

SECTION : 7D

AUTOMATIC TEMPERATURE CONTROL HEATING, VENTILATION, AND AIR CONDITIONING SYSTEM

CAUTION : *Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.*

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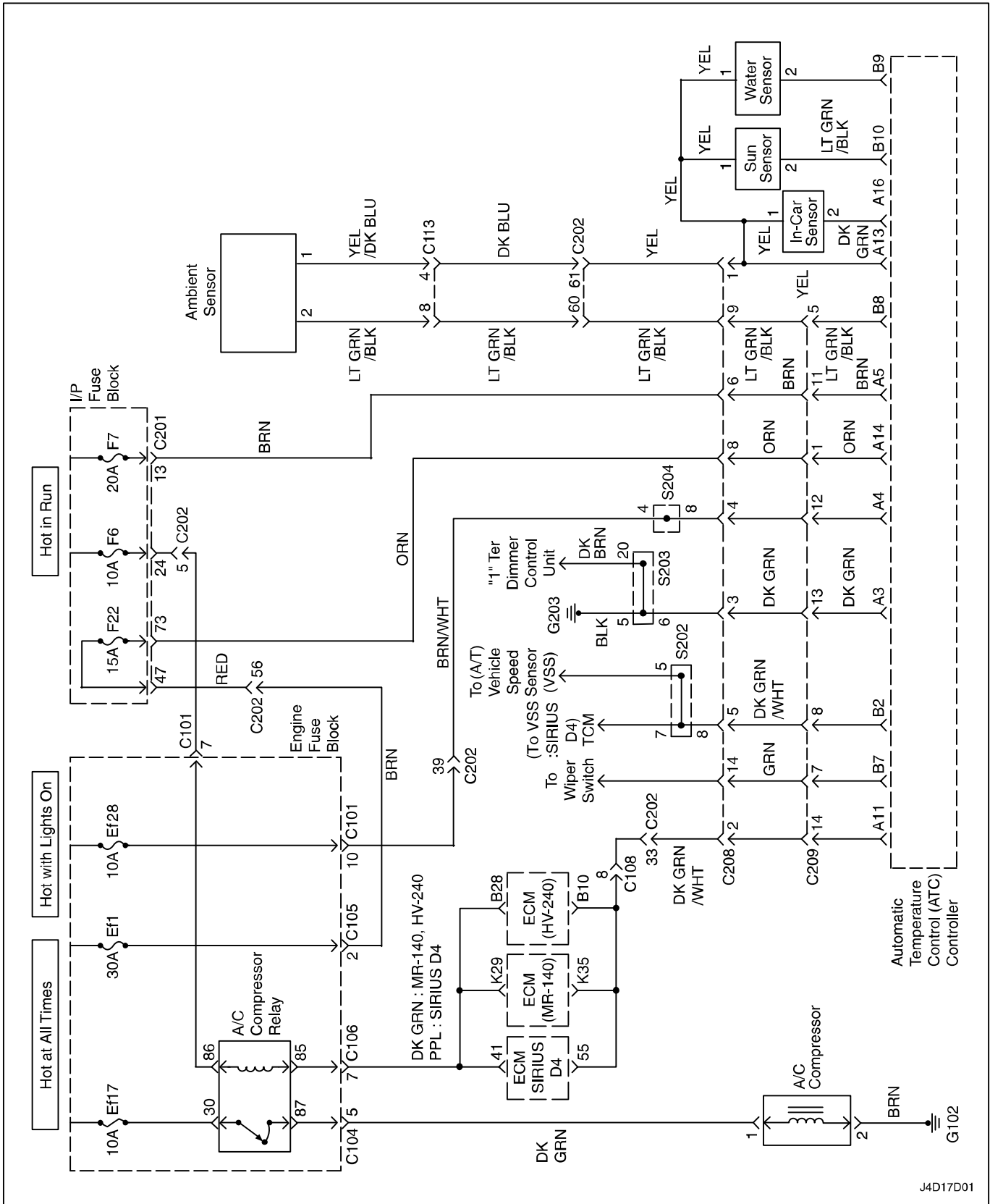
SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

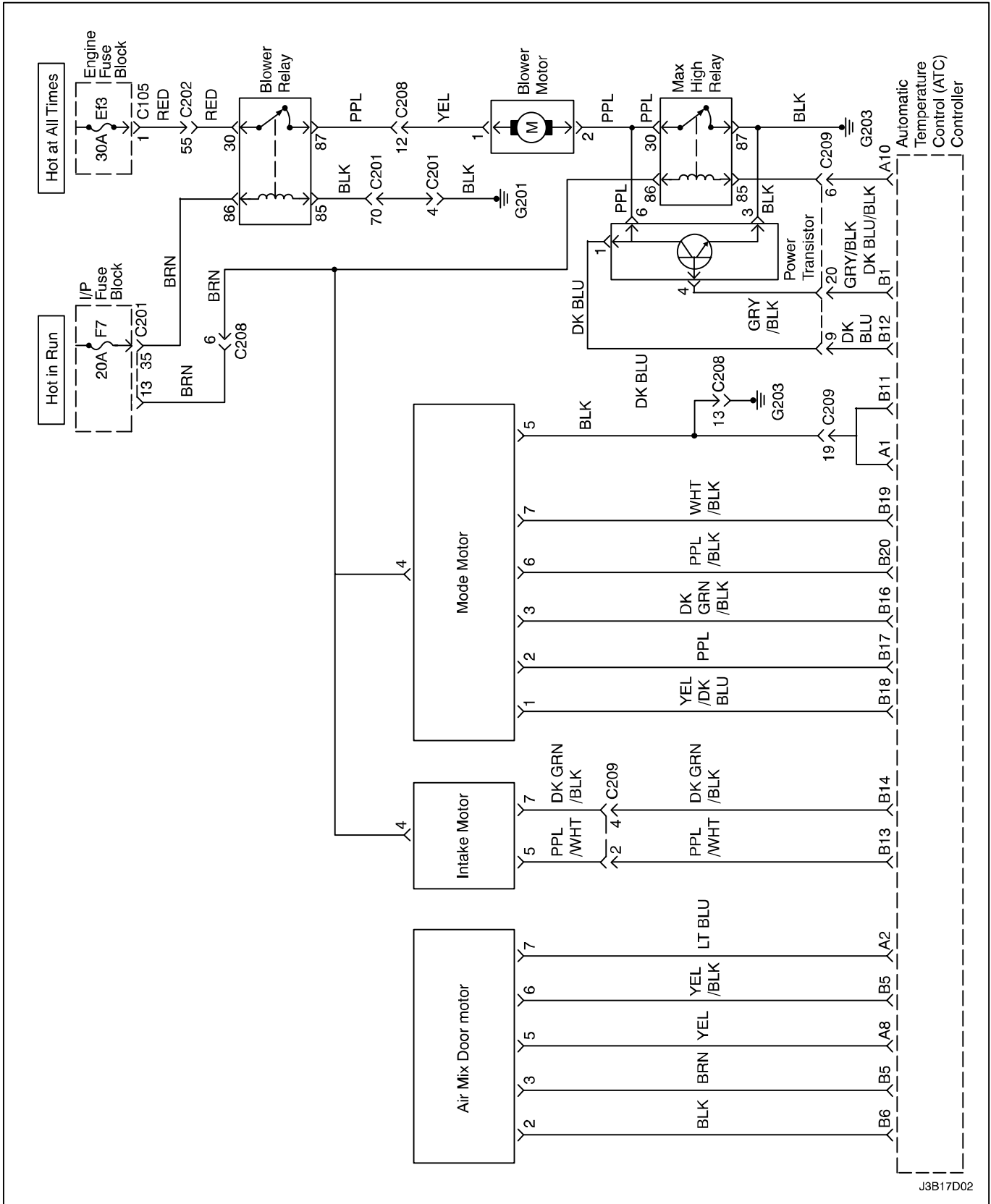
Application	N•m	Lb-Ft	Lb-In
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SCHEMATIC AND ROUTING DIAGRAMS

A/C SENSORS/DEFOGGERS AND A/C COMPRESSOR CONTROLS DIAGRAM



A/C BLOWER AND MOTOR CONTROLS DIAGRAM



DIAGNOSIS

GENERAL A/C DIAGNOSTICS

Refer to *Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System* for details of the following procedures:

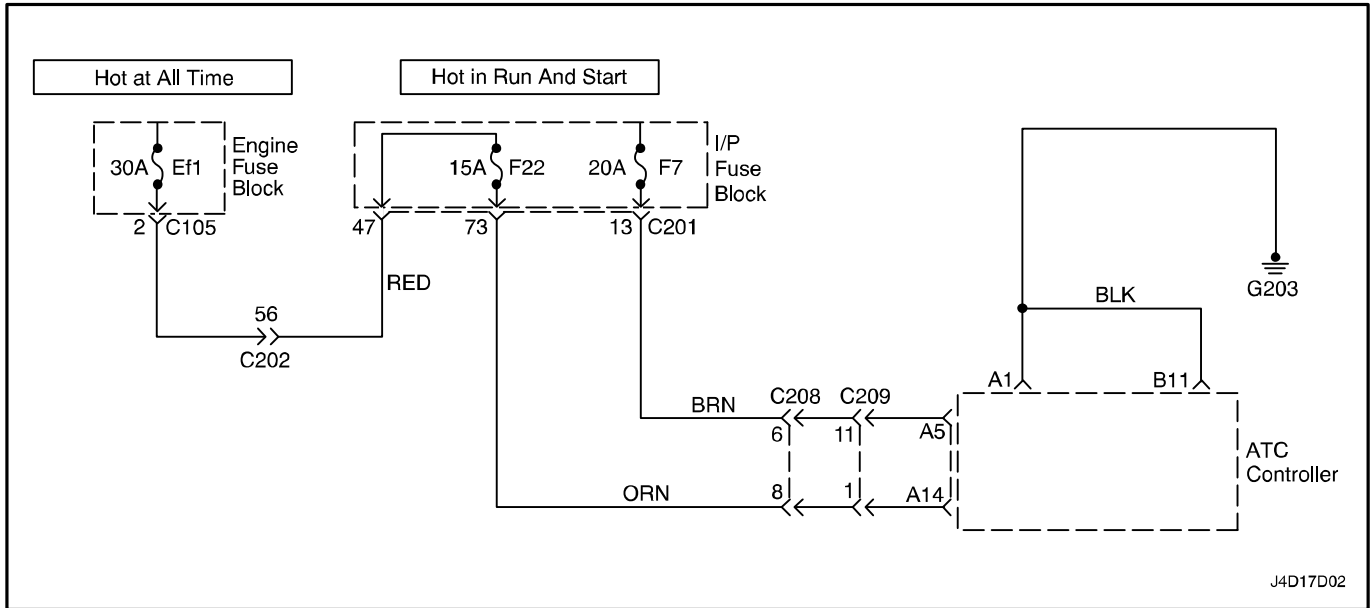
- A/C Performance Test.
- Insufficient Cooling "Quick Check" Procedure.
- Insufficient Cooling Diagnosis.
- Leak Testing the Refrigerant System.
- Low- and High-Side Pressure Relationship Chart.
- Pressure Test Chart (R-134a System).
- Pressure-Temperature Relationship of R-134a.
- Testing the Refrigerant System.

V5 SYSTEM AIR CONDITIONING AND AUTOMATIC TEMPERATURE CONTROL (ATC)

SELF-DIAGNOSTIC CIRCUIT CHECK

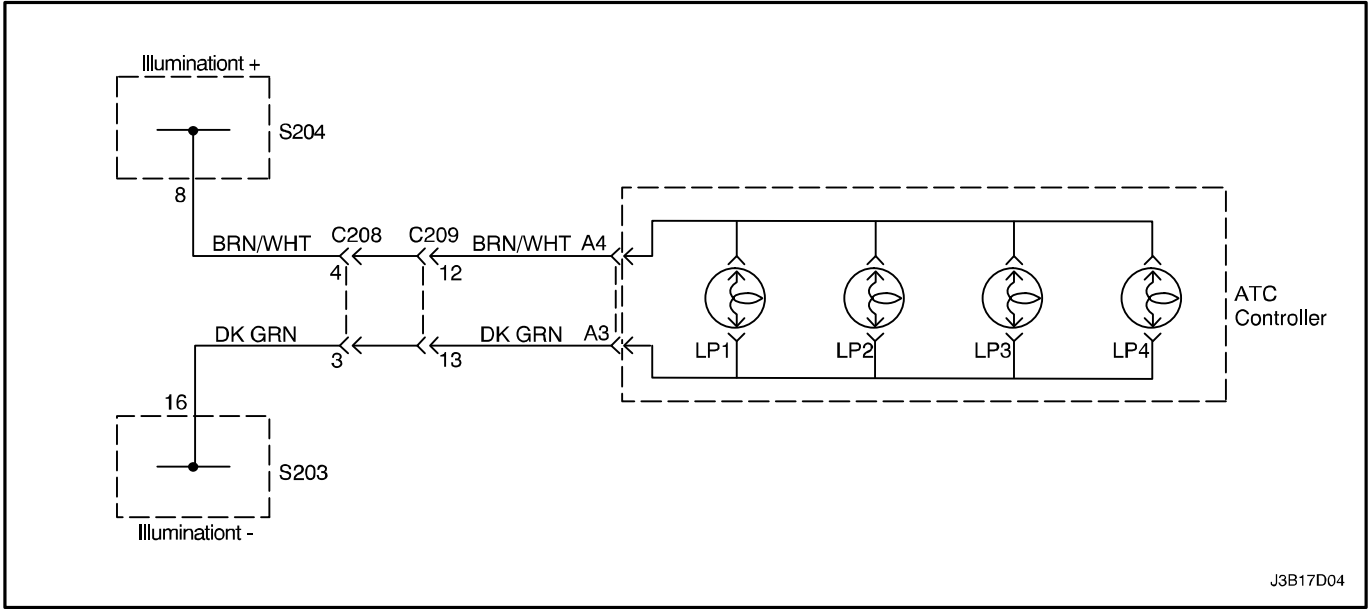
The Daewoo fully automatic temperature controller (FATC) contains a self-diagnosis function to aid in finding any problem with the system. To enter the diagnostic mode, perform the following procedure:

1. Turn the ignition to ON.
2. Set the temperature control to 26°C (79°F).
3. Within 3 seconds, push the AUTO and the OFF switches simultaneously, more than three times.
4. Count the number of times the temperature indicator screen blinks.
5. If there are no error codes set, the screen will not blink. When the controller indicates an error code, proceed to the table for that code.
6. Push the OFF switch to return the controller to its normal functions.



