A/C-HEATER SYSTEM
1999 Saab 9-5

ARTICLE BEGINNING

1999 AUTOMATIC A/C-HEATER SYSTEMS
SAAB
9-5

SPECIFICATIONS

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Application</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressor Type</td>
<td>Nipponenso 7SB16 7-Cyl.</td>
</tr>
<tr>
<td>Compressor Drive Belt Tension</td>
<td></td>
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<tr>
<td>System Oil Capacity</td>
<td>4.9 ozs.</td>
</tr>
<tr>
<td>Refrigerant (R-134a) Capacity</td>
<td>33-34 ozs.</td>
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<tr>
<td>System Operating Pressures</td>
<td></td>
</tr>
<tr>
<td>High Side</td>
<td>21.8-36.3 psi (1.5-2.6 kg/cm²)</td>
</tr>
<tr>
<td>Low Side</td>
<td></td>
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</tbody>
</table>

(1) - Belt tension is controlled by an automatic tensioner. Ensure mark on belt tension is between marks on tensioner mount. After applying 40 lbs. (178 N) to drive belt, tensioner should smoothly return to tensioned position.
(2) - Use ND8 SK-20. Compressor is shipped with 4.9 ounces of refrigerant oil.
(3) - Specification is with ambient temperature at approximately 68-77°F (20-25°C) and warm engine operating at 1500-2000 RPM.
(4) - High-side pressure varies depending on system load.

WARNING: To avoid injury from accidental air bag deployment, read and carefully follow all SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM procedures in AIR BAG RESTRAINT SYSTEM article in ACCESSORIES/SAFETY EQUIPMENT section.

CAUTION: When battery is disconnected, radio will go into anti-theft protection mode. Obtain radio anti-theft protection code from owner prior to servicing vehicle.

DESCRIPTION

Under normal conditions the Automatic Climate Control (ACC) system maintains selected temperature inside vehicle regardless of ambient (outside) temperature. There are separate temperature controls for driver and passengers that allow driver to select temperatures 9°F (5°C) warmer or cooler than passengers. ACC panel (control unit) monitors and controls air distribution, blower motor speed, air recirculation, and selected temperatures based on inputs from 5 different sensors.

ACC system sensors include an in-vehicle temperature sensor, ambient (outside) temperature sensor, left and right outlet air temperature sensors, and a sunload sensor. ACC system consists of 5 sensors, ACC control panel, 2 mixed-air stepping motors, air distribution flap stepping motor, air recirculation direct current
motor, variable speed direct current blower motor, blower motor speed control module, heater core coolant shutoff solenoid valve, coolant circulation pump, and rear door fans.

**OPERATION**

**AUTOMATIC CLIMATE CONTROL (ACC) CONTROL UNIT**

Automatic Climate Control (ACC) control unit consists of a control panel with a active function display and control buttons, and an integrated control module. See Fig. 1. Under normal conditions the ACC control module maintains selected temperatures for one driver and two passenger zones (front and rear). Control of temperature in each zone is based on pre-selected temperatures and information from 5 sensors. ACC control module calculates actual zone temperature and compares it with outside and pre-selected temperatures. When a difference in temperature is detected, ACC control module changes position of mixed-air flap for affected zone.

When engine is started, ACC control module begins to regulate cabin temperature. Automatic system control will be cancelled if a manual mode function has been selected or operator programming has been performed. When a manual mode function has been selected, like changing blower motor speed for example, system will lock in on selected mode. Remaining modes will continue to be controlled automatically.

When the ignition is turned off, ACC control panel display goes out, no buttons operate, all stepping motors are turned off, and air recirculation off is selected after 10 seconds. Diagnostics communication will remain active if it was active when ignition was turned off. ACC control module is active for 10 minutes after ignition is turned off. If ignition is turned on within 10 minutes, any manual selections will be retained. After 10 minutes, ACC control module will start in AUTO mode or operator programmed mode. If battery voltage is less than 9.5 volts and starter is not operating, ACC display will show OFF until battery voltage is more than 10.0 volts.

![Fig. 1: Identifying Automatic Climate Control (ACC) Control Panel](https://example.com/acc_control_panel.png)

1. A/C Compressor ON/OFF Control
2. A/C Compressor ON/OFF Control
3. A/C Compressor ON/OFF Control
4. A/C Compressor ON/OFF Control
5. A/C Compressor ON/OFF Control
6. A/C Compressor ON/OFF Control
7. A/C Compressor ON/OFF Control
8. A/C Compressor ON/OFF Control
9. Floor Mode Control
10. Floor Mode Control
11. Floor Mode Control
12. Floor Mode Control
13. Floor Mode Control
14. Floor Mode Control
15. Floor Mode Control
16. Floor Mode Control

**A/C COMPRESSOR CLUTCH ACTIVATION**
A/C compressor operation is activated automatically when ACC control panel is on (OFF button has not be selected), ECON is not selected, engine is operating, and ambient air temperature is more than 41°F (5°C). A/C request goes to Dashboard Integrated Central Electronics (DICE) via the communication bus. DICE receives information from sensors and the TRIONIC engine control module and confirms A/C operating parameters are met.

The DICE will send an A/C request to TRIONIC module if engine coolant temperature is less than 257°F (125°C), A/C system pressure is 29.0-391.6 psi (2.0-27.5 kg/cm²), and evaporator temperature is more than 37.4°F (3.0°C). If evaporator temperature is less than 32°F (0°C) then DICE will only send an A/C request if ambient temperature is more than 77°F (25°C), engine has been operating for less than 30 minutes, and vehicle speed is less than 3 MPH. When conditions for A/C operation are met, the TRIONIC module will ground A/C relay and energize A/C compressor clutch.

AIR DISTRIBUTION

AUTO Mode
When AUTO button is selected, all climate control functions are automatically controlled. See Fig. 1. Occupant selected temperature and AUTO are displayed. When AUTO button is selected again, the full display is shown and current settings are stored in ACC control module memory as the default value. ECON, electrically heated rear window, and temperature up or down can be selected without deselecting AUTO. ACC system always starts in AUTO mode, unless it has been reprogrammed.

ECON Mode
When ECON button is selected, A/C and air recirculation are turned off, and ECON will be displayed. See Fig. 1. AUTO will continue to be displayed. When manual operation has been selected by selecting the OFF button, ECON functions can be programed.

Air Recirculation Mode
The air recirculation button turns manual air recirculation on and off. See Fig. 1. When air recirculation button is selected, air recirculation is turned on and button symbols are displayed. AUTO will be displayed even though air recirculation is manually controlled. To return to automatic control, AUTO button must be selected.

Defrost Mode
When front defrost button is selected, blower motor is activated, heated rear window and door mirror heating elements are activated, A/C is turned on, and ECON is turned off. See Fig. 1. Air is directed through front defrost outlets to windshield and front side windows. Air recirculation is turned off. Normal temperature control continues. All active function symbols and selected temperatures will be displayed, except AUTO. When air distribution is in defrost mode, diagnostic scan tool will indicate 100 percent.

Defrost/Floor Air Mode
When front defrost and floor buttons are selected, air is directed through front defrost and floor outlets. See Fig. 1. All active function symbols and selected temperatures will be displayed, except AUTO. When air distribution is in defrost/floor mode, diagnostic scan tool will indicate 70 percent.
Floor Air Mode
When floor button is selected, a majority of air is directed through floor outlets with a small amount directed through front defrost outlets. See Fig. 1. There are 4 floor outlets, 2 direct air to floor under instrument panel and 2 direct air to back seat floor and to rear door windows. All active function symbols and selected temperatures will be displayed, except AUTO. When air distribution is in floor mode, diagnostic scan tool will indicate 50 percent.

Floor Air/Panel Mode
When floor air/panel button is selected, air is directed through floor and panel outlets. See Fig. 1. All active function symbols and selected temperatures will be displayed, except AUTO. When air distribution is in floor air/panel mode, diagnostic scan tool will indicate 25 percent.

Panel Mode
When panel button is selected, air is directed through 4 instrument panel outlets and 2 rear center console outlets. See Fig. 1. All active function symbols and selected temperatures will be displayed, except AUTO. When air distribution is in panel mode, diagnostic scan tool will indicate zero percent.

MIXED-AIR TEMPERATURE SENSORS
There are 2 mixed-air temperature sensors. One sensor is inserted into each floor outlet. See Fig. 2. ACC control module uses sensor values, to control positions of right and left mixed-air flaps, to maintain selected mixed-air temperature at floor outlets.

The mixed-air temperature sensors are a rod thermistor, which has a negative temperature coefficient. Voltage across sensor decreases as temperature increases. ACC control module supplies sensor ground from terminal No. 37 (right side) and terminal No. 38 (left side), and 5 volts through a 5600 ohm integrated resistor to each sensor from terminal No. 18 (right side) and terminal No. 19 (left side).
AIR RECIRCULATION MOTOR

Two linked air recirculation flaps are operated by a direct current motor. See Figs. 2 and 3. Depending on position of recirculation flaps, the blower motor can be supplied with either outside air or cabin air. There are no intermediate positions. Battery voltage is supplied from ACC control module terminals No. 2 and 21 for
only 10 seconds during flap position change. Polarity of battery voltage is reversed to change direction of motor rotation and flap position. When ignition is turned off, ACC system will default to outside air position after 10 seconds.

**MIXED-AIR FLAP STEPPING MOTORS**

Mixed-air flaps and air distribution flap are operated by electrical stepping motors. See Figs. 2 and 3. Each stepping motor has 2 windings that are energized with short pulses in a specific order. When air flap is in desired position both windings are energized continuously to lock stepping motor in position.

The ACC control module controls air flap position by sending a specific number of pulses to energized stepping motor. The ACC system stepping motors do not require a flap position feedback signal to ACC control module. The ACC control module calibrates each air flap position by setting air flap to both end positions.

If a stepping motor has been replaced, air flap position has been changed independent of ACC control module control, or battery has been disconnected, ACC control module must be recalibrated. During calibration, ACC control module moves each flap to its end position. See ACC CONTROL MODULE CALIBRATION under PROGRAMMING.

**SOLAR SENSOR**

The solar sensor is located on top of dashboard. See Fig. 2. ACC control module calculates intensity, height, and angle of sun in relation to car using information from solar sensor. ACC control module uses sensor value to calculate head height temperature for driver and front passenger. Every 440 milliseconds the ACC control module looks for a solar sensor signal.

Solar sensor consists of 5 infrared-sensitive elements that face left, right, forward, back and up. ACC control module supplies pulsed battery voltage to sensor from terminal No. 16 and ground from terminal No. 36. Each solar sensor element signal is sent consecutively to ACC control module terminal No. 17. A continuous 5 volt, 0 volt, 5 volt identification pulse precedes each group of signals so ACC control module can separate each signal. Solar sensor pulse signals are synchronized by short ground pulses from ACC control module terminal No. 16.

**HEATER CORE**

The heater core is located in A/C-heater assembly. See Fig. 3. Flow of engine coolant to heater core is controlled by a vacuum operated heater core shutoff valve. To increase temperature control, ACC control module will increase or decrease flow of engine coolant through heater core. Vehicle may be equipped with a heater core circulation pump to increase coolant flow through heater core during low engine speed.

**COOLANT CIRCULATION PUMP**

Some models are equipped with an engine coolant circulation pump. See Figs. 2 and 3. Circulation pump is used to increase coolant flow to heater core during low engine speeds. Circulation pump can be used to circulate engine coolant when parking heater function is activated.
During engine operation, circulation pump will be activated by ACC control module when engine speed is less than 1600 RPM and outside temperature is less than 32°F (0°C). Circulation pump will be deactivated when engine speed is more than 2000 RPM, or outside temperature is more than 41°F (5°C).

HEATER CORE SHUTOFF VALVE

To increase cooling efficiency, the climate system is equipped with a vacuum controlled heater core shutoff valve to control coolant flow through heater core. ACC control module closes shutoff valve by energizing a solenoid vacuum valve. Heater core shutoff valve will be closed when cabin temperature must be reduced more than 10°F (6°C) to attain selected temperature for all cabin zones. Heater core shutoff valve is located in front of firewall, under charge air bypass valve solenoid valve.

Fig. 3: Locating A/C-Heater & Ventilation Components
Courtesy of Saab-Scania of America, Inc.

COLD START WITH AUTO SELECTED
When ambient air temperature is cold during engine start, ACC control module attempts to defrost windshield and then warm cabin air as quickly as possible. Cold start function will be activated if calculated air temperature at head height of driver is less than selected temperature displayed on ACC panel display and ambient temperature is less than 43°F (6°C). Air distribution and blower motor speed are determined based on engine coolant and ambient air temperatures.

When ambient air temperature and engine coolant are cold, blower motor speed selected will be slow in an attempt to maintain highest air temperature possible after heater core. Blower motor speed will be increased as engine coolant temperature increases. Air distribution at engine start will be in defrost mode until engine coolant temperature is 149-167°F (65-75°C). When engine coolant has increased to specified temperature defrost/floor air mode will be selected.

Default ambient air temperature, used by ACC control module to select defrost mode during cold start function, can be adjusted using an scan tool. Default coolant temperature, used by ACC control module to select defrost/floor air mode during cold start function, can be adjusted using an scan tool.

**CONDENSER COOLING FANS**

Vehicle is equipped with two dual-speed condenser cooling fans, located behind radiator. Fan operation is controlled by DICE control module based on A/C system pressure and 3 other input signals. Communications bus sends engine coolant temperature from TRIONIC engine control module, vehicle speed from Main Instrument Unit (MIU), and ambient air temperature from Saab Information Display (SID).

When engine coolant temperature is 212°F (100°C) or more, DICE will energize low speed fan relay No. 155 (located in engine compartment main fuse/relay box). Both fans will operate at low speed. When engine coolant temperature increases to 232°F (111°C), DICE energizes 2 more relays (high speed fan relays No. 81 and 396).

When ignition is turned off and for 30 seconds thereafter, low speed cooling fans will continue to operate, or start if engine coolant temperature is more than 220°F (104°C). Cooling fans will stop when coolant temperature decreases to less than 220°F (104°C). After one minute from turning ignition off, low speed cooling fans will continue to operate, or start if engine coolant temperature is more than 228°F (109°C). Cooling fans will stop when coolant temperature decreases to less than 228°F (109°C). After 3.5 minutes cooling fan operation will stop regardless of coolant temperature.

During A/C compressor operation, fans will operate at low speed if ambient air temperature is more than 72°F (22°C), or vehicle speed is less than 24 MPH and A/C system pressure is less than 131 psi (9.2 kg/cm²). During A/C compressor operation, fans will operate at high speed if A/C system pressure increases to more than 261 psi (18.4 kg/cm²).

**EVAPORATOR**

The evaporator is located in A/C-heater assembly. See Figs. 3 and 4. The evaporator cools and dehumidifies the air before it enters passenger compartment. Warm air passing from outside or inside cabin, through evaporator core and back to cabin, is cooled to 41-50°F (5-10°C) and dehumidified. The amount of cooled, dehumidified air...
returning to cabin is controlled by ACC control module based on pre-selected temperature compared to current temperature. Any moisture (humidity) in incoming air condenses on the surface of evaporator core and is drained off as water. An evaporator temperature sensor protects evaporator from freeze-up by monitoring evaporator temperature.

