SPECIFICATIONS

General Specifications

Item	Specification
Lubricants	
High Temperature Nickel Anti-Seize Lubricant F6AZ-9L494-AA	ESE-M12A4-A

Torque Specifications

Description	Nm	lb-ft
Muffler-to-converter bolts and nuts	40	30
Converter-to-manifold bolts	40	30
Dual converter Y-pipe to dual three-way converter nuts (4.0L with single inlet muffler)	40	30
LH three-way converter to RH three-way converter bolts and nuts (4.0L with dual inlet muffler)	40	30
Torca clamp	48	35
U-bolt clamp	80	59
Transmission mount bolt	103	76
Transmission crossmember bolts	99	73
Skid plate bolts	24	18
Heated oxygen sensors	40	30
Catalyst monitor sensors	40	30

Exhaust System

The 4.0L with a single inlet muffler exhaust system:

- is constructed of stainless steel
- has one three-way catalytic converter (TWC) (5E212)
- has one dual converter Y-pipe

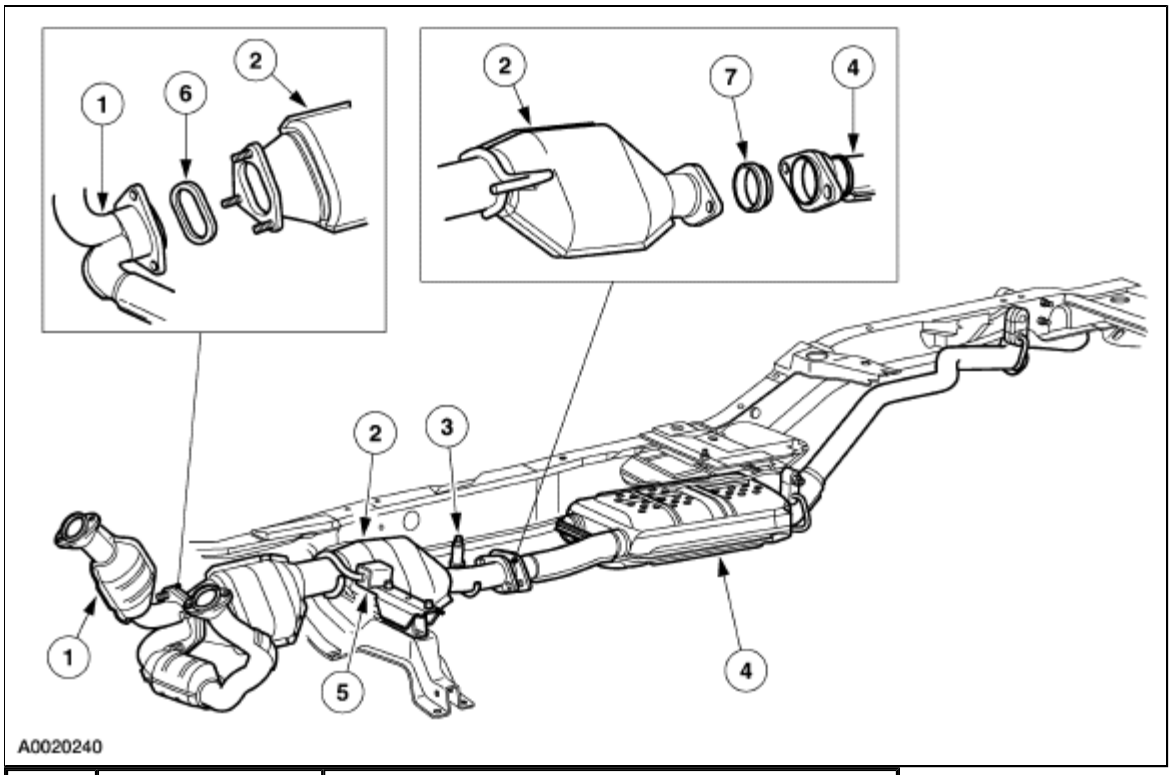
The 4.0L with a dual inlet muffler exhaust system:

- is constructed of stainless steel
- has two three-way catalytic converters
- has a muffler and resonator assembly

The 5.0L exhaust system:

- has four heated oxygen sensors
- has a front three-way catalytic converter
- has a rear three-way catalytic converter
- has a muffler and tailpipe assembly

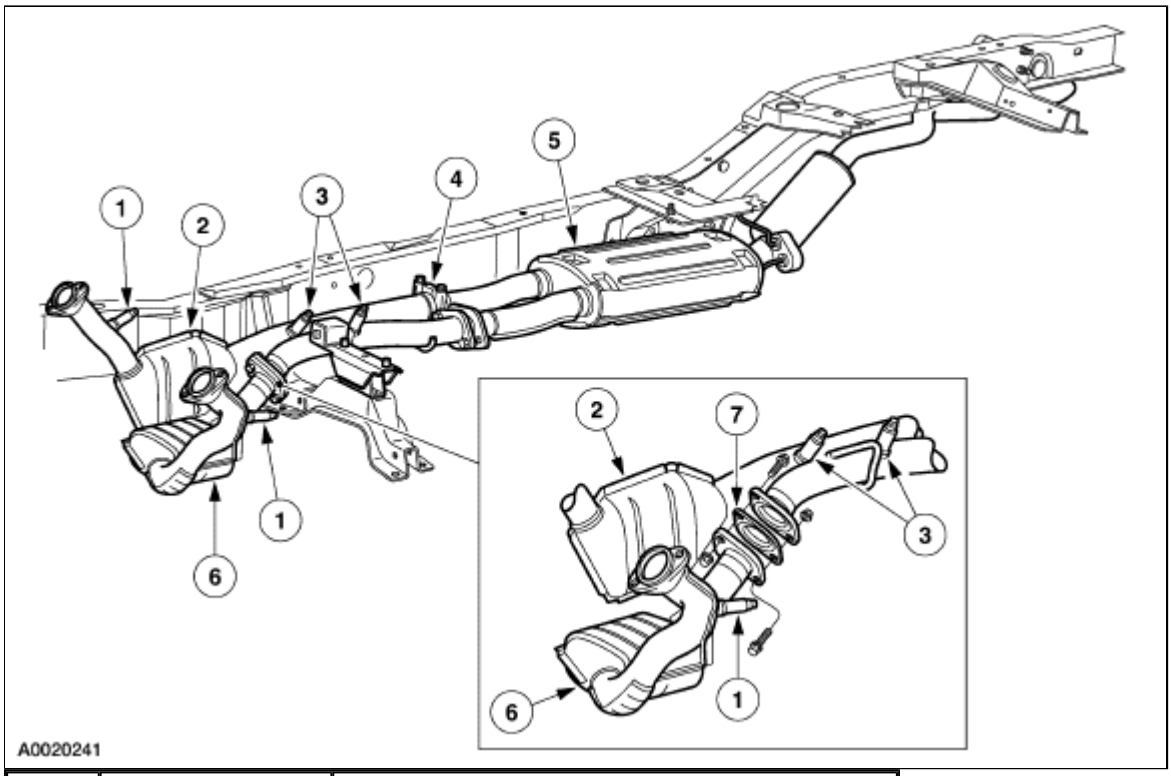
Exhaust System — 4.0L With Single Inlet Muffler



Item	Part Number	Description

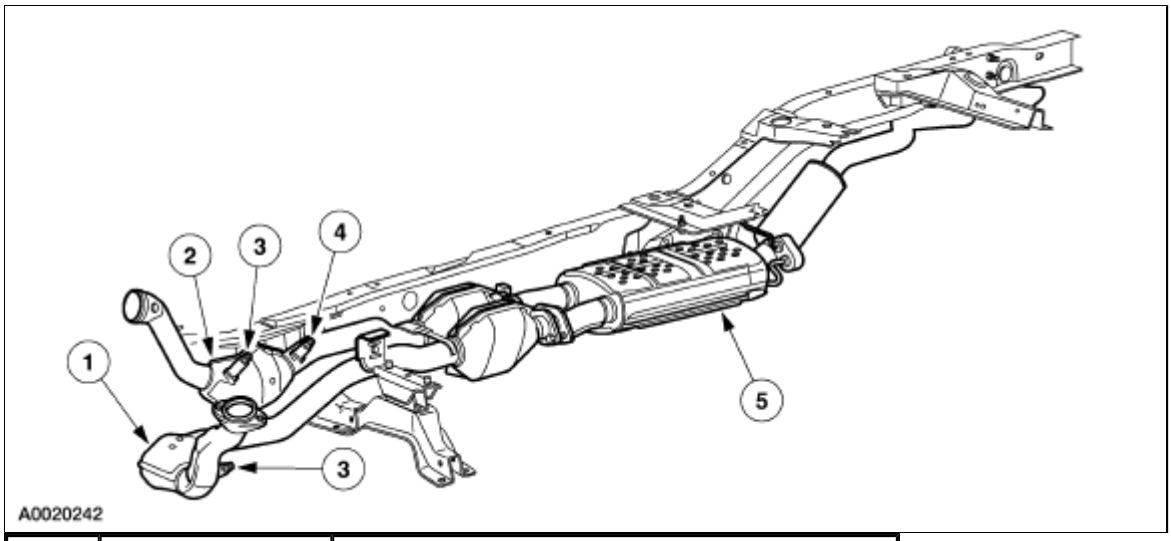
1	5F250	Dual converter Y-pipe
2	5E212	Three-way catalytic converter
3	9F472	Catalyst monitor sensor
4	5230	Muffler and tailpipe
5	5E269	Exhaust converter bracket
6	5B266	Exhaust converter inlet pipe gasket
7	5E241	Exhaust converter outlet pipe gasket

Exhaust System — 4.0L With Dual Inlet Muffler



Item	Part Number	Description
1	9F472	Heated oxygen sensors
2	—	Three-way catalytic converter (RH)
3	9F472	Catalyst monitor sensors
4	5A231	Exhaust clamp
5	5230	Muffler and tailpipe
6	5E212	Three-way catalytic converter (LH)
7	—	Gasket

Exhaust System — 5.0L



Item	Part Number	Description
1	—	Three-way catalytic converter (LH)
2	5E212	Three-way catalytic converter (RH)
3	9F472	Heated oxygen sensor
4	9F472	Catalyst monitor sensor
5	5230	Muffler and tailpipe

Exhaust System

Symptom Chart

SYMPTOM CHART

Condition	Possible Sources	Action
• Noisy or Leaking Exhaust	• Broken or loose clamps and brackets. • Punctures in the muffler (5230). • Broken, loose or missing exhaust manifold fasteners or gaskets. • Loose heated oxygen sensor.	• REPAIR as necessary.
• Loss of Power	• Kinked or damaged exhaust pipe. • Clogged three-way catalytic converter (TWC) (5E212). • Foreign object in the exhaust system.	• REPAIR as necessary.

Exhaust System Alignment

1. Raise and support the vehicle. For additional information, refer to Section 100-02 .
2. Loosen all fasteners joining the exhaust system components.
3. Align the exhaust system.
4. **NOTE:** On 4.0L SOHC and 5.0L with dual inlet muffler, the muffler inlet flange bolts must be tightened before the inlet pipe is tightened.

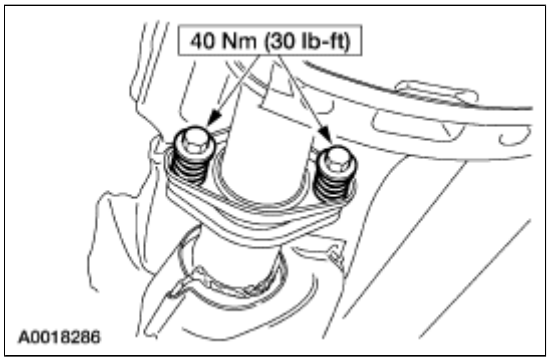
   Tighten all fasteners to specification starting from the rear of the vehicle. For additional information, refer to Specifications in this section.

Muffler/Tailpipe —4.0L with Single Inlet Muffler

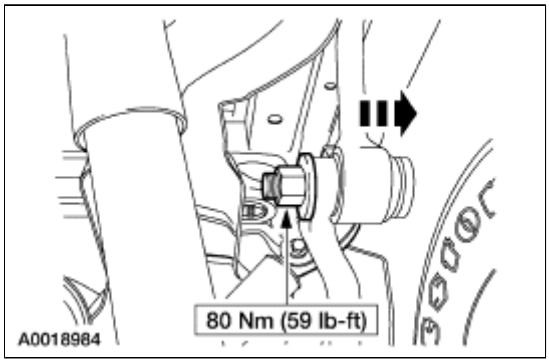
Removal and Installation

NOTE: 4.0L EFI shown, 4.0L SOHC similar.

1. Raise and support the vehicle. For additional information, refer to Section 100-02 .
2. Remove the bolts and springs.

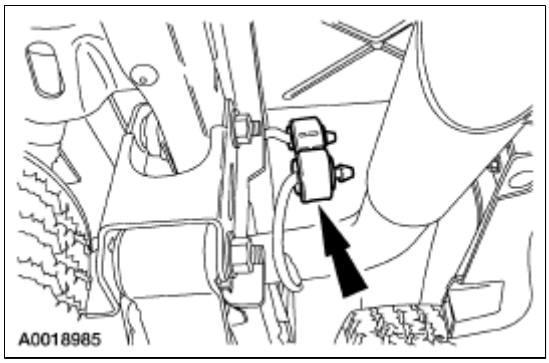


3. Remove the nut and position the right-hand stabilizer bar link out of the way.

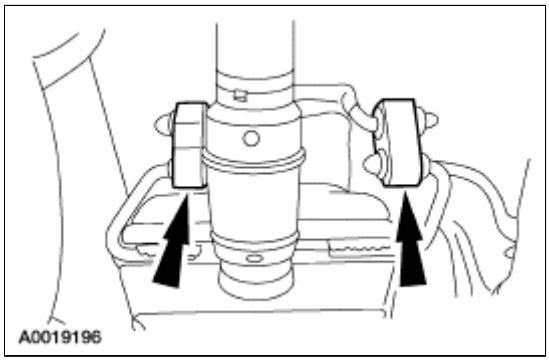


4. **NOTE:** To ease the removal and installation of the exhaust components, lubricate the insulators using a soap and water solution.

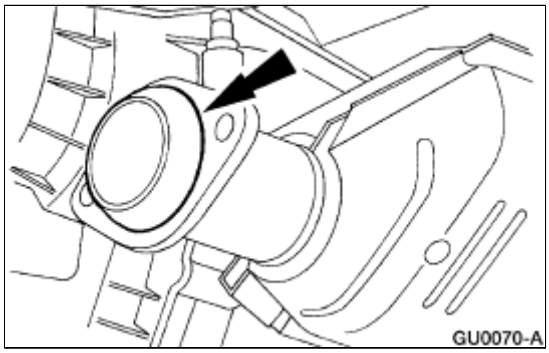
   Detach the tailpipe from the insulator.



5. Detach the muffler from the insulators and remove the muffler and tailpipe.



6. Remove and discard the gasket.

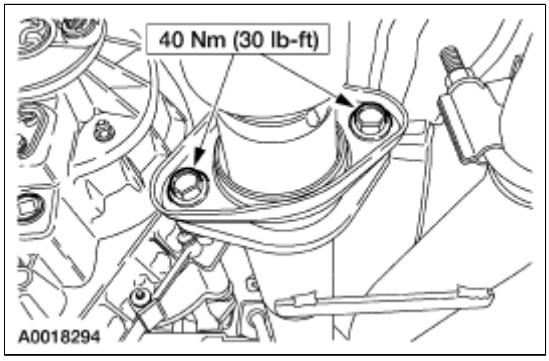


7. To install, reverse the removal procedure.

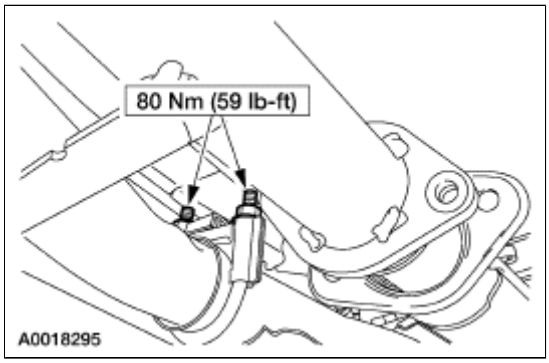
Muffler/Tailpipe —4.0L with Dual Inlet Muffler

Removal and Installation

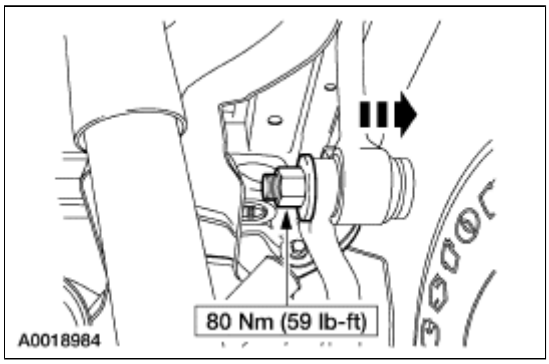
1. Raise and support the vehicle. For additional information, refer to Section 100-02 .
2. Remove the bolts and the flag nuts.



3. Remove the nuts and the exhaust clamp.

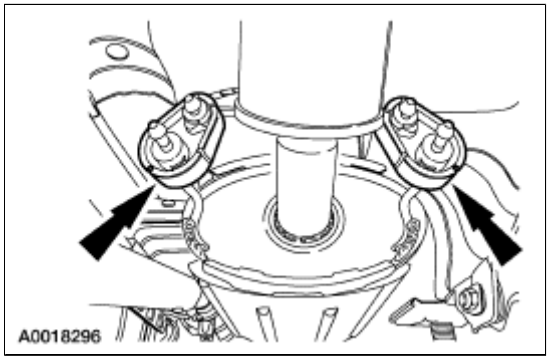


4. Remove the nut and position the right-hand rear stabilizer bar link aside.

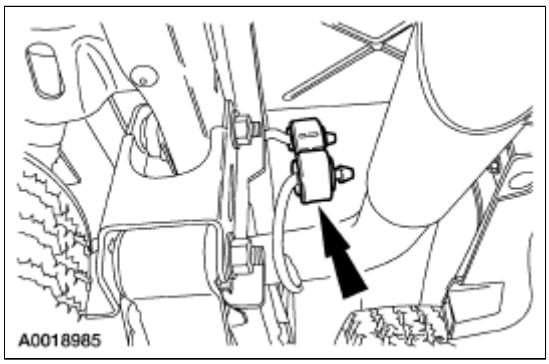


5. **NOTE:** To ease the removal and installation of the exhaust components, lubricate the insulators using a soap and water solution.

Detach the muffler from the insulators.



6. Detach the tailpipe from the insulator and remove the muffler and tailpipe.

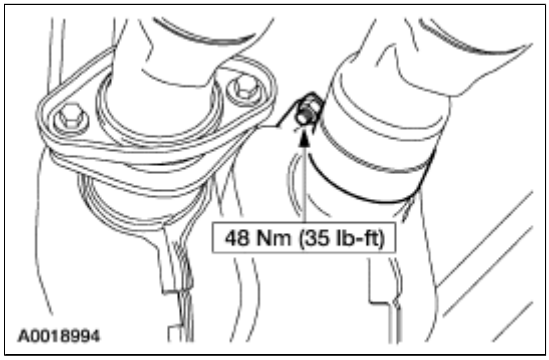


7. To install, reverse the removal procedure.

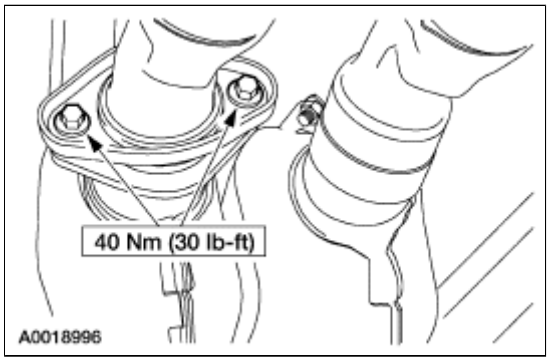
Muffler/Tailpipe —5.0L

Removal and Installation

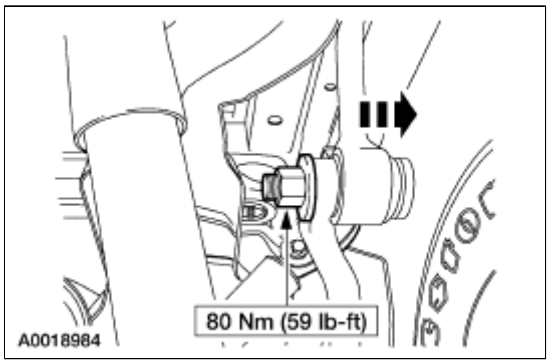
1. Raise and support the vehicle. For additional information, refer to Section 100-02 .
2. Loosen the clamp nut.



3. Remove the bolts.

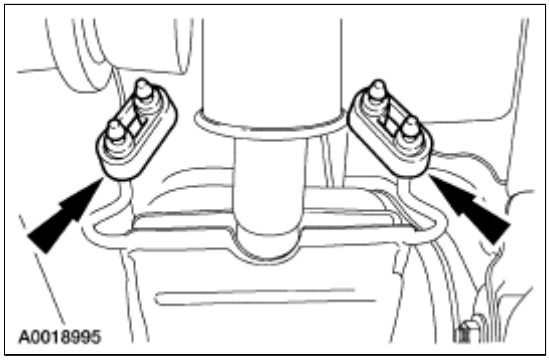


4. Remove the nut and position the right-hand rear stabilizer bar link out of the way.

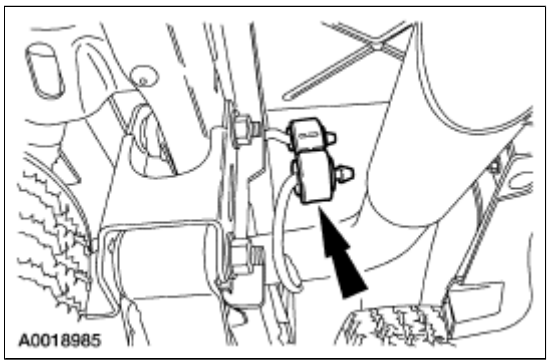


5. **NOTE:** To ease the removal and installation of the exhaust components, lubricate the insulators using using a soap and water solution.

Detach the muffler from the insulators.



6. Detach the tailpipe from the insulator and remove the muffler and tailpipe.



7. To install, reverse the removal procedure.

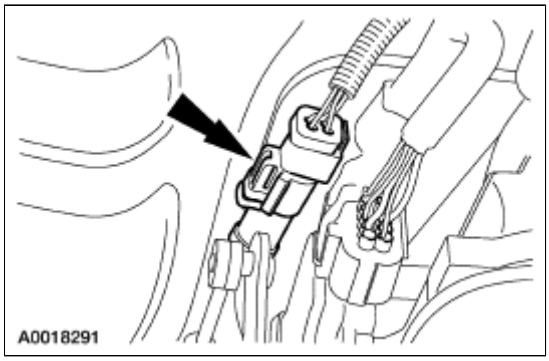
Dual Converter Y-Pipe —4.0L

Removal and Installation

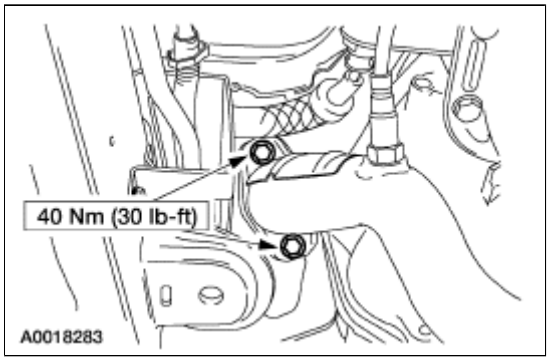
NOTE: 4.0L SOHC shown, 4.0L EFI similar.

1. Remove the three-way catalytic converter. For additional information, refer to Three Way Catalytic Converter (TWC)—4.0L with Single Inlet Muffler in this section.

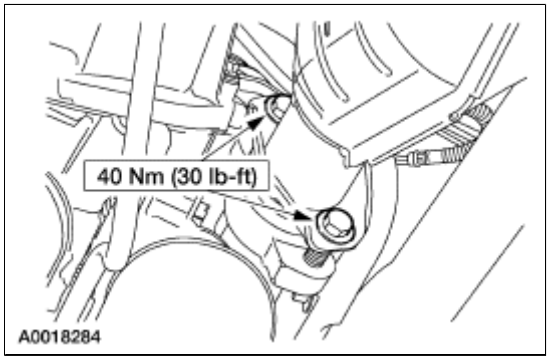
2. Disconnect the heated oxygen sensors.



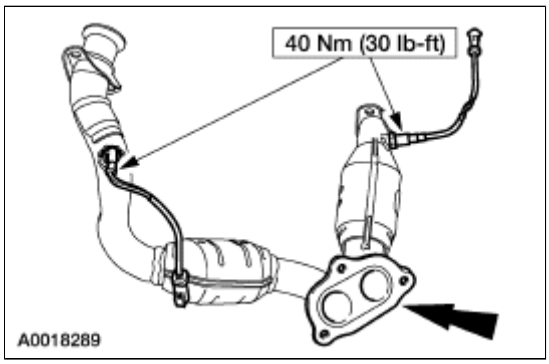
3. Remove the bolts.



4. Remove the bolts and remove the dual converter Y-pipe.



5. Remove the gasket and, if necessary, the heated oxygen sensors.
   - Discard the gasket.



6. **CAUTION: Make sure that the dual converter Y-pipe to exhaust manifold bolts are tightened after the three-way catalytic converter is installed.**

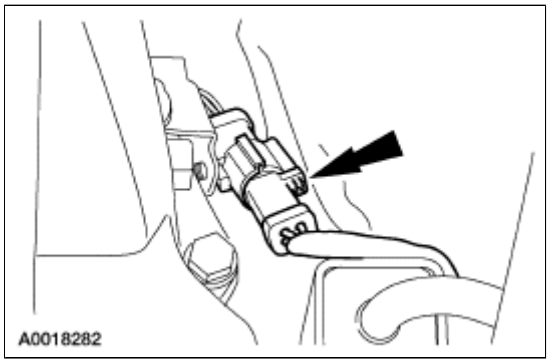
   To install, reverse the removal procedure.
   - Make sure to apply High Temperature Nickel Anti-Seize Lubricant F6AZ-9L494-AA or equivalent meeting Ford specification ESE-M12A4-A to the threads of the sensors before installation.

Three Way Catalytic Converter (TWC) —4.0L with Single Inlet Muffler

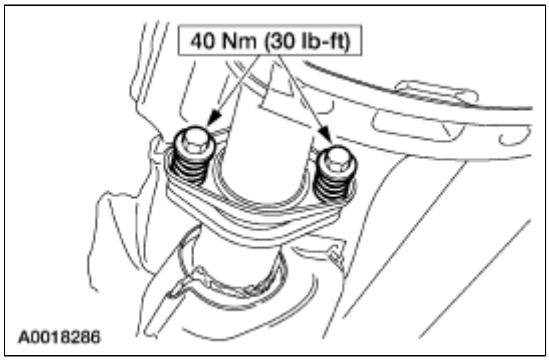
Removal and Installation

NOTE: 4.0L shown, 4.0L EFI similar.

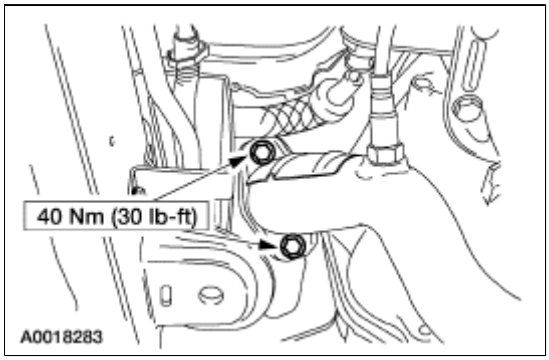
1. Raise and support the vehicle. For additional information, refer to Section 100-02 .
2. Disconnect the catalyst monitor sensor.



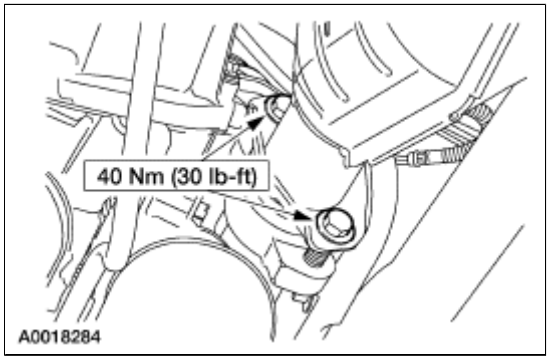
3. Remove the bolts and springs.



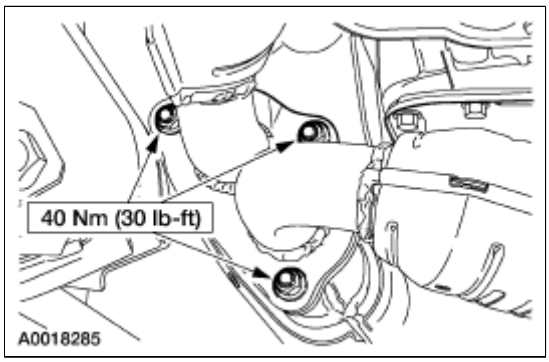
4. Loosen the bolts.



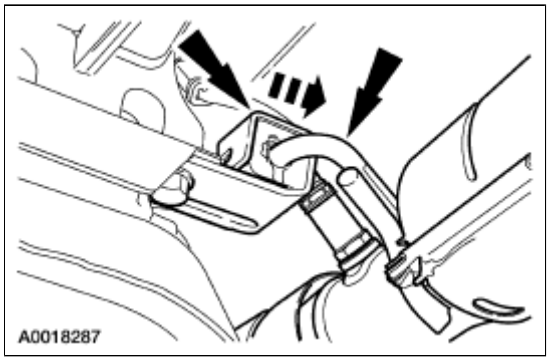
5. Loosen the bolts.



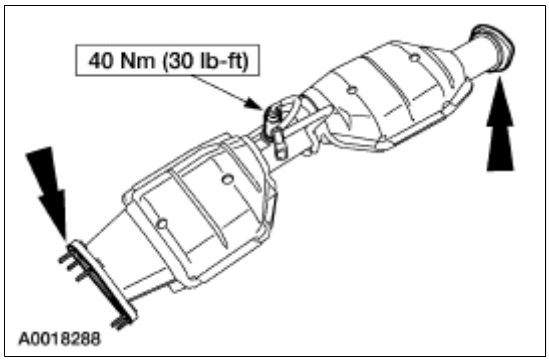
6. Remove the nuts.



7. Detach the three-way catalytic converter (TWC) from the insulator and remove the TWC.



8. Remove the gaskets and, if necessary, the catalyst monitor sensor.
    - Discard the gaskets.



9. **CAUTION: Make sure to tighten the exhaust component fasteners starting from the rear of the vehicle.**

   To install, reverse the removal procedure.
   - Make sure to apply High Temperature Nickel Anti-Seize Lubricant F6AZ-9L494-AA or equivalent meeting Ford specification ESE-M12A4-A to the threads of the sensor prior to installation.

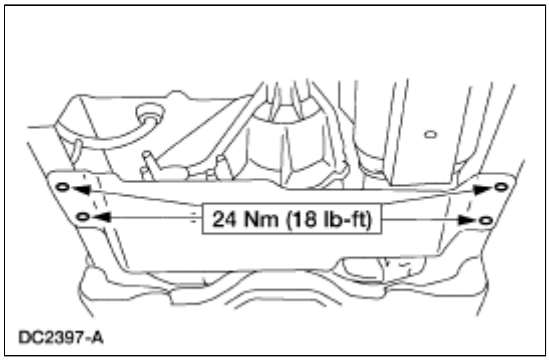
Three Way Catalytic Converter (TWC) —4.0L with Dual Inlet Muffler

Removal and Installation

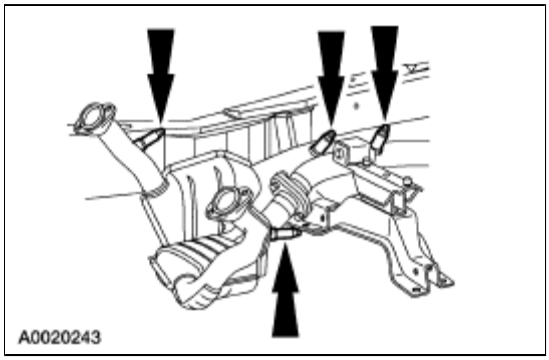
NOTE: If removing both converters, the left-hand converter must be removed before the right-hand converter.

Both converters

1. Remove the bolts and the skid plate (if equipped).

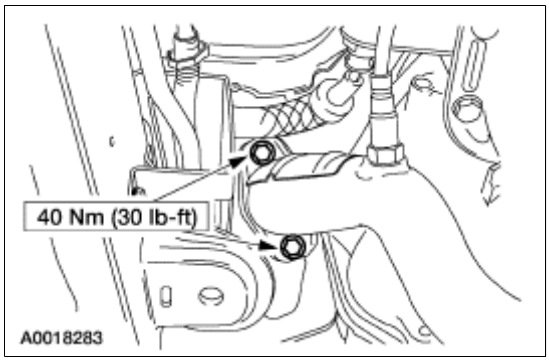


2. If removing the left-hand converter, disconnect the heated oxygen sensor. If removing left and right-hand converters, disconnect both heated oxygen sensors catalyst monitor sensors.

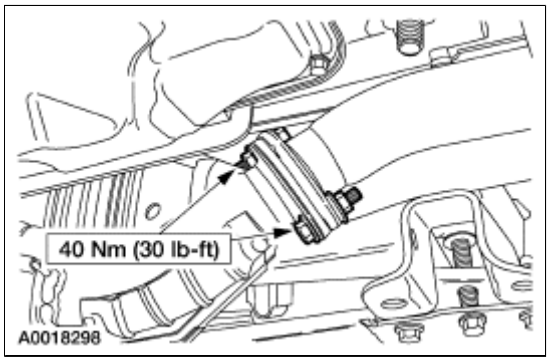


Left-hand converter

3. Remove the bolts.



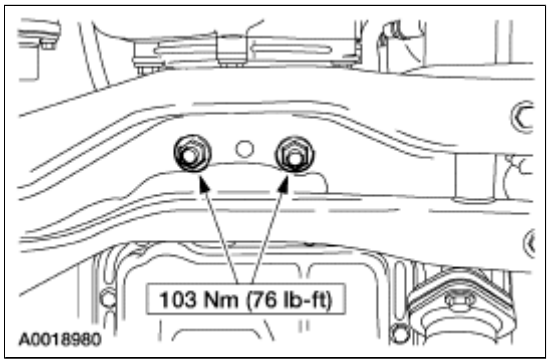
4. Remove the bolts and the flag nuts and remove the left-hand three-way catalytic converter (TWC).



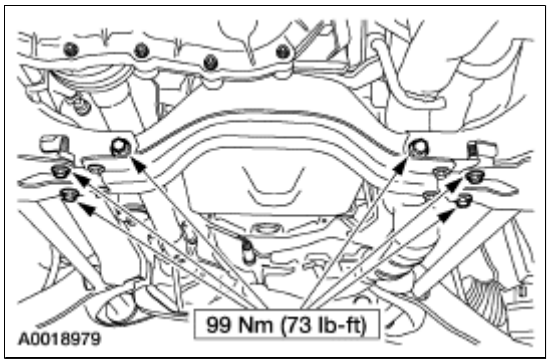
Right-hand

5. Remove the muffler and tailpipe. For additional information, refer to Muffler/Tailpipe—4.0L with Dual Inlet Muffler in this section.

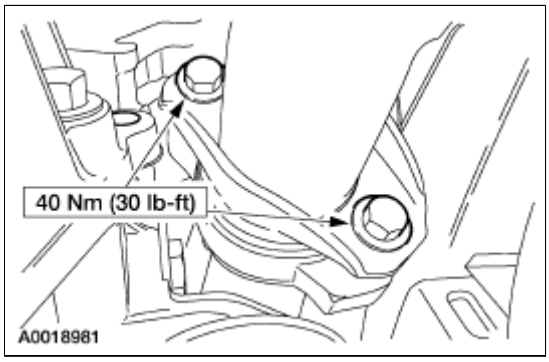
6. Remove the nuts.
   - Position a suitable transmission jack under the transmission.



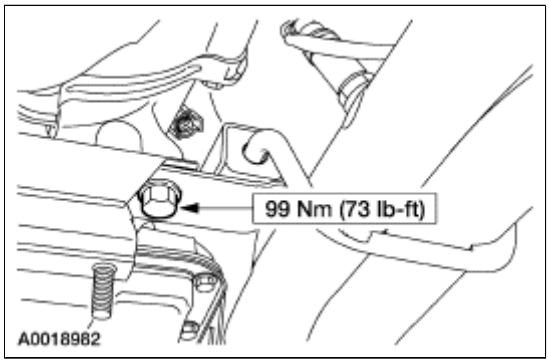
7. Remove the bolts and the transmission crossmember.



8. Remove the bolts.

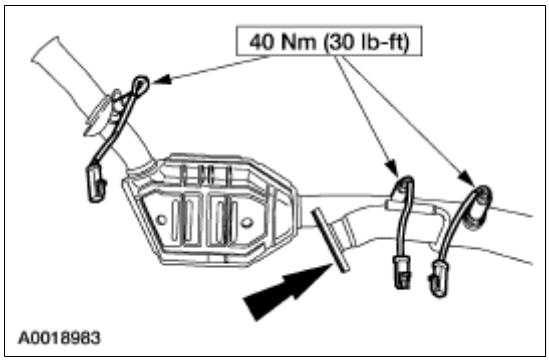


9. Remove the bolt and the right-hand TWC.



Both converters

10. Remove the gasket and the heated oxygen sensors and the catalyst monitor sensors (if necessary).
    - Discard the gasket.



11. To install, reverse the removal procedure.
    - Tighten the left-hand to right-hand converter bolts before tightening the converter to manifold bolts.
    - Apply High Temperature Nickel Anti-Seize Lubricant F6AZ-9L494-AA or equivalent meeting Ford specification ESE-M12A4-A to the threads of the sensors prior to installation.

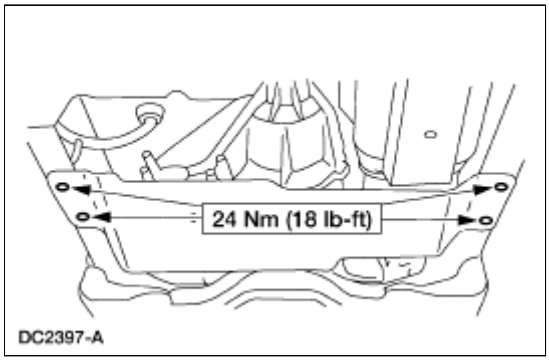
Three Way Catalytic Converter (TWC) —5.0L

NOTE: The left-hand converter must be removed before the right-hand converter.

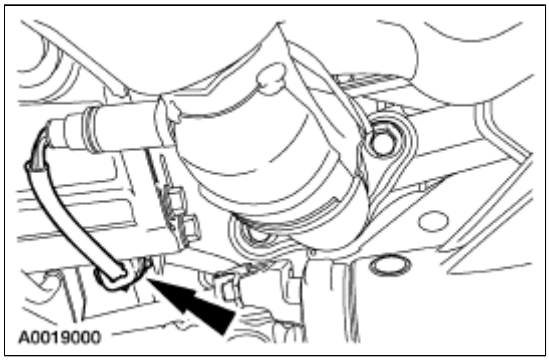
Left-hand and right-hand

1. Remove the muffler and tailpipe. For additional information, refer to Muffler/Tailpipe—5.0L in this section.

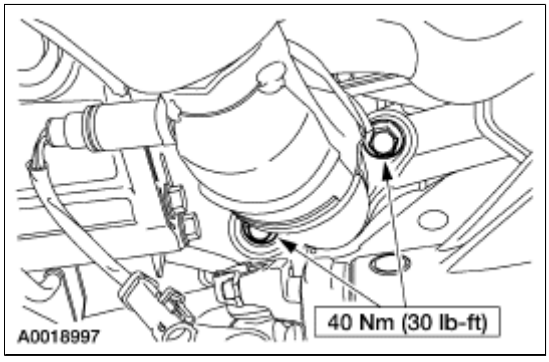
2. Remove the bolts and the skid plate (if equipped).



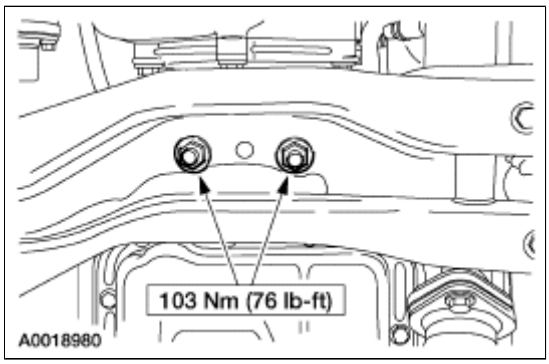
3. Disconnect the heated oxygen sensors and the catalyst monitor sensors.



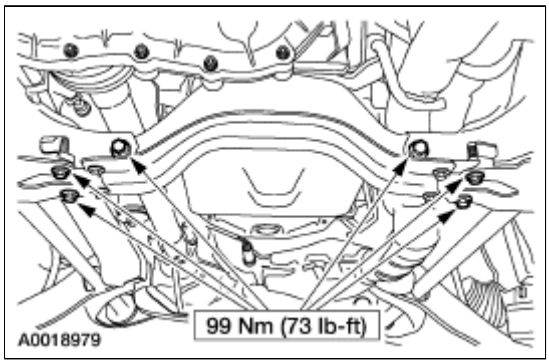
4. Remove the bolts.



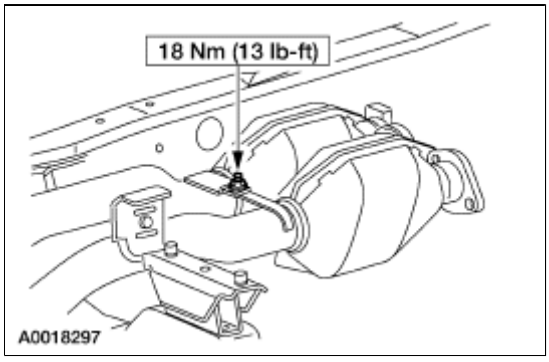
5. Remove the nuts.
    - Position a suitable transmission jack under the transmission.



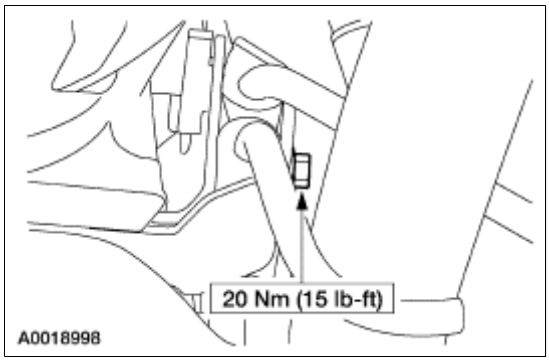
6. Remove the bolts and the transmission crossmember.



7. Remove the nut.

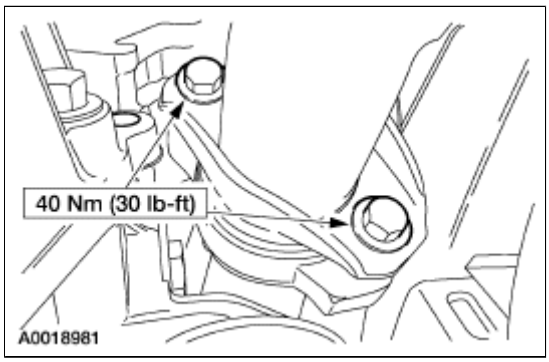


8. Remove the bolt and the three-way catalytic converter (TWC).



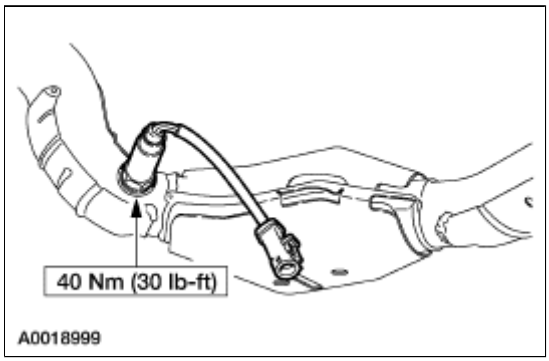
Right-hand

9. Remove the bolts and the TWC.



Left-hand and right-hand

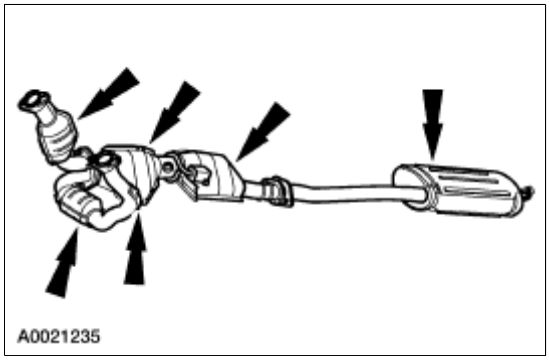
10. Remove the heated oxygen sensors and the catalyst monitor sensors (if necessary).



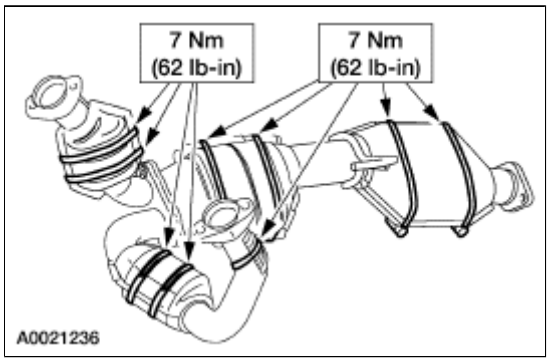
11. To install, reverse the removal procedure.
    - Apply High Temperature Nickel Anti-Seize Lubricant F6AZ-9L494-AA or equivalent meeting Ford specification ESE-M12A4-A to the threads of the sensors prior to installation.

Heat Shield —Catalytic Converter and Muffler

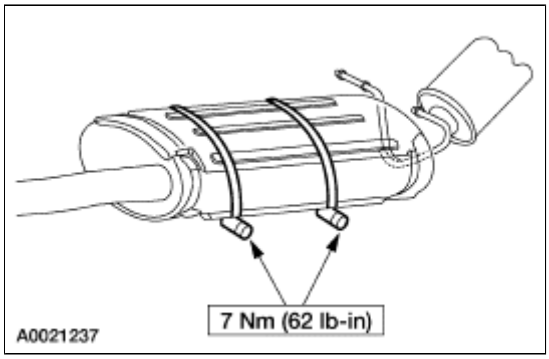
1. Raise the vehicle. For additional information, refer to Section 100-02 .
2. Inspect the catalytic converter and muffler for loose or missing heat shields.



3. Install worm clamps for heat shields that are loose.
   - Use one of the following clamps: FOTZ-5A231–A or W705949–S300.
   - Trim off the excess ear of the worm clamp.



4. If the heat shields are missing, install new heat shields. If new heat shields are not available, install a new catalytic converter. For additional information, refer to Dual Converter Y-Pipe—4.0L , Three Way Catalytic Converter (TWC)—4.0L with Single Inlet Muffler , Three Way Catalytic Converter (TWC)—4.0L with Dual Inlet Muffler or Three Way Catalytic Converter (TWC)—5.0L in this section.



5. Lower the vehicle.

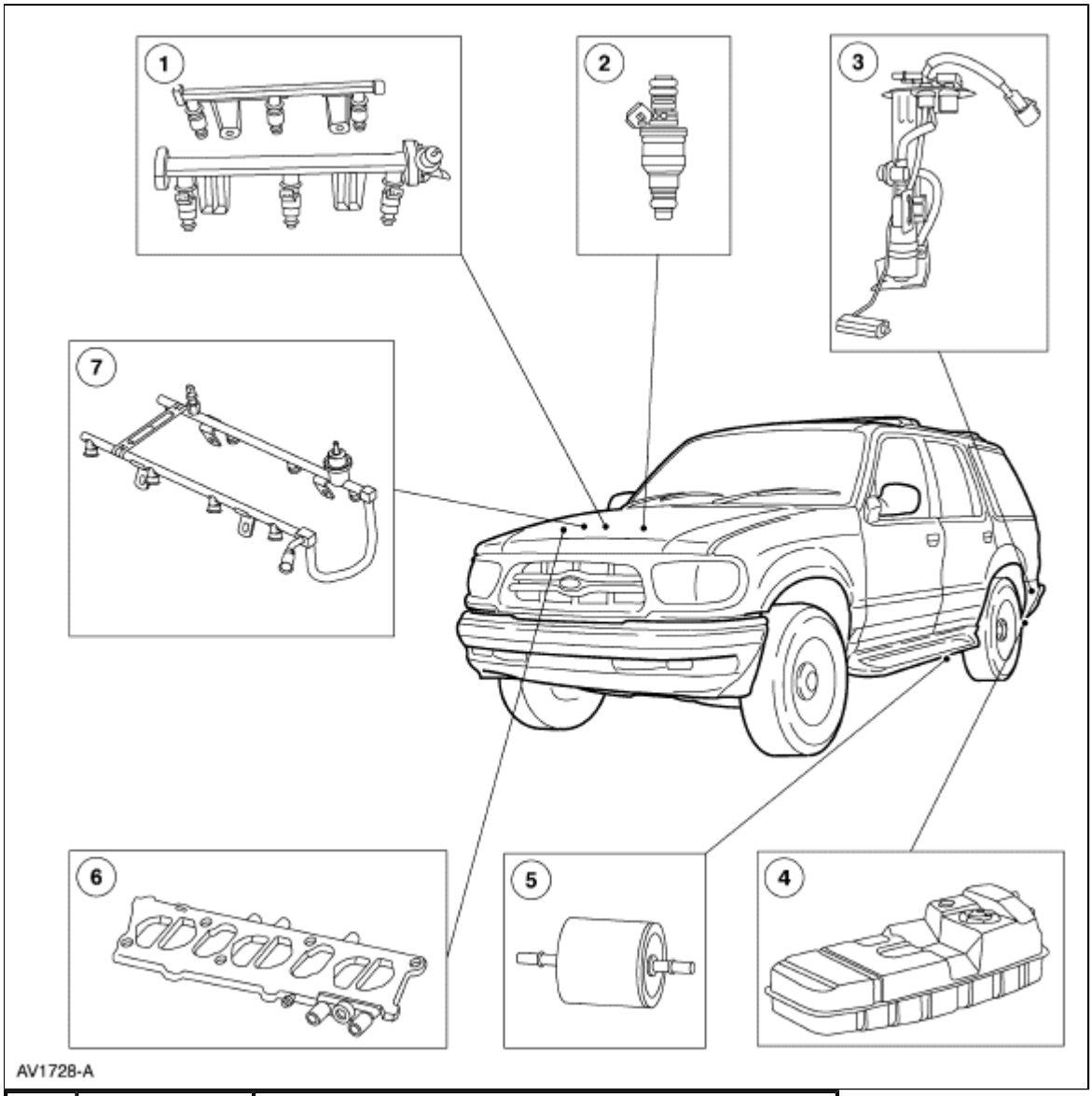
SPECIFICATIONS

General Specifications

Item	Specification
Fuel Capacity	
2-door L (GAL)	66 (17.5)
4-door L (GAL)	80 (21)
Lubricants	
Engine oil	WSS-M2C153-G

Fuel System

Fuel System Components



Item	Part Number	Description
1	9D280	Fuel injection supply manifold— (4.0L SOHC)
2	9F593	Fuel injector
3	9H307	Fuel pump assembly
4	9002	Fuel tank
5	9155	Fuel filter
6	9D280	Fuel injection supply manifold— (4.0L push rod)

7	9D280	Fuel injection supply manifold— (5.0L)

The vehicle:

- is equipped with a multiport fuel injection system.
- has separately controlled fuel injectors (9F593) mounted to the intake manifold for each cylinder.
- fuel injectors are supplied with regulated pressurized fuel from the fuel pump (9350) through the fuel injection supply manifold (9D280).
- has a fuel injection supply manifold.
- has a fuel pressure regulator controlling the pressure going to the fuel injectors.

For information concerning adjustments, refer to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.

Pressure Relief

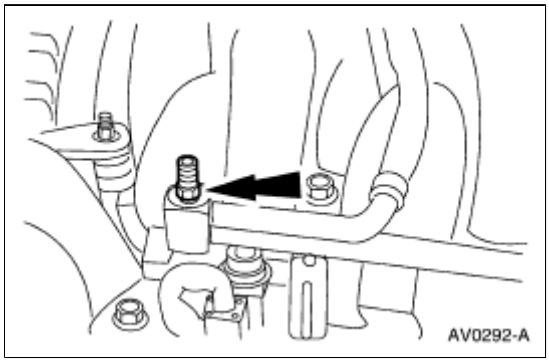
Special Tool(s)

 ST1371-A	Fuel Pressure Gauge 310-012 (T80L-9974-B)

WARNING: Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited, resulting in possible personal injury.

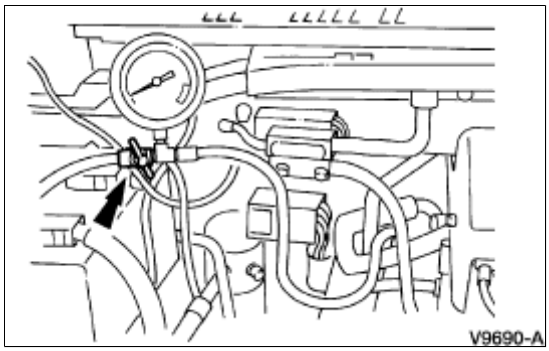
WARNING: Fuel in the fuel system remains under high pressure even when the engine is not running. Before servicing or disconnecting any of the fuel lines or fuel system components, the fuel system pressure must be relieved to prevent accidental spraying of fuel, causing personal injury or a fire hazard.

1. Remove the Schrader valve cap and attach the Fuel Pressure Gauge.



2. **NOTE:** Open the manual valve slowly to relieve the system pressure. This may drain fuel from the system. Place the fuel in a suitable container.

   Open the manual valve on the Fuel Pressure Gauge slowly and relieve the fuel pressure.


V9690-A

Draining

Special Tool(s)

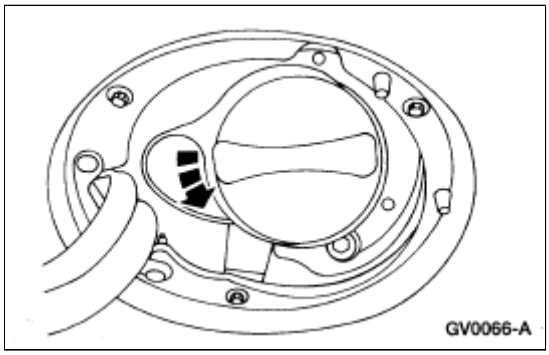
 ST1114-A	30 Gallon Gasoline Hand Pump Storage Tanker 164-R3201 or equivalent

1. **WARNING: The electrical power to the air suspension system must be shut off prior to hoisting, jacking or towing an air suspension vehicle. This can be accomplished by turning off the air suspension switch located in the rear jack storage area. Failure to do so may result in unexpected inflation or deflation of the air springs which may result in shifting of the vehicle during these operations.**

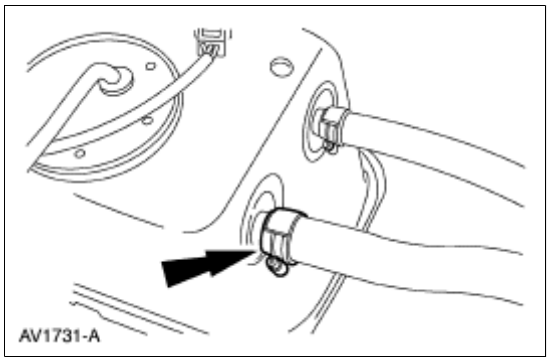
   WARNING: Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited, resulting in possible personal injury.

   Raise and support the vehicle. For additional information, refer to Section 100-02 .

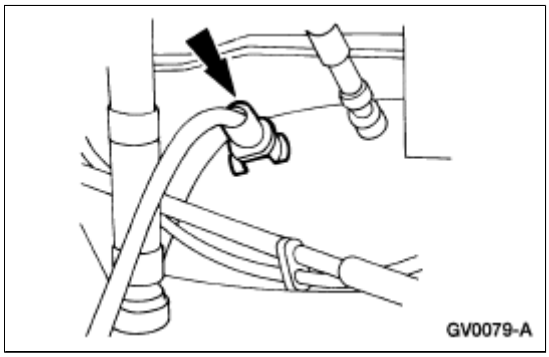
2. Remove the gas cap.



3. Disconnect the fuel filler tube at the fuel tank.

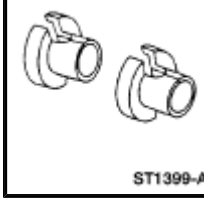


4. Use the Fuel Storage Tanker to siphon the fuel through the fuel tank spud opening.



Fittings —Push Connect

Special Tool(s)

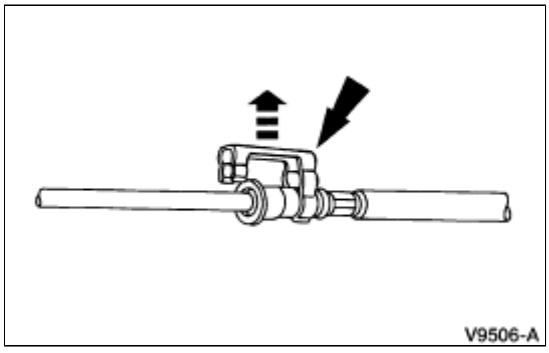
 ST1399-A	Fuel Line Disconnect Tool 310-S039 (T90T-9550-S)

Disconnect

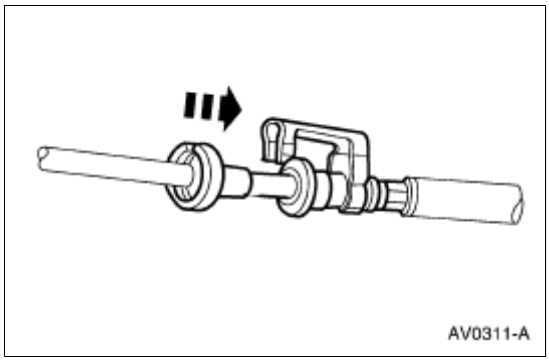
WARNING: Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited, resulting in possible personal injury.

WARNING: Fuel in the fuel system remains under high pressure even when the engine is not running. Before servicing or disconnecting any of the fuel lines or fuel system components, the fuel system pressure must be relieved to prevent accidental spraying of fuel, causing personal injury or a fire hazard.

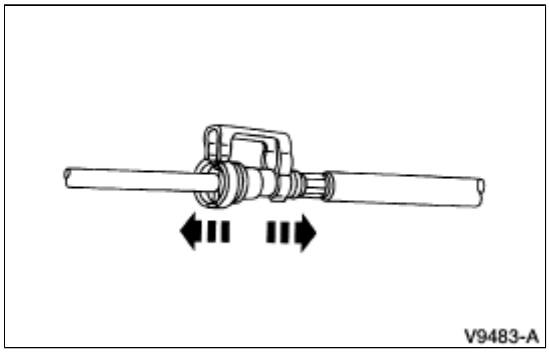
1. Relieve the fuel pressure. For additional information, refer to Pressure Relief in this section.
2. Disconnect the safety clip from the male hose.



3. Install the Fuel Line Disconnect Tool and push it into the fitting.



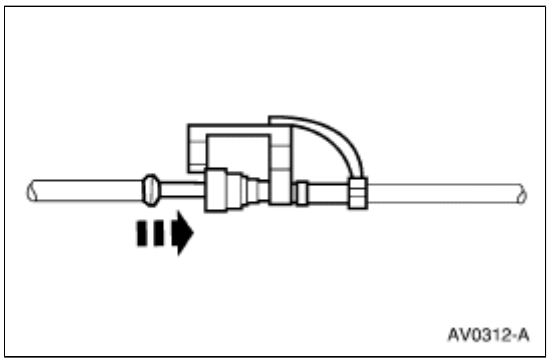
4. Separate the fittings.
    - Inspect for damage.
    - Clean the fittings.



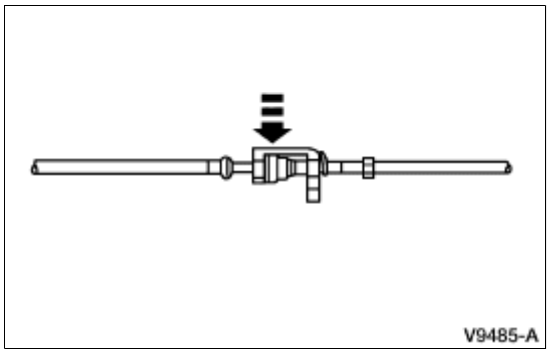
Connect

1. **NOTE:** Lubricate the tube end with clean engine oil meeting Ford specification WSS-M2C153-G to ease assembly.

   Align the tube to the fitting and push until you hear a click.



2. Pull on the fitting to make sure it is fully engaged, then install the safety clip.


V9485-A

Fittings —R-Clip

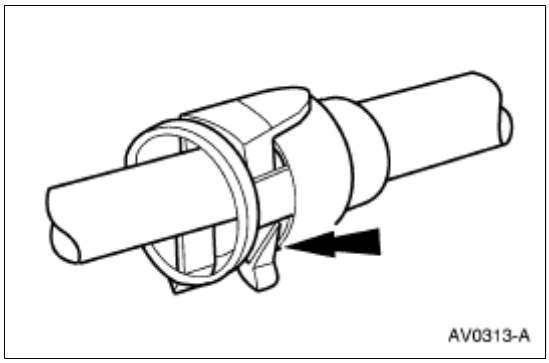
Disconnect

WARNING: Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited, resulting in possible personal injury.

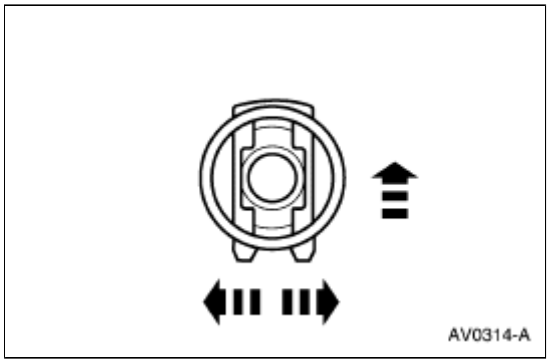
WARNING: Fuel in the fuel system remains under high pressure even when the engine is not running. Before servicing or disconnecting any of the fuel lines or fuel system components, the fuel system pressure must be relieved.

CAUTION: Do not use any tools. The use of tools may cause a deformity in the clip components which may cause fuel leaks.

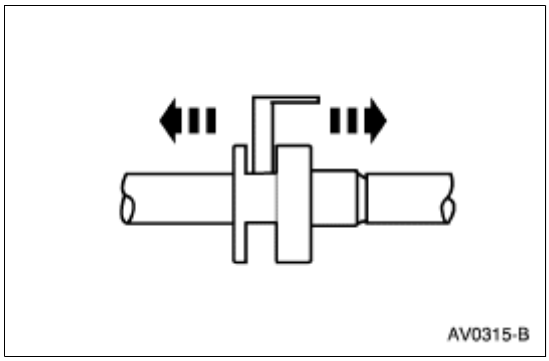
1. Relieve the fuel pressure. For additional information, refer to Pressure Relief in this section.



2. Remove the shipping tab by bending downward.
3. Spread the R-clip legs and push the clip into the fitting.

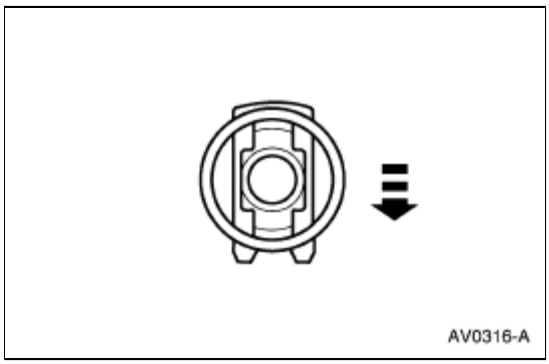


4. Separate the fitting from the tube.

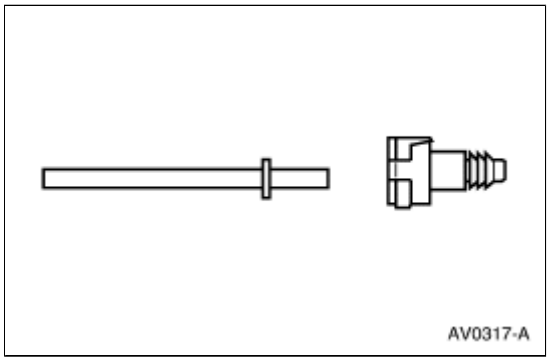


Connect

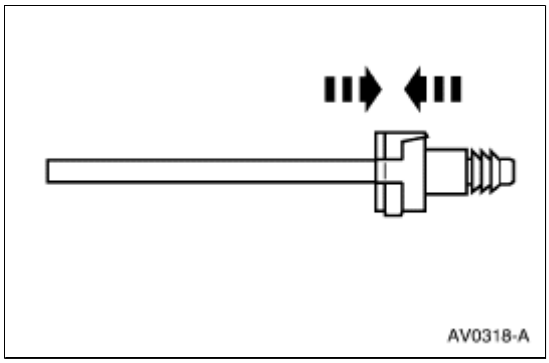
1. Inspect the fitting and the tube for damage. Remove any dirt or obstructions.
2. Apply a light coat of clean engine oil meeting Ford specification WSS-M2C153-G to the male tube end.
3. Insert the R-clip into the fitting.



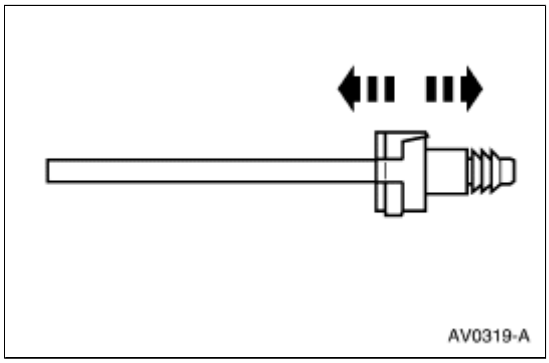
4. Align the tube and the fitting.



5. Insert the tube into the fitting and push together until a click is heard.



6. Pull on the connection to make sure it is fully engaged.



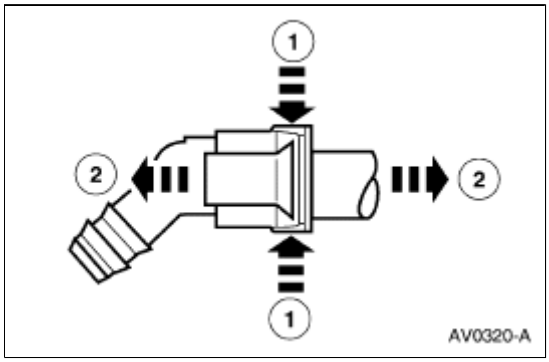
Fittings —Vapor Tube

Disconnect

1. **WARNING: The evaporative emission system contains fuel vapor and condensed fuel vapor. Although not present in large quantities, it still presents the danger of explosion or fire. Disconnect the battery ground cable from the battery to minimize the possibility of an electrical spark occurring, possibly causing a fire or explosion if fuel vapor or fuel liquid is present in the area.**

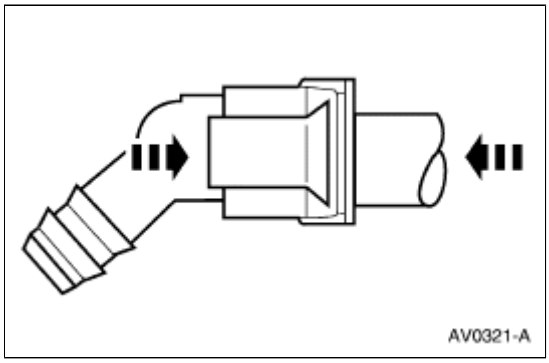
   Disconnect the battery ground cable. For additional information, refer to Section 414-01

2. Disconnect the vapor tube from the fitting.
   1. Squeeze the fitting.
   2. Disconnect the vapor tube from the fitting.

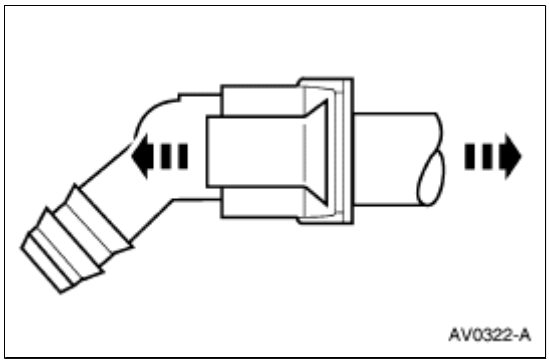


Connect

1. Inspect the fitting and the tube for damage.
2. Remove any dirt or obstructions.
3. Push the tube into the fitting until it snaps in place.



4. Pull on the connection to make sure the fitting is secure.


AV0322-A

Coupling —Spring Lock

Special Tool(s)

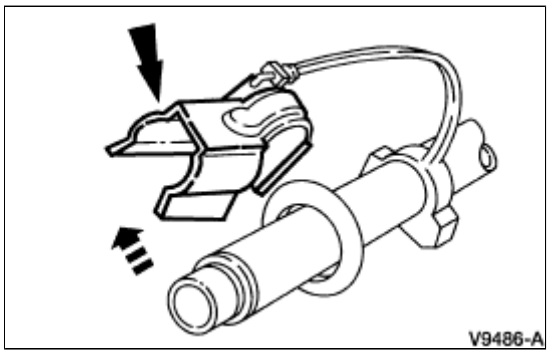
 ST1146-A	Spring Lock Coupler Tool (3/8 inch) 310-D004 (D87L-9280-A) or equivalent
 ST1147-A	Spring Lock Coupler Tool (1/2 inch) 310-D005 (D87L-9280-B) or equivalent

Disconnect

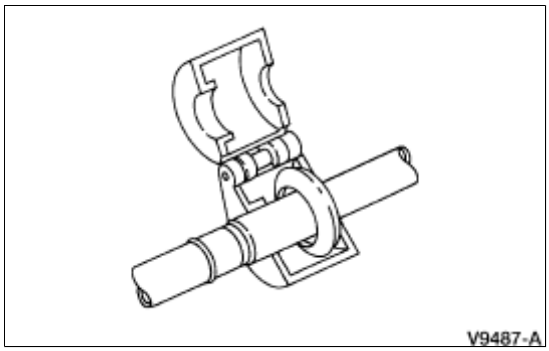
WARNING: Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited, resulting in possible personal injury.

WARNING: Fuel in the fuel system remains under high pressure even when the engine is not running. Before servicing or disconnecting any of the fuel lines or fuel system components, the fuel system pressure must be relieved to prevent accidental spraying of fuel, causing personal injury or a fire hazard.

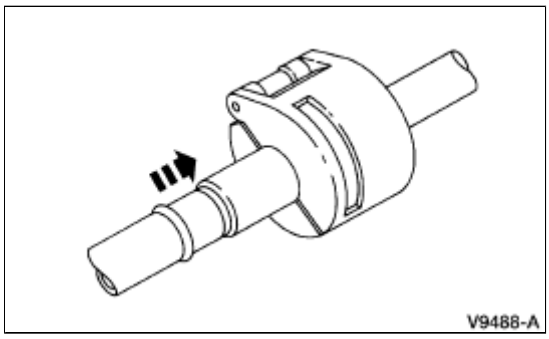
1. Relieve the fuel pressure. For additional information, refer to Pressure Relief in this section.
2. Remove the fuel tube clip.



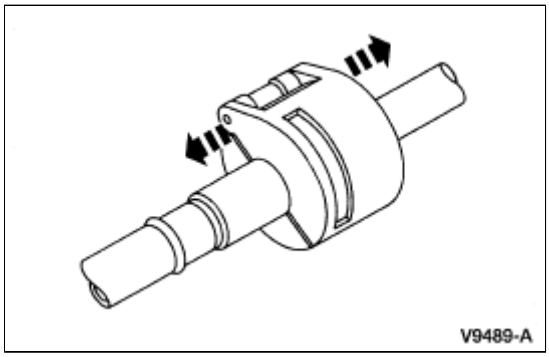
3. Install the Spring Lock Coupler Tool.



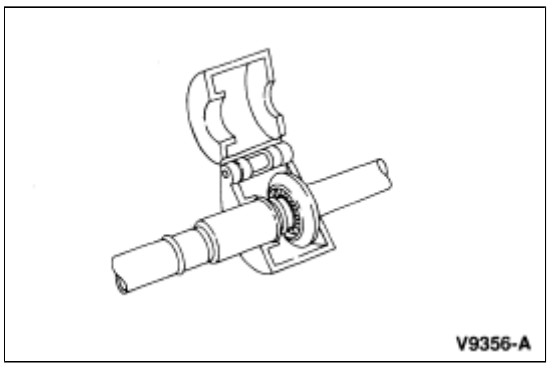
4. Close and push the Spring Lock Coupler Tool into the open side of the cage.



5. Separate the fitting.

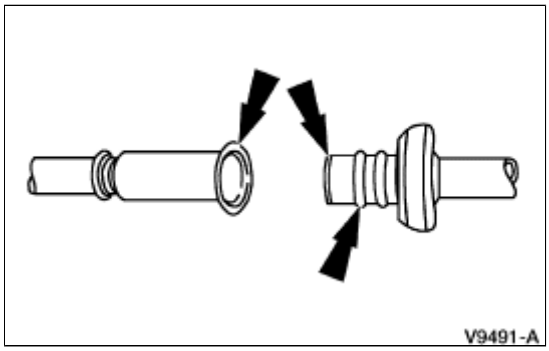


6. Remove the Spring Lock Coupler Tool.



Connect

1. Connect the fitting.
    - Inspect and clean both the coupling ends.
    - Lubricate the O-rings with clean engine oil meeting Ford specification WSS-M2C153-G.
    - Connect the fitting.
    - Pull on the fitting to make sure it is fully engaged.
    - Install the safety clip.



General Specifications

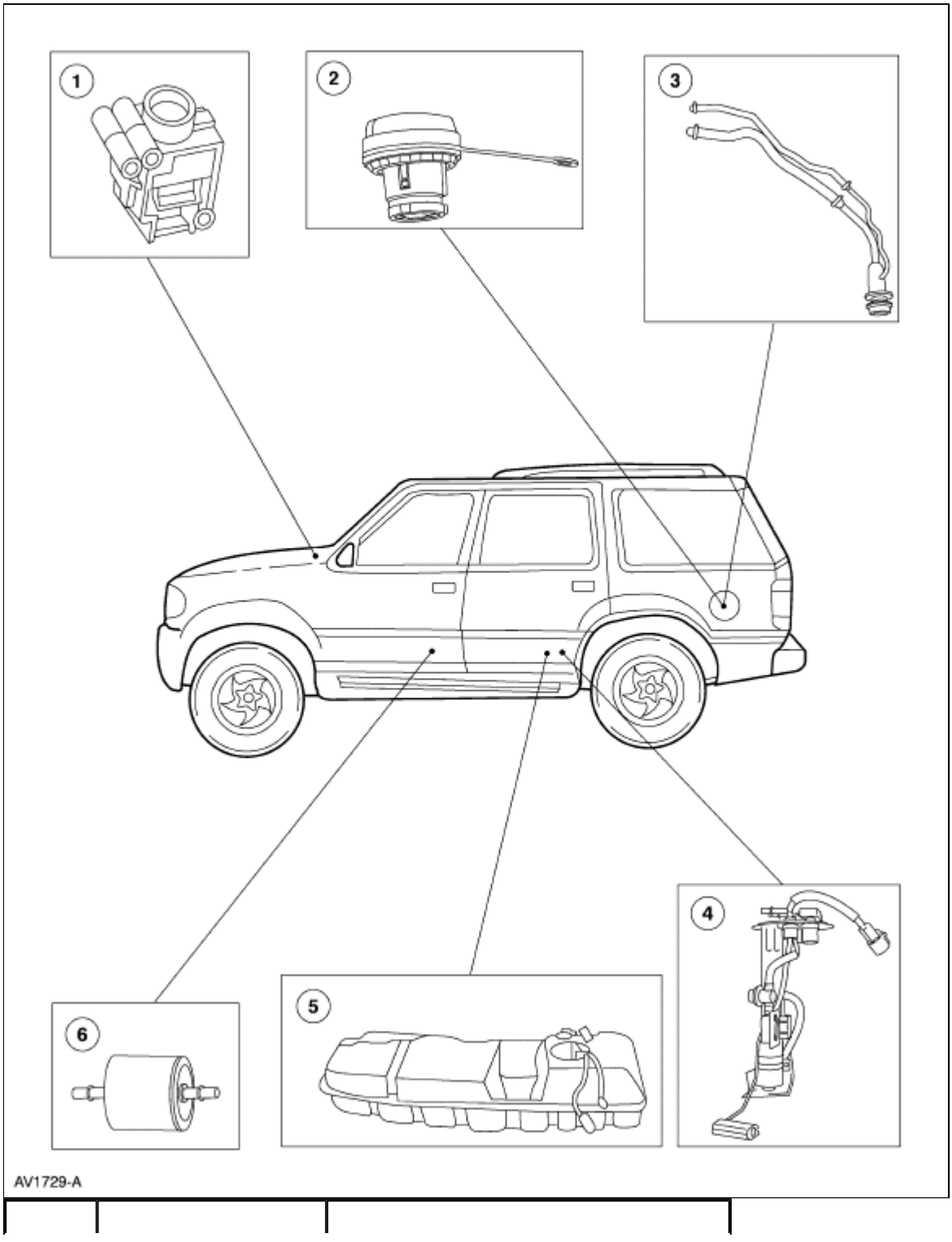
Item	Specification
Explorer Midship 2-Door	66L (17.5 Gal.)
Midship 4-Door	80L (21.0 Gal.)
Mountaineer Midship	79.5L (21.0 Gal.)
Fuel pressure	65±8 PSI

Torque Specifications

Description	Nm	lb-ft	lb-in
Fuel tank bracket bolt	34-46	25-34	—
Fuel tank skid plate bolts	40	30	—
Fuel tank support strap bolt	34-46	25-34	—
Fuel pump bolts	9-12	—	80-107

Fuel Tank and Lines

Component Locations



Item	Part Number	Description
1	9341	Inertia fuel shutoff switch
2	9030	Fuel tank filler cap
3	9034	Fuel tank filler pipe
4	9H307	Fuel pump assembly
5	9002	Fuel tank
6	9155	Fuel filter

The fuel system consists of:

- the fuel tank (9002).
- the fuel tank filler pipe (9034) which contains a restrictor plate to permit only unleaded fuel to be pumped into the fuel tank.
- a 1/8 turn type fuel tank filler cap (9030).
- a fuel filter (9155) providing filtration to protect the fuel injectors.
- fuel lines.
- a fuel pressure regulator.
- a fuel pump assembly (9H307) containing:
    - the electric fuel pump which provides pressurized fuel to the engine.
    - the fuel level sensor.
    - an inlet filter.
    - a check valve which maintains system pressure after the pump is shut off.
    - a mechanical fuel pressure regulator with pressure relief for over pressure protection.

The fuel pump is controlled by the powertrain control module (PCM) (12A650) which energizes the fuel pump relay. Electrical power to the pump is provided through the inertia fuel shutoff switch (IFS switch) (9341).

Tank

Removal

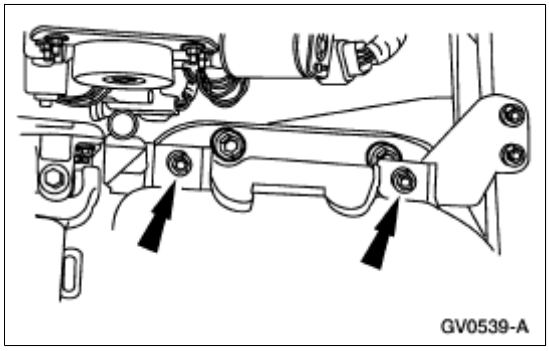
All vehicles

WARNING: Do not smoke, carry lighted tobacco or open flame of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited, resulting in possible personal injury.

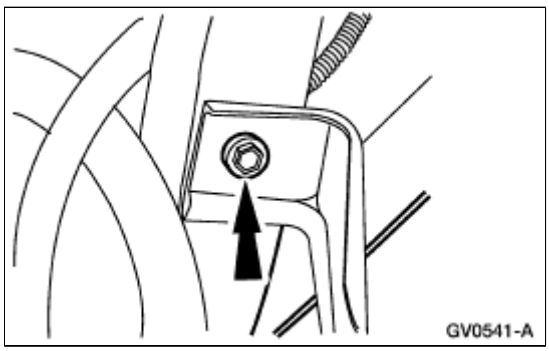
1. Disconnect the battery. For additional information, refer to Section 414-01 .
2. Relieve the fuel system pressure. For additional information, refer to Section 310-00 .
3. Raise the vehicle on a hoist. For additional information, refer to Section 100-02 .
4. Drain the fuel tank (9002). For additional information, refer to Section 310-00 .

Four wheel drive vehicles

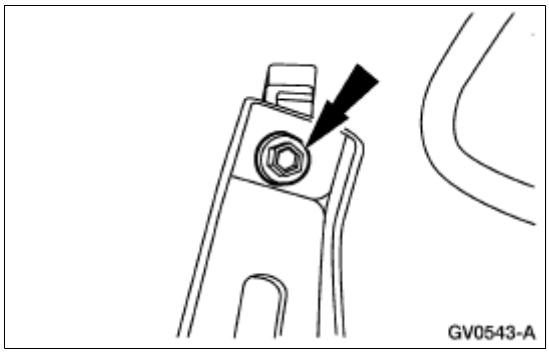
5. Remove the bolts.



6. Remove the rear LH bolt.

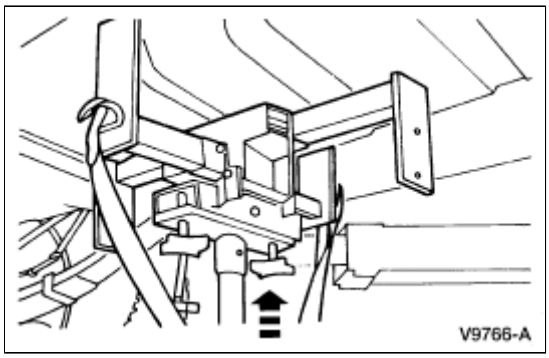


7. Remove the rear RH bolt and lower the fuel tank skid plate (9A147).

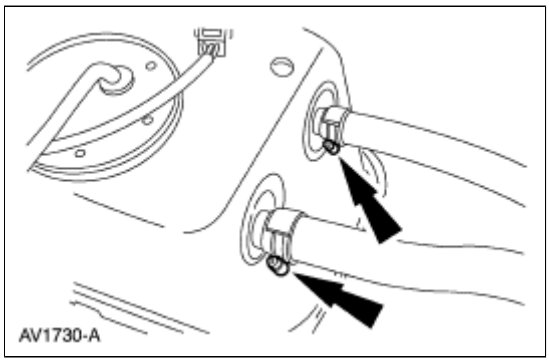


All vehicles

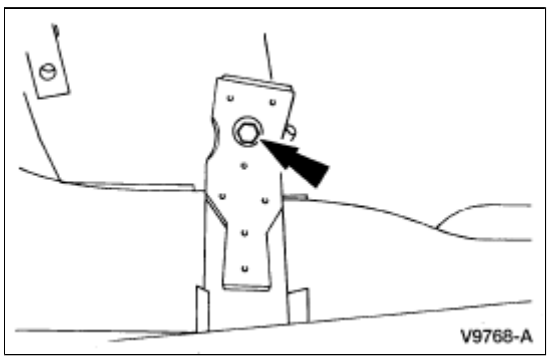
8. Use a suitable jack to support the fuel tank.



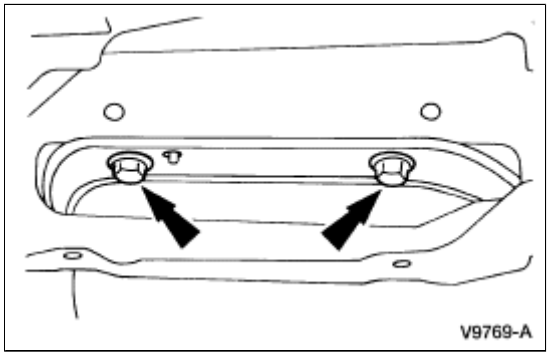
9. Remove the fuel tank filler pipe (9034) and the vent hose.



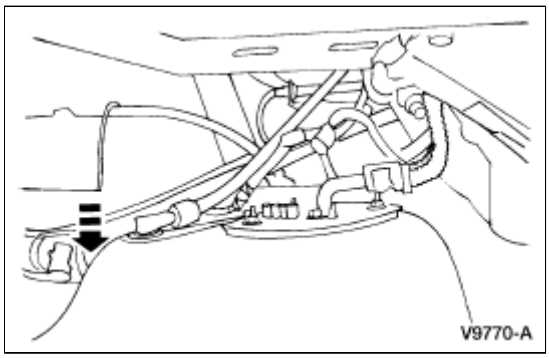
10. Remove the bolt and remove the fuel tank support strap (9057).



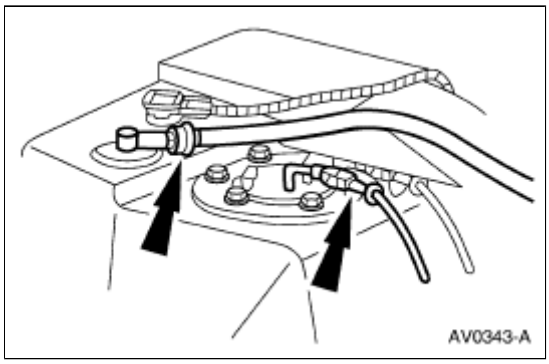
11. Remove the bolts and push the fuel tank back until the lip clears the support bracket.



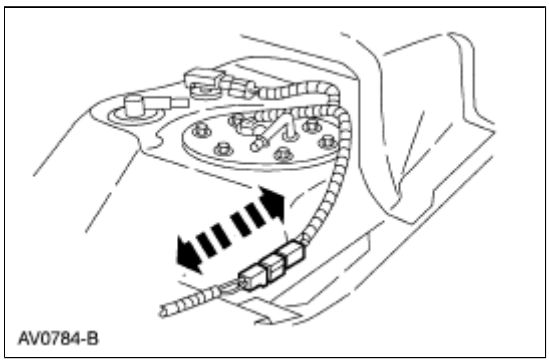
12. Lower the fuel tank just enough to expose the fuel lines and the fuel tank transducer connector.



