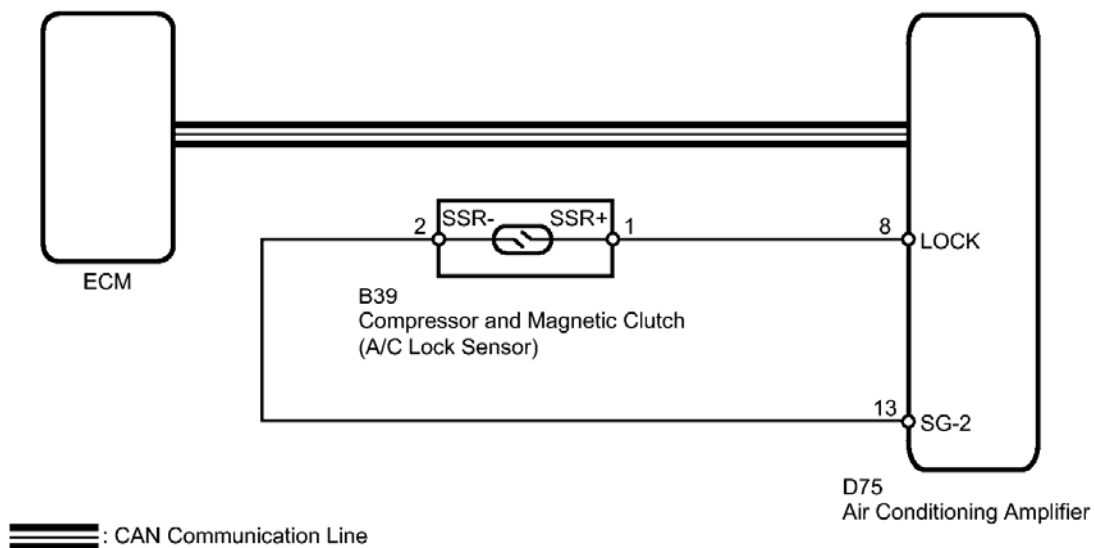


Fig. 12: Compressor Lock Sensor Circuit - Wiring Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. CHECK CAN COMMUNICATION SYSTEM

- a. Use the Techstream to check if the CAN communication system is functioning normally.

RESULT

Result	Proceed to
CAN DTC is not output	A
CAN DTC is output	B

B --> See step 4

A: Go to next step

2. INSPECT COMPRESSOR AND MAGNETIC CLUTCH (A/C LOCK SENSOR)

- a. Disconnect the Compressor and magnetic clutch connector.

*a

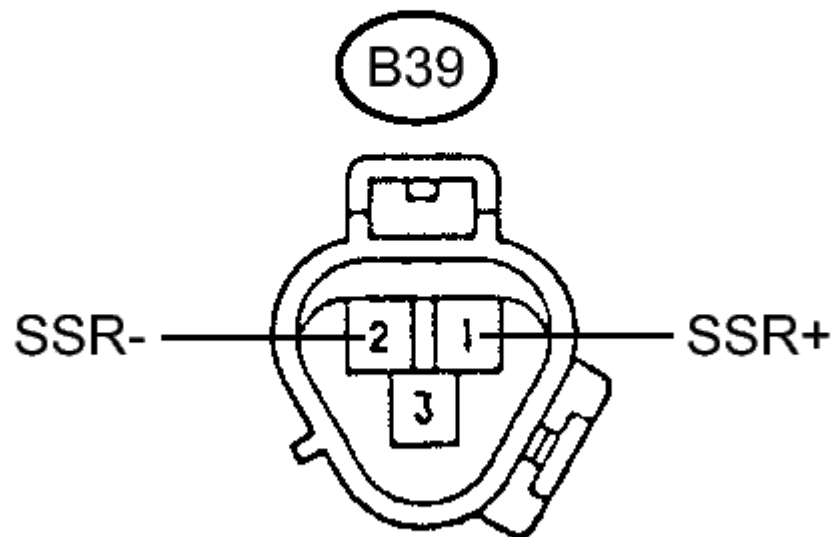


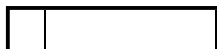
Fig. 13: Measuring Resistance Of Compressor And Magnetic Clutch (A/C Lock Sensor)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
B39-1 (SSR+) - B39-2 (SSR-)	20°C (68° F)	160 to 320 ohms

TEXT IN ILLUSTRATION



*a	Component without harness connected (Compressor and magnetic clutch (A/C Lock Sensor))
----	--

NG --> See step 7

OK: Go to next step

3. CHECK HARNESS AND CONNECTOR (AIR CONDITIONING AMPLIFIER - A/C LOCK SENSOR)

- Disconnect the air conditioning amplifier connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D75-8 (LOCK) - B39-1 (SSR+)	Always	Below 1 ohms
D75-13 (SG-2) - B39-2 (SSR-)	Always	Below 1 ohms
D75-8 (LOCK) - Body ground	Always	10 kohms or higher
D75-13 (SG-2) - Body ground	Always	10 kohms or higher

RESULT

Result	Proceed to
NG	A

OK (When troubleshooting according to Problem Symptoms Table)	B
OK (When troubleshooting according to the DTC)	C

B --> See step 5

C --> See step 6

A --> REPAIR OR REPLACE HARNESS OR CONNECTOR

4. **GO TO CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
5. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
6. **REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL**
7. **REPLACE COMPRESSOR AND MAGNETIC CLUTCH (A/C LOCK SENSOR). Refer to REMOVAL**

DTC B1423/23: PRESSURE SENSOR CIRCUIT

DESCRIPTION

This DTC is output when the refrigerant pressure is either extremely low (0.19 MPa [2.0 kgf/cm² , 28 psi] or less) or extremely high (3.14 MPa [32.0 kgf/cm² , 455 psi] or more). The air conditioning pressure sensor, which is installed on the pipe of the high pressure side, detects the refrigerant pressure and sends refrigerant pressure signals to the air conditioning amplifier. The air conditioning amplifier determines the pressure from the signals in accordance with the sensor characteristics, and controls the compressor accordingly.

DTC Code	DTC Detection Condition	Trouble Area
B1423/23	Open or short in air conditioning pressure sensor circuit	• Air conditioner pressure sensor • Harness or connector between air conditioner pressure sensor and air conditioning amplifier • Air conditioning amplifier

WIRING DIAGRAM

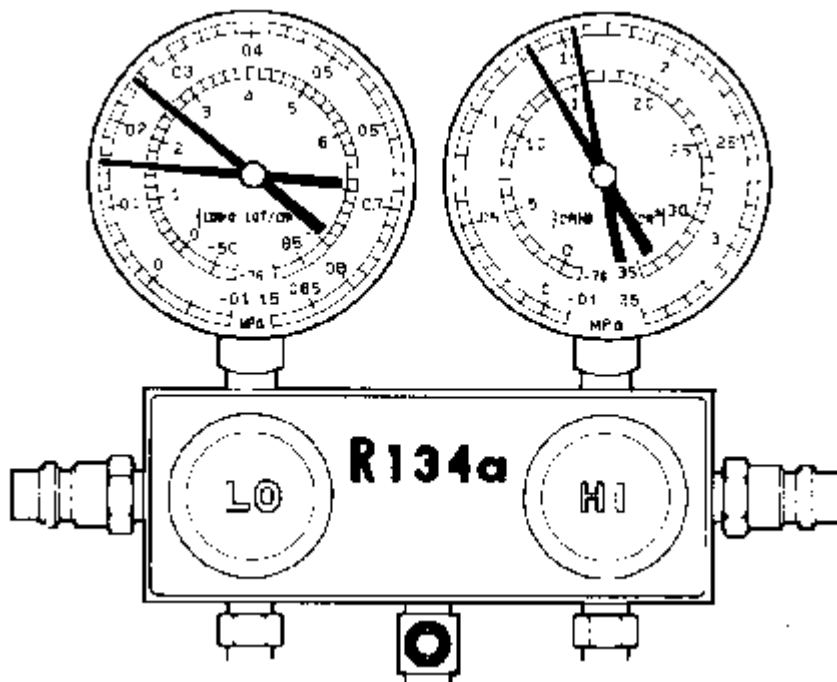


Fig. 14: Pressure Sensor Circuit - Wiring Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. CHECK REFRIGERANT PRESSURE



E50573

Fig. 15: Checking A/C Refrigeration Pressure
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- a. Install the manifold gauge set. Refer to **ON-VEHICLE INSPECTION** .
- b. Read the manifold gauge pressure when the following conditions are established.
 1. Prepare the vehicle in accordance with the chart below.

Item	Condition
Engine speed	1500 RPM
Vehicle doors	Fully open
Temperature setting	MAX COLD
Blower speed	HI
A/C switch	ON
Air inlet	RECIRC

2. When the refrigerant volume is correct, the gauge reading indicates as follows:

Standard

Tester Connection	Refrigerant Pressure
Low pressure side	0.15 to 0.25 MPaG (1.5 to 2.5 kg/cm ² , 22 to 36 psi)
High pressure side	1.37 to 1.57 MPaG (14 to 16 kg/cm ² , 199 to 228 psi)

HINT:

Pressure varies in accordance with certain conditions such as outside air temperature, sunlight and wind.

NG --> See step 10

OK: Go to next step

2. READ VALUE USING TECHSTREAM (REG PRESS SENS)

- Connect Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Air Conditioner / Data List.
- Check the value(s) by referring to the table below.

AIR CONDITIONER

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Regulator Pressure Sensor	Air conditioner pressure sensor/ Min.: -0.4566 MPaG (0 kgf/cm ² G) Max.: 3.2943 MPaG (38.25 kgf/cm ² G)	Actual regulator pressure displayed	-

OK

The display is as specified in the normal condition column.

RESULT

Result	Proceed to
NG	A
OK (When troubleshooting according to Problem Symptoms Table)	B
OK (When troubleshooting according to the DTC)	C

B --> See step 9

C --> See step 8

A: Go to next step

3. CHECK HARNESS AND CONNECTOR (AIR CONDITIONER PRESSURE SENSOR - AIR CONDITIONING AMPLIFIER)

- a. Disconnect the air conditioner pressure sensor connector.
- b. Disconnect the air conditioning amplifier connector.
- c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A32-3 (+) - D75-10 (S5-3)	Always	Below 1 ohms
A32-2 (PR) - D75-9 (PRE)	Always	Below 1 ohms
A32-1 (-) - D75-13 (SG-2)	Always	Below 1 ohms
A32-3 (+) - Body ground	Always	10 kohms or higher
A32-2 (PR) - Body ground	Always	10 kohms or higher
A32-1 (-) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

4. INSPECT AIR CONDITIONING AMPLIFIER

- a. Remove the air conditioning amplifier with its connectors still connected.

*a

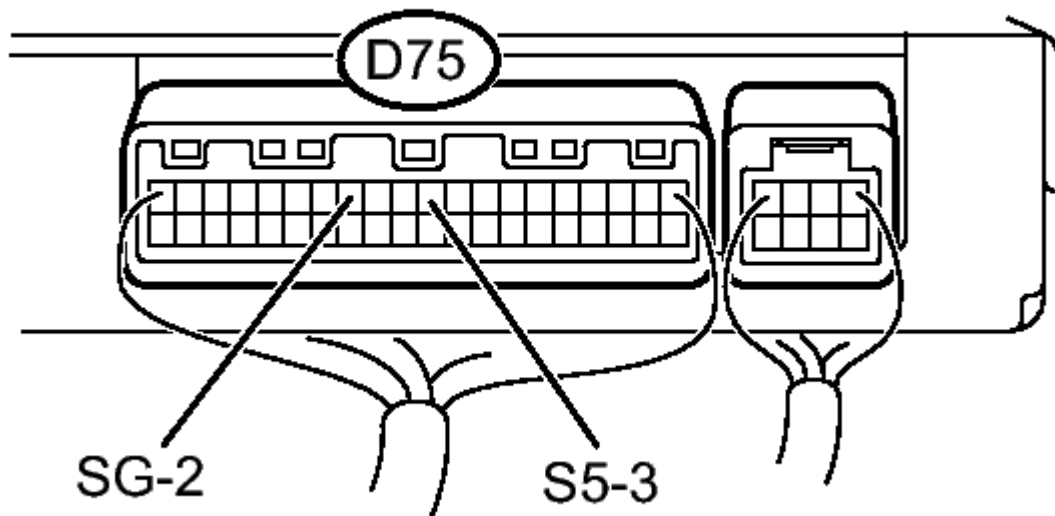


Fig. 16: Measuring Resistance Of Air Conditioning Amplifier
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D75-13 (SG-2) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Component with harness connected (Air Conditioning Amplifier)
----	---

- c. Turn the ignition switch to ON.
d. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
D75-10 (S5-3) - D75-13 (SG-2)	Ignition switch ON (A/C ON)	4.75 to 5.25 V

NG --> See step 8

OK: Go to next step

5. INSPECT AIR CONDITIONER PRESSURE SENSOR

- Remove the air conditioning amplifier with its connectors still connected.

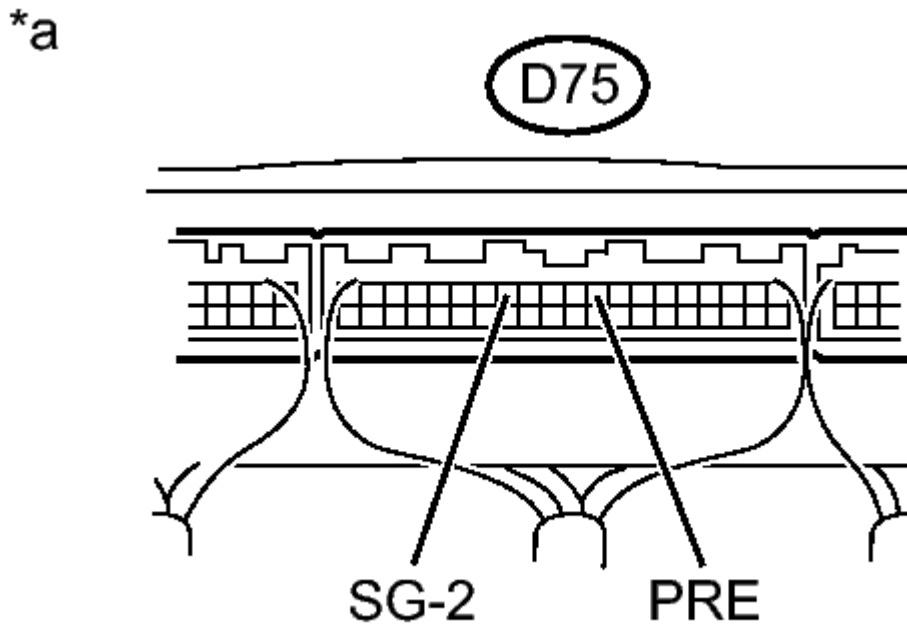


Fig. 17: Measuring Voltage Of Air Conditioning Pressure Sensor
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- Set the manifold gauge.
- Warm up the engine.
- Turn the A/C switch ON.
- Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Refrigerant Pressure	Specified Condition
-------------------	----------------------	---------------------

D75-9 (PRE) - D75-13 (SG-2)	0.176 to 3.025 MPa (1.8 to 30.9 kgf/cm ²)	0.63 to 4.72 V
--------------------------------------	--	-------------------

TEXT IN ILLUSTRATION

*a	Component without harness connected (Air Conditioning Amplifier)
----	--

NG --> See step 7

OK --> See step 6

6. **REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL**
7. **REPLACE AIR CONDITIONER PRESSURE SENSOR. Refer to REMOVAL**
8. **REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL**
9. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
10. **CHARGE REFRIGERANT. Refer to ON-VEHICLE INSPECTION**

DTC B1441/41: AIR MIX DAMPER CONTROL SERVO MOTOR CIRCUIT (PASSENGER SIDE)

DESCRIPTION

The air mix control servo motor sends pulse signals to indicate the damper position to the air conditioning amplifier. The air conditioning amplifier activates the motor (normal or reverse) based on these signals to move the air mix damper (front passenger side) to any position. As a result, the amount of air passing through the heater core after passing through the evaporator is adjusted, and the temperature of the air blowing toward the passenger side is controlled.

The air conditioning amplifier communicates with the servo through a communication/driver IC and wiring assembly called the air conditioning harness.

HINT:

Confirm that no mechanical problem is present because this DTC can be output when either a damper link or the damper is mechanically locked.

DTC Code	DTC Detection Condition	Trouble Area
	Air mix damper position sensor	

B1441/41

value does not change even if
air conditioning amplifier
operates air mix control servo
motor

- Air mix control servo motor
- Air conditioning harness
- Air conditioning amplifier

WIRING DIAGRAM

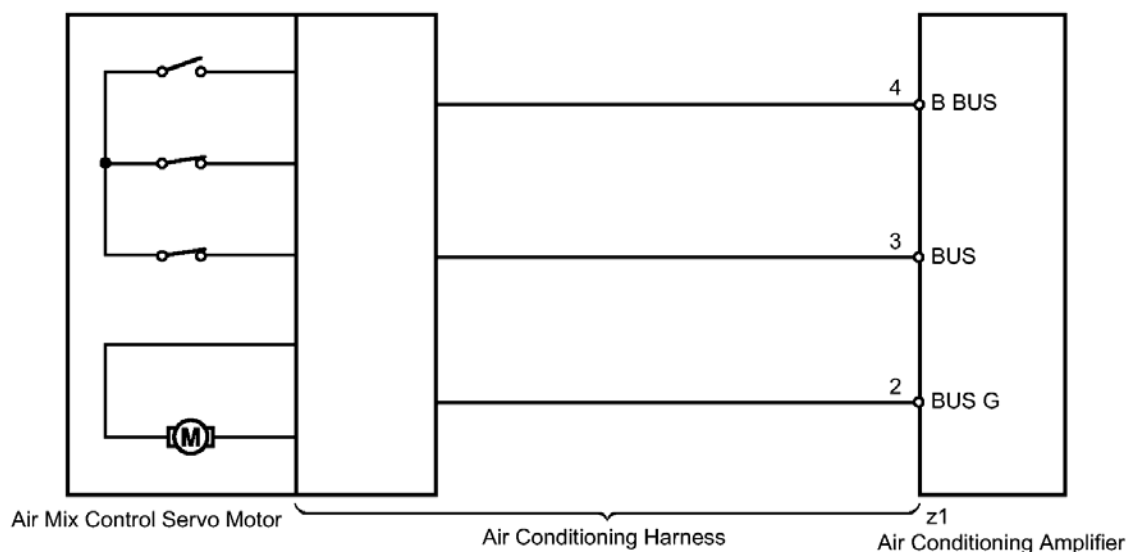


Fig. 18: Air Mix Damper Control Servo Motor Circuit (Passenger Side) - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. READ VALUE USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Operate the front passenger side temperature adjustment switch.
- Enter the following menus: Body Electrical / Air Conditioner / Data List.
- Check the value(s) by referring to the table below.

AIR CONDITIONER

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Air Mix Servo Targ	Passenger side air mix servo motor target pulse /	MAX. COLD: 5 (pulse) MAX.	-

Pulse (P)	Min.: 0 Max.: 255	HOT: 103 (pulse)	
--------------	----------------------	---------------------	--

OK

The display is as specified in the Normal Condition column.

RESULT

Result	Proceed to
NG	A
OK (When troubleshooting according to Problem Symptoms Table)	B
OK (When troubleshooting according to the DTC)	C

B --> See step 6

C --> See step 7

A: Go to next step

2. PERFORM ACTIVE TEST USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body / Air Conditioner / Active Test.
- Check the operation by referring to the table below.

AIR CONDITIONER

Tester Display	Test Part	Control Range	Diagnostic Note
Air Mix Servo Targ Pulse (P)	Air mix servo motor pulse (P side)	Min.: 0, Max.: 255	-

OK

Air temperature changes in accordance with each control range.

NG --> See step 3

OK --> See step 7

3. INSPECT AIR MIX CONTROL SERVO MOTOR

- a. Replace the air mix control servo motor. Refer to DISASSEMBLY .

HINT:

Since the servo motor cannot be inspected while it is removed from the vehicle, replace the servo motor with a new or a known good one and check that the condition returns to normal.

- b. Check for the DTC.

RESULT

Result	Proceed to
DTC B1441/41 is output	A
DTC B1441/41 is not output	B

B --> See step 8

A: Go to next step

4. REPLACE AIR CONDITIONING HARNESS. Refer to DISASSEMBLY

5. INSPECT AIR CONDITIONING HARNESS

- a. Replace the air conditioning harness. Refer to DISASSEMBLY .

HINT:

Since the air conditioning harness cannot be inspected while it is removed from the vehicle, replace the air conditioning harness with a new or a known good one and check that the condition returns to normal.

- b. Check for the DTC.

RESULT

Result	Proceed to
DTC B1441/41 is output	A
DTC B1441/41 is not output	B

B --> See step 4

A --> See step 7

6. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
7. **REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL**
8. **REPLACE AIR MIX CONTROL SERVO MOTOR. Refer to DISASSEMBLY**

DTC B1442/42: AIR INLET DAMPER CONTROL SERVO MOTOR CIRCUIT

DESCRIPTION

The air inlet control servo motor sends pulse signals to indicate the damper position to the air conditioning amplifier. The air conditioning amplifier activates the motor (normal or reverse) based on these signals to move the air inlet mode selection air inlet control damper to any position, which controls the intake air settings (FRESH, FRESH/RECIRCULATION, and RECIRCULATION).

The air conditioning amplifier communicates with the servo through a communication/driver IC and wiring assembly called the air conditioning harness.

HINT:

Confirm that no mechanical problem is present because this DTC can be output when either a damper link or the damper is mechanically locked.

DTC Code	DTC Detection Condition	Trouble Area
B1442/42	Air inlet damper position sensor value does not change even if air conditioning amplifier operates air inlet control servo motor	• Air inlet control servo motor • Air conditioning harness • Air conditioning amplifier

WIRING DIAGRAM

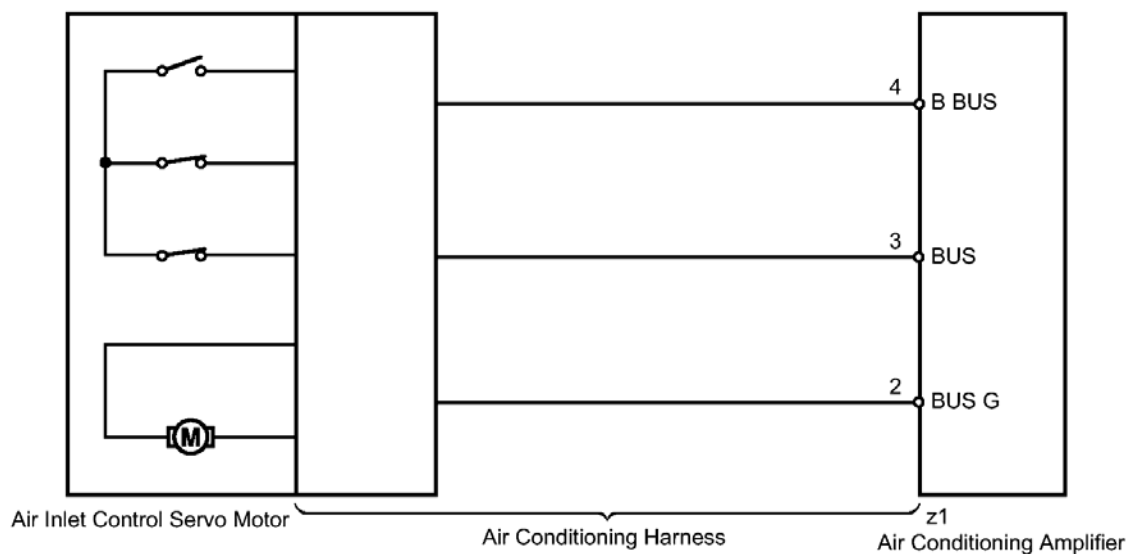


Fig. 19: Air Inlet Damper Control Servo Motor Circuit - Wiring Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. READ VALUE USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Operate the R/F (Recirculation/Fresh) switch.
- Enter the following menus: Body Electrical / Air Conditioner / Data List.
- Check the value(s) by referring to the table below.

AIR CONDITIONER

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Air Inlet Damper Targ Pulse	Air inlet servo motor target pulse / Min.: 0 Max.: 255	RECIRCULATION: 7 (pulse) FRESH: 28 (pulse)	-

OK

The display is as specified in the Normal Condition column.

RESULT

Result	Proceed to
NG	A
OK (When troubleshooting according to Problem Symptoms Table)	B
OK (When troubleshooting according to the DTC)	C

B --> See step 5

C --> See step 6

A: Go to next step

2. PERFORM ACTIVE TEST USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Air Conditioner / Active Test.
- Check the operation by referring to the table below.

AIR CONDITIONER

Tester Display	Test Part	Control Range	Diagnostic Note
Air Inlet Damper Targ Pulse	Air inlet damper target pulse	Min.: 0, Max.: 255	-

OK

Recirculation damper position changes in accordance with each control range.

NG --> See step 3

OK --> See step 6

3. INSPECT AIR INLET CONTROL SERVO MOTOR

- a. Replace the air inlet control servo motor. Refer to **DISASSEMBLY** .

HINT:

Since the servo motor cannot be inspected while it is removed from the vehicle, replace the servo motor with a new or a known good one and check that the condition returns to normal.

- b. Check for the DTC.

RESULT

Result	Proceed to
DTC B1442/42 is output	A
DTC B1442/42 is not output	B

B --> See step 7

A: Go to next step

4. INSPECT AIR CONDITIONING HARNESS

- a. Replace the air conditioning harness. Refer to **DISASSEMBLY** .

HINT:

Since the air conditioning harness cannot be inspected while it is removed from the vehicle, replace the air conditioning harness with a new or a known good one and check that the condition returns to normal.

- b. Check for the DTC.

RESULT

Result	Proceed to
DTC B1442/42 is output	A
DTC B1442/42 is not output	B

B --> See step 8

A --> See step 6

- 5. PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
- 6. REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL**
- 7. REPLACE AIR INLET CONTROL SERVO MOTOR. Refer to DISASSEMBLY**
- 8. REPLACE AIR CONDITIONING HARNESS. Refer to DISASSEMBLY**

DTC B1443/43: AIR OUTLET DAMPER CONTROL SERVO MOTOR CIRCUIT

DESCRIPTION

The air outlet control servo motor sends pulse signals to indicate the damper position to the air conditioning amplifier. The air conditioning amplifier activates the motor (normal or reverse) based on these signals to move the mode damper to any position, which controls the air outlet switching.

The air conditioning amplifier communicates with the servo through a communication/driver IC and wiring assembly called the air conditioning harness.

HINT:

Confirm that no mechanical problem is present because this DTC can be output when either a damper link or the damper is mechanically locked.

DTC Code	DTC Detection Condition	Trouble Area
B1443/43	Air outlet damper position sensor value does not change even if air conditioning amplifier operates air outlet control servo motor	• Air outlet control servo motor • Air conditioning harness • Air conditioning amplifier

WIRING DIAGRAM

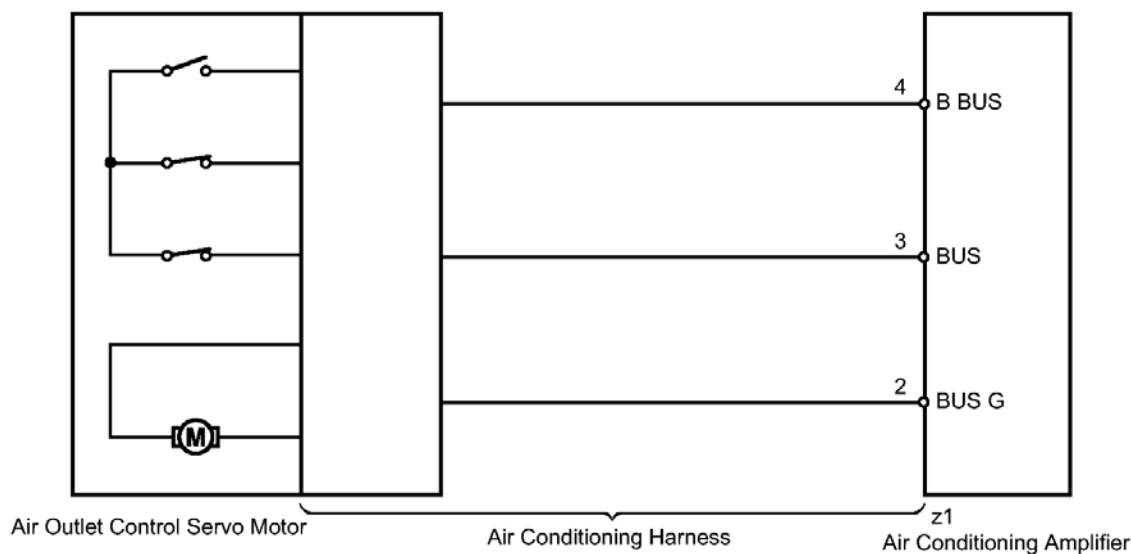


Fig. 20: Air Outlet Damper Control Servo Motor Circuit - Wiring Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. READ VALUE USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Operate the MODE switch.
- Enter the following menus: Body Electrical / Air Conditioner / Data List.
- Check the value(s) by referring to the table below.

AIR CONDITIONER

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Air Outlet Servo Pulse (D)	Air outlet servo motor target pulse / Min.: 0 Max.: 255	FACE: 8 (pulse) B/L: 30 to 38 (pulse) FOOT: 50 to 74 (pulse) FOOT/DEF: 80 (pulse) DEF: 97 (pulse)	-

OK

The display is as specified in the Normal Condition column.

RESULT

Result	Proceed to
NG	A
OK (When troubleshooting according to Problem Symptoms Table)	B
OK (When troubleshooting according to the DTC)	C

B --> See step 5

C --> See step 6

A: Go to next step

2. PERFORM ACTIVE TEST USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Air Conditioner / Active Test.
- Check the operation by referring to the table below.

AIR CONDITIONER

Tester Display	Test Part	Control Range	Diagnostic Note
Air Outlet Servo Pulse (D)	Air outlet servo motor pulse	Min.: 0, Max.: 255	-

OK

Air flow position changes in accordance with each control range.

NG --> See step 3

OK --> See step 6

3. INSPECT AIR OUTLET CONTROL SERVO MOTOR

- a. Replace the No. 1 air mix control servo motor (air outlet control servo motor). Refer to **DISASSEMBLY** .

HINT:

Since the servo motor cannot be inspected while it is removed from the vehicle, replace the servo motor with a new or a known good one and check that the condition returns to normal.

- b. Check for the DTC.

RESULT

Result	Proceed to
DTC B1443/43 is output	A
DTC B1443/43 is not output	B

B --> See step 7

A: Go to next step

4. INSPECT AIR CONDITIONING HARNESS

- a. Replace the air conditioning harness. Refer to **DISASSEMBLY** .

HINT:

Since the air conditioning harness cannot be inspected while it is removed from the vehicle, replace the air conditioning harness with a new or a known good one and check that the condition returns to normal.

- b. Check for the DTC.

RESULT

Result	Proceed to
DTC B1443/43	A

is output	
DTC B1443/43 is not output	B

B --> See step 8

A --> See step 6

5. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
6. **REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL**
7. **REPLACE AIR OUTLET CONTROL SERVO MOTOR. Refer to DISASSEMBLY**
8. **REPLACE AIR CONDITIONING HARNESS. Refer to DISASSEMBLY**

DTC B1446/46: AIR MIX DAMPER CONTROL SERVO MOTOR CIRCUIT (DRIVER SIDE)

DESCRIPTION

The air mix control servo motor sends pulse signals to indicate the damper position to the air conditioning amplifier. The air conditioning amplifier activates the motor (normal or reverse) based on these signals to move the air mix damper (driver side) to any position. As a result, the amount of air passing through the heater core after passing through the evaporator is adjusted, and the temperature of the air blowing toward the driver side is controlled.

The air conditioning amplifier communicates with the servo through a communication/driver IC and wiring assembly called the air conditioning harness.

HINT:

Confirm that no mechanical problem is present because this DTC can be output when either a damper link or the damper is mechanically locked.

DTC Code	DTC Detection Condition	Trouble Area
B1446/46	Air mix damper position sensor value does not change even if air conditioning amplifier operates air mix control servo motor	• Air mix control servo motor • Air conditioning harness • Air conditioning amplifier

WIRING DIAGRAM

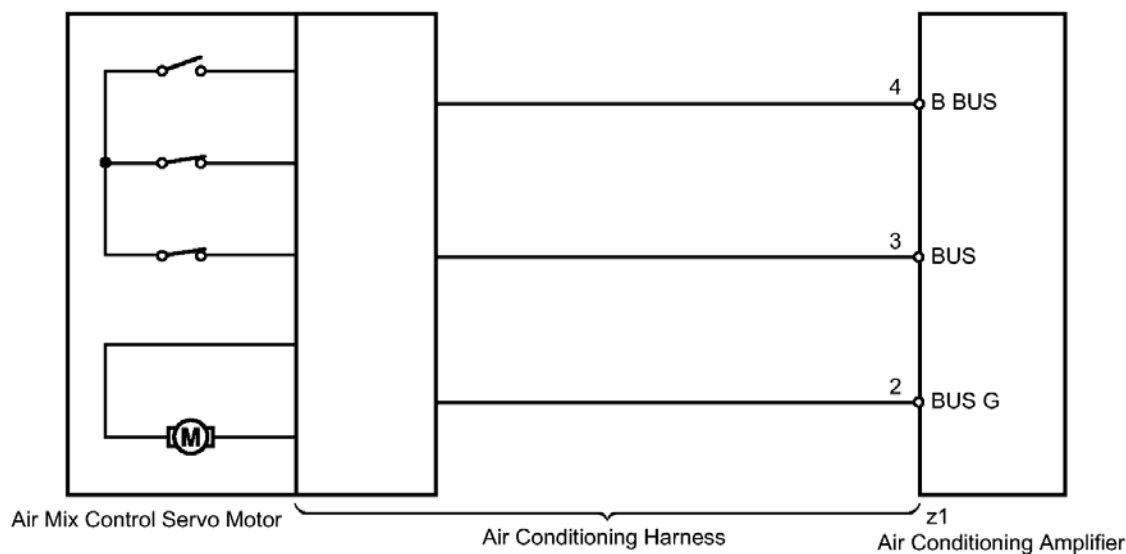


Fig. 21: Air Mix Damper Control Servo Motor Circuit (Passenger Side) - Wiring Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. READ VALUE USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Operate the driver side temperature adjustment switch.
- Enter the following menus: Body Electrical / Air Conditioner / Data List.
- Check the value(s) by referring to the table below.

AIR CONDITIONER

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Air Mix Servo Targ Pulse (D)	Driver side air mix servo motor target pulse / Min.: 0 Max.: 255	MAX. COLD: 105 (pulse) MAX. HOT: 7 (pulse)	-

OK

The display is as specified in the Normal Condition column.

RESULT

Result	Proceed to
NG	A
OK (When troubleshooting according to Problem Symptoms Table)	B
OK (When troubleshooting according to the DTC)	C

B --> See step 5

C --> See step 6

A: Go to next step

2. PERFORM ACTIVE TEST USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body / Air Conditioner / Active Test.
- Check the operation by referring to the table below.

AIR CONDITIONER

Tester Display	Test Part	Control Range	Diagnostic Note
Air Mix Servo Targ Pulse (D)	Air mix servo motor pulse (D side)	Min.: 0, Max.: 255	-

OK

Air temperature changes in accordance with each control range.

NG --> See step 3

OK --> See step 6

3. INSPECT AIR MIX CONTROL SERVO MOTOR

- a. Replace the No. 1 air mix control servo motor (air mix control servo motor). Refer to **DISASSEMBLY** .

HINT:

Since the servo motor cannot be inspected while it is removed from the vehicle, replace the servo motor with a new or a known good one and check that the condition returns to normal.

- b. Check for the DTC.

RESULT

Result	Proceed to
DTC B1446/46 is output	A
DTC B1446/46 is not output	B

B --> See step 7

A: Go to next step

4. INSPECT AIR CONDITIONING HARNESS

- a. Replace the air conditioning harness. Refer to **DISASSEMBLY** .

HINT:

Since the air conditioning harness cannot be inspected while it is removed from the vehicle, replace the air conditioning harness with a new or a known good one and check that the condition returns to normal.

- b. Check for the DTC.

RESULT

Result	Proceed to
DTC B1446/46 is output	A
DTC	

B1446/46 is not output	B
------------------------------	---

B --> See step 8

A --> See step 6

5. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
6. **REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL**
7. **REPLACE AIR MIX CONTROL SERVO MOTOR. Refer to DISASSEMBLY**
8. **REPLACE AIR CONDITIONING HARNESS. Refer to DISASSEMBLY**

DTC B1447/47: REAR AIR MIX DAMPER CONTROL SERVO MOTOR CIRCUIT

DESCRIPTION

The rear air mix control servo motor sends pulse signals to indicate the damper position to the air conditioning amplifier. The air conditioning amplifier activates the motor (normal or reverse) based on these signals to move the rear air mix damper to any position. As a result, the amount of air passing through the heater core after passing through the evaporator is adjusted, and the temperature of the air blowing toward the rear is controlled.

The air conditioning amplifier communicates with the servo through a communication/driver IC and wiring assembly called the rear air conditioning harness.

HINT:

Confirm that there are no mechanical problems because this DTC can be output when either a damper link or the damper is mechanically locked.

DTC Code	DTC Detection Condition	Trouble Area
B1447/47	Rear air mix damper position does not change even if air conditioning amplifier operates rear air mix control servo motor	• Rear air mix control servo motor • Rear air conditioning harness • Harness or connector between rear air conditioning harness and air conditioning amplifier • Air conditioning amplifier

WIRING DIAGRAM

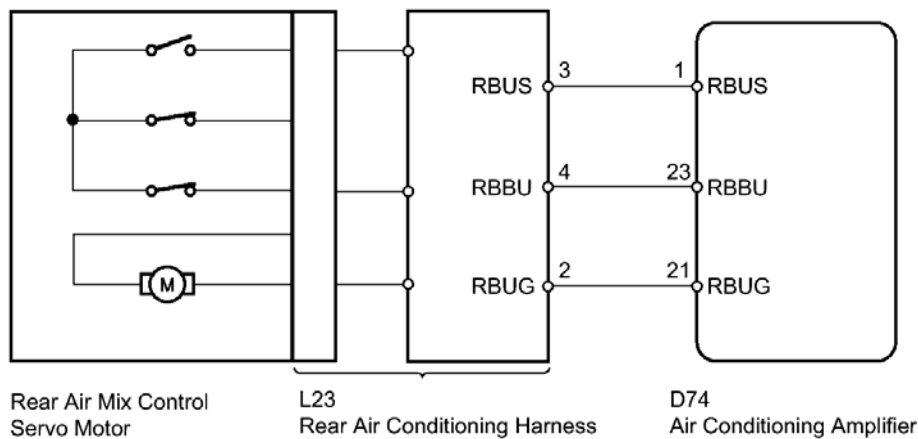


Fig. 22: Rear Air Mix Damper Control Servo Motor Circuit - Wiring Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. READ VALUE USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Operate the rear side temperature adjustment switch.
- Enter the following menus: Body Electrical / Air Conditioner / Data List.
- Check the value(s) by referring to the table below.

AIR CONDITIONER

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Air Mix Servo Targ Pulse (R)	Rear air mix servo motor target pulse / Min.: 0 Max.: 255	MAX. COLD: 9 (pulse) MAX. HOT: 54 (pulse)	-
Air Mix Servo Actual Pulse	Rear air mix servo motor actual pulse / Min.: 0	MAX. COLD: 9 (pulse) MAX. HOT: 54	-

(R)	Max.: 255	(pulse)	
-----	-----------	---------	--

OK

The display is as specified in the Normal Condition column.