**EVAPORATOR TEMPERATURE SENSOR**

The evaporator temperature sensor is inserted into a hole in evaporator cooling fins. See Fig. 4. Evaporator temperature sensor protects evaporator from freeze-up by monitoring evaporator temperature. Evaporator temperature signal is sent to DICE control module which controls operation of A/C compressor clutch. DICE will de-energize compressor clutch when evaporator temperature is approximately 32°F (0°C). DICE will energize compressor clutch when evaporator temperature increases to approximately 37°F (3°C).

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**Fig. 4: Locating A/C-Heater System Components**

1. Compressor  
2. Condenser  
3. A/C System Pressure Sensor  
4. Receiver-Drier  
5. Expansion Valve  
6. Evaporator  
7. Cut Location For Evaporator Lines  
8. Evaporator Temperature Sensor  
9. A/C Relay

Courtesy of Saab-Scania of America, Inc.
The air filter is located on intake side of evaporator. See Fig. 3. The air filter is electrostatically charged to assist in trapping particles of all sizes including pollen and plant spores. Vehicle may also be equipped with an optional carbon filter located between air filter and evaporator. Carbon filter is designed to reduce fumes. Carbon filter can be installed if not originally equipped.

PARKING HEATER

Parking heater is used to maintain occupant selected temperature when vehicle is parked in cold weather. Parking heater function is activated when AUTO button is pressed after engine has been turned off. When ignition is turned off, ACC will continue cabin temperature control. When engine coolant temperature at parking heater outlet is at least 104°F (40°C), parking heater will supply battery voltage to ACC control module terminal No. 3.

The mixed-air flaps are controlled automatically according to selected temperature, air distribution flap is set to defrost position for 25 minutes and then to defrost/floor position, air recirculation flap is set to fresh air position unless outside temperature is less than 14°F (-10°C), and blower motor is set to low speed. ACC control panel will display blower motor speed.

Manual selections can be made with all buttons, except blower motor speed, ECON, and heated rear window. See Fig. 1. If AUTO button is pressed, a full ACC system function display is shown. Parking heater function will stop after about 30 minutes, when coolant temperature is less than 104°F (40°C), when ignition is turned on, or OFF button is pressed. ACC control module will return to normal system control when battery voltage to terminal No. 3 is interrupted.

WARM START WITH AUTO SELECTED

When ambient air temperature is warm during engine start, ACC control module attempts to cool cabin air as quickly as possible. Warm start function will be activated if calculated air temperature at head height of driver is approximately 9°F (5°C) more than selected temperature displayed on ACC panel display. Warm start function activation will continue until calculated air temperature at head height of driver corresponds with selected temperature. Warm function sets air distribution to panel position and blower motor speed almost to maximum. If necessary, blower motor speed will be gradually increased to maximum speed until calculated air temperature is the same as selected temperature.

ADJUSTMENTS

REFILLING ENGINE COOLING SYSTEM

Fill engine cooling system with a 50 percent concentration of anti-freeze to MAX level. Install pressure cap and start engine. Operate engine with A/C turned off at varying speeds until radiator/condenser cooling fans comes on. Carefully remove pressure cap and add coolant to MAX level again. Reinstall pressure cap and operate engine at varying speeds until radiator/condenser cooling fans have come on 3 times. Turn engine off and ensure coolant is at MAX level.
PROGRAMMING

ACC CONTROL MODULE CALIBRATION

NOTE: ACC control module calibration is required when battery is disconnected or discharged, ACC control module or stepping motor has been replaced, or position of a flap has been changed.

1) To calibrate ACC control module, turn ignition on. To start calibration, simultaneously press AUTO and OFF buttons on ACC control panel. Calibration and self-diagnostic test will end in approximately 30 seconds. Any DTCs detected during ACC control module calibration will be displayed on ACC display panel. See RETRIEVING DIAGNOSTIC TROUBLE CODES.

2) The ACC control module will be automatically calibrated when ignition is turned on and ACC control module has been replaced. Automatic calibration will occur when ignition is turned on, after battery voltage to ACC control module terminal No. 22 (Red wire) has been cut, within 10 minutes of ignition being turned off.

ACC CONTROL MODULE PROGRAMMING

NOTE: Manufacturer has found that approximately half of all ACC control modules thought to be faulty were actually user-programmed. Before replacing ACC control module ensure user-programming has been cancelled and malfunction verified.

User Programming

The ACC control module can have manual selections programmed by user that activate when vehicle is started. Functions not programmed by user will activate automatically according to ACC system parameters. ACC control module processor is active for 10 minutes after ignition is turned off. If ignition is turned on within 10 minutes of being turned off, any manual selections made during the last trip will be retained. After 10 minutes the ACC control module will use user-programmed selections.

To access ACC control module user programming, turn ignition on and press function button corresponding to desired function. See Fig. 1. Press OFF and heated rear window buttons simultaneously to save selection. Selected function will flash on ACC display. When user programming is complete, turn ignition off for at least 10 minutes to save selections in ACC system memory.

To cancel user programming, press AUTO and blower motor speed down buttons simultaneously. ACC display will flash to confirm selections have been cancelled. ACC control module can be programmed using a scan tool to always start with any manual selections made during the last trip.

NOTE: Extended user programming allows user to change activation parameters of certain automatic functions. These selections are stored and used by ACC control module until programming is cancelled, activating default parameters.

Extended User Programming
control button. See Fig. 1. Hold button until selected function symbol is displayed, flashes 4 times, and a chime is sounded. During programming a message will be displayed on Saab Information Display (SID). When programming is done, AUTO will still be displayed on ACC control panel.

2) During ECON programming, SID will display ACC: LOW TEMP A/C CTRL. During ECON program cancelling, SID will display ACC: NORMAL A/C CTRL. The ACC control module automatic default selection of ECON function will occur when outside temperature is less than 50°F (10°C) and calculated solar intensity is less than a specific value. ECON function will disengage when outside temperature is more than 55°F (13°C) or calculated solar intensity is more than a specific value. ACC control module will not accept increased temperatures if vehicle speed is less than 19 MPH. ACC control module can be programmed using a scan tool so ECON is selected at other temperatures.

3) During air recirculation control programming, SID will display ACC: RECIRC ACC: SPEED CTRL. During air recirculation control program cancelling, SID will display ACC: RECIRC ACC: NORMAL CTRL. The ACC control module automatic default selection for air recirculation function will occur when vehicle speed is less than 6 MPH. Air recirculation function will disengage when vehicle speed is more than 19 MPH. In addition, vehicle speed must have exceeded 19 MPH at least once during trip for air recirculation function to activate. ACC control module can be programmed using a scan tool to automatically select air recirculation at other vehicle speeds.

4) During heated rear window control programming, SID will display ACC: AUTO RDEFR CTRL. During heated rear window control program cancelling, SID will display ACC: MANUAL RDEFR CTRL. The ACC control module automatic default request for electrically heated rear window and door mirrors function occurs 5 seconds after engine has been started when outside temperature is less than 41°F (5°C) and cabin temperature is less than 50°F (10°C). Heated rear window function will remain active for 2 minutes when outside temperature is 41°F (5°C) and up to 10 minutes when outside temperature is less than 14°F (-10°C).

Programming Using Scan Tool
1) Access PROGRAMMING menu on scan tool. Under DISABLE AUTOMATIC RECIRCULATION - YES/NO function, select NO. If NO is selected, manual or automatic air recirculation can be selected. If YES is selected, then air recirculation can only be selected manually.

2) Under CIRCULATION PUMP - YES/NO function, select YES if vehicle is equipped with a coolant circulation pump. If vehicle is not equipped with a coolant circulation pump, select NO. If YES is selected and vehicle is not equipped with a circulation pump, an ACC control panel DTC 19 will be displayed on right side of control panel. If this occurs, select NO during ACC control module programming.

3) Under CALIBRATION FOR CLIMATE ZONE - WARM CLIMATE/COLD CLIMATE function, make the selection most appropriate for climate region. Programming for climate zone specifies direction mixed-air flap is moved during ACC control module calibration. For WARM CLIMATE, calibration is toward maximum cold. For COLD CLIMATE, calibration is toward maximum heat. This function ensures that mixed-air flap does not leak when in position used most often for selected climate zone.

TROUBLE SHOOTING

DELAYED BLOWER MOTOR OPERATION
NOTE: When engine is started, blower motor and heated rear window should be active within 5 seconds. Activation occurs when DICE control module has received IGNITION +54 ON and IGNITION +15 ON signals. If activation is delayed 20 seconds after engine has been started, DICE control module has not received an IGNITION +54 ON signal.

1) Ensure ACC control module has not been reprogrammed by user to delay blower motor and electrically heated rear window activation. See ACC CONTROL MODULE PROGRAMMING under PROGRAMMING. If ACC control module has not been programmed, go to next step. If ACC control module has been programmed, clear programming and go to step 6).

2) Turn ignition off. Connect scan tool to Data Link Connector (DLC), located under steering column. If scan tool is not available, go to step 4). Turn ignition on. Using scan tool, contact DICE control module. Check value for IGNITION +54 signal. If value is ON, go to next step. If value is not ON, repair open in Violet wire between fuse "C" (7.5-amp) and DICE 70-pin connector terminal No. 31. See Fig. 5. See WIRING DIAGRAMS. DICE control module is located under driver's side of instrument panel. When repair is completed, go to step 6).

3) Turn ignition off. Using scan tool, check value for IGNITION +54 signal. If value is OFF, go to step 6). If value is not OFF, repair short to battery voltage in Violet wire between fuse "C" (7.5-amp) and DICE 70-pin connector terminal No. 31. When repair is completed, use scan tool to clear all DTCs in all systems and go to step 6).

4) Turn ignition off. Remove driver's side lower panel under steering column. Remove main fuse board cover located between instrument panel and driver's door. Disconnect DICE control module 70-pin connector. Check for voltage between 70-pin connector terminal No. 31 (Violet wire) and terminal No. 57 (Black wire). If voltage is not present, go to next step. If voltage is present, repair short to battery voltage in Violet wire between fuse "C" and DICE 70-pin connector.

5) Turn ignition on. Measure voltage between 70-pin connector terminal No. 31 (Violet wire) and terminal No. 57 (Black wire). If battery voltage is present, go to next step. If battery voltage is not present, repair open in Violet wire between fuse "C" and DICE 70-pin connector. Ensure problem is corrected.

6) Using scan tool, clear all DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If A/C system is not operating properly and/or a DTC has been detected, DICE control module may need to be replaced. See CONTROL MODULES under TESTING.

Fig. 5: Identifying Dashboard Integrated Central Electronics (DICE) Connector Terminals
Courtesy of Saab-Scania of America, Inc.
BLOWER MOTOR DOES NOT OPERATE

1) Check for continuity between terminals of fuse No. 22 (40-amp), located in main fuse board. Main fuse board is located between instrument panel and driver's door. If fuse is okay, go to next step. If fuse is blown, replace fuse and recheck blower motor operation. If blower motor operates, repair is complete. If blower motor does not operate and fuse blows, repair short in Red wire between fuse No. 22 (40-amp) and blower motor. If blower motor does not operate and fuse is okay, go to step 8).

2) Disconnect blower motor 2-pin connector located on passenger-side of A/C-heater assembly. See Fig. 6. Connect a test light between ground and female side of blower motor 2-pin connector terminal No. 1 (Red wire). See WIRING DIAGRAMS. If test light comes on, go to next step. If test light does come on, repair open in Red wire and go to step 8).

3) Connect test light between female side of blower motor 2-pin connector terminal No. 1 (Red wire) and terminal No. 2 (Black wire). If test light comes on, go to next step. If test light does come on, repair suspect circuit and go to step 8).

4) Reconnect blower motor 2-pin connector. Using a fused (30-amp) jumper wire, backprobe blower motor 2-pin connector terminal No. 2 (Black wire) and connect to blower motor terminal No. 1 (Red/Brown wire). If blower motor operates at full speed, go to next step. If blower motor does not operate, replace blower motor. See BLOWER MOTOR ASSEMBLY under REMOVAL & INSTALLATION. When repair is completed, go to step 8).

5) Turn ignition off. Disconnect blower motor speed control module 4-pin connector. See Fig. 6. Connect a test light between ground and speed control 4-pin connector terminal No. 3 (Orange/White wire). Turn ignition on. If test light comes on, go to next step. If test light does not come on, repair open in Orange/White wire between connector terminal No. 3 and ACC control module connector, and go to step 8).

6) Turn ignition off. Using a fused jumper wire, backprobe between ACC control module 39-pin connector terminal No. 1 (Black wire) and terminal No. 35 (White/Green wire). See Fig. 7. Connect a test light between blower motor speed control module 4-pin connector terminal No. 2 (Green/White wire) and terminal No. 3 (Orange/White wire). Turn ignition on. If test light comes on, go to next step. If test light does not come on, repair open in Green/White wire and go to step 8).

7) Turn ignition off. Disconnect ACC control module 39-pin connector. Ensure terminals and wiring are clean, tight and properly connected. See Fig. 7. If connector terminals and wiring are okay, go to DTC B2425. If connector terminals and wiring are not okay, perform repairs as necessary and go to next step.

8) Using scan tool, clear all DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If A/C system is not operating properly and/or a DTC has been detected, ACC control module may need to be replaced. See CONTROL MODULES under TESTING.
Fig. 6: Locating A/C-Heater Unit Components (Right Side) & Connectors
Courtesy of Saab-Scania of America, Inc.

1. Right Side Mixed-Air Temperature Sensor
2. Heater Core
3. Right Side Mixed-Air Stepping Motor
4. Air Distribution Stepping Motor
5. Air Recirculation Direct Current Motor
6. Air Recirculation Motor Connector
7. Evaporator Temperature Sensor Connector
8. Blower Motor Speed Control Module Connectors
9. Connector Mounting Plate
10. Air Filter Service Cover
NO A/C OPERATION

NOTE: No A/C operation is concerned with conditions pertaining to A/C system being on. If A/C compressor clutch engages, go to NO OR INSUFFICIENT COOLING.

1) Turn ignition off. Connect scan tool to Data Link Connector (DLC), located under steering column. Turn ignition on. Using scan tool, contact DICE control module and ensure DICE is programmed for A/C. If DICE control module is programmed for A/C, go to next step. If DICE control module is not programmed for A/C, program DICE for A/C using scan tool. Clear DTCs from all systems. Ensure A/C system is operating properly. If A/C system is operating properly, repair is complete. If A/C system is not operating properly, replace DICE control module. See CONTROL MODULES under TESTING.

2) Check ambient (outside) temperature displayed on Saab Information Display (SID). If temperature displayed is more than 41°F (5°C), go to next step. If temperature displayed is less than 41°F (5°C), go to step 4).

3) Turn ignition on. Using scan tool, contact TRIONIC engine control module. Activate A/C RELAY (ON). A/C compressor clutch should engage. If clutch engages, go to step 5). If clutch does not engage, go to step 12).

