

8. Temperature control actuator	17. "VENT" switch	26. "DEF" indicator light
9. Air flow control actuator	18. "AUTO" switch	

Diagnostic Information and Procedures

Air Conditioning System Check

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To ensure that system diagnosis is done accurately and smoothly, read "Precautions in Diagnosing Trouble" and follow "Air Conditioning System Check".

Step	Action	Yes	No
1	☞ Customer complaint analysis 1) Perform "Customer Complaint Analysis". <i>Was customer complaint analysis performed according to instruction?</i>	Go to Step 2.	Perform customer complaint analysis.
2	☞ Visual inspection 1) Perform "Visual Inspection". <i>Is there any faulty condition?</i>	Repair or replace malfunction part.	Go to Step 3.
3	☞ DTC check 1) Perform "DTC Check". <i>Is it malfunction code?</i>	Go to Step 4.	Go to Step 5.
4	☞ Troubleshooting for DTC 1) Check and repair according to DTC diag. flow. <i>Are check and repair completed?</i>	Go to Step 7.	Check and repair malfunction part(s).
5	☞ Check for intermittent problem 1) Check for intermittent problem. <i>Is there faulty condition?</i>	Repair or replace malfunction part(s).	Go to Step 6.
6	☞ Air conditioning system symptom diagnosis 1) Inspect and repair referring to "A/C System Symptom Diagnosis". <i>Are inspect and repair complete?</i>	Go to Step 7.	Inspect and repair malfunction part(s).
7	☞ Final confirmation test 1) Perform DTC check. <i>Is there any DTC?</i>	Go to Step 4.	Air Conditioning system is good condition.

7B-12 Air Conditioning System:

Customer Complaint Analysis

Record details of the problem (failure, complaint) and how it occurred as described by the customer.

For this purpose, use of such a questionnaire form as shown in the figure will facilitate collecting information to the point required for proper analysis and diagnosis.

Customer questionnaire (example)

Customer's Name:	Model:	VIN:	
Date of Issue:	Date Reg.	Date of Problem:	Mileage:
Problem Symptoms	<ul style="list-style-type: none">• "FRE" indicator light abnormal: fails to turn ON / fails to go OFF / flashes• Abnormal noise while "A/C" switch is turned ON: from compressor, from radiator fan motor, other _____• Cool air does not come out:• Radiator fan motor does not work:• A/C compressor does not work:• Blower fan motor does not work:		
Frequency of Occurrence	• Continuous / Intermittent (_____ times a day, a month) / other _____		
Conditions for Occurrence of Problem	<ul style="list-style-type: none">• Vehicle at stop & A/C compressor is working:• For some time after A/C switch is ON:• When outside air temperature is high:• When outside air temperature is low:• All the time:		
Environmental Condition	<ul style="list-style-type: none">• Weather: fair / cloudy / rain / snow / other _____• Temperature: _____ °F (_____ °C)		
DTC	<ul style="list-style-type: none">• First check: Normal code / malfunction code (_____)• Second check: Normal code / malfunction code (_____)		

NOTE

The form is a standard sample. It should be modified according to conditions characteristic of each market.

Visual Inspection

As a preliminary step, be sure to perform visual check of the items that support proper function of the air conditioning system referring to "Visual Inspection".

DTC Check

Refer to "DTC Check" for checking procedure.

Troubleshooting for DTC

Based on the DTC indicated in Step 4 and referring to applicable DTC flow, locate the cause of the trouble, namely in a sensor, actuator, wire harness, connector, HVAC control module or other part and repair or replace faulty parts.

Check for Intermittent Problem

Check parts where an intermittent trouble is easy to occur (e.g., wire harness, connector, etc.), referring to "Intermittent and Poor Connection Inspection in Section 00".

Air Conditioning System Symptom Diagnosis

Check the parts or system suspected as a possible cause referring to "A/C System Symptom Diagnosis".

Final Confirmation Test

Confirm that the problem symptom has gone and the air conditioning system is free from any abnormal conditions. If what has been repaired is related to the malfunction DTC, check DTC once and confirm that no DTC is indicated.

