

SPECIFICATIONS

Material

Item	Specification	Fill Capacity
A/C Cooling Coil Coating YN-29	—	—
A/C System Flushing Solvent YN-23	—	—
PAG Refrigerant Compressor Oil (R-134a Systems) YN-12-D	WSH-M1C231-B	207 ml (7 fl oz)
R-134a Refrigerant YN-19 (US); CYN-16-P or CYN-16-R (Canada)	WSH-M17B19-A	0.74 kg (26 oz) (1.63 lb)

General Specifications

Item	Specification
A/C Compressor	
Type	FS-18
Rotation	Clockwise
A/C Compressor Magnetic Clutch	
Air gap clearance	0.35-0.65 mm (0.014-0.026 in)
A/C Cycling Switch Open and Closed Pressures^a	
Open pressure	145-159 kPa (21-23 psi)
Closed pressure	290 kPa (42 psi)


General Specifications (Continued)

Item	Specification
A/C Pressure Relief Valve^a	
Open pressures	3,792-4,137 kPa (550-600 psi)
A/C Pressure Transducer (V6)	Refer to Powertrain Control/Emissions Diagnosis (PC/ED) manual.
Evaporator Core Orifice	
Color	Blue
Dual Function Pressure Switch (V8)^a	
Clutch off/open	2,999-3,275 kPa (435-475 psi)
Clutch on/closed	1,517-1,931 kPa (220-280 psi)
Fan on/open	2,137-2,344 kPa (310-340 psi)
Fan off/closed	1,655-2,137 kPa (240-310 psi)
Refrigerant System Dye	
R-134a Leak Detection Dye 164-R6060 or 164-R6081	—

- ^a Manifold gauge set pressures may vary slightly depending on the distance between the service gauge port valve and the A/C pressure relief valve, the A/C cycling switch, the A/C pressure transducer (V6) and the dual function pressure switch (V8) location.

DESCRIPTION AND OPERATION

Climate Control System

 **WARNING:** Take the following precautions when repairing an air conditioning system containing R-134a:

- Always wear safety goggles.
- Avoid contact with liquid refrigerant R-134a. R-134a vaporizes at approximately -25°C (-13°F) under atmospheric pressure and will freeze skin tissue.
- Never allow refrigerant R-134a gas to escape in quantity in an occupied space. It will displace the oxygen needed to support life.
- Never use a torch in an atmosphere containing R-134a gas. R-134a is non-toxic at all normal conditions, but it decomposes when exposed to high temperatures such as a torch flame. During decomposition it releases irritating and toxic gasses (as described in the MSDS sheet from the manufacturer). Decomposition products are hydrofluoric acid, carbon dioxide and water.

Failure to follow these instructions may result in serious personal injury.

NOTICE: To avoid damaging the vehicle or air conditioning (A/C) components, the following precautions must be observed.

- The A/C refrigerant of all vehicles must be identified and analyzed prior to refrigerant charging. Failure to do so may contaminate the shop bulk refrigerant and other vehicles.
- Do not add R-12 refrigerant to an A/C system that requires the use of R-134a refrigerant. These 2 types of refrigerant must never be mixed. Doing so may damage the A/C system.
- Charge the A/C system with the engine running only at the low-pressure side to prevent refrigerant slugging from damaging the A/C compressor.

- Use only R-134a refrigerant. Due to environmental concerns, when the air conditioning system is drained, the refrigerant must be collected using refrigerant recovery/recycling equipment. Federal law **REQUIRES** that R-134a be recovered into appropriate recovery equipment and the process be conducted by qualified technicians who have been certified by an approved organization, such as MACS, ASI, etc. The use of a recovery machine dedicated to R-134a is necessary to reduce the possibility of oil and refrigerant incompatibility concerns. Refer to the instructions provided by the equipment manufacturer when removing refrigerant from or charging the air conditioning system.
- Refrigerant R-134a must not be mixed with air for leak testing or used with air for any other purpose above atmospheric pressure. R-134a is combustible when mixed with high concentrations of air and higher pressures.
- A number of manufacturers are producing refrigerant products that are described as direct substitutes for refrigerant R-134a. The use of any unauthorized substitute refrigerant may severely damage the A/C components. If repair is required, use only new or recycled refrigerant R-134a.

NOTICE: To avoid contamination of the air conditioning (A/C) system:

- Never open or loosen a connection before recovering the refrigerant.
- When loosening a connection, if any residual pressure is evident, allow it to leak out before opening the fitting.
- Evacuate a system that has been opened to install a new component, or one that has discharged through leakage before charging.
- Seal open fittings with a cap or plug immediately after disconnecting a component from the system.
- Clean the outside of the fittings thoroughly before disconnecting a component from the system.
- Do not remove the sealing caps from a new component until ready to install.

DESCRIPTION AND OPERATION (Continued)

- Refrigerant oil will absorb moisture from the atmosphere if left uncapped. Do not open an oil container until ready to use and install the cap immediately after using. Store the oil in a clean, moisture-free container.
- Install a new O-ring seal before connecting an open fitting. Coat the fitting and O-ring seal with mineral oil before connecting.
- When installing a refrigerant line, avoid sharp bends. Position the line away from the exhaust or any sharp edges that may chafe the line.
- Tighten threaded fittings only to specifications. The steel and aluminum fittings used in the refrigerant system will not tolerate overtightening.
- When disconnecting a fitting, use a wrench on both halves of the fitting to prevent twisting the refrigerant lines or tubes.
- Do not open a refrigerant system or uncap a new component unless it is as close as possible to room temperature. This will prevent condensation from forming inside a component that is cooler than the surrounding air.

The Electronic Manual Temperature Control (EMTC) system heats or cools the vehicle depending on the function and temperature selected.

- The function selected on the climate control assembly determines heating or cooling, air distribution and enables blower motor operation.
- The temperature control setting determines the air temperature.
- The blower motor setting varies the blower motor speed.

The system components are the following:

- A/C compressor
- A/C compressor clutch assembly
- A/C condenser core
- A/C evaporator core
- Suction accumulator
- Connecting refrigerant lines
- A/C evaporator core orifice
- A/C cycling switch
- A/C pressure transducer (4.0L)
- A/C dual function pressure switch (4.6L)
- Heater core and evaporator core housing

- HVAC module
- Blower switch
- Temperature blend door actuator
- Panel/floor door actuator
- Defrost door actuator
- Air inlet door actuator
- Blower motor resistor
- Blower motor

Electronic Manual Temperature Control (EMTC) System

The EMTC system operation is determined by the settings on the climate control assembly. The climate control assembly includes a serviceable blower motor switch.

The blower motor switch:

- sets the blower motor speed.
- directs the blower motor path to ground through the blower motor resistor to allow blower motor operation in LO, MED LO and MED HI.
- directs the blower motor path directly to ground, bypassing the blower motor resistor, to allow blower motor operation in HI.

The A/C request switch:

- can command the A/C compressor ON when the function selector switch is in PANEL, FLOOR/PANEL, FLOOR/DEFROST and FLOOR when the A/C request switch is pressed. Indicator illuminates when A/C request switch is toggled ON.
- can command the A/C compressor OFF in FLOOR/DEFROST if RECIRC is commanded OFF.
- is inoperative in MAX A/C, OFF and DEFROST.
- indicator illuminates when the function selector switch is in MAX A/C and cannot be toggled.
- indicator does not illuminate in OFF and cannot be toggled.
- indicator in FLOOR/DEFROST and DEFROST does not change. The A/C compressor will operate regardless of indicator status if the outside air temperature is above 2°C (35°F).
- is serviced only with the climate control assembly.

DESCRIPTION AND OPERATION (Continued)

The function selector switch:

- selects airflow direction.
- is serviced only with the climate control assembly.

NOTE: Recirculated air only is used when the EMTC mode selector is set in the MAX A/C or OFF modes or if the RECIRC request button is selected in any mode except MAX A/C, OFF or DEFROST.

The air recirculation button:

- selects either recirculated or outside air source.
- is serviced only with the climate control assembly.

System Airflow Description — Electronic Manual Temperature Control (EMTC) System

Max A/C

When MAX A/C is selected:

- the air inlet door actuator closes off outside air and admits only recirculated air.
- the recirc button is disabled and the indicator is illuminated.
- the defrost door actuator is in the full closed position, directing airflow to the floor/panel door.
- the floor/panel door actuator is in the full panel position, directing airflow to the instrument panel A/C registers. A small amount of airflow from the floor duct will be present.
- blended air temperature is available.
- the A/C request button is illuminated and will be disabled.
- the A/C compressor will operate if the outside temperature is above approximately 2°C (35°F).
- the blower motor is ON.

PANEL

When PANEL is selected:

- the recirc request button is enabled. If the recirc request button is selected (indicator ON), the air inlet door actuator closes off outside air from entering the passenger compartment. If the recirc request button is not selected (indicator OFF), the air inlet door actuator admits only outside air into the passenger compartment.

- the defrost door actuator is in the full closed position, directing airflow to the floor/panel door.
- the floor/panel door actuator is in the full panel position, directing airflow to the instrument panel A/C registers. A small amount of airflow from the floor duct will be present.
- blended air temperature is available.
- the A/C request button is enabled. The A/C compressor will operate and the indicator will illuminate if the A/C request button is selected and the outside temperature is above approximately 2°C (35°F).
- the blower motor is ON.

PANEL/FLOOR

When PANEL/FLOOR is selected:

- the recirc request button is enabled. If the recirc request button is selected (indicator ON), the air inlet door actuator closes off outside air from entering the passenger compartment. If the recirc request button is not selected (indicator OFF), the air inlet door actuator admits only outside air into the passenger compartment.
- the defrost door actuator is in the full closed position, directing airflow to the floor/panel door.
- the floor/panel door actuator is positioned partially between the floor and panel position, directing airflow to the floor duct and the instrument panel A/C registers.
- blended air temperature is available.
- the A/C request button is enabled. The A/C compressor will operate and the indicator will illuminate if the A/C request button is selected and the outside temperature is above approximately 2°C (35°F).
- the blower motor is ON.

OFF

When OFF is selected:

- the recirc request button is disabled.
- the air inlet door actuator closes off outside air.
- the defrost door actuator is in the full closed position and floor/panel door actuator is in the partially open position.
- the A/C request button is disabled.
- the blower motor is OFF.

DESCRIPTION AND OPERATION (Continued)**FLOOR**

When FLOOR is selected:

- the recirc request button is enabled. If the recirc request button is selected (indicator ON), the air inlet door actuator closes off outside air from entering the passenger compartment. If the recirc request button is not selected (indicator OFF), the air inlet door actuator admits only outside air into the passenger compartment.
- the floor/panel door is in the floor position and the defrost door fully closes, directing airflow to the floor duct. A small amount of airflow from the defrost duct and side demisters will be present.
- blended air temperature is available.
- the A/C request button is enabled. The A/C compressor will operate and the indicator will illuminate if the A/C request button is selected and the outside temperature is above approximately 2°C (35°F).
- the blower motor is ON.

FLOOR/DEFROST

When the FLOOR/DEFROST is selected:

- the recirc request button is enabled. If the recirc request button is selected (indicator ON), the air inlet door actuator closes off outside air from entering the passenger compartment. If the recirc request button is not selected (indicator OFF), the air inlet door actuator admits only outside air into the passenger compartment.

- the floor/panel door actuator is in the full floor position and the defrost door is partially open, directing airflow to the floor duct, the defroster duct and the side window demisters.
- blended air temperature is available.
- the A/C request button is enabled. The A/C compressor will operate and the indicator will illuminate if the A/C request button is selected and the outside temperature is above approximately 2°C (35°F).
- the blower motor is ON.

DEFROST


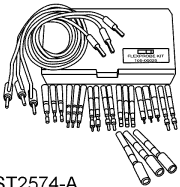
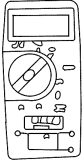
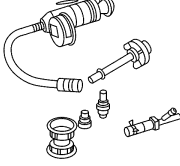
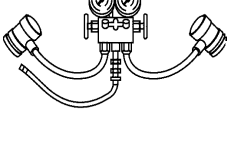
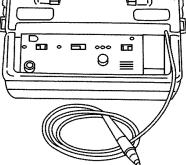
When DEFROST is selected:

- the air inlet door actuator opens, admitting only outside air into the passenger compartment.
- the floor/panel door actuator is in the full floor position.
- the defrost door is in the fully open position, directing airflow to the defroster duct and side window demisters. A small amount of airflow from the floor duct will be present.
- blended air temperature is available.
- the A/C request button will illuminate and is enabled. To reduce fogging, the A/C compressor will operate automatically, regardless of indicator status, if the outside temperature is above approximately 2°C (35°F).
- the blower motor is ON.

DIAGNOSIS AND TESTING

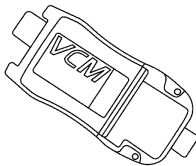
Climate Control System

Special Tool(s)

 <p>ST2985-A</p>	<p>A/C Flush Adapter Kit 219-00074 or equivalent</p>
 <p>ST2574-A</p>	<p>Flex Probe Kit 105-R025C or Equivalent</p>
 <p>ST1137-A</p>	<p>Fluke 77 III Automotive Meter 105-R0056 or equivalent</p>
 <p>ST1474-A</p>	<p>Pressure Test Kit 014-R1072 or equivalent</p>
 <p>ST1928-A</p>	<p>R-134a Manifold Gauge Set 176-R032A or equivalent</p>
 <p>ST2351-A</p>	<p>Refrigerant Leak Detector 216-00001 or equivalent</p>

(Continued)

Special Tool(s)

 <p>ST2834-A</p>	<p>Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool</p>
--	--

Principles of Operation

Compressor Anti-Slugging Strategy (CASS)

Liquid refrigerant may accumulate in the A/C compressor under certain conditions. To alleviate damage to the A/C compressor, Compressor Anti-Slugging Strategy (CASS) is utilized.

CASS is initiated only under specific conditions:

- When the ignition is OFF for more than 8 hours
- When the ambient temperature is above -4°C (25°F)
- When battery voltage is above 8.5 volts during engine cranking

When these conditions are present, the PCM will activate the A/C control relay prior to cranking of the engine. The A/C control relay engages the A/C compressor for approximately 4-15 A/C compressor revolutions or a maximum of 2 seconds (depending upon vehicle application), allowing the liquid refrigerant to be pushed from the A/C compressor. CASS is initiated by the PCM regardless of the function selector switch position or the HVAC system settings.

The Refrigerant Cycle

During stabilized conditions (A/C system shutdown), the refrigerant is in a vaporized state and pressures are equal throughout the system. When the A/C compressor is in operation, it increases pressure on the refrigerant vapor, raising its temperature. The high-pressure and high-temperature vapor is then released into the top of the condenser core.

The condenser core, being close to ambient temperature, causes the refrigerant vapor to condense into a liquid when heat is removed by ambient air passing over the fins and tubing. The now liquid refrigerant, still at high pressure, exits from the bottom of the condenser core and enters the inlet side of the evaporator core orifice.

DIAGNOSIS AND TESTING (Continued)

The evaporator core orifice is the restriction in the refrigerant system that creates the low-pressure drop in the evaporator core and separates the high- and low-pressure sides of the A/C system. As the liquid refrigerant leaves this restriction, its pressure and boiling points are reduced.

The liquid refrigerant is now at its lowest pressure and temperature. As it passes through the evaporator core, it absorbs heat from the passenger compartment airflow passing over the plate/fin sections of the evaporator core. This addition of heat causes the refrigerant to boil (convert to gas). The now cooler passenger compartment air can no longer support the same humidity level of the warmer air and this excess moisture condenses on the exterior of the evaporator coils and fins and drains outside the vehicle.

The suction accumulator is designed to remove moisture from the refrigerant and to prevent any liquid refrigerant that may not have been vaporized in the evaporator core from reaching the A/C compressor. The A/C compressor is designed to pump refrigerant vapor only, as liquid refrigerant will not compress and can damage the A/C compressor.

The refrigerant cycle is now repeated with the A/C compressor again increasing the pressure and temperature of the refrigerant.

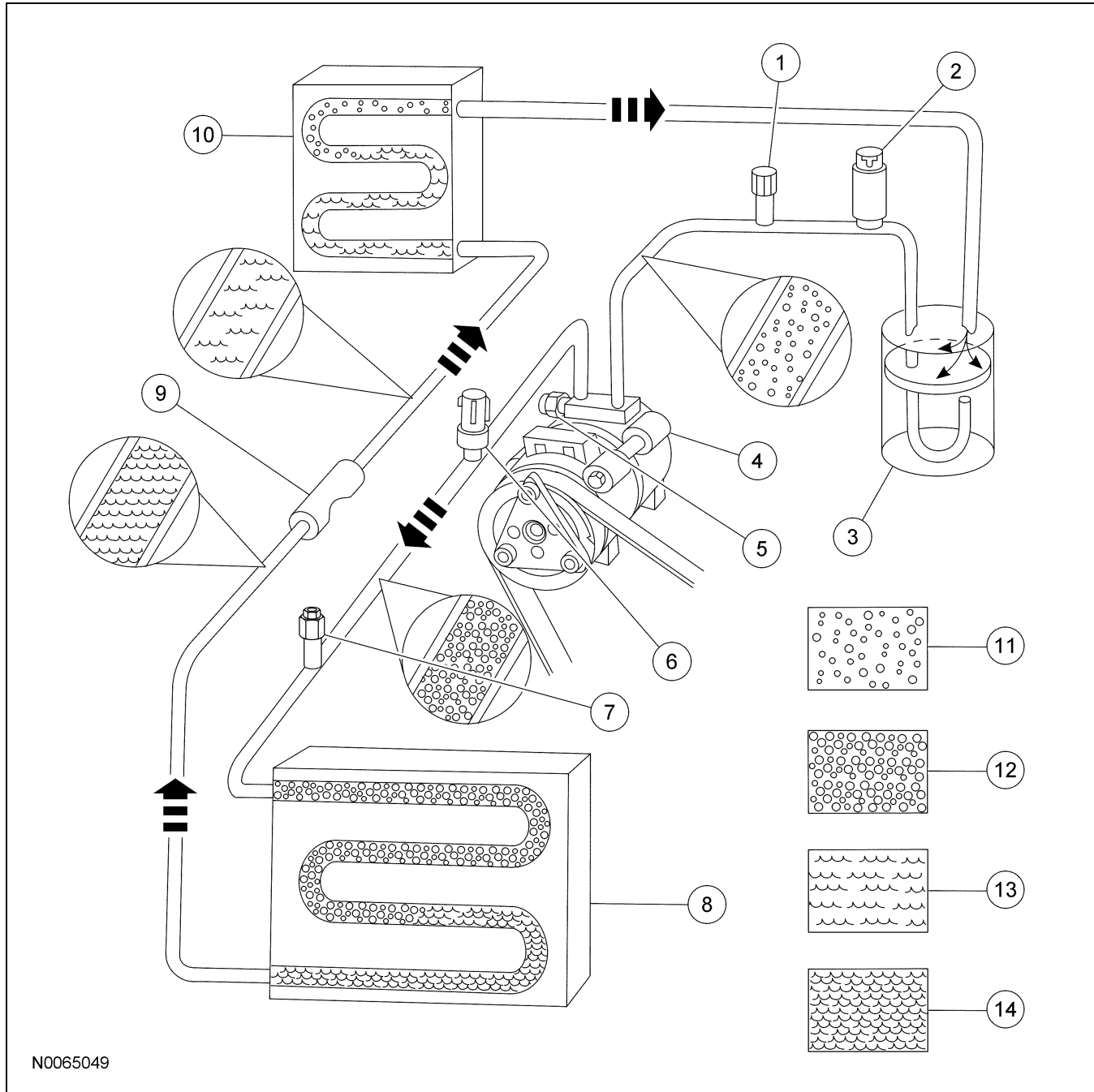
The A/C cycling switch interrupts compressor operation before the external temperature of the evaporator core gets low enough to cause the condensed water vapor (excess humidity) to turn to ice. It does this by monitoring low side line pressure. It is known that a refrigerant pressure of approximately 210 kPa (30 psi) will yield an operating temperature of 0°C (32°F). The A/C cycling switch controls system operation in an effort to maintain this temperature.

The high side line pressure is also monitored so that A/C compressor operation can be interrupted if system pressure becomes too high. When the A/C compressor discharge pressure rises, the A/C dual-function pressure switch contacts open (4.6L and 5.4L) or the A/C pressure transducer value changes (4.0L), disengaging the A/C compressor. When the pressure drops, operation of the A/C compressor resumes.

The A/C pressure relief valve will open and vent refrigerant to relieve unusually high system pressure.

DIAGNOSIS AND TESTING (Continued)

Clutch Cycling Orifice Tube Type Refrigerant System



N0065049

Item	Description
1	A/C charge valve port (low side)
2	A/C cycling switch
3	Suction accumulator
4	A/C compressor
5	A/C compressor pressure relief valve
6	A/C pressure transducer (4.0L)
6	A/C dual function pressure switch (4.6L and 5.4L)

Item	Description
7	A/C charge valve port (high side)
8	Condenser core
9	Evaporator core orifice tube
10	Evaporator core
11	Low-pressure vapor
12	High-pressure vapor
13	Low-pressure liquid
14	High-pressure liquid

DIAGNOSIS AND TESTING (Continued)**Inspection and Verification**

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> • Loose, missing or damaged A/C compressor drive belt • Loose or disconnected A/C clutch • Broken or binding door/actuator • Broken or leaking refrigerant lines 	<ul style="list-style-type: none"> • Smart Junction Box (SJB) fuse(s): <ul style="list-style-type: none"> — 3 (10A) — 14 (5A) — 19 (5A) — 10 (5A) — 12 (5A) • Bussed Electrical Center (BEC) fuse(s): <ul style="list-style-type: none"> — 2 (30A) — 47 (15A) — 49 (15A) • Blower motor inoperative • A/C compressor inoperative • Circuitry open/shorted • Disconnected electrical connectors • Cooling fan inoperative

3. As pinpoint tests and measurements are being carried out, be sure to inspect for any disconnected, loose-fitting or incorrectly installed components, module and in-line electrical connectors and pins.
4. If the inspection reveals obvious concern(s) that can be readily identified, repair as required.
5. **NOTE:** Make sure to use the latest scan tool software release.

If the cause is not visually evident, connect the scan tool to the Data Link Connector (DLC).

6. **NOTE:** The Vehicle Communication Module (VCM) LED prove-out confirms power and ground from the DLC are provided to the VCM.

If the scan tool does not communicate with the VCM:

- check the VCM connection to the vehicle.
- check the scan tool connection to the VCM.
- refer to Section 418-00, No Power To The Scan Tool, to diagnose no power to the scan tool.

7. If the scan tool does not communicate with the vehicle:
 - verify the ignition key is in the ON position.
 - verify the scan tool operation with a known good vehicle.
 - **NOTE:** The Smart Junction Box (SJB) may also be referred to as a Generic Electronic Module (GEM).
Refer to Section 418-00 to diagnose no response from the SJB or PCM.
8. Carry out the network test.
 - If the scan tool responds with no communication from one or more modules, refer to Section 418-00.
 - If the network test passes, retrieve and record the continuous memory DTCs.
9. **NOTE:** Some PCM DTCs may inhibit A/C operation. If any PCM DTCs are retrieved, diagnose those first. Refer to [Powertrain Control/Emissions Diagnosis \(PC/ED\) manual](#).
Clear the continuous DTCs and carry out the self-test diagnostics for the SJB or PCM.
10. If the SJB DTCs retrieved are related to the concern, refer to the Smart Junction Box (SJB) DTC Chart. If the PCM DTCs retrieved are related to the concern, refer to the PCM DTC Chart.
11. If no DTCs related to the concern are retrieved, GO to [Symptom Chart — Climate Control Systems](#) or GO to [Symptom Chart — NVH](#).

HVAC Module Cold Boot Process

The purpose of the cold boot process is to allow the HVAC module to reinitialize and calibrate the actuators. To carry out the cold boot process, follow the steps below.

1. Turn the ignition switch to the OFF position.
2. Disconnect the HVAC module electrical connectors.
3. Inspect the module connectors for:
 - corrosion.
 - pushed-out pins.
 - incorrectly seated connector.
4. Wait one minute.
5. Connect the HVAC module electrical connectors.

DIAGNOSIS AND TESTING (Continued)

6. Turn the ignition switch to the ON position.
7. Select any position except OFF on the HVAC module.

The HVAC module will now initialize and calibrate the actuators. Calibration of the actuators will take approximately 30 seconds.

Smart Junction Box (SJB) DTC Chart

DTC	Description	Action to Take
B2175	A/C Request Signal Circuit Short to Ground	GO to Pinpoint Test G.
All Other DTCs	—	REFER to the Master DTC Chart in Section 419-10.

PCM DTC Chart

DTC	Description	Action to Take
P0532	A/C Pressure Refrigerant Sensor A Circuit Low	GO to Pinpoint Test A.
P0533	A/C Refrigerant Pressure Sensor A Circuit High	GO to Pinpoint Test A.
P0645	Air Conditioning Clutch Relay (A/CCR) Control Circuit	GO to Pinpoint Test B.
P1464	A/C Demand Out Of Self Test Range	If the HVAC selector was not in the OFF position, place it in the OFF position, CLEAR the DTCs and REPEAT the self-test. If the DTC does not return, ignore the DTC and continue diagnostics. If the DTC returns, GO to Pinpoint Test H. ^a
All Other DTCs	—	REFER to Powertrain Control/Emissions Diagnosis (PC/ED) manual.

^a PCM DTC P1464 will set if the function selector is in PANEL with A/C button pressed, DEFROST or MAX A/C mode when the on-demand self-test is being run.

Symptom Chart — Climate Control Systems**Symptom Chart — Climate Control Systems**

NOTE: Some PCM DTCs may inhibit A/C operation. If any PCM DTCs are retrieved, diagnose those first. Refer to the PCM DTC Chart

Condition	Possible Sources	Action
<ul style="list-style-type: none"> • HVAC functions verification 	<ul style="list-style-type: none"> • HVAC system and/or related components 	<ul style="list-style-type: none"> • GO to Pinpoint Test K.
<ul style="list-style-type: none"> • The air inlet mode door is inoperative 	<ul style="list-style-type: none"> • Circuitry short/open • HVAC module • Air inlet mode door actuator/linkage 	<ul style="list-style-type: none"> • GO to Pinpoint Test C.
<ul style="list-style-type: none"> • Incorrect/erratic direction of airflow from outlet(s) 	<ul style="list-style-type: none"> • Circuitry • Door actuator • Mode door binding or stuck • HVAC module • Door actuator arm not connected to the door crank 	<ul style="list-style-type: none"> • GO to Pinpoint Test D.

DIAGNOSIS AND TESTING (Continued)**Symptom Chart — Climate Control Systems (Continued)**

Condition	Possible Sources	Action
<ul style="list-style-type: none"> Insufficient, erratic or no heat 	<ul style="list-style-type: none"> Low engine coolant level Engine overheating Plugged or partially plugged heater core Temperature blend door is binding or stuck Temperature blend door actuator Heater hose is kinked or binding 	<ul style="list-style-type: none"> GO to Pinpoint Test E.
<ul style="list-style-type: none"> The air conditioning (A/C) is inoperative 	<ul style="list-style-type: none"> Fuse Circuitry short/open A/C system discharged/low charge Dual-function pressure switch PCM Smart Junction Box (SJB) HVAC module A/C cycling switch A/C compressor clutch air gap A/C clutch relay 	<ul style="list-style-type: none"> GO to Pinpoint Test F.
<ul style="list-style-type: none"> The air conditioning (A/C) is always on — A/C compressor does not cycle 	<ul style="list-style-type: none"> Circuitry short PCM SJB A/C compressor clutch air gap A/C cycling switch A/C clutch relay 	<ul style="list-style-type: none"> GO to Pinpoint Test G.
<ul style="list-style-type: none"> The air conditioning (A/C) is always on — A/C mode always commanded ON 	<ul style="list-style-type: none"> Circuitry short PCM SJB 	<ul style="list-style-type: none"> GO to Pinpoint Test H.
<ul style="list-style-type: none"> Temperature control is inoperative/does not operate correctly 	<ul style="list-style-type: none"> Circuitry open/shorted HVAC module Temperature blend door Temperature blend door actuator 	<ul style="list-style-type: none"> GO to Pinpoint Test L.
<ul style="list-style-type: none"> The blower motor is inoperative 	<ul style="list-style-type: none"> Fuse(s) Circuitry open/shorted A/C blower motor switch Blower motor relay A/C blower motor 	<ul style="list-style-type: none"> GO to Pinpoint Test I.
<ul style="list-style-type: none"> The blower motor does not operate correctly 	<ul style="list-style-type: none"> Circuitry short A/C blower motor resistor A/C blower motor switch 	<ul style="list-style-type: none"> GO to Pinpoint Test J.
<ul style="list-style-type: none"> Reduced outlet airflow 	<ul style="list-style-type: none"> Circuitry short A/C compressor clutch air gap A/C cycling switch A/C clutch relay Blower motor Blower motor resistor Blower motor resistor PCM SJB 	<ul style="list-style-type: none"> If the A/C compressor does not cycle, GO to Pinpoint Test G. If the A/C compressor cycles normally, GO to Pinpoint Test J.

DIAGNOSIS AND TESTING (Continued)**Symptom Chart — Climate Control Systems (Continued)**

Condition	Possible Sources	Action
<ul style="list-style-type: none"> A/C pressure relief valve discharging 	<ul style="list-style-type: none"> High system pressure A/C pressure relief valve 	<ul style="list-style-type: none"> CHECK the high-side system pressure. If the pressure is below the A/C pressure relief valve open pressure, REPLACE the A/C pressure relief valve. If the system pressure is above the A/C pressure relief valve open pressure, REPAIR the system for a restriction.

Symptom Chart — NVH**Symptom Chart — NVH**

NOTE: NVH symptoms will be identified using the diagnostic tools that are available. For a list of these tools, an explanation of their uses and a glossary of common terms, refer to Section 100-04. Since it is possible any one of multiple systems may be the cause of a symptom, it may be necessary to use a process of elimination type of diagnostic approach to pinpoint the responsible system. If this is not the causal system for the symptom, refer back to Section 100-04 for the next likely system and continue diagnosis.

Condition	Possible Sources	Action
<ul style="list-style-type: none"> Noisy A/C compressor clutch 	<ul style="list-style-type: none"> A/C compressor clutch air gap out of specification 	<ul style="list-style-type: none"> CHECK and ADJUST the A/C compressor clutch gap if necessary. REFER to Air Conditioning (A/C) Clutch Air Gap Adjustment in this section. TEST the system for normal operation. If the A/C compressor clutch gap is OK, INSTALL an A/C compressor clutch. REFER to Section 412-01. TEST the system for normal operation.

Pinpoint Tests**Pinpoint Test A: DTC P0532 or P0533**

Refer to [Wiring Diagrams Cell 54, Manual Climate Control System](#) for schematic and connector information.

Normal Operation

Under normal operation, the A/C pressure transducer receives a ground from the PCM through circuit 359 (GY/RD). A 5-volt reference voltage is supplied to the A/C pressure transducer from the PCM through circuit 351 (BN/WH). The A/C pressure transducer sends a voltage to the PCM through circuit 439 (TN/RD) to indicate the A/C pressure.

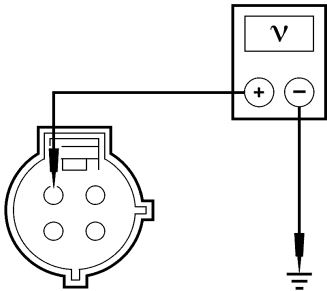
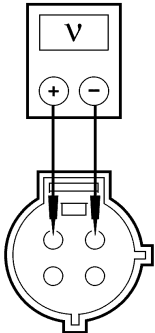
- DTC P0532 A/C Pressure Refrigerant Sensor A Circuit Low — The A/C pressure transducer inputs a voltage to the PCM. If the voltage is below the calibrated level, this DTC sets.
- DTC P0533 A/C Pressure Refrigerant Sensor A Circuit High — The A/C pressure transducer inputs a voltage to the PCM. If the voltage is above the calibrated level this DTC sets.

DIAGNOSIS AND TESTING (Continued)

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- A/C pressure transducer
- PCM

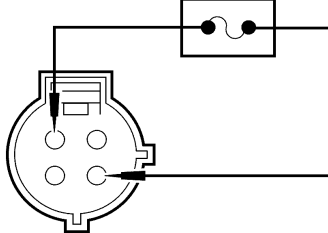
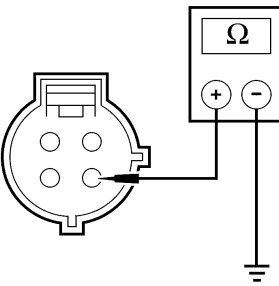
PINPOINT TEST A: DTC P0532 OR P0533

Test Step		Result / Action to Take
A1	<p>CHECK THE PCM OUTPUT VOLTAGE</p> <ul style="list-style-type: none"> • Ignition OFF. • Disconnect: A/C Pressure Transducer C1260. • Ignition ON. • Measure the voltage between ground and A/C pressure transducer C2160-2, circuit 351 (BN/WH), harness side.  <p>N0082573</p> <ul style="list-style-type: none"> • Is the voltage between 4.7 and 5.1 volts? 	<p>Yes GO to A2.</p> <p>No REPAIR circuit 351 (BN/WH) for an open. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p>
A2	<p>CHECK THE PCM SENSOR GROUND</p> <ul style="list-style-type: none"> • Measure the voltage between A/C pressure transducer C2160-1, circuit 359 (GY/RD), harness side and A/C pressure transducer C2160-2, circuit 351 (BN/WH), harness side.  <p>A0047632</p> <ul style="list-style-type: none"> • Is the voltage between 4.7 and 5.1 volts? 	<p>Yes If diagnosing DTC P0532, GO to A3. If diagnosing DTC P0533, GO to A5.</p> <p>No REPAIR circuit 359 (GY/RD) for an open. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p>
A3	<p>CHECK THE A/C PRESSURE TRANSDUCER HIGH</p> <ul style="list-style-type: none"> • Enter the following diagnostic mode on the scan tool: A/C Pressure (ACP_PRESS) PCM PID. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

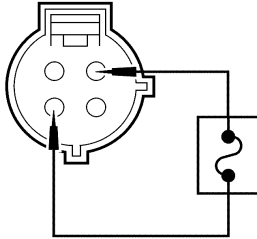
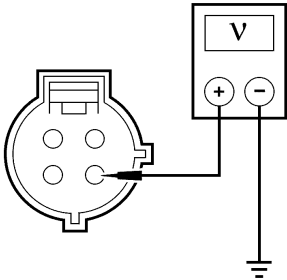
PINPOINT TEST A: DTC P0532 OR P0533 (Continued)

Test Step		Result / Action to Take
A3	<p>CHECK THE A/C PRESSURE TRANSDUCER HIGH (Continued)</p> <ul style="list-style-type: none"> While observing the ACP_PRESS PCM PID, connect a fused jumper between A/C pressure transducer C2160-3, circuit 439 (TN/RD), harness side and A/C pressure transducer C2160-2, circuit 351 (BN/WH), harness side.  <p>N0082574</p> <ul style="list-style-type: none"> Does the ACP_PRESS PCM PID voltage read greater than 4 volts? 	<p>Yes INSTALL a new A/C pressure transducer. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p> <p>No GO to A4.</p>
A4	<p>CHECK CIRCUIT 439 (TN/RD) FOR A SHORT TO GROUND</p> <ul style="list-style-type: none"> Ignition OFF. Disconnect: PCM C175b. Measure the resistance between ground and A/C pressure transducer C2160-3, circuit 439 (TN/RD), harness side.  <p>A0047688</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? 	<p>Yes GO to A7.</p> <p>No REPAIR circuit 439 (TN/RD) for a short to ground. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p>
A5	<p>CHECK THE A/C PRESSURE TRANSDUCER HIGH</p> <ul style="list-style-type: none"> Enter the following diagnostic mode on the scan tool: A/C Pressure (ACP_PRESS) PCM PID. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

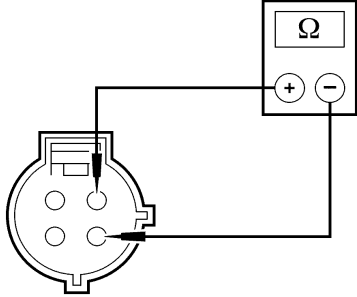
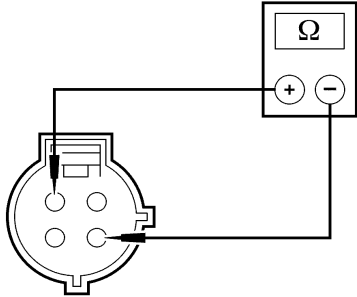
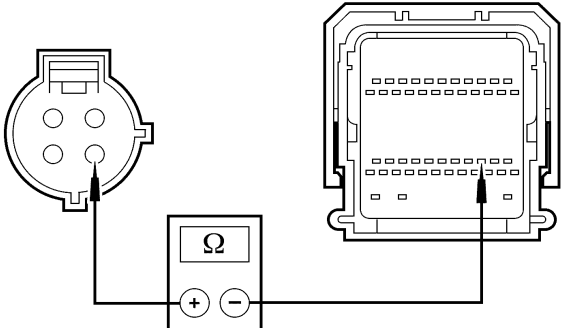
PINPOINT TEST A: DTC P0532 OR P0533 (Continued)

Test Step		Result / Action to Take
A5	<p>CHECK THE A/C PRESSURE TRANSDUCER HIGH (Continued)</p> <ul style="list-style-type: none"> While observing the ACP_PRESS PCM PID, connect a fused jumper between A/C pressure transducer C2160-3, circuit 439 (TN/RD), harness side and A/C pressure transducer C2160-1, circuit 359 (GY/RD), harness side.  <p>A0008126</p> <ul style="list-style-type: none"> Does the ACP_PRESS PCM PID voltage read less than 4.9 volts? 	<p>Yes INSTALL a new A/C pressure transducer. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p> <p>No GO to A6.</p>
A6	<p>CHECK CIRCUIT 439 (TN/RD) FOR A SHORT TO VOLTAGE</p> <ul style="list-style-type: none"> Ignition OFF. Disconnect: PCM C175b. Ignition ON. Measure the voltage between ground and A/C pressure transducer C2160-3, circuit 439 (TN/RD), harness side.  <p>A0047689</p> <ul style="list-style-type: none"> Is any voltage present? 	<p>Yes REPAIR circuit 439 (TN/RD) for a short to voltage. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p> <p>No GO to A7.</p>
A7	<p>CHECK CIRCUIT 439 (TN/RD) FOR A SHORT TO CIRCUIT 351 (BN/WH) OR 359 (GY/RD)</p> <ul style="list-style-type: none"> Ignition OFF. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST A: DTC P0532 OR P0533 (Continued)

Test Step	Result / Action to Take
<p>A7 CHECK CIRCUIT 439 (TN/RD) FOR A SHORT TO CIRCUIT 351 (BN/WH) OR 359 (GY/RD) (Continued)</p> <ul style="list-style-type: none"> NOTE: For DTC P0532 only. Measure the resistance between A/C pressure transducer C2160-3, circuit 439 (TN/RD), harness side and A/C pressure transducer C2160-1, circuit 359 (GY/RD), harness side.  <p>N0082575</p> <ul style="list-style-type: none"> NOTE: For DTC P0533 only. Measure the resistance between A/C pressure transducer C2160-3, circuit 439 (TN/RD), harness side and A/C pressure transducer C2160-2, circuit 351 (BN/WH), harness side.  <p>N0082576</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? 	<p>Yes GO to A8.</p> <p>No REPAIR circuit 439 (TN/RD) for a short to circuit 351 (BN/WH) or 359 (GY/RD). CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p>
<p>A8 CHECK CIRCUIT 439 (TN/RD) FOR AN OPEN</p> <ul style="list-style-type: none"> Measure the resistance between A/C pressure transducer C2160-3, circuit 439 (TN/RD), harness side and PCM C175b-26, circuit 439 (TN/RD), harness side.  <p>N0082577</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes GO to A9.</p> <p>No REPAIR circuit 439 (TN/RD) for an open. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p>

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST A: DTC P0532 OR P0533 (Continued)

Test Step		Result / Action to Take
A9	CHECK THE PCM MODULE CONNECTION	<p>Yes INSTALL a new PCM. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.</p>
	<ul style="list-style-type: none"> • Clear the DTCs. • Disconnect all the PCM connectors. • Check for: <ul style="list-style-type: none"> — corrosion. — pushed-out pins. — incorrectly seated connector. • Connect and correctly seat all the PCM connectors. • Operate the system. • Does the concern return? 	

Pinpoint Test B: DTC P0645 — Air Conditioning Clutch Relay (A/CCR) Control Circuit

Refer to [Wiring Diagrams Cell 54, Manual Climate Control System for schematic and connector information.](#)

Normal Operation

Under normal operation, voltage is provided to the A/C clutch relay coil from Bussed Electrical Center (BEC) fuse 47 (15A). When A/C is requested, and A/C line pressures allow, a ground is provided to the A/C clutch relay from the PCM through circuit 321 (GY/WH), energizing the A/C clutch relay.

- DTC P0645 — A/C Clutch Relay Control Circuit — The DTC sets when the PCM grounds the relay circuit and excessive current draw is detected on the relay circuit. The DTC also sets when the relay circuit is OFF and no voltage is detected on the relay circuit. The PCM expects to detect voltage coming through the relay coil to the relay circuit when it is not grounding it.

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- A/C clutch relay
- PCM

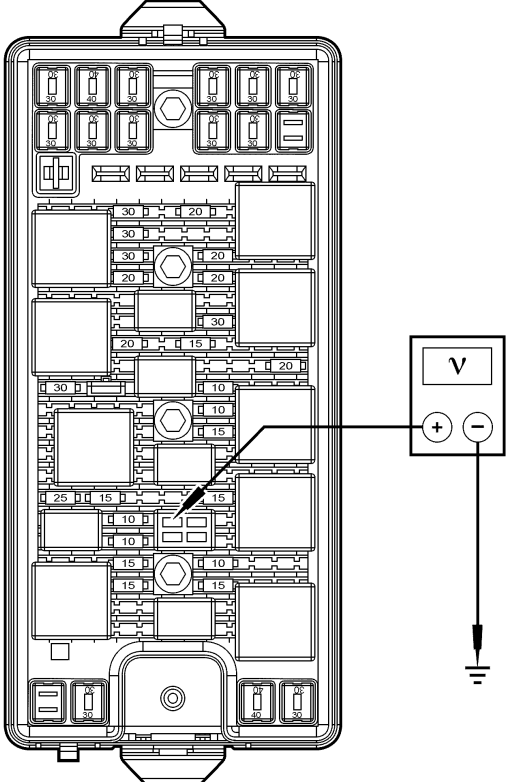
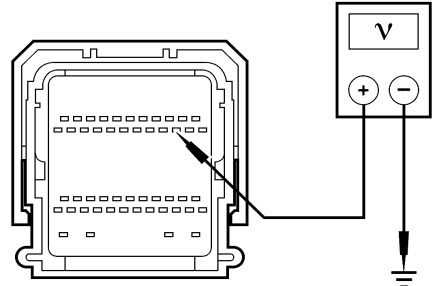
PINPOINT TEST B: DTC P0645 — AIR CONDITIONING CLUTCH RELAY (A/CCR) CONTROL CIRCUIT

Test Step		Result / Action to Take
B1	CHECK THE VOLTAGE TO THE A/C CLUTCH RELAY	
	<p>NOTICE: Use the Flex Probe Kit for all test connections to prevent damage to the wiring terminals. Do not use the test probe.</p> <ul style="list-style-type: none"> • Ignition OFF. • Disconnect: A/C Clutch Relay. • Ignition ON. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

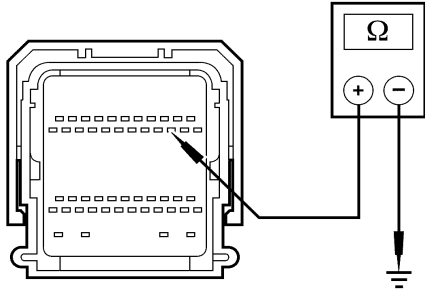
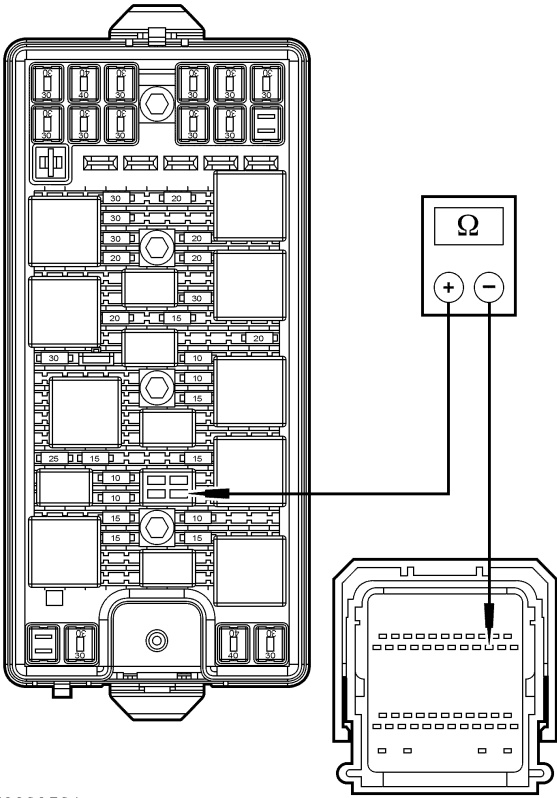
PINPOINT TEST B: DTC P0645 — AIR CONDITIONING CLUTCH RELAY (A/CCR) CONTROL CIRCUIT (Continued)

Test Step	Result / Action to Take
<p>B1 CHECK THE VOLTAGE TO THE A/C CLUTCH RELAY (Continued)</p> <ul style="list-style-type: none"> Measure the voltage between ground and the A/C clutch relay socket.  <p>N0082578</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? 	<p>Yes CARRY OUT the A/C clutch relay component test. REFER to Refer to Wiring Diagrams Cell 149 for component testing. If the relay tests OK, GO to B2.</p> <p>No VERIFY BEC fuse 47 (15A) is OK. If OK, INSTALL a new BEC. If not OK, refer to the Wiring Diagrams Manual to identify the possible causes of the circuit short. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p>
<p>B2 CHECK CIRCUIT 321 (GY/WH) FOR A SHORT TO VOLTAGE</p> <ul style="list-style-type: none"> Ignition OFF. Disconnect: PCM C175b. Ignition ON. Measure the voltage between ground and PCM C175b-14, circuit 321 (GY/WH), harness side.  <p>N0082579</p> <ul style="list-style-type: none"> Is any voltage present? 	<p>Yes REPAIR circuit 321 (GY/WH) for a short to voltage. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p> <p>No GO to B3.</p>

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST B: DTC P0645 — AIR CONDITIONING CLUTCH RELAY (A/CCR) CONTROL CIRCUIT (Continued)

Test Step	Result / Action to Take
<p>B3 CHECK CIRCUIT 321 (GY/WH) FOR A SHORT TO GROUND</p> <ul style="list-style-type: none"> Ignition OFF. Measure the resistance between ground and PCM C175b-14, circuit 321 (GY/WH), harness side.  <p>N0082580</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? 	<p>Yes GO to B4.</p> <p>No REPAIR circuit 321 (GY/WH) for a short to ground. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p>
<p>B4 CHECK CIRCUIT 321 (GY/WH) FOR AN OPEN</p> <p>NOTICE: Use the Flex Probe Kit for all test connections to prevent damage to the wiring terminals. Do not use the test probe.</p> <ul style="list-style-type: none"> Measure the resistance between A/C clutch relay socket, circuit 321 (GY/WH) and PCM C175b-14, circuit 321 (GY/WH), harness side.  <p>N0082581</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes GO to B5.</p> <p>No REPAIR circuit 321 (GY/WH) for an open. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p>

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST B: DTC P0645 — AIR CONDITIONING CLUTCH RELAY (A/CCR) CONTROL CIRCUIT (Continued)

Test Step		Result / Action to Take
B5	CHECK THE PCM MODULE CONNECTION	<p>Yes INSTALL a new PCM. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.</p>
	<ul style="list-style-type: none"> • Clear the DTCs. • Disconnect all the PCM connectors. • Check for: <ul style="list-style-type: none"> — corrosion. — pushed-out pins. — incorrectly seated connector. • Connect and correctly seat all the PCM connectors. • Operate the system. • Does the concern return? 	

Pinpoint Test C: The Air Inlet Mode Door is Inoperative

Refer to [Wiring Diagrams Cell 54, Manual Climate Control System](#) for schematic and connector information.

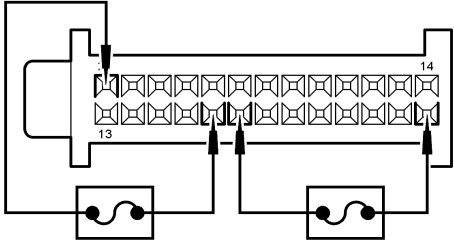
Normal Operation

Under normal operation, the air inlet mode door actuator motor is supplied voltage or ground on circuit 1116 (DG), depending on desired actuator rotation, by the HVAC module. The HVAC module then supplies the appropriate voltage or ground to the other side of the actuator motor on circuit 1117 (LG).