4) Park vehicle in an area where ambient temperature is more than 41°F (5°C). Turn ignition on. Using scan tool, contact ACC control module. Activate OUTSIDE TEMPERATURE 20°C (ON) and A/C RELAY (ON). The A/C compressor clutch should engage. If clutch engages, go to next step. If clutch does not engage, go to step 12).

5) Start engine and allow to idle. Using scan tool, contact DICE control module and read A/C IN (BUS FROM ACC). Scan tool should display ON. If scan tool displays ON, go to next step. If scan tool does not display ON, replace ACC control module. See CONTROL MODULES under TESTING.

6) With engine idling at normal operating temperature, read A/C PRESSURE using scan tool. If pressure displayed is less than 29 psi (2.0 kg/cm²) or more than 392 psi (27.5 kg/cm²), go to next step. If pressure displayed is 29-392 psi (2.0-27.5 kg/cm²), go to step 8).

7) Connect A/C system manifold gauge set to A/C refrigerant system. With engine idling at normal operating temperature, read A/C PRESSURE using scan tool. If value displayed on scan tool and value displayed on high-side pressure gauge agree, repair A/C refrigerant system leak. Evacuate and charge A/C system, and ensure proper A/C operation. If value displayed on scan tool and value displayed on high-side pressure gauge do not agree, replace A/C pressure sensor. See A/C PRESSURE SENSOR under REMOVAL & INSTALLATION.
8) With engine idling at normal operating temperature, contact DICE and read COOLANT TEMPERATURE (BUS FROM TRIONIC) using scan tool. If engine coolant temperature displayed is less than 257°F (125°C), go to next step. If engine coolant temperature displayed is more than 257°F (125°C), compare with actual coolant temperature. If compared temperatures seem reasonable, A/C has not been allowed to operate because of high engine temperature. If compared temperatures do not seem reasonable, perform repairs as necessary and ensure proper A/C operation.

9) With engine idling at normal operating temperature, contact DICE and read EVAPORATOR TEMPERATURE using scan tool. If evaporator temperature displayed is more than 41°F (5°C), go to next step. If evaporator temperature displayed is less than 41°F (5°C), compare with actual evaporator temperature. If compared temperatures seem reasonable, A/C has not been allowed to operate because of low evaporator temperature. If compared temperatures do not seem reasonable, perform repairs as necessary and ensure proper A/C system operation.

10) With engine idling at normal operating temperature, contact TRIONIC engine control module and read A/C IN using scan tool. Scan tool should display ON. If scan tool displays ON, replace engine control module. If scan tool does not display ON, replace DICE control module. See CONTROL MODULES under TESTING. After replacing suspect control module, go to next step.

11) Delete DTCs from all systems. Drive vehicle, varying engine loads and engine speeds for at least 5 minutes. Ensure proper A/C system operation and that no DTCs have been set. If system is not operating properly, see CONTROL MODULES under TESTING.

12) Turn ignition off. Disconnect A/C compressor clutch connector. Using a fused jumper wire, connect battery voltage to compressor clutch connector terminal (Yellow wire). See WIRING DIAGRAMS. If compressor clutch engages, go to next step. If compressor clutch does not engage, replace compressor clutch. Ensure gap between compressor clutch and drive pulley is 0.014-0.026" (0.35-0.65 mm).

13) Remove A/C compressor relay, located in engine compartment main fuse/relay box. Main fuse/relay box is located behind battery. Connect a test light between ground and relay connector terminal No. 1/30 (Red wire). If test light comes on, go to next step. If test light does not come on, repair Red wire between relay connector terminal No. 1 and fuse No. 14 (10-amp) located in main fuse/relay box.

14) Connect a fused jumper wire between A/C relay connector terminals No. 1/30 (Red wire) and No. 2/87 (Yellow wire). Connect a test light between ground and A/C compressor clutch harness connector terminal (Yellow wire). If test light comes on, replace A/C compressor relay. If test light does not come on, repair Yellow wire between A/C compressor relay and compressor clutch.

**NO OR INSUFFICIENT HEATING**

**NOTE:** Vehicle is equipped with a vacuum controlled heater core shutoff valve. Vehicle may be equipped with an electric coolant circulation pump. Check for impurities in coolant and verify correct amount and mixture. Ensure that ACC control module is not user programmed. See ACC CONTROL MODULE PROGRAMMING under PROGRAMMING.

1) Turn ignition on and calibrate ACC control module. See ACC
CONTROL MODULE CALIBRATION under PROGRAMMING. Connect scan tool to Data Link Connector (DLC) located under instrument panel, below steering column. Using scan tool, contact ACC control module and read any stored DTCs. If no DTCs are stored, go to next step. If any DTCs are stored, go to RETRIEVING DIAGNOSTIC TROUBLE CODES under SELF-DIAGNOSTICS. Perform repairs as necessary.

2) Using a vacuum pump, ensure heater core shutoff valve opens and closes properly and allows coolant to pass through it. See Fig. 3. If heater core shutoff valve operates properly, go to next step. Replace heater core shutoff valve if it does not operate properly. After repairs ensure ACC system operates properly.

3) If vehicle is equipped with coolant circulation pump, ensure pump is operating properly. See Figs. 2 and 3. See COOLANT CIRCULATION PUMP under TESTING. Perform repairs as necessary. After repairs, ensure ACC system operates properly. If vehicle is not equipped with coolant circulation pump, go to next step.

4) Start engine and allow to idle until thermostat opens and radiator/condenser cooling fans operate. Using scan tool, contact TRIONIC engine control module and read engine coolant temperature. Compare scan tool temperature with actual coolant temperature. Thermostat should open when coolant temperature is 188-196°F (87-91°C).

5) Radiator/condenser cooling fans should operate at low speed when coolant is 208-216°F (98-102°C). Radiator/condenser cooling fans should operate at high speed when coolant is 231-239°F (111-115°C). If thermostat and radiator/condenser cooling fans operate as specified, engine cooling system is operating properly. If thermostat and radiator/condenser cooling fans do not operate as specified, perform repairs as necessary.

NO OR INSUFFICIENT COOLING

NOTE: A/C compressor clutch engages but A/C system cooling is insufficient.

1) Ensure ambient temperature is more than 41°F (5°C) and that radiator/condenser cooling fans are operating properly. Check areas on both sides of A/C condenser and ensure they are clear, free of debris and have an adequate airflow. Ensure temperatures of receiver-drier inlet and outlet lines are the same. Using an A/C system manifold gauge set, ensure A/C system refrigerant operating pressures are within specifications. See SPECIFICATIONS. Perform repairs as necessary. If areas specified are okay, go to next step.

2) Start engine and allow to idle. Turn air recirculation on, select maximum heat for both zones and set blower motor to maximum speed. See Fig. 1. Close hood and all doors and windows. Operate A/C system for 5 minutes, ensuring A/C compressor operates continuously. If A/C compressor operates as specified, go to next step. If A/C compressor does operate as specified, go to step 10).

3) Using scan tool contact DICE control module and read EVAPORATOR TEMPERATURE. If indicated evaporator temperature is less than 50°F (10°C), go to next step. If indicated evaporator temperature is not less than 50°F (10°C), go to step 7).

4) Start engine and allow to idle. Select AUTO and maximum cooling for both zones. See Fig. 1. Check heater core return line temperature. If return line temperature does not decrease, go to next step. If return line temperature decreases, ensure mixed-air flap is operating properly and air filter and/or carbon filter are not
clogged. See Figs. 2 and 3. Restricted fresh-air intake can diminish ACC system cooling capacity. When repairs are complete, go to step 12).

5) Check vacuum hoses between heater core shutoff valve, heater core shutoff valve control solenoid valve and intake manifold. See Figs. 2 and 3. Repair hoses as necessary and go to step 12). If vacuum hoses are okay, go to next step.

6) Disconnect heater core shutoff valve control solenoid valve 2-pin connector. Turn ignition on. Connect a test light between ground and solenoid valve 2-pin connector terminal No. 1 (Violet wire). If test light comes on, go to step 12). If test light does not come on, repair open in Violet wire and go to step 12).

7) Check A/C system for refrigerant leaks. If no refrigerant leaks exist, go to next step. Repair any refrigerant leaks as necessary, evacuate and charge A/C system. Go to step 12).

8) Measure amount of refrigerant in system. See SPECIFICATIONS. If A/C system contains correct amount of refrigerant, replace expansion valve. See EXPANSION VALVE under REMOVAL & INSTALLATION. Evacuate and charge A/C system and go to next step. If A/C system does not contain correct amount of refrigerant, evacuate and charge A/C system with correct amount of refrigerant. Go to 12).

9) Using scan tool, contact DICE control module. Read EVAPORATOR TEMPERATURE. If indicated value is less than 50°F (10°C), go to step 12). If indicated value is more than 50°F (10°C), replace A/C compressor clutch. See COMPRESSOR SERVICING article in this section. When repairs are complete, go to step 12).

10) Connect scan tool to Data Link Connector (DLC) located under instrument panel, below steering column. Using scan tool, contact TRIONIC engine control module and read engine COOLANT TEMPERATURE. Using scan tool, contact DICE control module and read A/C PRESSURE and EVAPORATOR TEMPERATURE.

* If indicated A/C condenser pressure is less than 392 psi (27.6 kg/cm²), go to next step. If indicated evaporator temperature is less than 32°F (0°C), replace evaporator temperature sensor. See EVAPORATOR TEMPERATURE SENSOR under REMOVAL & INSTALLATION. When repairs are complete, go to step 12).

* If scan tool indicated engine coolant temperature is more than 257°F (125°C), A/C compressor operation has been cancelled because of high coolant temperature. Ensure cooling system and engine coolant temperature sensor are operating properly. Perform repairs as necessary. When repairs are complete, go to step 12).

11) Connect A/C system manifold gauge set to A/C refrigerant system. With engine idling at normal operating temperature, read A/C PRESSURE using scan tool. If value displayed on scan tool and value displayed on high-side pressure gauge agree, repair A/C refrigerant system overcharge condition. Evacuate and charge A/C system, and ensure proper A/C operation. If value displayed on scan tool and value displayed on high-side pressure gauge do not agree, replace A/C pressure sensor. See A/C PRESSURE SENSOR under REMOVAL & INSTALLATION. When repairs are complete, go to next step.

12) Using scan tool, clear all DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If A/C system is not operating properly, or a DTC has been detected, a
control module may need to be replaced. See CONTROL MODULES under TESTING.

SELF-DIAGNOSTICS

* PLEASE READ THIS FIRST *

The self-diagnostic function detects abnormal conditions of A/C control unit, related sensors and wiring. Self-diagnostic function includes automatic control back-up, which provides substitute value in case of system failure.

RETRIEVING DIAGNOSTIC TROUBLE CODES

1) When ACC control module calibration is completed, any detected DTCs will be stored. During ACC control module calibration, the number of DTCs detected will be displayed in place of driver's side temperature (left side of ACC panel). A DTC number (01-23) will be displayed for 3 seconds in place of passenger's side temperature (right side of ACC panel). Saab Tech 2 or OBD-II compliant scan tool is necessary to retrieve or erase Diagnostic Trouble Codes (DTCs).

2) Connect scan tool to Data Link Connector (DLC) located under instrument panel, below steering column. Turn ignition on. Following scan tool manufacturer's instructions, read and note DTCs. See ACC CONTROL MODULE DTCs and DICE CONTROL MODULE DTCs tables.

Because a functional problem in one system can be caused from a problem in another system it is important to read DTCs from all vehicle systems. Compare DTCs with customer complaint. DTC that most closely corresponds with customer complaint is probably caused by primary malfunction.

ACC CONTROL MODULE DTCs

<table>
<thead>
<tr>
<th>DTC</th>
<th>Display (1)</th>
<th>Component</th>
<th>Fault</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1340</td>
<td>03</td>
<td>Solar Sensor</td>
<td>Open Circuit Or Communication Error</td>
</tr>
<tr>
<td>B1345</td>
<td>04</td>
<td>Mixed-Air Temperature</td>
<td>Open Or Short to Battery Voltage</td>
</tr>
<tr>
<td>B1345</td>
<td>04</td>
<td>Mixed-Air Temperature - Left Side</td>
<td>Short To Ground</td>
</tr>
<tr>
<td>B1350</td>
<td>02</td>
<td>Cabin Temperature Sensor</td>
<td>Open Or Short To Battery Voltage</td>
</tr>
<tr>
<td>B1350</td>
<td>02</td>
<td>Cabin Temperature Sensor</td>
<td>Short To Ground</td>
</tr>
<tr>
<td>B1605</td>
<td>01</td>
<td>ACC Control Module</td>
<td>Internal Failure</td>
</tr>
<tr>
<td>B2290</td>
<td>09</td>
<td>Mixed-Air Flap Stepping</td>
<td>Open Or Short Motor - Right Side</td>
</tr>
<tr>
<td>B2295</td>
<td>08</td>
<td>Mixed-Air Flap - Right Side</td>
<td>Loose Flap</td>
</tr>
<tr>
<td>B2296</td>
<td>10</td>
<td>Mixed-Air Flap - Right Side</td>
<td>Jammed Flap</td>
</tr>
<tr>
<td>B2345</td>
<td>05</td>
<td>Mixed-Air Temperature</td>
<td>Short To Ground</td>
</tr>
<tr>
<td>B2345</td>
<td>05</td>
<td>Mixed-Air Temperature</td>
<td>Open Or Short To Battery Voltage</td>
</tr>
<tr>
<td>B2375</td>
<td>18</td>
<td>Heater Core Shutoff</td>
<td>Open Or Short</td>
</tr>
<tr>
<td>B2375</td>
<td>18</td>
<td>Heater Core Shutoff</td>
<td>Short To Battery</td>
</tr>
</tbody>
</table>
Valve Solenoid ........................ Voltage

B2380 .. 19 .. Coolant Circulation ..... Open Or Short To Ground Pump (3)

B2380 .. 19 .. Coolant Circulation .... Short To Battery Voltage Pump (3)

B2400 .. 12 .. Air Distribution Flap ... Open Or Short To Ground Stepping Motor

B2405 .. 14 .. Air Distribution Flap ............... Loose Flap Stepping Motor

B2406 .. 13 .. Air Distribution Flap ............... Jammed Flap Stepping Motor

B2410 .. 21 .. Recirculation Flap ..... Open Or Short To Ground Direct Current Motor

B2410 .. 21 .. Recirculation Flap ..... Short To Battery Voltage Direct Current Motor

B2425 .. 20 .. Blower Motor Control Voltage .... Short To Ground

B2425 .. 20 .. Blower Motor Control ... Short To Battery Voltage

B2490 .. 06 .. Mixed-Air Flap Stepping ........ Open Or Short To Motor - Left Side .................. Ground

B2495 .. 08 .. Mixed-Air Flap Stepping ............... Loose Flap Motor - Left Side

B2945 .. 23 .. Sensor Ground ................. Open Or Shorted To Battery Voltage

(1) - Diagnostic Trouble Codes (DTCs) retrieved using a scan tool.
(2) - Diagnostic Trouble Codes (DTCs) displayed after ACC system calibration.
(3) - If equipped.

