

# **SERVICE MANUAL**

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## **SERVICE MANUAL SECTION**

**CF 500, CF 600 Cab**

**Truck Model: CF 500**

**Truck Model: CF 600**

**Unit Code: 16AAK**

**Unit Code: 16LBA**

**Unit Code: 16LBL**

**Unit Code: 16LJU**

**Unit Code: 16LJV**

**Unit Code: 16PJA**

**Unit Code: 16PJB**

**Unit Code: 16PPR**

**Unit Code: 16PPS**

**Unit Code: 16SEU**

**Unit Code: 16WJU**

**Unit Code: 16WRX**

**Unit Code: 16WRZ**

**S16032**

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S16032

Read all safety instructions in the "Safety Information" section of this manual before doing any procedures.

Follow all warnings, cautions, and notes.

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## Safety Information

**NOTE:** Read the following before starting the service procedure.

The information contained in this International Service Manual Section was current at the time of printing and is subject to change without notice or liability.

You must follow your company safety procedures when you service or repair equipment. Be sure to understand all of the procedures and instructions before you begin work on the unit.

International uses the following types of notations to give warning of possible safety problems and to give information that will prevent damage to the equipment being serviced or repaired.



**WARNING:** A warning indicates procedures that must be followed exactly. Personal injury or possible death can occur if the procedure is not followed.

**CAUTION:** A caution indicates procedures that must be followed exactly. If the procedure is not followed, damage to equipment or components can occur.

**NOTE:** A note indicates an operation, procedure or instruction that is important for correct service.

Some procedures require the use of special tools for safe and correct service. Failure to use these special tools when required can cause injury to service personnel or damage to vehicle components.

This service manual section is intended for use by professional technicians, NOT a “do-it-yourselfer.” It is written to inform these technicians of conditions that may occur on some vehicles, or to provide information that could assist in the proper service of a vehicle. Properly trained technicians have the equipment, tools, safety instructions, and know-how to do a job properly and safely. If a condition is described, DO NOT assume that the service section applies to your vehicle. See your International Truck Dealer for information on whether this service section applies to your vehicle.

## Body System

### Description and Operation

#### Body

The body:

- is a cab-forward design.
- is constructed of lightweight, all steel-welded material, with bolted, removable front fenders and hinged doors.
- is supported by a full frame.

#### Insulation

Insulation is installed:

- over the floorpan areas.
- on the exterior of the floorpan, above the engine.
  - The nuts that retain this insulation are push-on nuts. They must be screwed off to remove.
- on the back panel.

### Body Sealer Types And Applications

#### Silicone Rubber

Silicone Gasket and Sealant TA-30 or Silicone Rubber TA-32 (clear) or equivalent:

- does not run.
- is fast drying.
- remains semi-elastic.
- can be used for seam-sealing in such areas as the floorpan, wheelhouse, bulkhead, door openings and drip rails.

#### Caulking Cord

3M Strip Caulk (Black) 051135-08578 or equivalent:

- has a plastic base with a filler.
- is heavy-bodied.
- is used on spot-weld holes, around mounting clips and between surfaces not sealed by a gasket.

#### Weatherstrip Adhesive

Trim and Weatherstrip Adhesive TA-14 or equivalent:

- is a quick-drying, strong adhesive.

- is designed to hold or repair weatherstrips on doors, bodies and the surrounding metal.

## Diagnosis and Testing

### Inspection and Verification — Body System

#### Leaks

**NOTE:** The trim will reveal the location of most leaks. Use spray chalk and a hose if necessary.

1. Remove any trim or carpet in the general area of the leak.
2. Road test or water hose test the vehicle.
3. Inspect for a dust pattern around the area in question. Inspect for water paths near and above the area in question.

4. Some leaks can be located by placing bright light under the vehicle, removing any necessary trim or carpet and inspecting the interior of the body at joints and weld lines.

#### Noise

Wind noise, rattles and their sources are detected by driving the vehicle at highway speeds. The vehicle should be driven in 4 different directions, with all windows closed, radio off, blower motor off and all ventilation ducts open.

Most wind noise leaks will occur at the door and window seals or at the sheet metal joints in the door or the door opening.



**Table 1 Symptom Chart**

Condition	Possible Sources	Action
Dust and water leaks	<ul style="list-style-type: none"> <li>A. Body sealer missing.</li> <li>B. Opening in welds or body joints.</li> <li>C. Components not fully installed.</li> <li>D. Components missing.</li> <li>Components damaged.</li> <li>E. Door out of adjustment.</li> <li>F. Watershield not properly attached.</li> </ul>	<ul style="list-style-type: none"> <li>A. REMOVE the trim.</li> <li>B. CHECK for leaks and SEAL with appropriate sealer. ROAD TEST or WATER HOSE TEST for leaks. RECHECK the trim for leaks, or USE a light under the vehicle with the trim removed.</li> <li>CHECK the interior of the body at joints and weld seams.</li> <li>C. REINSTALL the components.</li> <li>D. INSTALL any missing or damaged components as necessary.</li> <li>E. ADJUST the door.</li> <li>F. RE-ATTACH the watershield.</li> </ul>
Dust/water leaks at floor pan and grommets	<ul style="list-style-type: none"> <li>• Missing or damaged plugs or grommets.</li> </ul>	<ul style="list-style-type: none"> <li>• CHECK the plugs for proper installation. INSTALL new plugs or grommets as necessary.</li> </ul>
Doors collecting water	<ul style="list-style-type: none"> <li>• Door drain holes clogged with mud, road tar or rustproofing.</li> </ul>	CHECK the door drain holes regularly. CLEAN the drain holes of dirt and foreign materials with a punch or screwdriver.
Water leaks around perimeter of windshield	<ul style="list-style-type: none"> <li>A. Gaps in the sealant bead.</li> <li>B. Windshield misaligned or not installed correctly.</li> <li>C. Opening in weld or body joint.</li> </ul>	<ul style="list-style-type: none"> <li>A. APPLY Urethane Adhesive Essex 400-HV or equivalent.</li> <li>B. REINSTALL the windshield. REFER to Glass, Frames and Mechanisms (Glass, Frames and Mechanisms, page 26).</li> <li>C. See above condition for dust and water leaks.</li> </ul>

Table 1 Symptom Chart (cont.)

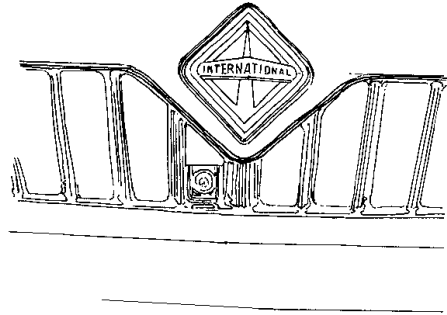
Condition	Possible Sources	Action
Wind noise	<p>A. Leaks at door and window seals or sheet metal joints in doors or door openings.</p> <p>B. Loose or misaligned weatherstrip.</p> <p>C. Poor door fit.</p>	<p>A. NOTE: Avoid silicone sealer(s) from coming in contact with the door weatherstrips.</p> <p>SEAL leaks with an appropriate sealer.</p> <p>B. REATTACH the weatherstrip. CHECK for any damaged or missing pin-type retainers. INSTALL new retainers as necessary. USE Trim and Weatherstrip Adhesive TA-14 or equivalent as necessary.</p> <p>C. CHECK for worn or damaged door hinges. INSTALL new hinges as necessary. ADJUST the door striker or hinges as necessary.</p>
Rattles	<p>A. Loose objects in door wells, body pillars and quarter panels.</p> <p>B. Misalignment of doors (if tightening the bolts does not eliminate the rattle).</p> <p>C. Loose weatherstrip or anti-squeak material.</p>	<p>A. CHECK doors by carefully STRIKING the underside of the door with a rubber mallet. LISTEN for loose objects in the door. REPAIR or TIGHTEN loose body bolts and screws. If tightening bolts/screws does not eliminate the rattle, the cause could be misalignment.</p> <p>B. CHECK for worn or damaged door hinges. INSTALL new hinges, hinge pins or hinge bushings as necessary. ADJUST the door striker or door hinges as necessary.</p> <p>C. RE-ATTACH the weatherstrip or anti-squeak material. APPLY additional sealer. INSTALL in proper location to eliminate the rattle.</p>

## Body Closures

### Specifications

**Table 2 Torque Specifications**

Description	Nm	lb-ft
Upper door hinge-to-body bolts	22	16
Upper door hinge-to-body nut	22	16
Lower door hinge-to-body bolts	22	16
Upper door hinge-to-door bolts	22	16
Lower door hinge-to-door bolts	22	16
Door striker bolts	22	16