13. Disconnect the fuel lines and the vapor lines. For additional information, refer to Section 310-00 .



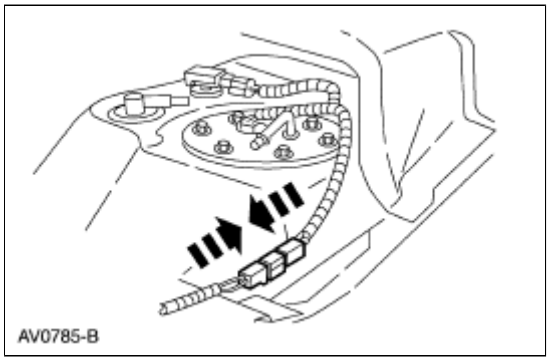
14. Disconnect the fuel tank electrical supply connector near the frame rail. Lower the fuel tank.



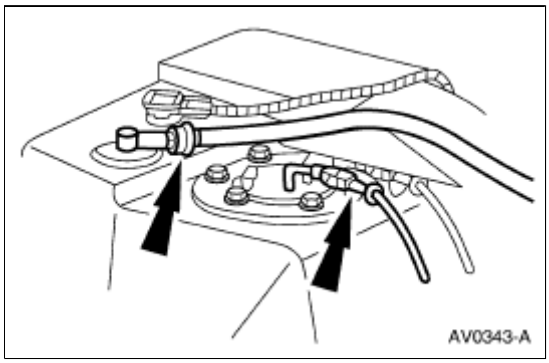
Installation

All vehicles

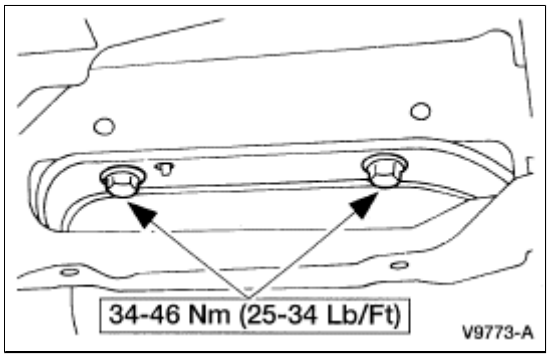
1. Connect the fuel tank electrical supply connector near the frame rail.



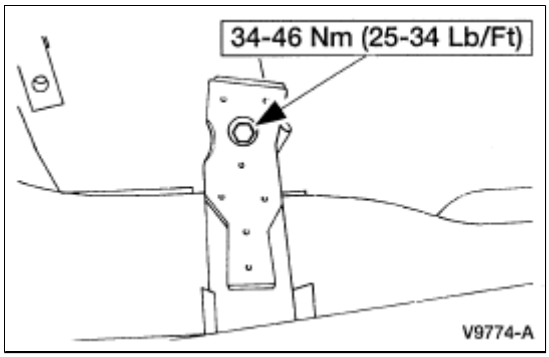
2. Connect the fuel lines and the vapor lines. For additional information, refer to Section 310-00 .



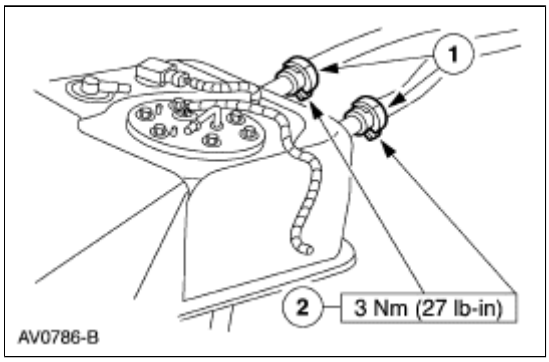
3. Raise the fuel tank into position, slide it forward into the support bracket, and install the bolts.



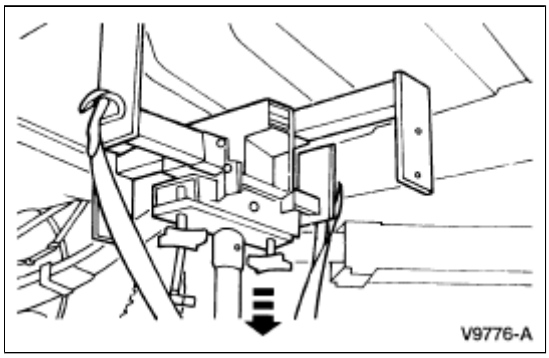
4. Position the fuel tank support strap and install the bolt.



5. Install the fuel tank filler pipe and the vent hose.
    1. Orient clamp bonding patch with top of the fuel tank.
    2. Tighten the hose clamps.

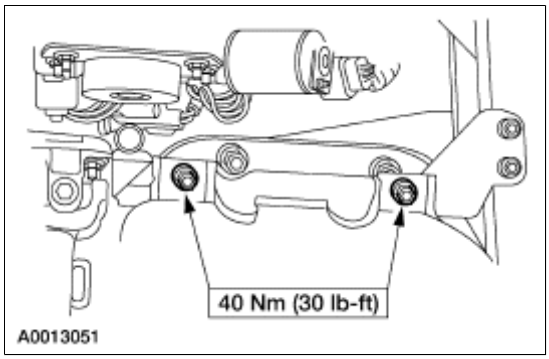


6. Remove the jack.

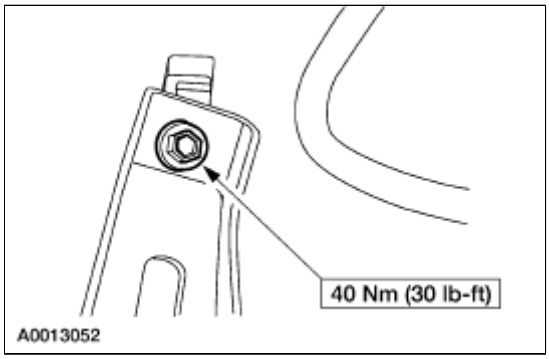


Four wheel drive vehicles

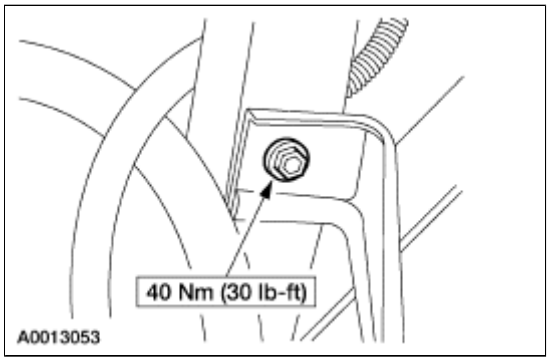
7. Position the fuel tank skid plate and install the front bolts.



8. Install the rear RH bolt.



9. Install the rear LH bolt.



All vehicles

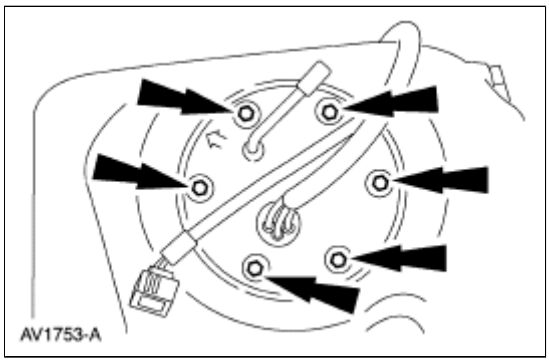
10. Lower the vehicle.
11. Fill the fuel tank.
12. Connect the battery. For additional information, refer to Section 414-01 .

Pump

Removal

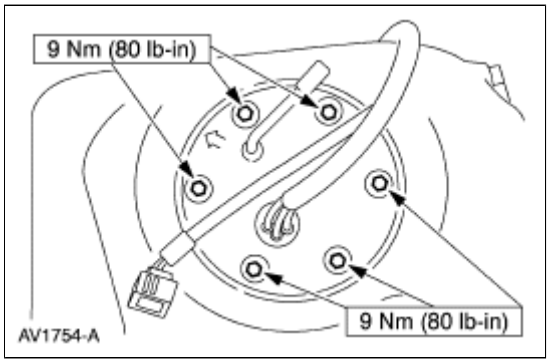
1. Remove the fuel tank (9002). For additional information, refer to Tank in this section.
2. Clean the area around the fuel pump assembly (9H307) mounting flange.
3. Disconnect the electrical connector from the fuel pressure transducer.
4. **CAUTION: The fuel pump assembly must be handled carefully to avoid damage to the float arm and the filter.**

   Remove the fuel pump mounting bolts and remove the fuel pump assembly.



Installation

1. Clean the fuel pump assembly mounting flange and the fuel tank mounting surface.
2. Install the fuel pump assembly.
   1. Position the fuel pump assembly in the fuel tank.
   2. Align the arrow on the fuel pump flange with the dimple on the fuel tank.
   3. Install the bolts.



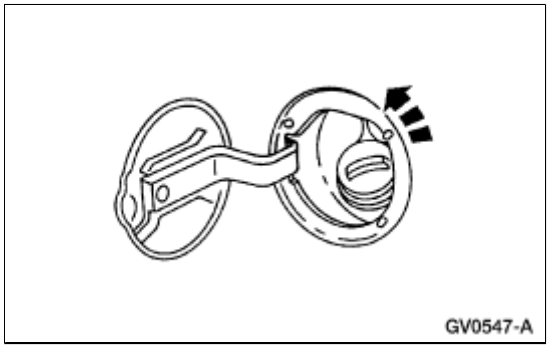
3. Connect the electrical connector to the fuel pressure transducer.

4. Install the fuel tank. For additional information, refer to Tank in this section.

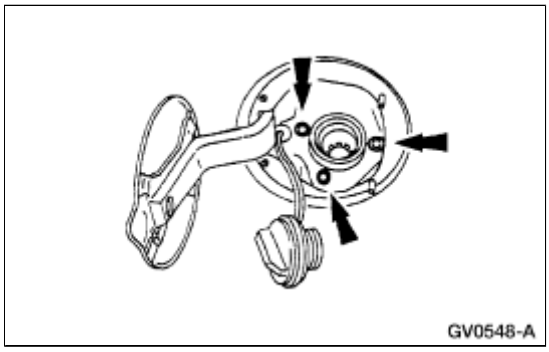
Filler Pipe

Removal

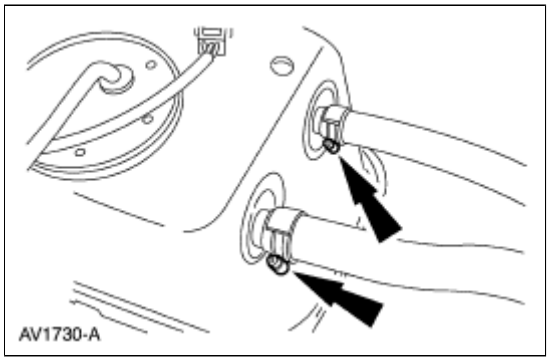
1. Remove the fuel tank filler cap (9030).



2. Remove the screws.



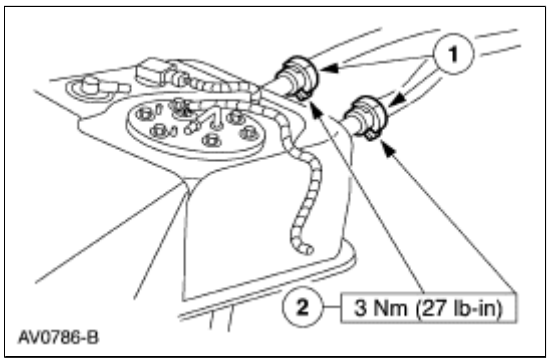
3. Remove the fuel tank filler pipe (9034) and the vent hose from the fuel tank (9002) and remove the fuel tank filler pipe.



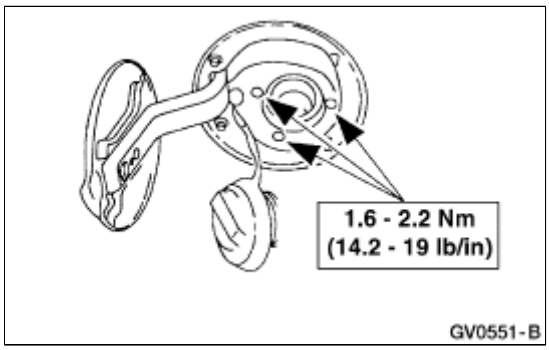
Installation

1. Install the fuel tank filler pipe and the vent hose.
    1. Orient clamp bonding patch with top of the fuel tank.

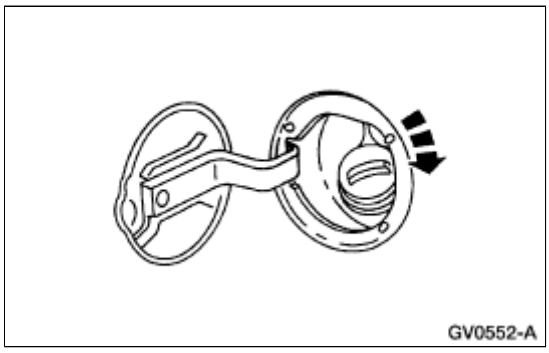
2. Tighten the hose clamps.



2. Install the three fuel tank filler pipe screws.



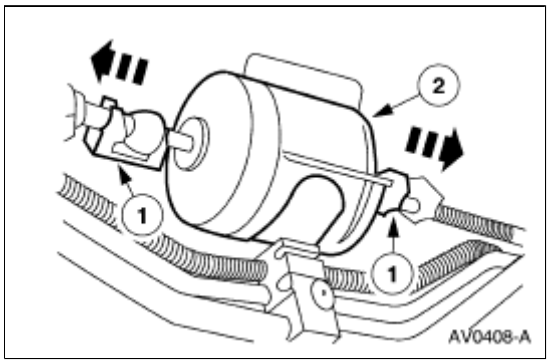
3. Install the fuel tank filler cap.



Filter

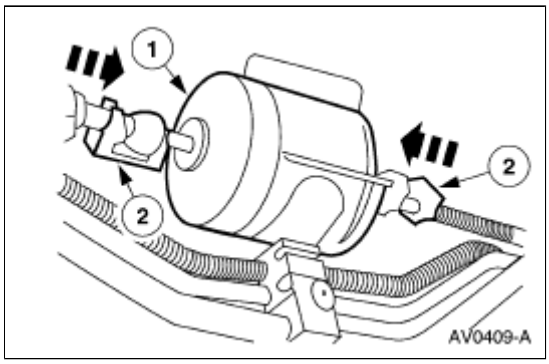
Removal

1. Relieve the fuel pressure. For additional information, refer to Section 310-00 .
2. Raise and support the vehicle. For additional information, refer to Section 100-02 .
3. Remove the fuel filter (9155).
    1. Disconnect the fuel lines. For additional information, refer to Section 310-00 .
    2. Remove the fuel filter from the fuel filter support.



Installation

1. Install the fuel filter.
    1. Position the fuel filter in the fuel filter support.
    2. Install the fuel lines. For additional information, refer to Section 310-00 .

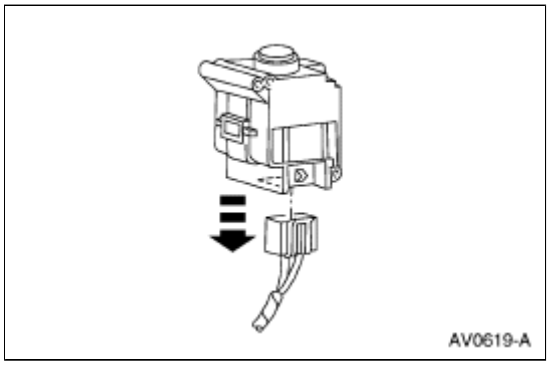


2. Lower the vehicle.

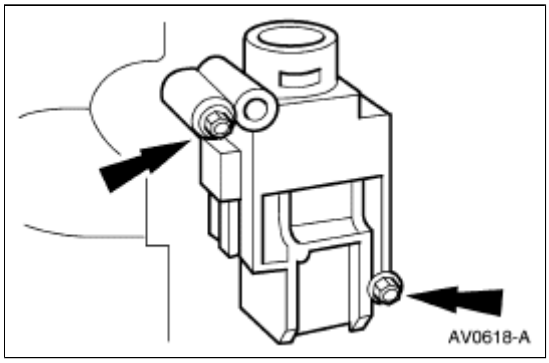
Inertia Fuel Shutoff (IFS) Switch

Removal

1. Disconnect the battery. For additional information, refer to Section 414-01 .
2. Access the inertia fuel shutoff (IFS) switch (9341) on the RH toe board and disconnect the electrical connector.



3. Remove the bolts and remove the IFS switch.



Installation

1. To install, reverse the removal procedure.

Torque Specifications

Description	Nm	lb-in
Accelerator cable bracket to coil bracket nut	8-10	70-89
Accelerator cable bracket stud bolt	16-24	141-212
Accelerator control splash shield bolts—4.0L (push rod), 5.0L	7-9	62-79
Accelerator control splash shield bolts—4.0L SOHC	3.5	31
Accelerator control splash shield bolts—4.0L (push rod)	4.1	49
Accelerator pedal and shaft pivot screw	9-12	80-106
Throttle body-to-upper intake manifold bolts	8-10	71-89

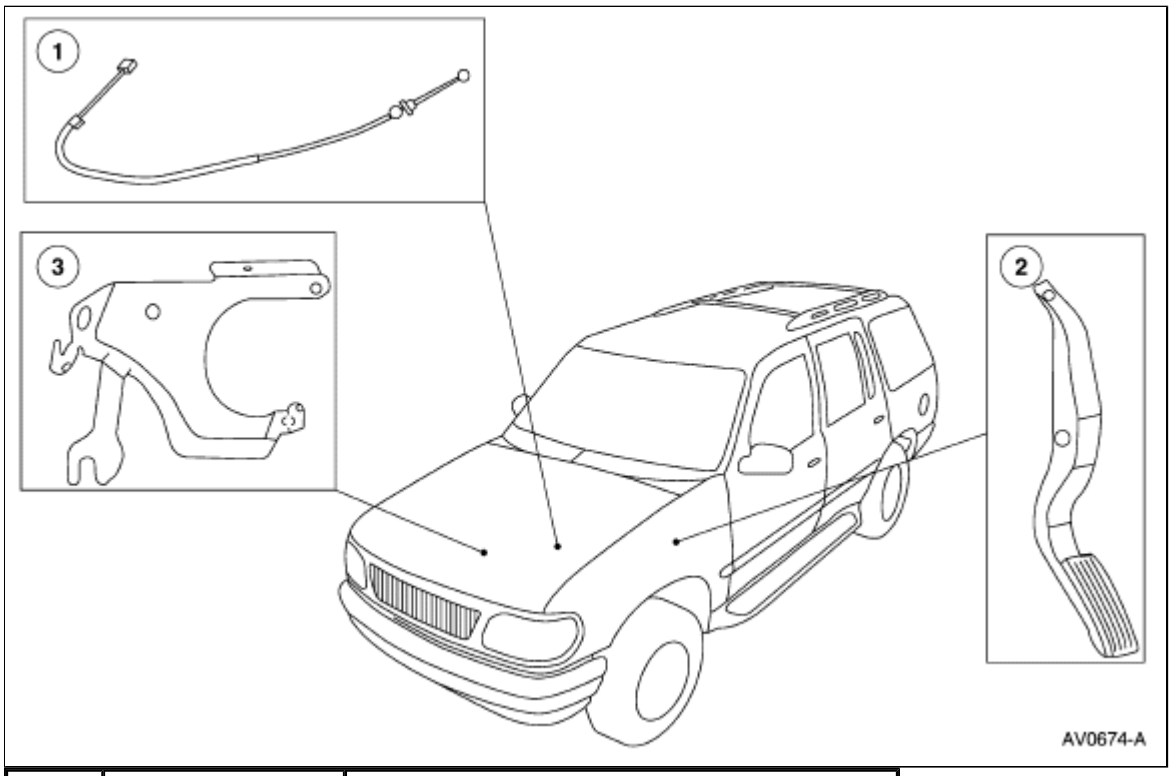
Acceleration Control

The accelerator cable (9A758) is controlled by an accelerator pedal and shaft (9725). The pedal and shaft should travel smoothly from the idle to wide-open throttle positions. Failure to return or hesitation on return to the idle position must not occur.

Surrounding components such as wiring, hoses, sound insulator and floor covering must not contact the sliding inner member of the accelerator cable or the accelerator pedal and shaft.

The speed control speedometer cable (9A820) and the accelerator cable are attached at the throttle lever on the throttle body (9E926).

Component Location



Item	Part Number	Description
1	9A758	Accelerator cable
2	9725	Accelerator pedal and shaft
3	9728	Accelerator cable bracket— 5.0L

Acceleration Control

Inspection and Verification

NOTE: Care should be exercised when performing service on or around the accelerator pedal linkage and controls.

1. Inspect the accelerator pedal and shaft (9725) and attaching linkage for damage or distortion which would bind or limit accelerator travel.
2. Inspect the accelerator cable (9A758) for kinks or fraying which may cause bending.
3. Inspect the engine idle speed adjustment to make sure of the correct idle speed specification after any accelerator linkage adjustment or repair.
4. Inspect throttle body (9E926) for excessive wear or damage.

Symptom Chart

SYMPTOM CHART

Condition	Possible Sources	Action
• Excessive effort needed to depress accelerator pedal and shaft	• Worn accelerator lever pivot bushing.	• INSTALL a new accelerator pedal and shaft.
	• Accelerator cable binding.	• INSTALL a new accelerator cable.
	• Worn or damaged throttle body.	• INSTALL a new throttle body. REFER to Section 303-04A (4.0L EI), Section 303-04B (4.0L SOHC) or Section 303-04C (5.0L).
• Accelerator pedal and shaft feels rough or raspy	• Frayed or binding accelerator cable.	• INSTALL a new accelerator cable.
	• Worn or damaged throttle body.	• INSTALL a new throttle body. REFER to Section 303-04A (4.0L EI), Section 303-04B (4.0L SOHC) or Section 303-04C (5.0L).
• Accelerator pedal and shaft bind or stick	• Kinked accelerator cable.	• INSTALL a new accelerator cable.
	• Foreign object caught in accelerator pedal	• CHECK the accelerator pedal linkage.

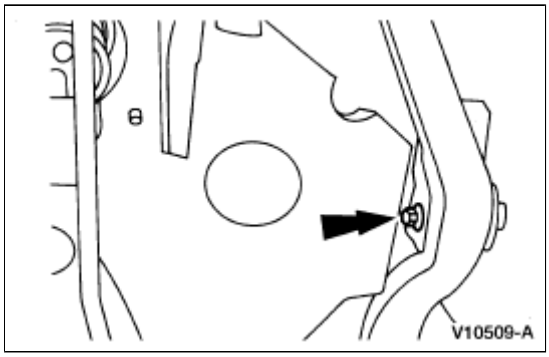
	linkage. • Worn or damaged throttle body.	• INSTALL a new throttle body. REFER to Section 303-04A (4.0L EI), Section 303-04B (4.0L SOHC) or Section 303-04C (5.0L).
• High engine idle speed	• Kinked accelerator cable. • Foreign object caught in accelerator pedal linkage. • Incorrect engine idle speed.	• INSTALL a new accelerator cable. • CHECK the accelerator pedal linkage. • REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual, for diagnosis and testing of the idle control system.

Pedal —Accelerator

Removal

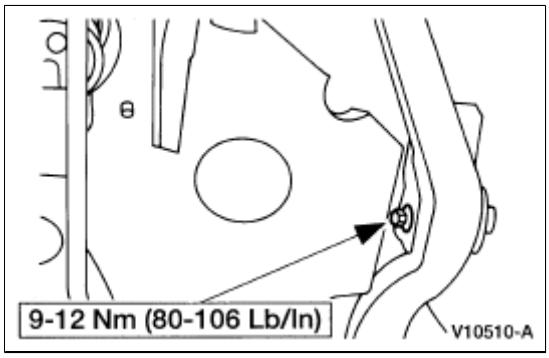
1. Disconnect the accelerator cable (9A758) from the accelerator pedal and shaft (9725) . For additional information, refer to Cable—Accelerator, 4.0L (Push Rod) , Cable—Accelerator, 4.0L SOHC or Cable—Accelerator, 5.0L in this section.

2. Remove the accelerator pedal and shaft pivot screw, and remove the accelerator pedal and shaft.



Installation

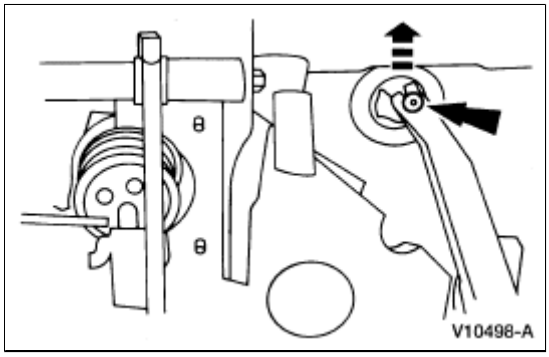
1. To install, reverse the removal procedure.



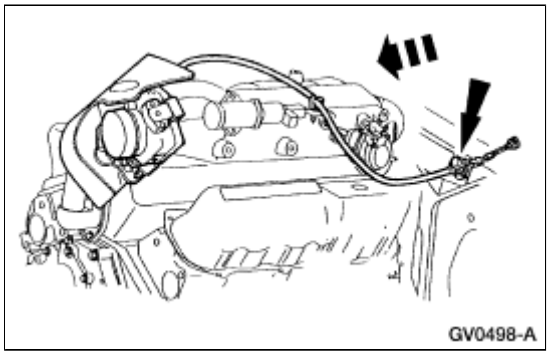
Cable —Accelerator, 4.0L (Push Rod)

Removal

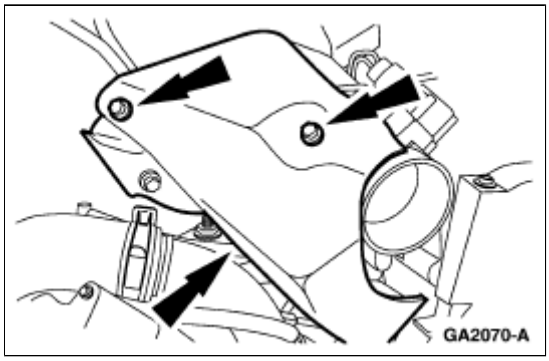
1. Disconnect the accelerator cable (9A758) from the accelerator pedal and shaft (9725).



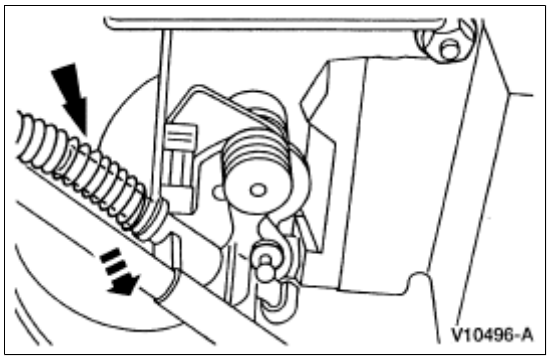
2. Collapse the clips at the dash panel and push the accelerator cable through the dash panel into the engine compartment.



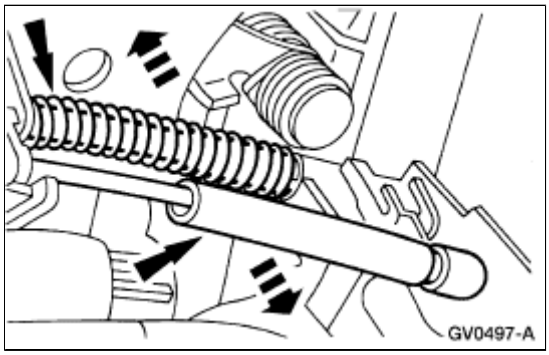
3. Remove the two bolts and the accelerator control splash shield (9E766).



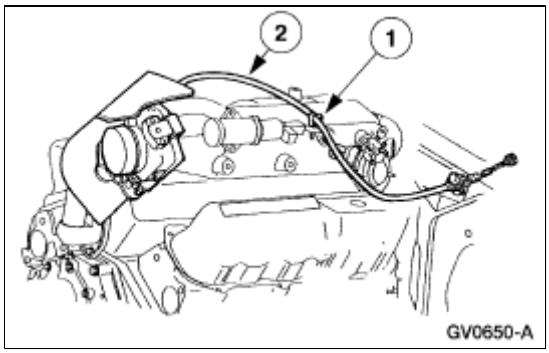
4. Disconnect the accelerator cable from the throttle body (9E926).



5. Separate the accelerator cable from the speed control actuator cable (9A825).



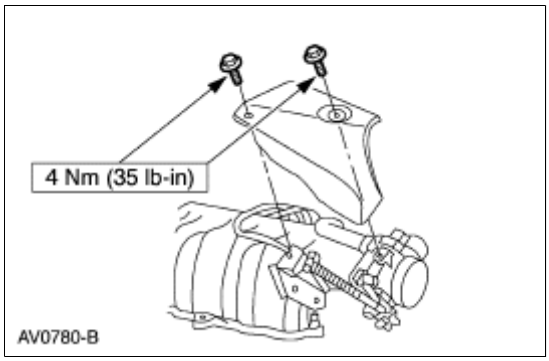
6. Remove the accelerator cable.
    1. Remove the accelerator cable from the guide clip.
    2. Remove the accelerator cable.



Installation

1. **NOTE:** The accelerator cable should be routed over the air conditioning lines and under the power brake and speed control vacuum hoses.

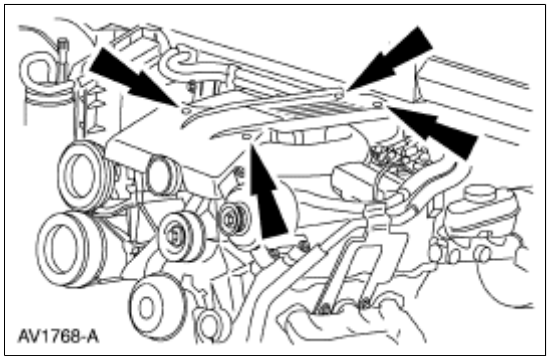
   To install, reverse the removal procedure.


4 Nm (35 lb-in)
AV0780-B

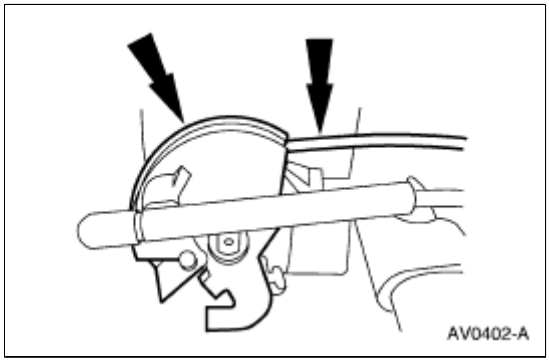
Cable —Accelerator, 4.0L SOHC

Removal

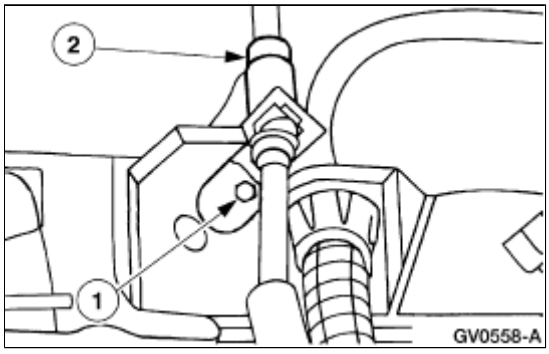
1. Remove the screws and the accelerator control splash shield (9E766).



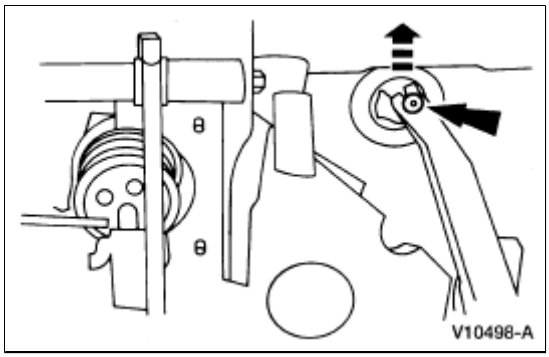
2. Disconnect the accelerator cable (9A758) from the throttle body (9E926).



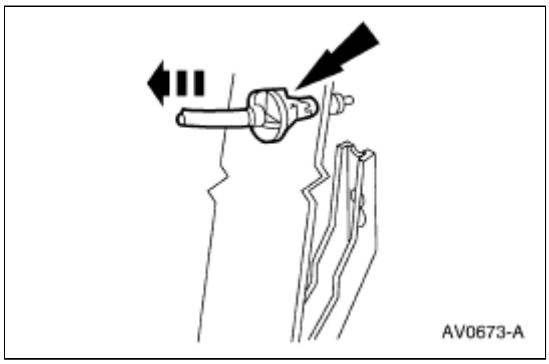
3. Disconnect the accelerator cable from the intake manifold (9424).
    1. Remove the screw.
    2. Disconnect the accelerator cable from the intake manifold.



4. From inside the vehicle, disconnect the accelerator cable from the accelerator pedal and shaft (9725).



5. Collapse the clips at the dash panel and push the accelerator cable through the dash panel into the engine compartment and remove the accelerator cable.



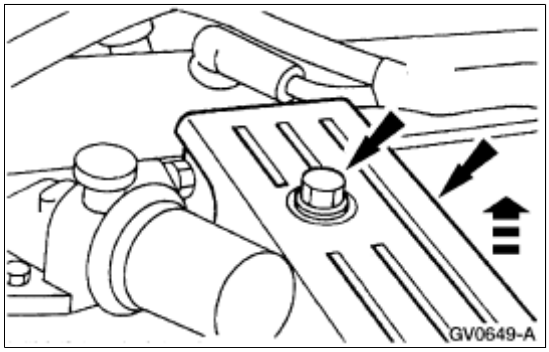
Installation

1. To install, reverse the removal procedure.

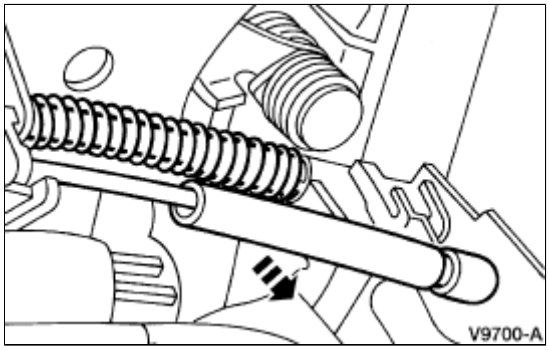
Cable —Accelerator, 5.0L

Removal

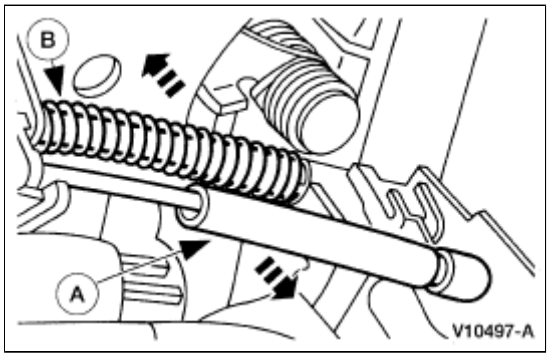
1. Remove the bolt and the accelerator control splash shield (9E766).



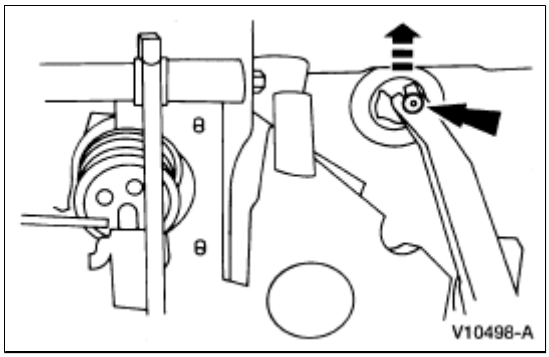
2. Disconnect the accelerator cable (9A758) from the throttle body (9E926).



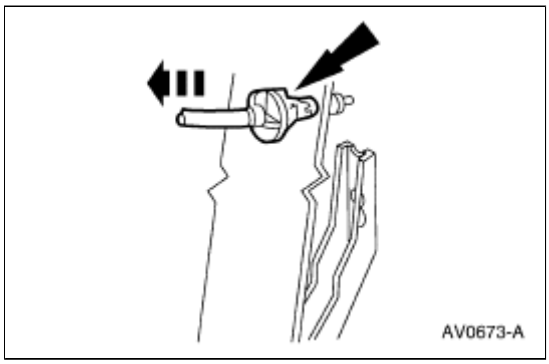
3. Separate the (B) accelerator cable from the (A) speed control actuator cable (9A825).



4. Disconnect the accelerator cable from the accelerator pedal and shaft (9725).

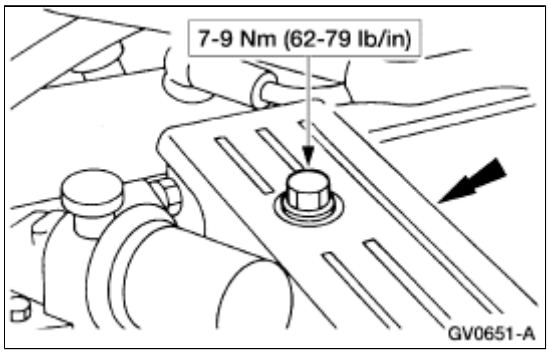


5. Collapse the clips at the dash panel and push the accelerator cable through the dash panel into the engine compartment and remove the accelerator cable.



Installation

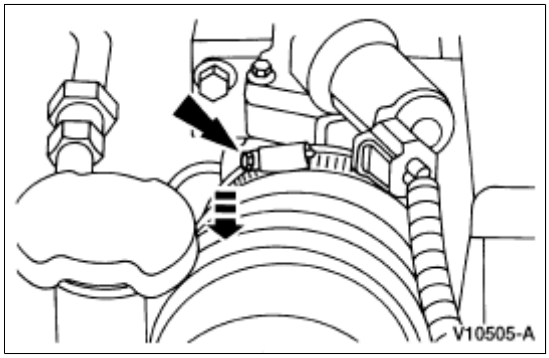
1. To install, reverse the removal procedure.



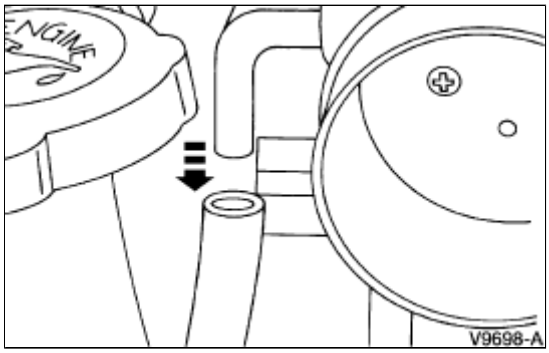
Cable Bracket —Accelerator, 5.0L

Removal

1. Loosen the engine air cleaner outlet tube clamp and remove the air cleaner outlet tube (9B659).

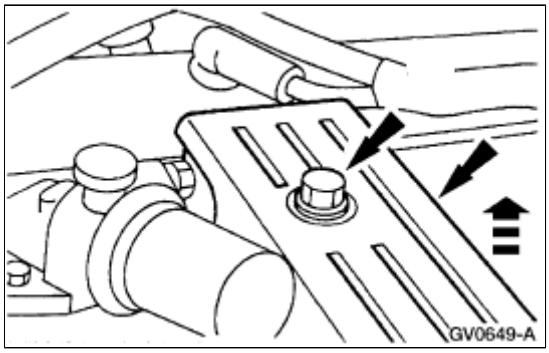


2. Disconnect the PCV vent hose.

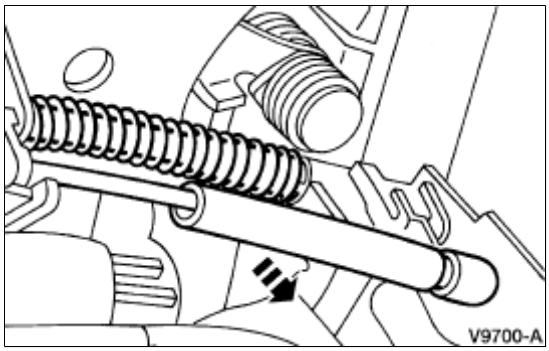


3. Disconnect the idle air control (IAC) valve electrical connector.

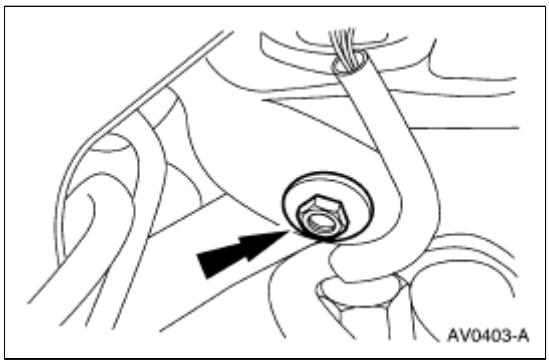
4. Remove the bolt and the accelerator control splash shield (9E766).



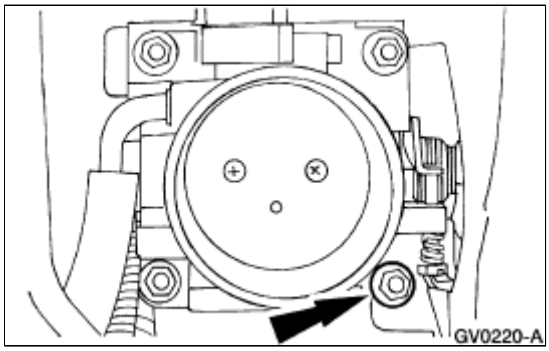
5. Disconnect the accelerator cable (9A758) from the throttle body (9E926).



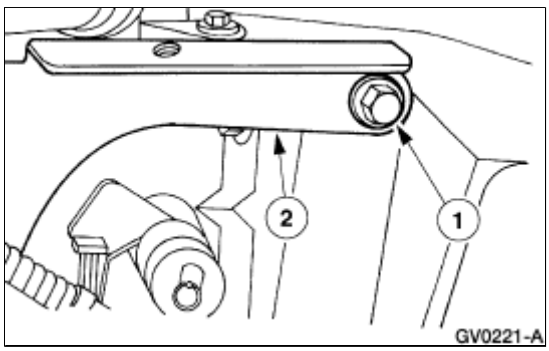
6. Remove the nut from the ignition coil bracket.



7. Remove the nut from the throttle body.

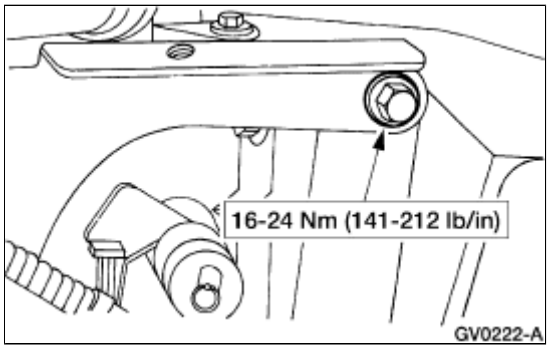


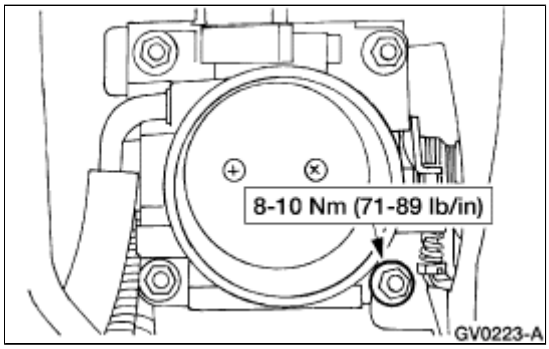
8. Remove the accelerator cable bracket (9723).
    1. Remove the bolt.
    2. Remove the accelerator cable bracket.

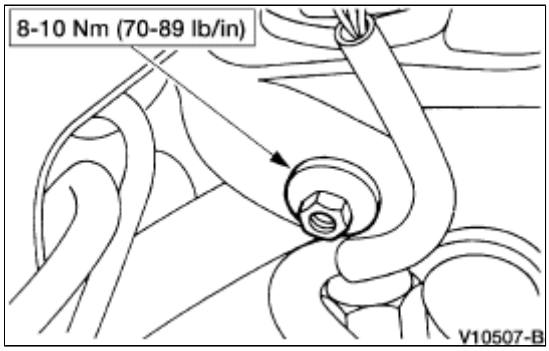


Installation

1. To install, reverse the removal procedure.







Torque Specifications

Description	Nm	lb-ft	lb-in
Accelerator Control Splash Shield Bolt (4.0L [Push Rod], 5.0L)	10	—	89
Accelerator Control Splash Shield Bolts (4.0L SOHC)	4	—	35
Battery Ground Cable	7-10	—	62-89
Deactivator Switch	15-20	11-15	—
Speed Control Actuator Cable Bolt	3.1-4.3	—	27-38
Speed Control Actuator Switch Screws	7	—	62
Speed Control Servo Bracket Bolt	9-12	7-9	—

Vehicle Speed Control

The vehicle speed control consists of the following components:

- speed control servo (9C735)
- speed control actuator cable (9A825)
- speed control indicator lamp
- speed control actuator switches (9D743)
- brake pedal position (BPP) switch (13480)
- deactivator switch
- anti-lock brake control module (2C018)
- clutch pedal position (CPP) switch

Vehicle Speed Control

Refer to Wiring Diagrams Cell 31 , Speed Control for schematic and connector information.

Special Tool(s)

 ST1137-A	73III Automotive Meter 105-R0057 or equivalent

Principles of Operation

The speed control system is designed to maintain vehicle speed above 48 km/h (30 mph). After the ON switch is depressed, depressing the SET/ACCEL switch will activate the speed control servo. To increase a set speed, either depress and hold for continuous acceleration, or momentarily tap the SET/ACCEL switch for 1.6 km/h (1 mph) acceleration increments. To decrease a set speed, depress and hold the COAST switch until the target speed is reached, or momentarily tap the COAST switch for 1.6 km/h (1 mph) deceleration increments. When the speed control system has been disabled by tapping the brake pedal, the RESUME switch can be depressed and the vehicle will return to the original set speed if the vehicle is traveling over 48 km/h (30 mph) and the OFF switch has not been depressed.

NOTE: The deactivator switch is provided as an additional safety feature. Normally, when the brake pedal is depressed, an electrical signal from the brake lamp circuit to the speed control servo will deactivate the system. Under increased brake pedal effort, the deactivator switch will open and remove power to the speed control servo, releasing the throttle independent of the speed control servo.

NOTE: The air bag sliding contact provides the electrical interface between the steering column wiring and the speed control actuator switches in the steering wheel.

The inputs to the speed control servo are:

- vehicle speed signal
- speed control actuator switches
- brake pedal position (BPP) switch
- clutch pedal position (CPP) switch
- deactivator switch

The outputs of the speed control servo are:

- speed control indicator
- speed control actuator cable controlling the throttle position

Inspection and Verification

Visual inspection is an important part of diagnosis. The inspection should be done to locate obvious reasons for customer concern.

When carrying out visual inspection, check all items for abnormal conditions. Look for such items as bare, broken or disconnected wires. For the speed control to function correctly, the speed control servo (9C735) (throttle actuator) and throttle linkage should operate freely and smoothly.

Any concerns found by the visual inspection should be corrected before further tests of the speed control system are made. The following items should be inspected.

- If the yellow ABS indicator in the instrument cluster stays illuminated when the ignition switch (11572) is in the RUN position, refer to Section 206-09 before continuing with the speed control diagnostics.
- Does the speedometer operate? If not, refer to Section 413-01 .
- Does the horn (13832) operate? If not, refer to Section 413-06 .
- Check the central junction box (CJB) Fuse 9 (7.5A), 10 (7.5A), and 13 (20A).

Check for unseated connectors at the speed control servo.

- Look for loose or unseated connector pins.
- Check for broken wires at the connectors.

The following items should be inspected before proceeding to the Symptom Chart.

- Misadjusted speed control actuator cable (9A825). If misadjustment is suspected, refer to Adjustments, Actuator Cable.
- Broken speed control actuator cable.
- Carry out Self-Test Diagnostics procedure before proceeding to the Symptom Chart.

Self-Test Diagnostics

WARNING: This test is a key on engine off (KOEO) test only that is conducted in PARK only with parking brake fully engaged.

- Enter Self-Test Diagnostics by depressing the speed control OFF switch while turning the ignition key ON, making sure the engine does not start and is not running. The speed control indicator lamp on the instrument panel will flash once to indicate that the speed control module entered the diagnostic mode.

NOTE: Five additional flashes at this point indicate a defective speed control servo. Release the OFF switch.

- Release the OFF switch.

- **NOTE:** If the ON switch is not pressed within five seconds after entering the diagnostic mode, the module times out and the procedure must be started over.

  Press the remaining switches in this sequence: ON, RSM (resume), CST (coast), and SET/ACCEL. The speed control indicator lamp will flash as each switch is pressed. Press each switch in the sequence immediately after the light goes out for the previous switch.
- A lamp flash with the last button (SET/ACCEL) indicates that the STATIC test passed. If the lamp

does not flash with the last button and there are no additional flashes of the lamp, the switch is defective. If the lamp does not flash with the last button, and additional flashes occur, follow the chart below for trouble codes:
    - Two flashes - Brake pedal position (BPP) switch is defective, circuit is defective, or brake pedal is applied; clutch pedal position (CPP) switch is defective, circuit is defective, or clutch pedal is applied.
    - Three flashes - Brake deactivation switch is open or circuit is defective.
    - Four flashes - Vehicle speed signal is out of range or circuit is defective.
- Immediately after the static test has passed, the speed servo will then carry out a dynamic test automatically by actuating the throttle lever from 1mm to 10 mm of travel from the idle position. During the dynamic throttle pull, observe the throttle movement to witness any binding or sticking of actuator cable, correct connection of actuator cable to throttle lever, and make sure the throttle returns back to idle position. If incorrect connection and/or binding or sticking of actuator is observed, go to the Symptom Chart. If dynamic pull at the throttle body is observed, Go To Pinpoint Test A .
- Return the ignition switch to the OFF position and proceed to the Symptom Chart.

Symptom Chart

NOTE: Self-Test Diagnostics must be carried out before proceeding to the Symptom Chart.

Symptom Chart

Condition	Possible Sources	Action
• Flash code 1 — system pass	• —	• System Pass.
• Flash code 1 — no dynamic pull at throttle body	• Speed control actuator cable. • Speed control servo.	• GO to Pinpoint Test A .
• Flash code 1 — speed control inoperative	• Circuitry. • Speed control servo.	• GO to Pinpoint Test D .
• Flash code 2 — BBP switch circuit failure	• Circuitry. • BPP switch. • CPP switch or jumper. • Speed control servo.	• GO to Pinpoint Test B .
• Flash code 3 — deactivator switch	• CJB Fuse 13 (20A). • Circuitry. • Deactivator switch. • Speed control servo.	• GO to Pinpoint Test C .
• Flash code 4 — speed signal circuit failure	• Circuitry. • Speed control servo. • Anti-lock brake control module.	• GO to Pinpoint Test D .
• Flash code 5	• Speed control servo.	• INSTALL a new speed control servo; REFER to Actuator—Speed Control Servo . TEST the system for normal operation.

• The speed control is inoperative — no flash codes	• CJB Fuse 10 (7.5A). • Circuitry. • BPP switch. • Speed control actuator switches (9D743). • Anti-lock brake control module. • Speed control servo.	• GO to Pinpoint Test E .
• The speed control does not disengage when the clutch is applied	• BPP switch. • CPP switch (M/T). • Circuitry.	• GO to Pinpoint Test F .
• The speed control switch is inoperative — COAST	• Speed control actuator switch. • Speed control servo.	• GO to Pinpoint Test G .
• The speed control switch is inoperative — SET/ACCEL	• Speed control actuator switches. • Speed control servo.	• GO to Pinpoint Test H .
• The speed control switch is inoperative — RESUME	• Speed control actuator switch. • Speed control servo.	• GO to Pinpoint Test J .
• The speed control switch is inoperative — OFF	• Speed control actuator switch. • Speed control servo.	• GO to Pinpoint Test K .
• The speed control indicator lamp is always on	• Circuitry. • Speed control servo. • Instrument cluster.	• GO to Pinpoint Test L .
• The speed control indicator is inoperative	• Circuitry. • Bulb. • Instrument cluster. • Speed control servo.	• REFER to Section 413-01 .
• The set speed fluctuates	• Anti-lock brake control module. • Speed control servo. • Speed control actuator switch. • Circuitry. • Speed control actuator cable. • Engine (6007).	• GO to Pinpoint Test M . • REFER to Powertrain

		Control/Emissions Diagnosis (PC/ED) manual. REPAIR engine as necessary.

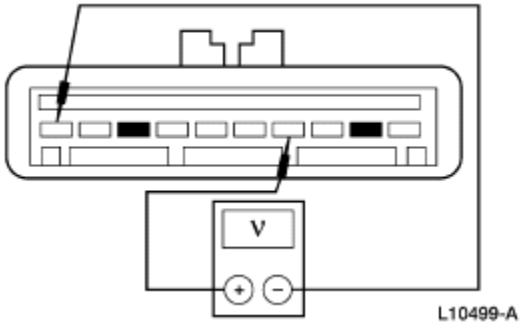
Pinpoint Tests

PINPOINT TEST A: FLASH CODE 1 — NO DYNAMIC PULL AT SPEED CONTROL SERVO

CONDITIONS	DETAILS/RESULTS/ACTIONS
A1 CHECK THE SPEED CONTROL ACTUATOR CABLE	
	1 Check the speed control actuator cable for attachment at both the speed control servo and the throttle. • **Is the speed control actuator cable attached at both the speed control servo and the throttle?** → **Yes** GO to A2 . → **No** CONNECT the speed control actuator cable. TEST the system for normal operation.
A2 CHECK FOR CORRECT AMOUNT OF SLACK IN SPEED CONTROL ACTUATOR CABLE	
	1 Remove the speed control actuator cable from the throttle. 2 Check for correct amount of slack in the speed control actuator cable. • **Is there approximately 3mm of slack in the cable?** → **Yes** GO to A3 . → **No** ADJUST the speed control actuator cable slack to approximately 3mm. REFER to Cable Adjustment—4.0L SOHC Shown (5.0L and 4.0L Push Rod Similar) . TEST the system for normal operation.
A3 CHECK FOR A STICKING OR BINDING SPEED CONTROL ACTUATOR	
	1 Disconnect the speed control actuator cable from the speed control servo. 2 Check the speed control actuator cable for sticking or binding. • **Is the speed control actuator cable OK?** → **Yes** INSTALL a new speed control servo; REFER to Actuator—Speed Control Servo . TEST the system for normal operation.

	→ **No** REPAIR or INSTALL a new speed control actuator cable; REFER to Actuator Cable—4.0L or Actuator Cable—5.0L Shown, 4.0L (Push Rod) Similar . TEST the system for normal operation.

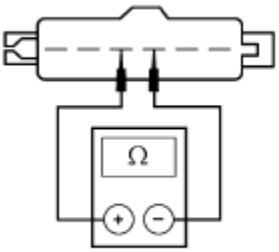
PINPOINT TEST B: FLASH CODE 2 — BRAKE PEDAL POSITION SWITCH CIRCUIT FAILURE

CONDITIONS	DETAILS/RESULTS/ACTIONS
B1 CHECK THE BRAKE PEDAL POSITION (BPP) SWITCH CIRCUITRY	
1  2  Speed Control Servo C171 3  4  	4 Measure the voltage between speed control servo C171 Pin 4, Circuit 306 (TN/LB), harness side and speed control servo C171 Pin 10, Circuit 57 (BK), harness side. • **Is voltage present?** → **Yes** GO to B7 . → **No** If the vehicle is equipped with automatic transmission with high series console, GO to B5 . If the vehicle is equipped with a manual transmission or automatic transmission without high series console, GO to B2 .
B2 CHECK THE CLUTCH PEDAL POSITION (CPP) SWITCH	
1	

2

CPP Switch or Jumper C209

3



GV1098-A

3 Measure the resistance between CPP switch or jumper Pin 3 (component side), and CPP switch or jumper Pin 4, (component side).

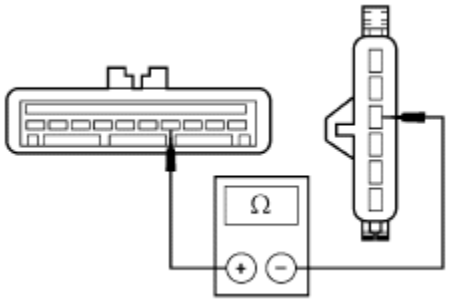
- **Is the resistance less than 5 ohms?**

→ **Yes**
GO to B3 .

→ **No**
INSTALL a new CPP switch or jumper. TEST the system for normal operation.

B3 CHECK CIRCUIT 306 (TN/LB) FOR AN OPEN

1



GV1038-A

1 Measure the resistance between speed control servo C171 Pin 4, Circuit 306 (TN/LB), harness side and CPP switch or jumper C209 Pin 3, Circuit 306 (TN/LB), harness side.

- **Is the resistance less than 5 ohms?**

→ **Yes**
GO to B4 .

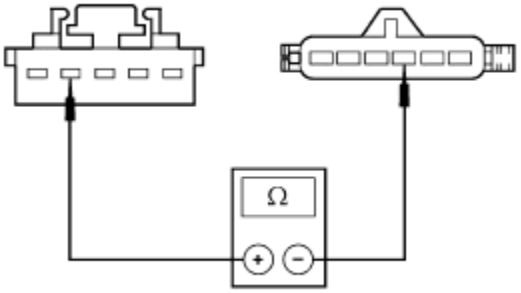
→ **No**
REPAIR the circuit. TEST the system for normal operation.

B4 CHECK CIRCUIT 810 (RD/LG) FOR AN OPEN

1

BPP Switch C224

2



2 Measure the resistance between CPP switch or jumper C209 Pin 4, Circuit 810 (RD/LG), harness side and BPP switch C224 Pin 2, Circuit 810 (RD/LG), harness side.

- **Is the resistance less than 5 ohms?**

→ **Yes**
GO to B6 .

→ **No**
REPAIR the circuit. TEST the system for normal operation.

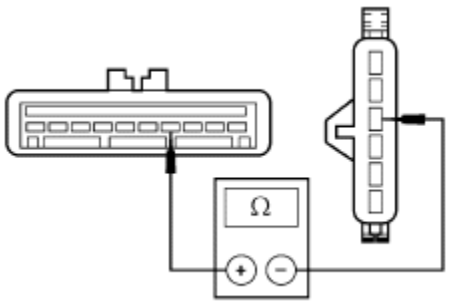
B5 CHECK CIRCUIT 810 (RD/LG) AND CIRCUIT 306 (TN/LB) FOR AN OPEN

1

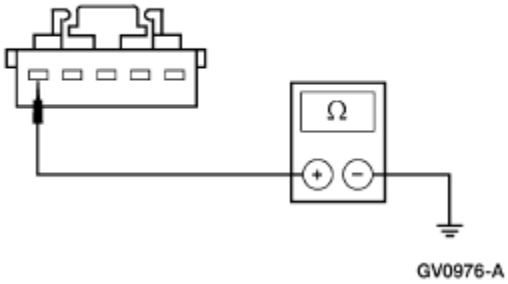
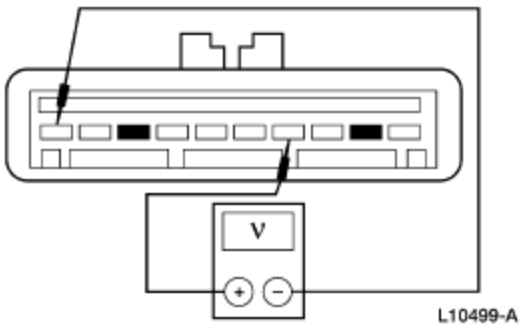
2

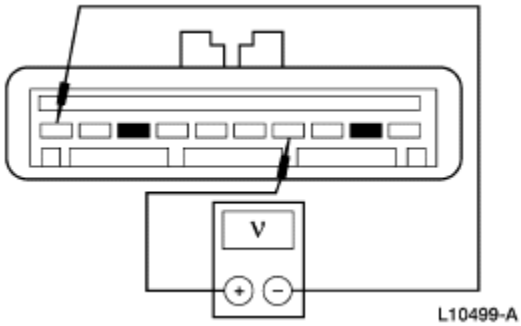
BPP Switch C224

3



3 Measure the resistance between speed control servo C171 Pin 4, Circuit 306 (TN/LB), harness side and BPP switch C224 Pin 2, Circuit 810 (RD/LG), harness side.

	• **Is the resistance less than 5 ohms?** → **Yes** GO to B6 . → **No** REPAIR Circuit 810 (RD/LG) or Circuit 306 (TN/LB). TEST the system for normal operation.
B6 CHECK CIRCUIT 57 (BK) AT BPP SWITCH	
1  GV0976-A	1 Measure the resistance between BPP switch C224 Pin 1, Circuit 57 (BK), harness side and ground. • **Is the resistance less than 5 ohms?** → **Yes** INSTALL a new BPP switch; REFER to Section 417-01 . TEST the system for normal operation. → **No** REPAIR Circuit 57 (BK). TEST the system for normal operation.
B7 CHECK THE BPP SWITCH	
1  BPP Switch C224 2  L10499-A	2 Measure the voltage between speed control servo C171 Pin 4, Circuit 306 (TN/LB), harness side and speed control servo C171 Pin 10, Circuit 57 (BK), harness side.

	• **Is voltage present?** → **Yes** If the vehicle is equipped with automatic transmission with high series console, REPAIR Circuit 810 (RD/LG) or Circuit 306 (TN/LB). If the vehicle is equipped with a manual transmission or automatic transmission without high series console, GO to B8 . → **No** INSTALL a new BPP switch; REFER to Section 417-01 . TEST the system for normal operation.
B8 CHECK CIRCUIT 306 (TN/LB) FOR SHORT TO POWER	
1  CPP Switch or Jumper C209 2  	2 Measure the voltage between speed control servo C171 Pin 4, Circuit 306 (TN/LB), harness side and speed control servo C171 Pin 10, Circuit 57 (BK), harness side. • **Is voltage present?** → **Yes** REPAIR Circuit 810 (RD/LG). TEST the system for normal operation. → **No** REPAIR Circuit 306 (TN/LB). TEST the system for normal operation.

PINPOINT TEST C: FLASH CODE 3 — DEACTIVATOR SWITCH CIRCUIT FAILURE

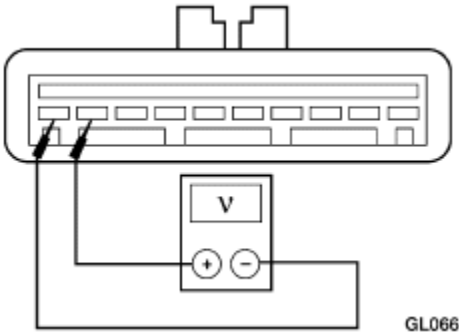
CONDITIONS	DETAILS/RESULTS/ACTIONS
C1 CHECK THE DEACTIVATOR SWITCH CIRCUITRY	
1	

2

Speed Control Servo C171

3

4



4 Measure the voltage between speed control servo C171 Pin 9, Circuit 307 (BK/YE), harness side and speed control servo C171 Pin 10, Circuit 57 (BK), harness side.

- **Is the voltage greater than 10 volts?**

→ **Yes**
INSTALL a new speed control servo; REFER to Actuator—Speed Control Servo . TEST the system for normal operation.

→ **No**
GO to C2 .

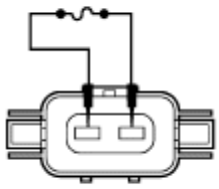
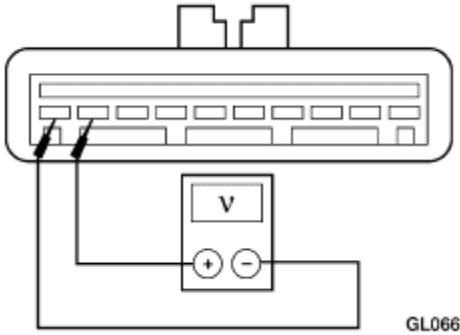
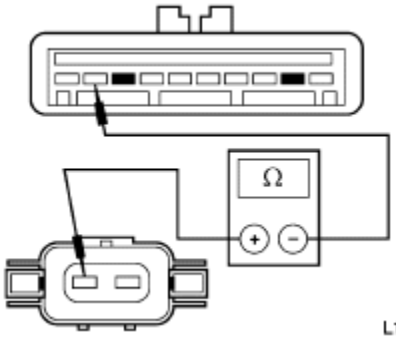
C2 CHECK THE DEACTIVATOR SWITCH

1

2

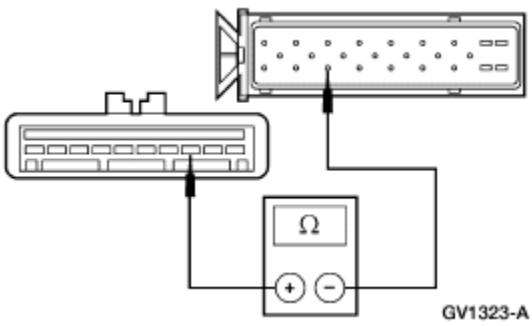
Deactivator Switch C102

3

4  GV1322-A	4 Connect a 10A fused jumper wire between deactivator switch C102, Circuit 10 (LG/RD), harness side and deactivator switch C102, Circuit 307 (BK/YE), harness side.
5  GL0666-A	5 Measure the voltage between speed control servo C171 Pin 9, Circuit 307 (BK/YE), harness side and speed control servo C171 Pin 10, Circuit 57 (BK), harness side. • **Is the voltage greater than 10 volts?** → **Yes** INSTALL a new deactivator switch; REFER to Switch—Deactivator . TEST the system for normal operation. → **No** GO to C3 .
C3 CHECK CIRCUIT 307 (BK/YE) FOR AN OPEN	
1  L10503-A	1 Measure the resistance between speed control servo C171 Pin 9, Circuit 307 (BK/YE), harness side and deactivator switch C102, Circuit 307 (BK/YE), harness side. • **Is the resistance less than 5 ohms?** → **Yes** REPAIR Circuit 10 (LG/RD). TEST the system for normal operation.

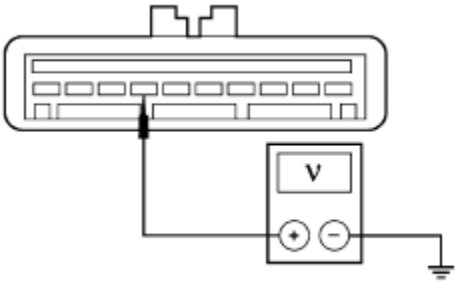
	→ **No** REPAIR Circuit 307 (BK/YE). TEST the system for normal operation.

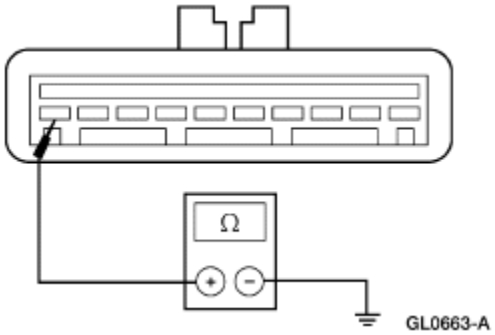
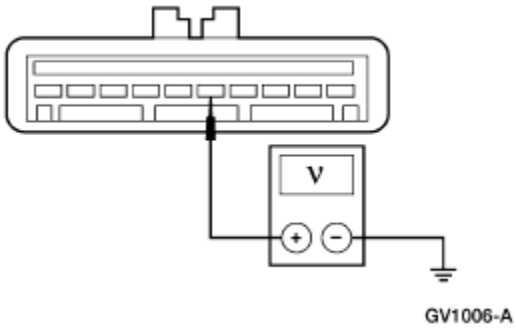
PINPOINT TEST D: FLASH CODE 1 — SPEED CONTROL INOPERATIVE

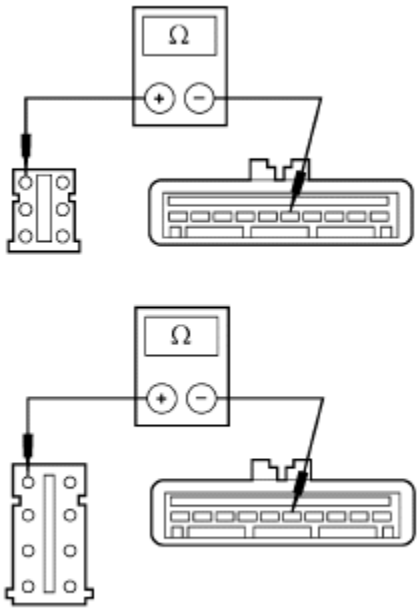
CONDITIONS	DETAILS/RESULTS/ACTIONS
D1 CHECK THE SPEEDOMETER OPERATION	
	1 Check the speedometer for correct operation by driving the vehicle. • **Does the speedometer operate correctly?** → **Yes** GO to D2 . → **No** REFER to Section 413-01 .
D2 CHECK CIRCUIT 679 (GY/BK) FOR AN OPEN	
1  2  Speed Control C171 3  Anti-Lock Brake Control Module C186 4  GV1323-A	4 Measure the resistance between anti-lock brake control module C186 Pin 19, Circuit 679 (GY/BK), harness side and the speed control servo C171 Pin 3, Circuit 679 (GY/BK), harness side.

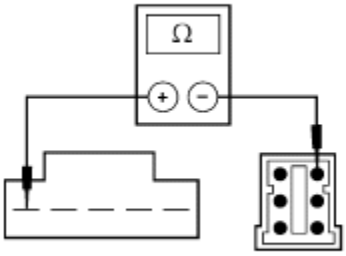
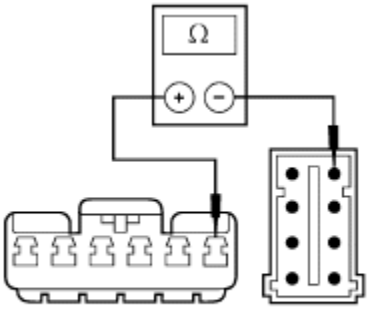
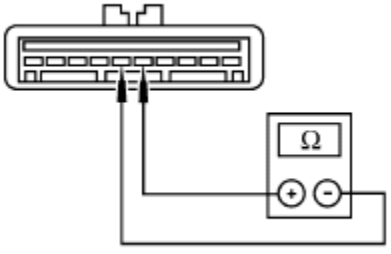
	• **Is the resistance less than 5 ohms?** → **Yes** INSTALL a new speed control servo; REFER to Actuator—Speed Control Servo . TEST the system for normal operation. → **No** REPAIR circuit 679 (GY/BK). TEST the system for normal operation.

PINPOINT TEST E: THE SPEED CONTROL IS INOPERATIVE — NO FLASH CODES

CONDITIONS	DETAILS/RESULTS/ACTIONS
E1 CHECK CIRCUIT 1003 (GY/YE) FOR AN OPEN	
1  2  Speed Control Servo C171 3  4  GV1005-A	4 Measure the voltage between speed control servo C171 Pin 7, Circuit 1003 (GY/YE), harness side and ground. • **Is the voltage greater than 10 volts?** → **Yes** GO to E2 . → **No**

	REPAIR the circuit. TEST the system for normal operation.
E2 CHECK CIRCUIT 57 (BK) FOR AN OPEN	
1  2  	2 Measure the resistance between speed control servo C171 Pin 10, Circuit 57 (BK), harness side and ground. • **Is the resistance less than 5 ohms?** → **Yes** GO to E3 . → **No** REPAIR the circuit. TEST the system for normal operation.
E3 CHECK THE SPEED CONTROL ACTUATOR SWITCH CIRCUITRY	
1  2  	2 Measure the voltage between speed control servo C171 Pin 5, Circuit 151 (LB/BK), harness side and ground, while pressing the speed control actuator switch ON. • **Is the voltage greater than 10 volts?** → **Yes** GO to E6 .

	→ **No** GO to E4 .
E4 CHECK CIRCUIT 151 (LB/BK) FOR AN OPEN	
1  2  Air Bag Sliding Contact C220 3  GV1039-A	3 **NOTE:** If the vehicle is equipped with remote audio/climate controls, C220 is an eight pin connector and if the vehicle is not equipped with remote audio/climate controls, C220 is a six pin connector. Measure the resistance between air bag sliding contact C220F Pin 1, Circuit 151 (LB/BK), harness side and speed control servo C171 Pin 5, Circuit 151 (LB/BK), harness side. • **Is the resistance less than 5 ohms?** → **Yes** GO to E5 . → **No** REPAIR the circuit. TEST the system for normal operation.
E5 CHECK THE AIR BAG SLIDING CONTACT	
	1 Remove the driver side air bag. Refer to Section 501-20B .

2   GV1041-B	2 If not equipped with remote audio/climate controls, measure the resistance between top of air bag sliding contact Pin 1 (component side), and air bag sliding contact C220M Pin 1 (component side). If equipped with remote audio/climate controls, measure the resistance between top of air bag sliding contact Pin 6 (component side), and air bag sliding contact C220M Pin 1 (component side). • **Is the resistance less than 1 ohm?** → **Yes** If not equipped with remote audio/climate controls, INSTALL a new speed control actuator switch; REFER to Switch—Speed Control Actuator (Without Remote Audio/Climate Controls) . TEST the system for normal operation. If equipped with remote audio/climate controls, GO to E7 . → **No** INSTALL a new air bag sliding contact; REFER to Section 501-20B . TEST the system for normal operation.
E6 CHECK THE SPEED CONTROL ACTUATOR SWITCH OPERATION	
1  DL0037-A	1 Measure the resistance between speed control servo C171 Pin 5, Circuit 151 (LB/PK), harness side and speed control servo C171 Pin 6, Circuit 848 (DG/OG), harness side while pressing the speed control actuator switch OFF.

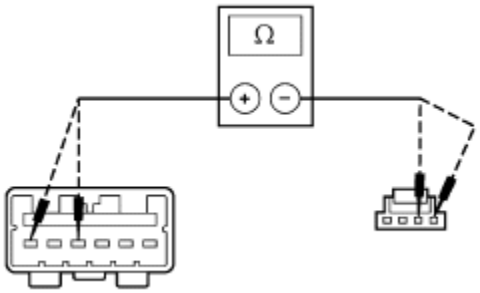
- **Is the resistance less than 5 ohms?**

→ **Yes**
GO to E8 .

→ **No**
If not equipped with remote audio/climate controls, INSTALL a new speed control actuator switch; REFER to Switch—Speed Control Actuator (Without Remote Audio/Climate Controls) . TEST the system for normal operation. If equipped with remote audio/climate controls, GO to E7 .

E7 CHECK THE SPEED CONTROL ACTUATOR SWITCH WIRE HARNESS

1



1 Measure the resistance between top of air bag sliding contact connector, and speed control actuator switch connector as follows:

Top of Air Bag Sliding Contact Connector	Speed Control Actuator Switch Connector
Pin 6	Pin 1
Pin 4	Pin 2

- **Are the resistances less than 5 ohms?**

→ **Yes**
INSTALL a new speed control actuator switch; REFER to Switch—Speed Control Actuator (With Remote Audio/Climate Controls) . TEST the system for normal operation.

→ **No**
INSTALL a new speed control actuator switch wire harness. TEST the system for normal operation.

E8 CHECK CIRCUIT 679 (GY/BK) FOR AN OPEN

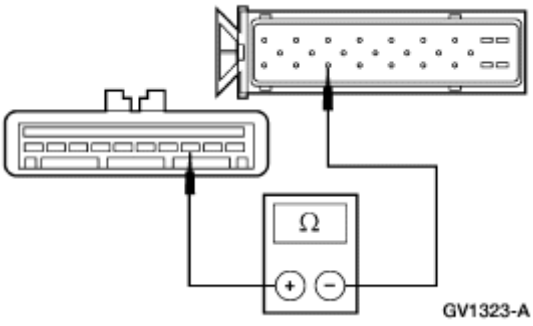
1

2

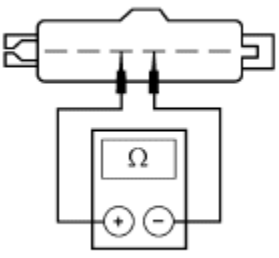
Anti-Lock Brake Control Module C186

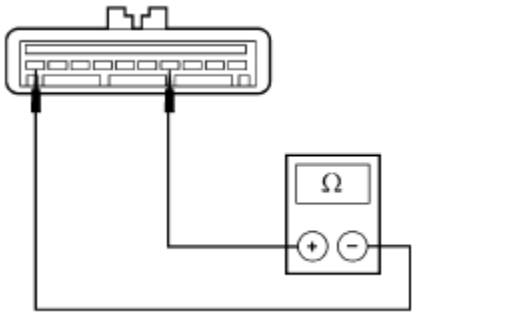
3

3 Measure the resistance between anti-lock

	brake control module C186 pin 19, circuit 679 (GY/BK), harness side and the speed control servo C171 pin 3, circuit 679 (GY/BK), harness side. • **Is the resistance less than 5 ohms?** → **Yes** INSTALL a new speed control servo; REFER to Actuator—Speed Control Servo . TEST the system for normal operation. → **No** REPAIR circuit 679 (GY/BK). TEST the system for normal operation.

PINPOINT TEST F: THE SPEED CONTROL DOES NOT DISENGAGE WHEN THE CLUTCH IS APPLIED

CONDITIONS	DETAILS/RESULTS/ACTIONS
F1 CHECK THE CPP SWITCH	
1  2  CPP Switch C209 3 	3 Measure the resistance between CPP switch Pin 3 (component side), and CPP switch Pin 4 (component side), while pressing the clutch pedal. • **Is the resistance greater than 10,000**

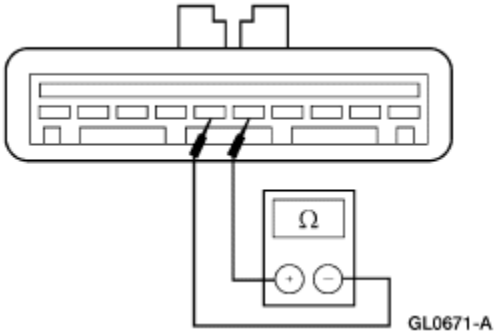
	ohms? → **Yes** GO to F2 . → **No** INSTALL a new CPP switch. TEST the system for normal operation.
F2 CHECK CIRCUIT 306 (TN/LB) FOR SHORT TO GROUND	
1  Speed Control Servo C171 2  GV1165-A	2 Measure the resistance between speed control servo C171 Pin 4, Circuit 306 (TN/LB), harness side and ground. • **Is the resistance greater than 10,000 ohms?** → **Yes** INSTALL a new speed control servo; REFER to Actuator—Speed Control Servo . TEST the system for normal operation. → **No** REPAIR Circuit 306 (TN/LB). TEST the system for normal operation.

PINPOINT TEST G: THE SPEED CONTROL SWITCH IS INOPERATIVE — COAST

CONDITIONS	DETAILS/RESULTS/ACTIONS
G1 CHECK THE SPEED CONTROL ACTUATOR SWITCH	
1  2	

Speed Control Servo C171

3



3 Measure the resistance between speed control servo C171 Pin 5, Circuit 151 (LB/BK), harness side and speed control servo C171 Pin 6, Circuit 848 (DG/OG), harness side, while pressing the speed control actuator switch COAST.

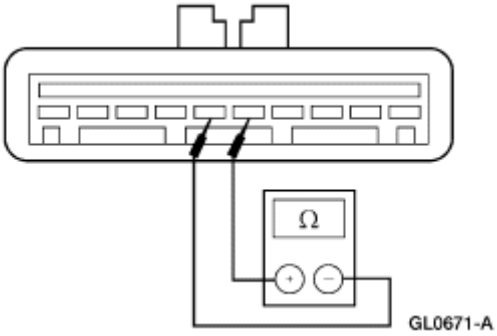
- **Is the resistance between 108 and 132 ohms?**

→ **Yes**
INSTALL a new speed control servo; REFER to Actuator—Speed Control Servo . TEST the system for normal operation.

→ **No**
INSTALL a new speed control actuator switch; REFER to Switch—Speed Control Actuator (Without Remote Audio/Climate Controls) or REFER to Switch—Speed Control Actuator (With Remote Audio/Climate Controls) . TEST the system for normal operation.

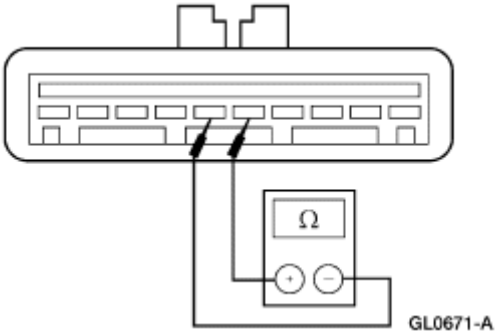
PINPOINT TEST H: THE SPEED CONTROL SWITCH IS INOPERATIVE — SET/ACCEL

CONDITIONS	DETAILS/RESULTS/ACTIONS
H1 CHECK THE SPEED CONTROL ACTUATOR SWITCH	
1  2  Speed Control Servo C171 3	3 Measure the resistance between speed control servo C171 Pin 5, Circuit 151 (LB/BK), harness side and speed control servo C171

	Pin 6, Circuit 848 (DG/OG), harness side, while pressing the speed control actuator switch SET/ACCEL. • **Is the resistance between 612 and 748 ohms?** → **Yes** INSTALL a new speed control servo; REFER to Actuator—Speed Control Servo . TEST the system for normal operation. → **No** INSTALL a new speed control actuator switch; REFER to Switch—Speed Control Actuator (Without Remote Audio/Climate Controls) or REFER to Switch—Speed Control Actuator (With Remote Audio/Climate Controls) . TEST the system for normal operation.

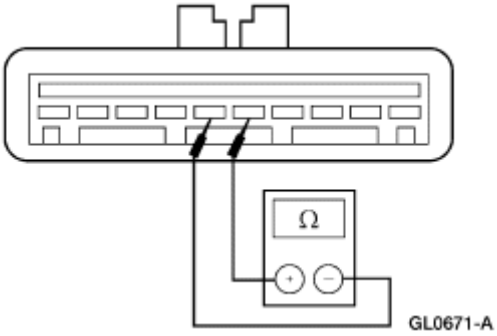
PINPOINT TEST J: THE SPEED CONTROL SWITCH IS INOPERATIVE — RESUME

CONDITIONS	DETAILS/RESULTS/ACTIONS
J1 CHECK THE SPEED CONTROL ACTUATOR SWITCH	
1  2  Speed Control Servo C171 3	3 Measure the resistance between speed control servo C171 Pin 5, Circuit 151 (LB/BK), harness side and speed control servo C171 Pin 6, Circuit 848 (DG/OG), harness side, while pressing the speed control actuator switch RESUME.

	• **Is the resistance between 1,980 and 2,420 ohms?** → **Yes** INSTALL a new speed control servo; REFER to Actuator—Speed Control Servo . TEST the system for normal operation. → **No** INSTALL a new speed control actuator switch; REFER to Switch—Speed Control Actuator (Without Remote Audio/Climate Controls) or REFER to Switch—Speed Control Actuator (With Remote Audio/Climate Controls) . TEST the system for normal operation.

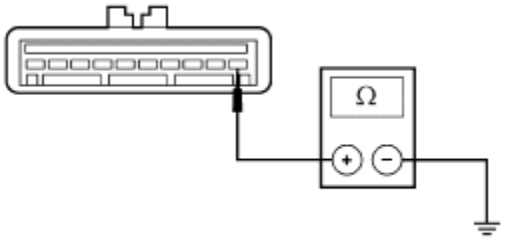
PINPOINT TEST K: THE SPEED CONTROL SWITCH IS INOPERATIVE — OFF

CONDITIONS	DETAILS/RESULTS/ACTIONS
K1 CHECK THE SPEED CONTROL ACTUATOR SWITCH	
1  2  Speed Control Servo C171 3	3 Measure the resistance between speed control servo C171 Pin 5, Circuit 151 (LB/BK), harness side and speed control servo C171 Pin 6, Circuit 848 (DG/OG), harness side, while pressing the speed control actuator switch OFF.

	• **Is the resistance less than 5 ohms?** → **Yes** INSTALL a new speed control servo; REFER to Actuator—Speed Control Servo . TEST the system for normal operation. → **No** INSTALL a new speed control actuator switch; REFER to Switch—Speed Control Actuator (Without Remote Audio/Climate Controls) or REFER to Switch—Speed Control Actuator (With Remote Audio/Climate Controls) . TEST the system for normal operation.

PINPOINT TEST L: THE SPEED CONTROL INDICATOR LAMP IS ALWAYS ON

CONDITIONS	DETAILS/RESULTS/ACTIONS
L1 CHECK SPEED CONTROL SERVO FOR SHORT TO GROUND	
1  2  Speed Control Servo C171 3 	• **Is the indicator lamp illuminated?** → **Yes** GO to L2 .

	→ **No** INSTALL a new speed control actuator switch; REFER to Switch—Speed Control Actuator (Without Remote Audio/Climate Controls) or REFER to Switch—Speed Control Actuator (With Remote Audio/Climate Controls) . TEST the system for normal operation.
L2 CHECK CIRCUIT 203 (OG/LB) FOR SHORT TO GROUND	
1  2  Instrument Cluster C286 3  GV0981-A	3 Measure the resistance between speed control servo C171 Pin 1, Circuit 203 (OG/LB), harness side and ground. • **Is the resistance greater than 10,000 ohms?** → **Yes** INSTALL a new instrument cluster printed circuit; REFER to Section 413-01 . TEST the system for normal operation. → **No** REPAIR the circuit. TEST the system for normal operation.

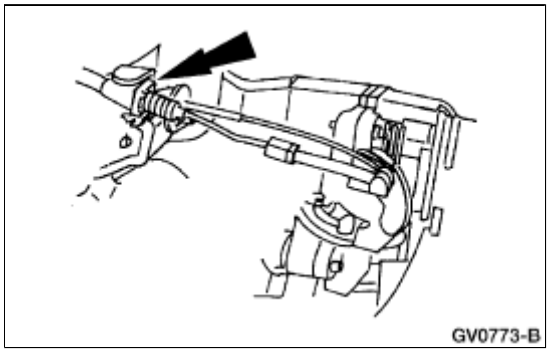
PINPOINT TEST M: THE SET SPEED FLUCTUATES

CONDITIONS	DETAILS/RESULTS/ACTIONS
M1 CHECK THE SPEED CONTROL ACTUATOR CABLE/THROTTLE BODY LINKAGE	
1	

	2 Remove the speed control actuator cable from the speed control servo. Visually inspect the core wire and check the speed control actuator cable by pulling on it and noting the throttle movement. • **Is the speed control actuator cable OK?** → **Yes** GO to M2 . → **No** INSTALL a new speed control actuator cable or REFER to Section 310-02 for repair of the throttle body linkage. TEST the system for normal operation.
M2 CHECK THE SPEEDOMETER OPERATION	
	1 Drive the vehicle at a steady speed and observe the speedometer operation. • **Does the speedometer needle fluctuate?** → **Yes** REFER to Section 413-01 . → **No** GO to A2 .