DICE CONTROL MODULE DTCs

<table>
<thead>
<tr>
<th>DTC (1)</th>
<th>Component</th>
<th>Fault</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2355</td>
<td>Evaporator Temperature Sensor</td>
<td>Short To Ground Or Out Of Range; Open Or Short To Battery Voltage</td>
</tr>
<tr>
<td>B2360</td>
<td>A/C Pressure Sensor</td>
<td>Short To Ground; Open Or Short To Battery Voltage</td>
</tr>
</tbody>
</table>

(1) - Diagnostic Trouble Codes (DTCs) retrieved using a scan tool.

**DTC B1340: SOLAR SENSOR**

**NOTE:** DTC will be cleared after ignition has been turned on 20 times if no fault conditions are detected. DTC can be cleared using scan tool.

Fault Symptoms
Temperature in passenger compartment (cabin) may seem too hot or too cold in relation to selected temperature. When DTC sets, ACC control module will use last valid value as a default until ignition.
is turned off. When ignition is turned on, a zero value will be used as a default.

Fault Conditions
The following conditions may cause DTC to set:

* An open circuit or communication error between solar sensor and ACC control module.
* DTC will set when there are 5 consecutive periods without a solar sensor signal.

Diagnostic Procedure
1) Turn ignition off. Connect scan tool to Data Link Connector (DLC) located under steering column. Using scan tool, contact ACC control module and check for DTC B2945. If DTC B2945 is not displayed, go to next step. If DTC B2945 is displayed, go to DTC B2945: SENSOR GROUND.
2) Locate solar sensor under windshield, at center of dashboard. Disconnect solar sensor 4-pin connector. Turn ignition on. Connect a test light between ground and harness side of sensor 4-pin connector terminal No. 1 (Yellow/Green wire). See Fig. 8. If test light comes on, go to next step. If test light does not come on, repair open in Yellow/Green wire between solar sensor and ACC control module. When repair is complete, go to step 6).
3) Turn ignition on. Connect a test light between harness side of solar sensor 4-pin connector terminal No. 1 (Yellow/Green wire) and terminal No. 4 (Blue/Red wire). Test light should come on faintly. If test light comes on, go to next step. If test light does not come on, repair open or short in Blue/Red wire between solar sensor and ACC control module. When repair is complete, go to step 6).
4) Turn ignition off. Disconnect ACC control module 39-pin connector. See Fig. 7. Check for continuity in White wire between harness side of solar sensor 4-pin connector terminal No. 2 and ACC control module 39-pin connector terminal No. 17. If continuity exists, go to next step. If continuity does not exist, repair open in White wire. When repair is complete, go to step 6).
5) Shine a 60-watt bulb on solar sensor from all 5 directions (front, back, left, right, and top). There should be 5 voltage values at solar sensor terminal No. 2 as light hits each infrared-element. If a voltage value is obtained from all 5 infrared elements, replace ACC control module. See CONTROL MODULES under TESTING. If a voltage value cannot be obtained from all 5 infrared-elements, replace solar sensor. When repair is complete, go to next step.
6) Using scan tool, clear all DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

Fig. 8: Identifying Solar Sensor 4-Pin Connector Terminals
Courtesy of Saab-Scania of America, Inc.
DTC B1345: MIXED-AIR TEMPERATURE SENSOR (LEFT SIDE)

NOTE: DTC will be cleared after ignition has been turned on 20 times if no fault conditions are detected. DTC can be cleared using scan tool.

Fault Symptoms
Temperature in cabin may seem too hot or too cold in relation to selected temperature. When DTC sets, ACC control module will use a default value based on relative position of mixed-air flap multiplied by engine coolant temperature.

Fault Conditions
A DTC will set if:

* There is an open or short to battery voltage between left mixed-air temperature sensor and ACC control module 39-pin connector terminal No. 19 (Brown/Orange wire). Voltage measured at ACC control module connector terminal No. 19 will be more than 4.9 volts.
* There is a short to ground between left mixed-air temperature sensor and ACC control module. Voltage measured at terminal No. 19 is less than 0.1 volt.
* There are 5 consecutive periods without a solar sensor signal. Every 440 milliseconds the ACC control module looks for a solar sensor signal.
* Mixed-air temperature sensor is out of range. See MIXED-AIR TEMPERATURE SENSOR RESISTANCE SPECIFICATIONS table. Measure sensor resistance between sensor terminals with sensor probe immersed in water.

MIXED-AIR TEMPERATURE SENSOR RESISTANCE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Temperature °F (°C)</th>
<th>Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>194 (90)</td>
<td>1100-1300</td>
</tr>
<tr>
<td>176 (80)</td>
<td>1500-1700</td>
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<tr>
<td>158 (70)</td>
<td>2100-2300</td>
</tr>
<tr>
<td>140 (60)</td>
<td>2800-3200</td>
</tr>
<tr>
<td>122 (50)</td>
<td>3900-4300</td>
</tr>
<tr>
<td>104 (40)</td>
<td>5400-6100</td>
</tr>
<tr>
<td>86 (30)</td>
<td>7800-8800</td>
</tr>
<tr>
<td>68 (20)</td>
<td>11,300-13,000</td>
</tr>
<tr>
<td>50 (10)</td>
<td>16,800-19,700</td>
</tr>
<tr>
<td>32 (0)</td>
<td>25,500-30,500</td>
</tr>
</tbody>
</table>

Diagnostic Procedure
1) Turn ignition off. Connect scan tool to Data Link Connector (DLC) located under steering column. Using scan tool, contact ACC control module and check for DTC B2945. If DTC B2945 is not displayed, go to next step. If DTC B2945 is displayed, go to DTC B2945: SENSOR GROUND.

2) Locate left mixed-air temperature sensor connector on front side of A/C-heater assembly. See Fig. 9. Disconnect Black 10-pin connector. Connect a test light between battery voltage and harness side of Black 10-pin connector terminal No. 10 (Brown/White wire).
Fig. 10. If test light comes on, go to next step. If test light does not come on, repair open in Brown/White wire between Black 10-pin connector and ACC control module 39-pin connector terminal No. 38. When repair is complete, go to step 5).

3) Turn ignition on. Using scan tool, contact ACC control module and read ACTUAL MIXED-AIR TEMPERATURE LH voltage. If 4.7-5.0 volts is indicated, go to next step. If 4.7-5.0 volts is not indicated, repair open in Brown/Orange wire between Black 10-pin connector terminal No. 9 and ACC control module 39-pin connector terminal No. 19. See Figs. 7 and 10. When repair is complete, go to step 5).

4) Connect a fused jumper wire between harness side of Black 10-pin connector terminal No. 9 (Brown/Orange wire) and terminal No. 10 (Brown/White wire). Using scan tool, contact ACC control module and read ACTUAL MIXED-AIR TEMPERATURE LH voltage. If zero volts is not indicated, repair open in Brown/Orange wire and go to next step. If zero volts is indicated, replace left mixed-air temperature sensor. See MIXED-AIR TEMPERATURE SENSOR (LEFT SIDE) under REMOVAL & INSTALLATION. After repairs are complete, go to next step.

5) Using scan tool, clear all DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

Fig. 9: Locating Mixed-Air Temperature Sensors 10-Pin Connectors
Courtesy of Saab-Scania of America, Inc.
DTC B1350: CABIN TEMPERATURE SENSOR

NOTE: DTC will be cleared after ignition has been turned on 20 times if no fault conditions are detected. DTC can be cleared using scan tool.

Fault Symptoms
Temperature in passenger compartment (cabin) may seem too hot or too cold in relation to selected temperature. When DTC sets, ACC control module will initially use ambient (outside) temperature as a default value when ignition is turned on. Default value used will then be a mean value of calculated temperatures at head height of front seats.

Fault Conditions
A DTC will set if:

* There is an open or short to battery voltage indicated between cabin temperature sensor and ACC control module 39-pin connector terminal No. 20 (Orange/White wire). Voltage measured at ACC control module terminal No. 20 will be more than 4.9 volts.
* There is a short to ground indicated between cabin temperature sensor and ACC control module 39-pin connector terminal No. 20. Voltage measured at terminal No. 20 is less than 0.1 volt.
* There are 5 consecutive periods without a cabin temperature signal. Every 440 milliseconds the ACC control module looks for a cabin temperature sensor signal.
* Cabin temperature sensor is out of range. See CABIN TEMPERATURE SENSOR RESISTANCE SPECIFICATIONS table. Measure sensor resistance between sensor terminals with sensor probe.
CABIN TEMPERATURE SENSOR RESISTANCE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Temperature °F (°C)</th>
<th>Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>104 (40)</td>
<td>5600-6000</td>
</tr>
<tr>
<td>86 (30)</td>
<td>8100-8500</td>
</tr>
<tr>
<td>77 (25)</td>
<td>9800-10,300</td>
</tr>
<tr>
<td>68 (20)</td>
<td>11,800-12,500</td>
</tr>
<tr>
<td>50 (10)</td>
<td>17,500-18,900</td>
</tr>
<tr>
<td>32 (0)</td>
<td>26,700-29,300</td>
</tr>
</tbody>
</table>

Diagnostic Procedure
1) Turn ignition off. Connect scan tool to Data Link Connector (DLC) located under steering column. Using scan tool, contact ACC control module and check for DTC B2945. If DTC B2945 is not displayed, go to next step. If DTC B2945 is displayed, go to DTC B2945: SENSOR GROUND.
2) Locate cabin temperature sensor in dome light roof panel, near rear view mirror. Disconnect sensor 2-pin connector (connector terminals are identified as No. 2 and No. 3). Connect a test light between battery voltage and harness side connector terminal No. 3 (Yellow/White wire). If test light comes on, go to next step. If test light does not come on, repair Yellow/White wire between cabin temperature sensor and ACC control module 39-pin connector terminal No. 39. When repairs are complete, go to step 5).
3) Turn ignition on. Using scan tool, contact ACC control module and read CABIN TEMPERATURE SENSOR voltage. If 4.7-5.0 volts is indicated, go to next step. If 4.7-5.0 volts is not indicated, repair open in Orange/White wire between cabin temperature sensor connector terminal No. 2 and ACC control module 39-pin connector terminal No. 20. See WIRING DIAGRAMS. When repair is complete, go to step 5).
4) Connect a fused jumper wire between cabin temperature sensor harness side connector terminals No. 2 and No. 3. Turn ignition on. Using scan tool, contact ACC control module and read CABIN TEMPERATURE SENSOR voltage. If zero volts is indicated, replace cabin temperature sensor. See CABIN TEMPERATURE SENSOR under REMOVAL & INSTALLATION. If zero volts is not indicated, repair open in Brown/White wire. When repairs are completed, go to next step.
5) Using scan tool, clear all DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

DTC B1605: ACC CONTROL MODULE

Fault Symptoms
ACC control panel does not function.

Diagnostic Procedure
Replace ACC control module with a known-good ACC control module. See ACC CONTROL MODULE under REMOVAL & INSTALLATION. Using scan tool, clear all DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, see CONTROL MODULES under TESTING.
detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

**DTC B2290: MIXED-AIR FLAP STEPPING MOTOR (RIGHT SIDE)**

**Fault Symptoms**
Temperature in cabin may seem too cold in relation to selected temperature and right side cabin temperature cannot be adjusted.

**Fault Conditions**
A DTC will set:
* When current on an ACC control module stepping motor output exceeds a certain value. DTC set will be for a short circuit.
* When current on an ACC control module stepping motor output is less than 55 mA. DTC set will be for an open circuit.
* During ACC control module monitoring and calibration, if a malfunction is detected.

**Diagnostic Procedure**
1) Disconnect right side mixed-air stepping motor 6-pin connector. See Fig. 2. Connect a Red/Green LED test light between stepping motor 6-pin connector terminal No. 1 (White/Black wire) and terminal No. 3 (White wire). See WIRING DIAGRAMS. Simultaneously press AUTO and OFF buttons on ACC control panel to activate ACC system calibration. See Fig. 1. If both LEDs come on, go to next step. If LEDs do not come on, repair White wire and/or White/Black wire between mixed-air motor and ACC control module 39-pin connector terminal No. 10 (White/Black wire) and terminal No. 29 (White wire). See Fig. 7. When repairs are complete, go to step 3).

2) Connect a Red/Green LED test light between stepping motor 6-pin connector terminals No. 4 (Black/Violet wire) and No. 6 (Red/Blue wire). Simultaneously press AUTO and OFF buttons on ACC control panel to activate ACC system calibration. If LEDs do not come on, repair Black/Violet wire and/or Red/Blue wire between mixed-air stepping motor and ACC control module 39-pin connector terminals No. 11 (Red/Blue wire) and/or No. 30 (Black/Violet wire).
   If both LEDs come on, replace right side mixed-air stepping motor. See MIXED-AIR FLAP STEPPING MOTOR (RIGHT SIDE) under REMOVAL & INSTALLATION. When repairs are complete, go to next step.

3) Using scan tool, clear DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

**DTC B2295: LOOSE MIXED-AIR FLAP (RIGHT SIDE)**

**Fault Symptoms**
Temperature in cabin may seem too cold in relation to selected temperature and right side cabin temperature cannot be adjusted.

**Fault Conditions**
A loose flap DTC will set:
* When ACC control module moves stepping motor toward an end position and stepping motor continues more than 20 percent past expected position.
* If ACC control module has not been calibrated.
* During monitoring and calibration, if a malfunction is detected.

Diagnostic Procedure

1) Remove right side mixed-air stepping motor without disconnecting 6-pin connector. See Fig. 2. Simultaneously press AUTO and OFF buttons on ACC control panel to activate ACC system calibration. See Fig. 1. If stepping motor operates, go to next step. If stepping motor does not operate, replace right side mixed-air stepping motor and flap. See MIXED-AIR FLAP STEPPING MOTOR (RIGHT SIDE) under REMOVAL & INSTALLATION. When repairs are complete, go to step 3).

2) Manually operate mixed-air flap to ensure that flap is not sticking, loose or damaged. Repair mixed-air flap as necessary. If flap is okay, install right side mixed-air stepping motor and calibrate ACC control module. See ACC CONTROL MODULE CALIBRATION under PROGRAMMING. After repairs and calibration, go to next step.

3) Using scan tool, clear DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

DTC B2296: JAMMED MIXED-AIR FLAP (RIGHT SIDE)

Fault Symptoms
Temperature in passenger compartment (cabin) may seem too cold in relation to selected temperature and right side cabin temperature cannot be adjusted.

Fault Conditions
A DTC will set:

* When stepping motor is operating within a 10-90 percent range and ACC control module detects excessive voltage usage. Mixed-air stepping motor operating range is considered to be 0-100 percent.
* If ACC control module has not been calibrated.
* During monitoring and calibration, if a malfunction is detected.

Diagnostic Procedure

1) Remove right side mixed-air stepping motor without disconnecting 6-pin connector. See Fig. 2. Simultaneously press AUTO and OFF buttons on ACC control panel to activate ACC system calibration. See Fig. 1. If stepping motor operates, go to next step. If stepping motor does not operate, replace right side mixed-air stepping motor and flap. Go to step 3).