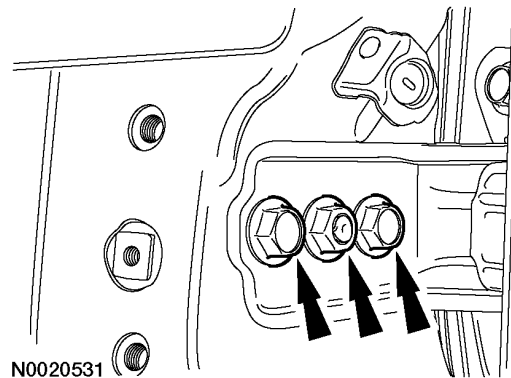
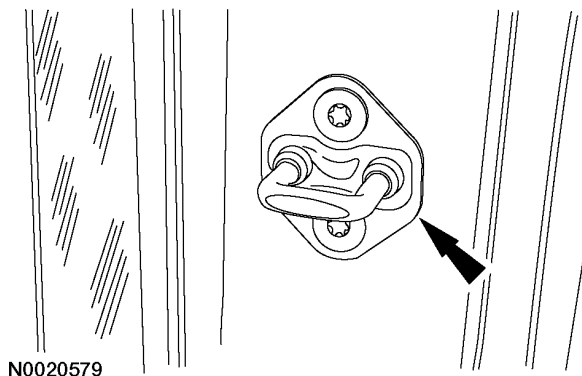
4. Remove the radiator grille.
5. Remove the exterior mirror. For additional information, refer to Rear View Mirrors(Rear View Mirrors, page 10).
6. Remove the headlamp assembly. For additional information, refer to Exterior Lighting in S08307.
7. Remove the fender. For additional information, refer to Front End Body Panels in S09012.
8. Loosen the upper door hinge-to-body bolts and nut slightly to allow door movement.
  - To install, tighten the bolts to 22 Nm (16 lb-ft).
  - To install, tighten the nut to 22 Nm (16 lb-ft).

### General Procedures

#### Door Adjustment

##### All adjustments

1. Remove the 2 door striker bolts.
  - To install, tighten to 22 Nm (16 lb-ft).
2. Remove the door striker.



#### Tilt/fore-aft adjustment

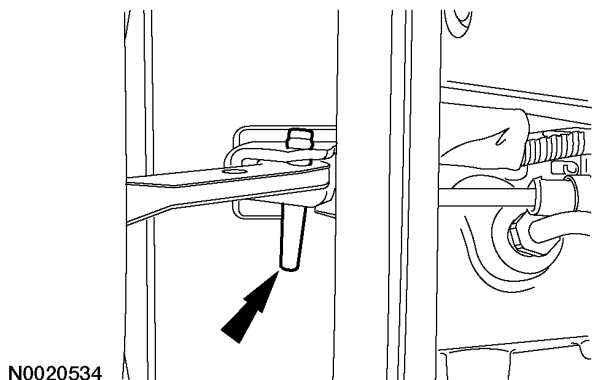
3. Remove the radiator grille retaining screw.
  - To install, tighten to 22 Nm (16 lb-ft).

9. Loosen the lower door hinge-to-body bolts slightly to allow door movement.
  - To install, tighten to 22 Nm (16 lb-ft).



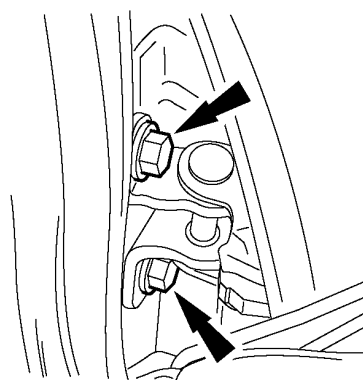
### In-out/up-down adjustment

10. Remove the door check pin.



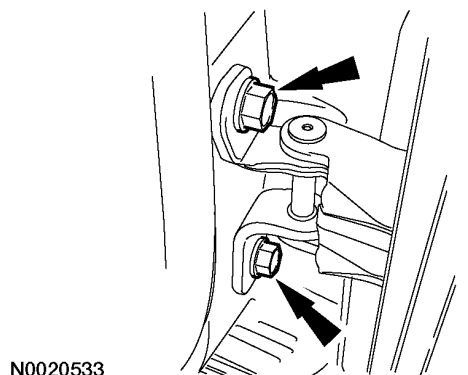
11. Loosen the upper door hinge-to-door bolts slightly to allow door movement.

- To install, tighten to 22 Nm (16 lb-ft).



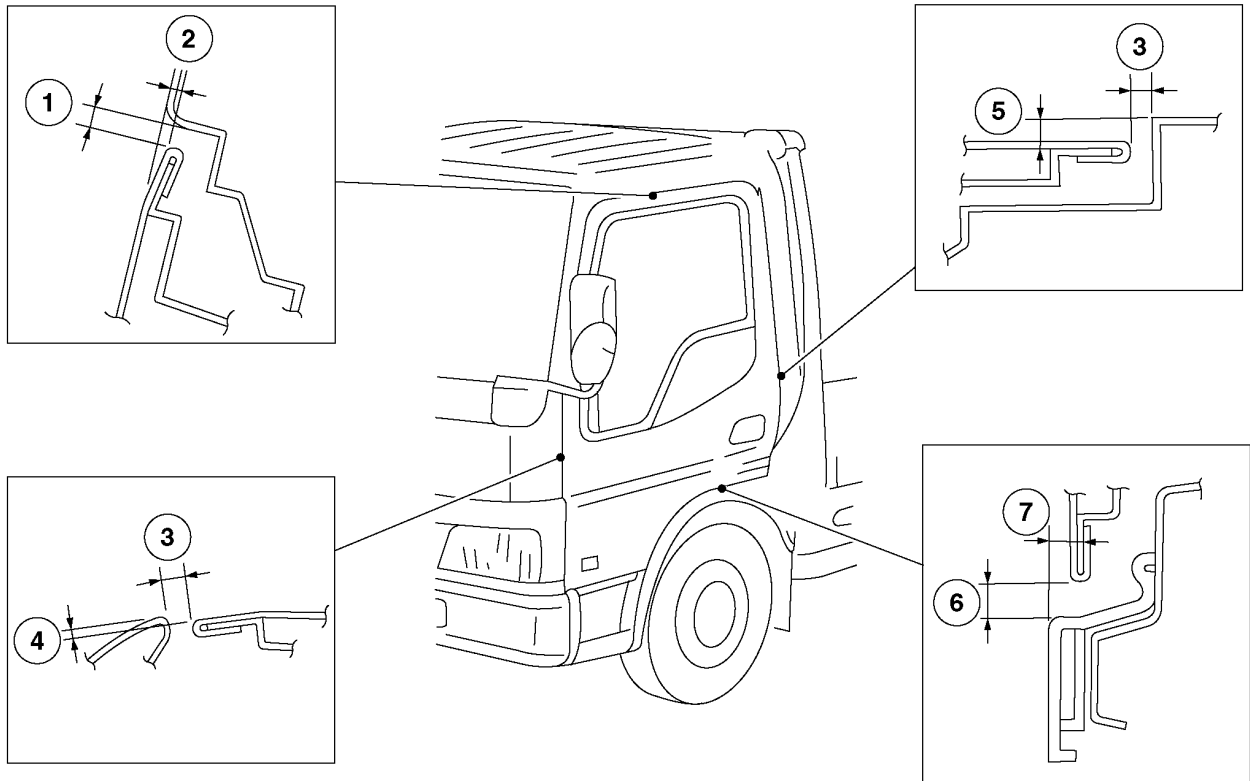
12. Loosen the lower door hinge-to-door bolts slightly to allow door movement.

- To install, tighten to 22 Nm (16 lb-ft).



### All adjustments

13. Adjust the door to the following specifications:



N0018912

Table 3

Item	Clearance (Metric)	Clearance (English)
1	4.0 to 7.4 mm	0.16 to 0.29 in
2	0.6 to 3.6 mm	0.03 to 0.14 in
3	4.2 to 7.2 mm	0.17 to 0.28 in
4	0.7 to 3.7 mm	0.03 to 0.14 in
5	-0.5 to 2.5 mm	-0.02 to 0.09 in
6	5.0 to 9.0 mm	0.20 to 0.35 in
7	-2.5 to 2.5 mm	-0.10 to 0.09 in

## Interior Trim and Ornamentation

### Specifications

Table 4 Torque Specifications

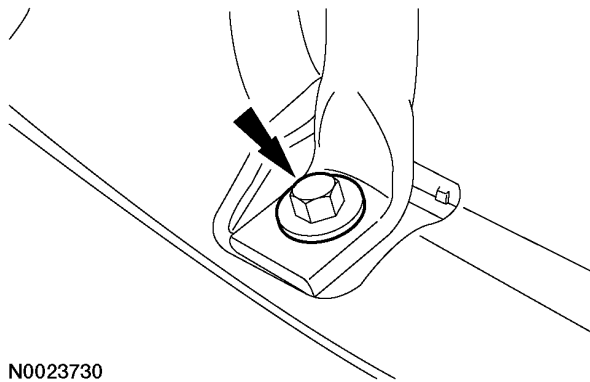
Description	Nm	lbf-ft	lb-in
Lower assist handle retaining bolt	11	8	—
Upper assist handle retaining bolt	10	—	89

### Removal and Installation

#### A-Pillar Trim Panel Removal and Installation

**NOTE:** RH side shown, LH side similar.

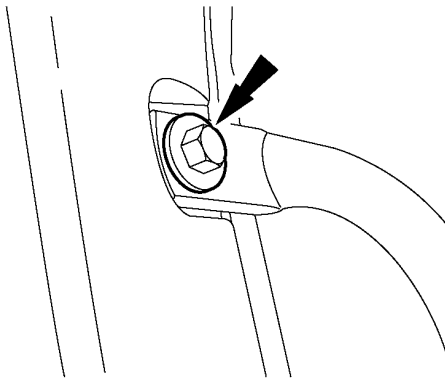
1. Remove the lower assist handle retaining bolt.
  - To install, tighten to 11 Nm (8 lb-ft).