RESULT

Result	Proceed to
NG	A
OK (When troubleshooting according to Problem Symptoms Table)	B
OK (When troubleshooting according to the DTC)	C

B --> See step 6

C --> See step 7

A: Go to next step

2. PERFORM ACTIVE TEST USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Air Conditioner / Active Test.
- Check the operation by referring to the table below.

AIR CONDITIONER

Tester Display	Test Part	Control Range	Diagnostic Note
Rear Air Mix Servo Targ Pulse	Rear air mix servo target pulse	Min.: 0, Max.: 255	-

OK

Air temperature changes in accordance with each control range.

NG --> See step 3

OK --> See step 7

3. CHECK HARNESS AND CONNECTOR (REAR AIR CONDITIONING HARNESS - AIR CONDITIONING AMPLIFIER)

- a. Disconnect the rear air conditioning harness connector.
- b. Disconnect the air conditioning amplifier connector.
- c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
L23-3 (RBUS) - D74-1 (RBUS)	Always	Below 1 ohms
L23-4 (RBBU) - D74-23 (RBBU)	Always	Below 1 ohms
L23-2 (RBUG) - D74-21 (RBUG)	Always	Below 1 ohms
D74-1 (RBUS) - Body ground	Always	10 kohms or higher
D74-23 (RBBU) - Body ground	Always	10 kohms or higher
D74-21 (RBUG) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

4. INSPECT REAR AIR MIX CONTROL SERVO MOTOR

- a. Replace the rear air mix control servo motor. Refer to **DISASSEMBLY** .

HINT:

Since the rear air mix control servo motor cannot be inspected while it is removed from the vehicle, replace the rear air mix control servo motor with a new or a known good one and check that the condition returns to normal.

- b. Check for the DTC.

RESULT

Result	Proceed to
DTC B1447/47 is output	A
DTC B1447/47 is not output	B

B --> See step 9

A: Go to next step

5. INSPECT REAR AIR CONDITIONING HARNESS

- a. Replace the rear air conditioning harness. Refer to **DISASSEMBLY** .

HINT:

Since the rear air conditioning harness cannot be inspected while it is removed from the vehicle, replace the rear air conditioning harness with a new or a known good one and check that the condition returns to normal.

- b. Check for the DTC.

RESULT

Result	Proceed to
DTC B1447/47 is output	A
DTC B1447/47 is not output	B

B --> See step 8

A --> See step 7

- 6. PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
- 7. REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL**
- 8. REPLACE REAR AIR CONDITIONING HARNESS. Refer to DISASSEMBLY**
- 9. REPLACE REAR AIR MIX CONTROL SERVO MOTOR. Refer to DISASSEMBLY**

DTC B1449/49: REAR AIR OUTLET DAMPER CONTROL SERVO MOTOR CIRCUIT

DESCRIPTION

The rear air outlet control servo motor sends pulse signals to indicate the damper position to the air conditioning amplifier. The air conditioning amplifier activates the motor (normal or reverse) based on these signals to move the rear air outlet damper to any position, which controls the air outlet modes.

The air conditioning amplifier communicates with the servo through a communication/driver IC and wiring assembly called the rear air conditioning harness.

HINT:

Confirm that there are no mechanical problems because this DTC can be output when either a damper link or the damper is mechanically locked.

DTC Code	DTC Detection Condition	Trouble Area
B1449/49	Rear air outlet damper position does not change even if air conditioning amplifier operates rear air outlet control servo motor	• Rear air outlet control servo motor • Rear air conditioning harness • Harness or connector between rear air conditioning harness and air conditioning amplifier • Air conditioning amplifier

WIRING DIAGRAM

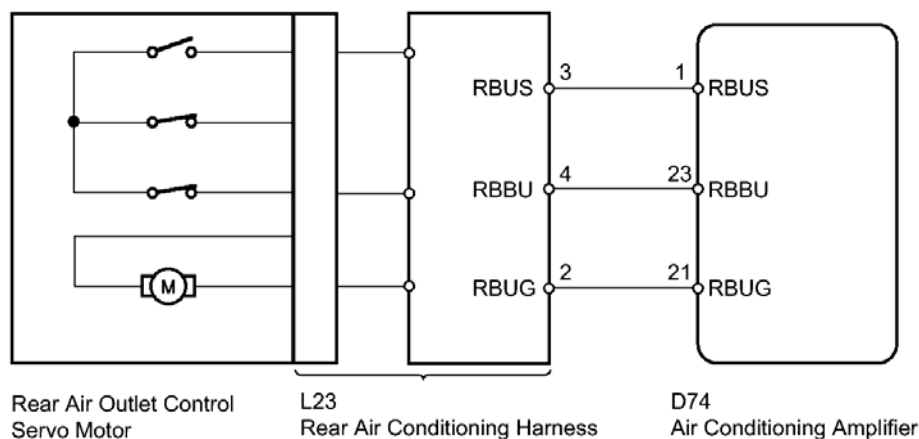


Fig. 23: Rear Air Outlet Damper Control Servo Motor Circuit - Wiring Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. READ VALUE USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Operate the rear side MODE switch.
- Enter the following menus: Body Electrical / Air Conditioner / Data List.
- Check the value(s) by referring to the table below.

AIR CONDITIONER

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Air Outlet Servo Pulse (R)	Rear air outlet servo motor target pulse / Min.: 0 Max.: 255	FACE: 83 (pulse) B/L: 35 (pulse) FOOT: 7 (pulse)	-
Air Outlet Servo Actual	Rear air outlet servo motor actual pulse / Min.: 0	FACE: 83 (pulse) B/L: 35 (pulse) FOOT: 7	-

Pls (R)	Max.: 255	(pulse)	
---------	-----------	---------	--

OK

The display is as specified in the Normal Condition column.

RESULT

Result	Proceed to
NG	A
OK (When troubleshooting according to Problem Symptoms Table)	B
OK (When troubleshooting according to the DTC)	C

B --> See step 6

C --> See step 7

A: Go to next step

2. PERFORM ACTIVE TEST USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Air Conditioner / Active Test.
- Check the operation by referring to the table below.

AIR CONDITIONER

Tester Display	Test Part	Control Range	Diagnostic Note
A/O Servo Pulse (Rr D)	Rear air outlet servo motor pulse	Min.: 0, Max.: 255	-

OK

Air flow position changes in accordance with each control range.

NG --> See step 3

OK --> See step 7

3. CHECK HARNESS AND CONNECTOR (REAR AIR CONDITIONING HARNESS - AIR CONDITIONING AMPLIFIER)

- a. Disconnect the rear air conditioning harness connector.
- b. Disconnect the air conditioning amplifier connector.
- c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
L23-3 (RBUS) - D74-1 (RBUS)	Always	Below 1 ohms
L23-4 (RBBU) - D74-23 (RBBU)	Always	Below 1 ohms
L23-2 (RBUG) - D74-21 (RBUG)	Always	Below 1 ohms
D74-1 (RBUS) - Body ground	Always	10 kohms or higher
D74-23 (RBBU) - Body ground	Always	10 kohms or higher
D74-21 (RBUG) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

4. INSPECT REAR AIR OUTLET CONTROL SERVO MOTOR

- a. Replace the rear air outlet control servo motor. Refer to **DISASSEMBLY** .

HINT:

Since the rear air outlet control servo motor cannot be inspected while it is removed from the vehicle, replace the rear air outlet control servo motor with a new or a known good one and check that the condition returns to normal.

- b. Check for the DTC.

RESULT

Result	Proceed to
DTC B1449/49 is output	A
DTC B1449/49 is not output	B

B --> See step 9

A: Go to next step

5. INSPECT REAR AIR CONDITIONING HARNESS

- a. Replace the rear air conditioning harness. Refer to **DISASSEMBLY** .

HINT:

Since the rear air conditioning harness cannot be inspected while it is removed from the vehicle, replace the rear air conditioning harness with a new or a known good one and check that the condition returns to normal.

- b. Check for the DTC.

RESULT

Result	Proceed to
DTC B1449/49 is output	A
DTC B1449/49 is not output	B

B --> See step 8

A --> See step 7

6. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
7. **REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL**
8. **REPLACE REAR AIR CONDITIONING HARNESS. Refer to DISASSEMBLY**
9. **REPLACE REAR AIR OUTLET CONTROL SERVO MOTOR. Refer to DISASSEMBLY**

DTC B1451/51: COMPRESSOR SOLENOID CIRCUIT

DESCRIPTION

In this circuit, the compressor and magnetic clutch receives a refrigerant compression demand signal from the air conditioning amplifier.

Based on this signal, the compressor and magnetic clutch changes the amount of compressor output.

DTC Code	DTC Detection Condition	Trouble Area
B1451/51	Open or short in compressor and magnetic clutch solenoid circuit	• Compressor and magnetic clutch (solenoid valve) • Harness or connector between air conditioning amplifier and compressor and magnetic clutch (solenoid valve) • Air conditioning amplifier

WIRING DIAGRAM

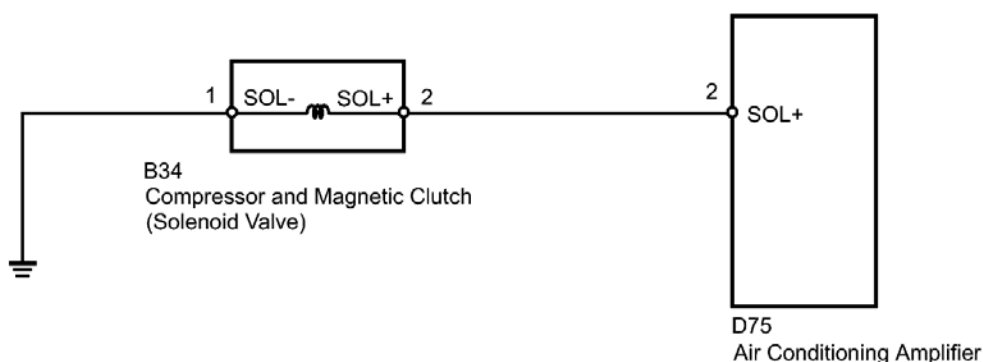


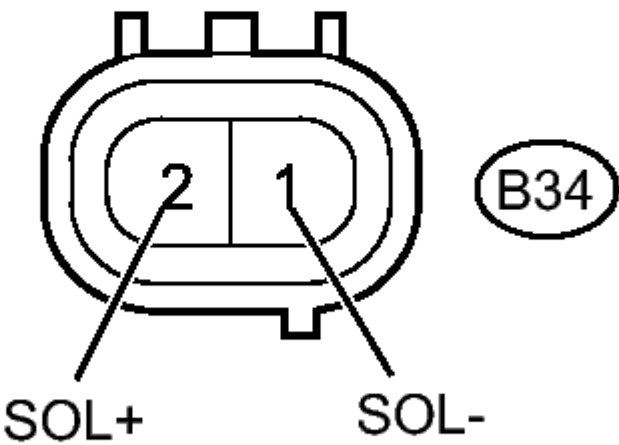
Fig. 24: Compressor Solenoid Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

- 1. INSPECT COMPRESSOR AND MAGNETIC CLUTCH (SOLENOID VALVE)**
 - a. Disconnect the compressor and magnetic clutch (solenoid valve) connector.

*a



H

Fig. 25: Measuring Resistance Of Compressor And Magnetic Clutch (Solenoid Valve)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
B34-2 (SOL+) -	20°C (68°	10 to 11

B34-1 (SOL-)	F)	ohms
-----------------	----	------

TEXT IN ILLUSTRATION

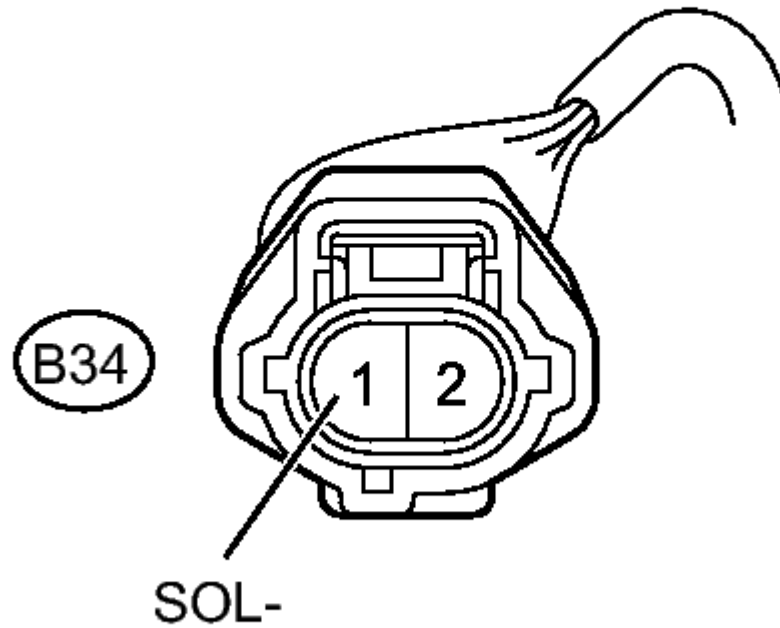
*a	Component without harness connected (Compressor and magnetic clutch (Solenoid Valve))
----	--

NG --> See step 6

OK: Go to next step

2. **CHECK HARNESS AND CONNECTOR (COMPRESSOR AND MAGNETIC CLUTCH (SOLENOID VALVE) - BODY GROUND)**
 - a. Measure the resistance according to the value(s) in the table below.

*a



H

Fig. 26: Measuring Resistance Of Compressor And Magnetic Clutch (Solenoid Valve)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Resistance

Tester Connection	Condition	Specified Condition
B34-1 (SOL-) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

Front view of wire harness

*a	connector (to Compressor and magnetic clutch (Solenoid Valve))
----	---

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

3. CHECK HARNESS AND CONNECTOR (COMPRESSOR AND MAGNETIC CLUTCH (SOLENOID VALVE) - AIR CONDITIONING AMPLIFIER)

- a. Disconnect the air conditioning amplifier connector.
- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D75-2 (SOL+) - B34-2 (SOL+)	Always	Below 1 ohms
D75-2 (SOL+) - Body ground	Always	10 kohms or higher

RESULT

Result	Proceed to
NG	A
OK (When troubleshooting according to Problem Symptoms Table)	B
OK (When troubleshooting according to the DTC)	C

B --> See step 4

C --> See step 5

A --> REPAIR OR REPLACE HARNESS OR CONNECTOR

4. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
5. **REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL**
6. **REPLACE COMPRESSOR AND MAGNETIC CLUTCH (SOLENOID VALVE). Refer to DISASSEMBLY**

DTC B1479/79: FLOW SENSOR CIRCUIT

DESCRIPTION

The flow sensor is built into the compressor, and outputs a signal indicating the flow rate of the refrigerant. The air conditioning amplifier converts the received signal to refrigerant flow rate data according to the characteristics of the sensor, which it then sends to the ECM via CAN communication.

DTC Code	DTC Detection Condition	Trouble Area
B1479/79	• The ignition switch is ON*1, the A/C is on and the flow sensor circuit has an open or short circuit. • The ignition switch is ON*1 and the flow sensor is stuck.	• Flow sensor (compressor and pulley) • Harness or connector between flow sensor and air conditioning amplifier • Air conditioning amplifier

*1: As the flow sensor measures the flow rate of the refrigerant in the air conditioning system, it is necessary to turn the ignition switch to ON in order to check the state of the flow sensor.

WIRING DIAGRAM

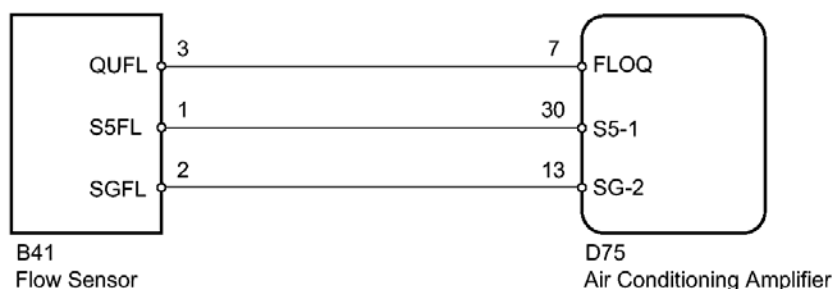


Fig. 27: Flow Sensor Circuit - Wiring Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. READ VALUE USING TECHSTREAM (FLOW SENSOR)

- Connect Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Air Conditioner / Data List.
- Check the value(s) by referring to the table below.

AIR CONDITIONER

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Flow sensor	Flow sensor voltage / Min.: 0 V Max.: 5 V	Flow sensor voltage displayed	Open circuit: 4.7 V or more Short circuit: 0.3 V or less

RESULT

Result	Proceed to
4.7 V or more: Open circuit (A/C is on)	A
0.3 V or less: Short circuit (A/C is on)	A
Circuit is not open or shorted	B

B --> See step 5

A: Go to next step

2. CHECK HARNESS AND CONNECTOR (FLOW SENSOR - AIR CONDITIONING AMPLIFIER)

- a. Disconnect the flow sensor connector.
- b. Disconnect the air conditioning amplifier connector.
- c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
B41-3 (QUFL) - D75-7 (FLOQ)	Always	Below 1 ohms
B41-1 (S5FL) - D75-30 (S5-1)	Always	Below 1 ohms
B41-2 (SGFL) - D75-13 (SG-2)	Always	Below 1 ohms
D75-7 (FLOQ) - Body ground	Always	10 kohms or higher
D75-30 (S5-1) - Body ground	Always	10 kohms or higher
D75-13 (SG-2) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS AND CONNECTOR

OK: Go to next step

3. REPLACE FLOW SENSOR (COMPRESSOR AND PULLEY)

- a. Replace the flow sensor with a normal one. Refer to **REMOVAL** .

NEXT: Go to next step

4. CHECK FOR DTC

- a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
- b. Check for DTCs. Refer to **DTC CHECK / CLEAR** .

OK

DTC B1479 is not output.

NG --> See step 8

OK --> END

5. READ VALUE USING TECHSTREAM (FLOW SENSOR)

- a. Connect Techstream to the DLC3.
- b. Turn the ignition switch to ON.
- c. Turn the Techstream on.
- d. Enter the following menus: Body Electrical / Air Conditioner / Data List.
- e. Check the value(s) by referring to the table below.

AIR CONDITIONER

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Flow sensor	Flow sensor voltage / Min.: 0 V Max.: 5 V	Flow sensor voltage displayed	Open circuit: 4.7 V or more Short circuit: 0.3 V or less

RESULT

Result	Proceed to
Sensor is stuck in an intermediate position • Engine idling • A/C switch off	

• Sensor voltage is 3.76 V or less and does not change for 8.5 minutes or more	A
Sensor is stuck at zero position • Engine idling • A/C switch on • Sensor voltage is 3.76 V or more and does not change for 8.5 minutes or more	A
Sensor is not stuck	B

B --> See step 7

A: Go to next step

6. REPLACE FLOW SENSOR

- Replace the flow sensor with a normal one. Refer to **REMOVAL** .

NEXT: Go to next step

7. CHECK FOR DTC

- a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
- b. Check for DTCs. Refer to **DTC CHECK / CLEAR** .

OK

DTC B1479 is not output.

NG --> See step 8

OK --> END

8. REPLACE AIR CONDITIONING AMPLIFIER ASSEMBLY. Refer to **REMOVAL**

DTC B1497/97: BUS IC COMMUNICATION MALFUNCTION

DESCRIPTION

The air conditioning harness connects the air conditioning amplifier and each servo. The air conditioning amplifier supplies power and sends operation instructions to each servo through the air conditioning harness. Each servo sends the damper position information to the air conditioning amplifier.

DTC Code	DTC Detection Condition	Trouble Area
B1497/97	Communication line error or open	- Air conditioning harness - Air conditioning amplifier

WIRING DIAGRAM

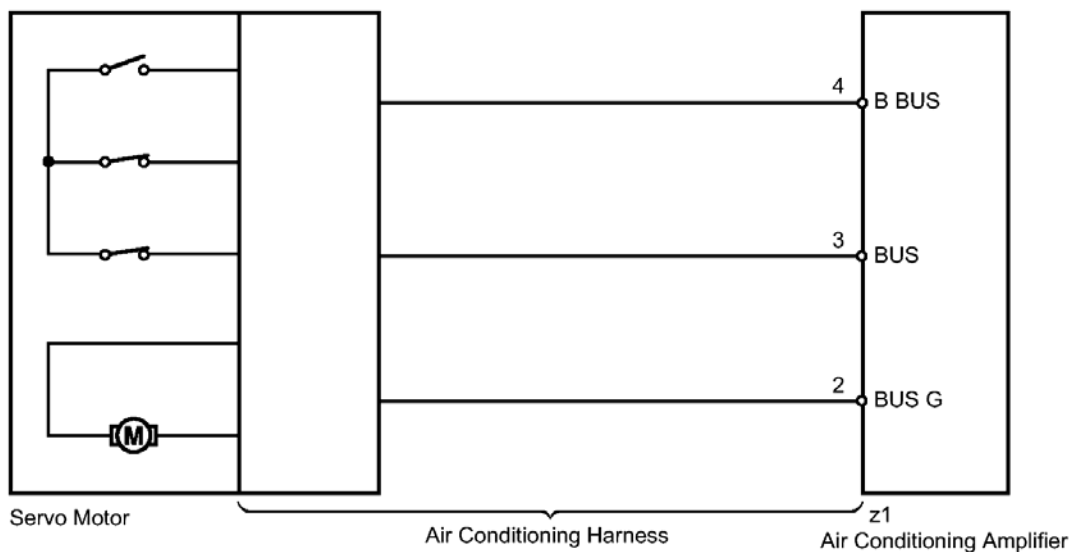


Fig. 28: BUS IC Communication Circuit - Wiring Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. INSPECT AIR CONDITIONING AMPLIFIER

- a. Remove the air conditioning amplifier with the connectors still connected.

*a

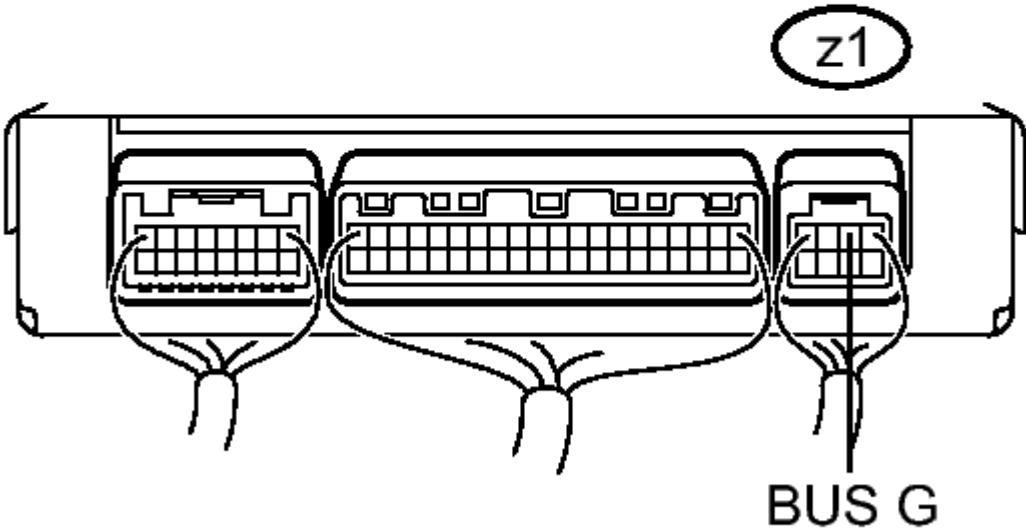


Fig. 29: Measuring Resistance Of Air Conditioning Amplifier
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
-------------------	-----------	---------------------

z1-2 (BUS G) - Body ground	Always	Below 1 ohms
----------------------------------	--------	-----------------

TEXT IN ILLUSTRATION

*a	Component with harness connected (Air Conditioning Amplifier)
----	--

NG --> See step 4

OK: Go to next step

2. INSPECT AIR CONDITIONING AMPLIFIER

- a. Measure the voltage according to the value(s) in the table below.

*a

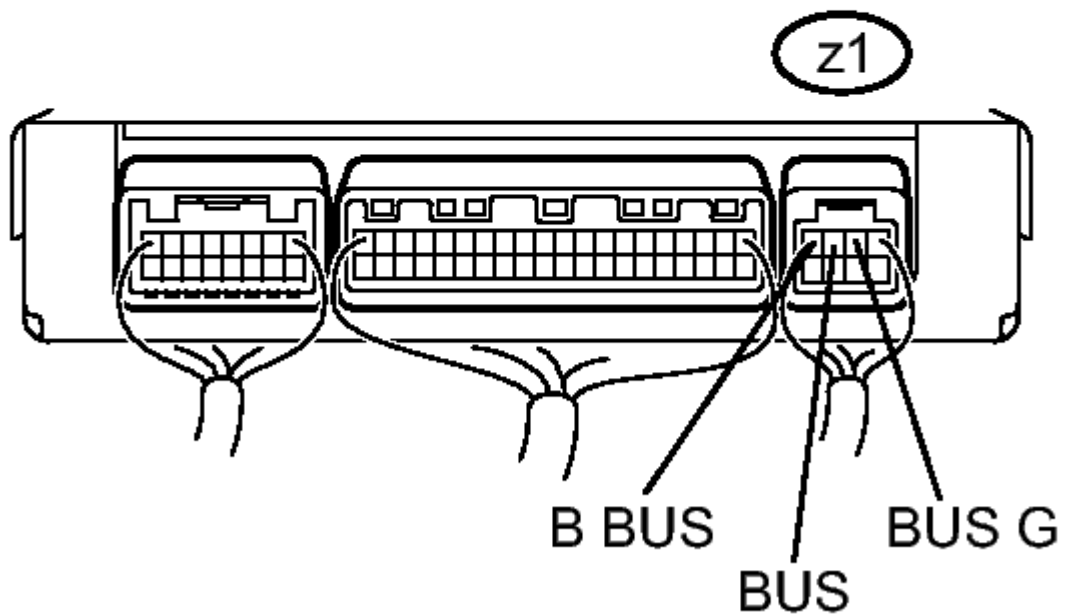


Fig. 30: Measuring Voltage Of Air Conditioning Amplifier
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
z1-4 (B BUS) - z1-2 (BUS G)	Ignition switch off	11 to 14 V
z1-4 (B BUS) - z1-2 (BUS G)	Ignition switch ON	11 to 14 V
z1-3 (BUS) - z1-2 (BUS G)	Ignition switch ON	Pulse generation

TEXT IN ILLUSTRATION

*a	Component with harness connected (Air Conditioning Amplifier)
----	--

NG --> See step 5

OK --> See step 3

3. REPLACE AIR CONDITIONING HARNESS. Refer to DISASSEMBLY
4. REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL
5. REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL

DTC B1499/99: MULTIPLEX COMMUNICATION CIRCUIT

DESCRIPTION

DTC Code	DTC Detection Condition	Trouble Area
B1499/99	• Open in CAN communication circuit	• CAN communication system

INSPECTION PROCEDURE

PROCEDURE

1. GO TO CAN COMMUNICATION SYSTEM
 - a. Refer to the CAN communication system. Refer to HOW TO PROCEED WITH TROUBLESHOOTING.

NEXT --> END

DTC B14A2: DRIVER SIDE SOLAR SENSOR SHORT CIRCUIT

DESCRIPTION

Resistance of Photodiode

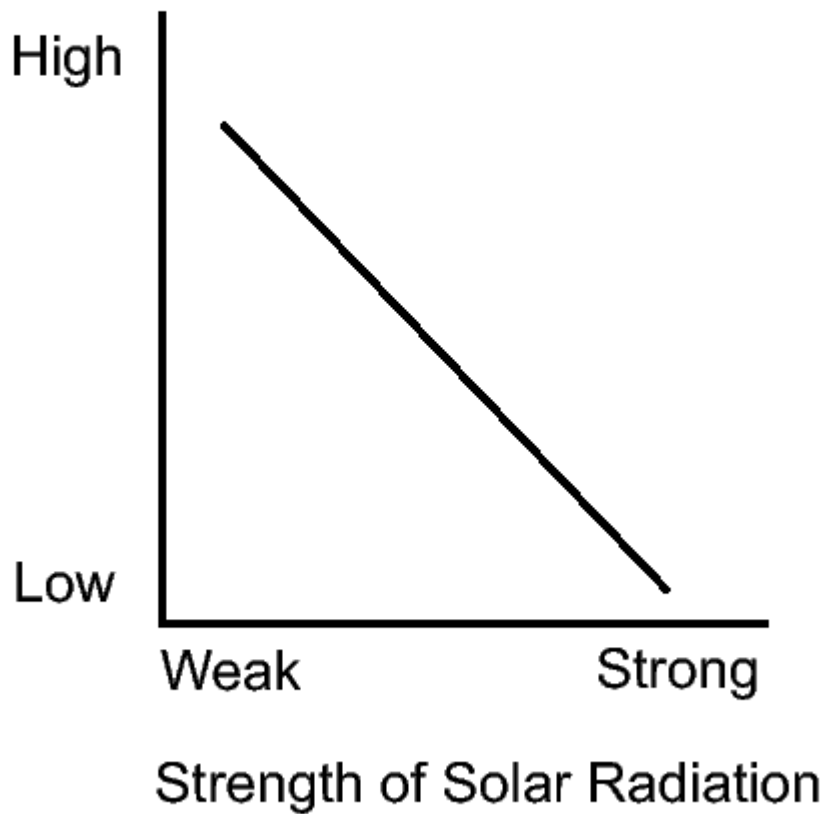


Fig. 31: Solar Radiation And Resistance Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

The solar sensor is installed on the upper side of the instrument panel. It detects sunlight to control air conditioning AUTO mode. The output voltage from the solar sensor varies in accordance with the amount of sunlight. When the amount of sunlight increases, the output voltage increases. As the sunlight decreases, the output voltage decreases. The air conditioning amplifier detects changes in the output voltage from the solar sensor.

DTC Code	DTC Detection Condition	Trouble Area
B14A2	Short in driver side solar sensor circuit	• Solar sensor • Harness or connector between solar sensor and air conditioning amplifier • Harness or connector between solar sensor and main body ECU

- Main body ECU
- Air conditioning amplifier

WIRING DIAGRAM

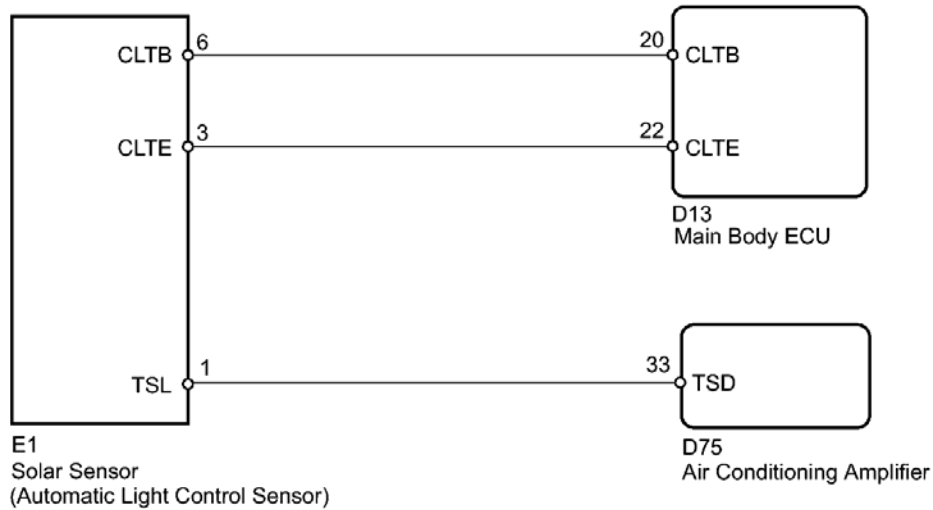


Fig. 32: Driver Side Solar Sensor Circuit - Wiring Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

HINT:

If DTC B1244 is output together with other DTCs, troubleshoot DTC B1244 first. Refer to **DTC B1244: Light Sensor Circuit Malfunction** .

PROCEDURE

1. READ VALUE USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Air Conditioner / Data List.
- Check the value(s) by referring to the table below.

AIR CONDITIONER

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
		Driver	

Solar Sensor (D side)	Driver side solar sensor / Min.: 0 Max.: 255	side solar sensor value increases as brightness increases	-
-----------------------	--	---	---

OK

The display is as specified in the Normal Condition column.

RESULT

Result	Proceed to
NG	A
OK (When troubleshooting according to Problem Symptoms Table)	B
OK (When troubleshooting according to the DTC)	C

B --> See step 6

C --> See step 7

A: Go to next step

2. CHECK HARNESS AND CONNECTOR (POWER SOURCE CIRCUIT)

- Disconnect the solar sensor connector.

*a

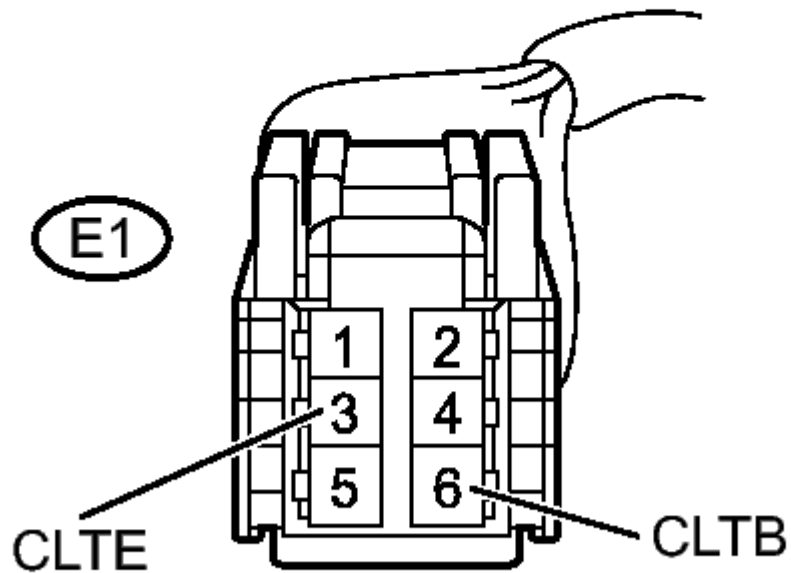


Fig. 33: Checking Harness And Connector (Power Source Circuit)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
E1-6 (CLTB) - E1-3 (CLTE)	Ignition switch off	Below 1 V
E1-6 (CLTB) - E1-3	Ignition switch	11 to 14 V

(CLTE)	ON	
--------	----	--

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Solar Sensor)
----	--

NG --> See step 5

OK: Go to next step

3. CHECK HARNESS AND CONNECTOR (SOLAR SENSOR - AIR CONDITIONING AMPLIFIER)

- Disconnect the solar sensor connector.
- Disconnect the air conditioning amplifier connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D75-33 (TSD) - E1- 1 (TSL)	Always	Below 1 ohms
D75-33 (TSD) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

4. INSPECT SOLAR SENSOR

- Remove the solar sensor.

*a

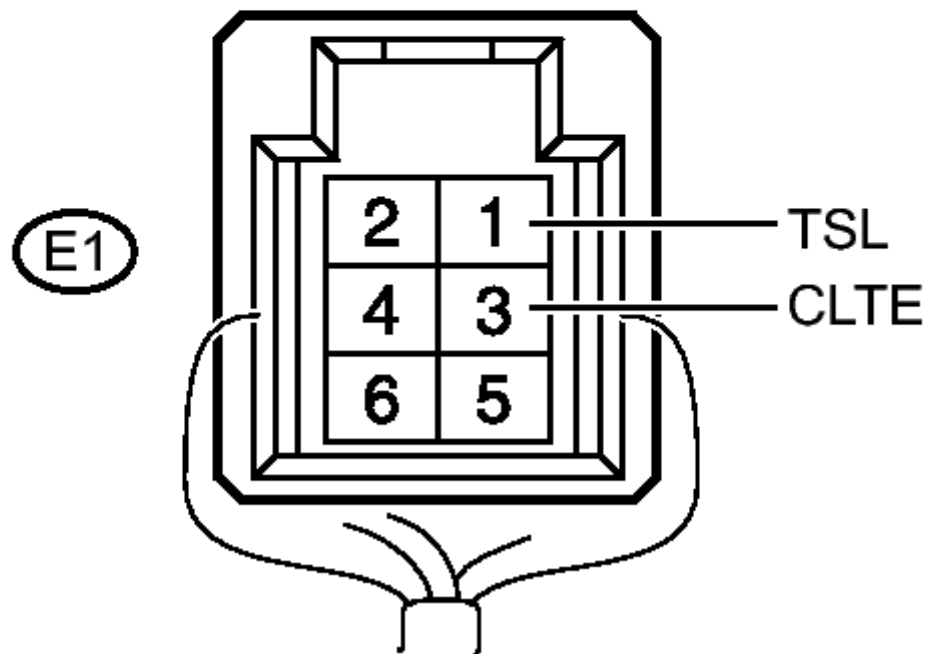


Fig. 34: Inspecting Solar Sensor
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Reconnect the solar sensor connector.
- c. Turn the ignition switch to ON.
- d. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Condition	Specified Condition
E1-1 (TSL) - E1-3 (CLTE)	Sensor is subjected to electric light	0.8 to 4.3 V

E1-1 (TSL) - E1-3 (CLTE)	Sensor is covered with a cloth	Below 0.8 V
--------------------------------	---	----------------

NOTE:

- The connection procedure for using a digital tester such as a TOYOTA electrical tester is shown above. When using an analog tester, connect the negative (-) lead to terminal 2 and the positive (+) lead to terminal 6 of the solar sensor.
- While using the battery during inspection, do not bring the positive and negative tester probes too close to each other as a short circuit may occur.

HINT:

- Use an incandescent light for inspection. Bring it within about 30 cm (11.8 in.) of the solar sensor.
- As the inspection light is moved away from the sensor, the voltage decreases.

TEXT IN ILLUSTRATION

*a	Component with harness connected (Solar Sensor)
----	--

NG --> See step 8

OK --> See step 7

5. CHECK HARNESS AND CONNECTOR (MAIN BODY ECU - SOLAR SENSOR)

- Disconnect the main body ECU connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D13-20 (CLTB) - E1-6 (CLTB)	Always	Below 1 ohms
D13-22 (CLTE) -		Below 1

E1-3 (CLTE)	Always	ohms
D13-20 (CLTB) - Body ground	Always	10 kohms or higher
D13-22 (CLTE) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 9

- 6. PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
- 7. REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL**
- 8. REPLACE SOLAR SENSOR. Refer to REMOVAL**
- 9. REPLACE MAIN BODY ECU. Refer to REMOVAL**

DTC B14A3: FRONT PASSENGER SIDE SOLAR SENSOR SHORT CIRCUIT

DESCRIPTION

Resistance of Photodiode

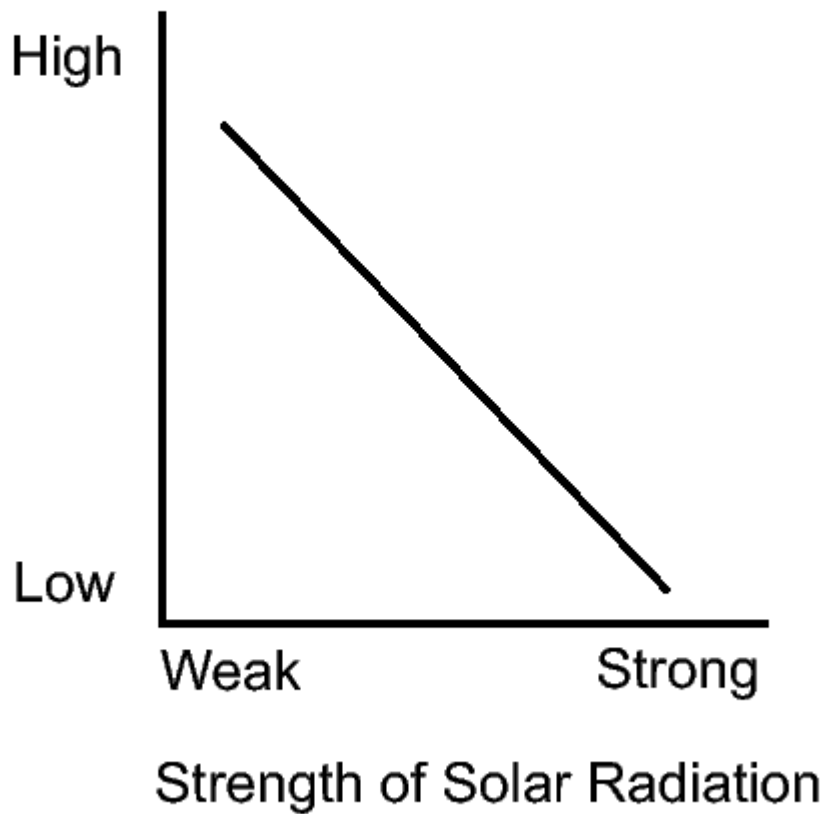


Fig. 35: Solar Radiation And Resistance Graph
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

The solar sensor is installed on the upper side of the instrument panel. It detects sunlight to control air conditioning AUTO mode. The output voltage from the solar sensor varies in accordance with the amount of sunlight. When the amount of sunlight increases, the output voltage increases. As the sunlight decreases, the output voltage decreases. The air conditioning amplifier detects changes in the output voltage from the solar sensor.