AUTOMATIC TEMPERATURE CONTROLLER DOES NOT OPERATE WHEN IGNITION IS ON

Step	Action	Value(s)	Yes	No
1	Check the fuse F7. Is fuse F7 blown?	–	Go to Step 2	Go to Step 3
2	Replace fuse F7. Is the repair complete?	–	System OK	–
3	1. Remove the controller. 2. Measure the voltage between connectors A5 and A14. Is the voltage within the specified value?	11–14 v	Go to Step 4	Go to Step 5
4	1. Check the controller for damage. 2. Replace the controller if it is damaged. Is the repair complete?	–	System OK	–
5	Check the voltage between terminal A1 and ground. Is this voltage as specified?	0 v	Go to Step 6	Go to Step 7
6	1. Check the wiring harness between fuse F7 and the terminal A5 for damage. 2. Replace the wiring harness if it is damaged. Is the repair complete?	–	System OK	–
7	1. Check the wiring harness between terminal A14 and ground G203 for damage. 2. Repair the wiring harness, or ground connection as required. Is the repair complete?	–	System OK	–



CONTROLLER DOES NOT ILLUMINATE WHEN LIGHT SWITCH IS ON

Step	Action	Value(s)	Yes	No
1	Check other instrumentation lights. Are those lights also off?	–	Go to Section 9E, Instrumentation/Driver Information	Go to Step 2
2	1. Remove the controller. 2. Check the voltage between terminals A3 and A4 of the controller connector. Is the voltage within the specified value?	11–14 v	Go to Step 4	Go to Step 3
3	Repair the wiring harness between splice S204 and controller connector terminal A4 or between splice S203 and controller connector terminal A3. Is the repair complete?	–	System OK	–
4	Check the illumination lamps. Is one burned out?	–	Go to Step 5	Go to Step 6
5	Replace the burned out illumination lamp. Is the repair complete?	–	System OK	–

NO HOT AIR FROM BLOWER

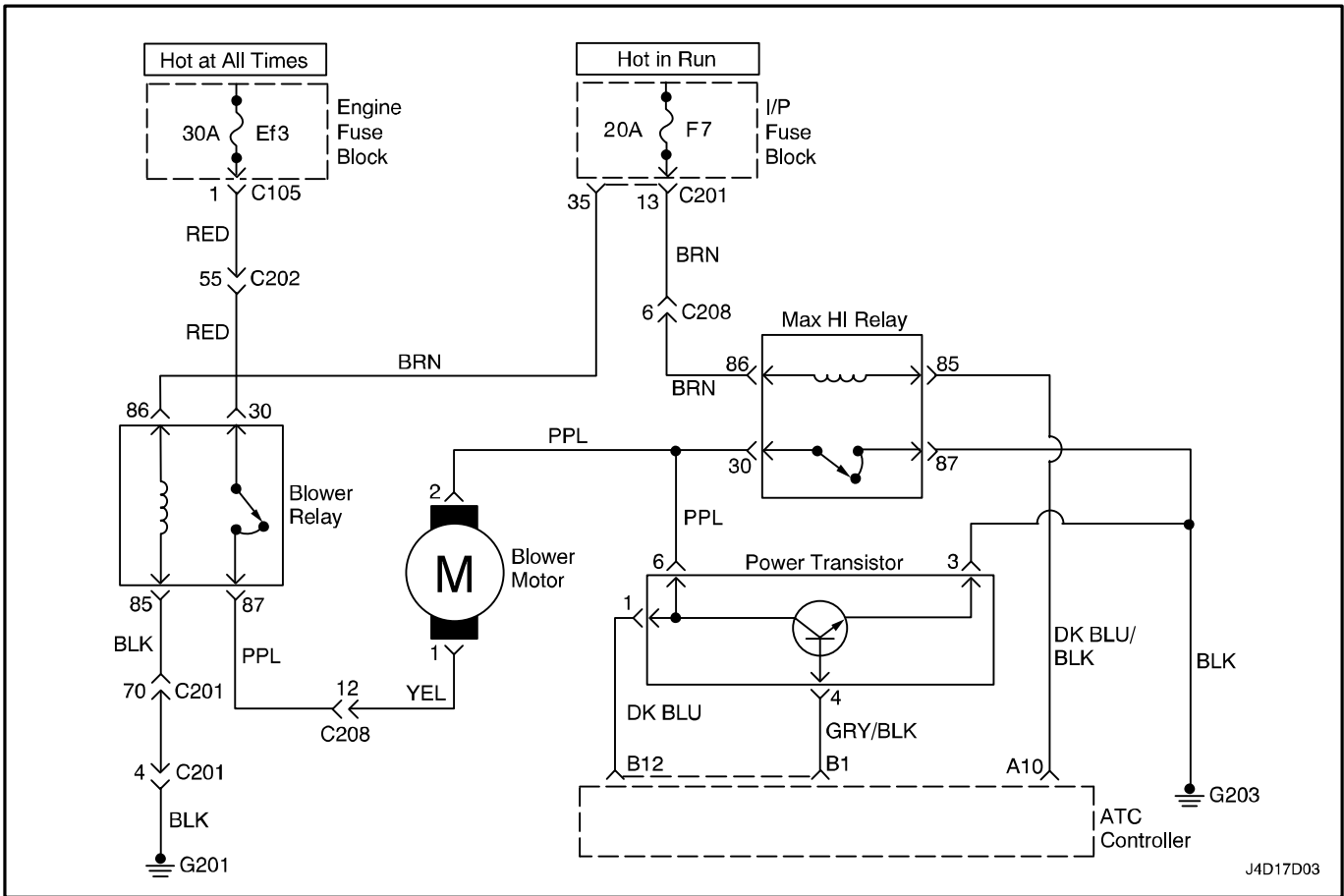
Step	Action	Value(s)	Yes	No
1	Check the coolant level. Is the coolant level correct?	–	Go to <i>Step 3</i>	Go to <i>Step 2</i>
2	Add coolant as needed. Is the heater operating?	–	System OK	Go to <i>Step 3</i>
3	1. Turn the ignition to ON. 2. Observe the temperature indication screen of the controller. Does the digit flash on and off?	–	Go to <i>Step 4</i>	Go to <i>Step 5</i>
4	Run a self–diagnosis circuit check. Does the display indicate a defect code?	–	Go to the table for the code that flashes	Go to <i>Step 7</i>
5	Observe the blower motor operation. Is the blower motor functioning at all?	–	Go to <i>Step 6</i>	Go to "Blower Motor Does Not Run at All"
6	Use the blower push switch to cycle the blower through its different speeds. Does the motor function at different speeds?	–	Go to <i>Step 7</i>	Go to "Code 6 – Power Transistor Error"
7	1. Run the blower and operate the MODE push switch manually. 2. Check for airflow out the various outlets. Does the air flow from the different outlets as it should?	–	Go to <i>Step 9</i>	Go to <i>Step 8</i>
8	1. Remove the heater outlet and check for obstructions. 2. Remove any obstructions found. Is the heater operating?	–	System OK	Go to <i>Step 9</i>
9	Observe the air mix door (AMD) motor while changing the temperature setting from 18 to 32°C (64 to 90°F) and then from 32 to 18°C (90 to 64°F). Is the AMD motor functioning properly?	–	Go to <i>Step 10</i>	Go to "Code 4 – Air Mix Door Error"
10	Check the coolant hoses for leaks or kinks. Are the coolant hoses in good condition?	–	Go to <i>Step 12</i>	Go to <i>Step 11</i>
11	Repair any problem with the coolant hoses. Is the heater operating?	–	System OK	Go to <i>Step 12</i>
12	Check the surge tank cap. Is the surge tank cap in good condition?	–	Go to <i>Step 14</i>	Go to <i>Step 13</i>
13	Repair or replace the surge tank cap as needed. Is the heater operating?	–	System OK	Go to <i>Step 14</i>
14	1. Set the A/C switch to OFF. 2. Set the temperature control to 32°C (90°F). 3. Set the blower motor speed to full high (all segments illuminated on the display). 4. Remove the surge tank cap. 5. Start the vehicle and run the engine at idle. 6. Watch for the flow of the coolant when the thermostat opens. Does the coolant flow?	–	Go to <i>Step 16</i>	Go to <i>Step 15</i>

Step	Action	Value(s)	Yes	No
15	1. Check for <ul style="list-style-type: none"> • A faulty thermostat. • A failed coolant pump impeller. • A restriction in the cooling system. 2. Make repairs as needed. Is the repair complete?	–	System OK	–
16	Check the temperature of the heater inlet and outlet hoses by feel. Is the heater inlet hose hot and the outlet hose warm?	–	Go to <i>Step 18</i>	Go to <i>Step 17</i>
17	Back flush or replace the heater core. Is the repair complete?	–	System OK	–
18	Check the vehicle for cold air leaks at the <ul style="list-style-type: none"> • Dash. • Heater cases. • Vents. Are any leaks found?	–	Go to <i>Step 20</i>	Go to <i>Step 19</i>
19	Repair any cold air leaks. Is the repair complete?	–	System OK	–
20	Check the coolant temperature sensor using the tests in "Code 3 – Coolant Temperature Sensor Error." Is there a problem indicated in the sensor, the sensor wiring, or the controller?	–	Go to <i>Step 21</i>	Go to <i>Step 22</i>
21	Repair or replace the sensor, the wiring, or the controller as required. Is the repair complete?	–	System OK	–
22	Check the in-car sensor using the tests in "Code 1 – In-Car Sensor Error." Is there a problem indicated in the sensor, the sensor wiring, or the controller?	–	Go to <i>Step 23</i>	Go to <i>Step 24</i>
23	Repair or replace the sensor, the wiring, or the controller as required. Is the repair complete?	–	System OK	–
24	Check the ambient air temperature sensor using the tests in "Code 2 – Ambient Air Temperature Sensor Error." Is there a problem indicated in the sensor, the sensor wiring, or the controller?	–	Go to <i>Step 25</i>	Go to <i>Step 26</i>
25	Repair or replace the sensor, the wiring, or the controller as required. Is the repair complete?	–	System OK	–
26	Check the sun sensor using the tests in "Code 5 – Sun Sensor Error." Is there a problem indicated in the sensor, the sensor wiring, or the controller?	–	Go to <i>Step 27</i>	Go to <i>Step 28</i>
27	Repair or replace the sensor, the wiring, or the controller as required. Is the repair complete?	–	System OK	–
28	Replace the ATC controller. Is the repair complete?	–	System OK	–

NO COOL AIR FROM BLOWER

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition to ON. 2. Observe the temperature indication screen of the controller. Does the digit flash on and off?	–	Go to <i>Step 2</i>	Go to <i>Step 3</i>
2	Run a self–diagnosis circuit check. Does the display indicate a defect code?	–	Go to the table for the code that flashes.	Go to <i>Step 7</i>
3	Observe the blower motor operation. Is the blower motor functioning at all?	–	Go to <i>Step 4</i>	Go to "Blower Motor Does Not Run at All"
4	Use the blower push switch to cycle the blower through its different speeds. Does the motor function at different speeds?	–	Go to <i>Step 5</i>	Go to "Code 6 – Power Transistor Error"
5	1. Run the blower and operate the MODE push switch manually. 2. Check for airflow out the various outlets. Does the air flow from the different outlets as it should?	–	Go to <i>Step 7</i>	Go to <i>Step 6</i>
6	1. Remove the heater outlet and check for obstructions. 2. Remove any obstructions found. Is the heater operating?	–	System OK	Go to <i>Step 9</i>
7	Observe the air mix door motor (AMD) while changing the temperature setting from 18 to 32°C (64 to 90°F) and then from 32 to 18°C (90 to 64°F). Is the AMD motor functioning properly?	–	Go to <i>Step 8</i>	Go to "Code 3 – Air Mix Door Error"
8	Perform the checks found in "Insufficient Cooling Diagnosis." Is the system operating normally now?	–	System OK	Go to <i>Step 9</i>
9	Place the controller in the AUTO mode. Is smoke taken into the intake port of the in–car sensor?	–	Go to <i>Step 12</i>	Go to <i>Step 10</i>
10	Check the intake hose for the in–car sensor. Is the hose in good condition?	–	Go to <i>Step 12</i>	Go to <i>Step 11</i>
11	Repair or replace the intake hose. Is the repair complete?	–	System OK	–
12	Check the in–car sensor using the tests in "Code 1 – In–Car Sensor Error." Is there a problem indicated in the sensor, the sensor wiring, or the controller?	–	Go to <i>Step 13</i>	Go to <i>Step 14</i>
13	Repair or replace the sensor, the wiring, or the controller as required. Is the repair complete?	–	System OK	–
14	Check the ambient air temperature sensor using the tests in "Code 2 – Ambient Air Temperature Sensor Error." Is there a problem indicated in the sensor, the sensor wiring, or the controller?	–	Go to <i>Step 15</i>	Go to <i>Step 16</i>