N0023730

**NOTE:** RH side shown, LH side similar.

2. Remove the upper assist handle retaining bolt.
  - To install, tighten to 10 Nm (89 lb-in).



N0023729

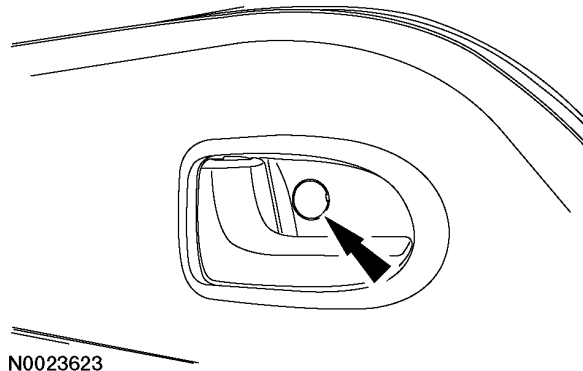
3. Remove the assist handle.
4. Position the door opening weatherstrip aside.
5. Remove the A-pillar trim panel.
6. To install, reverse the removal procedure.

### Door Trim Panel Removal and Installation

#### All vehicles

**NOTE:** Left front door trim panel shown, right front door trim panel similar.

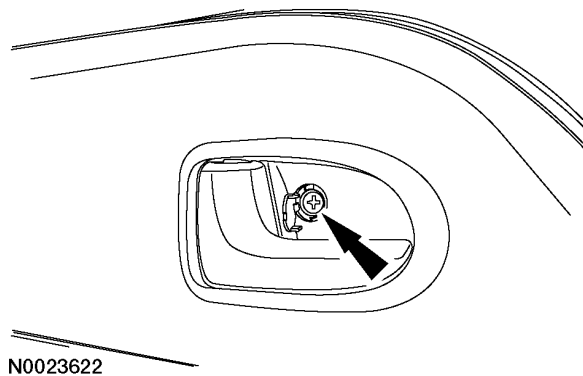
1. Open the door handle retaining screw cover.



N0023623

**NOTE:** Left front door trim panel shown, right front door trim panel similar.

2. Remove the door handle retaining screw.



N0023622

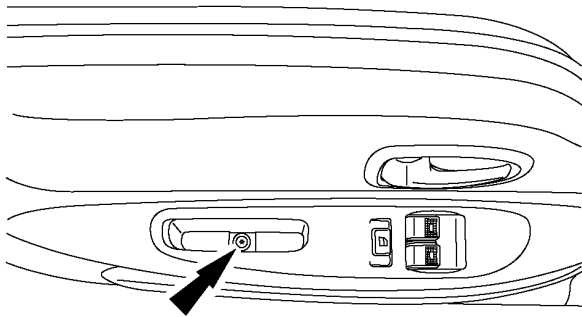
#### Vehicles equipped with manual windows

3. Remove the window regulator handle.

#### Vehicles equipped with power windows

**NOTE:** Left front door trim panel shown, right front door trim panel similar.

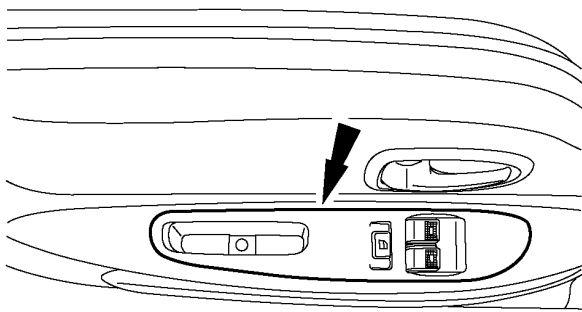
4. Remove the window control switch bezel retaining screw.



N0023620

**NOTE:** Left front door trim panel shown, right front door trim panel similar.

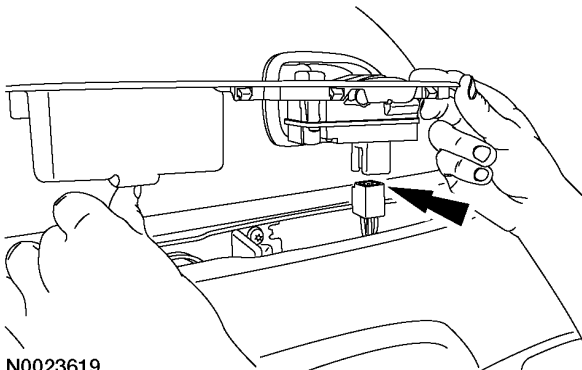
5. Remove the window control switch bezel from the door trim panel.



N0023621

**NOTE:** Left front door trim panel shown, right front door trim panel similar.

6. Disconnect the electrical connector.

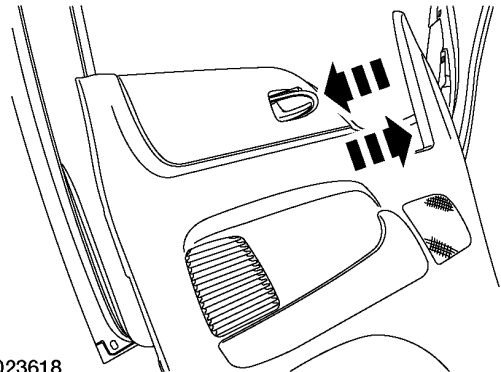


N0023619

### All vehicles

**NOTE:** Left front door trim panel shown, right front door trim panel similar.

7. Remove the door trim panel.
  - Pull the bottom of the door trim panel outward.
  - Position the door handle bezel through the opening in the door trim panel.
  - Remove the door trim panel.



N0023618

8. To install, reverse the removal procedure.

### Headliner Removal and Installation

1. Remove the overhead console. For additional information, refer to Instrument Panel and Console(Instrument Panel and Console, page 49).
2. Remove the interior mirror. For additional information, refer to Rear View Mirrors(Rear View Mirrors, page 10).
3. Remove the A-pillar trim panels. For additional information, refer to A-Pillar Trim Panel above.
4. Position the door opening weatherstrips aside.
5. Remove the headliner pin-type retainers.
6. Remove the headliner from the vehicle.
7. To install, reverse the removal procedure.

## Rear View Mirrors

### Specifications

**Table 5 Torque Specifications**

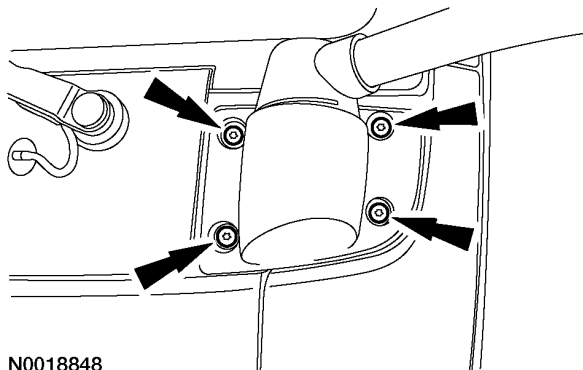
Description	Nm	lbf-ft	lb-in
Exterior mirror assembly upper mounting bolts	20	15	—
Exterior mirror assembly lower mounting bolts	20	15	—
Exterior mirror housing-to-exterior mirror bracket bolts	6	—	53

### Removal and Installation

#### Exterior Mirror Removal and Installation

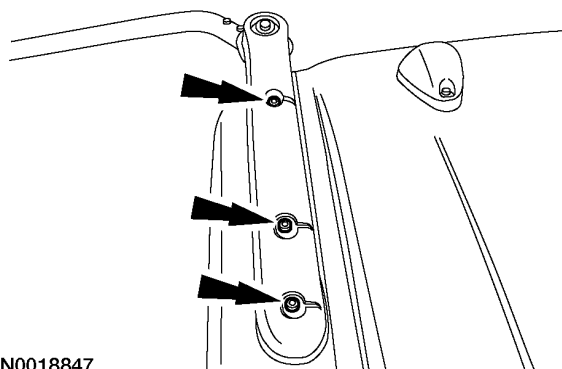
1. Remove the exterior mirror assembly lower mounting bolts.

• To install, tighten to 20 Nm (15 lbf-ft).



2. Tilt the vehicle cab forward to gain access to the exterior mirror assembly upper mounting bolts.
3. Remove the exterior mirror assembly upper mounting bolts.

• To install, tighten to 20 Nm (15 lbf-ft).