DTC Code	DTC Detection Condition	Trouble Area
B14A3	Short in passenger side solar sensor circuit	• Solar sensor • Harness or connector between solar sensor and air conditioning amplifier • Harness or connector between solar sensor and main body ECU

- Main body ECU
- Air conditioning amplifier

WIRING DIAGRAM

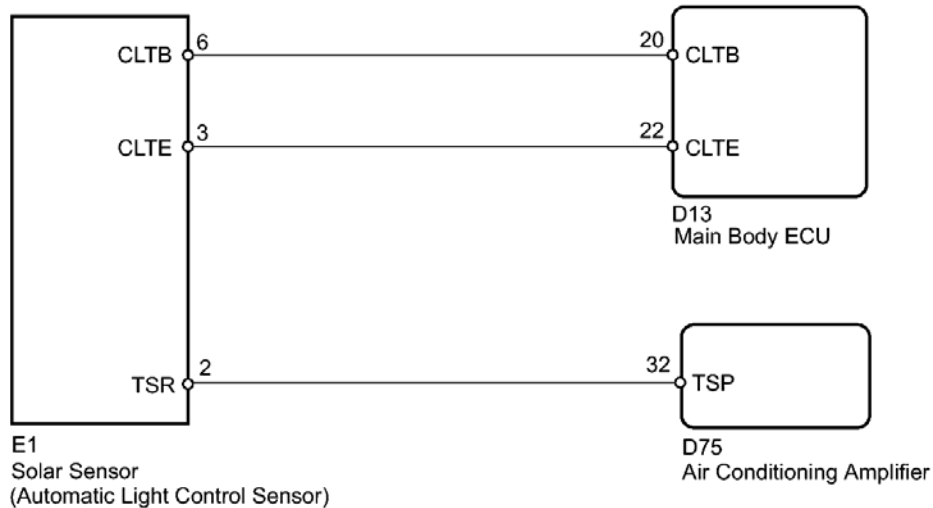


Fig. 36: Front Passenger Side Solar Sensor Circuit - Wiring Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

HINT:

If DTC B1244 is output together with other DTCs, troubleshoot DTC B1244 first. Refer to **DTC B1244: Light Sensor Circuit Malfunction** .

PROCEDURE

1. READ VALUE USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Air Conditioner / Data List.
- Check the value(s) by referring to the table below.

AIR CONDITIONER

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
		Passenger	

Solar Sensor (P Side)	Passenger side solar sensor / Min.: 0 Max.: 255	side solar sensor value increases as brightness increases	-
-----------------------	---	---	---

OK

The display is as specified in the Normal Condition column.

RESULT

Result	Proceed to
NG	A
OK (When troubleshooting according to Problem Symptoms Table)	B
OK (When troubleshooting according to the DTC)	C

B --> See step 6

C --> See step 7

A: Go to next step

2. CHECK HARNESS AND CONNECTOR (POWER SOURCE CIRCUIT)

- Disconnect the solar sensor connector.

*a

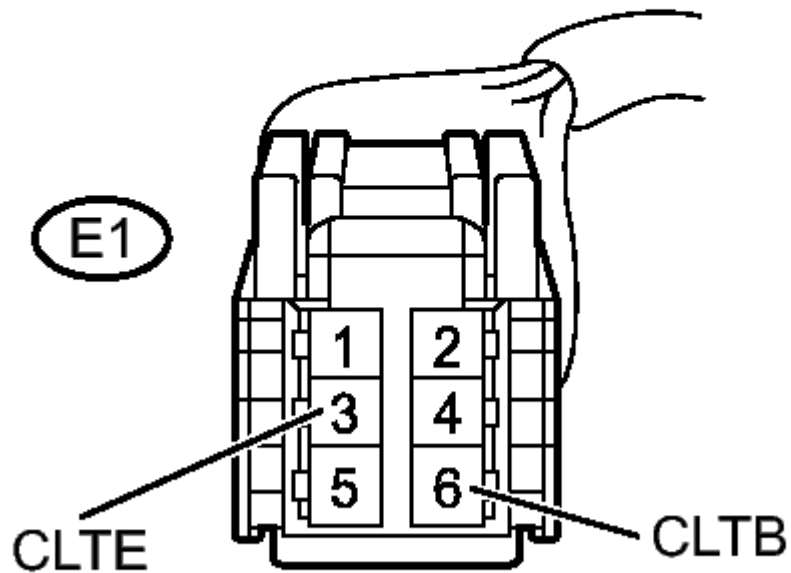


Fig. 37: Checking Harness And Connector (Power Source Circuit)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
E1-6 (CLTB) - E1-3 (CLTE)	Ignition switch off	Below 1 V
E1-6 (CLTB) - E1-3	Ignition switch	11 to 14 V

(CLTE)	ON	
--------	----	--

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Solar Sensor)
----	--

NG --> See step 5

OK: Go to next step

3. CHECK HARNESS AND CONNECTOR (SOLAR SENSOR - AIR CONDITIONING AMPLIFIER)

- Disconnect the solar sensor connector.
- Disconnect the air conditioning amplifier connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D75-32 (TSP) - E1- 2 (TSR)	Always	Below 1 ohms
D75-32 (TSP) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

4. INSPECT SOLAR SENSOR

- Remove the solar sensor.

*a

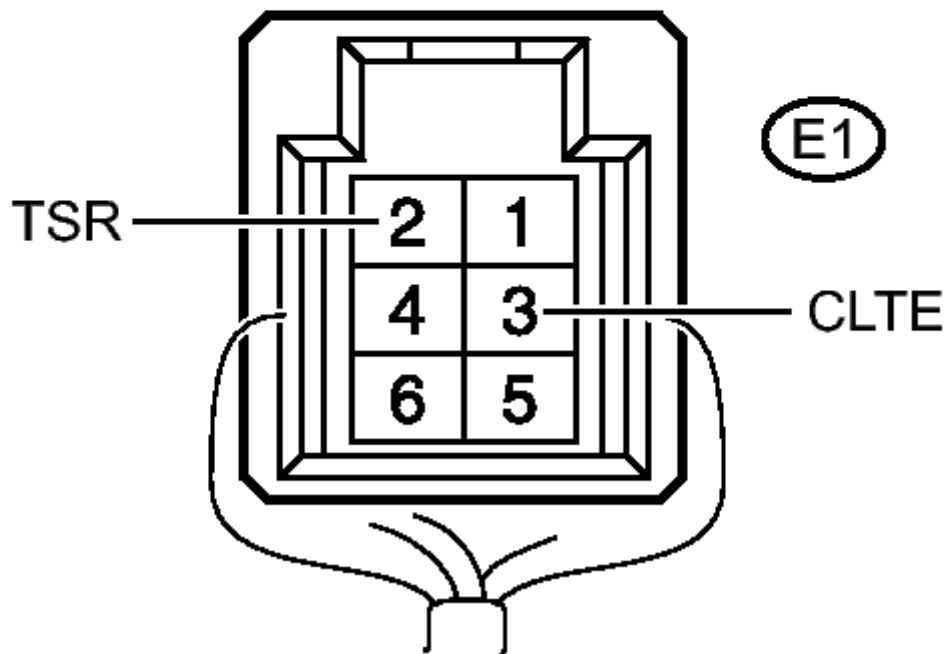


Fig. 38: Measuring Voltage Of Solar Sensor
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Reconnect the solar sensor connector.
- c. Turn the ignition switch to ON.
- d. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Condition	Specified Condition
E1-2 (TSR) - E1-3 (CLTE)	Sensor is subjected to electric light	0.8 to 4.3 V

E1-2 (TSR) - E1-3 (CLTE)	Sensor is covered with a cloth	Below 0.8 V
--------------------------------	---	----------------

NOTE:

- The connection procedure for using a digital tester such as a TOYOTA electrical tester is shown above. When using an analog tester, connect the negative (-) lead to terminal 1 and the positive (+) lead to terminal 6 of the solar sensor.
- While using the battery during inspection, do not bring the positive and negative tester probes too close to each other as a short circuit may occur.

HINT:

- Use an incandescent light for inspection. Bring it within about 30 cm (11.8 in.) of the solar sensor.
- As the inspection light is moved away from the sensor, the voltage decreases.

TEXT IN ILLUSTRATION

*a	Component with harness connected (Solar Sensor)
----	--

NG --> See step 8

OK --> See step 7

5. CHECK HARNESS AND CONNECTOR (MAIN BODY ECU - SOLAR SENSOR)

- Disconnect the main body ECU connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D13-20 (CLTB) - E1-6 (CLTB)	Always	Below 1 ohms
D13-22 (CLTE) -		Below 1

E1-3 (CLTE)	Always	ohms
D13-20 (CLTB) - Body ground	Always	10 kohms or higher
D13-22 (CLTE) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 9

- 6. PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
- 7. REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL**
- 8. REPLACE SOLAR SENSOR. Refer to REMOVAL**
- 9. REPLACE MAIN BODY ECU. Refer to REMOVAL**

CIRCUIT TESTS

Air Conditioning Control Panel Circuit

DESCRIPTION

This circuit consists of the air conditioning control assembly and the air conditioning amplifier. When the air conditioning control assembly is operated, signals are transmitted to the air conditioning amplifier through the LIN communication system.

If the LIN communication system malfunctions, the air conditioning amplifier does not operate even if the air conditioning control assembly is operated.

WIRING DIAGRAM

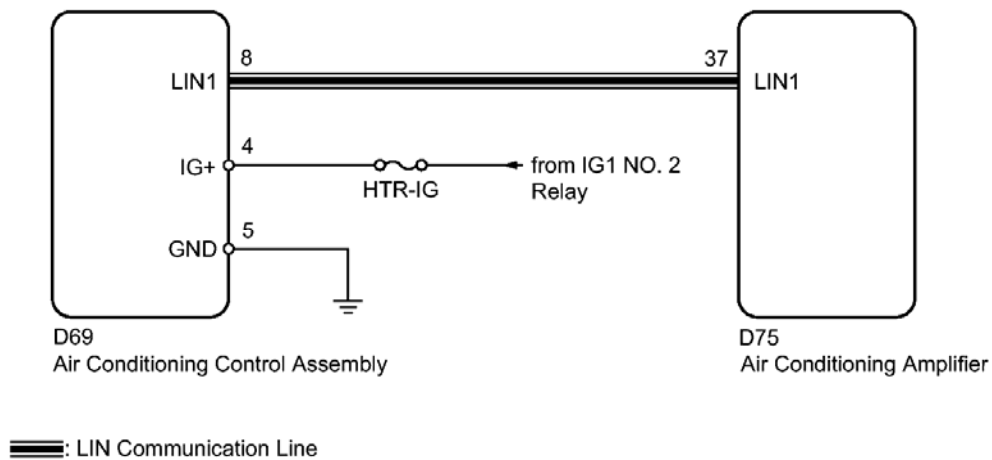


Fig. 39: Air Conditioning Control Panel Circuit - Wiring Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. **CHECK HARNESS AND CONNECTOR (AIR CONDITIONING CONTROL ASSEMBLY - BODY GROUND)**
 - a. Disconnect the air conditioning control assembly connector.

*a

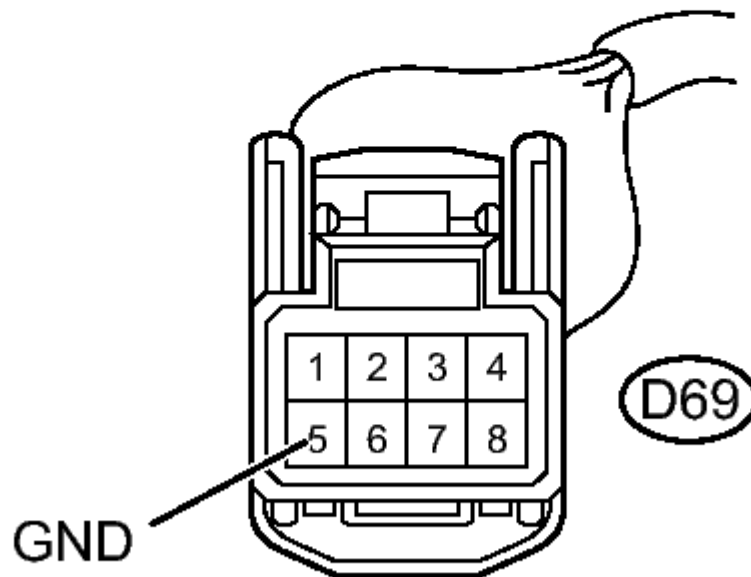


Fig. 40: Checking Harness And Connector (Air Conditioning Control Assembly - Body Ground)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D69-5 (GND) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Air Conditioning Control Assembly)
----	--

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

2. CHECK HARNESS AND CONNECTOR (AIR CONDITIONING CONTROL ASSEMBLY - BATTERY)

- a. Measure the voltage according to the value(s) in the table below.

*a

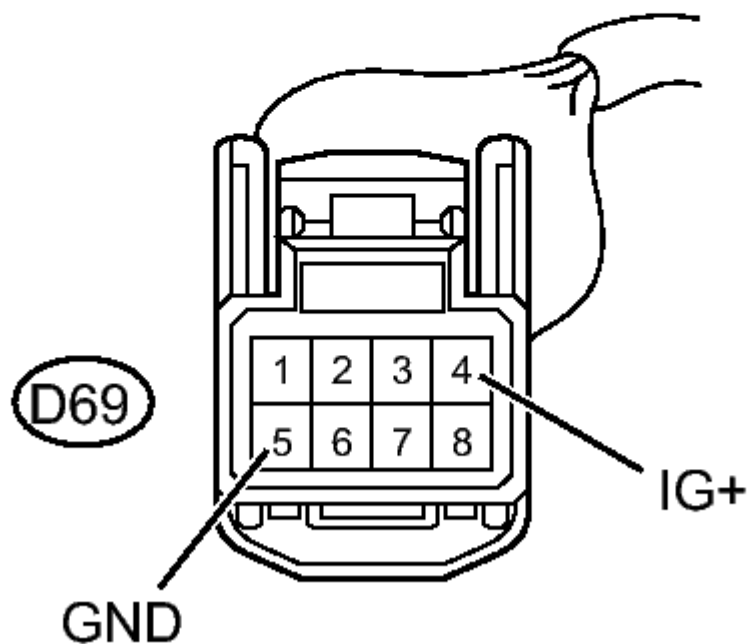


Fig. 41: Checking Harness And Connector (Air Conditioning Control Assembly - Battery)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
D69-4 (IG+) - D69-5 (GND)	Ignition switch ON	11 to 14 V

TEXT IN ILLUSTRATION

Front view of wire harness

*a	connector (to Air Conditioning Control Assembly)
----	--

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

3. CHECK HARNESS AND CONNECTOR (AIR CONDITIONING AMPLIFIER - AIR CONDITIONING CONTROL ASSEMBLY)

- Disconnect the air conditioning amplifier connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D75-37 (LIN1) - D69-8 (LIN1)	Always	Below 1 ohms
D75-37 (LIN1) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

4. INSPECT AIR CONDITIONING CONTROL ASSEMBLY

- Replace the air conditioning control assembly. Refer to **REMOVAL** .

HINT:

Since the air conditioning control assembly cannot be inspected while it is removed from the vehicle, replace the air conditioning control assembly with a new or a known good one and check that the condition returns to normal.

- Operate the air conditioning control assembly to check that it functions properly.

RESULT

Result	Proceed
--------	---------

	to
Air conditioning control assembly malfunctions	A
Air conditioning control assembly functions properly	B

B --> See step 5

A --> See step 6

5. **REPLACE AIR CONDITIONING CONTROL ASSEMBLY. Refer to REMOVAL**
6. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**

Blower Motor Circuit

DESCRIPTION

The blower motor is operated by signals from the air conditioning amplifier. Blower motor speed signals are transmitted in accordance with changes in the duty ratio.

WIRING DIAGRAM

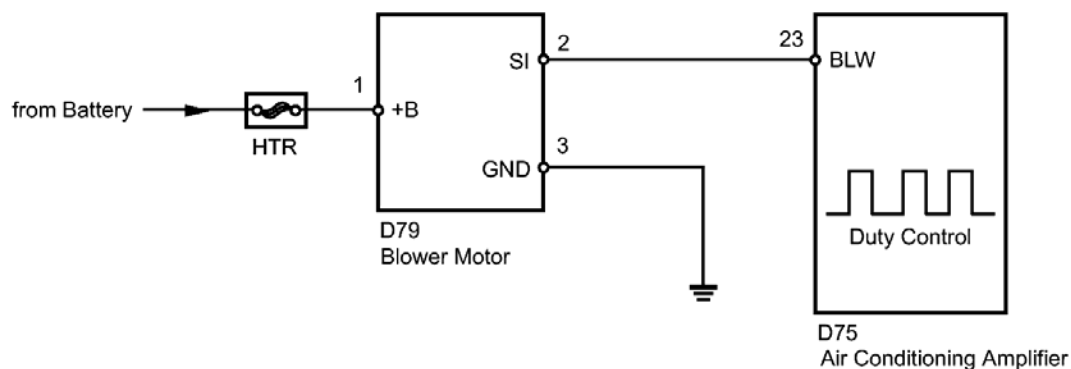


Fig. 42: Blower Motor Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. PERFORM ACTIVE TEST USING TECHSTREAM

- a. Connect the Techstream to the DLC3.
- b. Turn the ignition switch to ON.
- c. Turn the Techstream on.
- d. Enter the following menus: Body Electrical / Air Conditioner / Active Test.
- e. Check the operation by referring to the table below.

AIR CONDITIONER

Tester Display	Test Part	Control Range	Diagnostic Note
Blower Motor	Blower motor	Min.: 0, Max.: 31	-

OK

Blower motor operates and blower motor speed level changes.

RESULT

Result	Proceed to
OK	A
NG (Blower motor does not operate)	B
NG (Blower motor operates but does not change speed)	C

B --> See step 3

C --> See step 7

A --> See step 2

2. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
3. **CHECK HARNESS AND CONNECTOR (BLOWER MOTOR - BODY GROUND)**
 - a. Disconnect the blower motor connector.

*a

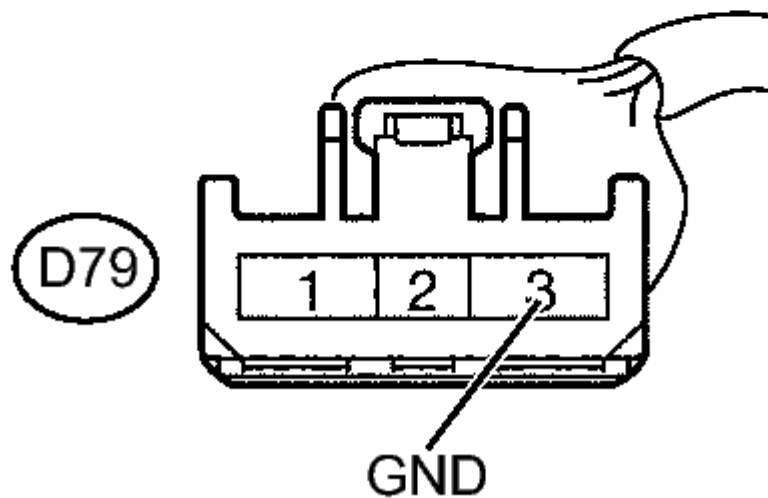


Fig. 43: Checking Harness And Connector (Blower Motor - Body Ground)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D79-3 (GND) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Blower Motor)
----	---

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

4. CHECK HARNESS AND CONNECTOR (BLOWER MOTOR - BATTERY)

- a. Measure the voltage according to the value(s) in the table below.

*a

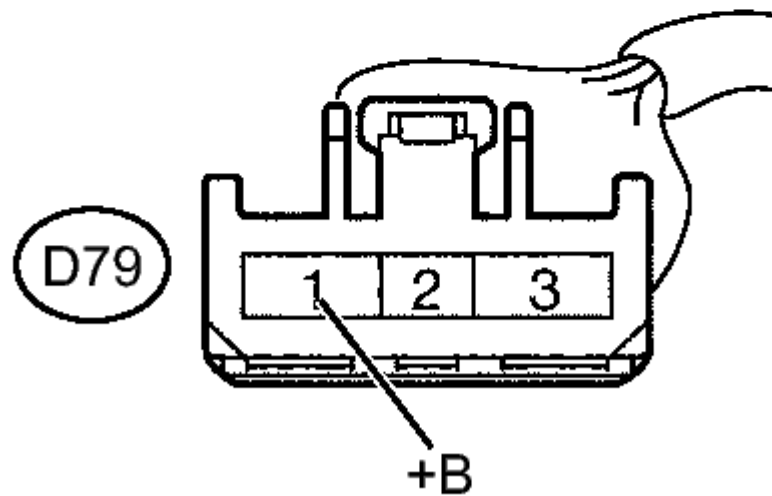


Fig. 44: Checking Harness And Connector (Blower Motor - Battery)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Voltage

Tester Connection	Condition	Specified Condition
D79-1 (+B) - Body ground	Always	11 to 14 V

TEXT IN ILLUSTRATION

Front view of wire harness

*a	connector (to Blower Motor)
----	--------------------------------------

NG --> **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK: Go to next step

5. CHECK HARNESS AND CONNECTOR (BLOWER MOTOR - AIR CONDITIONING AMPLIFIER)

- Disconnect the air conditioning amplifier connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D75-23 (BLW) - D79-2 (SI)	Always	Below 1 ohms
D75-23 (BLW) - Body ground	Always	10 kohms or higher

NG --> **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK: Go to next step

6. INSPECT BLOWER MOTOR

- Reconnect the blower motor connector.
- Measure the voltage according to the value(s) in the table below.

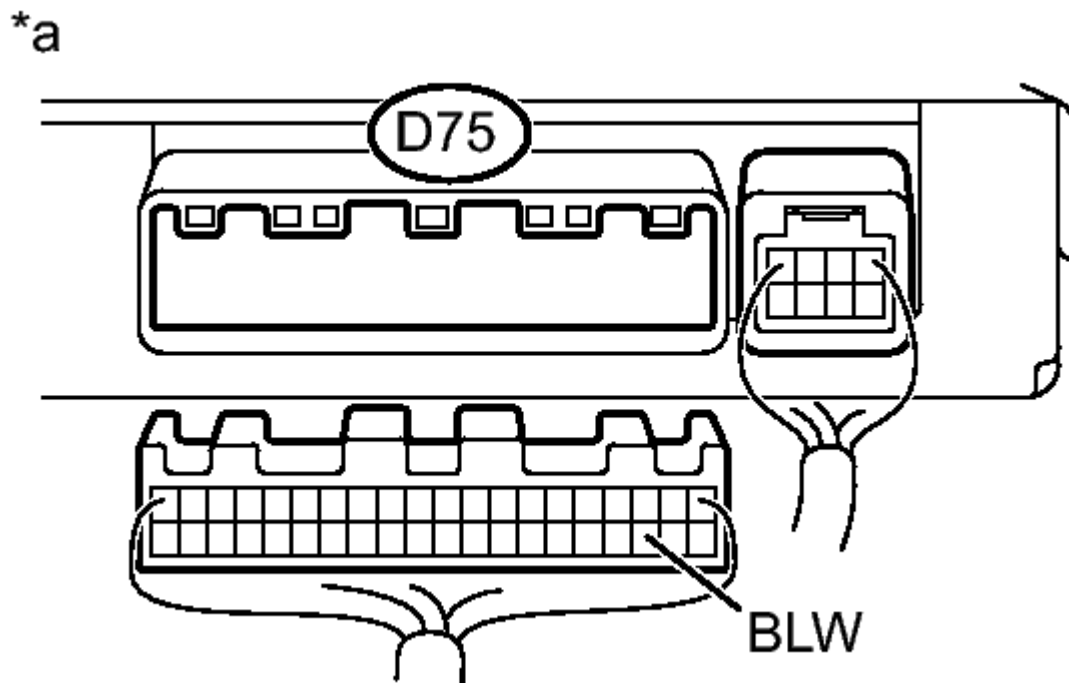


Fig. 45: Measuring Voltage Of Blower Motor
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Voltage

Tester Connection	Condition	Specified Condition
D75-23 (BLW) - Body ground	Always	4.5 to 5.5 V

TEXT IN ILLUSTRATION

*a	Rear view of wire harness connector (to Air Conditioning Amplifier)
-----------	---

NG --> See step 8

OK: Go to next step

7. INSPECT AIR CONDITIONING AMPLIFIER

- Remove the air conditioning amplifier.

*a

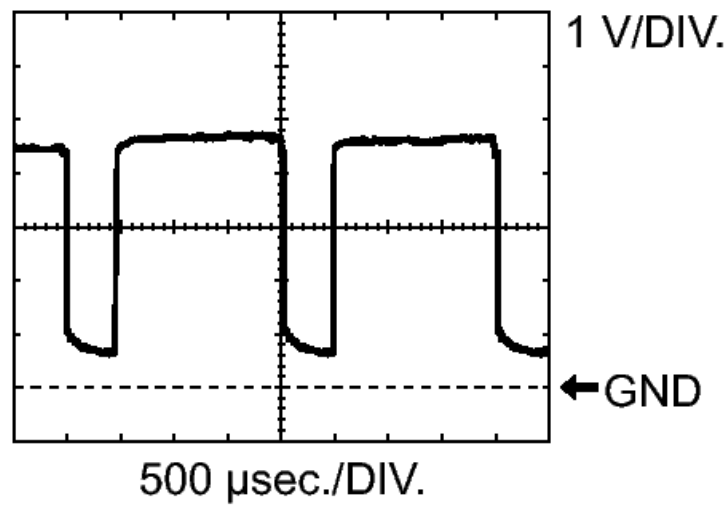
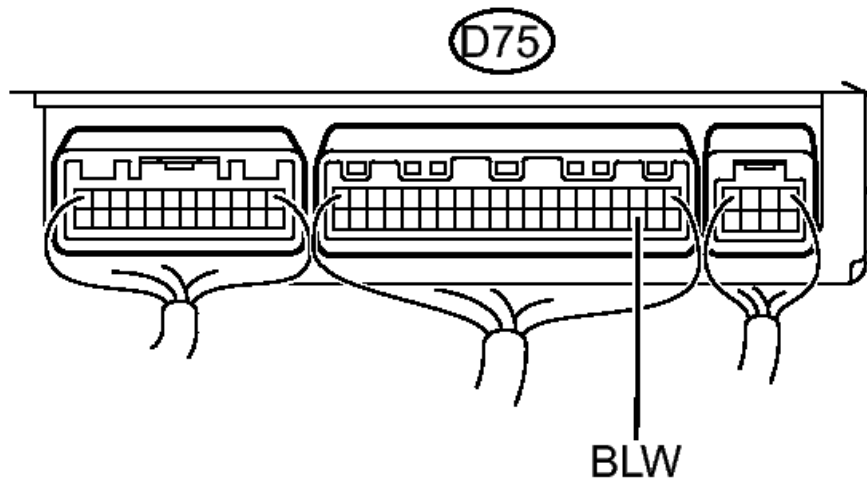


Fig. 46: Checking Air Conditioning Amplifier With Waveform Reference
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Reconnect the air conditioning amplifier connector.
- c. Turn the ignition switch to ON.

- d. Turn the blower switch LO.
- e. Measure the waveform between terminal D75-23 (BLW) of the air conditioning amplifier and body ground.

Item	Content
Tool setting	1 V/DIV., 500 μs/DIV.
Vehicle condition	Ignition switch ON Blower switch LO

OK

Waveform is as shown in the illustration above.

HINT:

The waveform varies with the blower speed.

TEXT IN ILLUSTRATION

*a	Component with harness connected (Air Conditioning Amplifier)
----	---

NG --> See step 9

OK --> See step 8

8. REPLACE BLOWER MOTOR. Refer to REMOVAL

9. REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL

Air Conditioning Compressor Magnetic Clutch Circuit

DESCRIPTION

When the air conditioning amplifier is turned on, a magnet clutch ON signal is sent from the MGC terminal of the air conditioning amplifier. Then, the magnet-clutch relay turns on to operate the magnet clutch.

WIRING DIAGRAM

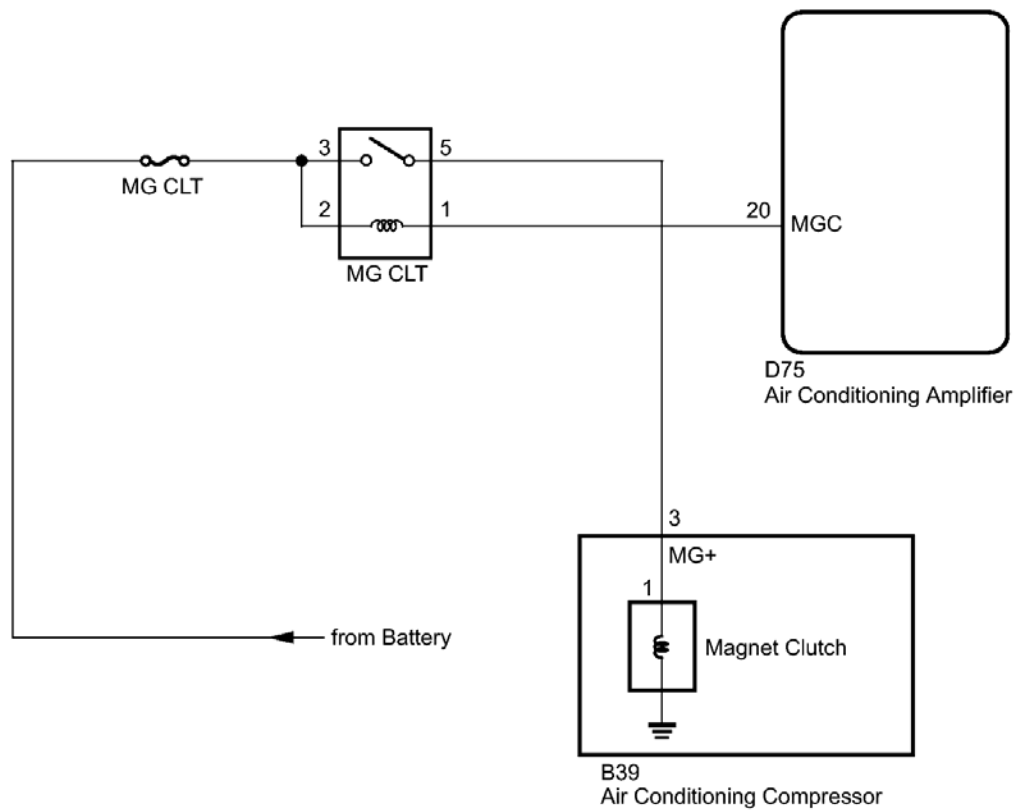


Fig. 47: Air Conditioning Compressor Magnetic Clutch Circuit Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: Inspect the fuses for circuits related to this system before performing the following inspection.

PROCEDURE

1. CHECK CAN COMMUNICATION SYSTEM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Select "Communication Bus Check"

OK

All ECUs and sensors connected to the CAN communication system are displayed.

NG --> See step 12

OK: Go to next step

2. PERFORM ACTIVE TEST USING TECHSTREAM (MAGNETIC CLUTCH RELAY)

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Air Conditioner / Active Test.
- Check that the relays operate.

AIR CONDITIONER

Tester Display	Test Part	Control Range	Diagnostic Note
Magnetic Clutch Relay	A/C compressor	OFF, ON	-

OK

The magnet clutch operates normally.

NG --> See step 4

OK: Go to next step

3. READ VALUE USING TECHSTREAM (A/C SIGNAL)

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Data List.
- Check the value(s) by referring to the table below.

ENGINE

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
A/C Signal	A/C Signal / ON, OFF	ON: A/C ON OFF: A/C OFF	-

OK

The display is as specified in the normal condition.

NG --> See step 11

OK --> See step 13

4. **INSPECT MAGNET-CLUTCH RELAY**

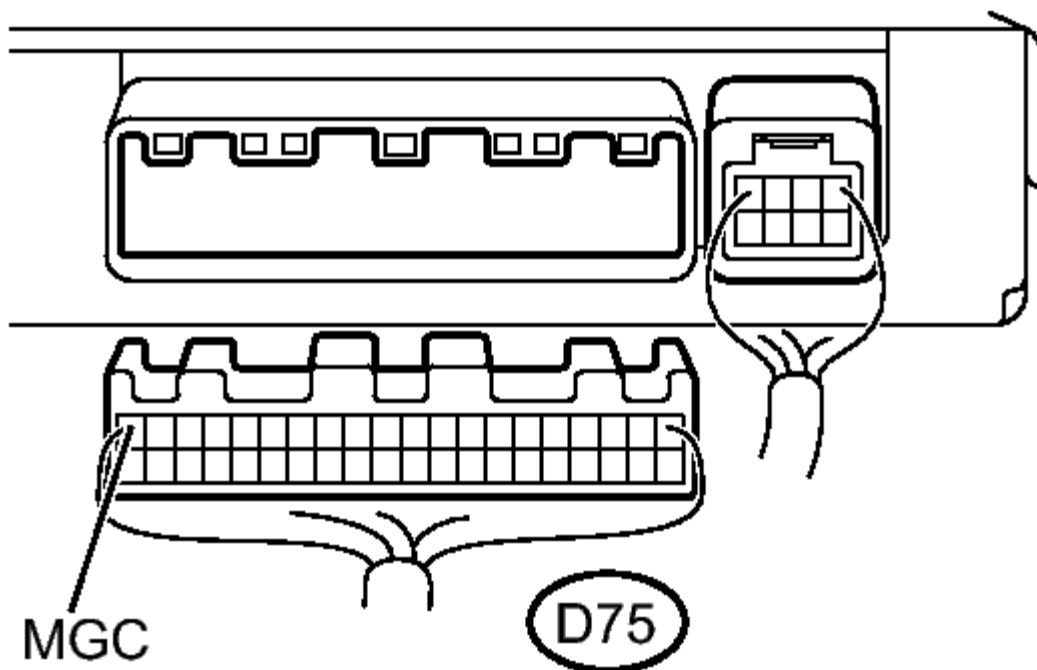
- a. Inspect the magnet-clutch relay. Refer to ON-VEHICLE INSPECTION .

NG --> **REPLACE MAGNET-CLUTCH RELAY**

OK: Go to next step

5. **CHECK HARNESS AND CONNECTOR (MGC CIRCUIT)**

*a



H

Fig. 48: Checking Harness And Connector (MGC Circuit)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- a. Disconnect the air conditioning amplifier connector.
- b. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
D75-20 (MGC) - Body ground	Always	11 to 14 V

TEXT IN ILLUSTRATION

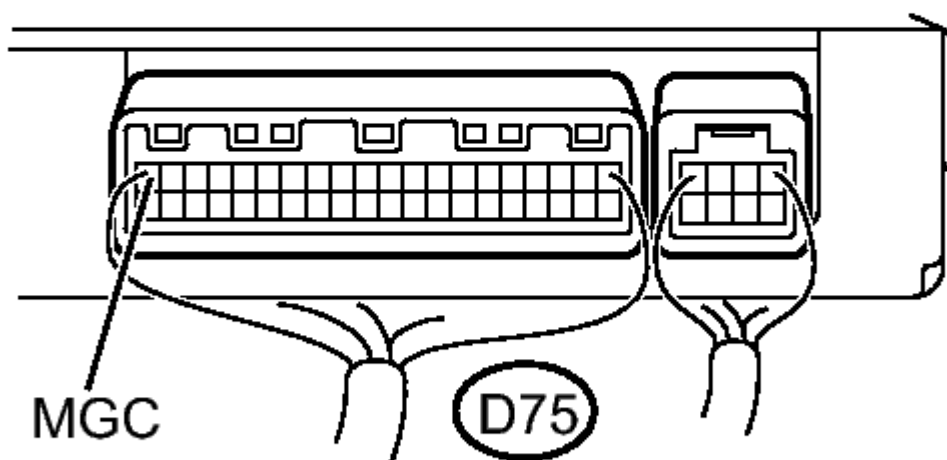
*a	Rear view of wire harness connector (to Air Conditioning Amplifier)
----	---

NG --> See step 10

OK: Go to next step

6. INSPECT AIR CONDITIONING AMPLIFIER (MGC VOLTAGE)

*a



H

Fig. 49: Measuring The Voltage Of Air Conditioning Amplifier (MGC Voltage)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- Remove the air conditioning amplifier with its connectors still connected. Refer to **REMOVAL** .
- Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
D75-20 (MGC) - Body ground	Engine running and A/C switch on	Below 1 V
	Engine	

	running and A/C switch off	11 to 14 V
--	----------------------------------	------------

TEXT IN ILLUSTRATION

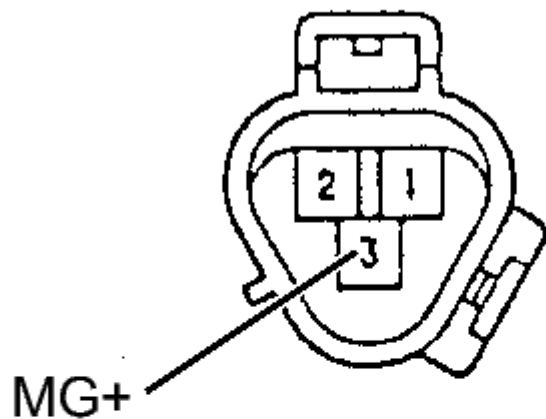
*a	Component with harness connected (Air Conditioning Amplifier)
----	--

NG --> See step 14

OK: Go to next step

7. INSPECT AIR CONDITIONING COMPRESSOR (COMPRESSOR HARNESS)

*a



*b



Fig. 50: Inspecting Air Conditioning Compressor Connector (Compressor Harness)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- Disconnect the air conditioning compressor connector.
- Disconnect the magnet clutch connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
3 (MG+) - 1	Always	Below 1 ohms
3 (MG+) - Body	Always	10 kohms or higher

ground		
--------	--	--

TEXT IN ILLUSTRATION

*a	Component without harness connected (Air Conditioning Compressor)
*b	Component without harness connected (Magnet Clutch)

NG --> See step 15

OK: Go to next step

8. INSPECT MAGNET CLUTCH

- Measure the resistance according to the value(s) in the table below.