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Air inlet mode door actuator
- HVAC module
- Stuck or bound linkage or door

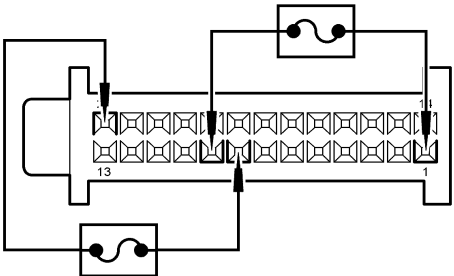
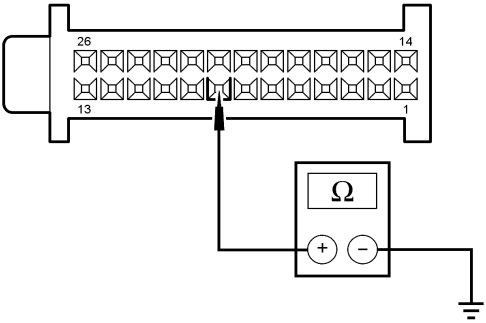
PINPOINT TEST C: THE AIR INLET MODE DOOR IS INOPERATIVE

Test Step		Result / Action to Take
C1	CHECK THE AIR INLET MODE DOOR ACTUATOR CLOCKWISE OPERATION	<p>Yes GO to C2.</p> <p>No GO to C3.</p>
	<ul style="list-style-type: none"> • Disconnect: HVAC Module C294a. • Remove the door actuator and disengage the actuator driveshaft from the actuator door. • Mark the door actuator driveshaft position. • Connect a fused jumper wire between: <ul style="list-style-type: none"> — HVAC module C294a-8, circuit 1116 (DG), harness side and C294a-1, circuit 1205 (BK), harness side. — HVAC module C294a-9, circuit 1117 (LG), harness side and C294a-26, circuit 1566 (RD/YE), harness side. <div style="text-align: center;">  </div> <p>A0072894</p> <ul style="list-style-type: none"> • Does the actuator motor move in the clockwise direction? 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

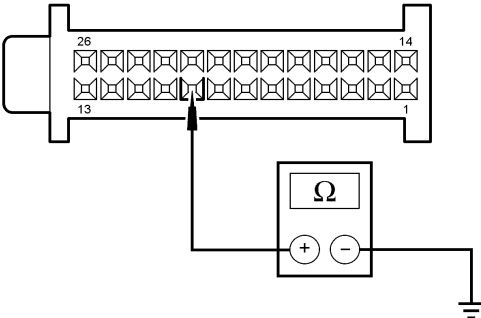
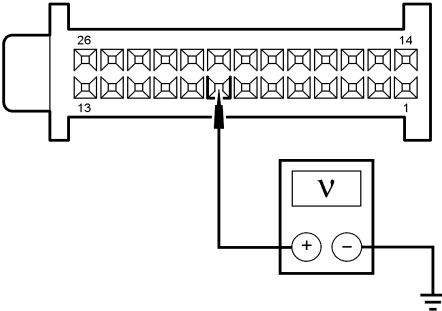
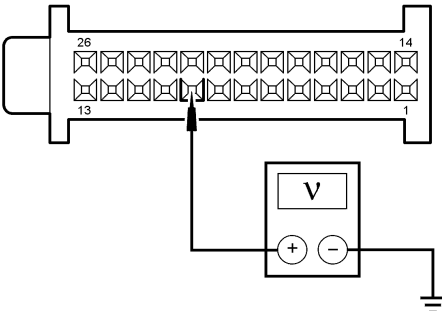
PINPOINT TEST C: THE AIR INLET MODE DOOR IS INOPERATIVE (Continued)

	Test Step	Result / Action to Take
C2	<p>CHECK THE AIR INLET MODE DOOR ACTUATOR COUNTERCLOCKWISE OPERATION</p>	
	<ul style="list-style-type: none"> • Connect a fused jumper wire between: <ul style="list-style-type: none"> — HVAC module C294a-8, circuit 1116 (DG), harness side and C294a-26, circuit 1566 (RD/YE), harness side. — HVAC module C294a-9, circuit 1117 (LG), harness side and C294a-1, circuit 1205 (BK), harness side.  <p>A0072895</p> <ul style="list-style-type: none"> • Does the actuator motor move in the counterclockwise direction? 	<p>Yes INSPECT for binding or broken door and linkage. If no condition is found, GO to C9.</p> <p>No GO to C3.</p>
C3	<p>CHECK CIRCUIT 1116 (DG) FOR A SHORT TO GROUND</p>	
	<ul style="list-style-type: none"> • Disconnect: Air Inlet Mode Door Actuator C2325. • Measure the resistance between ground and HVAC module C294a-8, circuit 1116 (DG), harness side.  <p>A0072896</p> <ul style="list-style-type: none"> • Is the resistance greater than 10,000 ohms? 	<p>Yes GO to C4.</p> <p>No REPAIR circuit 1116 (DG) for a short to ground. TEST the system for normal operation.</p>

(Continued)

DIAGNOSIS AND TESTING (Continued)

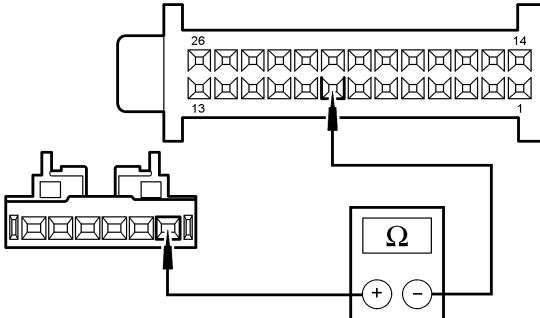
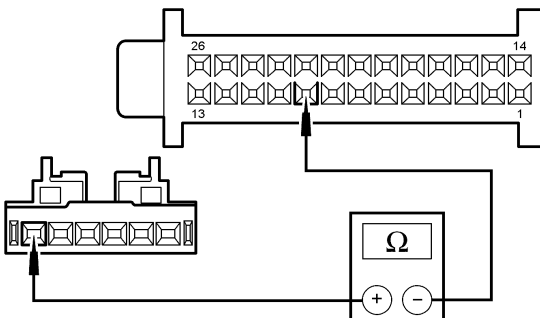
PINPOINT TEST C: THE AIR INLET MODE DOOR IS INOPERATIVE (Continued)

Test Step	Result / Action to Take
<p>C4 CHECK CIRCUIT 1117 (LG) FOR A SHORT TO GROUND</p> <ul style="list-style-type: none"> Measure the resistance between ground and HVAC module C294a-9, circuit 1117 (LG), harness side.  <p>A0072897</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? 	<p>Yes GO to C5.</p> <p>No REPAIR circuit 1117 (LG) for a short to ground. TEST the system for normal operation.</p>
<p>C5 CHECK CIRCUIT 1116 (DG) FOR A SHORT TO VOLTAGE</p> <ul style="list-style-type: none"> Ignition ON. Measure the voltage between ground and HVAC module C294a-8, circuit 1116 (DG), harness side.  <p>A0072898</p> <ul style="list-style-type: none"> Is any voltage present? 	<p>Yes REPAIR circuit 1116 (DG) for a short to voltage. TEST the system for normal operation.</p> <p>No GO to C6.</p>
<p>C6 CHECK CIRCUIT 1117 (LG) FOR A SHORT TO VOLTAGE</p> <ul style="list-style-type: none"> Measure the voltage between ground and HVAC module C294a-9, circuit 1117 (LG), harness side.  <p>A0072899</p> <ul style="list-style-type: none"> Is any voltage present? 	<p>Yes REPAIR circuit 1117 (LG) for a short to voltage. TEST the system for normal operation.</p> <p>No GO to C7.</p>
<p>C7 CHECK CIRCUIT 1116 (DG) FOR AN OPEN</p> <ul style="list-style-type: none"> Ignition OFF. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST C: THE AIR INLET MODE DOOR IS INOPERATIVE (Continued)

	Test Step	Result / Action to Take
C7	<p>CHECK CIRCUIT 1116 (DG) FOR AN OPEN (Continued)</p> <ul style="list-style-type: none"> Measure the resistance between HVAC module C294a-8, circuit 1116 (DG), harness side and air inlet mode door actuator C2325-1, circuit 1116 (DG), harness side.  <p>A0072900</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes GO to C8.</p> <p>No REPAIR circuit 1116 (DG) for an open. TEST the system for normal operation.</p>
C8	<p>CHECK CIRCUIT 1117 (LG) FOR AN OPEN</p> <ul style="list-style-type: none"> Measure the resistance between HVAC module C294a-9, circuit 1117 (LG), harness side and air inlet mode door actuator C2325-6, circuit 1117 (LG), harness side.  <p>A0072901</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes INSPECT for binding or broken linkage. If no condition is found, INSTALL a new air inlet mode door actuator. TEST the system for normal operation.</p> <p>No REPAIR circuit 1117 (LG) for an open. TEST the system for normal operation.</p>
C9	<p>CHECK THE MODULE CONNECTION</p> <ul style="list-style-type: none"> Carry out the HVAC Module Cold Boot Process. Operate the system. Does the concern return? 	<p>Yes INSTALL a new HVAC module. REFER to Section 412-01. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. TEST the system for normal operation.</p>

Pinpoint Test D: Incorrect/Erratic Direction of Airflow From Outlet(s)

Refer to [Wiring Diagrams Cell 54](#), Manual Climate Control System for schematic and connector information.

DIAGNOSIS AND TESTING (Continued)

Normal Operation

Under normal operation, to rotate the mode door actuator clockwise, the HVAC module supplies voltage to the DEFROST and FLOOR/PANEL mode door actuator motors through the door actuator feed B circuits, and supplies ground through the door actuator feed A circuits. To rotate the mode door actuator counterclockwise, the HVAC module reverses the voltage and ground circuits.

The mode door actuator feedback resistors are supplied a ground from the HVAC module by the mode door actuator return circuits and a 5-volt reference voltage on the mode door actuator reference circuits. The HVAC module reads the voltage on the mode door actuator feedback circuits to determine the mode door actuator position by the position of the actuator feedback resistor wiper arm.

Door actuator feed B circuits

- Defrost — 1137 (YE/LG)
- Floor/Panel — 1129 (BN/WH)

Door actuator feed A circuits

- Defrost — 1136 (RD/WH)
- Floor/Panel — 1128 (GY/LB)

Door actuator return circuits

- Defrost — 438 (RD/WH)
- Floor/Panel — 438 (RD/WH)

Door actuator reference circuits

- Defrost — 436 (RD/LG)
- Floor/Panel — 436 (RD/LG)

Door actuator feedback circuits

- Defrost — 1982 (LB/BK)
- Floor/Panel — 435 (YE/LB)

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- HVAC module
- Stuck or bound linkage or door

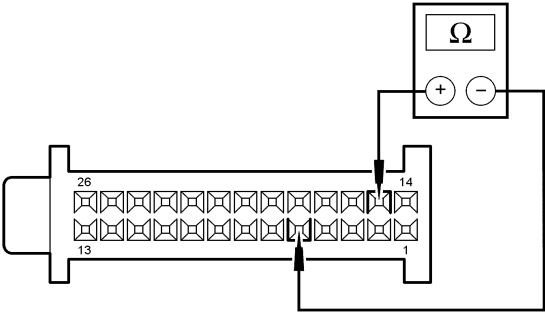
PINPOINT TEST D: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S)

Test Step		Result / Action to Take
D1	<p>CHECK THE AIRFLOW</p> <ul style="list-style-type: none"> • Ignition ON. • Check the airflow in the PANEL, DEFROST and FLOOR modes. • Is the airflow correct in each setting? 	<p>Yes The system is operating normally.</p> <p>No If the RECIRC button does not change the air inlet door position, GO to Pinpoint Test C. GO to D2.</p>
D2	<p>CHECK THE FEEDBACK POTENTIOMETER TOTAL RESISTANCE</p> <p>NOTICE: Use the correct size flex probe from the Flex Probe Kit for all test connections. The use of the correct size flex probe is critical to avoid damage to the connector terminals.</p> <p>NOTE: Check all electrical connectors for proper seating before disconnecting. If incorrectly seated, reseal and lock the connector. Test the system operation. If the condition remains, continue with this test.</p> <ul style="list-style-type: none"> • Disconnect: HVAC Module C294a. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

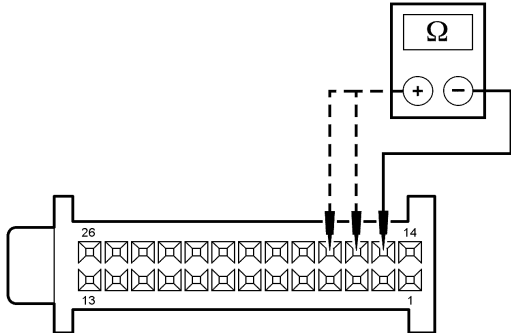
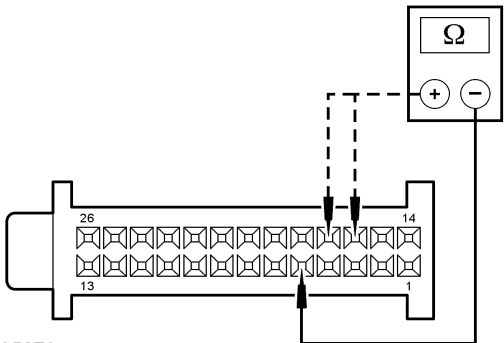
PINPOINT TEST D: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S) (Continued)

Test Step		Result / Action to Take
D2	<p>CHECK THE FEEDBACK POTENTIOMETER TOTAL RESISTANCE (Continued)</p> <ul style="list-style-type: none"> Measure the resistance between HVAC module C294a-5, circuit 436 (RD/LG) and HVAC module C294a-15, circuit 438 (RD/WH).  <p>A0072902</p> <ul style="list-style-type: none"> Is the resistance greater than 500 ohms? 	<p>Yes If the airflow is from the floor only or panel only in any mode except OFF and DEFROST and airflow is from defrost only on DEFROST mode, follow diagnostics for floor/panel mode door actuator. GO to D3.</p> <p>If the airflow is from the defrost only in all modes except OFF or from FLOOR/PANEL in DEFROST mode, follow diagnostics for defrost mode door actuator. GO to D3.</p> <p>No REPAIR circuits 436 (RD/LG) and 438 (RD/WH) for a short together. TEST the system for normal operation.</p>

(Continued)

DIAGNOSIS AND TESTING (Continued)

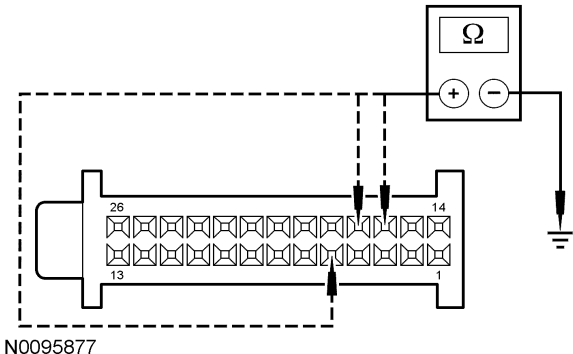
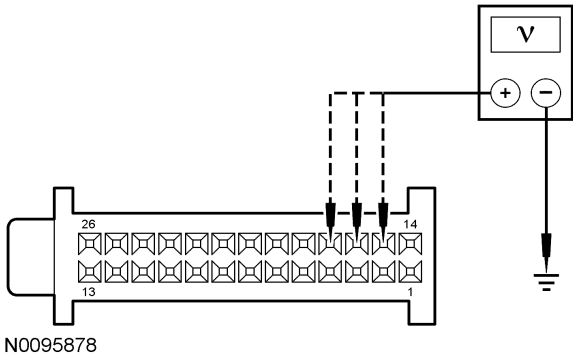
PINPOINT TEST D: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S) (Continued)

Test Step	Result / Action to Take
<p>D3 CHECK THE POTENTIOMETER LOW- AND HIGH-SIDE RESISTANCE</p>	
<ul style="list-style-type: none"> • Measure the low-side resistance between HVAC module C294a-15, circuit 438 (RD/WH) and the following: <ul style="list-style-type: none"> — For floor/panel mode door actuator: HVAC module C294a-16, circuit 435 (YE/LB). — For defrost mode door actuator: HVAC module C294a-17, circuit 1982 (LB/BK).  <p>N0095875</p> <ul style="list-style-type: none"> • Measure the high-side resistance between HVAC module C294a-5, circuit 436 (RD/LG) and the following: <ul style="list-style-type: none"> — For floor/panel mode door actuator: HVAC module C294a-16, circuit 435 (YE/LB). — For defrost mode door actuator: HVAC module C294a-17, circuit 1982 (LB/BK).  <p>N0095876</p> <ul style="list-style-type: none"> • Is the resistance between 225 and 11,275 ohms? 	<p>Yes GO to D4.</p> <p>No CARRY OUT the Floor/Panel Mode Door Actuator or Defrost Mode Door Actuator Component Test in this section. If the actuator tests OK and:</p> <p>If the low-side resistance only is greater than 11,275 ohms, REPAIR circuit 438 (RD/WH) for an open. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p> <p>If the low-side resistance only is less than 225 ohms, REPAIR circuits (floor/panel) 435 (YE/LB) or (defrost) 1982 (LB/BK) and 438 (RD/WH) for a short together. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p> <p>If the high-side resistance only is greater than 11,275 ohms, REPAIR circuit 436 (RD/LG) for an open. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p> <p>If the high-side resistance only is less than 225 ohms, REPAIR circuits (floor/panel) 435 (YE/LB) or (defrost) 1982 (LB/BK) and 436 (RD/LG) for a short together. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p> <p>If the high-side and low-side resistance is greater than 11,275 ohms, REPAIR circuit (floor/panel) 435 (YE/LB) or (defrost) 1982 (LB/BK) for an open. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p>

(Continued)

DIAGNOSIS AND TESTING (Continued)

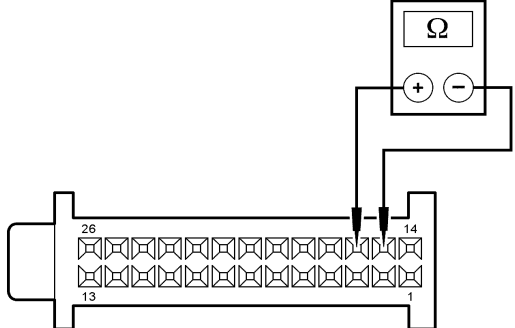
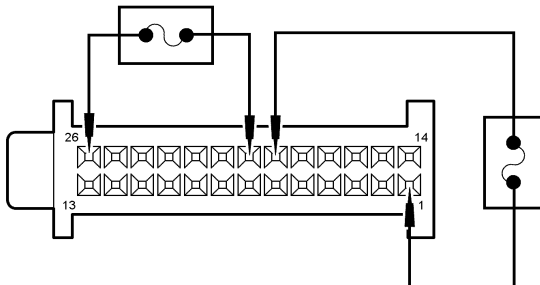
PINPOINT TEST D: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S) (Continued)

	Test Step	Result / Action to Take
D4	<p>CHECK CIRCUITS 436 (RD/LG), 435 (YE/LB) OR 1982 (LB/BK) FOR A SHORT TO GROUND</p> <ul style="list-style-type: none"> Measure the resistance between ground and the following: <ul style="list-style-type: none"> — HVAC module C294a-5, circuit 436 (RD/LG). — For floor/panel door actuator: HVAC module C294a-16, circuit 435 (YE/LB). — For defrost door actuator: HVAC module C294a-17, circuit 1982 (LB/BK).  <p>N0095877</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? 	<p>Yes GO to D5.</p> <p>No REPAIR circuit(s) for a short to ground. TEST the system for normal operation.</p>
D5	<p>CHECK CIRCUITS 438 (RD/WH), 435 (YE/LB) OR 1982 (LB/BK) FOR A SHORT TO POWER</p> <ul style="list-style-type: none"> Ignition ON. Measure the voltage between ground and the following: <ul style="list-style-type: none"> — HVAC module C294a-15, circuit 438 (RD/WH). — For floor/panel door actuator: HVAC module C294a-16, circuit 435 (YE/LB). — For defrost door actuator: HVAC module C294a-17, circuit 1982 (LB/BK).  <p>N0095878</p> <ul style="list-style-type: none"> Is any voltage present? 	<p>Yes REPAIR circuit(s) for a short to power. TEST the system for normal operation.</p> <p>No For floor/panel mode door actuator: GO to D6. For defrost mode door actuator: GO to D7.</p>
D6	<p>CHECK THE FLOOR/PANEL MODE DOOR ACTUATOR OPERATION</p> <p>NOTE: If a jumper fuse opens while carrying out this test step, repair the circuit(s) for a short.</p>	

(Continued)

DIAGNOSIS AND TESTING (Continued)

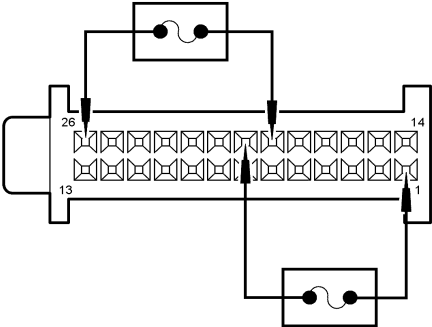
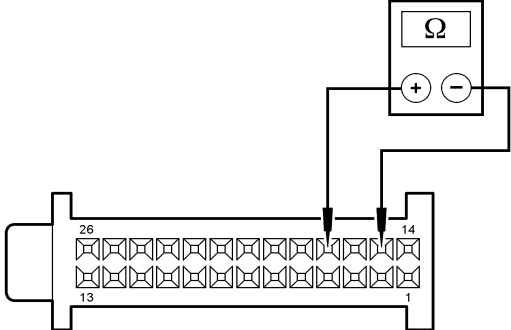
PINPOINT TEST D: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S) (Continued)

	Test Step	Result / Action to Take
D6	<p>CHECK THE FLOOR/PANEL MODE DOOR ACTUATOR OPERATION (Continued)</p>	
	<ul style="list-style-type: none"> Measure the low-side resistance between HVAC module C294a-15, circuit 438 (RD/WH) and HVAC module C294a-16, circuit 435 (YE/LB).  <p>N0095879</p> <ul style="list-style-type: none"> For no more than 3 seconds, connect a fused jumper wire between: <ul style="list-style-type: none"> — HVAC module C294a-26, circuit 1566 (RD/YE) and HVAC module C294a-20, circuit 1129 (BN/WH). — HVAC module C294a-1, circuit 1205 (BK) and HVAC module C294a-19, circuit 1128 (GY/LB).  <p>N0095880</p> <ul style="list-style-type: none"> Remove the fused jumpers. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

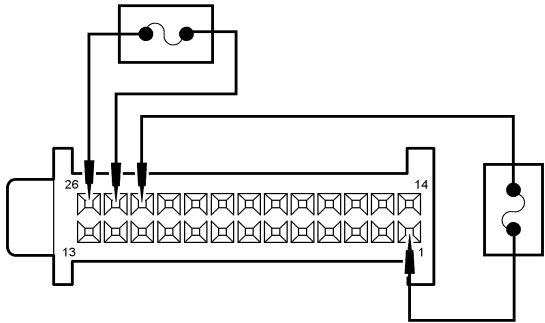
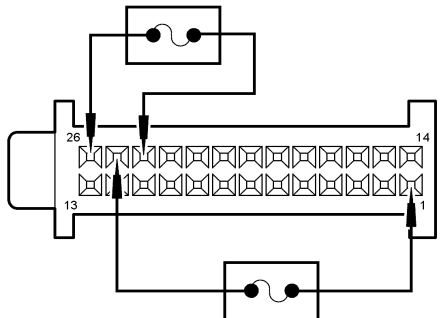
PINPOINT TEST D: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S) (Continued)

	Test Step	Result / Action to Take
D6	<p>CHECK THE FLOOR/PANEL MODE DOOR ACTUATOR OPERATION (Continued)</p>	
	<ul style="list-style-type: none"> For no more than 3 seconds, connect a fused jumper wire between: <ul style="list-style-type: none"> HVAC module C294a-1, circuit 1205 (BK) and HVAC module C294a-20, circuit 1129 (BN/WH). HVAC module C294a-26, circuit 1566 (RD/YE) and HVAC module C294a-19, circuit 1128 (GY/LB).  <p>N0095881</p> <ul style="list-style-type: none"> Does the resistance smoothly increase and/or decrease when the jumpers are connected? 	<p>Yes INSPECT for broken door and linkage. REPAIR as necessary. If no condition is found, GO to D9.</p> <p>No GO to D8.</p>
D7	<p>CHECK THE DEFROST MODE DOOR ACTUATOR OPERATION</p>	
	<ul style="list-style-type: none"> Measure the low-side resistance between HVAC module C294a-15, circuit 438 (RD/WH) and HVAC module C294a-17, circuit 1982 (LB/BK).  <p>N0095882</p>	

(Continued)

DIAGNOSIS AND TESTING (Continued)

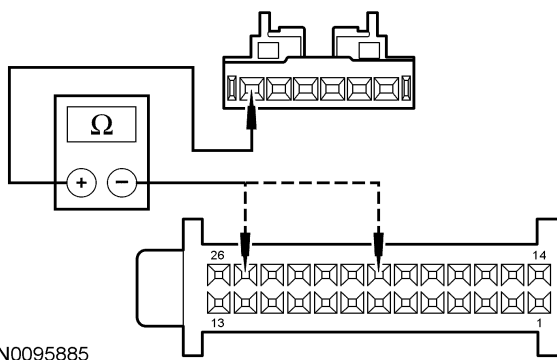
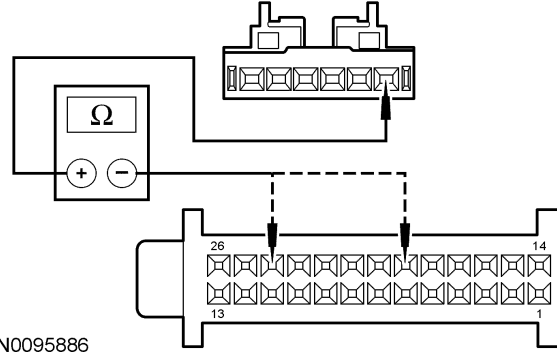
PINPOINT TEST D: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S) (Continued)

	Test Step	Result / Action to Take
<p>D7</p>	<p>CHECK THE DEFROST MODE DOOR ACTUATOR OPERATION (Continued)</p> <ul style="list-style-type: none"> For no more than 3 seconds, connect a fused jumper wire between: <ul style="list-style-type: none"> HVAC module C294a-26, circuit 1566 (RD/YE) and HVAC module C294a-25, circuit 1137 (YE/LG). HVAC module C294a-1, circuit 1205 (BK) and HVAC module C294a-24, circuit 1136 (RD/WH).  <p>N0095883</p> <ul style="list-style-type: none"> For no more than 3 seconds, connect a fused jumper wire between: <ul style="list-style-type: none"> HVAC module C294a-1, circuit 1205 (BK) and HVAC module C294a-25, circuit 1137 (YE/LG). HVAC module C294a-26, circuit 1566 (RD/YE) and HVAC module C294a-24, circuit 1136 (RD/WH).  <p>N0095884</p> <ul style="list-style-type: none"> Does the resistance smoothly increase and/or decrease when the jumpers are connected? 	<p>Yes INSPECT for broken door and linkage. REPAIR as necessary. If no condition is found, GO to D9.</p> <p>No GO to D8.</p>
<p>D8</p>	<p>CHECK THE ACTUATOR MOTOR DRIVE CIRCUITS FOR AN OPEN</p> <p>NOTE: Due to limited connector accessibility, before carrying out this test step, visually inspect the wiring between the HVAC module and actuator for opens or shorts. If no damage is visually evident, proceed with the test.</p> <ul style="list-style-type: none"> Ignition OFF. Disconnect: Floor/Panel Door Actuator C234 or Defrost Door Actuator C232. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST D: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S) (Continued)

	Test Step	Result / Action to Take
D8	<p>CHECK THE ACTUATOR MOTOR DRIVE CIRCUITS FOR AN OPEN (Continued)</p> <ul style="list-style-type: none"> Measure the resistance between: <ul style="list-style-type: none"> For floor/panel door actuator: HVAC module C294a-20, circuit 1129 (BN/WH) and floor/panel door actuator C234-6, circuit 1129 (BN/WH). For defrost door actuator: HVAC module C294a-25, circuit 1137 (YE/LG) and defrost door actuator C232-6, circuit 1997 (BN/YE).  <p>N0095885</p> <ul style="list-style-type: none"> Measure the resistance between: <ul style="list-style-type: none"> For floor/panel door actuator: HVAC module C294a-19, circuit 1128 (GY/LB) and floor/panel door actuator C234-1, circuit 1128 (GY/LB). For defrost door actuator: HVAC module C294a-24, circuit 1136 (RD/WH) and defrost door actuator C232-1, circuit 1136 (RD/WH).  <p>N0095886</p> <ul style="list-style-type: none"> Are the resistances less than 5 ohms? 	<p>Yes INSPECT for binding or broken linkage. REPAIR as necessary. If no condition is found, INSTALL a new door actuator. TEST the system for normal operation.</p> <p>No REPAIR the circuit(s) for an open. TEST the system for normal operation.</p>
D9	<p>MODULE ACTUATOR POSITION CALIBRATION</p> <p>NOTE: The purpose of the module actuator position calibration is to allow the HVAC module to reinitialize and calibrate the actuator stop points. To carry out the calibration, follow the steps below.</p> <ul style="list-style-type: none"> Ignition OFF. Inspect the module connectors for: <ul style="list-style-type: none"> corrosion. pushed-out terminals. damaged terminals. Connect: EMTC Module C294a. Ignition ON. Select any position except OFF. NOTE: The HVAC module will now initialize and calibrate the actuators. Calibration of the actuators will take approximately 30 seconds. Operate the system. Does the concern return? 	<p>Yes INSTALL a new HVAC module. REFER to Section 412-01. TEST the system for normal operation.</p> <p>No The system is now operating correctly. The concern may have been caused by a foreign object in the HVAC case or temporary binding that restricted actuator door travel. CHECK any actuator external linkage. If condition recurs, INSPECT actuator linkage and door for binding and CHECK HVAC case for foreign objects.</p>

DIAGNOSIS AND TESTING (Continued)

Pinpoint Test E: Insufficient, Erratic or No Heat

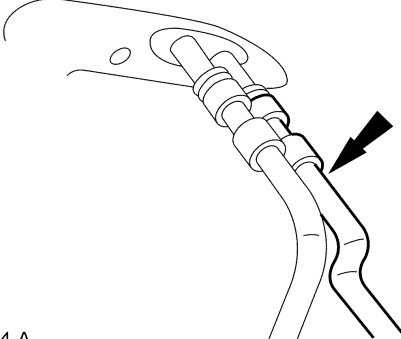
Normal Operation

Under normal operation, warm coolant flows from the engine through the heater core and back to the engine.

This pinpoint test is intended to diagnose the following:

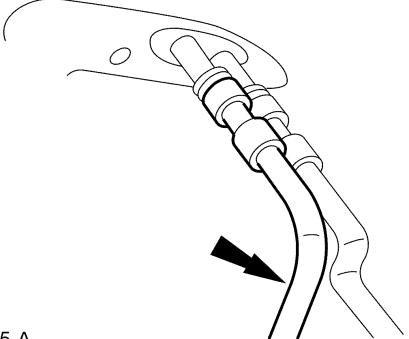
- Plugged heater core
- Coolant level
- Temperature blend door

PINPOINT TEST E: INSUFFICIENT, ERRATIC OR NO HEAT

Test Step		Result / Action to Take
E1	CHECK FOR CORRECT ENGINE COOLANT LEVEL	Yes GO to E3 . No GO to E2 .
	<ul style="list-style-type: none"> • Ignition OFF. • Check the engine coolant level when hot and cold. • Is the engine coolant at the correct level (hot/cold) as indicated on the engine coolant recovery reservoir? 	
E2	CHECK THE ENGINE COOLING SYSTEM FOR LEAKS	Yes REPAIR the engine coolant leak. TEST the system for normal operation. No GO to E3 .
	<ul style="list-style-type: none"> • Pressure test the cooling system for leaks. Refer to Section 303-03A. • Does the engine cooling system leak? 	
E3	CHECK FOR COOLANT FLOW TO THE HEATER CORE	Yes GO to E4 . No REFER to Section 303-03A to check cooling system function.
	<ul style="list-style-type: none"> • Ignition ON. • Run the engine until it reaches normal operating temperature. Select the FLOOR position on the control assembly. Set the temperature control to full warm. • Using a suitable temperature measuring device, check the heater core inlet hose to see if it is hot. <div style="text-align: center;">  </div> <p>GL1024-A</p> <ul style="list-style-type: none"> • Is the heater core inlet hose hot? 	

(Continued)

DIAGNOSIS AND TESTING (Continued)**PINPOINT TEST E: INSUFFICIENT, ERRATIC OR NO HEAT (Continued)**

Test Step		Result / Action to Take
E4	CHECK FOR A PLUGGED OR RESTRICTED HEATER CORE	
	<ul style="list-style-type: none"> Using a suitable temperature measuring device, measure the heater core outlet hose temperature.  <p>GL1025-A</p> <ul style="list-style-type: none"> Is the heater core outlet hose temperature similar to the inlet hose temperature (within approximately 6-17°C [10-30°F])? 	<p>Yes GO to Pinpoint Test D and diagnose for a blend door actuator.</p> <p>No INSTALL a new heater core. TEST the system for normal operation.</p>

Pinpoint Test F: The Air Conditioning (A/C) Is Inoperative

Refer to [Wiring Diagrams Cell 54, Manual Climate Control System](#) for schematic and connector information.

Normal Operation

Under normal operation, when A/C is requested, a ground signal is sent from the HVAC module to the Smart Junction Box (SJB) through circuit 1397 (GY/RD). The SJB then transmits an A/C request message through the High Speed Controller Area Network (HS-CAN) bus to the PCM.

4.0L only

Voltage is provided to the A/C cycling switch through circuit 391 (RD/YE). If the A/C cycling switch is closed (sufficient pressure) voltage is sent from the A/C cycling switch to the PCM (4.0L) through circuit 198 (DG/OG)/420 (DB/YE). When the PCM receives voltage from the pressure switch and the A/C pressure transducer does not indicate excessive pressure, the PCM provides a ground for the A/C clutch relay through circuit 321 (GY/WH).

4.6L and 5.4L only

Voltage is provided to the A/C cycling switch through circuit 391 (RD/YE). If the A/C cycling switch is closed (sufficient pressure) voltage is sent from the A/C cycling switch to the dual-function pressure switch (4.6L and 5.4L) through circuit 198 (DG/OG). If the dual-function pressure switch (4.6L and 5.4L) is closed (pressure not excessive), voltage is sent to the PCM through circuit 420 (DB/YE). When the PCM receives voltage from the pressure switches, the PCM provides a ground for the A/C clutch relay through circuit 321 (GY/WH).

When the relay is activated, ignition voltage is supplied to the A/C clutch solenoid through circuit 883 (PK/LB). Ground is supplied for the A/C clutch through circuit 1205 (BK).

This pinpoint test is intended to diagnose the following:

- Fuse
- Wiring, terminals or connectors
- PCM
- HVAC module
- A/C cycling switch
- Dual-function pressure switch
- A/C compressor clutch field coil
- A/C control relay
- A/C clutch air gap

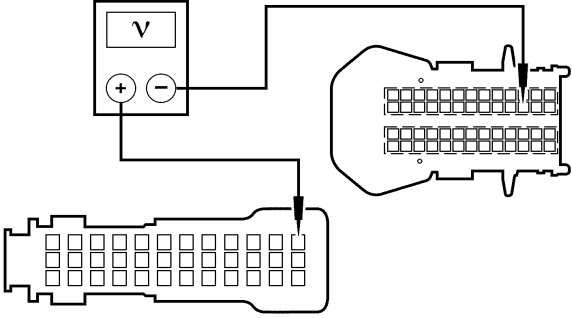
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST F: THE AIR CONDITIONING (A/C) IS INOPERATIVE

NOTICE: It is important to install relays in their correct position in the Bussed Electrical Center (BEC). Installing a relay incorrectly may cause wiring shorts or damage to modules. While carrying out diagnostics on BEC relays, have only one BEC relay removed at a time. Failure to follow these instructions may result in damage to the vehicle circuitry or to control modules.

NOTE: Some PCM DTCs may inhibit A/C operation. If any PCM DTCs are retrieved, diagnose those first. Refer to the PCM DTC Chart.

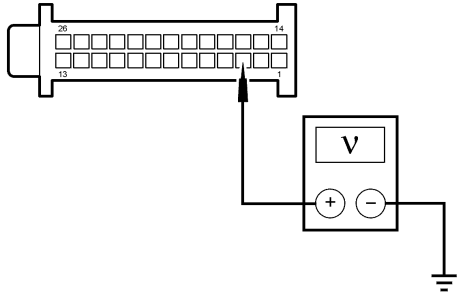
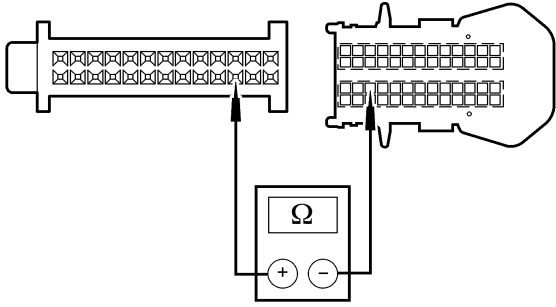
NOTE: Before carrying out the following test, check that the A/C system pressure is above 290 kPa (42 psi). If the pressure is below 290 kPa (42 psi), refer to Fluorescent Dye Leak Detection in this section.

	Test Step	Result / Action to Take
F1	CHECK THE AIR CONDITIONING REQUEST SIGNAL (AC_REQST) GEM PID	
	<ul style="list-style-type: none"> • Ignition ON. • Enter the following diagnostic mode on the scan tool: AC_REQST GEM PID. • With the engine running, select PANEL mode and press the A/C button on the HVAC module. • Does the AC_REQST GEM PID read ON? 	<p>Yes GO to F5.</p> <p>No GO to F2.</p>
F2	CHECK THE A/C SIGNAL WITH THE A/C ON <ul style="list-style-type: none"> • Ignition OFF. • Disconnect: SJB C2280b. • Disconnect: SJB C2280a. • Ignition ON. • Select PANEL mode and press the A/C button on the HVAC module. • Measure the voltage between SJB C2280b-29, circuit 1397 (GY/RD), harness side and SJB C2280a-36, circuit 1044 (WH/YE), harness side. <div style="text-align: center;">  <p>N0075870</p> </div> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? 	<p>Yes GO to F18.</p> <p>No GO to F3.</p>
F3	CHECK CIRCUIT 1397 (GY/RD) FOR A SHORT TO VOLTAGE <ul style="list-style-type: none"> • Ignition OFF. • Disconnect: HVAC Module C294a. • Ignition ON. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

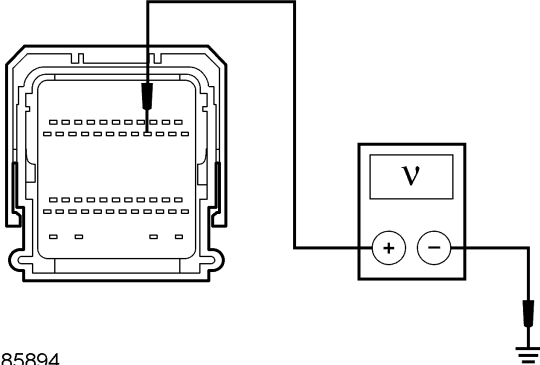
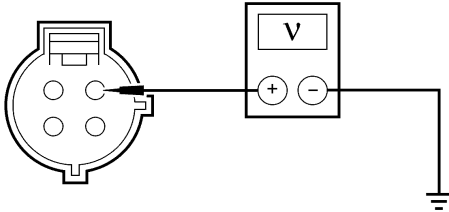
PINPOINT TEST F: THE AIR CONDITIONING (A/C) IS INOPERATIVE (Continued)

Test Step		Result / Action to Take
F3	CHECK CIRCUIT 1397 (GY/RD) FOR A SHORT TO VOLTAGE (Continued)	
	<ul style="list-style-type: none"> Measure the voltage between HVAC module C294a-3, circuit 1397 (GY/RD), harness side and ground.  <p>A0073157</p> <ul style="list-style-type: none"> Is any voltage present? 	<p>Yes REPAIR circuit 1397 (GY/RD) for a short to voltage. TEST the system for normal operation.</p> <p>No GO to F4.</p>
F4	CHECK CIRCUIT 1397 (GY/RD) FOR AN OPEN	
	<ul style="list-style-type: none"> Ignition OFF. Disconnect: HVAC Module C294a. Measure the resistance between HVAC module C294a-3, circuit 1397 (GY/RD), harness side and SJB C2280b-29, circuit 1397 (GY/RD), harness side.  <p>A0081824</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes GO to F19.</p> <p>No REPAIR circuit 1397 (GY/RD) for an open. TEST the system for normal operation.</p>
F5	CHECK THE AIR CONDITIONING COMPRESSOR CYCLING SWITCH (ACCS) PCM PID WITH THE A/C ON	
	<ul style="list-style-type: none"> Enter the following diagnostic mode on the scan tool: ACCS PCM PID. Select PANEL mode and press the A/C button on the HVAC module. Does the ACCS PCM PID read ON? 	<p>Yes For 4.0L, GO to F6. For 4.6L and 5.4L, GO to F12.</p> <p>No GO to F7.</p>
F6	CHECK THE A/C PRESSURE SENSOR (ACP_PRESS) PCM PID	
	<ul style="list-style-type: none"> Enter the following diagnostic mode on the scan tool: A/C Pressure PCM PID. With the manifold gauge set connected, compare the pressure readings of the manifold gauge set and the ACP_PRESS PCM PID. Are the pressure values of the manifold gauge set and the ACP_PRESS PCM PID similar? 	<p>Yes GO to F12.</p> <p>No INSTALL a new A/C pressure transducer. TEST the system for normal operation.</p>
F7	CHECK THE ACCS PCM INPUT	
	<ul style="list-style-type: none"> Ignition OFF. Disconnect: PCM C175b. Ignition ON. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

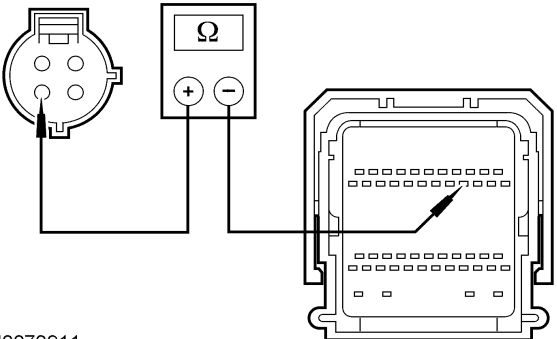
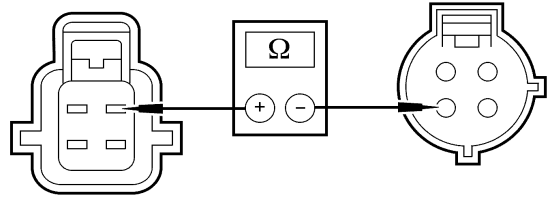
PINPOINT TEST F: THE AIR CONDITIONING (A/C) IS INOPERATIVE (Continued)

	Test Step	Result / Action to Take
F7	CHECK THE ACCS PCM INPUT (Continued)	
	<ul style="list-style-type: none"> Measure the voltage between PCM C175b-15, circuit 420 (DB/YE), harness side and ground.  <p>A0085894</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? 	<p>Yes GO to F20.</p> <p>No GO to F8.</p>
F8	CHECK THE A/C CYCLING SWITCH VOLTAGE	
	<ul style="list-style-type: none"> Ignition OFF. Disconnect: A/C Cycling Switch C130. Ignition ON. Measure the voltage between ground and A/C cycling switch C130-1, circuit 298 (VT/OG), harness side.  <p>A0013801</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? 	<p>Yes GO to F9.</p> <p>No VERIFY SJB fuse 14 (5A) is OK. If OK, REPAIR circuit 298 (VT/OG) for an open. If not OK, REFER to the Wiring Diagrams Manual to identify the possible causes of the circuit short. TEST the system for normal operation.</p>
F9	CHECK CIRCUIT 420 (DB/YE)/198 (DG/OG) FOR AN OPEN	
	<ul style="list-style-type: none"> Ignition OFF. Disconnect: PCM C175b (4.0L only). Disconnect: Dual-Function Pressure Switch C1078 (4.6L and 5.4L only). 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

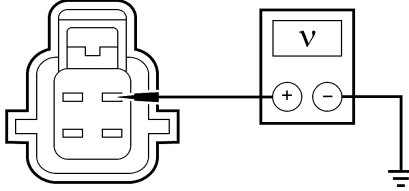
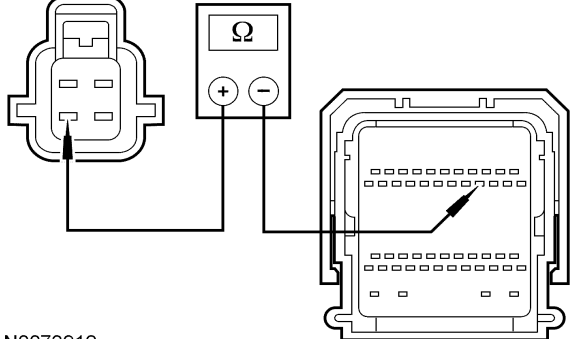
PINPOINT TEST F: THE AIR CONDITIONING (A/C) IS INOPERATIVE (Continued)

Test Step		Result / Action to Take
F9	<p>CHECK CIRCUIT 420 (DB/YE)/198 (DG/OG) FOR AN OPEN (Continued)</p> <ul style="list-style-type: none"> <p>NOTE: 4.0L only. Measure the resistance between A/C cycling switch C130-4, circuit 198 (DG/OG), harness side and PCM C175b-15, circuit 420 (DB/YE), harness side.</p>  <p>N0073911</p> <p>NOTE: 4.6L and 5.4L only. Measure the resistance between A/C cycling switch C130-4, circuit 198 (DG/OG), harness side and dual-function pressure switch C1078-1, circuit 198 (DG/OG), harness side.</p>  <p>N0008285</p> <p>Is the resistance less than 5 ohms?</p>	<p>Yes For 4.0L, INSTALL a new A/C cycling switch. TEST the system for normal operation. For 4.6L and 5.4L, GO to F10.</p> <p>No REPAIR circuit 420 (DB/YE)/198 (DG/OG) for an open. TEST the system for normal operation.</p>
F10	<p>CHECK VOLTAGE TO THE DUAL-FUNCTION PRESSURE SWITCH</p> <ul style="list-style-type: none"> Ignition OFF. Connect: A/C Cycling Switch C130. Ignition ON. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

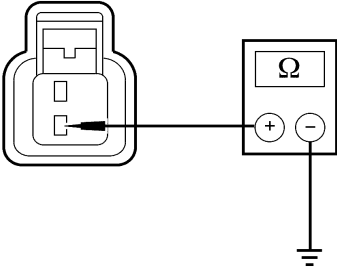
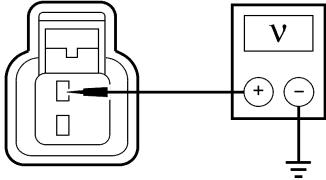
PINPOINT TEST F: THE AIR CONDITIONING (A/C) IS INOPERATIVE (Continued)

Test Step		Result / Action to Take
F10	CHECK VOLTAGE TO THE DUAL-FUNCTION PRESSURE SWITCH (Continued)	
	<ul style="list-style-type: none"> Measure the voltage between dual-function pressure switch C1078-1, circuit 198 (DG/OG), harness side and ground.  <p>A0042077</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? 	<p>Yes GO to F11.</p> <p>No INSTALL a new A/C cycling switch. TEST the system for normal operation.</p>
F11	CHECK CIRCUIT 420 (DB/YE) FOR AN OPEN	
	<ul style="list-style-type: none"> Ignition OFF. Disconnect: PCM C175b. Measure the resistance between dual-function pressure switch C1078-4, circuit 420 (DB/YE), harness side and PCM C175b-15, circuit 420 (DB/YE), harness side.  <p>N0073912</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes INSTALL a new dual-function pressure switch. TEST the system for normal operation.</p> <p>No REPAIR circuit 420 (DB/YE) for an open. TEST the system for normal operation.</p>
F12	CHECK THE AIR CONDITIONING CLUTCH (WAC/ACCR) PID WITH THE A/C ON	
	<ul style="list-style-type: none"> Enter the following diagnostic mode on the scan tool: WAC/ACCR PCM PID. With the engine running, select MAX A/C on the HVAC module. Does the WAC/ACCR PCM PID read ON? 	<p>Yes GO to F13.</p> <p>No GO to F20.</p>
F13	CHECK THE GROUND AT THE A/C COMPRESSOR CLUTCH FIELD COIL	
	<ul style="list-style-type: none"> Ignition OFF. Disconnect: A/C Compressor Clutch Field Coil C100. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