N0018847

4. Remove the exterior mirror assembly.

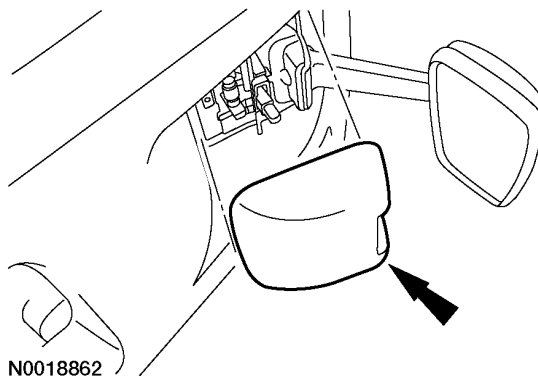
• Lift up on the lower mount while pulling forward to disengage the locating bolt from the keyway slot.

5. To install, reverse the removal procedure.

#### Interior Mirror Removal and Installation

**NOTE:** The interior mirror and compartment lamp are serviced as an assembly.

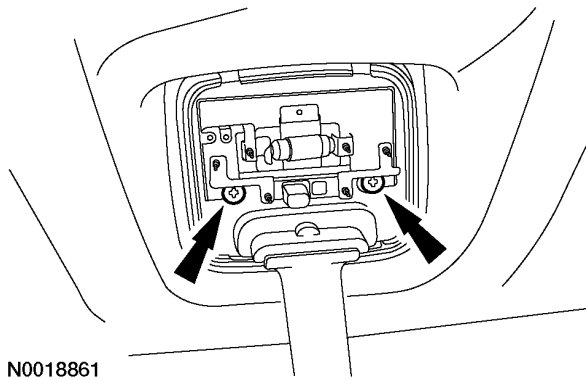
1. Remove the compartment lamp cover.



N0018862

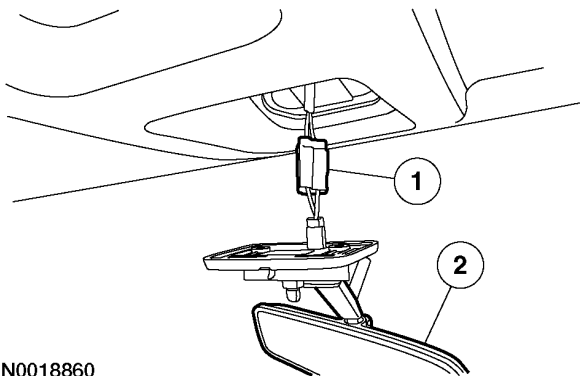
2. Remove the 2 retaining screws.





N0018861

3. Remove the interior mirror assembly.
  - a. Disconnect the compartment lamp electrical connector.
  - b. Remove the interior mirror assembly.



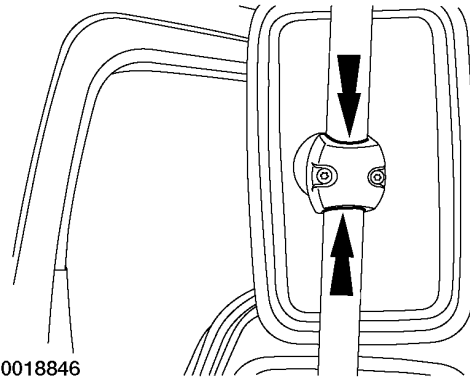
N0018860

4. To install, reverse the removal procedure.

### Exterior Mirror Glass Removal and Installation

**NOTE:** Main exterior mirror shown, spotter exterior mirror similar.

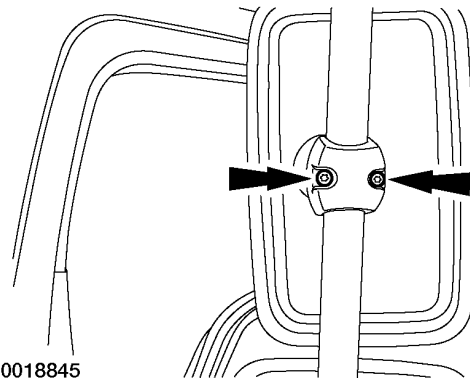
1. Index the location of the exterior mirror to the exterior mirror bracket.



N0018846

**NOTE:** Main exterior mirror shown, spotter exterior mirror similar.

2. Remove the 2 exterior mirror housing-to-exterior mirror bracket bolts.
  - To install, tighten to 6 Nm (53 lb-in).



N0018845

3. Remove the exterior mirror.
4. To install, reverse the removal procedure.

## Seating

### Specifications

**Table 6 Torque Specifications**

Description	Nm	lbf-ft
Driver seat track-to-floor bolts	22	16
Passenger seat backrest outboard mounting bracket-to-floor bolts	22	16
Passenger seat backrest stop support	13	10
Passenger seat cushion mounting bolts	22	16
Passenger seat backrest striker	22	16
Center seat backrest bracket-to-floor bolts	22	16
Center seat cushion mounting bolts	22	16
Seat backrest pivot bracket bolts	22	16

### Description and Operation

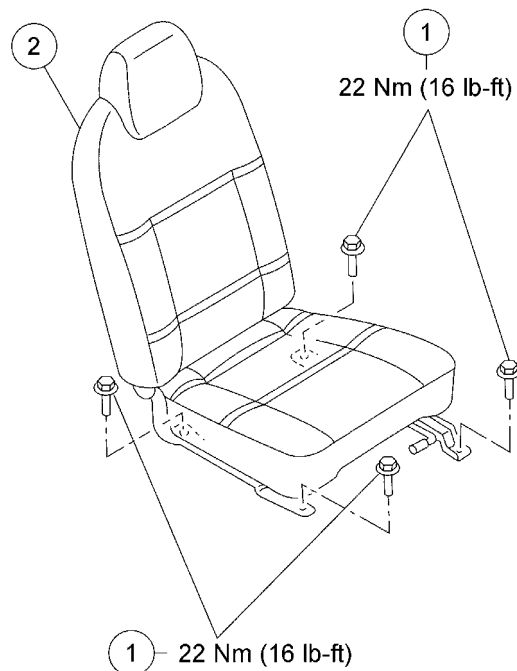
#### Seats

The seats can be equipped with the following systems:

- Manual recline on driver seat
- Manual seat track on driver seat
- Center seat fold down seatback/armrest
- Passenger seat fold down seatback/utility tray

### Removal and Installation

#### Driver Seat



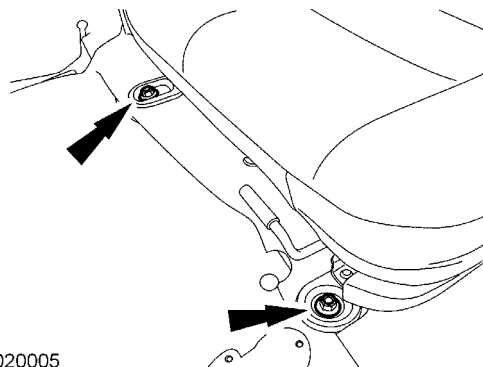
N0020448

**Figure 24**

1. Mounting bolts
2. Driver seat

1. Position the driver seat rearward and remove the front seat mounting bolts.

- To install, tighten to 22 Nm (16 lbf-ft).



N0020005

S16032

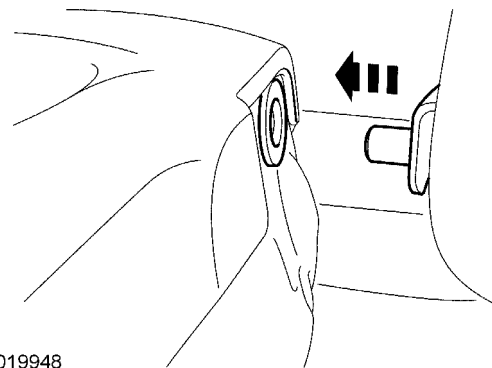
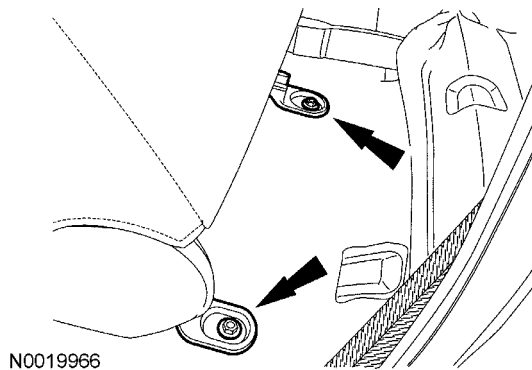
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Follow all warnings, cautions, and notes.

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2. Position the driver seat forward and remove the rear seat mounting bolts and remove the seat.

- To install, tighten to 22 Nm (16 lbf-ft).



4. If necessary, remove the 2 bolts and the passenger seat backrest stop support.

- To install, tighten to 13 Nm (10 lb-ft).