*a

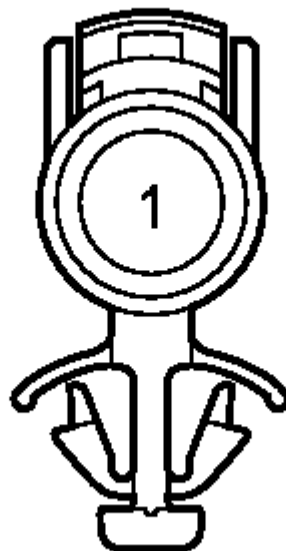


Fig. 51: Measuring Resistance Of Magnet Clutch
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Resistance

Tester Connection	Condition	Specified Condition
1 - Body ground	Always	3.4 to 3.8 ohms

TEXT IN ILLUSTRATION

*a	Component without harness connected (Magnet Clutch)
----	---

- b. When connector terminal 1 is connected to the positive (+) battery terminal, check that the following occurs: 1) the magnet clutch operating sound can be heard, and 2) the magnet clutch hub and rotor lock.

NG --> See step 15

OK: Go to next step

9. CHECK HARNESS AND CONNECTOR (AIR CONDITIONING COMPRESSOR - MAGNET-CLUTCH RELAY)

- a. Disconnect the air conditioning compressor connector.
- b. Remove the magnet-clutch relay (MG CLT relay) from engine room relay block.
- c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
B39-3 (MG+) - MG CLT relay holder 5	Always	Below 1 ohms
B39-3 (MG+) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 14

10. **CHECK HARNESS AND CONNECTOR (MAGNET-CLUTCH RELAY - BATTERY)**

- a. Remove the magnet-clutch relay from the engine room relay block.

*a

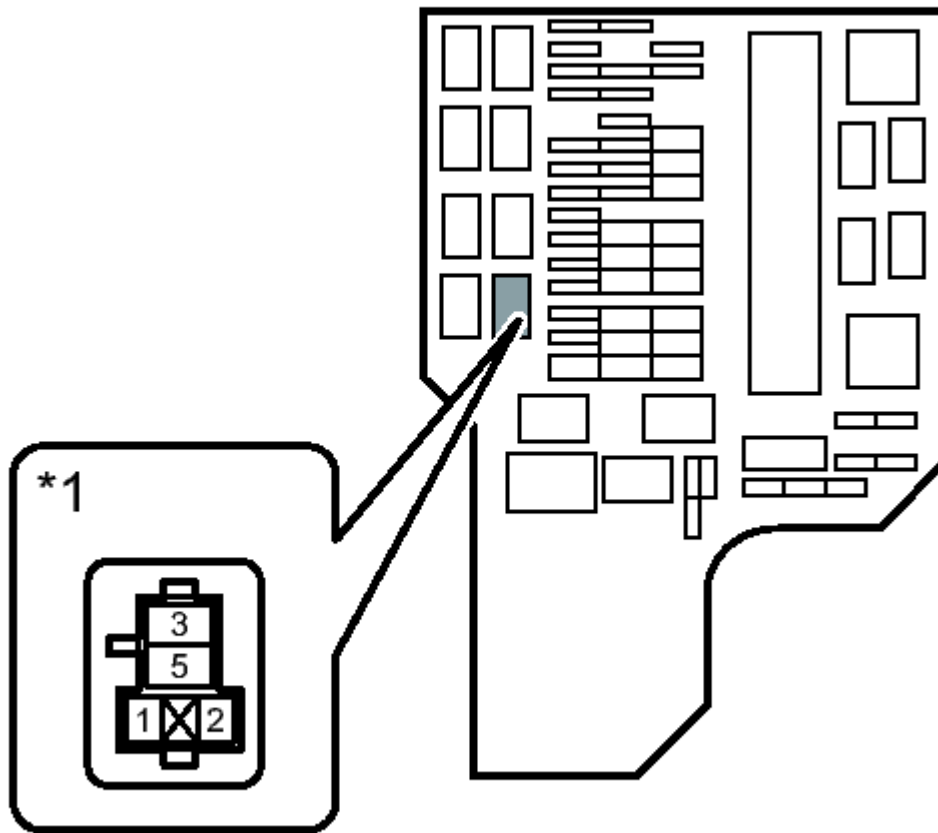


Fig. 52: Checking Harness And Connector (Magnet-Clutch Relay - Battery)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Condition	Specified Condition
MG CLT		

relay holder 2 - Body ground	Always	11 to 14 V
MG CLT relay holder 3 - Body ground	Always	11 to 14 V

TEXT IN ILLUSTRATION

*1	Magnet- clutch Relay Holder (MG CLT Relay)
*a	Component without relay installed (Engine Room Relay Block)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> REPAIR OR REPLACE HARNESS OR CONNECTOR (AIR CONDITIONING AMPLIFIER - MAGNET-CLUTCH RELAY)

11. REPLACE AIR CONDITIONING AMPLIFIER

- Replace the air conditioning amplifier with a normal one. Refer to **REMOVAL** .
- Check that the condition returns to normal.

OK

Same problem does not occur.

NG --> See step 16

OK --> END (AIR CONDITIONING AMPLIFIER WAS DEFECTIVE)

12. GO TO CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING

13. PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE

14. REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL

15. **REPLACE AIR CONDITIONING COMPRESSOR.** Refer to REMOVAL

16. **REPLACE ECM.** Refer to REMOVAL

Rear Air Conditioning Control Panel Circuit

DESCRIPTION

This circuit consists of the No. 2 air conditioning control assembly and the air conditioning amplifier. When the No. 2 air conditioning control assembly is operated, signals are transmitted to the air conditioning amplifier through the LIN communication system.

If the LIN communication system malfunctions, the air conditioning amplifier does not operate even if the No. 2 air conditioning control assembly is operated.

WIRING DIAGRAM

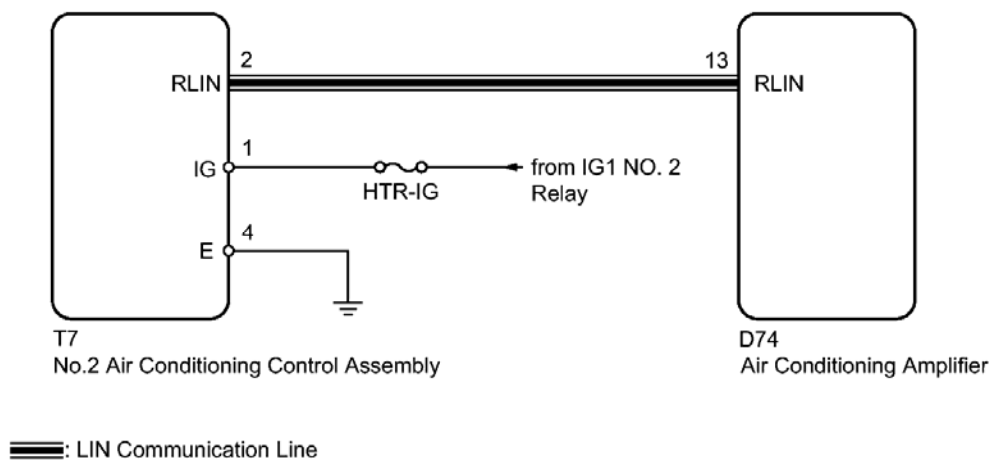


Fig. 53: Rear Air Conditioning Control Panel Circuit - Wiring Diagram

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. **CHECK HARNESS AND CONNECTOR (NO. 2 AIR CONDITIONING CONTROL ASSEMBLY - BODY GROUND)**
 - a. Disconnect the No. 2 air conditioning control assembly connector.

*a

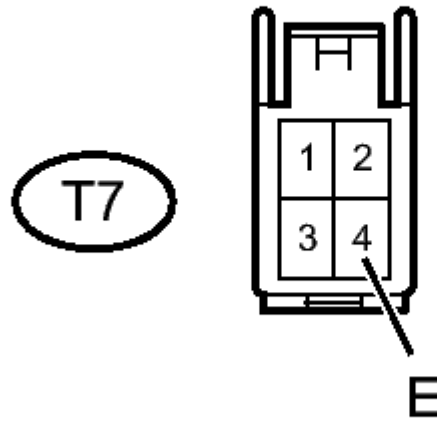


Fig. 54: Checking Harness And Connector (No. 2 Air Conditioning Control Assembly - Body Ground)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
T7-4 (E) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to No. 2 Air Conditioning Control Assembly)
----	---

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

2. **CHECK HARNESS AND CONNECTOR (NO. 2 AIR CONDITIONING CONTROL ASSEMBLY - BATTERY)**

- a. Measure the voltage according to the value(s) in the table below.

*a

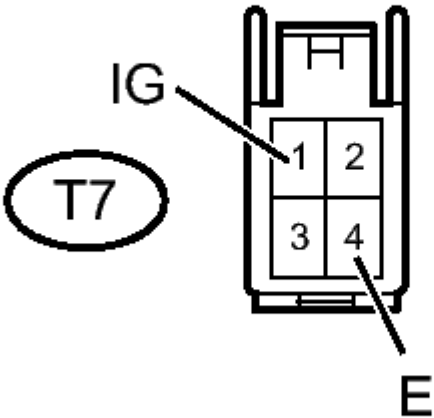


Fig. 55: Checking Harness And Connector (No. 2 Air Conditioning Control Assembly - Battery)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
T7-1 (IG) - T7-4 (E)	Ignition switch ON	11 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to No. 2 Air Conditioning Control Assembly)
----	---

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

3. **CHECK HARNESS AND CONNECTOR (NO. 2 AIR CONDITIONING CONTROL ASSEMBLY - AIR CONDITIONING AMPLIFIER)**

- a. Disconnect the No. 2 air conditioning amplifier connector.
- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D74-13 (RLIN) - T7-2 (RLIN)	Always	Below 1 ohms
D74-13 (RLIN) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

4. **INSPECT NO. 2 AIR CONDITIONING CONTROL ASSEMBLY**

- a. Replace the No. 2 air conditioning control assembly. Refer to **REMOVAL** .

HINT:

Since the air conditioning control assembly cannot be inspected while it is removed from the vehicle, replace the air conditioning control assembly with a new or a known good one and check that the condition returns to normal.

- b. Operate the air conditioning control assembly to check that it functions properly.

RESULT

Result	Proceed to
No. 2 air conditioning control assembly malfunctions	A

No. 2 air conditioning control assembly functions properly	B
---	---

B --> See step 6

A --> See step 5

5. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
6. **REPLACE NO. 2 AIR CONDITIONING CONTROL ASSEMBLY. Refer to REMOVAL**

PTC Heater Circuit

DESCRIPTION

PTC heater relays are closed in accordance with signals from the air conditioning amplifier assembly and power is supplied to the quick heater assembly installed on the heater radiator unit.

WIRING DIAGRAM

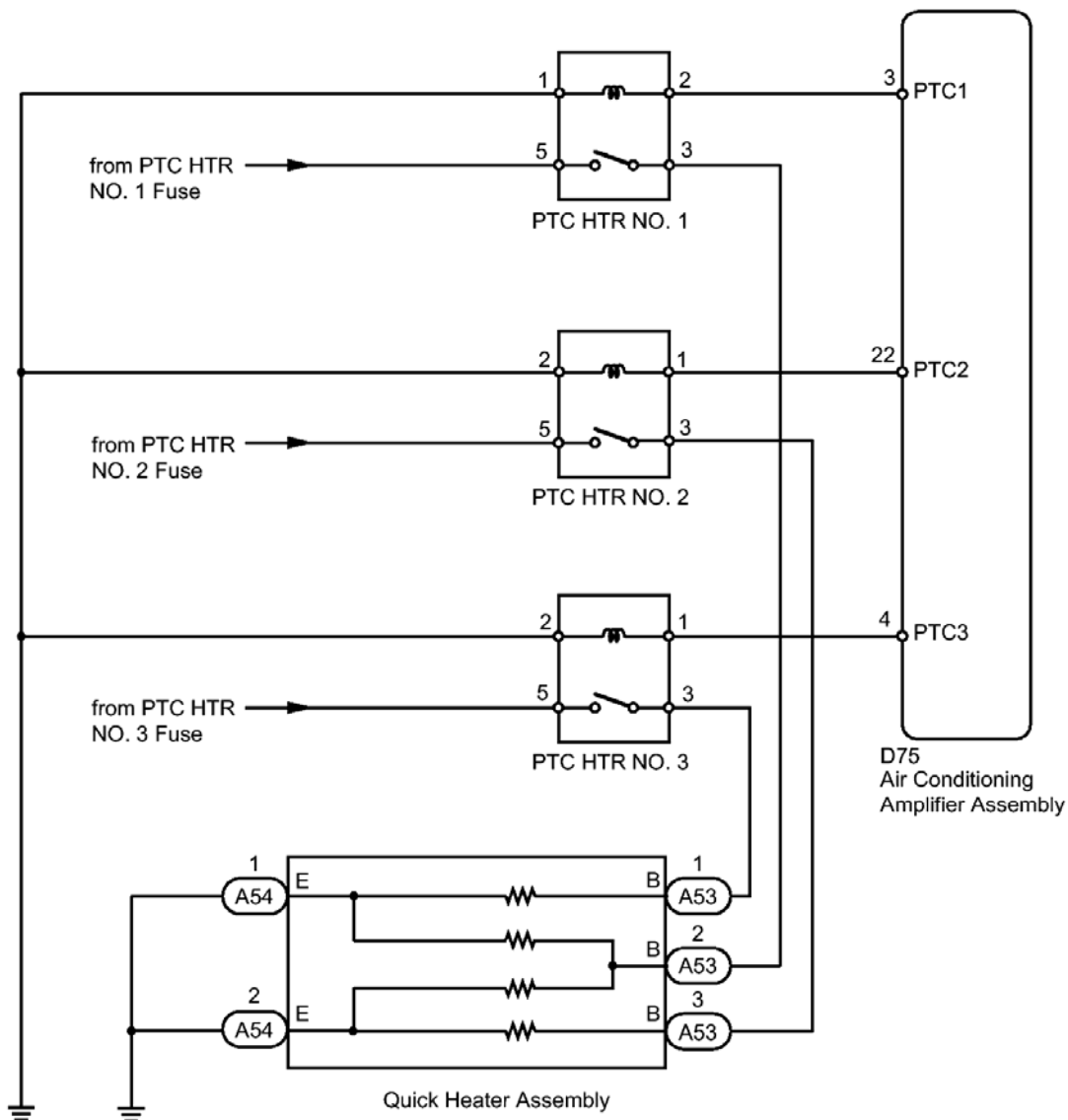


Fig. 56: PTC Heater Circuit - Wiring Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. INSPECT PTC HTR NO. 1 RELAY

- Remove the PTC HTR NO. 1 relay from the engine room relay block.

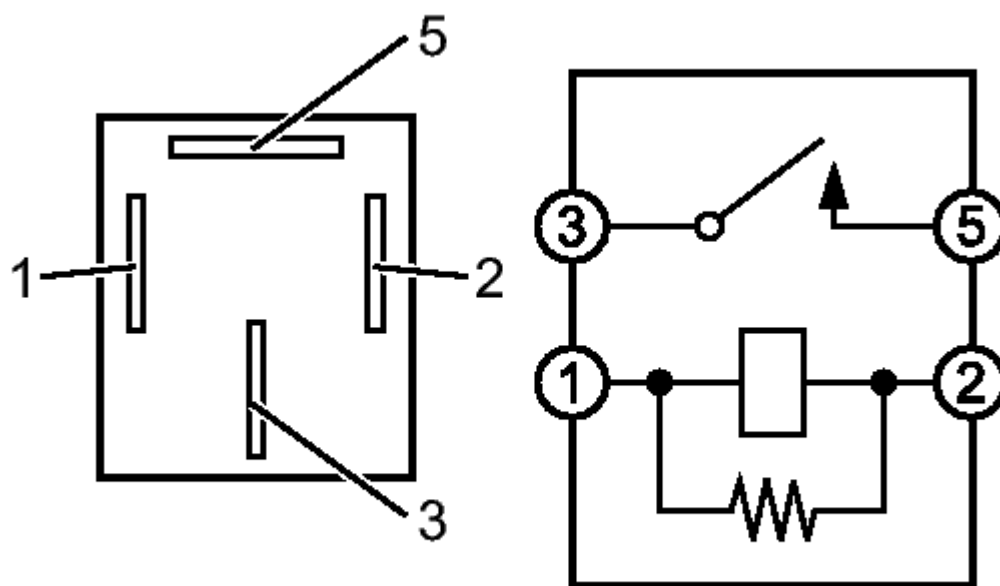


Fig. 57: Measuring Resistance Of PTC HTR No. 1 Relay
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
3 - 5	Battery voltage not applied	10 kohms or higher
	Battery voltage applied to terminals 1 and 2	Below 1 ohms

NG --> REPLACE PTC HTR NO. 1 RELAY

OK: Go to next step

2. INSPECT PTC HTR NO. 2 RELAY AND PTC HTR NO. 3 RELAY

- a. Remove the PTC HTR NO. 2 relay and PTC HTR NO. 3 relay from engine room relay block.

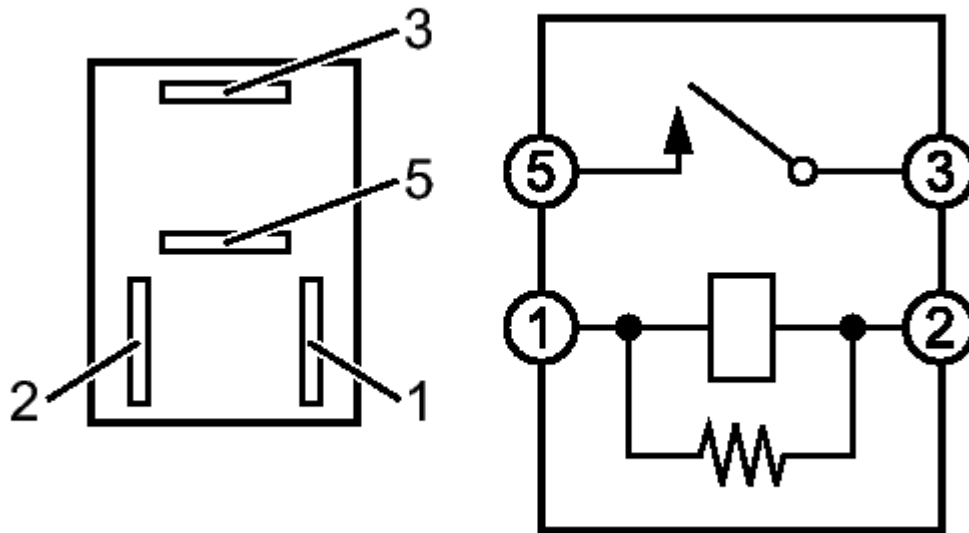


Fig. 58: Measuring Resistance Of PTC HTR No. 2 Relay And PTC HTR No. 3 Relay
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
3 - 5	Battery voltage not applied	10 kohms or higher
	Battery voltage applied to terminals 1 and 2	Below 1 ohms

NG --> REPLACE PTC HTR NO. 2 RELAY OR PTC HTR NO. 3 RELAY

OK: Go to next step

3. CHECK AIR CONDITIONING AMPLIFIER ASSEMBLY

- a. Remove the air conditioning amplifier assembly with its connectors still connected. Refer to **REMOVAL** .

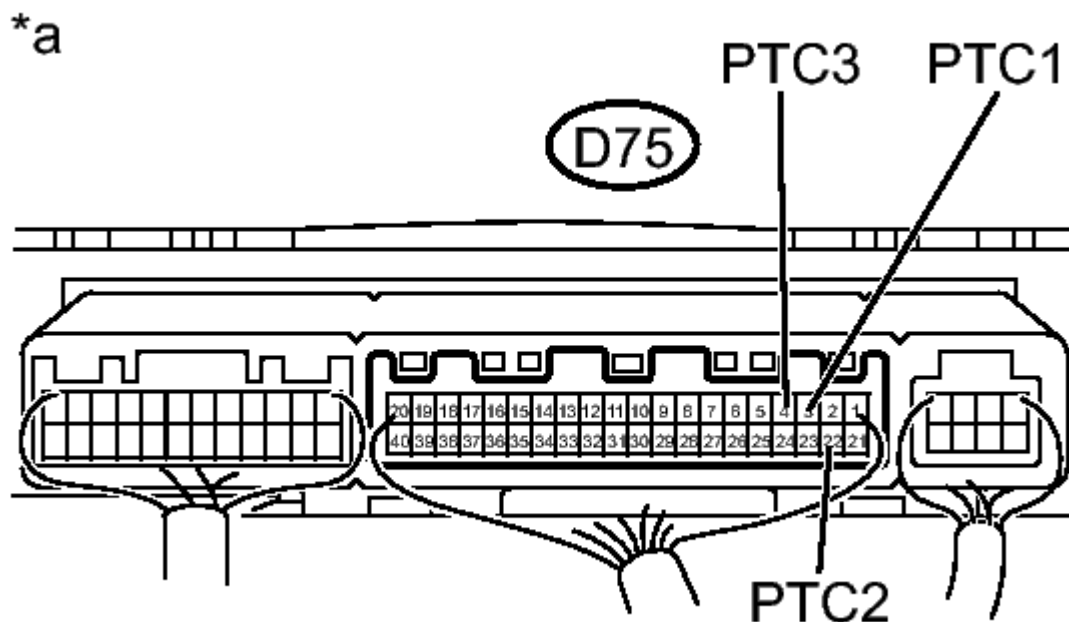


Fig. 59: Checking Air Conditioning Amplifier Assembly
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Condition	Specified Condition
D75-3 (PTC1) - Body ground	• Engine running (1250 RPM or more) • Temperature setting MAX HOT • Outside temperature 10°C (50°F) or less • Engine coolant temperature 75°C (167°F) or less • Headlight	

	dimmer switch off • Blower switch off	
D75-22 (PTC2) - Body ground	• Engine running (1250 RPM or more) • Temperature setting MAX HOT • Outside temperature 10°C (50°F) or less • Engine coolant temperature 70°C (158° F) or less • Headlight dimmer switch off • Blower switch off	Below 1 V*
D75-4 (PTC3) - Body ground	• Engine running (1250 RPM or more) • Temperature setting MAX HOT • Outside temperature 10°C (50°F) or less • Engine coolant temperature 65°C (149° F) or less • Headlight dimmer switch off	

	• Blower switch off	
D75-3 (PTC1) - Body ground	• Engine running (1250 RPM or more) • Temperature setting MAX HOT • Outside temperature 10°C (50°F) or less • Engine coolant temperature 75°C (167°F) or less • Headlight dimmer switch off • Blower switch on	11 to 14 V*
D75-22 (PTC2) - Body ground	• Engine running (1250 RPM or more) • Temperature setting MAX HOT • Outside temperature 10°C (50°F) or less • Engine coolant temperature 70°C (158°F) or less • Headlight dimmer switch off • Blower switch on	

D75-4 (PTC3) - Body ground	• Engine running (1250 RPM or more) • Temperature setting MAX HOT • Outside temperature 10°C (50°F) or less • Engine coolant temperature 65°C (149°F) or less • Headlight dimmer switch off • Blower switch on	
-------------------------------------	---	--

TEXT IN ILLUSTRATION

*a	Component with harness connected (Air Conditioning Amplifier Assembly)
----	---

HINT:

*: After the measurement conditions are met, wait 30 seconds before performing measurements.

NG --> See step 13

OK: Go to next step

4. CHECK HARNESS AND CONNECTOR (ENGINE ROOM RELAY BLOCK - AIR CONDITIONING AMPLIFIER)

- Remove the PTC HTR NO. 1 relay from the engine room relay block.
- Disconnect the air conditioning amplifier connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
PTC HTR NO. 1 relay holder 2 - D75-3 (PTC1)	Always	Below 1 ohms
PTC HTR NO. 1 relay holder 2 - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

5. CHECK HARNESS AND CONNECTOR (ENGINE ROOM RELAY BLOCK - AIR CONDITIONING AMPLIFIER)

- Remove the PTC HTR NO. 2 and PTC HTR NO. 3 relays from the engine room relay block.
- Disconnect the air conditioning amplifier connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
PTC HTR NO. 2 relay holder 1 - D75-22 (PTC2)	Always	Below 1 ohms
PTC HTR NO. 3 relay holder 1 - D75-4 (PTC3)		
PTC HTR NO. 2 relay holder 1 - Body ground	Always	10 kohms or higher
PTC HTR		

NO. 3 relay holder 1 - Body ground		
---	--	--

NG --> **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK: Go to next step

6. CHECK HARNESS AND CONNECTOR (ENGINE ROOM RELAY BLOCK - QUICK HEATER ASSEMBLY (PTC HEATER))

- Remove the PTC HTR NO. 1 relay from the engine room relay block.
- Disconnect the quick heater assembly (PTC heater) connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
PTC HTR NO. 1 relay holder 3 - A53-2 (B)	Always	Below 1 ohms
PTC HTR NO. 1 relay holder 3 - Body ground	Always	10 kohms or higher

NG --> **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK: Go to next step

7. CHECK HARNESS AND CONNECTOR (ENGINE ROOM RELAY BLOCK - QUICK HEATER ASSEMBLY (PTC HEATER))

- Remove the PTC HTR NO. 2 and PTC HTR NO. 3 relays from the engine room relay block.
- Disconnect the quick heater assembly (PTC heater) connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
PTC HTR NO. 2 relay		

holder 3 - A53-3 (B)		
PTC HTR NO. 3 relay holder 3 - A53-1 (B)	Always	Below 1 ohms
PTC HTR NO. 2 relay holder 3 - Body ground	Always	10 kohms or higher
PTC HTR NO. 3 relay holder 3 - Body ground		

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

8. CHECK HARNESS AND CONNECTOR (ENGINE ROOM RELAY BLOCK - BATTERY AND BODY GROUND)

- a. Remove the PTC HTR NO. 1 relay from the engine room relay block.

*a

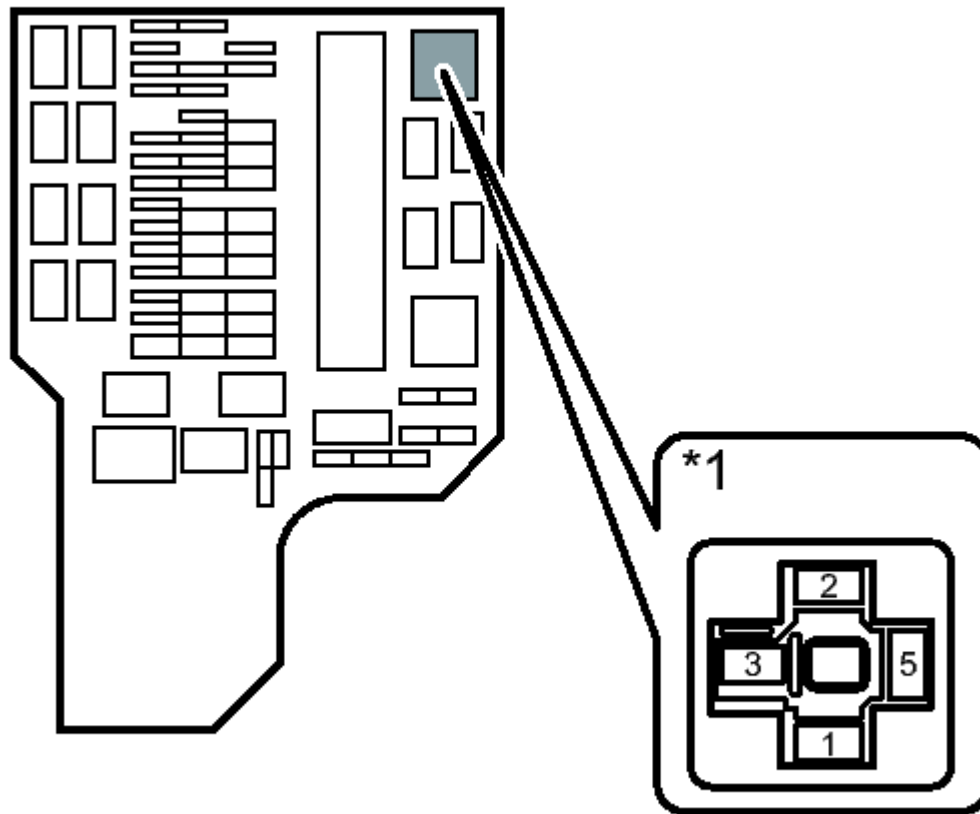


Fig. 60: Identifying PTC HTR No. 1 Relay
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Condition	Specified Condition
PTC HTR NO. 1 relay holder 5 - Body ground	Always	11 to 14 V

- c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
PTC HTR NO. 1 relay holder 1 - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*1	PTC HTR NO. 1 Relay Holder
*a	Component without relay installed (Engine Room Relay Block)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

9. CHECK HARNESS AND CONNECTOR (ENGINE ROOM RELAY BLOCK - BATTERY AND BODY GROUND)

- a. Remove the PTC HTR NO. 2 and PTC HTR NO. 3 relays from the engine room relay block.

*a

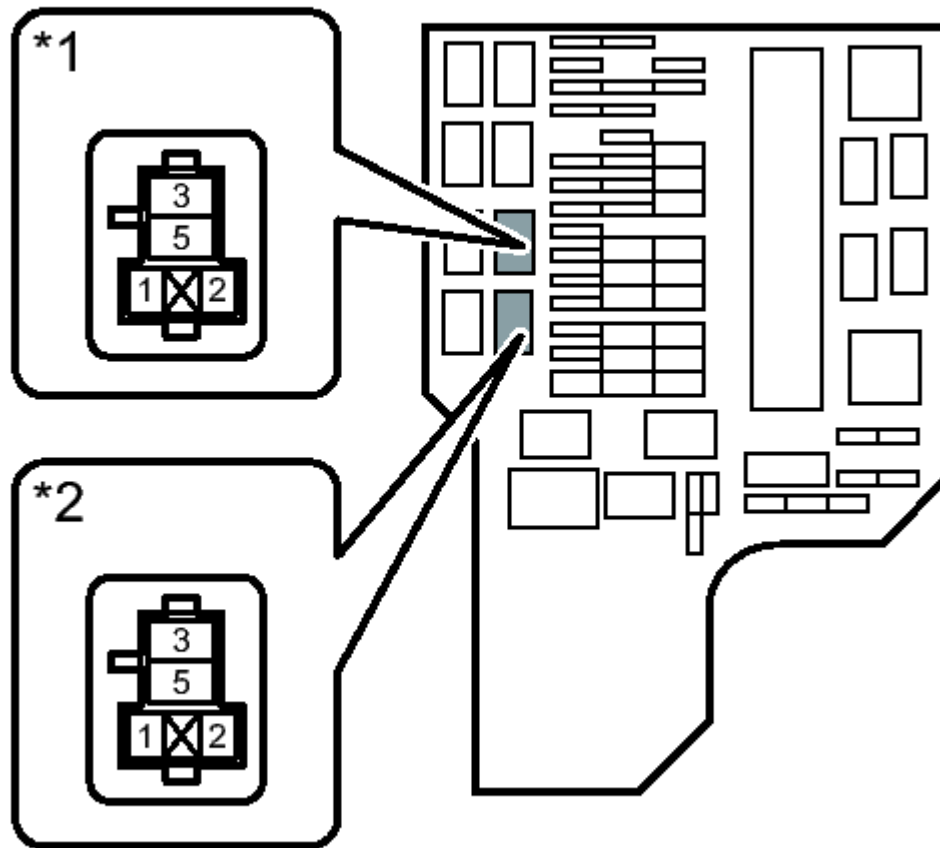


Fig. 61: Identifying PTC HTR No. 2 And PTC HTR No. 3 Relay
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Condition	Specified Condition
PTC HTR NO. 2 relay holder 5 - Body ground	Always	11 to 14 V
PTC HTR NO. 3 relay		

holder 5 - Body ground		
------------------------------	--	--

- c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
PTC HTR NO. 2 relay holder 2 - Body ground	Always	Below 1 ohms
PTC HTR NO. 3 relay holder 2 - Body ground		

TEXT IN ILLUSTRATION

*1	PTC HTR NO. 2 Relay Holder
*2	PTC HTR NO. 3 Relay Holder
*a	Component without relay installed (Engine Room Relay Block)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

10. INSPECT QUICK HEATER ASSEMBLY (PTC HEATER)

- a. Remove the quick heater assembly (PTC heater). Refer to **REMOVAL** .

*a

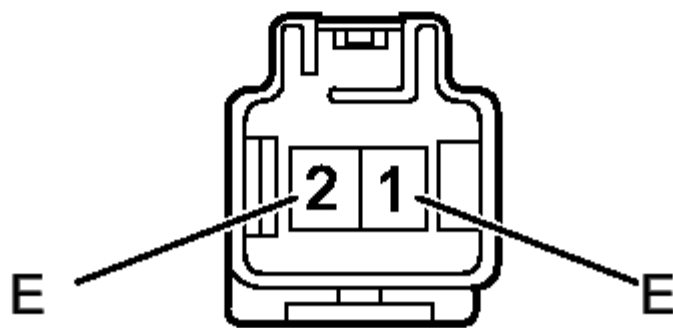
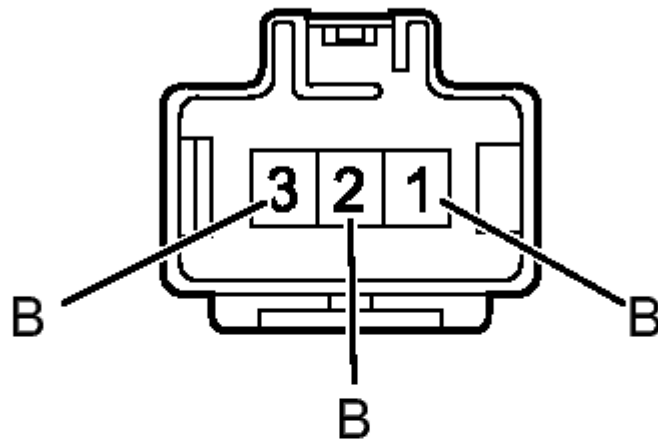


Fig. 62: Quick Heater Assembly Connector End View
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
1 (B) - 1 (E)	Always	Below 1 kohms
2 (B) - 1 (E)		
2 (B) - 2 (E)		
3 (B) - 2 (E)		

TEXT IN ILLUSTRATION

*a	Component without harness connected (Quick Heater Assembly (PTC Heater))
----	--

NG --> See step 12

OK: Go to next step

11. CHECK HARNESS AND CONNECTOR (QUICK HEATER ASSEMBLY (PTC HEATER) - BODY GROUND)

- Disconnect the quick heater assembly (PTC heater) connector.

*a

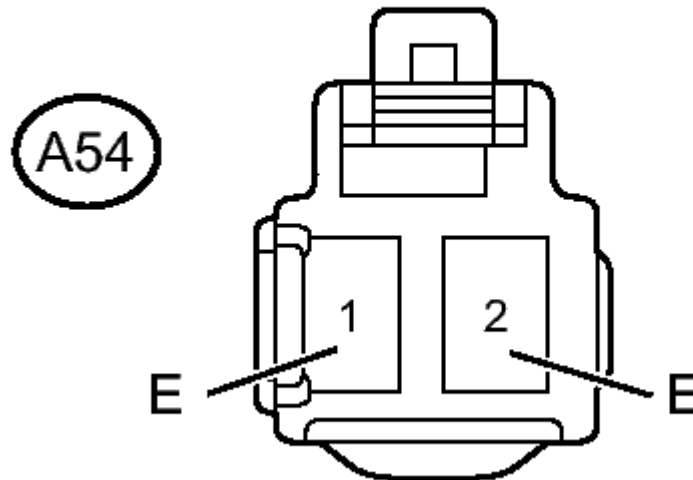


Fig. 63: Checking Harness And Connector (Quick Heater Assembly (PTC Heater) - Body Ground)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A54-1 (E) - Body ground	Always	Below 1 ohms
A54-2 (E) - Body ground		

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Quick Heater Assembly (PTC
----	---

|Heater))

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 13

12. **REPLACE QUICK HEATER ASSEMBLY (PTC HEATER).** Refer to REMOVAL
13. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE.** Refer to PROBLEM SYMPTOMS TABLE

Rear Blower Motor Circuit

DESCRIPTION

The rear blower motor is operated by signals from the air conditioning amplifier. Rear blower motor speed signals are transmitted in accordance with changes in the duty ratio.

WIRING DIAGRAM

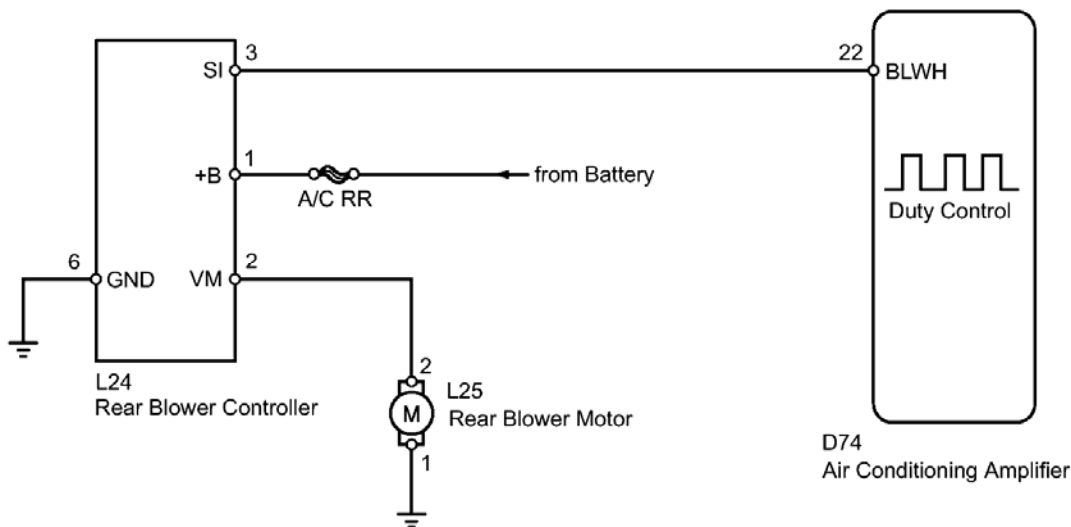


Fig. 64: Rear Blower Motor Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. **PERFORM ACTIVE TEST USING TECHSTREAM**

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Air Conditioner / Active Test.
- Check the operation by referring to the table below.

AIR CONDITIONER

Tester Display	Test Part	Control Range	Diagnostic Note
Rear Blower Motor	Rear blower motor	Min.: 0, Max.: 31	-

OK

Rear blower motor operates and rear blower motor speed level changes.

RESULT

Result	Proceed to
NG (Rear blower motor does not operate)	A
NG (Rear blower motor operates but does not change speed)	B
OK	C

B --> See step 9

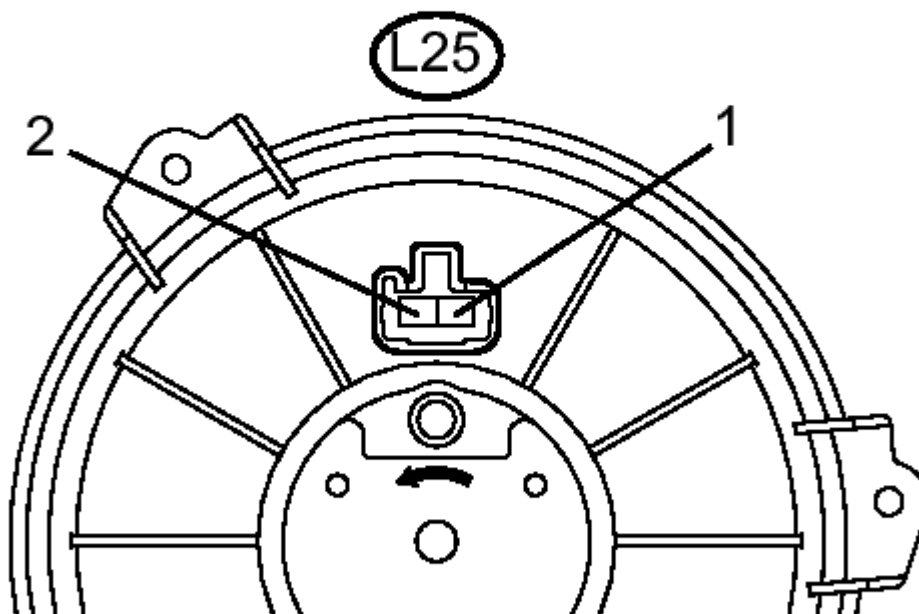
C --> See step 11

A: Go to next step

2. INSPECT REAR BLOWER MOTOR

- a. Disconnect the rear blower motor connector.