DTC Check

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NOTE

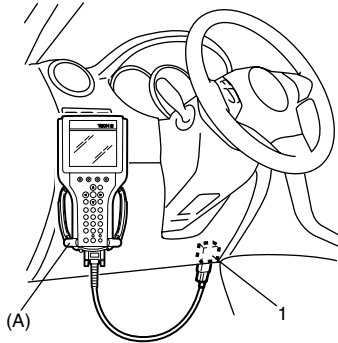
To know how to use SUZUKI scan tool in detail, refer to its operator's manual.

Using SUZUKI Scan Tool

- 1) Turn ignition switch to OFF position.
- 2) Connect SUZUKI scan tool to data link connector (DLC) (1) located on underside of instrument panel.

Special tool

(A): SUZUKI scan tool



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- 3) Apply light to sunload sensor vertically, holding incandescent light of approximately 100 W about 100 mm (3.94 in.) away from sunload sensor.

NOTE

If B1504 is detected when vehicle is not exposed to light (indoor, etc.), check again for DTC with light from incandescent light applied to sunload sensor, referring to "Sunload Sensor Inspection". If B1504 is not detected in this check, sunload sensor is in good condition.

- 4) Turn ignition switch to ON position.
- 5) Read DTC according to instructions displayed on SUZUKI scan tool and print it or write it down. Refer to SUZUKI scan tool operator's manual for further details.
If communication between scan tool and ECM (PCM) is not possible, check if scan tool is communicable by connecting it to ECM (PCM) in another vehicle. If communication is possible in this case, scan tool is good condition. Then check data link connector and serial data line (circuit) in the vehicle with which communication was not possible.
- 6) After completing the check, turn ignition switch OFF position and disconnect SUZUKI scan tool from data link connector (DLC).

Not Using SUZUKI Scan Tool**NOTE**

If B1504 is detected when vehicle is not exposed to light (indoor, etc.), check again for DTC with light from incandescent light applied to sunload sensor, referring to "Sunload Sensor Inspection". If B1504 is not detected in this check, sunload sensor is in good condition.

- 1) Apply light to sunload sensor vertically, holding incandescent light of approximately 100 W about 100 mm (3.94 in.) away from sunload sensor.
- 2) Set the following selectors to specified positions respectively with turn ignition switch OFF.
 - Temperature selector (1): max cool position
 - Blower speed selector (2): "OFF" position
- 3) While pressing "B/L" (BI-LEVEL) switch (3) and "D/F" (DEF/FOOT) switch (4) simultaneously turn ignition switch to ON position.

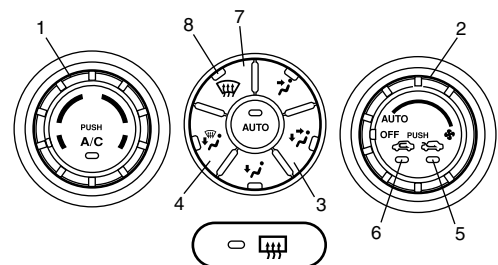
NOTE

For 15 seconds after ignition switch is turned on, both "REC" indicator light and "FRE" indicator light light for in-system trouble check.

- 4) Read DTC from flashing pattern of "FRE" indicator (5) and "REC" indicator (6) referring to "DTC Table".

NOTE

- Pressing "DEF" switch (7) alternates display of current DTC and history DTC.
- "DEF" indicator light (8) remains off when display is in current DTC mode and it lights up when display is in history DTC mode.



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7B-14 Air Conditioning System:

- 5) After completing above check, turn ignition switch to "OFF" position.

NOTE

HVAC control module returns to a original state at the following conditions.

- Ignition switch turned to "OFF" position
- Temperature selector is operated
- Blower speed selector is operated
- 5 minutes have passed since HVAC control unit started DTC display

DTC Clearance

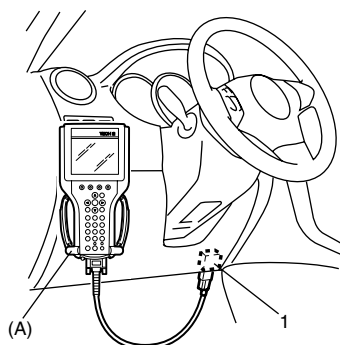
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Using SUZUKI Scan Tool

- 1) Turn ignition switch to OFF position.
- 2) Connect SUZUKI scan tool to data link connector (DLC) (1).