3. To install, reverse the removal procedure.

### Seat Backrest — Passenger and Center Removal and Installation

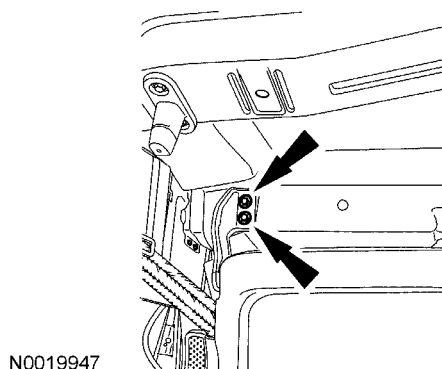
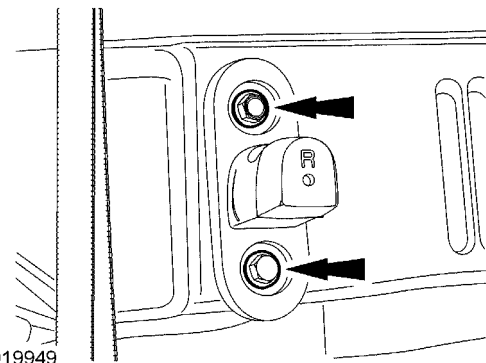
#### All seats

1. Fold the seat backrest down.

#### Passenger seat backrest

2. Remove the 2 bolts from the outboard backrest mounting bracket.

- To install, tighten to 22 Nm (16 lb-ft).

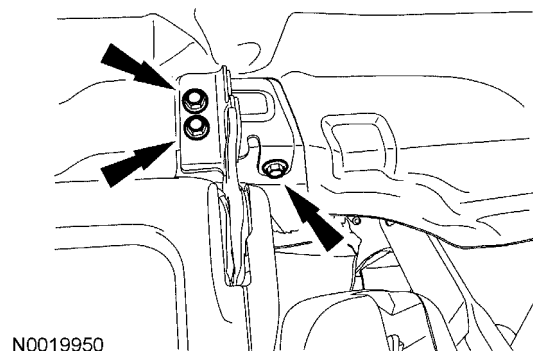


3. Slide the passenger seat backrest assembly out of the pivot bracket and remove the passenger seat backrest assembly.

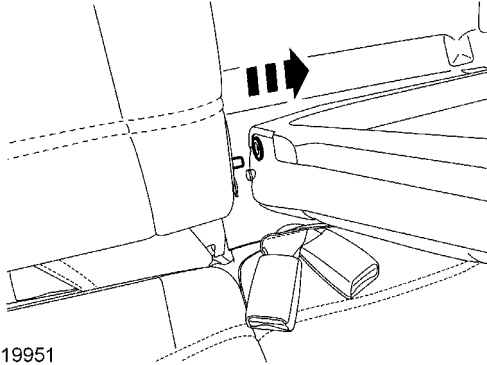
#### Center seat backrest

5. Remove the 3 center seat backrest bracket bolts.

- To install, tighten to 22 Nm (16 lb-ft).



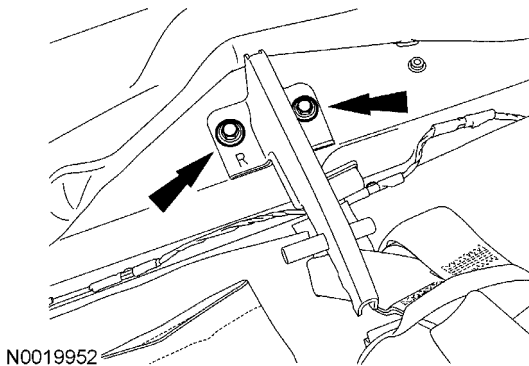
6. Slide the center seat backrest assembly out of the pivot bracket and remove the center seat backrest assembly.



#### All seats

**NOTE:** The passenger seat backrest and the center seat backrest must be removed to remove the passenger and center seat backrest pivot bracket.

7. If necessary, remove the 2 bolts and the seat backrest pivot bracket.
  - To install, tighten to 22 Nm (16 lb-ft).

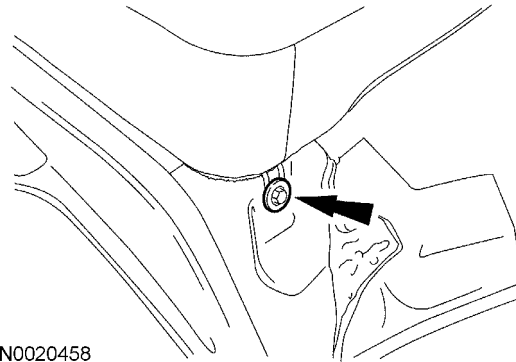


8. To install, reverse the removal procedure.

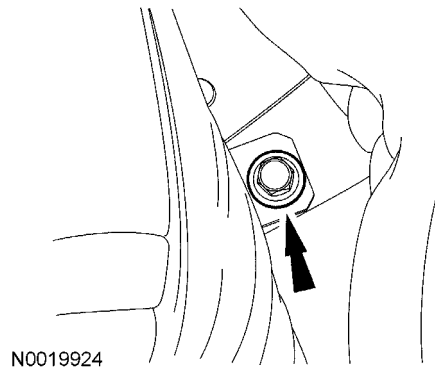
#### Seat Cushion — Passenger and Center Removal and Installation

##### Passenger seat cushion

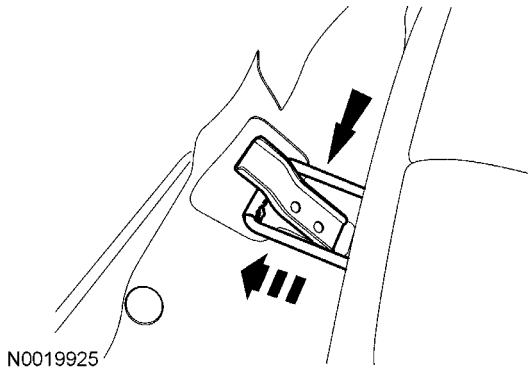
1. Remove the passenger seat cushion mounting bolt located at the right front corner of the seat cushion.
  - To install, tighten to 22 Nm (16 lb-ft).



2. Remove the passenger seat cushion mounting bolt located near the center of the seat cushion, between the passenger seat and the center seat cushion.
  - To install, tighten to 22 Nm (16 lb-ft).



3. Release the passenger seat cushion assembly by moving it rearward to detach it from the rear retainer and then remove the passenger seat cushion assembly.



**NOTE:** For installation, note the routing of the safety belt buckles and the lap belt through the guide straps at the rear of the seat cushion.

6. To remove the seat cushion assembly, route the safety belt buckles and lap belt out through the guide straps at the rear of the seat cushion, then pull upward on the front of the seat cushion to release it from the clip retainer in the floor.

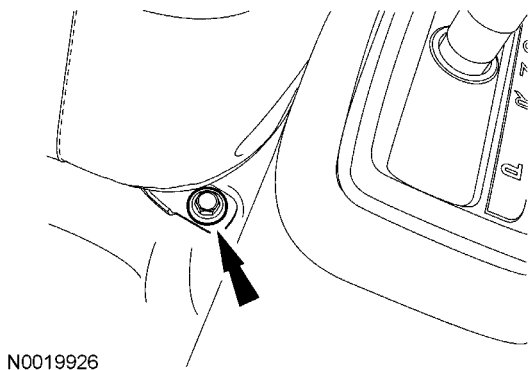
#### All seats

7. To install, reverse the removal procedure.

#### Center seat cushion

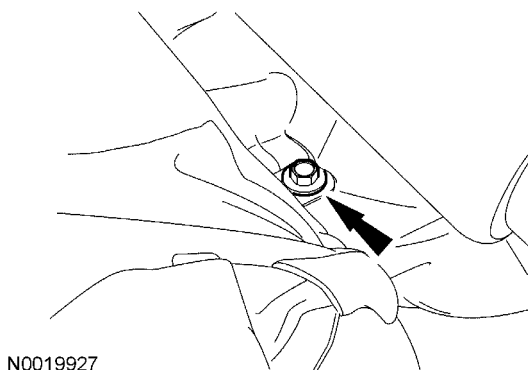
4. Remove the center seat cushion front mounting bolt.

- To install, tighten to 22 Nm (16 lb-ft).



5. Remove the center seat cushion rear mounting bolt.

- To install, tighten to 22 Nm (16 lb-ft).