*a



H

Fig. 65: Checking Rear Blower Motor

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Connect a battery positive (+) lead to terminal 2 and a negative (-) lead to terminal 1, then check that the rear blower motor operates smoothly.

OK

The rear blower motor operates smoothly.

TEXT IN ILLUSTRATION

	Component
--	-----------

*a	without harness connected (Rear Blower Motor)
----	--

NG --> See step 10

OK: Go to next step

3. **CHECK HARNESS AND CONNECTOR (REAR BLOWER CONTROLLER - BODY GROUND)**
 - a. Disconnect the rear blower controller connector.

*a

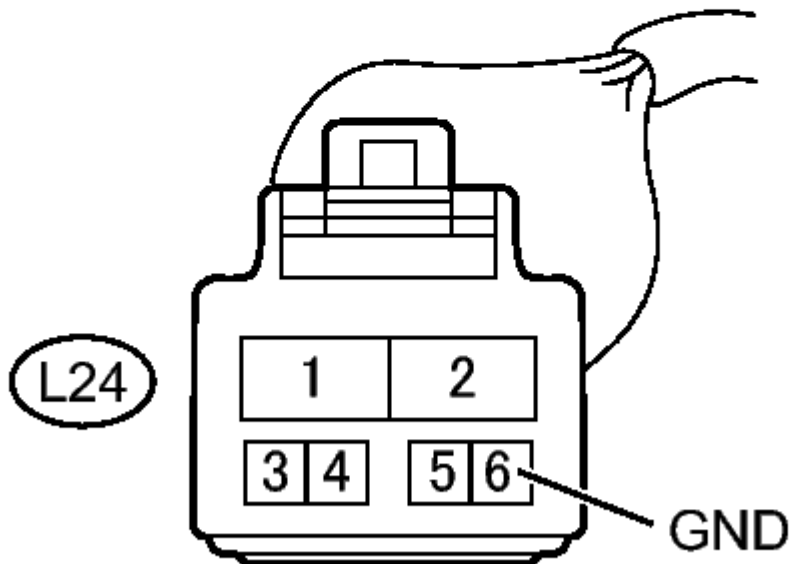


Fig. 66: Checking Harness And Connector (Rear Blower Controller - Body Ground)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
L24-6 (GND) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Rear Blower Controller)
----	--

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

4. **CHECK HARNESS AND CONNECTOR (REAR BLOWER CONTROLLER - BATTERY)**
- a. Measure the voltage according to the value(s) in the table below.

*a

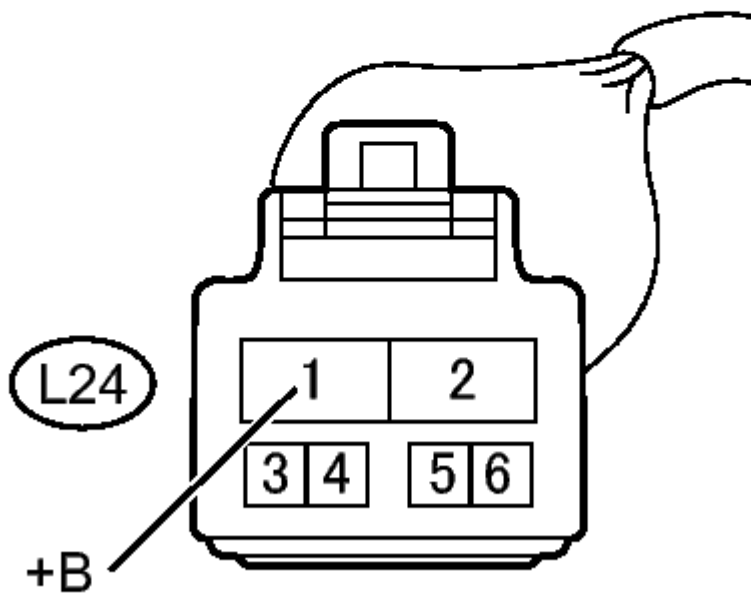


Fig. 67: Checking Harness And Connector (Rear Blower Controller - Battery)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Voltage

Tester Connection	Condition	Specified Condition
L24-1 (+B) - Body ground	Always	11 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector
----	---

(to Rear Blower Controller)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

5. CHECK HARNESS AND CONNECTOR (REAR BLOWER CONTROLLER - REAR BLOWER MOTOR)

- a. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
L24-2 (VM) - L25-2	Always	Below 1 ohms
L24-2 (VM) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

6. CHECK HARNESS AND CONNECTOR (REAR BLOWER MOTOR - BODY GROUND)

- a. Measure the resistance according to the value(s) in the table below.

*a

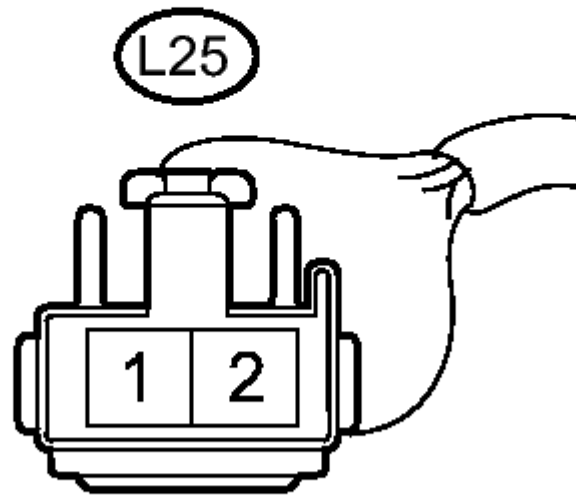


Fig. 68: Checking Harness And Connector (Rear Blower Motor - Body Ground)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Resistance

Tester Connection	Condition	Specified Condition
L25-1 - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

Front view of wire harness

*a	connector (to Rear Blower Motor)
----	---

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

7. CHECK HARNESS AND CONNECTOR (REAR BLOWER CONTROLLER - A/C AMPLIFIER)

- Disconnect the air conditioning amplifier connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D74-22 (BLWH) - L24-3 (SI)	Always	Below 1 ohms
D74-22 (BLWH) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

8. INSPECT REAR BLOWER CONTROLLER

- Reconnect the rear blower controller connector.

*a

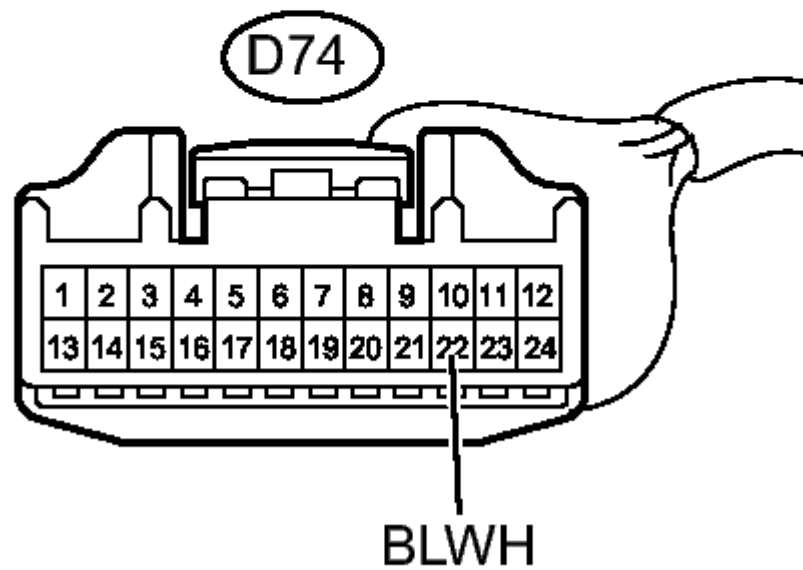


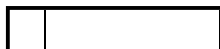
Fig. 69: Checking Rear Blower Controller
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

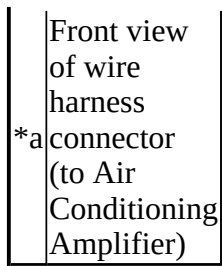
- b. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Condition	Specified Condition
D74-22 (BLWH) - Body ground	Always	4.5 to 7.0 V

TEXT IN ILLUSTRATION





NG --> See step 13

OK: Go to next step

9. INSPECT AIR CONDITIONING AMPLIFIER

- a. Reconnect the air conditioning amplifier connector.
- b. Remove the air conditioning amplifier with the connectors still connected.

*a

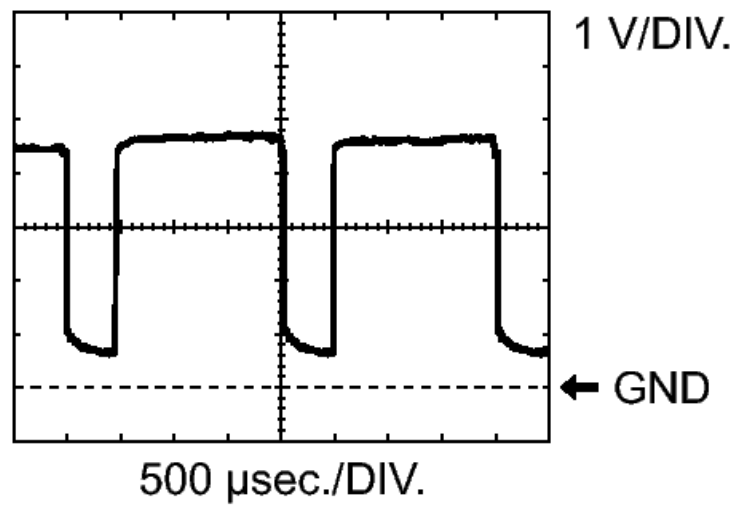
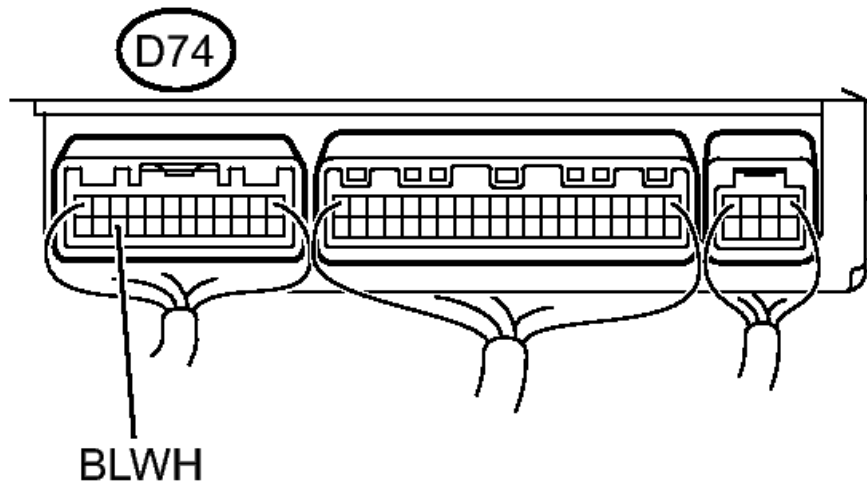


Fig. 70: Checking Air Conditioning Amplifier

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- c. Measure the waveform between terminal D74-22 (BLWH) of the air conditioning amplifier and body ground.

Item	Content
Tool Setting	1 V/DIV., 500 μsec./DIV.
Condition	Ignition switch ON Blower switch: LO

TEXT IN ILLUSTRATION

*a	Component with harness connected (Air Conditioning Amplifier)
----	--

OK

Waveform is as shown in the illustration above.

HINT:

The waveform varies with the blower level.

NG --> See step 12

OK --> See step 13

10. **REPLACE REAR BLOWER MOTOR. Refer to REMOVAL**
11. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
12. **REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL**
13. **REPLACE REAR BLOWER CONTROLLER. Refer to REMOVAL**

Generator Signal Circuit

DESCRIPTION

When the engine is started, the generator rotates and a pulsed voltage signal is generated. This signal is used by the air conditioning amplifier. The generated voltage signals sent from the generator are used for controlling the number of the heater elements to be heated.

WIRING DIAGRAM

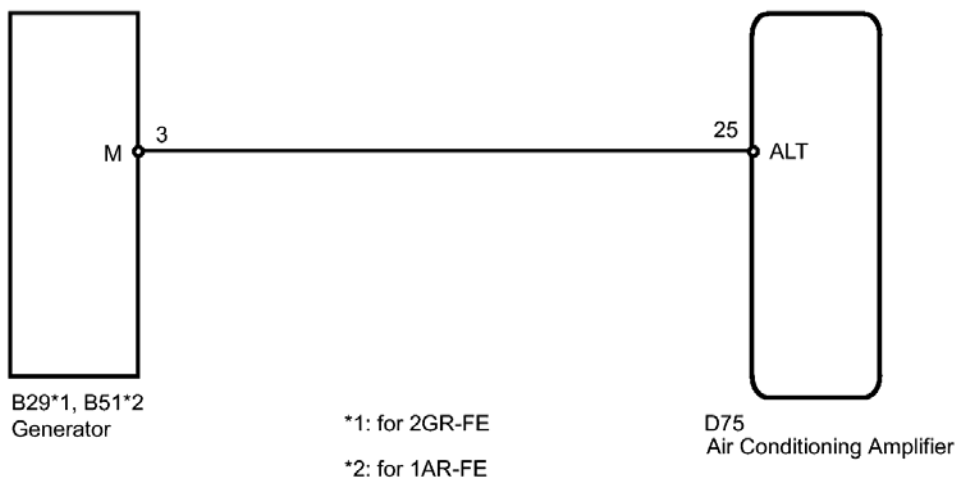


Fig. 71: Generator Signal Circuit Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. CHECK HARNESS AND CONNECTOR (AIR CONDITIONING AMPLIFIER - GENERATOR)

- Disconnect the air conditioning amplifier connector.
- Disconnect the generator connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

FOR 2GR-FE

Tester Connection	Condition	Specified Condition
D75-25 (ALT) - B29-3 (M)	Always	Below 1 ohms
D75-25 (ALT) - Body ground	Always	10 kohms or higher

FOR 1AR-FE

Tester Connection	Condition	Specified Condition
D75-25		Below 1

(ALT) - B51-3 (M)	Always	ohms
D75-25 (ALT) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

2. INSPECT GENERATOR

- a. Inspect the generator. Refer to **2GR-FE - ON-VEHICLE INSPECTION** or **1AR-FE - ON-VEHICLE INSPECTION** for On-Vehicle Inspection. Refer to **2GR-FE - INSPECTION** or **1AR-FE - INSPECTION** for Inspection.

NG --> See step 4

OK --> See step 3

3. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
4. **REPLACE GENERATOR. Refer to REMOVAL**

IG Power Source Circuit

DESCRIPTION

This is the main power source supplied to the air conditioning amplifier when the ignition switch is ON. This power source is used for operating components, such as the air conditioning amplifier and servo motors.

WIRING DIAGRAM

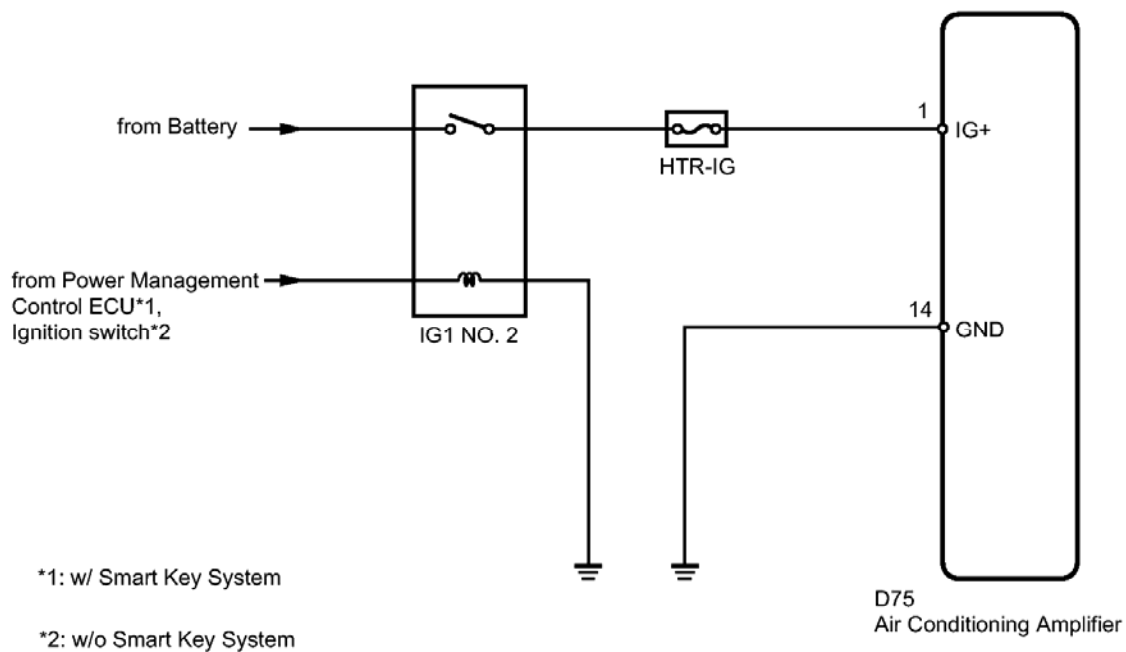


Fig. 72: IG Power Source Circuit - Wiring Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. **INSPECT AIR CONDITIONING AMPLIFIER**
 - a. Disconnect the air conditioning amplifier connector.

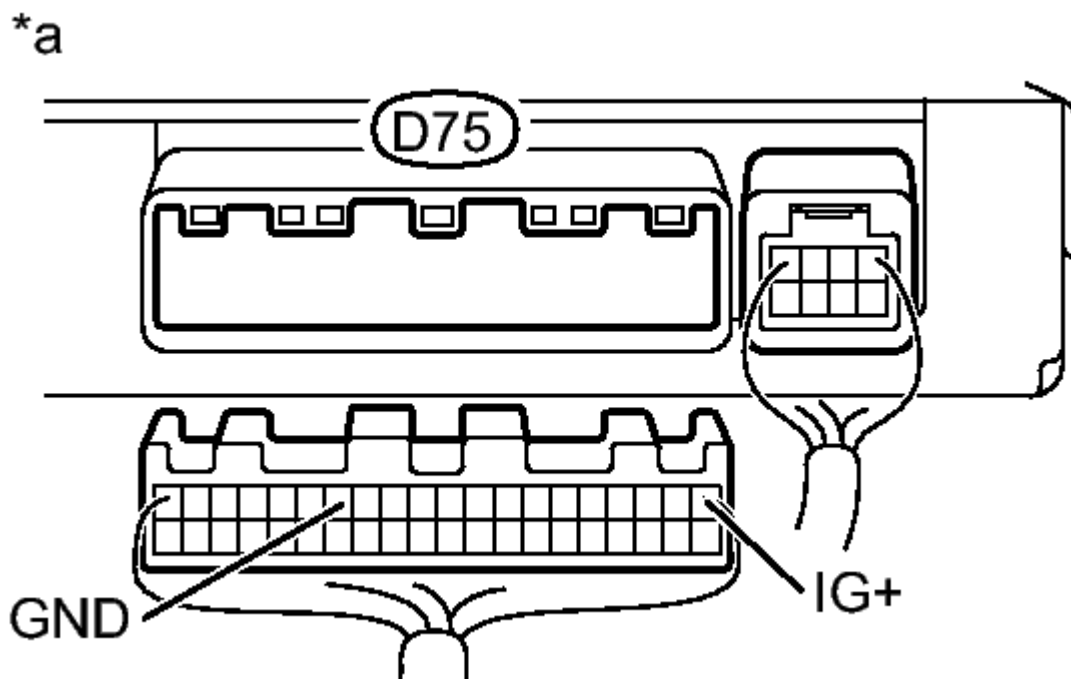


Fig. 73: Checking Air Conditioning Amplifier
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Turn the ignition switch to ON.
- c. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
D75-1 (IG+) - D75-14 (GND)	Ignition switch ON	11 to 14 V

TEXT IN ILLUSTRATION

*a	Rear view of wire harness connector (to Air Conditioning Amplifier)
----	---

NG --> See step 2

OK --> See step 3

2. **CHECK HARNESS AND CONNECTOR (AIR CONDITIONING AMPLIFIER - BODY GROUND)**

- a. Disconnect the air conditioning amplifier connector.

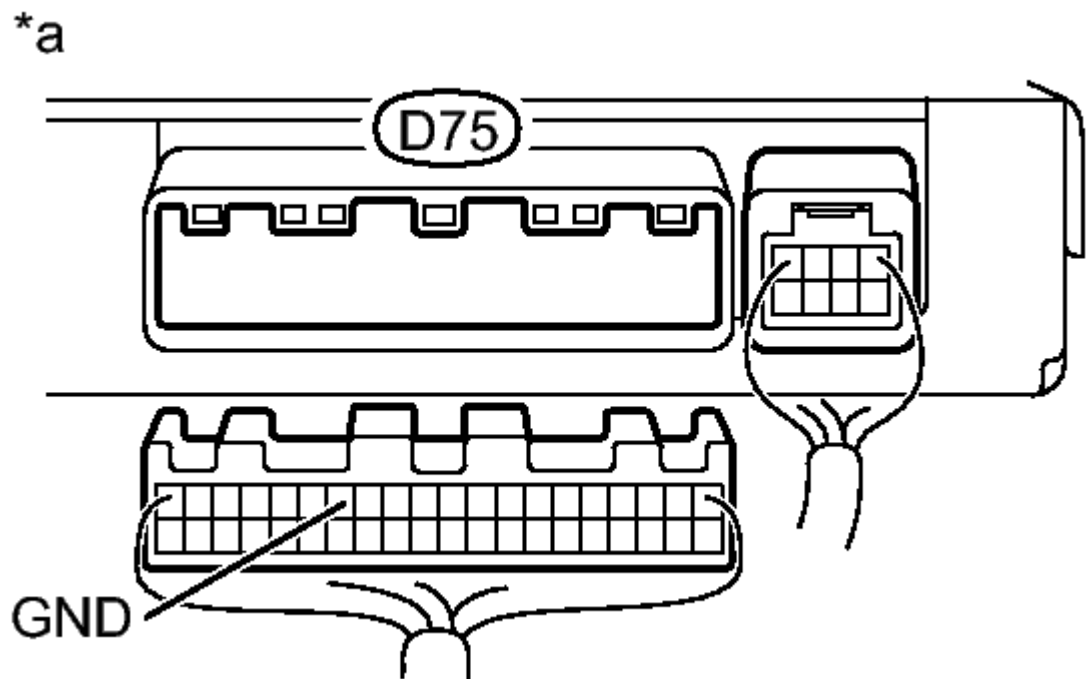


Fig. 74: Measuring Resistance Of Air Conditioning Amplifier
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D75-14 (GND) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Rear view of wire harness connector (to Air Conditioning Amplifier)
----	---

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1 NO. 2 RELAY - AIR CONDITIONING AMPLIFIER)

3. **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**

Back-up Power Source Circuit

DESCRIPTION

This is the back-up power source circuit for the air conditioning amplifier. Power is supplied even when the ignition switch is turned off, and is used for functions such as the diagnostic trouble code memory.

WIRING DIAGRAM

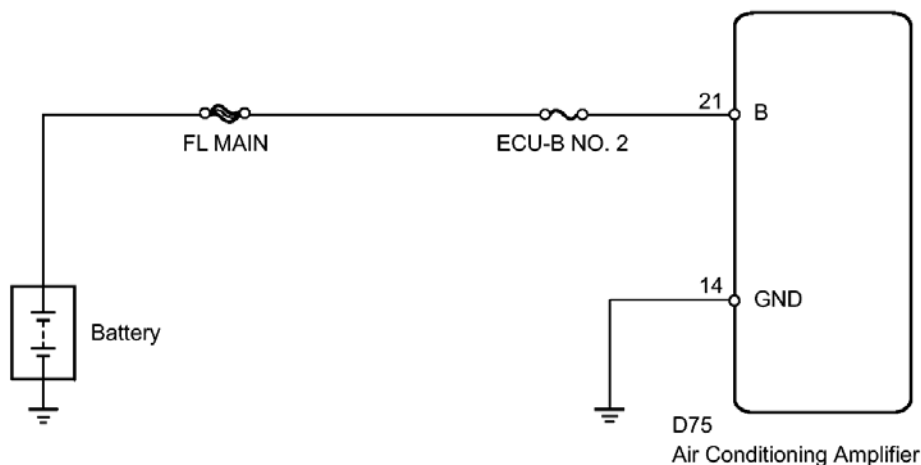


Fig. 75: Back-Up Power Source Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. **CHECK HARNESS AND CONNECTOR (AIR CONDITIONING AMPLIFIER - BATTERY)**
 - a. Disconnect the air conditioning amplifier connector.

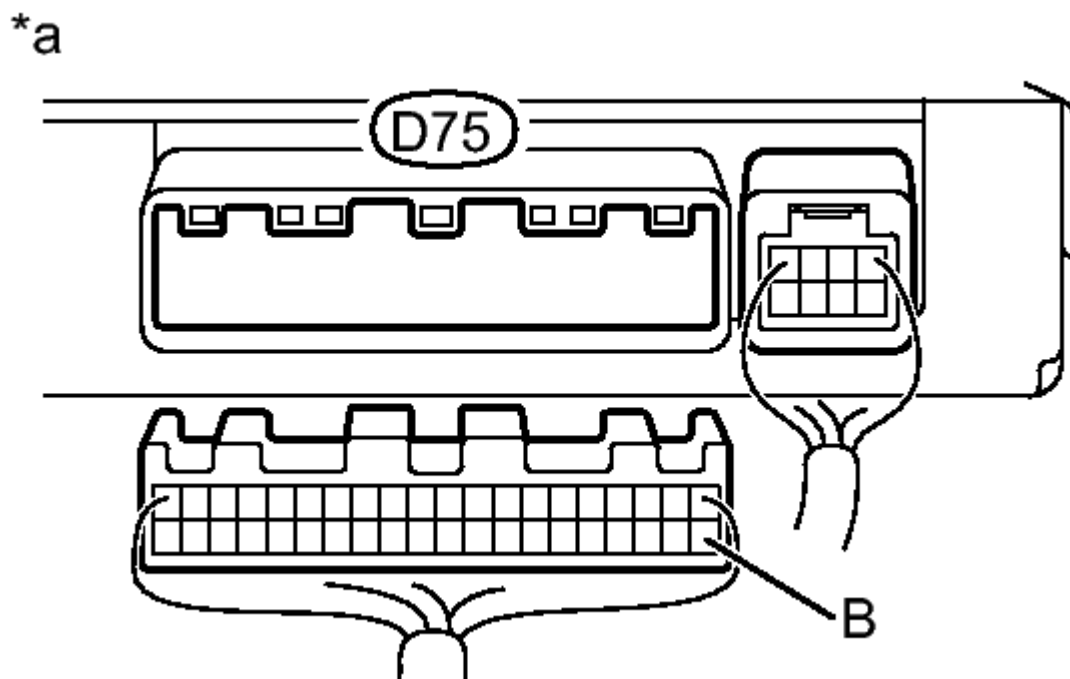


Fig. 76: Measuring Voltage Of Air Conditioning Amplifier
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Condition	Specified Condition
D75-21 (B) - Body ground	Always	11 to 14 V

TEXT IN ILLUSTRATION

*a	Rear view of wire harness connector (to Air Conditioning Amplifier)
----	---

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

- 2. CHECK HARNESS AND CONNECTOR (AIR CONDITIONING AMPLIFIER - BODY GROUND)**

- a. Disconnect the air conditioning amplifier connector.

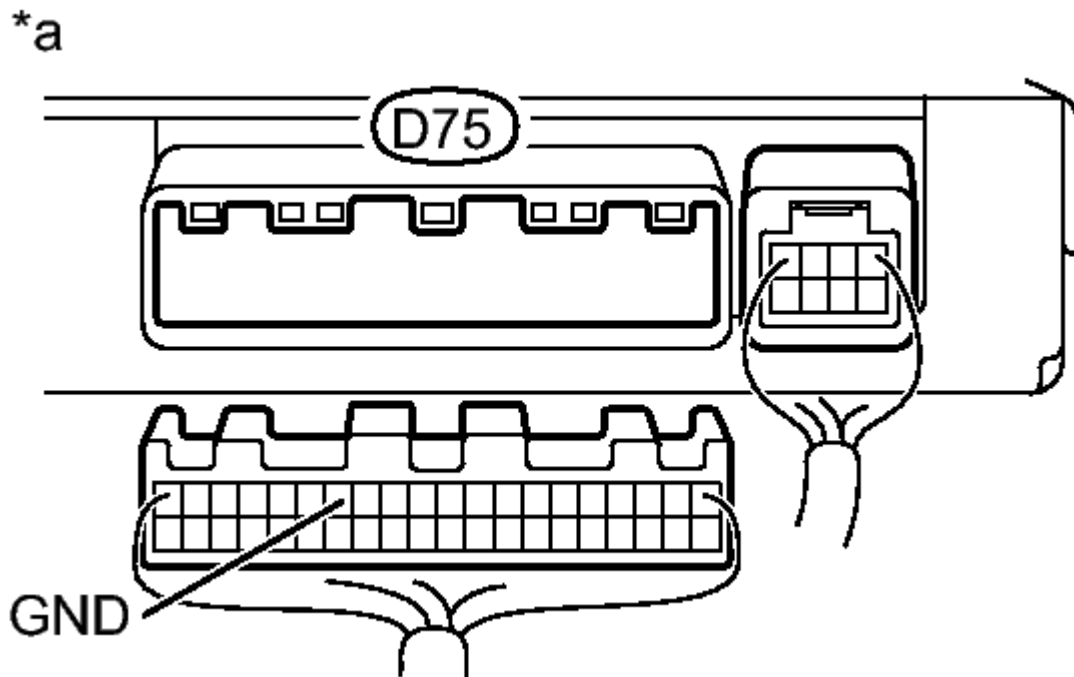


Fig. 77: Measuring Resistance Of Air Conditioning Amplifier
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D75-14 (GND) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Rear view of wire harness connector (to Air Conditioning Amplifier)
-----------	---

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 3

3. REPLACE AIR CONDITIONING AMPLIFIER. Refer to REMOVAL

ACCESSORIES & EQUIPMENT

Air Conditioning System (Auto A/C) - Sienna

AIR CONDITIONING SYSTEM (FOR AUTOMATIC AIR CONDITIONING SYSTEM)

PRECAUTION

PRECAUTION

1. IGNITION SWITCH EXPRESSION

- a. The type of ignition switch used on this model differs according to the specification of the vehicle. The expressions listed in the table below are used in this information.

Expression	Ignition Switch (Position)	Engine Switch (Condition)
Ignition Switch off	LOCK	Off
Ignition Switch ACC	ACC	On (ACC)
Ignition Switch ON	ON	On (IG)
Engine Start	START	Start

2. DO NOT HANDLE REFRIGERANT IN AN ENCLOSED AREA OR NEAR AN OPEN FLAME

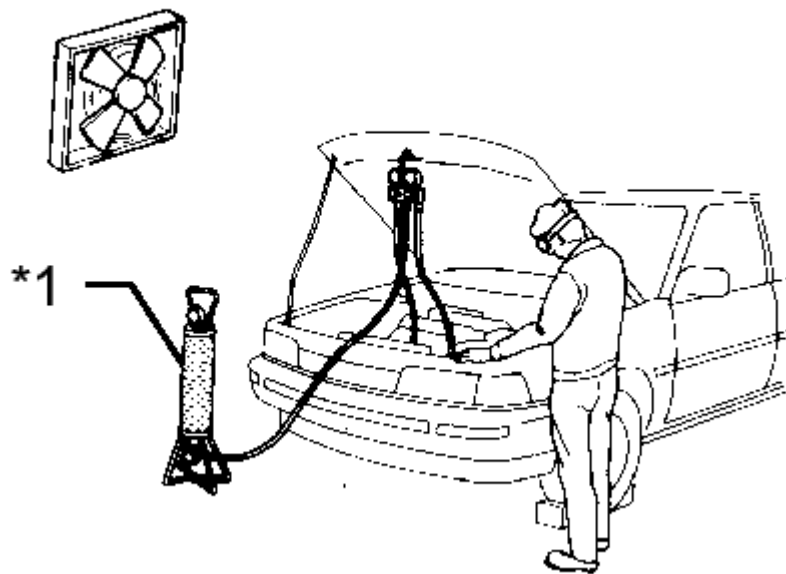
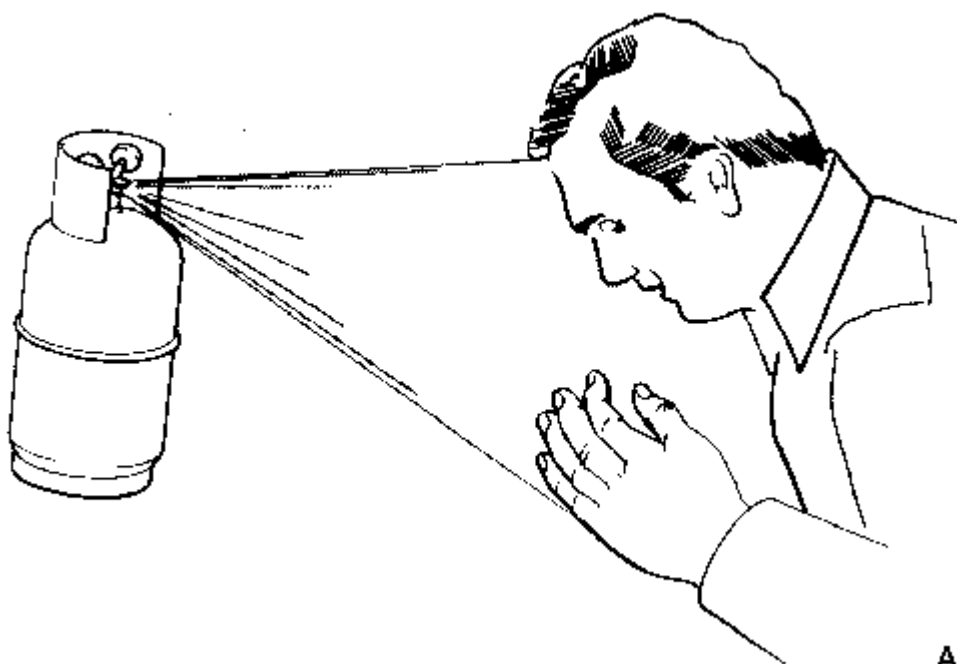


Fig. 1: Precaution For Handling Refrigerant
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*1	Charging Cylinder
----	----------------------

3. **ALWAYS WEAR EYE PROTECTION**
4. **BE CAREFUL NOT TO GET LIQUID REFRIGERANT IN YOUR EYES OR ON YOUR SKIN**



AC2811

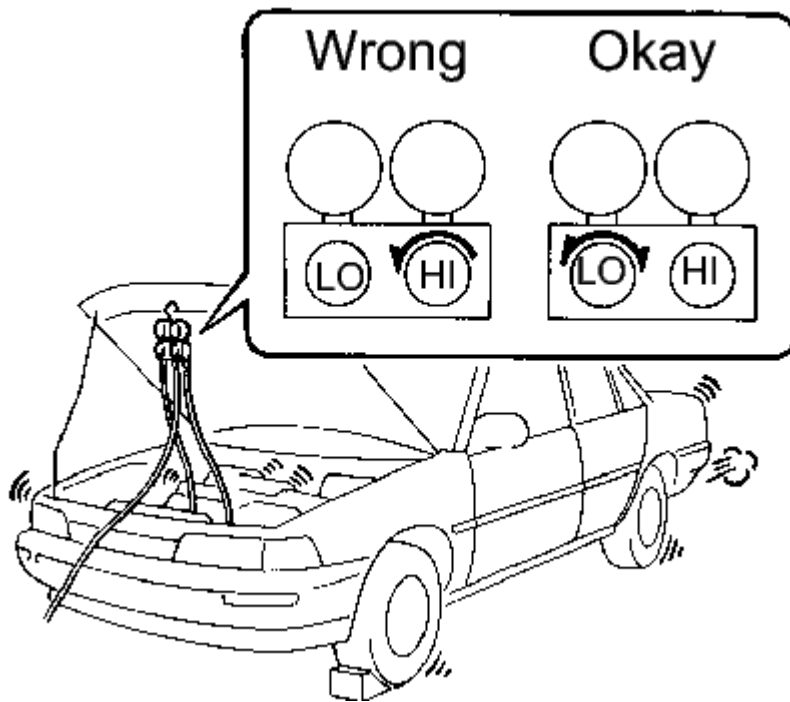
Fig. 2: Precaution For Liquid Refrigerant In Eyes Or On Skin
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

If liquid refrigerant gets in your eyes or on your skin:

- a. Wash the area with lots of cold water.

WARNING: Do not rub your eyes or skin.

- b. Apply clean petroleum jelly to the skin.
 - c. Go immediately to a hospital or see a physician for professional treatment.
5. **NEVER HEAT CONTAINER OR EXPOSE THE CONTAINER TO AN OPEN FLAME**
 6. **BE CAREFUL NOT TO DROP CONTAINER OR APPLY PHYSICAL SHOCKS TO IT**
 7. **DO NOT OPERATE COMPRESSOR WITHOUT ENOUGH REFRIGERANT IN REFRIGERANT SYSTEM**



N11084

Fig. 3: Identifying Correct And Incorrect Connection Of Valves
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

If there is not enough refrigerant in the A/C system, oil lubrication will be insufficient and the compressor may be damaged.

Necessary care should be taken to avoid this.

8. DO NOT OPEN HIGH PRESSURE MANIFOLD VALVE WHILE COMPRESSOR IS OPERATING

- a. Open and close only the low pressure valve.

If the high pressure valve is opened, refrigerant flows in the reverse direction causing the charging cylinder to rupture.

9. BE CAREFUL NOT TO OVERCHARGE SYSTEM WITH REFRIGERANT

If refrigerant is overcharged, it causes problems such as insufficient cooling, poor fuel economy, engine overheating, etc.

10. DO NOT OPERATE ENGINE AND COMPRESSOR WITH NO REFRIGERANT

WARNING: Doing so may damage the inside of the compressor because the compressor parts always move regardless of whether the A/C system is turned on or off.

11. SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

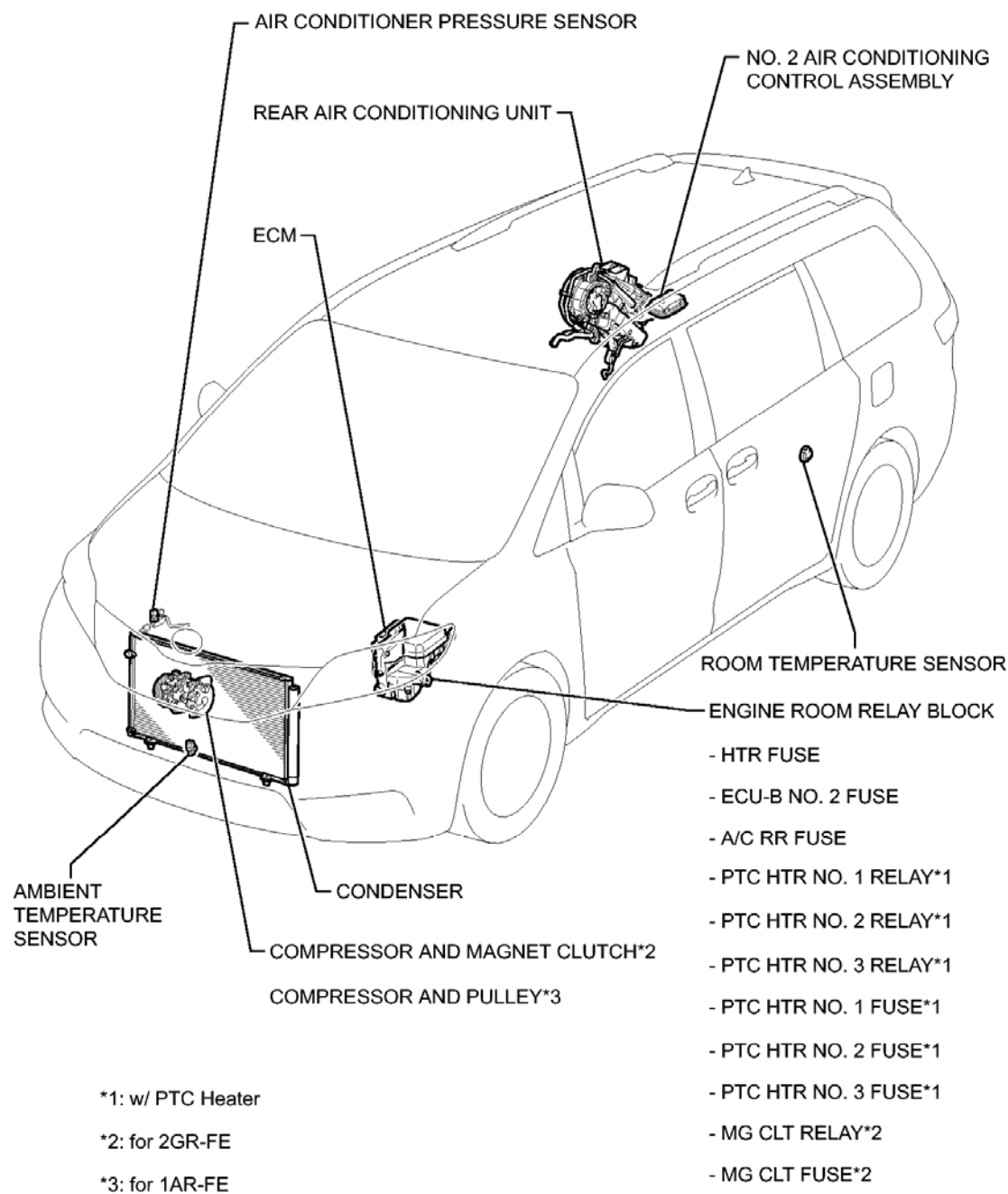
- a. This vehicle is equipped with an Supplemental Restraint System (SRS) such as the driver, front passenger, side, and curtain shield airbags. Failure to carry out service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices. Refer to **PRECAUTION** .

12. GENERAL PRECAUTION

- a. While using the battery during inspection, do not bring the positive (+) and negative (-) tester probes too close to each other as a short circuit may occur.

PARTS LOCATION

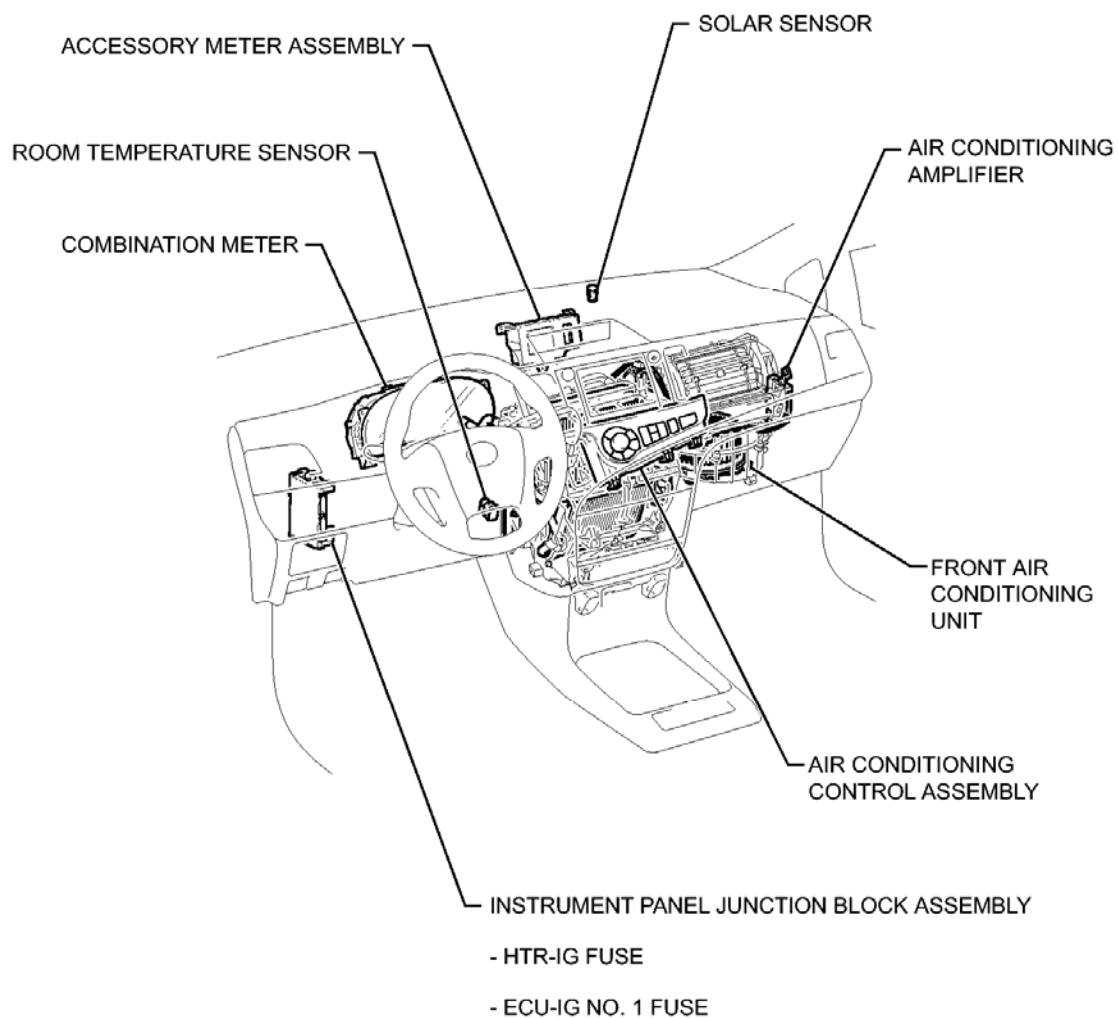
ILLUSTRATION



Y

Fig. 4: HVAC Component Locations (Auto A/C) (1 Of 4)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

ILLUSTRATION

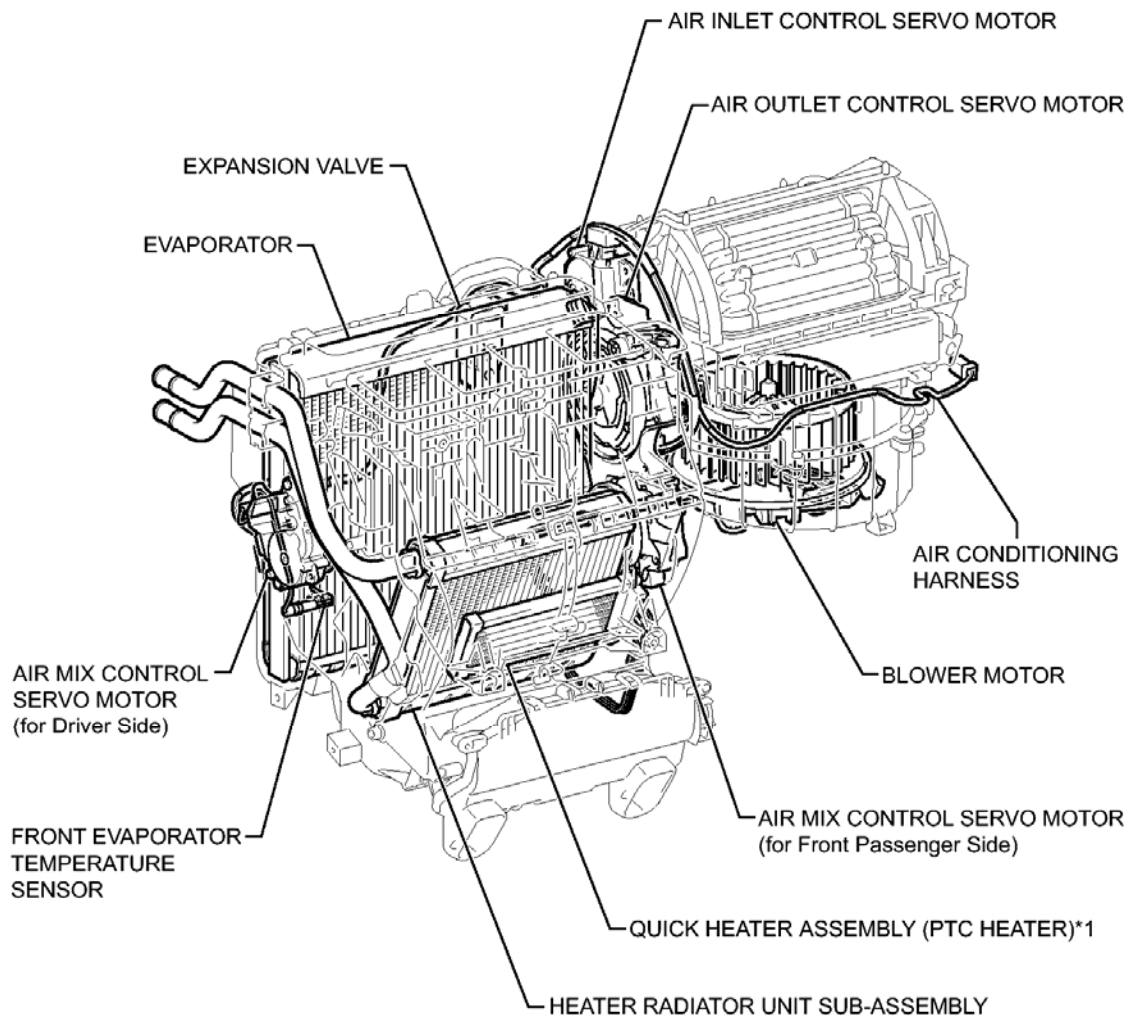


Y

Fig. 5: HVAC Component Locations (Auto A/C) (2 Of 4)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

ILLUSTRATION

Front Air Conditioning Unit



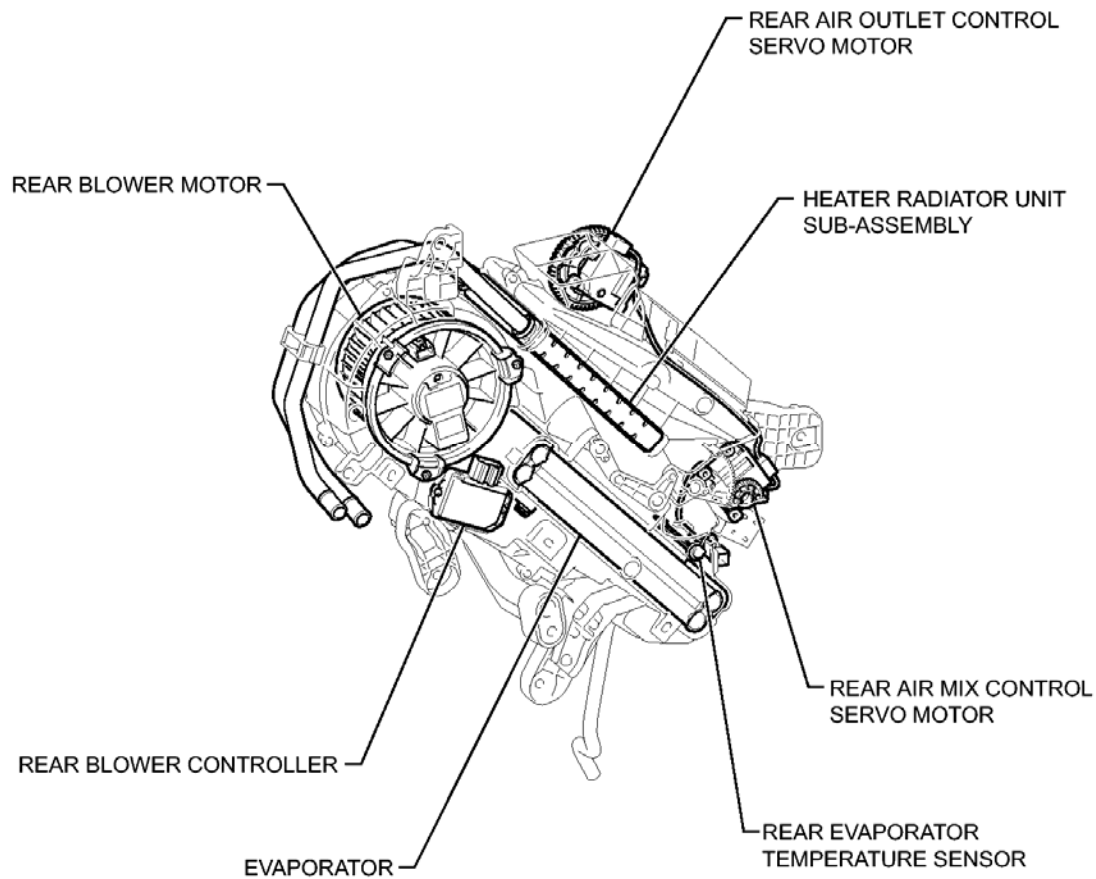
*1: w/ PTC Heater

P

Fig. 6: HVAC Component Locations (Auto A/C) (3 Of 4)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

ILLUSTRATION

REAR AIR CONDITIONING UNIT



P

Fig. 7: HVAC Component Locations (Auto A/C) (4 Of 4)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

SYSTEM DIAGRAM

SYSTEM DIAGRAM

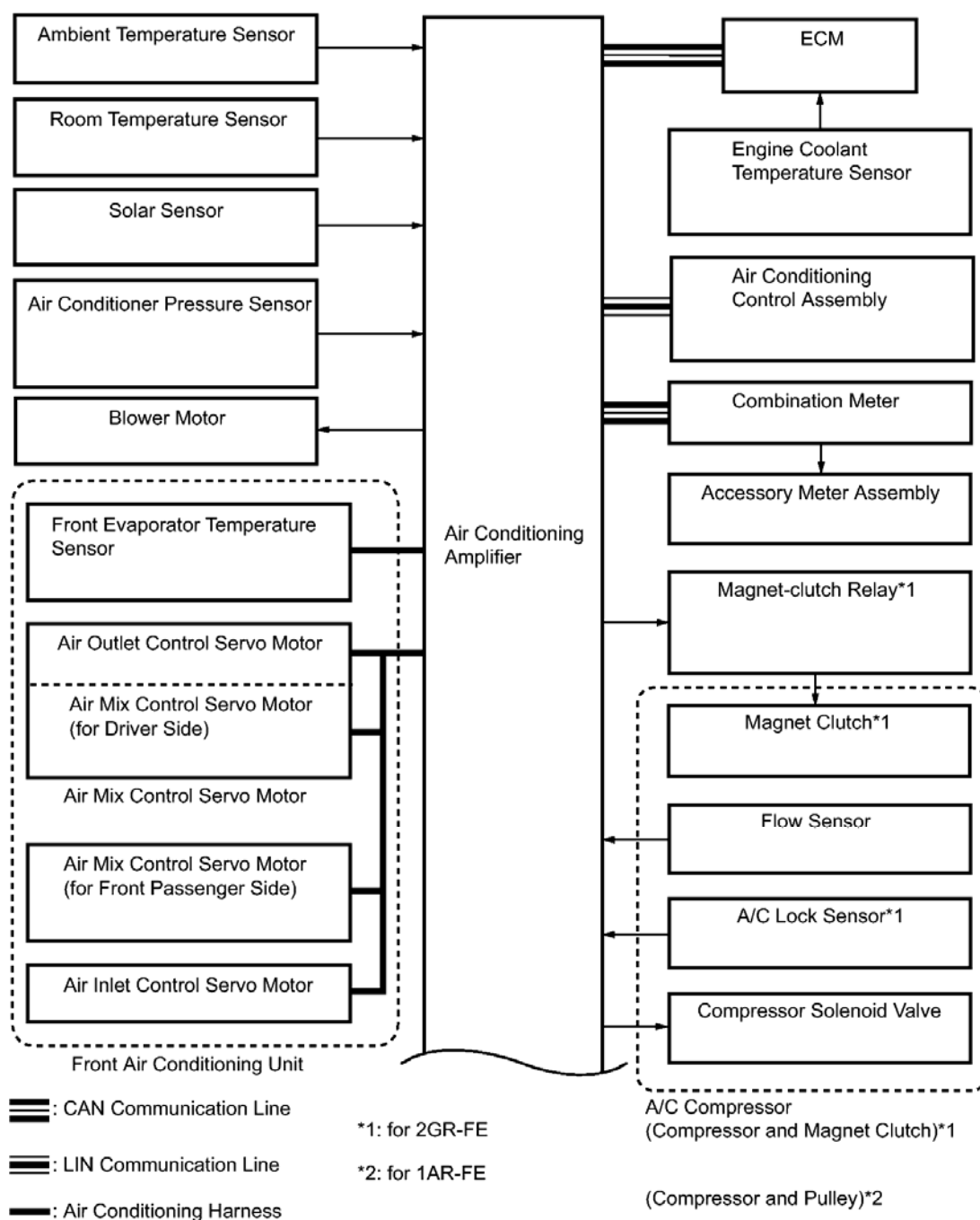


Fig. 8: HVAC System Diagram (1 Of 2)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

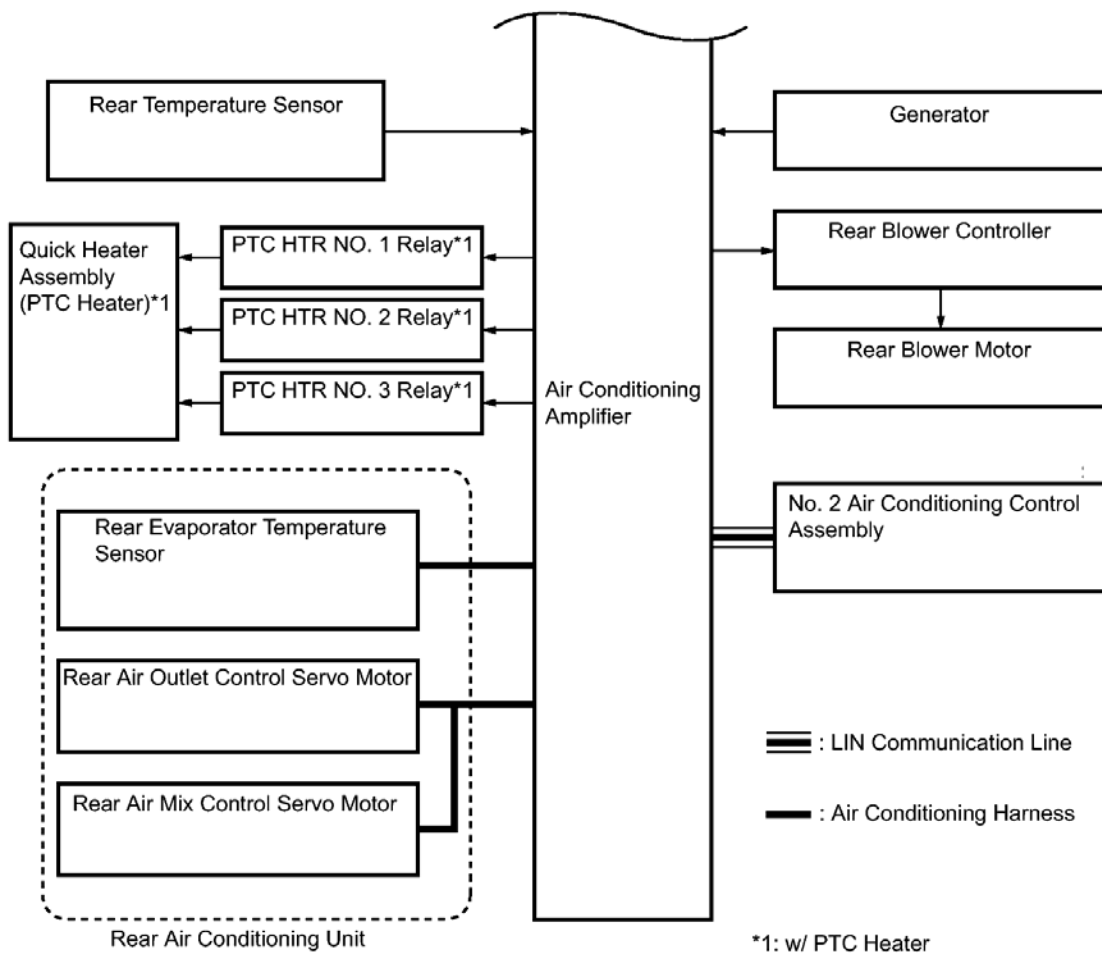


Fig. 9: HVAC System Diagram (2 Of 2)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

COMMUNICATION TABLE

Sender	Receiver	Signal	Communication Line
Air conditioning amplifier	ECM	Magnet clutch request signal	CAN
		Idle up request signal	
		PTC heater control request signal*1	
		External variable control solenoid current signal	
		Refrigerant gas pressure sensor signal	
		Ambient temperature	

		signal	
		Compressor torque signal	
Air conditioning amplifier	Air conditioning control assembly	Front panel indication signal	LIN
		RECIRC indication signal	
Air conditioning amplifier	No. 2 air conditioning control assembly	Rear panel indication signal	LIN
		MODE indication signal	
		Blower level indication signal	
		Set temperature indication signal	
Combination meter	Air conditioning amplifier	Vehicle speed signal	CAN
ECM	Air conditioning amplifier	Engine revolution speed signal	CAN
		Engine coolant temperature signal	
		A/C control cut signal	
Air conditioning control assembly	Air conditioning amplifier	AUTO switch signal	LIN
		OFF switch signal	
		A/C switch signal	
		Fr DEF switch signal	
		Rr DEF switch signal	
		MODE switch signal	
		REC/FRS switch signal	
		REAR switch signal	
		FRONT DUAL switch signal	
		Pollen removal mode switch signal	
		Blower switch signal (FAN+, FAN-)	
		Set temperature switch signal (UP, DOWN)	
No. 2 air conditioning control assembly	Air conditioning amplifier	AUTO switch signal	LIN
		OFF switch signal	
		MODE switch signal	
		Blower switch signal	

		(FAN+, FAN-)
		Set temperature switch signal (UP, DOWN)

*1: w/ PTC Heater

SYSTEM DESCRIPTION

SYSTEM DESCRIPTION

1. GENERAL

- a. The air conditioning system has the following controls.

Control	Outline
Neural Network Control	This control is capable of performing complex control by artificially simulating the information processing method of the nervous system of living organisms in order to establish a complex input/output relationship similar to that of a human brain.
Outlet Air Temperature Control	Based on the temperature set by the temperature control dial, the neural network control calculates outlet air temperature based on input signals from various sensors.
	The temperature settings for the driver and front passenger are

Left and Right Independent Control	controlled independently in order to provide separate vehicle interior temperatures for the right and left sides of the vehicle. Thus, air conditioning that accommodates the occupants' preferences has been realized.
Blower Control	Controls the blower motor in accordance with the airflow volume that has been calculated by the neural network control based on the input signals from various sensors.
Air Outlet Control	Automatically switches the air outlets in accordance with the outlet mode that has been calculated by the neural network control.
	In accordance with the engine coolant temperature, ambient air temperature, amount of sunlight, required blower, outlet temperature, and vehicle speed conditions, this control automatically switches the

	blower outlet to foot and defroster mode to prevent the windows from becoming fogged up when the ambient air temperature is low.
Air Inlet Control	Automatically controls the air inlet control damper to help achieve the calculated outlet air temperature that is required.
	Drives the air inlet control servo motor according to the operation of the air inlet control switch and moves the dampers to the fresh or recirculation position.
Compressor Control	Through the calculation of the target evaporator temperature based on various sensor signals, the air conditioning amplifier optimally controls discharge capacity by regulating the opening extent of the compressor solenoid valve.
	The air conditioning amplifier compares the pulley speed signals (transmitted by the lock sensor located on the

	compressor) with the engine speed signal (which is transmitted by the ECM (crankshaft position sensor)). When the air conditioning amplifier determines that the pulley is locked, it turns off the magnetic clutch.
Defroster Control	Defroster control logic is used to improve defroster performance.
Rear Defogger Control	When the ignition switch is ON and the rear defogger switch is pushed, the system is activated to keep the defogger heater on for approx. 15 minutes. However, the operating time of the rear defogger can be extended up to approx. 60 minutes when both of the following requirements are met: • Ambient Temperature: 0°C (32°F) or less • Vehicle Speed: 37.3 mph (60 km/h) or more
	A DTC (Diagnostic Trouble Code) is

Diagnosis	stored in the memory when the air conditioning amplifier detects a problem with the air conditioning system.
-----------	--

2. NEURAL NETWORK CONTROL

- In the previous automatic air conditioning systems, the A/C amplifier determined the required outlet air temperature and blower air volume in accordance with the calculation formula that has been obtained based on information received from the sensors.

However, because the senses of a person are rather complex, a given temperature is sensed differently, depending on the environment in which the person is situated. For example, a given amount of solar radiation can feel comfortably warm in a cold climate, or extremely uncomfortable in a hot climate. Therefore, as a technique for effecting a higher level of control, a neural network has been adopted in the automatic air conditioning system. With this technique, the data that has been collected under varying environmental conditions is stored in the A/C amplifier. The A/C amplifier can then effect control to provide enhanced air conditioning comfort.

- The neural network control consists of neurons in the input layer, intermediate layer and output layer. The input layer neurons process the input data of the outside temperature, the amount of sunlight and the room temperature based on the outputs of the switches and sensors, and output them to the intermediate layer neurons. Based on this data, the intermediate layer neurons adjust the strength of the links among the neurons. The sum of these is then calculated by the output layer neurons in the form of the required outlet temperature, solar correction, target airflow volume and outlet mode control volume. Accordingly, the A/C amplifier controls the servo motors and blower motor in accordance with the control volumes that have been calculated by the neural network control.

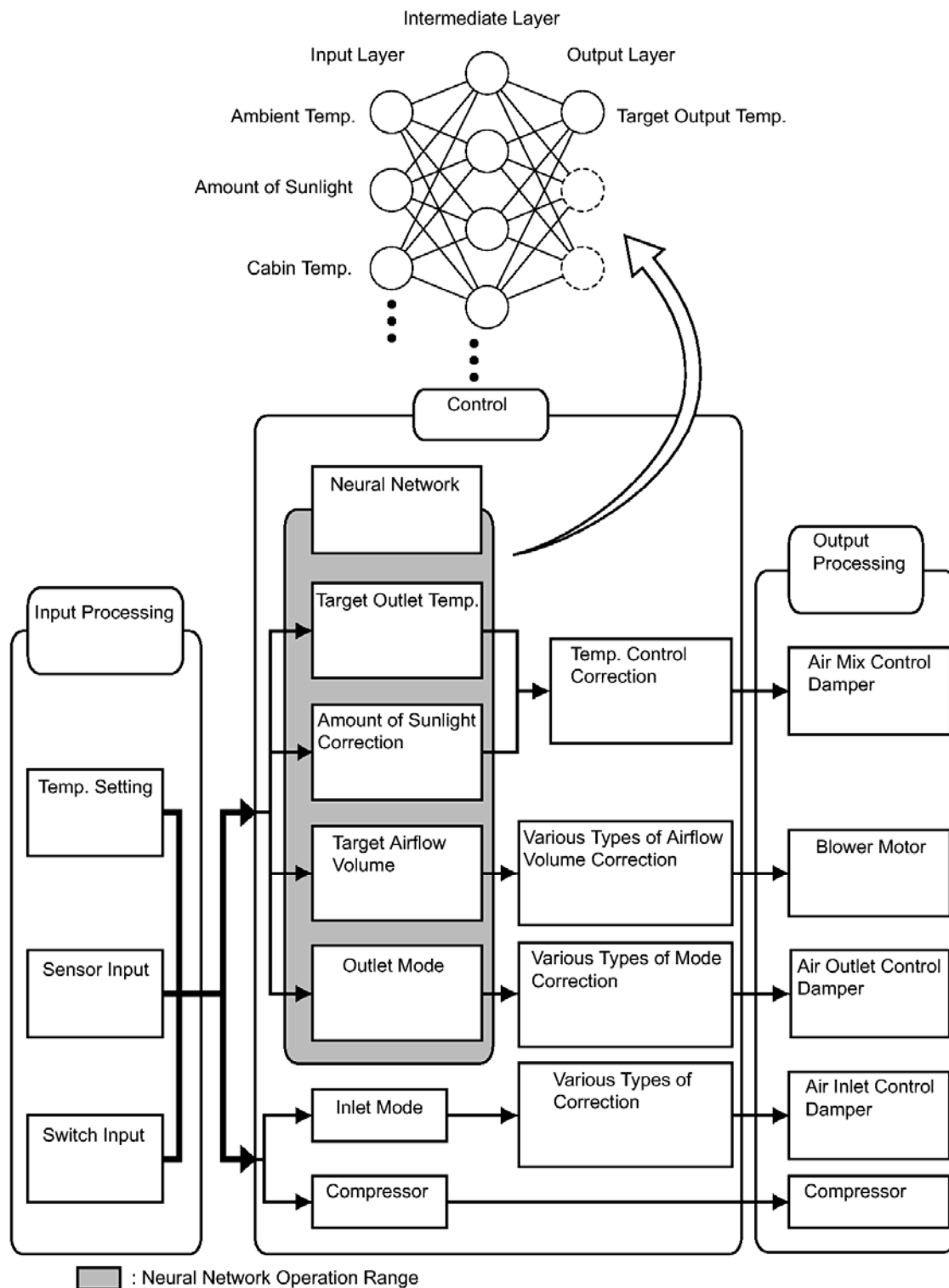
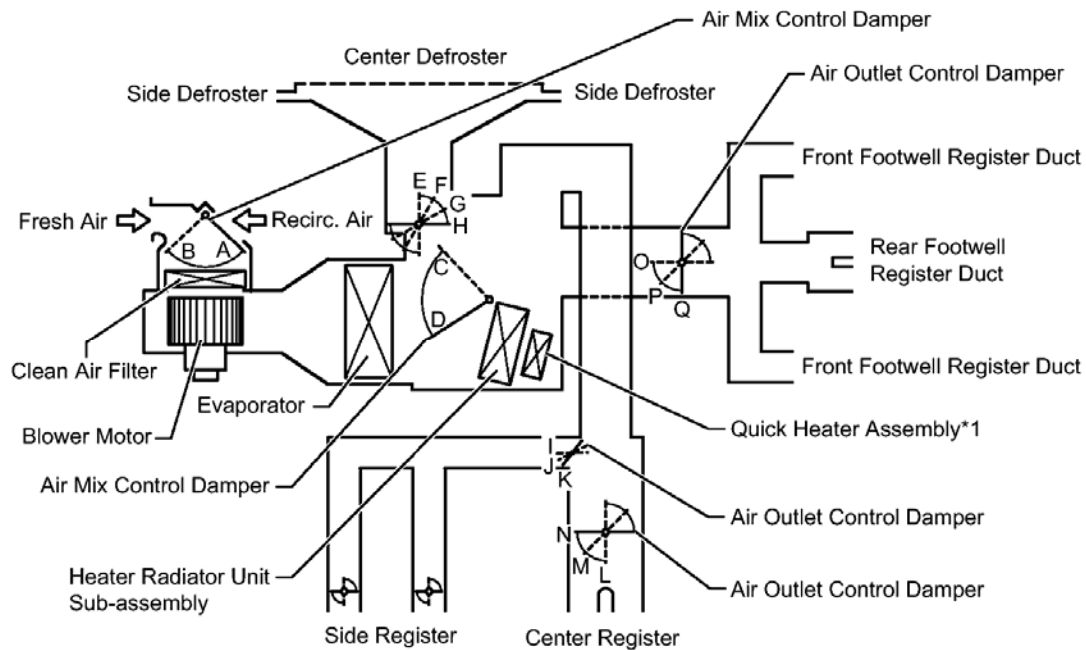


Fig. 10: Neural Network Control System Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

3. MODE POSITION AND DAMPER OPERATION

a. Mode Position and Damper Operation



*1: w/ PTC Heater

Fig. 11: Identifying Mode Position And Damper Operation
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

FUNCTIONS OF MAIN DAMPERS

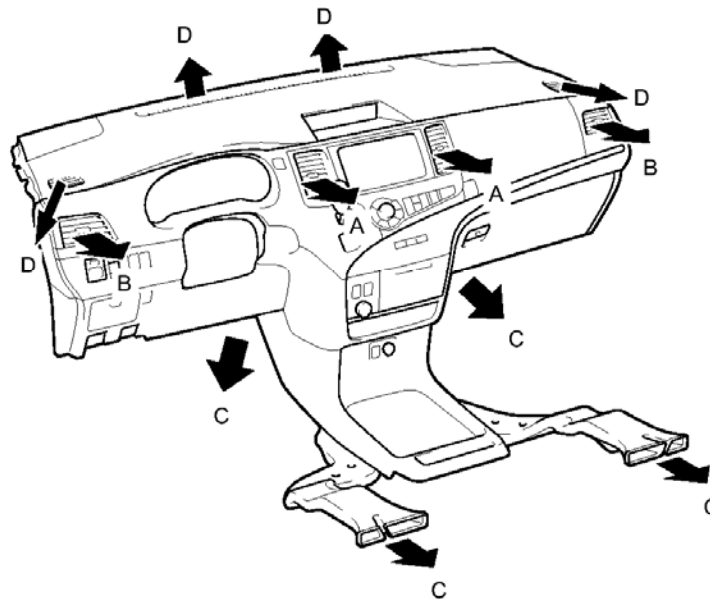
Control Damper	Operation Position	Damper Position	Operation
Air Inlet Control Damper	FRESH	A	Allows fresh air to enter.
	RECIRCULATION	B	Causes internal air to recirculate.
			Varies the mixture

Air Mix Control Damper	MAX COLD to MAX HOT Temperature Setting	C, D	ratio of warm air and cool air in order to regulate the temperature continuously between hot and cold.
Air Outlet Control Damper	DEF.	E, K, N, Q	Defrosts the windshield through the center defroster, side defroster, and side register ducts.
	FOOT/DEF.	F, K, N, O	Defrosts the windshield through the center defroster, side defroster and side register ducts, while air is also blown out from the front and rear footwell register ducts.
	FOOT.	G, K, N, O	Air blows out of the footwell register and side register ducts. In addition, air blows out slightly from the center

			defroster and side defroster.
	BI-LEVEL	H, J, M, P	Air blows out of the front register, side register and front and rear footwell register ducts.
	FACE	H, I, L, Q	Air blows out of the front center register and side register ducts.

4. AIR OUTLETS AND AIRFLOW VOLUME

a. Air Outlets and Airflow Volume (Front Side)



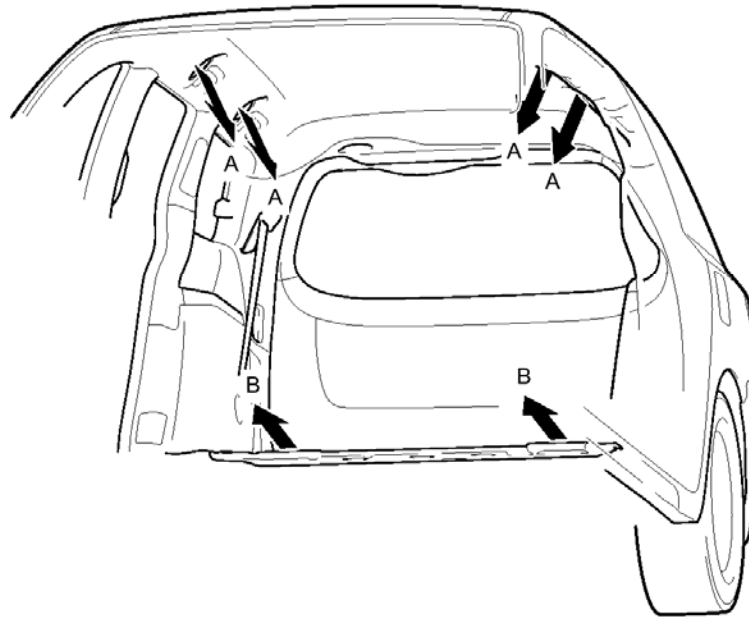
P

Fig. 12: Identifying Air Outlets And Airflow Volume (Front Side)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Indication	Mode	CENTER	SIDE	LOWER	DEF
		A	B	C	D
	FACE				
	B/L				
	FOOT				
	F/D				
	DEF				

The size of each circle o indicates the ratio of airflow volume.

b. Air Outlets and Airflow Volume (Rear Side)



P

Fig. 13: Identifying Air Outlets And Airflow Volume (Rear Side)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Indication	Mode	FACE	FOOT
		A	B
	FACE		
	B/L		
	FOOT		

The size of each circle o indicates the ratio of airflow volume.

5. A/C COMPRESSOR

a. General:

1. The A/C compressor is a continuously variable capacity type in which its capacity can be varied in accordance with the cooling load of the air conditioning system.
2. The compressor consists of the A/C pulley, shaft, lug plate, swash plate, piston, shoe, crank chamber, cylinder, solenoid valve and flow sensor.
3. The A/C pulley with built-in magnetic clutch has an A/C lock sensor that detects whether the A/C compressor is locked.
4. A solenoid valve that is provided to enable the suction pressure to be controlled as desired.

5. The internal valve is provided to improve the A/C compressor durability under the high speed and large thermal load conditions. The internal valve is integrated into the solenoid valve.

b. **Solenoid Valve Operation:**

1. The crank chamber is connected to the suction passage. A solenoid valve is provided between the suction passage (low pressure) and the discharge passage (high pressure).
2. The solenoid valve operates under duty cycle control in accordance with the signals from the air conditioning amplifier.
3. When the solenoid valve closes (solenoid coil is energized), a difference in pressure is created and the pressure in the crank chamber decreases. Then, the pressure that is applied to the right side of the piston becomes greater than the pressure that is applied to the left side of the piston. This compresses the spring and tilts the swash plate. As a result, the piston stroke increases and the discharge capacity also increases.
4. When the solenoid valve opens (solenoid coil is not energized), the difference in pressure disappears. Then, the pressure that is applied to the left side of the piston becomes the same as the pressure that is applied to the right side of the piston. Thus, the spring elongates and eliminates the tilt of the swash plate. As a result, there is no piston stroke, and the discharge capacity is reduced.

6. A/C LOCK SENSOR

The A/C lock sensor sends A/C pulley speed signals to the A/C amplifier. The A/C amplifier determines whether the A/C compressor is locked or not by using those signals and engine speed signals.