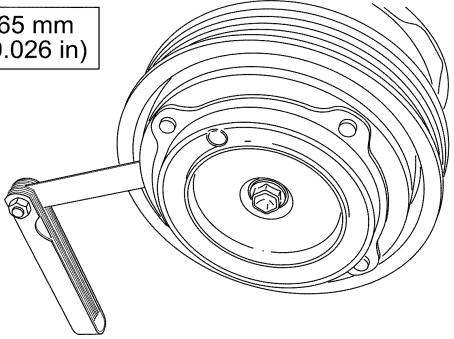
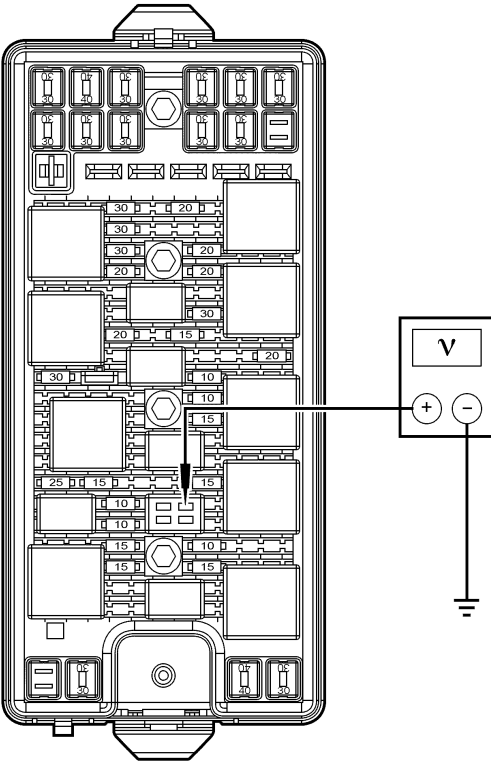
PINPOINT TEST F: THE AIR CONDITIONING (A/C) IS INOPERATIVE (Continued)

Test Step		Result / Action to Take
F13	<p>CHECK THE GROUND AT THE A/C COMPRESSOR CLUTCH FIELD COIL (Continued)</p> <ul style="list-style-type: none"> Measure the resistance between A/C compressor clutch field coil C100-2, circuit 1205 (BK), harness side and ground.  <p>N0003086</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes GO to F14.</p> <p>No REPAIR circuit 1205 (BK) for an open. TEST the system for normal operation.</p>
F14	<p>CHECK THE VOLTAGE AT THE A/C COMPRESSOR CLUTCH FIELD COIL</p> <ul style="list-style-type: none"> Ignition ON. Select PANEL mode and press the A/C button on the HVAC module. With the engine running, measure the voltage between A/C compressor clutch field coil C100-1, circuit 883 (PK/LB), harness side and ground.  <p>A0048576</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? 	<p>Yes GO to F15.</p> <p>No GO to F16.</p>

(Continued)

DIAGNOSIS AND TESTING (Continued)

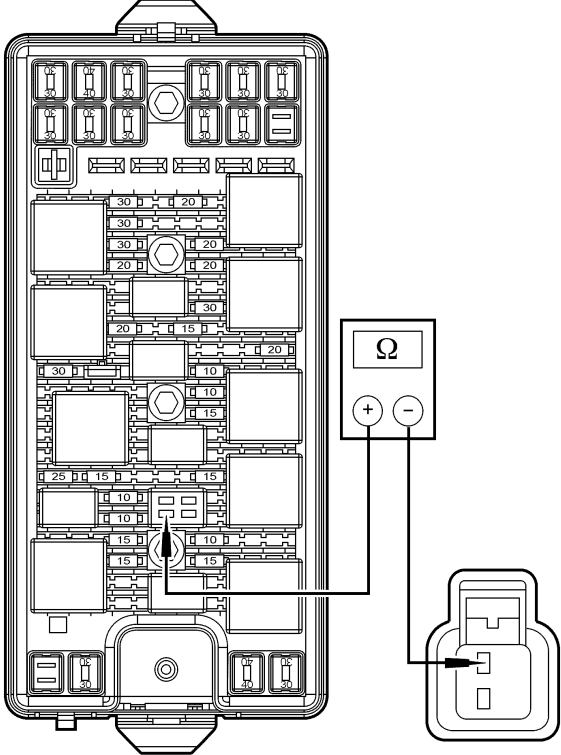
PINPOINT TEST F: THE AIR CONDITIONING (A/C) IS INOPERATIVE (Continued)

	Test Step	Result / Action to Take
F15	<p>CHECK THE A/C COMPRESSOR CLUTCH AIR GAP</p> <ul style="list-style-type: none"> Measure the A/C compressor clutch air gap at 3 equally spaced locations between the clutch hub and the A/C compressor clutch pulley. 	
	<div data-bbox="264 415 467 478" style="border: 1px solid black; padding: 2px; width: fit-content;"> 0.35-0.65 mm (0.014-0.026 in) </div>  <p>N0043653</p> <ul style="list-style-type: none"> Is the A/C compressor clutch air gap average greater than 0.65 mm (0.026 in)? 	<p>Yes ADJUST the A/C compressor clutch gap. REFER to Air Conditioning (A/C) Clutch Air Gap Adjustment in this section. TEST the system for normal operation.</p> <p>No INSTALL a new A/C compressor clutch field coil. TEST the system for normal operation.</p>
F16	<p>CHECK VOLTAGE TO RELAY SWITCH</p>	
	<p>NOTICE: Use the Flex Probe Kit for all test connections to prevent damage to the wiring terminals. Do not use the test probe.</p> <ul style="list-style-type: none"> Ignition OFF. Disconnect: A/C Clutch Relay. Ignition ON. Measure the voltage between A/C control relay socket and ground.  <p>N0040282</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? 	<p>Yes GO to F17.</p> <p>No VERIFY the Bussed Electrical Center (BEC) fuse 49 (15A) is OK. If OK, INSTALL a new BEC. If not OK, refer to the Wiring Diagrams Manual to identify the possible causes of the circuit short. TEST the system for normal operation.</p>

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST F: THE AIR CONDITIONING (A/C) IS INOPERATIVE (Continued)

Test Step	Result / Action to Take
<p>F17 CHECK CIRCUIT 883 (PK/LB) FOR AN OPEN</p> <p>NOTICE: Use the Flex Probe Kit for all test connections to prevent damage to the wiring terminals. Do not use the test probe.</p> <ul style="list-style-type: none"> Measure the resistance between A/C control relay socket, circuit 883 (PK/LB) and A/C compressor clutch field coil C100-1, circuit 883 (PK/LB), harness side.  <p>N0051114</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes INSTALL a new A/C control relay. TEST the system for normal operation.</p> <p>No REPAIR circuit 883 (PK/LB) for an open. TEST the system for normal operation.</p>
<p>F18 CHECK THE SJB MODULE CONNECTION</p> <ul style="list-style-type: none"> Clear the DTCs. Disconnect all the SJB connectors. Check for: <ul style="list-style-type: none"> corrosion. pushed-out pins. incorrectly seated connector. Connect and correctly seat all the SJB connectors. Operate the system. Does the concern return? 	<p>Yes INSTALL a new SJB. REFER to Section 419-10. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.</p>
<p>F19 CHECK THE MODULE CONNECTION</p> <ul style="list-style-type: none"> Carry out the HVAC Module Cold Boot Process. Operate the system. Does the concern return? 	<p>Yes INSTALL a new HVAC module. REFER to Section 412-01. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. TEST the system for normal operation.</p>
<p>F20 CHECK THE PCM MODULE CONNECTION</p> <ul style="list-style-type: none"> Clear the DTCs. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST F: THE AIR CONDITIONING (A/C) IS INOPERATIVE (Continued)

Test Step		Result / Action to Take
F20	CHECK THE PCM MODULE CONNECTION (Continued)	<p>Yes INSTALL a new PCM. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.</p>
	<ul style="list-style-type: none"> • Disconnect all the PCM connectors. • Check for: <ul style="list-style-type: none"> — corrosion. — pushed-out pins. — incorrectly seated connector. • Connect and correctly seat all the PCM connectors. • Operate the system. • Does the concern return? 	

Pinpoint Test G: The Air Conditioning (A/C) is Always On — A/C Compressor Does Not Cycle

Refer to [Wiring Diagrams Cell 54, Manual Climate Control System](#) for schematic and connector information.

Normal Operation

Under normal operation, when A/C is requested, a ground signal is sent from the HVAC module to the Smart Junction Box (SJB) through circuit 1397 (GY/RD). The SJB then transmits an A/C request message through the High Speed Controller Area Network (HS-CAN) bus to the PCM.

4.0L only

Voltage is provided to the A/C cycling switch through circuit 391 (RD/YE). If the A/C cycling switch is closed (sufficient pressure) voltage is sent from the A/C cycling switch to the PCM (4.0L) through circuit 198 (DG/OG)/420 (DB/YE). When the PCM receives voltage from the pressure switch and the A/C pressure transducer does not indicate excessive pressure, the PCM provides a ground for the A/C clutch relay through circuit 321 (GY/WH).

4.6L and 5.4L only

Voltage is provided to the A/C cycling switch through circuit 391 (RD/YE). If the A/C cycling switch is closed (sufficient pressure) voltage is sent from the A/C cycling switch to the dual-function pressure switch (4.6L and 5.4L) through circuit 198 (DG/OG). If the dual-function pressure switch (4.6L and 5.4L) is closed (pressure not excessive), voltage is sent to the PCM through circuit 420 (DB/YE). When the PCM receives voltage from the pressure switches, the PCM provides a ground for the A/C clutch relay through circuit 321 (GY/WH).

When the relay is activated, ignition voltage is supplied to the A/C clutch solenoid through circuit 883 (PK/LB). Ground is supplied for the A/C clutch through circuit 1205 (BK).

- DTC B2175 A/C Request Signal Circuit Short to Ground — The module senses a continuous short to ground on the A/C request circuit.

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- PCM
- SJB
- HVAC module
- A/C cycling switch
- A/C control relay
- A/C clutch air gap

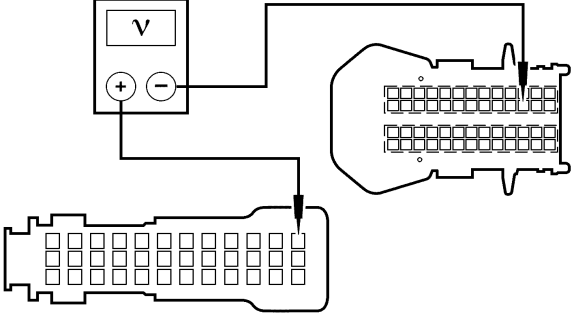
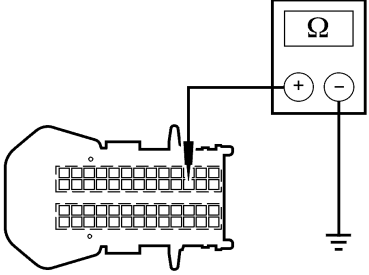
PINPOINT TEST G: THE AIR CONDITIONING (A/C) IS ALWAYS ON — A/C COMPRESSOR DOES NOT CYCLE

Test Step		Result / Action to Take
G1	CHECK THE AIR CONDITIONING REQUEST SIGNAL (AC_REQST) GEM PID	<p>Yes GO to G4.</p> <p>No GO to G2.</p>
	<ul style="list-style-type: none"> • Ignition ON. • With the engine running, select the OFF position on the HVAC module. • Enter the following diagnostic mode on the scan tool: AC_REQST Generic Electronic Module (GEM) PID. • Does the AC_REQST GEM PID read OFF? 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

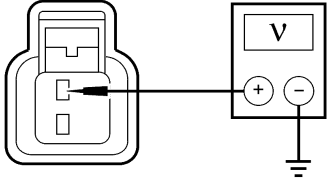
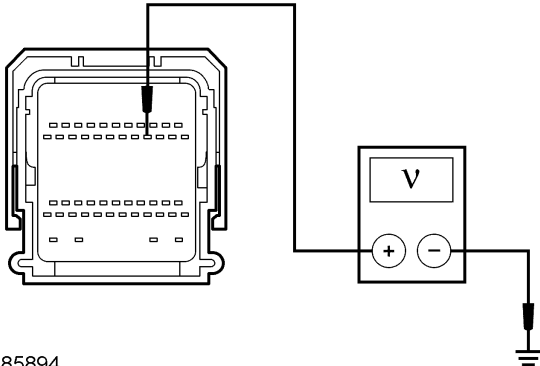
PINPOINT TEST G: THE AIR CONDITIONING (A/C) IS ALWAYS ON — A/C COMPRESSOR DOES NOT CYCLE (Continued)

Test Step		Result / Action to Take
G2	<p>CHECK THE A/C SIGNAL WITH THE A/C OFF</p> <ul style="list-style-type: none"> Ignition OFF. Disconnect: SJB C2280a. Disconnect: SJB C2280b. Ignition ON. With the engine running, select the OFF position on the HVAC module. Measure the voltage between SJB C2280b-29, circuit 1397 (GY/RD), harness side and SJB C2280a-36, circuit 1044 (WH/YE), harness side.  <p>N0075870</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? 	<p>Yes GO to G3.</p> <p>No GO to G11.</p>
G3	<p>CHECK CIRCUIT 1397 (GY/RD) FOR A SHORT TO GROUND</p> <ul style="list-style-type: none"> Ignition OFF. Disconnect: HVAC Module C294a. Measure the resistance between SJB C2280b-29, circuit 1397 (GY/RD), harness side and ground.  <p>A0081866</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? 	<p>Yes GO to G12.</p> <p>No REPAIR circuit 1397 (GY/RD) for a short to ground. TEST the system for normal operation.</p>
G4	<p>CHECK THE AIR CONDITIONING COMPRESSOR CYCLING SWITCH (ACCS) PCM PID WITH THE A/C OFF</p> <ul style="list-style-type: none"> With the engine running, select the OFF position on the HVAC module. Enter the following diagnostic mode on the scan tool: ACCS PCM PID. Does the ACCS PCM PID read OFF? 	<p>Yes GO to G5.</p> <p>No GO to G13.</p>
G5	<p>CHECK THE AIR CONDITIONING CLUTCH (WAC/ACCR) PID WITH THE A/C OFF</p> <ul style="list-style-type: none"> Enter the following diagnostic mode on the scan tool: WAC/ACCR PCM PID. With the engine running, select PANEL mode on the HVAC module and make sure the A/C button is OFF. Does the WAC/ACCR PCM PID read OFF? 	<p>Yes GO to G6.</p> <p>No GO to G13.</p>

(Continued)

DIAGNOSIS AND TESTING (Continued)

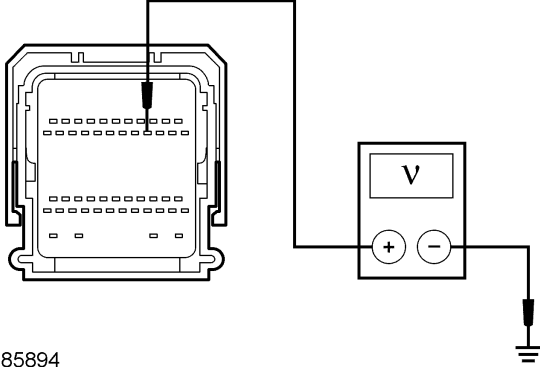
PINPOINT TEST G: THE AIR CONDITIONING (A/C) IS ALWAYS ON — A/C COMPRESSOR DOES NOT CYCLE (Continued)

Test Step		Result / Action to Take
G6	CHECK THE A/C CLUTCH RELAY <ul style="list-style-type: none"> Ignition OFF. Disconnect: A/C Clutch Relay. Ignition ON. With the engine running, observe the A/C clutch operation. Does the A/C clutch engage? 	<p>Yes GO to G7.</p> <p>No CARRY OUT the A/C clutch relay component test. Refer to Wiring Diagrams Cell 149 for component testing. If the relay tests OK, GO to G8.</p>
G7	CHECK CIRCUIT 883 (PK/LB) FOR A SHORT TO VOLTAGE <ul style="list-style-type: none"> Ignition OFF. Disconnect: A/C Compressor Clutch Field Coil C100. Ignition ON. Measure the voltage between A/C compressor clutch field coil C100-1, circuit 883 (PK/LB), harness side and ground. <div style="text-align: center;">  <p>A0048576</p> </div> <ul style="list-style-type: none"> Is any voltage present? 	<p>Yes REPAIR circuit 883 (PK/LB) for a short to voltage. TEST the system for normal operation.</p> <p>No ADJUST the A/C compressor clutch gap. REFER to Air Conditioning (A/C) Clutch Air Gap Adjustment in this section. TEST the system for normal operation.</p>
G8	CHECK CIRCUIT 420 (DB/YE) FOR VOLTAGE <ul style="list-style-type: none"> Ignition OFF. Disconnect: PCM C175b. Disconnect: A/C Cycling Switch C130. Ignition ON. Measure the voltage between PCM C175b-15, circuit 420 (DB/YE), harness side and ground. <div style="text-align: center;">  <p>A0085894</p> </div> <ul style="list-style-type: none"> Is any voltage present? 	<p>Yes For 4.0L, REPAIR circuit 420 (DB/YE)/198 (DG/OG) for a short to voltage. TEST the system for normal operation. For 4.6L and 5.4L, GO to G10.</p> <p>No GO to G9.</p>
G9	CHECK THE A/C CYCLING SWITCH <ul style="list-style-type: none"> Ignition OFF. Remove the A/C cycling switch from the vehicle. Measure the resistance between the A/C cycling switch pins. Is the resistance greater than 10,000 ohms? 	<p>Yes GO to G13.</p> <p>No INSTALL a new A/C cycling switch. TEST the system for normal operation.</p>
G10	CHECK FOR A SHORT TO VOLTAGE <ul style="list-style-type: none"> Ignition OFF. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST G: THE AIR CONDITIONING (A/C) IS ALWAYS ON — A/C COMPRESSOR DOES NOT CYCLE (Continued)

Test Step		Result / Action to Take
G10	CHECK FOR A SHORT TO VOLTAGE (Continued)	
	<ul style="list-style-type: none"> • Disconnect: Dual-Function Pressure Switch C1078. • Ignition ON. • Measure the voltage between PCM C175b-15, circuit 420 (DB/YE), harness side and ground.  <p>A0085894</p> <ul style="list-style-type: none"> • Is any voltage present? 	<p>Yes REPAIR circuit 420 (DB/YE) for a short to voltage. TEST the system for normal operation.</p> <p>No REPAIR circuit 198 (DG/OG) for a short to voltage. TEST the system for normal operation.</p>
G11	CHECK THE SJB MODULE CONNECTION	
	<ul style="list-style-type: none"> • Clear the DTCs. • Disconnect all the SJB connectors. • Check for: <ul style="list-style-type: none"> — corrosion. — pushed-out pins. — incorrectly seated connector. • Connect and correctly seat all the SJB connectors. • Operate the system. • Does the concern return? 	<p>Yes INSTALL a new SJB. REFER to Section 419-10. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.</p>
G12	CHECK THE MODULE CONNECTION	
	<ul style="list-style-type: none"> • Carry out the HVAC Module Cold Boot Process. • Operate the system. • Does the concern return? 	<p>Yes INSTALL a new HVAC module. REFER to Section 412-01. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. TEST the system for normal operation.</p>
G13	CHECK THE PCM MODULE CONNECTION	
	<ul style="list-style-type: none"> • Clear the DTCs. • Disconnect all the PCM connectors. • Check for: <ul style="list-style-type: none"> — corrosion. — pushed-out pins. — incorrectly seated connector. • Connect and correctly seat all the PCM connectors. • Operate the system. • Does the concern return? 	<p>Yes INSTALL a new PCM. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.</p>

Pinpoint Test H: The Air Conditioning (A/C) is Always On — A/C Mode Always Commanded ON

Refer to Wiring Diagrams Cell 54, Manual Climate Control System for schematic and connector information.

Normal Operation

Under normal operation, when A/C is requested, a ground signal is sent from the HVAC module to the Smart Junction Box (SJB) through circuit 1397 (GY/RD). The SJB then transmits an A/C request message through the High Speed Controller Area Network (HS-CAN) bus to the PCM.

DIAGNOSIS AND TESTING (Continued)

4.0L only

Voltage is provided to the A/C cycling switch through circuit 391 (RD/YE). If the A/C cycling switch is closed (sufficient pressure) voltage is sent from the A/C cycling switch to the PCM (4.0L) through circuit 198 (DG/OG)/420 (DB/YE). When the PCM receives voltage from the pressure switch and the A/C pressure transducer does not indicate excessive pressure, the PCM provides a ground for the A/C clutch relay through circuit 321 (GY/WH).

4.6L and 5.4L only

Voltage is provided to the A/C cycling switch through circuit 391 (RD/YE). If the A/C cycling switch is closed (sufficient pressure) voltage is sent from the A/C cycling switch to the dual-function pressure switch (4.6L and 5.4L) through circuit 198 (DG/OG). If the dual-function pressure switch (4.6L and 5.4L) is closed (pressure not excessive), voltage is sent to the PCM through circuit 420 (DB/YE). When the PCM receives voltage from the pressure switches, the PCM provides a ground for the A/C clutch relay through circuit 321 (GY/WH).

When the relay is activated, ignition voltage is supplied to the A/C clutch solenoid through circuit 883 (PK/LB). Ground is supplied for the A/C clutch through circuit 1205 (BK).

- DTC B2175 A/C Request Signal Circuit Short to Ground — The module senses a continuous short to ground on the A/C request circuit.

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- PCM
- SJB
- HVAC module
- A/C cycling switch
- A/C control relay
- A/C clutch air gap

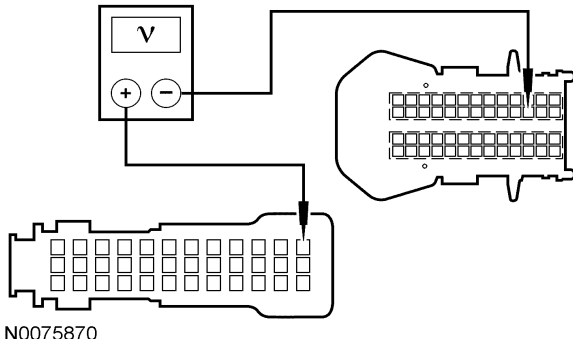
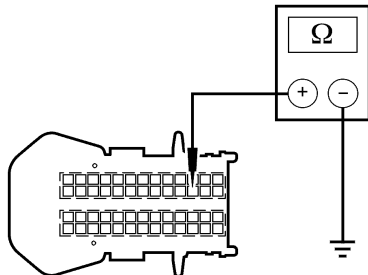
PINPOINT TEST H: THE AIR CONDITIONING (A/C) IS ALWAYS ON — A/C MODE ALWAYS COMMANDED ON

Test Step		Result / Action to Take
H1	CHECK THE AIR CONDITIONING REQUEST SIGNAL (AC_REQST) GEM PID	
	<ul style="list-style-type: none"> • Ignition ON. • With the engine running, select the OFF position on the HVAC module. • Enter the following diagnostic mode on the scan tool: AC_REQST Generic Electronic Module (GEM) PID. • Does the AC_REQST GEM PID read OFF? 	<p>Yes GO to H4.</p> <p>No GO to H2.</p>
H2	CHECK THE A/C SIGNAL WITH THE A/C OFF	
	<ul style="list-style-type: none"> • Ignition OFF. • Disconnect: SJB C2280a. • Disconnect: SJB C2280b. • Ignition ON. • With the engine running, select the OFF position on the HVAC module. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

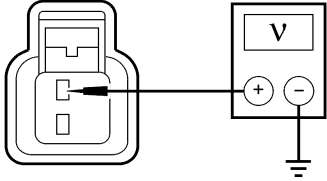
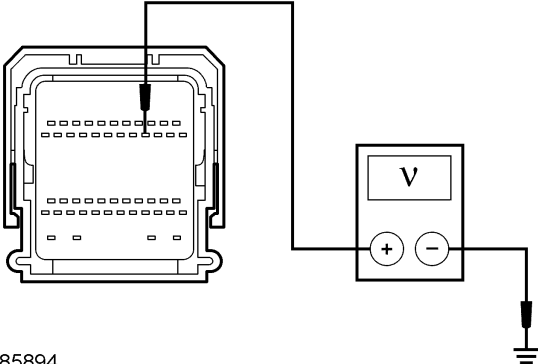
PINPOINT TEST H: THE AIR CONDITIONING (A/C) IS ALWAYS ON — A/C MODE ALWAYS COMMANDED ON (Continued)

Test Step		Result / Action to Take
H2	CHECK THE A/C SIGNAL WITH THE A/C OFF (Continued)	
	<ul style="list-style-type: none"> Measure the voltage between SJB C2280b-29, circuit 1397 (GY/RD), harness side and SJB C2280a-36, circuit 1044 (WH/YE), harness side.  <p>N0075870</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? 	<p>Yes GO to H3.</p> <p>No GO to H11.</p>
H3	CHECK CIRCUIT 1397 (GY/RD) FOR A SHORT TO GROUND	
	<ul style="list-style-type: none"> Ignition OFF. Disconnect: HVAC Module C294a. Measure the resistance between SJB C2280b-29, circuit 1397 (GY/RD), harness side and ground.  <p>A0081866</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? 	<p>Yes GO to H12.</p> <p>No REPAIR circuit 1397 (GY/RD) for a short to ground. TEST the system for normal operation.</p>
H4	CHECK THE AIR CONDITIONING COMPRESSOR CYCLING SWITCH (ACCS) PCM PID WITH THE A/C OFF	
	<ul style="list-style-type: none"> With the engine running, select the OFF position on the HVAC module. Enter the following diagnostic mode on the scan tool: ACCS PCM PID. Does the ACCS PCM PID read OFF? 	<p>Yes GO to H5.</p> <p>No GO to H13.</p>
H5	CHECK THE AIR CONDITIONING CLUTCH (WAC/ACCR) PCM PID WITH THE A/C OFF	
	<ul style="list-style-type: none"> Enter the following diagnostic mode on the scan tool: WAC/ACCR PCM PID. With the engine running, select PANEL mode on the HVAC module and make sure the A/C button is OFF. Does the WAC/ACCR PCM PID read OFF? 	<p>Yes GO to H6.</p> <p>No GO to H13.</p>

(Continued)

DIAGNOSIS AND TESTING (Continued)

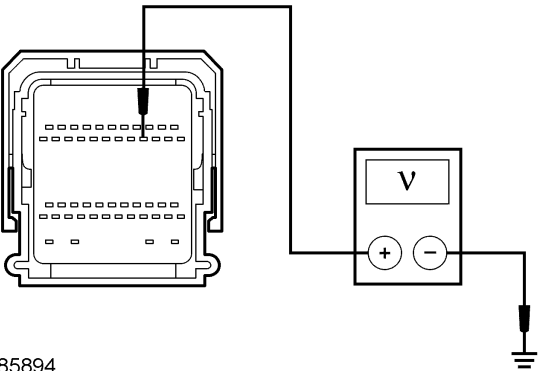
PINPOINT TEST H: THE AIR CONDITIONING (A/C) IS ALWAYS ON — A/C MODE ALWAYS COMMANDED ON (Continued)

Test Step		Result / Action to Take
H6	CHECK THE A/C CLUTCH RELAY	
	<ul style="list-style-type: none"> Ignition OFF. Disconnect: A/C Clutch Relay. Ignition ON. With the engine running, observe the A/C clutch operation. Does the A/C clutch engage? 	<p>Yes GO to H7.</p> <p>No CARRY OUT the A/C clutch relay component test. Refer to Wiring Diagrams Cell 149 for component testing. If the relay tests OK, GO to H8.</p>
H7	CHECK CIRCUIT 883 (PK/LB) FOR A SHORT TO VOLTAGE	
	<ul style="list-style-type: none"> Ignition OFF. Disconnect: A/C Compressor Clutch Field Coil C100. Ignition ON. Measure the voltage between A/C compressor clutch field coil C100-1, circuit 883 (PK/LB), harness side and ground. <div style="text-align: center;">  </div> <p>A0048576</p> <ul style="list-style-type: none"> Is any voltage present? 	<p>Yes REPAIR circuit 883 (PK/LB) for a short to voltage. TEST the system for normal operation.</p> <p>No ADJUST the A/C compressor clutch gap. REFER to Air Conditioning (A/C) Clutch Air Gap Adjustment in this section. TEST the system for normal operation.</p>
H8	CHECK CIRCUIT 420 (DB/YE) FOR VOLTAGE	
	<ul style="list-style-type: none"> Ignition OFF. Disconnect: PCM C175b. Disconnect: A/C Cycling Switch C130. Ignition ON. Measure the voltage between PCM C175b-15, circuit 420 (DB/YE), harness side and ground. <div style="text-align: center;">  </div> <p>A0085894</p> <ul style="list-style-type: none"> Is any voltage present? 	<p>Yes For 4.0L, REPAIR circuit 420 (DB/YE)/198 (DG/OG) for a short to voltage. TEST the system for normal operation. For 4.6L and 5.4L, GO to H10.</p> <p>No GO to H9.</p>
H9	CHECK THE A/C CYCLING SWITCH	
	<ul style="list-style-type: none"> Ignition OFF. Remove the A/C cycling switch from the vehicle. Measure the resistance between the A/C cycling switch pins. Is the resistance greater than 10,000 ohms? 	<p>Yes GO to H13.</p> <p>No INSTALL a new A/C cycling switch. TEST the system for normal operation.</p>
H10	CHECK FOR A SHORT TO VOLTAGE	
	<ul style="list-style-type: none"> Ignition OFF. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST H: THE AIR CONDITIONING (A/C) IS ALWAYS ON — A/C MODE ALWAYS COMMANDED ON (Continued)

Test Step		Result / Action to Take
H10	CHECK FOR A SHORT TO VOLTAGE (Continued)	
	<ul style="list-style-type: none"> • Disconnect: Dual-Function Pressure Switch C1078. • Ignition ON. • Measure the voltage between PCM C175b-15, circuit 420 (DB/YE), harness side and ground.  <p>A0085894</p> <ul style="list-style-type: none"> • Is any voltage present? 	<p>Yes REPAIR circuit 420 (DB/YE) for a short to voltage. TEST the system for normal operation.</p> <p>No REPAIR circuit 198 (DG/OG) for a short to voltage. TEST the system for normal operation.</p>
H11	CHECK THE SJB MODULE CONNECTION	
	<ul style="list-style-type: none"> • Clear the DTCs. • Disconnect all the SJB connectors. • Check for: <ul style="list-style-type: none"> — corrosion. — pushed-out pins. — incorrectly seated connector. • Connect and correctly seat all the SJB connectors. • Operate the system. • Does the concern return? 	<p>Yes INSTALL a new SJB. REFER to Section 419-10. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.</p>
H12	CHECK THE MODULE CONNECTION	
	<ul style="list-style-type: none"> • Carry out the HVAC Module Cold Boot Process. • Operate the system. • Does the concern return? 	<p>Yes INSTALL a new HVAC module. REFER to Section 412-01. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. TEST the system for normal operation.</p>
H13	CHECK THE PCM MODULE CONNECTION	
	<ul style="list-style-type: none"> • Clear the DTCs. • Disconnect all the PCM connectors. • Check for: <ul style="list-style-type: none"> — corrosion. — pushed-out pins. — incorrectly seated connector. • Connect and correctly seat all the PCM connectors. • Operate the system. • Does the concern return? 	<p>Yes INSTALL a new PCM. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.</p>

Pinpoint Test I: The Blower Motor is Inoperative

Refer to [Wiring Diagrams Cell 54, Manual Climate Control System](#) for schematic and connector information.

DIAGNOSIS AND TESTING (Continued)

Normal Operation

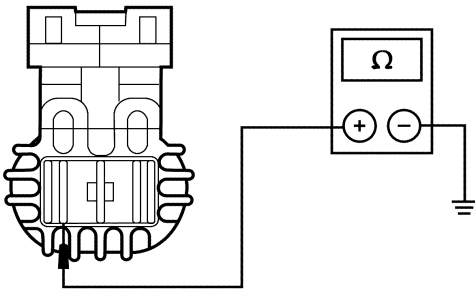
Under normal operation, the blower motor relay coil receives ignition voltage. The coil receives ground from the HVAC module through circuit 364 (BK/LG) if any position but OFF is selected. Voltage is supplied to the relay switch contact. When the relay coil is energized, voltage is delivered to the blower motor through circuit 371 (PK/WH). Ground for the blower motor is provided through circuit 261 (OG/BK) from the blower resistor or the blower switch (HI). The blower resistor and blower switch is grounded through circuit 1205 (BK).

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Blower motor
- Blower motor relay
- Blower motor switch

PINPOINT TEST I: THE BLOWER MOTOR IS INOPERATIVE

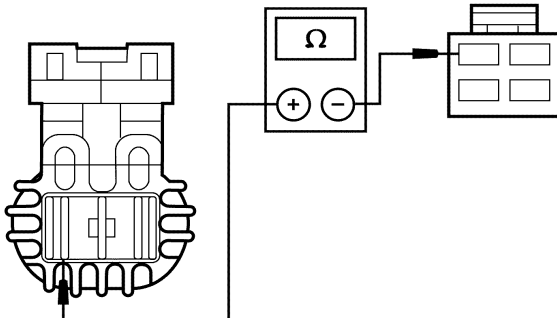
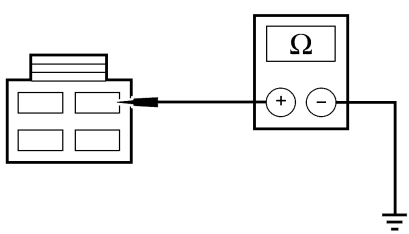
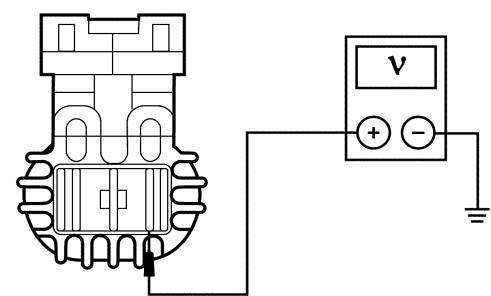
NOTICE: It is important to install relays in their correct position in the Bussed Electrical Center (BEC). Installing a relay incorrectly may cause wiring shorts or damage to modules. While carrying out diagnostics on BEC relays, have only one BEC relay removed at a time. Failure to follow these instructions may result in damage to the vehicle circuitry or to control modules.

Test Step		Result / Action to Take
I1	<p>CHECK CIRCUIT 261 (OG/BK) FOR GROUND</p> <ul style="list-style-type: none"> • Disconnect: Blower Motor C2066. • Turn the function selector switch to the PANEL position. • Turn the blower motor switch to the high position. • Measure the resistance between blower motor connector C2066-2, circuit 261 (OG/BK), harness side and ground. <div style="text-align: center;">  <p>AM0420-A</p> </div> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? 	<p>Yes GO to I4.</p> <p>No GO to I2.</p>
I2	<p>CHECK CIRCUIT 261 (OG/BK) FOR AN OPEN</p> <ul style="list-style-type: none"> • Disconnect: Blower Motor Switch C294b. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

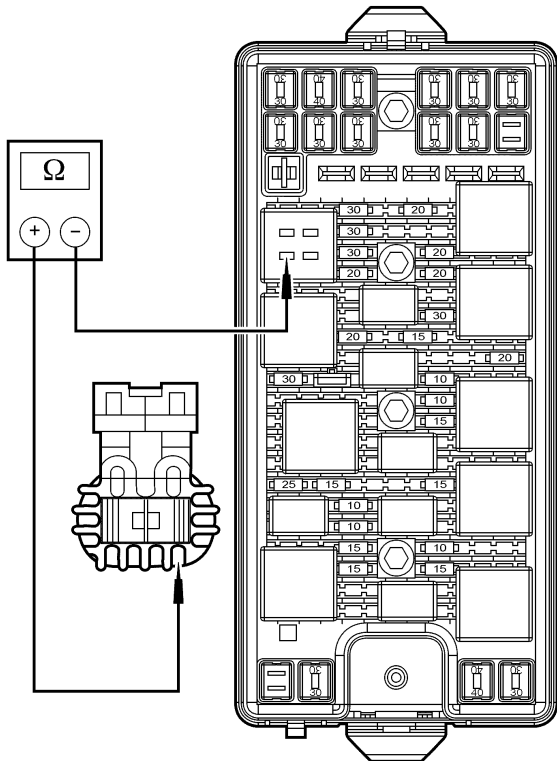
PINPOINT TEST I: THE BLOWER MOTOR IS INOPERATIVE (Continued)

Test Step		Result / Action to Take
I2	<p>CHECK CIRCUIT 261 (OG/BK) FOR AN OPEN (Continued)</p> <ul style="list-style-type: none"> Measure the resistance between blower motor switch C294b-2, circuit 261 (OG/BK), harness side and blower motor C2066-2, circuit 261 (OG/BK), harness side.  <p style="text-align: center;">AM0415-A</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes GO to I3.</p> <p>No REPAIR circuit 261 (OG/BK) for an open. TEST the system for normal operation.</p>
I3	<ul style="list-style-type: none"> Measure the resistance between blower motor switch C294b-1, circuit 1205 (BK), harness side and ground.  <p style="text-align: center;">A0040182</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes INSTALL a new blower motor switch. TEST the system for normal operation.</p> <p>No REPAIR circuit 1205 (BK) for an open. TEST the system for normal operation.</p>
I4	<p>CHECK BLOWER MOTOR CIRCUIT 371 (PK/WH) FOR VOLTAGE</p> <ul style="list-style-type: none"> Ignition ON. Measure the voltage between blower motor connector C2066-1, circuit 371 (PK/WH), harness side and ground.  <p style="text-align: center;">AM0416-A</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? 	<p>Yes INSTALL a new blower motor. TEST the system for normal operation.</p> <p>No GO to I5.</p>

(Continued)

DIAGNOSIS AND TESTING (Continued)

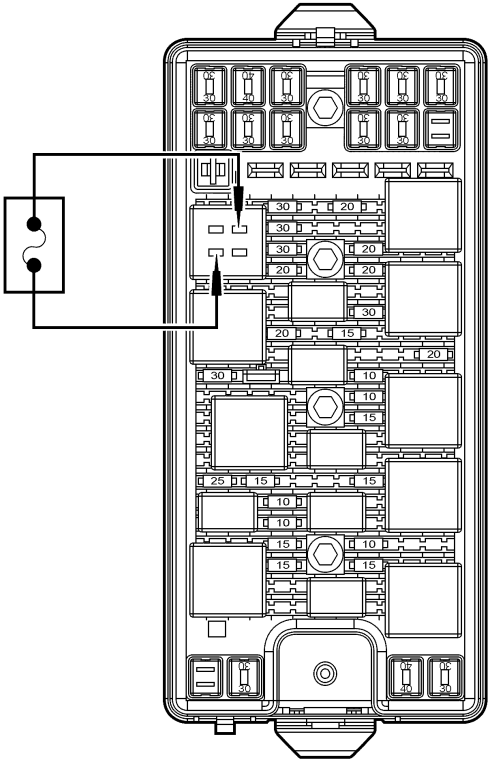
PINPOINT TEST I: THE BLOWER MOTOR IS INOPERATIVE (Continued)

Test Step	Result / Action to Take
<p>15 CHECK CIRCUIT 371 (PK/WH) FOR AN OPEN</p> <p>NOTICE: Use the Flex Probe Kit for all test connections to prevent damage to the wiring terminals. Do not use the test probe.</p> <ul style="list-style-type: none"> • Ignition OFF. • Disconnect: Blower Motor Relay. • Measure the resistance between blower motor relay socket, circuit 371 (PK/WH) and blower motor C2066-1, circuit 371 (PK/WH), harness side.  <p>N0040284</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? 	<p>Yes GO to I6.</p> <p>No REPAIR circuit 371 (PK/WH) for an open. TEST the system for normal operation.</p>
<p>16 CHECK THE BLOWER MOTOR RELAY</p> <p>NOTICE: Use the Flex Probe Kit for all test connections to prevent damage to the wiring terminals. Do not use the test probe.</p> <ul style="list-style-type: none"> • Connect: Blower Motor C2066. • Ignition ON. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

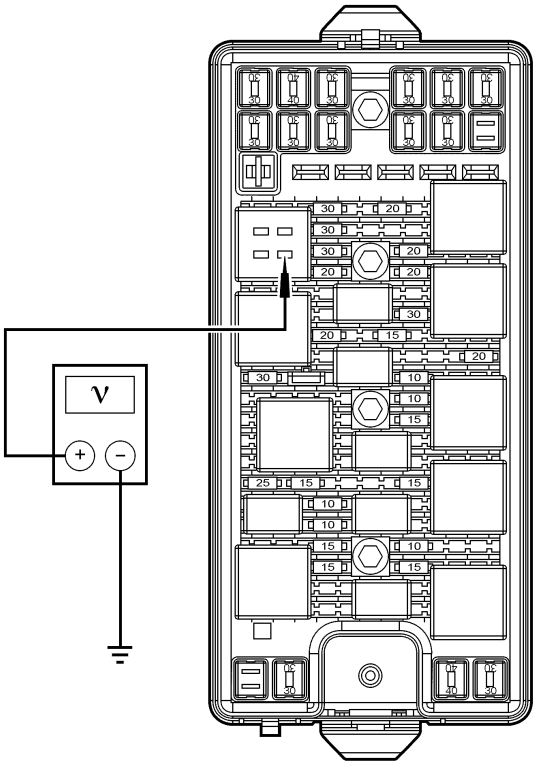
PINPOINT TEST I: THE BLOWER MOTOR IS INOPERATIVE (Continued)

Test Step		Result / Action to Take
16	<p>CHECK THE BLOWER MOTOR RELAY (Continued)</p> <ul style="list-style-type: none"> Connect a fused jumper lead between blower motor relay socket and blower motor relay socket, circuit 371 (PK/WH). <div style="text-align: center;">  </div> <p>N0040285</p> <ul style="list-style-type: none"> Does the blower motor operate? 	<p>Yes GO to 17.</p> <p>No VERIFY Bussed Electrical Center (BEC) fuse 2 (30A) is OK. If OK, INSTALL a new BEC. If not OK, refer to the Wiring Diagrams Manual to identify the possible causes of the circuit short. TEST the system for normal operation.</p>
17	<p>CHECK THE RELAY COIL SUPPLY VOLTAGE</p> <p>NOTICE: Use the Flex Probe Kit for all test connections to prevent damage to the wiring terminals. Do not use the test probe.</p>	

(Continued)

DIAGNOSIS AND TESTING (Continued)

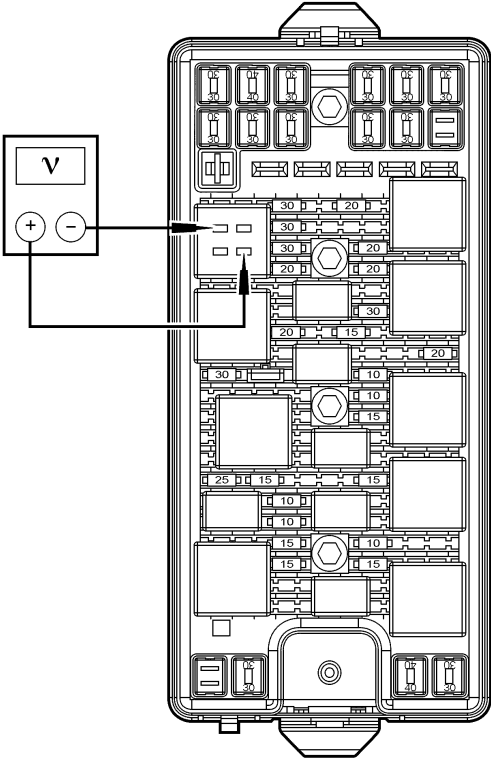
PINPOINT TEST I: THE BLOWER MOTOR IS INOPERATIVE (Continued)

Test Step		Result / Action to Take
17	<p>CHECK THE RELAY COIL SUPPLY VOLTAGE (Continued)</p> <ul style="list-style-type: none"> Measure the voltage between blower motor relay socket, circuit 1322 (BN/WH) and ground. <div style="text-align: center;">  </div> <p>N0040286</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? 	<p>Yes GO to I8.</p> <p>No VERIFY the Smart Junction Box (SJB) fuse 3 (10A) is OK. If OK, REPAIR circuit 1322 (BN/WH) for an open. If not OK, REFER to the Wiring Diagrams Manual to identify the possible causes of the circuit short. TEST the system for normal operation.</p>
18	<p>CHECK THE BLOWER MOTOR RELAY</p> <p>NOTICE: Use the Flex Probe Kit for all test connections to prevent damage to the wiring terminals. Do not use the test probe.</p> <ul style="list-style-type: none"> Ignition ON. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

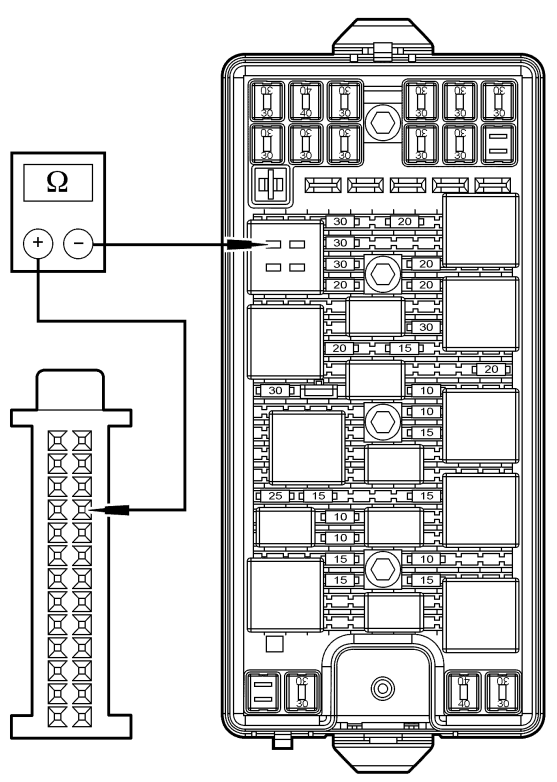
PINPOINT TEST I: THE BLOWER MOTOR IS INOPERATIVE (Continued)

Test Step		Result / Action to Take
18	<p>CHECK THE BLOWER MOTOR RELAY (Continued)</p> <ul style="list-style-type: none"> Measure the voltage between blower motor relay socket, circuit 364 (BK/LG) and socket blower motor relay, circuit 1322 (BN/WH).  <p>N0040287</p> <ul style="list-style-type: none"> Is the voltage greater than 10 volts? 	<p>Yes INSTALL a new blower motor relay. TEST the system for normal operation.</p> <p>No GO to I9.</p>
19	<p>CHECK CIRCUIT 364 (BK/LG) FOR AN OPEN</p> <p>NOTICE: Use the Flex Probe Kit for all test connections to prevent damage to the wiring terminals. Do not use the test probe.</p> <ul style="list-style-type: none"> Ignition OFF. Disconnect: HVAC module C294a. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST I: THE BLOWER MOTOR IS INOPERATIVE (Continued)

Test Step		Result / Action to Take
19	<p>CHECK CIRCUIT 364 (BK/LG) FOR AN OPEN (Continued)</p> <ul style="list-style-type: none"> Measure the resistance between blower motor relay socket, circuit 364 (BK/LG) and HVAC module C294a-23, circuit 364 (BK/LG), harness side.  <p>N0040288</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes GO to I10.</p> <p>No REPAIR circuit 364 (BK/LG) for an open. TEST the system for normal operation.</p>
I10	<p>CHECK THE MODULE CONNECTION</p> <ul style="list-style-type: none"> Carry out the HVAC Module Cold Boot Process. Operate the system. Does the concern return? 	<p>Yes INSTALL a new HVAC module. REFER to Section 412-01. TEST the system for normal operation.</p> <p>No The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. TEST the system for normal operation.</p>

Pinpoint Test J: The Blower Motor Does Not Operate Correctly

Refer to [Wiring Diagrams Cell 54, Manual Climate Control System](#) for schematic and connector information.

Normal Operation

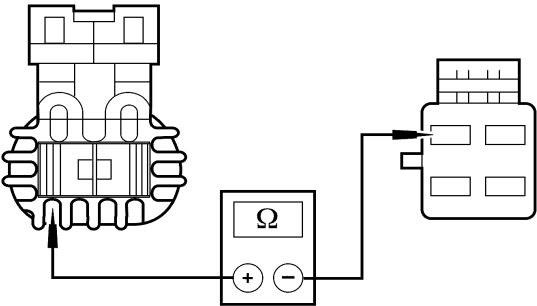
Under normal operation, the blower motor is provided a ground from the blower resistor through circuit 261 (OG/BK). The resistor gets a ground from circuit 1205 (BK) in the lowest blower setting. In MED-LO and MED-HI, the resistor gets a ground through circuit 754 (LG/WH) or 752 (YE/RD), depending on selected speed. In HI, the blower motor is grounded directly through the blower switch from circuit 261 (OG/BK) to circuit 1205 (BK). The blower switch receives its ground from circuit 1205 (BK).