Step	Action	Value(s)	Yes	No
15	Repair or replace the sensor, the wiring, or the controller, as required. Is the repair complete?	–	System OK	–
16	Check the sun sensor using the tests in "Code 5 – Sun Sensor Error." Is there a problem indicated in the sensor, the sensor wiring, or the controller?	–	Go to <i>Step 17</i>	Go to <i>Step 18</i>
17	Repair or replace the sensor, the wiring, or the controller as required. Is the repair complete?	–	System OK	–
18	Perform the coolant temperature sensor test. Is the coolant temperature sensor malfunctioning?	–	Go to <i>Step 19</i>	Go to <i>Step 20</i>
19	Replace the coolant temperature sensor. Is the repair complete?	–	System OK	–
20	Replace the ATC controller. Is the repair complete?	–	System OK	–



BLOWER MOTOR DOES NOT RUN AT ALL

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition to ON. 2. Observe the temperature indication screen of the controller. Does the digit go on and off?	–	Go to Step 2	Go to Step 3
2	Run a self–diagnosis circuit check. Does the display indicate a defect code?	–	Go to the table for the code that flashes.	–
3	Check fuse F7 in the I/P fuse block. Is this fuse in good condition?	–	Go to Step 5	Go to Step 4
4	Replace fuse F7. Is the repair complete?	–	System OK	–
5	Check fuse EF3 in the engine fuse block. Is this fuse in good condition?	–	Go to Step 7	Go to Step 6
6	Replace fuse EF3. Is the repair complete?	–	System OK	–
7	1. Turn the ignition switch to ON. 2. Measure the voltage between ground and terminal 87(Violet) of the blower relay. Is the voltage within the specified value?	11–14 v	Go to Step 15	Go to Step 8
8	Measure the voltage between ground and terminal 86 (Brown) at the blower relay. Is the voltage within the specified value?	11–14 v	Go to Step 10	Go to Step 9

Step	Action	Value(s)	Yes	No
9	<ol style="list-style-type: none"> 1. Turn the ignition switch to OFF. 2. Check circuit (Brown) between terminal 86 of the blower relay to F7 in the I/P fuse block. 3. Repair any problem found in the wiring or terminals at the relay socket or connector C203. Is the repair complete?	–	System OK	–
10	Measure the voltage between ground and terminal 30 (Red) at the blower relay. Is the voltage within the specified value?	11–14 v	Go to <i>Step 12</i>	Go to <i>Step 11</i>
11	<ol style="list-style-type: none"> 1. Turn the ignition switch to OFF. 2. Check circuit (Red) between terminal 30 of the blower relay to EF3 in the engine fuse block. 3. Repair any problem found in the wiring or terminals at the fuse block connector C105, connector C202, or at the relay socket. Is the repair complete?	–	System OK	–
12	<ol style="list-style-type: none"> 1. Turn the ignition switch to OFF. 2. Check the continuity in the wiring harness between the blower relay terminal 85 (Black) and ground. Does the ohmmeter show the specified value?	$\approx 0 \Omega$	Go to <i>Step 14</i>	Go to <i>Step 13</i>
13	Repair any problem found in terminal 85 at the relay connector, circuit (Black), Connector C201, or ground G201. Is the repair complete?	–	System OK	–
14	Replace the blower relay. Is the repair complete?	–	System OK	–
15	<ol style="list-style-type: none"> 1. Turn the ignition switch to OFF. 2. Disconnect the wiring harness at the blower motor. 3. Turn the ignition switch to ON. 4. Measure voltage between ground and blower connector 1 (Yellow). Is the voltage within the specified value?	11–14 v	Go to <i>Step 17</i>	Go to <i>Step 16</i>
16	<ol style="list-style-type: none"> 1. Turn the ignition switch to OFF. 2. Check circuit (Yellow) between blower connector terminal 1 and blower relay terminal 87. 3. Repair any problem found in the wiring or a connector terminal at the blower connector, connector C208, or the blower relay socket. Is the repair complete?	–	System OK	–
17	Measure the resistance between the connector terminals on the blower motor. Does the resistance match the specified value?	$\approx 5 \Omega$	Go to <i>Step 19</i>	Go to <i>Step 18</i>
18	Replace the blower motor. Is the repair complete?	–	System OK	–
19	Measure the resistance of circuit (Violet) between terminal 2 of the blower connector and terminal 30 of the Max HI relay and terminal 6 of the power transistor. Does the resistance match the specified value?	$\approx 0 \Omega$	Go to <i>Step 21</i>	Go to <i>Step 20</i>

Step	Action	Value(s)	Yes	No
20	Repair the problem in circuit (Violet). Is the repair complete?	–	System OK	–
21	Measure the resistance of circuit (Black) from terminal 3 of the power transistor connector to ground. Does the resistance match the specified value?	$\approx 0 \Omega$	Go to <i>Step 23</i>	Go to <i>Step 22</i>
22	1. Trace circuit (Black) from terminal 3 of the power transistor connector and terminal 87 of the Max HI relay to ground G203. 2. Repair any problem found in the wiring, ground G203. Is the repair complete?	–	System OK	–
23	Replace the ATC controller. the repair complete?	–	System OK	–

MODE CONTROL DO NOT WORK

Refer to "A/C Blower and Motor Controls Diagram" for the electrical schematic diagram of the circuits described in this procedure.

Mode Controls Do Not Work

Step	Action	Value(s)	Yes	No
1	Measure the voltage between terminal 4 and terminal 5 of the mode motor. Is the voltage within the specified value for motor?	11–14 v	Go to <i>Step 3</i>	Go to <i>Step 2</i>
2	1. Check fuse F7? 2. Check the connector and circuit (Brown and Black) for any wiring or terminal problems. 3. Repair any problems found. Is the repair complete?	–	System OK	–
3	1. Using the Motor Control Table, measure the voltages at the specified terminals of the specified motor connectors. 2. Change the mode settings and observe the voltage changes. Are the voltages as specified?	See the "Motor Control Table"	Go to <i>Step 4</i>	Go to <i>Step 5</i>
4	Replace the motor that does not operate properly. Is the repair complete?	–	System OK	–
5	1. Using the Motor Control Table, measure the voltages at the specified terminals of the specified controller connectors. 2. Change the mode settings and observe the voltage changes. Are the voltages as specified?	See the "Motor Control Table"	Go to <i>Step 6</i>	Go to <i>Step 7</i>
6	1. Check the wiring harness and connectors between the controller and the motor that is not performing properly. 2. Repair or replace the wiring harness or the defective terminal. Is the repair complete?	–	System OK	–
7	Check the connector at the controller. Is there a defective terminal?	–	Go to <i>Step 8</i>	Go to <i>Step 9</i>

Step	Action	Value(s)	Yes	No
8	Repair or replace the terminal. Is the repair complete?	–	System OK	–
9	Replace the controller. Is the repair complete?	–	System OK	–

Motor Control Table

Mode Setting	Mode Motor				
	Connector Terminal				
	Controller/ Motor	Controller/ Motor	Controller/ Motor	Controller/ Motor	Controller/ Motor
	B16/3	B17/2	B18/1	B19/7	B20/6
Vent	11–14 v	11–14 v	11–14 v	11–14 v	0 v
Bi-Level	11–14 v	11–14 v	11–14 v	0 v	11–14 v
Foot	11–14 v	11–14 v	0 v	11–14 v	11–14 v
Foot/Defrost	11–14 v	0 v	11–14 v	11–14 v	11–14 v
Defrost	0 v	11–14 v	11–14 v	11–14 v	11–14 v

AIR SOURCE SELECTION NOT CONTROLLED

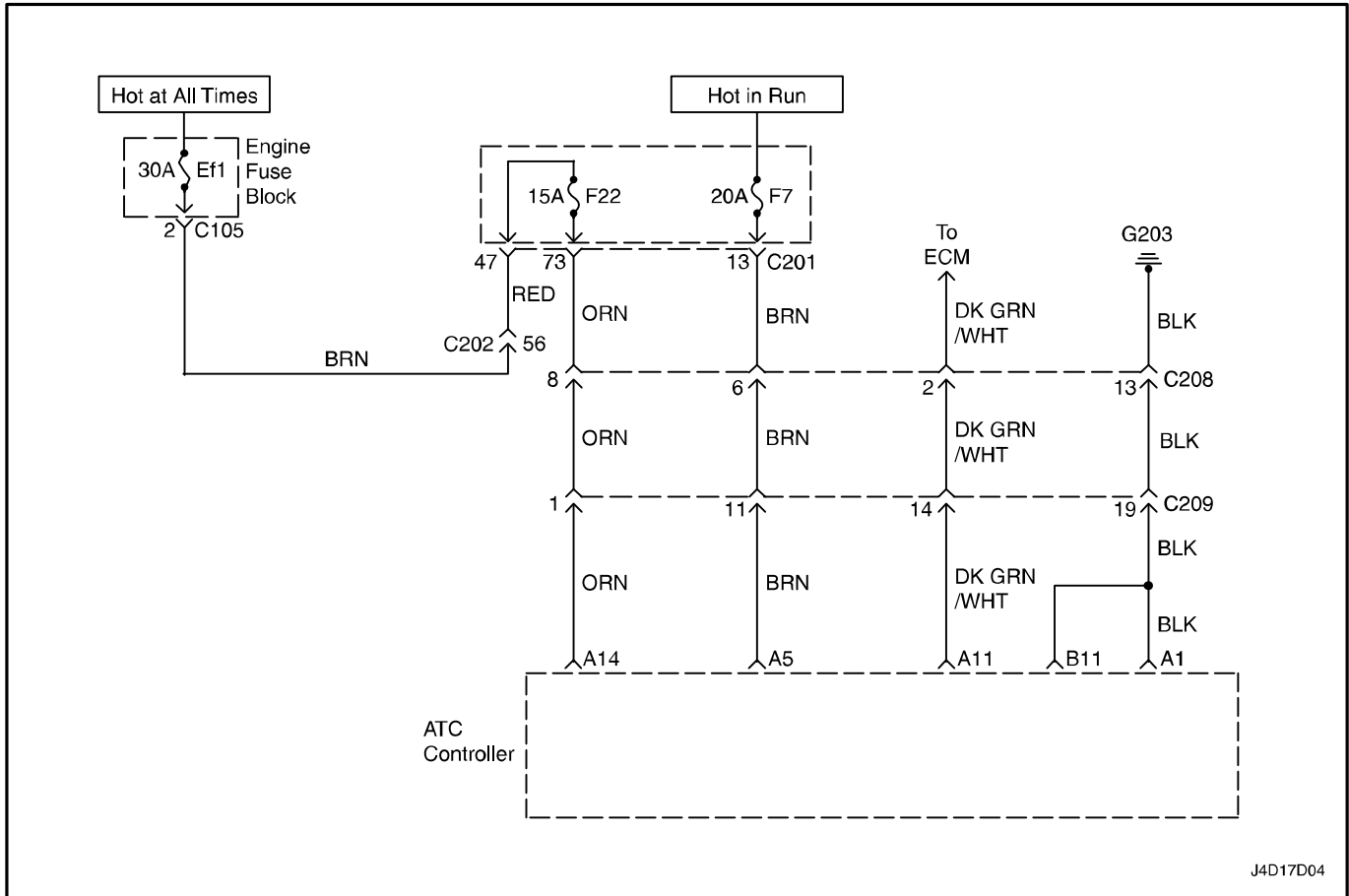
Refer to "A/C Blower and Motor Controls Diagram" for the electrical schematic diagram of the circuits described in this procedure.