Cable Adjustment —4.0L SOHC Shown (5.0L and 4.0L Push Rod Similar)

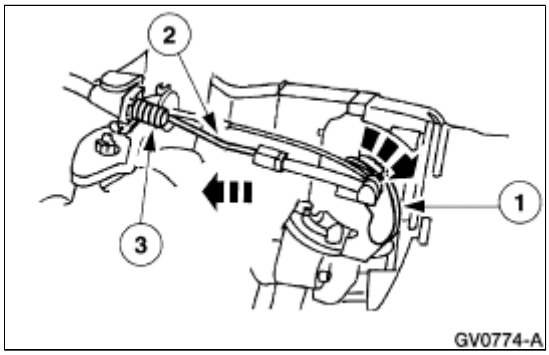
1. Remove the speed control actuator cable clip.



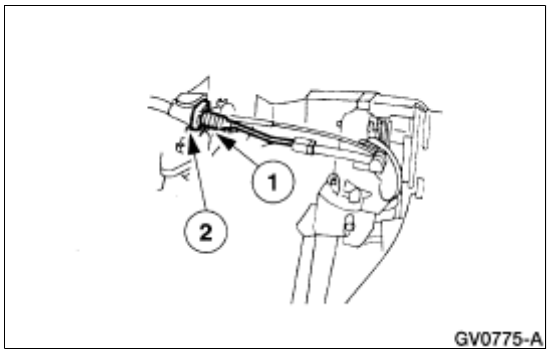
2. **NOTE:** The speed control actuator cable must not be pulled tight for proper operation.

   NOTE: The throttle body cam will automatically spring set to the closed position. The throttle body cam must be in the closed position.

   Adjust the speed control actuator cable.
   1. Make sure the throttle body cam is in the closed position.
   2. Pull on the speed control actuator cable to remove any slack.
   3. Back off the speed control actuator cable one notch.



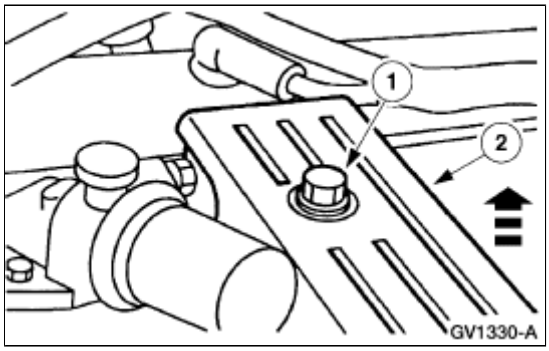
3. Install the speed control actuator cable clip.
   1. Hold the speed control actuator cable.
   2. Insert the speed control actuator clip securely.


1
2
GV0775-A

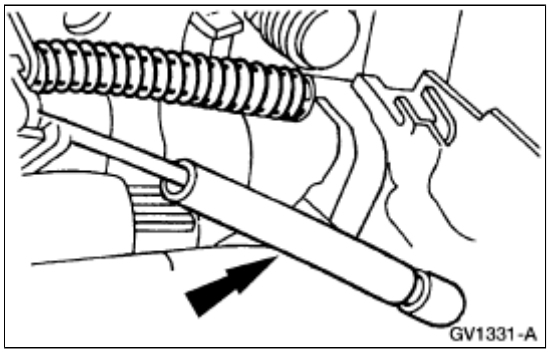
Actuator Cable —5.0L Shown, 4.0L (Push Rod) Similar

Removal

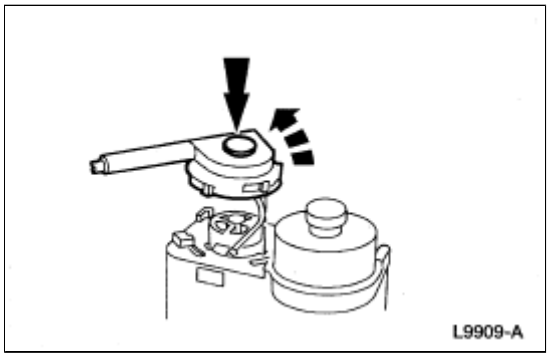
1. Remove the accelerator control splash shield.
    1. Remove the bolt.
    2. Remove the splash shield.



2. Remove the speed control cable from the accelerator bracket.

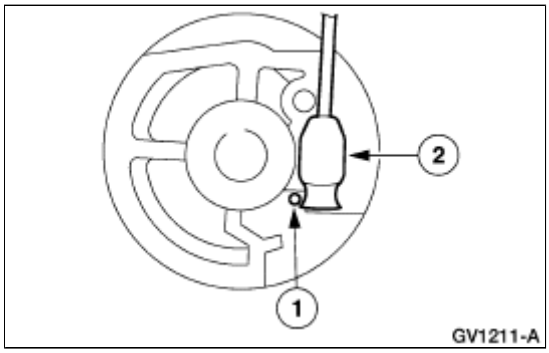


3. Remove the speed control actuator cable cap from the speed control servo (9C735).
    - Push in the locking arm on the speed control actuator cable cap then rotate the cap counterclockwise.



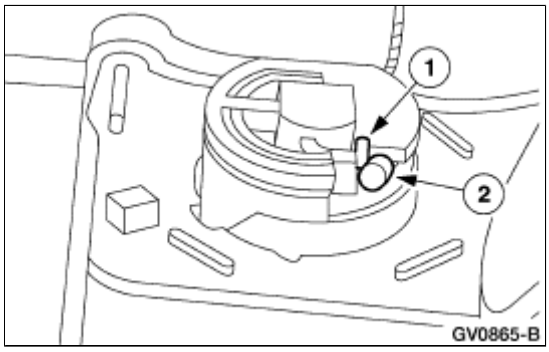
4. Disconnect the speed control core wire end from the speed control servo pulley.

1. Depress the spring retainer.
2. Slide the core wire end out of the speed control servo pulley.



Installation

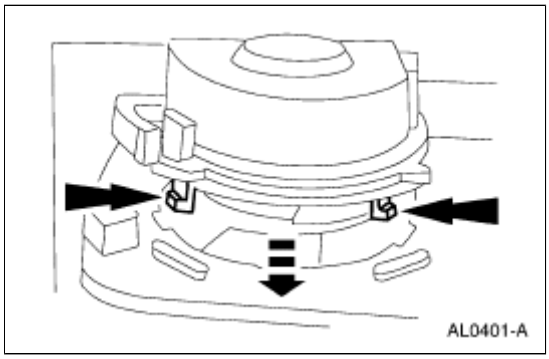
1. Insert the speed control cable slug into the speed control servo pulley slot.
   1. Gently compress the speed control servo spring.
   2. Insert the speed control cable slug into the speed control servo pulley slot.



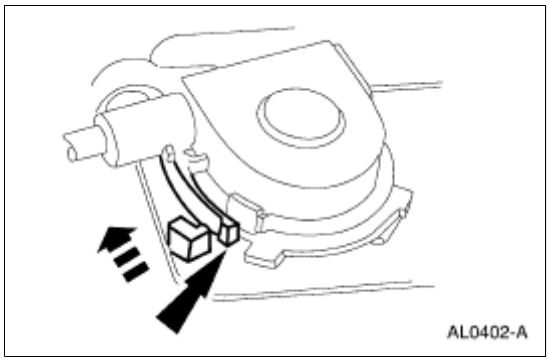
2. **WARNING: Incorrect wrapping of the speed control actuator cable around the speed control servo pulley may result in a high idle condition.**

   NOTE: Make sure the rubber seal is fully seated onto the speed control actuator cable cap.

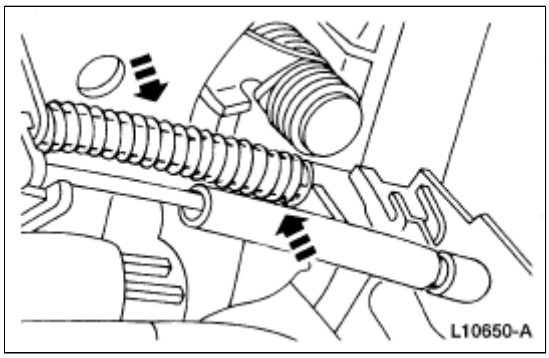
   Release the compressed spring while aligning the speed control actuator cable cap tabs with the slots in the speed control servo housing.



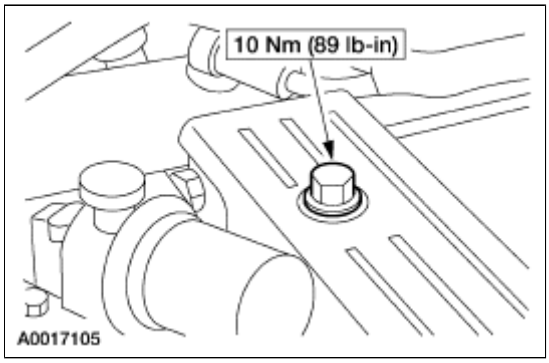
3. Rotate the speed control actuator cable cap until the locking arm engages.



4. Snap the speed control actuator cable and the accelerator cable together in the clip and install the cables onto the accelerator cable bracket (9723).



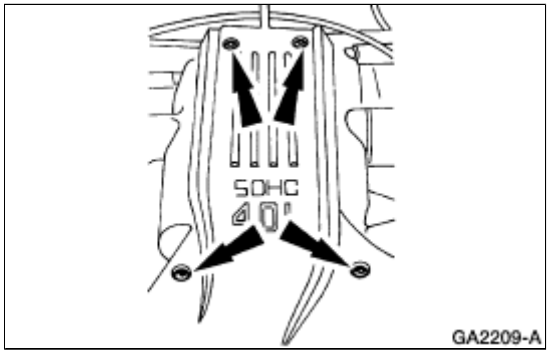
5. Position the accelerator control splash shield and install the bolt.



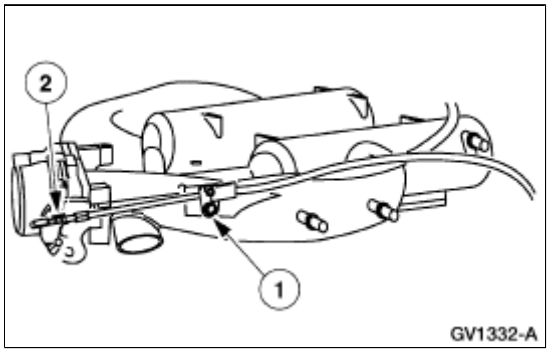
Actuator Cable —4.0L

Removal

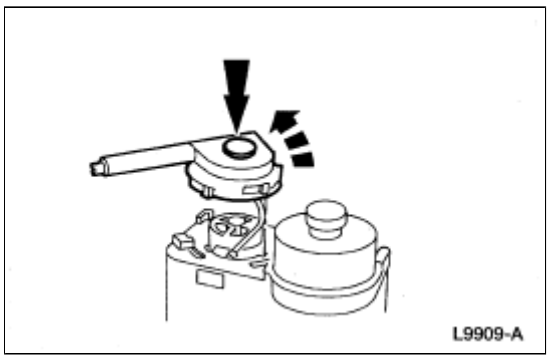
1. Remove the accelerator control splash shield.
   - Remove the bolts.



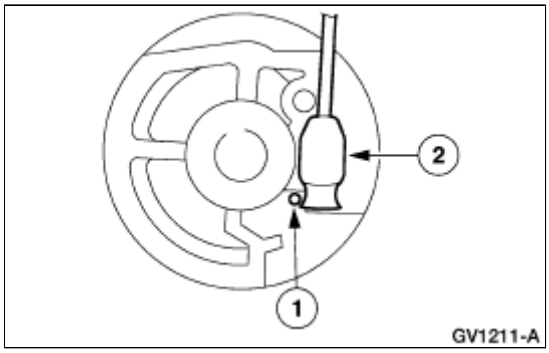
2. Remove the speed control actuator cable (9A825).
   1. Remove the bolt.
   2. Remove the speed control actuator cable from the throttle linkage.



3. Remove the speed control actuator cable cap from the speed control servo (9C735).
   - Push in the locking arm on the speed control actuator cable cap then rotate the cap counterclockwise.

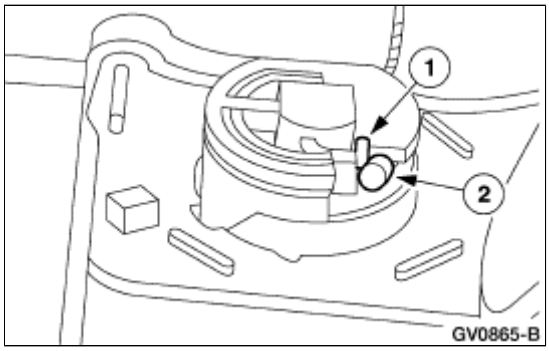


4. Disconnect the speed control core wire end from the speed control servo pulley.
    1. Depress the spring retainer.
    2. Slide the core wire end out of the speed control servo pulley.



Installation

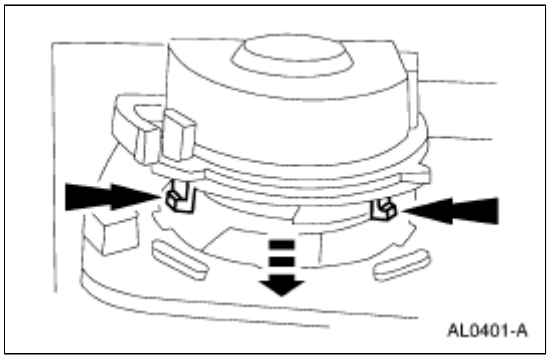
1. Insert the speed control cable slug into the speed control servo pulley slot.
    1. Gently compress the speed control servo spring.
    2. Insert the speed control cable slug into the speed control servo pulley slot.



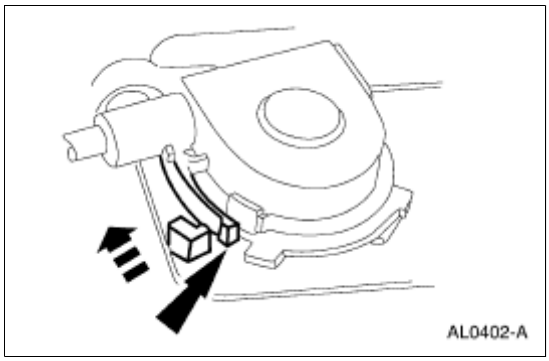
2. **WARNING: Incorrect wrapping of the speed control actuator cable around the speed control servo pulley may result in a high idle condition.**

    NOTE: Make sure the rubber seal is fully seated onto the speed control actuator cable cap.

    Release the compressed spring while aligning the speed control actuator cable cap tabs with the slots in the speed control servo housing.

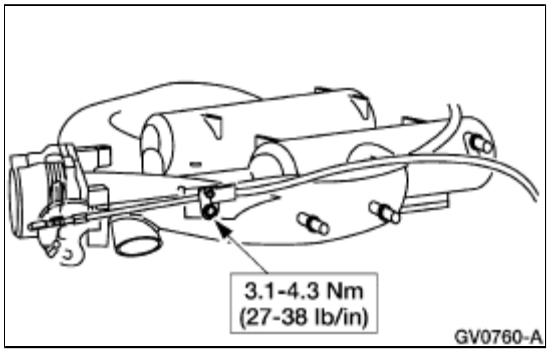


3. Rotate the speed control actuator cable cap until the locking arm engages.

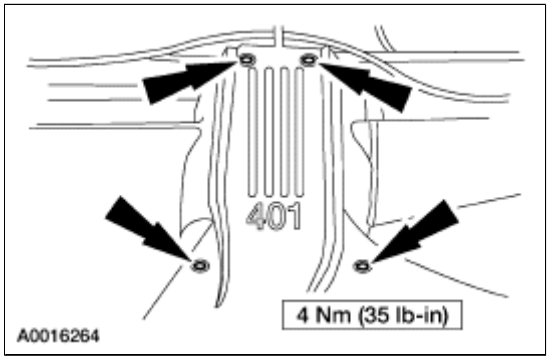


4. **CAUTION: The guide pin must be fully seated before installing the speed control actuator cable bolt.**

   Snap the speed control actuator cable and the accelerator cable together in the clip and install the cables onto the accelerator cable bracket (9723).



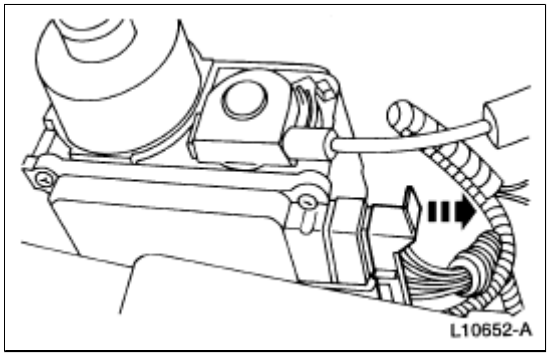
5. Position the accelerator control splash shield and install the bolts.



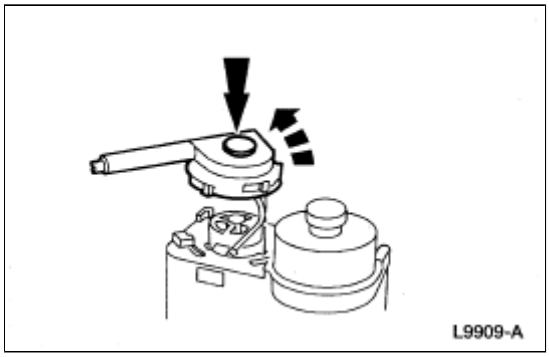
Actuator —Speed Control Servo

Removal

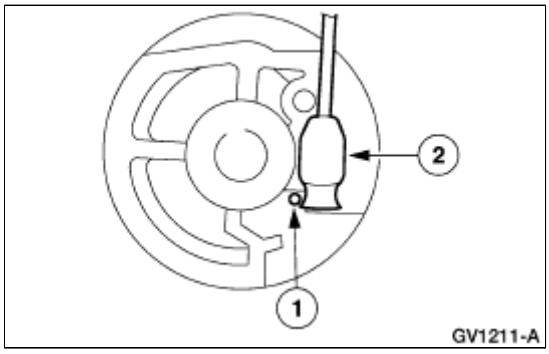
1. Disconnect the speed control servo electrical connector.



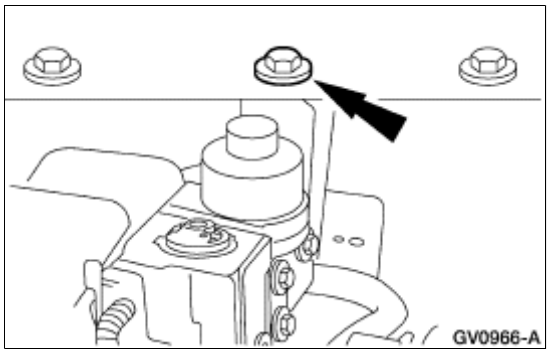
2. Remove the speed control actuator cable cap from the speed control servo (9C735).
   - Push the locking arm on the speed control actuator cable cap then rotate the cap counterclockwise



3. Disconnect the speed control core wire end from the speed control servo pulley.
   1. Depress the spring retainer.
   2. Slide the core wire end out of the speed control servo pulley.



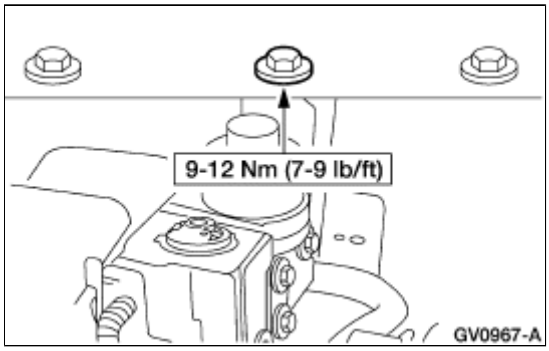
4. Remove the speed control servo bracket bolt.



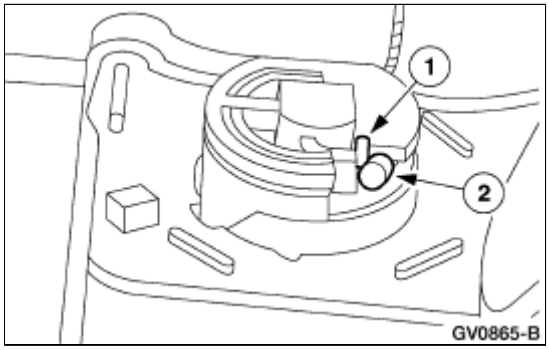
5. Remove the speed control servo.

Installation

1. Install the speed control servo bracket bolt.



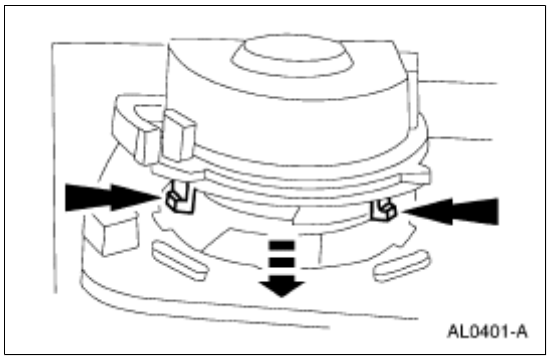
2. Insert the speed control cable slug into the speed control servo pulley slot.
    1. Gently compress the speed control servo spring.
    2. Insert the speed control cable slug into the speed control servo pulley slot.



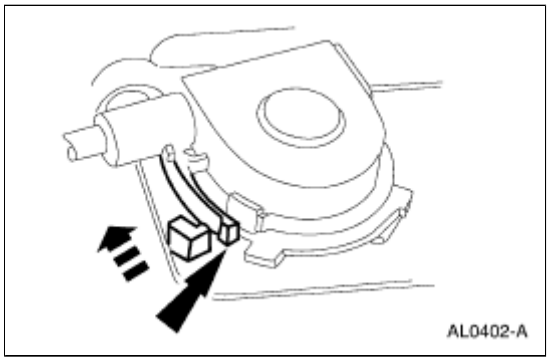
3. **WARNING: Incorrect wrapping of the speed control actuator cable around the speed control servo pulley may result in a high idle condition.**

    NOTE: Make sure the rubber seal is fully seated onto the speed control actuator cable cap.

    Release the compressed spring while aligning the speed control actuator cable cap tabs with the slots in the speed control servo housing.



4. Rotate the speed control actuator cable cap until the locking arm engages.

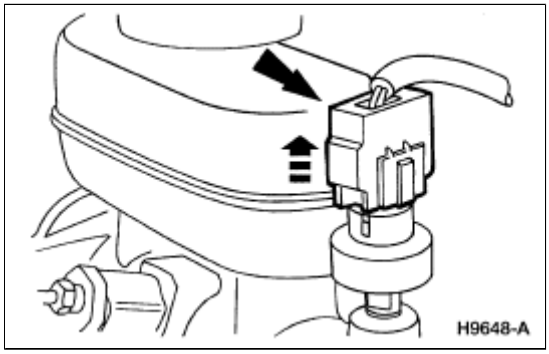


Switch —Deactivator

Removal

1. Disconnect the battery ground cable.

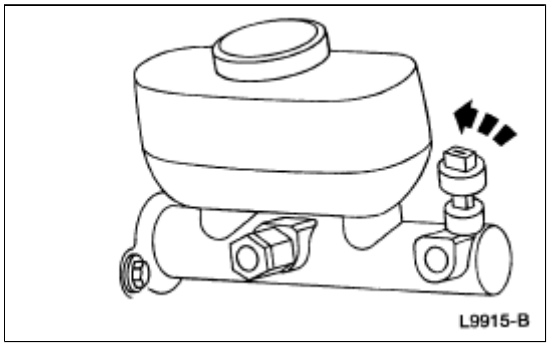
2. Disconnect the deactivator switch electrical connector.



3. **WARNING: Brake fluid contains polyglycol ethers and polyglycols. Avoid contact with eyes. Wash hands thoroughly after handling. If brake fluid contacts eyes, flush eyes with running water for 15 minutes. Get medical attention if irritation persists. If taken internally, drink water and induce vomiting. Get medical attention immediately.**

   CAUTION: Brake fluid is harmful to painted and plastic surfaces. If brake fluid is spilled onto a painted or plastic surface, immediately wash it with water.

   Remove the deactivator switch.



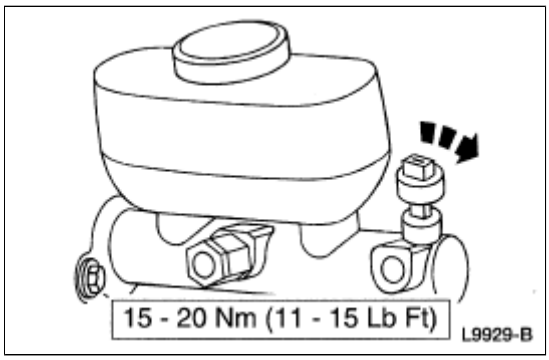
Installation

1. **NOTE:** When the battery is disconnected and reconnected, some abnormal drive symptoms may occur while the vehicle relearns its adaptive strategy. The vehicle may need to be driven 16 km (10 miles) or more to relearn the strategy.

   NOTE: After the deactivator switch is installed, it is necessary to bleed the brake system; refer to

Section 206-00 .

To install, reverse the removal procedure.

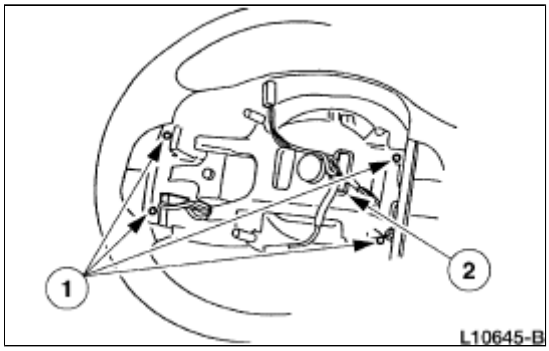


Switch —Speed Control Actuator (Without Remote Audio/Climate Controls)

Removal

1. Remove the driver side air bag module (043B13). Refer to Section 501-20B .

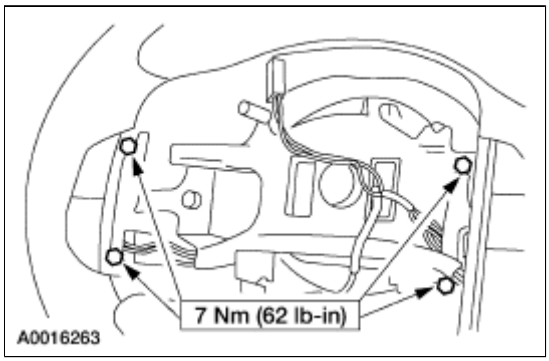
2. Remove the speed control actuator switches.
    1. Remove the screws.
    2. Disconnect the electrical connector then remove the speed control actuator switches.



Installation

1. **NOTE:** When the battery is disconnected and reconnected, some abnormal drive symptoms may occur while the vehicle relearns its adaptive strategy. The vehicle may need to be driven 16 km (10 miles) or more to relearn the strategy.

    To install, reverse the removal procedure.



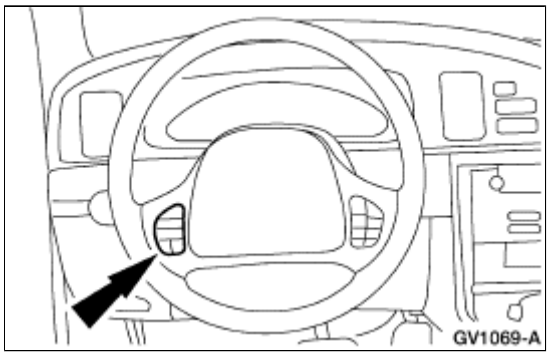
Switch —Speed Control Actuator (With Remote Audio/Climate Controls)

Removal

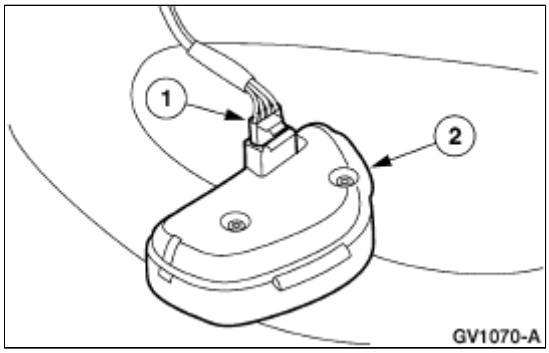
1. Disconnect the battery ground cable.

2. **CAUTION: When separating the speed control actuator switch from the steering wheel, it is necessary to take precautions not to damage the steering wheel.**

   Separate the speed control actuator switch out of the steering wheel.



3. Remove the speed control actuator switch.
   1. Disconnect the speed control actuator switch electrical connector.
   2. Remove the speed control actuator switch.



Installation

1. **NOTE:** When the battery is disconnected and reconnected, some abnormal drive symptoms may occur while the vehicle relearns its adaptive strategy. The vehicle may need to be driven 16 km (10 miles) or more to relearn its strategy.

   To install, reverse the removal procedure.

SPECIFICATIONS

General Specifications

Item	Specification
A/C compressor	FS-10 swashplate, 5 double acting pistons
Magnetic Clutch	
Air gap between pulley and hub mm (in)	0.35-0.75 (0.014-0.030)
Lubricant	
PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA (Motorcraft YN-12-C)	WSH-M1C231-B
Capacity ml (oz)	266 (9)
Refrigerant	
R-134a Refrigerant YN-19	WSH-M17B19-A
Capacity kg (oz)	0.85 (30)
Cleaner	
A/C Systems Flushing Solvent Ford F4AZ-19579-A	—

Torque Specifications

Description	Nm	lb-in
Peanut fitting nut	7-9	62-79

Climate Control System

WARNING: To avoid accidental deployment and possible injury, the air bag system backup power supply must be depleted before repairing any climate control components. To deplete the backup power supply, disconnect the battery positive cable and wait one minute.

WARNING: Carbon monoxide is colorless, odorless and dangerous. If it is necessary to operate the engine with vehicle in a closed area such as a garage, always use an exhaust collector to vent the exhaust gases outside the closed area.

WARNING: R-134a is classified as a safe refrigerant, but misuse can make it dangerous. The following precautions must be observed.

- **Always wear safety goggles when repairing an air conditioning system.**
- **Avoid contact with liquid refrigerant R-134a. R-134a vaporizes at approximately -25°c (-13°f) under atmospheric pressure and it will freeze skin tissue.**
- **Never allow refrigerant R-134a gas to escape in quantity in an occupied space. R-134a is non-toxic, but 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 when it is exposed to high temperatures, such as a torch flame, it decomposes. During decomposition it releases irritating and toxic gases (as described in the MSDS sheet from the manufacturer). Decomposition products are hydrofluoric acid, carbon dioxide and water.**
- **Do not allow any portion of the charged air conditioning system to become too hot. The pressure in an air conditioning system rises as the temperature rises and temperatures of approximately 85°C (185°F) can be dangerous.**
- **Allow the engine to cool sufficiently prior to carrying out maintenance or serious burns and injury can occur.**

CAUTION: To avoid damaging the vehicle or 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 due so can 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 two types of refrigerant must never be mixed. Doing so can 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. 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 can severely damage the A/C components. If repair is required, use only new or recycled Refrigerant R-134a.**

 **CAUTION: To avoid contamination of the A/C system:**

- **Never open or loosen a connection recovering the refrigerant using approved equipment.**
- **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.**
- **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 refrigerant oil before connecting.**
- **When installing a refrigerant line, avoid sharp bends. Position the line away from the exhaust or any sharp edges that can 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 of 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 manual climate control system heats and/or cools the vehicle depending on the function selector switch position and the temperature selected.

- The function selector switch position determines heating or cooling and air distribution.
- The temperature control setting determines the air temperature.
- The heater blower motor switch (18578) varies the blower motor speed.

The electronic automatic temperature control system maintains the selected vehicle interior temperature by heating and/or cooling the air.

- During A/C operation the system also reduces the relative humidity of the air.
- The driver may override the automatic mode of operation.

Principles of Operation

There are four main principles involved with the basic theory of operation:

- heat transfer
- latent heat of vaporization

- relative humidity
- effects of pressure

Heat Transfer

If two substances of different temperature are placed near each other, the heat in the warmer substance will transfer to the colder substance.

Latent Heat of Vaporization

When a liquid boils (converts to gas) it absorbs heat without raising the temperature of the resulting gas. When the gas condenses (converts back to a liquid), it gives off heat without lowering the temperature of the resulting liquid.

Relative Humidity

The amount of moisture (water vapor content) that the air can hold is directly related to the air temperature. The more heat there is in the air, the more moisture the air can hold. The lower the moisture content in the air, the more comfortable you feel. Removing the moisture from the air lowers its relative humidity and improves personal comfort.

Effects of Pressure on Boiling or Condensation

As the pressure is increased on a liquid, the temperature at which the liquid boils (converts to gas) also increases. Conversely, when the pressure on a liquid is reduced, its boiling point is also reduced. When in the gas state, an increase in pressure causes an increase in temperature, while a decrease in pressure will decrease the temperature of the gas.

The Refrigerant Cycle

During stabilized conditions (air conditioning system shutdown), the refrigerant is in a vaporized state and pressures are equal throughout the system. When the A/C compressor (19703) 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 A/C condenser core (19712).

The A/C condenser core, being close to ambient temperature, causes the refrigerant vapor to condense into a liquid when heat is removed from the refrigerant by ambient air passing over the fins and tubing. The now liquid refrigerant, still at high pressure, exits from the bottom of the A/C condenser core and enters the inlet side of the A/C evaporator core orifice (19D990).

The A/C evaporator core orifice is the restriction in the refrigerant system that creates the high pressure buildup in the A/C evaporator core (19860) and separates the high and low pressure sides of the A/C system. As the liquid refrigerant leaves this restriction, its pressure and boiling point are reduced.

The liquid refrigerant is now at its lowest pressure and temperature. As it passes through the A/C evaporator core, it absorbs heat from the passenger compartment airflow passing over the plate/fin sections of the A/C 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/drier (19C836) is designed to remove moisture from the refrigerant and to prevent any liquid refrigerant that may not have been vaporized in the A/C 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.

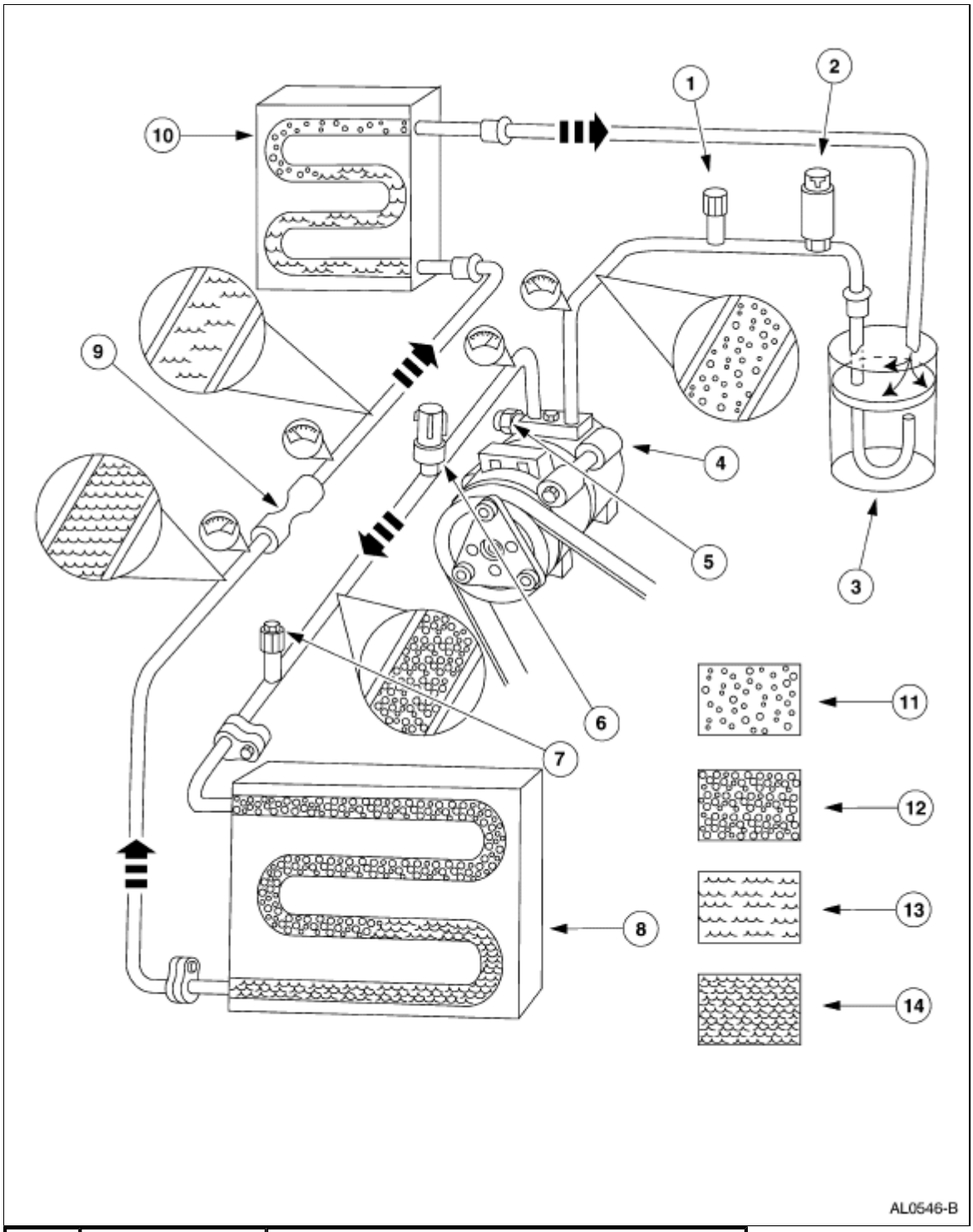
The refrigerant cycle is now repeated with the A/C compressor again increasing the pressure and temperature of the refrigerant.

The A/C cycling switch (19E561) interrupts compressor operation before the external temperature of the A/C 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.

The A/C compressor pressure relief valve (19D644) will open and vent refrigerant to relieve unusually high system pressure.

Clutch Cycling Orifice Tube Type Refrigerant System

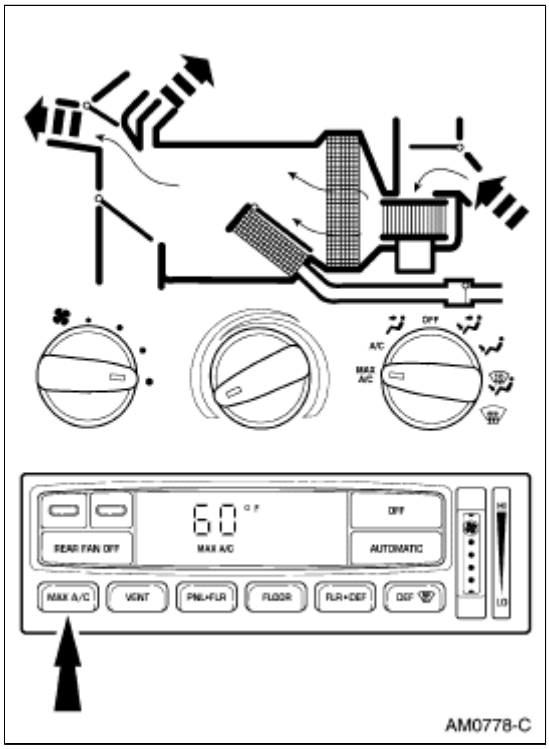


Item	Part Number	Description
1	19E762	A/C charge valve port (low side)
2	19E561	A/C cycling switch
3	19C836	Suction accumulator/drier
4	19703	A/C compressor
5	19D644	A/C compressor pressure relief valve

6	19D594	A/C pressure cut-off switch
7	19E762	A/C charge valve port (high side)
8	19712	A/C condenser core
9	19D990	A/C evaporator core orifice
10	19860	A/C evaporator core
11	—	Low pressure vapor
12	—	High pressure vapor
13	—	Low pressure liquid
14	—	High pressure liquid

System Airflow Description

MAX A/C



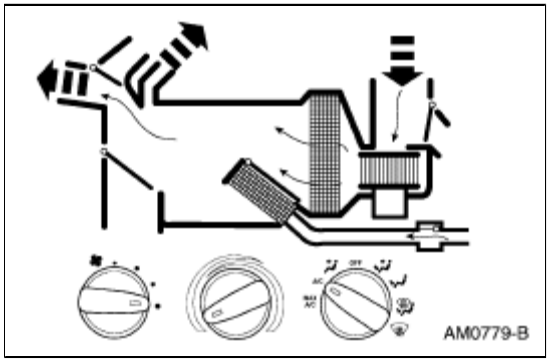
When MAX A/C is selected:

- The air inlet duct door is at full vacuum, closing off outside air and admitting only recirculated air.
- The heater water control valve (18495) is at full vacuum, preventing hot coolant from reaching the heater core (18476).
- The panel/defrost door is at full vacuum and the floor/panel door is at no vacuum, directing airflow to the A/C registers (19893).
- Temperature control is usually set for maximum cold but because the heater water control valve is preventing hot coolant from reaching the heater core, the air cannot be heated in any temperature control position.
- Air will be picked up at the recirc opening by the blower motor (18527). With the temperature control set for maximum cold, airflow across the A/C evaporator core will be diverted past the heater core

and then directed into the passenger compartment through the instrument panel A/C registers. There is also some airflow to the side window demisters.

- The A/C compressor will be enabled when MAX A/C is selected.
- The blower motor is on.

A/C

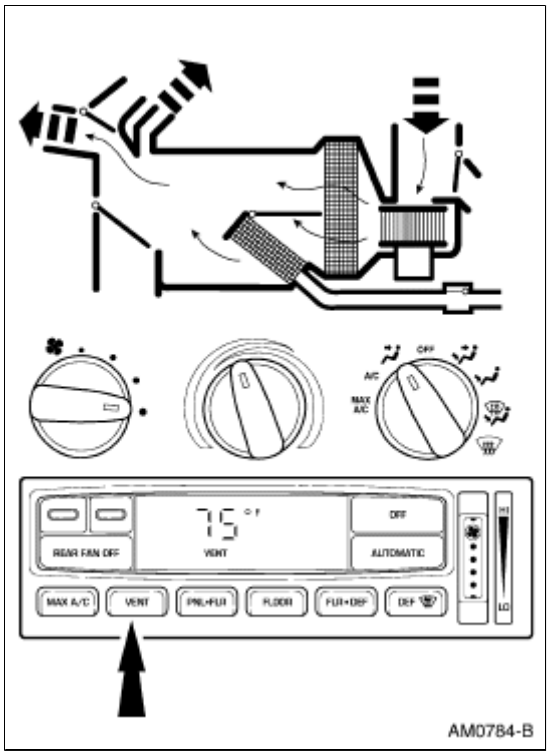


A/C

When A/C is selected:

- The air inlet duct door is set at no vacuum, blocking the recirc passage and admitting outside air.
- The heater water control valve is also at no vacuum, allowing hot coolant into the heater core.
- All other door positions are the same as described.
- Temperature setting can be changed manually.
- The A/C compressor will be enabled when A/C is selected.
- The blower motor is on.

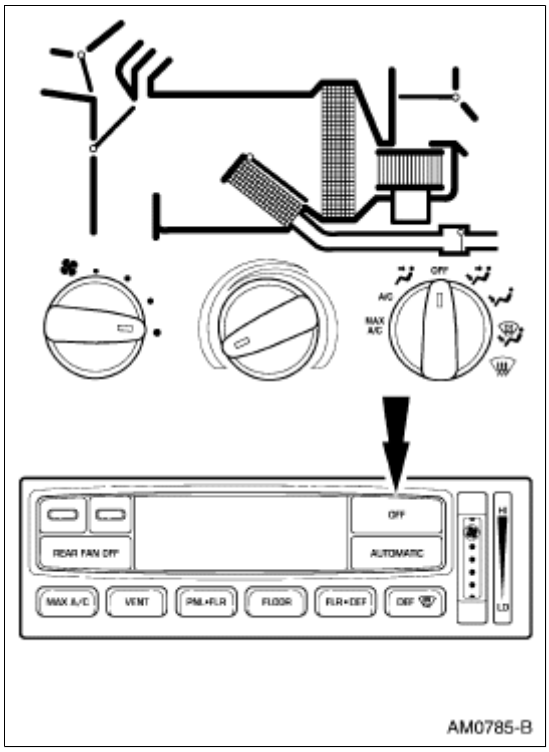
VENT



When vent is selected:

- The air inlet duct door, with no vacuum being applied, will block recirculated air and admit outside air. From there, air flows through the system to the instrument panel A/C registers. There is also some airflow to the side window demisters.
- The heater water control valve is at no vacuum, allowing hot coolant into the heater core.
- The floor/panel door is in the no vacuum position to block airflow to the heater outlet floor duct.
- The panel/defrost door is at full vacuum, closing off airflow to the windshield defroster hose nozzle (18490).
- The temperature can be adjusted to heat the air but the air cannot be cooled below the outside temperature.
- The A/C compressor will be disabled when VENT is selected.
- The blower motor is on.

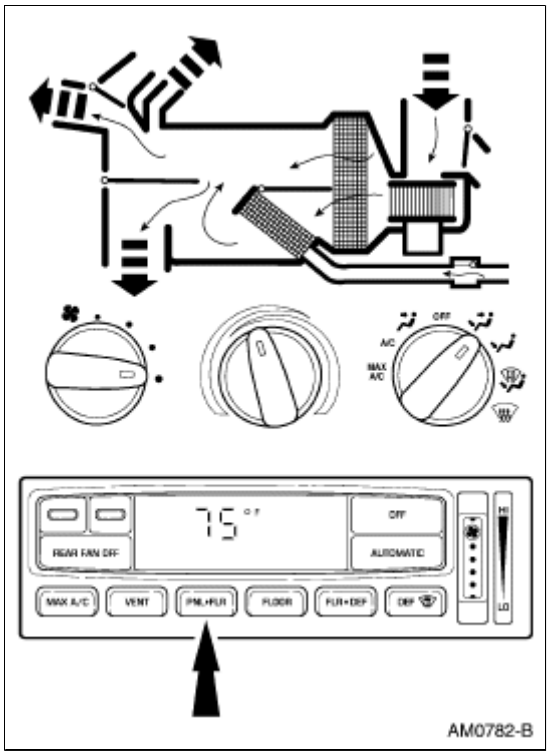
OFF



When OFF is selected:

- The A/C inlet duct door is at full vacuum, closing off outside air and admitting only recirc air.
- The heater water control valve is at full vacuum, preventing hot coolant from reaching the heater core.
- The floor/panel and panel/defrost doors are at full vacuum, closing off the passages to the A/C registers.
- The blower motor and the A/C compressor are off.

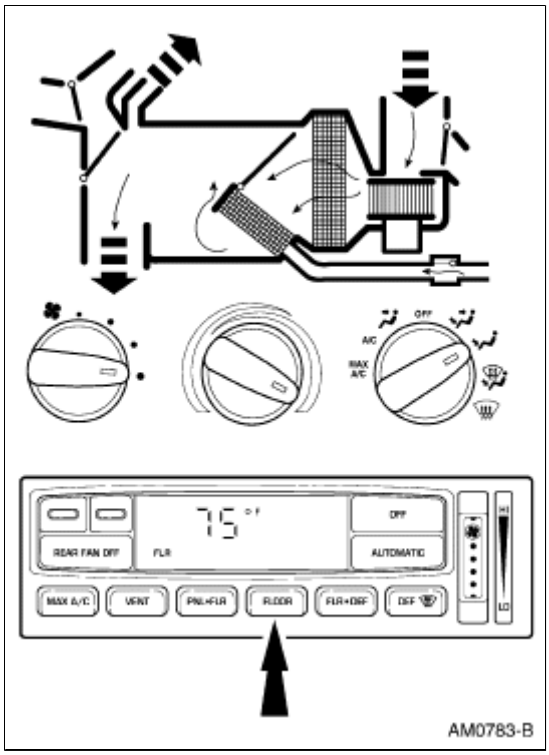
PANEL/FLOOR



When PANEL/FLOOR is selected:

- The air inlet duct door is set at no vacuum, blocking the recirc passage and admitting outside air.
- The heater water control valve is also at no vacuum, allowing hot coolant into the heater core.
- The floor/panel airflow door is in the partial vacuum position, allowing airflow to both the A/C registers and the heater outlet floor duct.
- The panel/defrost airflow door is at full vacuum, closing off airflow to the windshield defroster hose nozzle and directing airflow to the A/C registers. There is also some airflow to the side window demisters.
- The A/C compressor will be enabled when PANEL/FLOOR is selected.
- The blower motor is on.

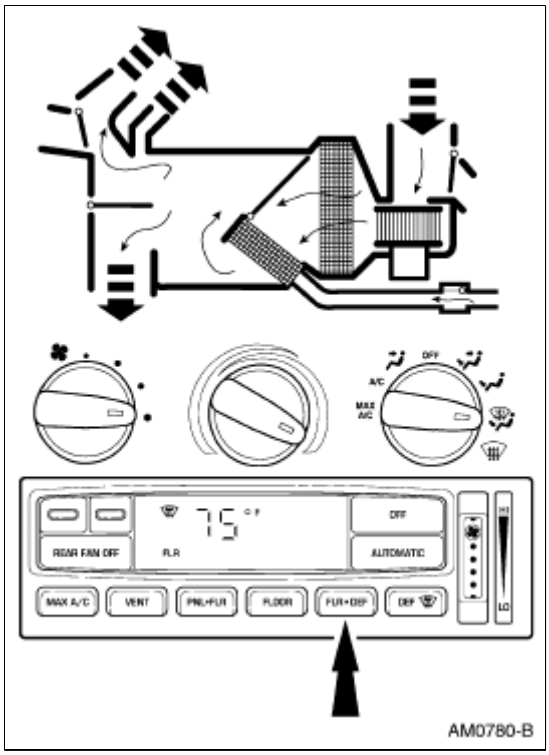
FLOOR



When FLOOR is selected:

- The air inlet duct door is in the no vacuum position, blocking recirc air and admitting outside air.
- The heater water control valve is also at no vacuum, allowing hot coolant into the heater core.
- The floor/panel airflow door is in the full vacuum position, directing all airflow to the heater outlet floor duct. There is also some airflow to the side window demisters.
- The temperature can be adjusted to mix airflowing through and around the heater core to achieve the desired temperature level.
- The panel/defrost airflow door is in the no vacuum position, blocking air circulation to the panel A/C registers.
- The A/C compressor will be disabled when FLOOR is selected.
- The blower motor is on.

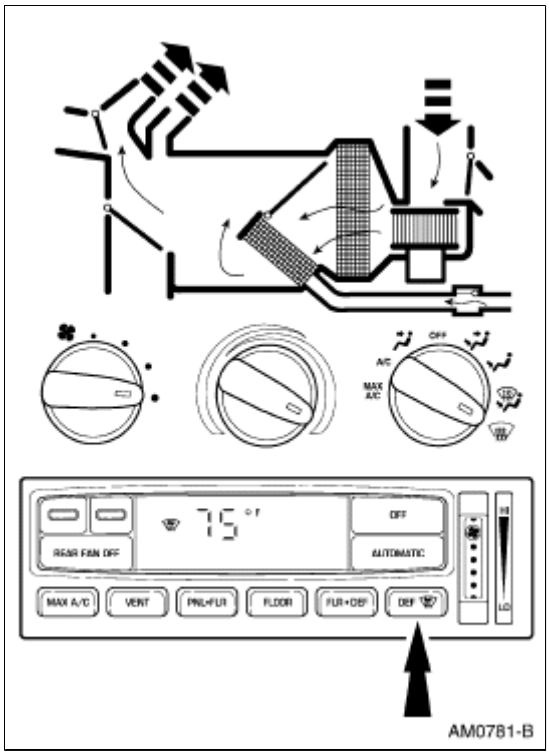
FLOOR/DEFROST



When FLOOR/DEFROST is selected:

- The air inlet duct door is in the no vacuum position blocking recirc air and admitting outside air.
- The heater water control valve is also at no vacuum, allowing hot coolant into the heater core.
- The floor/panel airflow door is in the partial vacuum position, allowing airflow to both the windshield defroster hose nozzle and the heater outlet floor duct.
- The panel/defrost airflow door is in the no vacuum position, directing airflow to the windshield defroster hose nozzle. There is also some airflow to the side window demisters.
- The A/C compressor will be enabled when FLOOR/DEFROST is selected to dehumidify the air and reduce windshield fogging.
- The blower motor is on.

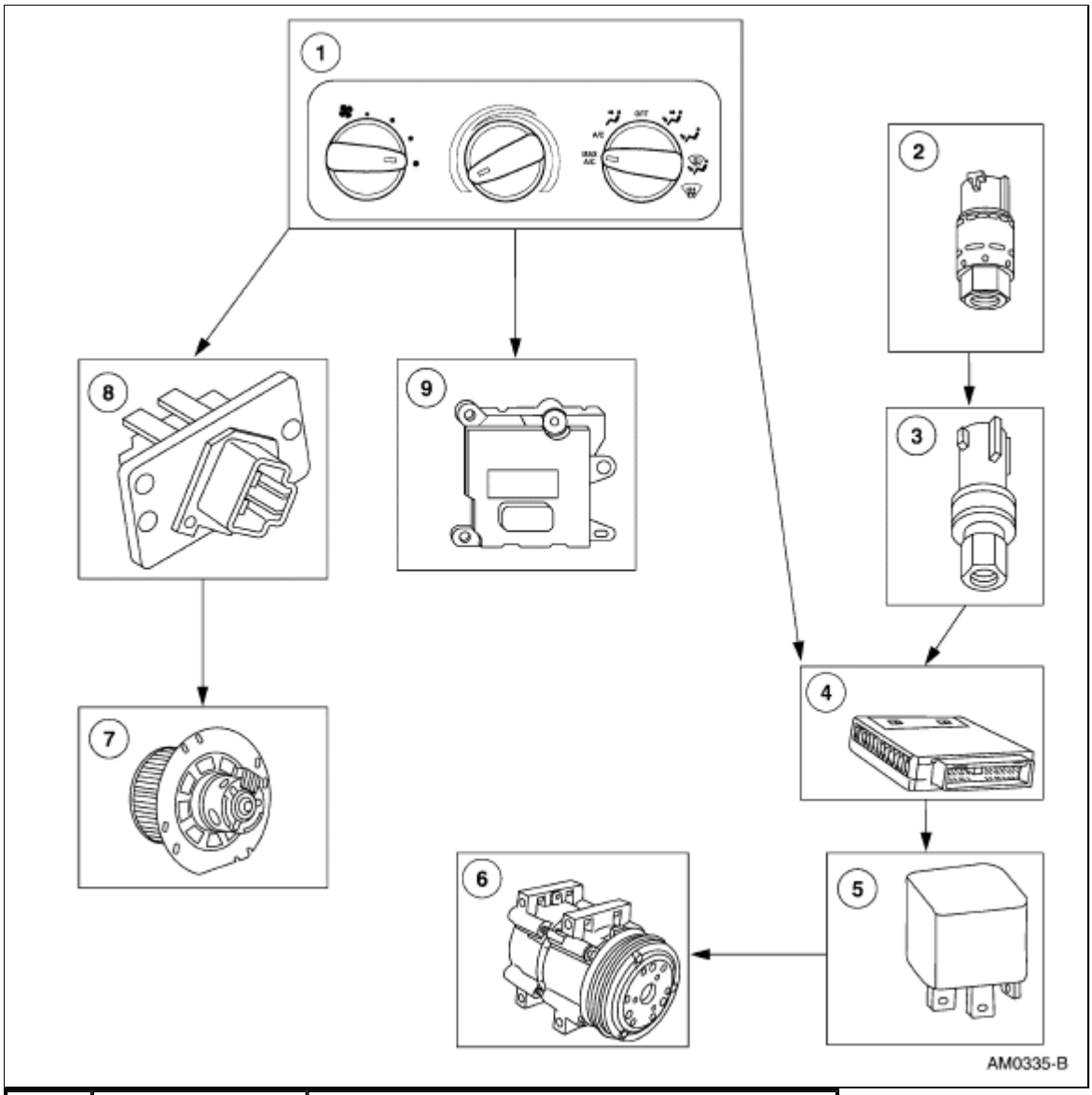
DEFROST



When DEFROST is selected:

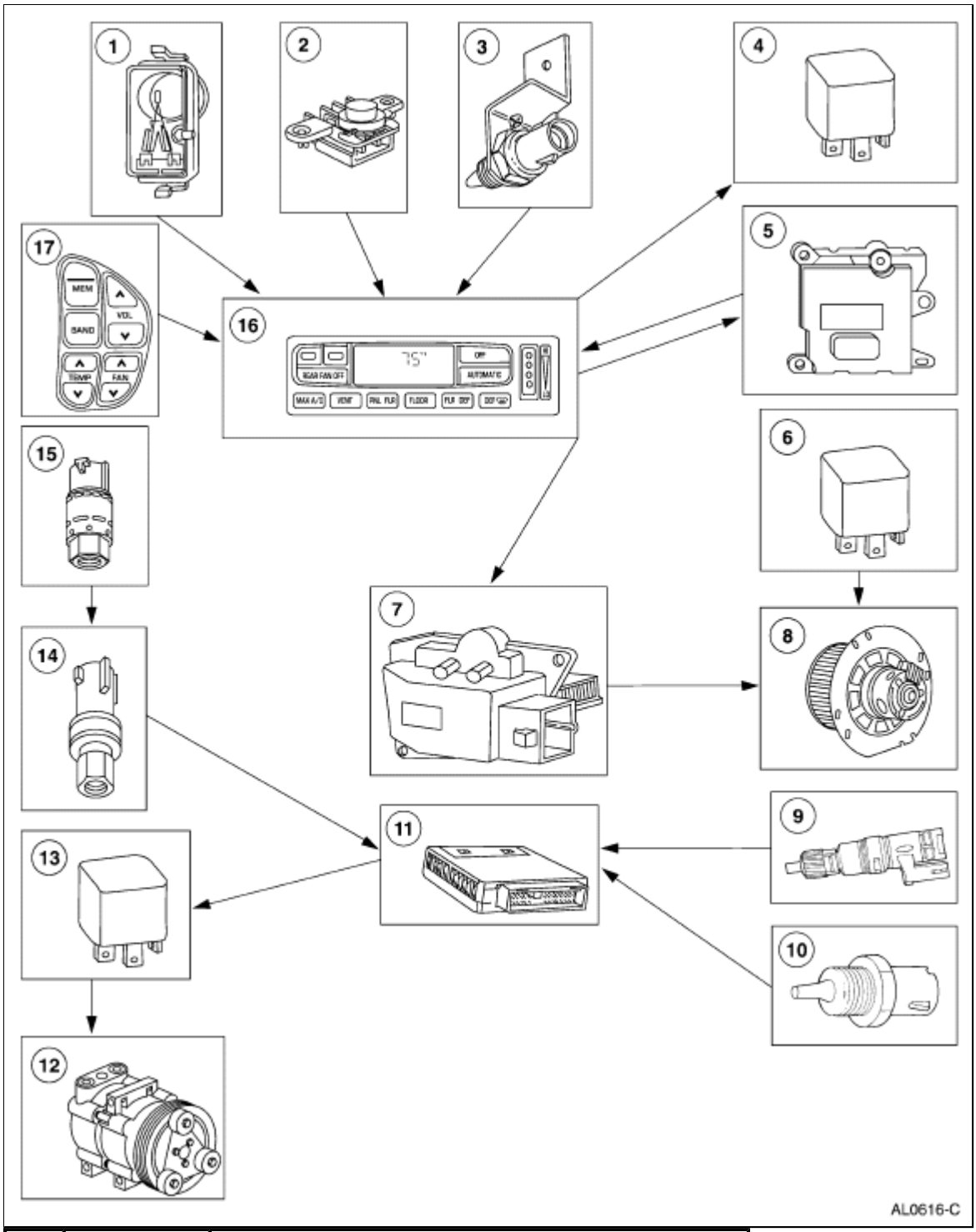
- The air inlet duct door is in the no vacuum position, admitting outside air.
- The heater water control valve is also at no vacuum, allowing hot coolant into the heater core.
- Both the floor/panel airflow door and the panel/defrost airflow door are in the no vacuum position so that most of the incoming air is directed to the windshield defroster hose nozzle. There is also airflow to the side window demisters.
- The temperature setting will determine the amount of air that is directed through the heater core and the amount that bypasses the heater core.
- The A/C compressor will be enabled when DEFROST is selected to dehumidify the air and reduce windshield fogging.
- The blower motor is on.

Manual A/C Electrical Components



Item	Part Number	Description
1	19980	Manual A/C control assembly
2	19E561	A/C cycling switch
3	19D594	A/C pressure cut-off switch
4	12A650	Powertrain control module
5	14B192	WOT A/C relay
6	19703	A/C compressor
7	18527	Blower motor
8	18591	Heater blower motor switch resistor
9	19E616	A/C electronic door actuator motor

Electronic Automatic Temperature Control Electrical Components



Item	Part Number	Description
1	19D888	Automatic temperature control sensor hose and elbow
2	19E663	A/C sunload sensor
3	19E702	A/C ambient air temperature sensor and bracket
4	14B192	Rear console blower relay

5	19E616	A/C electronic door actuator motor
6	14B192	Blower motor relay
7	19E624	A/C blower motor speed control
8	18527	Blower motor
9	9E731	Vehicle speed sensor
10	12A648	Engine coolant temperature sensor
11	12A650	Powertrain control module
12	2987	A/C clutch field coil
13	14B192	WOT A/C relay
14	19D594	A/C pressure cut-off switch
15	19E561	A/C cycling switch
16	19980	Electronic automatic temperature control module
17	—	Remote control buttons

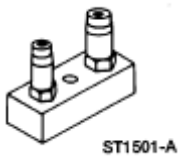
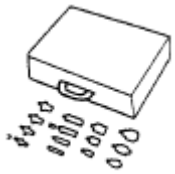
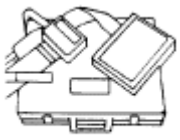
Climate Control System

Refer to Wiring Diagrams Cell 54 , Air Conditioner/Heater for schematic and connector information.

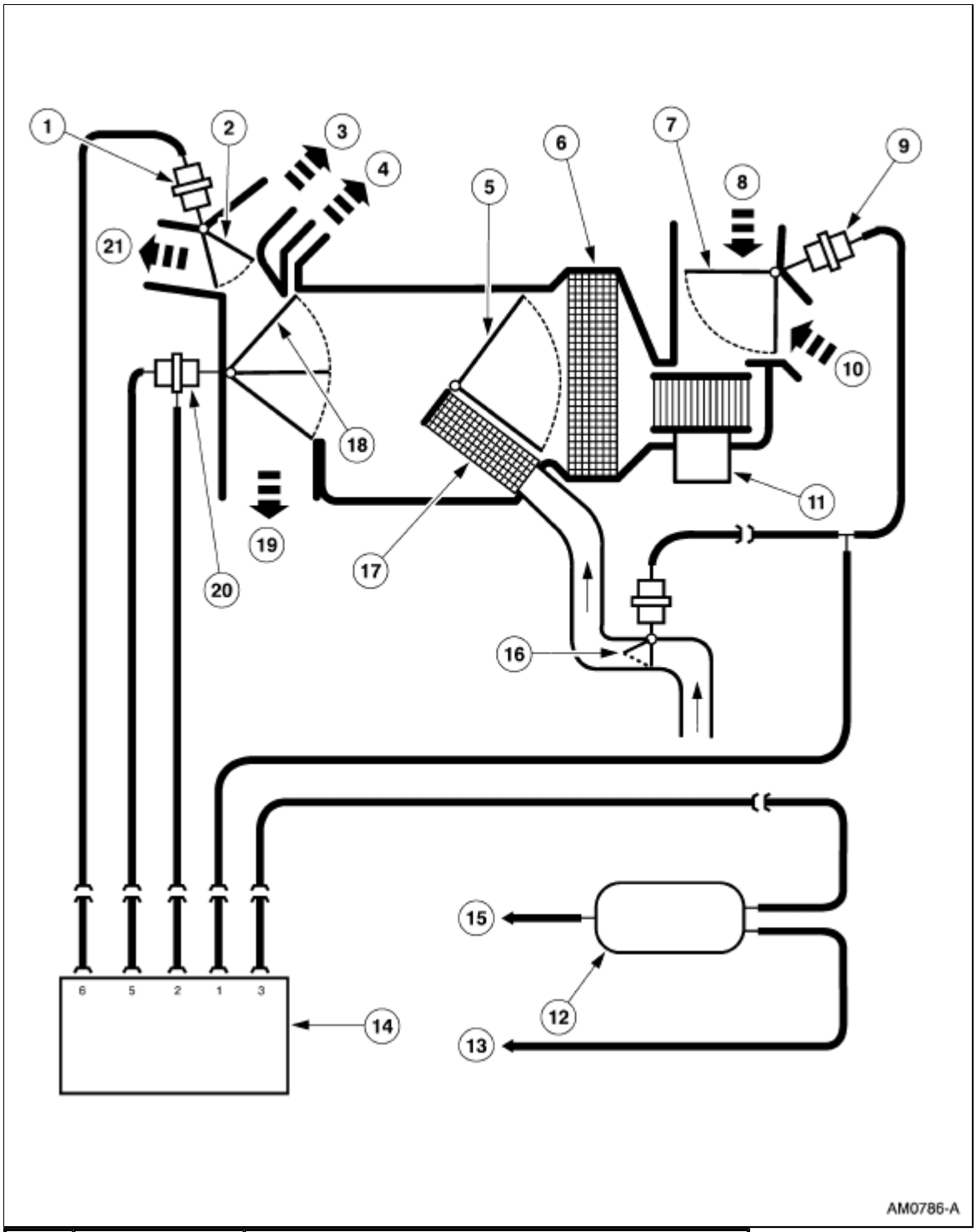
Refer to Wiring Diagrams Cell 55 , Electronic Automatic Temperature Control (EATC) for schematic and connector information.

Special Tool(s)

 ST2332-A	Worldwide Diagnostic System (WDS) 418-F224, New Generation STAR (NGS) Tester 418-F052, or equivalent scan tool
 ST1179-A	Alternator, Regulator, Battery and Starter Tester (ARBST) 010-00735 or equivalent
 ST2173-A	Starter, Alternator, Battery Regulator, Electrical Tester (S.A.B.R.E.) 010-00730 or equivalent
 ST1137-A	Rotunda 73 Digital Multimeter 105-R0051 or equivalent
 ST1176-A	Vacuum Pump Kit 416-D002 (D95L-7559-A) or equivalent
 ST1928-A	R-134a Manifold Gauge Set 176-R032A or equivalent

 ST1501-A	A/C Pressure Test Adapter 412-093 (T94P-19623-E)
 ST1252-A	R-12/R-134a Air Conditioning Test Fitting Set 412-DS028 (014-00333, D93L-19703-B) or equivalent
 ST2351-A	Refrigerant Leak Detector 216-00001 or equivalent
 ST1474-A	Pressure Tester 014-R1072 or equivalent
 ST1391-A	EEC-V 104-Pin Breakout Box 418-049 (014-00950, T94L-50-EEC-V)

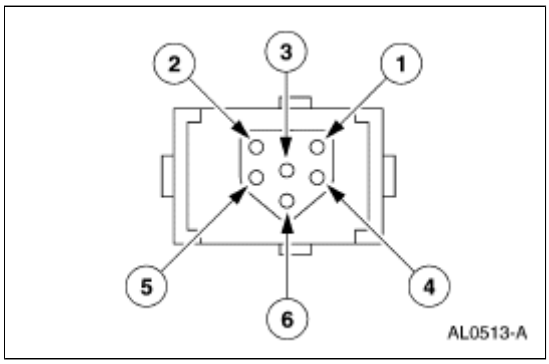
Vacuum Schematic — Manual A/C



Item	Part Number	Description
1	18A318	Vacuum control motor, panel/defrost door
2	18A478	Panel/defrost door (full vacuum position)
3	—	Defrost airflow
4	—	Side window demister airflow
5	18B545	Temperature blend door (full heat position)

6	19860	A/C evaporator core
7	19A813	Air inlet duct door (full vacuum position)
8	—	Outside air inlet
9	18A318	Vacuum control motor, air inlet duct door
10	—	Recirculated air inlet
11	19805	A/C blower motor
12	19A566	A/C vacuum reservoir tank and bracket
13	—	Vacuum from the engine intake manifold
14	19B888	A/C — heater function selector switch
15	—	Vacuum to the 4x4 hub solenoids
16	18495	Water diverter valve
17	18476	Heater core
18	18A559	Floor/panel door (full vacuum position)
19	—	Floor airflow
20	18A318	Vacuum control motor, floor/panel door
21	—	Panel vent airflow

Vacuum Connector End View — Manual A/C



Port No.	Hose Color	Function
1	White	Air inlet duct door and water diverter valve
2	Yellow	Floor/panel door
3	Black	Vacuum source
4	—	Not used
5	Blue	Floor/panel door
6	Red	Panel/defrost door

VACUUM APPLICATION CHART—MANUAL A/C

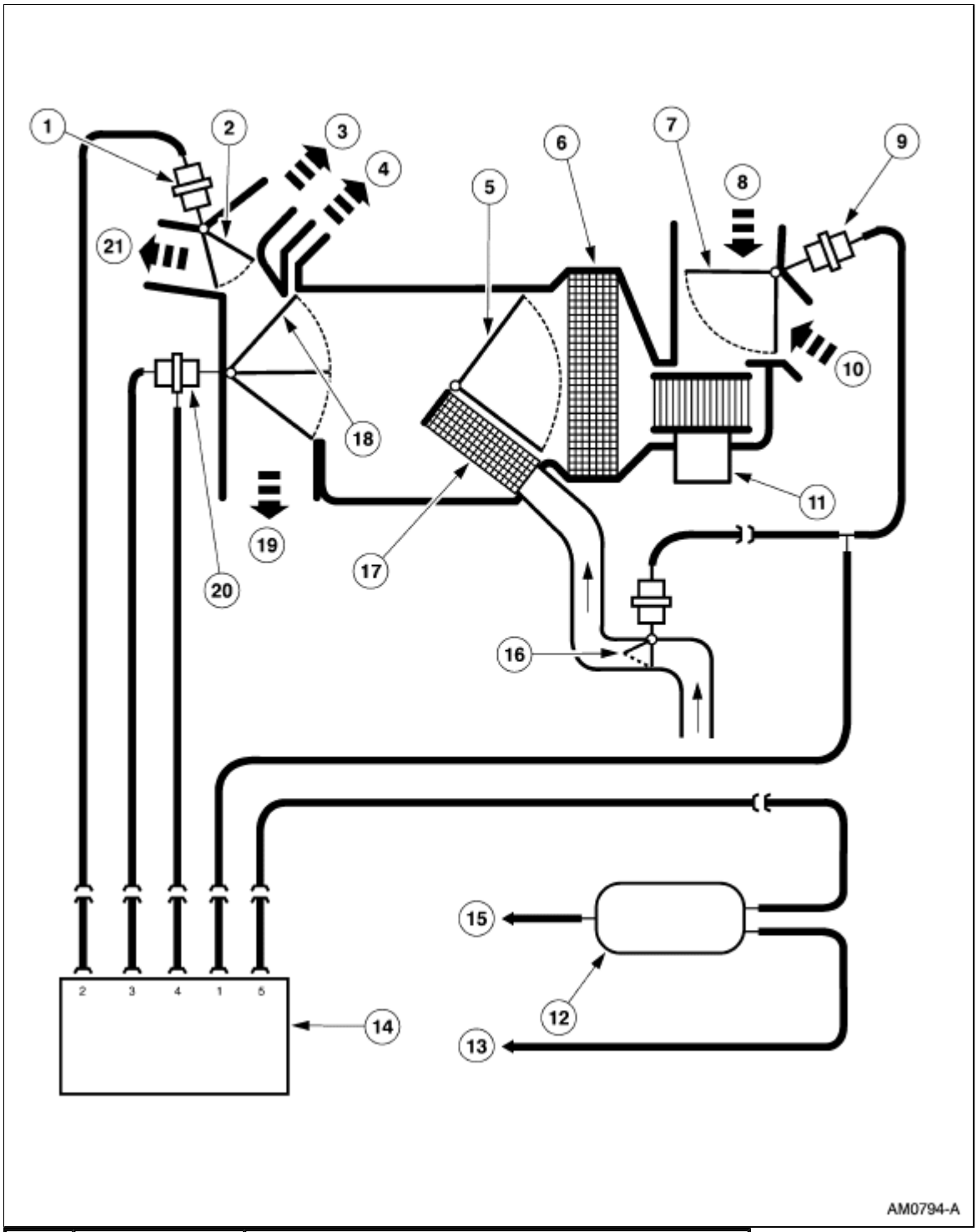
			Function Selector Switch Position							

Switch Port	Color	Function	MAX A/C	A/C	PNL/ VENT	OFF	FLR/ PNL	FLR	FLR/ DEF	DEF
1	White	Outside/recirc, water diverter	V	NV	NV	V	NV	NV	NV	NV
2	Yellow	Floor/panel	NV	NV	NV	V	NV	V	NV	NV
3	Black	Vacuum source	V	V	V	V	V	V	V	V
5	Blue	Full floor	NV	NV	NV	V	V	V	V	NV
6	Red	Panel/defrost	V	V	V	NV	V	NV	NV	NV

V = Vacuum

NV= No Vacuum

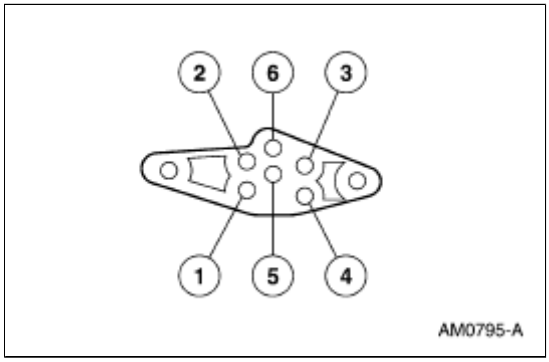
Vacuum Schematic — Electronic Automatic Climate Control System



Item	Part Number	Description
1	18A318	Vacuum control motor, panel/defrost door
2	18A478	Panel/defrost door (full vacuum position)
3	—	Defrost airflow
4	—	Side window demister airflow
5	18B545	Temperature blend door (full heat position)
6	19860	A/C evaporator core

7	19A813	Air inlet duct door (full vacuum position)
8	—	Outside air inlet
9	18A318	Vacuum control motor, air inlet duct door
10	—	Recirculated air inlet
11	19805	A/C blower motor
12	19A566	A/C vacuum reservoir tank and bracket
13	—	Vacuum from the engine intake manifold
14	19B888	A/C — heater function selector switch
15	—	Vacuum to the 4x4 hub solenoids
16	18495	Water diverter valve
17	18476	Heater core
18	18A559	Floor/panel door (full vacuum position)
19	—	Floor airflow
20	18A318	Vacuum control motor, floor/panel door
21	—	Panel vent airflow

Vacuum Connector End View — Electronic Automatic Climate Control



Port No.	Hose Color	Function
1	White	Air inlet duct door
2	Red	Panel/defrost door
3	Blue	Floor/panel door
4	Yellow	Floor/panel door
5	Black	Source vacuum
6	—	Not used

VACUUM APPLICATION CHART—ELECTRONIC AUTOMATIC CLIMATE CONTROL

Vacuum Harness Hose Color	Function	Manual Override Selector Buttons						
		OFF	MAX A/C	VENT	PNL & FLR	FLOOR	FLR & DEF	DEFROST

White	Outside/recirc, water diverter	V	V	NV	NV	NV	NV	NV
Yellow	Full floor	NV	NV	NV	NV	V	NV	NV
Blue	Floor-panel (partial)	NV	NV	NV	V	V	V	NV
Red	Panel-defrost	NV	V	V	V	NV	NV	NV
Black	Source	V	V	V	V	V	V	V

V = Vacuum

NV = No Vacuum

Inspection and Verification

1. Verify the customer's concern by operating the climate control system to duplicate the condition.

2. Inspect to determine if one of the following mechanical or electrical concerns apply:

Visual Inspection Chart

Mechanical	Electrical
• Loose, missing or damaged A/C compressor drive belt. • Loose or disconnected A/C clutch. • Loose, misrouted or damaged vacuum lines. [a] • Broken or leaking vacuum control motor [a] • Broken or leaking refrigerant lines. • Obstructed in-vehicle temperature sensor.	• Open fuses. • Blower motor inoperative. • A/C compressor inoperative. • Circuitry open/shorted. • Disconnected electrical connectors.

[a] A leak in the vacuum control circuit may occur during acceleration (slow leak), may exist at all times (large leak), and may exist only when specific functions are selected (indicating a leak in that portion of the circuit). The vacuum hoses used in the passenger compartment control circuit are constructed from PVC plastic material. The vacuum hoses used in the engine compartment are constructed of Hytrel®. Because of the materials used, never pinch the vacuum hoses off during diagnosis to locate a leak. A wood golf tee can be used as a plug when it is necessary to plug one end of the vacuum hose for leak test purposes.

3. If the inspection reveals obvious concern(s) that can be readily identified, repair as required.

4. If the concern remains after the inspection, connect the scan tool to the data link connector (DLC) located beneath the instrument panel and select the vehicle to be tested from the scan tool menu. If the vehicle selection cannot be entered:
   - check that the program card is correctly installed.
   - check the connections to the vehicle.
   - check the ignition switch position.

If the scan tool still does not allow the vehicle selection to be entered, refer to the scan tool manual.

5. Perform the DATA LINK DIAGNOSTIC TEST using the scan tool. If the scan tool responds with:
   - CKT 914 and CKT 915 = ALL MODULE NO RESPONSE/NOT EQUIPPED, go to Communication System Diagnostics in Section 418-00 to diagnose network concern.

- If the powertrain control module (PCM) is not listed for a communication concern, turn the A/C controls to OFF and execute self-test diagnostics for the PCM.
- If equipped with EATC, and the EATC module is not listed for a communication concern, execute self-test diagnostics for the EATC module.

6. If any PCM or EATC DTCs are retrieved, and are related to the concern, go to the Powertrain Control Module Diagnostic Trouble Code (DTC) Index or the Electronic Automatic Temperature Control (EATC) Module Diagnostic Trouble Code (DTC) Index to continue diagnostics.

7. If no DTCs related to the concern are retrieved, go to the Symptom Chart to continue diagnostics.

8. If the electronic automatic temperature control module cannot be accessed by the scan tool, GO to Pinpoint Test A.

Electronic Automatic Temperature Control Module Self-Test

- The EATC module self-test will not detect concerns associated with data link messages like engine coolant temperature or vehicle speed signals. A scan tool tester must be used to retrieve these concerns.
- The EATC module self-test will detect concerns in the system control functions and will display hard diagnostic trouble codes (DTC) in addition to intermittent diagnostic trouble codes for concerns that occur during system operation. The vehicle interior temperature should be between 4°-32°C (40-90° F) when performing the self-test. If the temperatures are not within the specified ranges, false in-vehicle temperature sensor DTCs will be displayed.
- The self-test can be initiated at any time. Normal operation of the system stops when the self-test is activated.
- To enter the self-test, press the OFF and FLOOR buttons simultaneously and then press the AUTOMATIC button within two seconds. The display will show a pulse tracer going around the center of the display window. The test may run as long as 30 seconds. Record all DTCs displayed.
- If any DTCs appear during the self-test, follow the diagnostics procedure given under ACTION for each DTC given.
- If a condition exists but no DTCs appear during the self-test, refer to the Symptom Chart Condition: The EATC System Is Inoperative, Intermittent or Improper Operation.
- To exit self-test and retain all intermittent DTCs, push the blue (cooler) button. The control will exit self-test, retain all intermittent diagnostic trouble codes and then turn OFF (display blank).
- To exit self-test and clear all diagnostic trouble codes, press the DEFROST button. The vacuum fluorescent display window will show 888 and all function symbols for one second. Then, the EATC control assembly will turn OFF (display blank) and all DTCs will be cleared.
- Always exit the self-test before powering the system down (system turned OFF).
- Intermittent DTCs will be deleted after 80 ignition switch ON cycles after the intermittent condition occurs.

Powertrain Control Module Diagnostic Trouble Code (DTC) Index

DTC	Description	Action
P1460	WOT A/C cutout circuit malfunction	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.
P1464	A/C demand out of self test range	GO to DTC P1464.

ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE DIAGNOSTIC TROUBLE CODE (DTC) INDEX

DTC	EATC (Hard) Self-Test Faults	EATC (Intermittent) Run-Time Faults	Description	Action to Take
B1249	024	022	Blend door short	
		025	Blend door failure	Go To Pinpoint Test A .
B1251	031	N/A	A/C in-vehicle temperature sensor open circuit	Go To Pinpoint Test B .
B1253	030	N/A	A/C in-vehicle temperature sensor short to ground	Go To Pinpoint Test B .
B1255	041	043	A/C ambient temperature sensor open circuit	Go To Pinpoint Test C .
B1257	040	042	A/C ambient temperature sensor short to ground	Go To Pinpoint Test C .
B1261	050	052	A/C solar radiation sensor circuit short to ground	Go To Pinpoint Test D .
U1073	N/A	N/A	SCP invalid or missing data for engine coolant	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.
U1341	N/A	N/A	SCP invalid data for vehicle speed	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.

Symptom Chart

SYMPTOM CHART

Condition	Possible Sources	Action
• No communication with the electronic automatic temperature control module	• Circuitry short/open. • EATC module communication network.	• Go To Pinpoint Test E .
• The EATC system is inoperative, intermittent or incorrect operation	• Circuitry short/open. • Input sensor (s)/erratic input signals. • Charging system. • Automatic temperature control sensor hose and elbow.	• Go To Pinpoint Test F .

• Incorrect/erratic direction of airflow from outlet — manual A/C	• Function selector switch. • A/C vacuum check valve. • Vacuum hose. • A/C vacuum reservoir tank and bracket. • Vacuum control motor. • Vacuum actuator arm.	• Go To Pinpoint Test G .
• Incorrect/erratic direction of airflow from outlet — EATC	• No vacuum to the A/C control. • A/C control leaks vacuum. • Kinked/pinched vacuum hose. • Vacuum control motor. • A/C vacuum check valve. • A/C vacuum reservoir tank and bracket. • Vacuum actuator arm not connected to the door crank.	• Go To Pinpoint Test H .
• Insufficient, erratic, or no heat	• Low engine coolant level. • Engine overheating. • Plugged or partially plugged heater core. • Temperature blend door binding/stuck. • A/C electric blend door actuator.	• Go To Pinpoint Test I .
• The A/C does not operate/does not operate correctly — manual A/C	• Fuse. • Circuitry short/open. • A/C cycling switch. • A/C system. • Function selector switch. • A/C refrigerant.	• Go To Pinpoint Test J .
• The A/C does not operate/does not operate correctly — EATC	• Open fuse. • Circuitry short/open. • A/C cycling switch. • A/C system discharged/low charge. • A/C pressure cutoff switch.	• Go To Pinpoint Test K .

	• A/C control.	
• The A/C is always on — manual A/C	• Circuit short/open. • A/C cycling switch. • A/C control.	• Go To Pinpoint Test L .
• The A/C is always on — EATC	• Circuit short/open. • A/C cycling switch. • A/C control.	• Go To Pinpoint Test M .
• No operation in all temperature settings — manual A/C	• Temperature blend door. • Temperature blend door actuator control. • A/C electronic blend door actuator motor. • Circuitry short/open.	• Go To Pinpoint Test N .
• The blower motor does not operate — manual A/C	• Fuse. • Circuitry short/open. • A/C blower motor switch. • A/C blower motor resistor. • A/C blower motor.	• Go To Pinpoint Test O .
• The blower motor is inoperative — EATC	• Circuitry short/open. • A/C blower motor. • A/C blower motor speed control. • Blower motor relay.	• Go To Pinpoint Test P .
• The blower motor does not operate correctly — manual A/C	• Circuitry short/open. • A/C blower motor resistor. • A/C blower motor switch.	• Go To Pinpoint Test Q .
• The blower motor does not operate correctly — EATC	• Circuitry short/open. • A/C blower motor speed control. • EATC module.	• Go To Pinpoint Test R .
• No operation in high blower setting — manual A/C	• A/C blower motor resistor. • A/C blower motor switch.	• Go To Pinpoint Test S .
• The temperature set point does not repeat after turning the ignition switch OFF — EATC	• Fuse(s). • Circuitry short/open. • EATC module.	• CHECK circuit 54 (LG/YE) for a short or open and repair as necessary. If okay, INSTALL a new EATC module.
• The temperature display will not switch	• EATC module.	• PRESS the MAX A/C and DEFROST buttons

between Celsius and Fahrenheit — EATC		simultaneously for at least 0.75 second. If the temperature display does not switch between Celsius and Fahrenheit, INSTALL a new EATC module.
• One or more steering wheel control switches is inoperative	• Circuitry short/open. • Steering wheel control switch. • EATC module. • Clockspring.	• Go To Pinpoint Test T .
• The console blower motor does not operate	• Fuse. • Circuitry short/open. • Console blower motor. • Console blower resistor. • Rear integrated control panel.	• Go To Pinpoint Test U .

Pinpoint Tests

PINPOINT TEST P1464: DTC P1464: A/C DEMAND OUT OF SELF TEST RANGE

CONDITIONS	DETAILS/RESULTS/ACTIONS
P14641 VERIFY THE CLIMATE CONTROL SYSTEM	
	1 Check the climate control head installed in the vehicle. • **Is the vehicle equipped with EATC?** → **Yes** GO to P14645 . → **No** GO to P14642 .
P14642 RECHECK FOR THE DTC	
1	1 Make sure the function selector switch is in the OFF position.

AM0577-A

2

3

PCM Self-Test

- **Is DTC P1464 retrieved?**

→ **Yes**
GO to P14643 .

→ **No**
The system is functioning correctly. This DTC will set if the A/C is turned on when carrying out the PCM self-test.