Special tool

(A): SUZUKI scan tool

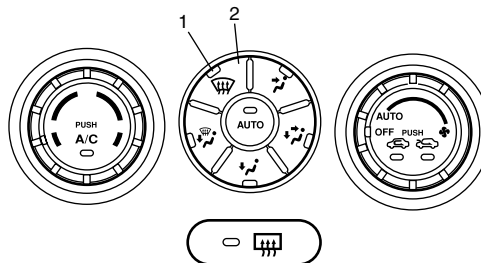


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- 3) Turn ignition switch to ON position.
- 4) Erase DTC according to instructions displayed on SUZUKI scan tool. Refer to SUZUKI scan tool operator's manual for further details.
- 5) After completing the clearance, turn ignition switch to OFF position and disconnect SUZUKI scan tool from DLC.
- 6) Perform "DTC Check" and confirm if normal DTC (NO CODES) is displayed.

Not Using SUZUKI Scan Tool

- 1) Display history DTC by HVAC control module referring to "Not Using SUZUKI Scan Tool" under "DTC Check".
- 2) Confirm display DTC and light "DEF" indicator light (1).
- 3) Push "DEF" switch (2) at 5 seconds or more.



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- 4) After completing the clearance, turn ignition switch OFF position.
- 5) Perform "DTC Check", and confirm if normal DTC is displayed and if any other DTC is detected.

DTC Table

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⚠ CAUTION

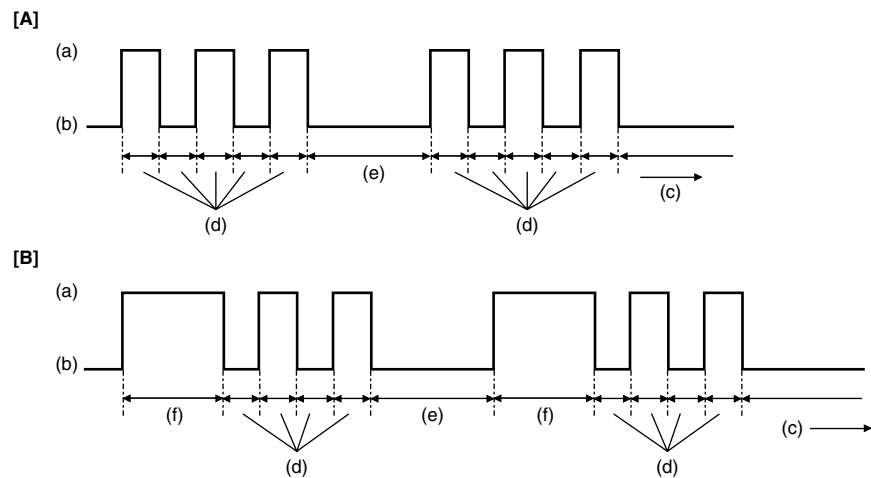
Be sure to perform “Air Conditioning System Check” before starting diagnosis.