2) Manually operate mixed-air flap to ensure that flap is not sticking, loose or damaged. If flap is okay, install right side mixed-air stepping motor and calibrate ACC control module. See ACC CONTROL MODULE CALIBRATION under PROGRAMMING. Repair mixed-air flap as necessary. After repairs and calibration, go to next step.

3) Using scan tool, clear DTCs from all systems. Recheck A/C
system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

**DTC B2345: MIXED-AIR TEMPERATURE SENSOR (RIGHT SIDE)**

**NOTE:** DTC will be cleared after ignition has been turned on 20 times if no fault conditions are detected. DTC can be cleared using scan tool.

**Fault Symptoms**
Temperature in cabin may seem too cold in relation to selected temperature and right side cabin temperature cannot be adjusted. When DTC sets, ACC control module will use a default value based on relative position of mixed-air flap multiplied by engine coolant temperature.

**Fault Conditions**
A DTC will set if:

* There is an open or short to battery voltage between right mixed-air temperature sensor and ACC control module 39-pin connector terminal No. 18 (Brown/Red wire). Voltage measured at connector terminal No. 18 will be more than 4.9 volts.
* There is a short to ground between right mixed-air temperature sensor and ACC control module 39-pin connector terminal No. 18. Voltage measured at connector terminal No. 18 is less than 0.1 volt.
* There are 5 consecutive periods without a mixed-air temperature sensor signal. Every 440 milliseconds ACC control module looks for a mixed-air temperature sensor signal.
* Mixed-air temperature sensor is out of range. See MIXED-AIR TEMPERATURE SENSOR RESISTANCE SPECIFICATIONS table. Measure sensor resistance between sensor terminals with sensor probe immersed in water.

**MIXED-AIR TEMPERATURE SENSOR RESISTANCE SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Temperature °F (°C)</th>
<th>Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>194 (90)</td>
<td>1100-1300</td>
</tr>
<tr>
<td>176 (80)</td>
<td>1500-1700</td>
</tr>
<tr>
<td>158 (70)</td>
<td>2100-2300</td>
</tr>
<tr>
<td>140 (60)</td>
<td>2800-3200</td>
</tr>
<tr>
<td>122 (50)</td>
<td>3900-4300</td>
</tr>
<tr>
<td>104 (40)</td>
<td>5400-6100</td>
</tr>
<tr>
<td>86 (30)</td>
<td>7800-8800</td>
</tr>
<tr>
<td>68 (20)</td>
<td>11,300-13,000</td>
</tr>
<tr>
<td>50 (10)</td>
<td>16,800-19,700</td>
</tr>
<tr>
<td>32 (0)</td>
<td>25,500-30,500</td>
</tr>
</tbody>
</table>

**Diagnostic Procedure**

1) Turn ignition off. Connect scan tool to Data Link Connector (DLC) located under steering column. Using scan tool, contact ACC control module and check for DTC B2945. If DTC B2945 is not displayed, go to next step. If DTC B2945 is displayed, go to DTC
DTC B2945: SENSOR GROUND.

2) Locate left mixed-air temperature sensor Gray 10-pin connector on front side of A/C-heater assembly. Disconnect Gray 10-pin connector. Connect a test light between battery voltage and harness side of Gray 10-pin connector terminal No. 10 (Violet wire). See Fig. 10. See WIRING DIAGRAMS. If test light illuminates, go to next step. If test light does not illuminate, repair open in Violet wire between Gray 10-pin connector and ACC control module 39-pin connector terminal No. 37. When repair is complete, go to step 5).

3) Turn ignition on. Using scan tool, contact ACC control module and read ACTUAL MIXED-AIR TEMPERATURE RH voltage. If 4.7-5.0 volts is indicated, go to next step. If 4.7-5.0 volts is not indicated, repair open in Brown/Red wire between Gray 10-pin connector terminal No. 9 and ACC control module 39-pin connector terminal No. 18. See Figs. 7 and 10. When repair is complete, go to step 5).

4) Connect a fused jumper wire between harness side of Gray 10-pin connector terminal No. 9 (Brown/Red wire) and terminal No. 10 (Violet wire). Using scan tool, contact ACC control module and read ACTUAL MIXED-AIR TEMPERATURE RH voltage. If zero volts is not indicated, repair open in Brown/Red wire and go to next step. If zero volts is indicated, replace right mixed-air temperature sensor. See MIXED-AIR FLAP STEPPING MOTOR (RIGHT SIDE) under REMOVAL & INSTALLATION. After repairs are complete, go to next step.

5) Using scan tool, clear all DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

DTC B2355: EVAPORATOR TEMPERATURE SENSOR

Fault Symptoms
Evaporator temperature sensor stops functioning, which means that A/C system does not supply cold air.

Fault Conditions
A DTC will set if:

* There is a short to ground between evaporator temperature sensor 2-pin connector terminal No. 1 and Dashboard Integrated Central Electronics (DICE) 70-pin connector terminal No. 10 (Blue/White wire).
* There is an open or short to battery voltage between evaporator temperature sensor 2-pin connector terminal No. 2 and DICE control module 70-pin connector terminal No. 30 (Green/Red wire).
* Evaporator temperature sensor is out of range. See EVAPORATOR TEMPERATURE SENSOR RESISTANCE SPECIFICATIONS table. Measure sensor resistance between sensor terminals with sensor probe immersed in ice water.

EVAPORATOR TEMPERATURE SENSOR RESISTANCE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Temperature °F (°C)</th>
<th>Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>104 (40)</td>
<td>2527-2793</td>
</tr>
<tr>
<td>86 (30)</td>
<td>3819-4221</td>
</tr>
<tr>
<td>68 (20)</td>
<td>5938-6563</td>
</tr>
</tbody>
</table>
Diagnostic Procedure

1) Disconnect evaporator temperature sensor 2-pin connector located at right side of A/C-heater assembly. See Fig. 4. Connect a test light between battery voltage and harness side of sensor 2-pin connector terminal No. 2 (Green/Red wire). If test light illuminates, go to next step. If test light does not illuminate, repair open or short to battery voltage in Green/Red wire between sensor and DICE control module 70-pin connector terminal No. 30. See Fig. 5. When repairs are completed, go to step 3).

2) Turn ignition on. Measure voltage between harness side of evaporator sensor 2-pin connector terminals. Measure voltage with DVOM positive lead on terminal No. 1 (Blue/White wire) and negative lead on terminal No. 2 (Green/Red wire). If voltage is 6.5-8.5 volts, replace evaporator temperature sensor. See EVAPORATOR TEMPERATURE SENSOR under REMOVAL & INSTALLATION. If voltage is not 6.5-8.5 volts, repair open in Blue/White wire between sensor terminal No. 1 and DICE control module 70-pin connector terminal No. 10. See Fig. 5. When repairs are completed, go to next step.

3) Using scan tool, clear DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

DTC B2360: A/C PRESSURE SENSOR

Fault Symptoms
A/C system does not supply cold air.

Fault Conditions
A DTC will set if:

* There is a short to ground detected at DICE control module 70-pin connector terminal No. 9 (Blue/Green wire).
* Voltage detected at DICE control module connector terminal No. 9 is less than normal range.
* There is an open or short to battery voltage detected at DICE control module connector terminal No. 9.
* Voltage detected at DICE control module connector terminal No. 9 is more than normal range.
* Evaporator A/C pressure sensor is out of range. See A/C PRESSURE SENSOR VOLTAGE table. Measure sensor voltage with connector connected by backprobing terminals.

A/C PRESSURE SENSOR VOLTAGE

<table>
<thead>
<tr>
<th>Pressure psi (kg/cm²)</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>29 (2.0)</td>
<td>0.39-0.41</td>
</tr>
<tr>
<td>145 (10.2)</td>
<td>1.55-1.65</td>
</tr>
</tbody>
</table>
Diagnostic Procedure

1) Disconnect A/C pressure sensor 3-pin connector located end of condenser. See Fig. 4. Turn ignition on. Measure voltage on harness side of sensor 3-pin connector with DVOM positive lead on terminal "B" (Blue/Yellow wire) and negative lead on battery negative terminal. If voltage is 4.7-5.5 volts, go to next step. If voltage is not 4.7-5.5 volts, repair open in Blue/Yellow wire between 3-pin terminal "B" and DICE control module 70-pin connector terminal No. 38. See Fig. 5. When repairs are complete, go to step 5).

2) Measure voltage on harness side of sensor 3-pin connector with DVOM positive lead on terminal "A" (Orange wire) and negative lead on terminal "B" (Blue/Yellow wire). If voltage is 4.7-5.5 volts, go to next step. If voltage is not 4.7-5.5 volts, repair open in Orange wire between 3-pin connector terminal "A" and DICE control module 70-pin connector terminal No. 54. When repairs are complete, go to step 5).

3) Connect scan tool to Data Link Connector (DLC) located under steering column. Using scan tool, contact DICE control module. Connect a fused jumper wire between harness side of sensor 3-pin connector terminal "B" (Blue/Yellow wire) and terminal "C" (Blue/Green wire). Turn ignition on. Using scan tool, read A/C PRESSURE value. If A/C pressure value is 406-508 psi (28.6-35.7 kg/cm²), go to next step. If A/C pressure value is not 406-508 psi (28.6-35.7 kg/cm²), repair open or short to ground in Blue/Green wire between sensor 3-pin connector terminal "C" and DICE control module 70-pin connector terminal No. 9. When repairs are complete, go to step 5).

4) Connect a fused jumper wire between harness side of sensor 3-pin connector terminal "A" (Orange wire) and terminal "C" (Blue/Green wire). Turn ignition on. Using scan tool, read A/C PRESSURE value. If A/C pressure value is zero psi (zero kg/cm²), replace A/C pressure sensor. See A/C PRESSURE SENSOR under REMOVAL & INSTALLATION. If A/C pressure value is not zero psi (zero kg/cm²), repair open or short to battery voltage in Blue/Green wire between sensor 3-pin connector terminal "C" and DICE control module 70-pin connector terminal No. 9. When repairs are complete, go to next step.

5) Using scan tool, clear all DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

DTC B2375: HEATER CORE SHUTOFF VALVE CONTROL SOLENOID VALVE

NOTE: DTC will be cleared after ignition has been turned on 20 times if no fault conditions are detected. DTC can be cleared using scan tool.

Fault Symptoms
Temperature in cabin may seem too hot or too cold in relation to selected temperature. When DTC sets, ACC control module will turn
Fault Conditions
A DTC will set if:

* A short to battery voltage is detected when heater core shutoff valve solenoid is activated. Voltage detected at ACC control module 39-pin connector terminal No. 24 (White/Green wire) is more than 6 volts.
* A short to ground is detected when heater core shutoff valve solenoid is not activated. Voltage detected at ACC control module connector terminal No. 24 is more than 6 volts.
* There are 5 consecutive voltage measurements (one every 440 milliseconds).

Diagnostic Procedure
1) Disconnect heater core shutoff valve control solenoid valve 2-pin connector. See Fig. 2. See WIRING DIAGRAMS. Turn ignition on. Connect a test light between ground and harness side of control solenoid valve 2-pin connector terminal No. 1 (Violet wire). If test light illuminates, go to next step. If test light does not illuminate, repair open or short in Violet wire. When repair is complete, go to step 3).

2) Connect a fuse jumper wire between harness side of control solenoid valve 2-pin connector terminal No. 1 (Violet wire) and terminal No. 2 (White/Green wire). Connect scan tool to Data Link Connector (DLC) located under steering column. Using scan tool, contact ACC control module and activate SOLENOID (ON). Test light should be off and come on when solenoid is activated. If test light does not come on, repair open in White/Green wire. If test light comes on, replace heater core shutoff valve control solenoid valve. See Fig. 2. When repair is complete, go to next step.

3) Using scan tool, clear DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

DTC B2380: COOLANT CIRCULATION PUMP

NOTE: DTC will be cleared after ignition has been turned on 20 times if no fault conditions are detected. DTC can be cleared using scan tool.

Fault Symptoms
Temperature in cabin may seem too cold in relation to selected temperature. When DTC sets, ACC control module will turn off activation output to circulation pump.

Fault Conditions
A DTC will set if:

* A short to battery voltage is detected when circulation pump is activated. Voltage detected at ACC control module 39-pin connector terminal No. 23 (White wire) is more than 6 volts.
* A short to ground is detected when circulation pump is not activated. Voltage detected at ACC control module connector
terminal No. 23 is more than 6 volts.
* There are 5 consecutive voltage measurements (one every 440 milliseconds).

Diagnostic Procedure
1) Coolant circulation pump is located behind power brake booster. Disconnect circulation pump 2-pin connector. Connect a test light between ground and circulation pump harness side 2-pin connector terminal No. 2 (Red wire). See Fig. 2. If test light illuminates, go to next step. If test light does not illuminate, repair open or short in Red wire between fuse No. 8 (15-amp) and coolant circulation pump connector. When repair is complete, go to step 3).

2) Connect test light between harness side 2-pin connector terminals No. 1 (White wire) and No. 2 (Red wire). Using scan tool, contact ACC control module and activate circulation pump. If test light comes on when circulation pump is activated, replace coolant circulation pump. See Fig. 2. If test light does not come on, repair open in White wire between circulation pump and ACC control module. When repair is complete, go to next step.

3) Using scan tool, clear DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

DTC B2400: AIR DISTRIBUTION FLAP STEPPING MOTOR

Fault Symptoms
Temperature in cabin may seem too cold or too hot in relation to selected temperature. Air distribution does not correspond with illuminated symbol in ACC panel display.

Fault Conditions
A DTC will set:
* When current on an ACC control module stepping motor output exceeds a certain value. DTC set will be for a short circuit.
* When current on an ACC control module stepping motor output is less than 55 mA. DTC set will be for an open circuit.
* During ACC control module monitoring and calibration, if a malfunction is detected.

Diagnostic Procedure
1) Disconnect air distribution flap stepping motor 6-pin connector. See Fig. 2. Connect a Red/Green LED test light between stepping motor harness side 6-pin connector terminal No. 1 (Red/White wire) and terminal No. 3 (White/Yellow wire). Simultaneously press AUTO and OFF buttons on ACC control panel to activate ACC system calibration. See Fig. 1.
   If LEDs do not come on, repair Red/White wire and/or White/Yellow wire between stepping motor and ACC control module 39-pin connector terminal No. 8 (Red/White wire) and terminal No. 27 (White/Yellow wire). See Fig. 7. When repairs are complete, go to step 3). If both LEDs come on, go to next step.

2) Connect a Red/Green LED test light between stepping motor 6-pin connector terminal No. 4 (Yellow/White wire) and terminal No. 6 (Yellow/Brown wire). Simultaneously press AUTO and OFF buttons on ACC
control panel to activate ACC system calibration. If both LEDs come on, replace air distribution flap stepping motor. See AIR DISTRIBUTION FLAP STEPPING MOTOR under REMOVAL & INSTALLATION. If LEDs do not come on, repair Yellow/White wire and/or Yellow/Blue wire between stepping motor and ACC control module 39-pin connector terminal No. 9 (Red/Blue wire) and terminal No. 28 (Red/Violet wire). After repairs are complete, go to next step.