P14643 CHECK PID ACCS WITH THE A/C CONTROL DISCONNECTED

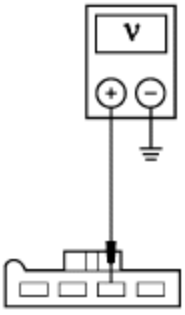
1

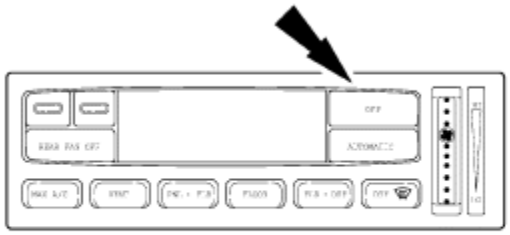
2

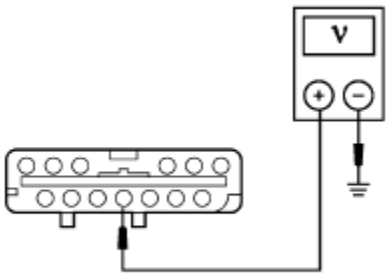
Function Selector Switch C231

3

4

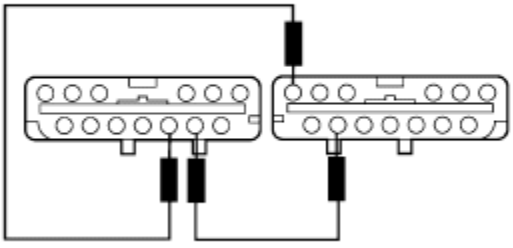
PCM PID ACCS	• **Does PID ACCS read ON?** → **Yes** GO to P14644 . → **No** INSTALL a new function selector switch. REFER to Section 412-04 . REPEAT the PCM self-test and verify DTC P1464 is no longer retrieved.
P14644 CHECK CIRCUIT 348 (VT) FOR A SHORT TO B+	
1  2  PCM C202 3  4  AM0582-A	4 Measure the voltage at the function selector switch pin C231, circuit 348 (VT). • **Is voltage present?** → **Yes** REPAIR circuit 348 (VT) for a short to B+. REPEAT the PCM self-test and verify DTC P1464 is no longer retrieved. → **No** INSTALL a new powertrain control module. REFER to Section 303-14 . REPEAT the PCM self-test and verify DTC P1464 is no longer

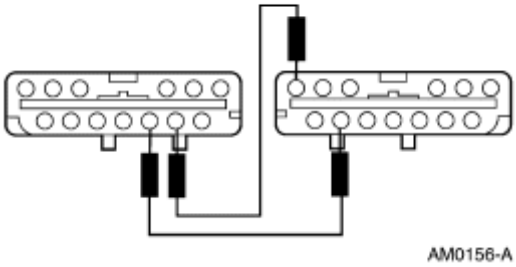
	retrieved.
P14645 RECHECK FOR THE DTC	
1  2  AM0852-A 3  PCM Self-Test	2 Press the OFF button on the electronic automatic temperature control module. • **Is DTC P1464 retrieved?** → **Yes** GO to P14646 . → **No** The system is functioning correctly. This DTC will set if the A/C is turned on when carrying out the PCM self-test.
P14646 CHECK PID ACCS WITH THE A/C CONTROL DISCONNECTED	
1  2  EATC Module C297 3 	

4  PCM PID ACCS	• **Does PID ACCS read ON?** → **Yes** GO to P14647 . → **No** INSTALL a new EATC module. REFER to Section 412-04 . REPEAT the PCM self-test and verify DTC P1464 is no longer retrieved.
P14647 CHECK CIRCUIT 348 (VT) FOR A SHORT TO B+	
1  2  PCM C202 3  4  AM0856-A	4 Measure the voltage at the EATC module connector pin C297-11, circuit 348 (VT). • **Is voltage present?** → **Yes** REPAIR circuit 348 (VT) for a short to B+. REPEAT the PCM self-test and verify DTC P1464 is no longer retrieved.

	→ **No** INSTALL a new powertrain control module. REFER to Section 303-14 . REPEAT the PCM self-test and verify DTC P1464 is no longer retrieved.

PINPOINT TEST A: DTC B1249 — BLEND DOOR FAILURE OR SHORT

CONDITIONS	DETAILS/RESULTS/ACTIONS
A1 CHECK THE BLEND DOOR ACTUATOR CLOCKWISE OPERATION	
1  EATC Module C297 and C298 2  3  AM0155-A	3 Connect a fused jumper wire between EATC module C297 pin 13, circuit 250 (OG) and EATC module C298 pin 2, circuit 54 (LG/YE). Connect a second fused jumper wire between EATC module C297 pin 26, circuit 249 (DB/LG) and EATC module C298 pin 3, circuit 57 (BK). • **Does the air bypass door actuator motor move in the closed direction?** → **Yes** GO to A2 . → **No** GO to A3 .
A2 CHECK THE BLEND DOOR ACTUATOR COUNTERCLOCKWISE OPERATION	
1	1 Connect a fused jumper wire between EATC module C297 pin 26, circuit 249 (DB/LG) and EATC module C298 pin 2, circuit 54 (LG/YE). Connect a second fused jumper wire between EATC module C297 pin 13, circuit 250 (OG) and EATC module C298 pin 3, circuit 57 (BK).


AM0156-A

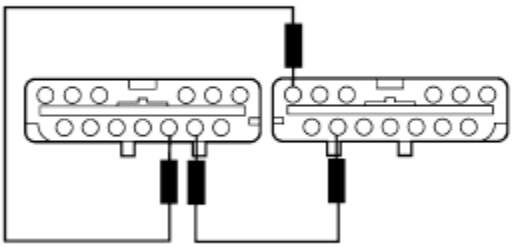
- **Does the actuator motor move in the clockwise direction?**

→ **Yes**
GO to A9 .

→ **No**
GO to A3 .

A3 CHECK THE ACTUATOR CLOCKWISE OPERATION

2


AM0155-A

1 Remove the door actuator and disengage the actuator driveshaft from the actuator door. Refer to Section 412-04 .

2 Connect a fused jumper wire between EATC module C297 pin 13, circuit 250 (OG) and EATC module C298 pin 2, circuit 54 (LG/YE). Connect a second fused jumper wire between EATC module C297 pin 26, circuit 249 (DB/LG) and EATC module C298 pin 3, circuit 57 (BK).

- **Does the air bypass door actuator motor move in the closed direction?**

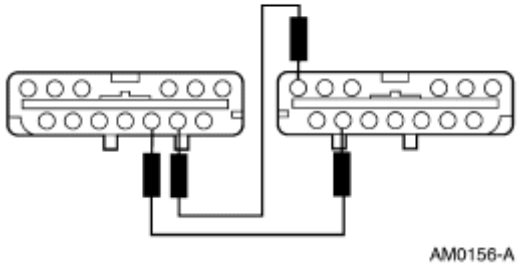
→ **Yes**
INSPECT for binding, broken door or linkage. If no condition is found, INSTALL a new door actuator. REFER to Section 412-04 . TEST the system for normal operation.

→ **No**
GO to A4 .

A4 CHECK THE ACTUATOR COUNTERCLOCKWISE OPERATION

1

1 Connect a fused jumper wire between EATC module C297 pin 26, circuit 249 (DB/LG) and


AM0156-A

EATC module C298 pin 2, circuit 54 (LG/YE).
Connect a second fused jumper wire between EATC module C297 pin 13, circuit 250 (OG) and EATC module C298 pin 3, circuit 57 (BK).

- **Does the actuator motor move in the clockwise direction?**

→ **Yes**
INSPECT for binding or broken door or linkage. If no condition is found, INSTALL a new door actuator. REFER to Section 412-04 . TEST the system for normal operation.

→ **No**
GO to A5 .

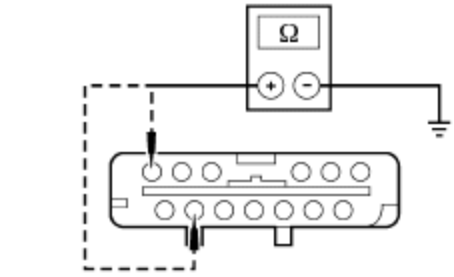
A5 CHECK CIRCUIT 249 (DB/LG) AND CIRCUIT 250 (OG) FOR A SHORT TO GROUND

1

2

Temperature Blend Door Actuator C270

3

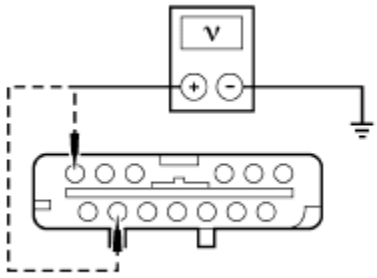
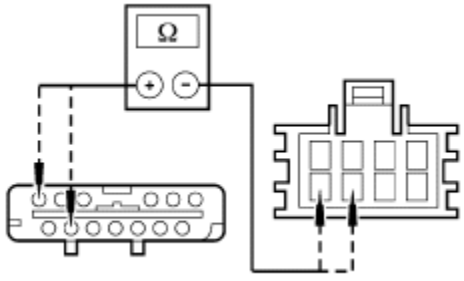


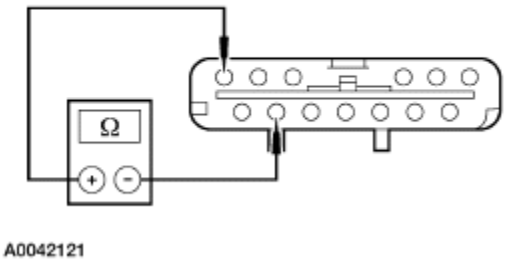
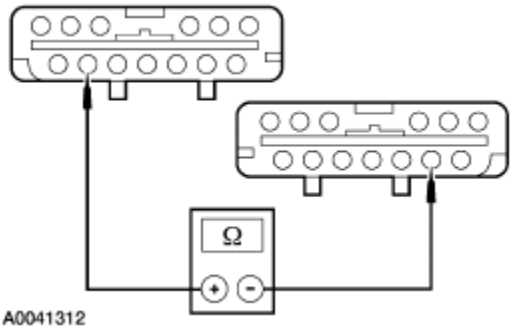
A0042517

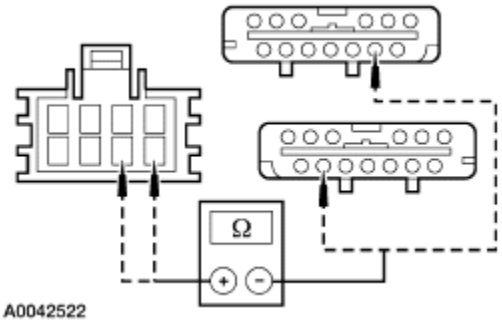
3 Measure the resistance between EATC module C297 pin 26, circuit 249 (DB/LG) and ground. Measure the resistance between EATC module C297 pin 13, circuit 250 (OG) and ground.

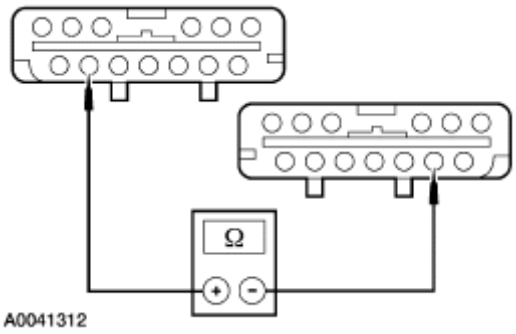
- **Are the resistances greater than 10,000 ohms?**

→ **Yes**
GO to A6 .

	→ **No** REPAIR the affected circuit for a short to ground. TEST the system for normal operation.
A6 CHECK CIRCUIT 249 (DB/LG) AND CIRCUIT 250 (OG) FOR A SHORT TO POWER	
1  2  A0042518	2 Measure the voltage between EATC module C297 pin 26, circuit 249 (DB/LG) and ground. Measure the voltage between EATC module C297 pin 13, circuit 250 (OG) and ground. • **Is voltage present?** → **Yes** REPAIR the affected circuit for a short to power. TEST the system for normal operation. → **No** GO to A7.
A7 CHECK CIRCUIT 249 (DB/LG) AND CIRCUIT 250 (OG) FOR AN OPEN	
1  2  A0042519	2 Measure the resistance between EATC module C298 pin 26, circuit 249 (DB/LG) and the temperature blend door actuator C270 pin 8, circuit 249 (DB/LG). Measure the resistance between EATC module C297 pin 13, circuit 250 (OG) and the temperature blend door actuator C270 pin 7, circuit 250 (OG). • **Are the resistances less than 5 ohms?**

	→ **Yes** GO to A8 . → **No** REPAIR the affected circuit for an open. TEST the system for normal operation.
A8 CHECK CIRCUIT 250 (OG) AND CIRCUIT 249 (DB/LG) FOR A SHORT TOGETHER	
1  A0042121	1 Measure the resistance between EATC module C297 pin 13, circuit 250 (OG) and EATC module C297 pin 26, circuit 249 (DB/LG). • **Is the resistance less than 5 ohms?** → **Yes** INSTALL a new door actuator. REFER to Section 412-04 . TEST the system for normal operation. → **No** REPAIR circuit 250 (OG) and circuit 249 (DB/LG) for a short together. TEST the system for normal operation.
A9 CHECK THE FEEDBACK POTENTIOMETER TOTAL RESISTANCE	
1  2  A0041312	2 Measure the resistance between EATC module C298 pin 6, circuit 243 (LG/OG) and EATC module C297 pin 9, circuit 776 (OG/BK). • **Is the resistance between 5,000 and 6,000 ohms?**

	→ **Yes** GO to A12 . → **No** If the resistance is greater than 6,000 ohms, GO to A10 . If the resistance is less than 5,000 ohms, GO to A11 .
A10 CHECK CIRCUIT 243 (LG/OG) AND CIRCUIT 776 (OG/BK) FOR AN OPEN	
1  Temperature Blend Door Actuator C270 2  A0042522	2 Measure the resistance between EATC module C298 pin 6, circuit 243 (LG/OG) and the temperature blend door actuator C270 pin 5, circuit 243 (LG/OG). Measure the resistance between EATC module C297 pin 9, circuit 776 (OG/BK) and the temperature blend door actuator C270 pin 6, circuit 776 (OG/BK). • **Are the resistances less than 5 ohms?** → **Yes** INSTALL a new temperature blend door actuator. REFER to Section 412-04 . TEST the system for normal operation. → **No** REPAIR the affected circuit for an open. TEST the system for normal operation.
A11 CHECK CIRCUIT 776 (OG/BK) FOR A SHORT TO CIRCUIT 243 (LG/OG)	
1  Temperature Blend Door Actuator C270 2	2 Measure the resistance between EATC module C297 pin 9, circuit 776 (OG/BK) and EATC module C298 pin 6, circuit 243 (LG/OG).



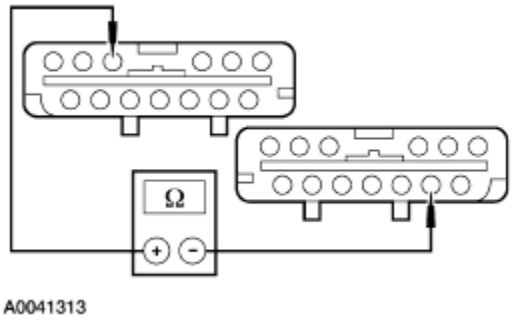
- **Is the resistance greater than 10,000 ohms?**

→ **Yes**
INSTALL a new temperature blend door actuator (19E616). REFER to Section 412-04 . TEST the system for normal operation.

→ **No**
REPAIR circuit 776 (OG/BK) for a short to circuit 243 (LG/OG). TEST the system for normal operation.

A12 CHECK POTENTIOMETER LOW SIDE RESISTANCE

2



1 Drive the actuator to the full counterclockwise position. Refer to Step A2.

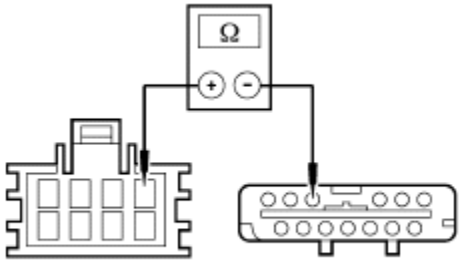
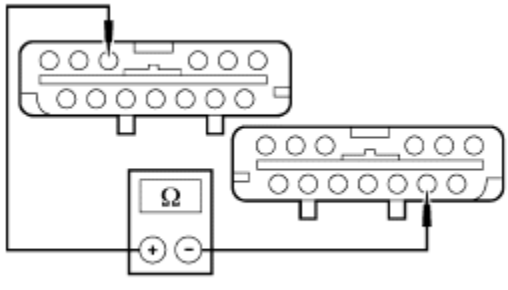
2 Measure the resistance between EATC module C298 pin 18, circuit 351 (BN/WH) and EATC module C297 pin 9, circuit 776 (OG/BK).

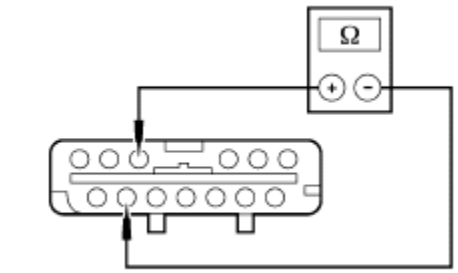
- **Is the resistance between 250 and 3,000 ohms?**

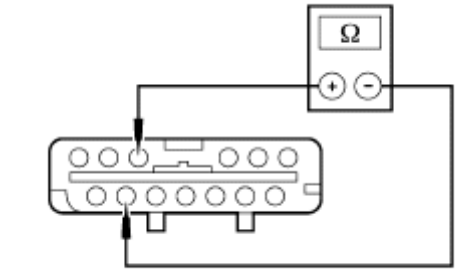
→ **Yes**
GO to A15 .

→ **No**
If the resistance is greater than 3,000 ohms, GO to A13 .
If the resistance is less than 250 ohms, GO to A14 .

A13 CHECK CIRCUIT 351 (BN/WH) FOR AN OPEN

1  Temperature Blend Door Actuator C270 2  A0042524	2 Measure the resistance between EATC module C298 pin 18, circuit 351 (BN/WH) and the temperature blend door actuator C270 pin 1, circuit 351 (BN/WH). • **Is the resistance less than 5 ohms?** → **Yes** INSTALL a new temperature blend door actuator (19E616). REFER to Section 412-04 . TEST the system for normal operation. → **No** REPAIR circuit 351 (BN/WH) for an open. TEST the system for normal operation.
A14 CHECK CIRCUIT 776 (OG/BK) AND CIRCUIT 351 (BN/WH) FOR A SHORT TOGETHER	
1  Temperature Blend Door Actuator C270 2  A0041313	2 Measure the resistance between EATC module C297 pin 9, circuit 776 (OG/BK) and EATC module C298 pin 18, circuit 351 (BN/WH). • **Is the resistance greater than 10,000 ohms?** → **Yes**

	INSTALL a new temperature blend door actuator (19E616). REFER to Section 412-04 . TEST the system for normal operation. → **No** REPAIR circuit 351 (BN/WH) for a short to circuit 776 (OG/BK). TEST the system for normal operation.
A15 CHECK POTENTIOMETER HIGH SIDE RESISTANCE	
1  A0041314	1 Measure the resistance between EATC module C298 pin 6, circuit 243 (LG/OG) and EATC module C298 pin 18, circuit 351 (BN/WH). • **Is the resistance between 3,000 and 6,000 ohms?** → **Yes** GO to A17 . → **No** If the resistance is greater than 6,000 ohms, INSTALL a new temperature blend door actuator. REFER to Section 412-04 . TEST the system for normal operation. If the resistance is less than 3,000 ohms, GO to A16 .
A16 CHECK CIRCUIT 243 (LG/OG) AND CIRCUIT 351 (BN/WH) FOR A SHORT TOGETHER	
1  Temperature Blend Door Actuator C270	
2	2 Measure the resistance between EATC module C298 pin 6, circuit 243 (LG/OG) and EATC module C298 pin 18, circuit 351 (BN/WH).



A0041314

- **Is the resistance greater than 10,000 ohms?**

→ **Yes**
INSTALL a new temperature blend door actuator (19E616). REFER to Section 412-04 . TEST the system for normal operation.

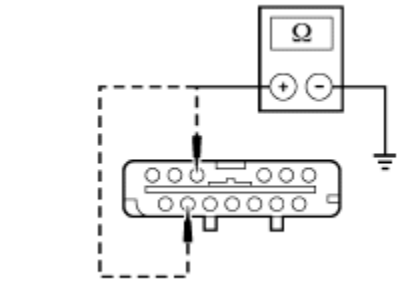
→ **No**
REPAIR circuits 243 (LG/OG) and circuit 351 (BN/WH) for a short together. TEST the system for normal operation.

A17 CHECK CIRCUIT 243 (LG/OG) AND CIRCUIT 351 (BN/WH) FOR A SHORT TO GROUND

1


Temperature Blend Door Actuator C270

2



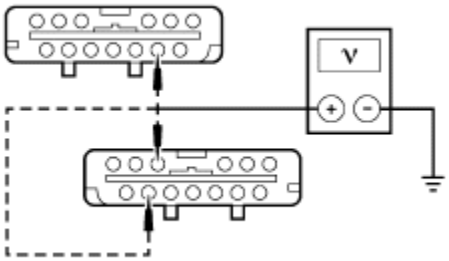
A0042526

2 Measure the resistance between EATC module C298 pin 6, circuit 243 (LG/OG) and ground. Measure the resistance between EATC module C298 pin 18, circuit 351 (BN/WH) and ground.

- **Are the resistances greater than 10,000 ohms?**

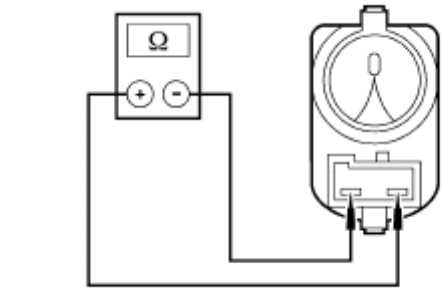
→ **Yes**
GO to A18 .

→ **No**
REPAIR the affected circuit 243 (LG/OG) or circuit 351 (BN/WH) for a short to ground.

	TEST the system for normal operation.
A18 CHECK CIRCUITS 243 (LG/OG) 351 (BN/WH) AND 776 (OG/BK) FOR A SHORT TO POWER	
1  2  A0042527	2 Measure the voltage between EATC module C298 pin 6, circuit 243 (LG/OG), EATC module C298 pin 18, circuit 351 (BN/WH) and EATC module C297 pin 9, circuit 776 (OG/BK) and ground. • **Is voltage present?** → **Yes** REPAIR the affected circuit for a short to power. TEST the system for normal operation. → **No** INSPECT for a broken door or linkage. If no condition is found, INSTALL a new EATC module. REFER to Section 412-04 . TEST the system for normal operation.

PINPOINT TEST B: DTC B1251 OR DTC B1253 — A/C IN-VEHICLE TEMPERATURE SENSOR OPEN CIRCUIT OR SHORT TO GROUND

CONDITIONS	DETAILS/RESULTS/ACTIONS
B1 CHECK THE SENSOR RESISTANCE	
1  2  In-Vehicle Temperature Sensor C296 3	3 Measure the resistance between the in-vehicle temperature sensor terminals.



A0041320

- **Is the resistance within the specified values for these temperature ranges: 10-20°C (50-68°F), 37,000-58,000 ohms; 20-30°C (68-86°F), 24,000-37,000 ohms; 30-40°C (86-104°F), 16,000-24,000 ohms?**

→ **Yes**
GO to B2 .

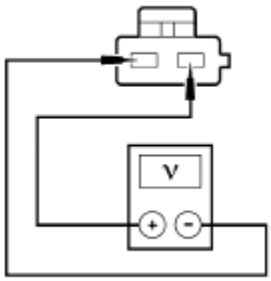
→ **No**
INSTALL a new in-vehicle temperature sensor (19D888). TEST the system for normal operation.

B2 CHECK THE EATC SENSOR OUTPUT VOLTAGE

1

2 Press the AUTOMATIC button.

3



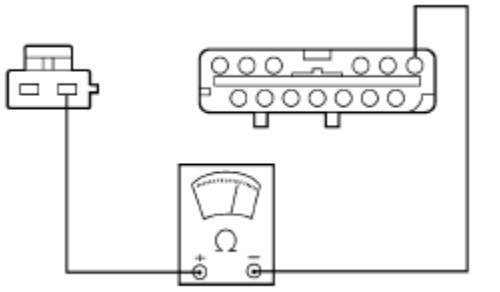
A0041321

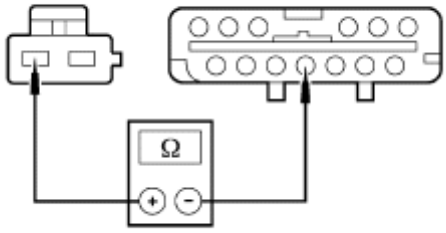
3 Measure the voltage between the in-vehicle temperature sensor C296, circuit 790 (WH/OG) and circuit 470 (PK/BK).

- **Is the voltage between 4.7 and 5.1 volts?**

→ **Yes**
INSTALL a new EATC module (19980). TEST the system for normal operation.

→ **No**
If diagnosing DTC B1251, GO to B3 .

	If diagnosing DTC B1253, GO to B5 .
B3 CHECK CIRCUIT 790 (WH/OG) FOR AN OPEN	
1  2  EATC Module C297 3  AL0581-A	3 Measure the resistance between the EATC module C297 pin 21, circuit 790 (WH/OG) and the in-vehicle temperature sensor C296, circuit 790 (WH/OG). • **Is the resistance less than 5 ohms?** → **Yes** GO to B4 . → **No** REPAIR circuit 790 (WH/OG) for an open. TEST the system for normal operation.
B4 CHECK CIRCUIT 470 (PK/BK) FOR AN OPEN	
NOTE: When performing tests, allow time for resistance measurement to stabilize.	
1  EATC Module C298 2	2 Measure the resistance between the EATC module C298 pin 4, circuit 470 (PK/BK) and the in-vehicle temperature sensor C296, circuit 470 (PK/BK).



A0041323

- **Is the resistance less than 5 ohms?**

→ **Yes**
INSTALL a new EATC module (19980). TEST the system for normal operation.

→ **No**
REPAIR circuit 470 (PK/BK) for an open. TEST the system for normal operation.

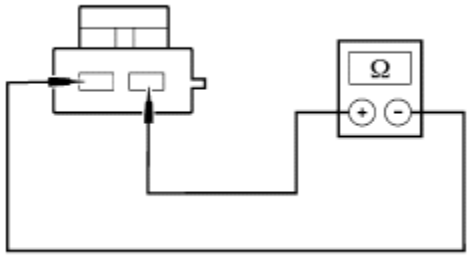
B5 CHECK CIRCUIT 790 (WH/OG) FOR A SHORT TO CIRCUIT 470 (PK/BK)

1

2

EATC Module C297

3



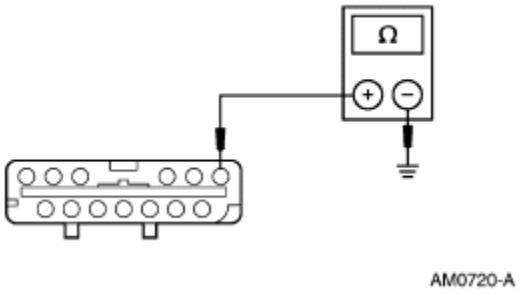
A0038067

3 Measure the resistance between the in-vehicle temperature sensor C296, circuit 790 (WH/OG) and circuit 470 (PK/BK).

- **Is the resistance greater than 10,000 ohms?**

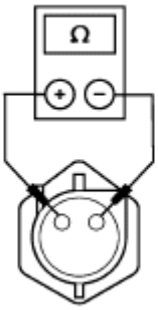
→ **Yes**
GO to B6 .

→ **No**

	REPAIR circuit 790 (WH/OG) for a short to circuit 470 (PK/BK). TEST the system for normal operation.
B6 CHECK CIRCUIT 790 (WH/OG) FOR A SHORT TO GROUND	
1  AM0720-A	1 Measure the resistance between the EATC module C297 pin 21, circuit 790 (WH/OG) and ground. • **Is the resistance greater than 10,000 ohms?** → **Yes** INSTALL a new EATC module (19980). TEST the system for normal operation. → **No** REPAIR circuit 790 (WH/OG) for a short to ground. TEST the system for normal operation.

PINPOINT TEST C: DTC B1255 OR DTC B1257 — A/C AMBIENT TEMPERATURE SENSOR OPEN CIRCUIT OR SHORT TO GROUND

CONDITIONS	DETAILS/RESULTS/ACTIONS
C1 CHECK THE AMBIENT TEMPERATURE SENSOR RESISTANCE	
1 	
2  Ambient Temperature Sensor C196	
3	3 Measure the resistance between the ambient temperature sensor terminals.



A0002817

- **Is the resistance within the specified values for these temperature ranges: 10-20°C (50-68°F), 37,000-58,000 ohms; 20-30°C (68-86°F), 24,000-37,000 ohms; 30-40°C (86-104°F), 16,000-24,000 ohms?**

→ **Yes**
GO to C2 .

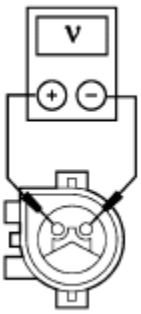
→ **No**
INSTALL a new ambient air temperature sensor (19E702). TEST the system for normal operation.

C2 CHECK THE EATC MODULE OUTPUT VOLTAGE

1

2 Press the AUTOMATIC button.

3



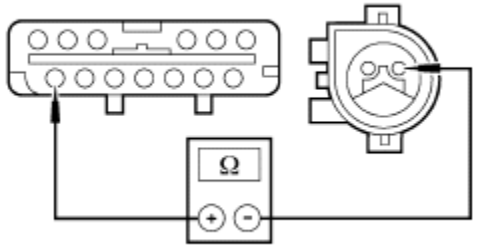
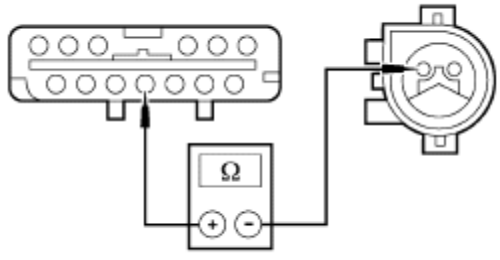
A0002818

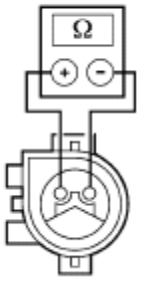
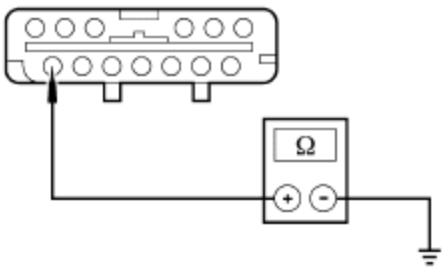
3 Measure the voltage between the ambient temperature sensor C196, circuit 767 (LB/OG) and circuit 470 (PK/BK).

- **Is the voltage between 4.7 and 5.1 volts?**

→ **Yes**
INSTALL a new EATC module (19980). TEST the system for normal operation.

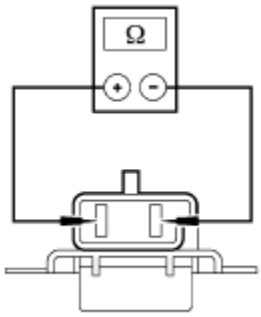
→ **No**
If diagnosing DTC B1255, GO to C3 .

	If diagnosing DTC B1257, GO to C5 .
C3 CHECK CIRCUIT 767 (LB/OG) FOR AN OPEN	
1  2  EATC Module C298 3  A0041324	3 Measure the resistance between the EATC module C298 pin 7, circuit 767 (LB/OG) and the ambient temperature sensor C196, circuit 767 (LB/OG). • **Is the resistance less than 5 ohms?** → **Yes** GO to C4 . → **No** REPAIR circuit 767 (LB/OG) for an open. TEST the system for normal operation.
C4 CHECK CIRCUIT 470 (PK/BK) FOR AN OPEN	
1  A0041325	1 Measure the resistance between the EATC module C298 pin 4, circuit 470 (PK/BK) and the ambient temperature sensor C196, circuit 470 (PK/BK). • **Is the resistance less than 5 ohms?** → **Yes** INSTALL a new EATC module (19980). TEST

	the system for normal operation. → **No** REPAIR circuit 470 (PK/BK) for an open. TEST the system for normal operation.
C5 CHECK CIRCUIT 767 (LB/OG) FOR A SHORT TO CIRCUIT 470 (PK/BK)	
1  2  EATC Module C298 3  A0038068	3 Measure the resistance between the ambient temperature sensor C196, circuit 767 (LB/OG) and circuit 470 (PK/BK). • **Is the resistance greater than 10,000 ohms?** → **Yes** GO to C6 . → **No** REPAIR circuit 767 (LB/OG) for a short to ground. TEST the system for normal operation.
C6 CHECK CIRCUIT 767 (LB/OG) FOR A SHORT TO GROUND	
1  A0041326	1 Measure the resistance between the EATC module C298 pin 7, circuit 767 (LB/OG) and ground.

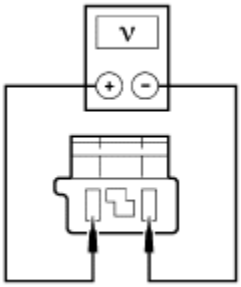
	• **Is the resistance greater than 10,000 ohms?** → **Yes** INSTALL a new EATC module (19980). TEST the system for normal operation. → **No** REPAIR circuit 767 (LB/OG) for a short to ground. TEST the system for normal operation.

PINPOINT TEST D: DTC B1261 — A/C SOLAR RADIATION SENSOR CIRCUIT SHORT TO GROUND

CONDITIONS	DETAILS/RESULTS/ACTIONS
D1 CHECK THE SOLAR RADIATION SENSOR RESISTANCE	
1  2  Solar Radiation Sensor C294 3  A0041327	3 **NOTE:** Connect the ground lead of the multimeter to ground on the sensor, circuit 470 (PK/BK). Measure the resistance between the solar radiation sensor terminals. • **Is the resistance greater than 0 ohms?** → **Yes** GO to D2 . → **No** INSTALL a new solar radiation sensor (19E663). TEST the system for normal operation.
D2 CHECK THE SOLAR RADIATION SENSOR REFERENCE VOLTAGE	

1

3



A0041328

2 Press the AUTOMATIC button.

3 Measure the voltage between the solar radiation sensor C294, circuit 468 (BN) and circuit 470 (PK/BK).

- **Is the voltage between 4.7 and 5.1 volts?**

→ **Yes**
INSTALL a new EATC module (19980). TEST the system for normal operation.

→ **No**
GO to D3 .

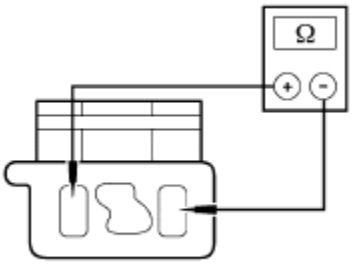
D3 CHECK CIRCUIT 468 (BN) FOR A SHORT TO CIRCUIT 470 (PK/BK)

1

2

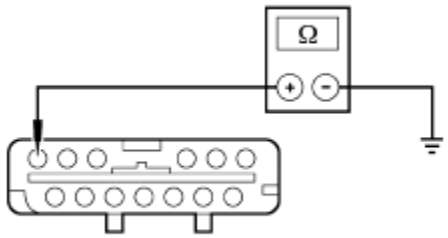
EATC Module C298

3



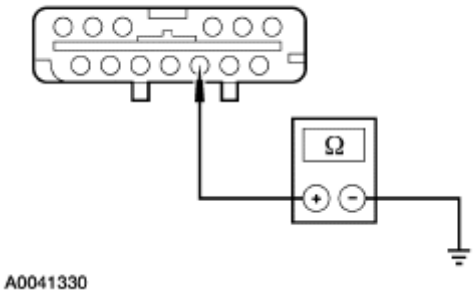
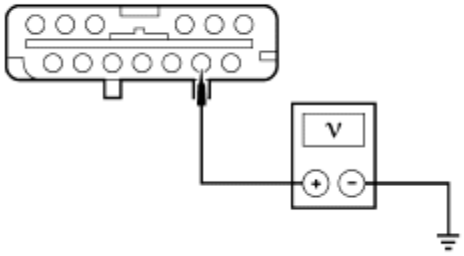
A0038069

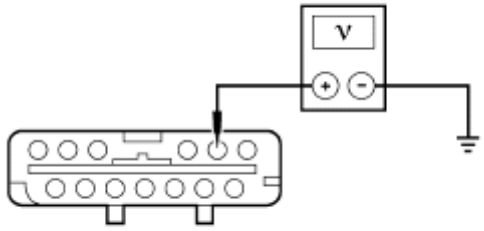
3 Measure the resistance between the solar radiation sensor C294, circuit 468 (BN) and circuit 470 (PK/BK).

	• **Is the resistance greater than 10,000 ohms?** → **Yes** GO to D4 . → **No** REPAIR circuit 468 (BN) for a short to circuit 470 (PK/BK).
D4 CHECK CIRCUIT 468 (BN) FOR A SHORT TO GROUND	
1  A0041329	1 Measure the resistance between the EATC module C298 pin 20, circuit 468 (BN) and ground. • **Is the resistance greater than 10,000 ohms?** → **Yes** INSTALL a new EATC module (19980). TEST the system for normal operation. → **No** REPAIR circuit 468 (BN) for a short to ground. TEST the system for normal operation.

PINPOINT TEST E: NO COMMUNICATION WITH THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL MODULE

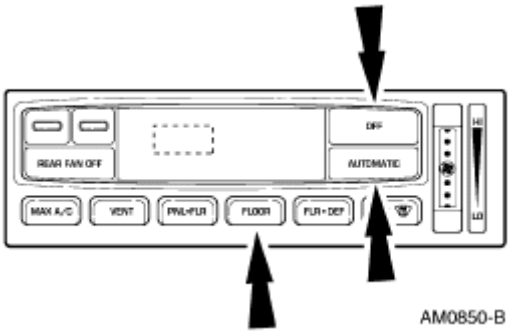
CONDITIONS	DETAILS/RESULTS/ACTIONS
E1 CHECK CIRCUIT 57 (BK) FOR AN OPEN	
1  2  EATC Module C298 3	

 A0041330	3 Measure the resistance between the EATC module C298 pin 3, circuit 57 (BK) and ground. • **Is the resistance less than 25 ohms?** → **Yes** GO to E2 . → **No** REPAIR circuit 57 (BK) for an open. TEST the system for normal operation.
E2 CHECK CIRCUIT 54 (LG/YE) FOR B+	
1  A0041331	1 Measure the voltage between the EATC module C298 pin 2, circuit 54 (LG/YE) and ground. • **Is the voltage B+?** → **Yes** GO to E3 . → **No** REPAIR circuit 54 (LG/YE) for an open. TEST the system for normal operation.
E3 CHECK CIRCUIT 364 (BK/LG) FOR B+	
1  2	2 Measure the voltage between the EATC module C298 pin 16, circuit 364 (BK/LG) and ground.

 A0041332	• **Is the voltage B+?** → **Yes** REFER to Section 418-00 to diagnose a network concern. → **No** REPAIR circuit 364 (BK/LG) for an open. TEST the system for normal operation.

PINPOINT TEST F: THE EATC SYSTEM IS INOPERATIVE, INTERMITTENT OR INCORRECT OPERATION

CONDITIONS	DETAILS/RESULTS/ACTIONS
F1 VERIFY AUTOMATIC OPERATION	
1 	2 Press the AUTOMATIC button. • **Does AUTO and the selected temperature appear in the display window?** → **Yes** GO to F2 . → **No** GO to F11 .
F2 CARRY OUT THE EATC MODULE SELF-TEST	
1	1 Carry out the EATC module self-test. Refer to the Electronic Automatic Temperature Control Module Self-Test in this section. Record the DTCs displayed, if any.



- **Were any DTCs displayed as a result of the EATC self-test?**

→ **Yes**
REFER to the Electronic Automatic Temperature Control (EATC) Module Diagnostic Trouble Code (DTC) Index. CARRY OUT the necessary diagnosis and REPAIR as required.

→ **No**
GO to F3 .

F3 CHECK THE VACUUM FLUORESCENT DISPLAY

1 Exit self-test by pressing the DEFROST button. Observe the function symbols displayed on the vacuum fluorescent display.

- **Is the display correct and complete without any missing elements?**

→ **Yes**
GO to F4 .

→ **No**
INSTALL a new EATC module (19980). TEST the system for normal operation.

F4 CHECK THE BLOWER MANUAL OVERRIDE OPERATION

1 Slowly rotate the blower motor speed override control from LO to HI.

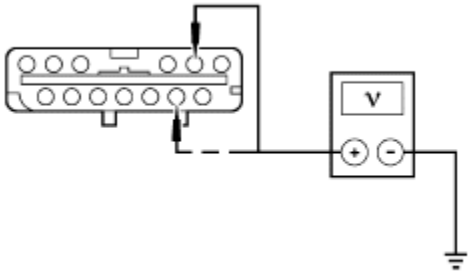
- **Does the blower motor speed increase smoothly from low speed to high speed?**

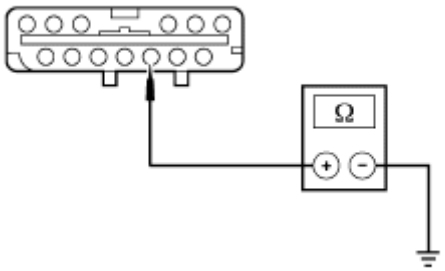
→ **Yes**
GO to F5 .

→ **No**
If the blower motor is inoperative, Go To Pinpoint Test M .

	If the blower motor operates continuously in high speed, Go To Pinpoint Test Q . If the blower motor is inoperative only in some speeds, Go To Pinpoint Test R .
F5 VERIFY THE DEFROST OVERRIDE OPERATION	
	1 Press the override button for DEFROST operation. • **Is outside air being discharged from the windshield defroster nozzle and the side window demisters?** → **Yes** GO to F6 . → **No** Go To Pinpoint Test H .
F6 VERIFY THE FLOOR OVERRIDE OPERATION	
	1 Press the override button for FLOOR operation. • **Is outside air being discharged from the floor duct?** → **Yes** GO to F7 . → **No** Go To Pinpoint Test H .
F7 VERIFY THE VENT OVERRIDE OPERATION	
	1 Press the override button for VENT operation. • **Is outside air being discharged from the instrument panel registers?** → **Yes** GO to F8 . → **No** Go To Pinpoint Test H .
F8 VERIFY THE A/C CLUTCH DOES NOT ENGAGE IN THE VENT MODE	
	1 Press the override button for VENT operation. • **Does the A/C clutch engage when the VENT override button is pressed?**

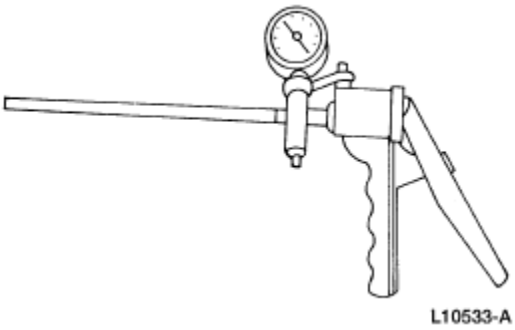
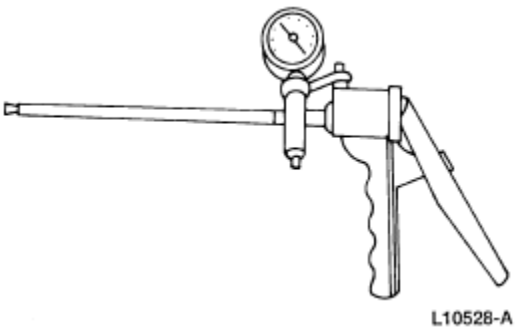
	→ **Yes** REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. → **No** GO to F9.
F9 VERIFY THE MAX A/C OVERRIDE OPERATION	
	1 Make sure the ambient air temperature is above 5°C (41°F). 2 Press the override button for MAX A/C operation. • **Is recirculated air being discharged from the instrument panel registers?** → **Yes** GO to F10. → **No** Go To Pinpoint Test H.
F10 VERIFY A/C CLUTCH ENGAGEMENT IN THE MAX A/C MODE	
	1 Press the override button for MAX A/C operation. • **Does the A/C clutch engage when the MAX A/C override button is pressed?** → **Yes** The test is complete. The system is functioning normally. → **No** Go To Pinpoint Test I.
F11 CHECK THE EATC MODULE FUNCTIONS	
	1 Press each function button and observe the display. • **Does the EATC perform and display any functions?** → **Yes** INSTALL a new EATC module (19980). TEST the system for normal operation. → **No** GO to F12.
F12 CHECK THE VOLTAGE TO THE EATC	
1	

2  EATC Module C298 3  4  A0038636	4 Measure the voltage between ground and: • EATC module C298 pin 2, circuit 54 (LG/YE) • EATC module C298 pin 16, circuit 364 (BK/LG) • **Are the voltages greater than 10 volts?** → **Yes** GO to F13 . → **No** REPAIR the affected circuit. TEST the system for normal operation.
F13 CHECK THE GROUND CIRCUIT TO THE EATC	
1  2	2 Measure the resistance between the EATC module C298 pin 3, circuit 57 (BK) and ground.

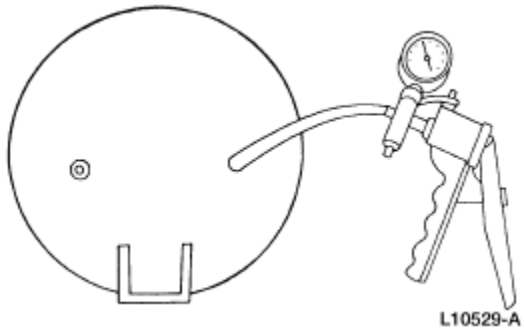
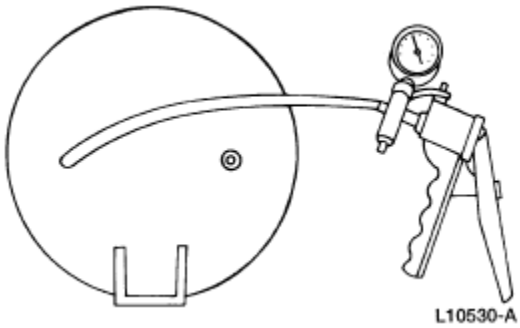
 A0038714	• **Is the resistance less than 5 ohms?** → **Yes** INSTALL a new EATC module (19980). TEST the system for normal operation. → **No** REPAIR circuit 57 (BK) for an open. TEST the system for normal operation.

PINPOINT TEST G: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET — MANUAL CLIMATE CONTROL

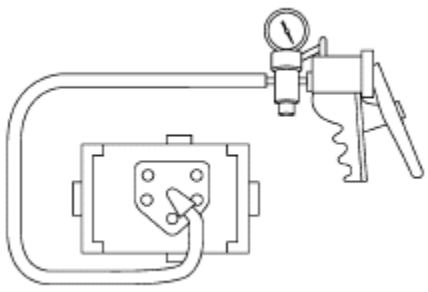
CONDITIONS	DETAILS/RESULTS/ACTIONS
G1 CHECK THE AIRFLOW IN EACH SETTING	
1 	2 Set the blower motor speed to maximum. 3 Check the airflow in each function selector switch setting at engine idle and under acceleration. • **Is the airflow from only the defroster outlets in each function selector switch setting?** → **Yes** GO to G2 . → **No** GO to G7 .
G2 CHECK THE VACUUM RESERVOIR SUPPLY LINE FOR BLOCKAGE	
	1 Disconnect the vacuum reservoir supply line at the vacuum reservoir and the vacuum

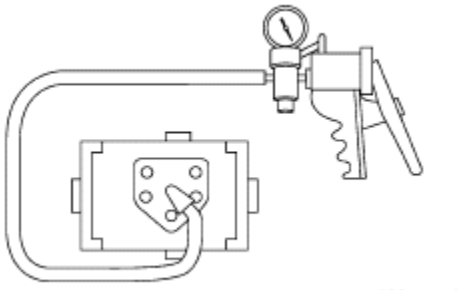
2  L10533-A	source. 2 Connect the vacuum pump to the vacuum reservoir supply line and attempt to pull a vacuum. • **Can a vacuum be pulled on the vacuum reservoir supply line?** → **Yes** REPAIR or INSTALL a new vacuum reservoir supply line. TEST the system for normal operation. → **No** GO to G3 .
G3 CHECK THE VACUUM RESERVOIR SUPPLY LINE FOR LEAKS	
2  L10528-A	1 Plug the vacuum reservoir supply line at the vacuum source connection. 2 Leak test the vacuum reservoir supply line using the vacuum pump. • **Does the vacuum reservoir line leak?** → **Yes** REPAIR or INSTALL a new vacuum reservoir supply line. TEST the system for normal operation. → **No** GO to G4 .
G4 CHECK THE VACUUM RESERVOIR FOR A LEAK	
NOTE: The reservoir has two vacuum hoses, these hoses are not interchangeable. The A/C check	

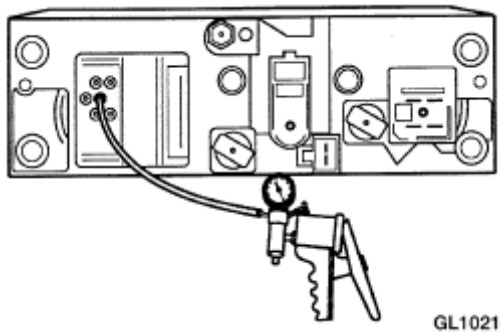
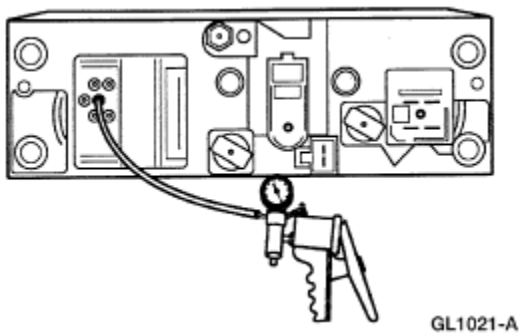
valve is built into the vacuum reservoir tank.

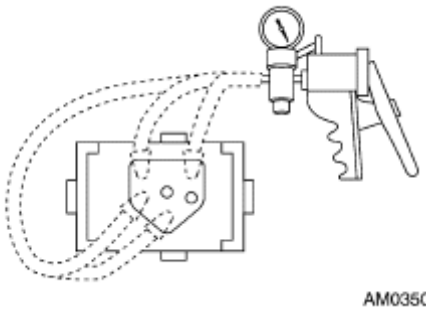
	1 Connect the vacuum pump reservoir line to the vacuum reservoir.
2  L10529-A	2 With the vacuum pump connected to the vacuum reservoir, leak test the vacuum reservoir.
3  L10530-A	3 With the vacuum pump connected to the vacuum reservoir, leak test the vacuum reservoir.
	• **Does the vacuum reservoir leak?** → **Yes** INSTALL a new vacuum reservoir (19A566). TEST the system for normal operation. → **No** GO to G5 .

G5 CHECK THE FUNCTION SELECTOR SWITCH VACUUM SOURCE LINE FOR BLOCKAGE

	1 Disconnect the function selector switch vacuum connector.
2  AM0342-A	2 Connect the vacuum pump to the function selector switch vacuum source line and attempt to pull a vacuum.

	• **Can a vacuum be pulled on the function selector switch vacuum source line?** → **Yes** REPAIR or INSTALL a new function selector switch vacuum source line. TEST the system for normal operation. → **No** GO to G6 .
G6 CHECK THE FUNCTION SELECTOR SWITCH VACUUM SOURCE LINE FOR LEAKS	
2  AM0342-A	1 Plug the function selector switch vacuum source line at the vacuum reservoir connection. 2 Leak test the function selector switch vacuum source line using the vacuum pump. • **Does the function selector switch vacuum source line leak?** → **Yes** REPAIR or INSTALL a new function selector switch vacuum source line. TEST the system for normal operation. → **No** INSTALL a new function selector switch (19B888). REFER to Section 412-04 . TEST the system for normal operation.
G7 CHECK THE FUNCTION SELECTOR SWITCH FOR BLOCKAGE	
1  Function Selector Switch Vacuum Harness 2	2 Connect a vacuum pump to the function selector switch vacuum supply port and try to pull a vacuum in each function selector switch position. If the vacuum pump can pull and hold a vacuum, the switch is plugged. If the

 GL1021-A	vacuum pump pulls a vacuum that slowly decays, the function selector switch is restricted. • **Is the function selector switch plugged or restricted?** → **Yes** INSTALL a new function selector switch (19B888). REFER to Section 412-04 . TEST the system for normal operation. → **No** GO to G8 .
G8 LEAK TEST THE FUNCTION SELECTOR SWITCH	
1  GL1021-A	1 Connect a vacuum pump to the function selector switch vacuum supply port and plug each control port. 2 At each function selector switch position apply 51 kPa (15 in-Hg) of vacuum. • **Does the vacuum drop exceed 3.37 kPa (1 in-Hg) per minute?** → **Yes** INSTALL a new function selector switch (19B888). REFER to Section 412-04 . TEST the system for normal operation. → **No** GO to G9 .
G9 CHECK THE VACUUM HOSE	
2	1 Disconnect the suspect hose. 2 Connect a vacuum pump to each hose and


AM0350-A

attempt to pull and hold a vacuum.

- **Does the vacuum drop in any hose exceed 3.37 kPa (1 in-Hg) per minute?**

→ **Yes**
GO to G10 .

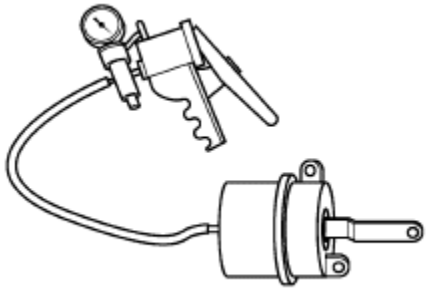
→ **No**
GO to G11 .

G10 CHECK THE VACUUM CONTROL MOTOR

1


Vacuum Control Motor

2


AL0136-A

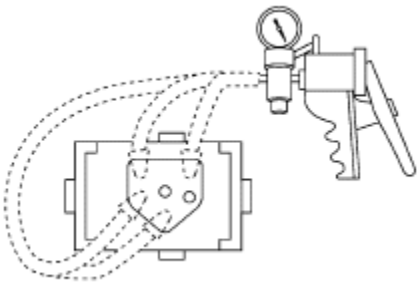
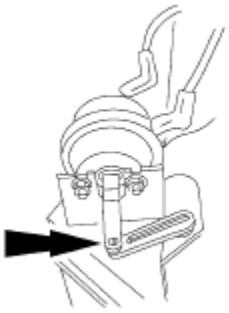
2 Connect a vacuum pump to the affected vacuum control motor. Apply 51 kPa (15 in-Hg) of vacuum.

- **Does the vacuum drop exceed 1.68 kPa (0.5 in-Hg) per minute?**

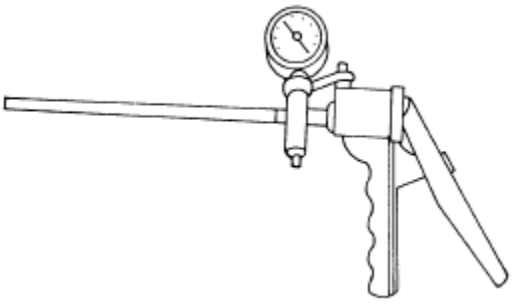
→ **Yes**
INSTALL a new vacuum control motor (18A318). REFER to Section 412-04 . TEST the system for normal operation.

→ **No**
REPAIR or INSTALL a new vacuum harness (19C827). TEST the system for normal operation.

G11 CHECK THE VACUUM CONTROL MOTOR HOSES FOR BLOCKAGE

1  Vacuum Control Motors 2  AM0350-A	2 Connect a vacuum pump to each hose and try to pull a vacuum. If the vacuum pump can pull and hold a vacuum, the hose is plugged. If the vacuum pump pulls a vacuum that slowly decays, the hose is restricted. • **Is the hose plugged or restricted?** → **Yes** REPAIR or INSTALL a new vacuum harness (19C827). TEST the system for normal operation. → **No** GO to G12 .
G12 CHECK THE VACUUM CONTROL MOTOR INSTALLATION	
1  AL0158-A	1 Check the attachment of the vacuum control motor arm to the damper door. • **Is the vacuum control motor arm attached to the door or door crank arm?** → **Yes** REPAIR the damper door. TEST the system for normal operation. → **No** CONNECT the vacuum control motor arm to the door crank arm. TEST the system for normal operation.

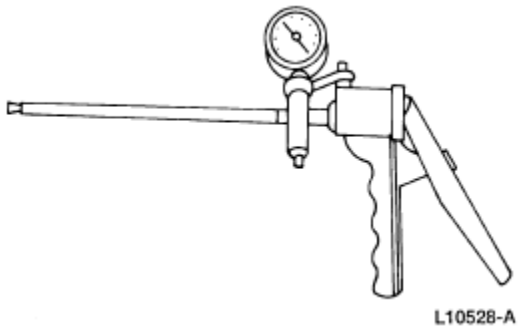
PINPOINT TEST H: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET — EATC

CONDITIONS	DETAILS/RESULTS/ACTIONS
H1 CHECK THE AIRFLOW IN EACH SETTING	
1 	2 Check the airflow in each manual override setting on the EATC module during engine idle and under acceleration. • **Is the airflow correct in each manual override setting?** → **Yes** The system is operating normally. → **No** If the airflow is from the defrost outlet only in all settings, GO to H2 . If the airflow is incorrect in one setting only, NOTE the non-functional setting. GO to H7 . If the airflow is incorrect in MAX only, GO to H11 .
H2 CHECK THE VACUUM RESERVOIR SUPPLY LINE FOR BLOCKAGE	
2  L10533-A	1 Disconnect the vacuum reservoir supply line at the vacuum reservoir and the vacuum source. 2 Connect the vacuum pump to the vacuum reservoir supply line and attempt to pull a vacuum. • **Can a vacuum be pulled on the vacuum reservoir supply line?** → **Yes** REPAIR or INSTALL a new vacuum reservoir supply line. TEST the system for normal operation.

→ **No**
GO to H3 .

H3 CHECK THE VACUUM RESERVOIR SUPPLY LINE FOR LEAKS

2


L10528-A

1 Plug the vacuum reservoir supply line at the vacuum source connection.

2 Leak test the vacuum reservoir supply line using the vacuum pump.

- **Does the vacuum reservoir line leak?**

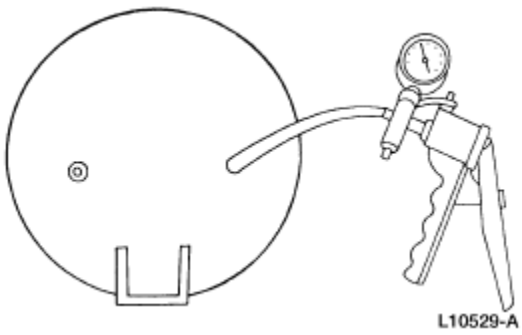
→ **Yes**
REPAIR or INSTALL a new vacuum reservoir line. TEST the system for normal operation.

→ **No**
GO to H4 .

H4 CHECK THE VACUUM RESERVOIR FOR A LEAK

NOTE: The reservoir has two vacuum hoses, these hoses are not interchangeable. The A/C check valve is built into the vacuum reservoir tank.

2

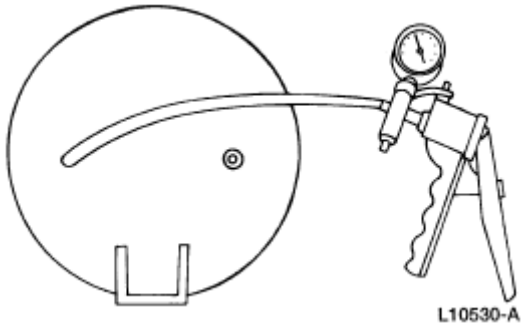

L10529-A

1 Connect the vacuum pump to the vacuum reservoir.

2 With the vacuum pump connected to the vacuum reservoir, leak test the vacuum reservoir.

3

3 With the vacuum pump connected to the vacuum reservoir, leak test the vacuum reservoir.



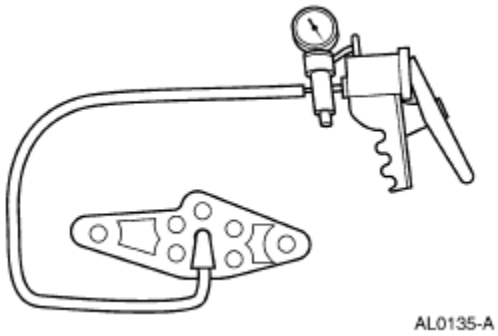
- **Does the vacuum reservoir leak?**

→ **Yes**
INSTALL a new vacuum reservoir. TEST the system for normal operation.

→ **No**
GO to H5 .

H5 CHECK THE EATC MODULE VACUUM SOURCE LINE FOR BLOCKAGE

2



1 Disconnect the EATC module vacuum connector.

2 Connect the vacuum pump to the EATC module vacuum source line and attempt to pull a vacuum.

- **Can a vacuum be pulled on the EATC module vacuum source line?**

→ **Yes**
REPAIR or INSTALL a new EATC module vacuum source line. TEST the system for normal operation.

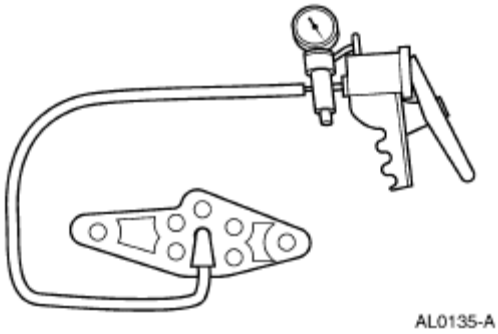
→ **No**
GO to H6 .

H6 CHECK THE EATC MODULE VACUUM SOURCE LINE FOR LEAKS

2

1 Plug the EATC module vacuum source line at the vacuum reservoir connection.

2 Leak test the EATC module vacuum source line using the vacuum pump.


AL0135-A

- **Does the EATC module vacuum source line leak?**

→ **Yes**
REPAIR or INSTALL a new EATC module vacuum source line. TEST the system for normal operation.

→ **No**
INSTALL a new EATC module (19980). TEST the system for normal operation.

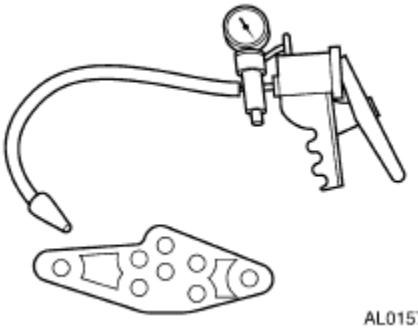
H7 CHECK THE VACUUM CONTROL MOTOR LINE FOR BLOCKAGE

1

2 Disconnect the EATC module vacuum connector.

3 Disconnect the vacuum line from the appropriate vacuum control motor noted in Step H1.

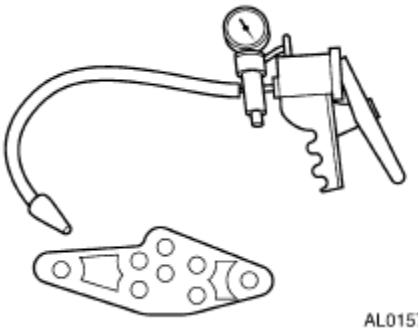
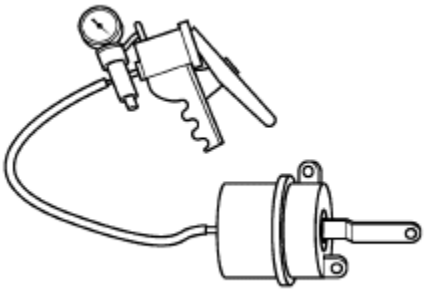
4

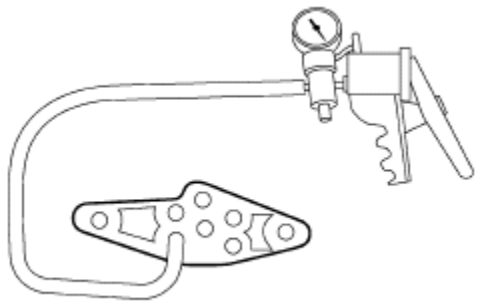

AL0157-A

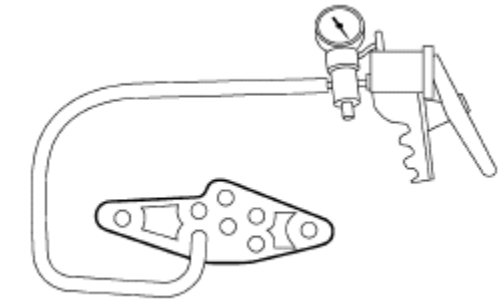
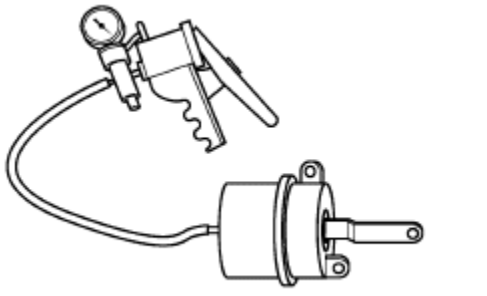
4 Connect the vacuum pump to the appropriate vacuum control motor line noted in Step H1, and attempt to pull a vacuum.

- **Can a vacuum be pulled on the vacuum control motor line?**

→ **Yes**
REPAIR or INSTALL a new plenum vacuum

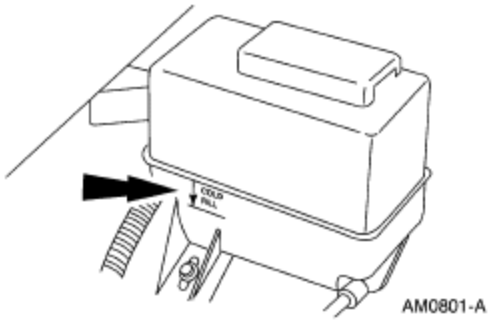
	harness (19C827). TEST the system for normal operation. → **No** GO to H8 .
H8 CHECK THE VACUUM CONTROL MOTOR LINE FOR LEAKS	
2  AL0157-A	1 Plug the vacuum control motor line at the vacuum control motor connection. 2 Leak test the vacuum control motor line using the vacuum pump. • **Does the vacuum control motor line leak?** → **Yes** REPAIR or INSTALL a new vacuum harness. TEST the system for normal operation. → **No** GO to H9 .
H9 CHECK THE VACUUM CONTROL MOTOR FOR LEAKS AND CORRECT OPERATION	
1  AL0136-A	1 Connect the vacuum pump to the appropriate vacuum control motor and pull a vacuum. • **Does the vacuum control motor operate and hold vacuum?** → **Yes** GO to H10 . → **No**

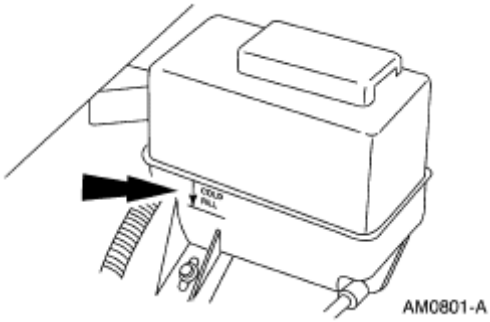
	INSTALL a new vacuum control motor (18A318). TEST the system for normal operation.
H10 CHECK THE MODE DOOR LINKAGE AND MOVEMENT	
	1 Inspect the mode door linkage and verify correct movement of the mode door. • **Is the mode door or mode door linkage broken, binding or otherwise obstructed?** → **Yes** REPAIR the mode door or mode door linkage as necessary. TEST the system for normal operation. → **No** INSTALL a new EATC module. TEST the system for normal operation.
H11 CHECK THE AIR INLET DOOR VACUUM CONTROL MOTOR LINE FOR BLOCKAGE	
1  3  A0036133	2 Disconnect the air inlet door vacuum control motor vacuum connector. 3 Disconnect the EATC module vacuum connector and attempt to pull a vacuum on the RECIRC vacuum control motor line using the vacuum pump. • **Can a vacuum be pulled on the air inlet door vacuum control motor line?** → **Yes** REPAIR or INSTALL a new plenum vacuum harness (19C827). TEST the system for normal operation. → **No** GO to H12 .
H12 CHECK THE AIR INLET DOOR VACUUM CONTROL MOTOR LINE FOR LEAKS	

2  A0036133	1 Plug the air inlet door vacuum control motor line at the RECIRC vacuum control motor connection. 2 Leak test the air inlet door vacuum control motor line using the vacuum pump. • **Does the air inlet door vacuum control motor line leak?** → **Yes** REPAIR or INSTALL a new vacuum harness (19C827). TEST the system for normal operation. → **No** GO to H13.
H13 CHECK THE AIR INLET DOOR VACUUM CONTROL MOTOR FOR LEAKS AND CORRECT OPERATION	
1  AL0136-A	1 Connect the vacuum pump to the air inlet door vacuum control motor and pull a vacuum. • **Does the air inlet door vacuum control motor operate and hold a vacuum?** → **Yes** GO to H14. → **No** INSTALL a new air inlet door vacuum control motor (18A318). TEST the system for normal operation.
H14 INSPECT THE AIR INLET DOOR LINKAGE AND MOVEMENT	

	1 Inspect the air inlet door linkage and verify correct movement of the door. • **Is the air inlet door or air inlet door linkage broken, binding or otherwise obstructed?** → **Yes** REPAIR the air inlet door or air inlet door linkage as needed. TEST the system for correct operation. → **No** INSTALL a new EATC module (19980). TEST the system for normal operation.

PINPOINT TEST I: INSUFFICIENT, ERRATIC OR NO HEAT

CONDITIONS	DETAILS/RESULTS/ACTIONS
I1 CHECK FOR CORRECT ENGINE COOLANT LEVEL	
1  2  	2 Check the engine coolant level. • **Is the engine coolant at the correct level in the coolant reservoir?** → **Yes** GO to I3 . → **No** GO to I2 .
I2 CHECK COOLANT SYSTEM INCLUDING RADIATOR CAP FOR LEAKS	
1	1 Fill the coolant system to the specified "COLD FILL" level.



2 Pressure check the engine cooling system. Refer to Section 303-03 .

- **Does the engine cooling system, including the radiator cap, hold pressure?**

→ **Yes**
GO to I3 .

→ **No**
PRESSURE TEST the heater core.

I3 CHECK THE HEATER CORE INLET HOSE FOR HOT WATER

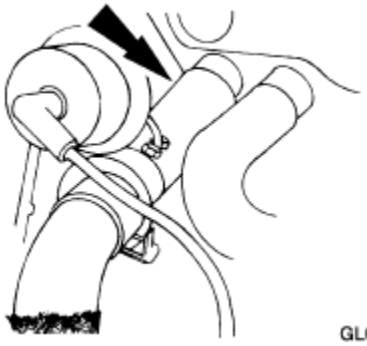
WARNING: The heater core inlet hose will become too hot to handle and can cause serious burns if the system is working correctly.

1

Ignition Start

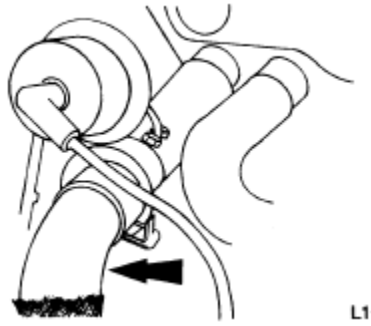
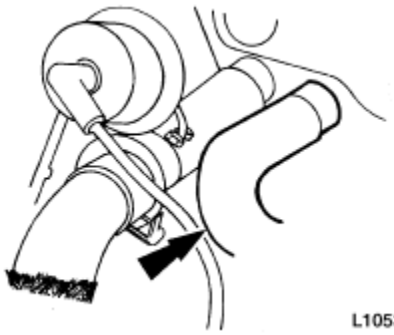
2 Run the engine until it reaches normal operation temperature. Select the FLOOR position on the control assembly. Set the temperature control to full WARM.

3



3 Feel the heater core inlet hose.

- **Is the heater core inlet hose hot?**

	→ **Yes** GO to I5 . → **No** GO to I4 .
I4 CHECK FOR HOT WATER TO THE HEATER CONTROL VALVE INLET HOSE	
1  L10536-A	1 Feel the heater control valve inlet hose. • **Is the heater control valve inlet hose too hot to handle?** → **Yes** GO to I6 . → **No** GO to Section 303-03 .
I5 CHECK THE HEATER CORE OUTLET HOSE	
1  L10537-A	1 Feel the heater core outlet hose. • **Is the heater core outlet hose hot?** → **Yes** GO to Pinpoint Test L (Manual A/C). GO to DTC B1249 (EATC). → **No** TEST the heater core for a plugged or partial-plugged condition.
I6 CHECK VACUUM SUPPLY TO THE HEATER CONTROL VALVE	

	1 Disconnect the heater control valve vacuum supply hose at the heater control valve. 2 Check for presence of vacuum at the heater control valve vacuum supply hose connector. • **Is there vacuum present?** → **Yes** GO to I7 . → **No** INSTALL a new heater control valve. TEST the system for normal operation.
I7 CHECK FOR INCORRECT VACUUM LINE PLACEMENT	
1 	2 Inspect the heater control valve and A/C vacuum lines for correct placement. • **Is the vacuum line placement correct?** → **Yes** INSTALL a new climate control assembly. REFER to Section 412-04 . TEST the system for normal operation. → **No** CORRECT the vacuum line placement. TEST the system for normal operation.

PINPOINT TEST J: THE A/C DOES NOT OPERATE/DOES NOT OPERATE CORRECTLY — MANUAL A/C

CONDITIONS	DETAILS/RESULTS/ACTIONS
J1 CHECK PID WACF WITH A/C OFF	
NOTE: When PCM PID WACF is YES, this is the same fault as DTC P1460.	
1	1 Turn the function selector switch to the OFF position.

AM0577-A

2

3

PCM PID WACF

- **Does the PCM PID WACF read YES?**

→ **Yes**
REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual to continue the diagnosis.

→ **No**
GO to J2 .

J2 CHECK PID WACF WITH A/C ON

NOTE: When PCM PID WACF is YES, this is the same fault as DTC P1460.

2

AM0576-A

3

1 Start the engine and run at idle.

2 Turn the function selector switch to the A/C position.

PCM PID WACF	• **Does the PCM PID WACF read YES?** → **Yes** REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual to continue the diagnosis. → **No** GO to J3 .
J3 CHECK PID ACCS WITH A/C ON	
2  AM0576-A 3  PCM PID ACCS	1 Make sure the engine is at idle. 2 Turn the function selector switch to the A/C position. • **Does the PCM PID ACCS read ON?** → **Yes** GO to J4 . → **No** GO to J6 .
J4 CHECK PID ACP WITH A/C ON	
NOTE: Diagnosis for vehicles equipped with 4.0L engines do not contain the PCM PID ACP.	
2	1 If equipped with 5.0L engine, make sure the engine is at idle. 2 If equipped with 5.0L engine, turn the function selector switch to the A/C position.

AM0576-A

3

PCM PID ACP 5.0L Engine

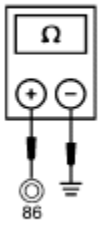
4

4.0L Engine (if equipped)

5 If equipped with 4.0L engine, connect the Rotunda EEC V 104-Pin Breakout Box.

6 If equipped with 4.0L engine, measure the resistance to ground at breakout box pin 86.

6



AM0951-A

- **If equipped with 5.0 engine, does the PCM PID ACP read CLOSED?**

  If equipped with 4.0L engine, is the resistance less than 5 ohms (4.0L)?

→ **Yes**
GO to J5 .

→ **No**
GO to J15 .

J5 CHECK PID WAC WITH A/C ON

1

2

AM0576-A

3

PCM PID WAC

2 Turn the function selector switch to the A/C position.

- **Does the PID WAC read ON?**

→ **Yes**
GO to J23 .

→ **No**
REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual to continue the diagnosis.

J6 CHECK THE INPUT SIGNAL TO THE PCM

NOTE: Do not directly probe the PCM wire harness connector.

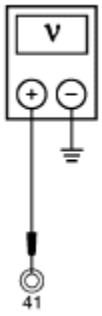
1

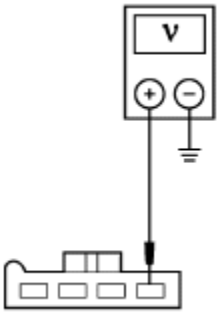
2

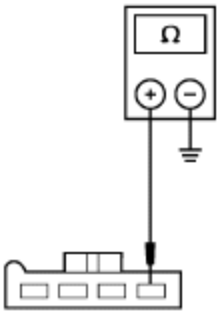
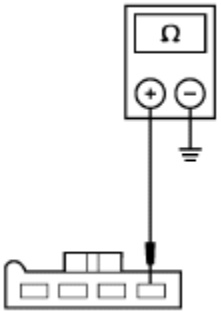
PCM C202

3 Connect the Rotunda EEC-V 104-Pin Breakout Box to the wire harness connector C202. Do not connect the breakout box to the PCM.

4

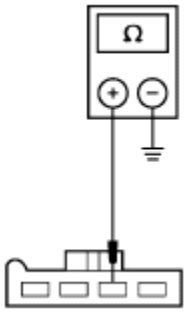
 5	5 Turn the function selector switch to the A/C position.
 AM0576-A	
6  AM0584-A	6 Measure the voltage at the breakout box pin 41, circuit 348 (VT).
	• **Is the voltage reading B+?** → **Yes** INSTALL a new powertrain control module. REFER to Section 303-14 . TEST the system for normal operation. → **No** GO to J7 .
J7 CHECK THE SUPPLY TO THE FUNCTION SELECTOR SWITCH	
1  2  Function Selector Switch C231 3	

 4  AM0585-A	4 Measure the voltage at the function selector switch connector pin C231, circuit 1003 (GY/YE). • **Is the voltage reading B+?** → **Yes** GO to J13 . → **No** GO to J8 .
J8 CHECK FUSE 10 (7.5A)	
1  2  Fuse Junction Panel Fuse 10 (7.5A) 3  Fuse Junction Panel Fuse 10 (7.5A)	• **Is fuse 10 (7.5A) OK?** → **Yes** REPAIR circuit 1003 (GY/YE) for an open. TEST the system for normal operation. → **No** GO to J9 .
J9 CHECK CIRCUIT 1003 (GY/YE) FOR A SHORT TO GROUND	

1  AM0586-A	1 Measure the resistance between the function selector switch connector pin C231, circuit 1003 (GY/YE) and ground. • **Is the resistance reading 10,000 ohms or less?** → **Yes** GO to J10 . → **No** GO to J11 .
J10 CHECK THE BLEND DOOR ACTUATOR	
1  Blend Door Actuator C270 2  AM0586-A	2 Measure the resistance between the function selector switch connector pin C231, circuit 1003 (GY/YE) and ground. • **Is the resistance reading 10,000 ohms or less?** → **Yes** REPAIR circuit 1003 (GY/YE) for a short to ground. TEST the system for normal operation. → **No** INSTALL a new A/C electronic door actuator motor (19E616). REFER to Section 412-04 . TEST the system for normal operation.

J11 CHECK CIRCUIT 348 (VT) FOR A SHORT TO GROUND

1



AM0587-A

1 Measure the resistance between the function selector switch connector pin C231, circuit 348 (VT) and ground.

- **Is the resistance reading 10,000 ohms or less?**

→ **Yes**
REPAIR circuit 348 (VT) for a short to ground. TEST the system for normal operation.

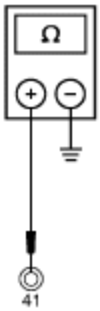
→ **No**
GO to J12 .

J12 CHECK FOR A SHORTED FUNCTION SELECTOR SWITCH

1

Function Selector Switch C231

2



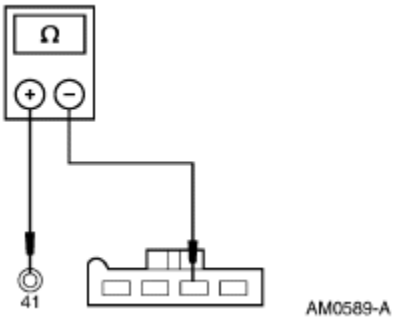
AM0588-A

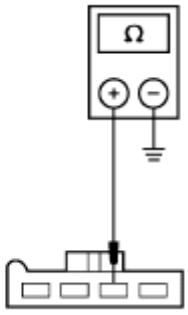
2 **NOTE:** Make sure fuse 10 (7.5A) is still removed.

Measure the resistance between the breakout box pin 41, circuit 348 (VT) and ground.

3 Turn the function selector switch to each of the following positions and note the resistance reading.

- MAX A/C
- A/C
- PNL/FLR
- FLR/DEF
- DEF

	• **Are any of the resistance readings 10,000 ohms or less?** → **Yes** INSTALL a new function selector switch. REFER to Section 412-04 . TEST the system for normal operation. → **No** INSTALL a new fuse 10 (7.5A). TEST the system for normal operation. If fuse 10 (7.5A) opens again, INSTALL a new powertrain control module. REFER to Section 303-14 . TEST the system for normal operation.
J13 CHECK CIRCUIT 348 (VT) FOR AN OPEN	
1  2 	2 Measure the resistance of circuit 348 (VT) between the PCM breakout box pin 41 and the function selector switch connector pin C231. • **Is the resistance reading 5 ohms or less?** → **Yes** GO to J14 . → **No** REPAIR circuit 348 (VT) for an open. TEST the system for normal operation.
J14 CHECK FOR A SHORTED INPUT	
1	1 Measure the resistance between the function selector switch connector pin C231, circuit 348 (VT) and ground.



AM0587-A

- **Is the resistance reading 10,000 ohms or less?**

→ **Yes**
REPAIR circuit 348 (VT) for a short to ground. TEST the system for normal operation.

→ **No**
INSTALL a new function selector switch. REFER to Section 412-04 . TEST the system for normal operation.

J15 CHECK THE REFRIGERANT SYSTEM PRESSURE

1

2 Connect the manifold set to the service ports. Refer to Manifold Gauge Set Connection in this section.

- **Is the pressure between 345 kPa (50 psi) and 1,724 kPa (250 psi)?**

→ **Yes**
GO to J16 .

→ **No**
CHECK the system for refrigerant system leaks. REFER to Leak Detection—Using Refrigerant Leak Detector or Leak Detection—Using Tracer Dye in this section.

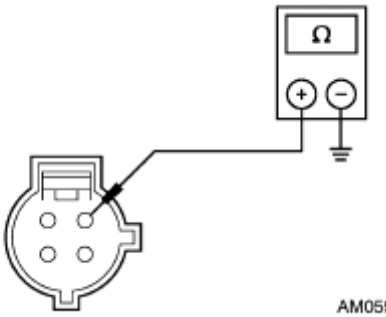
J16 CHECK CIRCUIT 570 (BK/WH)

1

A/C Pressure Cut-Off Switch C195

2

2 Measure the resistance between the A/C



pressure cut-off switch connector C195, circuit 570 (BK/WH) and ground.

- **Is the resistance reading 5 ohms or less?**

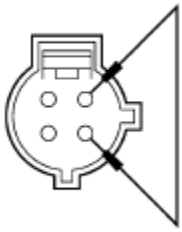
→ **Yes**
GO to J17.

→ **No**
REPAIR circuit 570 (BK/WH) for an open.
TEST the system for normal operation.

J17 CHECK THE A/C PRESSURE CUT-OFF SWITCH

NOTE: Diagnostics for vehicles with 4.0L engines do not contain the PCM PID ACP.

1



2

5.0L Engine

3

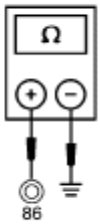
PCM PID ACP 5.0L Engine

5

1 Connect a jumper wire across the A/C pressure switch connector C195, circuit 570 (BK/WH) and circuit 441 (RD/YE).

4 If equipped with 4.0L engine, connect the Rotunda EEC-V 104-Pin Breakout Box.

5 If equipped with 4.0L engine, measure the resistance to ground of breakout box pin 86.



AM0951-A

- **If equipped with 5.0L engine, does the PID ACP read CLOSED?**

  If equipped with 4.0L engine, is the resistance less than 5 ohms?

→ **Yes**
INSTALL a new A/C pressure cut-off switch (19D594). REFER to Section 412-03 . TEST the system for normal operation.

→ **No**
GO to J18 .

J18 CHECK THE A/C CYCLING SWITCH

NOTE: Diagnostics for vehicles with 4.0L engines do not contain the PCM PID ACP.

1

2

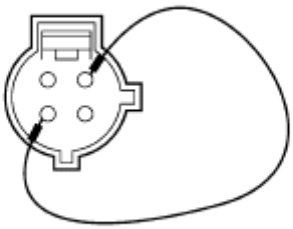
A/C Pressure Cut-Off Switch C195

3

A/C Cycling Switch C151

4

4 Connect a jumper wire across the A/C cycling switch connector C151, circuit 347 (BK/YE) and circuit 441 (RD/YE).



AL0112-A

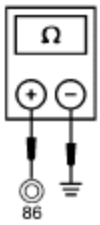
5

5.0L Engine

6

PCM PID ACP 5.0L Engine

7



AM0951-A

7 If equipped with 4.0L engine, measure the resistance to ground of breakout box pin 86.

- **If equipped with 5.0L engine, does the PID ACP read CLOSED?**

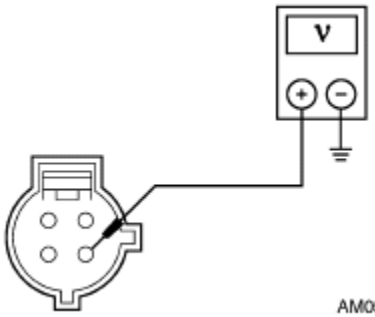
  If equipped with 4.0L engine, is the resistance less than 5 ohms?

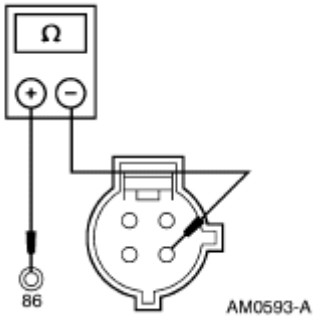
→ **Yes**
INSTALL a new A/C cycling switch (19E561). REFER to Section 412-03 . TEST the system for normal operation.

→ **No**
GO to J19 .

J19 CHECK CIRCUIT 347 (BK/YE) FOR A SHORT TO B+

1

 2  PCM C202 3  4  AM0592-A	4 Measure for voltage at the A/C cycling switch connector C151, circuit 347 (BK/YE). • **Is voltage present?** → **Yes** REPAIR circuit 347 (BK/YE) for a short to B+. TEST the system for normal operation. → **No** GO to J20 .
J20 CHECK CIRCUIT 347 (BK/YE) FOR AN OPEN	
NOTE: Do not directly probe the PCM wire harness connector.	
1  3	2 Connect the Rotunda EEC-V 104-Pin Breakout Box. 3 Measure the resistance of circuit 347 (BK/YE) between the breakout box pin 86 and the A/C cycling switch Connector C151.



- **Is the resistance reading 5 ohms or less?**

→ **Yes**
GO to J21 .

→ **No**
REPAIR circuit 347 (BK/YE) for an open. TEST the system for normal operation.

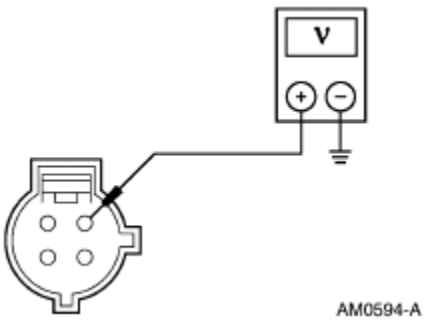
J21 CHECK CIRCUITY 441 (RD/YE) FOR A SHORT TO B+

1

A/C Pressure Cut-Off Switch C195

2

3

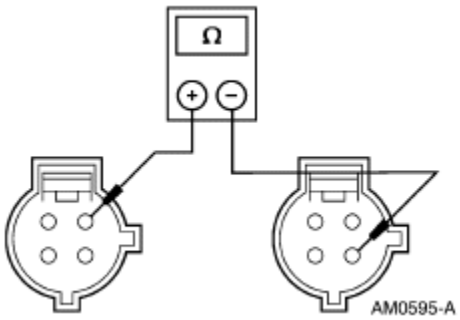


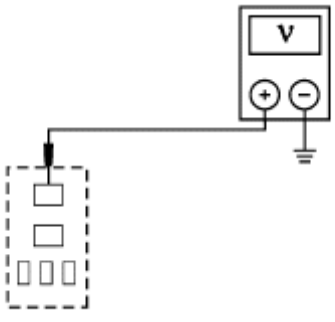
3 Measure for voltage at the A/C cycling switch connector C151, circuit 441 (RD/YE).