DIAGNOSIS AND TESTING (Continued)

This pinpoint test is intended to diagnose the following:

- Wiring, terminals or connectors
- Blower motor resistor
- Blower motor switch

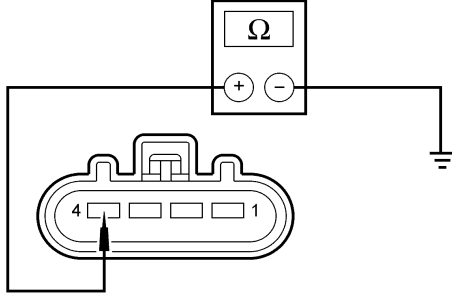
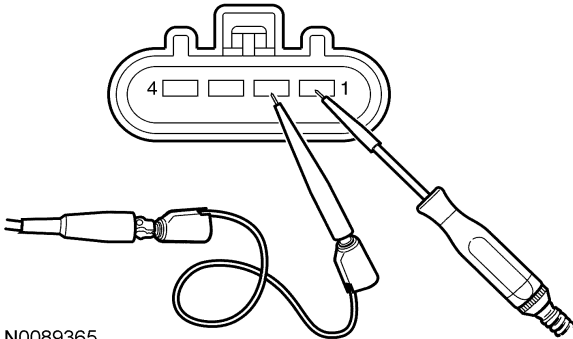
PINPOINT TEST J: THE BLOWER MOTOR DOES NOT OPERATE CORRECTLY

Test Step		Result / Action to Take
J1	CHECK THE BLOWER MOTOR OPERATION	<p>Yes If the blower motor does not operate in HI setting only, GO to J2. If the blower motor does not operate in LO setting only, GO to J3. If the blower motor does not operate in MED-LO or MED-HI setting only, GO to J4. If the blower motor operates in HI setting only, GO to J6. If the blower motor operates in LO setting only, GO to J7. For all other symptoms, GO to J8.</p> <p>No GO to Pinpoint Test I.</p>
	<ul style="list-style-type: none"> • Ignition ON. • Turn the function selector switch to the FLOOR position. • Select all blower speed positions. • Does the blower motor operate in any speed position? 	
J2	CHECK CIRCUIT 261 (OG/BK) FOR AN OPEN	<p>Yes INSTALL a new blower motor switch. TEST the system for normal operation.</p> <p>No REPAIR circuit 261 (OG/BK) for an open. TEST the system for normal operation.</p>
	<ul style="list-style-type: none"> • Ignition OFF. • Disconnect: Blower Motor Switch C294b. • Disconnect: Blower Motor C2066. • Measure the resistance between blower motor switch C294b-2, circuit 261 (OG/BK) and blower motor C2066-2, circuit 261 (OG/BK).  <p>N0095887</p> <ul style="list-style-type: none"> • Is the resistance less than 5 ohms? 	
J3	CHECK BLOWER MOTOR RESISTOR GROUND CIRCUIT 1205 (BK) FOR AN OPEN	
	<ul style="list-style-type: none"> • Ignition OFF. • Disconnect: Blower Motor Resistor C2185. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

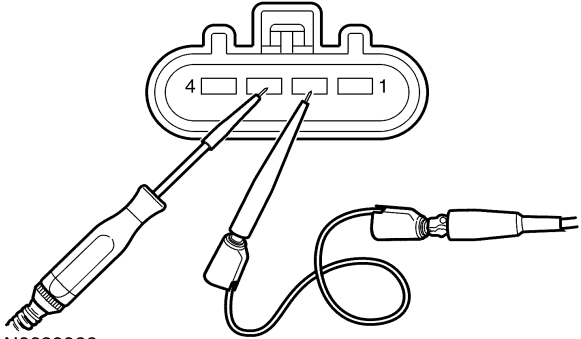
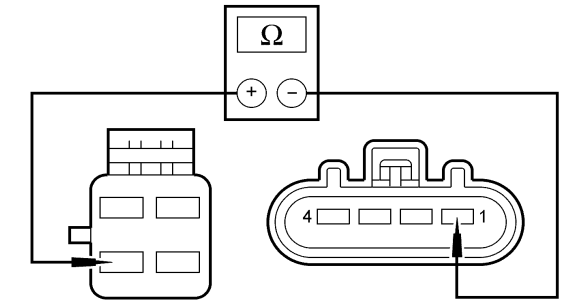
PINPOINT TEST J: THE BLOWER MOTOR DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
J3	<p>CHECK BLOWER MOTOR RESISTOR GROUND CIRCUIT 1205 (BK) FOR AN OPEN (Continued)</p> <ul style="list-style-type: none"> Measure the resistance between blower motor resistor C2185-4, circuit 1205 (BK) and ground.  <p>A0035320</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes INSTALL a new blower motor resistor. TEST the system for normal operation.</p> <p>No REPAIR circuit 1205 (BK) for an open. TEST the system for normal operation.</p>
J4	<p>CHECK CIRCUIT 752 (YE/RD) OR 754 (LG/WH) FOR AN OPEN</p> <p>NOTICE: Use the Flex Probe Kit for all test connections to prevent damage to the wiring terminals. Do not use the test lamp probe.</p> <ul style="list-style-type: none"> Ignition OFF. Disconnect: Blower Motor Resistor C2185. Ignition ON. For MED-LO inoperative: With the blower motor switch in the MED-LO speed position, connect a 12-volt test lamp between blower motor resistor C2185-2, circuit 261 (OG/BK), harness side and blower motor resistor C2185-1, circuit 752 (YE/RD), harness side. <p>For MED-LO inoperative</p>  <p>N0089365</p>	

(Continued)

DIAGNOSIS AND TESTING (Continued)

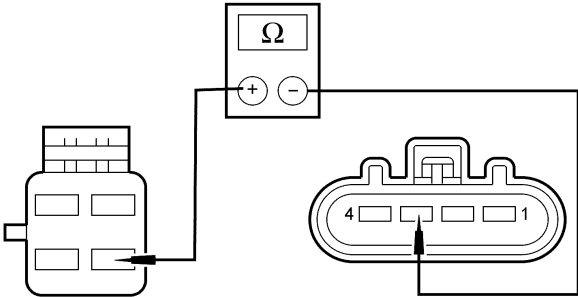
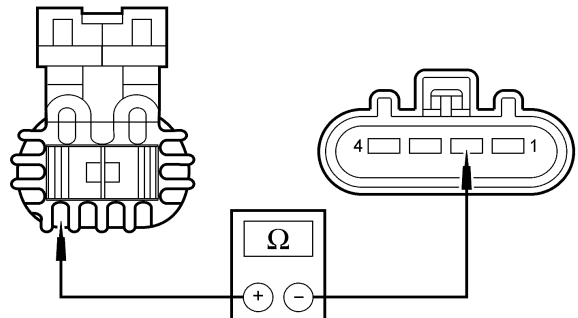
PINPOINT TEST J: THE BLOWER MOTOR DOES NOT OPERATE CORRECTLY (Continued)

	Test Step	Result / Action to Take
<p>J4</p>	<p>CHECK CIRCUIT 752 (YE/RD) OR 754 (LG/WH) FOR AN OPEN (Continued)</p>	
	<ul style="list-style-type: none"> • For MED-HI inoperative: With the blower motor switch in the MED-HI speed position, connect a 12-volt test lamp between blower motor resistor C2185-2, circuit 261 (OG/BK), harness side and blower motor resistor C2185-3, circuit 754 (LG/WH), harness side. <p>For MED-HI inoperative</p>  <p>N0089366</p> <ul style="list-style-type: none"> • Does the test lamp illuminate? 	<p>Yes INSTALL a new blower motor resistor. TEST the system for normal operation.</p> <p>No GO to J5.</p>
<p>J5</p>	<p>CHECK CIRCUIT 752 (YE/RD) OR 754 (LG/WH) FOR AN OPEN</p>	
	<ul style="list-style-type: none"> • Ignition OFF. • Disconnect: Blower Motor Switch C294b. • For MED-LO inoperative, measure the resistance between blower motor switch C294b-4, circuit 752 (YE/RD), harness side and blower motor resistor C2185-1, circuit 752 (YE/RD), harness side. <p>For MED-LO inoperative</p>  <p>A0071488</p>	

(Continued)

DIAGNOSIS AND TESTING (Continued)

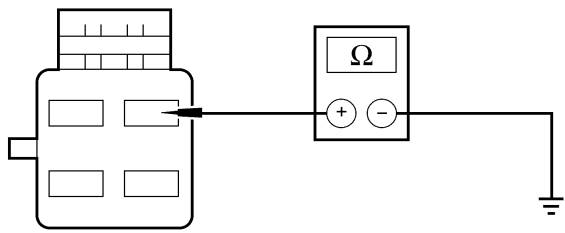
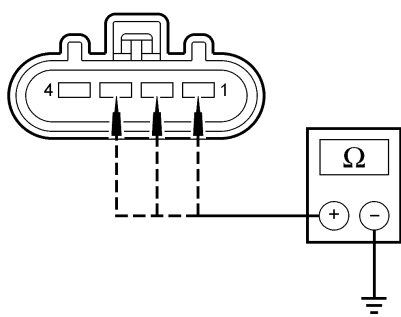
PINPOINT TEST J: THE BLOWER MOTOR DOES NOT OPERATE CORRECTLY (Continued)

	Test Step	Result / Action to Take
<p>J5</p>	<p>CHECK CIRCUIT 752 (YE/RD) OR 754 (LG/WH) FOR AN OPEN (Continued)</p>	
	<ul style="list-style-type: none"> For MED-HI inoperative, measure the resistance between blower motor switch C294b-3, circuit 754 (LG/WH), harness side and blower motor resistor C2185-3, circuit 754 (LG/WH), harness side. <p>For MED-HI inoperative</p>  <p>A0071487</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes CARRY OUT the Blower Motor Resistor component test in this section. If the resistor tests OK, INSTALL a new blower motor switch. TEST the system for normal operation.</p> <p>No REPAIR circuit 752 (YE/RD) or 754 (LG/WH) for an open. TEST the system for normal operation.</p>
<p>J6</p>	<p>CHECK BLOWER MOTOR RESISTOR CIRCUIT 261 (OG/BK) FOR AN OPEN</p>	
	<ul style="list-style-type: none"> Ignition OFF. Disconnect: Blower Motor Resistor C2185. Connect: Blower Motor C2066. Measure the resistance between blower motor resistor C2185-2, circuit 261 (OG/BK) and blower motor C2066-2, circuit 261 (OG/BK).  <p>A0073902</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes INSTALL a new blower motor resistor. TEST the system for normal operation.</p> <p>No REPAIR circuit 261 (OG/BK) for an open. TEST the system for normal operation.</p>
<p>J7</p>	<p>CHECK BLOWER MOTOR SWITCH CIRCUIT 1205 (BK) FOR AN OPEN</p>	
	<ul style="list-style-type: none"> Ignition OFF. Disconnect: Blower Motor Switch C294b. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

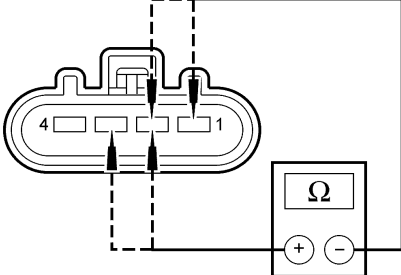
PINPOINT TEST J: THE BLOWER MOTOR DOES NOT OPERATE CORRECTLY (Continued)

	Test Step	Result / Action to Take
<p>J7</p>	<p>CHECK BLOWER MOTOR SWITCH CIRCUIT 1205 (BK) FOR AN OPEN (Continued)</p>	
	<ul style="list-style-type: none"> Measure the resistance between blower motor switch C294b-1, circuit 1205 (BK) and ground.  <p>A0020414</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes INSTALL a new blower motor switch. TEST the system for normal operation.</p> <p>No REPAIR circuit 1205 (BK) for an open. TEST the system for normal operation.</p>
<p>J8</p>	<p>CHECK CIRCUITS 261 (OG/BK), 752 (YE/RD) AND 754 (LG/WH) FOR A SHORT TO GROUND</p>	
	<ul style="list-style-type: none"> Ignition OFF. Disconnect: Blower Motor C2066. Disconnect: Blower Motor Switch C294b. Disconnect: Blower Motor Resistor C2185. Measure the resistance between ground and blower motor resistor C2185, circuit: <ul style="list-style-type: none"> — 752 (YE/RD) pin 1 — 261 (OG/BK) pin 2 — 754 (LG/WH) pin 3  <p>A0051664</p> <ul style="list-style-type: none"> Are the resistances greater than 10,000 ohms? 	<p>Yes GO to J9.</p> <p>No REPAIR the affected circuit. TEST the system for normal operation.</p>

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST J: THE BLOWER MOTOR DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
J9	CHECK THE BLOWER MOTOR CIRCUITS FOR SHORTS TOGETHER	
<ul style="list-style-type: none"> Measure the resistance between blower motor resistor C2185: <ul style="list-style-type: none"> — pin 1, circuit 752 (YE/RD) and pin 2, circuit 261 (OG/BK). — pin 1, circuit 752 (YE/RD) and pin 3, circuit 754 (LG/WH). — pin 2, circuit 261 (OG/BK) and pin 3, circuit 754 (LG/WH).  <p>A0051665</p> <ul style="list-style-type: none"> Are the resistances greater than 10,000 ohms? 		<p>Yes CARRY OUT the Blower Motor Resistor component test in this section. If the resistor tests OK, INSTALL a new blower motor switch. TEST the system for normal operation.</p> <p>No REPAIR the affected circuits. TEST the system for normal operation.</p>

Pinpoint Test K: HVAC Functions Verification

the following:

- Incorrect functioning of the HVAC system

This pinpoint test is intended to diagnose

PINPOINT TEST K: HVAC FUNCTIONS VERIFICATION

Test Step		Result / Action to Take
K1	CARRY OUT THE MODULES SELF-TESTS	
<ul style="list-style-type: none"> Ignition ON. Carry out the Smart Junction Box (SJB) and PCM modules self-tests. Record the DTCs displayed, if any. Were any DTCs displayed as a result of the self-tests? 		<p>Yes REFER to the Smart Junction Box (SJB) DTC Chart or PCM DTC Chart. CARRY OUT the necessary diagnosis and REPAIR as required.</p> <p>No GO to K2.</p>
K2	CHECK THE BLOWER MOTOR OPERATION	
<ul style="list-style-type: none"> Select PANEL mode. Observe blower motor operation and select each blower motor speed. Does the blower motor operate in all selections and change speed in each? 		<p>Yes GO to K3.</p> <p>No If the blower motor does not operate in any setting, GO to Pinpoint Test I. If the blower motor does not properly change speeds or shut OFF, GO to Pinpoint Test J.</p>
K3	CHECK AIRFLOW OPERATION	
<ul style="list-style-type: none"> Select the highest blower motor setting. NOTE: Refer to Climate Control System in Description and Operation for proper airflow descriptions. While observing the airflow, select each of the airflow positions (PANEL, PANEL/FLOOR, FLOOR, FLOOR/DEFROST, DEFROST). Is the airflow directed to the proper outlets? 		<p>Yes GO to K4.</p> <p>No GO to Pinpoint Test D.</p>

(Continued)

DIAGNOSIS AND TESTING (Continued)**PINPOINT TEST K: HVAC FUNCTIONS VERIFICATION (Continued)**

Test Step		Result / Action to Take
K4	VERIFY TEMPERATURE CONTROL OPERATION	Yes GO to K5 . No If the temperature does not get very warm, GO to Pinpoint Test E. If the temperature does not change at all, GO to Pinpoint Test D.
	<ul style="list-style-type: none"> Start the vehicle and allow it to reach normal operating temperature. With the A/C OFF, select PANEL mode. Change the temperature setting from the coldest to the warmest and back to the coldest Does the temperature change between very warm to cool? 	
K5	VERIFY THE A/C CLUTCH DOES NOT ENGAGE WITH A/C OFF	Yes GO to K6 . No If the temperature is warmer than ambient temperature, GO to Pinpoint Test D and diagnose for inoperative blend door. If the outlet temperature is significantly colder than ambient temperature and the A/C compressor clutch cycles normally, GO to Pinpoint Test G. If the outlet temperature is significantly colder than ambient temperature and the A/C compressor clutch does not cycle, GO to Pinpoint Test H.
	<ul style="list-style-type: none"> With the A/C OFF, select PANEL mode. Select the coldest temperature setting. Is the outlet temperature close to ambient temperature? 	
K6	VERIFY A/C CLUTCH ENGAGEMENT IN THE A/C MODE	Yes GO to K7 . No GO to Pinpoint Test F.
	<ul style="list-style-type: none"> Make sure the ambient air temperature is above 2°C (35°F). Select PANEL mode. Press the A/C button (indicator ON). Does the A/C clutch engage when the PANEL and A/C button (indicator ON) is pressed? 	
K7	CHECK THE RECIRC OPERATION	Yes The system is operating normally. No GO to Pinpoint Test C.
	<ul style="list-style-type: none"> Press the RECIRC button (indicator OFF). Select PANEL mode. Select the highest blower motor setting. Observe airflow noise. Press the RECIRC button (indicator ON). Does the airflow noise increase when the RECIRC mode is selected (indicator ON)? 	

Pinpoint Test L: Temperature Control is Inoperative/Does Not Operate Correctly

Refer to Wiring Diagrams Cell 54, Manual Climate Control System for schematic and connector information.

Normal Operation

Under normal operation, to rotate the mode door actuator clockwise, the HVAC module supplies voltage to the BLEND door actuator motor through circuit 1376 (BK/LB), and supplies ground through circuit 1375 (PK/YE). To rotate the mode door actuator counterclockwise, the HVAC module reverses the voltage and ground circuits.

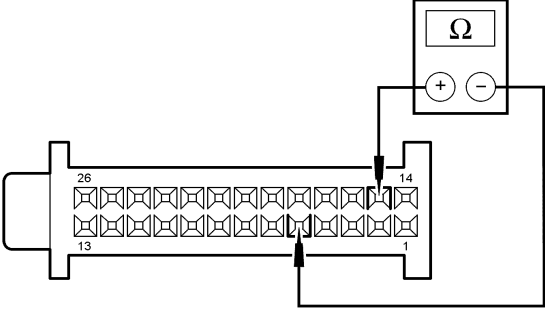
The blend door actuator feedback resistors are supplied a ground from the HVAC module by circuit 438 (RD/WH) and a 5-volt reference voltage on circuit 436 (RD/LG). The HVAC module reads the voltage on circuit 437 (YE/LG) to determine the blend door actuator position by the position of the actuator feedback resistor wiper arm.

This pinpoint test is intended to diagnose the following:

- An open, short to voltage, ground or together in door actuator open, close, return, reference or feedback circuits
- Blend, air inlet, defrost and floor/panel mode door actuator motor
- HVAC module
- Manual climate control module
- Stuck or bound linkage or door

DIAGNOSIS AND TESTING (Continued)

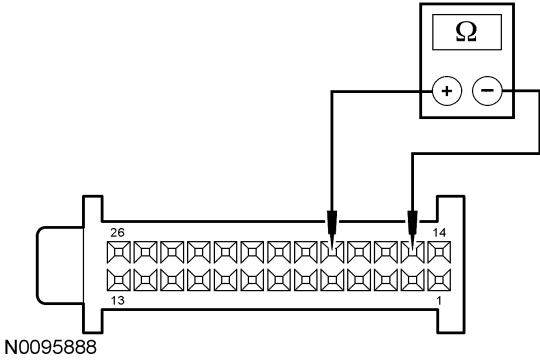
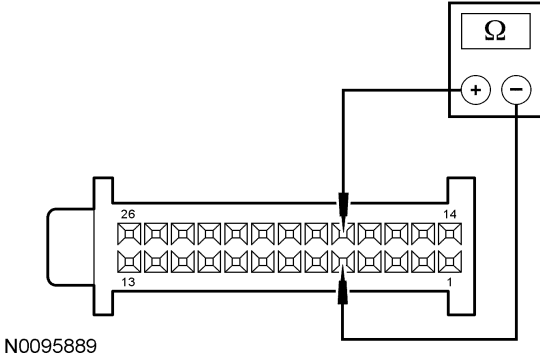
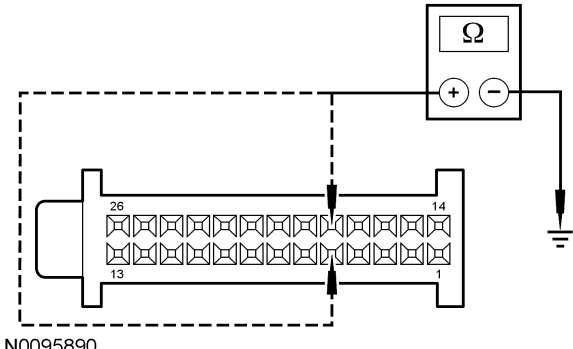
PINPOINT TEST L: TEMPERATURE CONTROL IS INOPERATIVE/DOES NOT OPERATE CORRECTLY

	Test Step	Result / Action to Take
L1	<p>CHECK THE FEEDBACK POTENTIOMETER TOTAL RESISTANCE</p>	
	<p>NOTICE: Use the correct size flex probe from the Flex Probe Kit for all test connections. The use of the correct size flex probe is critical to avoid damage to the connector terminals.</p> <p>NOTE: Check all electrical connectors for proper seating before disconnecting. If incorrectly seated, reseal and lock the connector. Test the system operation. If the condition remains, continue with this test.</p> <ul style="list-style-type: none"> • Disconnect: HVAC Module C294a. • Measure the resistance between HVAC module C294a-5, circuit 436 (RD/LG) and HVAC module C294a-15, circuit 438 (RD/WH).  <p>A0072902</p> <ul style="list-style-type: none"> • Is the resistance greater than 500 ohms? 	<p>Yes GO to L2.</p> <p>No REPAIR circuits 436 (RD/LG) and 438 (RD/WH) for a short together. TEST the system for normal operation.</p>

(Continued)

DIAGNOSIS AND TESTING (Continued)

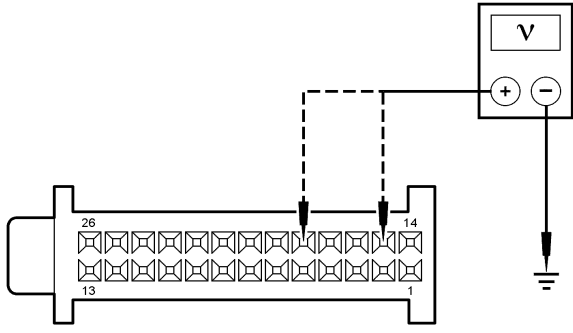
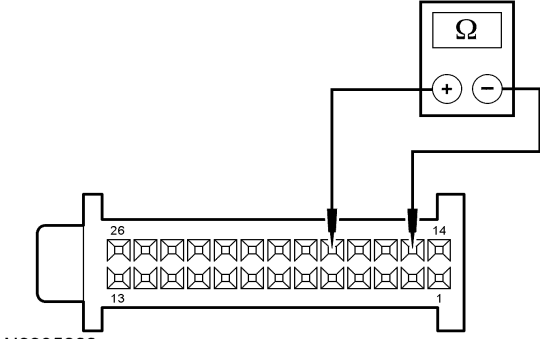
PINPOINT TEST L: TEMPERATURE CONTROL IS INOPERATIVE/DOES NOT OPERATE CORRECTLY (Continued)

	Test Step	Result / Action to Take
<p>L2</p>	<p>CHECK THE POTENTIOMETER LOW- AND HIGH-SIDE RESISTANCE</p> <ul style="list-style-type: none"> Measure the low-side resistance between HVAC module C294a-15, circuit 438 (RD/WH) and HVAC module C294a-18, circuit 437 (YE/LG).  <p>N0095888</p> <ul style="list-style-type: none"> Measure the high-side resistance between HVAC module C294a-5, circuit 436 (RD/LG) and HVAC module C294a-18, circuit 437 (YE/LG).  <p>N0095889</p> <ul style="list-style-type: none"> Is the resistance between 225 and 11,275 ohms? 	<p>Yes GO to L3.</p> <p>No CARRY OUT the Temperature Blend Door Actuator Component Test in this section. If the actuator tests OK and:</p> <p>If the low-side resistance only is greater than 11,275 ohms, REPAIR circuit 438 (RD/WH) for an open. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p> <p>If the low-side resistance only is less than 225 ohms, REPAIR circuits 437 (YE/LG) and 438 (RD/WH) for a short together. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p> <p>If the high-side resistance only is greater than 11,275 ohms, REPAIR circuit 436 (RD/LG) for an open. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p> <p>If the high-side resistance only is less than 225 ohms, REPAIR circuits 437 (YE/LG) and 436 (RD/LG) for a short together. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p> <p>If the high-side and low-side resistance is greater than 11,275 ohms, REPAIR circuit 437 (YE/LG) for an open. CLEAR the DTCs. REPEAT the self-test. TEST the system for normal operation.</p>
<p>L3</p>	<p>CHECK CIRCUITS 436 (RD/LG) AND 437 (YE/LG) FOR A SHORT TO GROUND</p> <ul style="list-style-type: none"> Disconnect: Blend Door Actuator C289. Measure the resistance between ground and the following: <ul style="list-style-type: none"> — HVAC module C294a-5, circuit 436 (RD/LG). — HVAC module C294a-18, circuit 437 (YE/LG).  <p>N0095890</p> <ul style="list-style-type: none"> Is the resistance greater than 10,000 ohms? 	<p>Yes GO to L4.</p> <p>No REPAIR circuit(s) for a short to ground. TEST the system for normal operation.</p>

(Continued)

DIAGNOSIS AND TESTING (Continued)

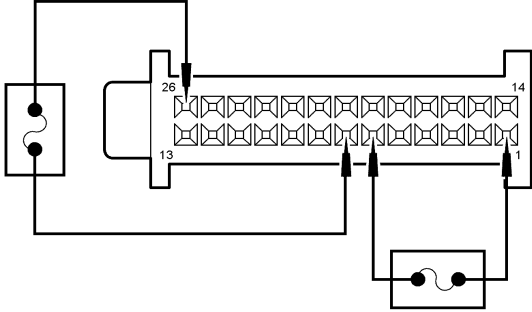
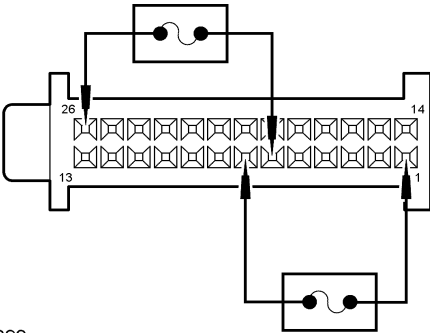
PINPOINT TEST L: TEMPERATURE CONTROL IS INOPERATIVE/DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
L4	<p>CHECK CIRCUITS 438 (RD/WH) AND 437 (YE/LG) FOR A SHORT TO POWER</p> <ul style="list-style-type: none"> Ignition ON. Measure the voltage between ground and the following: <ul style="list-style-type: none"> HVAC module C294a-15, circuit 438 (RD/WH). HVAC module C294a-18, circuit 437 (YE/LG).  <p>N0095891</p> <ul style="list-style-type: none"> Is any voltage present? 	<p>Yes REPAIR circuit(s) for a short to power. TEST the system for normal operation.</p> <p>No GO to L5.</p>
L5	<p>CHECK THE DOOR ACTUATOR OPERATION</p> <p>NOTE: If a jumper fuse opens while carrying out this test step, repair the circuit(s) for a short.</p> <ul style="list-style-type: none"> Measure the low-side resistance between HVAC module C294a-15, circuit 438 (RD/WH) and HVAC module C294a-18, circuit 437 (YE/LG).  <p>N0095888</p>	

(Continued)

DIAGNOSIS AND TESTING (Continued)

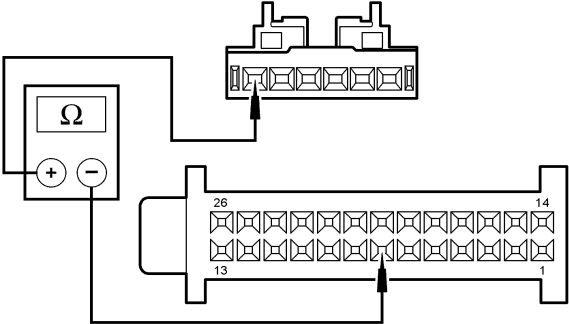
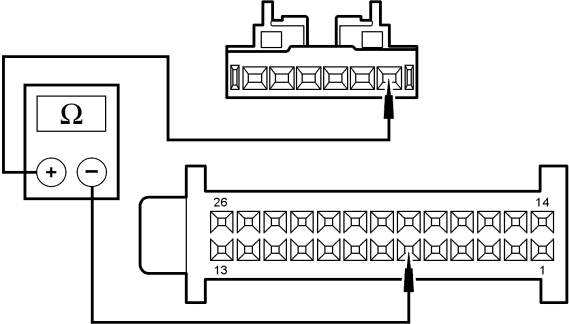
PINPOINT TEST L: TEMPERATURE CONTROL IS INOPERATIVE/DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
L5	<p>CHECK THE DOOR ACTUATOR OPERATION (Continued)</p> <ul style="list-style-type: none"> For no more than 3 seconds, connect a fused jumper wire between: <ul style="list-style-type: none"> HVAC module C294a-26, circuit 1566 (RD/YE) and HVAC module C294a-7, circuit 1376 (BK/LB). HVAC module C294a-1, circuit 1205 (BK) and HVAC module C294a-6, circuit 1375 (PK/YE).  <p>N0095892</p> <ul style="list-style-type: none"> Remove the fused jumpers. For no more than 3 seconds, connect a fused jumper wire between: <ul style="list-style-type: none"> HVAC module C294a-1, circuit 1205 (BK) and HVAC module C294a-7, circuit 1376 (BK/LB). HVAC module C294a-26, circuit 1566 (RD/YE) and HVAC module C294a-6, circuit 1375 (PK/YE).  <p>N0095893</p> <ul style="list-style-type: none"> Does the resistance smoothly increase and/or decrease when the jumpers are connected? 	<p>Yes INSPECT for broken door and linkage. REPAIR as necessary. If no condition is found, GO to L7.</p> <p>No GO to L6.</p>
L6	<p>CHECK THE ACTUATOR MOTOR DRIVE CIRCUITS FOR AN OPEN</p> <p>NOTE: Due to limited connector accessibility, before carrying out this test step, visually inspect the wiring between the HVAC module and actuator for opens or shorts. If no damage is visually evident, proceed with the test.</p> <ul style="list-style-type: none"> Ignition OFF. Disconnect: Blend Door Actuator C289. 	

(Continued)

DIAGNOSIS AND TESTING (Continued)

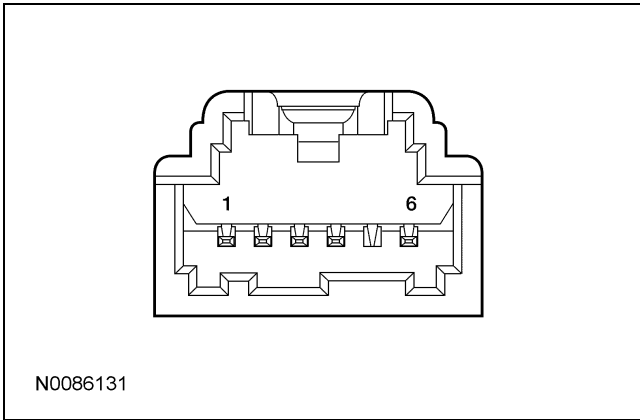
PINPOINT TEST L: TEMPERATURE CONTROL IS INOPERATIVE/DOES NOT OPERATE CORRECTLY (Continued)

Test Step	Result / Action to Take
<p>L6 CHECK THE ACTUATOR MOTOR DRIVE CIRCUITS FOR AN OPEN (Continued)</p> <ul style="list-style-type: none"> Measure the resistance between HVAC module C294a-7, circuit 1376 (BK/LB) and blend door actuator C289-6, circuit 1376 (BK/LB).  <p>N0095894</p> <ul style="list-style-type: none"> Measure the resistance between HVAC module C294a-6, circuit 1375 (PK/YE) and blend door actuator C289-1, circuit 1375 (PK/YE).  <p>N0095895</p> <ul style="list-style-type: none"> Is the resistance less than 5 ohms? 	<p>Yes INSPECT for binding or broken linkage. REPAIR as necessary. If no condition is found, INSTALL a new door actuator. TEST the system for normal operation.</p> <p>No REPAIR the circuit(s) for an open. TEST the system for normal operation.</p>
<p>L7 MODULE ACTUATOR POSITION CALIBRATION</p> <p>NOTE: The purpose of the module actuator position calibration is to allow the HVAC module to reinitialize and calibrate the actuator stop points. To carry out the calibration, follow the steps below.</p> <ul style="list-style-type: none"> Ignition OFF. Inspect the module connectors for: <ul style="list-style-type: none"> — corrosion. — pushed-out terminals. — damaged terminals. Connect: EMTC Module C294a. Ignition ON. Select any position except OFF. NOTE: The HVAC module will now initialize and calibrate the actuators. Calibration of the actuators will take approximately 30 seconds. Operate the system. Does the concern return? 	<p>Yes INSTALL a new HVAC module. REFER to Section 412-01. TEST the system for normal operation.</p> <p>No The system is now operating correctly. The concern may have been caused by a foreign object in the HVAC case or temporary binding that restricted actuator door travel. CHECK any actuator external linkage. If condition recurs, INSPECT actuator linkage and door for binding and CHECK HVAC case for foreign objects.</p>

DIAGNOSIS AND TESTING (Continued)

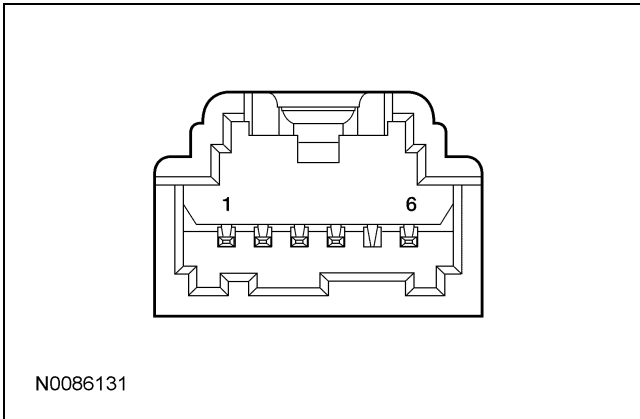
Component Tests

Floor/Panel Mode Door Actuator



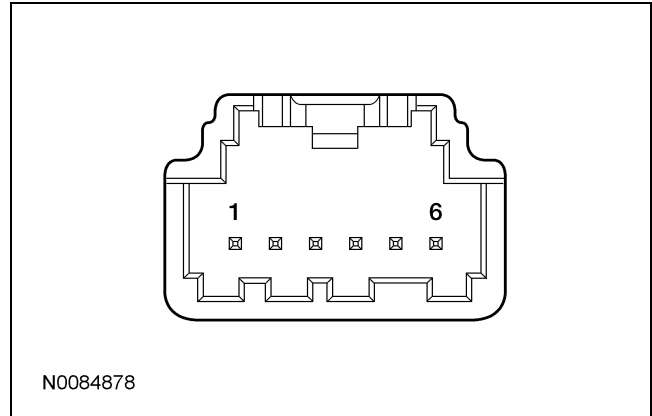
Actuator Pins	Approx. Resistance
2 and 3	9,450-11,550 ohms
2 and 4	225-11,275 ohms
3 and 4	225-11,275 ohms
1 and 6	32-40 ohms

Defrost Mode Door Actuator



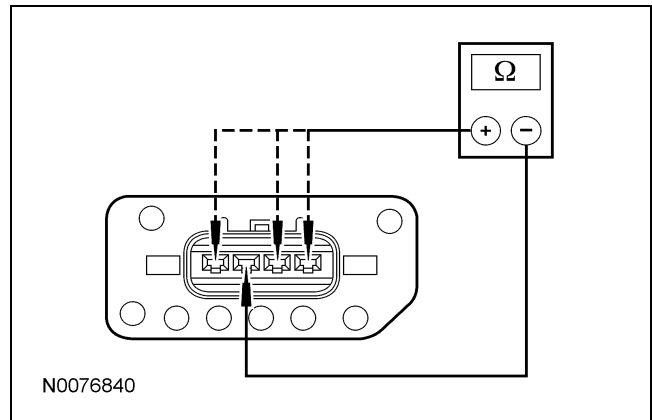
Actuator Pins	Approx. Resistance
2 and 3	9,450-11,550 ohms
2 and 4	225-11,275 ohms
3 and 4	225-11,275 ohms
1 and 6	32-40 ohms

Blend Mode Door Actuator



Actuator Pins	Approx. Resistance
2 and 3	9,450-11,550 ohms
2 and 4	225-11,275 ohms
3 and 4	225-11,275 ohms
1 and 6	32-40 ohms

Resistor — Blower Motor



Blower Motor Resistor Pins	Resistance
4 and 2	2.0-2.6 ohms
2 and 3	0.2-0.4 ohms
2 and 1	0.8-1.1 ohms

DIAGNOSIS AND TESTING (Continued)

Heater Core

1. **NOTE:** If a heater core leak is suspected, the heater core must be tested by carrying out the plugged heater core component test before the heater core pressure test. Carry out a system inspection by checking the heater system thoroughly as follows:

Inspect for evidence of coolant leakage at the heater water hose to heater core attachments. A coolant leak in the heater water hose could follow the heater core tube to the heater core and appear as a leak in the heater core.

2. **NOTE:** Spring-type clamps are installed as original equipment. Installation and overtightening of non-specification clamps can cause leakage at the heater water hose connection and damage the heater core.

Check the integrity of the heater water hose clamps.

Heater Core — Plugged

1. Check to see that the engine coolant is at the correct level.
2. Start the engine and turn on the heater.
3. When the engine coolant reaches operating temperature, check the heater core inlet and outlet hoses to see if they are hot.

If the inlet hose is not hot:

- the thermostat is not working correctly.

If the outlet hose is not hot:


- the heater core may have an air pocket.
- the heater core may be restricted or plugged.

Heater Core — Pressure Test

Use the Radiator/Heater Core Pressure Tester to carry out the pressure test.

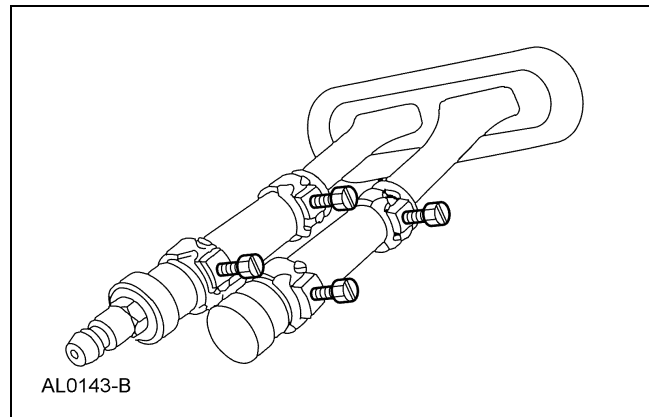
1. **NOTE:** Due to space limitations, a bench test may be necessary for pressure testing.

Clamp off the heater hoses.

2.  **WARNING:** Before disconnecting any heater water hoses, shut OFF the engine and wait until engine is fully cool. Failure to comply with this warning may result in serious injury or burns from hot liquid escaping from the engine cooling system.

Disconnect the heater water hoses from the heater core.

3. Install a short piece of heater hose, approximately 101 mm (4 in) long on each heater core tube.
4. Fill the heater core and heater hoses with water and install plug BT-7422-B and the adapter BT-7422-A from the Pressure Test Kit. Secure the heater hoses, plug and adapter with hose clamps.



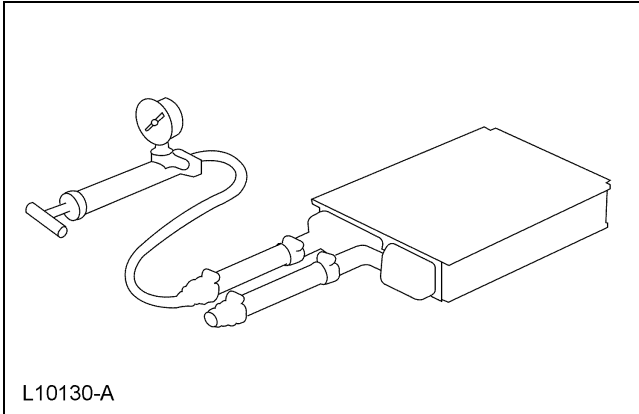
5. Attach the pump and gauge assembly from the Pressure Test Kit to the adapter.
6. Close the bleed valve at the base of the gauge. Pump 138 kPa (20 psi) of air pressure into the heater core.
7. Observe the pressure gauge for a minimum of 3 minutes.
8. If the pressure drops, check the heater water hose connections to the core tubes for leaks. If the heater water hoses do not leak, remove the heater core from the vehicle and carry out the bench test.

Heater Core — Bench Test

1. Remove the heater core from the vehicle. Refer to Section 412-01.
2. Drain all of the coolant from the heater core.
3. Connect the 101 mm (4 in) test heater hoses with plug and adapter to the core tubes. Then connect the Pressure Test Kit to the adapter.
4. Apply 138 kPa (20 psi) of air pressure to the heater core. Submerge the heater core in water.

DIAGNOSIS AND TESTING (Continued)

5. If a leak is observed, install a new heater core.

**A/C Evaporator/Condenser Core — On Vehicle Leak Test**

1. Recover the refrigerant. Refer to Air Conditioning (A/C) System Recovery, Evacuation and Charging in this section.
2. **NOTE:** DO NOT leak test an A/C evaporator core with the suction accumulator/drier attached to the core tubes.

Disconnect the suspect A/C evaporator core or A/C condenser core from the A/C system. Refer to Section 412-01.
3. Clean the spring lock couplings. Refer to Spring Lock Coupling in this section.
4. Connect the appropriate test fittings from the A/C Flush Adapter Kit to the evaporator or condenser tube connections.
5. **NOTE:** The automatic shut-off valves on some gauge set hoses do not open when connected to the test fittings. If available, use hoses without shut-off valves. If hoses with shut-off valves are used, make sure the valve opens when attached to the test fittings or install an adapter which will activate the valve. The test is not valid if the shut-off valve does not open.

Connect the red and blue hoses from the R-134a Manifold Gauge Set to the test fittings on the A/C evaporator core or A/C condenser core. Connect the yellow hose to a known good vacuum pump.

6. Open both gauge set valves and start the vacuum pump. Allow the vacuum pump to operate for a minimum of 45 minutes after the gauge set low pressure gauge indicates 101 kPa (30 in-Hg). The 45 minute evacuation is necessary to remove any refrigerant from oil left in the A/C evaporator core or A/C condenser core. If the refrigerant is not completely removed from the oil, outgassing will degrade the vacuum and appear as a refrigerant leak.
7. If the low pressure gauge reading will not drop to 101 kPa (30 in-Hg) when the valves on the gauge and manifold set are open and the vacuum pump is operating, close the gauge set valves and observe the low pressure gauge. If the pressure rises rapidly to zero, a large leak is indicated. Recheck the test fitting connections and gauge set connections before installing a new A/C evaporator core or A/C condenser core.
8. After evacuating for 45 minutes, close the gauge set valves and stop the vacuum pump. Observe the low pressure gauge; it should remain at the 101 kPa (30 in-Hg) mark.
 - If the low pressure gauge reading rises 34 or more kPa (10 or more in-Hg) of vacuum from the 101 kPa (30 in-Hg) position in 10 minutes, a leak is indicated.
 - If a very small leak is suspected, wait 30 minutes and observe the vacuum gauge.
 - If a small amount of vacuum is lost, operate the vacuum pump with gauge valves open for an additional 30 minutes to remove any remaining refrigerant from the oil in the A/C evaporator core or A/C condenser core. Then recheck for loss of vacuum.
 - If a very small leak is suspected, allow the system to set overnight with vacuum applied and check for vacuum loss.
9. If the A/C evaporator core or A/C condenser core does leak, as verified by the above procedure, install a new A/C evaporator core or A/C condenser core. Refer to Section 412-01.

A/C Compressor — External Leak Test

1. Install the correct adapter from the A/C Flush Adapter Kit on the rear head of the A/C compressor, using the existing manifold retaining bolt.

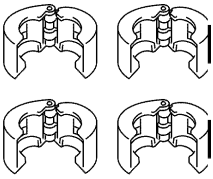
DIAGNOSIS AND TESTING (Continued)

2. Connect the high- and low-pressure lines of a manifold gauge set or a refrigerant recovery/recycling station to the corresponding fittings on the adapter.
 3. Attach the center hose of the manifold gauge set to a refrigerant container standing in an upright position.
 4. Open the low-pressure gauge valve, the high-pressure gauge valve and the valve on the refrigerant container to allow the refrigerant vapor to flow into the A/C compressor.
 5. Using the Refrigerant Leak Detector, check for leaks at the compressor shaft.
 6. If an external leak is found, install a new A/C compressor. Refer to Section 412-01.
 7. When the leak test is complete, recover the refrigerant from the compressor.
-

GENERAL PROCEDURES

Spring Lock Coupling

Special Tool(s)

 <p>ST2352-A</p>	<p>Remover, Refrigerant Coupling Spring 412-039 (T84L-19623-B)</p>
---	--

Material

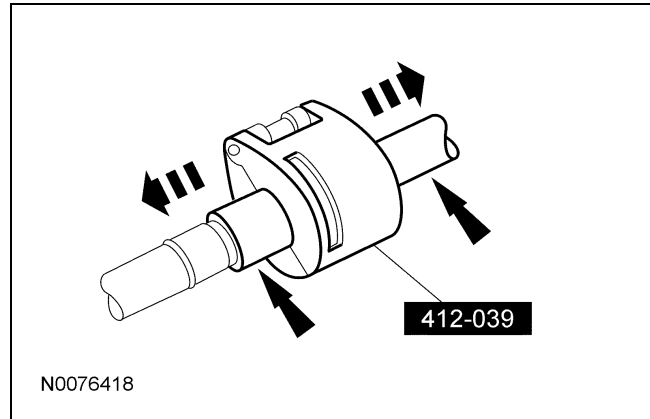
Item	Specification
PAG Refrigerant Compressor Oil (R-134a Systems) YN-12-D	WSH-M1C231-B

Disconnect

NOTE: If a leak has been found at a spring lock coupling, inspect the O-ring sealing surfaces on the male and female sides of the fitting for damage or scratches. Replace the affected component if damage is identified. If no damage is present, thoroughly clean both sides of the fitting using a suitable non-abrasive cloth, lubricate with PAG oil and install new O-ring seals. Due to subtle differences in O-ring sizes, it is critical for leak prevention that the correct O-ring seal be identified. Refer to the Ford master parts catalog for the specific vehicle and application. When repairs are complete, leak test the spring lock coupling to verify the repair.

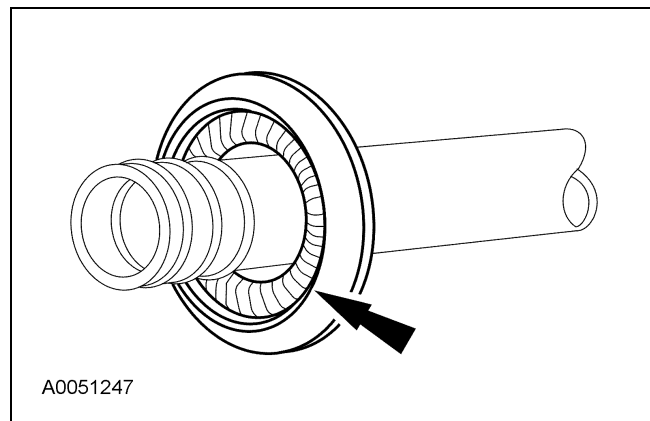
1. Remove the spring lock coupling clip, if equipped.
2. **NOTICE:** Do not use metal tools to remove the O-ring seals. They may cause axial scratches across the O-ring seal grooves, resulting in refrigerant leaks.
Push the Refrigerant Coupling Spring Remover into the cage opening to release the female fitting from the spring lock coupling spring and pull the fitting apart.

- Remove the O-ring seals using a non-metallic tool.



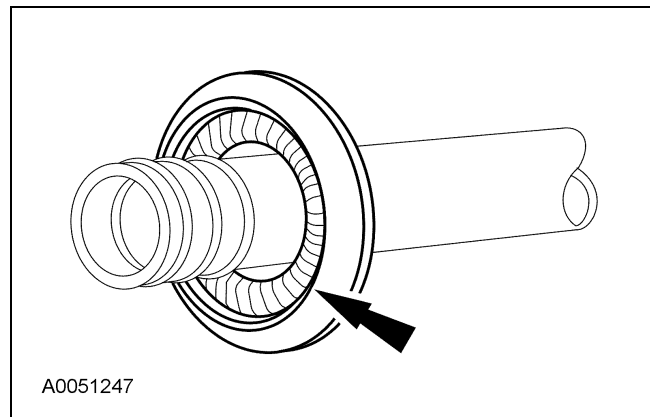
3. **NOTICE:** Do not use a screwdriver or similar tool to remove the Air Conditioning (A/C) tube lock coupling spring; this may cause axial scratches across the O-ring seal grooves resulting in refrigerant leaks.