Air Source Selection Not Controlled

Step	Action	Value(s)	Yes	No
1	Measure the voltage at terminal 4 of the intake motor. Is the voltage within the value specified?	11–14 v	Go to <i>Step 3</i>	Go to <i>Step 2</i>
2	1. Check the connector and circuit (Brown) for any wiring or terminal problems. 2. Repair any problems found. Is the repair complete?	–	System OK	–
3	1. Using the Intake Motor Table, measure the voltages between terminal 4 and terminal 5 of the motor connector. 2. Change the intake setting and observe the voltage changes. Are these voltages within the specified value?	See the "Intake Motor Table"	Go to <i>Step 4</i>	Go to <i>Step 5</i>
4	Replace the intake motor. Is the repair complete?	–	System OK	–
5	1. Using the Intake Motor Table, measure the voltages between terminal 4 and terminal 7 of the motor connector. 2. Change the intake setting and observe the voltage changes. Are these voltages within the specified value?	See the "Intake Motor Table"	Go to <i>Step 6</i>	Go to <i>Step 7</i>
6	1. Check the wiring harness and connectors between the controller and the motor that is not performing properly. 2. Repair or replace the wiring harness or the defective terminal. Is the repair complete?	–	System OK	–
7	Check the connector at the controller. Is there a defective terminal?	–	Go to <i>Step 8</i>	Go to <i>Step 9</i>
8	Repair or replace the terminal. Is the repair complete?	–	System OK	–
9	Replace the controller. Is the repair complete?	–	System OK	–

Intake Control Table

Intake Setting	Intake Motor	
	Connector Terminal	
	Controller/Motor	Controller/Motor
	B14/7	B13/5
Recirculate	11–14 v	0 v
Fresh	0 v	11–14 v

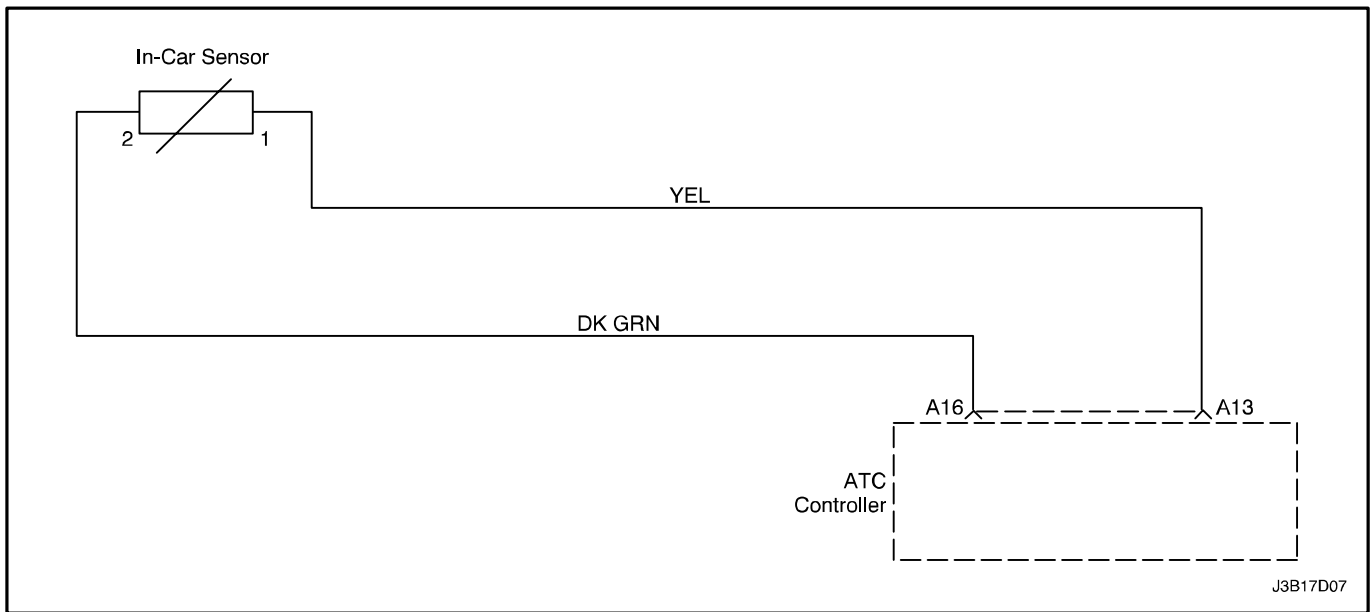


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COMPRESSOR MAGNETIC CLUTCH DOES NOT ENGAGE

Step	Action	Value(s)	Yes	No
1	1. Remove the ATC Controller from the instrument panel, keeping the wiring harness connected. 2. Turn the ignition switch to ON. 3. Turn the A/C switch to ON. 4. Check the voltage between ground and terminal A11 on the controller. Is the voltage within the specified value?	11–14 v	Go to "Insufficient Cooling Diagnosis"	Go to <i>Step 2</i>
2	Replace the ATC controller. Is the repair complete?	–	System OK	–

DIAGNOSTIC TROUBLE CODES



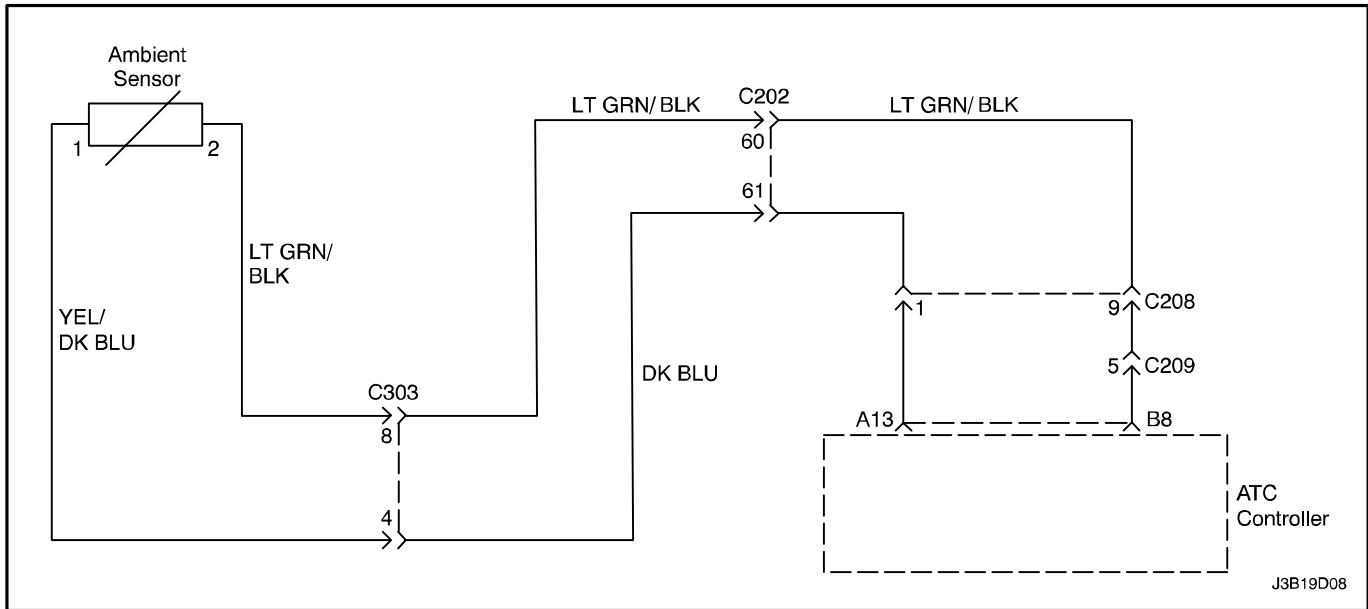
CODE 1 – IN-CAR SENSOR ERROR

This code will set if the output of the in-car sensor indicates a probable short circuit or an open in the sensor or the associated wiring harness, or a malfunction of the ATC controller.

Code 1 – In-Car Sensor Error

Step	Action	Value(s)	Yes	No
1	<ol style="list-style-type: none"> 1. Disconnect the in-car sensor connector from the ATC controller. 2. Examine the wiring from the sensor to the connector and the connector for any signs of damage. 3. Measure the resistance between the in-car sensor connector terminals. <p>Is there any sign of damage in the wiring or connector, or is the resistance outside the specified value at 20 to 25 °C (68 to 77 °F)?</p>	2600–2100 Ω	Go to <i>Step 2</i>	Go to <i>Step 3</i>
2	<p>Repair the damaged wiring or the connector, or replace the in-car sensor as required.</p> <p>Is the repair complete?</p>	–	System OK	–
3	<ol style="list-style-type: none"> 1. Turn the ignition to ON. 2. Measure the voltage between the two connector terminals on the controller housing. <p>Is the voltage equal to the value specified?</p>	> 4 v	Go to <i>Step 7</i>	Go to <i>Step 4</i>
4	<p>Check the terminals on the in-car sensor connector.</p> <p>Is any problem found with the connector?</p>	–	Go to <i>Step 5</i>	Go to <i>Step 6</i>
5	<p>Repair the connector terminals or replace the in-car sensor or ATC controller as required.</p> <p>Is the repair complete?</p>	–	System OK	–

Step	Action	Value(s)	Yes	No
6	1. Reconnect the in-car sensor to the controller. 2. Turn the ignition switch to ON. 3. Observe the temperature display area. Does this display indicate the continuing presence of a code 1 condition?	–	Go to <i>Step 7</i>	System OK
7	Replace the ATC controller. Is the repair complete?	–	System OK	–



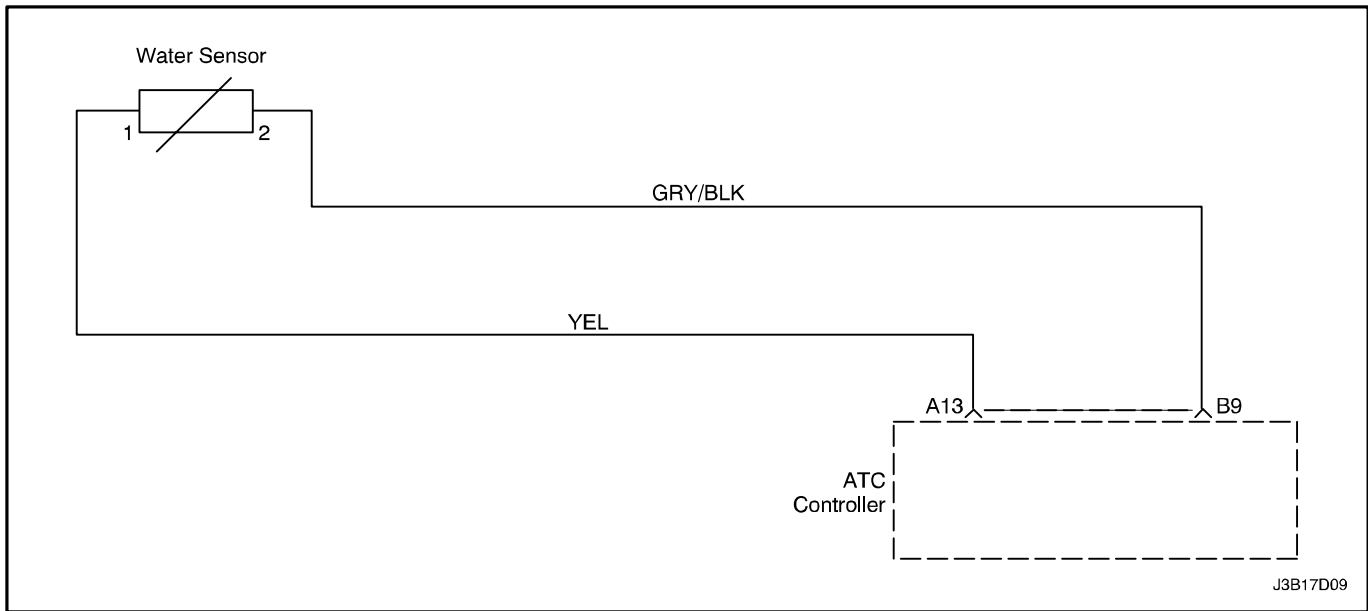
CODE 2 – AMBIENT AIR TEMPERATURE SENSOR ERROR

This code will set if the output of the ambient air temperature sensor indicates a probable short circuit or an open in the sensor or the associated wiring harness, or a malfunction of the ATC controller.

Code 2 – Ambient Air Temperature Sensor Error

Step	Action	Value(s)	Yes	No
1	1. Disconnect the ambient air sensor connector from the front bumper harness. 2. Measure the resistance between the ambient air sensor connector terminals. Is the resistance equal to the specified value at 20 to 25°C (68 to 77°F)?	2600–2100 Ω	Go to <i>Step 5</i>	Go to <i>Step 2</i>
2	1. Remove the ambient air sensor from behind the front bumper. 2. Examine the wiring for any open or short and examine the connector for any damage. Is there a problem with the wiring or the connector?	–	Go to <i>Step 3</i>	Go to <i>Step 4</i>
3	Repair the problem found in the ambient air sensor wiring or the connector. Is the repair complete?	–	System OK	–
4	Replace the ambient air sensor. Is the repair complete?	–	System OK	–
5	1. Turn the ignition to ON. 2. Measure the voltage between the two terminals in the ambient air sensor connector on the front bumper harness. Is the voltage equal to the value specified?	> 4 v	Go to <i>Step 7</i>	Go to <i>Step 6</i>
6	1. Reconnect the in-car sensor to the controller. 2. Turn the ignition switch to ON. 3. Observe the temperature display area. Does this display indicate the continuing presence of a code 2 condition?	–	Go to <i>Step 8</i>	System OK

Step	Action	Value(s)	Yes	No
7	1. Pull the ATC controller from the instrument panel, leaving the wiring harness connected. 2. Measure the voltage between terminals A13 and B8 by backprobing the connectors. Is the voltage equal to the value specified?	< 4 v	Go to <i>Step 8</i>	Go to <i>Step 9</i>
8	Replace the ATC Controller. Is the repair complete?	–	System OK	–
9	1. Trace the wiring for the ambient air sensor from the ATC controller, through connectors C209, C208, C202 and C303 to the ambient air sensor connector on the front bumper harness. 2. Repair any open or high resistance condition in the wiring or a connector terminal. Is the repair complete?	–	System OK	–