DTC No. (displayed on SUZUKI scan tool)	DTC (indicated on HVAC control module)		Priority of display	Diagnosis	
	Indicated by “REC” indicator light	Indicated by “FRE” indicator light			
B1562	1	4	1	Outside air temperature sensor and/or its circuit malfunction	Data error
B1502	2	1	2	Inside air temperature sensor and/or its circuit malfunction	Open
		2	3		Short
B1503	3	1	4	Evaporator temperature sensor and/or its circuit malfunction	Open
		2	5		Short
B1504	4	1	29	Sunload sensor and/or its circuit malfunction	Open
		2	6		Short
B1561	5	4	7	Engine coolant temperature sensor and/or its circuit malfunction	Data error
B1511	6	1	8	Temperature control actuator (position sensor) and/or its circuit malfunction	Open
		2	9		Short
B1513	6	3	10	Temperature control actuator and/or its circuit malfunction	Lock detect
B1512	7	1	11	Air flow control actuator (position sensor) and/or its circuit malfunction	Open
		2	12		Short
B1514	7	3	13	Air flow control actuator and/or its circuit malfunction	Lock detect
B1530	8	1	14	Air intake control actuator (position sensor) and/or its circuit malfunction	Open
		2	15		Short
B1531	8	3	16	Air intake control actuator and/or its circuit malfunction	Lock detect
B1551	9	1	17	Serial communication circuit malfunction	Open
		2	18		Short
B1552	9	4	19		Data error
B1553	10	4	20	CAN communication circuit malfunction	Data error
B1557	11	4	21	Wheel speed sensor and/or its circuit malfunction	Data error
B1556	12	4	22	Camshaft position (CMP) sensor and/or its circuit malfunction	Data error
B1563	13	4	23	A/C refrigerant pressure sensor and/or its circuit malfunction	Data error
B1546		5	24	A/C refrigerant pressure malfunction	Refrigerant pressure malfunction
B1520	15	1	25	Temperature selector malfunction	Open
		2	26		Short
B1521	16	1	27	Blower speed selector malfunction	Open
		2	28		Short
—	See NOTE below		—	Normal	—

NOTE

When no abnormality is detected, “FRE” indicator light and “REC” indicator light repeat cycle of ON for 2 seconds and OFF for 1 second.

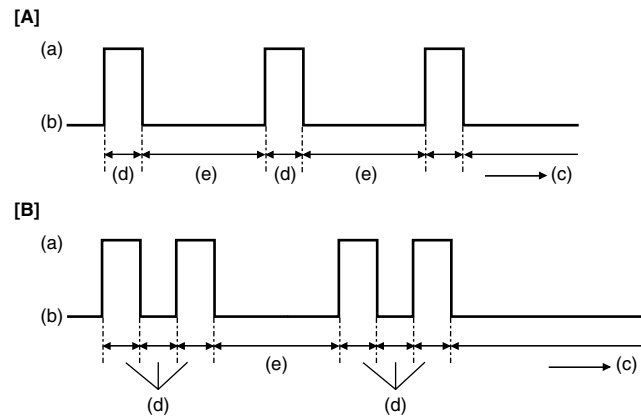
Example of “REC” Indicator Light Flashing Pattern



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[A]: B1503 (No.3)	(b): “REC” indicator light “OFF”	(e): 2.0 (sec.)
[B]: B1556 (No.12)	(c): Time (sec.)	(f): 1.5 (sec.)
(a): “REC” indicator light “ON”	(d): 0.5 (sec.)	

Example of “FRE” Indicator Light Flashing Pattern



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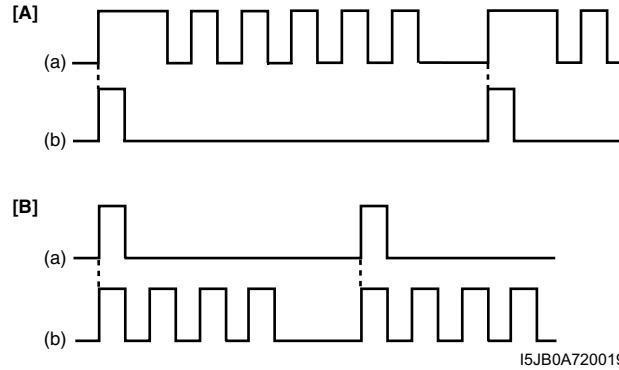
[A]: Open	(b): “FRE” indicator light “OFF”	(e): 2.0 (sec.)
[B]: Short	(c): Time (sec.)	
(a): “FRE” indicator light “ON”	(d): 0.5 (sec.)	

NOTE

Locked actuator, data error and refrigerant pressure malfunction are indicated by flashing pattern of “FRE” indicator light specified for each of them.

Display Timing of “FRE” Indicator Light and “REC” Indicator Light

Code with short display time waits until display of code with long display time is over.



[A]: B1520 (15 – 1)	(a): “REC” indicator flashing pattern
[B]: B1562 (1 – 4)	(b): “FRE” indicator flashing pattern

Fail-Safe Table

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When any of the following malfunctions (DTCs) is detected, HVAC control module enters fail-safe mode. However, when HVAC control module detects normal operation of A/C system, fail-safe mode is canceled.