7. EVAPORATOR TEMPERATURE SENSOR

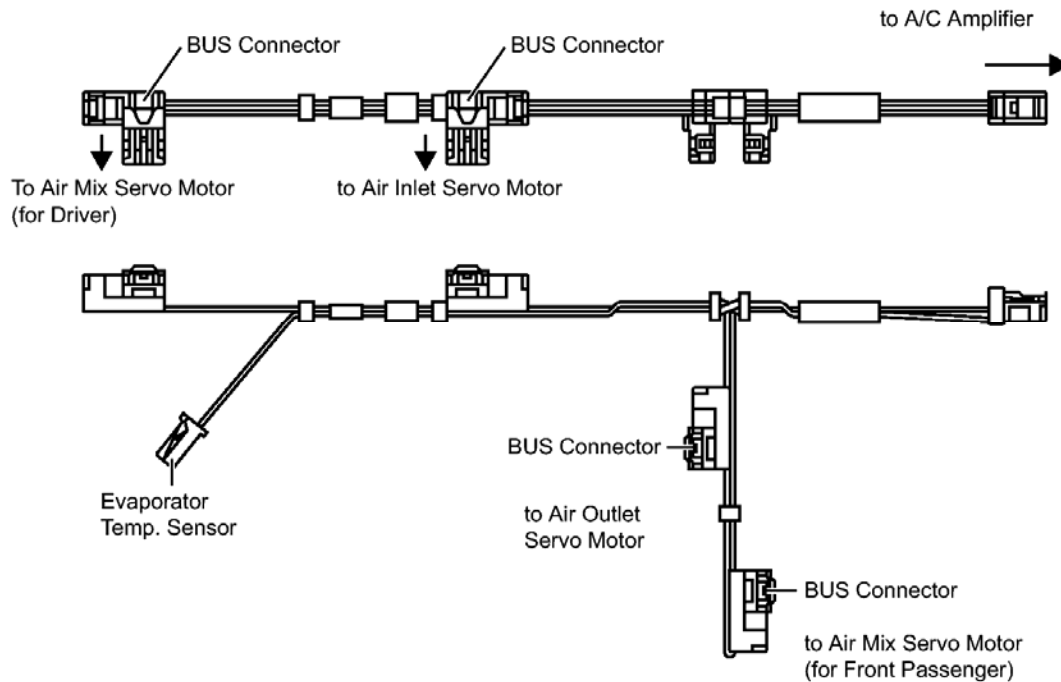
The evaporator temperature sensor detects the temperature of the cool air immediately through the evaporator in the form of resistance changes, and outputs it to the A/C amplifier.

8. BLOWER MOTOR

The blower motor has a built-in blower controller, and is controlled using duty control performed by the A/C amplifier.

9. BUS CONNECTOR (AIR CONDITIONING HARNESS)

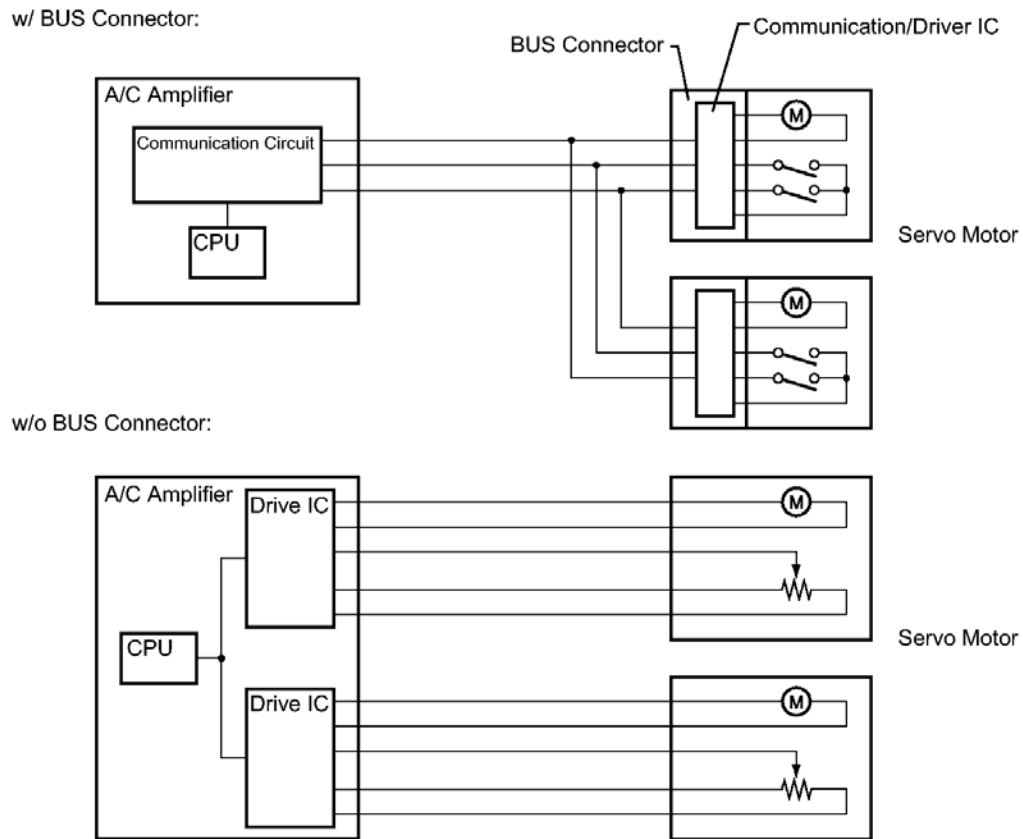
- a. A BUS connector is used in the wire harness connection that connects the servo motor from the A/C amplifier.



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Fig. 14: Identifying Bus Connector (Air Conditioning Harness)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Each BUS connector has a built-in communication/driver IC which communicates with each servo motor connector, actuates the servo motor, and has a position detection function. This enables bus communication for the servo motor wire harness, for a more lightweight construction and a reduced number of wires.

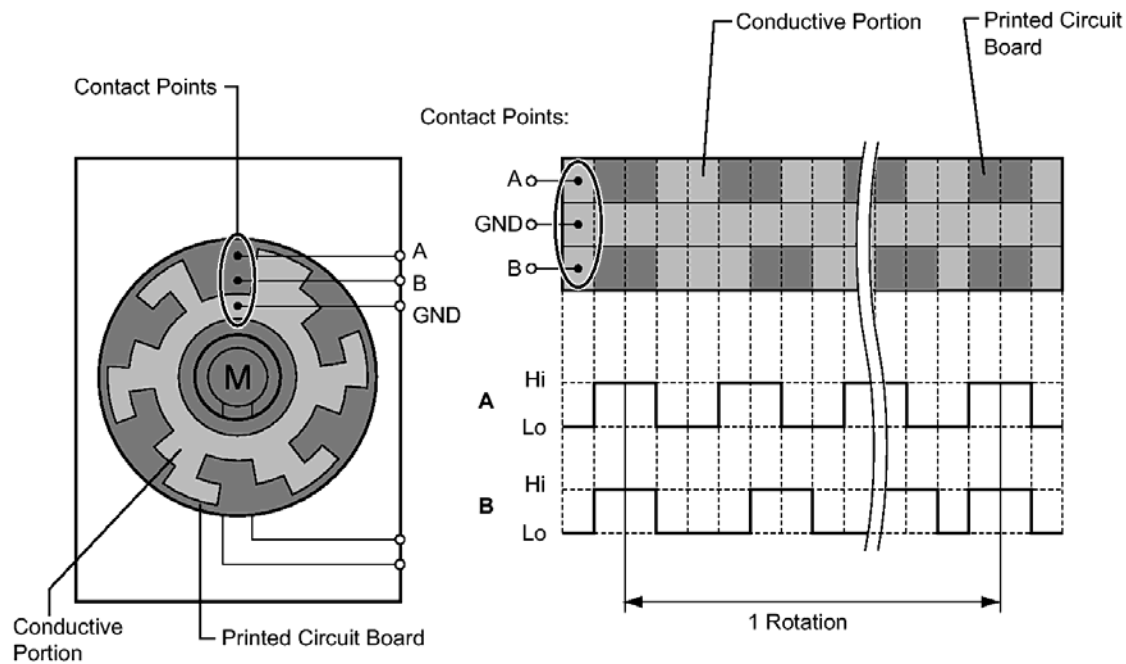


H

Fig. 15: Air Conditioning Harness Circuit Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

10. SERVO MOTOR

The pulse pattern type servo motor consists of a printed circuit board and a servo motor. The printed circuit board has three contact points, and can transmit two ON-OFF signals to the A/C amplifier based on the difference of the pulse phases. The BUS connector can detect the damper position and movement direction with this signal.



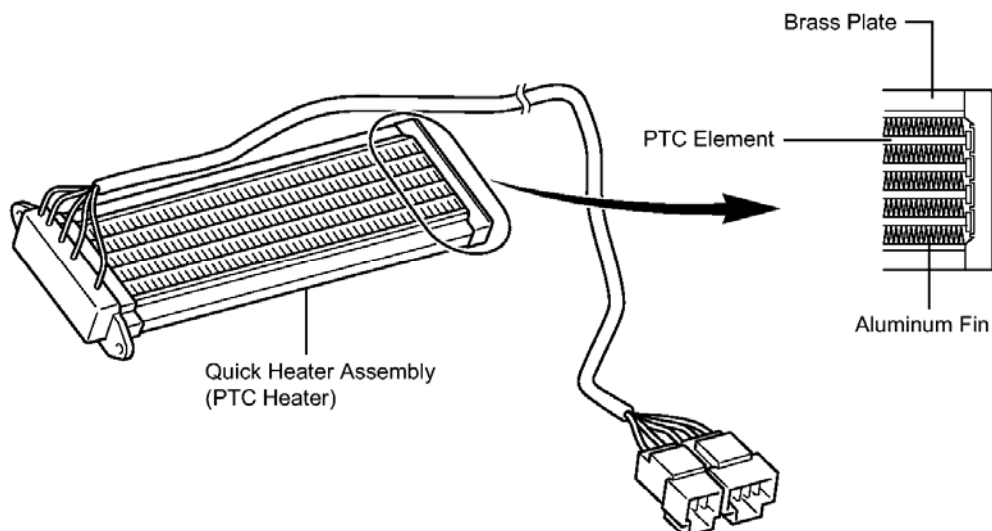
H

Fig. 16: Identifying Pulse Pattern Type Servo Motor And Printed Circuit Board
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

11. QUICK HEATER ASSEMBLY (w/ PTC Heater)

a. General

1. The PTC heater is located above the heater core in the air conditioner unit.
2. The PTC heater consists of a PTC element, aluminum fins and brass plates. When current is applied to the PTC element, it generates heat to warm the air that passes through the unit.



H

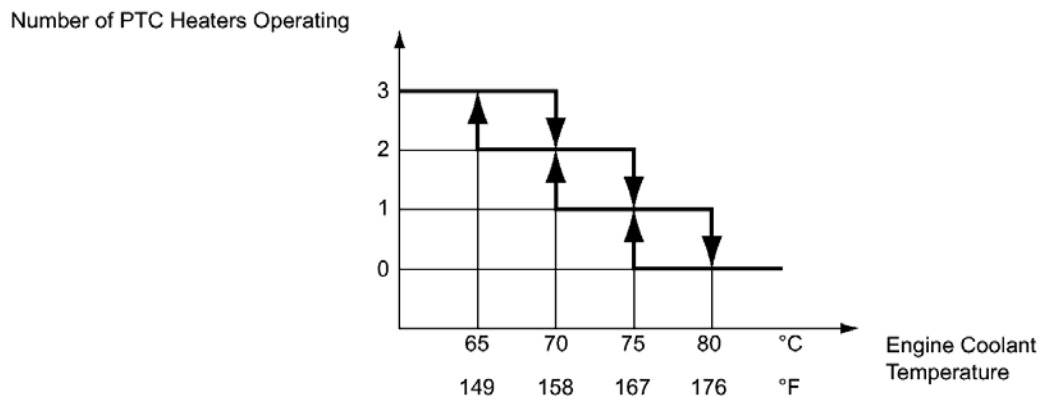
Fig. 17: Identifying Quick Heater Assembly (w/ PTC Heater)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. PTC Heater Operating Conditions

1. The on/off operation of the PTC heater is controlled by the air conditioning amplifier assembly in accordance with the engine coolant temperature, ambient temperature, engine speed, air mix setting and electrical load (generator power ratio).

For example, the number of operating PTC heaters varies according to engine coolant temperature as shown in the graph below.

Heater Operation Pattern:



H

Fig. 18: Identifying PTC Heater Operating Conditions
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

12. **ROOM TEMPERATURE SENSOR**

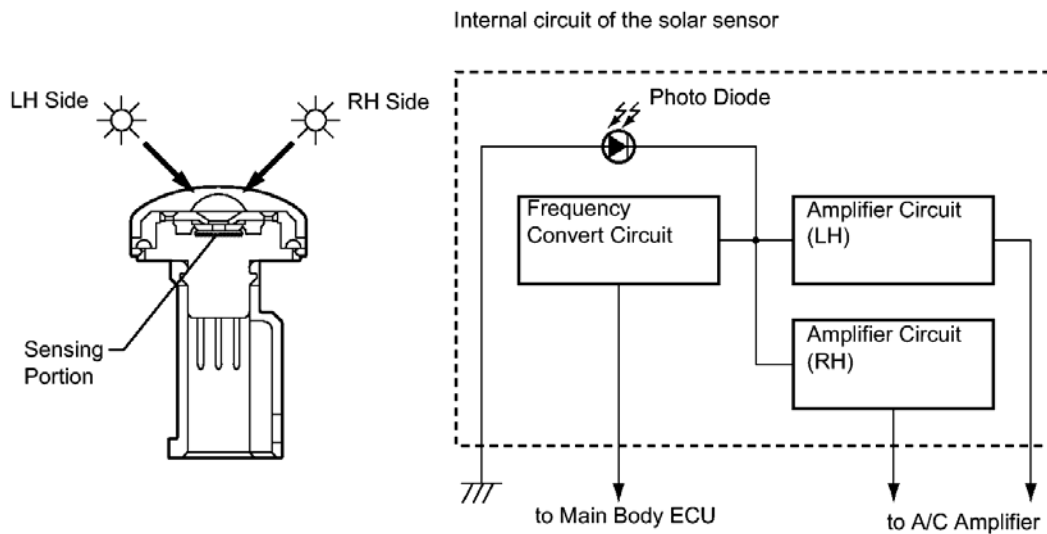
The room temperature sensor detects the cabin temperature based on changes in the resistance of its built-in thermistor and sends a signal to the A/C amplifier.

13. **AMBIENT TEMPERATURE SENSOR**

The ambient temperature sensor detects the outside temperature based on changes in the resistance of its built-in thermistor and sends a signal to the A/C amplifier.

14. **SOLAR SENSOR**

- a. The solar sensor consists of a photo diode, two amplifier circuits for the solar sensor, and frequency converter circuit for the light control sensor.
- b. The solar sensor detects (in the form of changes in the current that flows through the built-in photo diode) the changes in the amount of sunlight from the LH and RH sides (2 directions) and outputs these sunlight strength signals to the A/C amplifier.



H

Fig. 19: Solar Sensor - Internal Circuit Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

15. AIR CONDITIONER PRESSURE SENSOR

The air conditioner pressure sensor detects the refrigerant pressure and outputs it to the A/C amplifier in the form of voltage changes.

HOW TO PROCEED WITH TROUBLESHOOTING

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedure to troubleshoot the air conditioning system.
- *: Use the Techstream.

1. VEHICLE BROUGHT TO WORKSHOP

NEXT: Go to next step

2. INSPECT BATTERY VOLTAGE

- Inspect the battery voltage.

Standard Voltage

11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding to the next step.

NEXT: Go to next step

3. CHECK COMMUNICATION FUNCTION OF LIN COMMUNICATION SYSTEM*

- a. Use the Techstream to check if the LIN communication system is functioning normally.

RESULT

Result	Proceed to
LIN DTC is not output	A
LIN DTC is output	B

B --> GO TO LIN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING

A: Go to next step

4. CHECK COMMUNICATION FUNCTION OF CAN COMMUNICATION SYSTEM*

- a. Use the Techstream to check if the CAN communication system is functioning normally.

RESULT

Result	Proceed to
CAN DTC is not output	A
CAN DTC is output	B

B --> GO TO CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING

A: Go to next step

5. CHECK FOR DTC*

- a. Check for DTCs and note any code that is output.
- b. Clear the DTCs.
- c. Recheck for DTCs. Based on the DTCs output above, try to force the A/C system to output DTCs by simulating the conditions indicated by the DTC.

RESULT

Result	Proceed to
DTC is not output	A
DTC is output	B

B --> Go to step 8

A: Go to next step

6. PROBLEM SYMPTOMS TABLE

- a. Refer to **PROBLEM SYMPTOMS TABLE**.

RESULT

Result	Proceed to
Fault is not listed in Problem Symptoms Table	A
Fault is listed in Problem Symptoms Table	B

B --> Go to step 8

A: Go to next step

7. OVERALL ANALYSIS AND TROUBLESHOOTING*

- a. Panel diagnosis (indicator check). Refer to **DIAGNOSIS SYSTEM**
- b. Panel diagnosis (sensor check). Refer to **DIAGNOSIS SYSTEM**

- c. Data List / Active Test. Refer to **DATA LIST / ACTIVE TEST**
- d. Terminals of ECU. Refer to **TERMINALS OF ECU**
- e. On-vehicle Inspection
- f. Inspection

NEXT: Go to next step

8. ADJUST, REPAIR OR REPLACE

NEXT --> END

CUSTOMIZE PARAMETERS

CUSTOMIZE PARAMETERS

HINT:

The following items can be customized.

NOTE:

- When the customer requests a change in a function, first make sure that the function can be customized.
- Be sure to make a note of the current settings before customizing.
- When troubleshooting a function, first make sure that the function is set to the default setting.

AIR CONDITIONER

Display (Item)	Default	Content	Setting
Set Temperature Shift	Normal	Function to control with the shifted temperature against the displayed temperature	+2 C, +1 C, Normal, -1 C or -2 C
Evaporator Control	AUTO	Function to set the evaporator control to the AUTOMATIC position (AUTO) to save power, or to the coldest position (MANUAL) to dehumidify air and to prevent the windows from fogging up	MANUAL or AUTO
Compressor Mode	AUTO	Function to automatically turn the A/C on by pressing the AUTO button when blower is on and the A/C is off	MANUAL or AUTO
Air Inlet Mode	AUTO	Function to shift from INLET mode to RECIRCULATION mode when the A/C is turned on	MANUAL or AUTO
Foot / DEF Auto Mode	ON	Function to automatically turn the airflow from FOOT/DEF on when AUTO mode is on	OFF or ON

Foot / DEF Automatic Blow Up Function	ON	Function to automatically increase the blower level when the defroster is on	OFF or ON
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PROBLEM SYMPTOMS TABLE

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

FRONT AIR CONDITIONING SYSTEM

Symptom	Suspected Area	See
All functions of the A/C system do not operate	IG power source circuit	Refer to <u>IG Power Source Circuit</u>
	Back-up power source circuit	Refer to <u>Back-up Power Source Circuit</u>
	Air conditioning control panel circuit	Refer to <u>Air Conditioning Control Panel Circuit</u>
	Air conditioning amplifier	Refer to <u>REMOVAL</u>
Air flow control: No blower operation	Blower motor circuit	Refer to <u>Blower Motor Circuit</u>
	Air conditioning control panel circuit	Refer to <u>Air Conditioning Control Panel Circuit</u>
	Air conditioning amplifier	Refer to <u>REMOVAL</u>
Air flow control: No blower control	Blower motor circuit	Refer to <u>Blower Motor Circuit</u>
	Air conditioning control panel circuit	Refer to <u>Air Conditioning Control Panel Circuit</u>
	Air conditioning amplifier	Refer to <u>REMOVAL</u>
Air flow control: Insufficient air flow	Blower motor circuit	Refer to <u>Blower Motor Circuit</u>
	Air conditioning amplifier	Refer to <u>REMOVAL</u>
	Refrigerant volume	-
	Refrigerant pressure	Refer to <u>ON-VEHICLE INSPECTION</u>
	Pressure sensor circuit	Refer to <u>DTC B1423/23: Pressure Sensor Circuit</u>
	Air conditioning compressor magnetic clutch circuit	Refer to <u>Air Conditioning Compressor Magnetic Clutch Circuit</u>
	Compressor lock sensor circuit	Refer to <u>DTC B1422/22: Compressor Lock Sensor Circuit</u>
	Compressor solenoid circuit	Refer to <u>DTC B1451/51: Compressor Solenoid Circuit</u>
	Air mix damper control servo	Refer to <u>DTC B1446/46: Air Mix Damper Control Servo Motor Circuit</u>

Temperature control: No cool air comes out	motor circuit (for Driver side)	<u>(Driver Side)</u>
	Air mix damper control servo motor circuit (for Passenger side)	Refer to <u>DTC B1441/41: Air Mix Damper Control Servo Motor Circuit (Passenger Side)</u>
	Evaporator temperature sensor circuit	Refer to <u>DTC B1413/13: Evaporator Temperature Sensor Circuit</u>
	Room temperature sensor circuit	Refer to <u>DTC B1411/11: Room Temperature Sensor Circuit</u>
	Ambient temperature sensor circuit	Refer to <u>DTC B1412/12: Ambient Temperature Sensor Circuit</u>
	Air conditioning control panel circuit	Refer to <u>Air Conditioning Control Panel Circuit</u>
	Expansion valve	Refer to <u>DISASSEMBLY</u>
	Air conditioning amplifier	Refer to <u>REMOVAL</u>
	ECM (for 2GR-FE)	Refer to <u>REMOVAL</u>
	ECM (for 1AR-FE)	Refer to <u>REMOVAL</u>
Temperature control: No warm air comes out	Air mix damper control servo motor circuit (for Driver side)	Refer to <u>DTC B1446/46: Air Mix Damper Control Servo Motor Circuit (Driver Side)</u>
	Air mix damper control servo motor circuit (for Passenger side)	Refer to <u>DTC B1441/41: Air Mix Damper Control Servo Motor Circuit (Passenger Side)</u>
	Evaporator temperature sensor circuit	Refer to <u>DTC B1413/13: Evaporator Temperature Sensor Circuit</u>
	Room temperature sensor circuit	Refer to <u>DTC B1411/11: Room Temperature Sensor Circuit</u>
	Ambient temperature sensor circuit	Refer to <u>DTC B1412/12: Ambient Temperature Sensor Circuit</u>
	Air conditioning control panel circuit	Refer to <u>Air Conditioning Control Panel Circuit</u>
	Air conditioning amplifier	Refer to <u>REMOVAL</u>
	Generator signal circuit	Refer to <u>Generator Signal Circuit</u>
	ECM (for 2GR-FE)	Refer to <u>REMOVAL</u>
	ECM (for 1AR-FE)	Refer to <u>REMOVAL</u>
	Refrigerant volume	-
	Refrigerant pressure	Refer to <u>ON-VEHICLE INSPECTION</u>
	Air conditioning compressor magnetic clutch circuit	Refer to <u>Air Conditioning Compressor Magnetic Clutch Circuit</u>
	Compressor lock sensor circuit	Refer to <u>DTC B1422/22: Compressor Lock Sensor Circuit</u>
	Compressor solenoid circuit	Refer to <u>DTC B1451/51: Compressor Solenoid Circuit</u>
	Driver side solar sensor short circuit	Refer to <u>DTC B14A2: Driver Side Solar Sensor Short Circuit</u>

Temperature control: Output air is warmer or cooler than the set temperature or response is slow	Front passenger side solar sensor short circuit	Refer to <u>DTC B14A3: Front Passenger Side Solar Sensor Short Circuit</u>
	Room temperature sensor circuit	Refer to <u>DTC B1411/11: Room Temperature Sensor Circuit</u>
	Ambient temperature sensor circuit	Refer to <u>DTC B1412/12: Ambient Temperature Sensor Circuit</u>
	Air mix damper control servo motor circuit (for Driver side)	Refer to <u>DTC B1446/46: Air Mix Damper Control Servo Motor Circuit (Driver Side)</u>
	Air mix damper control servo motor circuit (for Passenger side)	Refer to <u>DTC B1441/41: Air Mix Damper Control Servo Motor Circuit (Passenger Side)</u>
	Air inlet damper control servo motor circuit	Refer to <u>DTC B1442/42: Air Inlet Damper Control Servo Motor Circuit</u>
	Air conditioning control panel circuit	Refer to <u>Air Conditioning Control Panel Circuit</u>
	Radiator unit sub-assembly	Refer to <u>DISASSEMBLY</u>
	Expansion valve	Refer to <u>DISASSEMBLY</u>
	Air conditioning amplifier	Refer to <u>REMOVAL</u>
	ECM (for 2GR-FE)	Refer to <u>REMOVAL</u>
	ECM (for 1AR-FE)	Refer to <u>REMOVAL</u>
Temperature control: No temperature control (only Max. cool or Max. warm)	Air mix damper control servo motor circuit (for Driver side)	Refer to <u>DTC B1446/46: Air Mix Damper Control Servo Motor Circuit (Driver Side)</u>
	Air mix damper control servo motor circuit (for Passenger side)	Refer to <u>DTC B1441/41: Air Mix Damper Control Servo Motor Circuit (Passenger Side)</u>
	Room temperature sensor circuit	Refer to <u>DTC B1411/11: Room Temperature Sensor Circuit</u>
	Ambient temperature sensor circuit	Refer to <u>DTC B1412/12: Ambient Temperature Sensor Circuit</u>
	Evaporator temperature sensor circuit	Refer to <u>DTC B1413/13: Evaporator Temperature Sensor Circuit</u>
	Driver side solar sensor short circuit	Refer to <u>DTC B14A2: Driver Side Solar Sensor Short Circuit</u>
	Front passenger side solar sensor short circuit	Refer to <u>DTC B14A3: Front Passenger Side Solar Sensor Short Circuit</u>
	Air conditioning control panel circuit	Refer to <u>Air Conditioning Control Panel Circuit</u>
No air inlet control	Air conditioning amplifier	Refer to <u>REMOVAL</u>
	Air inlet damper control servo motor circuit	Refer to <u>DTC B1442/42: Air Inlet Damper Control Servo Motor Circuit</u>
	Air conditioning control panel circuit	Refer to <u>Air Conditioning Control Panel Circuit</u>

	Air conditioning amplifier	Refer to <u>REMOVAL</u>
No air flow mode control	Air outlet damper control servo motor circuit	Refer to <u>DTC B1443/43: Air Outlet Damper Control Servo Motor Circuit</u>
	Air conditioning control panel circuit	Refer to <u>Air Conditioning Control Panel Circuit</u>
	Air conditioning amplifier	Refer to <u>REMOVAL</u>
Engine coolant does not warm up quickly when engine is cold (PTC heater does not operate) *1	PTC heater circuit	Refer to <u>PTC Heater Circuit</u>
	Generator signal circuit	Refer to <u>Generator Signal Circuit</u>
	Generator assembly	Refer to <u>REMOVAL</u>
	Air conditioning amplifier	Refer to <u>REMOVAL</u>
Engine does not start for heater	Air conditioning compressor magnetic clutch circuit	Refer to <u>Air Conditioning Compressor Magnetic Clutch Circuit</u>
	Compressor lock sensor circuit	Refer to <u>DTC B1422/22: Compressor Lock Sensor Circuit</u>
	Compressor solenoid circuit	Refer to <u>DTC B1451/51: Compressor Solenoid Circuit</u>
	Air conditioning amplifier	Refer to <u>REMOVAL</u>
Blinking of A/C indicator	Compressor solenoid circuit	Refer to <u>DTC B1451/51: Compressor Solenoid Circuit</u>
	Air conditioning amplifier	Refer to <u>REMOVAL</u>
Diagnostic trouble codes (DTCs) are not recorded. Set mode is cleared when ignition switch is off.	Back-up power source circuit	Refer to <u>Back-up Power Source Circuit</u>
	Air conditioning amplifier	Refer to <u>REMOVAL</u>

*1: w/ PTC Heater

REAR AIR CONDITIONING SYSTEM

Symptom	Suspected Area	See
All functions of the A/C system do not operate	Air conditioning amplifier	Refer to <u>REMOVAL</u>
	Rear air conditioning control panel circuit	Refer to <u>Rear Air Conditioning Control Panel Circuit</u>
	No. 2 air conditioning control panel assembly	Refer to <u>Rear Air Conditioning Control Panel Circuit</u>
Air Flow Control: No blower operation	Rear blower motor circuit	Refer to <u>Rear Blower Motor Circuit</u>
	No. 2 air conditioning control panel assembly	Refer to <u>Rear Air Conditioning Control Panel Circuit</u>
	Air conditioning amplifier	Refer to <u>REMOVAL</u>
Air Flow Control: No blower control	Rear blower motor circuit	Refer to <u>Rear Blower Motor Circuit</u>
	No. 2 air conditioning control panel assembly	Refer to <u>Rear Air Conditioning Control Panel Circuit</u>
	Air conditioning amplifier	Refer to <u>REMOVAL</u>
	Rear blower motor circuit	Refer to <u>Rear Blower Motor Circuit</u>

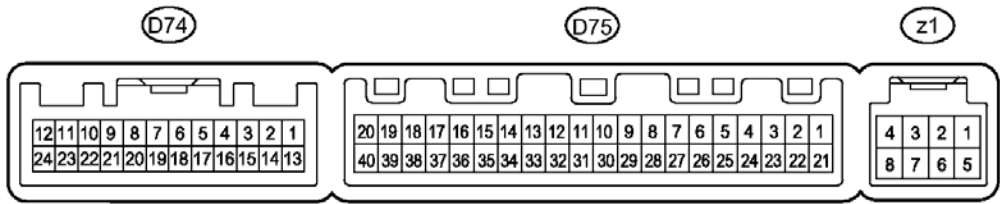
Air Flow Control: Insufficient air out	No. 2 air conditioning control panel assembly	Refer to <u>Rear Air Conditioning Control Panel Circuit</u>
	Air conditioning amplifier	Refer to <u>REMOVAL</u>
Temperature Control: Cool air does not come out	Volume of refrigerant	Refer to <u>ON-VEHICLE INSPECTION</u>
	Drive belt tension	-
	Refrigerant pressure	Refer to <u>ON-VEHICLE INSPECTION</u>
	Air conditioning compressor magnetic clutch circuit	Refer to <u>Air Conditioning Compressor Magnetic Clutch Circuit</u>
	Pressure sensor circuit	Refer to <u>DTC B1423/23: Pressure Sensor Circuit</u>
	Ambient temperature sensor circuit	Refer to <u>DTC B1412/12: Ambient Temperature Sensor Circuit</u>
	Rear evaporator temperature sensor circuit	Refer to <u>DTC B1417/17: Rear Evaporator Temperature Sensor Circuit</u>
	No. 2 air conditioning control panel assembly	Refer to <u>Rear Air Conditioning Control Panel Circuit</u>
	Air conditioning amplifier	Refer to <u>REMOVAL</u>
Temperature Control: Warm air does not come out	Rear air mix damper control servo motor circuit	Refer to <u>DTC B1447/47: Rear Air Mix Damper Control Servo Motor Circuit</u>
	Ambient temperature sensor circuit	Refer to <u>DTC B1412/12: Ambient Temperature Sensor Circuit</u>
	Rear room temperature sensor circuit	Refer to <u>DTC B1419/19: Rear Room Temperature Sensor Circuit</u>
	Rear evaporator temperature sensor circuit	Refer to <u>DTC B1417/17: Rear Evaporator Temperature Sensor Circuit</u>
	No. 2 air conditioning control panel assembly	Refer to <u>Rear Air Conditioning Control Panel Circuit</u>
	Air conditioning amplifier	Refer to <u>REMOVAL</u>
	Heater radiator	Refer to <u>DISASSEMBLY</u>
Temperature Control: Output air is warmer or cooler than the set temperature or response is slow	Rear room temperature sensor circuit	Refer to <u>DTC B1419/19: Rear Room Temperature Sensor Circuit</u>
	Ambient temperature sensor circuit	Refer to <u>DTC B1412/12: Ambient Temperature Sensor Circuit</u>
	Rear air mix damper control servo motor circuit	Refer to <u>DTC B1447/47: Rear Air Mix Damper Control Servo Motor Circuit</u>
	Air conditioning amplifier	Refer to <u>REMOVAL</u>
Temperature Control: No temperature control (only Max. cool or Max. hot)	Rear air mix damper control servo motor circuit	Refer to <u>DTC B1447/47: Rear Air Mix Damper Control Servo Motor Circuit</u>
	No. 2 air conditioning control panel assembly	Refer to <u>Rear Air Conditioning Control Panel Circuit</u>
	Air conditioning amplifier	Refer to <u>REMOVAL</u>
No air outlet control	Rear air outlet damper control servo motor circuit	Refer to <u>DTC B1449/49: Rear Air Outlet Damper Control Servo Motor Circuit</u>
	No. 2 air conditioning control	Refer to <u>Rear Air Conditioning Control</u>

	panel assembly	Panel Circuit
	Air conditioning amplifier	Refer to REMOVAL

TERMINALS OF ECU

TERMINALS OF ECU

1. AIR CONDITIONING AMPLIFIER



H
Fig. 20: Air Conditioning Amplifier Connector Terminal Identification
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

Check from the rear of the connector while it is connected to the air conditioning amplifier.

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
D75-1 (IG+) - D75-14 (GND)	R - W- B	Power source (IG)	Ignition switch ON	11 to 14 V
D75-1 (IG+) - D75-14 (GND)	R - W- B	Power source (IG)	Ignition switch off	Below 1 V
D75-2 (SOL+) - D75-14 (GND)	L - W- B	A/C compressor solenoid operation signal	Engine running A/C switch: on Blower switch: LO	Pulse generation (See Fig. 21)
			- Engine running (1250 RPM or more) - Temperature setting	

D75-3 (PTC1) - Body ground*1	V - Body ground	PTC NO. 1 relay operation signal	MAX HOT • Outside temperature 10°C (50°F) or less • Engine coolant temperature 75°C (167°F) or less • Headlight dimmer switch off • Blower switch on	11 to 14 V*2
D75-4 (PTC3) - Body ground*1	G - Body ground	PTC NO. 3 relay operation signal	• Engine running (1250 RPM or more) • Temperature setting MAX HOT • Outside temperature 10°C (50°F) or less • Engine coolant temperature 65°C (149°F) or less • Headlight dimmer switch off • Blower switch on	11 to 14 V*2
D75-5 (TAM) - D75-14 (GND)	B - W- B	Ambient temperature sensor signal	Ignition switch ON Ambient temperature: 25°C (77°F)	1.35 to 1.75 V
D75-5 (TAM) - D75-14	B - W- B	Ambient temperature sensor signal	Ignition switch ON Ambient temperature: 40°C	0.9 to 1.2 V

(GND)			(104°F)	
D75-7 (FLOQ) - Body ground	R - Body ground	Flow sensor signal	Always	10 kohms or higher
D75-8 (LOCK) *5 - D75- 14 (GND)	W - W- B	A/C compressor lock sensor signal	Engine running Blower switch: LO A/C switch: on	Pulse generation (See Fig. 22)
D75-9 (PRE) - D75-13 (SG-2)	V - W	A/C pressure sensor signal	Start engine, Operate A/C system, Refrigerant pressure: Abnormal pressure (more than 3140 kPa (32.0 kgf/cm ² , 455 psi))	4.88 V or higher
D75-9 (PRE) - D75-13 (SG-2)	V - W	A/C pressure sensor signal	Start engine, Operate A/C system, Refrigerant pressure: Abnormal pressure (less than 196 kPa (2.0 kgf/cm ² , 28 psi))	Below 0.66 V
D75-9 (PRE) - D75-13 (SG-2)	V - W	A/C pressure sensor signal	Start engine, Operate A/C system, Refrigerant pressure: Normal pressure (less than 3140 kPa (32.0 kgf/cm ² , 455 psi) and more than 196 kPa (2.0 kgf/cm ² , 28 psi))	0.66 to 4.88 V
D75-10 (S5-3) - D75-13 (SG-2)	LG - W	Power supply for A/C pressure sensor	Ignition switch ON A/C switch: on	4.75 to 5.25 V
D75-10 (S5-3) -	LG -	Power supply	Ignition switch	4.75 to

D75-13 (SG-2)	W	for A/C pressure sensor	ON A/C switch: off	5.25 V
D75-11 (CANH) - D75-12 (CANL)	V*3 - W G*4 - W	CAN communication system	CAN communication circuit	Pulse generation
D75-13 (SG-2) - Body ground	W - Body ground	Ground for A/C pressure sensor, A/C ambient temperature sensor, A/C lock sensor	Always	Below 1 V
D75-14 (GND) - Body ground	W-B - Body ground	Ground for main power supply	Always	Below 1 V
D75-20 (MGC)*5 - D75-14 (GND)	R - W- B	A/C compressor magnetic clutch operation signal	Ignition switch ON Blower switch: LO A/C switch: off	11 to 14 V
D75-20 (MGC)*5 - D75-14 (GND)	R - W- B	A/C compressor magnetic clutch operation signal	Ignition switch ON Blower switch: LO A/C switch: on	Below 1 V
D75-21 (B) - D75-14 (GND)	P - W- B	Power source (Back-up)	Always	11 to 14 V
D75-22 (PTC2) - Body ground*1	Y - Body ground	PTC NO. 2 relay operation signal	• Engine running (1250 RPM or more) • Temperature setting MAX HOT • Outside temperature 10°C (50°F) or less • Engine coolant	11 to 14 V*2

			temperature 70°C (158° F) or less • Headlight dimmer switch off • Blower switch on	
D75-23 (BLW) - D75-14 (GND)	P - W- B	Blower motor speed control signal	Ignition switch ON Blower switch: on	Pulse generation (See Fig. 23)
D75-25 (ALT) - Body ground	L - Body ground	Generator signal	Engine idling	Pulse generation
D75-29 (TR) - D75-34 (SG-1)	G - W	Room temperature sensor signal	Ignition switch ON Cabin temperature: 25°C (77°F)	1.8 to 2.2 V
D75-29 (TR) - D75-34 (SG-1)	G - W	Room temperature sensor signal	Ignition switch ON Cabin temperature: 40°C (104°F)	1.2 to 1.6 V
D75-30 (S5-1) - Body ground	B - Body ground	Flow sensor signal	Always	10 kohms or higher
D75-32 (TSP) - D75-14 (GND)	B - W- B	Solar sensor signal (for Front passenger side)	Ignition switch ON Solar sensor subjected to electric light	0.8 to 4.3 V
D75-32 (TSP) - D75-14 (GND)	B - W- B	Solar sensor signal (for Front passenger side)	Ignition switch ON Solar sensor covered with a cloth	Below 0.8 V
D75-33 (TSD) - D75-14 (GND)	Y - W- B	Solar sensor signal (for Driver side)	Ignition switch ON Solar sensor subjected to electric light	0.8 to 4.3 V
			Ignition switch	

D75-33 (TSD) - D75-14 (GND)	Y - W- B	Solar sensor signal (for Driver side)	ON Solar sensor covered with a cloth	Below 0.8 V
D75-34 (SG-1) - Body ground	W - Body ground	Ground for room temperature sensor	Always	Below 1 V
D75-37 (LIN1) - D75-14 (GND)	LG - W-B	LIN communication signal	Ignition switch ON	Pulse generation
D75-38 (RDFG) - D75-14 (GND)	Y - W- B	DEF relay signal	Ignition switch ON REAR DEF switch: on	Below 1 V
D75-38 (RDFG) - D75-14 (GND)	Y - W- B	DEF relay signal	Ignition switch ON REAR DEF switch: off	11 to 14 V
D75-39 (MHTR) - D75-14 (GND)	B - W- B	Mirror heater relay drive signal	Mirror heater switch OFF-->ON	11 to 14 V --> Below 1 V
D74-1 (RBUS) - D74-21 (RBUG)	V - P	BUS IC control signal (for Rear)	Ignition switch ON	Pulse generation
D74-4 (TEC) - D74-19 (SGND)	SB - G	Rear evaporator temperature sensor signal	Ignition switch ON Rear evaporator temperature: 0°C (32°F)	2.0 to 2.4 V
D74-4 (TEC) - D74-19 (SGND)	SB - G	Rear evaporator temperature sensor signal	Ignition switch ON Rear evaporator temperature: 15°C (59°F)	1.4 to 1.8 V
D74-7 (SG-6) - Body ground	Y - Body ground	Ground for rear room temperature sensor	Always	Below 1 V
D74-13 (RLIN) - D74-20 (GND2)	L - W- B	LIN communication signal	Ignition switch ON	Pulse generation

D74-17 (TR) - D74-7 (SG-6)	G - Y	Rear room temperature sensor signal	Ignition switch ON Cabin temperature: 25°C (77°F)	1.8 to 2.2 V
D74-17 (TR) - D74-7 (SG-6)	G - Y	Rear room temperature sensor signal	Ignition switch ON Cabin temperature: 40°C (104°F)	1.2 to 1.6 V
D74-19 (SGND) - Body ground	G - Body ground	Ground for rear evaporator temperature sensor	Always	Below 1 V
D74-20 (GND2) - Body ground	W-B - Body ground	Ground for power supply	Always	Below 1 V
D74-21 (RBUG) - Body ground	P - Body ground	Ground for BUS IC (for Rear)	Always	Below 1 V
D74-22 (BLWH) - D74-20 (GND2)	L - W-B	Rear blower motor control signal	Ignition switch ON Rear blower switch: on	Pulse generation (See Fig. 23)
D74-23 (RBBU) - D74-21 (RBUG)	GR - P	Power supply for BUS IC (for Rear)	Ignition switch ON	11 to 14 V
D74-24 (+B2) - D74-20 (GND2)	P - W-B	Power source (Back-up)	Always	11 to 14 V
z1-2 (BUS G) - Body ground	-	Ground for BUS IC	Always	Below 1 V
z1-3 (BUS) - z1-2 (BUS G)	-	BUS IC control signal	Ignition switch ON	Pulse generation
z1-4 (B BUS) - z1-2 (BUS G)	-	Power supply for BUS IC	Ignition switch off	11 to 14 V

z1-4 (B BUS) - z1-2 (BUS G)	-	Power supply for BUS IC	Ignition switch ON	11 to 14 V
z1-5 (SGA) - Body ground	-	Ground for evaporator temperature sensor	Always	Below 1 V
z1-6 (TEA) - z1-5 (SGA)	-	A/C evaporator temperature sensor signal	Ignition switch ON Evaporator temperature: 0°C (32°F)	1.7 to 2.1 V
z1-6 (TEA) - z1-5 (SGA)	-	A/C evaporator temperature sensor signal	Ignition switch ON Evaporator temperature: 15°C (59°F)	0.9 to 1.3 V

*1: w/ PTC Heater

HINT:

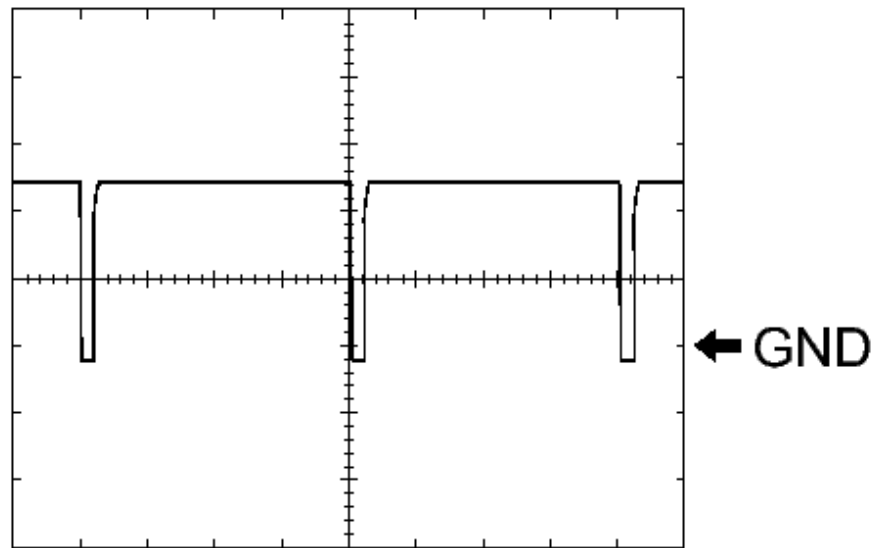
*2: After the measurement conditions are met, wait 30 seconds before performing measurements. If the result is not as specified, the air conditioning amplifier assembly may have a malfunction.