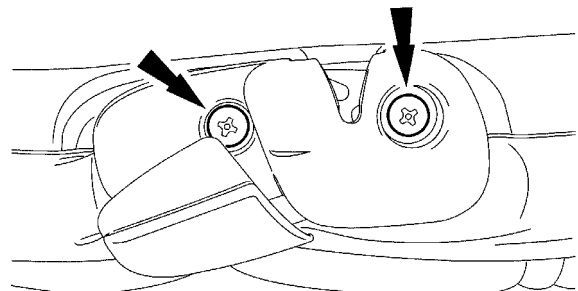
#### Seat Latch — Passenger and Center Removal and Installation

#### All seats

1. Fold the seat backrest down.

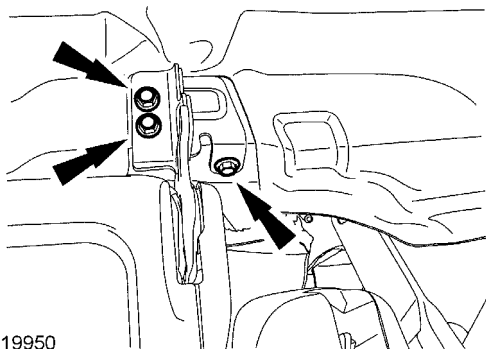
#### Passenger seat latch

2. Remove the 2 screws and the passenger seat backrest latch assembly.



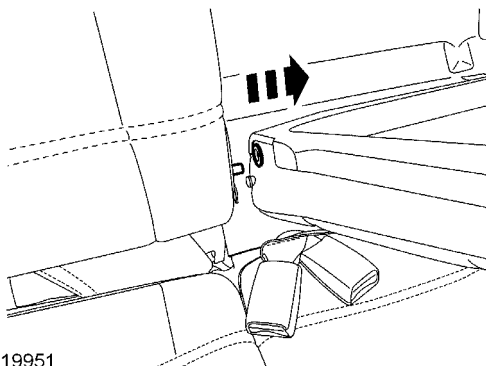
#### Center seat latch

3. Remove the 3 center seat backrest bracket bolts.
- To install, tighten to 22 Nm (16 lb-ft).



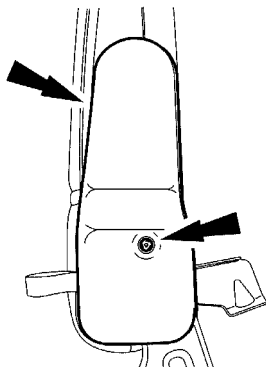
N0019950

4. Slide the center seat backrest assembly out of the pivot bracket and remove the center seat backrest assembly.



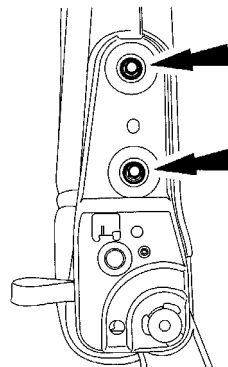
N0019951

5. Remove the screw and the center seat backrest latch trim panel.



N0019954

6. Remove the 2 bolts and the center seat backrest latch assembly.



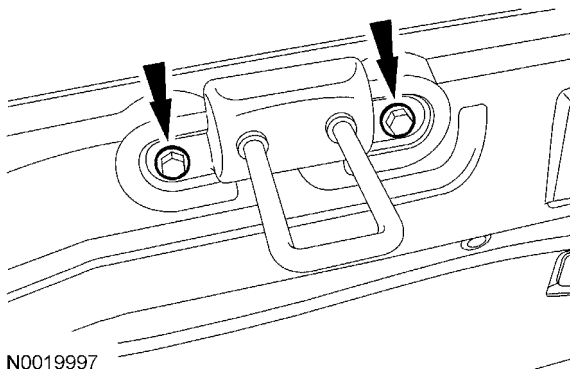
N0019955

#### All seats

7. To install, reverse the removal procedure.

#### Seat Latch Striker Removal and Installation

1. Position the passenger seat backrest down.
2. Remove the 2 bolts and the passenger seat backrest striker.
  - To install, tighten to 22 Nm (16 lb-ft).



N0019997

3. To install, reverse the removal procedure.

## Safety Belt System

### Specifications

**Table 7 Torque Specifications**

Description	Nm	lb-ft	lb-in
Shoulder safety belt guide upper anchor bolt	41	30	—
Safety belt retractor belt anchor bracket bolt	41	30	—
Safety belt retractor upper bolt	10	—	89
Safety belt retractor lower bolt	41	30	—
Driver safety belt buckle anchor bolt	41	30	—
Passenger safety belt buckle anchor bracket bolt	41	30	—
Center safety belt buckle anchor bracket bolt	41	30	—
Center safety belt anchor bracket bolt	41	30	—
Shoulder height adjuster bolts	41	30	—

### Description and Operation

#### Safety Belt System



**WARNING:** All safety belt assemblies including retractors, belt tension sensor (BTS), if equipped, buckles, shoulder belt height adjusters (if equipped), child safety seat tether attachments and attaching hardware should be inspected after any collision. All new belt assemblies should be installed unless a qualified technician finds the assemblies show no damage and operate correctly. Belt assemblies not in use during a collision should also be inspected and new assemblies installed if either damage or incorrect operation is noted.



**WARNING:** Each seating position in the vehicle has a specific safety belt assembly which consists of one buckle and one tongue. The safety belt assembly is designed to be used as a pair and is not to be used across seating positions.

**NOTE:** New safety belt buckles, height adjusters, center adjust tongues, and belts and retractors can be installed separately. However, if a safety assembly was in use during a collision, a new belt and retractor must be installed as well as the center adjust tongue, and belt and buckle assembly or the center adjust tongue, and the cable and buckle assembly. When installing new safety belts and buckles, height adjusters, safety cables and buckles, center adjust tongues, and belt and retractors, use only the parts specified in the Ford Master Parts Catalogs for the make and model of the vehicle being repaired. Safety belt assemblies must not be interchanged between vehicle models.

The active restraint system consists of the following:

- Driver, center and passenger safety belt buckles, attached to the floor pan.

- Driver and passenger safety belt retractors, located on the B-pillar behind the safety belt retractor trim panel covers.

The outboard safety belt for the driver and passenger seat is a continuous-loop 3-point system. The combination lap and shoulder belt (continuous-loop) uses a common slip tongue.

### Vehicle-Sensitive (Emergency) Locking Mode

The emergency locking retractor (ELR) mode will allow the occupant freedom of movement, locking tight only on hard braking, hard cornering or an impact of approximately 8 km/h (5 mph). The ELR mode helps to reduce the forward movement of the driver and passengers. The ELR mode is continuously in operation at all seating positions.

### Energy Management Retractor

The driver and front outboard passenger seat belt systems have a safety belt system with an energy management feature at the front seating positions to help further reduce the risk of injury in the event of a head-on collision.

The energy management retractor feature is designed to pay out webbing in a controlled manner. This feature is designed to help reduce the belt force acting on an occupant's chest.

### Fastening Safety Belts



**WARNING:** Do not introduce slack into the safety belt system because the belt locks upon impact where it is positioned. Use the shoulder safety belt on the outside shoulder only. Never wear the shoulder safety belt under the arm. Never swing the shoulder safety belt around the neck over the inside shoulder. Never use a single belt for more than one person. Make sure the lap portion of the belt is fitted snugly and as low as possible around the hips, not the waist. Failure to follow these precautions could increase the chance and severity of injury in a collision.

Always follow the preceding safety precautions when fastening the safety belts.

### Safety Belt Extension Assembly

In certain cases, the safety belt may be too short even when it is fully extended. About 20 cm (8 in) can be added to the belt length by using a safety belt extension. Safety belt extensions are available at no cost from any Ford or Lincoln-Mercury dealer parts department. Safety belt extensions are only available with black webbing.

Use only extensions manufactured by the same supplier as the safety belt. Manufacturer identification is located at the end of the webbing on the label. Also, use the safety belt extension only if the safety belt is too short for you when fully extended. Do not use an extension to change the fit of the shoulder belt across the torso.

### Safety Belt Warning System — Driver Safety Belt

The driver safety belt incorporates a safety belt warning indicator switch, warning indicator and chime. The warning indicator and chime are reminders to fasten the safety belt.

- If the driver safety belt is not buckled before the ignition switch is turned to the ON position, the safety belt indicator light illuminates for 1 to 2 minutes and the warning chime sounds for 4 to 8 seconds.
- If the driver safety belt is buckled while the safety belt indicator light is on and the warning chime is sounding, the warning light and warning chime turn off.
- If the driver safety belt is buckled before the ignition switch is turned to the ON position, the safety belt indicator light and warning chime remain off.

### Diagnosis and Testing

#### Inspection and Verification

1. Verify the customer's concern by operating the active restraint system to duplicate the condition.
2. Inspect to determine if any of the following mechanical or electrical concerns apply:



**Table 8 Visual Inspection Chart**

Mechanical	Electrical
<ul style="list-style-type: none"> <li>Safety belt webbing integrity</li> <li>Safety belt buckle and tongue assembly</li> <li>Safety belt retractor</li> </ul>	<ul style="list-style-type: none"> <li>Open fuse</li> <li>Bare, broken or disconnected wire</li> <li>Connector not tightly engaged</li> <li>Safety belt warning indicator lamp burned out or broken</li> </ul>

- If the inspection reveals an obvious concern(s) that can be readily identified, service as required. With the exception of removing a twist from the safety belt webbing, do not attempt to repair a component of the safety belt system; new components must be installed.
- If the concern remains after the inspection, determine the symptom. GO to the Symptom Chart.
- To check the active restraint system for correct operation, carry out the appropriate Functional Test(s).

**Table 9 Symptom Chart**

Condition	Possible Sources	Action
The safety belt warning indicator lamp does not operate, the safety belt warning chime is OK	<ul style="list-style-type: none"> <li>Burned-out bulb.</li> <li>Circuitry.</li> <li>Instrument cluster.</li> </ul>	Refer to Instrument Cluster in S08307.
Neither the safety belt warning chime nor the safety belt warning indicator lamp operates	<ul style="list-style-type: none"> <li>Safety belt I switch.</li> <li>Instrument cluster.</li> <li>Circuitry.</li> </ul>	Refer to Instrument Cluster in S08307.
Excessive pressure on the occupant during normal wear, the webbing cannot be extracted, excessive slack in webbing does not retract	<ul style="list-style-type: none"> <li>Front safety belt retractor and tongue.</li> </ul>	CARRY out the component Functional Test in this section. INSTALL a new retractor if necessary.