Remove the spring lock coupling spring with a small hooked wire.



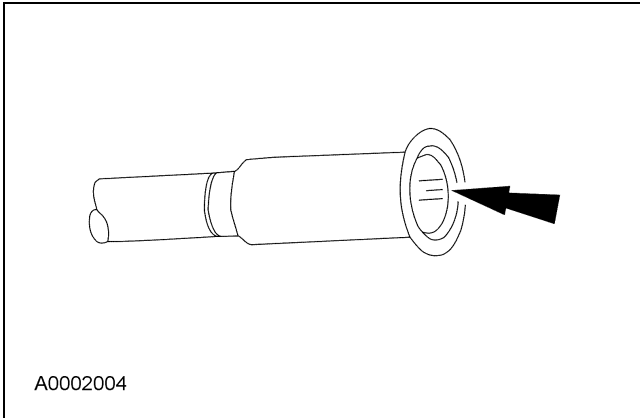
Connect

1. Install the spring lock coupling spring.

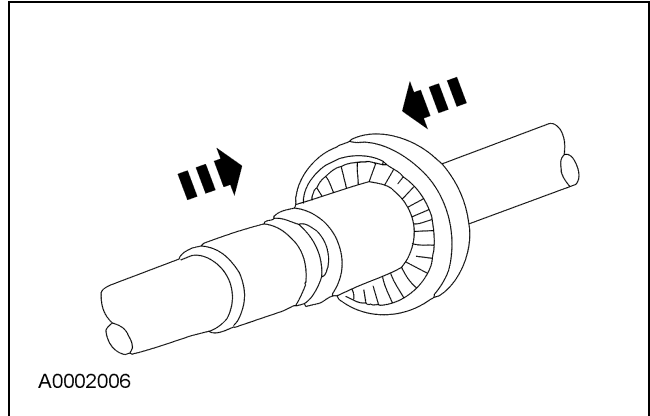


GENERAL PROCEDURES (Continued)

- 2. Lubricate the inside of the coupling with PAG oil.



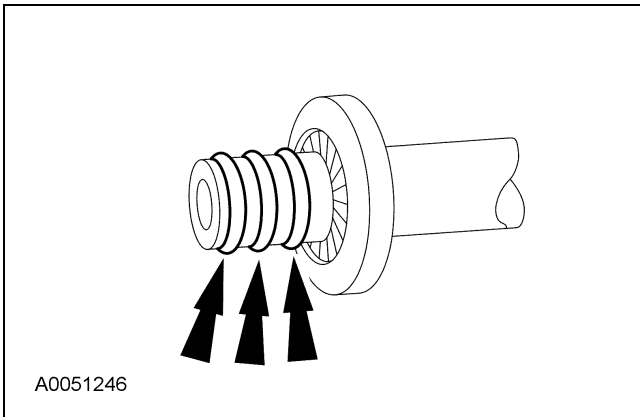
- 4. Connect the spring lock coupling fittings with a twisting motion until the spring lock coupling spring snaps over the flared end of the female fitting.



- 3. **NOTICE:** Use only the new O-ring seals. The use of any O-ring seals other than those specified in the Ford Master Parts Catalog may result in intermittent leakage during vehicle operation.

Install the O-ring seals.

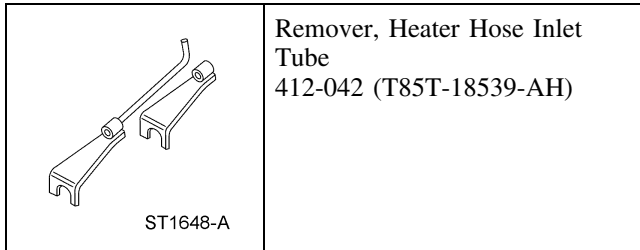
- 5. Install the spring lock coupling clip.



GENERAL PROCEDURES


Heater Hose Coupling

Special Tool(s)



Disconnect

NOTICE: Do not attempt to install a new bushing, spacer or O-rings in the heater hose coupling; damage to the heater hose coupling can result. If the heater hose coupling is the cause of a coolant leak, the affected heater hose must be replaced as an assembly.

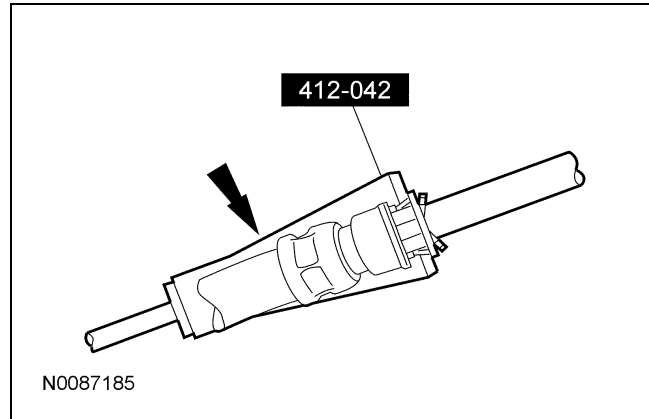
1.  **WARNING:** Before disconnecting any heater water hoses, shut OFF the engine and wait until engine is fully cool. Failure to comply with this warning may result in serious injury or burns from hot liquid escaping from the engine cooling system.

Depressurize the engine cooling system.

2. Push the heater hose toward the tube to fully expose the locking tabs.
3. **NOTE:** When compressing the white coupling retainer, the Heater Hose Disconnect Tool or Heater Hose Inlet Tube Remover must be perpendicular to and on the highest point of the coupling.

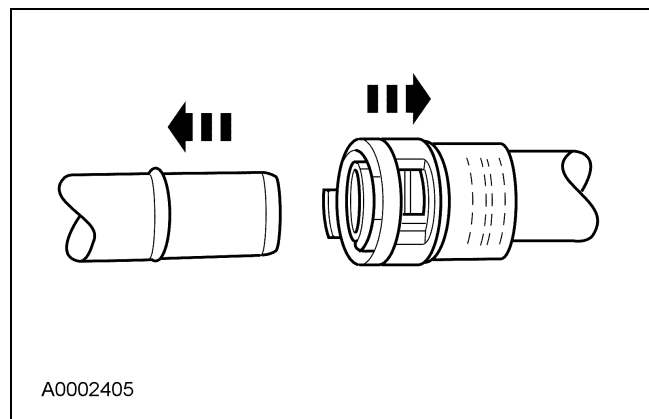
NOTE: If the heater hose coupling is accessible, the retainer tabs can be compressed by hand to disconnect the heater hose.

Push the Heater Hose Disconnect Tool or Heater Hose Inlet Tube Remover over the coupling retainer windows to compress the retainer locking tabs.

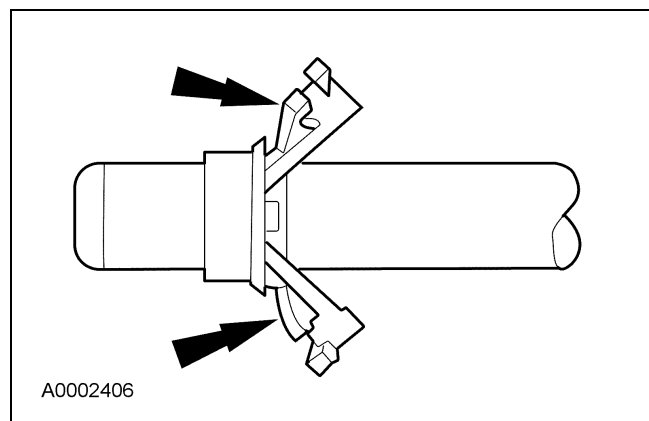


4. **NOTE:** A slight twisting motion while pulling on the heater water hose may be necessary to assist in the removal.

Pull the heater hose away from the heater core tube.

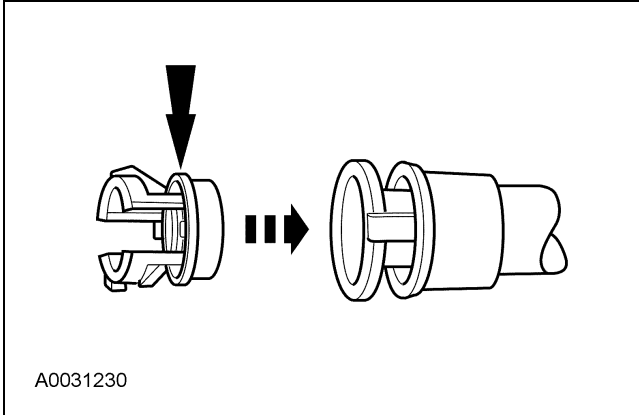


5. Spread the retainer tabs apart and slide the retainer off the tube.
 - Discard the retainer.

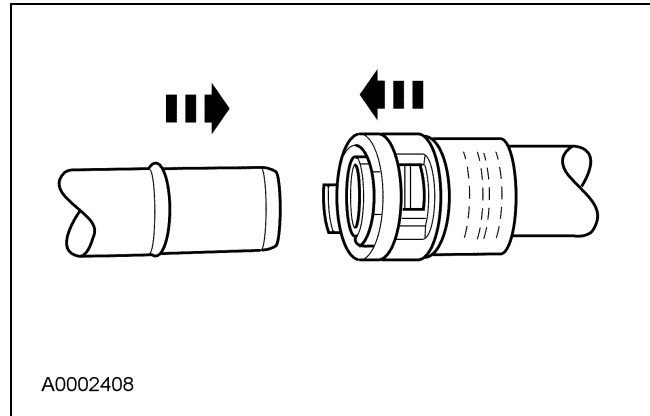


GENERAL PROCEDURES (Continued)**Connect**

1. Clean the tubes and lubricate with plain water.
2. Install a new coupling retainer into the heater hose coupling housing.



3. Push the heater hose coupling onto the tube.



4. Make sure the heater hose coupling is fully engaged by lightly pulling on the heater hose.

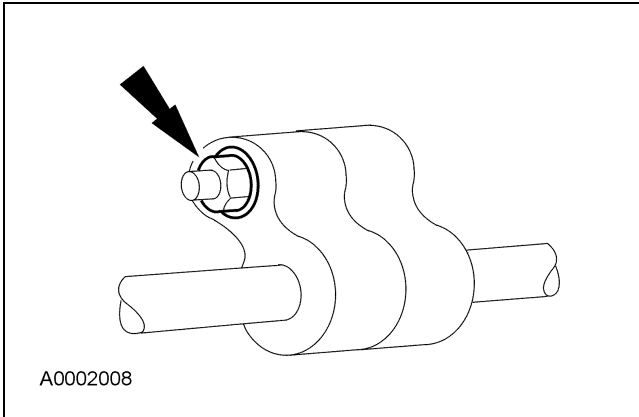
GENERAL PROCEDURES

Air Conditioning Line (Peanut) Fitting

Disconnect

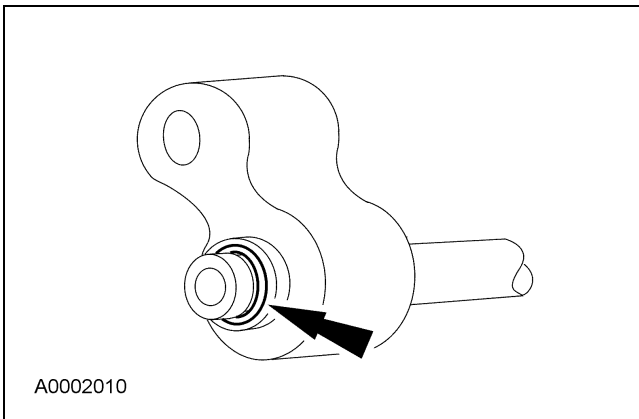
1. **NOTICE:** Support the female fitting with a wrench to prevent the tubes from twisting.

Remove the nut and separate the 2 halves of the peanut fitting.



2. **NOTICE:** Do not use metal tools to remove the O-ring seal. They can cause axial scratches across the O-ring seal groove, resulting in refrigerant leaks.

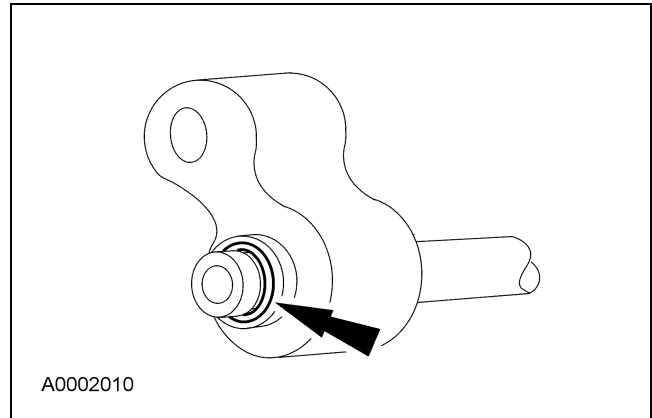
Remove the O-ring seal with a non-metallic tool.



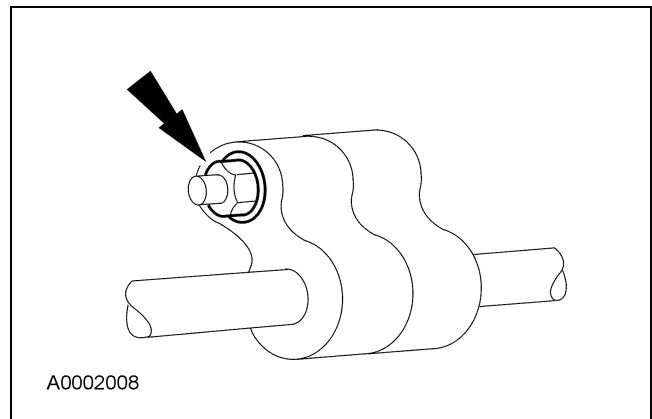
Connect

1. Clean all dirt or foreign material from the fittings.
2. **NOTICE:** Use only the new O-ring seals. The use of any O-ring seals other than those specified in the Ford Master Parts Catalog may result in intermittent leakage during vehicle operation.

Install the O-ring seal.



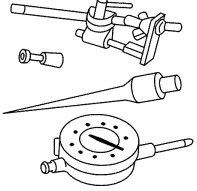
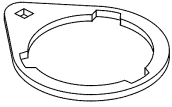
3. **NOTE:** When correctly assembled, the male and female fittings should be flush. Assemble the male and female fittings together.



GENERAL PROCEDURES

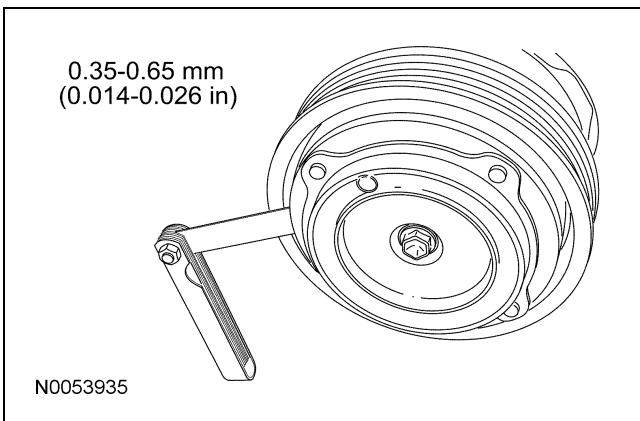
Air Conditioning (A/C) Clutch Air Gap Adjustment

Special Tool(s)

 <p>ST1214-A</p>	<p>Dial Indicator Gauge With Holding Fixture 100-001 or equivalent</p>
 <p>ST2946-A</p>	<p>Holding Tool, Compressor Clutch 412-134</p>

4.0L SOHC and 4.6L (3V) vehicles

1. Check the clutch air gap at 3 equally spaced places between the clutch plate and the A/C clutch pulley.

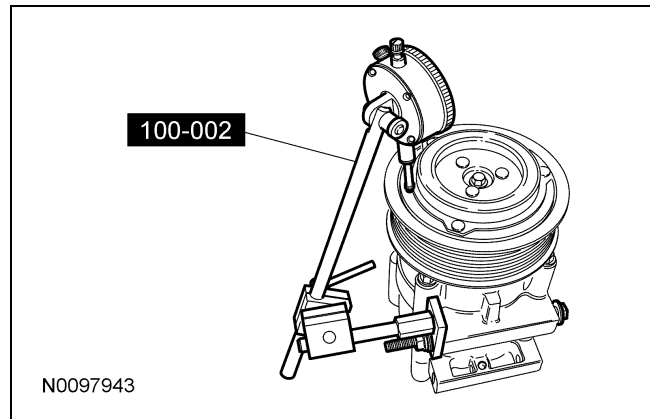


5.4L (4V) vehicles

2. If the A/C compressor has not been removed from the vehicle, remove the lower front A/C compressor bolt.
 - To install, tighten to 25 Nm (18 lb-ft).

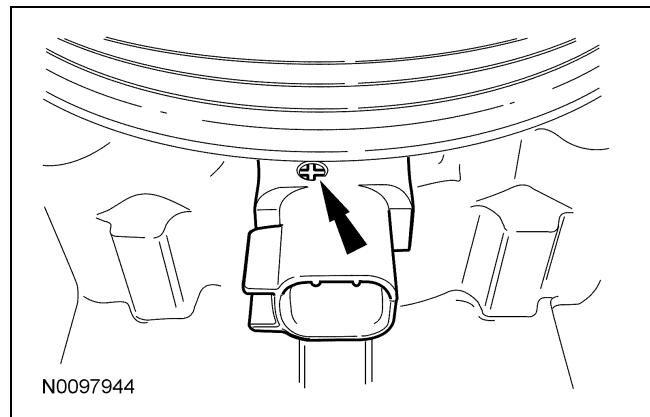
3. **NOTE:** If carrying out the clutch air gap measurement with the A/C compressor removed from the vehicle, the Dial Indicator Gauge with Holding Fixture can be installed using the lower front A/C compressor bolt and a suitable nut.

Using the A/C compressor bolt, attach the Dial Indicator Gauge with Holding Fixture to the bottom front compressor mounting boss with the gauge pin contacting the hub portion of the A/C clutch disc and hub and partially depressed.



4. **NOTICE:** The positive side of the A/C clutch field coil electrical connector will be identified by the presence of a positive symbol on the component side of the electrical connector.

Disconnect and inspect the A/C clutch field coil electrical connector to correctly identify the positive side of the electrical connector.



GENERAL PROCEDURES (Continued)

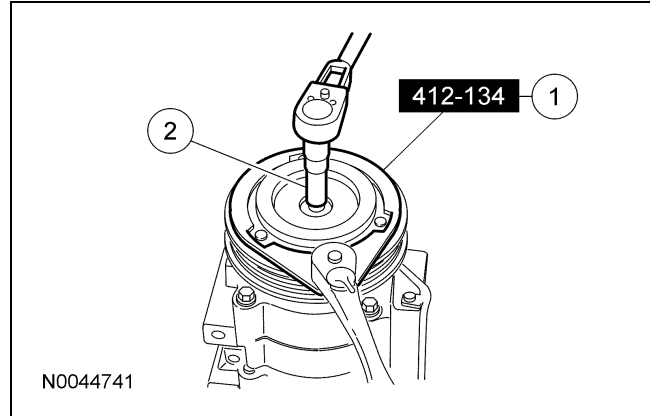
5. **NOTE:** To make sure of correct polarity, only attach the 12V power supply positive lead to the positive side of the electrical connector and the negative lead to the negative side.

Using 2 fused jumper wires, engage the compressor clutch by connecting the A/C clutch field coil to the power and ground from a 12V power supply.

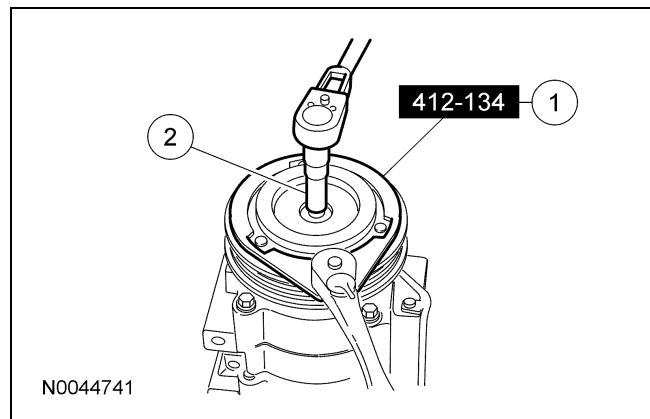
6. Adjust the Dial Indicator Gauge to the zero position with the A/C clutch engaged.
7. Disconnect the 12V power supply from the A/C clutch field coil.
8. **NOTE:** When the 12V power supply is disconnected from the A/C clutch field coil, the clutch air gap measurement will be displayed on the runout gauge.
Record the clutch air gap measurement shown on the runout gauge.
9. Repeat the measurement at 2 additional equally spaced places on the disc portion of the A/C clutch disc and hub assembly.
10. Remove the Dial Indicator Gauge with Holding Fixture from the vehicle and reinstall the lower front A/C compressor bolt.

All vehicles

11. If the A/C clutch air gap measurement is out of range, remove the A/C clutch disc and hub bolt.
- 1 Using the Compressor Clutch Holding Tool, hold the A/C clutch disc and hub.
 - 2 Remove the A/C clutch disc and hub bolt.



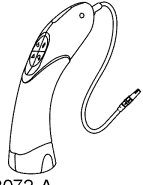
12. Remove the A/C clutch disc and hub.
13. Add or remove A/C clutch disc and hub spacer(s) as needed.
14. Install the A/C clutch disc and hub.
15. Install the A/C clutch disc and hub bolt.
- 1 Using the Compressor Clutch Holding Tool, hold the A/C clutch disc and hub.
 - 2 Install the A/C clutch disc and hub bolt.
 - Tighten to 13 Nm (10 lb-ft).



GENERAL PROCEDURES

Electronic Leak Detection

Special Tool(s)

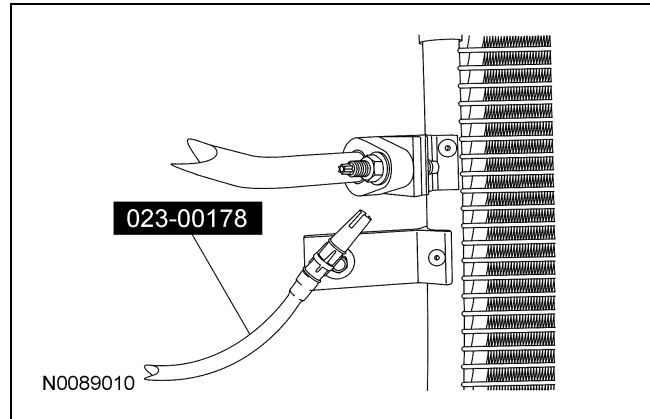
 <p>ST3072-A</p>	<p>Heated Pentode Halogen Leak Detector 023-00178 or equivalent</p>
---	---

NOTE: Good ventilation is necessary in the area where electronic A/C leak testing is to be carried out. If the surrounding air is contaminated with refrigerant gas, the Heated Pentode Halogen Leak Detector will indicate this gas all the time. Odors from other chemicals such as antifreeze, diesel fuel, disc brake cleaner or other cleaning solvents can cause the same problem. Using a fan to ventilate the area to be tested before proceeding with the leak detection procedure is helpful in removing small traces of contamination from the air, but the fan should be turned off during actual testing.

NOTE: R-134a is heavier than air, and will tend to move downward from the source of the leak if present. It is possible that a leak may not be detected if the leak detector tip is held above the leaking fitting, line or component. Always be sure to thoroughly leak test below the fitting, line or component for the presence of R-134a as well as leak testing above and around.

- NOTE:** The system pressure should be between 413-551 kPa (60-80 psi) at 24°C (75°F) with the engine off.

Leak test the refrigerant system using the Heated Pentode Halogen Leak Detector. Follow the instructions included with the Heated Pentode Halogen Leak Detector for handling and operation techniques.

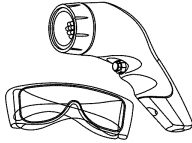
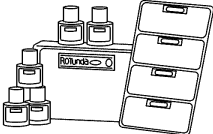
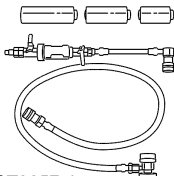
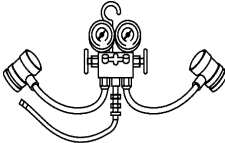




- If a leak is found, recover the refrigerant. For additional information, refer to Air Conditioning (A/C) System Recovery, Evacuation and Charging in this section.
 - Repair the system.
 - Test the system for normal operation.

GENERAL PROCEDURES

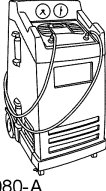
Fluorescent Dye Leak Detection

Special Tool(s)

 <p>ST3073-A</p>	<p>Cordless/Rechargeable True UV LED Light ES 023-00182 or equivalent</p>
 <p>ST2650-A</p>	<p>R-134a Leak Detection Dye 164-R6060</p>
 <p>ST3057-A</p>	<p>R-134a Loop/Add On Injector Kit-Set 219-00069 or equivalent</p>
 <p>ST1928-A</p>	<p>R-134a Manifold Gauge Set 023-00047 or equivalent</p>
 <p>ST3079A</p>	<p>R-134a Refrigerant Management Machine (SAE J-2788 Compliant) 023-00181 or equivalent</p>
 <p>ST3081-A</p>	<p>R-134a Refrigerant Management Machine (SAE J-2788 Compliant) 199-00067 or equivalent</p>

(Continued)

Special Tool(s)

 <p>ST3080-A</p>	<p>R-134a Refrigerant Management Machine (SAE J-2788 Compliant) 265-00012 or equivalent</p>
--	---

Fluorescent Dye Injection — Using a R-134a Refrigerant Management Machine and Dye Injector

NOTE: Fluorescent refrigerant system dye is added to the refrigerant system at the factory to assist in refrigerant system leak diagnosis using a Rotunda-approved UV blacklight. It is not necessary to add additional dye to the refrigerant system before diagnosing leaks, even if a significant amount of refrigerant has been removed from the system. Replacement suction accumulators and receiver/driers are shipped with a fluorescent dye “wafer” included in the desiccant bag which will dissolve after approximately 30 minutes of continued A/C operation. It is not necessary to add dye after flushing or filtering the refrigerant system because a new suction accumulator or receiver/drier is installed as part of the flushing or filtering procedure. Additional refrigerant system dye should only be added if more than 50% of the refrigerant system lubricant capacity has been lost due to a fitting separation, hose rupture or other damage.

NOTE: This method of fluorescent dye injection requires the addition of R-134a from a R-134a Refrigerant Management Machine or R-134a Manifold Gauge Set hooked to an external tank to charge the dye into the refrigerant system. If adding fluorescent dye to a refrigerant system that is already fully charged, the R-134a Loop/Add On Injector Kit-Set method should be used.

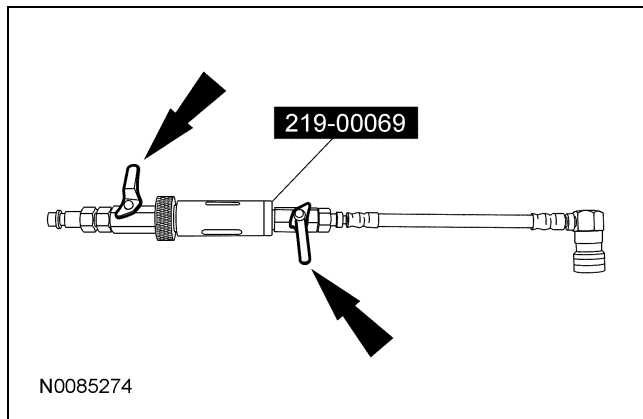
NOTE: Before using the R-134a Loop/Add On Injector Kit-Set for the first time, refer to the manufacturer’s instructions on evacuation of any non-condensable gases from the hoses.

GENERAL PROCEDURES (Continued)

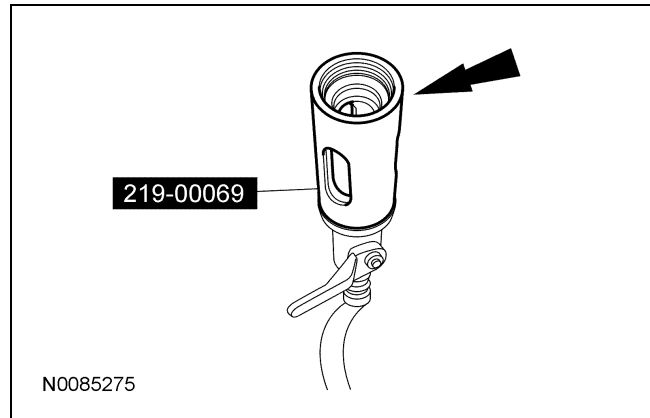
NOTE: Only connect the dye/lubricant injector from the R-134a Loop/Add On Injector Kit-Set when fluorescent dye is to be injected. The dye/lubricant injector has a one-way check valve that will prevent refrigerant system recovery and evacuation.

NOTE: Following fluorescent dye injection, the refrigerant system pressure should be between 413-551 kPa (60-80 psi) at 24°C (75°F) with the engine off and cool.

1. **NOTE:** If no R-134a pressure is present in the refrigerant system, the system should be evacuated before carrying out the injection procedure. For additional information, refer to Air Conditioning (A/C) System Recovery, Evacuation and Charging in this section.
Connect a R-134a Refrigerant Management Machine or a R-134a Manifold Gauge Set to the refrigerant system service port valves.
2. Verify that the valves on the dye/lubricant injector from the R-134a Loop/Add On Injector Kit-Set are closed.



3. Fill the R-134a fluorescent dye injector reservoir with 7 ml (0.25 oz) of fluorescent dye.



4. Install the dye/lubricant injector between the low-pressure service gauge port valve and the R-134a Refrigerant Management Machine or R-134a Manifold Gauge Set.
5. Open all valves and inject the fluorescent dye into the refrigerant system.
6. When fluorescent dye injection is complete, close all valves.
7. Recover the refrigerant from the dye/lubricant injector.
8. Remove the dye/lubricant injector from the low-pressure service gauge port valve and the R-134a Refrigerant Management Machine or R-134a Manifold Gauge Set.

GENERAL PROCEDURES (Continued)

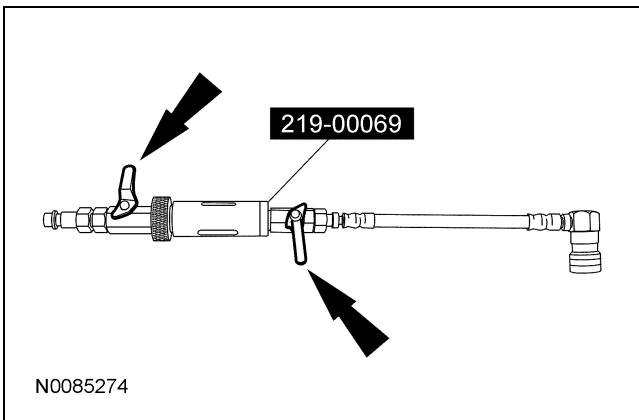
Fluorescent Dye Injection — Using a R-134a Loop/Add On Injector Kit-Set

NOTE: Fluorescent refrigerant system dye is added to the refrigerant system at the factory to assist in refrigerant system leak diagnosis using a Rotunda-approved UV blacklight. It is not necessary to add additional dye to the refrigerant system before diagnosing leaks, even if a significant amount of refrigerant has been removed from the system. Replacement suction accumulators and receiver/driers are shipped with a fluorescent dye “wafer” included in the desiccant bag which will dissolve after approximately 30 minutes of continued A/C operation. It is not necessary to add dye after flushing or filtering the refrigerant system because a new suction accumulator or receiver/drier is installed as part of the flushing or filtering procedure. Additional refrigerant system dye should only be added if more than 50% of the refrigerant system lubricant capacity has been lost due to a fitting separation, hose rupture or other damage.

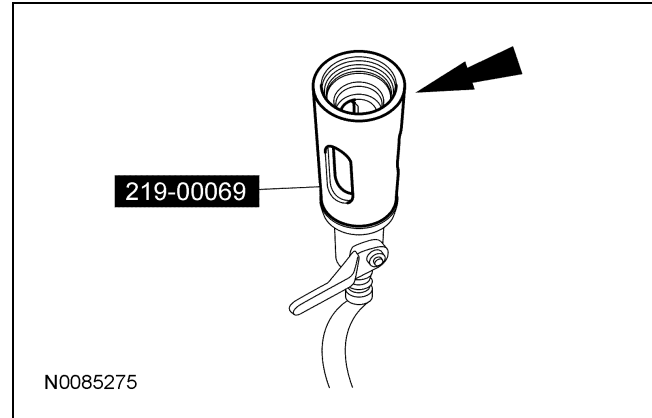
NOTE: Before using the R-134a Loop/Add On Injector Kit-Set for the first time, refer to the equipment manufacturer’s instructions on evacuation of non-condensable gases from the hoses.

NOTE: Refrigerant system pressure should be between 413-551 kPa (60-80 psi) at 24°C (75°F) with the engine off and cool.

1. Verify that the valves on the R-134a Loop/Add On Injector Kit-Set are closed.



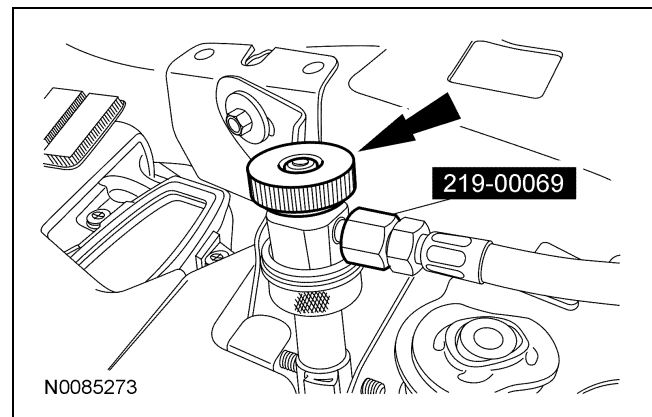
2. Fill the R-134a Loop/Add On Injector Kit-Set reservoir with 7 ml (0.25 oz) of fluorescent dye.



3. Install the R-134a Loop/Add On Injector Kit-Set between the high-pressure and low-pressure service gauge port valves.
4. **NOTICE:** Make sure all tools and hoses are clear of the engine cooling fan and drive belt before starting the engine. Failure to keep tools and hoses clear from the engine cooling fan and drive belt will result in damage to the tools and/or vehicle.

With the A/C off, start the engine. Allow engine speed to stabilize below 1,000 rpm.

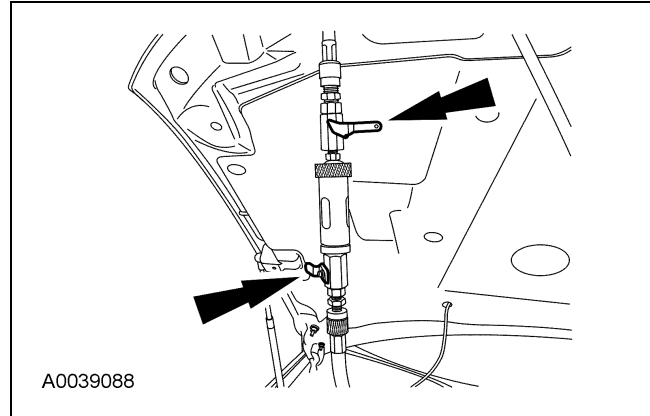
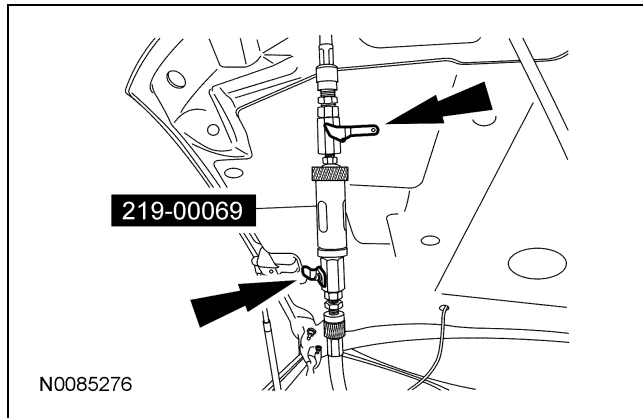
5. Set the A/C to the ON position.
6. Open the high-pressure service valve.



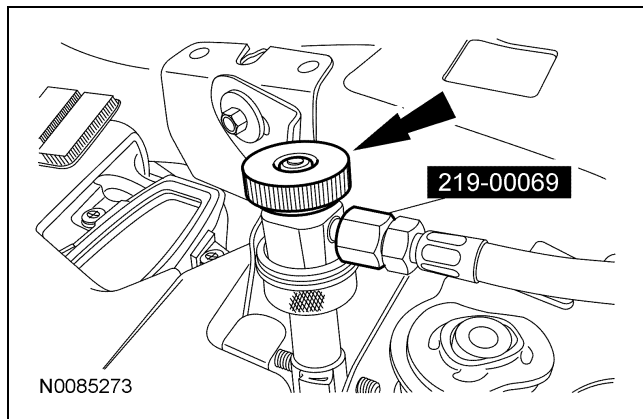
GENERAL PROCEDURES (Continued)

7. **NOTE:** To prevent pressure spike/liquid slug, crack the R-134a Loop/Add On Injector Kit-Set valves and slowly open to inject the fluorescent dye into the refrigerant system.

Open the R-134a Loop/Add On Injector Kit-Set valves and inject the fluorescent dye into the refrigerant system.



8. Close the high-pressure service valve to allow the pressure inside the R-134a Loop/Add On Injector Kit-Set to equalize with the suction side of the refrigerant system.



9. **NOTE:** Close the valves on the R-134a Loop/Add On Injector Kit-Set while the A/C compressor is operating.
- Close the valves on the R-134a Loop/Add On Injector Kit-Set.

10. **NOTE:** Leave all valves on the R-134a Loop/Add On Injector Kit-Set closed when not in use.
- Disconnect the high-pressure and low-pressure service valves and remove the R-134a Loop/Add On Injector Kit-Set from the vehicle.

Fluorescent Dye Detection

NOTE: Ford Motor Company vehicles are produced with R-134a fluorescent dye installed in the refrigerant system from the factory. The location of leaks can be pinpointed by the bright yellow-green glow of the fluorescent dye under a UV lamp. Since more than one leak can exist, make sure to inspect each component, line and fitting in the refrigerant system for a leak.

1. Check for leaks using a Rotunda-approved UV lamp and dye enhancing glasses.
 - Inspect all components, lines and fittings of the refrigerant system.
2. If a leak is found, recover the refrigerant. For additional information, refer to Air Conditioning (A/C) System Recovery, Evacuation and Charging in this section.
3. Repair the refrigerant system leak(s).
4. Evacuate and charge the refrigerant system. For additional information, refer to Air Conditioning (A/C) System Recovery, Evacuation and Charging in this section.
5. After the leak(s) is repaired, remove any traces of fluorescent dye with a general purpose oil solvent.

GENERAL PROCEDURES (Continued)

6. **NOTE:** Use of dye-enhancing glasses or goggles greatly improves the detection of the dye under the UV lamp.


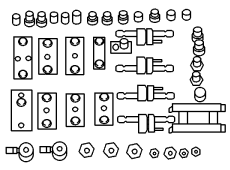

NOTE: Not all UV lamps will fluoresce the dye used in Ford vehicles. All Rotunda UV lamps are optimized to fluoresce the dye.

Verify the repair by running the vehicle for a short period of time and rechecking the area of the leak with a Rotunda-approved UV lamp.

GENERAL PROCEDURES

Air Conditioning (A/C) System Flushing

Special Tool(s)

 <p>ST2985-A</p>	<p>A/C Flush Adapter Kit 219-00074 or equivalent</p>
 <p>ST2469-A</p>	<p>A/C Flush and Purge Fitting Kit 219-00024 (part of 219-00023) or equivalent</p>
 <p>ST2466-A</p>	<p>A/C Flush and Purge Machine 219-00022 (part of 219-00023) or equivalent</p>

Material

Item	Specification
<p>A/C System Flushing Solvent YN-23</p>	<p>—</p>
<p>PAG Refrigerant Compressor Oil (R-134a Systems) YN-12-D</p>	<p>WSH-M1C231-B</p>

⚠ WARNING: Use extreme care and observe all safety and service precautions related to the use of refrigerants as outlined on refrigerant tank and on recovery and charging equipment. Failure to follow these instructions may result in serious personal injury.

NOTICE: An Air Conditioning (A/C) refrigerant analyzer must be used before the recovery of any vehicle's A/C refrigerant. Failure to do so puts the shop's bulk refrigerant at risk of contamination. If the vehicle's A/C refrigerant is contaminated, refer the customer to the service facility that carried out the last A/C service. If the customer wishes to pay the additional cost, use the A/C recovery equipment that is designated for recovering contaminated A/C refrigerant. All contaminated A/C refrigerant must be disposed of as hazardous waste. For all equipment, follow the equipment manufacturer procedures and instructions.

NOTICE: Suction accumulator or receiver/drier, Thermostatic Expansion Valve (TXV) and/or evaporator core orifice, and hoses with mufflers, should be removed when flushing the Air Conditioning (A/C) system. Internal plumbing of these devices makes it impossible to correctly remove any residual-flushing agent. These components are typically discarded after A/C system contamination. Hoses without mufflers can normally be reused unless they are clogged with foreign material. The 3.785L (1 gal) of A/C System Flushing Solvent and FL1-A filter used in A/C Flush and Purge Machine 219-00022 are intended for use on one vehicle only. They may be used to flush both the A/C condenser core and the A/C evaporator core on an individual vehicle, but under no circumstances should they be used on more than one vehicle.

NOTICE: Only the A/C Flush and Purge Machine 219-00022, A/C Flush and Purge Fitting Kit 219-00024, A/C Flush Adapter Kit 219-00074 and A/C System Flushing Solvent are approved for use on Ford vehicles. No other flushing device or solvent is approved for flushing heat exchangers (Air Conditioning [A/C] condenser, A/C evaporator). Use of any other flusher or solvent may cause damage to the A/C system and the flushing unit.

GENERAL PROCEDURES (Continued)

NOTE: Prior to using the A/C Flush and Purge Machine 219-00022 for the first time, review the operating instructions.

NOTE: Ford Motor Company has approved a procedure to provide technicians with a non-Chlorofluorocarbons (CFC) method of flushing contaminated A/C system heat exchangers. The procedure allows the specific components to be cleaned and flushed while installed in their normal in-vehicle location. The types of contamination flushed include particle matter that results from A/C compressor or desiccant failure and gummy residue that can form when refrigerant oil is overheated during A/C compressor seizure. The flushing process is a 2-step procedure that involves the use of an A/C Flush and Purge Machine 219-00022 to:

- circulate the flushing solvent through the heat exchanger in the reverse direction of normal refrigerant flow (back-flushing). Particulate matter picked up during flushing is filtered from the returning solvent before the solvent is returned to the reservoir for continued circulation.
 - remove the flushing solvent from the heat exchanger. In this step of the procedure, pressurized air (621-862 kPa [90-125 psi]) is used to push and evaporate any remaining flush solvent from the heat exchanger.
1. Recover the refrigerant. For additional information, refer to Air Conditioning (A/C) System Recovery, Evacuation and Charging in this section.
 2. Disconnect the refrigerant lines from the heat exchanger(s) to be flushed.
 3. Using the correct adapters from the A/C Flush Adapter Kit or A/C Flush and Purge Fitting Kit, connect the A/C Flush and Purge Machine to the heat exchanger to be flushed. Do not flush through the evaporator core orifice (if equipped), Thermostatic Expansion Valve (TXV) (if equipped) or hoses with mufflers. Internal plumbing and material make-up of these components make it impossible to correctly remove foreign material or residual flushing solvent.

4. **NOTE:** Use 3.785L (1 gal) of A/C System Flushing Solvent to flush the heat exchanger for a minimum of 15 minutes. The flush solvent may be used for one or both heat exchangers in the A/C system. However, the flush solvent is intended for one vehicle only. The filter used on the flushing unit is also intended for use on one vehicle only.

Flush the heat exchanger for a minimum of 15 minutes.

5. Apply 621-862 kPa (90-125 psi) pressurized air to the component for a minimum of 30 minutes. The 30-minute purge time is required to force and evaporate all residual solvent from the A/C system component. Failure to successfully remove all residual solvent within the component can result in system damage when reconnected and operated. Dispose of the used flush solvent and filter in accordance with local, state and federal regulations.
6. **NOTE:** A/C system filtering as described in this section is optional if system flushing is carried out. However, the filter kit use is recommended after flushing if the A/C system contamination is extensive.
Install a new A/C evaporator core orifice (if equipped) and/or TXV (if equipped) in any vehicle being serviced for an internal A/C compressor or desiccant failure.
7. Install new refrigerant hoses with mufflers if clogged with foreign material.
8. Install a new suction accumulator (if equipped), receiver/drier (if equipped) or receiver/drier cartridge (if equipped) in any vehicle being serviced for an internal A/C compressor or desiccant failure.
9. Reconnect the heat exchanger being serviced.
10. If a new A/C compressor is not to be installed, lubricate the refrigerant system with the correct amount of clean PAG oil. For additional information, refer to Refrigerant Oil Adding in this section.

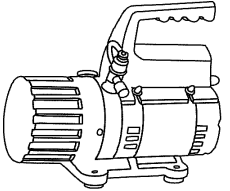
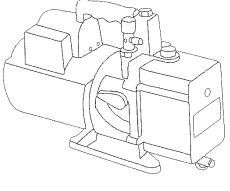
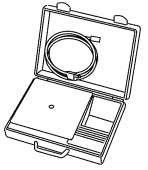
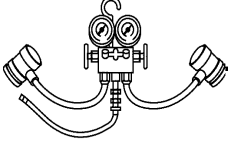


GENERAL PROCEDURES (Continued)

11. If a new A/C compressor is not to be installed, evacuate, leak test and charge the A/C system. For additional information, refer to Air Conditioning (A/C) System Recovery, Evacuation and Charging in this section.
-

GENERAL PROCEDURES

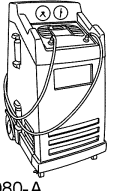
Air Conditioning (A/C) System Recovery, Evacuation and Charging

Special Tool(s)

 <p>ST1685-A</p>	<p>1.2 CFM Vacuum Pump 023-00162 or equivalent</p>
 <p>ST1686-A</p>	<p>4.0 CFM Vacuum Pump 023-00163 or equivalent</p>
 <p>ST2742-A</p>	<p>Automatic Refrigerant Charging Meter 023-00155 or equivalent</p>
 <p>ST1928-A</p>	<p>R-134a Manifold Gauge Set 023-00047 or equivalent</p>
 <p>ST3079A</p>	<p>R-134a Refrigerant Management Machine (SAE J-2788 Compliant) 023-00181 or equivalent</p>
 <p>ST3081-A</p>	<p>R-134a Refrigerant Management Machine (SAE J-2788 Compliant) 199-00067 or equivalent</p>

(Continued)

Special Tool(s)

 <p>ST3080-A</p>	<p>R-134a Refrigerant Management Machine (SAE J-2788 Compliant) 265-00012 or equivalent</p>
--	---

Material

Item	Specification
<p>PAG Refrigerant Compressor Oil (R-134a Systems) YN-12-D</p>	<p>WSH-M1C231-B</p>

Refrigerant System Recovery

NOTICE: An Air Conditioning (A/C) refrigerant analyzer must be used before the recovery of any vehicle's A/C refrigerant. Failure to do so puts the shop's bulk refrigerant at risk of contamination. If the vehicle's A/C refrigerant is contaminated, refer the customer to the service facility that carried out the last A/C service. If the customer wishes to pay the additional cost, use the A/C recovery equipment that is designated for recovering contaminated A/C refrigerant. All contaminated A/C refrigerant must be disposed of as hazardous waste. For all equipment, follow the equipment manufacturer procedures and instructions.

NOTE: Ford Motor Company recommends the use of R-134a refrigerant management equipment that meets the requirements of the SAE J2788 standard.

NOTE: Ford Motor Company recommends use of a R-134a Refrigerant Management Machine to carry out recovery. If a R-134a Refrigerant Management Machine is not available, refrigerant system recovery may be accomplished using a separate recovery station.

NOTE: Leaks in refrigerant system service equipment, hoses or gauges can cause a leak in vacuum that may be misinterpreted as a problem with the vehicle's refrigerant system. It is necessary to leak-test all refrigerant system service equipment, hoses and gauges on a weekly basis to verify that no leaks are present.