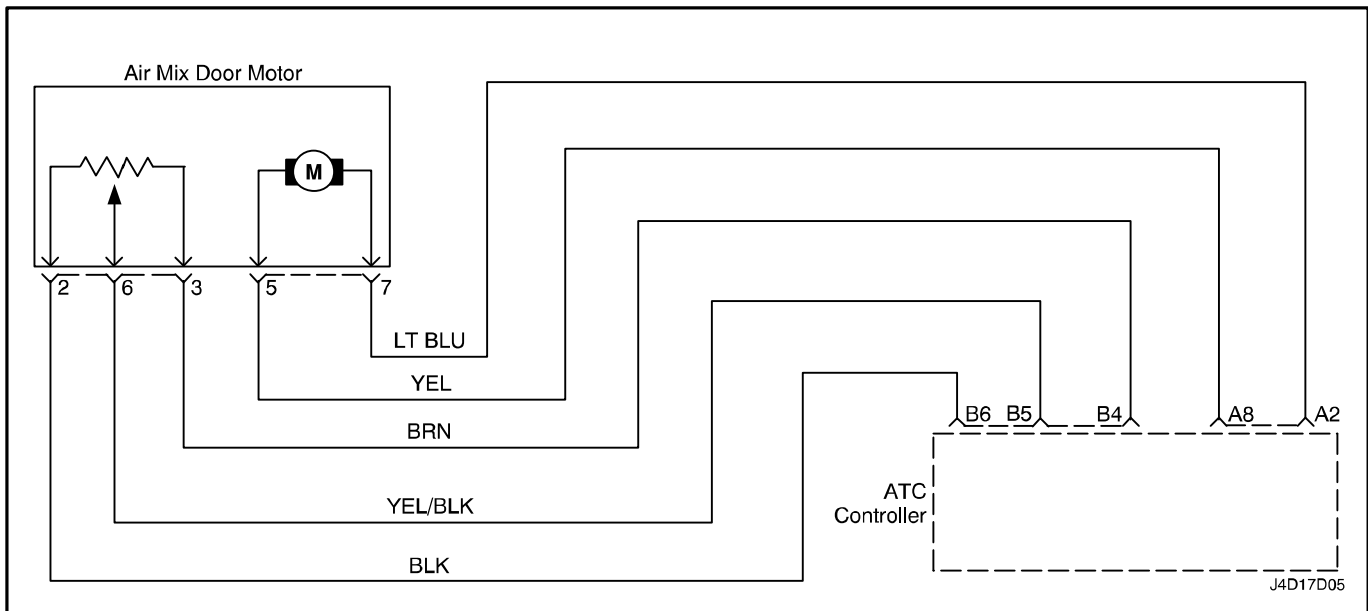
CODE 3 – WATER SENSOR ERROR

This code will set if the output of the coolant sensor indicates a probable short circuit or an open in the sensor or the associated wiring harness, or a malfunction of the ATC controller.

Code 3 – Water Sensor Error

Step	Action	Value(s)	Yes	No
1	<ol style="list-style-type: none"> 1. Disconnect the coolant temperature sensor connector from the ATC harness. 2. Examine the wiring from the sensor to the connector and examine the connector for any signs of damage. 3. Measure the resistance between the coolant temperature sensor connector terminals. Is there any sign of damage in the wiring or the connector, or is the resistance outside the specified value at 20 to 25 °C (68 to 77 °F)?	2600–2100 Ω	Go to <i>Step 2</i>	Go to <i>Step 3</i>
2	Repair the damaged wiring or the connector, or replace the coolant temperature sensor as required. Is the repair complete?	–	System OK	–
3	<ol style="list-style-type: none"> 1. Turn the ignition to ON. 2. Measure the voltage between the two coolant temperature sensor connector terminals on the ATC harness. Is the voltage equal to the specified value?	< 4 v	Go to <i>Step 7</i>	Go to <i>Step 4</i>
4	Check the terminals on the coolant temperature sensor connector. Is any problem found with the connector?	–	Go to <i>Step 5</i>	Go to <i>Step 6</i>
5	Repair the connector terminals or replace the coolant temperature sensor or ATC controller as required. Is the repair complete?	–	System OK	–

Step	Action	Value(s)	Yes	No
6	1. Reconnect the coolant temperature sensor to the ATC harness. 2. Turn the ignition switch to ON. 3. Observe the temperature display area. Does this display indicate the continuing presence of a code 3 condition?	–	Go to <i>Step 9</i>	System OK
7	1. Pull the ATC controller from the instrument panel, leaving the wiring harness connected. 2. Measure the voltage between terminals A13 and B9 by backprobing the connectors. Is the voltage equal to the value specified?	< 4 v	Go to <i>Step 9</i>	Go to <i>Step 8</i>
8	1. Trace the wiring from controller terminals A13 and B9 to the coolant temperature sensor connector terminals on the ATC harness connectors. 2. Repair any open or high resistance found in the wiring or connector terminals. Is the repair complete?	–	System OK	–
9	Replace the ATC controller. Is the repair complete?	–	System OK	–



CODE 4 – AIR MIX DOOR ERROR

This code will set if the output of the mix door indicator indicates that the door opening angle is out of range or does not change value when the door should be moving. This would indicate a short circuit or an open in the sensor or the associated wiring harness, a door motor that is not operating, or a malfunction of the ATC controller.

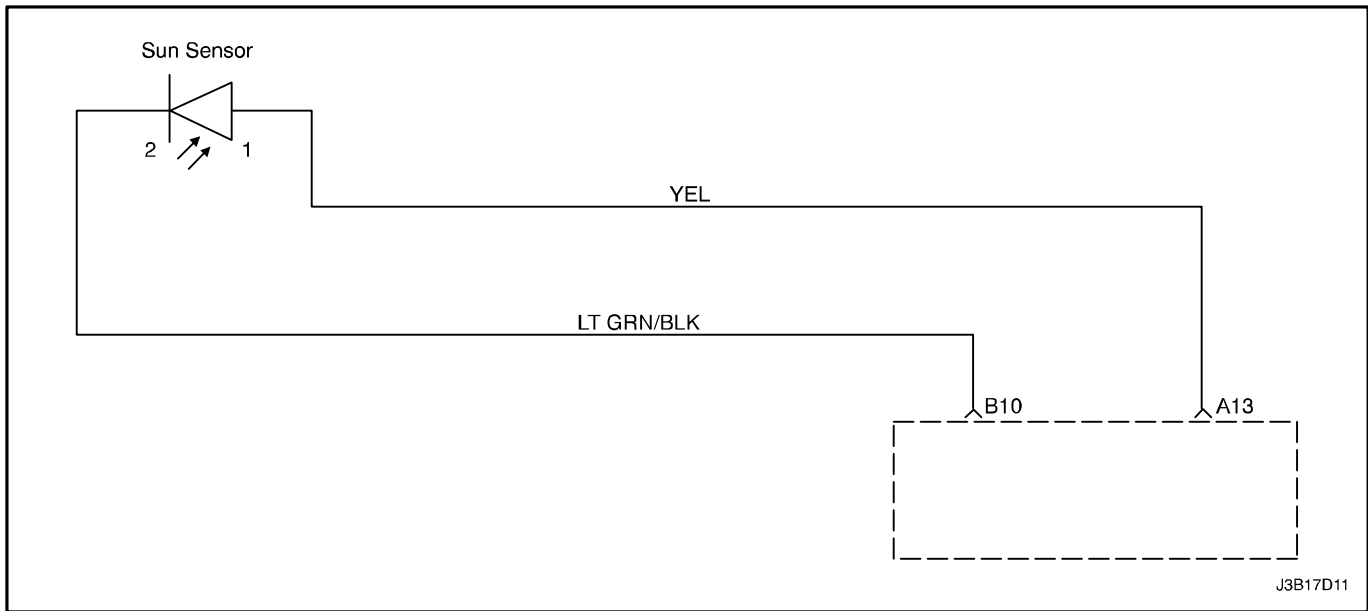
Code 4 – Air Mix Door Error

Step	Action	Value(s)	Yes	No
1	1. Disconnect the I/P wiring harness connector from the air mix door (AMD) motor. 2. Use an ohmmeter to measure the resistance between terminals 5 and 7 on the AMD motor. Does the measured resistance indicate an open or a shorted condition?	Open = ∞ , Short = $\approx 0 \Omega$	Go to <i>Step 4</i>	Go to <i>Step 2</i>
2	Measure the resistance between terminals 2 and 3 on the AMD motor. Is the resistance equal to the value specified?	$\approx 3000 \Omega$	Go to <i>Step 3</i>	Go to <i>Step 4</i>
3	Measure the resistance between terminals 6 and 2 and between terminals 6 and 3 on the AMD motor. Do these resistances add to approximately the value measured between terminals 2 and 3?	$\approx 3000 \Omega$	Go to <i>Step 5</i>	Go to <i>Step 4</i>
4	Replace the AMD motor. Is the repair complete?	–	System OK	–
5	Check the connector terminals at the AMD motor and the wiring in the ATC harness. Is there a problem with any terminal on either the harness connector or the motor connector or the wiring?	–	Go to <i>Step 6</i>	Go to <i>Step 7</i>
6	Repair the problem found with a connector terminal or the wiring, or replace the motor as required. Is the repair complete?	–	System OK	–

Step	Action	Value(s)	Yes	No
7	<ol style="list-style-type: none"> 1. Remove the ATC controller from the instrument panel. 2. Disconnect the harness connectors from the ATC controller. 3. Examine the connector terminals on the harness connectors and the controller connectors and the harness wiring. <p>Is there a problem with any of these connectors or the wiring?</p>	–	Go to <i>Step 8</i>	Go to <i>Step 9</i>
8	<p>Repair the problem found with a connector terminal or wiring.</p> <p>Is the repair complete?</p>	–	System OK	–
9	<p>Check continuity in the harness between the controller connectors and the AMD motor connector.</p> <ul style="list-style-type: none"> • Controller terminal A2 to motor terminal 7. • Controller terminal A8 to motor terminal 5. • Controller terminal B6 to motor terminal 2. • Controller terminal B5 to motor terminal 6. • Controller terminal B4 to motor terminal 3. <p>Does the continuity equal the specified value?</p>	$\approx 0 \Omega$	Go to <i>Step 10</i>	Go to <i>Step 11</i>
10	<p>Repair the continuity problem.</p> <p>Is the repair complete?</p>	–	System OK	–
11	<ol style="list-style-type: none"> 1. Reconnect the AMD motor to the ATC harness. 2. Reconnect the ATC harness connectors to the controller. 3. Turn the ignition to ON. 4. Use backprobing for voltage measurements. 5. Measure the voltage between ground and terminal B5 at the controller. <p>Is the voltage equal to the specified value?</p>	< 4 v	Go to <i>Step 12</i>	Go to <i>Step 14</i>
12	<ol style="list-style-type: none"> 1. Set the temperature controller to 18°C (64°F). 2. Connect a voltmeter between ground and terminal A8 at the controller. It should display about 12 v. 3. Raise the temperature setting on the controller to 32°C (90°F). <p>Does the voltage equal the specified value?</p>	Drops from 12 v to 0 v	Go to <i>Step 13</i>	Go to <i>Step 15</i>
13	<ol style="list-style-type: none"> 1. Connect a voltmeter between ground and terminal A2 at the controller. It should display about 12 v. 2. Change the temperature setting to 18°C (64°F). <p>Does the voltage equal the specified value?</p>	Drops from 12 v to 0 v	Go to <i>Step 20</i>	Go to <i>Step 15</i>
14	<ol style="list-style-type: none"> 1. Recheck the wiring harness and the connector terminals associated with controller terminals B4, B5, and B6, and AMD motor terminals 2, 6, and 3. 2. Repair any problem found. <p>Is the repair complete?</p>	–	System OK	–
15	<p>Recheck all wiring circuits between the controller and the AMD motor.</p> <p>Is there a problem in the wiring or the connectors?</p>	–	Go to <i>Step 16</i>	Go to <i>Step 17</i>

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Step	Action	Value(s)	Yes	No
16	Repair the problem in the wiring between the ATC controller and the AMD motor. Is the repair complete?	–	System OK	–
17	Recheck the AMD motor. Is there a problem in the AMD motor?	–	Go to <i>Step 18</i>	Go to <i>Step 19</i>
18	Replace the AMD motor. Is the repair complete?	–	System OK	–
19	Replace the controller. Is the repair complete?	–	System OK	–
20	Observe the operation of the air mix door when the temperature setting is changed. Does the door move normally?	–	Go to <i>Step 22</i>	Go to <i>Step 21</i>
21	Repair or replace the air mix door. Is the repair complete?	–	System OK	–
22	Observe the operation of the AMD motor when the temperature setting is changed. Does the motor operate normally?	–	Go to <i>Step 24</i>	Go to <i>Step 23</i>
23	Replace the AMD motor. Is the repair complete?	–	System OK	–
24	Reconnect everything and test the system. Does code 4 reset?	–	Go to <i>Step 25</i>	System OK
25	Replace the controller. Is the repair complete?	–	System OK	–