3) Using scan tool, clear all DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

**DTC B2405: AIR DISTRIBUTION FLAP STEPPING MOTOR (LOOSE FLAP)**

Fault Symptoms
Temperature in cabin may seem too cold or too hot in relation to selected temperature. Air distribution does not correspond with illuminated symbol in ACC panel display.

Fault Conditions
A loose flap DTC will set:

* When ACC control module moves stepping motor toward an end position and stepping motor continues more than 20 percent past expected position.
* If ACC control module has not been calibrated.
* During ACC control module monitoring and calibration, if a malfunction is detected.

Diagnostic Procedure
1) Remove air distribution flap stepping motor without disconnecting 6-pin connector. See Fig. 2. Simultaneously press AUTO and OFF buttons on ACC control panel to activate ACC system calibration. See Fig. 1. If stepping motor operates, go to next step. If stepping motor does not operate, replace air distribution flap stepping motor and flap. See AIR DISTRIBUTION FLAP STEPPING MOTOR under REMOVAL & INSTALLATION. When repairs are complete, go to step 3).

2) Manually operate air distribution flap to ensure that flap is not sticking, loose or damaged. Repair air distribution flap as necessary. If flap is okay, install air distribution flap stepping motor and calibrate ACC control module. See ACC CONTROL MODULE CALIBRATION under PROGRAMMING. After repairs and calibration, go to next step.

3) Using scan tool, clear DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

**DTC B2406: AIR DISTRIBUTION FLAP STEPPING MOTOR (JAMMED FLAP)**

Fault Symptoms
Temperature in cabin may seem too cold or too hot in relation to selected temperature. Air distribution does not correspond with illuminated symbol in ACC panel display.
Fault Conditions
A DTC will set:

* When stepping motor is operating within a 10-90 percent range and ACC control module detects excessive voltage usage. Air distribution flap stepping motor operating range is considered to be 0-100 percent. During stepping motor operation ACC control module monitors stepping motor voltage use.
* If ACC control module has not been calibrated.
* During monitoring and calibration, if a malfunction is detected.

Diagnostic Procedure
1) Remove air distribution flap stepping motor without disconnecting 6-pin connector. See Fig. 2. Simultaneously press AUTO and OFF buttons on ACC control panel to activate ACC system calibration. See Fig. 1. If stepping motor operates, go to next step. If stepping motor does not operate, replace air distribution flap stepping motor and flap. See AIR DISTRIBUTION FLAP STEPPING MOTOR under REMOVAL & INSTALLATION. When repairs are complete, go to step 3).

2) Manually operate air distribution flap to ensure that flap is not sticking, loose or damaged. Repair air distribution flap as necessary. If flap is okay, install air distribution flap stepping motor and calibrate ACC control module. See ACC CONTROL MODULE CALIBRATION under PROGRAMMING. After repairs and calibration, go to next step.

3) Using scan tool, clear DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

DTC B2410: RECIRCULATION FLAP DIRECT CURRENT MOTOR

NOTE: DTC will be cleared after ignition has been turned on 20 times if no fault conditions are detected. DTC can be cleared using scan tool.

Fault Symptoms
There is misting and/or bad air in passenger compartment (cabin). Temperature in cabin may seem too hot in relation to selected temperature. When DTC sets, ACC control module will turn off activation output air recirculation stepping motor.

Fault Conditions
A DTC will set:

* When a short to battery voltage is indicated between air recirculation motor and ACC control module, and air recirculation motor is not activated. Voltage measured at 39-pin connector terminal No. 21 (Green/White wire) will be more than 9 volts.
* When a short to ground or open is indicated between air recirculation motor and ACC control module, and air recirculation motor is not activated. Voltage measured at connector terminal No. 21 will be less than 3 volts.
* There are 5 consecutive voltage measurements (one every 440 milliseconds).

Diagnostic Procedure
1) Disconnect air recirculation stepping motor 2-pin connector located on right side of A/C-heater assembly. Connect a Red/Green LED test light between harness side 2-pin connector terminal No. 1 (Green/White wire) and terminal No. 2 (Red/White wire). Turn ignition on. Press ACC control panel air recirculation button on and off several times to activate air recirculation flap stepping motor. Both Red and Green LEDs should alternately come on as air recirculation is switched between outside air and recirculated air. If both LEDs do not alternately come on, repair open or short in Green/White wire or Red/White wire. If both LEDs alternately come on, replace air recirculation flap stepping motor. See AIR RECIRCULATION FLAP DIRECT CURRENT MOTOR under REMOVAL & INSTALLATION. When repairs are completed, go to next step.

2) Using scan tool, clear all DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

DTC B2425: BLOWER MOTOR CONTROL VOLTAGE

Fault Symptoms
Blower motor cannot be operated from ACC control panel.

Fault Conditions
A DTC will set if a short to ground or battery voltage is detected.

Diagnostic Procedure
1) Disconnect blower motor control module 4-pin connector located on right side of A/C-heater assembly. See Fig. 6. Measure voltage between ground and blower motor control module 4-pin connector terminal No. 1 (Blue/Green wire). Turn ignition on. Using blower motor speed control buttons on ACC control panel, increase blower motor speed in steps. If voltage is 0-5 volts in short steps from minimum to maximum blower motor speed, replace blower motor control module. See BLOWER MOTOR CONTROL MODULE under REMOVAL & INSTALLATION. If voltage is not as specified, repair open or short in Blue/Green wire between blower motor control module and ACC control module 39-pin connector terminal No. 14 (Blue/Green wire). When repairs are completed, go to next step.

2) Using scan tool, clear DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

DTC B2490: MIXED-AIR FLAP STEPPING MOTOR (LEFT SIDE)

Fault Symptoms
Temperature in passenger compartment (cabin) may seem too cold or too hot in relation to selected temperature.
Fault Conditions
A DTC will set:

* When current on an ACC control module stepping motor output exceeds a certain value. DTC set will be for a short circuit.
* When current on an ACC control module stepping motor output is less than 55 mA. DTC set will be for an open circuit.
* During ACC control module monitoring and calibration, if a malfunction is detected.

Diagnostic Procedure
1) Disconnect left mixed-air flap stepping motor 6-pin connector located on left side of A/C-heater assembly. Connect a Red/Green LED test light between harness side 6-pin connector terminal No. 1 (Violet/White wire) and terminal No. 3 (Green/Yellow wire). See WIRING DIAGRAMS. Press ACC control panel AUTO and OFF buttons to activate stepping motor calibration. If both LEDs come on, go to next step. If LEDs do not come on, repair short or open in Violet/White wire and/or Green/Yellow wire. When repairs are complete, go to step 3).

2) Connect a Red/Green LED test light between harness side 6-pin connector terminal No. 4 (Yellow/White wire) and terminal No. 6 (Yellow/Brown wire). Press ACC control panel AUTO and OFF buttons to activate stepping motor calibration. If both LEDs come on, replace left mixed-air flap stepping motor. See MIXED-AIR FLAP STEPPING MOTOR (LEFT SIDE) under REMOVAL & INSTALLATION. If LEDs do not come on, repair short or open in Yellow/White wire and/or Yellow/Brown wire. When repairs are complete, go to next step.

3) Using scan tool, clear DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

**DTC B2495: LEFT MIXED-AIR FLAP STEPPING MOTOR (LOOSE FLAP)**

Fault Symptoms
Temperature in cabin may seem too cold or too hot in relation to selected temperature.

Fault Conditions
A DTC will set:

* When ACC control module moves stepping motor toward an end position and stepping motor continues more than 20 percent past expected position.
* If ACC control module has not been calibrated.
* During ACC control module monitoring and calibration, if a malfunction is detected.

Diagnostic Procedure
1) Remove left side mixed-air stepping motor without disconnecting 6-pin connector. See Fig. 2. Simultaneously press AUTO and OFF buttons on ACC control panel to activate ACC system calibration. See Fig. 1. If stepping motor operates, go to next step. If stepping motor does not operate, replace left side mixed-air stepping motor and flap. See MIXED-AIR FLAP STEPPING MOTOR (LEFT SIDE)
under REMOVAL & INSTALLATION. When repairs are complete, go to step 3).

2) Manually operate mixed-air flap to ensure that flap is not sticking, loose or damaged. Repair mixed-air flap as necessary. If flap is okay, install mixed-air flap stepping motor and calibrate ACC control module. See ACC CONTROL MODULE CALIBRATION under PROGRAMMING. After repairs and calibration, go to next step.

3) Using scan tool, clear all DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

**DTC B2496: LEFT MIXED-AIR FLAP STEPPING MOTOR (JAMMED FLAP)**

**Fault Symptoms**
Temperature in cabin may seem too cold or too hot in relation to selected temperature.

**Fault Conditions**
A DTC will set:

* When stepping motor is operating within a 10-90 percent range and ACC control module detects excessive voltage usage. Air distribution flap stepping motor operating range is considered to be 0-100 percent.
* If ACC control module has not been calibrated.
* During monitoring and calibration, if a malfunction is detected.

**Diagnostic Procedure**
1) Remove left side mixed-air stepping motor without disconnecting 6-pin connector. See Fig. 2. Simultaneously press AUTO and OFF buttons on ACC control panel to activate ACC system calibration. See Fig. 1. If stepping motor operates, go to next step. If stepping motor does not operate, replace left side mixed-air stepping motor and flap. See MIXED-AIR FLAP STEPPING MOTOR (LEFT SIDE) under REMOVAL & INSTALLATION. When repairs are complete, go to step 3).

2) Manually operate mixed-air flap to ensure that flap is not sticking, loose or damaged. Repair mixed-air flap as necessary. If flap is okay, install mixed-air flap stepping motor and calibrate ACC control module. See ACC CONTROL MODULE CALIBRATION under PROGRAMMING. After repairs and calibration, go to next step.

3) Using scan tool, clear DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If a DTC has been detected, a control module may need to be replaced. See CONTROL MODULES under TESTING.

**DTC B2945: SENSOR GROUND**

**Fault Symptoms**
Temperature in passenger compartment (cabin) may seem too cold or too hot in relation to selected temperature.

**Fault Conditions**
A DTC will set:
When voltage measured at ACC control module 39-pin connector terminals No. 36 (Blue/Red wire), No. 37 (Violet wire), No. 38 (Brown/White wire) or No. 39 (Yellow/White wire) is more than 0.4 volt.

During monitoring, if a malfunction is detected, ACC control module measures voltage every 40 milliseconds.

Diagnostic Procedure

1) Turn ignition off. Disconnect ACC control module 39-pin connector. Check for continuity between ground and harness side of ACC control module 39-pin connector terminal No. 1 (Black wire). See Fig. 7. If continuity exists, go to next step. If continuity does not exist, repair open in Black wire. When repairs are completed, go to step 6).

2) Connect a test light between harness side of control module 39-pin connector terminal No. 1 (Black wire) and terminal No. 36 (Blue/Red wire). Turn ignition on. If test light does not come on, go to next step. If test light comes on, repair short to battery voltage in Blue/Red wire between control module and solar sensor. When repairs are completed, go to step 6).

3) Connect a test light between harness side of control module 39-pin connector terminal No. 1 (Black wire) and terminal No. 37 (Violet wire). Turn ignition on. If test light does not come on, go to next step. If test light comes on, repair short to battery voltage in Violet wire between control module and right side mixed-air temperature sensor. When repairs are completed, go to step 6).

4) Connect a test light between harness side of control module 39-pin connector terminal No. 1 (Black wire) and terminal No. 38 (Brown/White wire). Turn ignition on. If test light does not come on, go to next step. If test light comes on, repair short to battery voltage in Brown/White wire between control module and left side mixed-air temperature sensor. When repairs are completed, go to step 6).

5) Connect a test light between harness side of control module 39-pin connector terminal No. 1 (Black wire) and terminal No. 39 (Yellow/White wire). Turn ignition on. If test light does not come on, go to next step. If test light comes on, repair short to battery voltage in Yellow/White wire. When repairs are completed, go to next step.

6) Using scan tool, clear DTCs from all systems. Recheck A/C system operation for original complaint. If A/C system is operating properly and no DTC has been detected, repair is complete. If A/C system is not operating properly and/or a DTC has been detected, ACC control module may need to be replaced. See CONTROL MODULES under TESTING.

TESTING

A/C SYSTEM PERFORMANCE

1) Ensure ambient temperature is 68-77°F (20-25°C). Attach manifold gauge set to A/C system. Ensure all panel outlets are open. Insert thermometer 2" (50 mm) into center panel outlet. Close hood and all doors and windows. Start engine and operate at 1500-2000 RPM.

2) Select maximum blower motor speed. Select LO temperature as displayed on ACC control panel. Select panel mode control. See Fig. 1. After 5 minutes of A/C system operation, center panel outlet
temperature should be less than 45°F (7°C).

**ACC CONTROL MODULE PIN VOLTAGE TEST**

NOTE: Voltage and resistance tests should be performed using a Digital Volt-Ohmmeter (DVOM) with a minimum 10-megohm input impedance, unless otherwise specified. Other tests will require either a lab scope or a logic probe.

Before performing pin voltage tests, ensure ACC control module is supplied with power (terminals No. 4 and No. 22) and ground (terminal No. 1). To ensure changes in circuit polarity are correctly detected, connect positive (Red) lead to first terminal listed and negative (Black) lead to second terminal listed.

When instructed to operate an ACC system component, press appropriate button on ACC control panel. See Fig. 1. Turn ignition on (when instructed).

Expected test values listed are approximate. If test values are not as specified, inspect suspect circuit and related components. Perform repairs as necessary. If all test values are as specified, replace ACC control module. See CONTROL MODULES under TESTING.

1) Remove ACC control module from instrument panel to gain access to 39-pin connector. See ACC CONTROL MODULE under REMOVAL & INSTALLATION.

2) Ensure ACC control module 39-pin connector is properly connected and terminals are clean and tight. Backprobe ACC control module 39-pin connector between specified terminals. See Fig. 7.

3) Control Module Ground - Turn ignition on. Measure voltage between terminal No. 4 (Blue/Red wire) and terminal No. 1 (Black wire). See WIRING DIAGRAMS. Input value should be battery voltage.

4) Air Recirculation Flap Direct Current Motor Power Supply - Measure voltage between terminal No. 2 (Red/White wire) and terminal No. 21 (Green/White wire). Press air recirculation control button. Operate fresh air mode. Output value should be +12 volts for approximately 10 seconds. Operate recirculation air mode. Polarity should reverse. Output value should be -12 volts for approximately 10 seconds.

5) Parking Heater Connection - Measure voltage between terminal No. 3 and terminal No. 1 (Black wire). Ensure engine coolant temperature is more than 104°F (40°C). Turn ignition off. Press AUTO button until chime sounds and Saab Information Display (SID) displays AFTERHEATER ACTIVATED. Input value should be battery voltage.