DTC No.	Trouble Area	Fail-Safe Operation	
		When ignition switch is turned ON after malfunction is already detected	When malfunction is detected during ignition switch is ON
☞ B1502	Inside air temperature sensor and/or its circuit malfunction	HVAC control module controls actuators assuming that inside air temperature is 25 °C (77 °F).	
☞ B1503	Evaporator temperature sensor and/or its circuit malfunction	HVAC control module controls actuators assuming that amount of evaporator temperature is –6 °C (21.2 °F).	
☞ B1504	Sunload sensor and/or its circuit malfunction	HVAC control module controls actuators assuming that amount of sunlight is 0 W/m ² .	
☞ B1511	Temperature control actuator (position sensor) and/or its circuit malfunction	Circuit open: Temperature control actuator fixed to “MAX HOT” position. Circuit short: Temperature control actuator fixed to “MAX HOT” position.	
☞ B1512	Air flow control actuator (position sensor) and/or its circuit malfunction	Circuit open: Air flow control actuator fixed to “DEF” position. Circuit short: Air flow control actuator fixed to “DEF” position.	
☞ B1513	Temperature control actuator and/or its circuit malfunction	Stop the operation of temperature control actuator.	
☞ B1514	Air flow control actuator and/or its circuit malfunction	Stop the operation of Air flow control actuator.	
☞ B1520	Temperature selector malfunction	HVAC control module keeps condition just before malfunction is detected.	HVAC control module controls actuators assuming that setting of temperature selector is 25 °C (77 °F).
☞ B1521	Blower speed selector malfunction	HVAC control module keeps condition just before malfunction is detected.	HVAC control module controls actuators assuming that as follows. <ul style="list-style-type: none"> • Blower speed is minimum. • Air flow control actuator fixed to “DEF” position.
☞ B1530	Air intake control actuator (position sensor) and/or its circuit malfunction	Circuit open: Air intake control actuator fixed to “FRE” position. Circuit short: Air intake control actuator fixed to “FRE” position.	
☞ B1531	Air intake control actuator and/or its circuit malfunction	Stop the operation of temperature control actuator.	

7B-18 Air Conditioning System:

DTC No.	Trouble Area	Fail-Safe Operation	
		When ignition switch is turned ON after malfunction is already detected	When malfunction is detected during ignition switch is ON
B1551 B1552	Serial communication circuit malfunction	HVAC control module keeps condition just before malfunction is detected.	HVAC control module controls actuators assuming that as follows. <ul style="list-style-type: none"> • Outside air temperature is 20 °C (68 °F). • Engine coolant temperature is 90 °C (194 °F). • Vehicle speed is 0 km/h (0 mph). • Engine speed is 0 rpm.
B1553	CAN communication circuit malfunction		
B1556	Camshaft position (CMP) sensor and/or its circuit malfunction	HVAC control module keeps condition just before malfunction is detected.	HVAC control module controls actuators assuming that amount of engine speed is 0 rpm.
B1557	Vehicle speed sensor and/or its circuit malfunction	HVAC control module keeps condition just before malfunction is detected.	HVAC control module controls actuators assuming that amount of vehicle speed is 0 km/h (0 mph).
B1561	Engine coolant temperature sensor and/or its circuit malfunction	HVAC control module keeps condition just before malfunction is detected.	HVAC control module controls actuators assuming that amount of engine coolant temperature is 90 °C (194 °F).
B1562	Outside air temperature sensor and/or its circuit malfunction	HVAC control module keeps condition just before malfunction is detected.	HVAC control module controls actuators assuming that amount of outside air temperature is 20 °C (68 °F).

Scan Tool Data

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As the data values given below are standard values estimated on the basis of values obtained from the normally operating vehicles by using a scan tool, use them as reference values. Even when the vehicles are in good condition, there may be cases where the checked values do not fall within each specifies data range. Therefore, judgement as abnormal should not be made by checking with these data alone.