GENERAL PROCEDURES (Continued)

1. Prior to recovering, the purity of the refrigerant must be verified. For additional information, refer to Refrigerant Identification Testing in this section.
2. Connect a R-134a Refrigerant Management Machine to the low- and high-pressure service gauge port valves following the operating instructions provided by the equipment manufacturer.
3. Recover the refrigerant from the system following the operating instructions provided by the equipment manufacturer. Note the amount of oil removed during the refrigerant recovery (if any). Add that same amount back into the system once repairs are complete.
4. Once the R-134a Refrigerant Management Machine has recovered the refrigerant, switch OFF the power supply.
5. Allow the system to set for about 2 minutes, and observe the system vacuum reading. If the vacuum is not lost, disconnect the recovery equipment.
6. If the system does lose vacuum, repeat Steps 3 through 5 until the vacuum level remains stable for 2 minutes.
7. Carry out the required repairs.

Refrigerant System Evacuation Using a R-134a Refrigerant Management Machine

NOTE: Ford Motor Company recommends use of a R-134a Refrigerant Management Machine to carry out recovery, evacuation and charging of the refrigerant system. If a R-134a Refrigerant Management Machine is not available, evacuation may be accomplished using a separate Vacuum Pump and R-134a Manifold Gauge Set.

NOTE: Leaks in refrigerant system service equipment, hoses or gauges can cause a leak in vacuum that may be misinterpreted as a problem with the vehicle's refrigerant system. It is necessary to leak-test all refrigerant system service equipment, hoses and gauges on a weekly basis to verify that no leaks are present.

1. Connect a R-134a Refrigerant Management Machine to the low- and high-pressure service gauge port valves following the operating instructions provided by the equipment manufacturer.
2. Evacuate the system until the low-pressure gauge reads at least 99.4 kPa (29.5 in-Hg) of vacuum and as close to 101.1 kPa (30 in-Hg) as possible. Continue to operate the Vacuum Pump for a minimum of 45 minutes.
3. Turn OFF the Vacuum Pump. Observe the low-pressure gauge for 5 minutes to make sure that the system vacuum is held. If vacuum is not held for 5 minutes, leak test the system, repair the leak and evacuate the system again.

Refrigerant System Evacuation Using a R-134a Manifold Gauge Set and Vacuum Pump

NOTE: Ford Motor Company recommends use of a R-134a Refrigerant Management Machine to carry out evacuation of the refrigerant system. If a R-134a Refrigerant Management Machine is not available, refrigerant system evacuation may be accomplished using a separate Vacuum Pump and R-134a Manifold Gauge Set.

NOTE: Leaks in refrigerant system service equipment, hoses or gauges can cause a leak in vacuum that may be misinterpreted as a problem with the vehicle's refrigerant system. It is necessary to leak-test all refrigerant system service equipment, hoses and gauges on a weekly basis to verify that no leaks are present.

1. Connect the R-134a Manifold Gauge Set to the low-side and high-side service gauge port valves.
2. Connect the center (yellow) hose from the R-134a Manifold Gauge Set to the suction port on the Vacuum Pump.
3. Open all valves on the R-134a Manifold Gauge Set and both service gauge port valves.

GENERAL PROCEDURES (Continued)

4. Turn on the Vacuum Pump and evacuate the system until the low-pressure gauge reads at least 99.4 kPa (29.5 in-Hg) of vacuum and as close to 101.1 kPa (30 in-Hg) as possible. Continue to operate the Vacuum Pump for a minimum of 45 minutes.
5. Close the high-side and low-side valves on the R-134a Manifold Gauge Set (not the service gauge port valves) and turn OFF the Vacuum Pump.
6. Observe the low-pressure gauge for 5 minutes to make sure that the system vacuum is held. If vacuum is not held for 5 minutes, leak test the system, repair the leak and evacuate the system again.

Refrigerant System Charging Using a R-134a Refrigerant Management Machine

NOTE: Ford Motor Company recommends use of a R-134a Refrigerant Management Machine to carry out charging of the refrigerant system. If a R-134a Refrigerant Management Machine is not available, refrigerant system charging may be accomplished using a separate Automatic Refrigerant Charging Meter and R-134a Manifold Gauge Set.

NOTE: Leaks in refrigerant system service equipment, hoses or gauges can cause a leak that may be misinterpreted as a problem with the vehicle's refrigerant system. It is necessary to leak-test all refrigerant system service equipment, hoses and gauges on a weekly basis to verify that no leaks are present.

1. Lubricate the refrigerant system with the correct amount of clean PAG oil. For additional information, refer to Refrigerant Oil Adding in this section.
2. Connect a R-134a Refrigerant Management Machine to the low-side and high-side service gauge port valves following the operating instructions provided by the equipment manufacturer.

3. Set the refrigerant charge amount, and charge the refrigerant system following the instructions provided by the equipment manufacturer.

Refrigerant System Charging Using a R-134a Manifold Gauge Set and Automatic Refrigerant Charging Meter

NOTE: Ford Motor Company recommends use of a R-134a Refrigerant Management Machine to carry out charging of the refrigerant system. If a R-134a Refrigerant Management Machine is not available, refrigerant system charging may be accomplished using a separate Automatic Refrigerant Charging Meter and R-134a Manifold Gauge Set.


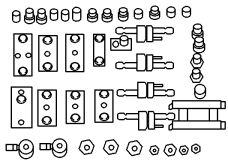
NOTE: Leaks in refrigerant system service equipment, hoses or gauges can cause a leak that may be misinterpreted as a problem with the vehicle's refrigerant system. It is necessary to leak-test all refrigerant system service equipment, hoses and gauges on a weekly basis to verify that no leaks are present.

1. Lubricate the refrigerant system with the correct amount of clean PAG oil. For additional information, refer to Refrigerant Oil Adding in this section.
2. Assemble the R-134a Manifold Gauge Set, Automatic Refrigerant Charging Meter and R-134a supply tank following the Automatic Refrigerant Charging Meter operating instructions.
3. Charge the refrigerant system following the Automatic Refrigerant Charging Meter operating instructions.
4. If the refrigerant flow stops before the refrigerant charge is complete, start the engine, select MAX A/C operation and allow the refrigerant charge to complete.

GENERAL PROCEDURES

Refrigerant System Filtering Following Air Conditioning (A/C) Compressor Installation

Special Tool(s)

 <p>ST2985-A</p>	<p>A/C Flush Adapter Kit 219-00074 or equivalent</p>
 <p>ST2469-A</p>	<p>A/C Flush and Purge Fitting Kit 219-00024 or equivalent</p>

Material

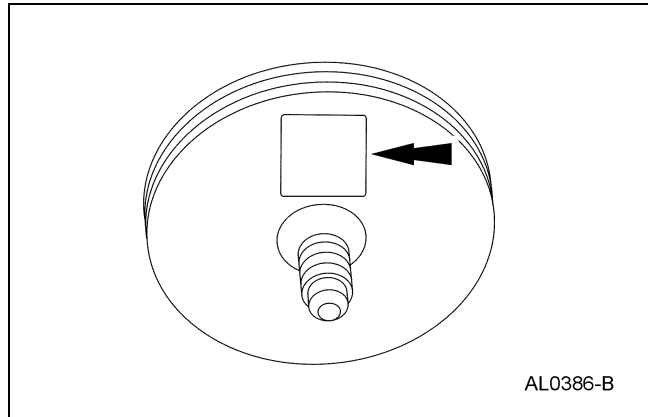
Item	Specification
PAG Refrigerant Compressor Oil (R-134a Systems) YN-12-D	WSH-M1C231-B

⚠ WARNING: Use extreme care and observe all safety and service precautions related to the use of refrigerants as outlined on refrigerant tank and on recovery and charging equipment. Failure to follow these instructions may result in serious personal injury.

NOTICE: An Air Conditioning (A/C) refrigerant analyzer must be used before the recovery of any vehicle's A/C refrigerant. Failure to do so puts the shop's bulk refrigerant at risk of contamination. If the vehicle's A/C refrigerant is contaminated, refer the customer to the service facility that carried out the last A/C service. If the customer wishes to pay the additional cost, use the A/C recovery equipment that is designated for recovering contaminated A/C refrigerant. All contaminated A/C refrigerant must be disposed of as hazardous waste. For all equipment, follow the equipment manufacturer's procedures and instructions.

NOTICE: On vehicles being serviced for an internal compressor or desiccant failure, a new suction accumulator or receiver/drier, Thermostatic Expansion Valve (TXV) or evaporator core orifice and any hoses containing mufflers must be installed prior to filtering the Air Conditioning (A/C) system. Internal plumbing of these devices makes it impossible to correctly remove any foreign material. These components are typically discarded after A/C system contamination. Hoses without mufflers can normally be reused unless they are clogged with foreign material. The filter is intended for use on one vehicle only.

1. Orient the filter inlet toward the A/C condenser core.



2. **NOTICE:** The flexible extension adapters included in the A/C Flush Adapter Kit are designed for low-pressure flushing and are not designed for use with a charged refrigerant system. Do not make the condenser fitting connections using the flexible extension adapters or damage to the adapters and loss of refrigerant will occur.

NOTE: The F8VZ-19E773-AB pancake filter is not permanently installed and will be removed at the end of this procedure.

Disconnect the condenser outlet fitting and temporarily install the pancake filter between the 2 halves of the fitting.

- Use flexible refrigerant hose of 17,238 kPa (2,500 psi) burst rating.
- Make the connections using the correct adapters from the A/C Flush Adapter Kit and/or A/C Flush and Purge Fitting Kit.

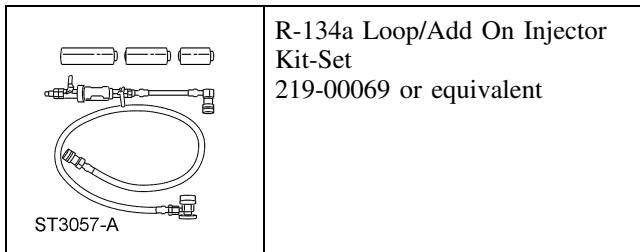
GENERAL PROCEDURES (Continued)

3. Lubricate the refrigerant system with the correct amount of clean PAG oil. For additional information, refer to Refrigerant Oil Adding in this section.
 4. Evacuate and charge the refrigerant system. For additional information, refer to Air Conditioning (A/C) System Recovery, Evacuation and Charging in this section.
 5. Check all refrigerant system hoses, lines and the position of the newly installed filters to be sure they do not interfere with other engine compartment components. If necessary, use tie straps to make adjustments.
 6. Provide adequate airflow to the front of the vehicle (with a fan, if necessary). Select A/C operation and set the blower motor speed to maximum. Start the engine and let it idle briefly. Make sure the A/C system is operating correctly.
 7. Gradually bring the engine up to 1,200 rpm by running it at lower rpms for short periods (first at 800 rpm, then at 1,000 rpm). Set the engine at 1,200 rpm and run it for one hour with the A/C system operating.
 8. Stop the engine.
 9. Recover the refrigerant. For additional information, refer to Air Conditioning (A/C) System Recovery, Evacuation and Charging in this section.
 10. Remove the adapters, flexible hoses and pancake filter from between the condenser and the condenser to evaporator tube.
 11. Discard the pancake filter. It can be used one time only.
 12. Reconnect the condenser outlet fitting.
 13. Evacuate, charge and leak-test the refrigerant system. For additional information, refer to Air Conditioning (A/C) System Recovery, Evacuation and Charging in this section.
-

GENERAL PROCEDURES

Refrigerant Oil Adding

Special Tool(s)



Material

Item	Specification
PAG Refrigerant Compressor Oil (R-134a Systems) YN-12-D	WSH-M1C231-B

Refrigerant Oil Adding

NOTE: During normal A/C operation, oil is circulated through the system with the refrigerant, and a small amount is retained in each component. If certain components of the system are removed, some of the PAG oil will go with the component. To maintain the original total oil charge, it is necessary to compensate for the oil lost by adding oil to the system with the new part.

1. Refer to the chart below for refrigerant oil adding amounts and methods of installation.

Component	PAG Oil Amount	Method of Adding
A/C Compressor	Refer to Adding Refrigerant Oil After A/C Compressor Replacement	Add directly to A/C compressor low-side port before installation.
Suction Accumulator or Receiver/Drier	Refer to Adding Refrigerant Oil After New Suction Accumulator or Receiver/Drier Replacement	Add directly to suction accumulator inlet port or inject to low-side service port during system charging.
Evaporator Core	45 ml (1.5 fl oz) added to the amount collected during refrigerant recovery	Add directly to evaporator core inlet tube or inject to low-side service port during system charging.
Condenser Core	60 ml (2 fl oz) added to the amount collected during refrigerant recovery	Add directly to condenser core inlet or inject to low-side service port during system charging.
Evaporator Core Orifice or Thermostatic Expansion Valve (TXV)	The amount collected during refrigerant recovery	Inject to low-side service port during system charging.
A/C Pressure Relief Valve	60 ml (2 fl oz) added to the amount collected during refrigerant recovery	Inject to low-side service port during system charging.
Refrigerant Hose/Line	60 ml (2 fl oz) added to the amount collected during refrigerant recovery ^a	Inject to low-side service port during system charging.
O-ring Leak Repair	60 ml (2 fl oz) added to the amount collected during refrigerant recovery ^b	Inject to low-side service port during system charging.
Service Port Leak Repair	60 ml (2 fl oz) added to the amount collected during refrigerant recovery	Inject to low-side service port during system charging.

- a If an excessive amount of PAG oil is lost due to a hose rupture/separation or other damage, the total system PAG oil capacity must be added.
- b The amount specified may be used for one or multiple O-ring leak repairs. Do not multiply the PAG oil amount by the number of O-ring leaks being repaired.

GENERAL PROCEDURES (Continued)

Adding Refrigerant Oil After A/C Compressor Replacement

NOTE: This PAG oil adding method is to be used when a new A/C compressor only has been installed. If a new suction accumulator or receiver drier and evaporator core orifice or Thermostatic Expansion Valve (TXV) have also been installed due to system contamination, refer to the appropriate heading.

NOTE: Service A/C compressors are shipped without refrigerant oil.

1. Rotate the old A/C compressor shaft 8 to 10 full rotations (clockwise) to discharge the PAG oil through the A/C compressor discharge port, while collecting the PAG oil in a clean measuring cup.
 - Add the same amount of new PAG oil plus the amount collected during refrigerant recovery plus 30 ml (1 fl oz).

Adding Refrigerant Oil After New Suction Accumulator or Receiver/Drier Replacement

NOTE: This refrigerant oil adding method is to be used when a new suction accumulator or receiver drier only has been installed. If a new A/C compressor and evaporator core orifice or TXV have also been installed due to system contamination, refer to the appropriate heading.

1. Drill one 12.7 mm (1/2 in) hole in the old suction accumulator or receiver/drier cylinder and drain the oil into a clean measuring cup.
2. Add the same quantity of new PAG oil, plus the amount collected during refrigerant recovery and 60 ml (2 fl oz).

Adding Refrigerant Oil After Multiple Component Replacement After A/C System Contamination

NOTE: This refrigerant oil adding method is to be used when a new A/C compressor, suction accumulator or receiver drier and evaporator core orifice or TXV have been installed due to system contamination and the A/C system has been flushed.

NOTE: Service A/C compressors are shipped without refrigerant oil.

1. Add 60 ml (2 fl oz) directly to the new A/C compressor suction port.
2. Inject the total vehicle PAG oil capacity minus 60 ml (2 fl oz) to the low-side service port during system charging. For the total PAG oil capacity specification, refer to the Specifications table in this section.

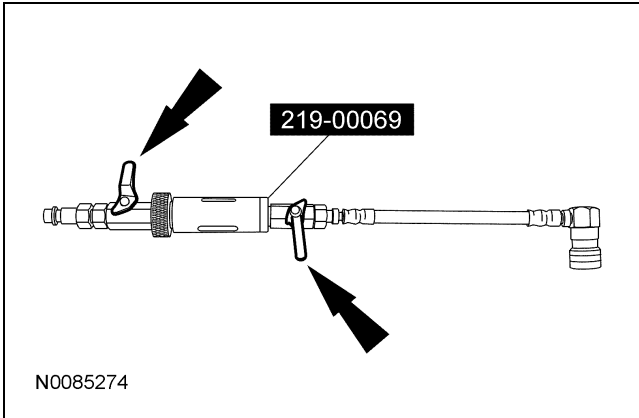
Oil Injection Using a Dye/Lubricant Injector

NOTE: If fluorescent leak detection dye is also to be added during A/C charging, the dye may be added to the dye/lubricant injector, from the R-134a Loop/Add On Injector Kit-Set, along with the PAG oil.

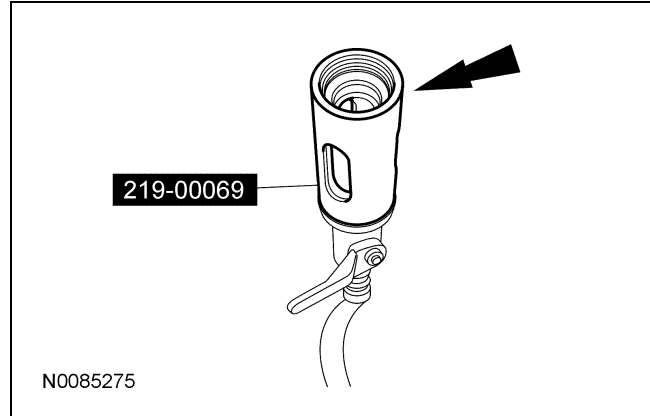
1. Evacuate the refrigerant system. For additional information, refer to Air Conditioning (A/C) System Recovery, Evacuation and Charging in this section.
2. Assemble the dye/lubricant injector and the correct adapters from the R-134a Loop/Add On Injector Kit-Set to match the amount of refrigerant compressor oil to be injected.

GENERAL PROCEDURES (Continued)

3. Verify that all the valves on the dye/lubricant injector are closed.



4. Fill the dye/lubricant injector with the correct amount of clean, new PAG oil.




5. Install the dye/lubricant injector between the low-side service gauge port valve and the refrigerant service station or manifold gauge set.
6. Open all valves and charge the refrigerant system. For additional information, refer to Air Conditioning (A/C) System Recovery, Evacuation and Charging in this section.

GENERAL PROCEDURES

Refrigerant Identification Testing

Special Tool(s)

 <p>ST3090-A</p>	<p>Refrigerant Blend Identifier with Printer 198-00012 or equivalent</p>
---	--

Refrigerant Identification

- NOTE:** A Refrigerant Blend Identifier with Printer must be used to identify gas samples taken directly from the refrigeration system or storage containers prior to recovering or charging the refrigerant system.

Follow the instructions included with the Refrigerant Blend Identifier with Printer to obtain the sample for testing.

- The Refrigerant Blend Identifier with Printer will display one of the following:
 - If the purity level of R-134a is 98% or greater by weight, the green PASS LED will light. The weight concentrations of R-134a, R-12, R-22, hydrocarbons and air will be displayed on the digital display.
 - If refrigerant R-134a does not meet the 98% purity level, the red FAIL LED will light and an alarm will sound alerting the user of potential hazards. The weight concentrations of R-134a, R-12, R-22 and hydrocarbons will be displayed on the digital display.
 - If hydrocarbon concentrations are 2% or greater by weight, the red FAIL LED will light, "Hydrocarbon High" will be displayed on the digital display, and an alarm will sound alerting the user of potential hazards. The weight concentrations of R-134a, R-12, R-22 and hydrocarbons will also be displayed on the digital display.

- The percentage of air contained in the sample will be displayed if the R-134a content is 98% or greater. The Refrigerant Blend Identifier with Printer eliminates the effect of air when determining the refrigerant sample content because air is not considered a contaminant, although air can affect A/C system performance. When the Refrigerant Blend Identifier with Printer has determined that a refrigerant source is pure (R-134a is 98% or greater by weight) and air concentration levels are 2% or greater by weight, the scan tool will prompt the user if an air purge is desired.

- If contaminated refrigerant is detected, repeat the refrigerant identification test to verify that the refrigerant is indeed contaminated.

Contaminated Refrigerant Handling

NOTICE: If contaminated refrigerant is detected, **DO NOT** recover the refrigerant into R-134a recovery/recycling equipment. Recovery of contaminated refrigerant will contaminate the recovered refrigerant supply and may damage the recovery/recycling equipment.

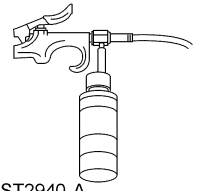
NOTE: A new suction accumulator or receiver/drier must be installed as directed by the A/C system flushing procedure.

- Recover the contaminated refrigerant using suitable recovery-only equipment designed for capturing and storing contaminated refrigerant only.
 - If this equipment is not available, contact an A/C service facility in the area with the correct equipment to carry out this service.
- Determine and correct the cause of the customer's initial concern.
- Flush the A/C system.
- Dispose of the contaminated refrigerant in accordance with all federal, state and local regulations.

GENERAL PROCEDURES

Air Conditioning (A/C) Odor Treatment

Special Tool(s)

 <p>ST2940-A</p>	<p>Flexible Applicator Tool 258-00004</p>
---	---

Material

Item	Specification
A/C Cooling Coil Coating YN-29	—

⚠ WARNING: Carry out this procedure in a well-ventilated area with all vehicle windows and doors opened. Carefully read cautionary information on product label. For **EMERGENCY MEDICAL INFORMATION**, seek medical advice. On Ford/Motorcraft products in the USA or Canada call: 1-800-959-3673. For additional information, consult the product Material Safety Data Sheet (MSDS), if available. Failure to follow these instructions may result in serious personal injury.

NOTE: There are typically 4 types of objectionable odors found in a vehicle:

- Chemical odors
- Environmental odors
- Human and other interior-generated odors
- Microbiological odors

Before determining that A/C odor treatment is required, the source and the circumstances under which the odor occurs must be determined.

NOTE: Chemical odors are usually constant regardless of the climate control system setting although they may be enhanced by A/C operation. Most chemical odors are caused by fluid leaks or incorrectly cured adhesives. Chemical odors can be eliminated by repairing the leaking component and removing any residue.

NOTE: Environmental odors usually occur for a short time and diminish after the vehicle passes through the affected area. These odors are typically only detected when the vehicle windows are open, or when the climate control system is operating in a mode that allows for fresh air. Environmental odors cannot be eliminated because they are external in source, but they may be minimized by switching to a climate control setting that uses recirculated air.

NOTE: Human and other interior-generated odors occur while the source is present and may linger for a short time after. These odors may be more noticeable during A/C operation. Human odors may be eliminated by removing the source and cleaning the affected area.

NOTE: Microbiological odors, if in the A/C system, usually last for about 30 seconds after the system is turned on. They will be detected while the A/C is turned on and using either outside or recirculated air. Microbiological odors that occur in areas other than the A/C system (for example, water in doors or wet carpeting) may last indefinitely and will be more intense when recirculated air is used. Microbiological odors will not be present at temperatures at or below 10°C (50°F).

Microbiological odors can be eliminated by removing the source and treating the affected area. Standing water must be allowed to drain and dry out. A/C systems may be treated by using A/C cooling coil coating as described in the service procedure below.

Microbiological odors result from microbial growth supported by warm temperatures and moisture. Microbiological odors are described as musty/mildew type smells and may occur on/in:

- foam seals.
- rubber seals.

GENERAL PROCEDURES (Continued)

- adhesives.
 - standing water.
 - water soaked carpet/trim.
1. Identify the type of odor present in the vehicle. Do not proceed with A/C odor treatment if the odor source is found to be outside of the A/C system. Refer to the following chart for examples.

Odor Source	Odor Description
Chemical Odors	
Coolant	Sweet smell
Fuel	Gasoline or diesel fuel smell
Oil	Oil type or burning smell
Power Steering Fluid	Oil type or burning smell
Transmission Fluid	Oil type or burning smell
Washer Fluid	Alcohol type smell
Gear Lube	Garlic/sulfur smell
Refrigerant Oil	Ether type smell
Carpet/trim Adhesives	Fishy, urine or sweet smell
Evaporator Core Coating	Wet cement type smell
Environmental Odors	
Exhaust	Exhaust, fuel or burning type smell
Industrial Pollutants	Various smells
Dust	Musty, mildew or wet cement type smell
Pollen	Sweet smell
Tobacco	Burning, tar smell
Human and Other Interior Generated Odors	
Body Secretions	Body odor
Perfuming Agents	Sweet or fragrance smell
Clothing	Musty, mildew or body odors
Food/Beverage	Sweet, musty, mildew or fishy smell
Microbiological Odors	
Microbiological Odors Occurring Inside of A/C System	Musty, mildew smell lasting about 30 seconds after A/C is turned on
Microbiological Odors Occurring Outside of A/C System	Musty, mildew smell lasting indefinitely and possibly more pronounced when using recirculated air

2. Identify the source of the odor.
 - Check the passenger and driver side carpet for moisture. Continue diagnosis if moisture is found.
 - Check the blower motor and blower motor cover (if equipped) for moisture resulting from water bypassing the cowl baffling system. Continue diagnosis if moisture is present.
 - Check the evaporator core drain tube for restriction.
 - Check the cowl top panel and air inlet screen for standing water or foreign material. If possible, remove any standing water and clean the air inlet screen using a wet/dry vacuum.
3. Open all vehicle windows and doors.
4. Make sure that the A/C is off.
5. Remove the evaporator discharge air temperature sensor (if equipped).
6. Set the following.
 - Select PANEL mode (A/C off).
 - Adjust the temperature setting to full warm.
 - Adjust the blower motor speed to HI.
7. Run the engine for 25 minutes to dry out the A/C system.
8. Turn the ignition OFF.
9. Remove the blower motor.
10. **NOTE:** Blower motor speed controls that are mounted outside of the evaporator core housing and not exposed to the blower motor airflow do not need to be removed.
Remove the blower motor resistor (if equipped) or blower motor speed control (if equipped and exposed to the inside of the evaporator core housing).
11. **NOTICE: To avoid damage to the vehicle interior, do not spill or spray this product on any interior surface.**
Add one full bottle of A/C cooling coil coating to the Flexible Applicator Tool.

GENERAL PROCEDURES (Continued)

12. Insert the nozzle into the evaporator housing and direct the spray toward the evaporator core face. Spray the entire evaporator core face until empty.
 13. Install the blower motor and blower motor resistor (if equipped) or blower motor speed control (if equipped).
 14. Install the evaporator air discharge temperature sensor (if equipped).
 15. Repeat Steps 6 through 8 to cure the evaporator core coating.
 16. Connect the low-side A/C pressure switch (cycling or low-charge protection) electrical connector.
-

SPECIFICATIONS

Material

Item	Specification	Fill Capacity
PAG Refrigerant Compressor Oil (R-134a Systems) YN-12-D	WSH-M1C231-B	207 ml (7 fl oz)
R-134a Refrigerant YN-19 (US); CYN-16-P or CYN-16-R (Canada)	WSH-M17B19-A	0.74 kg (26 oz)

General Specifications

Item	Specification
Magnetic Clutch	
Clutch air gap	0.35-0.65 mm (0.014-0.026 in)

Torque Specifications

Description	Nm	lb-ft	lb-in
A/C clutch disc and hub bolt	13	10	—
A/C pressure relief valve	10	—	89
Compressor bolt (4.0L)	25	18	—
Compressor fitting nuts (4.6L or 5.4L)	15	11	—
Compressor manifold and tube bracket nut	25	18	—
Compressor manifold bolt	21	15	—

Torque Specifications (Continued)

Description	Nm	lb-ft	lb-in
Compressor studs (4.6L or 5.4L)	25	18	—
Condenser inlet fitting nut	8	—	71
Condenser outlet fitting nut	8	—	71
Evaporator fitting nuts	8	—	71
Exterior heater core and evaporator core housing nuts	7	—	62
High-pressure Schrader-type valve	2.5	—	22
High-pressure service gauge port valve cap	0.8	—	7
Interior heater core and evaporator core housing nut	5	—	44
LH lower compressor stud (4.0L)	25	18	—
Low-pressure Schrader-type valve	1.8	—	16
Low-pressure service gauge port valve cap	0.8	—	7
Power steering pressure hose bracket bolt	8	—	71
Upper compressor studs (4.0L)	4	—	35
Upper LH compressor nut (4.0L)	25	18	—

DESCRIPTION AND OPERATION

Air Conditioning

The A/C system components are:

- A/C compressor
- A/C condenser core
- A/C evaporator core
- Suction accumulator
- Connecting refrigerant lines
- Evaporator core orifice
- A/C cycling switch
- A/C pressure transducer (4.0L)
- Dual-function pressure switch (4.6L and 5.4L)
- A/C compressor pressure relief valve

The refrigerant system incorporates an A/C compressor controlled by the PCM through an A/C clutch relay.

The A/C compressor clutch will only be engaged by the PCM if all of the following conditions are met:

- The HVAC module is set to a mode which provides an A/C request to the PCM.
- The A/C cycling switch is not open due to excessively low suction pressure in the low-pressure side of the refrigerant system.
- The A/C pressure transducer is not reading excessively high discharge pressure in the high-pressure side of the refrigerant system (4.0L).
- The dual-function pressure switch is not open due to excessively high discharge pressure in the high-pressure side of the refrigerant system (4.6L and 5.4L).
- The A/C compressor relay is switched to the closed position by the PCM.
- The engine coolant temperature is not excessively high.
- The PCM has not detected a Wide Open Throttle (WOT) condition.

For information concerning operating specifications, refer to Section 412-00.

An A/C compressor pressure relief valve is installed in the compressor manifold and tube assembly (4.0L vehicles) or the A/C compressor (4.6L or 5.4L vehicles) to protect the refrigerant system against excessively high refrigerant pressures.

Refrigerant flow into the evaporator core is metered by an evaporator core orifice tube.

For information concerning the refrigerant cycle and principles of A/C operation, refer to Section 412-00.

A/C Compressor and Clutch Assembly

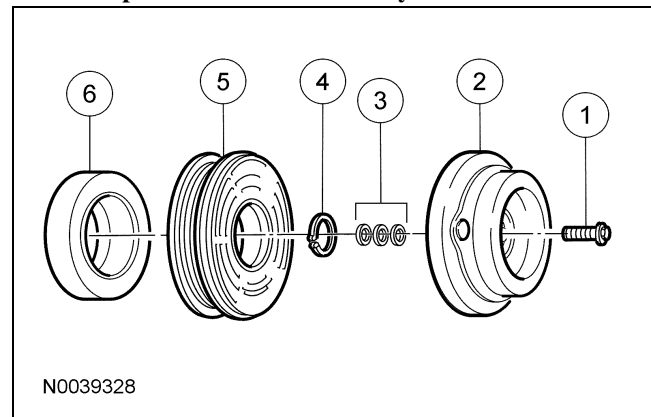
NOTE: Internal FS18 A/C compressor components are not serviced separately. The A/C compressor is serviced only as an assembly. The clutch disc and hub, A/C compressor pulley and bearing and clutch field coil are serviceable.

The FS18 A/C compressor:

- uses a non-serviceable shaft seal.
- has a pressure relief valve installed in the rear of the compressor on 4.6L and 5.4L vehicles to protect the refrigerant system against excessively high refrigerant pressures.
- uses PAG oil or equivalent. This oil contains special additives required for the A/C compressor.
 - PAG oil may have some slightly dark-colored streaks while maintaining normal oil viscosity. This is normal for this A/C compressor because of break-in wear that can discolor the oil.

Use standard oil matching procedures when installing new compressors.

A/C Compressor Clutch Assembly



Item	Part Number	Description
1	—	A/C clutch bolt
2	19D786	A/C clutch disc and hub
3	19D648	A/C clutch disc and hub spacers
4	—	A/C compressor pulley snap ring

(Continued)

DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
5	19D784	A/C compressor pulley
6	19D798	A/C clutch field coil

The magnetic A/C clutch has the following characteristics:

- The A/C clutch drives the compressor shaft.
- When battery positive voltage (B+) is applied to the A/C clutch field coil, the clutch plate and hub assembly is drawn toward the A/C clutch pulley.
- The magnetic force locks the clutch plate and hub assembly and the A/C clutch pulley together as one unit, causing the compressor shaft to rotate.
- When B+ is removed from the A/C clutch field coil, springs in the clutch plate and hub assembly move the clutch plate away from the A/C clutch pulley.

Evaporator Core Orifice

The evaporator core orifice is located in the evaporator inlet line at the condenser-to-evaporator line fitting. The evaporator core orifice provides a restriction to the flow of refrigerant from the high-pressure side of the refrigerant system, and separates the low-pressure and high-pressure sides of the refrigerant system.

A/C Cycling Switch

NOTE: It is not necessary to recover the refrigerant before removing the A/C cycling switch.

The A/C cycling switch is used to prevent icing of the evaporator core by cycling OFF the A/C compressor clutch when the suction pressure in the low-pressure side of the refrigerant system drops below acceptable levels. The PCM monitors the A/C cycling switch (and dual-function pressure switch on 4.6L and 5.4L vehicles) through the A/C cycling switch circuit. When the circuit is open, the PCM will disengage the A/C compressor clutch. For specifications regarding operating pressure(s), refer to Section 412-00.

A/C Pressure Transducer (4.0L)

NOTE: It is not necessary to recover the refrigerant before removing the A/C pressure transducer.

The A/C pressure transducer is used by the PCM to monitor the discharge pressure in the high-pressure side of the refrigerant system. When the A/C pressure transducer is reading a discharge pressure above acceptable levels, the PCM will disengage the A/C compressor clutch.

Dual-Function Pressure Switch (4.6L and 5.4L)

NOTE: It is not necessary to recover the refrigerant before removing the dual-function pressure switch.

The dual-function pressure switch includes 2 separate sets of contacts that are opened at 2 different pressures.

The first set of contacts in the dual-function pressure switch is used to interrupt A/C compressor operation in the event of excessively high discharge pressure in the high-pressure side of the refrigerant system. The PCM monitors the first set of contacts in the dual-function pressure switch in series with the A/C cycling switch. When the circuit is open, the PCM will disengage the A/C compressor clutch.

The second set of contacts in the dual-function pressure switch is used by the PCM to engage the high speed cooling fan. When the A/C pressure rises above a preset level, the second set of contacts will close and the high-speed cooling fan will be engaged.

For specifications regarding operating pressure(s), refer to Section 412-00.

Condenser Core

The condenser is an aluminum fin and tube design heat exchanger, located in front of the vehicle radiator. It cools compressed refrigerant gas by allowing air to pass over fins and tubes to extract heat, and by condensing gas to liquid refrigerant as it is cooled.

DESCRIPTION AND OPERATION (Continued)

Evaporator Core

NOTE: The evaporator core is not individually serviced. It is serviced only with the heater core and evaporator core housing.

The evaporator core is an aluminum plate/fin type and is located in the heater core and evaporator core housing. A mixture of refrigerant and oil enters the bottom of the evaporator core through the evaporator core inlet tube and then moves out of the evaporator core through the evaporator core outlet tube. Air from the blower motor is cooled and dehumidified as it flows through the evaporator core fins.

Suction Accumulator

NOTE: Installation of a new suction accumulator is not required when repairing the A/C system, except when there is physical evidence of contamination from a failed A/C compressor or damage to the suction accumulator. Damage to the suction accumulator includes leaks in the suction accumulator, physical damage to the suction accumulator shell or desiccant, or moisture contamination. Moisture contamination results only from a complete loss of refrigerant and equalization of the refrigerant system pressure with atmospheric pressure for a period longer than one hour. If even a slight amount of positive refrigerant pressure is present in the system before repairs are carried out, the suction accumulator should not be replaced.

The suction accumulator is located at the LH rear of the engine compartment and is used to prevent residual liquid refrigerant from reaching the A/C compressor after leaving the evaporator core. The suction accumulator allows the accumulated heavier liquid refrigerant and oil mixture to re-enter the compressor suction line at a controlled rate. A desiccant bag is mounted inside the canister to absorb any moisture which may be in the refrigerant system.

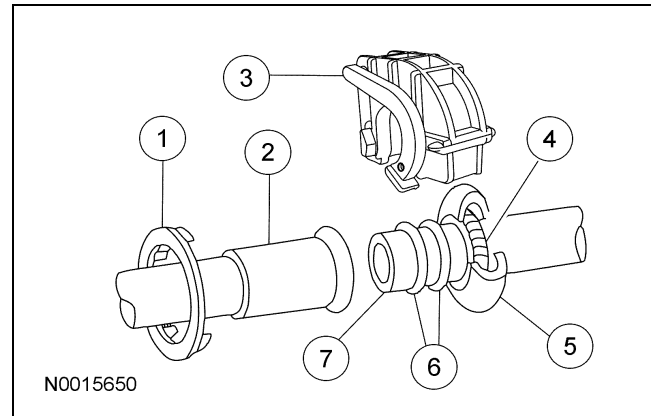
A/C Compressor Pressure Relief Valve

NOTE: If the A/C compressor is operating within limits and the A/C pressure relief valve is venting, or if the A/C pressure relief valve is leaking around the threads, install a new A/C pressure relief valve and O-ring. If the A/C pressure relief valve still vents after it is replaced, diagnose the refrigerant system for a restriction.

An A/C compressor pressure relief valve is incorporated in the compressor manifold and tube assembly (4.0L) or the A/C compressor (4.6L or 5.4L) to prevent damage to the A/C compressor and other system components, and to avoid total refrigerant loss by relieving unusually high refrigerant system discharge pressure buildups. For specifications regarding operating pressure(s), refer to Section 412-00.

The A/C pressure relief valve is a separate component and can be replaced separately from the A/C compressor or compressor manifold and tube assembly. It is necessary to recover the refrigerant before removing the A/C pressure relief valve.

Spring Lock Coupling



Item	Part Number	Description
1	—	Plastic indicator ring
2	—	Female fitting
3	19E746	A/C tube lock coupling clip
4	19E576	A/C tube lock coupling spring
5	—	Cage
6	19E889	O-ring seals
7	—	Male fitting

DESCRIPTION AND OPERATION (Continued)

The spring lock coupling is a refrigerant line coupling held together by a garter spring inside a circular cage.

- When the coupling is connected together, the flared end of the female fitting slips behind the garter spring inside the cage of the male fitting.
- The garter spring and cage then prevent the flared end of the female fitting from pulling out of the cage.
- Three O-ring seals are used to seal between the 2 halves of the coupling.
- Use only the O-ring seals listed in the Ford Master Parts Catalog for the spring lock coupling.
- A plastic indicator ring is used on the spring lock couplings of the A/C evaporator core to indicate, during vehicle assembly, that the coupling is connected. Once the coupling is connected, the indicator ring is no longer necessary but will remain captive by the coupling near the cage opening.
- The indicator ring may also be used during service operations to indicate connection of the coupling.
- An A/C tube lock coupling clip may be used to secure the coupling.

Peanut Fitting

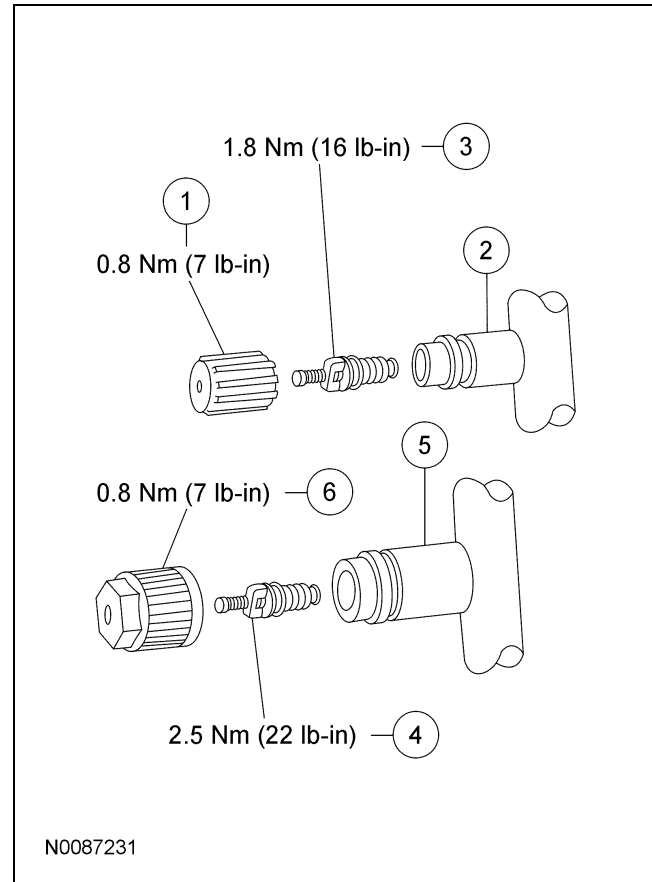
When disconnecting or connecting peanut fittings, observe the following.

- The male and female blocks of the peanut fitting are retained with a nut.
- Support the female fitting with a wrench to prevent twisting of the tubes.
- An O-ring seal is installed around the tube on the male block.
- On 4.6L and 5.4L vehicles, a gasket seal is installed along with the O-ring seal at the A/C compressor fittings.
- When correctly assembled, the male and female fittings should be flush.
- Use only the seals listed in the Ford Master Parts Catalog.

Service Gauge Port Valves

The high-pressure service gauge port valve is located on the condenser-to-evaporator line.

The low-pressure service gauge port valve is located on the suction accumulator.



Item	Part Number	Description
1	19D702	Low-pressure service gauge port valve cap
2	—	Low-pressure service gauge port valve
3	19D701	Low-pressure Schrader-type valve
4	19D701	High-pressure Schrader-type valve
5	—	High-pressure service gauge port valve
6	19D702	High-pressure service gauge port valve cap

The fitting is an integral part of the refrigerant system line or component.

- Special couplings are required for both the high-side and low-side service gauge ports.
- A very small amount of leakage will always be detectable around the Schrader-type valve with the service gauge port valve cap removed, and is considered normal. A new Schrader-type valve core can be installed if the seal leaks excessively.

DESCRIPTION AND OPERATION (Continued)

- The service gauge port valve caps are used as primary seals in the refrigerant system to prevent leakage through the Schrader-type valves from reaching the atmosphere. Always install and tighten the A/C service gauge port valve caps to the correct torque after they are removed.

Refrigerant System Dye

Fluorescent refrigerant system dye is added to the refrigerant system at the factory to assist in refrigerant system leak diagnosis using a Rotunda-approved ultraviolet blacklight. It is not necessary to add additional dye to the refrigerant system before diagnosing leaks, even if a significant amount of refrigerant has been removed from the system. New suction accumulators are shipped with a fluorescent dye “wafer” included in the desiccant bag which will dissolve after approximately 30 minutes of continued A/C operation. It is not necessary to add dye after flushing or filtering the refrigerant system because a new suction accumulator is installed as part of the flushing or filtering procedure. Additional refrigerant system dye should only be added if more than 50% of the refrigerant system lubricant capacity has been lost due to a fitting separation, hose rupture or other damage. Refer to Section 412-00.

DESCRIPTION AND OPERATION

Control Components

The Electronic Manual Temperature Control (EMTC) system control components are used to select:

- air inlet source (outside or recirculated).
- blower motor speed.
- discharge air temperature (temperature blend).
- discharge air location (defrost, panel, floor).
- A/C compressor operation.

Climate Control System Inputs

HVAC Module

The HVAC module integrates the temperature control, airflow mode selection, A/C request button, recirculated air request button and rear defog switch into a single unit.

The temperature control switch setting determines air temperature. Movement of the temperature display from COOL (blue) to WARM (red) causes a corresponding movement of the temperature blend door and determines the air discharge temperature that the air distribution system will maintain. The temperature control switch is an integral part of the HVAC module and cannot be installed separately.

The A/C request button determines A/C compressor operation, except when the function selector is in the OFF, MAX or DEFROST mode. The A/C request button is an integral part of the HVAC module and cannot be installed separately.

The recirculated air request button can select recirculated air in any mode except DEFROST, and fresh air in any mode except MAX A/C or OFF.

The rear defog button signals activation of the heated backlight. The rear defog button is an integral part of the HVAC module and cannot be installed separately.

The HVAC module is not equipped with self-test capabilities.

Blower Motor Switch

The blower motor switch controls blower motor speed (by adding or bypassing resistors in the blower motor resistor) in all modes except OFF. The blower motor switch is mounted to the HVAC module and can be installed separately.

Climate Control System Outputs

Blower Motor Resistor

The blower motor resistor adjusts the blower motor speed based on the blower motor switch setting. The blower motor resistor contains 3 resistor coils in series. The end of each resistor coil is wired to a setting in the blower motor switch. Voltage is available at the blower motor at all times when the ignition is in the RUN position and the function selector is not OFF. The ground side of the circuit then continues to the blower motor resistor. The blower motor switch will allow a path to ground with the addition of 1, 2 or 3 coils in the blower motor resistor to the circuit. When the blower motor switch is in the HI position, the blower motor resistor is bypassed.

Mode Door Actuators

The 3 airflow mode door actuators move the airflow mode doors on command from the HVAC module.

The panel/floor door and defrost door mode door actuators each contain a reversible electric motor and a potentiometer. The HVAC module applies a 5-volt signal to one end of the potentiometer and ground to the other. The potentiometer wiper is connected to the actuator output shaft and moves with the output shaft. The voltage available at the wiper indicates the position of the airflow mode door. The actuator wiper voltage is sent to the HVAC module which drives the actuator motor in whichever direction is necessary to make the actuator wiper voltage agree with the expected HVAC module wiper voltage value.

The air inlet mode door actuator is a reversible electric motor which moves the air inlet door between the outside and recirculated air inlets on command from the HVAC module. When RECIRC is requested, the air inlet mode door actuator moves to the RECIRC position, allowing only recirculated air inlet. When FRESH air inlet is requested, the air inlet mode door actuator moves to the FRESH air inlet position, allowing only outside air inlet.

Temperature Blend Door Actuator

The temperature blend door actuator moves the temperature blend door on command from the HVAC module.

DESCRIPTION AND OPERATION (Continued)

The temperature blend door actuator contains a reversible electric motor and a potentiometer. The HVAC module applies a 5-volt signal to one end of the potentiometer and ground to the other. The potentiometer wiper is connected to the actuator output shaft and moves with the output shaft. The voltage available at the wiper indicates the position of the temperature blend door. The actuator wiper voltage is sent to the HVAC module which drives the actuator motor in whichever direction is necessary to make the actuator wiper voltage agree with the expected HVAC module wiper voltage value.

The temperature blend door actuator is located on the heater core and evaporator core housing.

DESCRIPTION AND OPERATION

Air Distribution and Filtering

NOTE: The air distribution system of this vehicle is factory equipped with a cabin air filter.

There are 2 sources of air available to the air distribution system:

- Outside air
- Recirculated air

Recirculated air is only used when the HVAC module is set to the MAX A/C and OFF modes.

Air distribution within the vehicle is determined by the function selector switch position. Airflow mode doors are used to direct airflow within the plenum chamber. Electric mode door actuators are used to position the airflow mode doors. Refer to Section 412-00 for a description and operation of each mode.

Air enters the passenger compartment from the:

- instrument panel registers.
- floor ducts.
- windshield defroster duct.
- side window demisters.

Passenger compartment air is exhausted from the vehicle through open windows or body air vents.

Cabin Air Filter

The cabin air filter is located under the RH cowl vent screen. To install a new cabin air filter, remove the RH cowl vent screen. Refer to Section 501-02.

Plenum Chamber

The plenum chamber is used to distribute airflow from the heater core and evaporator core housing to the airflow outlets. It is mounted to the instrument panel and can be replaced separately from the heater core and evaporator core housing. The plenum chamber contains the PANEL and DEFROST mode doors which cannot be separately replaced.

Air Inlet Duct

The air inlet duct is used to switch between FRESH and RECIRCULATED air inlet. It is mounted to the heater core and evaporator core housing and can be replaced separately. The air inlet duct contains the air inlet mode door which cannot be separately replaced.

DESCRIPTION AND OPERATION

Heating and Ventilation

The heating and ventilation system has the following features:

- Controls the temperature and, during A/C operation, reduces the relative humidity of the air inside the vehicle
- Delivers heated or cooled air to maintain the vehicle interior temperature and comfort level
- Cooling or heating can be adjusted to maintain the desired temperature

The heating and ventilation system includes the:

- Blower motor
- Heater core and evaporator core housing
- Heater core

Blower Motor

The blower motor pulls air from the air inlet and forces it into the heater core and evaporator core housing where it is mixed and distributed. The blower motor receives battery voltage when the ignition is in the RUN position and the function selector is in an ON position, and is grounded by the blower motor switch.

Heater Core and Evaporator Core Housing

The heater core and evaporator core housing directs airflow from the blower motor through the evaporator core and heater core. All airflow from the blower motor passes through the evaporator core. The airflow is then directed through or around the heater core by the temperature blend door. After passing through the heater core, the airflow is distributed to the selected outlet by the plenum chamber.

Heater Core

NOTE: The heater core is not individually serviced. It is serviced only with the heater core and evaporator core housing.