6) ACC Control Module +15 (Power Supply) Circuit - Measure voltage between terminal No. 4 (Blue/Red wire) and terminal No. 1 (Black wire). Turn ignition on or activate ACC control module. Input value should be battery voltage.

7) Battery Voltage On Blower Motor Control Module - Measure voltage between terminal No. 5 (Orange/White wire) and terminal No. 1 (Black wire). See WIRING DIAGRAMS. Turn ignition on. Output value should be battery voltage.

8) Left Mixed-Air Stepping Motor - Check signal between terminal No. 6 (Green/Yellow wire) and terminal No. 25 (Violet/White wire). Turn ignition on and operate stepping motor. Output value should be 50 Hz/50% using a lab scope, or hi-lo using a logic probe.

9) Check signal between terminal No. 7 (Yellow/Brown wire) and terminal No. 26 (Yellow/White wire). Turn ignition on and operate stepping motor. Output value should be 50 Hz/50% using a lab scope, or hi-lo using a logic probe.
10) Air Distribution Flap Stepping Motor - Check signal between terminals No. 8 (Red/White wire) and No. 27 (White/Yellow wire). Turn ignition on and operate stepping motor. Output value should be 50 Hz/50% using a lab scope, or hi-lo using a logic probe.

11) Check signal between terminal No. 9 (Red/White wire) and terminal No. 28 (Red/Violet wire). Turn ignition on and operate stepping motor. Output value should be 50 Hz/50% using a lab scope, or hi-lo using a logic probe.

12) Right Mixed-Air Stepping Motor - Check signal between terminal No. 10 (White/Black wire) and terminal No. 29 (White wire). Turn ignition on and operate stepping motor. Output value should be 50 Hz/50% using a lab scope, or hi-lo using a logic probe.

13) Check signal between terminal No. 11 (Red/Blue wire) and terminal No. 30 (Black/Violet wire). Turn ignition on and operate stepping motor. Output value should be 50 Hz/50% using a lab scope, or hi-lo using a logic probe.

14) Blower Motor Control Module Voltage - Measure voltage between terminal No. 14 (Green/Blue wire) and terminal No. 1 (Black wire). Turn ignition on and change blower motor speed. Output value should be 0-5 volts.

15) Solar Sensor Unit Battery Voltage Supply & Clock Pulse - Check signal between terminal No. 16 (Yellow/Green wire) and terminal No. 1 (Black wire). Turn ignition on. Output value should be 12-volt, 25 Hz, -TRIGG, 1% using a lab scope; or hi-lo (with a visible pulse) using a logic probe.

16) Solar Sensor Test Lead - Check signal between terminal No. 17 (White wire) and terminal No. 1 (Black wire). See WIRING DIAGRAMS. Turn ignition on. Input value should be a 0-5 volt pulse using a lab scope, or hi-lo (with a visible pulse) using a logic probe.

17) Right Mixed-Air Temperature Sensor 5-Volt Power Supply - Measure voltage signal between terminal No. 18 (Brown/Red wire) and terminal No. 1 (Black wire). Turn ignition on. Input voltage will vary between 0.1-4.9 volts depending on sensor resistance. See MIXED-AIR TEMPERATURE SENSOR RESISTANCE SPECIFICATIONS table.

18) Left Mixed-Air Temperature Sensor 5-Volt Power Supply - Measure voltage signal between terminal No. 19 (Brown/Orange wire) and terminal No. 1 (Black wire). Turn ignition on. Input voltage will vary between 0.1-4.9 volts depending on sensor resistance. See MIXED-AIR TEMPERATURE SENSOR RESISTANCE SPECIFICATIONS table.

19) Cabin Temperature Sensor 5-Volt Power Supply - Measure voltage signal between terminal No. 20 (Orange/White wire) and terminal No. 1 (Black wire). Turn ignition on. Input voltage will vary between 0.1-4.9 volts depending on sensor resistance. See CABIN TEMPERATURE SENSOR RESISTANCE SPECIFICATIONS table.

20) Air Recirculating Flap Motor Power Supply - Measure voltage between terminal No. 21 (Green/White wire) and terminal No. 2 (Red/White wire). Press air recirculation control button. Operate recirculation air mode. Output value should be +12 volts for approximately 10 seconds. Operate fresh air mode. Polarity should reverse. Output value should be -12 volts for approximately 10 seconds.

21) ACC Control Module +30 (Power Supply) Circuit - Measure voltage between terminal No. 22 (Red wire) and terminal No. 1 (Black wire). See WIRING DIAGRAMS. Input voltage should be battery voltage.

22) Circulation Pump - Measure voltage between terminal No. 4 (Blue/Red wire) and terminal No. 23 (White wire). Operate circulation pump. Output value should be battery voltage.
23) Heater Core Shut-Off Valve Solenoid - Measure voltage between terminal No. 4 (Blue/Red wire) and terminal No. 24 (White/Green wire). Turn ignition on. Output value should be battery voltage.

24) Left Mixed-Air Flap Stepping Motor - Check signal between terminal No. 25 (Violet/White wire) and terminal No. 6 (Green/Yellow wire). Turn ignition on and operate stepping motor. Output value should be 50 Hz/50% using a lab scope, or hi-lo using a logic probe.

25) Check signal between terminal No. 26 (Yellow/White wire) and terminal No. 7 (Yellow/Brown wire). Turn ignition on and operate stepping motor. Output value should be 50 Hz/50% using a lab scope, or hi-lo using a logic probe.

26) Air Distribution Flap Stepping Motor - Check signal between terminal No. 27 (White/Yellow wire) and terminal No. 8 (Red/White wire). Turn ignition on and operate stepping motor. Output value should be 50 Hz/50% using a lab scope, or hi-lo using a logic probe.

27) Check signal between terminal No. 28 (Red/Violet wire) and terminal No. 9 (Red/White wire). Turn ignition on and operate stepping motor. Output value should be 50 Hz/50% using a lab scope, or hi-lo using a logic probe.

28) Right Mixed-Air Stepping Motor - Check signal between terminal No. 29 (White wire) and terminal No. 10 (White/Black wire). Turn ignition on and operate stepping motor. Output value should be 50 Hz/50% using a lab scope, or hi-lo using a logic probe.

29) Positive "I" Bus - Measure voltage between terminal No. 33 (Green wire) and terminal No. 1 (Black wire). Turn ignition on. Input and output values should be 2.0-3.0 volts.

30) Negative "I" Bus - Measure voltage between terminal No. 34 (White wire) and terminal No. 1 (Black wire). Turn ignition on. Input and output values should be 2.0-3.0 volts.

31) Blower Motor Control Module Ground - Measure voltage between terminal No. 4 (Blue/Red wire) and terminal No. 35 (Green/White wire). Turn ignition on. Output voltage should be battery voltage.

32) Solar Sensor Ground - Measure voltage between terminal No. 4 (Blue/Red wire) and terminal No. 36 (Blue/Red wire). See WIRING DIAGRAMS. Turn ignition on. Output voltage should be battery voltage.

33) Right Mixed-Air Temperature Sensor Ground - Measure voltage between terminal No. 4 (Blue/Red wire) and terminal No. 37 (Violet wire). Turn ignition on. Output voltage should be battery voltage.

34) Left Mixed-Air Temperature Sensor Ground - Measure voltage between terminal No. 4 (Blue/Red wire) and terminal No. 38 (Brown/White wire). Turn ignition on. Output voltage should be battery voltage.

35) Cabin Temperature Sensor Ground - Measure voltage between terminal No. 4 (Blue/Red wire) and terminal No. 39 (Yellow/White wire). Turn ignition on. Output voltage should be battery voltage.

COOLANT CIRCULATION PUMP

NOTE: Coolant circulation pump is not used on all vehicles.
1) Disconnect coolant circulation pump 2-pin connector. Connect a test light between ground and pump connector terminal No. 2 (Red wire). If test light comes on, go to next step. If test light does not come on, repair open or short in Red wire between pump and fuse No. 20 (15-amp).

2) Connect test light between coolant circulation pump connector terminals. If test light comes on, go to next step. If test light does not come on, repair open White wire between pump and ACC control module 39-pin connector terminal No. 23.

3) Using a fused jumper wire, connect battery voltage to pump terminal No. 2. Using another jumper wire, ground pump terminal No. 1. If pump operates, replace ACC control module. See CONTROL MODULES. Replace coolant circulation pump if it does not operate. See Fig. 2. Ensure ACC system operates properly.

CONTROL MODULES

Manufacturer has found many control modules that have been replaced were not the cause of the problem and replacement of the control module did not correct the problem. Upon examination, these control modules were found to be free of defects. Before replacing a suspect control module, perform the following:

* Control modules are sensitive to static electricity. Before touching a control module touch a ground point. Never touch control module pins.
* Connect test light, DVOM, or scan tool and wiggle wiring harness at several points and in different directions to detect intermittent opens and/or shorts. See WIRING DIAGRAMS. Perform repairs as necessary and recheck.
* Ensure all control module power supply circuits are okay.
* Ensure all control module ground connections are clean and tight.
* Using a scan tool or DVOM, ensure control module input and output signal values okay. If replacing ACC control module, see ACC CONTROL MODULE PIN VOLTAGE TEST. Before replacing a TRIONIC engine control module or DICE control module, see appropriate G - TESTS W/CODES article in ENGINE PERFORMANCE section.
* Before replacing ACC control module, ensure that all user programming has been cleared. See ACC CONTROL MODULE PROGRAMMING under PROGRAMMING.
* Using a scan tool, ensure that all functions are operating properly. A fault in one output signal may affect another output signal.
* If problem continues, replace ACC control module with a known-good control module and recheck. Replace ACC control module if problem is corrected. See ACC CONTROL MODULE under REMOVAL & INSTALLATION.

REMOVAL & INSTALLATION

* PLEASE READ THIS FIRST *

WARNING: To avoid injury from accidental air bag deployment, read and carefully follow all SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM procedures in AIR BAG RESTRAINT
NOTE: Before working on any ACC component, wait at least 30 seconds after turning ignition off, to give system time to reset valve motors and store any fault codes.

A/C COMPRESSOR

Removal & Installation
1) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Disconnect compressor clutch electrical connector (located behind right headlight). Relieve tension on drive belt by compressing and locking drive belt tensioner using a 3-mm Allen socket.
2) Remove and set aside intake air duct without disconnecting mass airflow sensor connector. Remove exhaust manifold heat shield. Disconnect by-pass line and valve and set aside.
3) Disconnect radiator/condenser cooling fans connectors located on fan cowl. Release clamps holding hose to top of coolant expansion tank. Release clamps holding A/T cooling hose from bottom of fan cowl. Remove fan cowl, Remove pressure hose from turbo.
4) Disconnect A/C compressor high pressure and low pressure hoses, plug exposed openings and set aside. Remove drive belt. Starting with top bolt, remove 3 A/C compressor mounting bolts and remove compressor.
5) To install, reverse removal procedure. Lubricate "O" rings with synthetic vaseline. Tighten bolts to specification. See TORQUE SPECIFICATIONS. Evacuate and charge A/C system. Operate A/C compressor with engine speed at more than 1500 RPM for at least 2 minutes to distribute refrigerant oil throughout system. Check A/C-heater system for proper operation.

ACC CONTROL MODULE

NOTE: Automatic Climate Control (ACC) system will not operate properly until replacement module has been programmed. See PROGRAMMING USING SCAN TOOL under ACC CONTROL MODULE PROGRAMMING.

Removal & Installation
Disconnect negative battery cable. Remove radio using Removal Handles (84-71-161). Insert each removal handle into holes located in face of radio until handles lock with a clicking sound. Using removal handles, remove radio. Disconnect radio connector and antenna to gain access to ACC control module. Remove ACC control module and disconnect connector. To install, reverse removal procedure.

A/C-HEATER UNIT

WARNING: Use care when storing seats removed from vehicle. SRS side impact module is located under the backrest trim on door side.

Removal & Installation
1) Position a pan under vehicle to collect engine coolant. Disconnect heater hoses at engine and drain engine coolant. Using compressed air, carefully blow into heater hose to remove remaining coolant from heater core.
2) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Remove instrument panel. See INSTRUMENT PANEL. Remove ground connections from instrument panel support.

3) Remove cable ties holding wiring harness to instrument panel support. Remove middle cable conduit. Remove driver's side and passenger's side knee shields. Remove relay box. Remove steering column-to-steering gear pinch bolt. Press lower steering column shaft upward and remove from steering gear. Remove lower steering column bolt as far as possible. Remove cable ties and move wiring harness away from steering column. Remove 2 upper steering column bolts. Remove steering column as a complete assembly.

4) Remove A/T control module and set aside. Disconnect 4 connectors on passenger's side of A/C-heater unit. In engine compartment, remove line between charge-air cooler and throttle body. Remove charge-air by-pass valve solenoid valve holder cover. Disconnect solenoid valve connector and remove holder from firewall. Disconnect heater hoses to heater core at firewall. Disconnect A/C system lines at expansion valve and plug exposed openings. Remove expansion valve and plug exposed openings.

5) Move front seat to full forward position. If electric seat operation is not functioning, use Emergency Seat Crank (84-71-187) to move seat. Remove 2 rear seat anchor bolts. Move seat to full rear position and remove 2 front seat anchor bolts. Tilt seat assembly back. Remove cable tie and disconnect connector located under seat. Remove seat from vehicle. Fold carpet out of the way, and remove air ducts under front seats.

6) Disconnect evaporator condensation drain hoses on both sides of A/C-heater unit. From engine compartment, remove 3 A/C-heater unit bolts. Lift A/C-heater unit and remove it past gear selector mounting. Ensure any coolant spillage is thoroughly cleaned up.

7) To install, reverse removal procedure. Tighten nuts and bolts to specification. See TORQUE SPECIFICATIONS. Lubricate "O" rings with synthetic vaseline. Evacuate and charge A/C system. Refill and bleed cooling system. See REFILLING ENGINE COOLING SYSTEM under ADJUSTMENTS.

BLOWER MOTOR ASSEMBLY

Removal & Installation
1) Turn air recirculation control off. See Fig. 1. Turn ignition off. Using a 2-jaw puller, remove wiper arms. Remove wiper arm shaft seals. Remove retaining clips from middle portion of rubber molding along edge of firewall. Loosen, but DO NOT remove outer retaining clips.

2) Loosen cover over firewall partition space that is held in place with clips by carefully lifting cover forward until it is released from windshield. Hold hood release cable to one side, lift cover backward, toward windshield and remove cover. Using a screwdriver, release water shield front clips and remove water shield.

3) Remove 4 wiper motor assembly bolts, disconnect wiper motor connector, and remove wiper motor assembly. Remove 2 clips and 2 bolts on front edge of frame, around blower motor, and remove frame. Remove 3 wiper arm bracket bolts and remove bracket.

4) Mark routing of blower motor control module wiring harness and seals. Cut cable ties as necessary and move wiring harness aside. See Fig. 11. Remove blower motor cover. Remove blower motor, cut wiring harness cable tie, and disconnect blower motor.

5) To install, reverse removal procedure. Ensure blower motor
fan frame is properly aligned in grooves and fan turns without interference. Check that wiring harness does not touch blower motor or air recirculation flap.