Scan Tool Data	Condition	Normal Condition / Reference Value
TEMP CONT SWITCH	Each reference value is relative to the position of temperature selector of HVAC control module.	Max Cool, 20 °C (65 °F) – 30 °C (85 °F), Max Hot
CABIN TEMPERATURE	Reference value is relative to in car temperature.	–40 °C – 87.5 °C (–40 °F – 189.5 °F)
OUT SIDE AIR TEMP	Reference value is relative to outside air temperature.	–40 °C – 87.5 °C (–40 °F – 189.5 °F)
EVAPORATOR TEMP	Reference value is relative to temperature of evaporator.	–40 °C – 87.5 °C (–40 °F – 189.5 °F)
COOLANT TEMP	At specified idle speed after warming up	–40 °C – 215 °C (–40 °F – 419 °F)
SUN LOAD	Reference value depends on the situation.	0 W/m ² – 4447.8 W/m ²
MODE CONT SWITCH	Each reference value is relative to the position of airflow selector of HVAC control module.	AUTO, VENT, BI-LEVEL, FOOT, DEF-FOOT DEF
FAN CONT SWITCH	Each reference value is relative to the position of blower speed selector of HVAC control module.	AUTO, OFF 1st, 2nd – 7th, 8th
FAN DESIRE VOLT	Reference value is relative to the position of blower speed selector of HVAC control module.	0 – 16.0 V
AIR MIX POS SENSOR	Reference value is relative to the position of temperature selector of HVAC control module.	Approx. 1.5 V (Max Hot) Approx. 4.5 V (Max Cool)
R/F POS SENSOR	Reference value is relative to the position of air intake selector of HVAC control module. (LH steering vehicle)	Approx. 4.0 V (REC) Approx. 0.9 V (FRE)
R/F POS SENSER	Reference value is relative to the position of air intake selector of HVAC control module. (RH steering vehicle)	Approx. 0.9 V (REC) Approx. 4.0 V (FRE)
MODE POS SENSOR	Reference value is relative to the position of airflow selector of HVAC control module.	Approx. 0.5 V (DEF) Approx. 4.5 V (VENT)

Scan Tool Data	Condition		Normal Condition / Reference Value
A/C CONT SIG	A/C system is ON.		ON
	A/C system is OFF.		OFF
AIR INTAKE MODE	Fresh air (FRE) mode is activated.		FRE
	Recirculation air (REC) mode is activated.		REC
	AUTO mode is activated.		AUTO
A/C COMP CLUCH	Magnet clutch is engaged.		ON
	Magnet clutch is not engaged.		OFF
REFRIGERANT PRESSURE	Engine running.	A/C ON (A/C is operating) at ambient temperature: 30 °C (86 °F)	1350 – 1650 kPa for more details, refer to pressure of high pressure gauge under “A/C System Performance Inspection”.
		A/C ON (A/C is not operating) at ambient temperature: 30 °C (86 °F) and engine coolant temperature: 90 °C – 100 °C (194 °F – 212 °F)	600 – 1000 kPa after longer than 10 min from A/C switch turned off.
A/C INDICATOR LIGHT	A/C indicator light is lighted.		ON
	A/C indicator light is not lighted.		OFF
FRE INDICATOR LIGHT	Fresh air (FRE) indicator light is lighted.		ON
	Fresh air (FRE) indicator light is not lighted.		OFF
REC INDICATOR LIGHT	Recirculation air (REC) indicator light is lighted.		ON
	Recirculation air (REC) indicator light is not lighted.		OFF
REAR DEF INDICATOR	Rear defogger indicator light is lighted.		ON
	Rear defogger indicator light is not lighted.		OFF
VEHICLE SPEED	At stop.		0 km/h (0 mph)
ENGINE SPEED	At engine idle speed		Engine idle speed is display

Scan Tool Data Definitions

TEMP CONT SWITCH: Position of temperature control selector of HVAC control module

CABIN TEMPERATURE: In-car temperature detected by inside air temperature sensor installed in HVAC control module

OUTSIDE AIR TEMP (OUTSIDE AIR TEMPERATURE): Outside air temperature detected by outside air temperature sensor installed in front bumper member

EVAPORATOR TEMP: Temperature of air passed through evaporator

COOLANT TEMP: Engine coolant temperature detected by engine coolant temperature sensor