- **Is voltage present?**

→ **Yes**
REPAIR circuit 441 (RD/YE) for a short to B+. TEST the system for normal operation.

→ **No**

	GO to J22 .
J22 CHECK CIRCUIT 441 (RD/YE) FOR AN OPEN	
1  2  	2 Measure the resistance of circuit 441 (RD/YE) between the A/C cycling switch connector C151 and the A/C pressure cut-off switch connector C195. • **Is the resistance reading 5 ohms or less?** → **Yes** REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual to continue diagnosis. → **No** REPAIR circuit 441 (RD/YE) for an open. TEST the system for normal operation.
J23 CHECK THE INPUT TO THE A/C CLUTCH RELAY	
1  3  4	2 Remove the A/C clutch relay from the power distribution box. 4 Measure the voltage at the A/C clutch relay connector pin 3, circuit 883 (PK/LB).



- **Is the voltage reading B+?**

→ **Yes**
GO to J27.

→ **No**
GO to J24.

J24 CHECK THE A/C FUSE

1

2

Power Distribution Box A/C Fuse (10A)

3

Power Distribution Box A/C Fuse (10A)

- **Is the A/C fuse (10A) OK?**

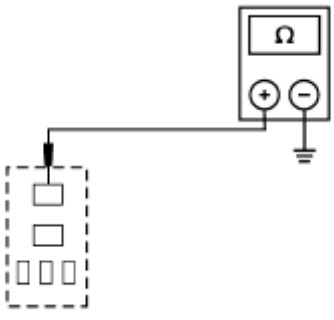
→ **Yes**
REPAIR circuit 883 (PK/LB) for an open. TEST the system for normal operation.

→ **No**
GO to J25.

J25 CHECK CIRCUIT 883 (PK/LB) FOR A SHORT TO GROUND

1

1 Measure the resistance between the A/C clutch relay connector pin 3, circuit 883 (PK/LB) and ground.



- **Is the resistance reading 10,000 ohms or less?**

→ **Yes**
REPAIR circuit 883 (PK/LB) for a short to ground. TEST the system for normal operation.

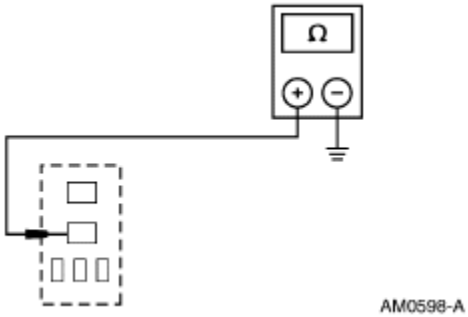
→ **No**
GO to J26 .

J26 CHECK CIRCUIT 321 (GY/WH) FOR A SHORT TO GROUND

1

A/C Clutch C152

2



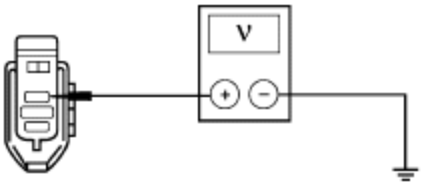
2 Measure the resistance between the A/C clutch relay connector pin 5, circuit 321 (GY/WH) and ground.

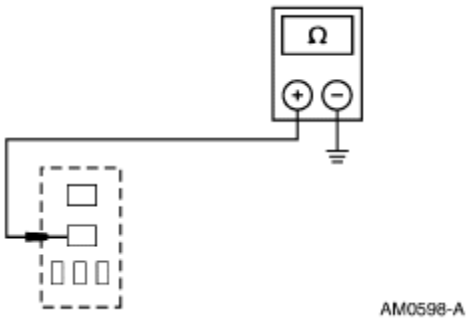
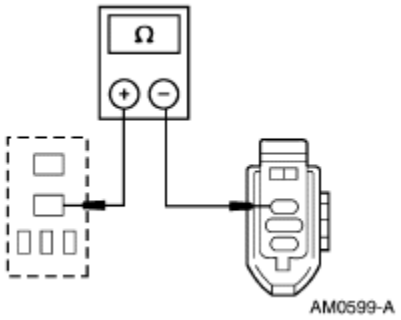
- **Is the resistance reading 10,000 ohms or less?**

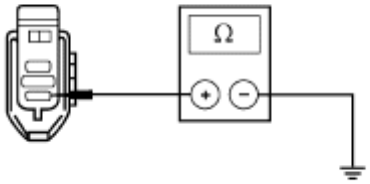
→ **Yes**
REPAIR circuit 321 (GY/WH) for a short to ground. TEST the system for normal operation.

→ **No**
INSTALL a new A/C clutch field coil (2987). REFER to Section 412-03 . TEST the system for normal operation.

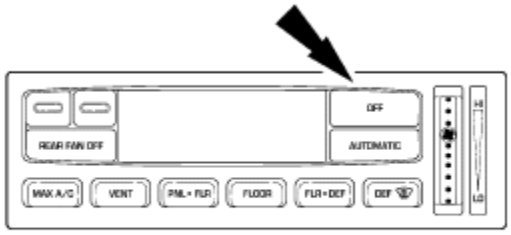
J27 CHECK THE A/C CLUTCH INPUT

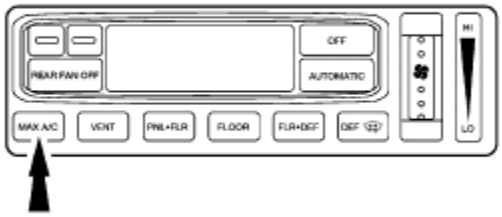
1  2 Install the A/C clutch relay in the power distribution box. 3  A/C Clutch C152 4  5  5 In Active Command Mode, command the PCM outputs ON. 6  GL0225-A 6 Measure for voltage at the A/C clutch connector C152, circuit 321 (GY/WH). 7 Command the PCM outputs OFF. • **Is the voltage reading B+?** → **Yes** GO to J30 . → **No** GO to J28 .
J28 CHECK FOR A SHORTED OUTPUT	
1  2 Remove the A/C clutch relay from the power distribution box.	

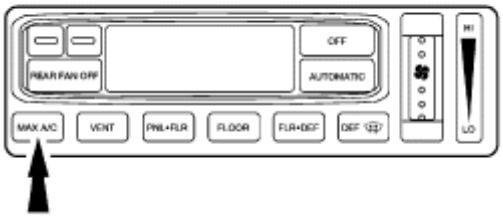
3  	3 Measure the resistance between the A/C clutch relay connector pin 5, circuit 321 (GY/WH) and ground. • **Is the resistance reading 10,000 ohms or less?** → **Yes** REPAIR circuit 321 (GY/WH) for a short to ground. TEST the system for normal operation. → **No** GO to J29 .
J29 CHECK CIRCUIT 321 (GY/WH) FOR AN OPEN	
1  	1 Measure the resistance of circuit 321 (GY/WH) between the A/C clutch relay connector pin 5 and the A/C clutch connector C152. • **Is the resistance reading 5 ohms or less?** → **Yes** INSTALL a new A/C clutch relay. TEST the system for normal operation. → **No** REPAIR circuit 321 (GY/WH) for an open. TEST the system for normal operation.
J30 CHECK CIRCUIT 57 (BK) FOR AN OPEN	
1	1 Measure the resistance between the A/C clutch connector C152, circuit 57 (BK) and ground.

 GL0227-A	• **Is the resistance reading 5 ohms or less?** → **Yes** INSTALL a new A/C clutch field coil. REFER to Section 412-03 . TEST the system for normal operation. → **No** REPAIR circuit 57 (BK) for an open. TEST the system for normal operation.

PINPOINT TEST K: THE A/C DOES NOT OPERATE/DOES NOT OPERATE CORRECTLY — EATC

CONDITIONS	DETAILS/RESULTS/ACTIONS
K1 CHECK PID WACF WITH A/C OFF	
NOTE: When PCM PID WACF is YES, this is the same fault as DTC P1460.	
1  2  AM0852-B 3  PCM PID WACF	2 Press the OFF button on the electronic automatic temperature control module.

	• **Does the PCM PID WACF read YES?** → **Yes** REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual to continue the diagnosis. → **No** GO to K2 .
K2 CHECK PID WACF WITH A/C ON	
NOTE: When PCM PID WACF is YES, this is the same fault as DTC P1460.	
2  GL1257-B 3  PCM PID WACF	1 Start the engine and run at idle. 2 Press the EATC MAX A/C button. • **Does the PCM PID WACF read YES?** → **Yes** REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual to continue the diagnosis. → **No** GO to K3 .
K3 CHECK PID ACCS WITH A/C ON	
2	1 Make sure the engine is at idle. 2 Press the EATC MAX A/C button.



GL1257-B

3

PCM PID ACCS

- **Does the PCM PID ACCS read ON?**

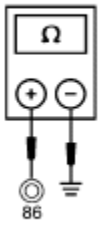
→ **Yes**
GO to K4 .

→ **No**
GO to K6 .

K4 CHECK A/C PRESSURE SWITCH CIRCUIT

1

3



AM0951-A

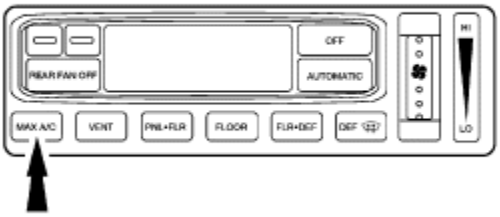
2 Connect the Rotunda EEC-V 104-Pin Breakout Box.

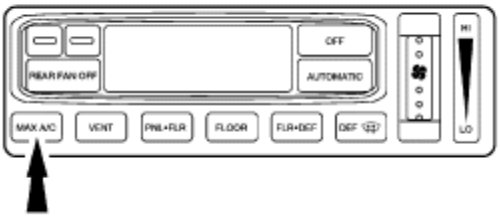
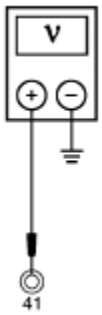
3 Measure the resistance to ground of breakout box pin 86.

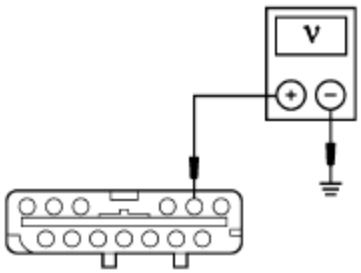
- **Is the resistance less than 5 ohms?**

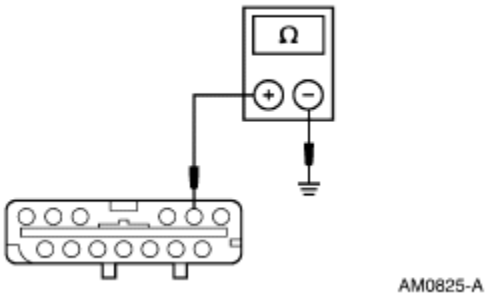
→ **Yes**
GO to K5 .

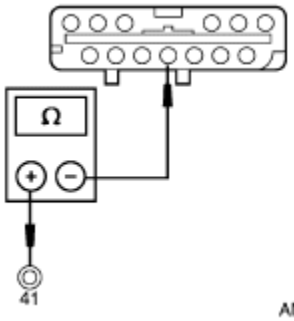
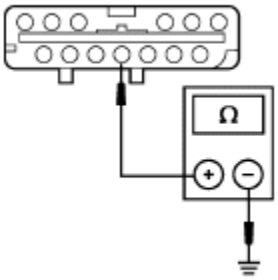
→ **No**

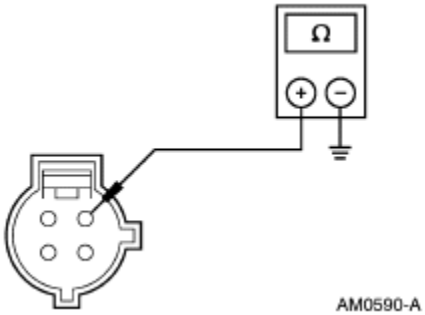
	GO to K13 .
K5 CHECK PID WAC WITH A/C ON	
1  2  GL1257-B 3  PCM PID WAC	2 Press the EATC MAX A/C button. • **Does the PID WAC read ON?** → **Yes** GO to K21 . → **No** REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual to continue the diagnosis.
K6 CHECK THE INPUT SIGNAL TO THE PCM	
NOTE: Do not directly probe the PCM wire harness connector.	
1  2  PCM C202	3 Connect the Rotunda EEC-V 104-Pin Breakout Box to the wire harness connector C202. Do not connect the breakout box to the PCM.

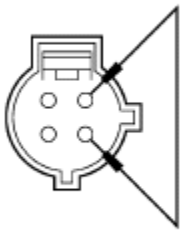
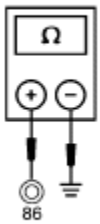
4  5  GL1257-B 6  AM0584-A	5 Press the EATC MAX A/C button. 6 Measure the voltage at the breakout box pin 41, circuit 348 (VT). • **Is the voltage reading B+?** → **Yes** INSTALL a new powertrain control module. REFER to Section 303-14 . TEST the system for normal operation. → **No** GO to K7 .
K7 CHECK THE SUPPLY TO THE EATC MODULE	
1  2  EATC Module C298 3	

 4  AM0857-A	4 Measure the voltage at the EATC module connector C298 pin 16, circuit 364 (BK/LG). • **Is the voltage reading B+?** → **Yes** GO to K11 . → **No** GO to K8 .
K8 CHECK FUSE 2 (7.5A)	
1  2  Fuse Junction Panel Fuse 2 (7.5A) 3  Fuse Junction Panel Fuse 2 (7.5A)	• **Is fuse 2 (7.5A) OK?** → **Yes** REPAIR circuit 364 (BK/LG) for an open. TEST the system for normal operation. → **No** GO to K9 .
K9 CHECK CIRCUIT 364 (BK/LG) FOR A SHORT TO GROUND	

1  	1 Measure the resistance between the EATC module connector C298 pin 16, circuit 364 (BK/LG) and ground. • **Is the resistance reading 100 ohms or less?** → **Yes** REPAIR circuit 364 (BK/LG) for a short to ground. TEST the system for normal operation. → **No** GO to K10 .
K10 CHECK THE AIR BAG DIAGNOSTIC MODULE	
1  Fuse Junction Panel Fuse 2 (7.5A) 2  3  4  Fuse Junction Panel Fuse 2 (7.5A) 5  Fuse Junction Panel Fuse 2 (7.5A)	• **Is fuse 2 (7.5A) OK?**

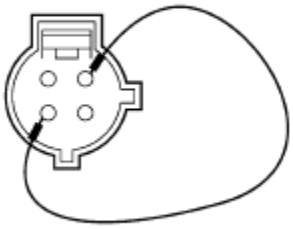
	→ **Yes** INSTALL a new EATC module. TEST the system for normal operation. → **No** GO to Section 501-20B .
K11 CHECK CIRCUIT 348 (VT) FOR AN OPEN	
1  2  AM0826-A	2 Measure the resistance of circuit 348 (VT) between the breakout box pin 41 and the EATC module connector C297 pin 11. • **Is the resistance reading 5 ohms or less?** → **Yes** GO to K12 . → **No** REPAIR circuit 348 (VT) for an open. TEST the system for normal operation.
K12 CHECK FOR A SHORTED INPUT	
1  AM0824-A	1 Measure the resistance between the EATC module connector C297 pin 11, circuit 348 (VT) and ground. • **Is the resistance reading 10,000 ohms or less?**

	→ **Yes** REPAIR circuit 348 (VT) for a short to ground. TEST the system for normal operation. → **No** INSTALL a new EATC module. REFER to Control Assembly — Electronic Automatic Temperature Control in Section 412-04. TEST the system for normal operation.
K13 CHECK THE REFRIGERANT SYSTEM PRESSURE	
1 	2 Connect the manifold set to the service ports. Refer to Manifold Gauge Set Connection in this section. • **Is the pressure between 345 kPa (50 psi) and 1,724 kPa (250 psi)?** → **Yes** GO to K14. → **No** CHECK the system for refrigerant leaks. REFER to Leak Detection—Using Refrigerant Leak Detector or Leak Detection—Using Tracer Dye in this section.
K14 CHECK CIRCUIT 570 (BK/WH)	
1  A/C Pressure Cut-Off Switch C195 2 	2 Measure the resistance between the A/C pressure cut-off switch connector C195, circuit 570 (BK/WH) and ground. • **Is the resistance reading 5 ohms or less?**

	→ **Yes** GO to K15 . → **No** REPAIR circuit 570 (BK/WH) for an open. TEST the system for normal operation.
K15 CHECK THE A/C PRESSURE CUT-OFF SWITCH	
1  AM0591-A	1 Connect a jumper wire across the A/C pressure switch connector C195, circuit 570 (BK/WH) and circuit 441 (RD/YE).
	2 Connect the Rotunda EEC-V 104-Pin Breakout Box.
3  AM0951-A	3 Measure the resistance to ground of breakout box pin 86.
	• **Is the resistance less than 5 ohms?** → **Yes** INSTALL a new A/C pressure cut-off switch. REFER to Section 412-03 . TEST the system for normal operation. → **No** GO to K16 .
K16 CHECK THE A/C CYCLING SWITCH	
1  A/C Pressure Cut-Off Switch C195 2	

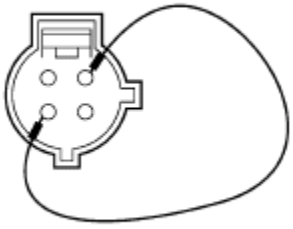
A/C Cycling Switch C151

3



AL0112-A

4



AL0112-A

3 Connect a jumper wire across the A/C cycling switch connector C151, circuit 347 (BK/YE) and circuit 441 (RD/YE).

4 Measure the resistance to ground of breakout box pin 86.

- **Is the resistance less than 5 ohms?**

→ **Yes**
INSTALL a new A/C cycling switch. REFER to Section 412-03 . TEST the system for normal operation.

→ **No**
GO to K17 .

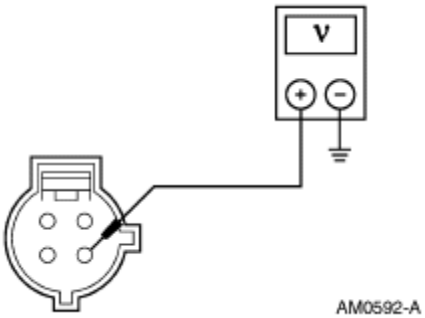
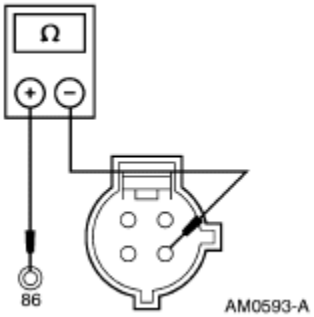
K17 CHECK CIRCUIT 347 (BK/YE) FOR A SHORT TO B+

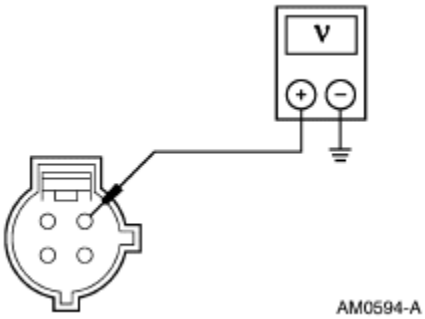
1

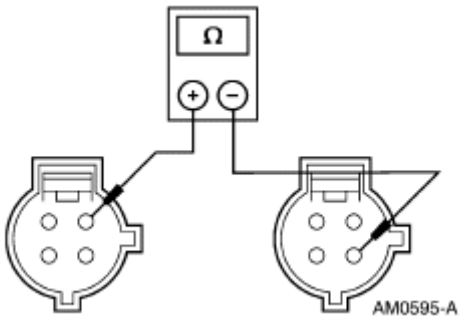
2

PCM C202

3

 4  	4 Measure for voltage at the A/C cycling switch connector C151, circuit 347 (BK/YE). • **Is voltage present?** → **Yes** REPAIR circuit 347 (BK/YE) for a short to B+. TEST the system for normal operation. → **No** GO to K18 .
K18 CHECK CIRCUIT 347 (BK/YE) FOR AN OPEN	
NOTE: Do not directly probe the PCM wire harness connector.	
1  3  	2 Connect the Rotunda EEC-V 104-Pin Breakout Box. 3 Measure the resistance of circuit 347 (BK/YE) between the breakout box pin 86 and the A/C cycling switch connector C151. • **Is the resistance reading 5 ohms or less?** → **Yes** GO to K19 .

	→ **No** REPAIR circuit 347 (BK/YE) for an open. TEST the system for normal operation.
K19 CHECK CIRCUITY 441 (RD/YE) FOR A SHORT TO B+	
1  A/C Pressure Cut-Off Switch C195 2  3  AM0594-A	3 Measure for voltage at the A/C cycling switch connector C151, circuit 441 (RD/YE). • **Is voltage present?** → **Yes** REPAIR circuit 441 (RD/YE) for a short to B+. TEST the system for normal operation. → **No** GO to K20 .
K20 CHECK CIRCUIT 441 (RD/YE) FOR AN OPEN	
1  2	2 Measure the resistance of circuit 441 (RD/YE) between the A/C cycling switch connector C151 and the A/C pressure cut-off switch connector C195.



- **Is the resistance reading 5 ohms or less?**

→ **Yes**
REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual to continue diagnosis.

→ **No**
REPAIR circuit 441 (RD/YE) for an open. TEST the system for normal operation.

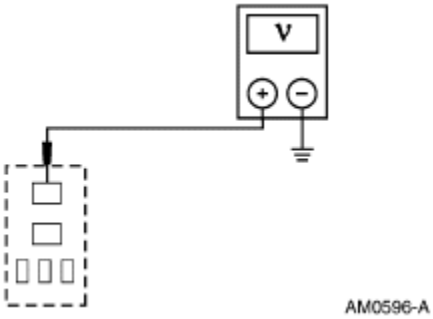
K21 CHECK THE INPUT TO THE A/C CLUTCH RELAY

1

2 Remove the A/C clutch relay from the power distribution box.

3

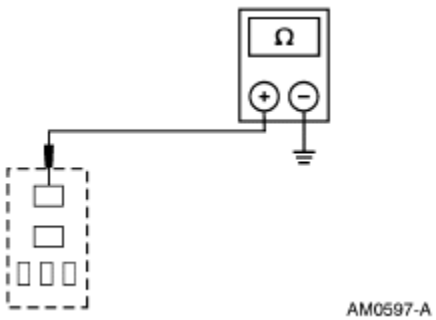
4

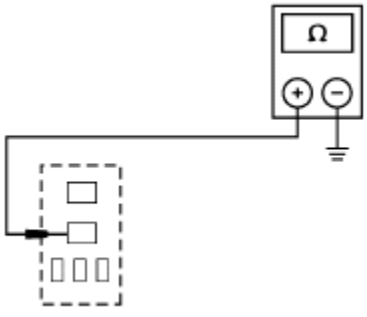


4 Measure the voltage at the A/C clutch relay connector pin 3, circuit 883 (PK/LB).

- **Is the voltage reading B+?**

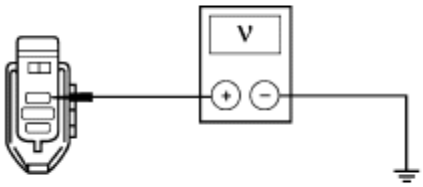
→ **Yes**

	GO to K25 . → **No** GO to K22 .
K22 CHECK THE A/C FUSE	
1  2  Power Distribution Box A/C Fuse (10A) 3  Power Distribution Box A/C Fuse (10A)	• **Is the A/C fuse (10A) OK?** → **Yes** REPAIR circuit 883 (PK/LB) for an open. TEST the system for normal operation. → **No** GO to K23 .
K23 CHECK CIRCUIT 883 (PK/LB) FOR A SHORT TO GROUND	
1  AM0597-A	1 Measure the resistance between the A/C clutch relay connector pin 3, circuit 883 (PK/LB) and ground. • **Is the resistance reading 10,000 ohms or less?** → **Yes** REPAIR circuit 883 (PK/LB) for a short to ground. TEST the system for normal operation.

	→ **No** GO to K24 .
K24 CHECK CIRCUIT 321 (GY/WH) FOR A SHORT TO GROUND	
1  A/C Clutch C152 2  AM0598-A	2 Measure the resistance between the A/C clutch relay connector pin 5, circuit 321 (GY/WH) and ground. • **Is the resistance reading 10,000 ohms or less?** → **Yes** REPAIR circuit 321 (GY/WH) for a short to ground. TEST the system for normal operation. → **No** INSTALL a new A/C clutch field coil. REFER to Section 412-03 . TEST the system for normal operation.
K25 CHECK THE A/C CLUTCH INPUT	
1  3  A/C Clutch C152 4 	2 Install the A/C clutch relay in the power distribution box.

5

6



GL0225-A

5 In Active Command Mode, command the PCM outputs ON.

6 Measure for voltage at the A/C clutch connector C152, circuit 321 (GY/WH).

7 Command the PCM outputs OFF.

- **Is the voltage reading B+?**

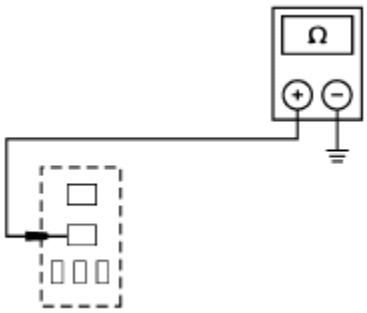
→ **Yes**
GO to K28 .

→ **No**
GO to K26 .

K26 CHECK FOR A SHORTED OUTPUT

1

3



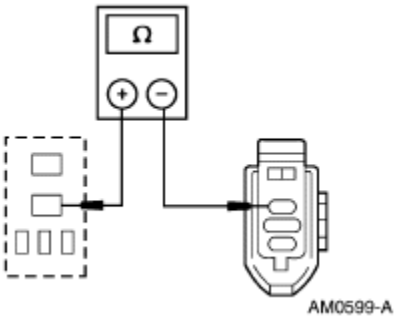
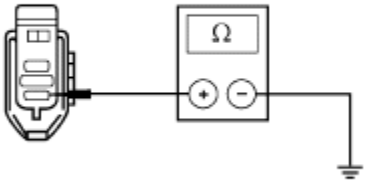
AM0598-A

2 Remove the A/C clutch relay from the power distribution box.

3 Measure the resistance between the A/C clutch relay connector pin 5, circuit 321 (GY/WH) and ground.

- **Is the resistance reading 10,000 ohms or less?**

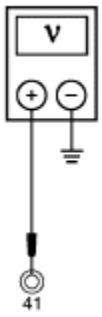
→ **Yes**
REPAIR circuit 321 (GY/WH) for a short to

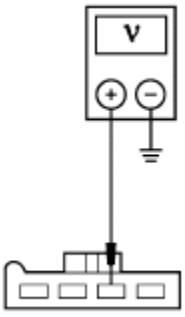
	ground. TEST the system for normal operation. → **No** GO to K27 .
K27 CHECK CIRCUIT 321 (GY/WH) FOR AN OPEN	
1  AM0599-A	1 Measure the resistance of circuit 321 (GY/WH) between the A/C clutch relay connector pin 5 and the A/C clutch connector C152. • **Is the resistance reading 5 ohms or less?** → **Yes** INSTALL a new A/C clutch relay. TEST the system for normal operation. → **No** REPAIR circuit 321 (GY/WH) for an open. TEST the system for normal operation.
K28 CHECK CIRCUIT 57 (BK) FOR AN OPEN	
1  GL0227-A	1 Measure the resistance between the A/C clutch connector C152, circuit 57 (BK) and ground. • **Is the resistance reading 5 ohms or less?** → **Yes** INSTALL a new A/C clutch field coil. REFER to Section 412-03 . TEST the system for normal operation. → **No** REPAIR circuit 57 (BK) for an open. TEST the

	system for normal operation.

PINPOINT TEST L: THE A/C IS ALWAYS ON — MANUAL A/C

CONDITIONS	DETAILS/RESULTS/ACTIONS
L1 CHECK PID WACF WITH THE A/C OFF	
1  AM0577-A 2  3  PCM PID WACF	1 Turn the function selector switch to the OFF position. • **Does the PCM PID WACF read YES?** → **Yes** REPAIR circuit 331 (PK/YE) for a short to ground. TEST the system for normal operation. → **No** GO to L2.
L2 CHECK PID ACCS WITH A/C OFF	
1  PCM PID ACCS	• **Does the PCM PID ACCS read ON?** → **Yes** GO to L3.

	→ **No** GO to L5 .
L3 CHECK FOR A FALSE INPUT SIGNAL TO THE PCM	
NOTE: Do not directly probe the PCM wire harness connector.	
1 	
2  PCM C111	
	3 Connect the Rotunda EEC-V 104-Pin Breakout Box to the wire harness connector C111. Do not connect the breakout box to the PCM.
4 	
5	5 Turn the function selector switch to the OFF position.
 AM0577-A	
6  41 AM0584-A	6 Measure the voltage at the breakout box pin 41, circuit 348 (VT). • **Is the voltage reading B+?**

	→ **Yes** GO to L4 . → **No** INSTALL a new powertrain control module. REFER to Section 303-14 . TEST the system for normal operation.
L4 CHECK CIRCUIT 348 (VT) FOR A SHORT TO B+	
1  2  Function Selector Switch C234 3  PCM C111 4  5  AM0582-A	5 Measure the voltage at the function selector switch connector C234 pin 3, circuit 348 (VT). • **Is voltage present?** → **Yes** REPAIR circuit 348 (VT) for a short to B+. TEST the system for normal operation. → **No** INSTALL a new function selector switch. REFER to Section 412-04 . TEST the system for normal operation.

L5 CHECK FOR A SHORTED CLUTCH INPUT

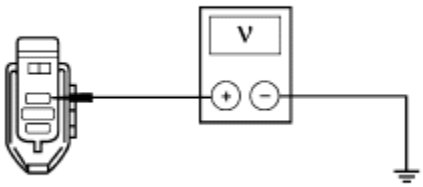
1

2

A/C Clutch Connector C166

3

4



GL0225-A

4 Measure for voltage at the A/C clutch connector C166, circuit 321 (GY/WH).

- **Is voltage present?**

→ **Yes**
GO to L6 .

→ **No**
CHECK the clutch air gap. REFER to A/C Clutch Air Gap Adjustment in this section.

L6 CHECK FOR A SHORTED A/C CLUTCH RELAY

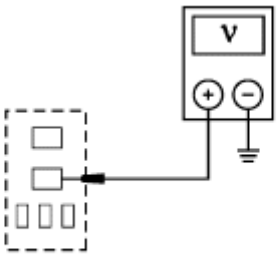
1

2 Remove the A/C clutch relay from the power distribution box.

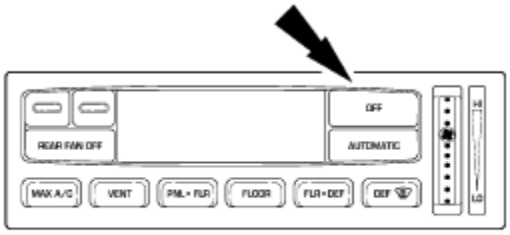
3

4

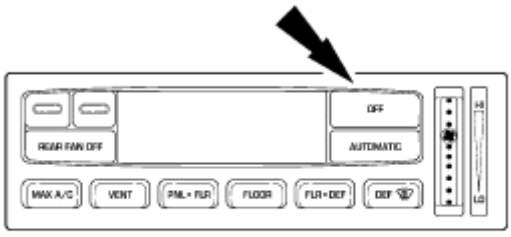
4 Measure the voltage at the A/C clutch relay

 AM0600-A	connector pin 5, circuit 321 (GY/WH). • **Is voltage present?** → **Yes** REPAIR circuit 321 (GY/WH) for a short to B+. TEST the system for normal operation. → **No** INSTALL a new A/C clutch relay. TEST the system for normal operation.

PINPOINT TEST M: THE A/C IS ALWAYS ON — EATC

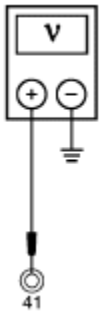
CONDITIONS	DETAILS/RESULTS/ACTIONS
M1 CHECK PID WACF WITH THE A/C OFF	
1 	
2  AM0852-B	2 Push the EATC off button.
3  PCM PID WACF	• **Does the PCM PID WACF read YES?**

	→ **Yes** REPAIR circuit 331 (PK/YE) for a short to ground. TEST the system for normal operation. → **No** GO to M2.
M2 CHECK PID ACCS WITH A/C OFF	
1  PCM PID ACCS	• **Does the PCM PID ACCS read ON?** → **Yes** GO to M3. → **No** GO to M5.
M3 CHECK FOR A FALSE INPUT SIGNAL TO THE PCM	
NOTE: Do not directly probe the PCM wire harness connector.	
1  2  PCM C111 4  5	3 Connect the Rotunda EEC-V 104-Pin Breakout Box to the wire harness connector C111. Do not connect the breakout box to the PCM. 5 Push the EATC off button.



AM0852-B

6



AM0584-A

6 Measure the voltage at the breakout box pin 41, circuit 348 (VT).

- **Is the voltage reading B+?**

→ **Yes**
GO to M4 .

→ **No**
INSTALL a new powertrain control module. REFER to Section 303-14 . TEST the system for normal operation.

M4 CHECK CIRCUIT 348 (VT) FOR A SHORT TO B+

1

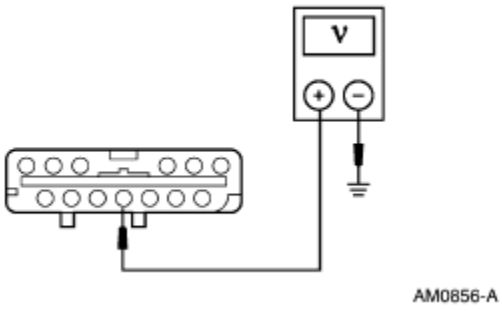
2

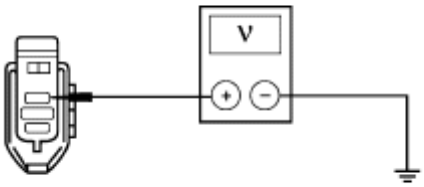
EATC Module C297

3

PCM C111

4

 5  AM0856-A	5 Measure the voltage at the EATC module connector C297 pin 11, circuit 348 (VT). • **Is voltage present?** → **Yes** REPAIR circuit 348 (VT) for a short to B+. TEST the system for normal operation. → **No** INSTALL a new EATC module. REFER to Section 412-04 . TEST the system for normal operation.
M5 CHECK FOR A SHORTED CLUTCH INPUT	
1  2  A/C Clutch Connector C166 3  4	4 Measure for voltage at the A/C clutch connector C166, circuit 321 (GY/WH).



GL0225-A

- **Is voltage present?**

→ **Yes**
GO to M6 .

→ **No**
CHECK the clutch air gap. REFER to A/C Clutch Air Gap Adjustment in this section.

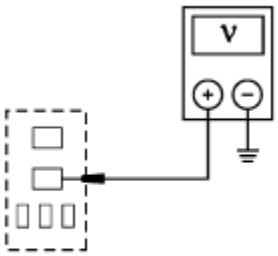
M6 CHECK FOR A SHORTED A/C CLUTCH RELAY

1

2 Remove the A/C clutch relay from the power distribution box.

3

4



AM0600-A

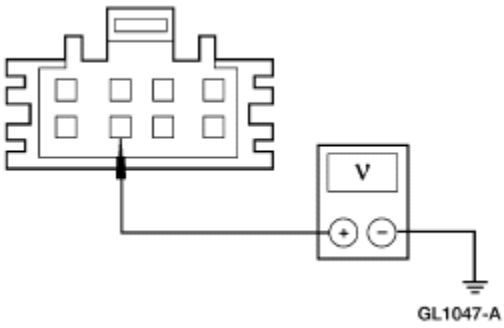
4 Measure the voltage at the A/C clutch relay connector pin 5, circuit 321 (GY/WH).

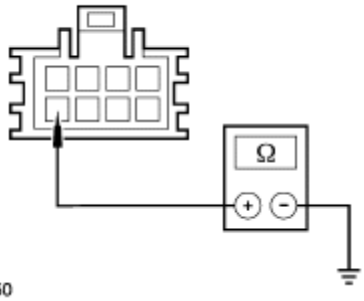
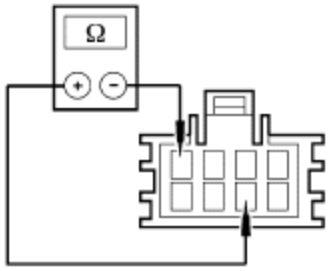
- **Is voltage present?**

→ **Yes**
REPAIR circuit 321 (GY/WH) for a short to B+. TEST the system for normal operation.

	→ **No** INSTALL a new A/C clutch relay. TEST the system for normal operation.

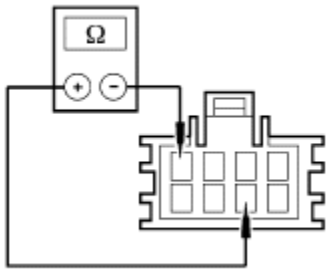
PINPOINT TEST N: NO OPERATION IN ALL TEMPERATURE SETTINGS—MANUAL CLIMATE CONTROL

CONDITIONS	DETAILS/RESULTS/ACTIONS
N1 CHECK THE VOLTAGE TO THE TEMPERATURE BLEND DOOR ACTUATOR MOTOR	
1  2  Temperature Blend Door Actuator Motor C270 3  4  	4 Measure the voltage between the temperature blend door actuator C270 pin 7, circuit 1003 (GY/YE) and ground. • **Is the voltage greater than 10 volts?** → **Yes** GO to N2 . → **No** REPAIR circuit 1003 (GY/YE). TEST the system for normal operation.
N2 CHECK THE GROUND TO THE BLEND DOOR ACTUATOR	
1	

 2  A0013850	2 Measure the resistance between the blend door actuator C270 pin 8, circuit 57 (BK) and ground. • **Is the resistance less than 5 ohms?** → **Yes** GO to N3 . → **No** REPAIR circuit 57 (BK). TEST the system for normal operation.
N3 CHECK THE TEMPERATURE CONTROL POTENTIOMETER TOTAL RESISTANCE	
1  A0042533	1 Measure the resistance between temperature blend door actuator C270 pin 4, circuit 660 (YE/LG) and pin 6, circuit 359 (GY/RD). • **Is the resistance between 4,500 and 5,500 ohms?** → **Yes** GO to N6 . → **No** If the resistance is less than 4,500 ohms, GO to N4 . If the resistance is greater than 5,500 ohms, GO to N5 .
N4 CHECK CIRCUIT 660 (YE/LG) AND CIRCUIT 359 (GY/RD) FOR A SHORT TOGETHER	
1	

Temperature Control Potentiometer C277

2



A0042533

2 Measure the resistance between temperature blend door actuator C270 pin 4, circuit 660 (YE/LG) and pin 6, circuit 359 (GY/RD).

- **Is the resistance less than 5 ohms?**

→ **Yes**
REPAIR circuit 660 (YE/LG) and circuit 359 (GY/RD) for a short together. TEST the system for normal operation.

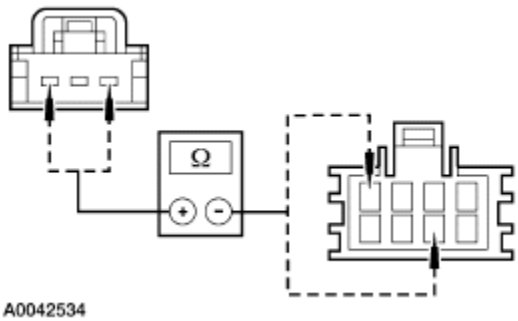
→ **No**
INSTALL a new temperature control potentiometer. REFER to Section 412-04 . TEST the system for normal operation.

N5 CHECK CIRCUIT 660 (YE/LG) AND CIRCUIT 359 (GY/RD) FOR AN OPEN

1

Temperature Control Potentiometer C277

2

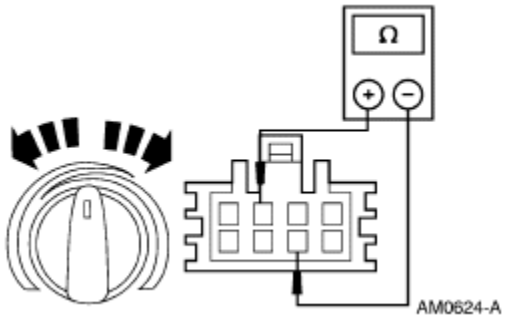
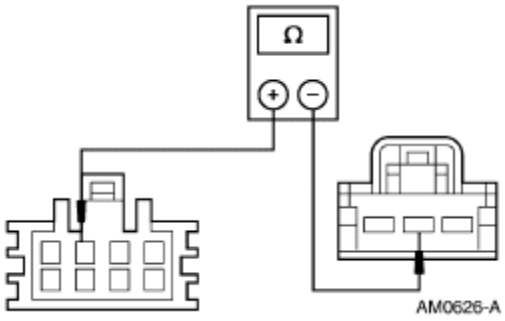


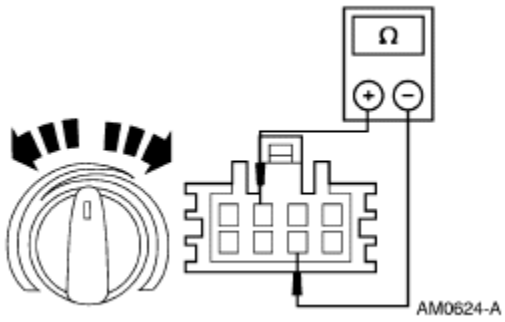
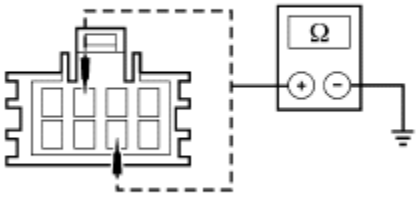
A0042534

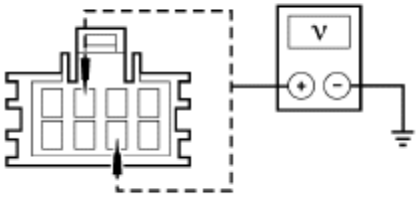
2 Measure the resistance between temperature blend door actuator C270 pin 4, circuit 660 (YE/LG) and temperature control potentiometer C277, circuit 660 (YE/LG); and between temperature blend door actuator C270 pin 6, circuit 359 (GY/RD) and temperature control potentiometer C277, circuit 359 (GY/RD).

- **Are the resistances less than 5 ohms?**

→ **Yes**
INSTALL a new temperature control

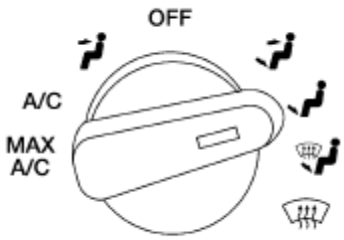
	potentiometer. REFER to Section 412-04 . TEST the system for normal operation. → **No** REPAIR the affected circuit. TEST the system for normal operation.
N6 CHECK THE TEMPERATURE CONTROL POTENTIOMETER OPERATION	
1  	1 Measure the resistance between temperature blend door actuator C270 pin 3, circuit 773 (DG/OG) and pin 6, circuit 359 (GY/RD) while rotating the temperature control potentiometer from full WARM to full COOL. • **Does the resistance vary between 150 and 4,800 ohms?** → **Yes** GO to N9 . → **No** GO to N7 .
N7 CHECK CIRCUIT 773 (DG/OG) FOR AN OPEN	
1  Temperature Control Potentiometer C277 2  	2 Measure the resistances between actuator C270 pin 3, circuit 773 (DG/OG) and temperature control potentiometer C277, circuit 773 (DG/OG). • **Is the resistance less than 5 ohms?** → **Yes** GO to N8 .

	→ **No** REPAIR circuit 773 (DG/OG) for an open. TEST the system for normal operation.
N8 CHECK CIRCUIT 773 (DG/OG) AND CIRCUIT 359 (GY/RD) FOR A SHORT TOGETHER	
1  	1 Measure the resistance between temperature blend door actuator C270 pin 3, circuit 773 (DG/OG) and pin 6, circuit 359 (GY/RD). • **Is the resistance less than 5 ohms?** → **Yes** REPAIR circuit 773 (DG/OG) and circuit 359 (GY/RD) for a short together. TEST the system for normal operation. → **No** INSTALL a new temperature control potentiometer. REFER to Section 412-04 . TEST the system for normal operation.
N9 CHECK CIRCUIT 773 (DG/OG) AND CIRCUIT 359 (GY/RD) FOR A SHORT TO GROUND	
1  Temperature Control Potentiometer C277	
2  	2 Measure the resistances between temperature blend door actuator C270 pin 3, circuit 773 (DG/OG) and ground, and between temperature blend door actuator C270 pin 6, circuit 359 (GY/RD) and ground. • **Are the resistances less than 5 ohms?** → **Yes**

	REPAIR the affected circuit for a short to ground. TEST the system for normal operation. → **No** GO to N10 .
N10 CHECK CIRCUIT 773 (DG/OG) AND CIRCUIT 359 (GY/RD) FOR A SHORT TO GROUND	
1  Temperature Control Potentiometer C277 2  3  A0042536	3 Measure the voltages between temperature blend door actuator C270 pin 6, circuit 660 (YE/LG) and ground, and between temperature blend door actuator C270 pin 3, circuit 773 (DG/OG) and ground. • **Is voltage present?** → **Yes** REPAIR the affected circuit for a short to power. TEST the system for normal operation. → **No** GO to N11 .
N11 CHECK FOR BINDING, STUCK OR BROKEN DOOR AND LINKAGE	
1 	2 Remove the actuator. Refer to Section 412-04 . 3 Inspect for a binding, stuck or broken blend door or linkage. • **Is there a binding, stuck or broken blend door or linkage condition?**

	→ **Yes** REPAIR the blend door/linkage. REFER to Section 412-04 . TEST the system for normal operation. → **No** INSTALL a new temperature blend door actuator. REFER to Section 412-04 . TEST the system for normal operation.

PINPOINT TEST O: THE BLOWER MOTOR DOES NOT OPERATE — MANUAL A/C

CONDITIONS	DETAILS/RESULTS/ACTIONS
O1 CHECK BLOWER MOTOR OPERATION	
1 	
2  L10572-A	2 Turn the A/C function switch to the FLOOR position.
3  L10527-A	3 Turn the blower motor switch to the high position.
4	4 Turn the blower motor switch to the low position.


GL0437-A

- **Does the blower motor operate?**

→ **Yes**
WIGGLE the wires and CHECK for intermittent operation. REPAIR as necessary. TEST the system for normal operation.

→ **No**
If the blower motor operates in some speeds, Go To Pinpoint Test Q .

If the blower motor operates in all settings except high, Go To Pinpoint Test S .

If the blower motor does not operate at all, GO to O2 .

O2 CHECK I/P FUSE 6 (7.5A)

1


I/P Fuse 6 (7.5A)

- **Is fuse 6 (7.5A) OK?**

→ **Yes**
GO to O4 .

→ **No**
INSTALL a new fuse 6 (7.5A). TEST the system for normal operation. If the fuse fails again, GO to O3 .

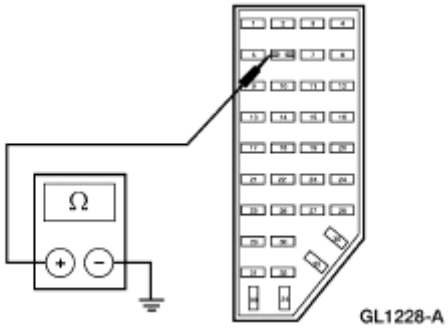
O3 CHECK CIRCUIT 364 (BK/LG) FOR SHORT TO GROUND

1


Blower Motor Relay

2

2 Measure the resistance between I/P fuse



panel fuse 6 (7.5A), pin 1, and ground.

- **Is the resistance greater than 10,000 ohms?**

→ **Yes**
INSTALL a new blower motor relay. TEST the system for normal operation.

→ **No**
REPAIR circuit 364 (BK/LG). TEST the system for normal operation.

O4 CHECK MAXI-FUSE 9 (50A)

1

maxi-fuse 9 (50A)

- **Is the maxi-fuse 9 (50A) OK?**

→ **Yes**
GO to O7 .

→ **No**
INSTALL a new maxi-fuse 9 (50A). TEST the system for normal operation. If the fuse fails again, GO to O5 .

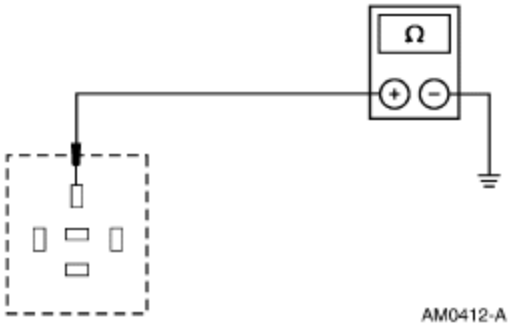
O5 CHECK BLOWER MOTOR FOR SHORT TO GROUND

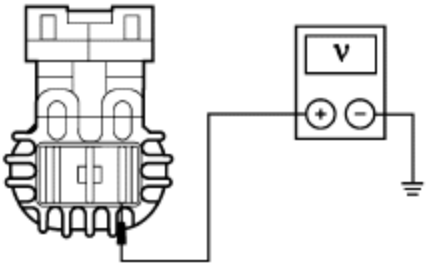
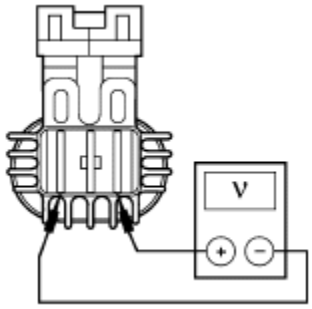
1

2

Blower Motor C154

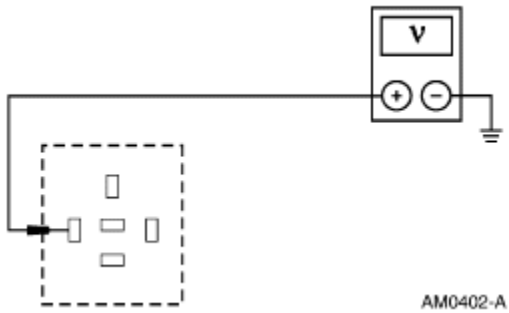
3 Install a new maxi-fuse 9 (50A).

4  5  L10527-A	5 Rotate the blower motor switch to the high position. • **Is the maxi-fuse 9 (50A) OK?** → **Yes** INSTALL a new blower motor. TEST the system for normal operation. → **No** GO to O6 .
O6 CHECK CIRCUIT 371 (PK/WH) FOR SHORT TO GROUND	
1  AM0412-A	1 Measure the resistance between blower motor relay connector pin 30, circuit 371 (PK/WH), and ground. • **Is the resistance greater than 10,000 ohms?** → **Yes** REPAIR circuit 364 (BK/LG) between the power distribution box and blower motor relay. TEST the system for normal operation. → **No** REPAIR circuit 371 (PK/WH). TEST the system for normal operation.
O7 CHECK CIRCUIT 371 (PK/WH) FOR VOLTAGE	

1  AM0416-A	1 Measure the voltage between blower motor C154, circuit 371 (PK/WH), and ground. • **Is the voltage greater than 10 volts?** → **Yes** GO to O8 . → **No** GO to O9 .
O8 CHECK CIRCUIT 181 (BN/OG)	
1  GL0438-A	1 Measure the voltage between blower motor C154, circuit 371 (PK/WH), and blower motor C154, circuit 181 (BN/OG). • **Is the voltage greater than 10 volts?** → **Yes** INSTALL a new blower motor. TEST the system for normal operation. → **No** GO to O15 .
O9 CHECK CIRCUIT 364 (BK/LG) FOR OPEN	
1  2	

Blower Motor Relay

3



3 Measure the voltage between blower motor relay connector pin 86, circuit 364 (BK/LG), and ground.

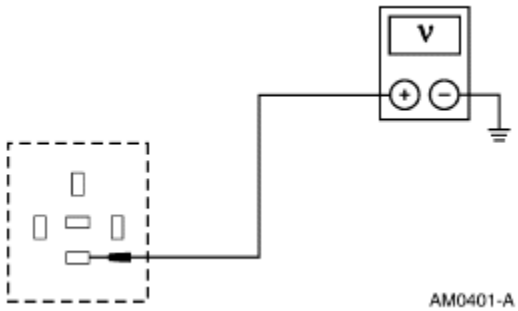
- **Is the voltage greater than 10 volts?**

→ **Yes**
GO to O10 .

→ **No**
REPAIR circuit 364 (BK/LG) between the I/P fuse panel and blower motor relay. TEST the system for the normal operation.

O10 CHECK VOLTAGE AT THE BLOWER MOTOR RELAY

1



1 Measure the voltage between blower motor relay connector pin 87, circuit 364 (BK/LG), and ground.

- **Is the voltage greater than 10 volts?**

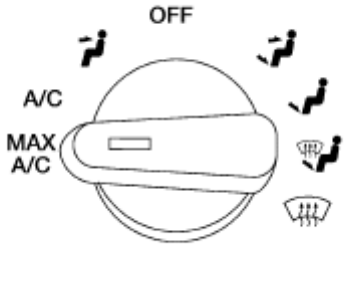
→ **Yes**
GO to O11 .

→ **No**
REPAIR circuit 364 (BK/LG) between the power distribution box and the blower motor relay. TEST the system for normal operation.

O11 CHECK CIRCUIT 260 (RD/OG) FOR OPEN

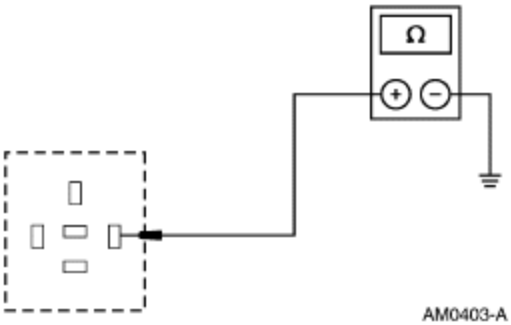
1

1 Turn the A/C function switch to MAX A/C.



L10562-A

2



AM0403-A

2 Measure the resistance between blower motor relay connector pin 85, circuit 260 (RD/OG), and ground.

- **Is the resistance less than 5 ohms?**

→ **Yes**
GO to O14 .

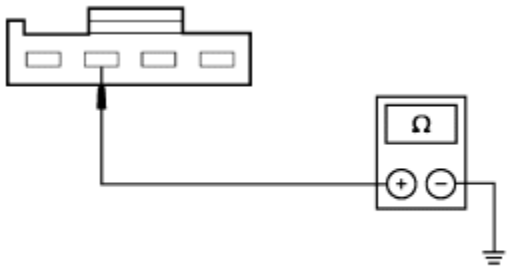
→ **No**
GO to O12 .

O12 CHECK CIRCUIT 57 (BK) FOR OPEN

1

A/C Function Switch C231

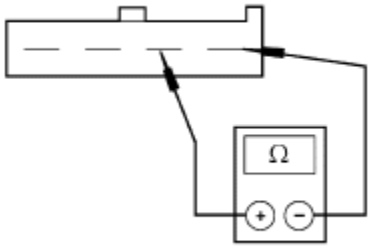
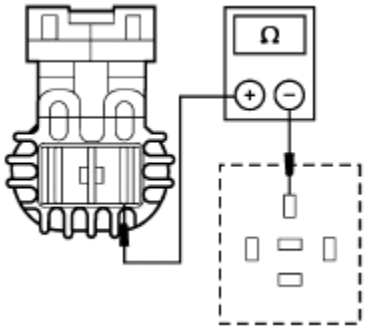
2

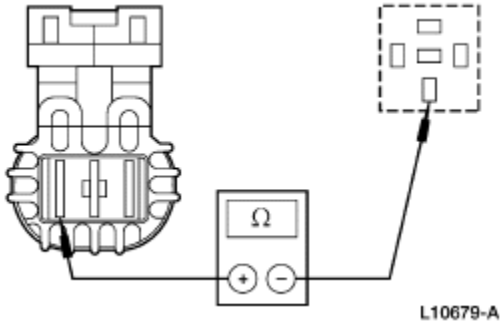


AM0413-A

2 Measure the resistance between A/C function switch C231 pin 3, circuit 57 (BK), and ground.

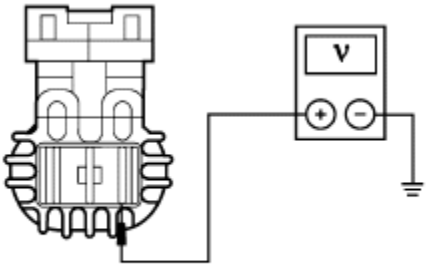
- **Is the resistance less than 5 ohms?**

	→ **Yes** GO to O13 . → **No** REPAIR circuit 57 (BK). TEST the system for normal operation.
O13 CHECK A/C FUNCTION SWITCH	
1  GL1229-A	1 Measure the resistance between A/C function switch terminal 1 and terminal 2, in all A/C function switch positions, except OFF. • **Is the resistance less than 5 ohms?** → **Yes** REPAIR circuit 260 (RD/OG). TEST the system for normal operation. → **No** INSTALL a new A/C function switch. TEST the system for normal operation.
O14 CHECK CIRCUIT 371 (PK/WH) FOR OPEN	
1  Blower Motor C154 2  AM0404-A	2 Measure the resistance between blower motor relay connector pin 30, circuit 371 (PK/WH), and blower motor C154, circuit 371 (PK/WH). • **Is the resistance less than 5 ohms?** → **Yes**

	INSTALL a new blower motor relay. TEST the system for normal operation. → **No** REPAIR circuit 371 (PK/WH). TEST the system for normal operation.
O15 CHECK CIRCUIT 181 (BN/OG) FOR OPEN	
1  High Speed Blower Motor Relay 2  L10679-A	2 Measure the resistance between blower motor C154, circuit 181 (BN/OG), and high speed blower motor relay connector pin 30, circuit 181 (BN/OG). • **Is the resistance less than 5 ohms?** → **Yes** INSTALL a new high speed blower motor relay. TEST the system for normal operation. → **No** REPAIR circuit 181 (BN/OG) for open. TEST the system for normal operation.

PINPOINT TEST P: THE BLOWER MOTOR IS INOPERATIVE — EATC

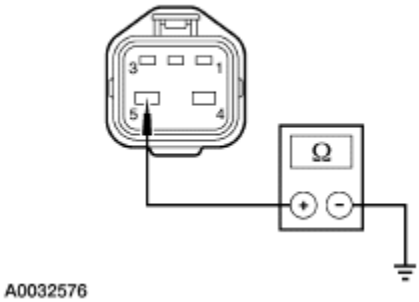
CONDITIONS	DETAILS/RESULTS/ACTIONS
P1 VERIFY THE BLOWER MOTOR OPERATION	
1 	2 Press the VENT button on the EATC module. Adjust the blower motor setting to LO and then to HI. • **Is the blower motor inoperative in all**

	settings? → **Yes** GO to P2 . → **No** Go To Pinpoint Test R .
P2 CHECK FOR VOLTAGE TO THE BLOWER MOTOR	
1  2  Blower Motor C154 3  4  AM0416-A	4 Measure the voltage between the blower motor C154, circuit 371 (PK/WH) and ground. • **Is the voltage greater than 10 volts?** → **Yes** GO to P3 . → **No** GO to P8 .
P3 CHECK CIRCUIT 57 (BK)	
1  2	

Blower Motor Speed Control C179

3

4



A0032576

4 Measure the resistance between the blower motor speed control C179 pin 5, circuit 57 (BK) and ground.

- **Is the resistance less than 5 ohms?**

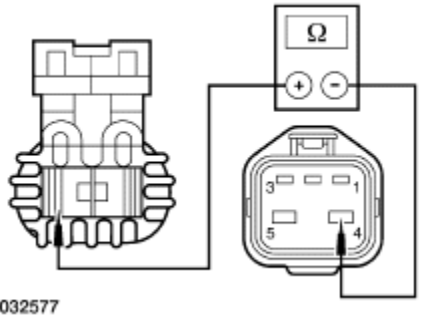
→ **Yes**
GO to P4 .

→ **No**
REPAIR circuit 57 (BK). TEST the system for normal operation.

P4 CHECK CIRCUIT 261 (OG/BK)

1

2

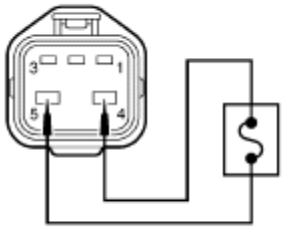


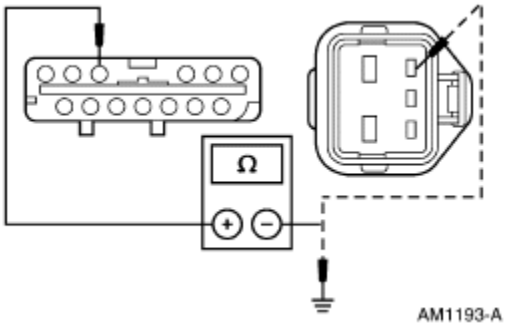
A0032577

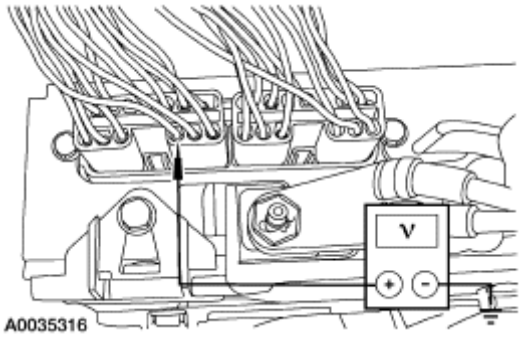
2 Measure the resistance between the blower motor C154, circuit 261 (OG/BK) and the blower motor speed control C179 pin 4, cicuit 261 (OG/BK).

- **Is the resistance less than 5 ohms?**

→ **Yes**

	GO to P5 . → **No** REPAIR circuit 261 (OG/BK). TEST the system for normal operation.
P5 CHECK THE BLOWER MOTOR	
1  Blower Motor C154 2  A0032579 3 	2 Connect a fused jumper lead between the blower motor speed control C179 pin 4, circuit 261 (OG/BK) and ground. • **Does the blower motor operate?** → **Yes** GO to P6 . → **No** INSTALL a new blower motor. TEST the system for normal operation.
P6 CHECK CIRCUIT 775 (BN/OG)	
1  3  EATC Module C298	2 Remove the fused jumper lead from the blower motor speed control C179.

4  	4 Measure the resistance between the EATC module C298 pin 24, circuit 775 (BN/OG) and the blower motor speed control C179 pin 3, circuit 775 (BN/OG), and measure the resistance between the EATC module C298 pin 24, circuit 775 (BN/OG) and ground. • **Is the resistance less than 5 ohms between the EATC module and the blower motor speed control and greater than 10,000 ohms between the EATC module and ground?** → **Yes** GO to P7 . → **No** REPAIR circuit 775 (BN/OG). TEST the system for normal operation.
P7 CHECK THE EATC MODULE OUTPUT	
1  EATC Module C298 2  Blower Motor Speed Control C179 3  5	4 Adjust the blower motor speed to HI (7 bars). 5 Measure the voltage between the EATC module C298 pin 24, circuit 775 (BN/OG) and ground by back-probing the EATC module C298.



- **Is the voltage within 2 volts of battery voltage?**

→ **Yes**
INSTALL a new blower motor speed control. TEST the system for normal operation.

→ **No**
INSTALL a new EATC module. TEST the system for normal operation.

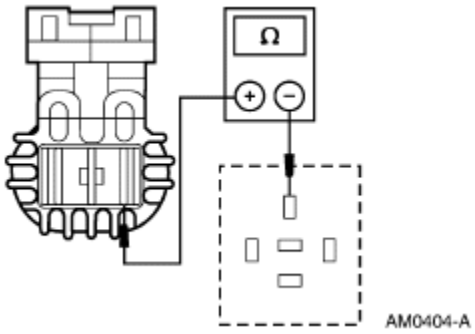
P8 CHECK CIRCUIT 371 (PK/WH)

1

2

Blower Motor Relay

3

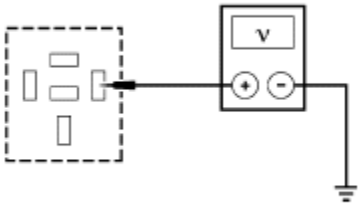
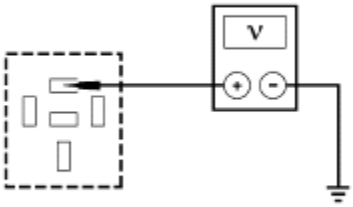


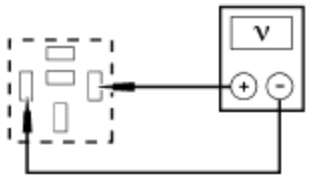
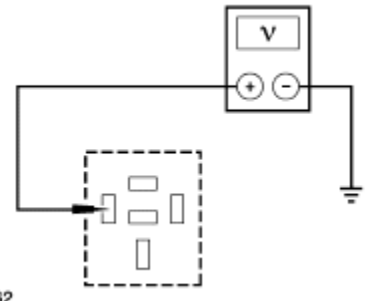
3 Measure the resistance between the blower motor C154, circuit 371 (PK/WH) and the blower motor relay socket pin 30, circuit 371 (PK/WH).

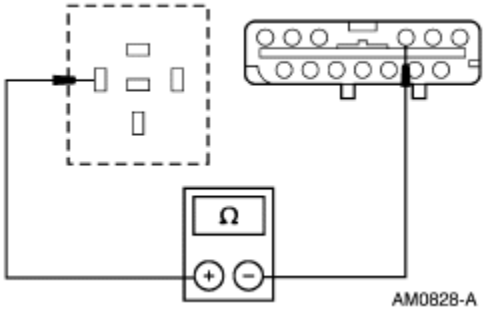
- **Is the resistance less than 5 ohms?**

→ **Yes**
GO to P9 .

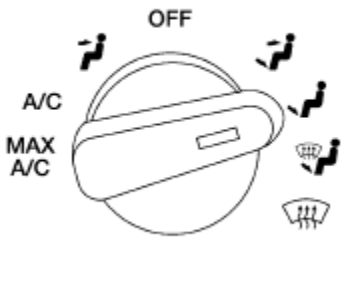
→ **No**

	REPAIR circuit 371 (PK/WH). TEST the system for normal operation.
P9 CHECK CIRCUIT 364 (BK/LG), COIL SIDE	
1  2  A0020210	2 Measure the voltage between the blower motor relay socket pin 86, circuit 364 (BK/LG) and ground. • **Is the voltage greater than 10 volts?** → **Yes** GO to P10 . → **No** REPAIR circuit 364 (BK/LG). TEST the system for normal operation.
P10 CHECK CIRCUIT 364 (BK/LG), SWITCH SIDE	
1  A0013861	1 Measure the voltage between the blower motor relay socket pin 87, circuit 364 (BK/LG) and ground. • **Is the voltage greater than 10 volts?** → **Yes** GO to P11 . → **No** REPAIR circuit 364 (BK/LG). TEST the system for normal operation.
P11 CHECK THE EATC MODULE OUTPUT	

1  A0034149	1 Measure the voltage between the blower motor relay socket pin 86, circuit 364 (BK/LG) and socket pin 85, circuit 575 (VT/BK). • **Is the voltage greater than 10 volts?** → **Yes** INSTALL a new blower motor relay. TEST the system for normal operation. → **No** GO to P12 .
P12 CHECK CIRCUIT 575 (VT/BK) FOR A SHORT TO VOLTAGE	
1  EATC Module C297 2  3  A0013862	3 Measure the voltage between the blower motor relay socket pin 85, circuit 575 (VT/BK) and ground. • **Is voltage present?** → **Yes** REPAIR circuit 575 (VT/BK). TEST the system for normal operation. → **No**

	GO to P13 .
P13 CHECK CIRCUIT 575 (VT/BK)	
1  2  	2 Measure the resistance between the EATC module C297 pin 17, circuit 575 (VT/BK) and the blower motor relay socket pin 85, circuit 575 (VT/BK). • **Is the resistance less than 5 ohms?** → **Yes** INSTALL a new EATC module. TEST the system for normal operation. → **No** REPAIR circuit 575 (VT/BK). TEST the system for normal operation.

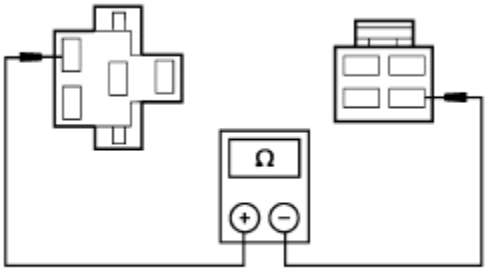
PINPOINT TEST Q: THE BLOWER MOTOR DOES NOT OPERATE CORRECTLY — MANUAL A/C

CONDITIONS	DETAILS/RESULTS/ACTIONS
Q1 CHECK BLOWER LOW SPEED OPERATION	
1  2  	2 Turn the A/C function switch to the FLOOR position.

3  GL0437-A	3 Turn the blower motor switch to low. • **Does the blower motor operate?** → **Yes** GO to Q5 . → **No** GO to Q2 .
Q2 CHECK BLOWER MEDIUM/LOW OPERATION	
1  GL1231-A	1 Turn the blower motor switch to medium/low. • **Does the blower motor operate?** → **Yes** GO to Q4 . → **No** GO to Q3 .
Q3 CHECK CIRCUIT 752 (YE/RD) FOR OPEN	
1  Blower Motor Switch C230 2	

Blower Motor Resistor C153

3



AM0376-B

3 Measure the resistance between blower motor switch C230 pin 4, circuit 752 (YE/RD), and blower motor resistor C153 pin 3, circuit 752 (YE/RD).

- **Is the resistance less than 5 ohms?**

→ **Yes**
GO to Q4 .

→ **No**
REPAIR circuit 752 (YE/RD). TEST the system for normal operation.

Q4 CHECK BLOWER MEDIUM/HIGH OPERATION

1

GL1234-A

1 Turn the blower motor switch to medium/high.

- **Does the blower motor operate?**

→ **Yes**
GO to Q6 .

→ **No**
GO to Q5 .

Q5 CHECK CIRCUIT 754 (LG/WH) FOR OPEN

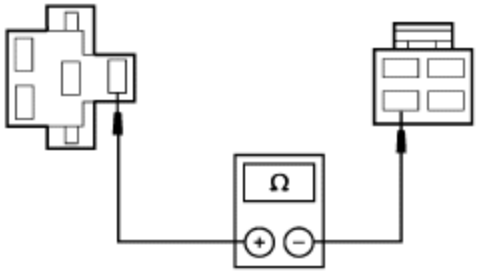
1

Blower Motor Switch C230

2

Blower Motor Resistor C153

3



AM0378-B

3 Measure the resistance between blower motor switch C230 pin 3, circuit 754 (LG/WH), and blower motor resistor C153 pin 1, circuit 754 (LG/WH).

- **Is the resistance less than 5 ohms?**

→ **Yes**
GO to Q6 .

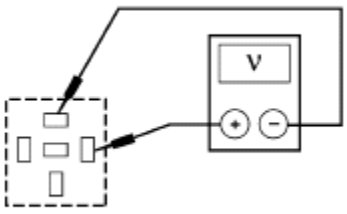
→ **No**
REPAIR circuit 754 (LG/WH). TEST the system for normal operation.

Q6 CHECK THE HIGH SPEED BLOWER MOTOR RELAY FOR VOLTAGE

1

High Speed Blower Motor Relay

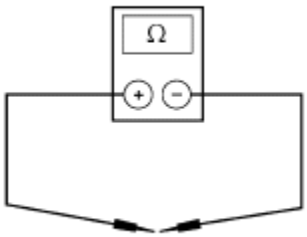
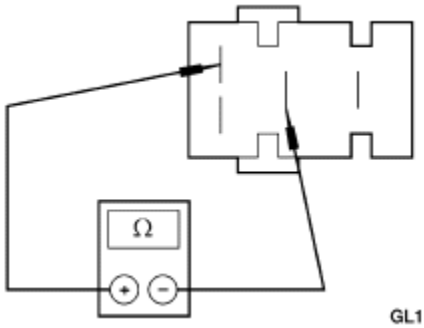
2

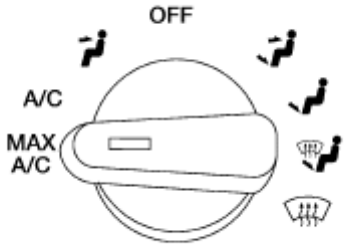


GL1513-A

2 Measure the voltage between high speed blower motor relay connector pin 87, circuit 261 (OG/BK), and high speed blower motor relay connector pin 86, circuit 371 (PK/WH).

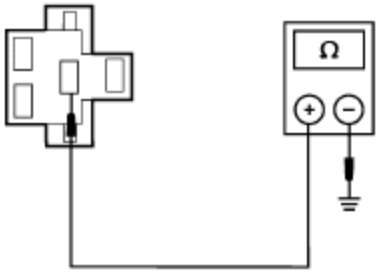
- **Is the voltage greater than 10 volts?**

	→ **Yes** INSTALL a new high speed blower motor relay. TEST the system for normal operation. → **No** GO to Q7 .
Q7 CHECK A/C BLOWER MOTOR RESISTOR	
1  L10681-A	1 Zero the multimeter by touching the leads together and recording the resistance value.
2  GL1232-A	2 Measure the resistance between A/C blower motor resistor terminal 2 and A/C blower motor resistor terminal 4. Subtract the resistance value found when zeroing the multimeter. • **Is the resistance between 3.375 and 4.125 ohms?** → **Yes** GO to Q8 . → **No** INSTALL a new A/C blower motor resistor. TEST the system for normal operation.
Q8 CHECK CIRCUIT 260 (RD/OG) FOR OPEN	
1	1 Turn the A/C function switch to MAX A/C.



L10562-A

2



AM0374-B

2 Measure the resistance between blower motor resistor C153 pin 2, circuit 260 (RD/OG), and ground.

- **Is the resistance less than 5 ohms?**

→ **Yes**
GO to Q9 .

→ **No**
REPAIR circuit 260 (RD/OG). TEST the system for normal operation.

Q9 CHECK BLOWER MOTOR SWITCH

1

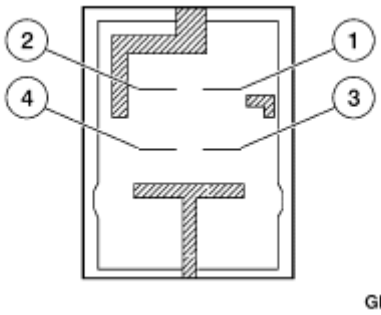
2

Blower Motor Switch

3 Measure the resistance of the blower motor switch. Refer to the chart shown.

Blower Switch Resistance Test

Switch Position	Resistance Between Terminals
Low	None



Medium/Low	2 and 3 only
Medium/High	2, 3 and 4 only
High	1, 2 and 4 only

- **Is the resistance less than 5 ohms?**

→ **Yes**
REPAIR circuit 261 (OG/BK). TEST the system for normal operation.

→ **No**
INSTALL a new blower motor switch. TEST the system for normal operation.

PINPOINT TEST R: THE BLOWER MOTOR DOES NOT OPERATE CORRECTLY — EATC

CONDITIONS	DETAILS/RESULTS/ACTIONS
R1 VERIFY THE BLOWER MOTOR OPERATION	
1 	2 Press the VENT button on the EATC module. Adjust the blower motor setting to LO and then to HI. • **Does the blower motor operate at any setting?** → **Yes** GO to R2 . → **No** Go To Pinpoint Test P .
R2 CHECK THE STEERING WHEEL CONTROLS	
1  2	

Clockspring C220

3

4 Adjust the blower motor setting to LO and then to HI.

- **Does the blower motor speed decrease to LO, then increase to HI?**

→ **Yes**
Go To Pinpoint Test T .

→ **No**
GO to R3 .

R3 CHECK CIRCUIT 261 (OG/BK)

1

2

Blower Motor Speed Control C179

3

- **Does the blower motor operate?**

→ **Yes**
REPAIR circuit 261 (OG/BK). TEST the system for normal operation.

→ **No**
GO to R4 .

R4 CHECK BLOWER MOTOR SPEED CONTROL

1

2

Blower Motor Speed Control C176

3

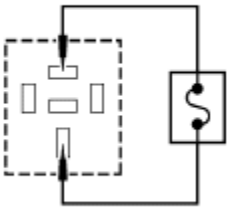
EATC Module C297 and C298

4

Blower Motor Relay

5

6



A0032587

6 Connect a fused jumper lead between the blower motor relay socket pin 30, circuit 371 (PK/WH) and socket pin 87, circuit 364 (BK/LG).

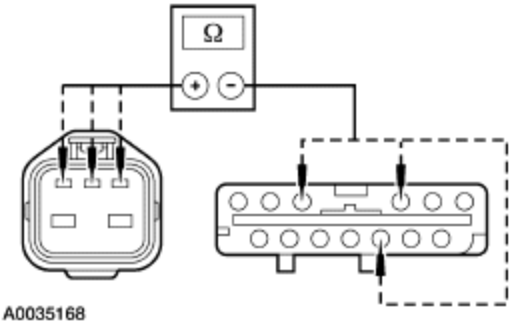
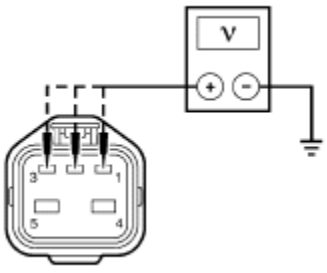
- **Does the blower motor operate?**

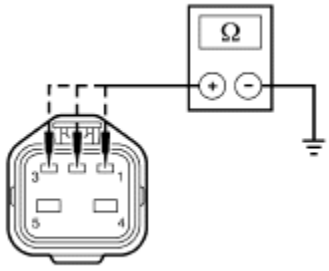
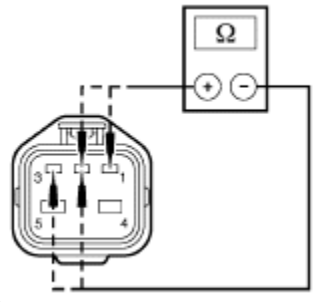
→ **Yes**
INSTALL a new blower motor speed control. TEST the system for normal operation.

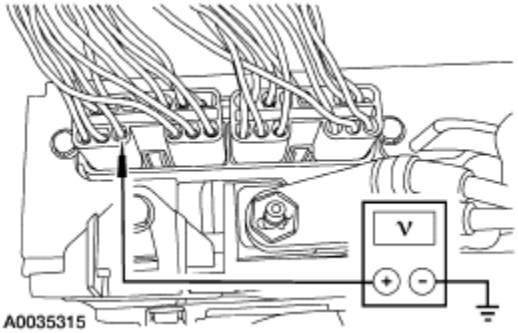
→ **No**
GO to R5 .

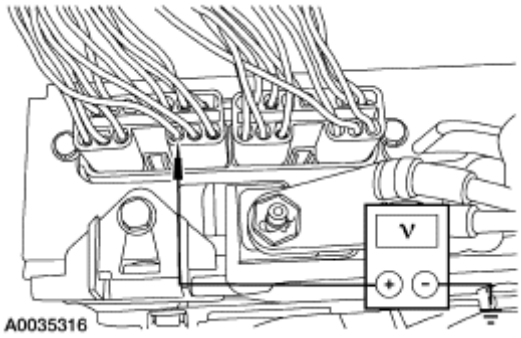
R5 CHECK THE BLOWER MOTOR SPEED CONTROL CIRCUITS FOR AN OPEN

1

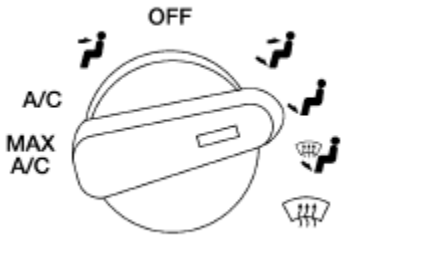
 Blower Motor Relay 2  Blower Motor Speed Control C179 3  A0035168	3 Measure the resistance between the blower motor speed control C179: ■ pin 1, circuit 184 (TN/OG) and the EATC module C298 pin 10, circuit 184 (TN/OG). ■ pin 2, circuit 181 (BN/OG) and the EATC module C298 pin 23, circuit 181 (BN/OG). ■ pin 3, circuit 775 (WH/PK) and the EATC module C298 pin 24, circuit 775 (WH/PK). • **Are the resistances less than 5 ohms?** → **Yes** GO to R6 . → **No** REPAIR the affected circuit. TEST the system for normal operation.
R6 CHECK THE BLOWER MOTOR SPEED CONTROL CIRCUITS FOR A SHORT TO VOLTAGE	
1  2  A0033862	2 Measure the voltage between the blower motor speed control C179: ■ pin 1, circuit 184 (TN/OG) and ground. ■ pin 2, circuit 181 (BN/OG) and ground. ■ pin 3, circuit 775 (WH/PK) and ground.

	• **Is voltage present?** → **Yes** REPAIR the affected circuit. TEST the system for normal operation. → **No** GO to R7 .
R7 CHECK THE BLOWER MOTOR SPEED CONTROL CIRCUITS FOR A SHORT TO GROUND	
1  2  A0033863	2 Measure the resistance between the blower motor speed control C179: ■ pin 1, circuit 184 (TN/OG) and ground. ■ pin 2, circuit 181 (BN/OG) and ground. ■ pin 3, circuit 775 (WH/PK) and ground. • **Are the resistances greater than 10,000 ohms?** → **Yes** GO to R8 . → **No** REPAIR the affected circuit. TEST the system for normal operation.
R8 CHECK THE BLOWER MOTOR SPEED CONTROL CIRCUITS FOR A SHORT	
1  A0033864	1 Measure the resistance between the blower motor speed control C179: ■ pin 1, circuit 184 (TN/OG) and pin 2, circuit 181 (BN/OG). ■ pin 1, circuit 184 (TN/OG) and pin 3, circuit 775 (WH/PK). ■ pin 2, circuit 181 (BN/OG) and pin 3, circuit 775 (WH/PK). • **Are the resistances greater than 10,000 ohms?**

	→ **Yes** GO to R9 . → **No** REPAIR the affected circuits. TEST the system for normal operation.
R9 CHECK THE EATC MODULE HIGH BLOWER OUTPUT	
1  EATC Module C297 and C298 2  Blower Motor Speed Control C179 3  5  	4 Adjust the blower motor speed to HI (7 bars). 5 Measure the voltage between the EATC module C298 pin 24, circuit 775 (WH/PK) and ground by back-probing the EATC module C298. • **Is the voltage within 2 volts of battery voltage?** → **Yes** GO to R10 . → **No** INSTALL a new EATC module. TEST the system for normal operation.
R10 CHECK THE EATC MODULE BLOWER CONTROL OUTPUT	
2	1 Adjust the blower motor speed to LO (1 bar). 2 Measure the voltage between the EATC module C298 pin 23, circuit 181 (BN/OG) and

	ground by back-probing the EATC module C298. • **Is the voltage greater than 1 volt?** → **Yes** INSTALL a new blower motor speed control. TEST the system for normal operation. → **No** INSTALL a new EATC module. TEST the system for normal operation.

PINPOINT TEST S: NO OPERATION IN HIGH BLOWER SETTING — MANUAL A/C

CONDITIONS	DETAILS/RESULTS/ACTIONS
S1 CHECK BLOWER MOTOR SPEED	
1 	
2 	2 Turn the A/C function switch to the FLOOR position.
3	3 Turn the blower motor switch to high.

L10527-A

- **Does the blower motor operate in high?**

→ **Yes**
CYCLE blower motor switch from high to low several times. If blower operates each time, advise owner of system operation. If blower does not operate in high each time, INSTALL a new blower motor switch.

→ **No**
GO to S2 .

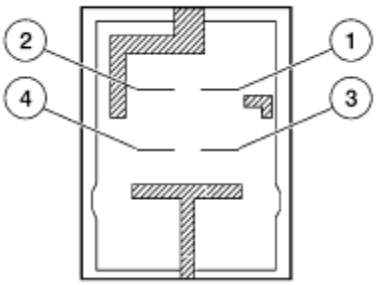
S2 CHECK BLOWER MOTOR SWITCH

1

2

Blower Motor Switch C230

3



GL1230-A

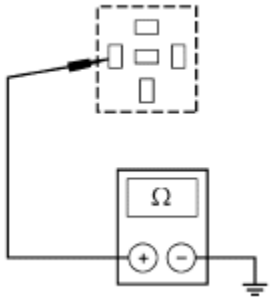
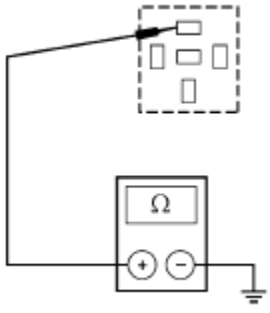
3 Measure the resistance of the blower motor switch. Refer to the chart shown.

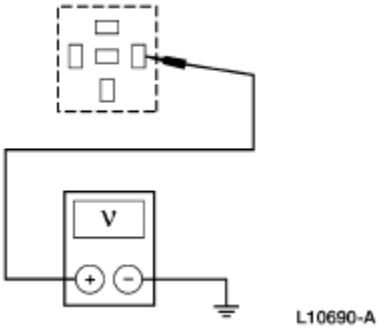
Blower Switch Resistance Test

Switch Position	Resistance Between Terminals
Low	None
Medium/Low	2 and 3 only
Medium/High	2, 3 and 4 only
HIGH	1, 2 and 4 only

- **Is the resistance less than 5 ohms?**

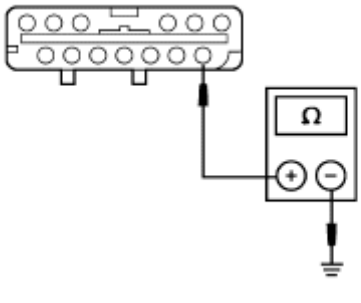
→ **Yes**
GO to S3 .

	→ **No** INSTALL a new blower motor switch. TEST the system for normal operation.
S3 CHECK CIRCUIT 261 (OG/BK) FOR OPEN	
1  High Speed Blower Motor Relay 2  	2 Measure the resistance between high speed blower motor relay connector pin 85, circuit 261 (OG/BK), and ground. • **Is the resistance 5 ohms or less?** → **Yes** GO to S4 . → **No** REPAIR circuit 261 (OG/BK). TEST the system for normal operation.
S4 CHECK CIRCUIT 57 (BK) FOR OPEN	
1  	1 Measure the resistance between high speed blower motor relay connector pin 87, circuit 57 (BK), and ground. • **Is the resistance 5 ohms or less?** → **Yes** GO to S5 . → **No**

	REPAIR circuit 57 (BK). TEST the system for normal operation.
S5 CHECK CIRCUIT 371 (PK/WH) FOR BATTERY VOLTAGE	
1  2  L10690-A	2 Turn the A/C function switch to any position except OFF. Measure the voltage between the high speed blower motor relay connector pin 86, circuit 371 (PK/WH), and the ground. • **Is the voltage greater than 10 volts?** → **Yes** INSTALL a new high speed blower motor relay. TEST the system for normal operation. → **No** REPAIR circuit 371 (PK/WH). TEST the system for normal operation.