**Component Tests**

Carry out the appropriate Functional Test(s) as determined in Inspection and Verification.

**Functional Test I (Buckle and Tongue)**

The safety belt buckle and tongue assembly must operate freely during the latching and unlatching

function. Fasten the safety belt by inserting the tongue (male portion) into the buckle (female portion).

1. Verify the following during the latching sequence:
  - Tongue insertion is not hindered by excessive effort.
  - A "click" is heard when the buckle latches the tongue.
2. Verify the system integrity by forcefully pulling on the belt webbing.
3. Unlatch the belt by fully depressing the buckle release button and allowing the belt to release and retract.
4. Verify the following during the unlatching process:
  - Push-button depression does not require excessive effort.
  - Tongue can be removed easily from the buckle.
  - Repeat the above steps 3 times.
5. If the inspection reveals an obvious concern(s) that can be readily identified, install a new safety belt buckle or safety belt retractor assembly as required. Do not attempt to carry out any repair on the buckle and tongue assembly. If a concern still exists with either component, a new safety belt buckle and safety belt and retractor assembly must also be installed.

#### *Functional Test II (Retractor)*

The safety belt and retractor assembly must be freely operational for extraction and retraction of the safety belt webbing between full extension and in-vehicle stowed positions.

1. Extract and retract the safety belt between the full extension and stowed positions.
2. Verify the retractor operates without excessive effort or binding.
3. Install a new safety belt buckle retractor and tongue assembly if no obvious concerns are noticed and the complaint has been verified.

#### *Functional Test III (System Road Test Inspection)*

**NOTE:** If the RH or the rear safety belts are to be tested, a passenger must be used.

1. Fasten the safety belts and proceed to a safe area.
2. Attain a speed of 8 km/h (5 mph).



**WARNING: The driver and passenger must be prepared to brace themselves if the retractor does not lock.**

3. Test the safety belts.
  - a. Grasp the shoulder harness and prepare to lean forward.



**WARNING: The maximum brake application should be on dry concrete or equivalent hard surface, NEVER on wet pavement or gravel.**



**WARNING: The driver and passenger must be prepared to brace themselves in the event the retractor does not lock.**


**NOTE:** Do not jerk on the safety belt webbing when carrying out this test. Lean forward slightly when the brake application is made.

- b. Make a maximum brake application without a skid.
4. The safety belts should lock up with minimum webbing extension.
5. If there is a lockup of both shoulder straps, the safety belt assemblies are functioning correctly. Should either or both retractors fail to lock up at the 8 km/h (5 mph) speed, repeat the test at a constant 24 km/h (15 mph) speed. (This test must be carried out with a RH front or rear passenger if the RH front or rear outboard safety belts are to be tested.)

**CAUTION:** Before installing a new safety belt assembly, inspect the mounting area for damage and distortion. If the retractor of a new safety belt assembly has been bolted into a damaged or distorted mounting area, the retractor could be warped and may not function. If this is the case, remove the retractor, return the sheet metal to the original configuration and install another complete safety belt assembly.

6. If either or both retractors do not lock up at the 24 km/h (15 mph) test, return the vehicle for service of malfunctioning safety belts.

#### *Functional Test IV (Automatic Locking Retractor)*

 **WARNING:** After any vehicle collision, the safety belt system at all outboard seating positions (except driver, which has no "automatic locking retractor" feature) must be checked by a qualified technician to verify that the "automatic locking" feature for child seats is still functioning properly, in addition to other checks for proper safety belt system function. A safety belt and retractor assembly must be replaced if the safety belt assembly's "automatic locking retractor" feature or any other safety belt function is not operating properly when checked according to the procedures in the workshop manual. Failure to replace the safety belt and retractor assembly could increase the risk of injury in collisions.

1. Position the seat back into the full up position.
2. Position the height adjuster (as equipped) in the full down or up position.
3. Latch the seat belt buckle and tongue assembly.
4. Pull the shoulder belt out until the automatic locking retractor (ALR) feature is activated.
5. Release the shoulder belt and allow it to retract until it stops.

6. Pull on the shoulder belt to check that the belt has remained in the ALR mode. If the belt is not locked, install a new safety belt and retractor assembly.
7. Unlatch the safety belt tongue from the buckle and allow the safety belt to retract to its stowed position.
8. Pull the shoulder belt to verify the retractor assembly has converted automatically out of the ALR mode. If the shoulder belt remains locked in the stowed position, install a new safety belt and retractor assembly.

### **General Procedures**

#### **Safety Belt Cleaning**

 **WARNING:** Do not bleach or re-dye the webbing, as the webbing may weaken.

Clean the safety belt webbing only with a mild soap solution recommended for cleaning upholstery or carpets. Follow the instructions provided with the soap.

#### **Safety Belt With Anchor Plate Thread Damage**

1. Remove the broken or stripped bolt and discard.
2. Drill out the internal threads in the safety belt anchor plate with a 27/64-inch drill.
3. Re-thread the anchor plate with a 1/2-13 tap (safety belt).
4. Blow out the chips.
5. Install the safety belt component(s).
6. Install a new bolt with the same part number, unless otherwise specified. Refer to the Parts Replacement Chart in the General Specifications portion of this section.
7. Tighten the bolt(s) to specification. Refer to Torque Specifications in the Specifications portion of this section.

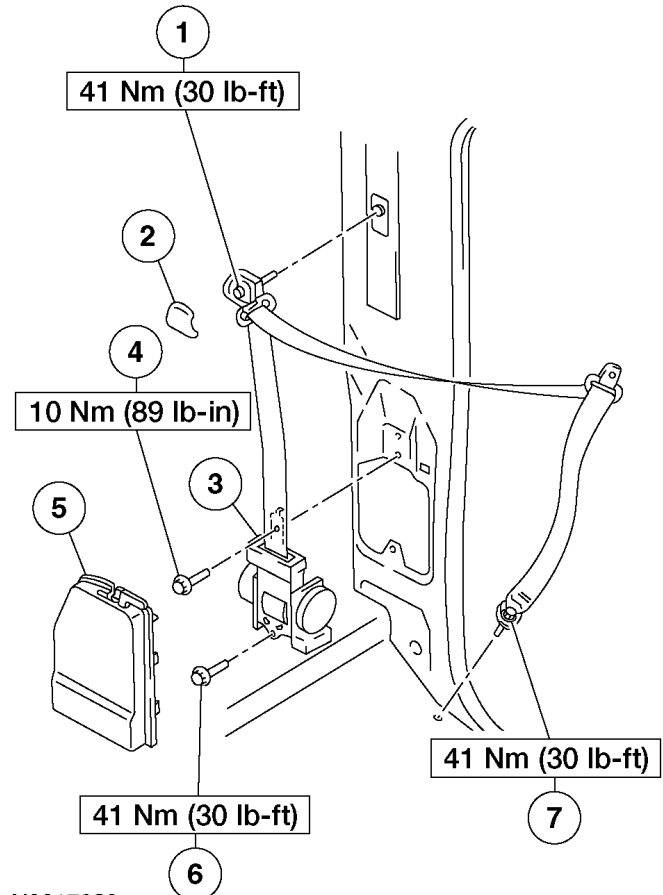
## Safety Belt Procedure After a Collision

**! WARNING:** All safety belt assemblies include retractors, buckles, front seat belt buckle support assemblies (slide bar, if so equipped), shoulder belt height adjuster (if equipped), child safety seat tether bracket assemblies (if equipped) and attaching hardware should be inspected after any collision. Ford recommends new safety belt assemblies be installed unless a qualified technician finds the assemblies show no damage and operate correctly. Safety belt assemblies not in use during a collision should also be inspected and new assemblies installed if either damage or incorrect operation is noted.

1. Before installing a new safety belt assembly, the safety belt attaching areas must be inspected for damage and distortion. If the attaching points are damaged and distorted, the sheet metal must be worked back to its original shape and structural integrity.
2. Install the new safety belt(s); refer to the procedure in this section. Carry-out the Functional Test. For additional information, refer to Safety Belt System in this section.

## Removal and Installation

### Safety Belt Retractor



N0017286

**Figure 44**

1. Shoulder safety belt guide upper anchor bolt
2. Shoulder safety belt guide cover
3. Safety belt retractor
4. Safety belt retractor upper bolt
5. Safety belt retractor trim cover
6. Safety belt retractor lower bolt
7. Safety belt retractor belt anchor bracket bolt

**! WARNING:** All safety belt assemblies including retractors, belt tension sensor (BTS), if equipped, buckles, shoulder belt height adjusters (if equipped), child safety seat tether attachments and attaching hardware should be inspected after any collision. All new belt assemblies should be installed unless a qualified technician finds the assemblies show no damage and operate correctly. Belt assemblies not in use during a collision should also be inspected and new assemblies installed if either damage or incorrect operation is noted.

**NOTE:** Driver side shown, passenger side similar.

1. Remove the shoulder safety belt guide cover.
2. Remove the shoulder safety belt guide upper anchor bolt.
  - To install, tighten to 41 Nm (30 lb-ft).