6) After connecting blower motor connector, secure wiring harness using a cable tie. Ensure blower motor cover and gasket do not interfere with air recirculation flap. Ensure blower motor wiring harness is routed and secured properly. Ensure seals are installed in each side of A/C-heater unit.

7) Tighten wiper motor assembly to specification. See TORQUE SPECIFICATIONS. Driver's side wiper blade mounting on wiper arm should be installed 1.5" (39 mm) from cover. Passenger's side wiper blade mounting on wiper arm should be installed 2.25" (57 mm) from cover.

Fig. 11: Locating Blower Motor Wiring Harness & Cover
Courtesy of Saab-Scania of America, Inc.

BLOWER MOTOR CONTROL MODULE

Removal & Installation
1) Remove driver's side lower instrument panel. Remove Data Link Connector (DLC) and disconnect floor light connector. Disconnect accelerator cable and remove accelerator pedal assembly.

2) Remove glove compartment and passenger's side of center console. Disconnect 2 connectors located above intake air filter in A/C-heater housing. Cut cable ties and remove connectors from mounting plate. See Fig. 12.

4) To install, reverse removal procedure. Ensure wiring harness, cable ties, rubber seals and connectors are installed in the same positions. Ensure air recirculation flap movement is not obstructed.

CONDENSER

Removal & Installation
1) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Remove grille and headlights. Remove center cover over radiator.
2) Disconnect A/C pressure sensor connector located on right side of condenser. Disconnect condenser refrigerant lines and plug all exposed openings. Remove air filter housing air duct. Remove condenser with A/C pressure sensor and receiver-drier attached. See Fig. 4.
3) To install, reverse removal procedure. Transfer components as necessary. Lubricate "O" rings with synthetic vaseline. Tighten A/C pressure sensor and refrigerant lines to specification. See TORQUE SPECIFICATIONS.

4) If a new condenser is being installed, add one ounce of refrigerant oil to high-pressure side of compressor. Evacuate and charge A/C system. Check A/C-heater system for proper operation.

A/C PRESSURE SENSOR
Removal & Installation
Remove grille and right side headlight. Disconnect A/C pressure sensor connector located on right side of condenser. See Fig. 4. Remove A/C pressure sensor. To install, reverse removal procedure. Lubricate "O" rings with synthetic vaseline. Tighten sensor to specification. See TORQUE SPECIFICATIONS.

CABIN TEMPERATURE SENSOR
Removal & Installation
Cabin temperature sensor is located in forward part of overhead panel, between rear view mirror and seat belt reminder display. Remove overhead panel light lens and screw. Disconnect sensor connector and remove sensor. To install, reverse removal procedure.

EVAPORATOR ASSEMBLY
NOTE: If evaporator inlet and outlet lines between firewall grommet and evaporator do not have a joint, refrigerant lines must be cut before evaporator can be removed.

Removal
1) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Remove glove box and trim cover on right side right side of A/C-heater unit. Cut cable tie holding wiring harness to A/C-heater unit service cover. Cut cable tie holding cooler duct to glove box. Remove A/C-heater unit service cover and intake air filter(s). See Figs. 3 and 6.
2) Remove blower motor. See BLOWER MOTOR ASSEMBLY. If evaporator inlet and outlet lines do not have a joint connection, cut lines as close to evaporator as possible. See Fig. 13. If there is a joint connection, remove connection bolt and separate connection. Remove evaporator by sliding it out passenger's side of A/C-heater unit. See Fig. 14.
3) Remove tip of evaporator temperature sensor from evaporator. Remove expansion valve and plug exposed openings. Remove inlet and outlet lines from A/C-heater unit. Using a vacuum cleaner, remove any cuttings, dust, or debris from A/C-heater unit.

Installation
1) Using 3/16" (4.5 mm) diameter round-tipped tool, create a hole in fifth cooling fin from passenger's side. See Fig. 14. Install evaporator temperature sensor into hole. Position lower portion of replacement inlet and outlet lines from inside vehicle. Position intake air filter holder with evaporator and push into A/C-heater unit.
2) Remove protective plugs from refrigerant lines. Install expansion valve. Connect joint in inlet and outlet lines between
firewall grommet and evaporator. Lubricate "O" rings with synthetic vaseline. Tighten evaporator joint and expansion valve bolts to specification. See Fig. 13. See TORQUE SPECIFICATIONS. Evacuate and charge A/C system. Add one ounce of refrigerant oil to high-pressure side of compressor. Check A/C-heater system for proper operation. To complete installation, reverse removal procedure.

Fig. 13: Locating Evaporator Components
Courtesy of Saab-Scania of America, Inc.
EVAPORATOR TEMPERATURE SENSOR

Removal & Installation
1) Remove glove box and trim cover on right side of A/C-heater unit. Cut cable tie holding wiring harness to A/C-heater unit service cover. Cut cable tie holding cooler duct to glove box. Remove A/C-heater unit service cover and intake air filter(s). See Fig. 3.
2) Carefully reach into filter holder and remove evaporator temperature sensor. Disconnect sensor connector, lift-up connector plate, and remove sensor connector from plate. See Fig. 14. Carefully install evaporator temperature sensor into existing hole. To complete installation, reverse removal procedure.

EXPANSION VALVE

Removal & Installation
1) Discharge A/C system, using approved refrigerant recovery/recycling equipment. In engine compartment, remove line
between charge-air cooler and throttle body. Remove charge-air by-pass valve solenoid valve holder cover. Disconnect solenoid valve connector and remove holder from firewall.

2) Disconnect A/C system refrigerant lines at expansion valve and plug exposed openings. See Figs. 4 and 14. Remove expansion valve and plug exposed openings to evaporator.

3) Lubricate "O" rings with synthetic vaseline and install on evaporator inlet and outlet lines. Press expansion valve onto inlet and outlet lines and tighten screws to specification. See TORQUE SPECIFICATIONS. To complete installation, reverse removal procedure. Evacuate and charge A/C system to specifications. See SPECIFICATIONS. Ensure A/C system is operating properly.

HEATER CORE

Removal & Installation

1) Ensure engine coolant is cold. Position a pan under engine to collect engine coolant. Disconnect heater hoses at engine inlet and outlet. Drain engine coolant. Using compressed air, carefully blow into each heater hose to remove coolant from heater core.

2) Remove glove box and trim cover on right side of A/C-heater unit. Remove tape from air outlet and duct, and remove air outlet. See Fig. 15. Disconnect heater core inlet pipe and outlet pipe joint. Remove 4 heater core cover screws and slide heater core out.

3) To install, reverse removal procedure. Lubricate "O" rings with synthetic vaseline. Install air outlet and secure to air duct with tape. Refill and bleed cooling system, and check for leaks. See REFILLING ENGINE COOLING SYSTEM under ADJUSTMENTS.

Fig. 15: Locating Heater Core
Courtesy of Saab-Scania of America, Inc.
Removal & Installation
1) Disable air bag system. See AIR BAG RESTRAINT SYSTEM article in ACCESSORIES/SAFETY EQUIPMENT section. Position steering wheel in a straight-ahead position. Turn ignition off. Remove instrument panel speakers and covers. Remove center cover with ACC solar sensor and/or alarm sensor. Disconnect ACC solar sensor and/or alarm sensor and push connector into hole.

2) Remove glove box and air duct. Remove 2 driver-side air bag side covers, screws and driver-side air bag. Disconnect driver's side air bag, steering wheel controls, and horn connectors. Remove steering wheel using a steering wheel puller. Tape SRS clockspring (contact roller) to steering column to ensure correct positioning is not lost.

3) Remove Data Link Connector (DLC) located under steering column. Remove driver's side lower instrument panel with air duct and floor light. Lift up manual gear shift lever boot (if equipped). Remove compartment or ashtray with holder and 2 screws. Disconnect central locking switch, lift cover and disconnect seat heater, and cigarette lighter connectors. Release steering wheel adjustment. Remove upper and lower steering column covers. Disconnect connectors for steering column switches and remove switches. Remove steering column dust boot.

4) Remove Saab Information Display (SID), radio, and ACC control modules. Remove side cover on left end of instrument panel, headlight control switch, hazard flasher switch and other switches. Release 4 clips and remove 6 switch panel screws. Remove switch panel. Remove fuse box located at left end of instrument panel. Remove steering column boot. Remove instrument cluster and driver's side air duct. Disconnect passenger's side air bag and remove positioning strap.

5) Remove front sill scuff plates. Fold back carpet and remove protective plate in front of lower instrument panel mounting nuts. Lift rear of center console straight up and remove. Position shift lever to Reverse (M/T) or Park (A/T) position and remove ignition key. Lift theft protection cover from ignition lock, disconnect connector, replace ignition key and move shift lever to Neutral position. Disconnect electric window switches. Remove upper part of center console. Make a match-mark between console and locating pin. Remove lower part of console.

6) Remove 2 bolts at either end of instrument panel, near windshield. Loosen nut located in center of instrument panel, near windshield. Remove 2 nuts lower end of instrument panel and then remove center nut. Lift instrument panel up and pull outward to remove. To install, reverse removal procedure. Ensure there are no wires or connectors trapped between supports and components.

AIR DISTRIBUTION FLAP STEPPING MOTOR

Removal & Installation
1) Remove glove box and trim cover on right side of A/C-heater unit. Remove air distribution flap stepping motor bolts. See Fig. 6. Disconnect stepping motor connector and remove stepping motor.

2) To install, reverse removal procedure. Ensure both air distribution flaps are closed when installing stepping motor. Perform ACC system calibration. See ACC CONTROL MODULE CALIBRATION under PROGRAMMING.

AIR RECIRCULATION FLAP DIRECT CURRENT MOTOR
Removal & Installation

1) Remove glove box and trim cover on right side of A/C-heater unit. Remove air recirculation motor bolts. See Fig. 6. Disconnect motor connector. Disengage motor arm from slot in air recirculation flap linkage, and remove motor. Cut cable tie securing wiring harness, and remove harness connector from connector mounting plate.

2) To install, reverse removal procedure. Ensure air recirculation flap moves freely between open and closed positions. Ensure motor arm is properly inserted into air recirculation flap linkage. Perform ACC system calibration. See ACC CONTROL MODULE CALIBRATION under PROGRAMMING.

MIXED-AIR FLAP STEPPING MOTOR (LEFT SIDE)

Removal & Installation
Remove left lower instrument panel under steering column. Remove DLC and floor light. Disconnect left side mixed-air flap stepping motor connector. Remove stepping motor. See Fig. 12. To install, reverse removal procedure. Perform ACC system calibration. See ACC CONTROL MODULE CALIBRATION under PROGRAMMING.

MIXED-AIR FLAP STEPPING MOTOR (RIGHT SIDE)

Removal & Installation
1) Using ACC control panel, set mixed-air temperature to either maximum cold or maximum hot position. Remove glove box and trim cover on right side of A/C-heater unit. Remove right side mixed-air flap stepping motor. Disconnect stepping motor connector. See Fig. 6.

2) To install, reverse removal procedure. Ensure lower flap is positioned similarly as top flap. Ensure both flaps move simultaneously and without restrictions. Perform ACC system calibration. See ACC CONTROL MODULE CALIBRATION under PROGRAMMING.

MIXED-AIR TEMPERATURE SENSOR (LEFT SIDE)

Removal & Installation
1) Disconnect negative battery cable. Remove left lower instrument panel under steering column. Remove DLC and floor light. Remove left side mixed-air temperature sensor from air duct. See Fig. 12.

2) Remove radio using Removal Handles (84-71-161). Insert each removal handle into holes located in face of radio, until handles lock with a clicking sound. Using removal handles, remove radio. Disconnect radio connector and antenna to gain access to ACC control module. Remove ACC control module and disconnect connector.

3) Disconnect Black 10-pin connector mounted on cabin side of A/C-heater unit. See Fig. 9. Remove temperature sensor terminals from Black 10-pin connector. Procedure can be simplified by cutting old sensor leads in an appropriate location and replacing sensor leads. To install, reverse removal procedure. Ensure sensor leads are secured to wiring harness.

MIXED-AIR TEMPERATURE SENSOR (RIGHT SIDE)

Removal & Installation
1) Remove glove box and trim cover on right side of A/C-
heater unit. Remove right side mixed-air temperature sensor from air duct. See Fig. 12.

2) Remove radio using Removal Handles (84-71-161). Insert each removal handle into holes located in face of radio, until handles lock with a clicking sound. Using removal handles, remove radio. Disconnect radio connector and antenna to gain access to ACC control module. Remove ACC control module and disconnect connector.

3) Disconnect Gray 10-pin connector mounted on cabin side of A/C-heater unit. See Fig. 9. Remove temperature sensor terminals from Gray 10-pin connector. Procedure can be simplified by cutting old sensor leads in an appropriate location and replacing sensor leads. To install, reverse removal procedure. Ensure sensor leads are secured to wiring harness.

RECEIVER-DRIER

Removal & Installation

1) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Remove grille and left side headlight. Raise and support vehicle. Remove center cover under radiator/condenser. Disconnect refrigerant lines from receiver-drier and plug exposed openings. See Fig. 4. Remove receiver-drier.

2) To install, reverse removal procedure. Lubricate "O" rings with synthetic vaseline. Tighten refrigerant line connections to specification. See TORQUE SPECIFICATIONS. Evacuate and charge A/C system to specifications. See SPECIFICATIONS. Add one ounce of refrigerant oil to high-pressure side of compressor. Check A/C-heater system for proper operation.

TORQUE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Application</th>
<th>Ft. Lbs. (N.m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accelerator Pedal</td>
<td>18 (24)</td>
</tr>
<tr>
<td>A/C Pressure Sensor</td>
<td>13 (18)</td>
</tr>
<tr>
<td>Compressor Mounting Bolts</td>
<td>18 (24)</td>
</tr>
<tr>
<td>Compressor Pressure Hose Connection</td>
<td>15 (20)</td>
</tr>
<tr>
<td>Compressor Clutch Shaft Bolt</td>
<td>10 (14)</td>
</tr>
<tr>
<td>Steering Wheel Center Nut</td>
<td>29 (39)</td>
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<tr>
<td>Steering Column-To-Steering Gear Pinch Bolt</td>
<td>22 (30)</td>
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<tr>
<td>Steering Column Mounting Bolts</td>
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<table>
<thead>
<tr>
<th>Application</th>
<th>INCH Lbs. (N.m)</th>
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<tbody>
<tr>
<td>Condenser Lines</td>
<td>71 (8)</td>
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<tr>
<td>Expansion Valve-To-Evaporator Screws</td>
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<tr>
<td>Expansion Valve Line Connection</td>
<td>71 (8)</td>
</tr>
<tr>
<td>Receiver-Drier Line Connection</td>
<td>71 (8)</td>
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<tr>
<td>Wiper Assembly Bolts</td>
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</tbody>
</table>

WIRING DIAGRAMS
Fig. 16: Automatic A/C-Heater System Wiring Diagram (9-5 - 1 Of 2)
Fig. 17: Automatic A/C-Heater System Wiring Diagram (9-5 - 2 Of 2)