PINPOINT TEST T: ONE OR MORE STEERING WHEEL CONTROL SWITCHES IS INOPERATIVE

CONDITIONS	DETAILS/RESULTS/ACTIONS
T1 CHECK THE INPUT TO THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC)	
1  2  EATC C297 3	3 Measure the resistance between the EATC module connector pin C297 pin 8, circuit 583 (YE) and ground.



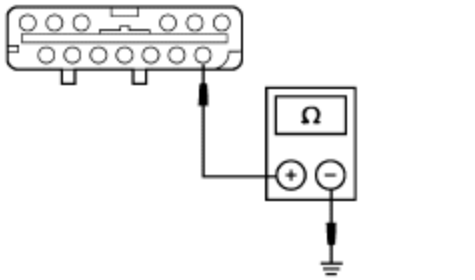
- **Is the resistance reading between 4,500 and 5,000 ohms?**

→ **Yes**
GO to T2 .

→ **No**
GO to T3 .

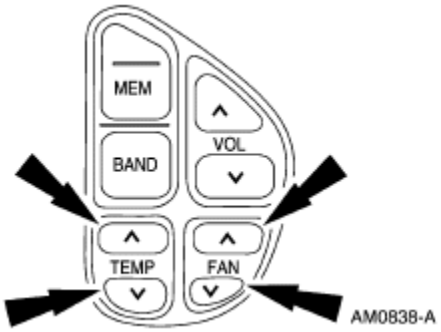
T2 CHECK THE STEERING WHEEL CONTROL SWITCH OUTPUT

1



1 Measure the resistance between the EATC module connector C297 pin 8, circuit 583 (YE) and ground.

2

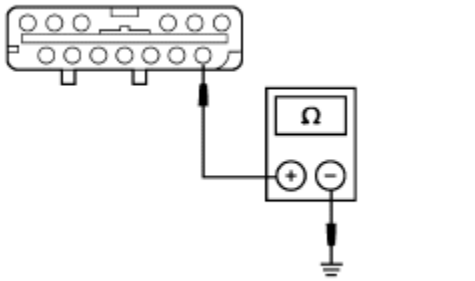
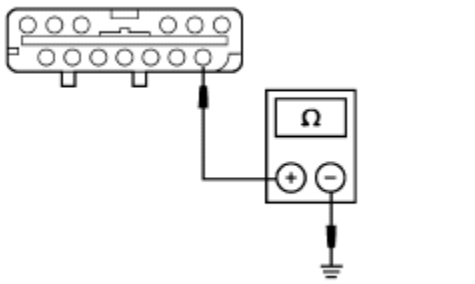


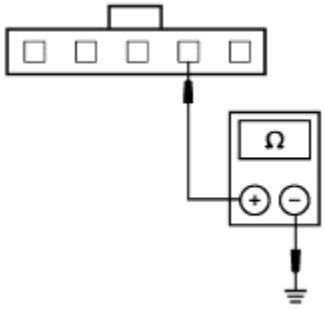
2 Press each steering wheel control switch and compare the resistance reading to the chart below.

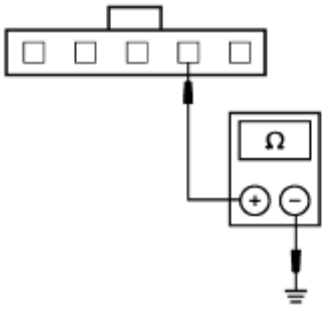
Switch	Resistance
TEMP UP	336-376 ohms
TEMP DOWN	1,620-1,810 ohms
FAN UP	736-821 ohms
FAN DOWN	123-138 ohms

- **Are the resistances within range?**

→ **Yes**
INSTALL a new EATC module. TEST the system for normal operation.

	→ **No** INSTALL a new steering column switch assembly. TEST the system for normal operation.
T3 CHECK THE SYSTEM FOR AN OPEN	
1  AM0837-A	1 Measure the resistance between the EATC module connector C297 pin 8, circuit 583 (YE) and ground. • **Is the resistance reading less than 4,500 ohms?** → **Yes** GO to T4 . → **No** GO to T7 .
T4 CHECK CIRCUIT 583 (YE) FOR A SHORT TO GROUND	
1  Clockspring C220 2  AM0837-A	2 Measure the resistance between the EATC module connector C297 pin 8, circuit 583 (YE) and ground. • **Is the resistance reading less than 10,000 ohms?** → **Yes** REPAIR circuit 583 (YE) for a short to ground. TEST the system for normal operation.

	→ **No** GO to T5 .
T5 CHECK THE CLOCKSPRING FOR A SHORT TO GROUND	
1  Climate Control Steering Wheel Switch 2  AM0840-A	2 Measure the resistance between the climate control steering wheel switch connector circuit (LB/RD) and ground. • **Is the resistance 10,000 ohms or less?** → **Yes** GO to T6 . → **No** INSTALL a new climate control steering wheel switches. TEST the system for normal operation.
T6 CHECK THE STEERING WHEEL SWITCH HARNESS FOR A SHORT TO GROUND	
2  Steering Wheel Switch In-Line Connector 3	1 Remove the driver air bag. Refer to Section 501-20B . 3 Measure the resistance between the climate control steering wheel switch connector, circuit (LB/RD) and ground.



- **Is the resistance 10,000 ohms or less?**

→ **Yes**
REPAIR the steering wheel switch harness. TEST the system for normal operation.

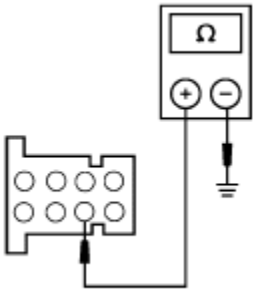
→ **No**
INSTALL a new clockspring. REFER to Section 501-20B . TEST the system for normal operation.

T7 CHECK THE GROUND SUPPLY TO THE STEERING COLUMN SWITCHES

1

Clockspring C220

2



2 Measure the resistance between the clockspring connector C220 pin 4, circuit 848 (DG/OG) and ground.

- **Is the resistance reading 5 ohms or less?**

→ **Yes**
GO to T9 .

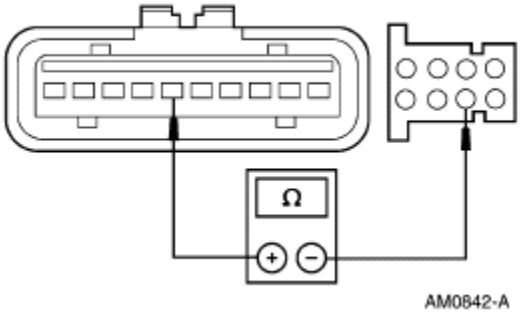
→ **No**
GO to T8 .

T8 CHECK CIRCUIT 848 (DG/OG) FOR AN OPEN

1

Speed Control Module C171

2



2 Measure the resistance of circuit 848 (DG/OG) between the clockspring connector C220 pin 4 and the speed control module connector C171 pin 6.

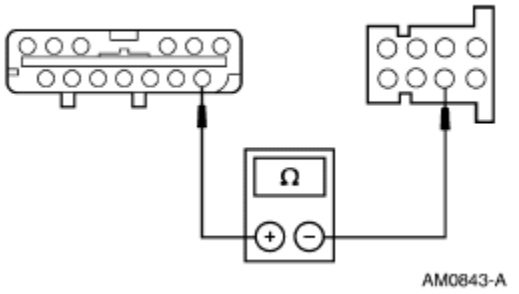
- **Is the resistance 5 ohms or less?**

→ **Yes**
INSTALL a new speed control module. REFER to Section 310-03 .

→ **No**
REPAIR circuit 848 (DG/OG) for an open. TEST the system for normal operation.

T9 CHECK CIRCUIT 583 (YE) FOR AN OPEN

1



1 Measure the resistance of circuit 583 (YE) between the clockspring connector C220 pin 5 and the EATC connector C297 pin 8.

- **Is the resistance reading 5 ohms or less?**

→ **Yes**
GO to T10 .

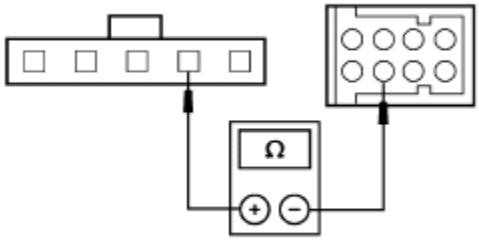
→ **No**
REPAIR circuit 583 (YE) for an open. TEST the system for normal operation.

T10 CHECK THE STEERING COLUMN SWITCH FOR AN OPEN

1

Climate Control Steering Wheel Switch

2



2 Measure the resistance between the clockspring connector terminal C220 pin 5, circuit (WH/LB) and the steering wheel switch connector, circuit (LB/RD).

- **Is the resistance reading 5 ohms or less?**

→ **Yes**
INSTALL a new steering wheel switch assembly. TEST the system for normal operation.

→ **No**
GO to T11 .

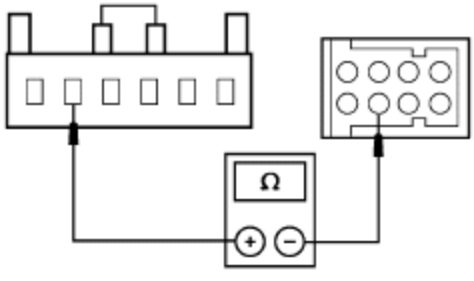
T11 CHECK THE CLOCKSPRING FOR AN OPEN

1 Remove the driver air bag. Refer to Section 501-20B .

2

Steering Wheel Switch In-Line Connector

3

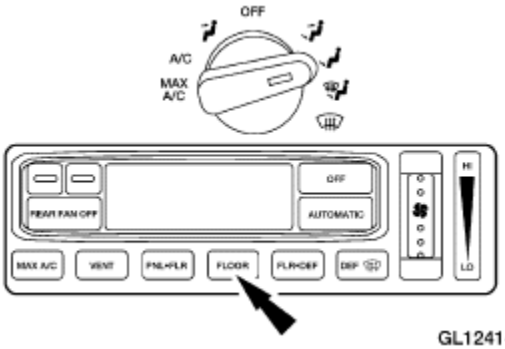


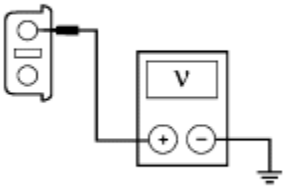
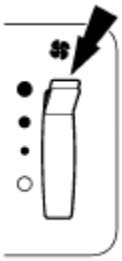
3 Measure the resistance of circuit (WH/LB) between the clockspring connector terminal C220 pin 5 and the clockspring to steering wheel switch in-line harness connector.

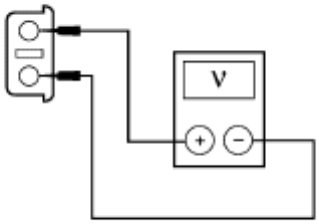
- **Is the resistance reading 5 ohms or less?**

	→ **Yes** REPAIR the steering wheel switch harness. TEST the system for normal operation. → **No** INSTALL a new clockspring. REFER to Section 501-20B .

PINPOINT TEST U: THE CONSOLE BLOWER MOTOR DOES NOT OPERATE

CONDITIONS	DETAILS/RESULTS/ACTIONS
U1 CHECK BLOWER MOTOR OPERATION	
1  2  GL1241-B	2 Place the front A/C function switch to FLR (manual A/C); or select the electronic automatic temperature control (EATC) FLOOR button. 3 Rotate the rear blower switch to MED, and then to HIGH. • **Does the rear blower operate?** → **Yes** If the blower operates in all speeds, WIGGLE the wires and CHECK for an intermittent condition. If the rear blower operates in one speed only, GO to U6 . → **No** GO to U2 .
U2 CHECK I/P FUSE 31 (7.5A)	
1  I/P Fuse 31 (7.5A)	

	• **Is fuse 31 (7.5A) OK?** → **Yes** GO to U3 . → **No** INSTALL a new fuse 31 (7.5A). TEST the system for normal operation. If the fuse fails again, GO to U14 .
U3 CHECK CIRCUIT 371 (PK/WH) FOR VOLTAGE	
1  Rear Blower Motor C2012 2  GL1069-A	2 Measure the voltage between rear blower motor C2012, circuit 371 (PK/WH), and ground. • **Is the voltage greater than 10 volts?** → **Yes** GO to U4 . → **No** GO to U10 .
U4 CHECK REAR BLOWER MOTOR OPERATION	
1  GL1238-A 2	1 Place the rear blower switch to HIGH. 2 Measure the voltage between rear blower motor C2012, circuit 371 (PK/WH), and rear



blower motor C2012, circuit 515 (OG/RD).

- **Is the voltage greater than 10 volts?**

→ **Yes**
INSTALL a new rear blower motor. TEST the system for normal operation.

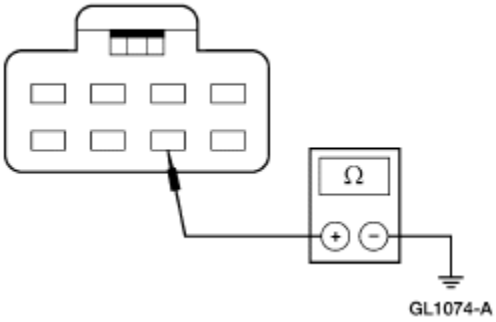
→ **No**
GO to U5 .

U5 CHECK CIRCUIT 57 (BK) FOR OPEN

1

Rear Blower Switch C2004

2



2 Measure the resistance between rear blower switch C2004 pin 7, circuit 57 (BK), and ground.

- **Is the resistance less than 5 ohms?**

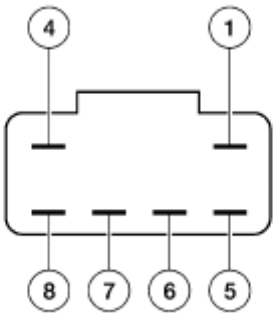
→ **Yes**
GO to U6 .

→ **No**
REPAIR circuit 57 (BK). TEST the system for normal operation.

U6 CHECK REAR BLOWER SWITCH

1

1 Measure the resistance of the rear blower switch. Refer to the chart shown.



GL0448-B

Blower Switch Resistance Test

Switch Position	Resistance Between Terminals
OFF	None
LOW	None
MED	6 and 7
HIGH	5 and 7

- **Is the resistance less than 5 ohms?**

→ **Yes**
GO to U7 .

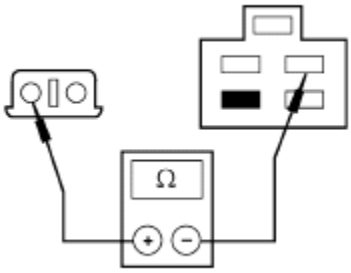
→ **No**
INSTALL a new rear blower switch. TEST the system for normal operation.

U7 CHECK CIRCUIT 515 (OG/RD) FOR OPEN

1


Rear Blower Motor Resistor C2014

2



GL0449-A

2 Measure the resistance between rear blower motor C2012, circuit 515 (OG/RD), and rear blower motor resistor C2014 pin 2, circuit 515 (OG/RD).

- **Is the resistance less than 5 ohms?**

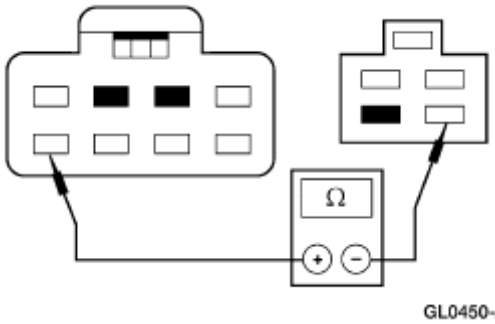
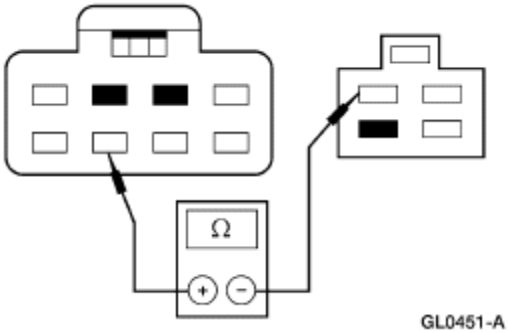
→ **Yes**
GO to U8 .

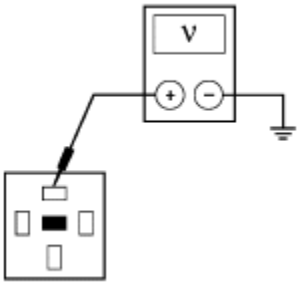
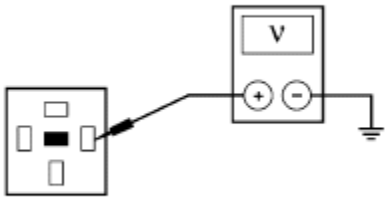
→ **No**
REPAIR circuit 515 (OG/RD). TEST the system for normal operation.

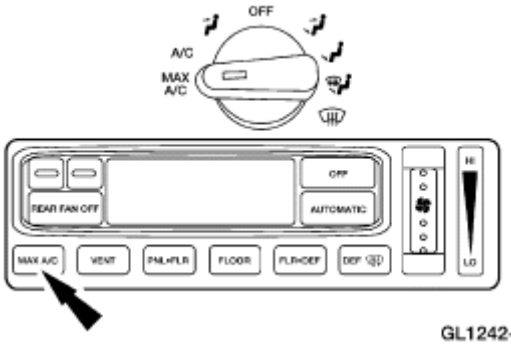
U8 CHECK CIRCUIT 261 (OG/BK) FOR OPEN

1

1 Measure the resistance between rear blower motor resistor C2014-4, circuit 261 (OG/BK), and rear blower switch C2014 pin 5, circuit

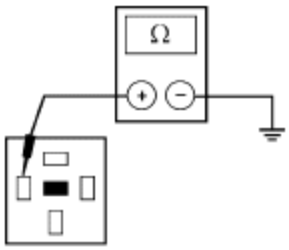
	261 (OG/BK). • **Is the resistance less than 5 ohms?** → **Yes** GO to U9 . → **No** REPAIR circuit 261 (OG/BK). TEST the system for normal operation.
U9 CHECK CIRCUIT 269 (LB/OG) FOR OPEN	
1 	1 Measure the resistance between rear blower motor resistor C2014 pin 1, circuit 269 (LB/OG), and rear blower switch C2014 pin 6, circuit 269 (LB/OG). • **Is the resistance less than 5 ohms?** → **Yes** INSTALL a new rear blower motor resistor. TEST the system for normal operation. → **No** REPAIR circuit 269 (LB/OG) for open. TEST the system for normal operation.
U10 CHECK CIRCUIT 181 (BN/OG) FOR OPEN	
1  Rear Blower Relay 2	

 3  GL0452-A	3 Measure the voltage between rear blower relay pin 87, circuit 181 (BN/OG), and ground. • **Is the voltage greater than 10 volts?** → **Yes** GO to U11 . → **No** REPAIR circuit 181 (BN/OG). TEST the system for normal operation.
U11 CHECK CIRCUIT 1003 (GY/YE) FOR OPEN	
1  GL0453-A	1 Measure the voltage between rear blower relay connector pin 85, circuit 1003 (GY/YE), and ground. • **Is the voltage greater than 10 volts?** → **Yes** GO to U12 . → **No** REPAIR circuit 1003 (GY/YE). TEST the system for normal operation.
U12 CHECK CIRCUIT 260 (RD/OG) FOR OPEN	
1	1 Turn the A/C function switch to MAX A/C (manual A/C); or select the electronic automatic temperature control (EATC) MAX A/C button.



GL1242-B

2



GL0454-A

2 Measure the resistance between the rear blower relay connector pin 86, circuit 260 (RD/OG), and ground.

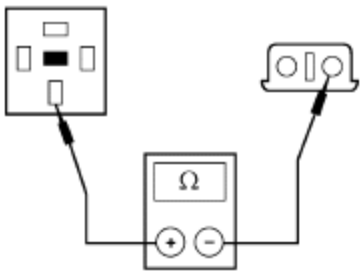
- **Is the resistance less than 5 ohms?**

→ **Yes**
GO to U13 .

→ **No**
REPAIR circuit 260 (RD/OG). TEST the system for normal operation.

U13 CHECK CIRCUIT 371 (PK/WH) FOR OPEN

1



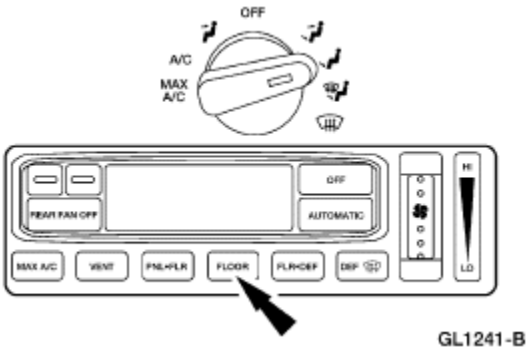
GL0455-A

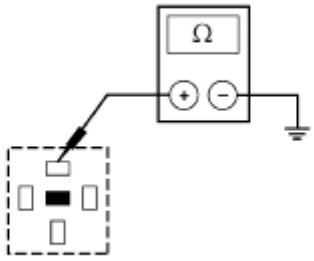
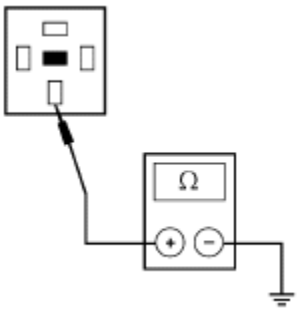
1 Measure the resistance between the rear blower relay connector pin 30, circuit 371 (PK/WH), and rear blower motor C2012, circuit 371 (PK/WH).

- **Is the resistance less than 5 ohms?**

→ **Yes**
INSTALL a new rear blower relay. TEST the system for normal operation.

→ **No**

	REPAIR circuit 371 (PK/WH). TEST the system for normal operation.
U14 CHECK FOR SHORTED REAR BLOWER MOTOR	
1  Rear Blower Motor C2012	
	2 Install a new I/P fuse 31 (7.5A).
3 	
4  GL1241-B	4 Turn the A/C function switch to the FLR (manual A/C) position; or select the electronic automatic temperature control (EATC) FLOOR button.
5  Fuse 31 (7.5A)	
	• **Is fuse 31 (7.5A) OK?** → **Yes** INSTALL a new rear blower motor. TEST the system for normal operation. → **No** GO to U15 .
U15 CHECK CIRCUIT 181 (BN/OG) FOR SHORT TO GROUND	
1  Rear Blower Relay	
2	2 Measure the resistance between rear blower relay connector pin 87, circuit 181 (BN/OG), and ground.

 GL0440-A	• **Is the resistance greater than 10,000 ohms?** → **Yes** GO to U16 . → **No** REPAIR circuit 181 (BN/OG). TEST the system for normal operation.
U16 CHECK CIRCUIT 371 (PK/WH) FOR SHORT TO GROUND	
1  GL1225-A	1 Measure the resistance between rear blower relay connector pin 30, circuit 371 (PK/WH), and ground. • **Is the resistance greater than 10,000 ohms?** → **Yes** INSTALL a new rear blower relay. TEST the system for normal operation. → **No** REPAIR circuit 371 (PK/WH). TEST the system for normal operation.

Component Tests

Heater Core

WARNING: Carbon monoxide is colorless, odorless and dangerous. If it is necessary to operate

the engine with the vehicle in a closed area such as a garage, always use an exhaust collector to vent the exhaust gases outside the closed area.

1. **NOTE:** Testing of returned heater cores reveals that a large percentage of heater cores are good and did not require installation of a new heater core. If a heater core leak is suspected, the heater core must be tested by following 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

WARNING: The heater core inlet hose will become too hot to handle if the system is working correctly.

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, feel the heater core outlet hose to see if it is hot.

If it is not hot:

- the heater core may have an air pocket
- the heater core may be plugged
- the thermostat is not working correctly.

Heater Core—Pressure Test

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

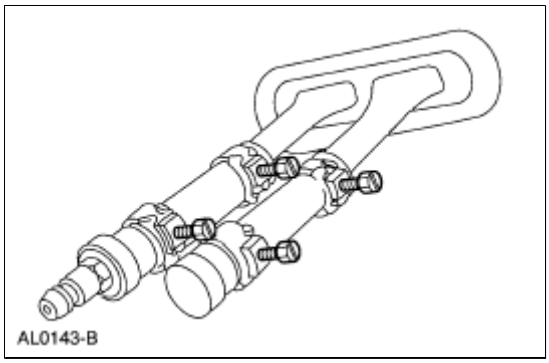
1. **NOTE:** Due to space limitations, a bench test may be necessary for pressure testing.

   Drain the coolant from the cooling system. For additional information, refer to Section 303-03 .

2. Disconnect the heater water hoses from the heater core. For additional information, refer to Section 412-02 .

3. Install a short piece of heater water hose, approximately 101 mm (4 inches) long on each heater core tube.

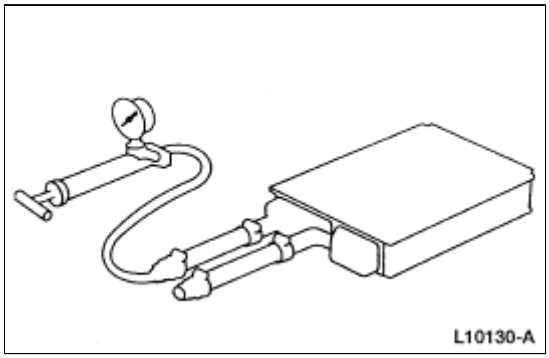
4. Fill the heater core and heater water hoses with water and install Plug BT-7422-B and adapter BT-7422-A from the radiator/heater core pressure tester in the heater water hose ends. Secure the heater water hoses, plug and adapter with hose clamps.



5. Attach the pump and gauge assembly from the Radiator/Heater Core Pressure Tester to the adapter.
6. Close the bleed valve at the base of the gauge. Pump 241 kPa (35 psi) of air pressure into the heater core.
7. Observe the pressure gauge for a minimum of three 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. For additional information, refer to Section 412-02 .
2. Drain all of the coolant from the heater core.
3. Connect the 101 mm (4 inch) test heater water hoses with plug and adapter to the core tubes. Then connect the radiator/heater core pressure tester to the adapter.
4. Apply 241 kPa (35 psi) of air pressure to the heater core. Submerge the heater core in water.
5. If a leak is observed, install a new heater core.



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

1. Discharge and recover the refrigerant. For additional information, refer to Discharging and Recovery in this section.
2. **NOTE:** DO NOT leak test an A/C evaporator core with the suction accumulator/drier (19C836) attached to the core tubes.

Disconnect the suspect A/C evaporator core or A/C condenser core from the A/C system. For additional information, refer to Section 412-03 .

3. Clean the spring lock couplings. For additional information, refer to Spring Lock Coupling in this section.

4. Connect the appropriate test fittings from the R-12/R-134a Air Conditioning Test Fitting Set 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. For additional information, refer to Section 412-03 .

A/C Compressor—External Leak Test

1. Install the A/C pressure test adapter on the rear head of the A/C compressor using the existing manifold retaining bolt.

2. Connect the high and low pressure lines of a manifold gauge set or a refrigerant recovery/recycling station such as R-134a A/C Service Center to the corresponding fittings on the A/C pressure test adapter.

3. Attach the center hose of the manifold gauge set to a refrigerant container standing in an upright position.

4. Hand-rotate the compressor shaft 10 complete revolutions to distribute the oil inside the A/C compressor.

5. 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.

6. Using the Refrigerant Leak Detector, check for leaks at the compressor shaft seal and the compressor center seal.

7. If a shaft seal leak is found, install a new shaft seal. For additional information, refer to Section 412-03 . If an external leak is found at the center joint of the A/C compressor, install a new A/C compressor.

8. When the leak test is complete, recover the refrigerant from the compressor.

Air Conditioning (A/C) System Check — Retail Procedure

NOTE: This Retail Procedure is not eligible for claiming on Ford paid repairs (warranty and ESP).

NOTE: The engine should be run at idle for 10 minutes with the air conditioning on and set to MAX A/C before carrying out this retail procedure.

NOTE: Read and follow all of the Warnings, Cautions and Notes at the beginning of this section before continuing.

1. **Visual inspection**
   Open the hood and visually inspect the heating and air conditioning systems for the following:
   - Coolant reservoir for correct coolant level
   - Heater hoses for deterioration or loose connections
   - Radiator and condenser for debris or damaged fins restricting airflow, loose mounting or connections
   - Accessory drive belt(s) and cooling fan(s) for wear or physical damage
   - Refrigerant lines and connections for physical damage or loose connections
   - Compressor for physical damage or loose connections
   - Suction accumulator/drier for physical damage or loose connections
   - Wiring and connectors for excessive wear, loose or damaged connections, or incorrect routing

2. **A/C refrigerant analysis**
   - Carry out air conditioning refrigerant analysis. For additional information, refer to Refrigerant Identification Testing in this section.
   - If the refrigerant fails the analysis, discontinue diagnosis and make recommendations for repairs.
   - If the refrigerant passes the analysis, carry out the air conditioning system check.

3. **Air conditioning system check**
   - Connect manifold gauge set or charging station with gauges to refrigerant system.
   - With the vehicle in park, parking brake set, thermometer installed in center panel vent, and air conditioning system on and set to MAX A/C, start the engine.
   - Record air refrigerant system pressures while running the engine at 1,500 rpm and allow engine to return to idle.
   - Operate the blower motor in all control positions and check for correct blower speed changes.
   - With the blower motor on HI, operate air discharge mode selector in all positions and check for correct airflow in each position.
   - Operate the temperature blend selector in all positions and check for correct change in discharge temperature. Check the air discharge temperature with the selector in the coolest position and the air conditioning on and set to MAX A/C to determine if the air discharge temperature is acceptable for the current ambient air temperature.
   - Carry out the EATC self-test (if applicable).
     If the refrigerant system pressures were low, carry out the refrigerant system leak test.

4. **Refrigerant system leak test**
   - Use either an ultraviolet (UV) or an electronic leak detector to check for leaks at all refrigerant lines, connections, and components.
     After all tests have been completed, report all findings and recommended repairs to your

service advisor before carrying out further diagnostic procedures.

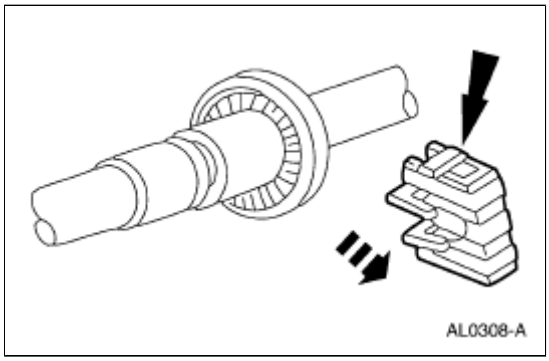
Spring Lock Coupling

Special Tool(s)

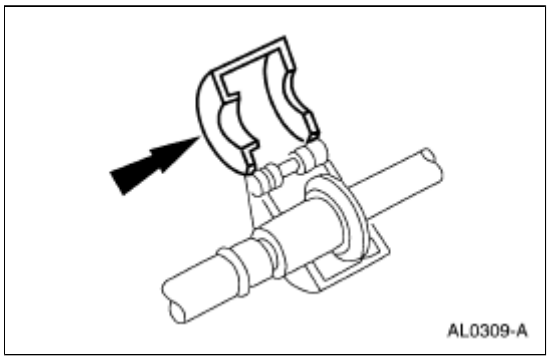
 ST2352-A	Spring Lock Coupling Disconnect Tool Set 412-039 (T84L-19623-B)

Disconnect

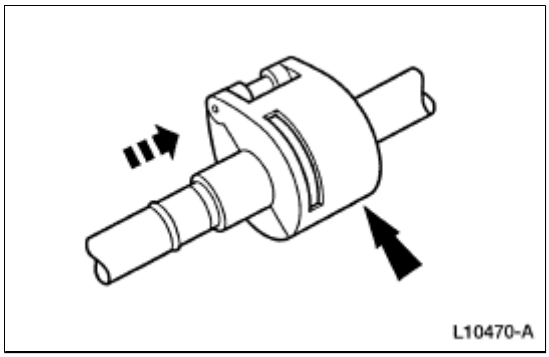
1. Remove the A/C tube lock coupling clip (19E746).



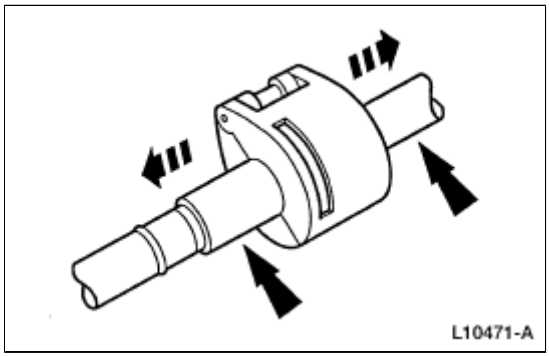
2. Fit the spring lock coupling disconnect tool to the spring lock coupling.



3. Push the tool into the cage opening to release the female fitting from the A/C tube lock coupling spring (19E576).

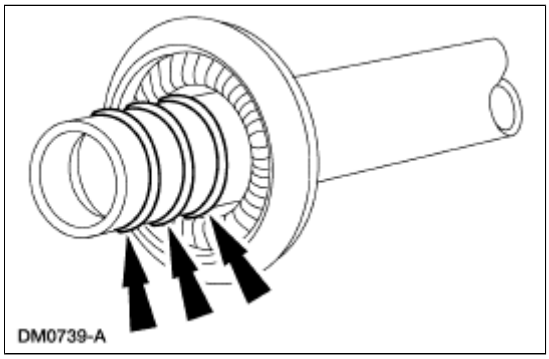


4. Pull the spring lock coupling fittings apart.



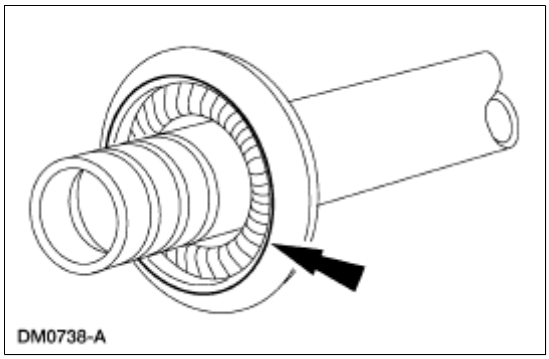
5. **CAUTION: Do not use metal tools to remove the O-ring seals. They can cause axial scratches across the O-ring seal grooves resulting in refrigerant leaks.**

   Remove the O-ring seals with a non-metallic tool.
   - There are three O-ring seals required for the A/C condenser core couplings.
   - There are two O-ring seals for all other refrigerant tube couplings.



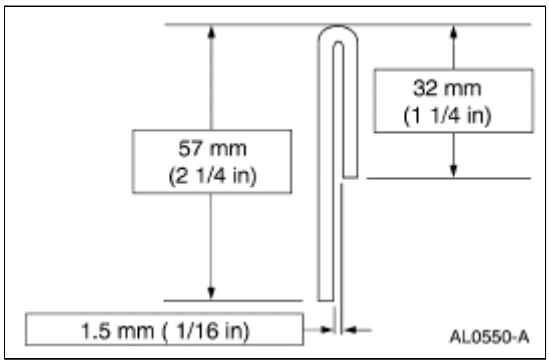
6. **CAUTION: Do not use a screwdriver or similar tool to remove the A/C tube lock coupling spring; this can cause axial scratches across the O-ring seal grooves resulting in refrigerant leaks.**

   Remove the A/C tube lock coupling spring with a small hooked wire.



Cleaning

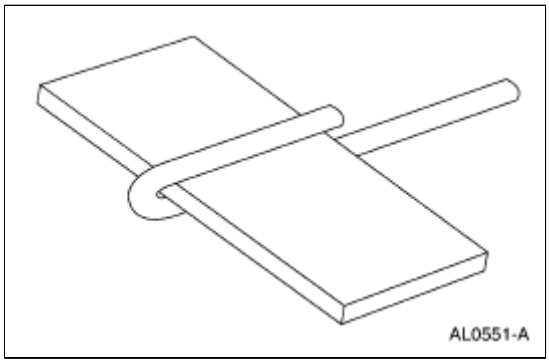
1. Fabricate a cleaning tool from a 1/8 inch diameter brazing rod.



2. Cut an abrasive pad from maroon colored 3M Scotch Brite® with the dimensions corresponding to the coupling size.

Coupling Size	Pad Size
3/8 inch	25 X 50 mm (1 X 2 inch)
1/2 inch	25 X 50 mm (1 X 2 inch)
5/8 inch	25 X 76 mm (1 X 3 inch)
3/4 inch	25 X 102 mm (1 X 4 inch)

3. Assemble the pad to the tool.



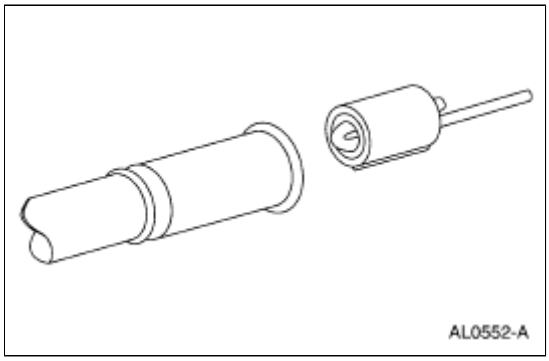
4. Coat the abrasive pad with PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA

(Motorcraft YN-12-C) or equivalent meeting Ford specification WSH-M1C231-B.

5. Roll the pad on the tool and install it in a variable speed drill motor.

6. **CAUTION: Maintain low speed drill rotation when inserting or removing the cleaning tool to prevent axial scratches which may cause future leaks.**

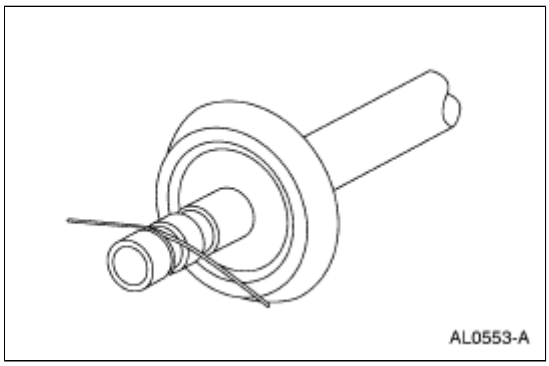
   Polish for one minute at moderate speed (less than 1,500 rpm) or until the surface is clean and free of scratches or foreign material.



7. Clean the fitting with a lint-free cloth.

8. Inspect the surface for grooves or scratches. If grooves and scratches are still present, install a new component.

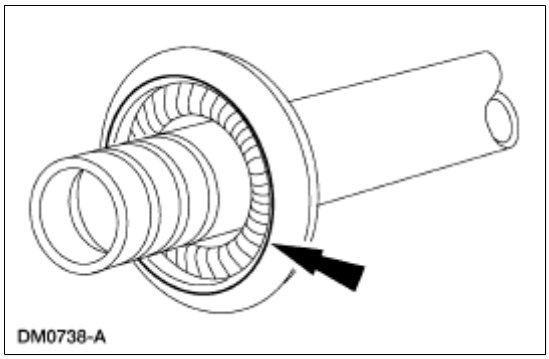
9. Clean the O-ring seal grooves with a 300 mm (12 inch) length of natural fiber string.
   - Loop the string around the grooves and pull the string back and forth.



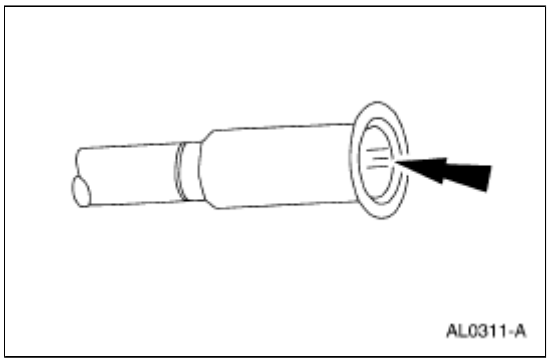
10. Remove any foreign material from the grooves with a lint-free cloth.

Connect

1. Install the A/C tube lock coupling spring.

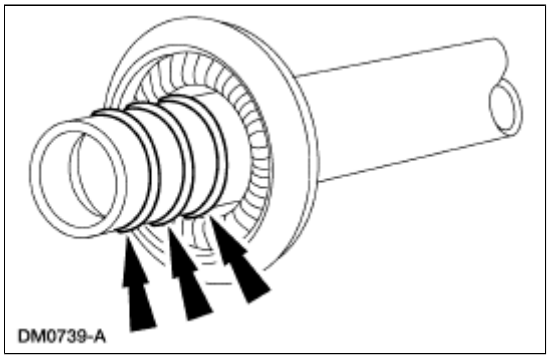


2. Lubricate the inside of the coupling with PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA (Motorcraft YN-12-C) or equivalent meeting Ford specification WSH-M1C231-B.

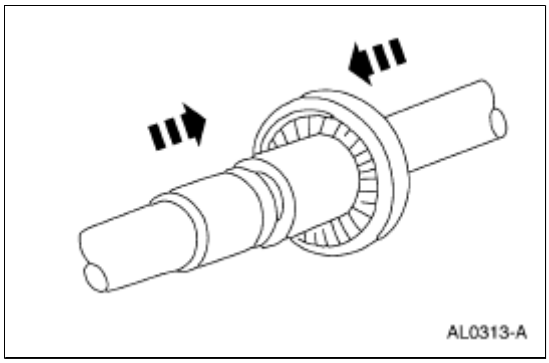


3. **CAUTION: Use only new green O-ring seals. The use of any O-ring seals other than specified may result in intermittent leakage during vehicle operation.**

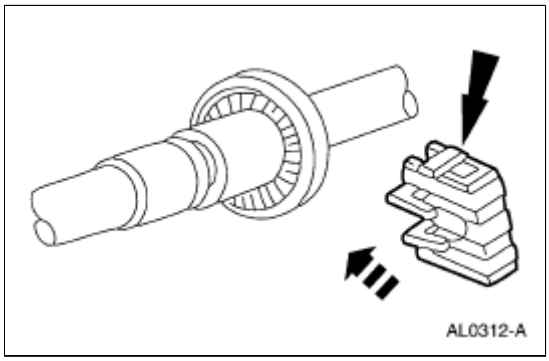
   Install the O-ring seals.
   - Lubricate the O-ring seals with PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA (Motorcraft YN-12-C) or equivalent meeting Ford specification WSH-M1C231-B.



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



5. Install the A/C tube lock coupling clip.

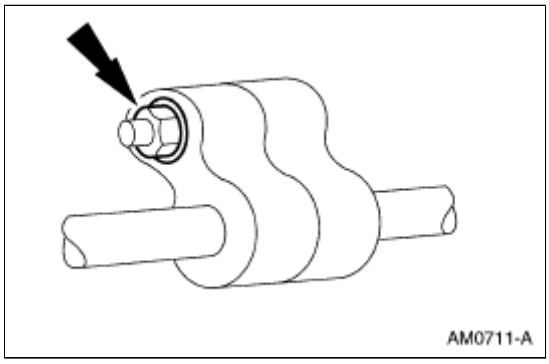


Fitting —Peanut

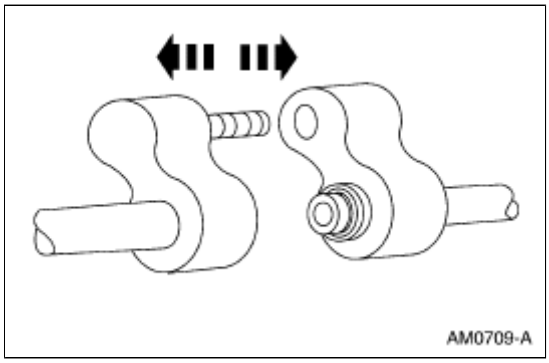
Disconnect

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

   Remove the nut from the peanut fitting.

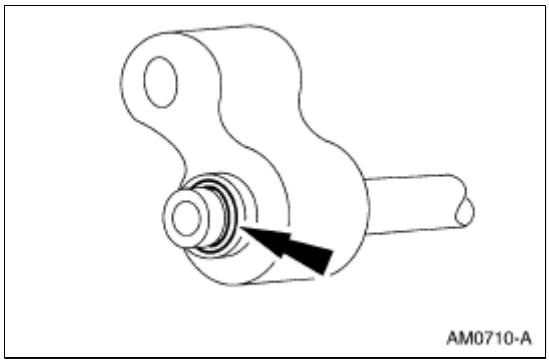


2. Pull the peanut fitting apart.



3. **CAUTION: 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.

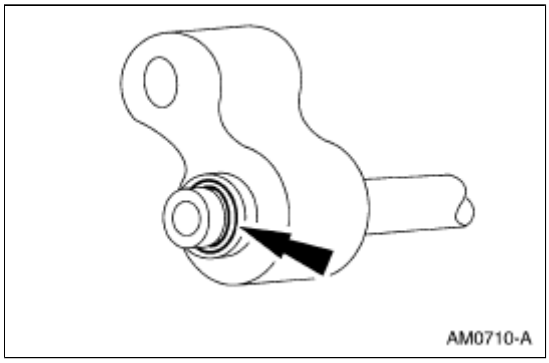


Connect

1. Clean all dirt or foreign material from the fittings.

2. **CAUTION: Use only new green O-ring seals. The use of any O-ring seals other than specified may result in intermittent leakage during vehicle operation.**

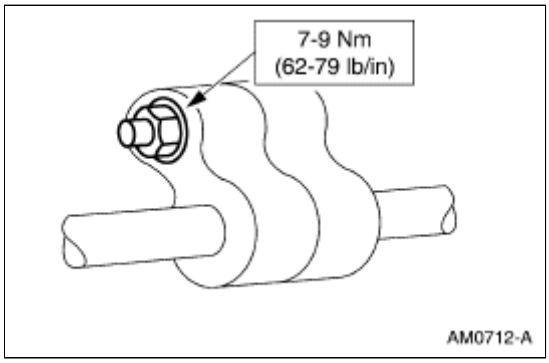
   Install the O-ring seal.
   - Lubricate the O-ring seal with PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA (Motorcraft YN-12-C) or equivalent meeting Ford specification WSH-M1C231-B.



3. Lubricate the inside of the fittings with PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA (Motorcraft YN-12-C) or equivalent meeting Ford specification WSH-M1C231-B.

4. **NOTE:** When correctly assembled the male and female fittings should be flush.

   Assemble the male and female fittings together.



Refrigerant System Tests

Special Tool(s)

 ST1928-A	R-134a Manifold Gauge Set 176-R032A or equivalent

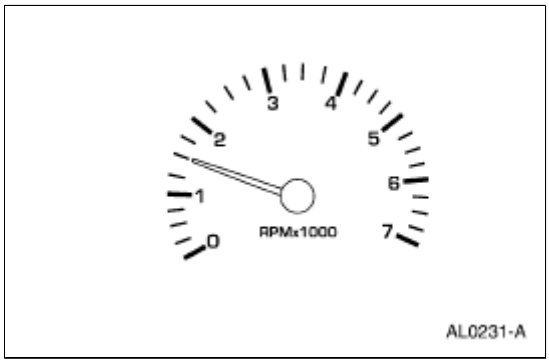
1. Connect the R-134a Manifold Gauge Set. For additional information, refer to Manifold Gauge Set Connection in this section.

2. Adjust the climate control for maximum cooling.
   - Start the engine.
   - Select MAX A/C operation.
   - Set the blower motor speed to maximum.

3. Stabilize the in-vehicle temperature at 21°C-27°C (70°F-80°F).

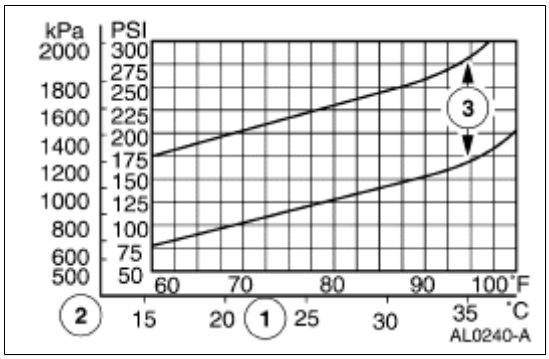
4. **NOTE:** When the ambient temperatures exceed 38°C (100°F), do not run the engine above normal idle speed.

   Maintain the engine speed at 1,500 rpm.



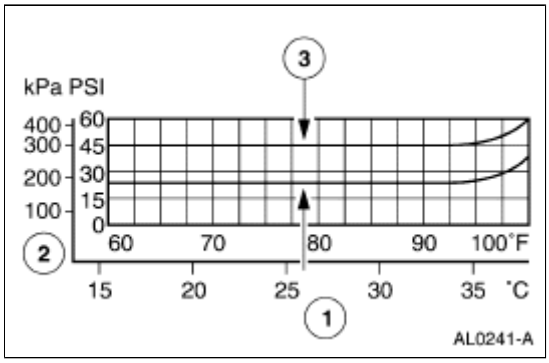
5. Determine the compressor discharge (high) pressure.
   1. Record the ambient temperature.
   2. Record the discharge (high) pressure.
   3. **NOTE:** In ambient temperatures between 38°C-43°C (100°F-110°F), the system performance pressures will be the same as those for ambient temperatures shown on the chart in the 32°C-38°C (90°F-100°F) range.

      The system performance is acceptable when the pressure reading falls between the upper and lower limits shown.



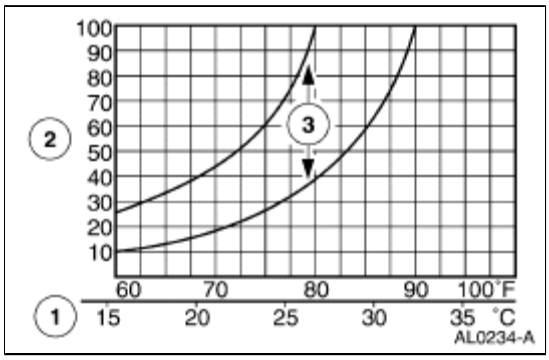
6. Determine the compressor suction (low) pressure.
    1. Record the ambient temperature.
    2. Record the suction (low) pressure.
    3. **NOTE:** In ambient temperatures between 38°C-43°C (100°F-110°F), the system performance pressures will be the same as those for ambient temperatures shown on the chart in the 32°C-38°C (90°F-100°F) range.

       The system performance is acceptable when the pressure reading falls between the upper and lower limits shown.



7. Determine the A/C clutch ON time.
    1. Record the ambient temperature.
    2. Record the A/C clutch ON time in seconds.
    3. **NOTE:** When the ambient temperature is above 26°C (80°F), the A/C clutch may not cycle.

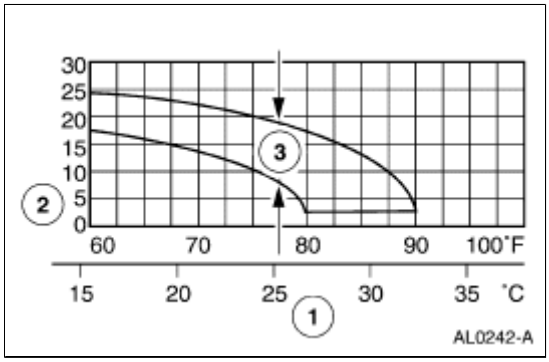
       The system performance is acceptable when the recorded time falls between the upper and lower limits shown.



8. Determine the A/C clutch OFF time.

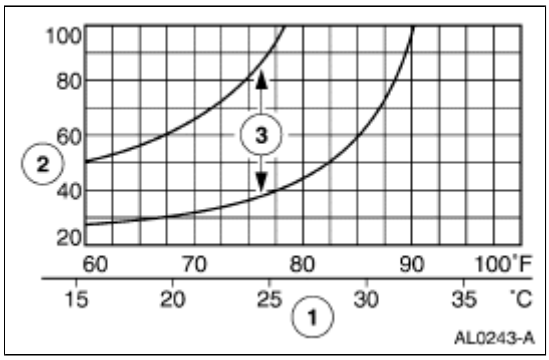
1. Record the ambient temperature.
2. Record the A/C clutch OFF time in seconds.
3. **NOTE:** When the ambient temperature is above 26°C (80°F), the A/C clutch may not cycle.

   The system performance is acceptable when the recorded time falls between the upper and lower limits shown.



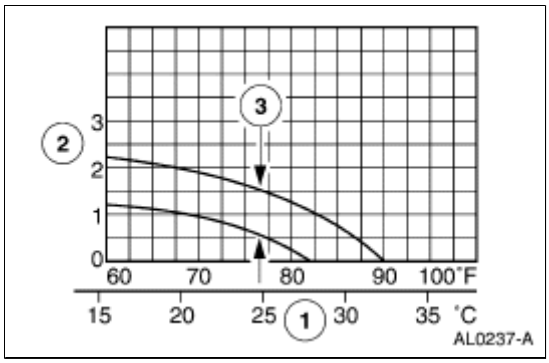
9. Determine the total A/C clutch cycle time.
   1. Record the ambient temperature.
   2. Record the time the A/C clutch is engaged plus the time it is disengaged (time ON plus time OFF).
   3. **NOTE:** When the ambient temperature is above 26°C (80°F), the A/C clutch may not cycle.

      The system performance is acceptable when the recorded time falls between the upper and lower limits shown.



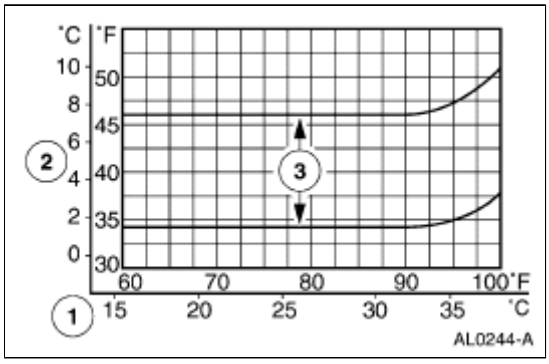
10. Determine the A/C clutch cycle rate per minute.
    1. Record the ambient temperature.
    2. Record the number of A/C clutch cycles occurring in one minute.
    3. **NOTE:** When the ambient temperature is above 26°C (80°F), the A/C clutch may not cycle.

       The system performance is acceptable when the recorded number of cycles fall between the upper and lower limits shown.



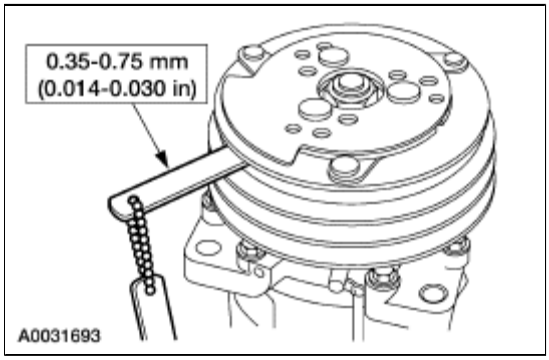
11. Determine the center A/C register discharge temperature.
    1. Record the ambient temperature.
    2. Record the center A/C register discharge temperature.
    3. **NOTE:** In ambient temperatures between 38°C-43°C (100°F-110°F), the A/C register discharge temperatures will be the same as those for ambient temperatures shown on the chart in the 32°C-38°C (90°F-100°F) range.

       The system performance is acceptable when the center A/C register discharge temperature falls between the upper and lower limits shown.



A/C Clutch Air Gap Adjustment

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



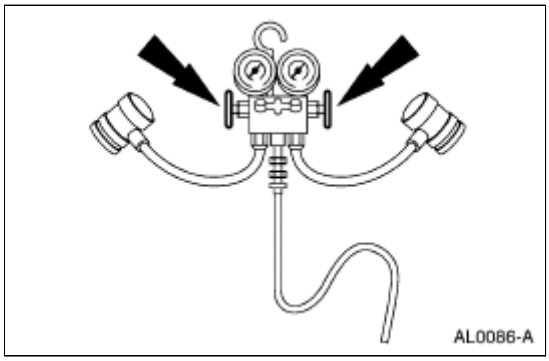
2. Remove the A/C clutch. Add or remove spacers between the A/C clutch and the compressor shaft until clearance is within specification. For additional information, refer to Section 412-03 .

Manifold Gauge Set Connection

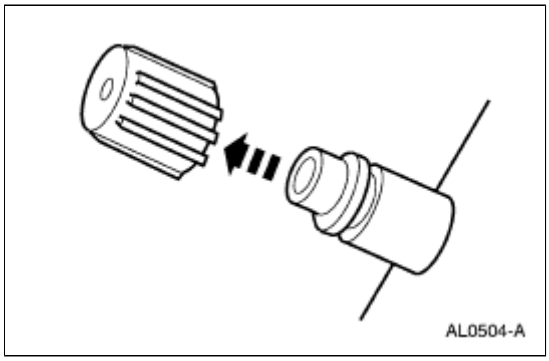
Special Tool(s)

 ST1928-A	R-134a Manifold Gauge Set 176-R032A or equivalent

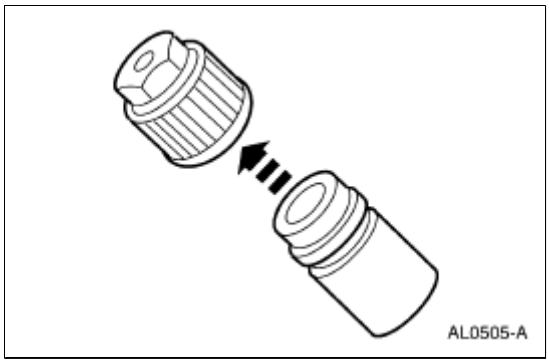
1. Turn both valves on the R-134a Manifold Gauge Set all the way to the left to close the low- and high-pressure hoses to the center manifold and center hose.



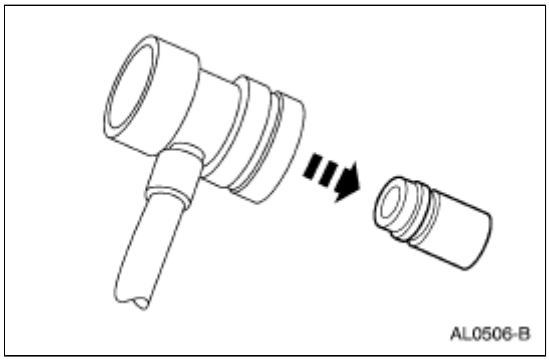
2. Remove the A/C charging valve cap (19D702) from the low-pressure service gauge port valve.



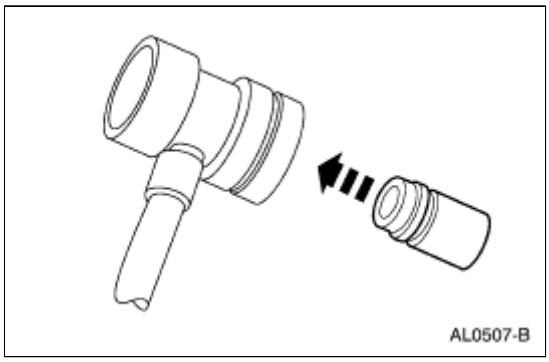
3. Remove the A/C charging valve cap from the high-pressure service gauge port valve.



4. Connect the R-134a Manifold Gauge Set low-pressure hose and the R-134a low side quick disconnect to the low-pressure service gauge port valve.



5. Connect the R-134a Manifold Gauge Set high-pressure hose and the R-134a high side quick disconnect to the high-pressure service gauge port valve.



Leak Detection —Using Refrigerant Leak Detector

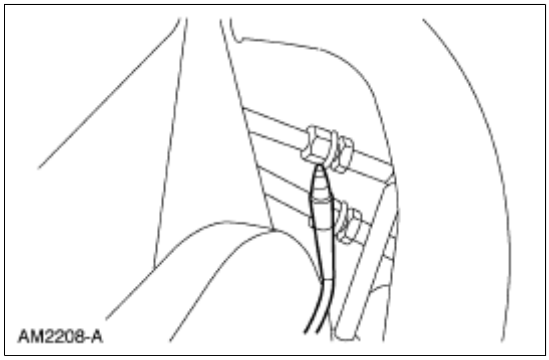
Special Tool(s)

 ST2351-A	Refrigerant Leak Detector 216-00001 or equivalent

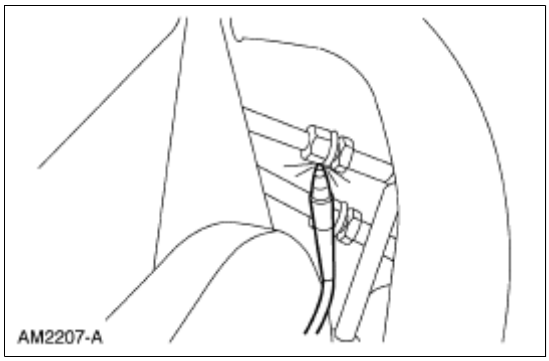
CAUTION: Good ventilation is necessary in the area where electronic A/C leak testing is to be performed. If the surrounding air is contaminated with refrigerant gas, the leak detector will indicate this gas all the time. Odors from other chemicals such as anti-freeze, diesel fuel, disc brake cleaner, or other cleaning solvents can cause the same problem. A fan, even in a well-ventilated area, is very helpful in removing small traces of contamination from the air that might affect the leak detector.

1. **NOTE:** 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 Refrigerant Leak Detector. Follow the instructions included with the leak detector for handling and operation techniques.

   
   AM2208-A

2. If a leak is found, discharge and recover the refrigerant. For additional information, refer to Discharging and Recovery in this section.
   - Repair the system.
   - Test the system for normal operation.


AM2207-A

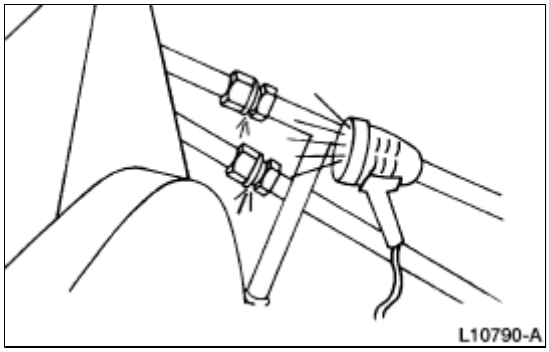
Leak Detection —Using Tracer Dye

Special Tool(s)

 ST1261-A	120 Watt UV Spot Lamp 164-R0721 or equivalent

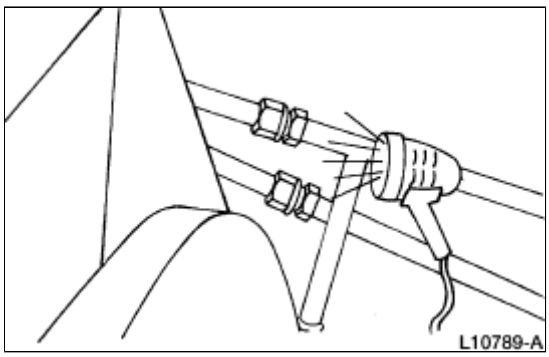
NOTE: Ford Motor Company vehicles are produced with a permanent leak tracer dye incorporated into the A/C system. The location of leaks can be pinpointed by the bright yellow-green glow of the tracer dye. Since more than one leak can exist, always inspect each component.

1. Check for leaks using a 120 Watt UV spot lamp.
   - Scan all components, fittings and lines of the A/C system.


L10790-A

2. After the leak is repaired, remove any traces of leak dye with a general purpose oil solvent.

3. Verify the repair by operating the system for a short time and inspecting with the UV spot lamp.


L10789-A

Discharging and Recovery

Special Tool(s)

 ST1834-A	R-134a A/C Refrigerant Center 023-00153 or equivalent
 ST1928-A	R-134a Manifold Gauge Set 176-R032A or equivalent

1. Prior to recovering the refrigerant system, you must verify the purity of the refrigerant. For additional information, refer to Refrigerant Identification Testing in this section.

2. **NOTE:** Some R-134a service centers require the use of an A/C manifold gauge set. For additional information, refer to Manifold Gauge Set Connection in this section.

   Connect the R-134a A/C refrigerant center to the low- and high-pressure service gauge port valves.

3. Recover the refrigerant from the system following the operating instructions provided by the equipment manufacturer.

4. Once the refrigerant center has recovered the vehicle A/C system refrigerant, close the refrigerant center inlet valve (if so equipped). Then switch off the power supply.

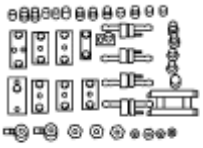
5. Allow the vehicle A/C system to remain closed for about two minutes. Observe the system vacuum level as shown on the gauge. If the pressure does not rise, disconnect the recovery station hose(s).

6. If the system pressure rises, repeat steps 2 through 5 until the vacuum level remains stable for two minutes.

7. Carry out the required repairs, then evacuate and recharge the A/C system. For additional information, refer to Evacuation and Charging in this section.

Air Conditioning (A/C) System Flushing

Special Tool(s)

 ST2466-A	A/C Flush and Purge Machine 219-00022 (part of 219-00023) or equivalent
 ST2469-A	A/C Flush and Purge Fitting Kit 219-00024 (part of 219-00023) or equivalent

WARNING: Use extreme care and observe all safety and service precautions related to the use of refrigerants.

WARNING: Due to refrigerant hazards, always wear safety goggles and non-penetrable gloves when working on or flushing A/C systems.

CAUTION: An 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.

CAUTION: Suction accumulator/drier, muffler, hoses, thermal expansion valve, and fixed orifice tube should be removed when flushing the A/C system. Internal plumbing of these devices makes it impossible to correctly remove any residual-flushing agent. Except for the hoses, these components are typically discarded after A/C system contamination. Hoses can normally be reused unless they are clogged with foreign material. The 3.785 liters (1 gallon) of A/C Systems Flushing Solvent F4AZ-19579-A 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.

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

   NOTE: Only the A/C Flush and Purge Machine kit 219-00023, which includes A/C Flush and Purge Machine 219-00022, A/C Flush and Purge Fitting Kit 219-00024, and the Ford Part number F4AZ-

19579-A A/C Systems Flushing Solvent, is approved for use on Ford vehicles. No other flushing device or solvent is approved for flushing heat exchangers. Use of any other flusher or solvent may cause damage to the A/C system and the flushing unit.

Ford Motor Company has approved a procedure to provide technicians with a non-CFC method of flushing contaminated A/C system heat exchangers, A/C evaporator core, and A/C condenser core. 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 within the suction accumulator/drier and gummy residue that can form when refrigerant oil is overheated during A/C compressor seizure. The flushing process is a two-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.

2. Discharge the A/C system. Observe all safety precautions. For additional information, refer to the procedure in this section.

3. Disconnect the refrigerant lines from the heat exchanger(s) to be flushed.

4. Connect the A/C Flush and Purge Machine 219-00022 and A/C Flush and Purge Fitting Kit 219-00024 to the heat exchanger to be flushed. Do not flush through the A/C evaporator core orifice, mufflers or hoses. Internal plumbing and material make-up of these components make it impossible to correctly remove foreign material or residual flushing solvent.

5. Use 3.785 liters (one gallon) of A/C Systems Flushing Solvent part number F4AZ-19579-A 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.

6. Flush the component for a minimum of 15 minutes.

7. 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 emissions.

8. **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 in any vehicle being serviced for A/C compressor or desiccant failure.

9. Install new refrigerant hoses if clogged with foreign material.

10. Reconnect the heat exchanger being serviced.

11. Add additional refrigerant oil as required. For additional information, refer to the procedure in this section.

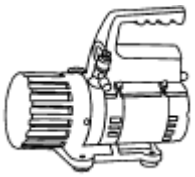
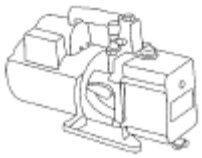
12. Evacuate, leak test and charge the A/C system. For additional information, refer to the procedure in

this section.

13. Check the system for normal operation.

Evacuation and Charging

Special Tool(s)

 ST1834-A	R-134a A/C Refrigerant Center 023-00153 or equivalent
 ST1928-A	R-134a Manifold Gauge Set 176-R032A or equivalent
 ST1685-A	1.2 CFM Vacuum Pump 023-R0162 or equivalent
 ST1686-A	4.0 CFM Vacuum Pump 023-R0163 or equivalent

1. Prior to charging the refrigerant system, you must verify the purity of the refrigerant. For additional information, refer to Refrigerant Identification Testing in this section.

2. **NOTE:** Ford Motor Company recommends use of a charging station to Carry out evacuation and charging of the refrigerant system. If a charging station is not available, system charging may be accomplished using a separate vacuum pump, charging cylinder, and manifold gauge set. For additional information, refer to Manifold Gauge Set Connection in this section.

   Connect the R-134a A/C Refrigerant Center to the low- and high-pressure service gauge port valves.

3. Evacuate the system until the low-pressure gauge reads at least 99.4 kPa (29.5 in-Hg) (vacuum) and as close as 101.1 kPa (30 in-Hg) as possible. Continue to operate the vacuum pump for a minimum of 45 minutes.

4. Turn off the evacuation pump. Observe the low-pressure gauge for five minutes to make sure that the system vacuum is held. If vacuum is not held for five minutes, leak-test the system, service the leaks, and evacuate the system again.

5. Correctly oil match the system to verify that the correct amount of refrigerant oil is present in the system. For additional information, refer to Refrigerant Oil Adding in this section.

6. Charge the system with the specified weight of refrigerant and refrigerant oil.

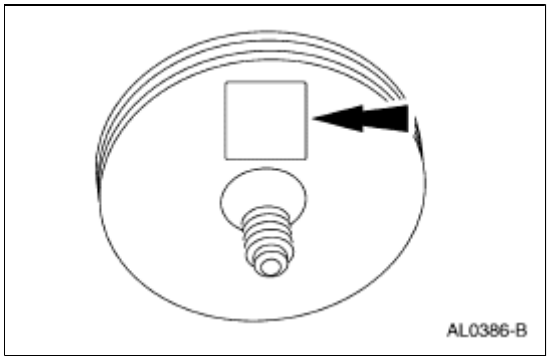
7. When no more refrigerant is being drawn into the system, start the engine and select MAX A/C operation. Set the blower motor speed to maximum and allow the remaining refrigerant to be drawn into the system. Continue to add refrigerant into the system until the specified weight of R-134a has been added. Close the charging cylinder valve and allow the system to pull any remaining refrigerant from the hose. When the suction pressure drops to approximately 207 kPa (30 psi), close the charging hose valve.

Refrigerant System Filtering After A/C Component Replacement

Special Tool(s)

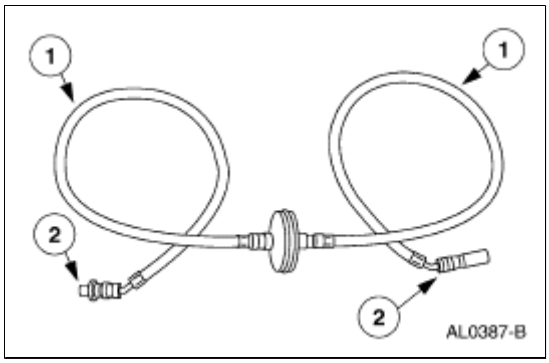
 ST1252-A	R-12/R-134a Air Conditioning Test Fitting Set 412-DS028 (014-00333, D93L-19703-B) or equivalent

1. Install the new A/C compressor. For additional information, refer to Section 412-03 .
2. Install the new suction accumulator/drier. For additional information, refer to Section 412-03 .
3. Install the new A/C evaporator core orifice. For additional information, refer to Section 412-03 .
4. Orient the filter inlet toward the A/C condenser core.



5. **NOTE:** The pancake filter is not permanently installed and will be removed at the end of this procedure.

   Temporarily install the pancake filter between the A/C condenser core and the condenser to evaporator tube (19835).
   1. Use flexible refrigerant hose of 17,238 kPa (2500 psi) burst rating.
   2. Make the connections using the A/C Test Fitting Set. For additional information, refer to the Spring Lock Couplings procedure in this section.



6. Correctly oil match the system. For additional information, refer to Refrigerant Oil Adding in this section.

7. Evacuate and charge the system. For additional information, refer to the procedure in this section.

8. Check all refrigerant system hoses, lines and the positioning 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.

9. Provide adequate airflow to the front of the vehicle (with a fan, if necessary). Select MAX 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.

10. 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.

11. Stop the engine.

12. Recover the refrigerant from the system. For additional information, refer to the procedure in this section.

13. Remove the fittings, flexible hoses and pancake filter from between the A/C condenser core and the condenser to evaporator tube.

14. Discard the pancake filter. It can be used one time only.

15. Reconnect the condenser to evaporator tube to the A/C condenser core. For additional information, refer to Spring Lock Coupling in this section.

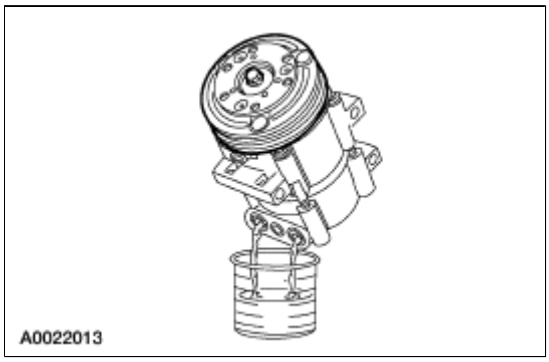
16. Evacuate and charge the system. For additional information, refer to the procedure in this section.

Refrigerant Oil Adding

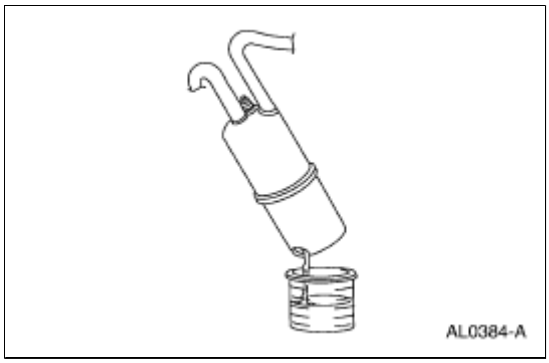
CAUTION: During normal A/C operation, oil is circulated through the system with the refrigerant, and a small amount is retained in each component. If certain components of the system are removed, some of the refrigerant oil will go with the component. To maintain the original total oil charge, it is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

1. **NOTE:** Service A/C compressors (19703) are shipped without compressor oil.

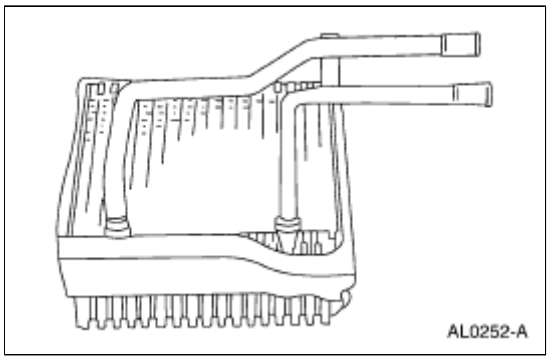
   Rotate the A/C compressor shaft six to eight revolutions while collecting oil in a clean measuring device.
   - If the amount of oil drained from the old A/C compressor is between 85-142 ml (3-5 ounces), pour the same amount plus 30 ml (1 ounce) of clean PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA (Motorcraft YN-12-C) or equivalent meeting Ford specification WSH-M1C231-B into the new A/C compressor.
   - If the amount of oil that was removed from the old A/C compressor is greater than 142 ml (5 ounces), pour the same amount drained of clean PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA (Motorcraft YN-12-C) or equivalent meeting Ford specification WSH-M1C231-B into the new A/C compressor.
   - If the amount of oil that was removed from the old A/C compressor is less than 85 ml (3 ounces), pour 85 ml (3 ounces) of clean PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA (Motorcraft YN-12-C) or equivalent meeting Ford specification WSH-M1C231-B into the new A/C compressor.



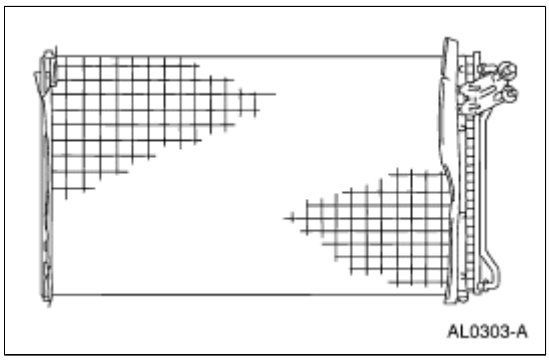
2. For the suction accumulator/drier (19C836), drill two 1/2 inch holes in the suction accumulator/drier cylinder and drain the oil into a calibrated container.
   - Add a quantity of new oil to match that drained from the old suction accumulator/drier plus 60 ml (2 ounces) of clean PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA (Motorcraft YN-12-C) or equivalent meeting Ford specification WSH-M1C231-B.



3. For the A/C evaporator core (19860), add 89 ml (3 ounces) of clean PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA (Motorcraft YN-12-C) or equivalent meeting Ford specification WSH-M1C231-B to the suction accumulator/drier inlet tube.



4. For the A/C condenser core (19712), add 30 ml (1 ounce) of clean PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA (Motorcraft YN-12-C) or equivalent meeting Ford specification WSH-M1C231-B to the A/C condenser core or the suction accumulator/drier inlet tube.



5. Add 60 ml (2 ounces) of clean PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA (Motorcraft YN-12-C) or equivalent meeting Ford specification WSH-M1C231-B to the suction accumulator/drier inlet tube when carrying out each of the following repairs:
    - installation of a new A/C evaporator core orifice (19D990)
    - installation of a new A/C compressor pressure relief valve (19D644)
    - installation of a new refrigerant line
    - repair of an O-ring seal leak
    - repair of a charge port leak

6. Installation of new components that do not require discharge of refrigerant and resulting oil loss, such as the A/C cycling switch (19E561) and the A/C pressure transducer, do not require additional oil.

Inspection and Assembly Requirements —Following An A/C Compressor Failure

CAUTION: To prevent refrigerant system contamination and possible failure of the new component, carry out the following procedures.

1. **NOTE:** The suction accumulator/drier and A/C evaporator core orifice cannot be cleaned and new components must be installed.

   When an A/C compressor fails due to internal causes, clean the refrigerant system by flushing or filtering. This will remove any foreign material or contaminants that may be present and prevent damage to the new A/C compressor.

2. **NOTE:** A dirty A/C evaporator core orifice or a condenser to evaporator tube containing black refrigerant oil and particles indicates that the A/C compressor has failed and a new compressor must be installed.

   Remove and discard the A/C evaporator core orifice. For additional information, refer to Section 412-03 .

3. **NOTE:** Residual refrigerant oil in the A/C compressor must be drained and measured for correct system oil matching. For additional information, refer to the Refrigerant Oil Addition procedure in this section.

   Remove the A/C compressor. For additional information, refer to Section 412-03 .

4. **NOTE:** Residual refrigerant oil in the suction accumulator/drier must be drained and measured for correct oil system matching. For additional information, refer to the Refrigerant Oil Addition procedure in this section.

   Remove the suction accumulator/drier. For additional information, refer to Section 412-03 .

5. **NOTE:** System flushing is the preferred method of cleaning. However, if flushing equipment is not available, system filtering may be carried out as an alternative.

   Clean the A/C evaporator core and the A/C condenser core by flushing. For additional information, refer to the Flushing procedure in this section.

6. Install the new A/C compressor. For additional information, refer to Section 412-03 .

7. Install the new suction accumulator/drier. For additional information, refer to Section 412-03 .

8. Install the new A/C evaporator core orifice. For additional information, refer to Section 412-03 .

9. Correctly oil match the system. For additional information, refer to the Refrigerant Oil Addition procedure in this section.

10. Evacuate and charge the system. For additional information, refer to the procedure in this section.

Refrigerant Identification Testing

Special Tool(s)

 ST1457-A	Deluxe A/C Refrigerant Analyzer 198-00003 or equivalent

1. **NOTE:** Prior to recovering or charging the refrigerant system, you must use an A/C refrigerant analyzer to identify gas samples taken directly from the refrigeration system or storage containers.

   Follow the instructions included with the Refrigerant Analyzer to obtain the sample for testing.

2. The analyzer will display one of the following:
   - R-12 or R-134a if the purity is better than 98 % by weight.
   - FAIL if neither of the two gases have been identified or if they are not at least 98% pure.
   - HC and a horn will sound if the gas detected contains a hydrocarbon (flammable material).

3. **CAUTION: If contaminated refrigerant is detected, DO NOT recover the refrigerant into your recovery/recycling equipment.**

   Recover the contaminated refrigerant using suitable recovery-only equipment designed for capturing and storing contaminated refrigerant. For additional information, refer to Contaminated Refrigerant Handling in this section.

Contaminated Refrigerant Handling

1. **CAUTION: If contaminated refrigerant is detected, DO NOT recover the refrigerant into your recovery/recycling equipment.**

   Recover the contaminated refrigerant using suitable recovery-only equipment designed for capturing and storing contaminated refrigerant.
   - This equipment must only be used to recover contaminated refrigerant to prevent the spread to other vehicles.
   - If this equipment is not available, contact an A/C service facility in your area with the correct equipment to carry out this service.

2. Determine and correct the cause of the customer's initial concern.

3. **NOTE:** Residual refrigerant oil in the suction accumulator/drier must be drained and measured for correct oil system matching. For additional information, refer to the Refrigerant Oil Addition procedure in this section.

   The suction accumulator/drier cannot be cleaned and a new component must be installed. Remove the suction accumulator/drier. For additional information, refer to Section 412-03 .

4. Clean the A/C evaporator core and the A/C condenser core by flushing. For additional information, refer to the Flushing procedure in this section.

5. Install the new suction accumulator/drier. For additional information, refer to Section 412-03 .

6. Correctly oil match the system. For additional information, refer to the Refrigerant Oil Addition procedure in this section.

7. Evacuate and charge the system. For additional information, refer to the procedures in this section.

8. Dispose of contaminated refrigerant according to all federal, state and local regulations.

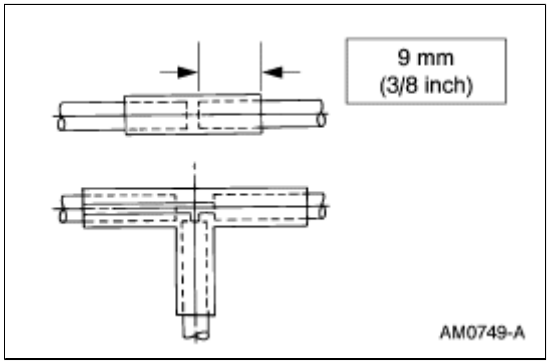
Vacuum Hose Repair —Mini-Tube

Special Tool(s)

 ST1176-A	Vacuum Pump Kit 416-D002 (D95L-7559-A) or equivalent

1. Measure the length of the damaged area of the mini-tube vacuum hose.
2. Cut a piece of standard 1/8 inch inner diameter vacuum hose approximately 25 mm (1 inch) longer than the damaged area of the mini-tube vacuum hose.
3. Cut off the mini-tube vacuum hose on each side of the damaged area.
4. **WARNING: Read the warning information on the product label to prevent possible injury.**

   Dip the mini-tube hose ends in commercially available paint thinner containing methyl ethyl ketone (MEK). This solvent will seal the mini-tube in the vacuum hose.
5. Insert the ends of the mini-tube vacuum hose approximately 9 mm (3/8 inch) into the ends of the standard 1/8 inch service vacuum hose section.



6. Shake the service joint after assembly to make sure the solvent is dispersed and the vacuum line is not plugged.
7. Test the system for a vacuum leak in the repair area.
   - Use the Vacuum Tester or equivalent.

General Specifications

Item	Specification
Rubber Suspension Insulator Lube E25Y-19553-A	ESF-M99B112-A

Torque Specifications

Description	Nm	lb-in
Side Window Demister Hose and Nozzle Screws	2-3	18-26
Instrument Panel Finish Panel Screws	2-3	18-26
LH Instrument Panel Register Screws	2-3	18-26
Plenum Chamber Nuts	3.4-4.8	31-42
Windshield Defroster Hose Nozzle Screws	2-3	18-26
Rear Floor Duct Screws	2-3	17-26

Air Distribution

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

- outside air
- recirculated air

Recirculated air is only used during MAX A/C, AUTOMATIC (if equipped with EATC) and OFF modes.

Air distribution within the vehicle is determined by the function selector switch position, if equipped with manual A/C, or is controlled by the electronic automatic temperature control system in the AUTOMATIC mode but can be overridden by the driver if desired. Airflow control doors are used to direct airflow within the heater air plenum chamber (18471). Vacuum control motors (18A318) are used to position these airflow control doors.

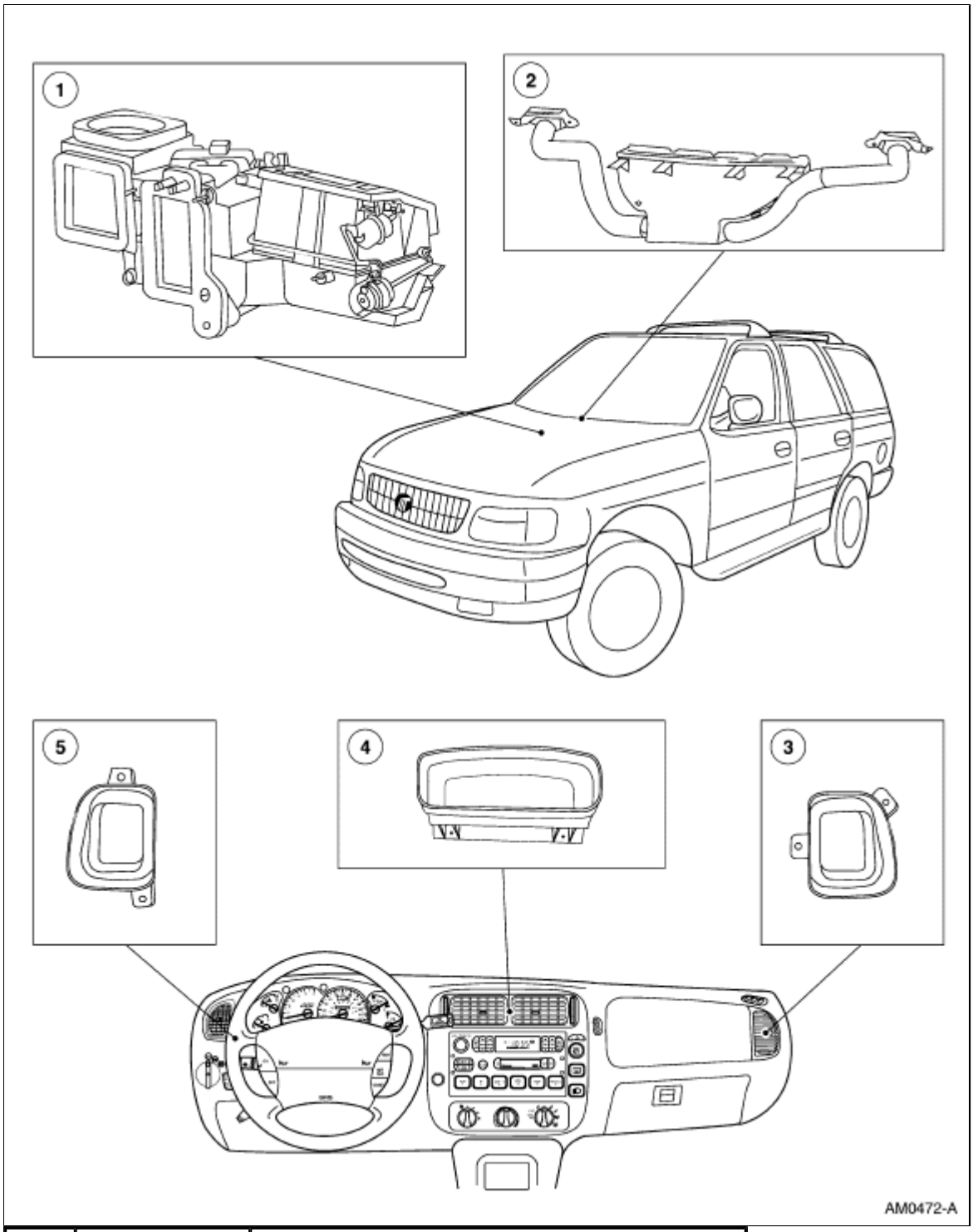
The air distribution system is designed to provide airflow from the defrost nozzle when no vacuum is applied to any of the vacuum control motors. This is done to prevent a situation where defrost cannot be obtained due to a system vacuum leak.