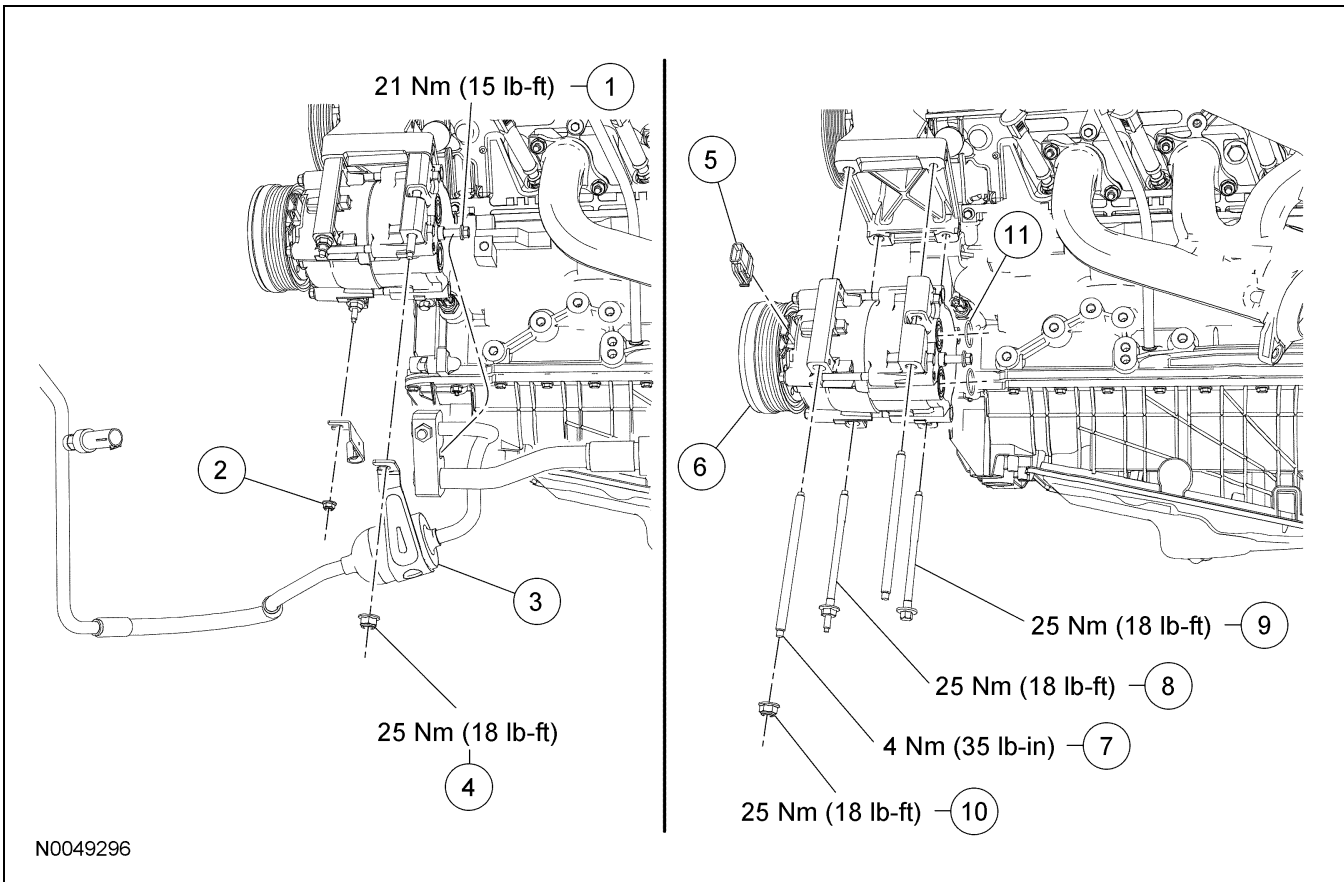
The heater core receives a flow of coolant from the engine cooling system through the heater core inlet. A restrictor is installed in the heater core inlet hose on V8 models to eliminate noise. The heater core consists of fins and tubes arranged to extract heat from the engine coolant and transfer it to air passing through the heater core. The engine coolant is then returned to the engine cooling system through the heater core outlet.

REMOVAL AND INSTALLATION

Air Conditioning (A/C) Compressor — 4.0L

Material

Item	Specification
PAG Refrigerant Compressor Oil (R-134a Systems) YN-12-D	WSH-M1C231-B



Item	Part Number	Description
1	N805334	Compressor manifold bolt
2	N520112	Line bracket nut
3	19D734	Compressor manifold and tube
4	W520112	Compressor manifold and tube bracket nut
5	—	Field coil electrical connector (part of 12B637)

(Continued)

Item	Part Number	Description
6	19703	A/C compressor
7	W704795	Upper compressor stud (2 required)
8	W707821	Lower LH compressor stud
9	N811329	Compressor bolt
10	N520112	Upper LH compressor nut
11	19E889	O-ring (2 required)

REMOVAL AND INSTALLATION (Continued)**Removal and Installation**

NOTICE: If installing a new air conditioning (A/C) compressor due to an internal failure of the old unit, the following procedures must be carried out to remove contamination from the A/C system. Failure to remove contamination from the A/C system, if present, will result in poor A/C performance and/or damage to the new A/C compressor and other components.

- If A/C flushing equipment is available, carry out flushing of the A/C system prior to installing a new A/C compressor. For additional information, refer to Section 412-00.
- If A/C flushing equipment is not available, carry out filtering of the A/C system after a new A/C compressor has been installed. For additional information, refer to Section 412-00.
- Install a new evaporator core orifice, as directed by the A/C flushing or filtering procedure.
- Install a new suction accumulator as directed by the A/C flushing or filtering procedure.

NOTE: Installation of a new suction accumulator is not required when repairing the A/C system, except when there is physical evidence of contamination from a failed A/C compressor or damage to the suction accumulator. Damage to the suction accumulator includes leaks in the suction accumulator, physical damage to the suction accumulator shell or desiccant, or moisture contamination. Moisture contamination results only from a complete loss of refrigerant and equalization of the refrigerant system pressure with atmospheric pressure for a period longer than one hour. If even a slight amount of positive refrigerant pressure is present in the system before repairs are carried out, the suction accumulator should not be replaced.

NOTE: If installing a new A/C compressor, the A/C clutch disc and hub, A/C compressor pulley and A/C clutch field coil must be inspected and transferred from the old unit to the new unit if suitable for reuse.

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to Section 100-02.
2. If flushing of the A/C system has not been carried out, recover the refrigerant. For additional information, refer to Section 412-00.
3. Remove the Air Cleaner (ACL) outlet tube. For additional information, refer to Section 303-12.
4. Remove the drive belt from the A/C compressor pulley.
5. Disconnect the field coil electrical connector.
6. Loosen the compressor manifold bolt and detach the compressor manifold.
 - Discard the O-ring seals.
 - To install, tighten to 21 Nm (15 lb-ft).
7. Remove the line bracket nut.
8. Remove the compressor manifold and tube bracket nut, and detach the compressor manifold and tube.
 - To install, tighten to 25 Nm (18 lb-ft).
9. Remove the upper LH compressor nut.
 - To install, tighten to 25 Nm (18 lb-ft).
10. Remove the 2 upper compressor studs.
 - To install, tighten to 4 Nm (35 lb-in).
11. Remove the lower LH compressor stud.
 - To install, tighten to 25 Nm (18 lb-ft).
12. Remove the compressor bolt.
 - To install, tighten to 25 Nm (18 lb-ft).
13. Remove the A/C compressor.
14. To install, reverse the removal procedure.
 - If a new A/C compressor is to be installed, the clutch assembly must be transferred from the old unit to the new unit. For additional information, refer to Clutch and Clutch Field Coil in this section.
 - Install new O-ring seals.
 - If filtering of the refrigerant system is not to be carried out, lubricate the refrigerant system with the correct amount of clean PAG oil. For additional information, refer to Section 412-00.

REMOVAL AND INSTALLATION (Continued)

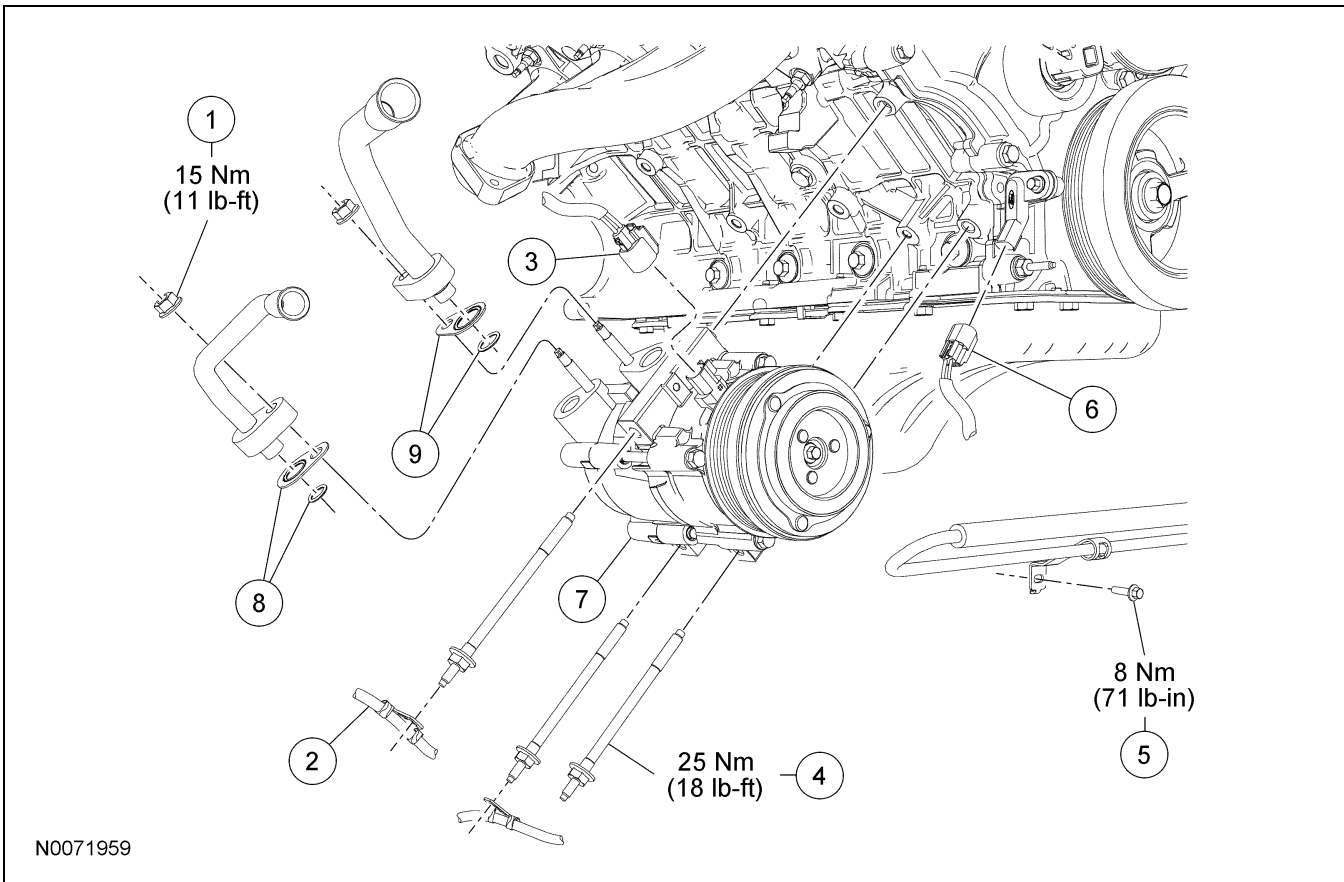
15. If filtering of the refrigerant system is not to be carried out, evacuate, leak test and charge the refrigerant system. For additional information, refer to Section 412-00.
-

REMOVAL AND INSTALLATION

Air Conditioning (A/C) Compressor — 4.6L, 5.4L

Material

Item	Specification
PAG Refrigerant Compressor Oil (R-134a Systems) YN-12-D	WSH-M1C231-B



N0071959


Item	Part Number	Description
1	N805334	Compressor fitting nut (2 required)
2	—	Wire harness retainer (2 required) (part of 12B637)
3	—	Field coil electrical connector (part of 12B637)
4	W705811	A/C compressor stud (3 required)
5	W505255	Power steering pressure hose bracket bolt

Item	Part Number	Description
6	—	Crankshaft position sensor electrical connector (part of 12B637)
7	19703	A/C compressor
8	19B596	O-ring seal and gasket seal kit
9	19B596	O-ring seal and gasket seal kit

(Continued)

REMOVAL AND INSTALLATION (Continued)

Removal and Installation

 **CAUTION:** If installing a new air conditioning compressor due to an internal failure of the old unit, you must carry out the following procedures to remove contamination from the air conditioning system. Failure to remove contamination from the A/C system, if present, will result in poor A/C performance and/or damage to the new A/C compressor and other components.

- If A/C flushing equipment is available, carry out flushing of the air conditioning system prior to installing a new air conditioning compressor. For additional information, refer to Section 412-00.
- If A/C flushing equipment is not available, carry out filtering of the air conditioning system after a new air conditioning compressor has been installed. For additional information, refer to Section 412-00.
- Install a new evaporator core orifice, as directed by the A/C flushing or filtering procedure.
- Install a new suction accumulator as directed by the A/C flushing or filtering procedure.

NOTE: Installation of a new suction accumulator is not required when repairing the A/C system except when there is physical evidence of contamination from a failed A/C compressor or damage to the suction accumulator.

NOTE: If installing a new A/C compressor, the A/C clutch disc and hub, A/C compressor pulley and A/C clutch field coil must be inspected and transferred from the old unit to the new unit if suitable for reuse.

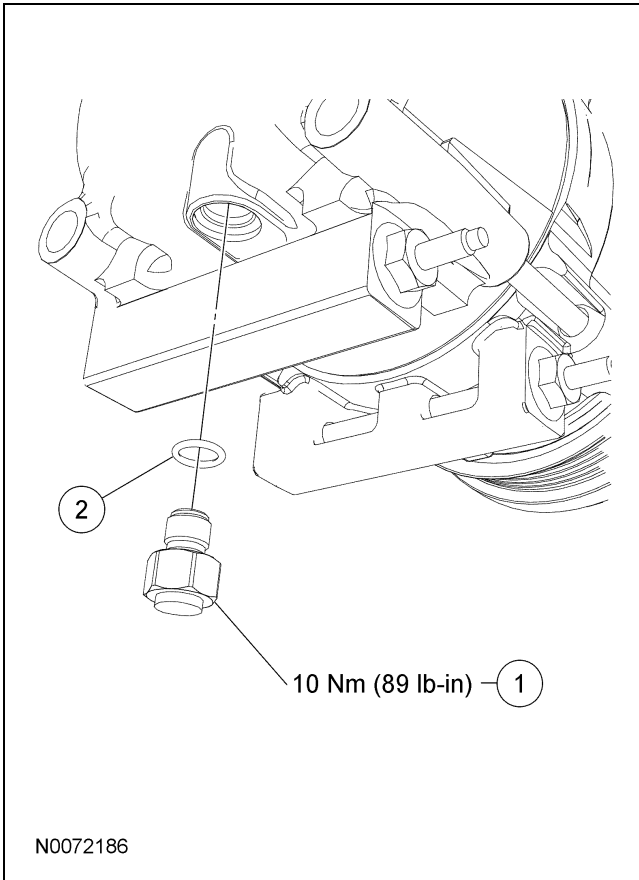
1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to Section 100-02.
2. If flushing of the A/C system has not been carried out, recover the refrigerant. For additional information, refer to Section 412-00.
3. Remove the drive belt from the A/C compressor pulley.
4. Remove the 2 compressor fitting nuts and disconnect the fittings.
 - Discard the O-ring seals and gasket seals.
 - To install tighten to 15 Nm (11 lb-ft).
5. Remove the power steering pressure hose bracket bolt.
 - To install, tighten to 8 Nm (71 lb-in).
6. Disconnect the crankshaft position sensor electrical connector.
7. Disconnect the field coil electrical connector.
8. Detach the 2 wire harness retainers from the A/C compressor studs.
9. Remove the 3 A/C compressor studs.
 - To install, tighten to 25 Nm (18 lb-ft).
10. To install, reverse the removal procedure.
 - If a new A/C compressor is to be installed, the clutch assembly must be transferred from the old unit to the new unit. For additional information, refer to Clutch and Clutch Field Coil in this section.
 - Install new O-ring seals and gasket seals.
 - If filtering of the refrigerant system is not to be carried out, lubricate the refrigerant system with the correct amount of clean PAG oil. For additional information, refer to Section 412-00.
11. If filtering of the refrigerant system is not to be carried out, evacuate, leak test and charge the refrigerant system. For additional information, refer to Section 412-00.

REMOVAL AND INSTALLATION

Air Conditioning (A/C) Pressure Relief Valve

Material

Item	Specification
PAG Refrigerant Compressor Oil (R-134a Systems) YN-12-D	WSH-M1C231-B



Item	Part Number	Description
1	19D644	A/C compressor pressure relief valve
2	—	O-ring seal (part of 19D644)

Removal and Installation

Vehicles with 4.6L or 5.4L

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to Section 100-02.

All vehicles

2. Recover the refrigerant. For additional information, refer to Section 412-00.
3. Remove the A/C compressor pressure relief valve and O-ring seal.
 - To install, tighten to 10 Nm (89 lb-in).
4. **NOTE:** A new O-ring seal will already be installed on the new A/C pressure relief valve service part.

To install, reverse the removal procedure.

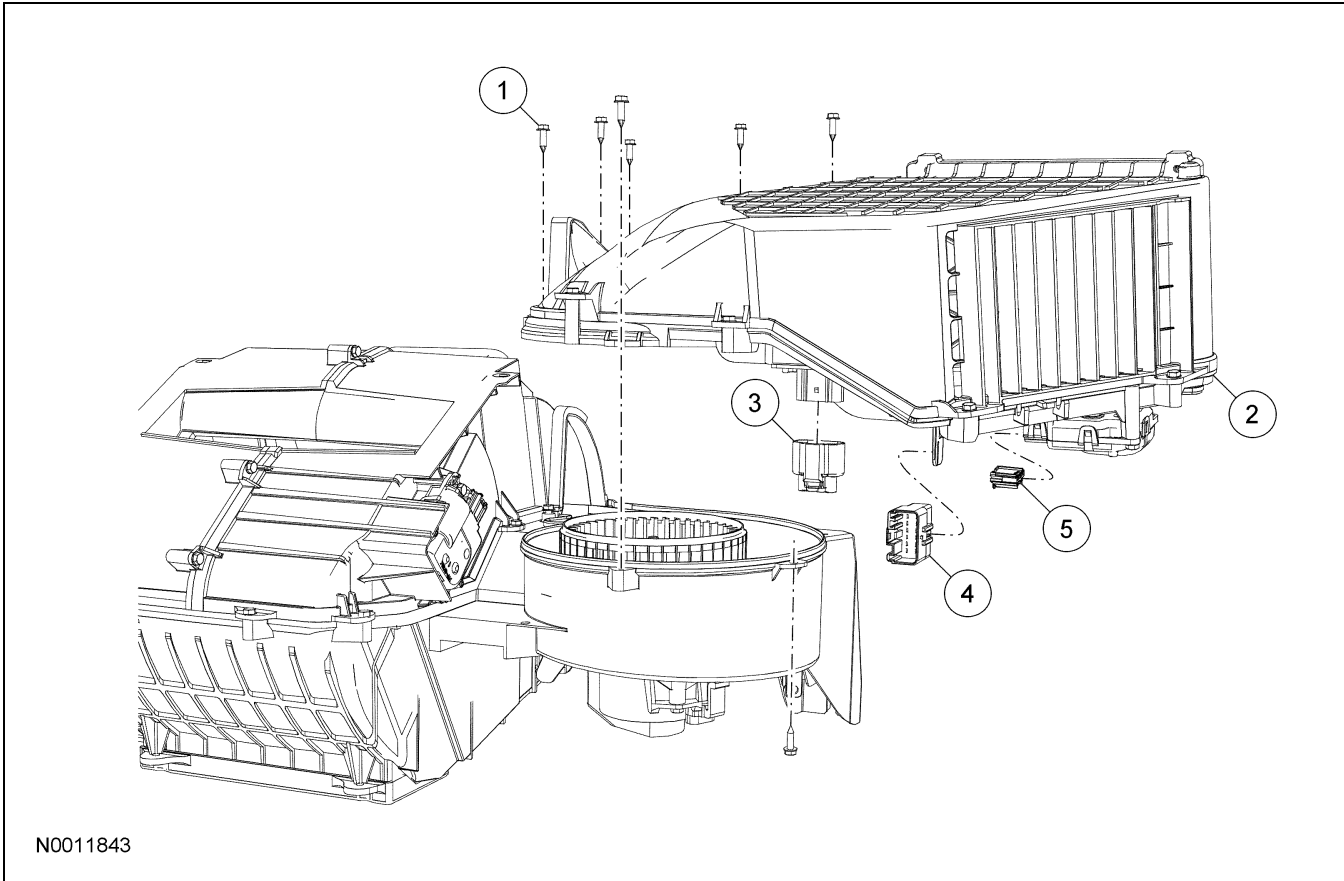
- Lubricate the refrigerant system with the correct amount of clean PAG oil. For additional information, refer to Section 412-00.

REMOVAL AND INSTALLATION (Continued)

5. Evacuate, leak test and charge the refrigerant system. For additional information, refer to Section 412-00.
-

REMOVAL AND INSTALLATION

Air Inlet Duct



Item	Part Number	Description
1	W701696	Air inlet duct screw (7 required)
2	19A648	Air inlet duct
3	—	Blower motor resistor electrical connector (part of 18B574)
4	—	Heater core and evaporator core housing harness electrical connector (part of 18B574)
5	—	Air inlet mode door actuator electrical connector (part of 18B574)

2. Disconnect the blower motor resistor electrical connector.
3. Disconnect the air inlet mode door actuator electrical connector.
4. Detach the heater core and evaporator core housing harness electrical connector from the bracket.
5. Remove the 7 air inlet duct screws.

Removal and Installation

1. Remove the heater core and evaporator core housing. For additional information, refer to Heater Core And Evaporator Core Housing in this section.

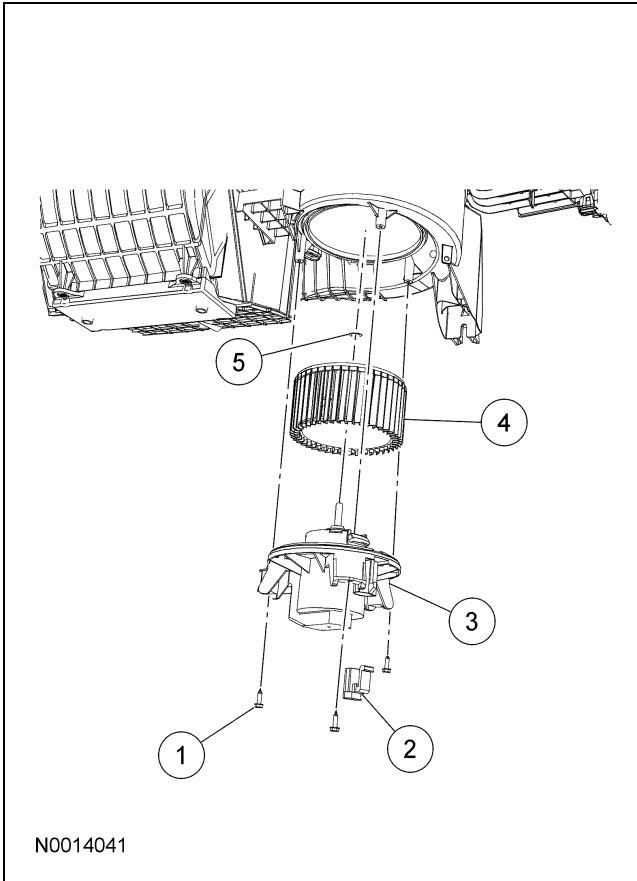
REMOVAL AND INSTALLATION (Continued)

6. Remove the air inlet duct.

7. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Blower Motor



Item	Part Number	Description
1	W701696	Blower motor screw (3 required)
2	—	Blower motor electrical connector (part of 18B574)
3	19805	Blower motor
4	19834	Blower motor wheel
5	18A287	Blower motor wheel clip

Removal and Installation

1. Disconnect the blower motor electrical connector.
2. Remove the 3 blower motor screws.
3. Remove the blower motor.
4. Remove the blower motor wheel clip.

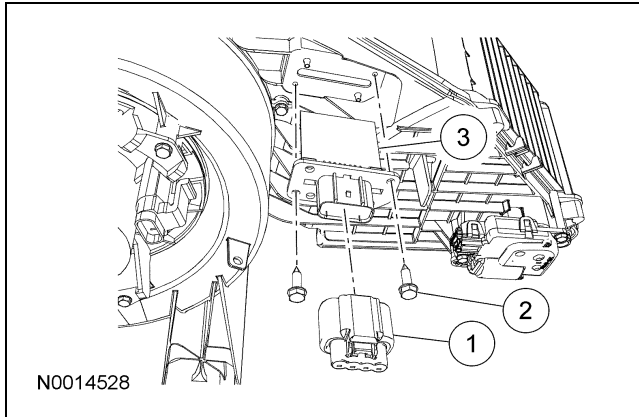
REMOVAL AND INSTALLATION (Continued)

5. Remove the blower motor wheel.

6. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Blower Motor Resistor



Item	Part Number	Description
1	—	Blower motor resistor electrical connector (part of 18B574)
2	W701696	Blower motor resistor screw (2 required)
3	18591	Blower motor resistor

Removal and Installation

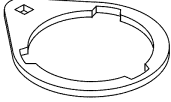
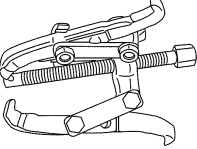
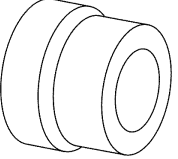
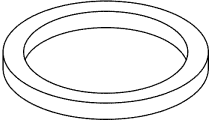
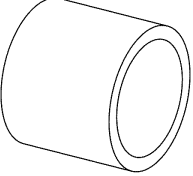
NOTE: The blower motor resistor can be accessed from below the RH side of the instrument panel.

1. Disconnect the blower motor resistor electrical connector.
2. Remove the 2 blower motor resistor screws.
3. Remove the blower motor resistor.
4. To install, reverse the removal procedure.

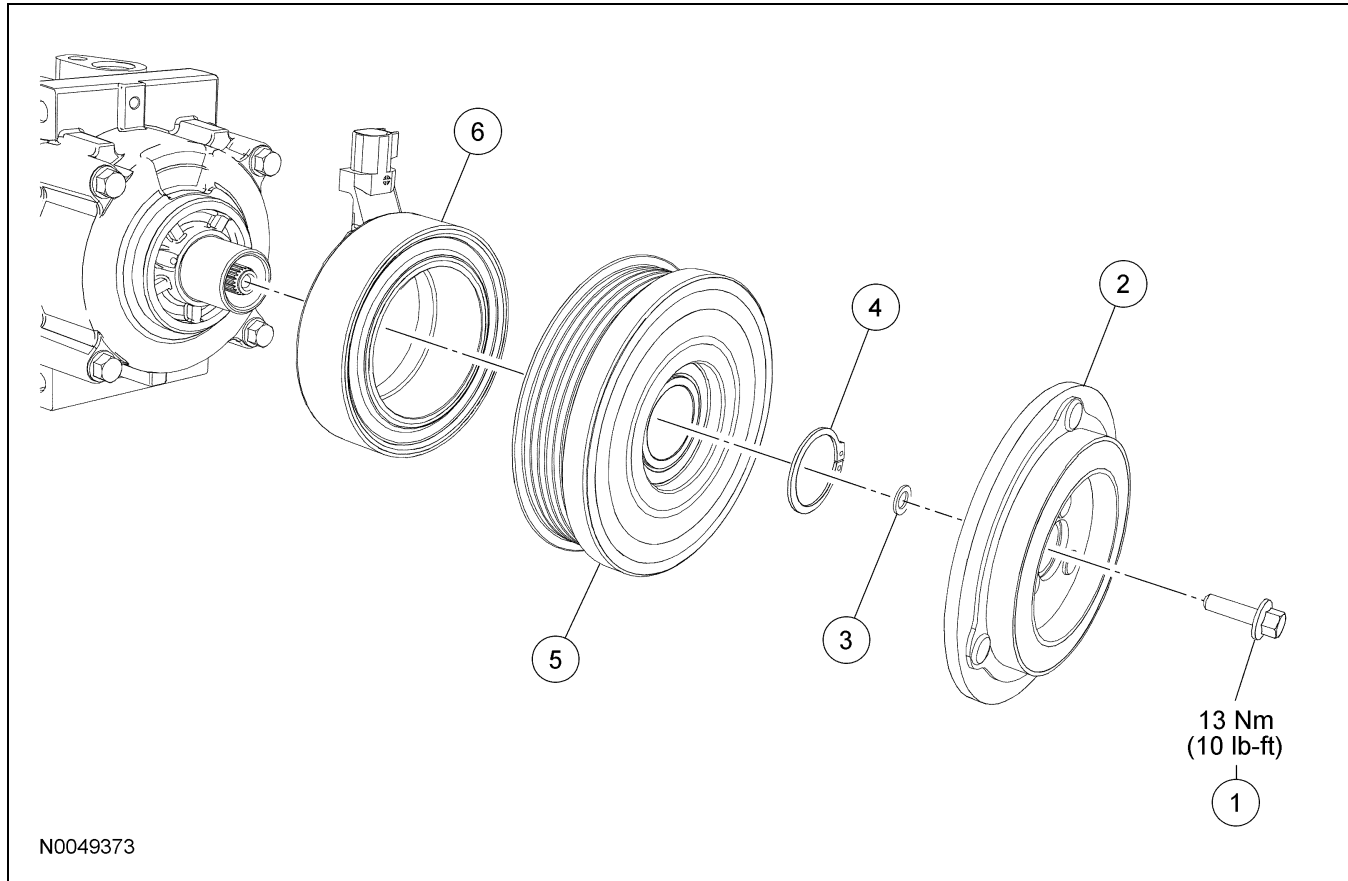
REMOVAL AND INSTALLATION

Clutch and Clutch Field Coil

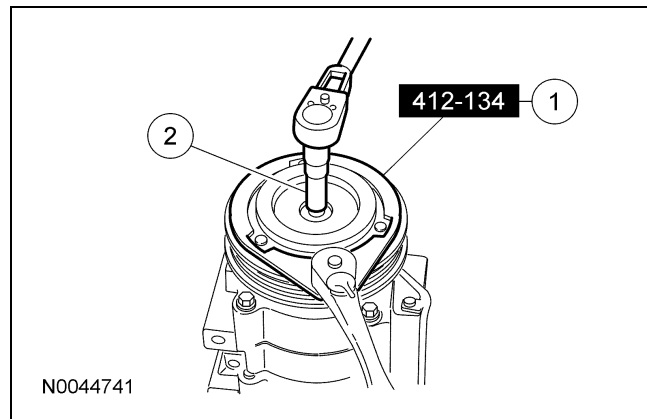
Special Tool(s)

 <p>ST2946-A</p>	<p>Holding Fixture, Compressor Clutch 412-134</p>
 <p>ST2382-A</p>	<p>Remover, Compressor Pulley 412-001 (T71P-19703-B)</p>
 <p>ST1232-A</p>	<p>Installer, A/C Compressor Coil 412-065 (T89P-19623-EH)</p>
 <p>ST1234-A</p>	<p>Installer, A/C Compressor Field Coil 412-078 (T91L-19623-CH)</p>
 <p>ST1233-A</p>	<p>Remover, A/C Compressor Field Coil 412-067 (T89P-19623-FH)</p>

REMOVAL AND INSTALLATION (Continued)



Item	Part Number	Description
1	N805332	A/C clutch disc and hub bolt (4.0L)
1	W711887	A/C clutch disc and hub bolt (4.6L or 5.4L)
2	19D786	A/C clutch disc and hub
3	19D648	A/C clutch disc and hub spacer
4	—	A/C compressor pulley snap ring
5	19D784	A/C compressor pulley
6	19D798	A/C clutch field coil



Removal

- Remove the A/C compressor. For additional information, refer to Air Conditioning (A/C) Compressor — 4.0L or Air Conditioning (A/C) Compressor — 4.6L, 5.4L in this section.
- Remove the A/C clutch disc and hub.
 - Using the special tool, hold the A/C clutch disc and hub.
 - Remove the A/C clutch disc and hub bolt.

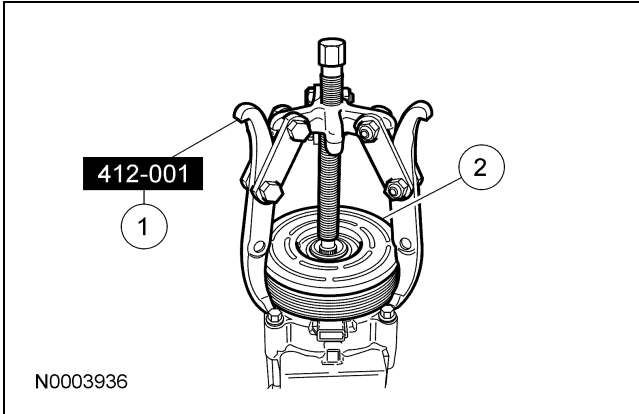
- Remove the A/C clutch disc and hub.
- Remove the A/C clutch disc and hub spacer(s).
- Remove the A/C compressor pulley snap ring.

REMOVAL AND INSTALLATION (Continued)

6. **NOTICE:** Do not use air tools. Damage to the A/C compressor pulley or A/C compressor may result.

Remove the A/C compressor pulley.

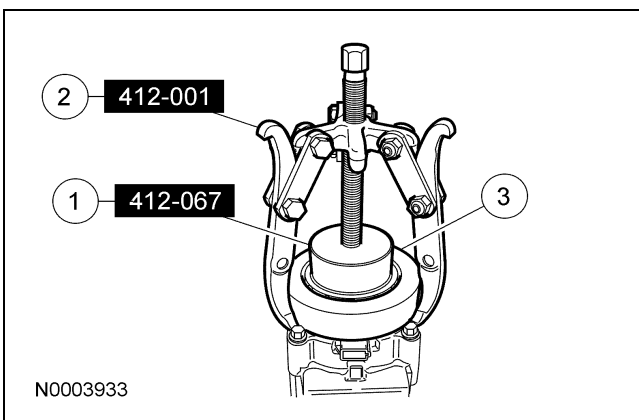
- 1 Install the special tool.
- 2 Remove the A/C compressor pulley.



7. **NOTICE:** Do not use air tools. Damage to the A/C clutch field coil or A/C compressor may result.

Remove the A/C clutch field coil.

- 1 Install the special tool.
- 2 Install the special tool.
- 3 Remove the A/C clutch field coil.

**Installation**

NOTE: If installing a new A/C compressor, the A/C clutch components should be reused unless obvious signs of damage are found. If excessive grooving is found, a new A/C clutch disc and hub and A/C compressor pulley must be installed together. Otherwise, each component can be installed individually where needed.

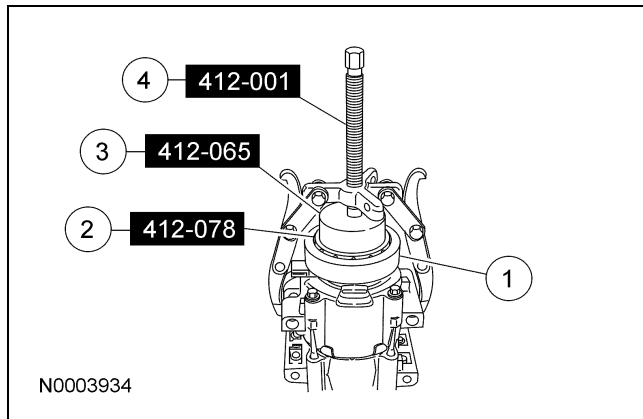
1. Visually inspect the A/C clutch disc and hub, A/C compressor pulley and A/C clutch field coil for damage.
 - Inspect for physical damage, including cracked or melted components or discoloration due to excessive heat.
 - Inspect for excessive wear, including grooving in the A/C clutch disc and hub or A/C compressor pulley that is more than fingernail depth.
 - Inspect for roughness in the A/C compressor pulley bearing.
2. Clean the A/C clutch field coil and pulley mounting surfaces.

REMOVAL AND INSTALLATION (Continued)

3. **NOTICE: Do not use air tools. Damage to the A/C clutch field coil or A/C compressor may result.**

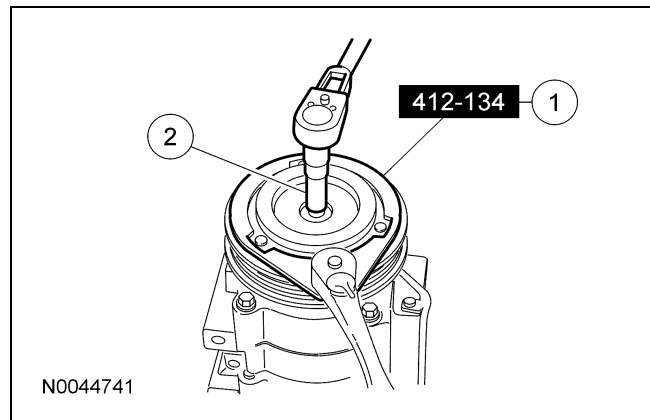
Install the A/C clutch field coil.

- 1 Place the A/C clutch field coil on the A/C compressor with the A/C clutch field coil electrical connector correctly positioned.
- 2 Place the special tool on the A/C clutch field coil.
- 3 Place special tool 412-065 on special tool 412-078.
- 4 Use the special tool to install the A/C clutch field coil.



4. Install the A/C compressor pulley.
5. Install the A/C compressor pulley snap ring.

6. Install the A/C clutch disc and hub spacer(s) and the A/C clutch disc and hub.
7. Install the A/C clutch disc and hub bolt.
 - 1 Hold the A/C clutch disc and hub with the special tool.
 - 2 Tighten to 13 Nm (10 lb-ft).



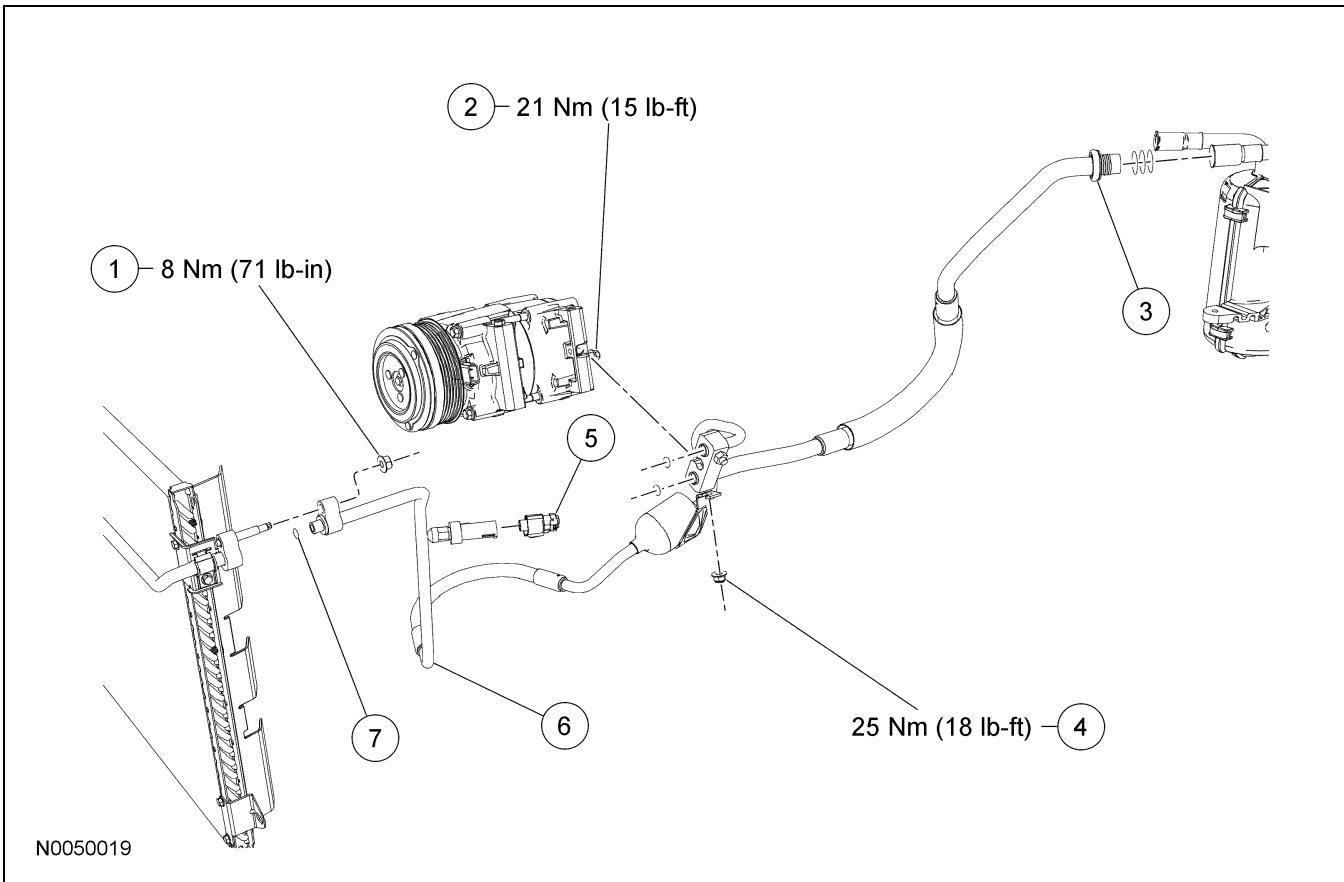
8. Measure and adjust the clutch air gap. For additional information, refer to the A/C clutch air gap adjustment procedure in Section 412-00.
9. Install the A/C compressor. For additional information, refer to Air Conditioning (A/C) Compressor — 4.0L or Air Conditioning (A/C) Compressor — 4.6L, 5.4L in this section.

REMOVAL AND INSTALLATION

Compressor Manifold and Tube Assembly — 4.0L

Material

Item	Specification
PAG Refrigerant Compressor Oil (R-134a Systems) YN-12-D	WSH-M1C231-B



Item	Part Number	Description
1	W520413	Condenser inlet fitting nut
2	N805334	Compressor manifold bolt
3	—	Suction accumulator outlet fitting (part of 19D734)
4	W520112	Compressor manifold and tube bracket nut
5	—	A/C pressure transducer electrical connector (part of 12B637)
6	19D734	Compressor manifold and tube assembly
7	19E889	O-ring seal (6 required)

Removal and Installation

1. Recover the refrigerant. For additional information, refer to Section 412-00.
2. Loosen the compressor manifold bolt and detach the compressor manifold.
 - Discard the O-ring seals.
 - To install, tighten to 21 Nm (15 lb-ft).
3. Remove the compressor manifold and tube bracket nut.
 - To install, tighten to 25 Nm (18 lb-ft).

REMOVAL AND INSTALLATION (Continued)

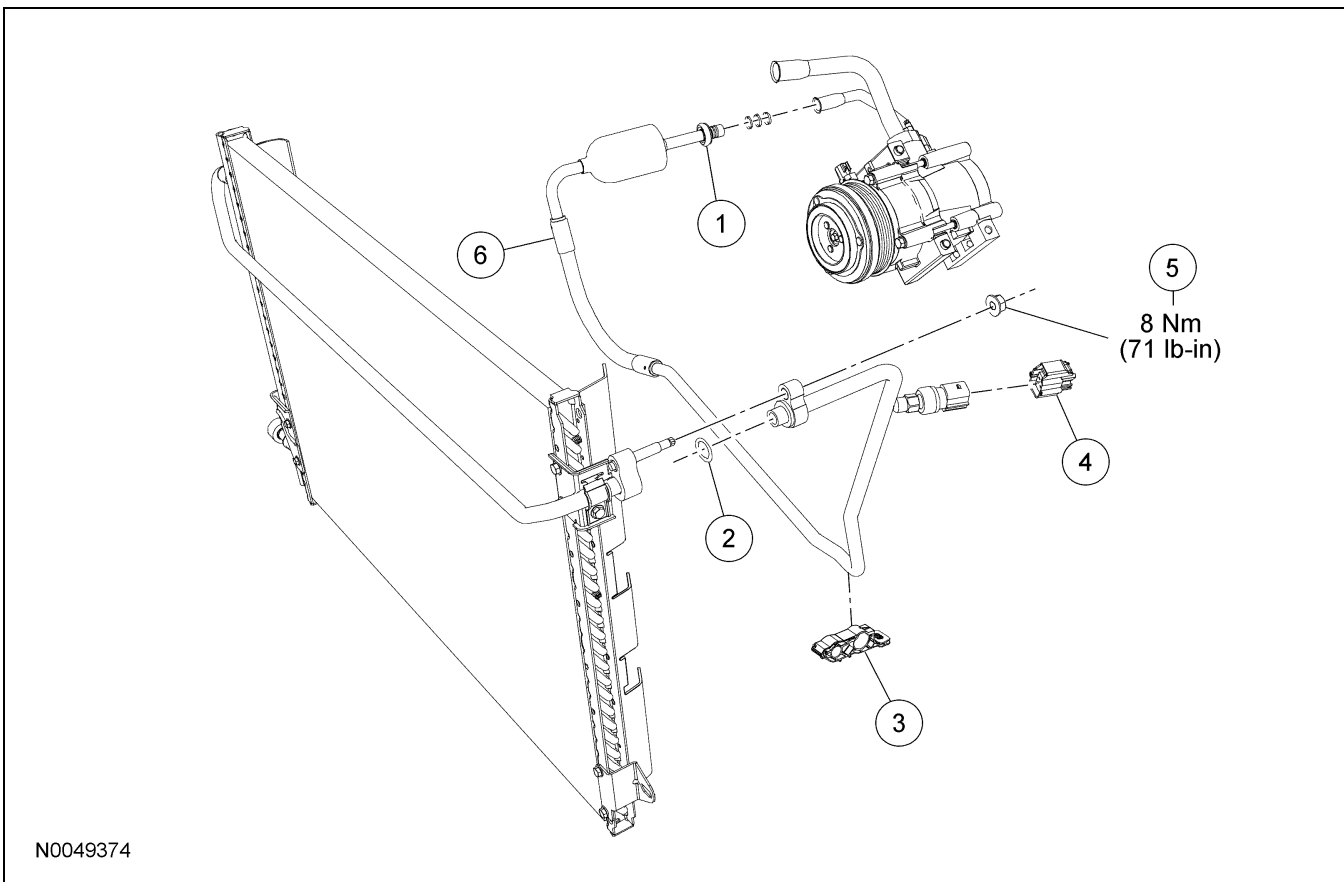
4. Disconnect the pressure transducer electrical connector.
 5. Disconnect the suction accumulator outlet fitting.
 - Discard the O-ring seals.
 6. Remove the condenser inlet fitting nut and disconnect the fitting.
 - Discard the O-ring seal.
 - To install, tighten to 8 Nm (71 lb-in).
 7. To install, reverse the removal procedure.
 - Install new O-ring seals.
 - Lubricate the refrigerant system with the correct amount of clean PAG oil. For additional information, refer to Section 412-00.
 8. Evacuate, leak test and charge the refrigerant system. For additional information, refer to Section 412-00.
-

REMOVAL AND INSTALLATION

Compressor to Condenser Discharge Line

Material

Item	Specification
PAG Refrigerant Compressor Oil (R-134a Systems) YN-12-D	WSH-M1C231-B



Item	Part Number	Description
1	—	Compressor discharge fitting (part of 19972)
2	19E889	O-ring (4 required)
3	19B632	A/C line bracket
4	—	Dual-function pressure switch electrical connector (part of 12B637)
5	W520413	Condenser inlet fitting nut
6	19972	Compressor-to-condenser discharge line

Removal and Installation

5.4L (4V) vehicles

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to Section 100-02.