CODE 5 – SUN SENSOR ERROR

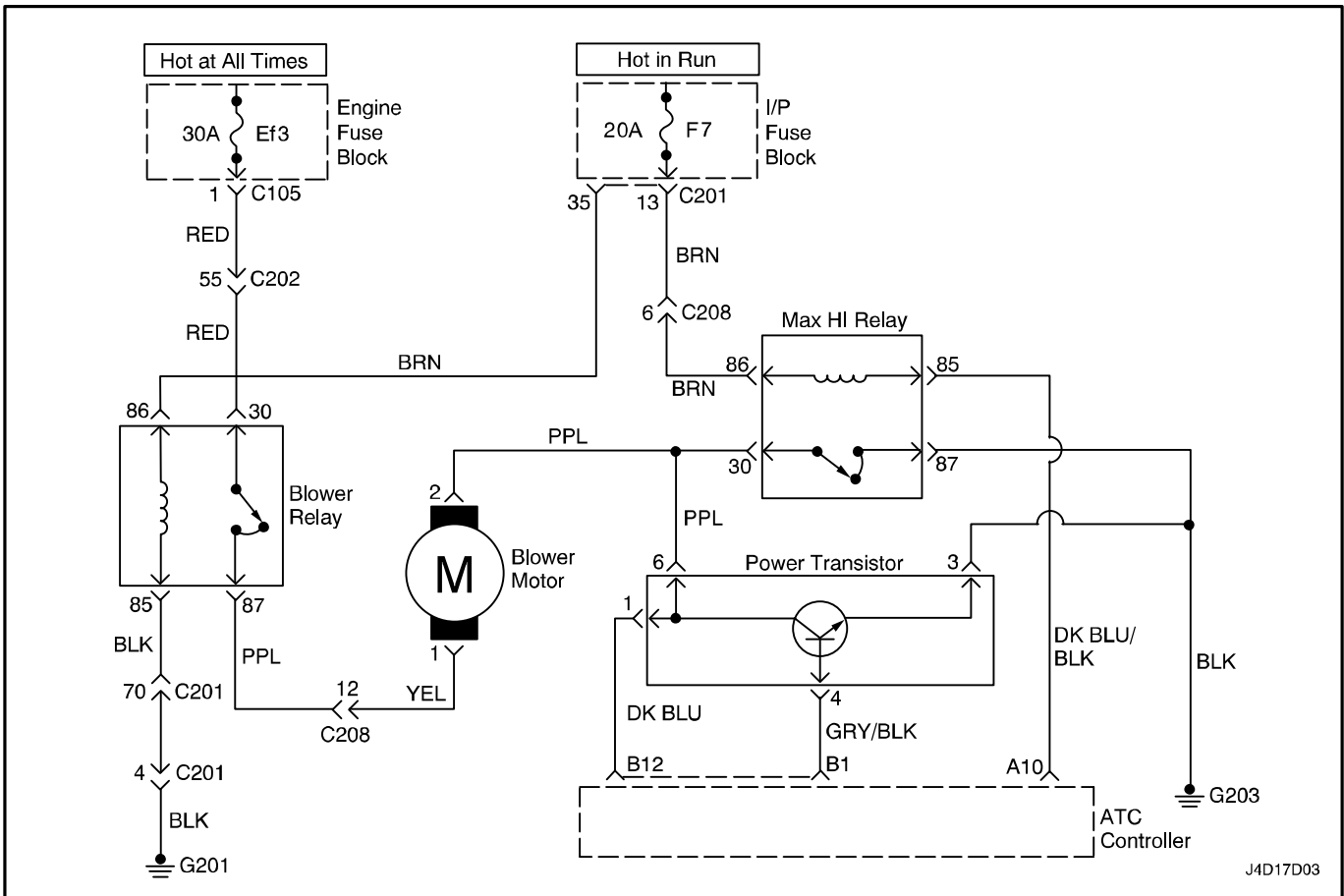
This code will set if the output of the sun sensor indicates a probable short circuit or an open in the sensor or the associated wiring harness, or a malfunction of the ATC controller.

Code 5 – Sun Sensor Error

Step	Action	Value(s)	Yes	No
1	<ol style="list-style-type: none"> Lift the sun sensor from the top of the dashboard. Secure the ATC harness below the sun sensor connector so it cannot fall through the opening in the top of the dashboard. Disconnect the sun sensor connector from the ATC harness. Examine the wiring from the sensor to the connector, and examine the connector for any signs of damage. Measure the resistance between the sun sensor connector terminals. Is there any sign of damage in the wiring or connector or does the resistance equal the value specified?	$\approx 0 \Omega$	Go to <i>Step 2</i>	Go to <i>Step 3</i>
2	Repair the damaged wiring or the connector, or replace the sun sensor as required. Is the repair complete?	–	System OK	–
3	<ol style="list-style-type: none"> Turn the ignition to ON. Measure the voltage between the two sun sensor connector terminals on the ATC harness. Is the voltage equal to the specified value?	$< 4 \text{ v}$	Go to <i>Step 7</i>	Go to <i>Step 4</i>
4	Check the terminals on the sun sensor connector. Is any problem found with the connector?	–	Go to <i>Step 5</i>	Go to <i>Step 6</i>
5	Repair the connector terminals or replace the sun sensor or ATC controller as required. Is the repair complete?	–	System OK	–

7D – 28 AUTOMATIC TEMPERATURE CONTROL HEATING, VENTILATION, AND AIR CONDITIONING SYSTEM

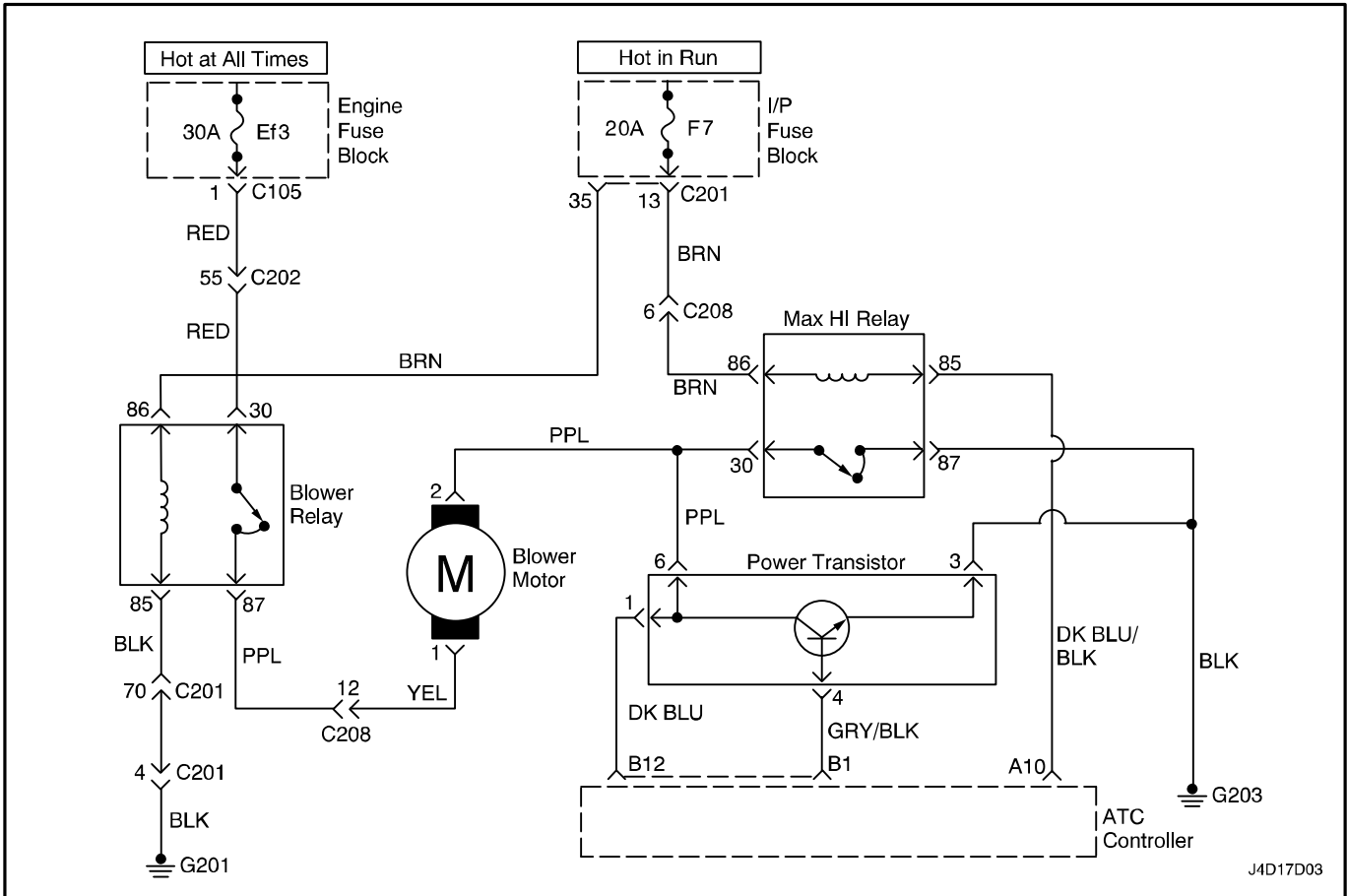
Step	Action	Value(s)	Yes	No
6	<ol style="list-style-type: none"> 1. Reconnect the sun sensor to the ATC harness. 2. Turn the ignition switch to ON. 3. Observe the temperature display area. Does this display indicate the continuing presence of a code 5 condition?	–	Go to <i>Step 9</i>	System OK
7	<ol style="list-style-type: none"> 1. Pull the ATC controller from the instrument panel, leaving the wiring harness connected. 2. Measure the voltage between terminals A13 and B10 by backprobing the connectors. Is the voltage equal to the value specified?	< 4 v	Go to <i>Step 9</i>	Go to <i>Step 8</i>
8	<ol style="list-style-type: none"> 1. Trace the wiring from controller terminals A13 and B10 to the sun sensor connector terminals on the ATC harness connectors. 2. Repair any open or high resistance found in the wiring or connector terminals. Is the repair complete?	–	System OK	–
9	Replace the ATC controller. Is the repair complete?	–	System OK	–



CODE 6 – POWER TRANSISTOR ERROR

Step	Action	Value(s)	Yes	No
1	1. Disconnect the ATC controller connectors A and B. 2. Disconnect the connectors from the power transistor. 3. Measure the resistance circuit GRY/BLK from terminal 4 of the power transistor to terminal B1 of the ATC controller. Does the resistance equal the specified value?	$\approx 0 \Omega$	Go to Step 2	Go to Step 6
2	Measure the resistance in the circuit from terminal 1 of the power transistor to terminal B12 of the ATC controller. Does the resistance equal the specified value?	$\approx 0 \Omega$	Go to Step 3	Go to Step 6
3	1. Reconnect the wiring harness to the ATC controller and to the power transistor. 2. Turn the ignition switch to ON. 3. Measure the voltage from ground to terminal B12 of the ATC controller. 4. Cycle the fan speed controller manually from the lowest (speed 1) to the highest speed (8). Do the voltages measured match approximately the specified values within ± 0.5 v?	1: 4.0 v 2: 5.0 v 3: 6.0 v 4: 7.0 v 5: 8.0 v 6: 9.0 v 7: 10.0 v 8: Max Hi:	Go to Step 4	Go to Step 5
4	Replace the ATC controller. Is the repair complete?	–	System OK	–

Step	Action	Value(s)	Yes	No
5	Measure the resistance in circuit (Violet) between terminal 6 of the power transistor and the blower motor terminal 2. Does the resistance equal the specified value?	$\approx 0 \Omega$	Go to <i>Step 7</i>	Go to <i>Step 6</i>
6	Repair or replace the wiring harness for the circuit (Violet). Is the repair complete?	–	System OK	–
7	Check the wiring harness of the motor and power supply. <ul style="list-style-type: none"> • Check the blower relay. • Check fuse EF3. Is there any problem in the wiring, the relay, or the fuse?	–	Go to <i>Step 9</i>	Go to <i>Step 8</i>
8	Replace the power transistor. Is the repair complete?	–	System OK	–
9	Repair or replace the wiring harness, the relay, or the fuse as required. Is the repair complete?	–	System OK	–



CODE 7 – MAX-HI RELAY ERROR

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition switch ON. 2. Set the blower speed manually for maximum speed. 3. Measure voltage between the ATC controller terminal A10 and ground. Is the voltage approximately equal to the specified value?	$\approx 0 \Omega$	Go to Step 3	Go to Step 2
2	Replace the ATC controller. Is the repair complete?	–	System OK	–
3	1. Check the wiring harness associated with the MAX-HI relay for defects or high terminal resistance. 2. Repair any defects found. Is the repair complete?	–	System OK	Go to Step 4
4	Replace the MAX-HI relay. Is the repair complete?	–	System OK	–

MAINTENANCE AND REPAIR

ON-VEHICLE SERVICE

GENERAL A/C SYSTEM SERVICE PROCEDURES

GENERAL SERVICE PROCEDURES

Refer to *Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System*, for details of the following procedures:

- Discharging, Adding Oil, Evacuating, and Charging Procedures for A/C System.
- Handling of Refrigerant Lines and Fittings.
- Handling Refrigerant.
- Maintaining Chemical Stability in the Refrigeration System.
- O-Ring Replacement.