Air enters the passenger compartment from the:

- instrument panel A/C registers (19893).
- heater outlet floor duct (18C433).
- windshield defroster hose nozzle (18490).
- side window demisters.
- rear seat airflow duct (if equipped).

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

Component Locations



Item	Part Number	Description
1	18471	Heater Air Plenum Chamber
2	18490	Windshield Defroster Hose Nozzle
3	19B680	A/C Evaporator Register Duct— (RH)
4	19B680	A/C Evaporator Register Duct— (Center)
5	19B680	A/C Evaporator Register Duct— (LH)

Air Distribution

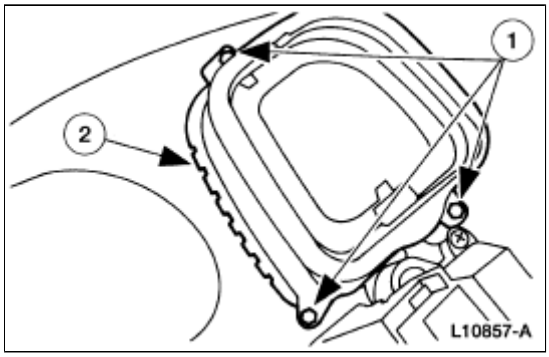
Refer to Section 412-00 .

Register — LH

Removal

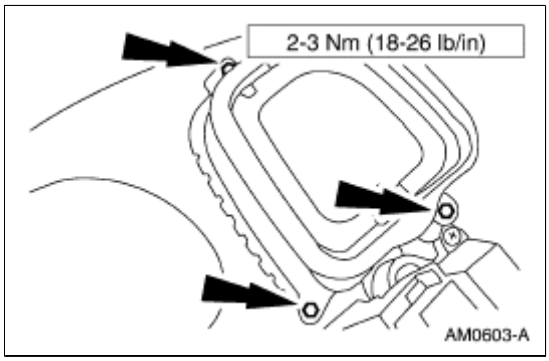
1. Remove the LH instrument panel finish panel (04338); refer to Section 501-12 .

2. Remove the LH instrument panel register.
    1. Remove the screws.
    2. Remove the LH instrument panel register.



Installation

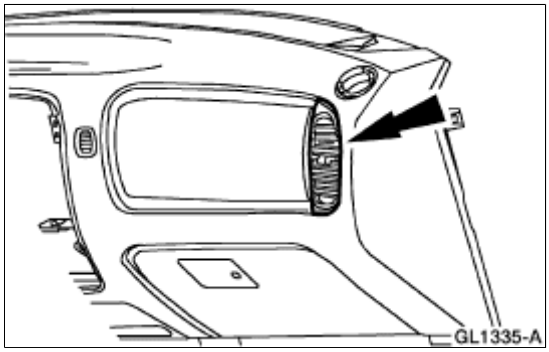
1. Follow the removal procedure in reverse order.



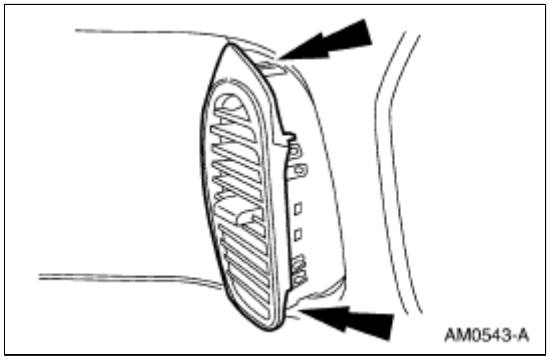
Register — RH

Removal

1. Lift the edge of the RH instrument panel register to expose the retainers.



2. Release the retainers and remove the RH instrument panel register.



Installation

1. Follow the removal procedure in reverse order.

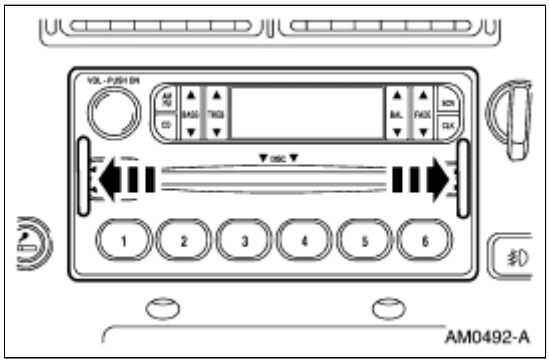
Register — Center

Special Tool(s)

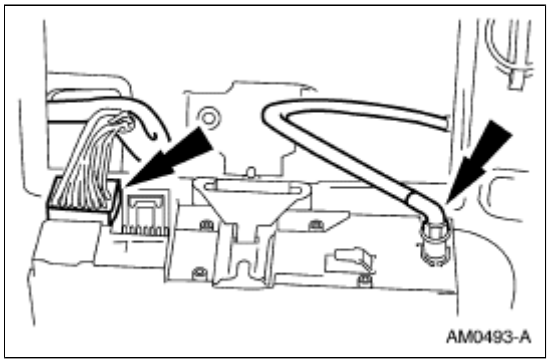
 ST1445-A	Radio Removing Tool 415-001 (T87P-19061-A)

Removal

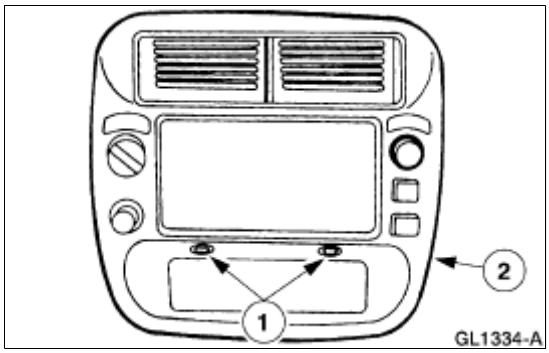
1. Use the Radio Removing Tool to remove the radio chassis (18806).



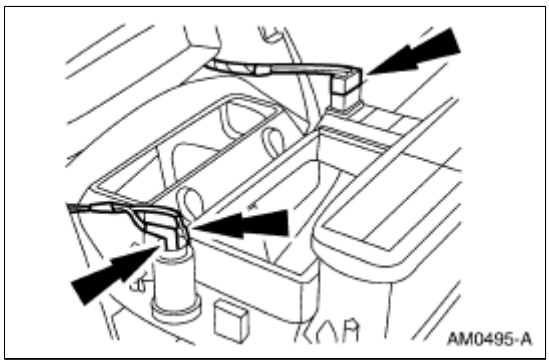
2. Disconnect the antenna lead and the wire harness connectors.



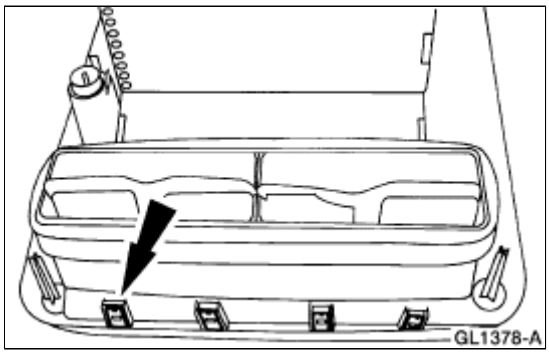
3. Remove the instrument panel finish panel (044D70).
    1. Remove the screws.
    2. Disengage the spring clips and remove the instrument panel finish panel.



4. Disconnect the wire harness connector.

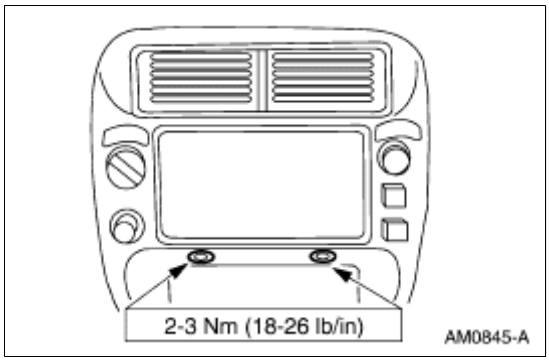


5. Release the eight clips and remove the center instrument panel register from the instrument panel finish panel.



Installation

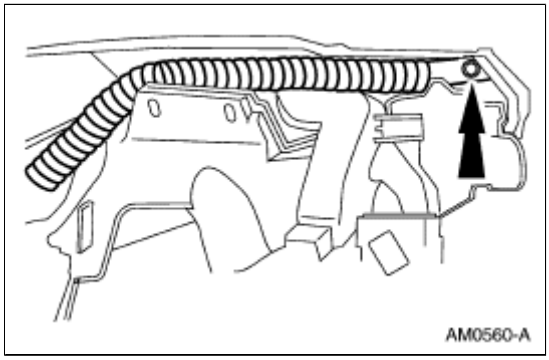
1. Follow the removal procedure in reverse order.


2-3 Nm (18-26 lb/in)
AM0845-A

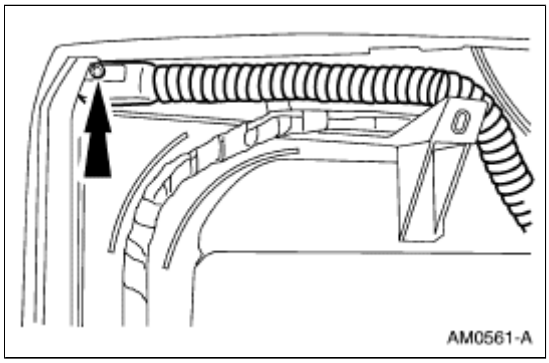
Nozzle —Windshield Defroster and Side Window Demister

Removal

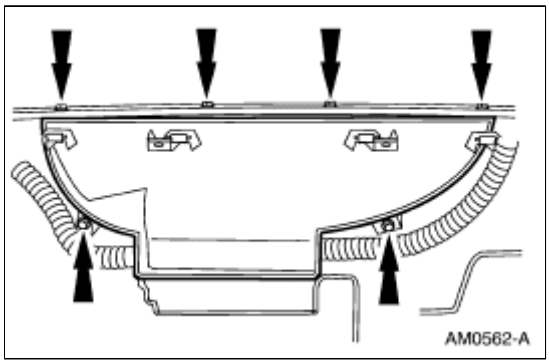
1. Remove the instrument panel (04320); refer to Section 501-12 .
2. Remove the two screws and remove the LH demister nozzle and duct (18D453).



3. Remove the two screws and remove the RH demister nozzle and duct.

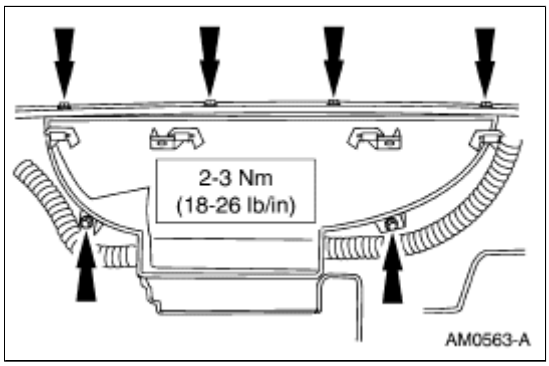


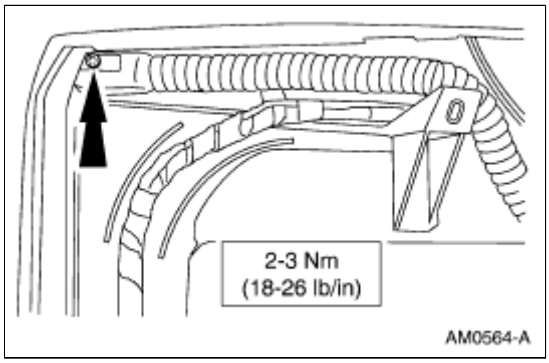
4. Remove the screws and remove the windshield defroster hose nozzle (18490).

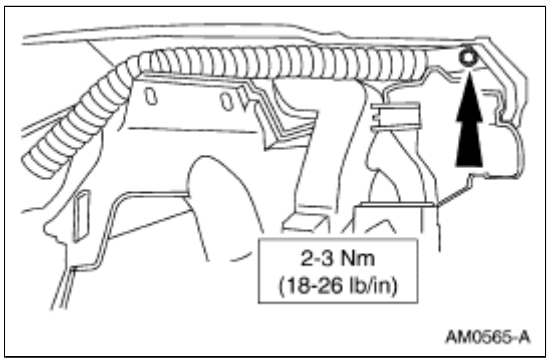


Installation

1. Follow the removal procedure in reverse order.





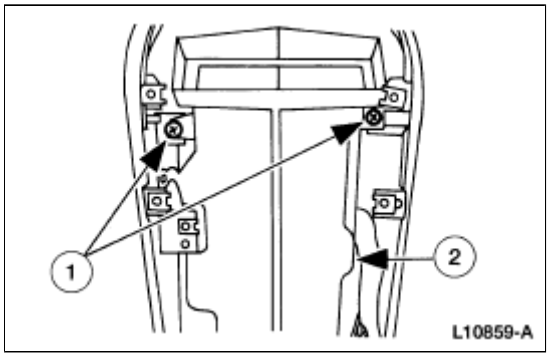


Duct —Floor

Removal

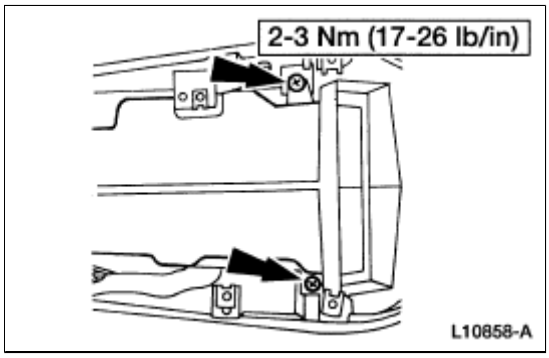
1. Remove the console rear controls; refer to Section 412-04 .

2. Remove the rear floor duct.
    1. Remove the screws.
    2. Remove the rear floor duct.



Installation

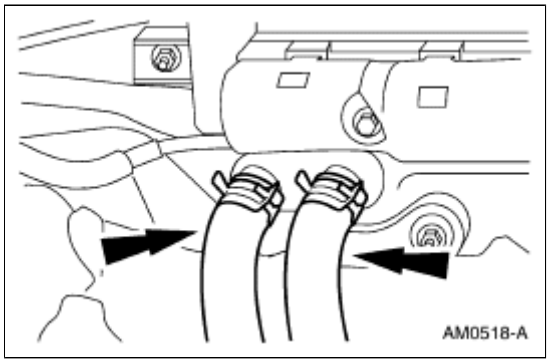
1. Follow the removal procedure in reverse order.



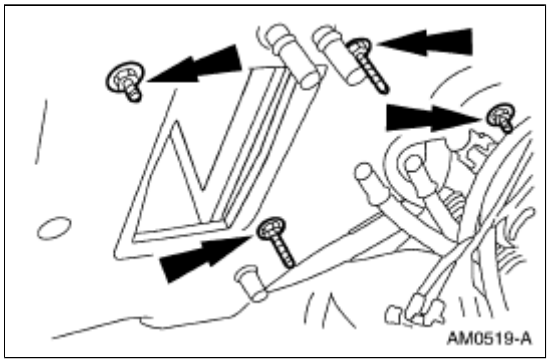
Plenum Chamber

Removal

1. Remove the instrument panel; refer to Section 501-12 .
2. Drain the radiator; refer to Section 303-03 .
3. Disconnect the heater hoses from the heater core (18476).
4. Remove the evaporator core housing; refer to Section 412-02 .

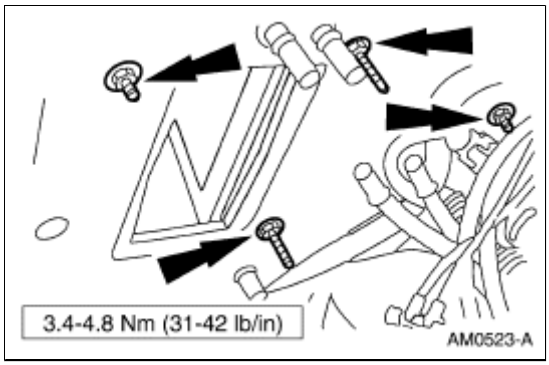


5. Remove the nuts and remove the plenum chamber.



Installation

1. Follow the removal procedure in reverse order.
   - Lubricate the hoses and fittings with Rubber Suspension Insulator Lube E25Y-19553-A or equivalent meeting Ford specification ESF-M99B112-A.


3.4-4.8 Nm (31-42 lb/in)
AM0523-A

Torque Specifications

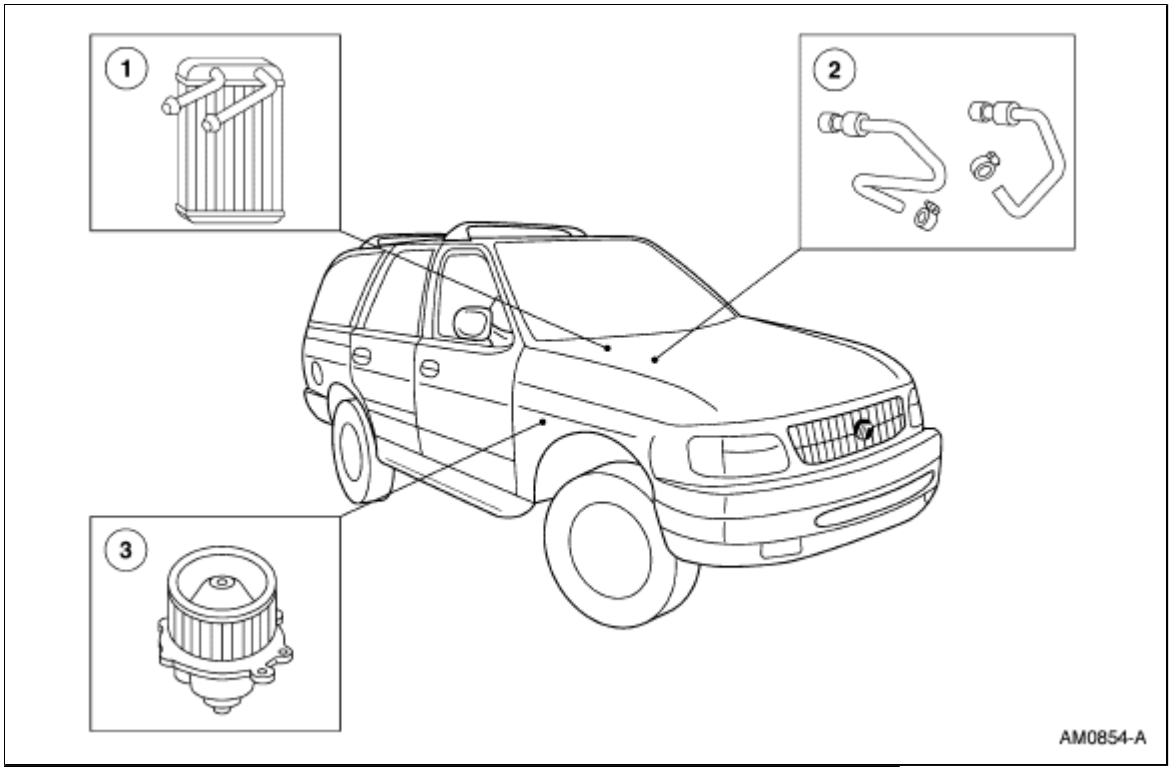
Description	Nm	lb-in
Cruise control servo mounting bolt	9-12	80-106
Coolant/washer reservoir screws and nuts	6-8	52-71

Heating/Defrosting

The heating and defrosting 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.
- Controls the blower motor speed.
- Cooling or heating can be adjusted to maintain the desired temperature.
- System uses a reheat method to provide conditioned air to the passenger compartment.
- The blower motor (18527) draws outside air through the air inlet duct from just below the windshield during all system operations except for MAX A/C, cooling (when recirculated air is used).
- All airflow from the blower motor passes through the A/C evaporator core (19860).
- The temperature is then regulated by reheating a portion of the air and blending it with the remaining cool air to the desired temperature.
- The temperature blending is varied by the air temperature control door, which regulates the amount of air that flows through and around the heater core (18476), where it is then mixed and distributed.

Component Locations



Item	Part Number	Description
1	18476	Heater core
2	18472	Heater water hoses
3	18527	Blower motor

Heater Core

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.

Blower Motor

The A/C blower motor (19805) pulls air from the air inlet and forces it into the plenum assembly where it is mixed and distributed.

Heating/Defrosting

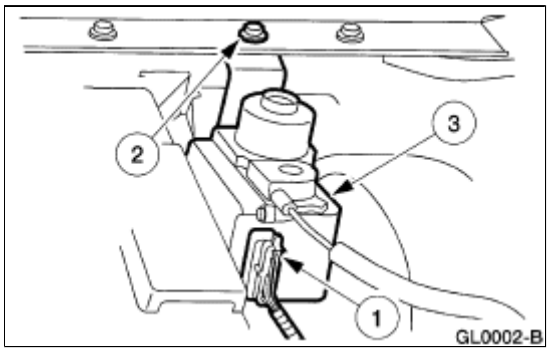
Refer to Section 412-00 .

Blower Motor

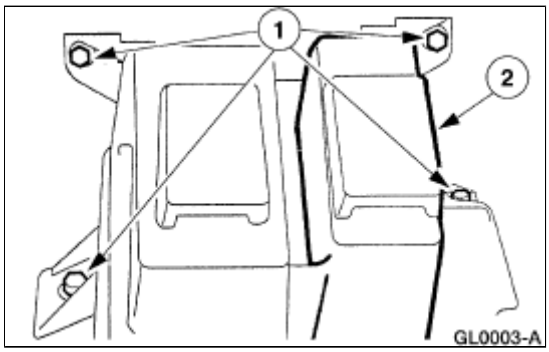
Removal

1. Disconnect the battery ground cable (14301). For additional information, refer to Section 414-01 .

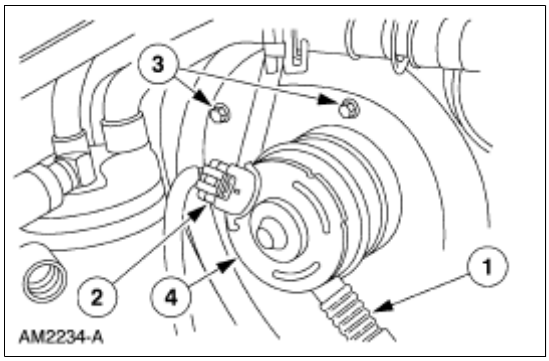
2. Remove the speed control servo.
    1. Disconnect the electrical connector.
    2. Remove the bolt.
    3. Position the speed control servo aside.



3. Position the coolant/washer reservoir.
    1. Remove the screws and the nuts.
    2. Move the coolant/washer reservoir aside.

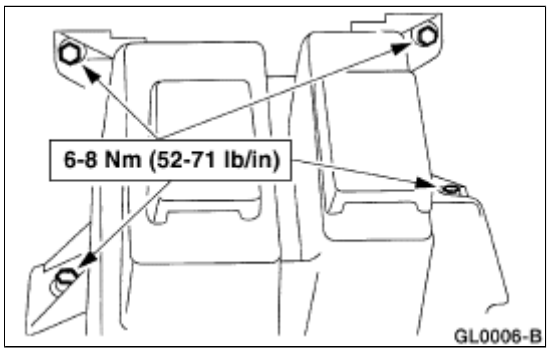


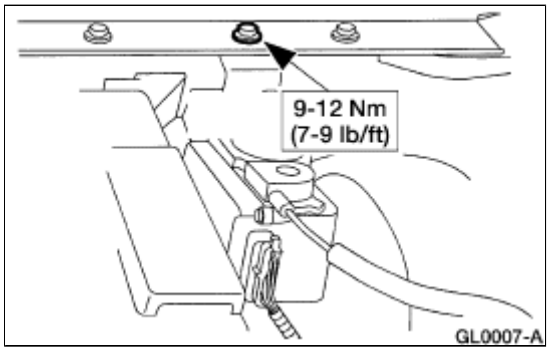
4. Remove the blower motor.
    1. Disconnect the vent hose.
    2. Disconnect the electrical connector.
    3. Remove the four screws.
    4. Remove the blower motor.



Installation

1. To install, reverse the removal procedure.





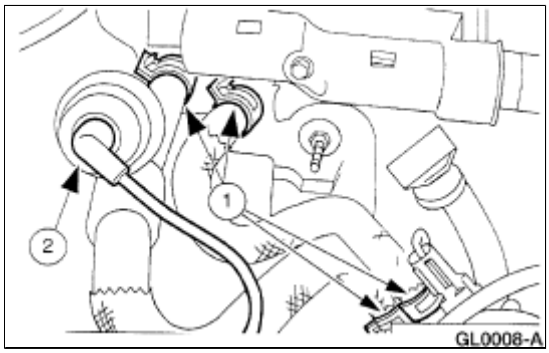
Heater Core

Removal

1. **NOTE:** If a heater core leak is suspected, the heater core must be leak tested before it is removed from the vehicle. For additional information, refer to Section 412-00 .

   Drain the radiator. For additional information, refer to Section 303-03 .

2. Remove the heater water hoses.
   1. Squeeze the clamps and pull the hoses off.
   2. Disconnect the vacuum hose from the water control valve.



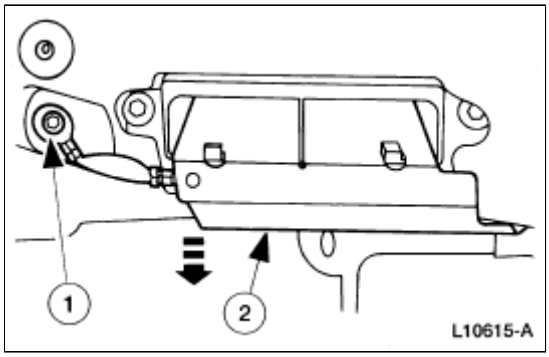
3. Remove the instrument panel. For additional information, refer to Section 501-12 .

4. Remove the A/C evaporator core housing. For additional information, refer to Section 412-03 .

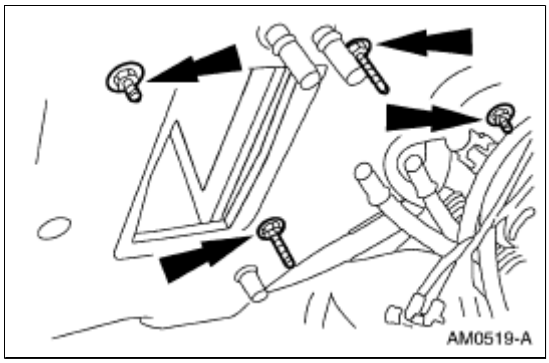
5. Remove the A/C evaporator core housing. For additional information, refer to Section 412-03 .

6. Remove the powertrain control module (PCM). For additional information, refer to Section 303-14 .

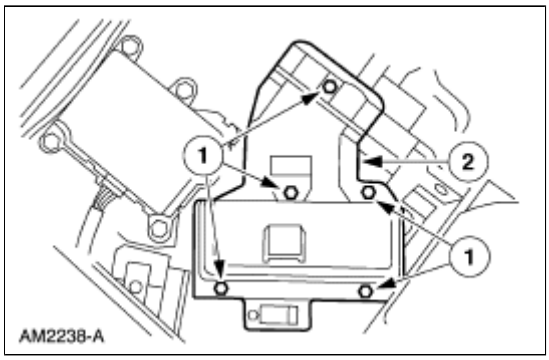
7. Remove the PCM heat sink.
   1. Remove the ground strap screw.
   2. Remove the heat sink.



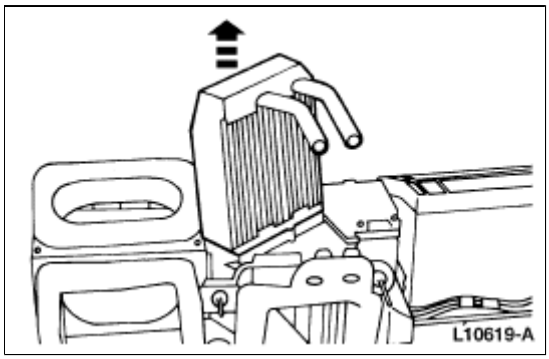
8. Remove the heater air plenum nuts from the engine side of the dash panel.



9. Remove the heater core.
    1. Remove the heater core cover to air plenum screws.
    2. Lift off the cover.



10. Remove the heater core (18476).



Installation

1. **NOTE:** Be sure to install a new oval foam seal around the heater core inlet and outlet tubes.

    To install, reverse the removal procedure.

General Specifications

Item	Specification
A/C cycling switch kPa (psi)	Close maximum 324 (47) Open minimum 152 (22)
A/C compressor pressure relief valve kPa (psi)	Opens at 3103 (470-600)
Lubricant	
PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA (Motorcraft YN-12-C)	WSH-M1C231-B
Capacity ml (ounce)	266 (9)
A/C Compressor	
A/C clutch air gap mm (inch)	0.35-0.75 (0.014-0.030)

Torque Specifications

Description	Nm	lb-ft	lb-in
Accumulator to evaporator core fitting	35-42	26-31	—
A/C condenser core bolt	8.4-11.2	—	75-99
A/C compressor heat shield bolts	5.5-8	—	50-71
A/C compressor mounting bolts	21-29	15-21	—
A/C manifold tube bolt	17-23	12.5-17	—
A/C manifold to generator clamp nut	15-22	11-16	—
A/C line to condenser nut	6.8-9.2	—	60.6-82
Power steering reservoir bolts	7.6-10.4	—	67-92
Power steering hose clamp nut	7.6-10.4	—	67-92
Speed control servo bolt	9-12	7-9	—
Suction/accumulator bracket screw	6-8	—	53-71
Windshield washer/coolant reservoir bolts and nuts	6-8	—	52-71
A/C clutch bolt	11-14	—	98-123
Peanut fittings	7-9	—	62-79

Air Conditioning

The A/C refrigerant system is a clutch cycling orifice tube type. The system components are:

- A/C compressor (19703).
- A/C clutch (2884).
- A/C condenser core (19712).
- A/C evaporator core (19860).
- suction accumulator/drier (19C836).
- connecting refrigerant lines.

The refrigeration system operation is controlled by the:

- A/C evaporator core orifice (19D990).
- A/C cycling switch (19E561).
- A/C compressor pressure relief valve (19D644).
- A/C pressure cut-off switch (19D594).

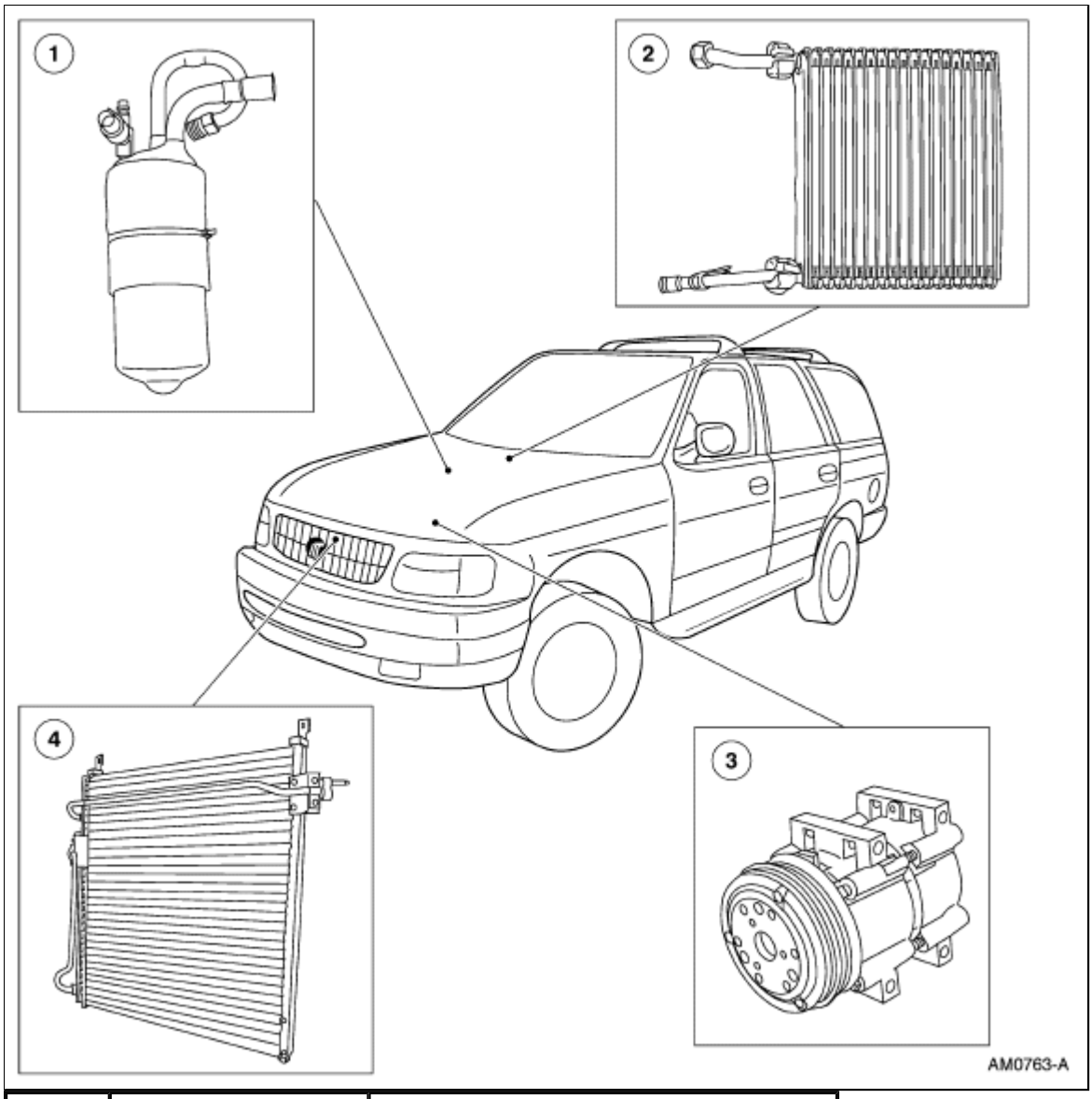
The refrigerant system incorporates an A/C compressor controlled by an A/C cycling switch.

The A/C cycling switch senses A/C evaporator core pressure to control A/C compressor operation.

An A/C compressor pressure relief valve is installed in the A/C manifold and tube (19D734) to protect the refrigerant system against excessively high refrigerant pressures.

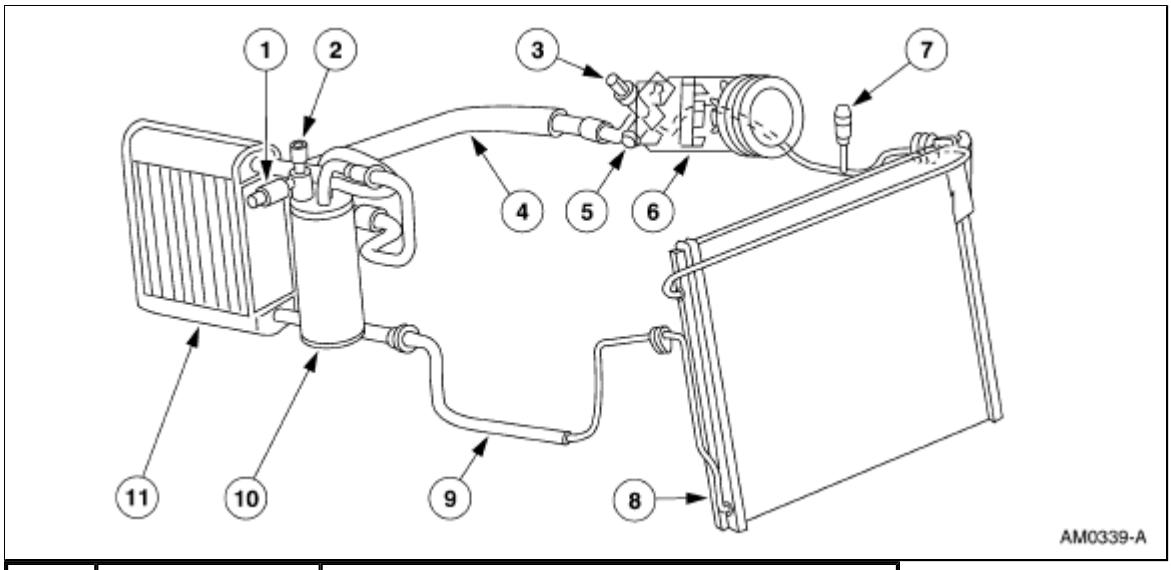
An A/C evaporator core orifice is installed in the condenser to evaporator tube (19835) to meter the liquid refrigerant into the A/C evaporator core.

Component Locations



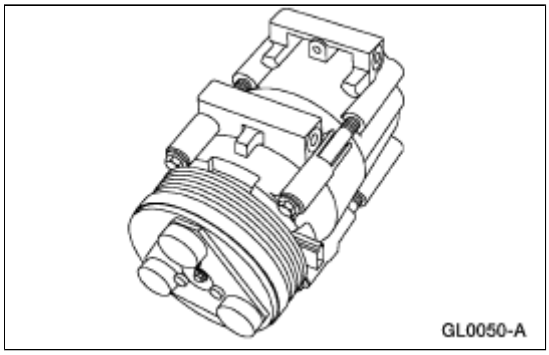
Item	Part Number	Description
1	19C836	Suction accumulator/drier
2	19860	A/C evaporator core
3	19D629	A/C compressor
4	19712	A/C condenser core

Refrigeration System Components — 4.0L (5.0L Similar)



Item	Part Number	Description
1	19E561	A/C cycling switch
2	19E762	A/C charge port valve (low side)
3	19D594	A/C pressure cut-off switch
4	19D734	A/C manifold and tube
5	19D644	A/C compressor pressure relief valve
6	19D629	A/C compressor
7	19E762	A/C charge port valve (high side)
8	19712	A/C condenser core
9	19835	Condenser to evaporator tube
10	19C836	Suction accumulator/drier
11	19860	A/C evaporator core

A/C Compressor and Clutch Assembly



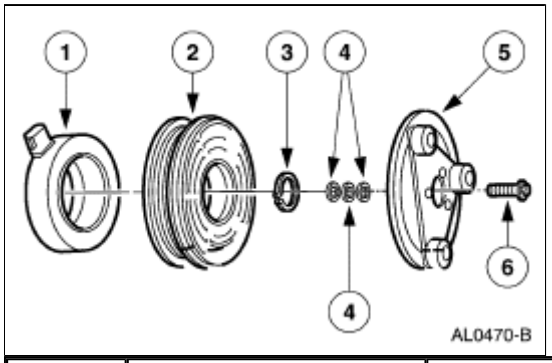
NOTE: Internal A/C compressor components are not serviced separately. The FS-10 A/C compressor is serviced only as an assembly. The A/C clutch, A/C clutch pulley (2E884), A/C clutch field coil (2987) and the shaft seal are serviceable.

NOTE: Installation of a new suction accumulator/drier is not required when repairing the air conditioning

system except when there is physical evidence of system contamination from a failed A/C compressor or damage to the suction accumulator/drier.

The FS-10 A/C compressor has the following characteristics:

- A ten-cylinder swashplate design utilizing the tangential design mount.
- Displacement of 170 cc (10.4 cubic inches).
- A one-piece lip-type seal (replaceable from the front of the A/C compressor) is used to seal it at the shaft opening in the assembly.
- Five double-acting pistons operate within the cylinder assembly. The pistons are actuated by a swashplate that changes the rotating action of the shaft to a reciprocating force.
- Reed-type discharge valves are located between the cylinder assembly and the head at each end of the A/C compressor.
- The A/C compressor uses PAG compressor oil, YN-12-C, F7AZ-19589-DA or equivalent meeting Ford specification WSH-M1C231-B. This oil contains special additives required for the A/C compressor.
- The A/C compressor oil from vehicles equipped with an FS-10 A/C compressor may have a dark color while maintaining a normal oil viscosity. This is normal for this A/C compressor because carbon from the piston rings will discolor the oil.



Item	Part Number	Description
1	2987	A/C clutch field coil
2	2E884	A/C clutch pulley
3	N805388-S2	Pulley snap ring
4	19D648	A/C clutch hub spacer
5	2884	A/C clutch
6	N805332-S2	A/C clutch bolt

The magnetic A/C clutch has the following characteristics:

- It drives the compressor shaft.
- When battery positive voltage (B+) is applied to the A/C clutch field coil, the clutch disc and hub assembly is drawn toward the A/C clutch pulley.
- The magnetic force locks the clutch disc 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 disc and hub assembly move the clutch plate away from the A/C clutch pulley.

A/C Compressor Pressure Relief Valve

An A/C compressor pressure relief valve is incorporated in the compressor A/C manifold and tube to:

- relieve unusually high refrigerant system discharge pressure buildups, (3,103 kPa [450 psi] and above).
- prevent damage to the A/C compressor and other system components.
- avoid total refrigerant loss by closing after the excessive pressure has been relieved.

A/C Condenser Core

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

The A/C condenser core has the following characteristics:

- It is an aluminum fin and tube design heat exchanger located in front of the vehicle radiator (8005).
- 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.

Refrigerant Lines

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

The condenser to evaporator tube contains high pressure liquid refrigerant upstream of the A/C evaporator core orifice.

The A/C manifold and tube is attached to the A/C compressor with O-ring seals and has the following features:

- The upstream side contains low pressure refrigerant gas.
- The downstream side contains high pressure refrigerant gas and a fitting used to mount a serviceable high-pressure A/C charge port valve.
- The downstream side also contains a fitting used to mount the A/C pressure cut-off switch. A long-travel Schrader-type valve stem core is installed in the fitting so that the A/C pressure cut-off switch can be removed without discharging the A/C system.

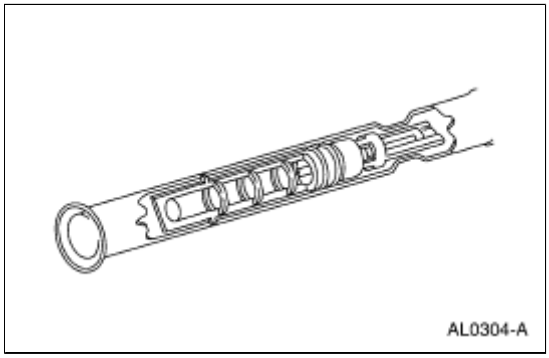
A/C Evaporator Core

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

The A/C evaporator core is the plate/fin type with a unique refrigerant flow path.

- A mixture of refrigerant and oil enters the bottom of the A/C evaporator core through the A/C evaporator core inlet tube and is routed so it flows through the partitioned first three plate/fin sections.
- The next four plate/fin sections are partitioned to force the refrigerant to flow toward the other end of the A/C evaporator core.
- Refrigerant then continues over to the remaining five plate/fin sections and then moves out of the A/C evaporator core through the A/C evaporator core outlet tube.
- This S-pass flow pattern accelerates the flow of refrigerant and oil through the A/C evaporator core.

A/C Evaporator Core Orifice

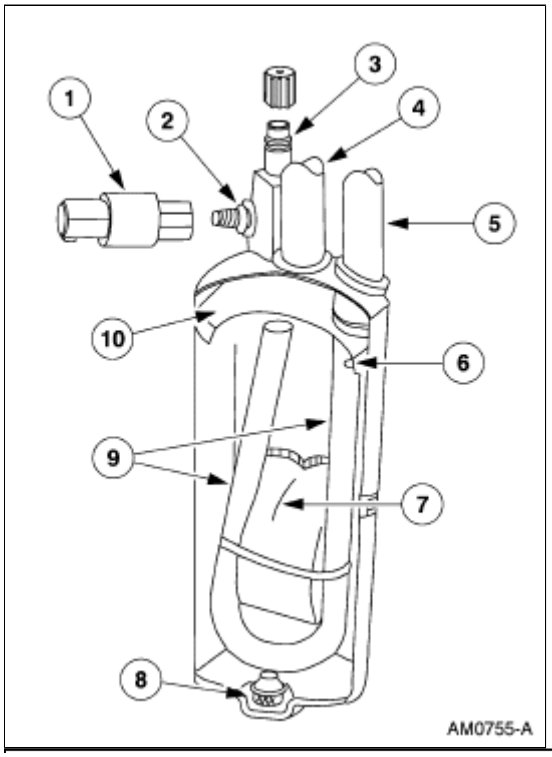


NOTE: A new A/C evaporator core orifice should be installed whenever a new A/C compressor is installed.

The A/C evaporator core orifice has the following characteristics:

- It is color-coded red.
- It has an orifice diameter of 1.6 mm (0.062 inch).
- It is located in the A/C evaporator core inlet tube.
- It has filter screens located on the inlet and outlet ends of the tube body.
- The inlet filter screen acts as a strainer for the liquid refrigerant flowing through the A/C evaporator core orifice.
- O-rings on the A/C evaporator core orifice prevent the high-pressure liquid refrigerant from bypassing the A/C evaporator core orifice.
- Adjustment or service cannot be made to the A/C evaporator core orifice assembly. A new evaporator core orifice assembly must be installed.

Suction Accumulator/Drier



Item	Part Number	Description
1	19E561	A/C cycling switch
2	—	O-ring seal (part of 19C836)
3	19E762	Low pressure service gauge port valve
4	—	Inlet from A/C evaporator core (part of 19C836)
5	—	Outlet to A/C compressor (part of 19C836)
6	—	Anti-siphon hole (part of 19C836)
7	—	Desiccant bag (part of 19C836)
8	—	Oil return orifice filter (part of 19C836)
9	—	Vapor return tube (part of 19C836)
10	—	Suction accumulator/drier dome (part of 19C836)

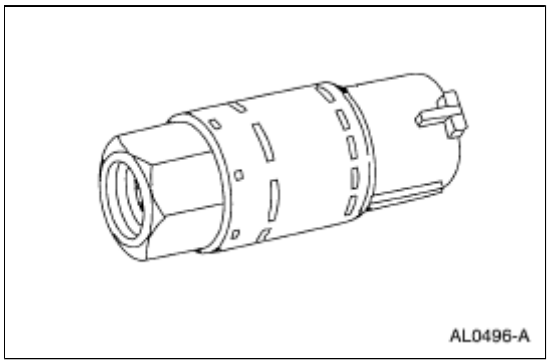
NOTE: Installation of a new suction accumulator/drier is not required when repairing the air conditioning system except when there is physical evidence of system contamination from a failed A/C compressor or damage to the suction accumulator/drier.

The suction accumulator/drier is mounted to the A/C accumulator bracket (19D606) to the right of the vehicle centerline. The inlet tube of the suction accumulator/drier attaches directly to the A/C evaporator core outlet tube and the outlet tube attaches to the A/C manifold and tube.

After entering the inlet of the suction accumulator/drier, the heavier oil-laden refrigerant contacts an internally mounted dome (which serves as an umbrella) and drips down onto the bottom of the canister.

- A small diameter oil bleed hole, in the bottom of the vapor return tube, allows the accumulated heavier liquid refrigerant and oil mixture to re-enter the compressor suction line at a controlled rate.
- As the heavier mixture passes through the small diameter liquid bleed hole, it has a second chance to vaporize and recirculate through the A/C compressor without causing compressor damage due to slugging.
- A fine mesh screened filter fits tightly around the bottom of the vapor return tube to filter out refrigerant system contaminant particles.
- A desiccant bag is mounted inside the canister to absorb any moisture which may be in the refrigerant system.
- A fitting located on the top of the suction accumulator/drier is used to attach the A/C cycling switch. A long-travel Schrader-type valve stem core is installed in the fitting so that the A/C cycling switch can be removed without discharging the A/C system.

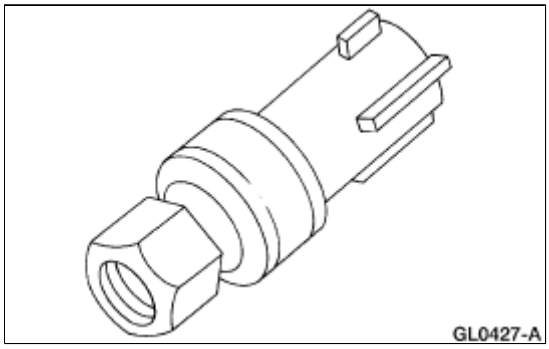
A/C Cycling Switch



The A/C cycling switch is mounted on a Schrader valve-type fitting on the top of the suction accumulator/drier.

- A valve depressor, located inside the threaded end of the A/C cycling switch, presses in on the Schrader valve stem.
- This allows the suction pressure inside the suction accumulator/drier to control the operation of the A/C cycling switch.
- The electrical switch contacts open when the suction pressure drops to 152-193 kPa (22-28 psi).
- The contacts close when the suction pressure rises to 276-324 kPa (40-47 psi).
- When the A/C cycling switch contacts close, the signal to energize the A/C clutch is sent to the wide open throttle A/C cutoff relay.
- When the A/C cycling switch contacts open, the A/C clutch field coil is de-energized and compressor operation stops.
- The A/C cycling switch will control the A/C evaporator core pressure at a point where the plate/fin surface temperature will be maintained slightly above freezing.
- This prevents icing of the A/C evaporator core and blockage of airflow.
- It is not necessary to discharge the refrigerant system to remove the A/C cycling switch.

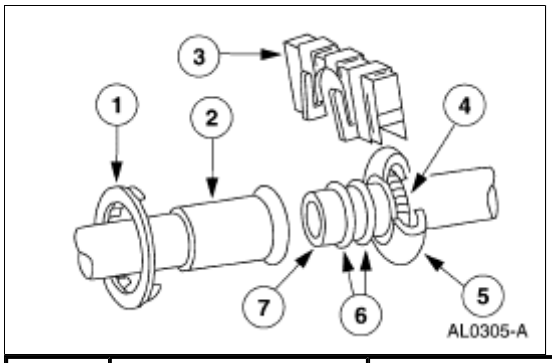
A/C Pressure Cut-Off Switch



The A/C pressure cut-off switch is used to interrupt A/C compressor operation in the event of high system discharge pressures.

- The A/C pressure cut-off switch is mounted on a Schrader valve-type fitting on the high pressure side of the A/C manifold and tube.
- A valve depressor, located inside the threaded end of the A/C pressure cut-off switch, presses on the Schrader valve stem.
- This allows the A/C pressure cut-off switch to monitor the compressor discharge pressure.
- When the compressor discharge pressure rises to approximately 2,896 kPa (420 psi), the switch contacts open, disengaging the A/C compressor,
- When the pressure drops to approximately 1,724 kPa (250 psi), the contacts close to allow operation of the A/C compressor.
- It is not necessary to discharge the refrigerant system to remove the A/C pressure cut-off switch.

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	—	O-ring seals (2 req'd)
7	—	Male fitting

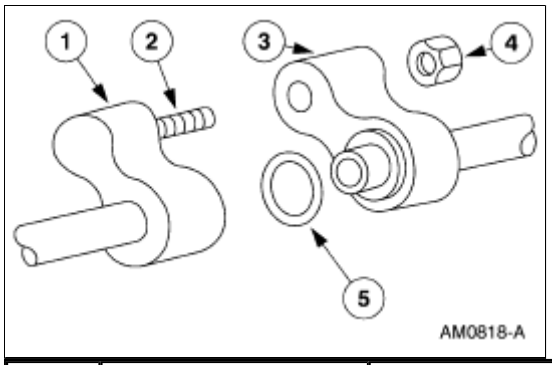
The spring lock coupling is a refrigerant line coupling held together by a garter spring inside a circular cage.

- 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 two halves of the A/C condenser core couplings, all other couplings have two O-ring seals.
- These O-ring seals are green in color and are made of special material.
- Use only the green 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 (19E746) may be used to secure the coupling but is not required.

Peanut Fitting

The A/C condenser core uses the peanut shaped refrigerant fittings instead of spring lock couplings.

- The male and female blocks of the peanut fitting are retained with a nut.
- An O-ring seal is installed around the tube on the male block.
- The female block is welded to the tube and is not adjustable.
- Support the female fitting with a wrench to prevent twisting of the tubes.
- The male block will pivot around the tube to allow for alignment with the female block during assembly.
- When correctly assembled the male and female fittings should be flush.

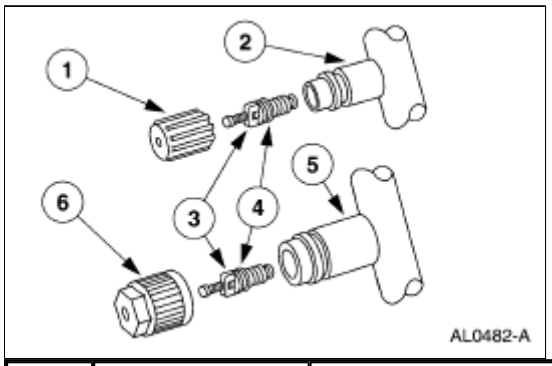


Item	Part Number	Description
1	—	Female block (part of tube assy)
2	W701890-S426	Stud (part of female block)
3	—	Male block (part of 19712)
4	W520413-S301	Nut
5	—	O-ring seal

Service Gauge Port Valves

The high-pressure service gauge port valve is located on the front A/C manifold and tube.

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



Item	Part Number	Description
1	19D702	A/C charging valve cap
2	—	Low pressure service gauge port valve
3	—	Schrader-type valve
4	—	O-ring seal
5	—	High pressure service gauge port valve
6	19D702	A/C charging valve cap

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

- Special couplings are required for both the high-side and low-side service gauge ports.
- A new Schrader-type valve core can be installed if the seal leaks.
- Always install the A/C charging valve cap (19D702) on the service gauge port valves after repairing

the refrigerant system.

Air Conditioning

Refer to Section 412-00 .

Air Conditioning (A/C) Compressor —4.0L OHV

Material

Item	Specification
PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA	WSH-M1C231-B

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.

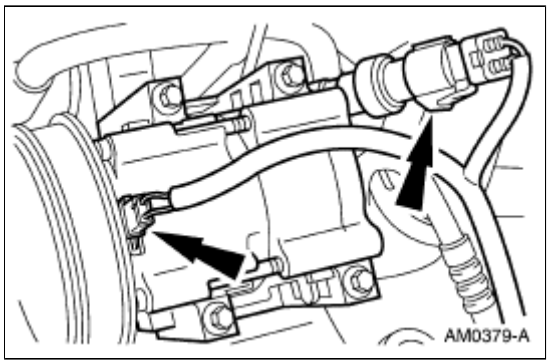
- **If A/C flushing equipment is available, carry out flushing of the air conditioning system prior to installing a new air conditioning compressor. For additional information, refer to Section 412-00 .**
- **If A/C flushing equipment is not available, carry out filtering of the air conditioning system after a new air conditioning compressor has been installed. For additional information, refer to Section 412-00 .**
- **Install a new evaporator core orifice (19D990) as directed by the A/C flushing or filtering procedure.**
- **Install a new suction accumulator (19C836) as directed by the A/C flushing or filtering procedure.**

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

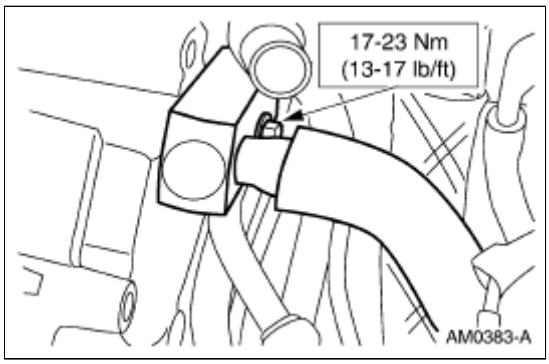
1. If flushing of the air conditioning system has not been carried out, recover the refrigerant. For additional information, refer to Section 412-00 .

2. Remove the drive belt (8620) from the air conditioning compressor pulley.

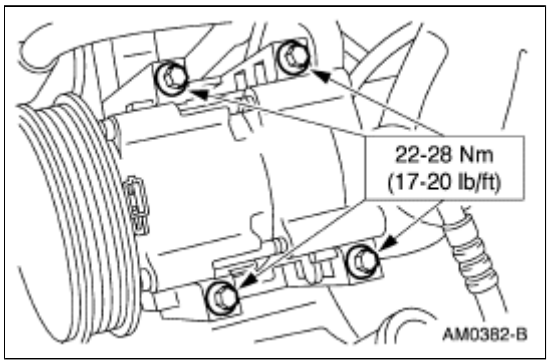
3. Disconnect the field coil and pressure cutoff switch electrical connectors.



4. Remove the bolt and detach the manifold and tube from the A/C compressor.
    - Discard the O-ring seals.



5. Remove the bolts and remove the A/C compressor.



6. To install, reverse the removal procedure.
    - Install new O-ring seals lubricated in clean PAG oil.
    - If filtering of the air conditioning system is not to be carried out, correctly oil match the system with clean PAG oil. For additional information, refer to Section 412-00 .

7. 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

Air Conditioning (A/C) Compressor —4.0L SOHC

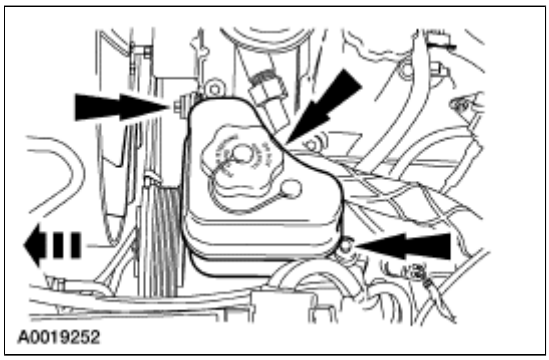
Removal and Installation

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.

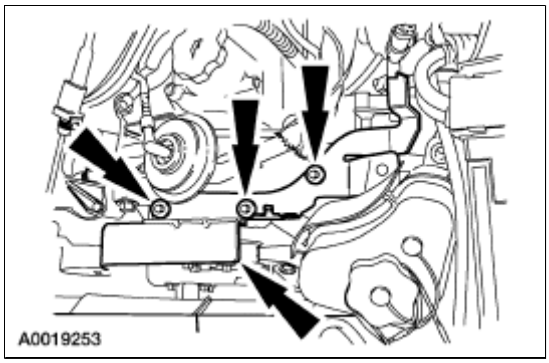
- **If A/C flushing equipment is available, carry out flushing of the air conditioning system prior to installing a new air conditioning compressor. For additional information, refer to Section 412-00 .**
- **If A/C flushing equipment is not available, carry out filtering of the air conditioning system after a new air conditioning compressor has been installed. For additional information, refer to Section 412-00 .**
- **Install a new evaporator core orifice (19D990) as directed by the A/C flushing or filtering procedure.**
- **Install a new suction accumulator (19C836) as directed by the A/C flushing or filtering procedure.**

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

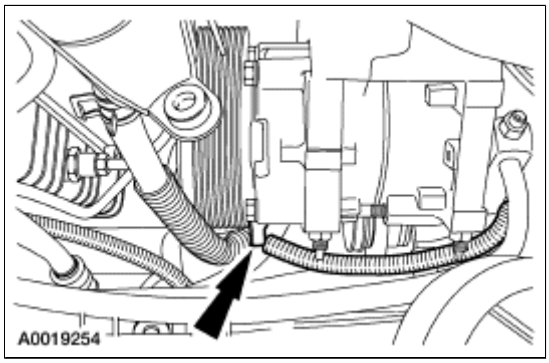
1. If flushing of the air conditioning system has not been carried out, recover the refrigerant. For additional information, refer to Section 412-00 .
2. Remove the air cleaner outlet tube. For additional information, refer to Section 303-12 .
3. Remove the drive belt from the A/C compressor pulley.
4. Remove the bolts and position aside the power steering reservoir.



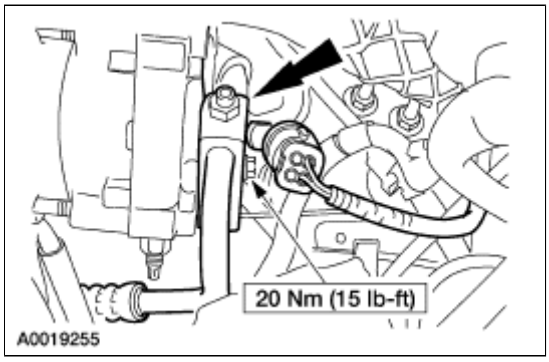
5. Remove the bolts and remove the power steering bracket.



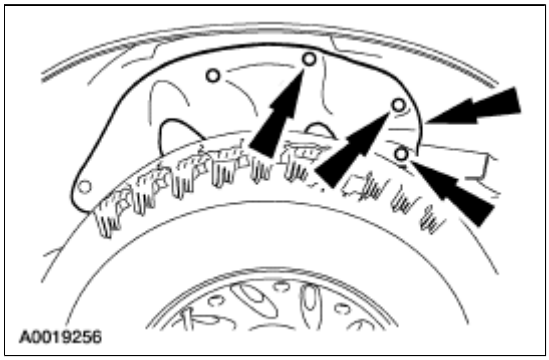
6. Disconnect the field coil electrical connector.



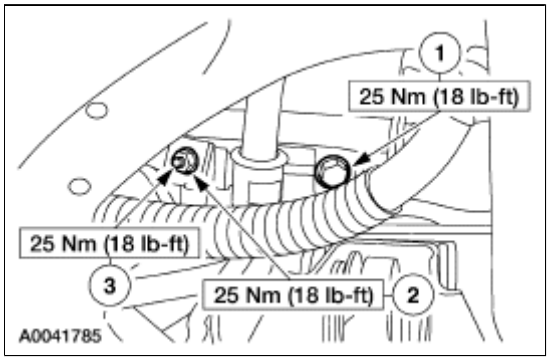
7. Remove the bolt and detach the manifold and tube from the A/C compressor.
    - Discard the O-ring seals.



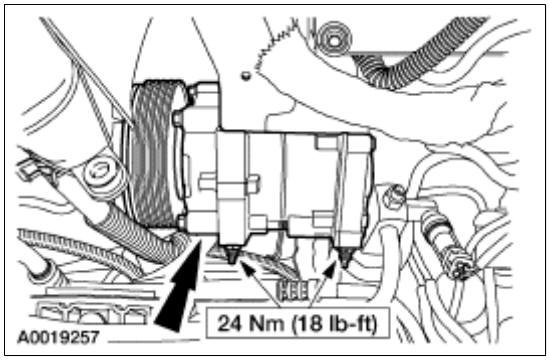
8. Remove the retaining pins and position aside the inner fender well splash shield.



9. Remove the lower A/C compressor bolt and stud.
    1. Remove the bolt.
    2. Remove the nut and detach the bracket from the stud.
    3. Remove the stud.



10. Remove the two A/C compressor nuts and studs, and remove the A/C compressor.



11. To install, reverse the removal procedure.
    - Install new O-ring seals lubricated in clean PAG oil.
    - If filtering of the air conditioning system is not to be carried out, correctly oil match the system with clean PAG oil. For additional information, refer to Section 412-00 .

12. 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 .

Air Conditioning (A/C) Compressor —5.0L

Material

Item	Specification
PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA	WSH-M1C231-B

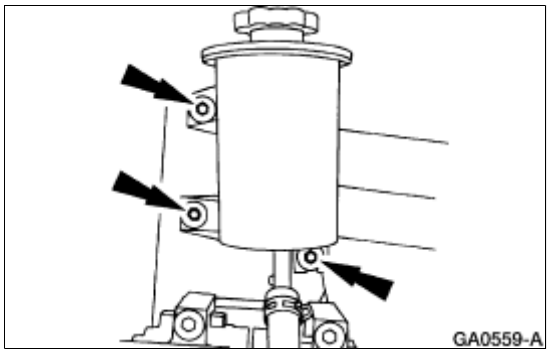
Removal and Installation

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.

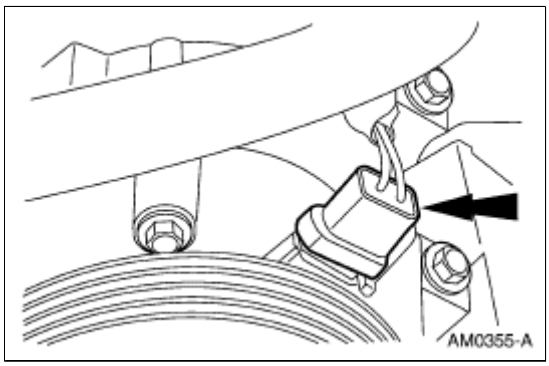
- **If A/C flushing equipment is available, carry out flushing of the air conditioning system prior to installing a new air conditioning compressor. For additional information, refer to Section 412-00 .**
- **If A/C flushing equipment is not available, carry out filtering of the air conditioning system after a new air conditioning compressor has been installed, For additional information, refer to Section 412-00 .**
- **Install a new evaporator core orifice (19D990) as directed by the A/C flushing or filtering procedure.**
- **Install a new suction accumulator (19C836) as directed by the A/C flushing or filtering procedure.**

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

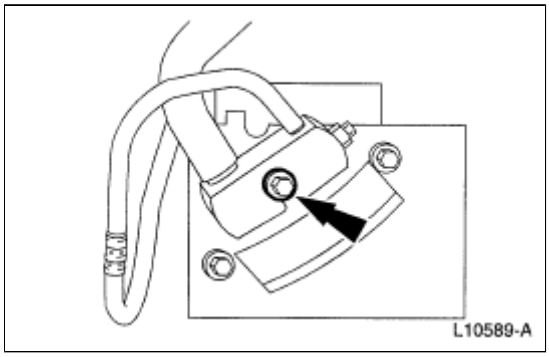
1. If flushing of the air conditioning system has not been carried out, recover the refrigerant. For additional information, refer to Section 412-00 .
2. Remove the air cleaner outlet pipe. For additional information, refer to Section 303-12 .
3. Remove the drive belt from the A/C compressor pulley.
4. Remove the bolts and position aside the power steering reservoir.



5. Disconnect the field coil electrical connector.

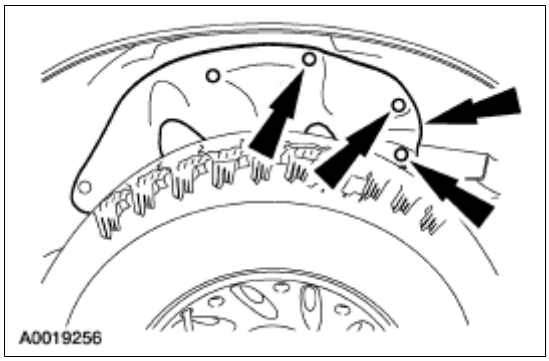


6. Remove the bolt and detach the compressor manifold and tube assembly from the A/C compressor.
   - Discard the O-ring seals.

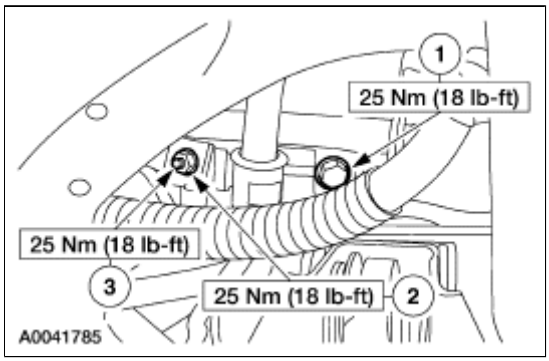


7. Partially raise the vehicle. For additional information, refer to Section 100-02 .

8. Remove the retaining pins and position the inner fender well access panel out of the way.

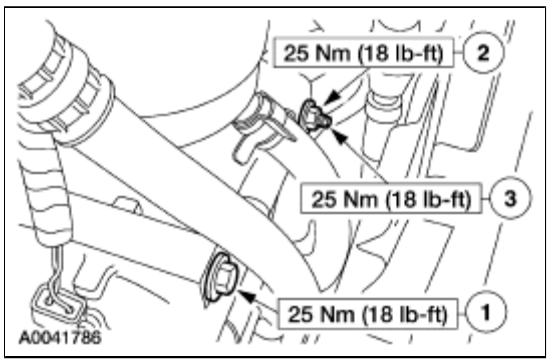


9. Remove the lower A/C compressor bolt and stud.
    1. Remove the bolt.
    2. Remove the nut and detach the bracket from the stud.
    3. Remove the stud.



10. Lower the vehicle.

11. Remove the upper A/C compressor bolt and stud.
    1. Remove the bolt.
    2. Remove the nut and detach the bracket from the stud.
    3. Remove the stud.



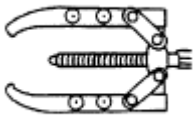
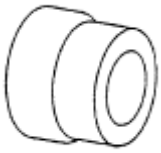
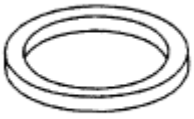
12. Remove the A/C Compressor.

13. To install, reverse the removal procedure.
    - Install new O-ring seals lubricated in clean PAG oil.
    - If filtering of the air conditioning system is not to be carried out, correctly oil match the system with clean PAG oil. For additional information, refer to Section 412-00 .

14. 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 .

Clutch And Clutch Field Coil

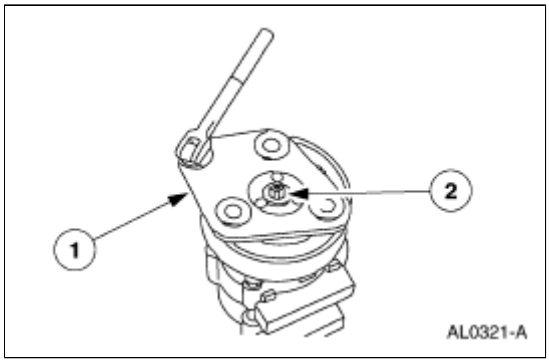
Special Tool(s)

 ST1260-A	2-Jaw Puller 205-D026 (D80L-1002-L) or equivalent
 ST1232-A	Coil Replacer 412-065 (T89P-19623-EH)
 ST1235-A	Compressor Clutch Holding Tool 412-098 (T94P-19703-AH)
 ST1220-A	Differential Bearing Cone Remover 205-116 (T77F-4220-B1)
 ST1234-A	Field Coil Replacer 412-078 (T91L-19623-CH)
 ST1233-A	Field Coil Remover 412-067 (T89P-19623-FH)

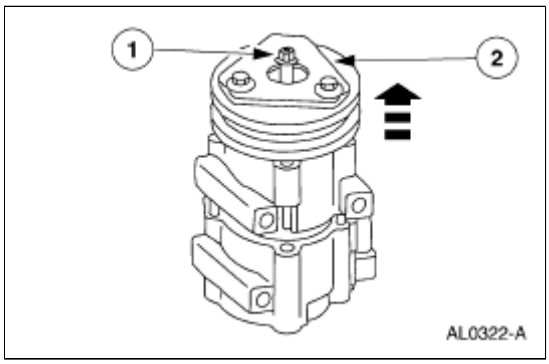
Removal

1. Remove the A/C compressor (19703). For additional information, refer to Air Conditioning (A/C) Compressor—4.0L OHV , Air Conditioning (A/C) Compressor—4.0L SOHC or Air Conditioning (A/C) Compressor—5.0L in this section.

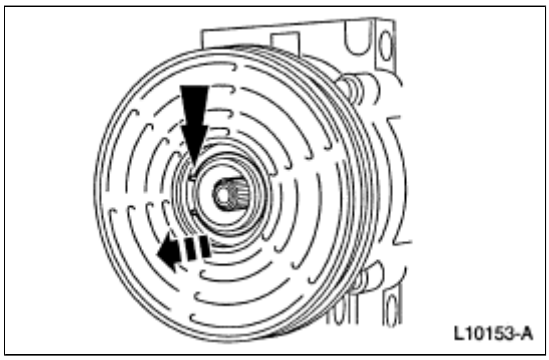
2. Remove the bolt.
    1. Hold the A/C clutch hub with the Compressor Clutch Holding Tool.
    2. Remove the bolt.



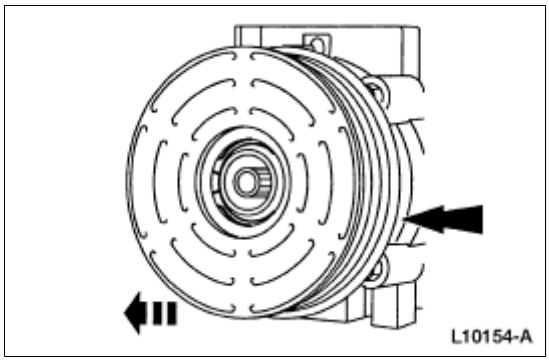
3. Remove the A/C clutch (2884) and the A/C clutch hub spacer (19D648).
    1. Thread an 8 x 1.25 mm bolt into the A/C clutch to force it from the compressor shaft.
    2. Lift the A/C clutch and the A/C clutch hub spacer from the compressor shaft.



4. Remove the pulley snap ring.

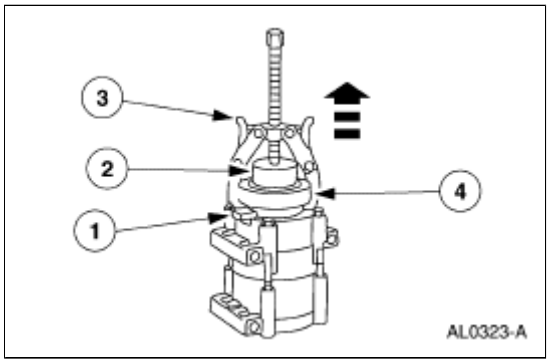


5. Remove the A/C clutch pulley (2E884).



6. **CAUTION: Do not use air tools. The A/C clutch field coil (2987) can be easily damaged.**

   Remove the A/C clutch field coil.
   1. Note the location of the A/C clutch field coil electrical connector.
   2. Install the Field Coil Remover on the nose opening of the A/C compressor.
   3. Install the Puller-Differential Side Bearing.
   4. Remove the A/C clutch field coil.

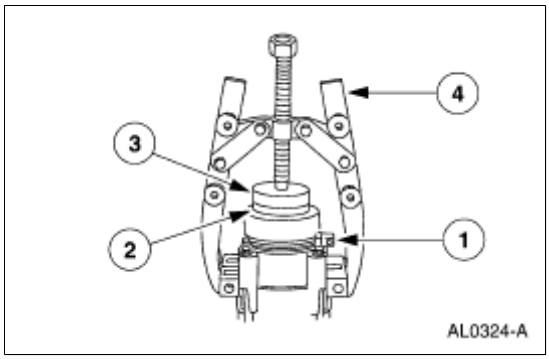


Installation

1. Clean the A/C clutch field coil and pulley bearing mounting surfaces.

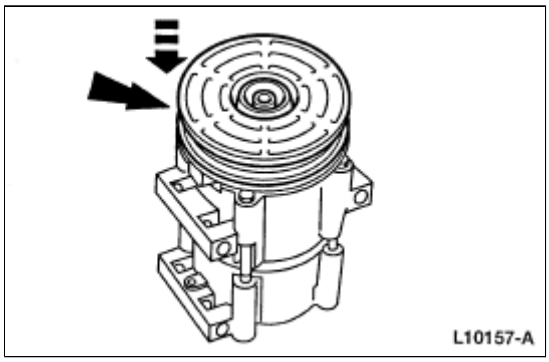
2. **CAUTION: Do not use air tools. The A/C clutch field coil can be easily damaged.**

   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 Field Coil Replacer on the A/C clutch field coil.
   3. Place the Coil Replacer on the Field Coil Replacer.
   4. Use the 2-Jaw Puller to install the A/C clutch field coil until bottomed completely against the A/C compressor.

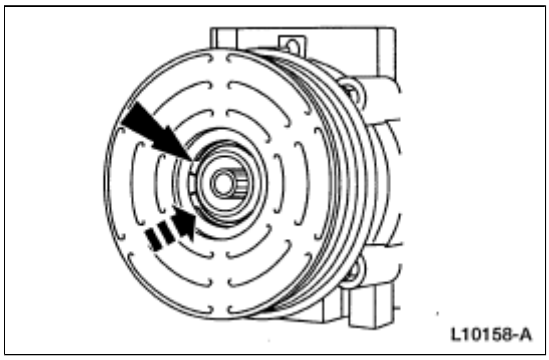


3. **NOTE:** The A/C clutch pulley is a tight fit on the A/C compressor head; it must be correctly aligned during installation.

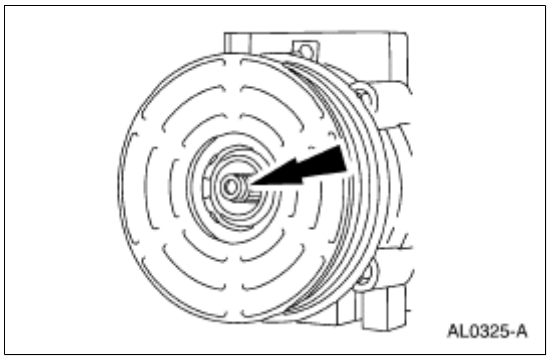
   Install the A/C clutch pulley.



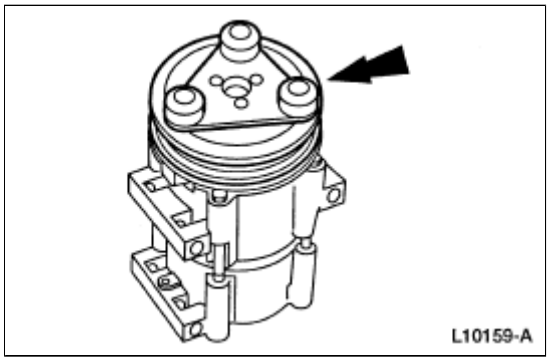
4. Install the pulley snap ring with the bevel side out.



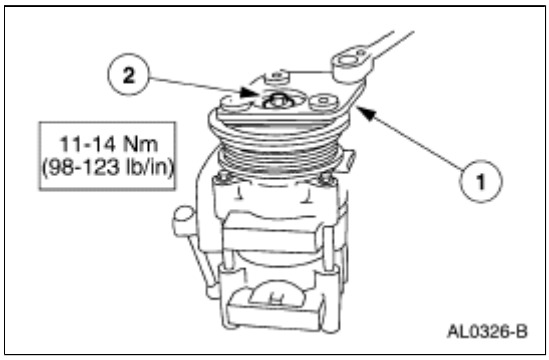
5. Place one nominal thickness A/C clutch hub spacer inside the clutch hub spline opening.



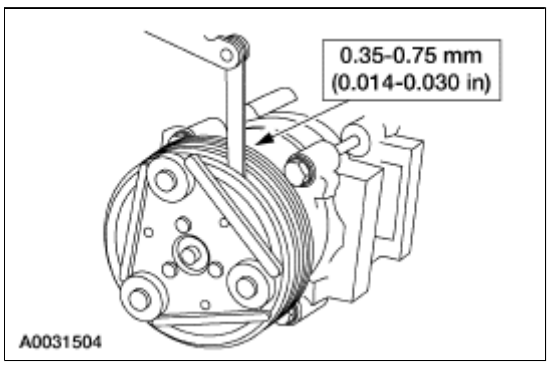
6. Install the A/C clutch.



7. Install the bolt.
    1. Hold the A/C clutch hub with the Compressor Clutch Holding Tool.
    2. Tighten the bolt.



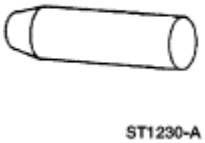
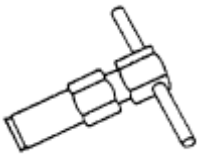
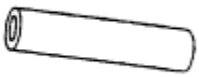
8. Measure and adjust the clutch air gap by removing or adding A/C clutch hub spacers.



9. Install the A/C compressor. For additional information, refer to Air Conditioning (A/C) Compressor—4.0L OHV , Air Conditioning (A/C) Compressor—4.0L SOHC or Air Conditioning (A/C) Compressor—5.0L in this section.

Shaft Seal

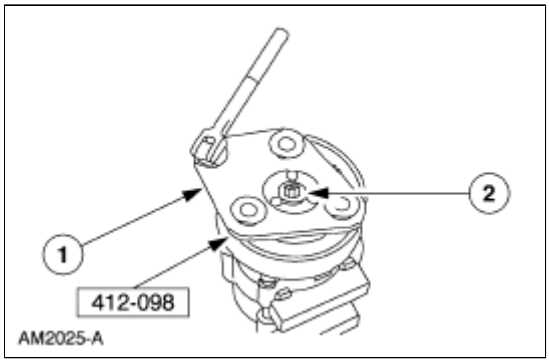
Special Tool(s)

 ST1230-A	Seal Protector 412-061 (T89P-19623-CH)
 ST1229-A	Compressor Seal Remover 412-059 (T89P-19623-BH)
 ST1228-A	Shaft Seal Replacer 412-058 (T89P-19623-AH)
 ST1231-A	Snap Ring Remover 412-063 (T89P-19623-DH)
 ST1219-A	O-Ring Removal Pick 100-010 (T71P-19703-C)
 ST1235-A	Compressor Clutch Holding Tool 412-098 (T94P-19703-AH)

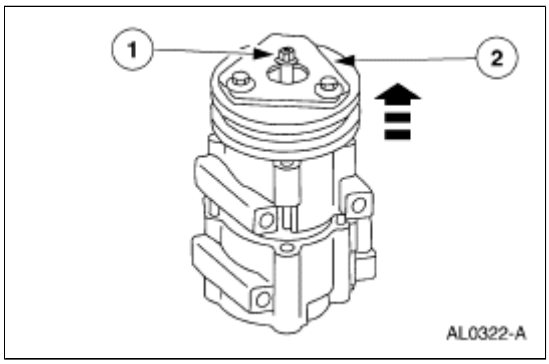
Removal

1. Remove the air conditioning (A/C) compressor. For additional information, refer to Air Conditioning (A/C) Compressor—4.0L OHV , Air Conditioning (A/C) Compressor—4.0L SOHC or Air Conditioning (A/C) Compressor—5.0L in this section.

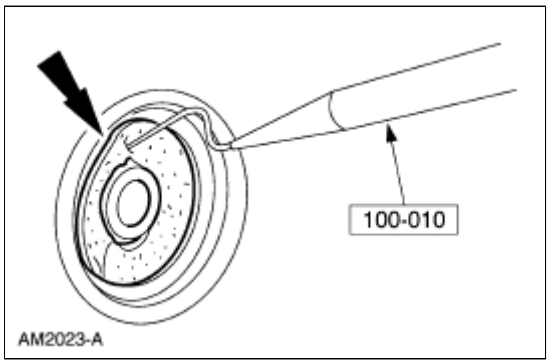
2. Remove the bolt.
    1. Hold the A/C clutch hub with the special tool.
    2. Remove the bolt.



3. Remove the A/C clutch and spacer.
    1. Thread an 8 x 1.25 mm (0.05 in) bolt into the A/C clutch to force it from the compressor shaft.
    2. Lift the A/C clutch and the A/C clutch hub spacer from the compressor shaft.

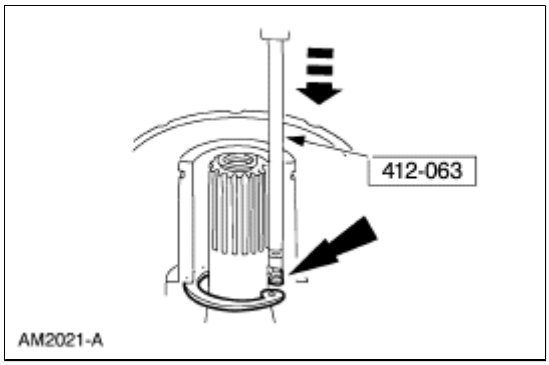


4. Remove the shaft seal felt from the nose of the A/C compressor with the special tool.

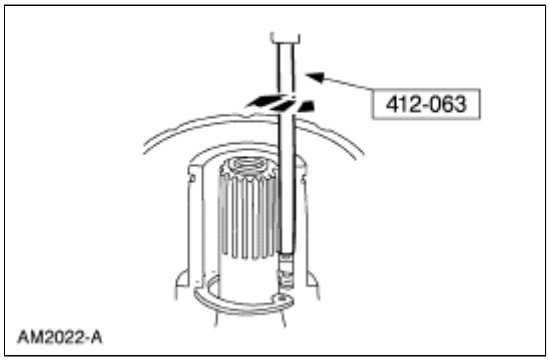


5. Clean the compressor nose area.

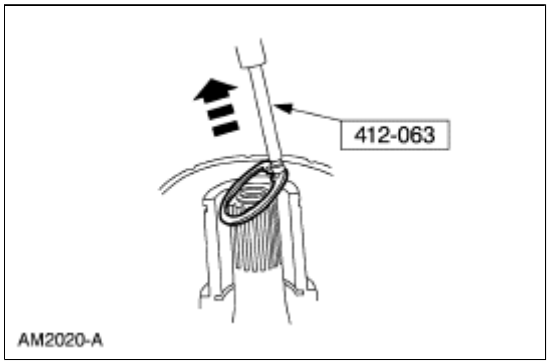
6. Insert the tip of the special tool into one of the snap ring eyes.



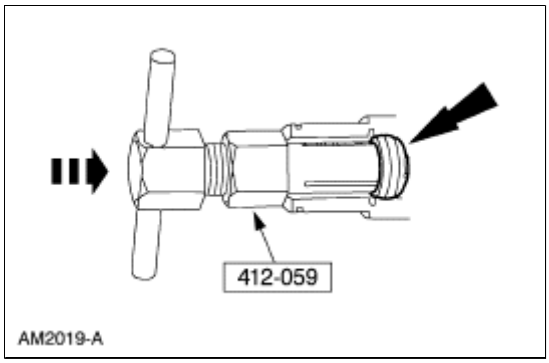
7. Rotate the special tool to position the tool tip and the snap ring eye closest to the A/C compressor shaft.