*3: w/ Smart Key System

*4: w/o Smart Key System

*5: for 2GR-FE

a. Waveform 1:

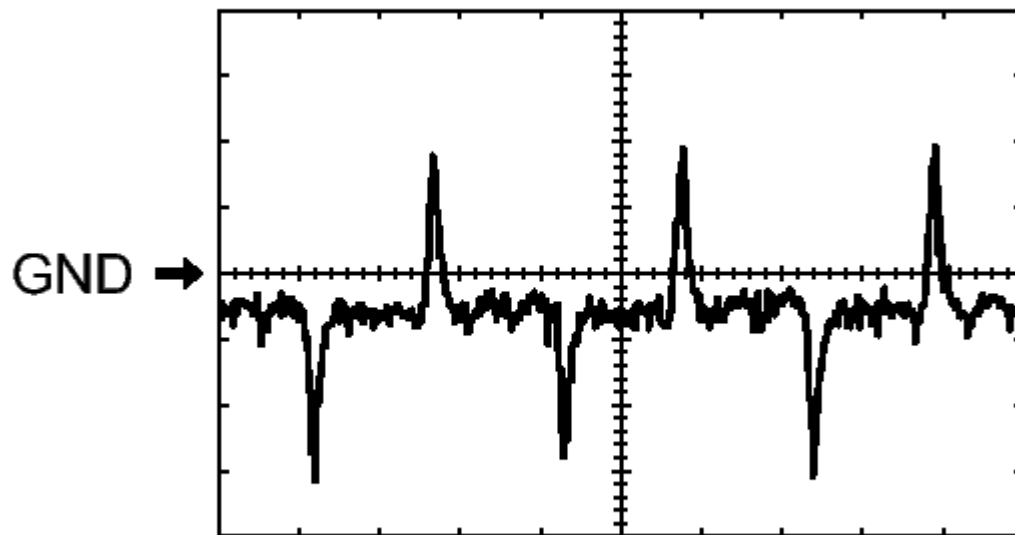


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Fig. 21: Identifying Waveform 1
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Item	Content
Terminal No.	D75-2 (SOL+) - D75-14 (GND)
Tool Setting	5 V/DIV., 500 μ s/DIV.
Vehicle Condition	Engine running A/C switch: on

b. Waveform 2:



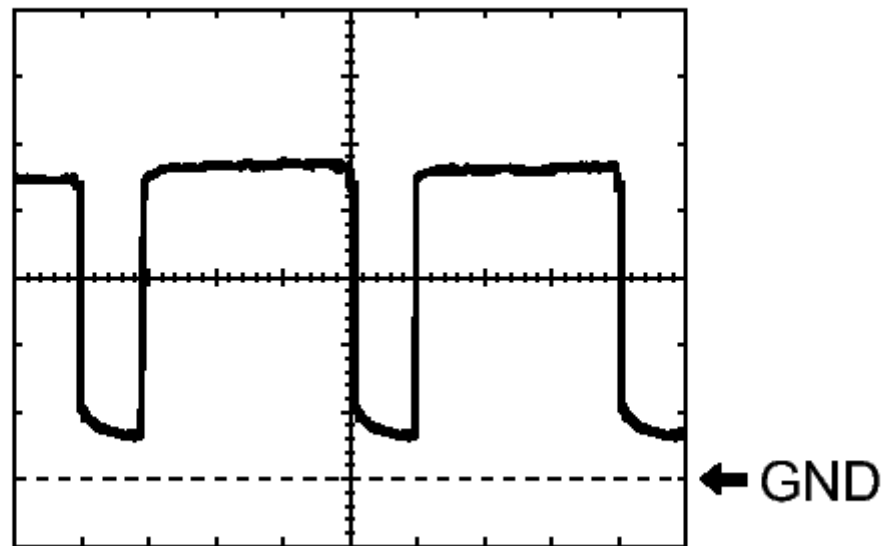
H

Fig. 22: Identifying Waveform 2

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Item	Content
Terminal No.	D75-8 (LOCK) - D75-14 (GND)
Tool Setting	200 mV/DIV., 10 ms./DIV.
Vehicle Condition	Engine running Blower switch: LO A/C switch: on

c. Waveform 3:



H

Fig. 23: Identifying Waveform 3

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Item	Content
Terminal No.	D75-23 (BLW) - D75-14 (GND)
	D74-22 (BLWH) - D74-20 (GND2)
Tool Setting	1 V/DIV., 500 μ s/DIV.
Vehicle Condition	Ignition switch ON Blower switch: on

2. AIR CONDITIONING CONTROL ASSEMBLY (for Front)

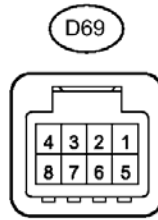


Fig. 24: Air Conditioning Control Assembly (For Front) Connector Terminal Identification
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

Check from the rear of the connector while it is connected to the air conditioning control assembly (for front).

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
D69-8 (LIN1) - D69-5 (GND)	LG - W-B	LIN communication signal	Ignition switch ON	Pulse generation
D69-5 (GND) - Body ground	W-B - Body ground	Ground for front air conditioning control assembly	Always	Below 1 V
D69-4 (IG+) - D69-5 (GND)	R - W- B	Power source (IG)	Ignition switch off	Below 1 V
D69-4 (IG+) - D69-5 (GND)	R - W- B	Power source (IG)	Ignition switch ON	11 to 14 V

3. NO. 2 AIR CONDITIONING CONTROL ASSEMBLY

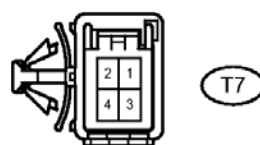


Fig. 25: No. 2 Air Conditioning Control Assembly Connector Terminal Identification
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

Check from the rear of the connector while it is connected to the No. 2 air conditioning control assembly.

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
T7-2 (RLIN) - T7-4 (E)	L - W-B	LIN communication signal (for Rear)	Ignition switch ON	Pulse generation
T7-1 (IG) - T7-4 (E)	R - W-B	Power source (IG)	Ignition switch off	Below 1 V
T7-1 (IG) - T7-4 (E)	R - W-B	Power source (IG)	Ignition switch ON	11 to 14 V
T7-4 (E) - Body ground	W-B - Body ground	Ground for rear A/C control assembly	Always	Below 1 V

DIAGNOSIS SYSTEM

DIAGNOSIS SYSTEM

1. DESCRIPTION

- a. Air conditioning system data and the Diagnostic Trouble Codes (DTCs) can be read through the Data Link Connector 3 (DLC3) of the vehicle. When the system seems to be malfunctioning, use the Techstream to check for malfunctions and perform troubleshooting.

2. CHECK DLC3

- a. Check the DLC3. Refer to **GENERAL INFORMATION** .

3. LIST OF OPERATION METHODS

- a. By operating each of the air conditioning control switches as shown in the diagram below, it is possible to enter diagnostic check mode.

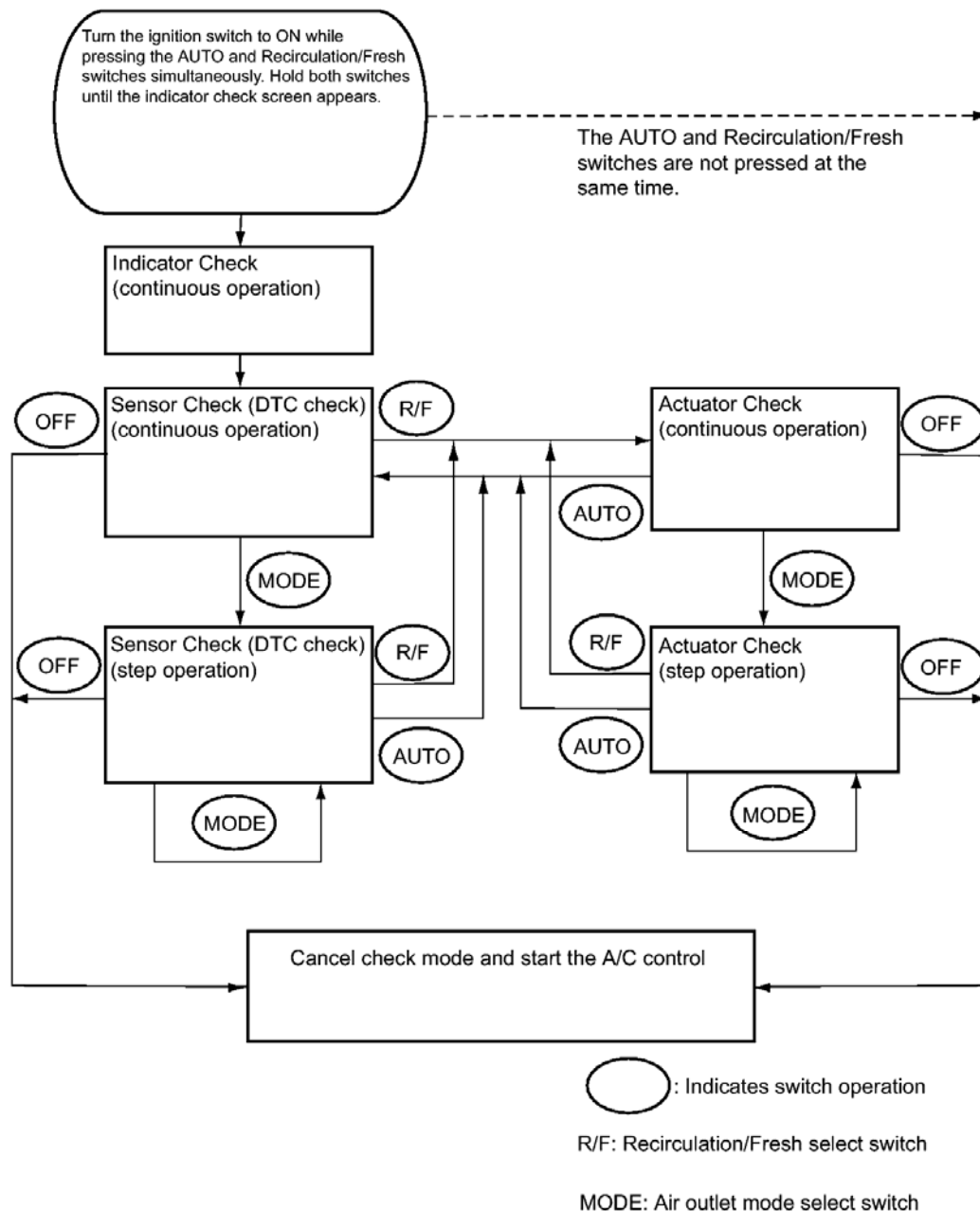


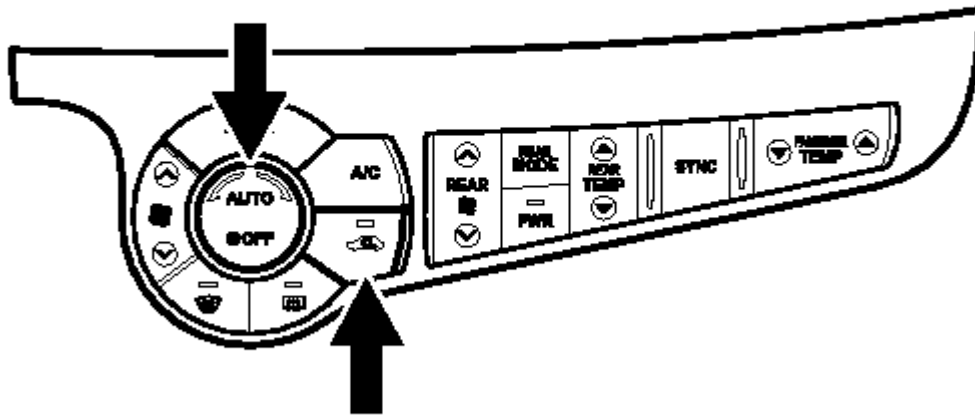
Fig. 26: Air Conditioning Control Assembly Block Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

4. INDICATOR CHECK

- Turn the ignition switch off.
- Turn the ignition switch to ACC and wait at least 5 seconds.
- Turn the ignition switch to ON while pressing the A/C control "AUTO" switch and "Recirculation/Fresh" switch simultaneously. Hold both switches until the indicator check screen

appears.

*1



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Fig. 27: Identifying A/C Control "AUTO" Switch And "Recirculation/Fresh" Switch
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

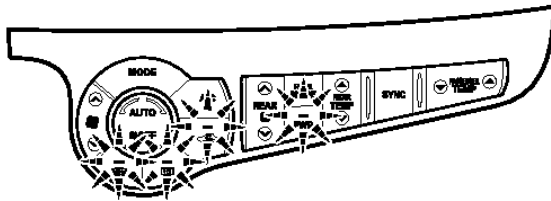
*1	Air Conditioning Control Assembly
----	--

- d. The indicator check is automatically performed when panel diagnosis is activated. Check that the indicators light up and go off 4 times at 1 second intervals continuously.

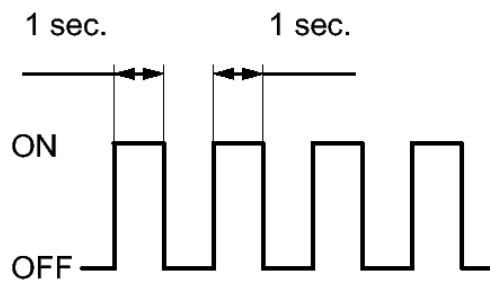
*1



*2



*a



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Fig. 28: Checking Indicators Light Up And Go Off
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

- The sensor check automatically starts when the indicator check is completed.
- Press the "OFF" switch to cancel the check mode.

TEXT IN ILLUSTRATION

*1	Accessory Meter Assembly (TFT)
*2	Air Conditioning Control Assembly
*a	Indicator Blinking Pattern

5. SENSOR CHECK (DTC CHECK)

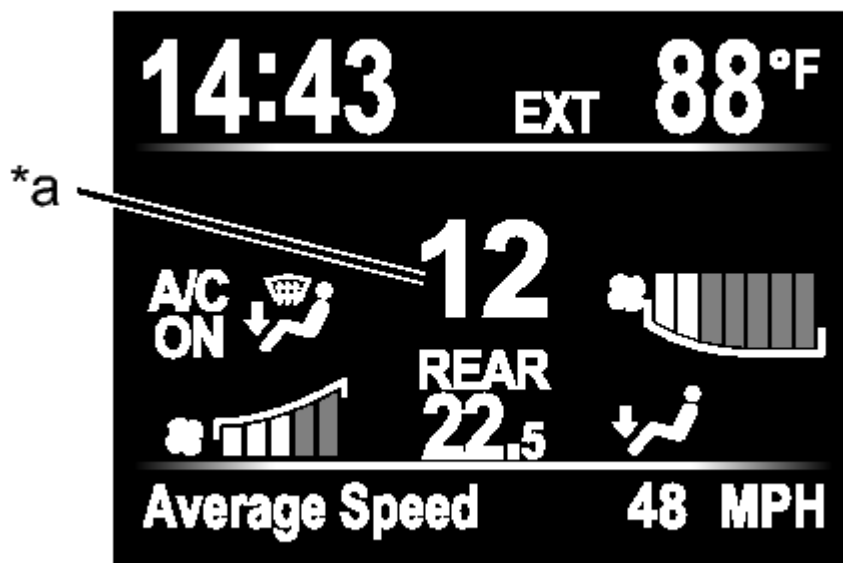
- Start the engine and warm it up.
- Perform the indicator check.

HINT:

After the indicator check is completed, the system enters DTC check mode automatically.

- Read the DTC displayed on the accessory meter display.

*1



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Fig. 29: Identifying DTC Displayed On Accessory Meter Display
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NOTE: In sensor check mode, which is automatically entered after indicator check mode, troubleshooting may be partially performed. Be sure to perform the actuator check, and then the sensor check again.

HINT:

Refer to **DIAGNOSTIC TROUBLE CODE CHART** for details of the codes.

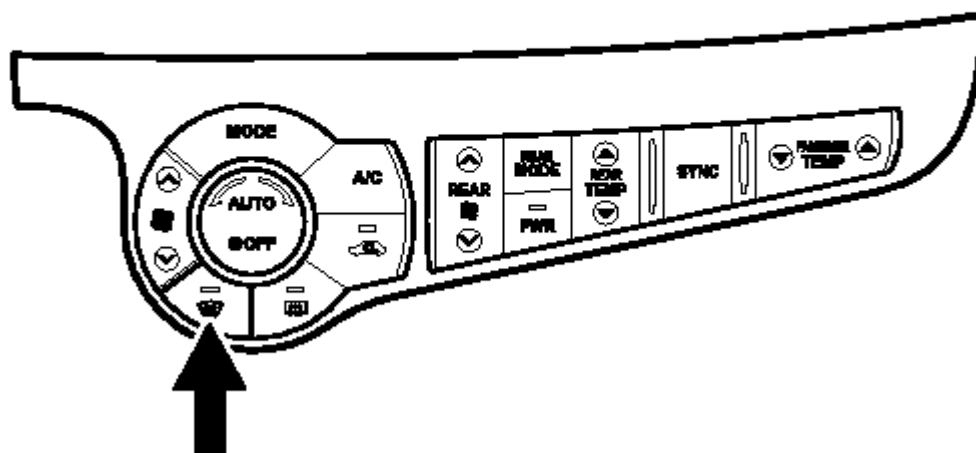
- When there are no problems, DTC 00 is output.
- As an example, the illustration shows that display DTC 12 is output.

TEXT IN ILLUSTRATION

*1	Accessory Meter Assembly (TFT)
*a	DTC

- d. If the steps are difficult to read because they change automatically, press the "Defroster" switch to display the steps one at a time so that they can be read easily. The items are displayed step by step each time the "Defroster" switch is pressed.

***1**



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Fig. 30: Identifying "Defroster" Switch

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

- Press the "OFF" switch to finish panel diagnosis.
- Press the "Recirculation/Fresh" switch to enter actuator check mode.

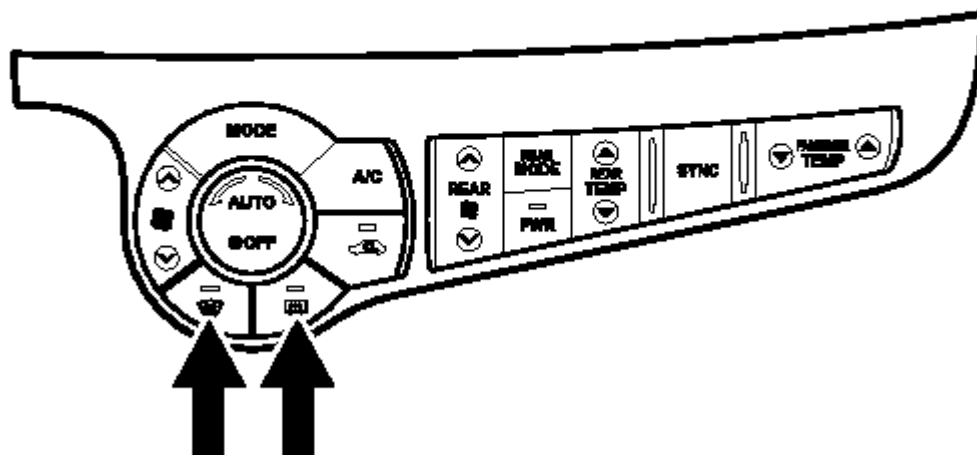
TEXT IN ILLUSTRATION

*1	Air Conditioning Control Assembly
----	--

e. Clear the DTC

1. During the sensor check, press the "Defroster" switch and "Rear Defogger" switch simultaneously.

*1



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Fig. 31: Identifying "Defroster" Switch And "Rear Defogger" Switch
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*1	Air Conditioning Control Assembly
----	--

DTC CHECK / CLEAR

DTC CHECK / CLEAR

1. DTC CHECK USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Air Conditioner / DTC.
- Check for DTCs.

2. DTC CLEAR USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Air Conditioner / DTC.
- Clear the DTCs by pressing the YES button on the Techstream display.

DATA LIST / ACTIVE TEST

DATA LIST / ACTIVE TEST

1. DATA LIST

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTE: In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Air Conditioner / Data List.
- Check the value(s) by referring to the table below.

AIR CONDITIONER

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
	Room temperature		

Room Temperature Sensor	sensor / Min.: -6.5°C (20.3°F) Max.: 57.25°C (135.05°F)	Actual cabin temperature displayed	-
Ambient Temp Sensor	Ambient temperature sensor / Min.: -23.3°C (-9.94°F) Max.: 65.95°C (150.71°F)	Actual ambient temperature displayed	-
Adjusted Ambient Temp	Adjusted ambient temperature / Min.: -30.8°C (-23.44°F) Max.: 50.8°C (123.44°F)	-	-
Evaporator Fin Thermistor	Evaporator temperature sensor / Min.: -30°C (-22°F) Max.: 59.6°C (139.28°F)	Actual evaporator temperature displayed	-
Evaporator Target Temp	Evaporator target temperature / Min.: -327.68°C (-557.82°F) Max.: 327.67°C (621.81°F)	Evaporator target temperature displayed	-
Solar Sensor (D side)	Driver side solar sensor / Min.: 0 Max.: 255	Driver side solar sensor value increases as brightness increases	-
Solar Sensor (P side)	Passenger side solar sensor / Min.: 0 Max.: 255	Passenger side solar sensor value increases as brightness increases	-
Engine Coolant	Engine coolant temperature sensor / Min.: 1.3°C	Actual engine coolant temperature	-

Temp	(34.34°F) Max.: 90.55° C (194.99°F)	displayed	
Set Temperature (D side)	Driver side set temperature / Min.: 18°C (65°F) Max.: 32°C (85°F)	Driver side actual set temperature displayed	-
Set Temperature (P side)	Passenger side set temperature / Min.: 18°C (65°F) Max.: 32°C (85°F)	Passenger side actual set temperature displayed	-
Blower Motor Speed Level	Blower motor speed level / Min.: 0 Max.: 31	Displayed speed level increases in range between 0 and 31 as blower motor speed increases	-
Regulator Pressure Sensor	Air conditioner pressure sensor Min.: -0.4566 MPaG (0 kgf/cm ² G) Max.: 3.2943 MPaG (38.25 kgf/cm ² G)	Actual regulator pressure displayed	-
Regulator Control Current	Regulator control current / Min.: 0 A Max.: 0.997 A	Value changes between 0 A and 0.997 A in accordance with compressor and magnetic clutch operation	-
Room Temp Sensor (Rear)	Room temperature sensor / Min.: -6.5°C (20.3°F) Max.: 57.25° C (135.05°F)	Actual room temperature for front seat is displayed	Open in the circuit: -6.5°C (20.3°F) Short in the circuit: 57.25°C (135.05°F)

Ambient Temp Sens (Rear)	Rear evaporator temperature sensor / Min.: -29.7°C (-21.46°F) Max.: 59.55°C (139.19°F)	Actual rear evaporator temperature is displayed	Open in the circuit: -29.7°C (-21.46°F) Short in the circuit: 59.55°C (139.19°F)
Set Temperature (Rear)	Rear side set temperature / Min.: 0 Max.: 255	Rear side actual set temperature is displayed	-
Blower Motor Level (Rear)	Blower motor speed level / Min.: 0 level Max.: 31 level	Increases in range between 0 and 31 as blower motor speed increases	-
Air Outlet Servo Pulse (R)	Rear air outlet servo motor target pulse / Min.: 0 Max.: 255	FACE: 83 (pulse) B/L: 35 (pulse) FOOT: 7(pulse)	-
Air Outlet Servo Actual Pls (R)	Rear air outlet servo motor actual pulse / Min.: 0 Max.: 255	FACE: 83 (pulse) B/L: 35 (pulse) FOOT: 7(pulse)	-
Air Mix Servo Targ Pulse (R)	Rear air mix servo motor target pulse / Min.: 0 Max.: 255	MAX. COLD: 9 (pulse) MAX. HOT: 54 (pulse)	-
Air Mix Servo Actual Pulse (R)	Rear air mix servo motor actual pulse / Min.: 0 Max.: 255	MAX. COLD: 9 (pulse) MAX. HOT: 54 (pulse)	-
Air Mix Servo Targ Pulse (D)	Driver side air mix servo motor target pulse / Min.: 0 Max.: 255	MAX. COLD: 105 (pulse) MAX. HOT: 7 (pulse)	-
Air Mix Servo Actual Pulse (D)	Driver side air mix servo motor actual pulse / Min.: 0	MAX. COLD: 105 (pulse) MAX. HOT: 7 (pulse)	-

	Max.: 255		
Air Mix Servo Targ Pulse (P)	Passenger side air mix servo motor target pulse / Min.: 0 Max.: 255	MAX. COLD: 5 (pulse) MAX. HOT: 103 (pulse)	-
Air Mix Servo Actual Pulse (P)	Passenger side air mix servo motor actual pulse / Min.: 0 Max.: 255	MAX. COLD: 5 (pulse) MAX. HOT: 103 (pulse)	-
Air Outlet Servo Pulse (D)	Air outlet servo motor target pulse / Min.: 0 Max.: 255	FACE: 8 (pulse) B/L: 30 to 38 (pulse) FOOT: 50 to 74 (pulse) FOOT/DEF: 80 (pulse) DEF: 97 (pulse)	-
Air Outlet Servo Actu Pulse (D)	Air outlet servo motor actual pulse / Min.: 0 Max.: 255	FACE: 8 (pulse) B/L: 30 to 38 (pulse) FOOT: 50 to 74 (pulse) FOOT/DEF: 80 (pulse) DEF: 97 (pulse)	-
Air Inlet Damper Targ Pulse	Air inlet servo motor target pulse / Min.: 0 Max.: 255	RECIRCULATION: 7 (pulse) FRESH: 28 (pulse)	-
Air Inlet Damper Actual Pulse	Air inlet servo motor actual pulse / Min.: 0 Max.: 255	RECIRCULATION: 7 (pulse) FRESH: 28 (pulse)	-
Electric Heater Active Level*1	Number of electric heaters operating / Min.: 0 Max.: 3	-	-
	Shift set temperature /		

Shift Set Temperature	+2 C, +1 C, Normal, -1 C, -2 C	Customized value will be displayed	-
Air Inlet Mode	Air inlet mode / Auto, Manual	Customized value will be displayed	-
Compressor Mode	Compressor mode / Auto, Manual	Customized value will be displayed	-
Evaporator Control	Evaporator control / Auto, Manual	Customized value will be displayed	-
Foot/DEF Auto Mode	FOOT/DEF auto mode / ON, OFF	Customized value will be displayed	-
Foot/DEF Auto Blow Up	FOOT/DEF auto blower up function / ON, OFF	Customized value will be displayed	-
Pls Servo Test Sts	Pulse servo motor test status / Wait, Move, Comp, Error, Stop	Wait: Servo motor now waiting Move: Servo motor now testing Comp: Servo motor test completed normally Error: Servo motor test completed abnormally Stop: Servo motor test interrupted	-
Flow Sensor	Flow sensor voltage / Min.: 0 V Max.: 5 V	Flow sensor voltage displayed	Open circuit: 4.7 V or more Short circuit: 0.3 V or less
A/C Cutoff Signal	A/C Cutoff Signal / ON, OFF	ON: A/C cutoff signal ON OFF: A/C cutoff signal OFF	-
Number of Trouble Codes	Number of trouble codes / Min.: 0 Max.: 255	Number of DTCs displayed	-

*1: w/ PTC Heater

ENGINE

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
A/C Signal	A/C Signal / ON, OFF	ON: A/C ON OFF: A/C OFF	-

2. ACTIVE TEST

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Air Conditioner / Active Test.
- Check the operation by referring to the table below.

AIR CONDITIONER

Tester Display	Test Part	Control Range	Diagnostic Note
Blower Motor	Blower motor	Min.: 0, Max.: 31	-
Magnetic Clutch Relay	A/C compressor	OFF, ON	-
Defogger Relay (Rear)	Defogger relay (Rear)	OFF, ON	-
Heater Active Level*1	Heater Level	Min.: 0, Max.: 3	-
Air Mix Servo Targ Pulse (D)	Air mix servo motor pulse (D side)	Min.: 0, Max.: 255	-
	Air mix		

Air Mix Servo Targ Pulse (P)	servo motor pulse (P side)	Min.: 0, Max.: 255	-
Air Outlet Servo Pulse (D)	Air outlet servo motor pulse	Min.: 0, Max.: 255	-
Air Inlet Damper Targ Pulse	Air inlet damper target pulse	Min.: 0, Max.: 255	-
Rear Blower Motor	Rear blower motor	Min.: 0, Max.: 31	-
Rear Air Mix Servo Targ Pulse	Rear air mix servo target pulse	Min.: 0, Max.: 255	-
A/O Servo Pulse (Rr D)	Rear air outlet servo motor pulse	Min.: 0, Max.: 255	-

*1: w/ PTC Heater

DIAGNOSTIC TROUBLE CODE CHART

DIAGNOSTIC TROUBLE CODE CHART

HINT:

When the air conditioning system functions properly, DTC B1400/00 is output.

AIR CONDITIONING SYSTEM

DTC Code	Detection Item	Trouble Area	Memory*3	See
B1411/11*1	Room Temperature	- Room temperature sensor - Harness or connector between room temperature	Memorized (4 sec. or	Refer to <u>DTC B1411/11: Room Temperature Sensor Circuit</u>

	Sensor Circuit	sensor and air conditioning amplifier - Air conditioning amplifier	more)	
B1412/12*2	Ambient Temperature Sensor Circuit	- Ambient temperature sensor - Harness or connector between ambient temperature sensor and air conditioning amplifier - Air conditioning amplifier	Memorized (4 sec. or more)	Refer to <u>DTC B1412/12: Ambient Temperature Sensor Circuit</u>
B1413/13	Evaporator Temperature Sensor Circuit	- Evaporator temperature sensor - Air conditioning harness - Air conditioning amplifier	Memorized (4 sec. or more)	Refer to <u>DTC B1413/13: Evaporator Temperature Sensor Circuit</u>
B1417/17	Rear Evaporator Temperature Sensor Circuit	- Rear evaporator temperature sensor - Harness or connector between rear evaporator temperature sensor and air conditioning amplifier - Air conditioning amplifier	Memorized (4 sec. or more)	Refer to <u>DTC B1417/17: Rear Evaporator Temperature Sensor Circuit</u>
		- Rear room temperature sensor		

B1419/19	Rear Room Temperature Sensor Circuit	- Harness or connector between rear air conditioning room temperature sensor and air conditioning amplifier - Air conditioning amplifier	Memorized (4 sec. or more)	Refer to <u>DTC B1419/19: Rear Room Temperature Sensor Circuit</u>
B1422/22	Compressor Lock Sensor Circuit	- Compressor and magnetic clutch (A/C lock sensor) - Compressor drive belt - Harness or connector between compressor and magnetic clutch and air conditioning amplifier - Air conditioning amplifier - CAN communication system	-	Refer to <u>DTC B1422/22: Compressor Lock Sensor Circuit</u>
B1423/23	Pressure Sensor Circuit	- Air conditioner pressure sensor - Harness or connector between air conditioner pressure sensor and air conditioning amplifier - Air conditioning amplifier	-	Refer to <u>DTC B1423/23: Pressure Sensor Circuit</u>

B1441/41	Air Mix Damper Control Servo Motor Circuit (Passenger Side)	- Air mix control servo motor - Air conditioning harness - Air conditioning amplifier	Memorized (30 sec. or more)	Refer to <u>DTC B1441/41: Air Mix Damper Control Servo Motor Circuit (Passenger Side)</u>
B1442/42	Air Inlet Damper Control Servo Motor Circuit	- Air inlet control servo motor - Air conditioning harness - Air conditioning amplifier	Memorized (30 sec. or more)	Refer to <u>DTC B1442/42: Air Inlet Damper Control Servo Motor Circuit</u>
B1443/43	Air Outlet Damper Control Servo Motor Circuit	- Air outlet control servo motor - Air conditioning harness - Air conditioning amplifier	Memorized (30 sec. or more)	Refer to <u>DTC B1443/43: Air Outlet Damper Control Servo Motor Circuit</u>
B1446/46	Air Mix Damper Control Servo Motor Circuit (Driver Side)	- Air mix control servo motor - Air conditioning harness - Air conditioning amplifier	Memorized (30 sec. or more)	Refer to <u>DTC B1446/46: Air Mix Damper Control Servo Motor Circuit (Driver Side)</u>
B1447/47	Rear Air Mix Damper Control Servo Motor Circuit	- Rear air mix control servo motor - Rear air conditioning harness - Harness or connector between rear air conditioning	Memorized (30 sec. or more)	Refer to <u>DTC B1447/47: Rear Air Mix Damper Control Servo Motor Circuit</u>

		harness and air conditioning amplifier - Air conditioning amplifier		
B1449/49	Rear Air Outlet Damper Control Servo Motor Circuit	- Rear air outlet control servo motor - Rear air conditioning harness - Harness or connector between rear air conditioning harness and air conditioning amplifier - Air conditioning amplifier	Memorized (30 sec. or more)	Refer to <u>DTC B1449/49: Rear Air Outlet Damper Control Servo Motor Circuit</u>
B1451/51	Compressor Solenoid Circuit	- Compressor and magnetic clutch (solenoid valve) - Harness or connector between air conditioning amplifier and compressor and magnetic clutch (solenoid valve) - Air conditioning amplifier	-	Refer to <u>DTC B1451/51: Compressor Solenoid Circuit</u>
B1479/79	Flow Sensor	- Flow sensor (compressor and pulley) - Harness or connector between flow	Memorized (4 sec.)*4	Refer to <u>DTC B1479/79: Flow Sensor Circuit</u>

	Circuit	sensor and air conditioning amplifier - Air conditioning amplifier	(8.5 min. or more)*5	
B1497/97	BUS IC Communication Malfunction	- Air conditioning harness - Air conditioning amplifier	Memorized (10 sec. or more)	Refer to <u>DTC B1497/97: BUS IC Communication Malfunction</u>
B1499/99	Multiplex Communication Circuit	- CAN communication system	Memorized	Refer to <u>DTC B1499/99: Multiplex Communication Circuit</u>
B14A2	Driver Side Solar Sensor Short Circuit	- Solar sensor - Harness or connector between solar sensor and air conditioning amplifier - Harness or connector between solar sensor and main body ECU - Main body ECU - Air conditioning amplifier	Memorized (4 sec. or more)	Refer to <u>DTC B14A2: Driver Side Solar Sensor Short Circuit</u>
B14A3	Front Passenger Side Solar Sensor Short Circuit	- Solar sensor - Harness or connector between solar sensor and air conditioning amplifier - Harness or connector between solar sensor and main body ECU - Main body	Memorized (4 sec. or more)	Refer to <u>DTC B14A3: Front Passenger Side Solar Sensor Short Circuit</u>

		ECU - Air conditioning amplifier		
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- *1: If the cabin temperature is approx. -18.6°C (-1.48°F) or lower, DTC B1411/11 may be output even though the system is normal.
- *2: If the ambient temperature is approx. -52.9°C (-63.22°F) or lower, DTC B1412/12 may be output even though the system is normal.
- *3: The A/C amplifier stores the DTC of the respective malfunction if it has occurred for the period of time indicated in the brackets.
- *4: Circuit is open or shorted.
- *5: Sensor is stuck.