4.6L vehicles

2. Remove the Air Cleaner (ACL) outlet tube. For additional information, refer to Section 303-12.

REMOVAL AND INSTALLATION (Continued)**All vehicles**

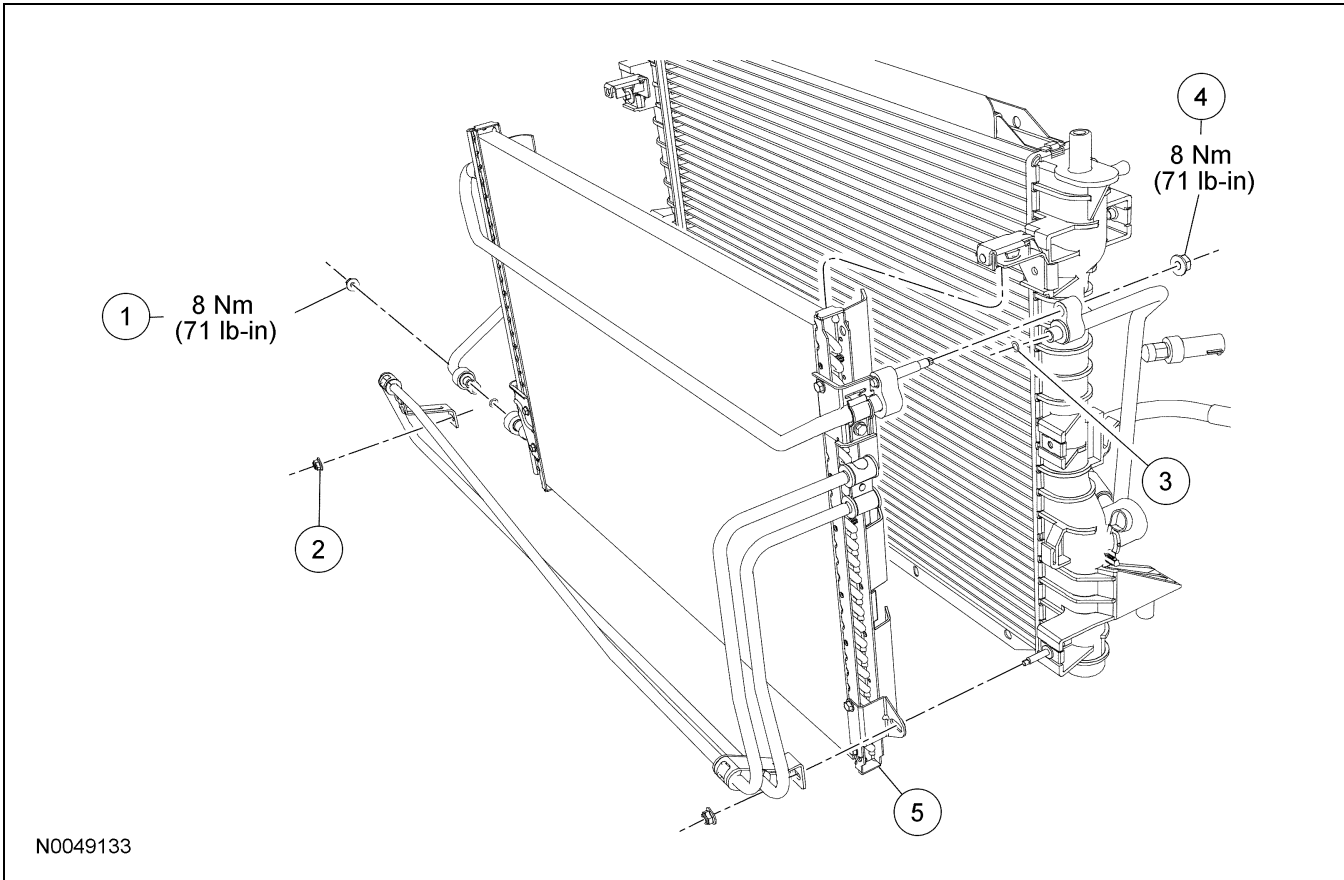
3. Recover the refrigerant. For additional information, refer to Section 412-00.
 4. Disconnect the compressor discharge fitting.
 - Discard the O-ring seals.
 5. Disconnect the dual-function pressure switch electrical connector and remove the dual-function pressure switch.
 6. Remove the condenser inlet fitting nut and disconnect the fitting.
 - Discard the O-ring seal.
 - To install, tighten to 8 Nm (71 lb-in).
 7. Detach the compressor-to-condenser discharge line from the A/C line bracket.
 8. Remove the compressor-to-condenser discharge line.
 9. To install, reverse the removal procedure.
 - Install new O-ring seals.
 - Lubricate the refrigerant system with the correct amount of clean PAG oil. For additional information, refer to Section 412-00.
 10. Evacuate, leak test and charge the refrigerant system. For additional information, refer to Section 412-00.
-

REMOVAL AND INSTALLATION

Condenser Core

Material

Item	Specification
PAG Refrigerant Compressor Oil (R-134a Systems) YN-12-D	WSH-M1C231-B



Item	Part Number	Description
1	W520413	Condenser outlet fitting nut
2	W520101	Power steering fluid cooler nut (2 required)
3	19E889	O-ring (2 required)
4	W520413	Condenser inlet fitting nut
5	19712	Condenser core

Removal and Installation

All vehicles

1. Recover the refrigerant. For additional information, refer to Section 412-00.

2. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to Section 100-02.
3. Remove the condenser inlet fitting nut and disconnect the fitting.
 - Discard the O-ring seal.
 - To install, tighten to 8 Nm (71 lb-in).

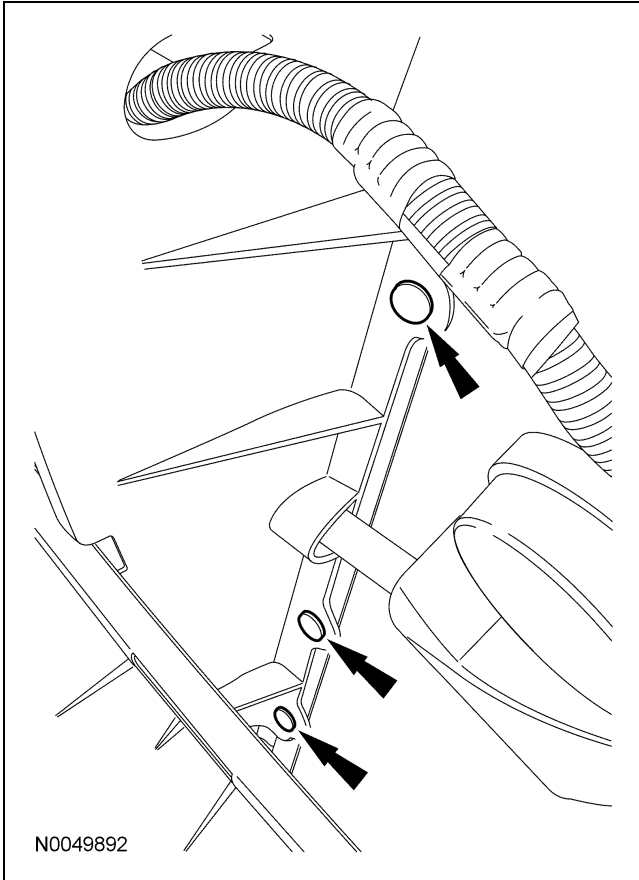
5.4L (4V) vehicles

4. Remove the front bumper cover. For additional information, refer to Section 501-19.

REMOVAL AND INSTALLATION (Continued)

5. **NOTE:** RH air deflector shown, LH similar.

Remove the pin-type retainers and detach the RH and LH air deflectors from the condenser core.

**All vehicles**

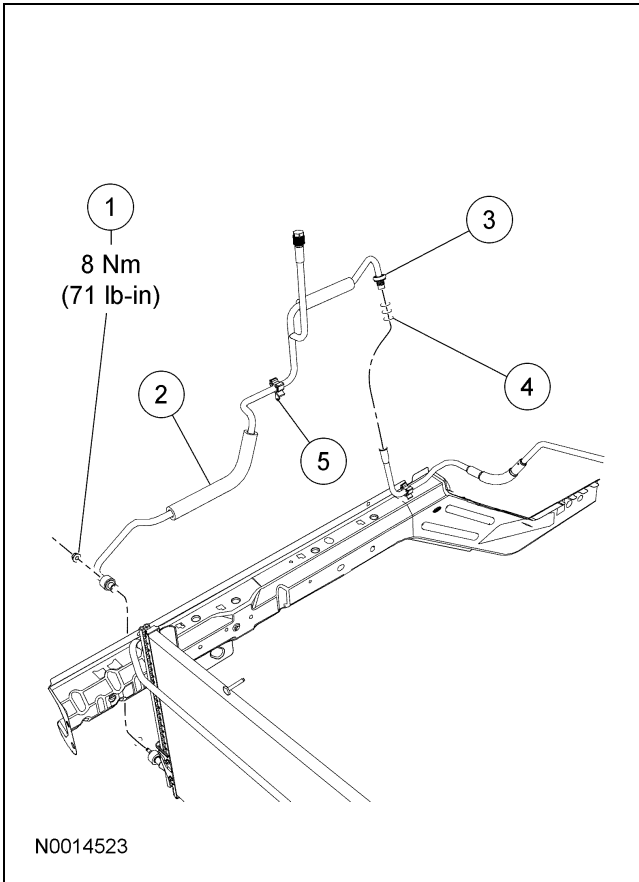
6. Remove the lower radiator air deflector.
7. Remove the condenser outlet fitting nut and disconnect the fitting.
 - Discard the O-ring seal.
 - To install, tighten to 8 Nm (71 lb-in).
8. Remove the 2 power steering fluid cooler nuts and position the cooler line aside.
9. Remove the condenser core.
10. To install, reverse the removal procedure.
 - Install new O-ring seals.
 - Lubricate the refrigerant system with the correct amount of clean PAG oil. For additional information, refer to Section 412-00.
11. Evacuate, leak test and charge the refrigerant system. For additional information, refer to Section 412-00.

REMOVAL AND INSTALLATION

Condenser to Evaporator Line

Material

Item	Specification
PAG Refrigerant Compressor Oil (R-134a Systems) YN-12-D	WSH-M1C231-B



Item	Part Number	Description
1	W520413	Condenser outlet fitting nut
2	19835	Condenser-to-evaporator line
3	—	Evaporator inlet line fitting (part of 19835)
4	19E889	O-ring seal (4 required)
5	9F274	Condenser-to-evaporator line clip

Removal and Installation

1. Recover the refrigerant. For additional information, refer to Section 412-00.
2. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to Section 100-02.
3. Disconnect the evaporator inlet line fitting.
 - Discard the O-ring seal.
4. Detach the condenser-to-evaporator line clip.
5. Remove the condenser outlet fitting nut and disconnect the fitting.
 - Discard the O-ring seal.
 - To install, tighten to 8 Nm (71 lb-in).
6. Remove the condenser-to-evaporator line.
7. To install, reverse the removal procedure.
 - Install new O-ring seals.
 - Lubricate the refrigerant system with the correct amount of clean PAG oil. For additional information, refer to Section 412-00.

REMOVAL AND INSTALLATION (Continued)

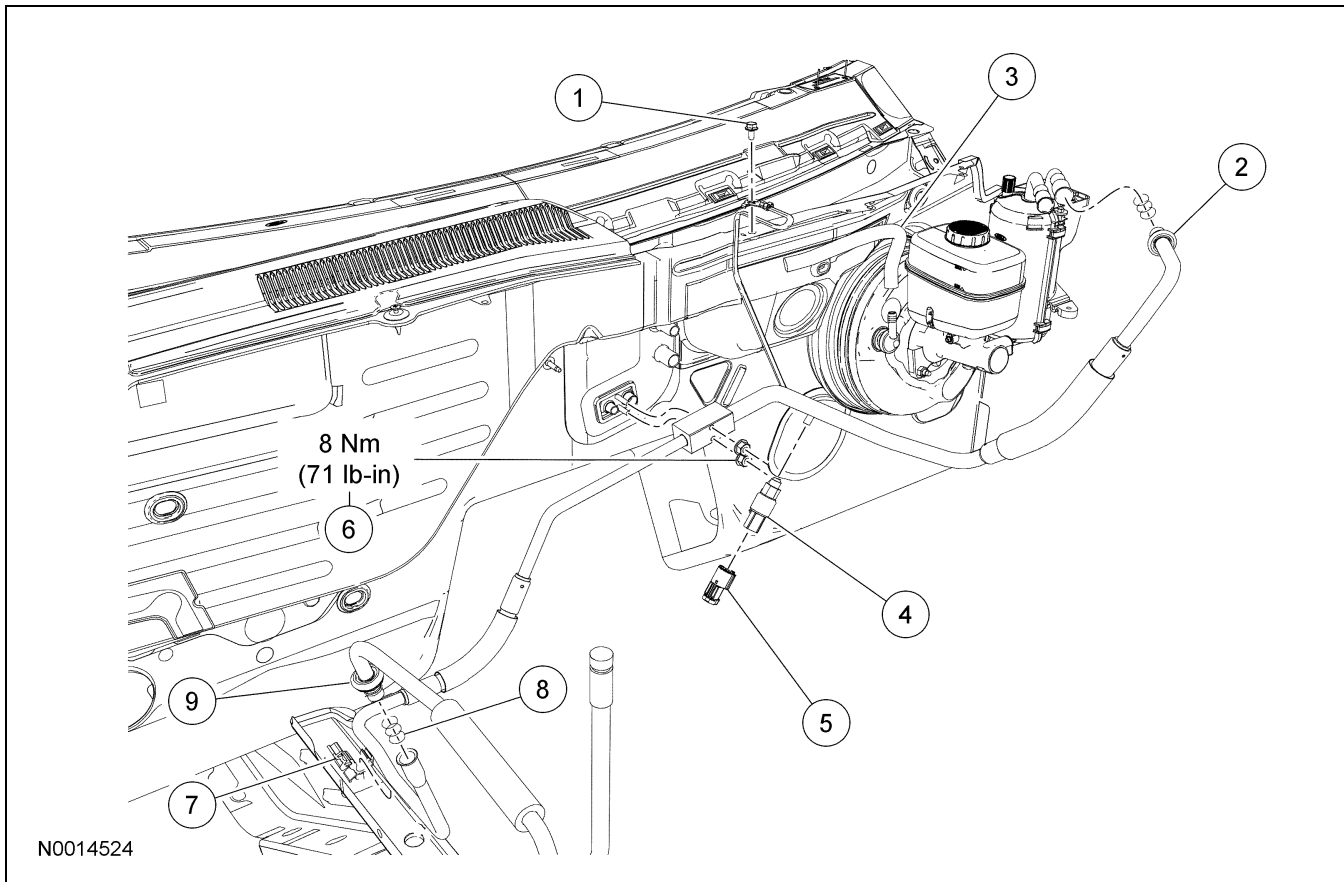
8. Evacuate, leak test and charge the refrigerant system. For additional information, refer to Section 412-00.
-

REMOVAL AND INSTALLATION

Evaporator Outlet Line

Material

Item	Specification
PAG Refrigerant Compressor Oil (R-134a Systems) YN-12-D	WSH-M1C231-B



Item	Part Number	Description
1	54042A06	Body ground strap bolt
2	—	Suction accumulator inlet fitting (part of 19835)
3	9C482	Brake booster vacuum hose
4	19E561	A/C cycling switch
5	—	A/C cycling switch electrical connector (part of 12B637)
6	W701838	Evaporator fitting nut (2 required)
7	9F274	Evaporator inlet line clip
8	19E889	O-ring seal (8 required)
9	—	Evaporator inlet line fitting (part of 19835)

Removal and Installation

All vehicles

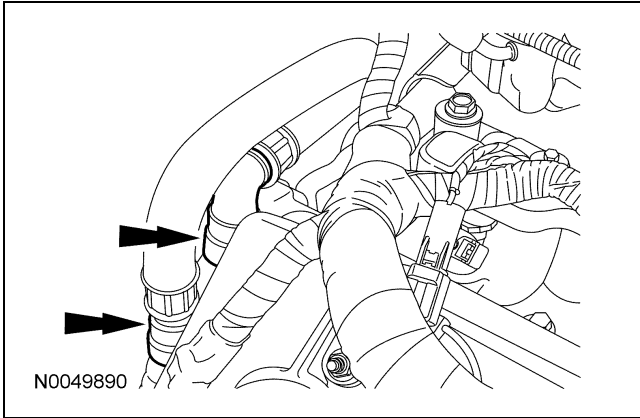
1. Recover the refrigerant. For additional information, refer to Section 412-00.

5.4L (4V) vehicles

2. Drain the engine cooling system. For additional information, refer to Section 303-03A.
3. Remove the brake booster. For additional information, refer to Section 206-07.

REMOVAL AND INSTALLATION (Continued)

4. Disconnect the 2 heater hose connections at the rear of the RH cylinder head and position the heater hoses aside.



5. Remove the EGR system module tube. For additional information, refer to Section 303-08.

4.0L and 4.6L vehicles

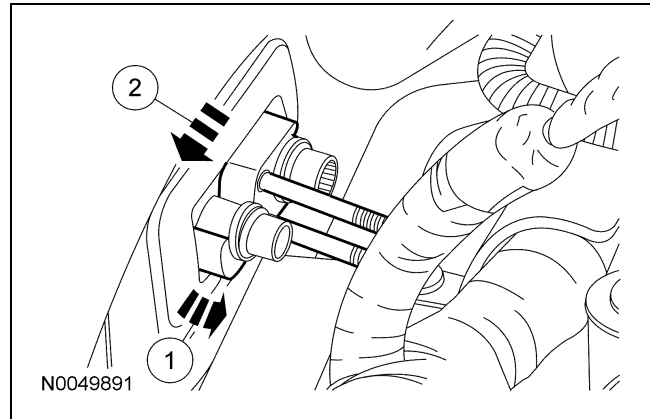
6. Remove the LH cowl vent screen. For additional information, refer to Section 501-02.
7. Remove the body ground strap bolt.
8. Disconnect the brake booster vacuum hose at the brake booster.

All vehicles

9. Disconnect the A/C cycling switch electrical connector and detach the wire harness from the evaporator outlet line.
10. Remove the A/C cycling switch.
11. Disconnect the evaporator inlet line fitting.
 - Discard the O-ring seals.
12. Detach the evaporator inlet line clip.
13. Disconnect the suction accumulator inlet fitting.
 - Discard the O-ring seals.

14. Remove the 2 evaporator fitting nuts and disconnect the fitting.
 - Discard the O-ring seals.
 - To install, tighten to 8 Nm (71 lb-in).

15. Remove the evaporator tube bracket.
 - 1 Rotate the evaporator tube bracket downward.
 - 2 Remove the evaporator tube bracket.



16. Remove the evaporator core manifold and tube assembly.
17. To install, reverse the removal procedure.
 - Install new O-ring seals.
 - Lubricate the refrigerant system with the correct amount of clean PAG oil. For additional information, refer to Section 412-00.

5.4L (4V) vehicles

18. Fill the engine cooling system. For additional information, refer to Section 303-03A.

All vehicles

19. Evacuate, leak test and charge the refrigerant system. For additional information, refer to Section 412-00.

REMOVAL AND INSTALLATION

Heater Core

Removal and Installation

NOTE: If a heater core leak is suspected, the heater core must be leak tested before it is removed from the vehicle.

NOTE: The heater core is not individually serviced. It is serviced only with the heater core and evaporator core housing.

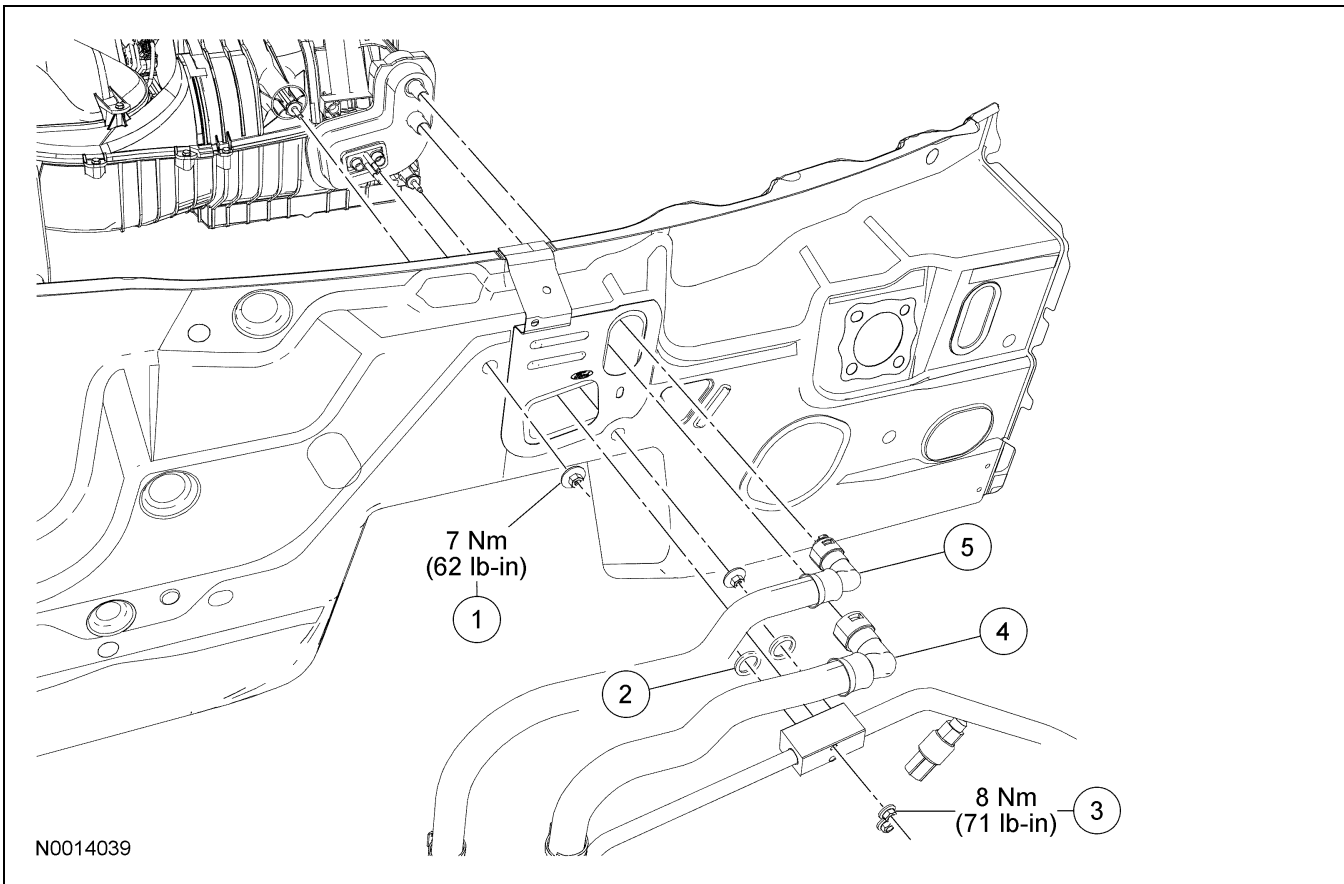
1. Remove the heater core and evaporator core housing. For additional information, refer to Heater Core And Evaporator Core Housing in this section.
 2. Transfer the heater core and evaporator core housing components as needed.
 3. Install the heater core and evaporator core housing. For additional information, refer to Heater Core And Evaporator Core Housing in this section.
-

REMOVAL AND INSTALLATION

Heater Core And Evaporator Core Housing

Material

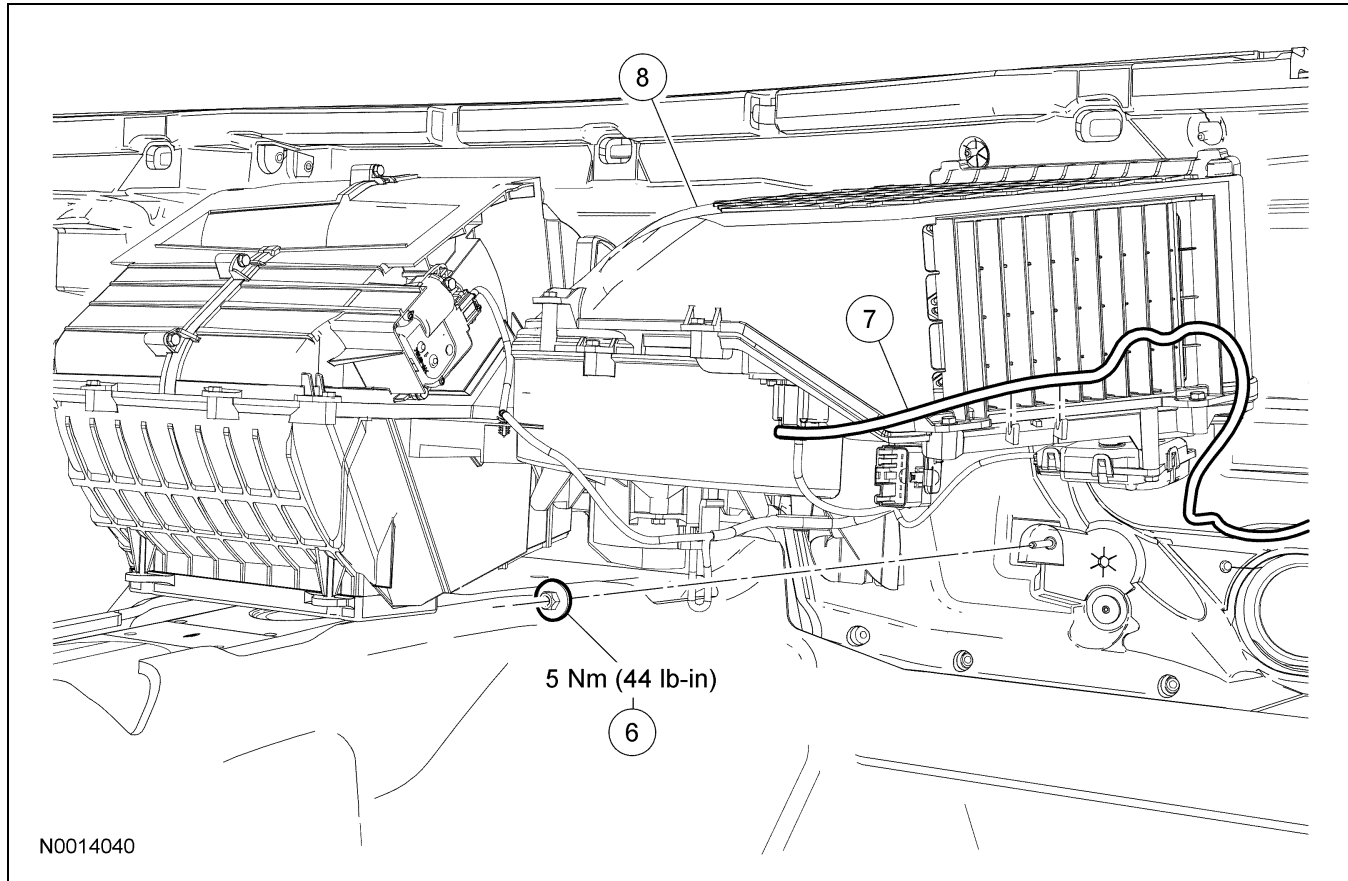
Item	Specification
PAG Refrigerant Compressor Oil (R-134a Systems) YN-12-D	WSH-M1C231-B



Item	Part Number	Description
1	W704904	Exterior heater core and evaporator core housing nut (2 required)
2	19E889	O-ring seal (2 required)
3	W701838	Evaporator fitting nut (2 required)

Item	Part Number	Description
4	18472	Heater core inlet hose
5	18472	Heater core outlet hose

(Continued)

REMOVAL AND INSTALLATION (Continued)

Item	Part Number	Description
6	W702751	Interior heater core and evaporator core housing nut
7	18812	Antenna cable
8	19850	Heater core and evaporator core housing

Removal and Installation

NOTE: The heater core and evaporator core are not individually serviced. They are serviced only with the heater core and evaporator core housing.

NOTE: If a heater core leak is suspected, the heater core must be leak tested before it is removed from the vehicle.

5.4L (4V) vehicles

1. Release the fuel system pressure. For additional information, refer to Section 310-00.

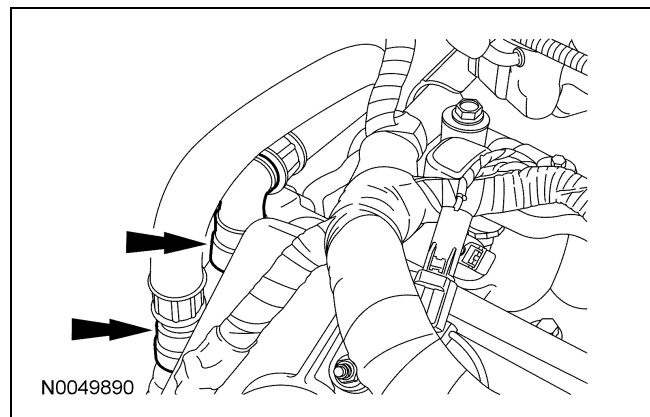
All vehicles

2. Recover the refrigerant. For additional information, refer to Section 412-00.

3. Drain the engine coolant. For additional information, refer to Section 303-03A.
4. Remove the instrument panel. For additional information, refer to Section 501-12.

5.4L (4V) vehicles

5. Remove the supercharger. For additional information, refer to Section 303-12.
6. Disconnect the heater hose fittings at the rear of the RH cylinder head and position the heater hoses aside.

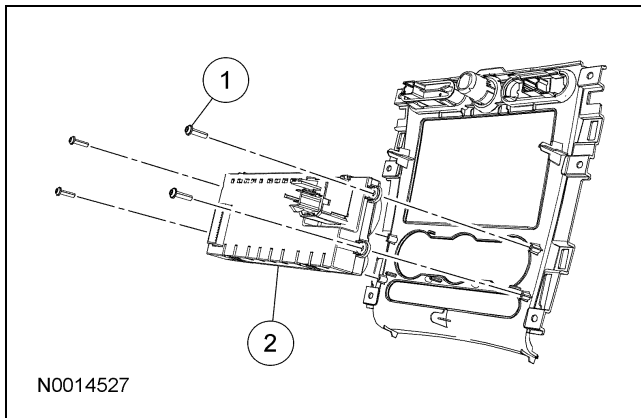


REMOVAL AND INSTALLATION (Continued)**All vehicles**

7. Disconnect the heater core inlet and outlet hoses at the heater core.
 8. Remove the 2 evaporator fitting nuts and disconnect the evaporator core fitting.
 - Discard the O-ring seals.
 - To install, tighten to 8 Nm (71 lb-in).
 9. Remove the 2 exterior heater core and evaporator core housing nuts at the dash panel.
 - To install, tighten to 7 Nm (62 lb-in).
 10. Detach the antenna cable from the heater core and evaporator core housing.
 11. Remove the interior heater core and evaporator core housing nut.
 - To install, tighten to 5 Nm (44 lb-in).
 12. Remove the heater core and evaporator core housing.
 13. To install, reverse the removal procedure.
 - Install new O-ring seals.
 - Lubricate the refrigerant system with the correct amount of clean PAG oil. For additional information, refer to Section 412-00.
 14. Fill the engine cooling system. For additional information, refer to Section 303-03A.
 15. Evacuate, leak test and charge the refrigerant system. For additional information, refer to Section 412-00.
-

REMOVAL AND INSTALLATION

Heating Ventilation Air Conditioning (HVAC) Module



Item	Part Number	Description
1	W505944	HVAC module screw (4 required)
2	19980	HVAC module

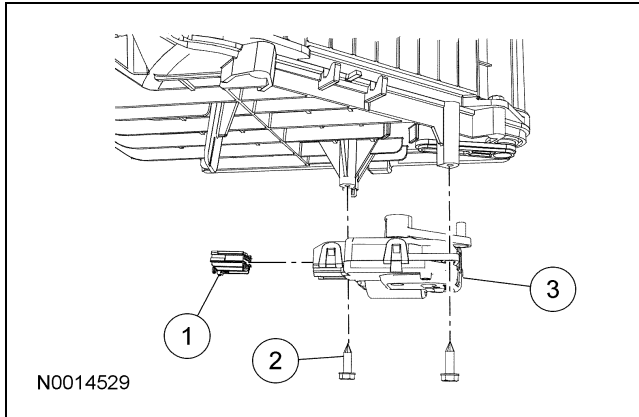
Removal and Installation

1. Remove the center instrument panel finish panel. For additional information, refer to Section 501-12.
2. Remove the 4 HVAC module screws.
3. Remove the HVAC module.
4. **NOTE:** Be sure that all HVAC module electrical connectors are securely fastened before installing the center instrument panel finish panel.

To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Mode Door Actuator — Air Inlet Door



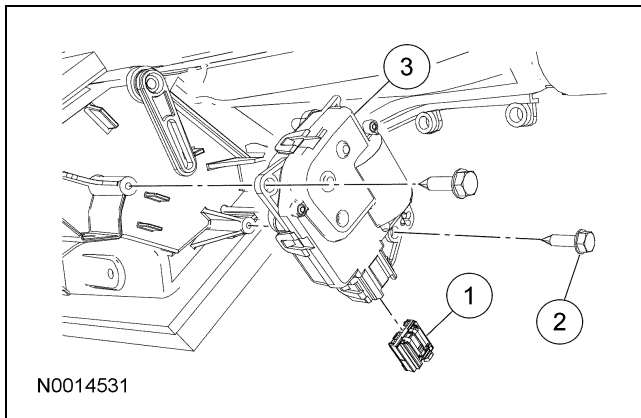
Item	Part Number	Description
1	—	Air inlet mode door actuator electrical connector (part of 18B574)
2	W701696	Air inlet mode door actuator screw (2 required)
3	19E616	Air inlet mode door actuator

Removal and Installation

1. Lower the glove compartment.
2. Disconnect the air inlet mode door actuator electrical connector.
3. Remove the 2 air inlet mode door actuator screws.
4. Remove the air inlet mode door actuator.
5. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Mode Door Actuator — Defrost Door



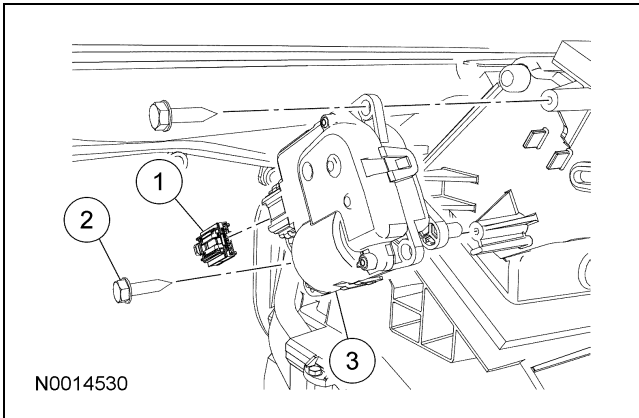
Item	Part Number	Description
1	—	Defrost door mode door actuator electrical connector (part of 14401)
2	W701696	Defrost door mode door actuator screw (2 required)
3	19E616	Defrost door mode door actuator

Removal and Installation

1. Lower the glove compartment.
2. Disconnect the defrost door mode door actuator electrical connector.
3. Remove the 2 defrost door mode door actuator screws.
4. Remove the defrost door mode door actuator.
5. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Mode Door Actuator — Panel/Floor Door



Item	Part Number	Description
1	18B574	Panel/floor door mode door actuator electrical connector
2	W701696	Panel/floor door mode door actuator screw (2 required)
3	19E616	Panel/floor door mode door actuator

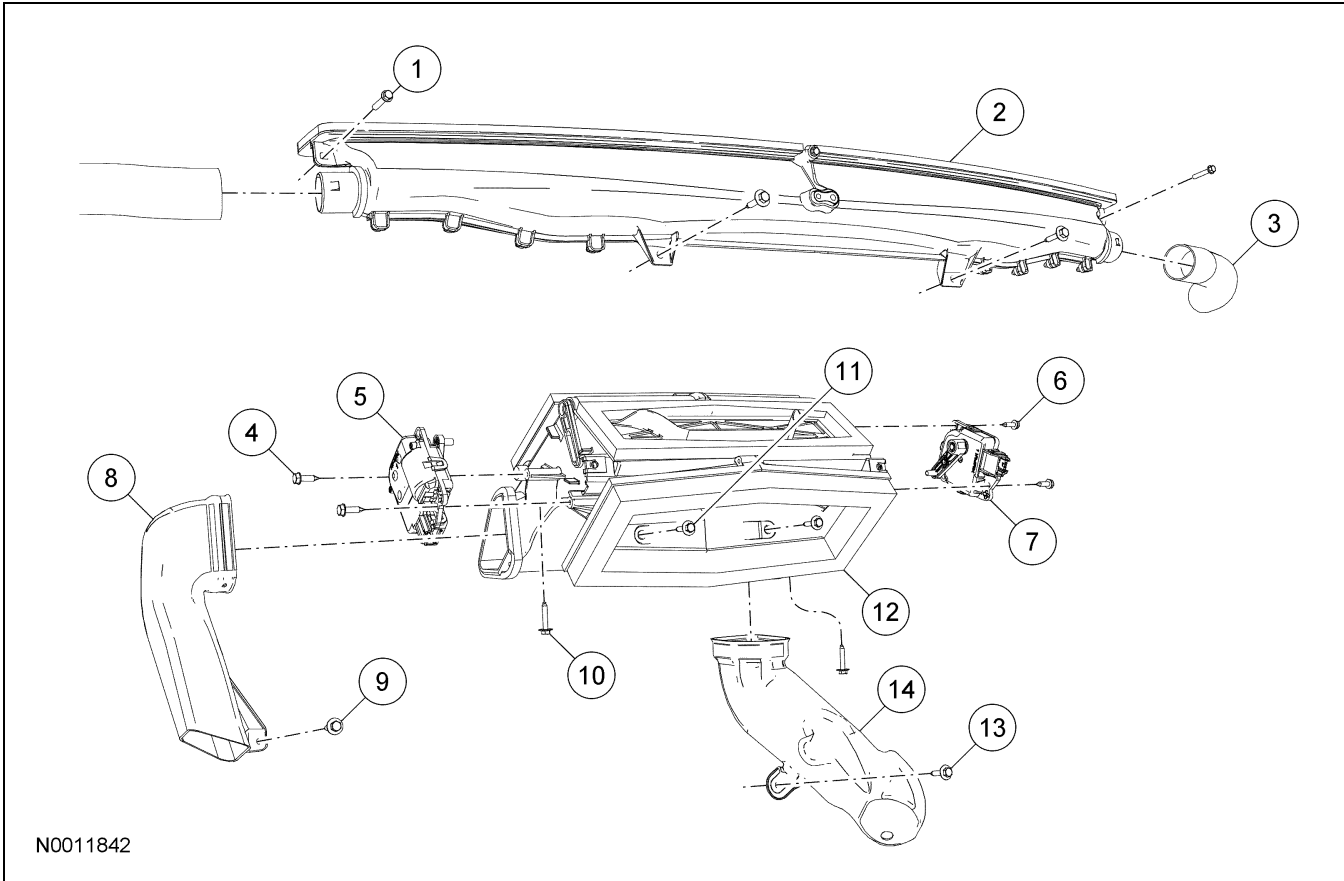
Removal and Installation

NOTE: The panel door mode door actuator can be accessed from below the LH side of the instrument panel.

1. Disconnect the panel/floor door mode door actuator electrical connector.
2. **NOTE:** The top panel/floor door mode door actuator screw can be removed using a shallow universal socket.
Remove the 2 panel/floor door mode door actuator screws.
3. Remove the panel/floor door mode door actuator.
4. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Plenum Chamber



N0011842

Item	Part Number	Description
1	W710480	Defroster duct screw (4 required)
2	18490	Defroster duct
3	19E630	Demister duct (2 required)
4	W701696	Panel mode door actuator screw (2 required)
5	19E616	Panel mode door actuator
6	W701696	Defrost mode door actuator screw (2 required)
7	19E616	Defrost mode door actuator
8	18C420	RH floor duct
9	W701506	RH floor duct screw
10	W505156	Plenum chamber bolt (2 required)
11	W710506	Plenum chamber screw (2 required)
12	18471	Plenum chamber
13	W710506	LH floor duct screw
14	18C420	LH floor duct

Removal and Installation

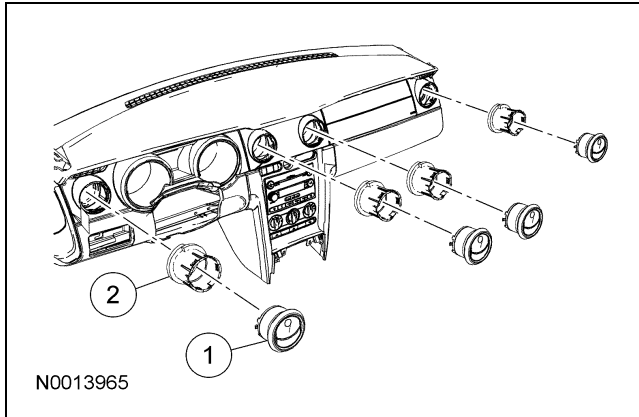
1. Remove the instrument panel. For additional information, refer to Section 501-12.
2. Remove the RH floor duct screw and the RH floor duct.
3. Remove the LH floor duct screw and the LH floor duct.
4. Remove the 4 defroster duct screws.
5. Detach the 2 demister ducts from the defroster duct.
6. Remove the defroster duct.
7. Remove the 2 defrost mode door actuator screws and position the defrost mode door actuator aside.

REMOVAL AND INSTALLATION (Continued)

- | | |
|--|--|
| 8. Remove the 2 panel mode door actuator screws and position the panel mode door actuator aside. | 10. Remove the 2 plenum chamber screws. |
| 9. Remove the 2 plenum chamber bolts. | 11. Remove the plenum chamber. |
| | 12. To install, reverse the removal procedure. |
-

REMOVAL AND INSTALLATION

Register — Instrument Panel



Item	Part Number	Description
1	—	Instrument panel register barrel (4 required) (part of 19893)
2	—	Instrument panel register housing (4 required) (part of 19893)

Removal and Installation

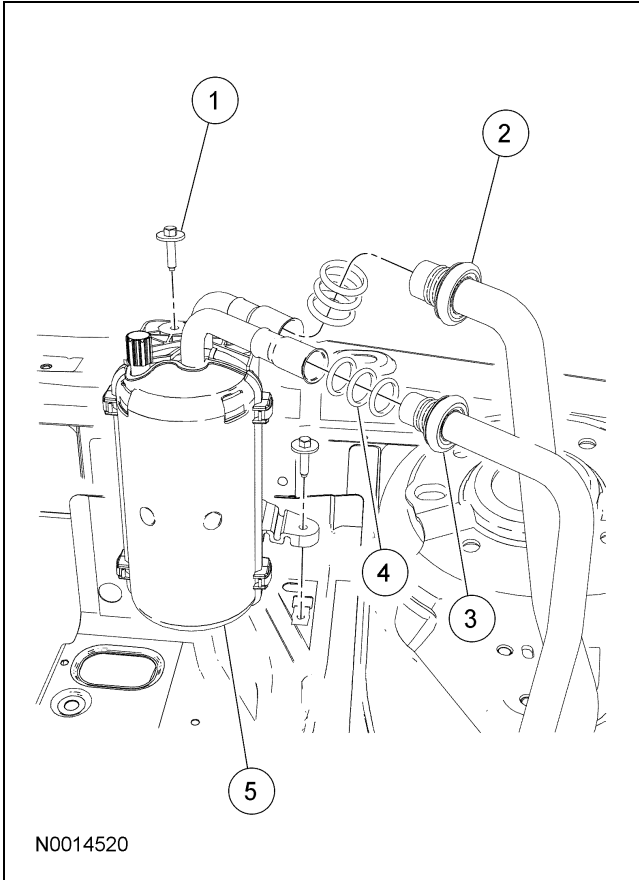
1. Pull and remove the instrument panel register barrel.
2. Release the tabs and remove the instrument panel register housing.
3. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Suction Accumulator

Material

Item	Specification
PAG Refrigerant Compressor Oil (R-134a Systems) YN-12-D	WSH-M1C231-B



Item	Part Number	Description
1	W705800	Suction accumulator bolt (2 required)
2	—	Suction accumulator outlet fitting (4.0L, part of 19D734) (4.6L, part of 19D742)
3	—	Suction accumulator inlet fitting (part of 19835)
4	19E889	O-ring (6 required)
5	19C836	Suction accumulator

Removal and Installation

NOTE: Installation of a new suction accumulator is not required when repairing the A/C system, except when there is physical evidence of contamination from a failed A/C compressor or damage to the suction accumulator. Damage to the suction accumulator includes leaks in the suction accumulator, physical damage to the suction accumulator shell or desiccant, or moisture contamination. Moisture contamination results only from a complete loss of refrigerant and equalization of the refrigerant system pressure with atmospheric pressure for a period longer than one hour. If even a slight amount of positive refrigerant pressure is present in the system before repairs are carried out, the suction accumulator should not be replaced.

1. Recover the refrigerant. For additional information, refer to Section 412-00.
2. Disconnect the suction accumulator inlet fitting.
 - Discard the O-ring seals.
3. Disconnect the suction accumulator outlet fitting.
 - Discard the O-ring seals.
4. Remove the 2 suction accumulator bolts.
5. Remove the suction accumulator.
6. **NOTE:** Care should be taken to minimize exposure of the suction accumulator desiccant to the atmosphere. Do not remove the shipping caps from the new suction accumulator until immediately before the line fittings are to be attached.

To install, reverse the removal procedure.

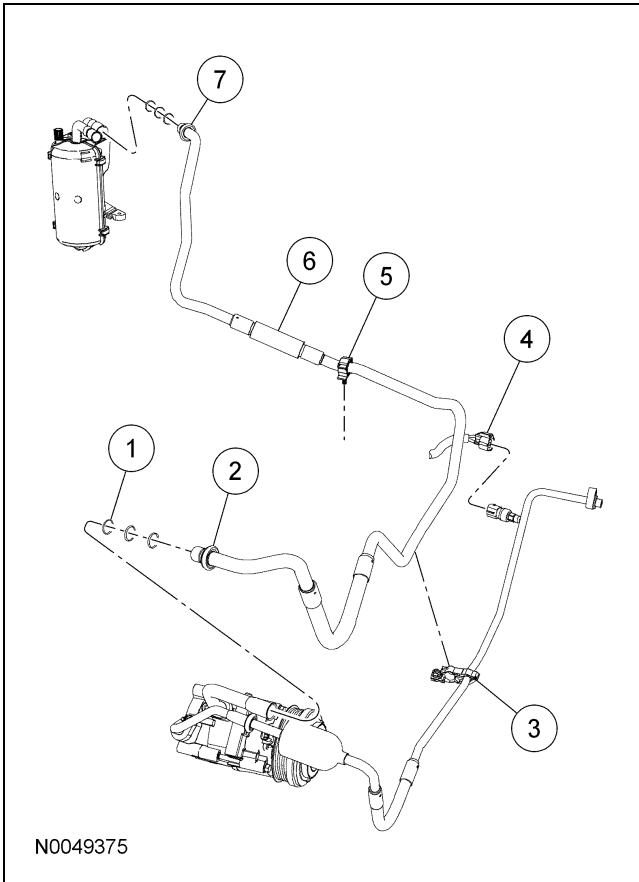
 - Install new O-ring seals.
 - Lubricate the refrigerant system with the correct amount of clean PAG oil. For additional information, refer to Section 412-00.
7. Evacuate, leak test and charge the refrigerant system. For additional information, refer to Section 412-00.

REMOVAL AND INSTALLATION

Suction Accumulator to Compressor Line

Material

Item	Specification
PAG Refrigerant Compressor Oil (R-134a Systems) YN-12-D	WSH-M1C231-B



Item	Part Number	Description
1	—	O-ring seal (6 required) (part of 14401)
2	—	Compressor manifold and tube suction fitting (part of 19D742)
3	19B632	A/C line bracket
4	—	Dual-function pressure switch electrical connector (part of 12B637)
5	19B632	Suction accumulator-to-compressor line clip

(Continued)

Item	Part Number	Description
6	19D742	Suction accumulator-to-compressor line
7	—	Suction accumulator outlet fitting (part of 19D742)

Removal and Installation

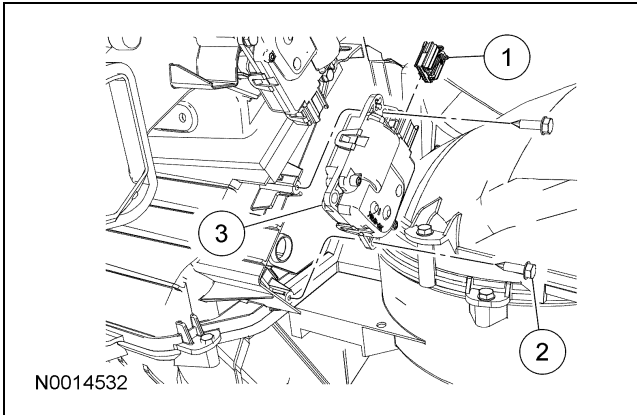
1. Recover the refrigerant. For additional information, refer to Section 412-00.
2. Remove the engine cooling fan and shroud. For additional information, refer to Section 303-03A.
3. Remove the Air Cleaner (ACL). For additional information, refer to Section 303-12.
4. Disconnect the compressor manifold and tube suction fitting.
 - Discard the O-ring seals.
5. Disconnect the suction accumulator outlet fitting.
 - Discard the O-ring seals.
6. Disconnect the dual-function pressure switch electrical connector.
7. Detach the suction accumulator-to-compressor line from the A/C line bracket.
8. Remove the suction accumulator-to-compressor line.
9. To install, reverse the removal procedure.
 - Install new O-ring seals.
 - Lubricate the refrigerant system with the correct amount of clean PAG oil. For additional information, refer to Section 412-00.

REMOVAL AND INSTALLATION (Continued)

10. Evacuate, leak test and charge the refrigerant system. For additional information, refer to Section 412-00.
-

REMOVAL AND INSTALLATION

Temperature Blend Door Actuator



Item	Part Number	Description
1	18B574	Temperature blend door actuator electrical connector
2	W701696	Temperature blend door actuator screw (2 required)
3	19E616	Temperature blend door actuator

Removal and Installation

1. Lower the glove compartment.
 2. Disconnect the temperature blend door actuator electrical connector.
 3. Remove the 2 temperature blend door actuator screws.
 4. Remove the temperature blend door actuator.
 5. To install, reverse the removal procedure.
-