SERVICEABLE COMPONENTS

COMMON HVAC COMPONENTS

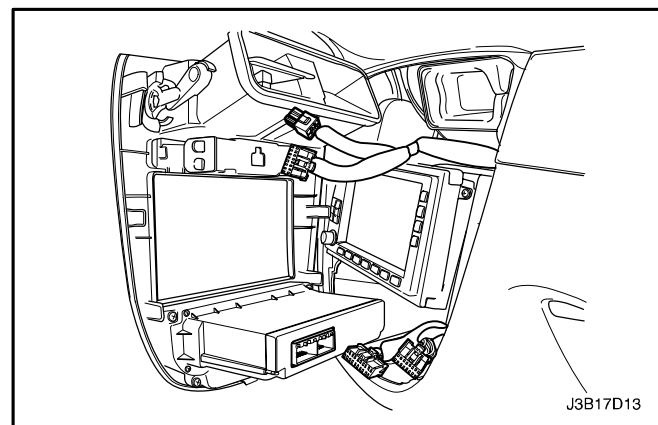
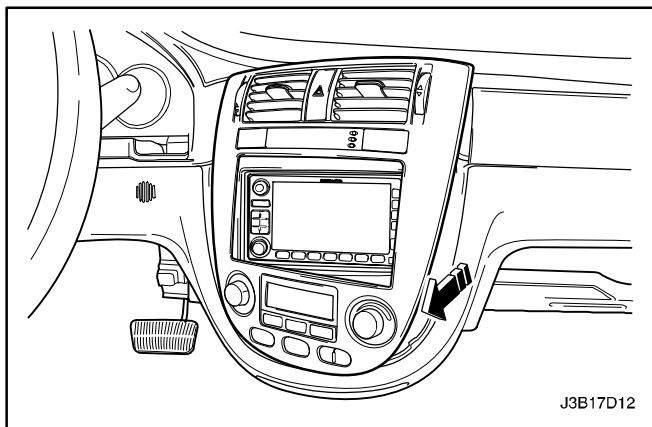
Those components used in non-automatic systems are covered in other sections of this manual.

Refer to *Section 7A, Heating and Ventilation System* for the following procedures:

- Blower Motor.
- Heater Hoses.
- Blower Resistor.
- High-Blower Relay.
- Heater/Air Distributor Case Assembly (A/C Module).
- Heater Core.

Refer to *Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System*, for the following procedures:

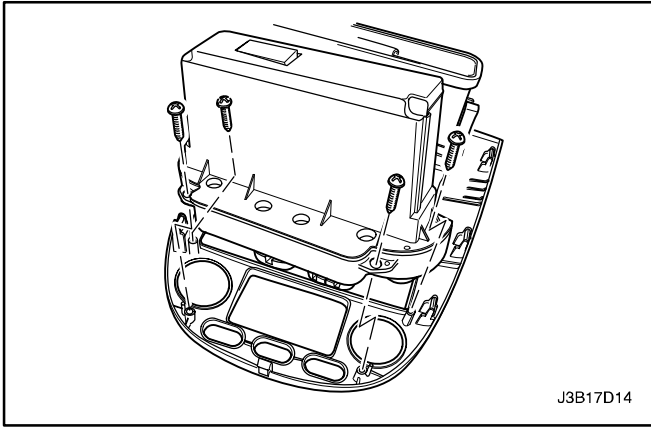
- A/C Pressure Transducer.
- A/C Compressor Relay.
- Air Filter.
- A/C Expansion Valve.
- A/C High-Pressure Pipe Line.
- Evaporator Core.
- A/C Suction Hose Assembly.
- A/C Discharge Hose-Compressor to Condenser.
- Compressor.
- Condenser.
- Receiver-Dryer.



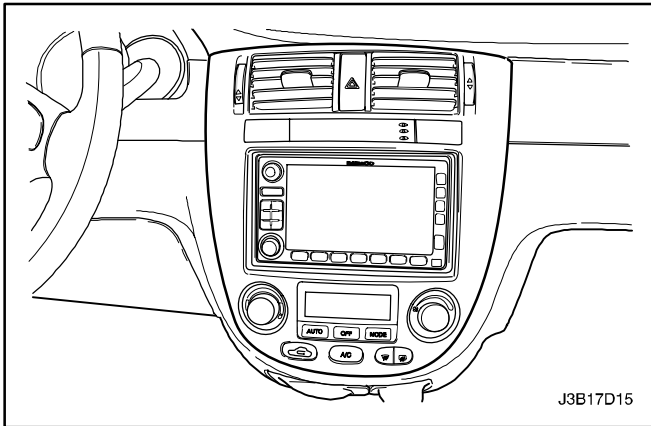
AUTOMATIC TEMPERATURE CONTROL ASSEMBLY

Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the center molding assembly. Refer to *Section 9E, Instrumentation/Driver Information*.
3. Pull out the unit to gain access to the rear.
4. Disconnect the electrical connectors.
5. Remove the center molding assembly from the instrument panel.



6. Remove the control assembly retaining screws.
7. Remove the automatic temperature control assembly.



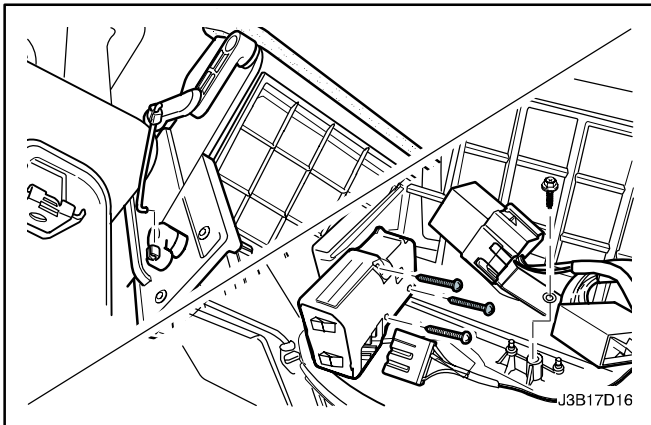
Installation Procedure

1. Position the automatic temperature control assembly on the center molding and install the retaining screws.

Tighten

Tighten the control assembly retaining screws to 2 N•m (18 lb-in).

2. Connect the electrical connectors.
3. Install the center molding assembly. Refer to *Section 9E, Instrumentation/Driver Information*.
4. Connect the negative battery cable.



INLET AIR DOOR MOTOR

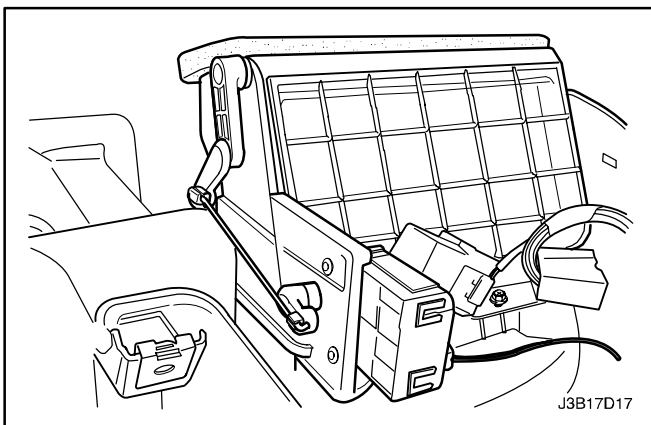
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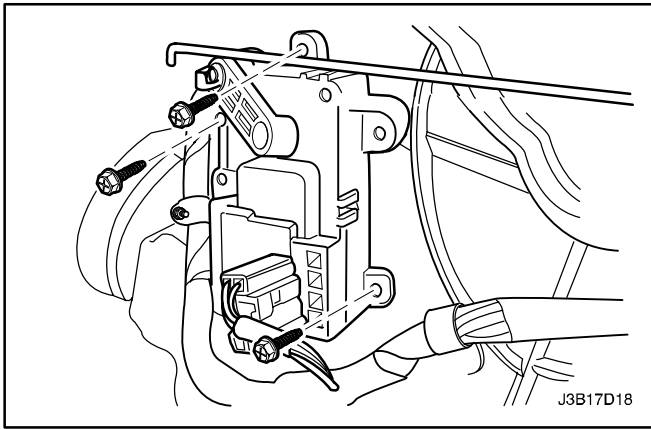
Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the glove box. Refer to *Section 9E, Instrumentation/Driver Information*.
3. Remove the actuating rod by snapping the rod out of the lever with needle-nose pliers.
4. Disconnect the electrical connector.
5. Remove a screw and the bracket mounting high-blower relay.
6. Remove the motor retaining screws.
7. Remove the motor.

Installation Procedure

1. Install the motor with the retaining screws.
2. Install the actuating rod.
3. Connect the electrical connector.
4. Install the bracket mounting high-blower relay with a screw.
5. Remove the glove box. Refer to *Section 9E, Instrumentation/Driver Information*.
6. Connect the negative battery cable.





MODE DOOR MOTOR

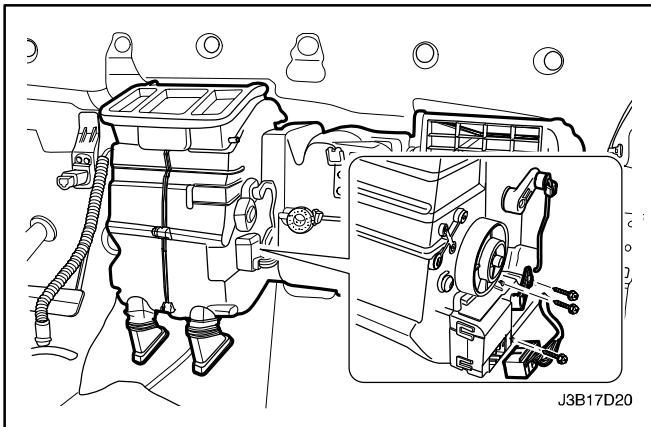
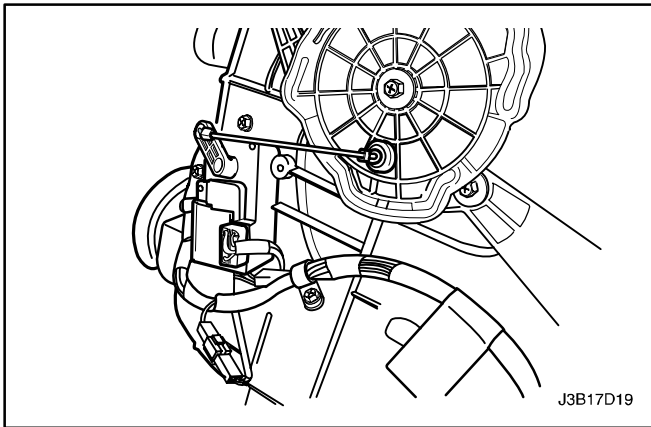
(Left-Hand Drive Shown, Right-Hand Drive Similar)

Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the instrument panel under cover. Refer to *Section 9G, Interior Trim*.
3. Disconnect the electrical connector.
4. Remove the motor actuating rod by snapping it out of the lever with needle-nose pliers.
5. Remove the motor retaining screws.
6. Remove the mode door motor.

Installation Procedure

1. Install the mode door motor with the retaining screws.
2. Install the actuating rod.
3. Connect the electrical connector.
4. Install the instrument panel under cover. *Section 9G, Interior Trim*.
5. Connect the negative battery cable.



AIR MIX DOOR MOTOR

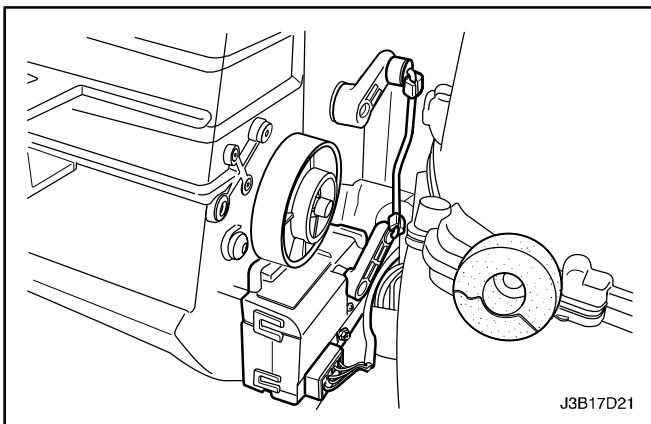
Removal Procedure

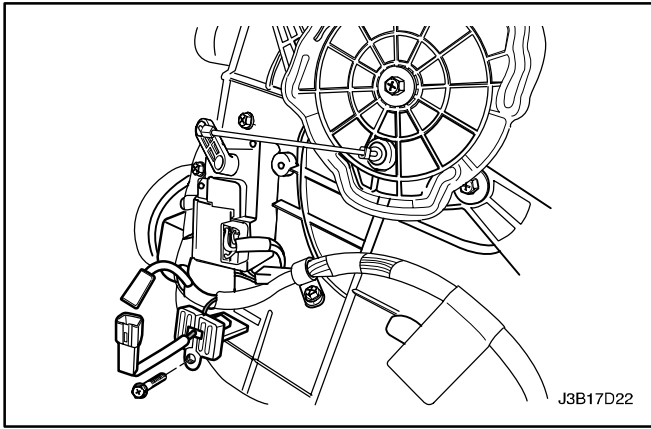
Important : Operate the automatic temperature control system and rotate the temperature control knob until the temperature reaches to the maximum.

1. Disconnect the negative battery cable.
2. Remove the glove box lower panel cover. Refer to *Section 9E, Instrumentation/Driver Information*.
3. Disconnect the electrical connector.
4. Remove the actuating rod by snapping it out of the lever with needle-nose pliers.
5. Remove the motor retaining screws.
6. Remove the temperature door motor.

Installation Procedure

1. Install the temperature door motor with the retaining screws.
2. Install the actuating rod onto the lever.
3. Connect the electrical connector.
4. Install the glove box. Refer to *Section 9E, Instrumentation/Driver Information*.
5. Connect the negative battery cable.