SUN LOAD: Amount of sunlight detected by sunload sensor installed on the driver side on the dashboard

MODE CONT SWITCH: Position of airflow selector of HVAC control module

FAN CONT SWITCH: Position of air speed selector of HVAC control module

FAN DESIRE VOLT: Voltage for blower motor

AIR MIX POS SENSOR: Input signal from position sensor in temperature control actuator

MODE POS SENSOR: Input signal from position sensor in air flow control actuator

R/F POS SENSOR (AIR FLOW CONTROL ACTUATOR POSITION SENSOR): Input signal from position sensor in air intake control actuator

A/C CONT SIG (ON or OFF): State of A/C indicator light

AIR INTAKE MODE (FRE, REC or MIX): State of air intake mode

A/C COMP CLUCH: State of magnet clutch

REFRIGERANT PRESSURE (A/C REFRIGERANT ABSOLUTE PRESSURE): This parameter indicates A/C refrigerant absolute pressure calculated by ECM

A/C INDICATOR LIGHT (ON or OFF): State of A/C indicator light

FRE INDICATOR LIGHT (ON or OFF): State of fresh air (FRE) indicator light

REC INDICATOR LIGHT (ON or OFF): State of recirculation air (REC) indicator light

REAR DEF INDICATOR (ON or OFF): State of rear defogger indicator light

VEHICLE SPEED: It is computed based on pulse signals from vehicle speed sensor

ENGINE SPEED: It is computed by signal from CMP sensor

Visual Inspection

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Visually check the following parts and systems.

Inspection Item	Correction
<ul style="list-style-type: none"> Refrigerant ---- leakage and amount A/C pipe or hose ---- disconnection, looseness and deterioration A/C compressor drive belt ---- looseness and damage Battery ---- fluid level and corrosion of terminal Connectors of electric wire harness ---- disconnection and friction Fuses ---- burning Parts ---- installation and damage Other parts that can be checked visually 	Refer to “A/C Compressor Drive Belt Inspection and Adjustment”.

A/C System Performance Inspection

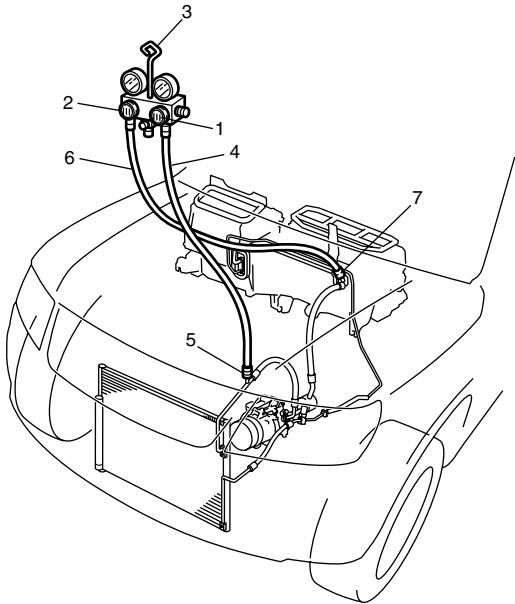
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- Confirm that vehicle and environmental conditions are as follows.
 - Vehicle is put indoors.
 - Ambient air temperature is within 15 – 35 °C (59 – 95 °F).
 - Relative humidity is within 30 – 70%.
 - There is no wind indoors.
 - HVAC unit is normal condition.
 - There is no air leakage from air ducts.
 - Condenser fins are clean.
 - Are filter is not clogged with dirt and dust.
 - Battery voltage is 12 V or more.
 - Radiator cooling fan operates normally.
- Make sure that high pressure valve (1) and low pressure valve (2) of manifold gauge (3) are firmly closed.
- Connect high pressure charging hose (4) to high pressure service valve (5) on vehicle, and connect low pressure charging hose (6) to low pressure service valve (7) on vehicle.

- Bleed the air in charging hoses by loosening their respective nuts on manifold gauge, utilizing the refrigerant pressure. When a hiss is heard, immediately tighten nut.

⚠ CAUTION

Do not interchange high and low pressure charging hoses by mistake.



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