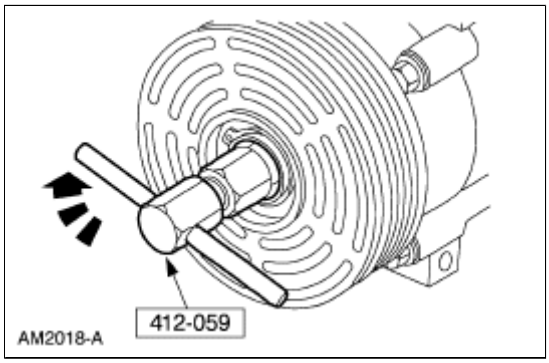
8. Pull the special tool up quickly while keeping the tool shaft against the side of the nose opening and remove the snap ring.



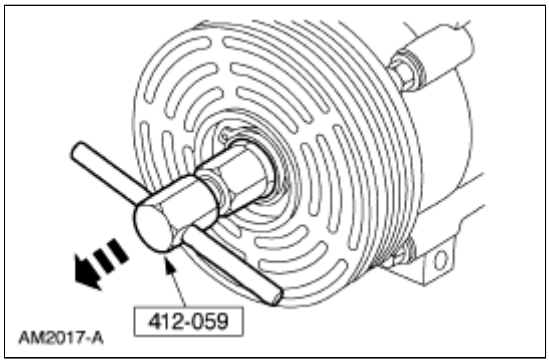
9. Engage the special tool into the inside diameter of the shaft seal.



10. Turn the tool handle clockwise to expand the tool tip inside of the shaft seal.



11. Pull the seal from the A/C compressor.

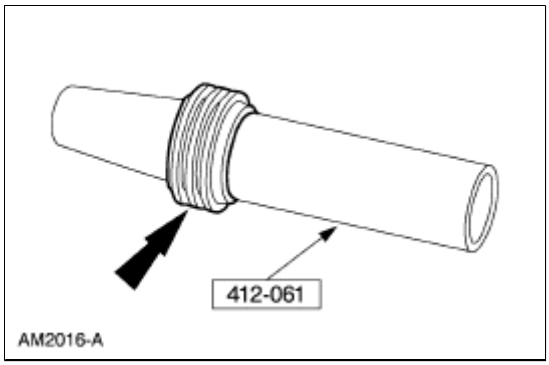


Installation

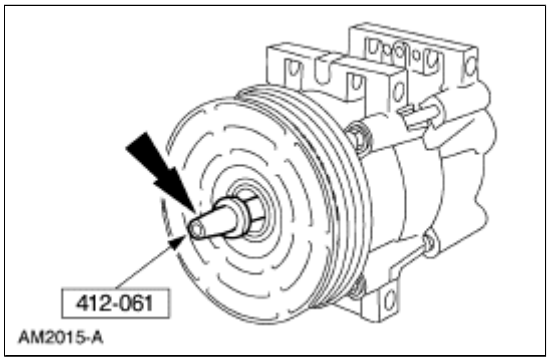
1. **CAUTION: Do not allow dirt or other foreign materials to enter the A/C compressor.**

   Clean the A/C compressor nose area.

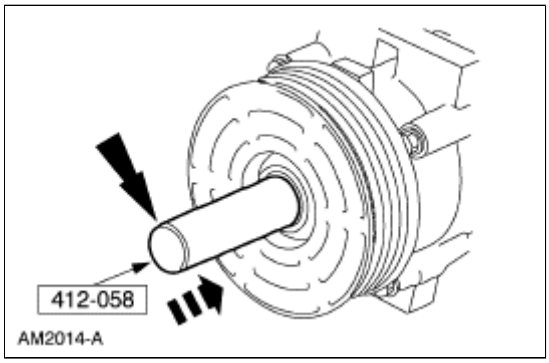
2. Place the shaft seal on the special tool. Lubricate the shaft seal and protector with PAG Refrigerant Compressor Oil, YN-12-C, F7AZ-19589-DA or equivalent meeting Ford specification WSH-M1C231-B.



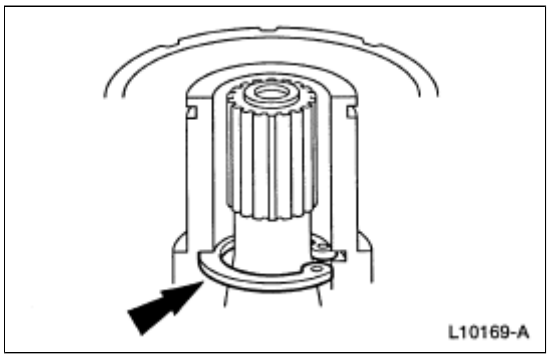
3. Position the shaft seal and the special tool over the A/C compressor shaft.



4. Push the shaft seal onto the A/C compressor shaft with the special tool until seated.

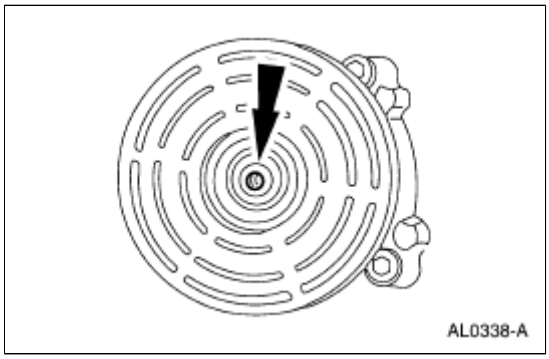


5. Install the shaft seal snap ring.

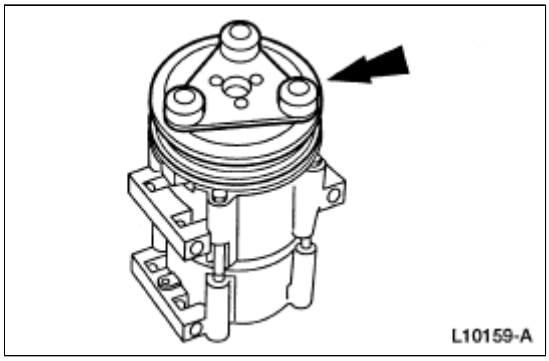


6. Conduct the A/C compressor external leak test. For additional information, refer to Section 412-00 .

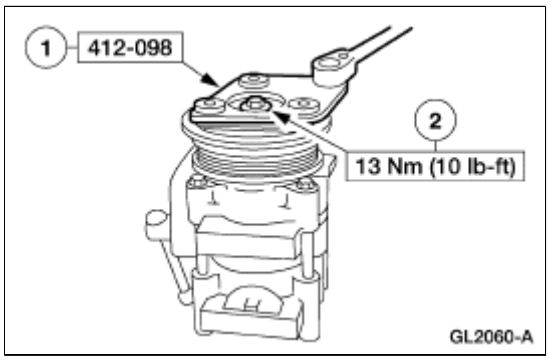
7. Install the shaft seal felt.



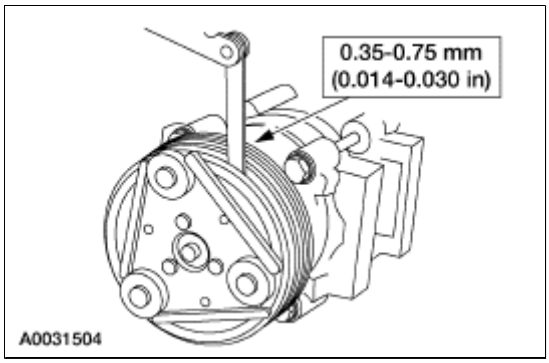
8. Install the A/C clutch hub spacer and the A/C clutch hub.



9. Install the bolt.
    1. Hold the A/C clutch hub with the special tool.
    2. Tighten the bolt.



10. Measure and adjust the clutch air gap by adding or removing A/C clutch hub spacers.



11. Install the Air Conditioning (A/C) compressor. For additional information, refer to Air Conditioning (A/C) Compressor—4.0L OHV , Air Conditioning (A/C) Compressor—4.0L SOHC or Air Conditioning (A/C) Compressor—5.0L in this section.

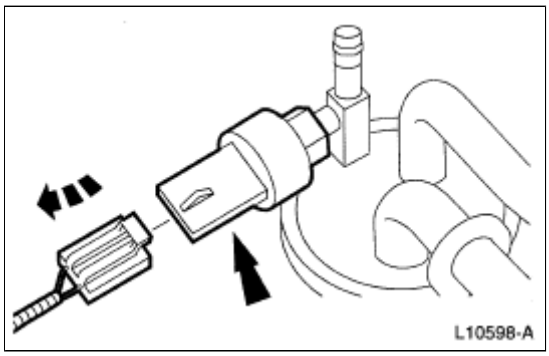
Evaporator Core

Removal

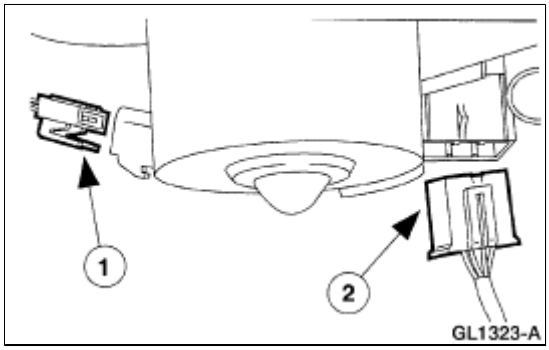
NOTE: Installation of a new suction accumulator/drier is not required when repairing the air conditioning system except when there is physical evidence of system contamination from a failed A/C compressor or damage to the suction accumulator/drier.

NOTE: If an A/C evaporator core leak is suspected, the A/C evaporator core must be leak tested before it is removed from the vehicle. For additional information, refer to Section 412-00 .

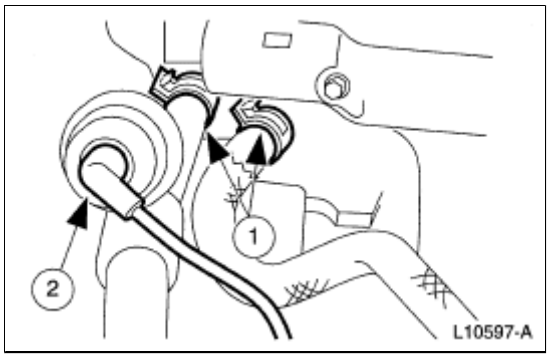
1. Disconnect the battery ground cable (14301). For additional information, refer to Section 414-01 .
2. Recover the refrigerant. For additional information, refer to Section 412-00 .
3. Disconnect the A/C cycling switch (19E561).



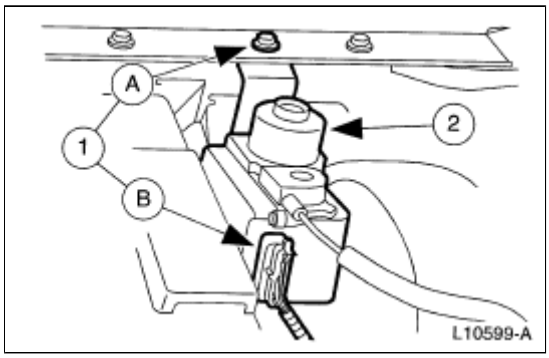
4. Disconnect the electrical connectors.
    1. Disconnect the A/C blower motor electrical connector.
    2. Disconnect the A/C blower motor resistor electrical connector.



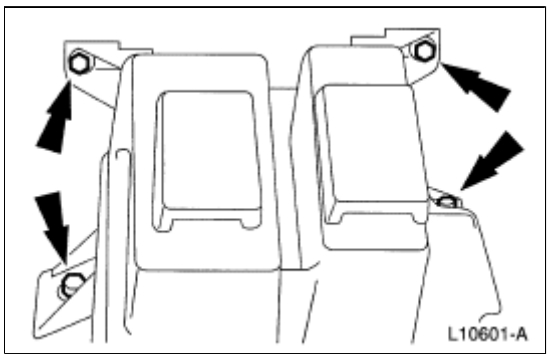
5. Disconnect the heater core (18476).
    1. Disconnect the heater water hoses (18472).
    2. Disconnect the heater water control valve vacuum hose.



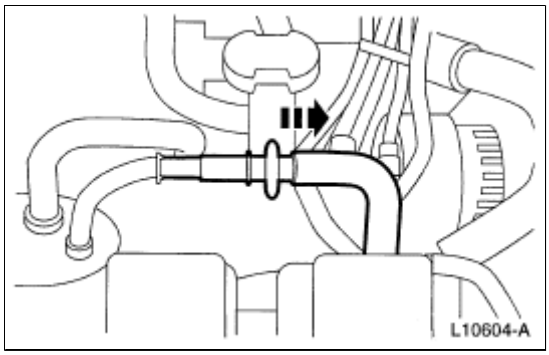
6. Position the speed control servo (9C735) aside.
    1. Remove the (A) bolt and disconnect the (B) servo electrical connector.
    2. Position the speed control servo aside.



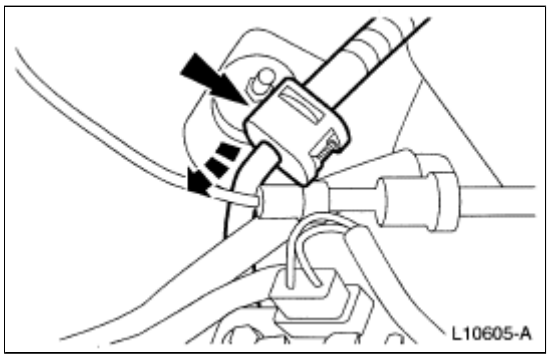
7. Remove the nuts and the screws from the windshield washer reservoir/coolant recovery reservoir. Set the reservoir aside.



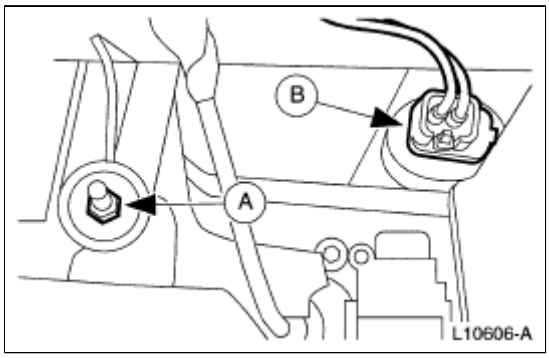
8. Disconnect the A/C manifold and tube (19D734) from the suction accumulator/drier. For additional information, refer to Section 412-00 .



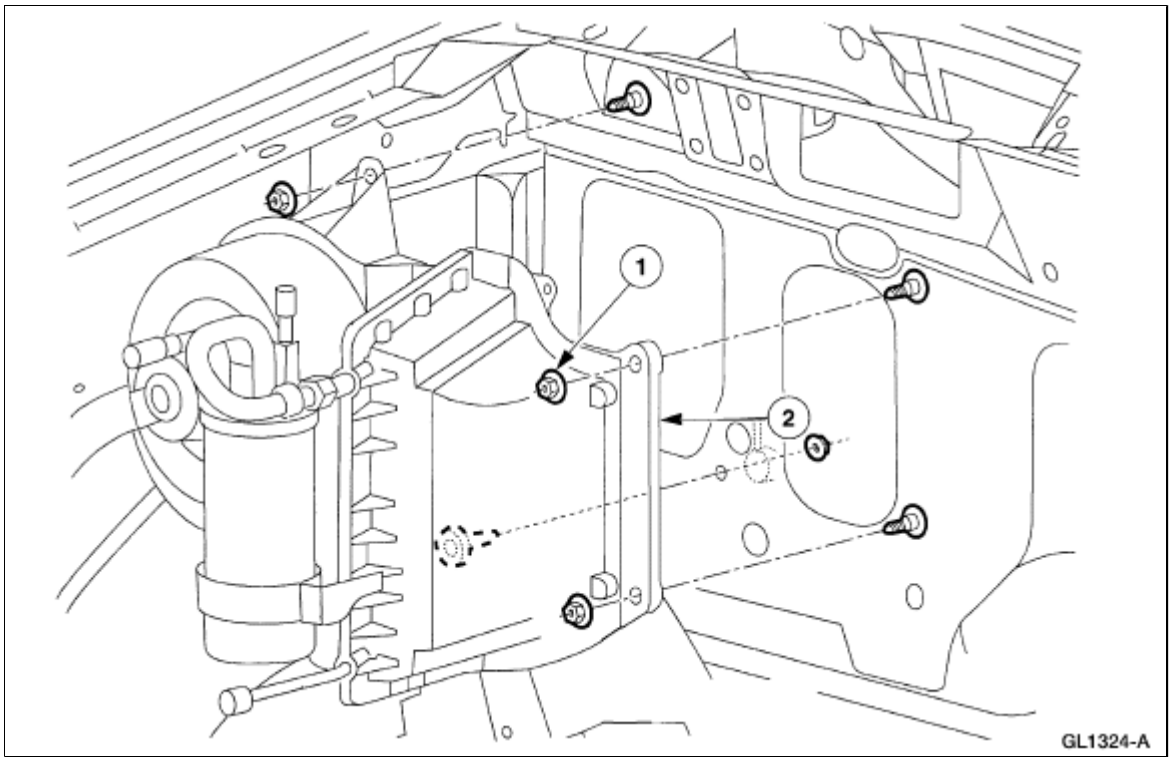
9. Disconnect the condenser to evaporator tube (19835). For additional information, refer to Section 412-00 .



10. Disconnect the (B) A/C system vacuum harness and the (A) A/C evaporator housing mounting nut inside the vehicle.



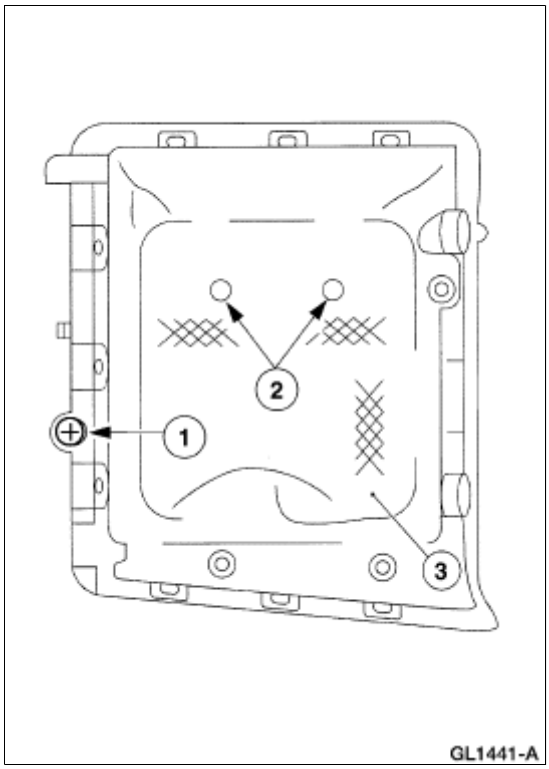
11. Remove the A/C evaporator housing (19850).
    1. Remove the three underhood and one underdash nuts.
    2. Lift the A/C evaporator housing out of the vehicle.



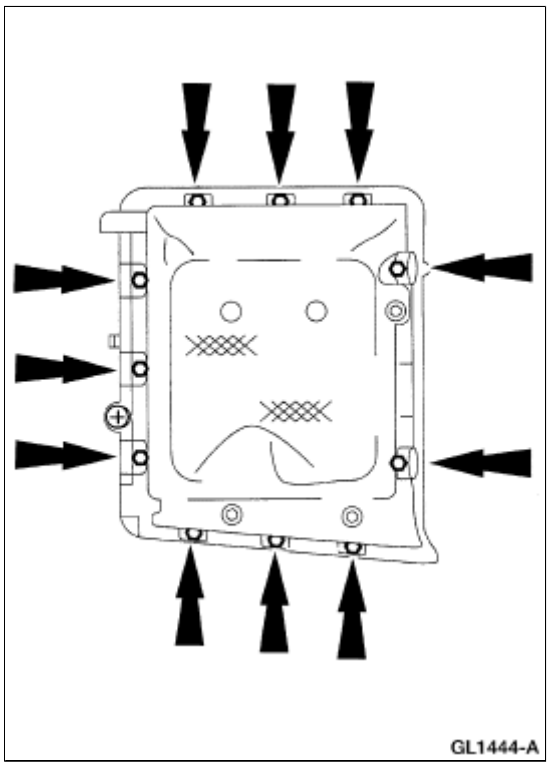
12. Disconnect the suction accumulator/drier from the A/C evaporator core. For additional information, refer to Evaporator Core in this section.

13. **NOTE:** For the 5.0L engine only:

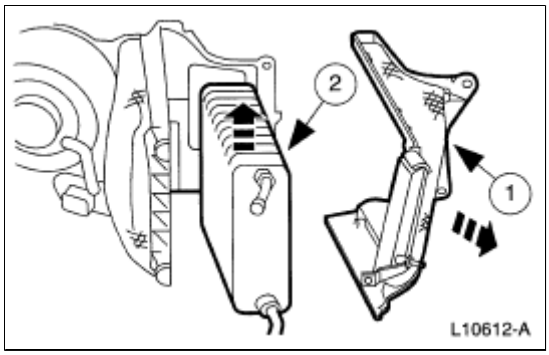
    Remove the evaporator housing heat shield.
    1. Remove the screw.
    2. Remove the clips.
    3. Remove the heat shield.



14. Remove the screws attaching the housing cover.

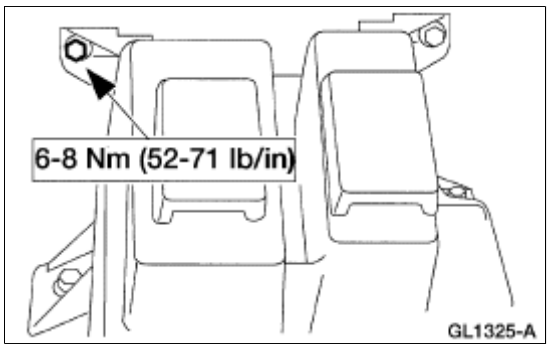


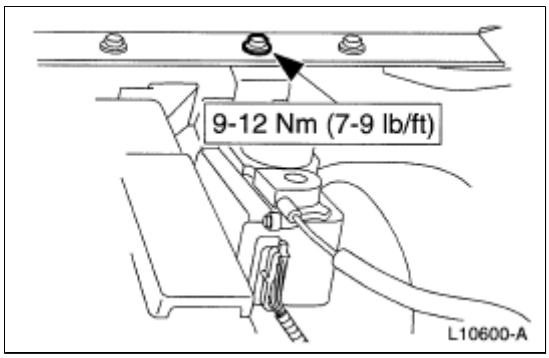
15. Remove the A/C evaporator core.
    1. Separate the evaporator case halves.
    2. Lift the A/C evaporator core out.



Installation

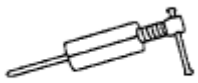
1. To install, reverse the removal procedure.
    - Service the new A/C evaporator core with the correct amount of PAG compressor oil, YN-12-C, F7AZ-19589-DA or equivalent meeting Ford specification WSH-M1C231-B. For additional information, refer to Section 412-00 .





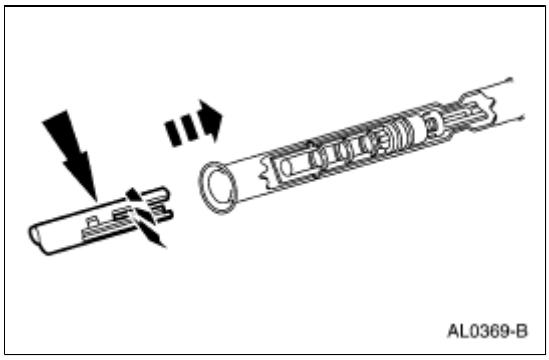
Evaporator Core Orifice

Special Tool(s)

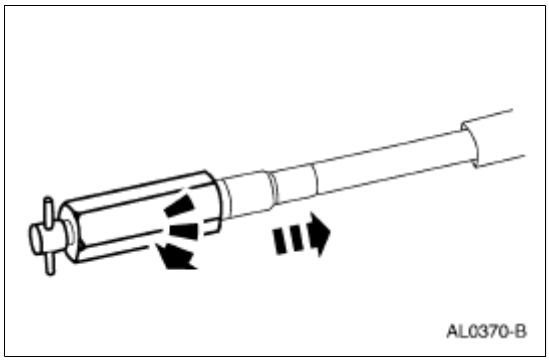
 ST1223-A	Throttle Remover 412-035 (T83L-19990-B)
 ST1224-A	Fixed Orifice Tube Tool 412-034 (T83L-19990-A)

Removal

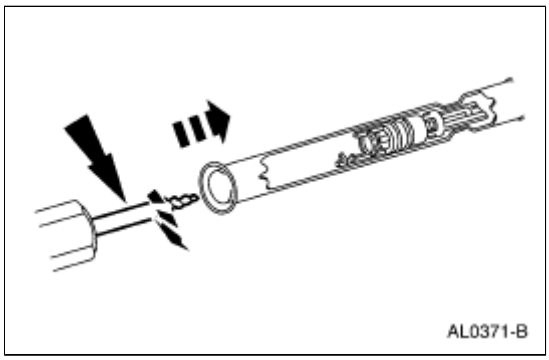
1. Remove the condenser to evaporator tube (19835). For additional information, refer to Line—Condenser to Evaporator in this section.
2. Engage the Fixed Orifice Tube Tool to the A/C evaporator core orifice (19D990).



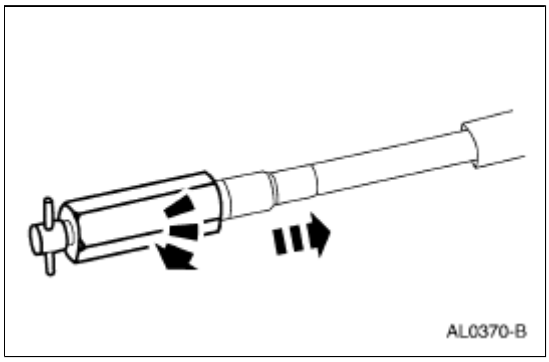
3. Hold the tool T-handle stationary and rotate the tool body to remove the A/C evaporator core orifice.



4. To remove a broken A/C evaporator core orifice, screw the end of the Throttle Remover into the broken A/C evaporator core orifice.



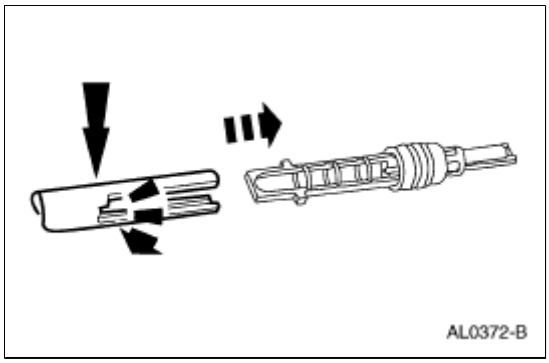
5. Hold the tool T-handle stationary and rotate the tool body to remove the broken A/C evaporator core orifice.



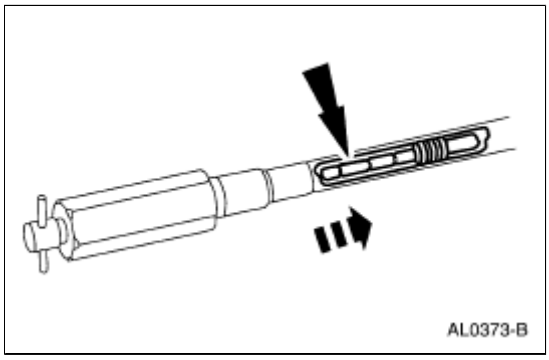
Installation

1. Lubricate and install the O-ring seals on the A/C evaporator core orifice.
    - Use PAG compressor oil, YN-12-C, F7AZ-19589-DA or equivalent meeting Ford specification WSH-M1C231-B.

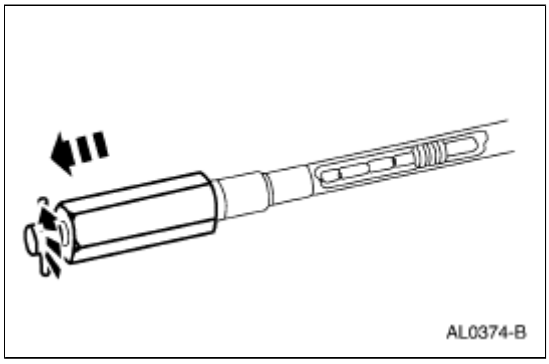
2. Place the A/C evaporator core orifice into the Fixed Orifice Tube Tool.



3. Insert the A/C evaporator core orifice into the condenser to evaporator tube until seated.



4. Remove the Fixed Orifice Tube Tool.

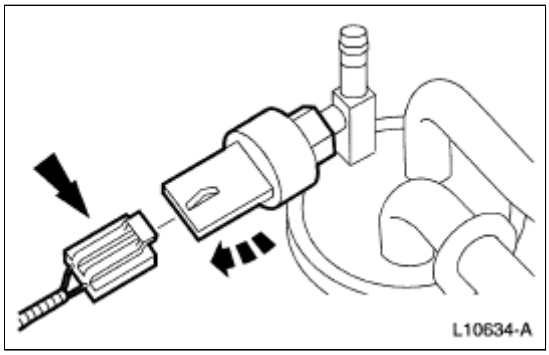


5. Install the condenser to evaporator tube. For additional information, refer to Line—Condenser to Evaporator in this section.

Suction Accumulator

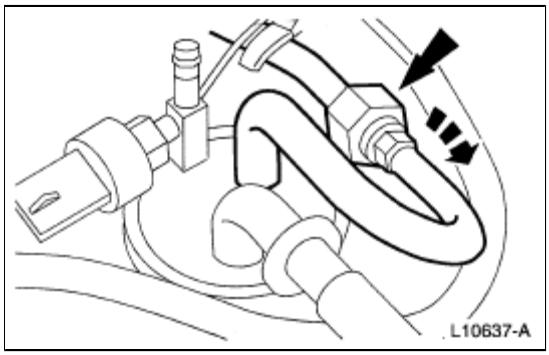
Removal

1. Disconnect the battery ground cable (14301). For additional information, refer to Section 414-01 .
2. Recover the refrigerant. For additional information, refer to Section 412-00 .
3. Disconnect the A/C cycling switch electrical connector.

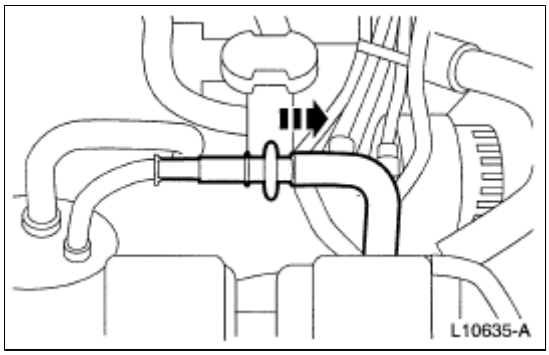


4. **CAUTION: Use a back-up wrench to prevent damage to the tubes.**

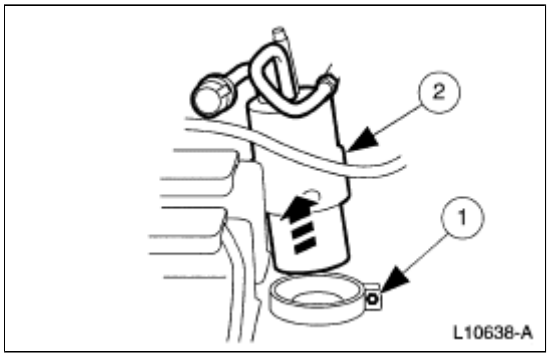
   Disconnect the suction accumulator/drier to A/C evaporator core fitting.



5. Disconnect the A/C manifold and tube spring lock coupling from the suction accumulator/drier (19C836) suction accumulator/drier. For additional information, refer to Section 412-00 .



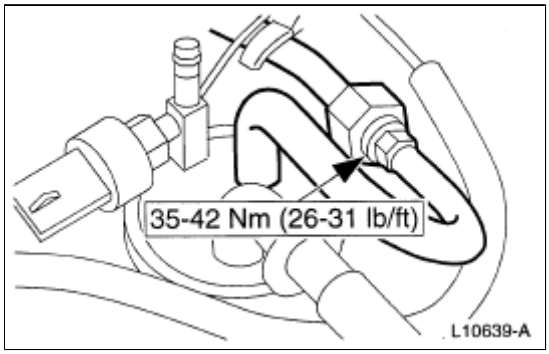
6. Remove the suction accumulator/drier.
    1. Remove the screw from the mounting bracket.
    2. Lift the suction accumulator/drier out.

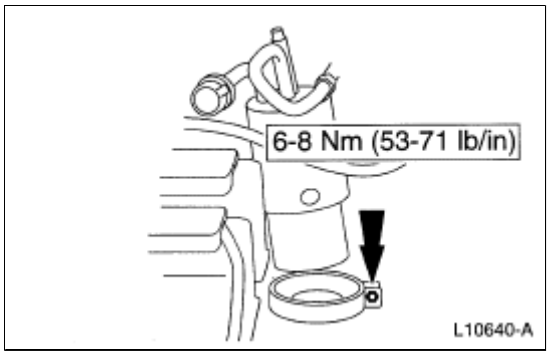


7. Transfer the A/C cycling switch (19E561) to the new suction accumulator/drier.

Installation

1. To install, reverse the removal procedure.
    - Service the new suction accumulator/drier with the correct amount of PAG compressor oil, YN-12-C, F7AZ-19589-DA or equivalent meeting Ford specification WSH-M1C231-B. For additional information, refer to Section 412-00 .




6-8 Nm (53-71 lb/in)
L10640-A

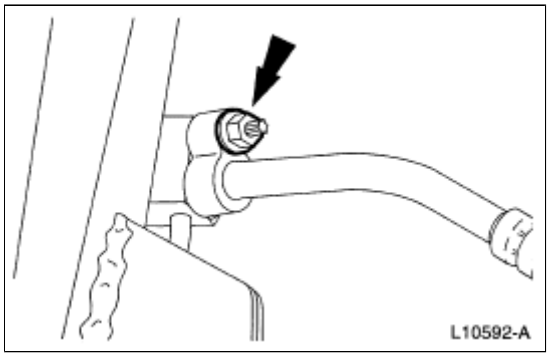
Condenser Core

Removal

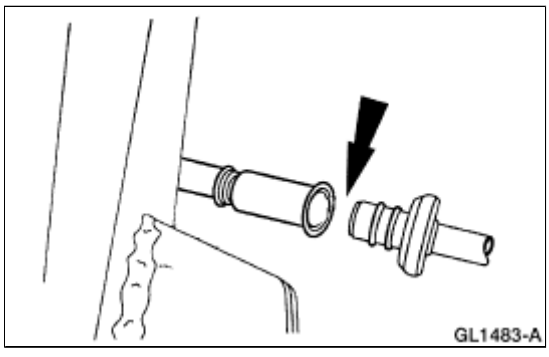
CAUTION: Installation of a new suction accumulator/drier is not required when repairing the air conditioning system except when there is physical evidence of system contamination from a failed A/C compressor or damage to the suction accumulator/drier.

NOTE: If an A/C condenser core leak is suspected, the A/C condenser core must be leak tested before it is removed from the vehicle. For additional information, refer to Section 412-00 .

1. Recover the refrigerant. For additional information, refer to Section 412-00 .
2. If equipped with 5.0L or 4.0L SOHC engine, disconnect the A/C manifold and tube (19D734) and the condenser to evaporator tube (19835) from the A/C condenser core.



3. If equipped with 4.0L push rod engine, disconnect the A/C manifold and tube and the condenser to evaporator tube spring lock couplings from the A/C condenser core. For additional information, refer to Section 412-00 .

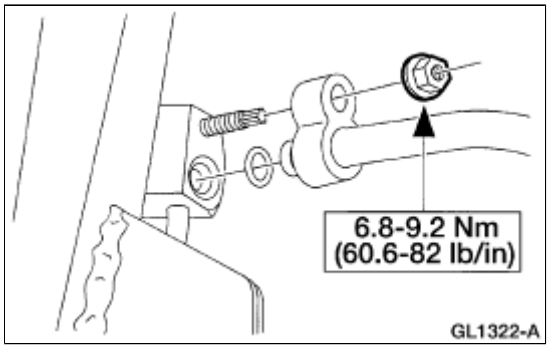


4. Remove the radiator. For additional information, refer to Section 303-03 .
5. Remove the A/C condenser core.

Installation

1. **NOTE:** When a new A/C condenser is installed, a new A/C evaporator core orifice (19D990) should also be installed.

   To install, reverse the removal procedure.
   - Service the new A/C condenser core with the correct amount of PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA (Motorcraft YN-12-C) or equivalent meeting Ford specification WSH-M1C231-B. For additional information, refer to Section 412-00 .
   - Lubricate new O-ring seals with PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA (Motorcraft YN-12-C) or equivalent meeting Ford specification WSH-M1C231-B.



Compressor Manifold and Tube Assembly —4.0L OHV

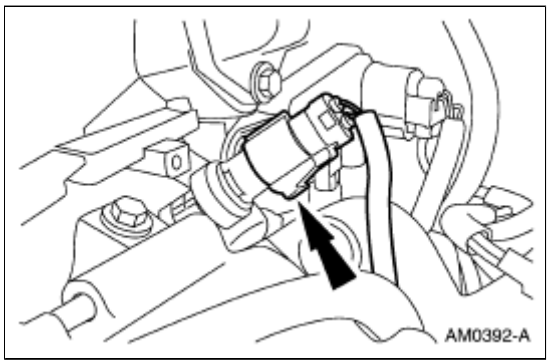
Material

Item	Specification
PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA (Motorcraft YN-12-C)	WSH-M1C231-B

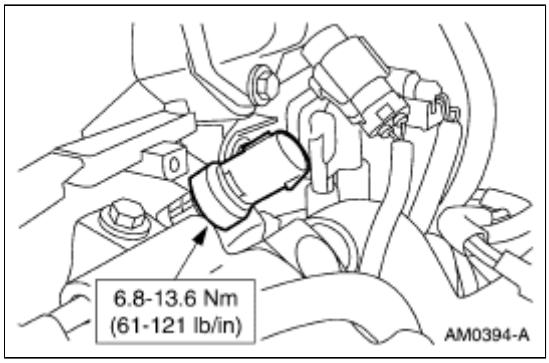
Removal and Installation

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

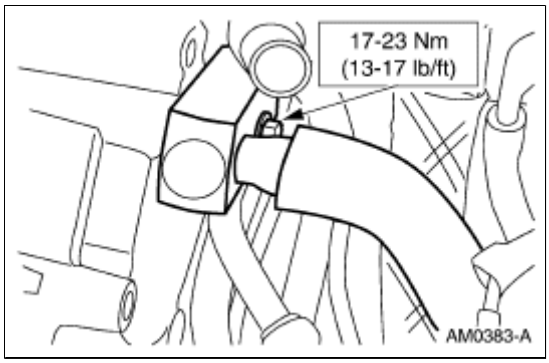
1. Recover the refrigerant. For additional information, refer to Section 412-00 .
2. Disconnect the pressure cutoff switch electrical connector.



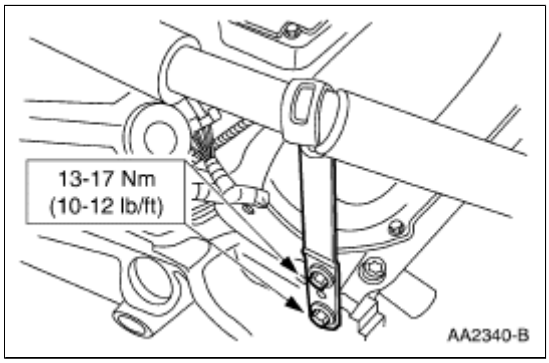
3. Remove the pressure cutoff switch.



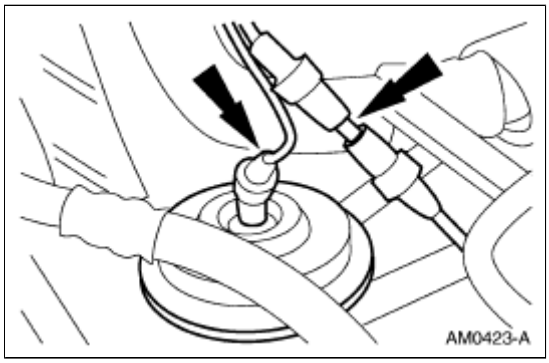
4. Remove the bolt and detach the manifold and tube from the A/C compressor.
   - Discard the O-ring seals.



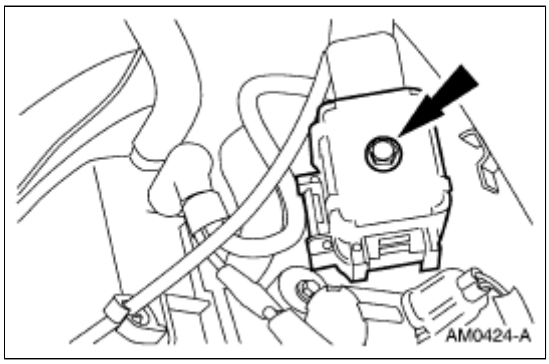
5. Remove the bolts and detach the manifold and tube bracket.



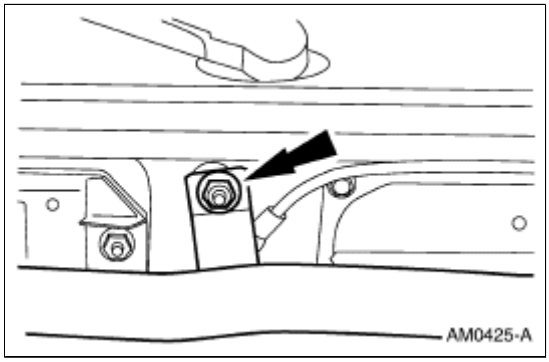
6. Disconnect and position aside the vacuum lines.



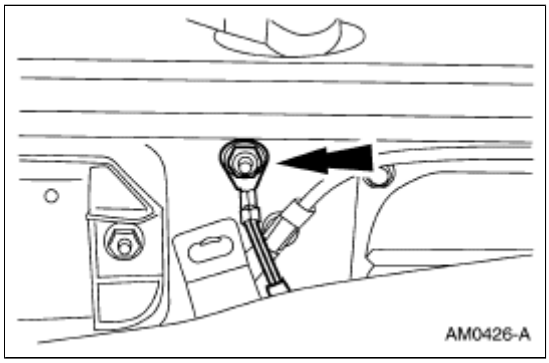
7. Disconnect the electrical connector.



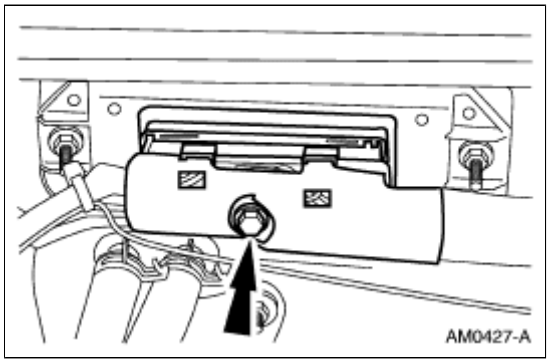
8. Remove the wiring harness retaining nut at the dash panel.



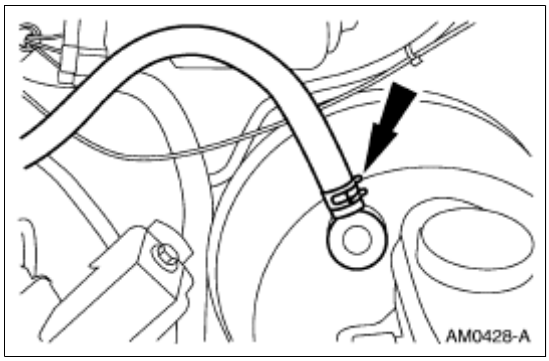
9. Detach the ground wire from the dash panel.



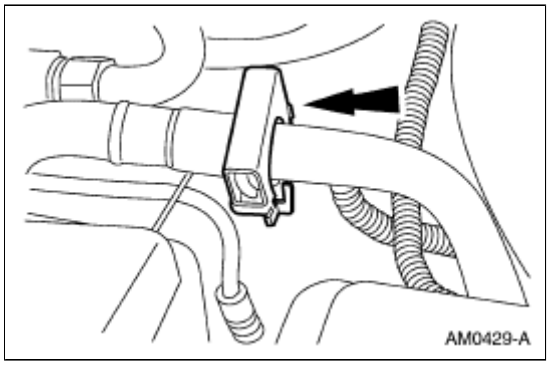
10. Disconnect and position aside the PCM electrical connector.



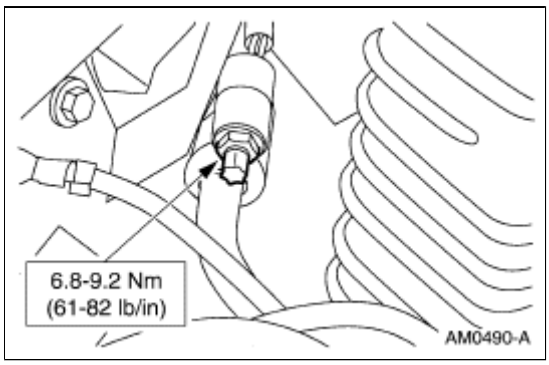
11. Disconnect the brake booster vacuum line.



12. Disconnect the manifold and tube spring lock coupling at the suction accumulator.
    - Discard the O-ring seals.



13. Remove the nut and disconnect the manifold and tube from the condenser core.
    - Discard the O-ring seals.



14. To install, reverse the removal procedure.
    - Install new O-ring seals lubricated in clean PAG oil.
    - Lubricate the refrigerant system with the correct amount of clean PAG oil. For additional information, refer to Section 412-00 .

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

Compressor Manifold and Tube Assembly —4.0L SOHC

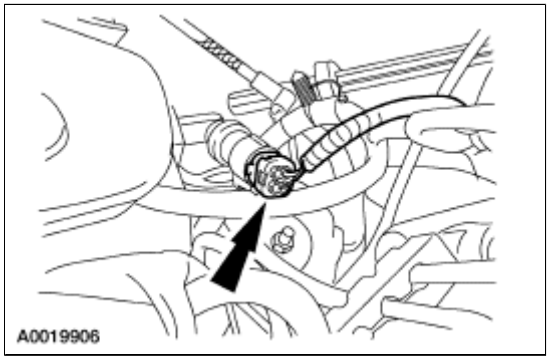
Material

Item	Specification
PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA (Motorcraft YN-12-C)	WSH-M1C231-B

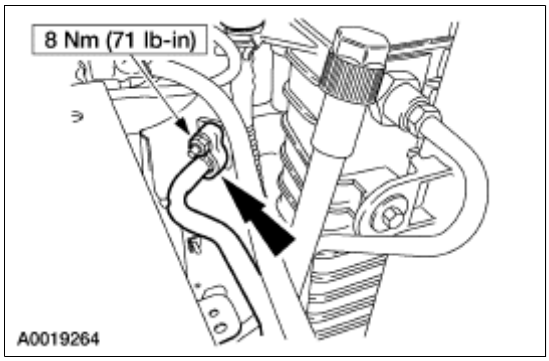
Removal and Installation

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

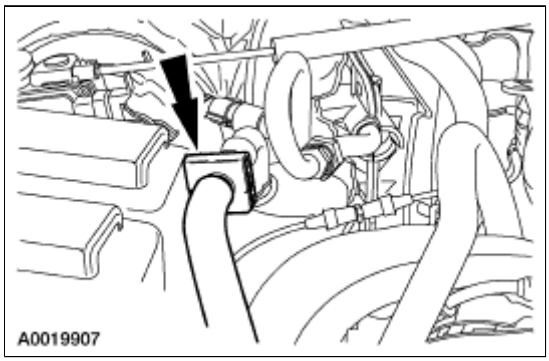
1. Recover the refrigerant. For additional information, refer to Section 412-00 .
2. Remove the air cleaner outlet tube. For additional information, refer to Section 303-12 .
3. Remove the A/C compressor. For additional information, refer to Air Conditioning (A/C) Compressor—4.0L SOHC in this section.
4. Remove the cooling fan and shroud. For additional information, refer to Section 303-03 .
5. Disconnect the A/C pressure cutoff switch electrical connector.



6. Remove the nut and disconnect the compressor manifold and tube assembly fitting at the condenser core.
   - Discard the O-ring seals.

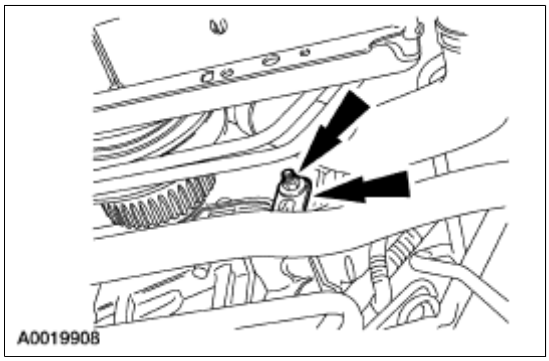


7. Disconnect the compressor manifold and tube assembly spring lock coupling at the suction accumulator.
   - Discard the O-ring seals.



8. Raise the vehicle. For additional information, refer to Section 100-02 .

9. Remove the bolt and detach the compressor manifold and tube assembly.



10. Lower the vehicle.

11. Remove the compressor manifold and tube assembly.

12. To install, reverse the removal procedure.
    - Install new O-ring seals lubricated in clean PAG oil.
    - Lubricate the refrigerant system with the correct amount of clean PAG oil. For additional information, refer to Section 412-00 .

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

412-00 .

Compressor Manifold and Tube Assembly —5.0L

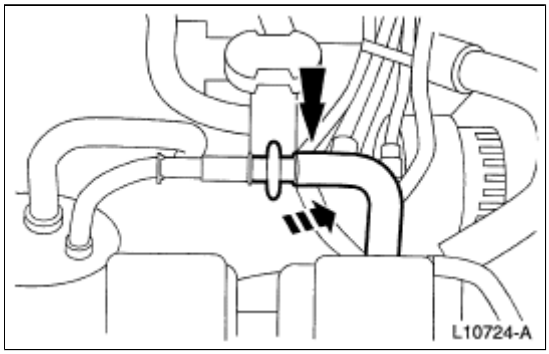
Material

Item	Specification
PAG Refrigerant Compressor Oil (R-134a Systems) F7AZ-19589-DA (Motorcraft YN-12-C)	WSH-M1C231-B

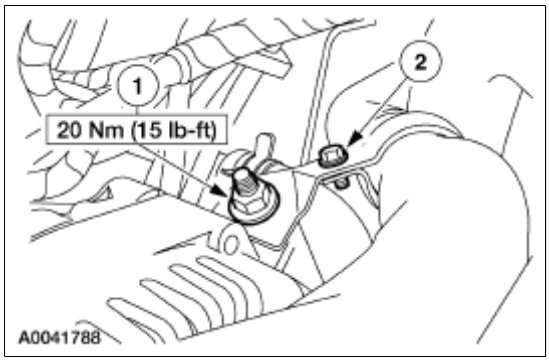
Removal and Installation

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

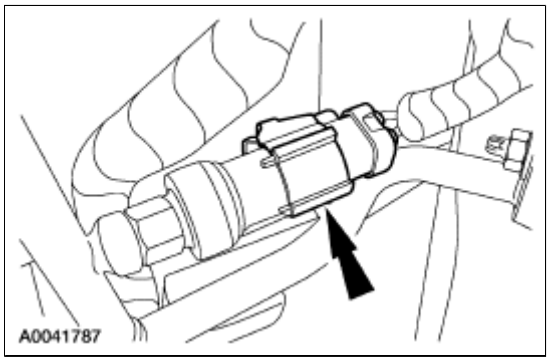
1. Recover the refrigerant. For additional information, refer to Section 412-00 .
2. Remove the air cleaner assembly. For additional information, refer to Section 303-12 .
3. Disconnect the compressor manifold and tube assembly from the suction accumulator.
   - Discard the O-ring seals.



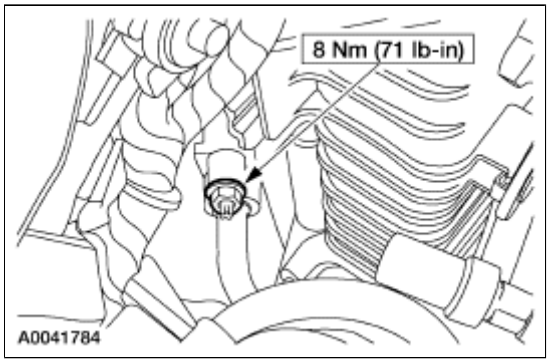
4. Detach the A/C line bracket.
   1. Remove the nut.
   2. Remove the screw and detach the A/C line bracket.



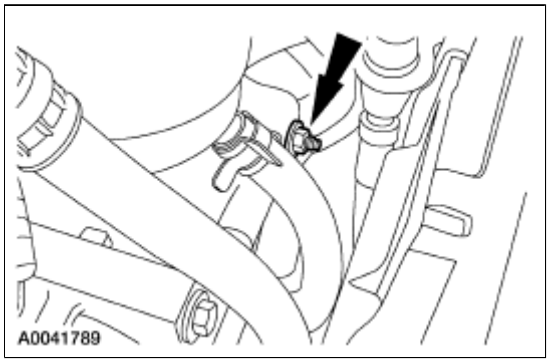
5. Disconnect the pressure cutoff switch electrical connector.



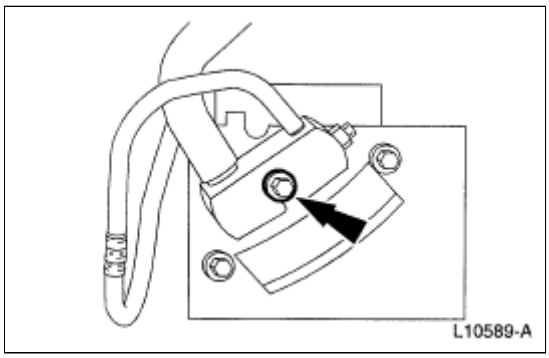
6. Remove the nut and disconnect the compressor manifold and tube fitting from the condenser core.
    - Discard the O-ring seal.



7. Remove the nut and position aside the bracket.



8. Remove the bolt and detach the compressor manifold and tube assembly from the A/C compressor.
    - Discard the O-ring seals.



9. Remove the compressor manifold and tube assembly.

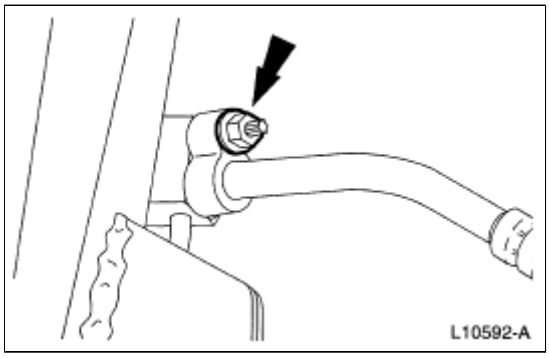
10. To install, reverse the removal procedure.
    - Install new O-ring seals lubricated in clean PAG oil.
    - Lubricate the refrigerant system with the correct amount of clean PAG oil. For additional information, refer to Section 412-00 .

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

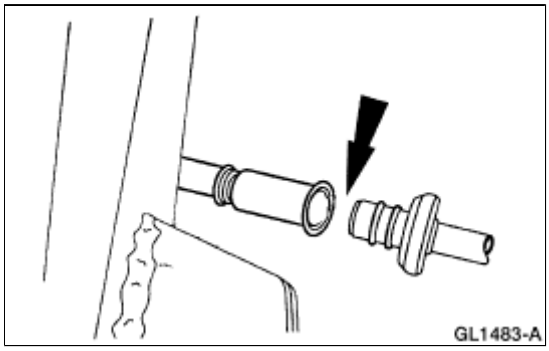
Line —Condenser to Evaporator

Removal

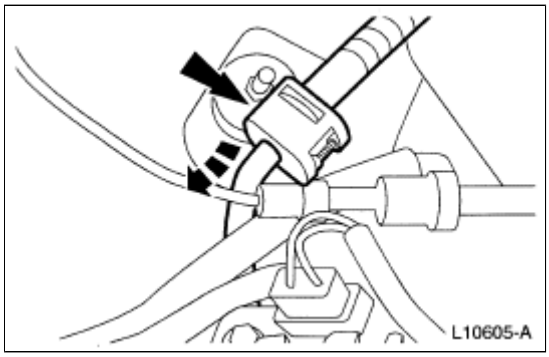
1. Recover the refrigerant. For additional information, refer to Section 412-00 .
2. If equipped with a 5.0L or 4.0L SOHC engine, disconnect the condenser to evaporator tube (19835) from the A/C condenser core (19712).



3. If equipped with a 4.0L push rod engine, disconnect the condenser to evaporator tube spring lock couplings from the A/C condenser core. For additional information, refer to Section 412-00 .

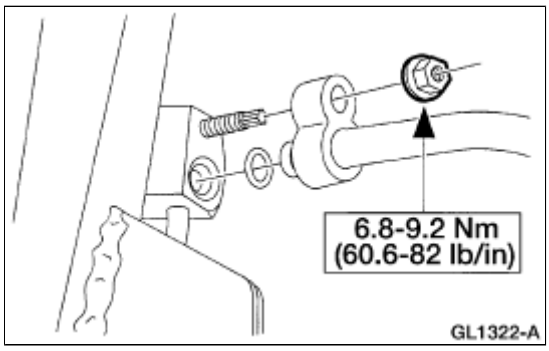


4. Disconnect the condenser to evaporator tube spring lock coupling from the A/C evaporator core (19860) and remove the condenser to evaporator tube. For additional information, refer to Section 412-00 .



Installation

1. To install, reverse the removal procedure.



Control Components

Manual A/C

The manual climate control system heats or cools the vehicle interior depending on the function selector position and the temperature selected. Function selector position determines heating or cooling and air distribution. The temperature blend control setting determines air temperature.

The manual climate control components are used to:

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

Electronic Automatic Temperature Control

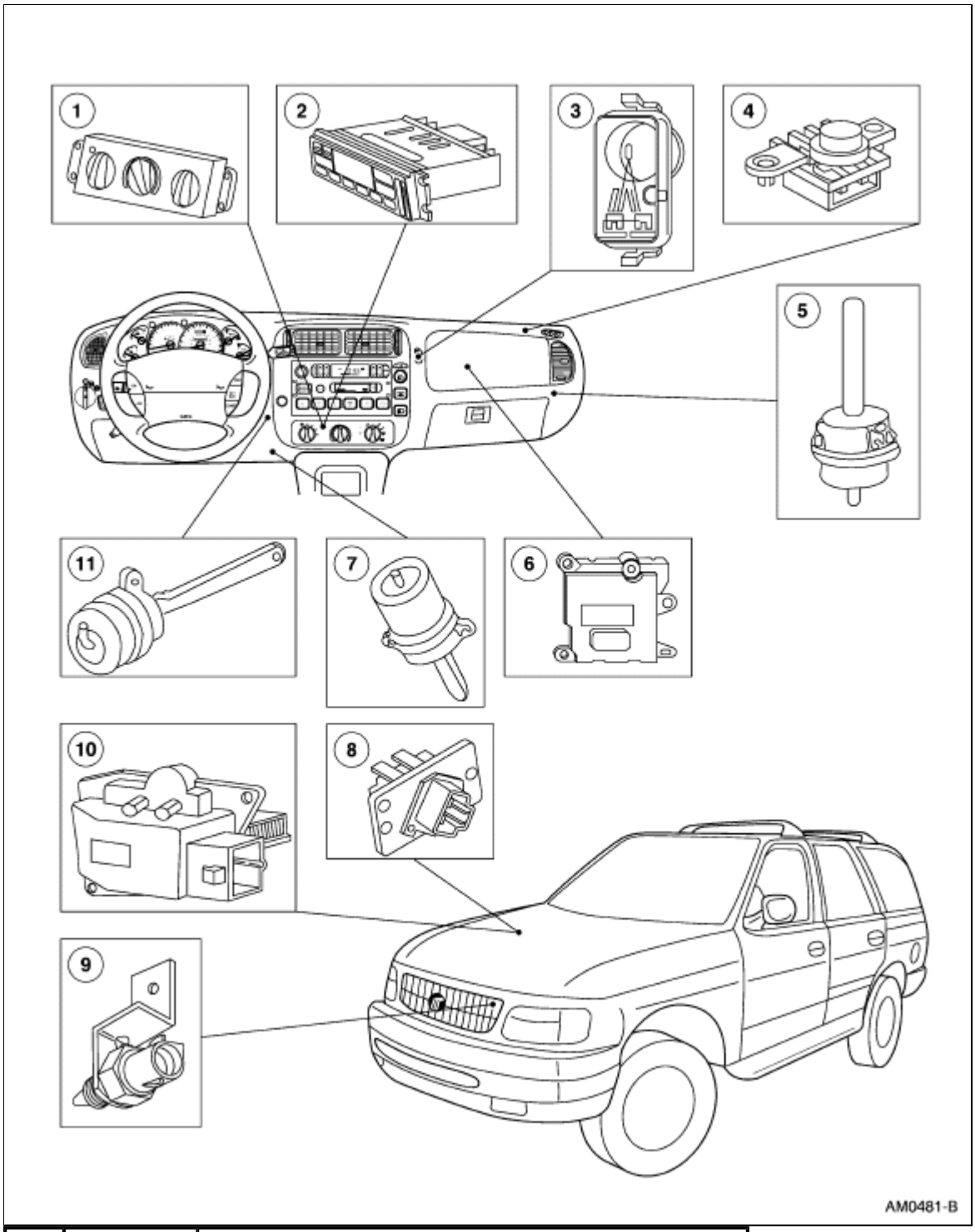
With the use of a microcontroller, the electronic automatic temperature control (EATC) module analyzes input from the following major sources:

- temperature, function and blower selection (made by the vehicle occupants)
- in-vehicle temperature
- ambient temperature
- sunload
- vehicle speed
- engine coolant temperature

Using these inputs, the microcontroller determines the correct conditions for the following outputs:

- A/C clutch engagement
- blower speed
- air temperature blend door position
- panel/floor door position
- panel/defrost door position
- air inlet door position

Component Locations



Item	Part Number	Description
1	19980	Manual A/C control assembly
2	19880	Electronic automatic temperature control module
3	19D888	Automatic temperature control sensor hose and elbow— (EATC only)
4	19E663	A/C sunload sensor— (EATC only)

5	18A318	Vacuum control motor— (air inlet door)
6	19E616	A/C electronic door actuator motor
7	18A318	Vacuum control motor— (panel/defrost door)
8	18591	Heater blower motor switch resistor
9	19E702	A/C ambient air temperature sensor and bracket— (EATC only)
10	19E624	A/C blower motor speed control— (EATC only)
11	18A318	Vacuum control motor— (floor/panel door)

Control System Inputs—Manual A/C

Climate Control Assembly

The climate control assembly has three system controls:

- The A/C heater function selector switch combines a vacuum selector valve with two electrical switches to supply battery positive voltage (B+) to the A/C clutch circuit and the blower motor control circuit.
- The temperature selection is accomplished with a potentiometer connected to the electric blend door actuator that controls positioning of the temperature blend door. Movement of the control knob (18519) from COOL (blue) to WARM (red) causes a corresponding movement on the air temperature control door and determines the temperature that the system will maintain.
- The blower motor switch controls blower motor speed by adding or bypassing resistors in the heater blower motor switch resistor (18591).

Control System Inputs—EATC

Climate Control Assembly

The electronic automatic temperature control (EATC) module, located in the instrument panel, has the following features:

- 11 push buttons
- a blower speed override thumbwheel for manual input
- a vacuum fluorescent display for displaying set temperature, function and diagnostic trouble codes (DTCs)
- an on-board diagnostic (OBD) feature to supply the technician with diagnostic trouble codes (DTCs). These DTCs direct the technician to the inoperative component.

A/C Ambient Air Temperature Sensor

The A/C ambient air temperature sensor and bracket (19E702):

- is located in front of the A/C condenser core (19712) near the center of the vehicle.
- contains a thermistor which measures the temperature of outside air as a resistance and sends that reading to the electronic automatic temperature control assembly.

In-Car Temperature Sensor

The in-car temperature sensor operates in the following manner:

- A thermistor in the in-car temperature sensor measures air temperature inside the passenger compartment.
- An automatic temperature control sensor hose and elbow (19D888) is connected between the plenum assembly and the in-car temperature sensor.
- The automatic temperature control sensor hose and elbow takes air from the plenum assembly air stream to create a suction in the in-car temperature sensor.
- The suction draws in-vehicle air into the in-car temperature sensor and across the thermistor.

A/C Sunload Sensor

The A/C sunload sensor (19E663):

- is located on the top of the instrument panel (04320).
- contains a photovoltaic diode that is sensitive to light.
- has some unspecified resistance across the terminals depending upon the amount of light reaching the photovoltaic diode; therefore the only test that can be carried out is for an internal short circuit.

Control System Outputs—Manual A/C

Blower Motor Switch Resistor

The heater blower motor switch resistor has the following features:

- The assembly is located on the evaporator housing in the engine compartment.
- Three resistance elements are mounted on the resistor board to provide four blower motor speeds.
- Depending on the heater blower motor switch position, series resistance is added or bypassed in the blower motor circuit to decrease or increase blower motor speed.
- An overheating protective device (thermal limiter) will open the resistor coil circuit when the temperature reaches 121°C (250°F) interrupting the blower motor operation in all speeds except HI.
- The thermal limiter cannot be reset and is not serviceable.

Control System Outputs—EATC

Blower Motor Speed Control

The blower speed control is located on the evaporator housing in the engine compartment.

- The function of the blower motor speed control is to convert low power signals from the electronic automatic temperature control module to a high current, variable ground feed for the blower motor (18527).
- The blower motor speed is infinitely variable and is controlled by the electronic automatic temperature control module software.
- A delay function provides a gradual increase or decrease in blower motor speed under all conditions.

A/C Electric Blend Door Actuator

The A/C electric blend door actuator is located on the plenum assembly.

- Its function is to move the air temperature blend door on command from the control assembly.
- The A/C electric blend door actuator contains a reversible electric motor and a potentiometer. The potentiometer wiper is connected to the actuator output shaft and moves with the output shaft to indicate the position of the air temperature blend door.

- A 5 volt signal is applied to the ends of the potentiometer. The voltage available at the wiper indicates the position of the potentiometer. The expressed value of the actuator wiper voltage is sent to the electronic automatic temperature control module and is matched with the wiper voltage of the module potentiometer. The control module then drives the actuator motor in whichever direction is necessary to make the actuator wiper voltage agree with the control module wiper voltage.

EATC SYSTEM RESPONSE

Control Assembly Selection	Air Temperature Blend Door Response	Panel/Floor Door Response	Panel/Defrost Door Response	Air Inlet Door Response	Blower Motor Response (Unless Manually Overridden)	A/C Clutch Response
OFF	Remains fixed	Fixed in PANEL	Fixed in DEFROST	Fixed in RECIRC	Blower Motor OFF	A/C Clutch Disabled
AUTO	Varies a ccording to the sensor temperatures and the customer temperature selection. The air temperature blend door is in the heat position when the sensors are cool. The air temperature blend door is in the A/C position when the sensors are hot.	Air to the floor during heating. Air to the panel during cooling. Air to both between heating and cooling.	Air to the windshield defroster hose nozzle during heating. Air to the panel during cooling.	Recirculates air when maximum air conditioning is required. Otherwise outside air.	Variable blower motor speeds when the engine coolant temp. is above 49°C (120°F) or A/C is required. Low blower motor speed when the engine coolant is below 49°C (120°F) and heating is required. [a]	A/C Clutch enabled if outside temp. is above 10° C (50°F).
MAX A/C	Varies according to the sensor temperatures and the customer temperature selection.	Air to the panel.	Fixed in the PANEL position.	Fixed in the RECIRC position.	Variable blower motor speeds.	A/C Clutch enabled if outside temp. is above 10° C (50°F).
VENT	Varies according to the sensor temperatures and the customer temperature selection.	Air to the panel.	Fixed in the PANEL position.	Fixed in the outside air position.	Variable blower motor speeds.	A/C Clutch disabled.
PNL-FLR	Varies according to the sensor temperatures and the customer temperature	Air to the panel and floor.	Fixed in the PANEL position.	Fixed in the outside air position.	Variable blower motor speeds.	A/C Clutch enabled if outside temp. is above 10° C (50°F).

	selection.					
FLOOR	Varies according to the sensor temperatures and the customer temperature selection.	Air to floor.	Fixed in the DEFROST position.	Fixed in the outside air position.	Variable blower motor speeds.	A/C Clutch disabled.
FLR-DEF	Varies according to the sensor temperatures and the customer temperature selection.	Air to the panel and floor.	Fixed in the DEFROST position.	Fixed in the outside air position.	Variable blower motor speeds.	A/C Clutch enabled if outside temp. is above 10° C (50°F).
DEFROST	Varies according to the sensor temperatures and the customer temperature selection.	Air to the panel.	Fixed in the DEFROST position.	Fixed in the outside air position.	Variable blower motor speeds.	A/C Clutch enabled if outside temp. is above 10° C (50°F).

[a] If the engine coolant temperature fails to reach 50°C (122°F) after 3 1/2 minutes of operation, the blower motor speed will increase and the panel/floor door will shift from the defrost position to the floor position.

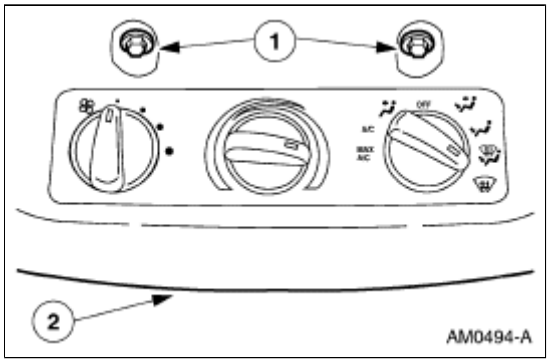
Control Components

Refer to Section 412-00 .

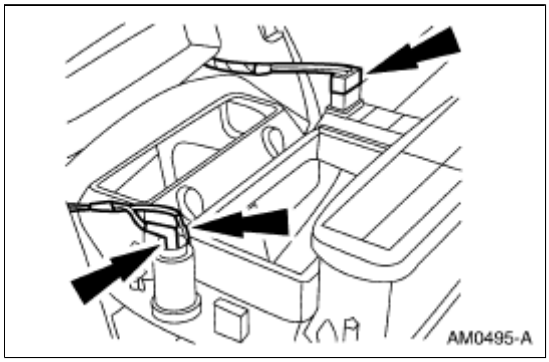
Control Assembly —Manual A/C

Removal

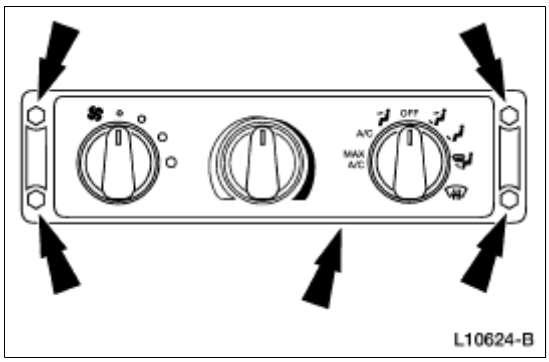
1. Remove the radio chassis (18806). For additional information, refer to Section 415-01 .
2. Remove the instrument panel finish panel (044D70).
    1. Remove the screws.
    2. Disengage the spring clips and remove the instrument panel finish panel.



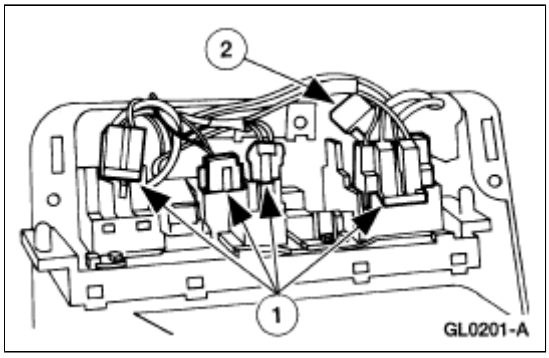
3. Disconnect the connectors.



4. Remove the screws and remove the climate control assembly.



5. Disconnect the climate control assembly.
    1. Disconnect the electrical connectors.
    2. Disconnect the vacuum harness connector.



Installation

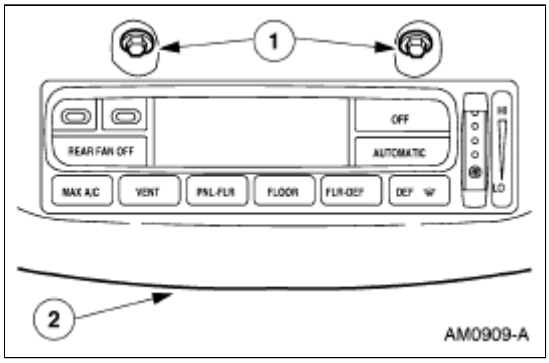
1. To install, reverse the removal procedure.

Control Assembly —Electronic Automatic Temperature Control

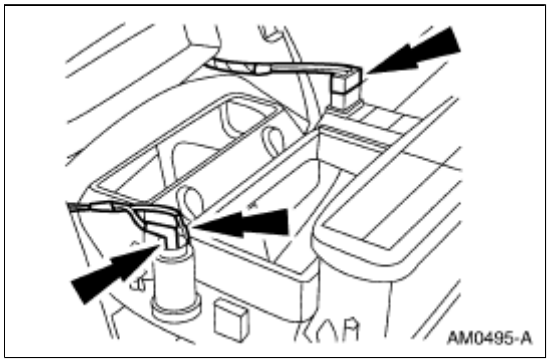
Removal

1. Remove the radio chassis (18806). For additional information, refer to Section 415-01 .

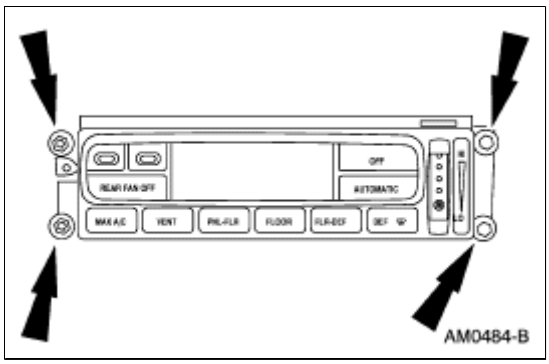
2. Remove the instrument panel finish panel (04338).
    1. Remove the screws.
    2. Disengage the spring clips and remove the instrument panel finish panel.



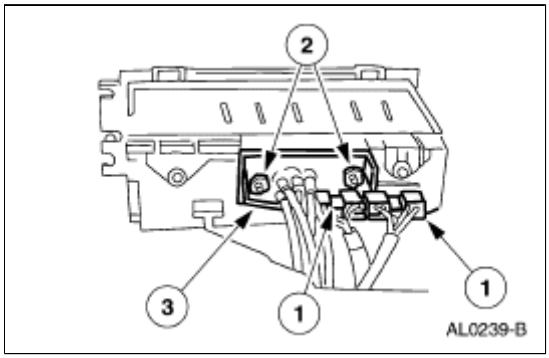
3. Disconnect the connectors.



4. Remove the screws and remove the electronic automatic temperature control module.



5. Remove the electronic automatic temperature control module.
    1. Disconnect the electrical connectors.
    2. Remove the nuts.
    3. Disconnect the vacuum harness connector.



Installation

1. To install, reverse the removal procedure.

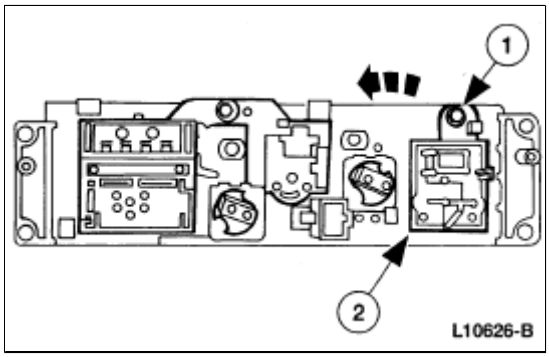
Switch —Manual A/C

Removal

1. Remove the climate control assembly. For additional information, refer to Control Assembly—Manual A/C in this section.

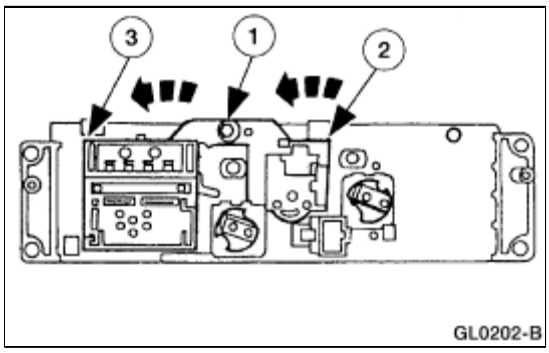
2. **NOTE:** The knob will come off when the switch is removed.

   Remove the heater blower motor switch.
   1. Remove the screw.
   2. Rotate and remove the heater blower motor switch.



3. **NOTE:** The knobs will come off when the switch is removed.

   Remove the temperature control switch and the A/C damper door switch (19B888).
   1. Remove the screw.
   2. Rotate and remove the temperature control switch.
   3. Rotate and remove the A/C damper door switch.



Installation

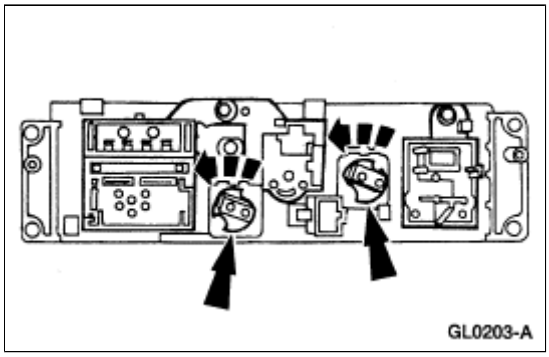
1. To install, reverse the removal procedure.

Bulbs —Manual A/C

Removal

1. Remove the climate control assembly. For additional information, refer to Control Assembly—Manual A/C in this section.

2. Turn and pull the lamp socket.
   - Install a new the bulb in the socket.



Installation

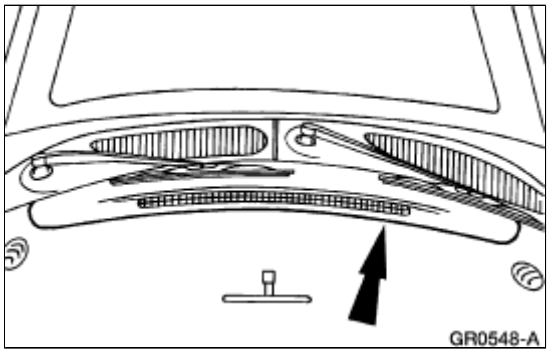
1. To install, reverse the removal procedure.

Temperature Blend Door Actuator

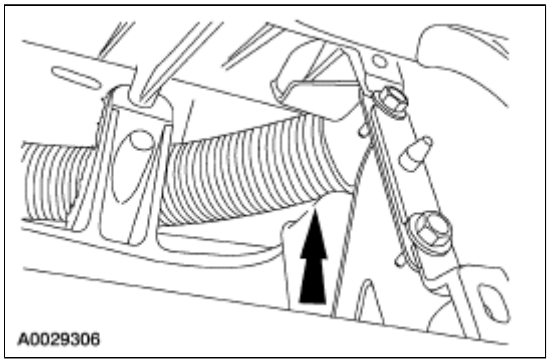
Removal and Installation

All vehicles

1. Remove the passenger air bag module. For additional information, refer to Section 501-20B .
2. Remove the defroster opening grill.

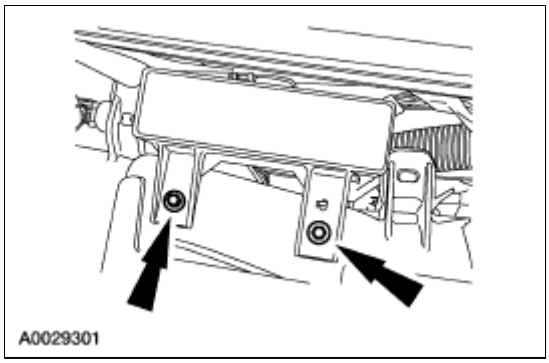


3. Detach and position aside the RH demister hose.



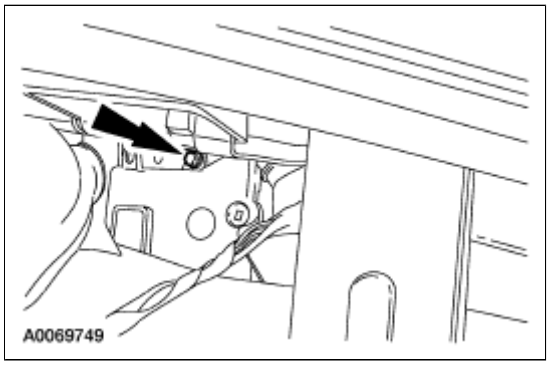
Vehicles with anti-theft/keyless entry

4. Remove the screws and position aside the anti-theft/keyless entry module.

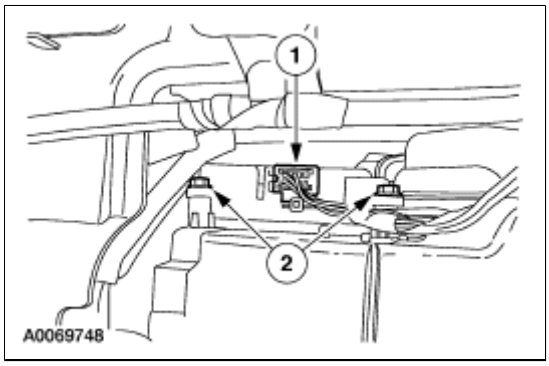


All vehicles

5. Working through the opening near the RH defroster nozzle, remove the screw.



6. Remove the temperature blend door actuator.
    1. Disconnect the electrical connector.
    2. Remove the screws and the temperature blend door actuator.

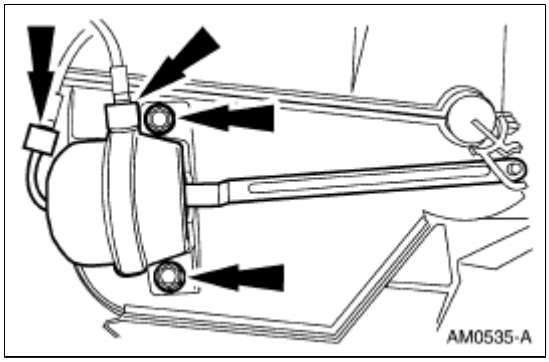


7. To install, reverse the removal procedure.

Vacuum Control Motor —Panel/Floor Door

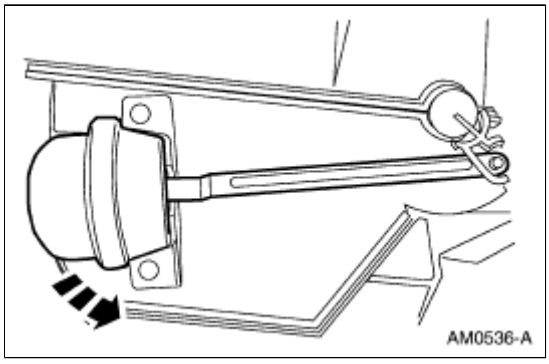
Removal

1. Remove the screws and disconnect the vacuum hose.



2. **CAUTION: Do not attempt to bend any part of the lever. It is brittle and will break.**

   Rotate the vacuum control motor (18A318), disengage the lever, and remove the vacuum control motor.



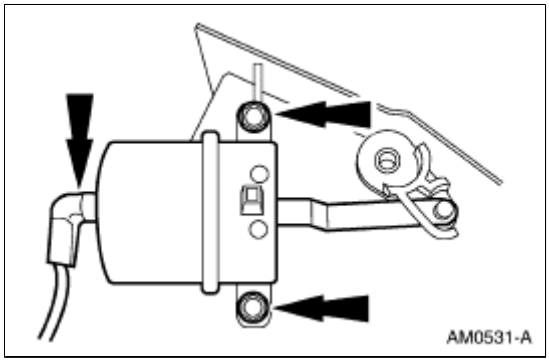
Installation

1. To install, reverse the removal procedure.

Vacuum Control Motor —Panel/Defrost Door

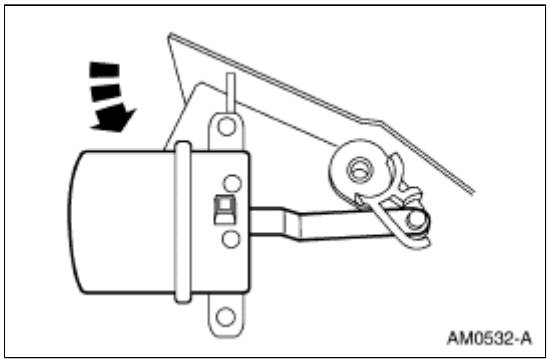
Removal

1. Remove the screws and disconnect the vacuum hose.



2. **CAUTION: Do not attempt to bend any part of the lever. It is brittle and will break.**

   Rotate the vacuum control motor (18A318), disengage the lever, and remove the vacuum control motor.



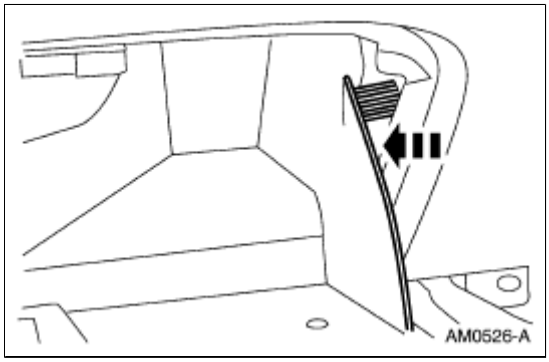
Installation

1. To install, reverse the removal procedure.

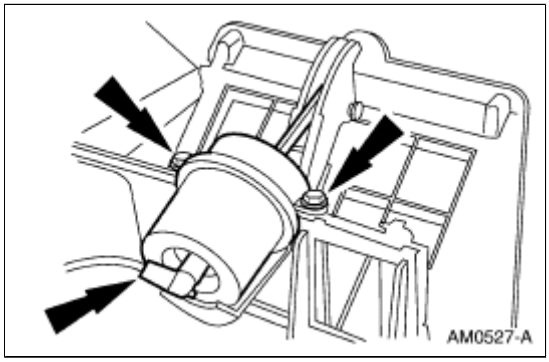
Vacuum Control Motor —Air Inlet Door

Removal

1. Release the stops and lower the glove compartment door to the floor.

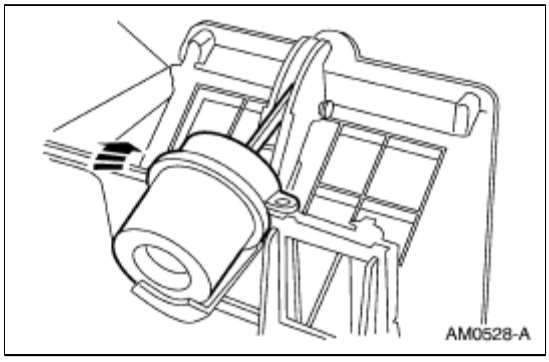


2. Remove the screws and disconnect the vacuum hose.



3. **CAUTION: Do not attempt to bend any part of the lever. It is brittle and will break.**

   Rotate the vacuum control motor (18A318), disengage the lever, and remove the vacuum control motor.



Installation

1. To install, reverse the removal procedure.