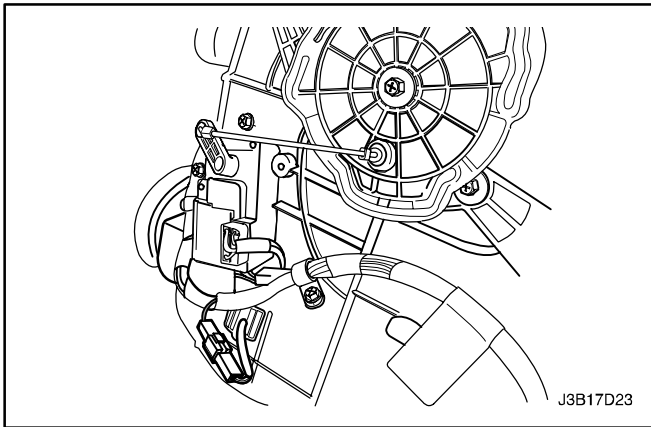


WATER SENSOR

(Left-Hand Drive Shown, Right-Hand Drive Similar)

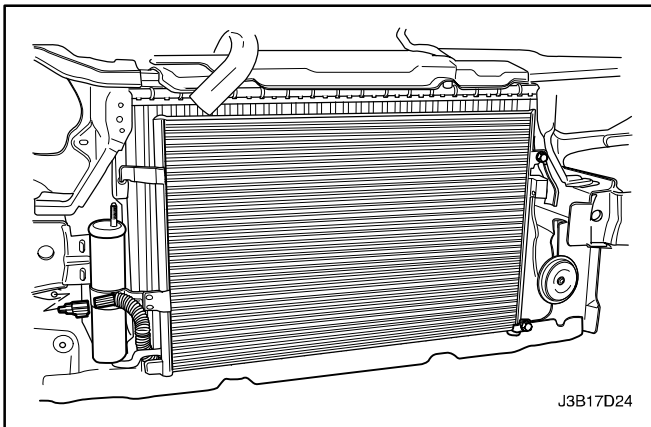
Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the instrument panel under cover. Refer to *Section 9G, Interior Trim*.
3. Disconnect the electrical connector.
4. Remove the sensor retaining screw.
5. Remove the sensor.



Installation Procedure

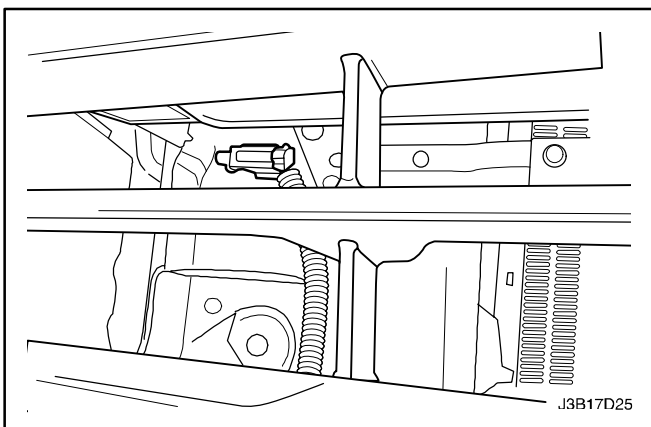
1. Install the sensor with the retaining screw.
2. Connect the electrical connector.
3. Install the instrument panel under cover. Refer to *Section 9G, Interior Trim*.
4. Connect the negative battery cable.



AMBIENT AIR TEMPERATURE SENSOR

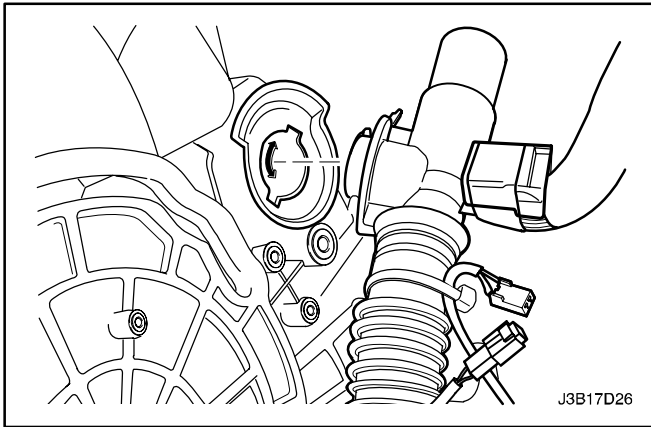
Removal Procedure

1. Disconnect the negative battery cable.
2. Disconnect the ambient air temperature sensor electrical connector.
3. Remove the ambient air temperature sensor from the bracket.



Installation Procedure

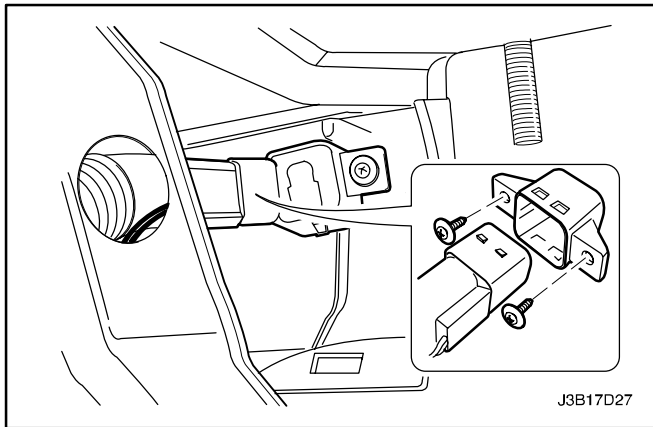
1. Install the ambient air temperature sensor into its bracket.
2. Connect the electrical connector.
3. Connect the negative battery cable.



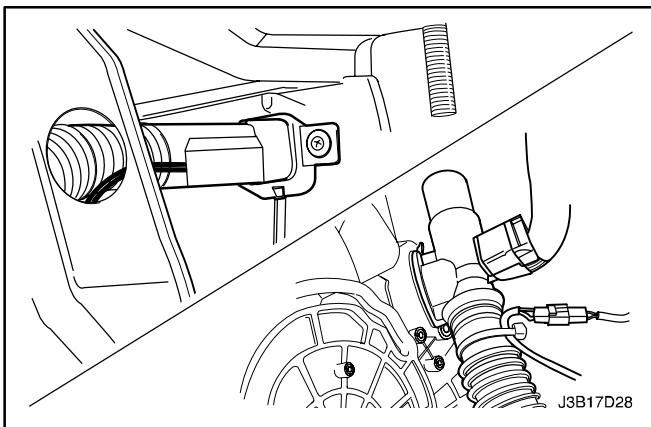
IN-CAR TEMPERATURE SENSOR

Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the instrument panel under cover. Refer to *Section 9G, Interior Trim*.
3. Disconnect the electrical connector.
4. Remove the tube by turning it clockwise.

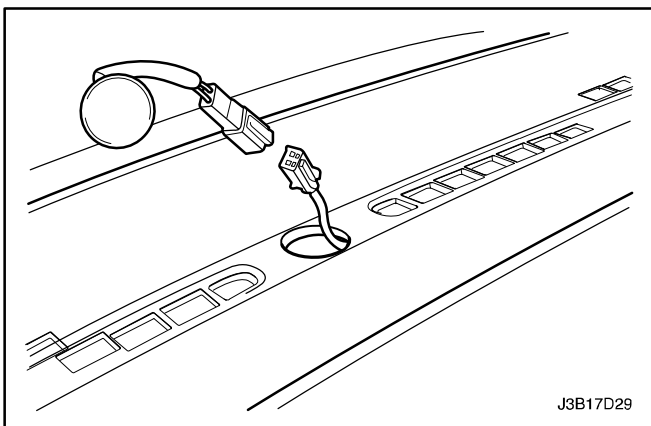


5. Remove the screws.
6. Remove the in-car sensor with the tube.



Installation Procedure

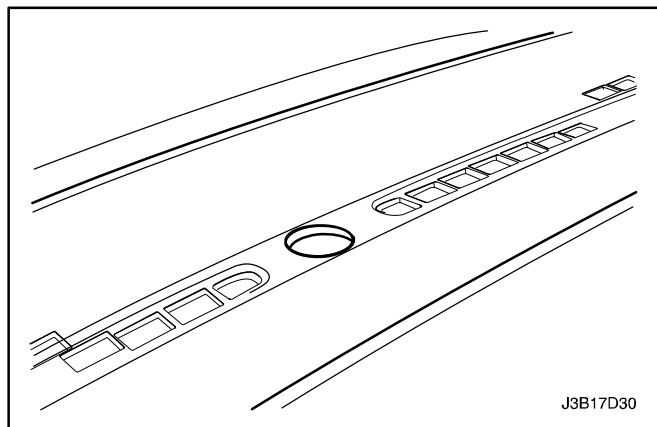
1. Install the in-car sensor.
2. Install the in-car sensor retaining screws and tighten.
3. Install the air inlet tube and connect the electrical connector.
4. Install the instrument panel under cover. Refer to *Section 9G, Interior Trim*.
5. Connect the battery negative cable.



SUN SENSOR

Removal Procedure

1. Disconnect the negative battery cable.
2. Gently pry up on the sun sensor to remove it.
3. Secure the electrical connector to prevent it from falling beneath the dash.
4. Disconnect the electrical connector and remove the sun sensor.



Installation Procedure

1. Connect the electrical connector.
2. Insert and press the sun sensor into position in the dash.
3. Connect the negative battery cable.

UNIT REPAIR

V5 AIR CONDITIONING COMPRESSOR OVERHAUL

COMPRESSOR OVERHAUL

Refer to *Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System* for details of the following procedures:

- Clutch Coil.
- Clutch Plate and Hub Assembly.
- Clutch Rotor and Bearing.
- Component Locator V5 Compressor.
- Control Valve Assembly.
- Cylinder to Front Head O–Ring.
- Leak Testing (External).
- Pressure Relief Valve.
- Rear Head, Gasket, Valve Plate, Reed Plate, and O–Ring.
- Shaft Seal Replacement.

GENERAL DESCRIPTION AND SYSTEM OPERATION

GENERAL INFORMATION

THE V5 SYSTEM

Refer to *Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System*, for general information details for the following:

- System Components – Functional.
- The V5 A/C System.
- V5 Compressor – Description of Operation.
- V5 Compressor – General Description.

SYSTEM COMPONENTS—CONTROL

Controller

The operation of the A/C system is controlled by the switches on the control head. This console-mounted heating and ventilation system contains the following knobs and display:

Temperature Control Push Knobs

1. Raise the temperature of the air entering the vehicle by pressing the top switch, with the red arrow pointing upward.
2. Lower the temperature by pressing the bottom switch, with the blue arrow pointing downward.
3. Actuate the air mix door by an electric motor.
4. Vary the mix of the air passing through the heater core with the air bypassing the core.

Each press of a switch changes the set temperature by increments of 0.5°C (1°F). This is shown in the temperature window on the function display.

The Function Display

This is an LCD display indicating the status of the control settings selected. Starting from the left end of the display, the sections are as follows:

1. Temperature setting – Indicates the temperature set with the temperature control knob.
2. Auto status – Indicates whether the system is operating in the full auto mode or the manual mode.
3. Defroster icon – Indicates manual selection of full defrost mode.
4. Mode – Indicated by icon, the mode chosen by the system in auto (or by the operator in manual) is shown by an illumination arrow indicating the air path.
5. A/C – A snowflake icon indicating whether the A/C is ON or OFF.
6. Fan speed – Indicates the fan speed by illuminating a bar based on the segment at the front, for low speed, and adding additional segments in order up to the fifth, for high speed.

Eight Additional Push Knobs

1. Full defrost – Causes the mode motors to direct all air to the windshield and aide window outlets for maximum defrosting.
2. Air intake – Switches between fresh air intake, the default, and recirculating air. Airflow arrows on the display indicate the mode in effect.
3. Full Auto Switch – Maintains the set temperature automatically. In this mode, the fully automatic temperature control (FATC) system controls the following:
 - The air mix door motor.
 - The mode door motor.
 - The blower motor speed.
 - The inlet air door motor.
 - A/C ON/OFF.
4. OFF Switch – Turns the automatic air conditioning and fan control off.
5. Mode Switch – Allows manual selection of the airflow direction.
 - Selection is shown on the function display.
 - Each time the mode switch is pressed, the next function is displayed.
6. A/C Switch – Allows manual selection and control of the air conditioning function.
7. Fan Control Switch – Allows manual selection among five fan speeds.
8. Defogger Switch – Turns on the electric defogging heater in the rear window and the outside rearview mirrors, if the vehicle is equipped with heated mirrors.

Pressure Transducer

Pressure transducer switching incorporates the functions of the high-pressure and the low-pressure cutout switches along with the fan cycling switch. The pressure transducer is located in the high-side liquid refrigerant line behind the right strut tower, between the right strut tower and the fire wall. The output from this pressure transducer goes to the electronic control module (ECM), which controls the compressor function based on the pressure signal.

Wide-Open Throttle (WOT) Compressor Cutoff

During full-throttle acceleration, the throttle position sensor (TPS) sends a signal to the ECM, which then controls the compressor clutch.

High RPM Cutoff

As engine rpm approaches the maximum limit, the ECM will disengage the compressor clutch until the engine slows to a lower rpm.