**NOTE:** Note the safety belt retractor belt anchor bolt bracket anti-rotation locators on the floor pan when removing the lower anchor bolt for installation.

3. Remove the safety belt retractor belt anchor bracket bolt.
  - To install, tighten to 41 Nm (30 lb-ft).
4. Remove the safety belt retractor trim cover.

**NOTE:** Note the position of the safety belt retractor upper locating tab for installation.

5. Remove the safety belt retractor upper bolt.
  - To install, tighten to 10 Nm (89 lb-in).
6. Remove the safety belt retractor lower bolt and the retractor.
  - To install, tighten to 41 Nm (30 lb-ft).
7. To install, reverse the removal procedure.
8. Check the active restraint system for correct operation. For additional information, refer to Safety Belt System in this section.

## Safety Belt — Center

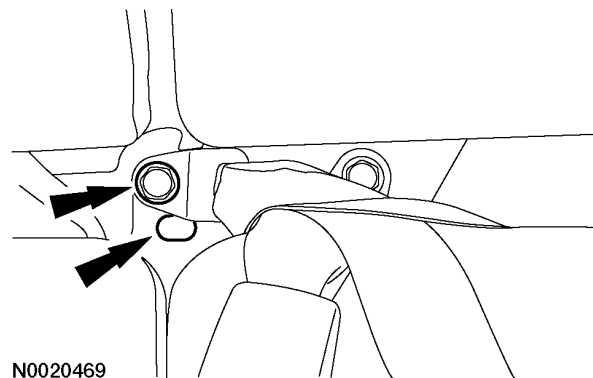
**! WARNING:** All safety belt assemblies including retractors, belt tension sensor (BTS), if equipped, buckles, shoulder belt height adjusters (if equipped), child safety seat tether attachments and attaching hardware should be inspected after any collision. All new belt assemblies should be installed unless a qualified technician finds the assemblies show no damage and operate correctly. Belt assemblies not in use during a collision should also be inspected and new assemblies installed if either damage or incorrect operation is noted.

1. Position aside the floor mat.

**NOTE:** Note the position and routing of the safety belt webbing and anchor bracket for installation.

**NOTE:** Note the safety belt anchor bolt bracket anti-rotation locator on the floor pan for installation.

2. Remove the safety belt anchor bracket bolt and the safety belt.
  - To install, tighten to 41 Nm (30 lb-ft).



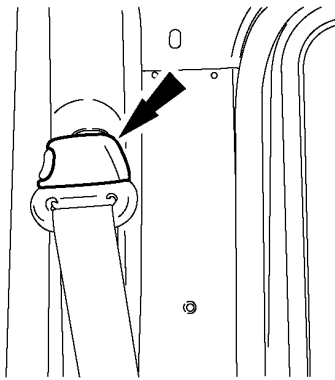
3. To install, reverse the removal procedure.
4. Check the active restraint system for correct operation. For additional information, refer to Safety Belt System in this section.

## Safety Belt Shoulder Height Adjuster

**! WARNING:** All safety belt assemblies including retractors, belt tension sensor (BTS), if equipped, buckles, shoulder belt height adjusters (if equipped), child safety seat tether attachments and attaching hardware should be inspected after any collision. All new belt assemblies should be installed unless a qualified technician finds the assemblies show no damage and operate correctly. Belt assemblies not in use during a collision should also be inspected and new assemblies installed if either damage or incorrect operation is noted.

1. Remove the upper shoulder safety belt guide cover.

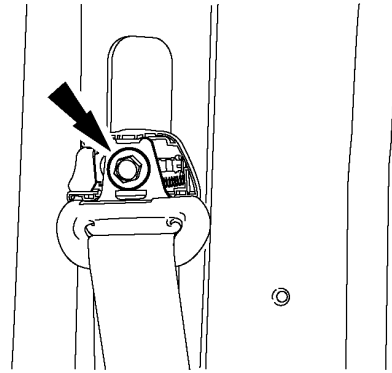
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2. Remove the shoulder safety belt guide upper anchor bolt.

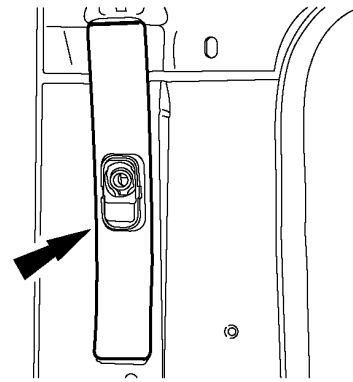
- To install, tighten to 41 Nm (30 lb-ft).

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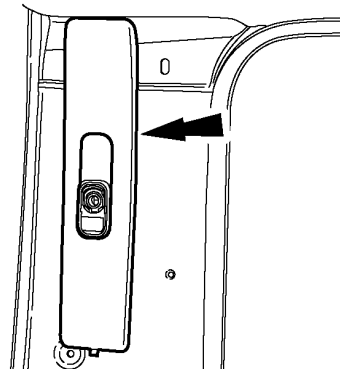
3. Remove the shoulder height adjuster outer trim cover by pulling outward at the top of the trim panel and then lift up to release the trim panel lower hook.

N0017294



4. Remove the shoulder height adjuster inner trim cover.

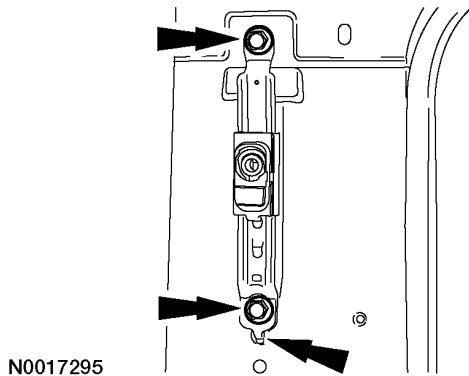
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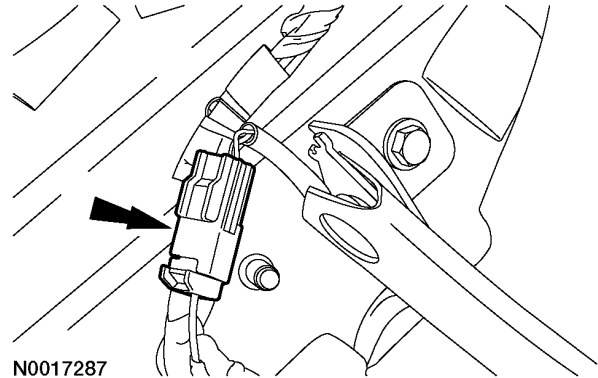
**NOTE:** Note the position of the locator tab at the bottom of the shoulder height adjuster for installation.

5. Remove the bolts and the shoulder height adjuster.

- To install, tighten to 41 Nm (30 lb-ft).



1. Position the driver seat to its forwardmost position.
2. Position aside the floor mat.
3. Disconnect the safety belt buckle switch electrical connector.



6. To install, reverse the removal procedure.
7. Check the active restraint system for correct operation. For additional information, refer to Safety Belt System in this section.

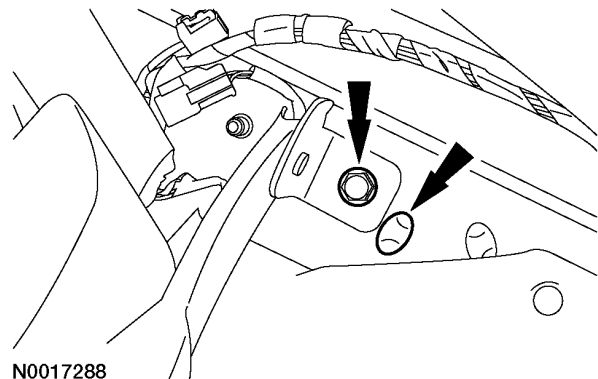
**NOTE:** Note the safety belt buckle anchor bolt bracket anti-rotation locator on the floor pan for installation.

4. Remove the bolt and the safety belt buckle.

- To install, tighten to 41 Nm (30 lb-ft).

### Safety Belt Buckle — Driver

**! WARNING:** All safety belt assemblies including retractors, belt tension sensor (BTS), if equipped, buckles, shoulder belt height adjusters (if equipped), child safety seat tether attachments and attaching hardware should be inspected after any collision. All new belt assemblies should be installed unless a qualified technician finds the assemblies show no damage and operate correctly. Belt assemblies not in use during a collision should also be inspected and new assemblies installed if either damage or incorrect operation is noted.



5. To install, reverse the removal procedure.
6. Check the active restraint system for correct operation. For additional information, refer to Safety Belt System in this section.

## Safety Belt Buckle — Passenger and Center

**! WARNING:** All safety belt assemblies including retractors, belt tension sensor (BTS), if equipped, buckles, shoulder belt height adjusters (if equipped), child safety seat tether attachments and attaching hardware should be inspected after any collision. All new belt assemblies should be installed unless a qualified technician finds the assemblies show no damage and operate correctly. Belt assemblies not in use during a collision should also be inspected and new assemblies installed if either damage or incorrect operation is noted.

### Passenger and center safety belt buckles

1. Position aside the floor mat.

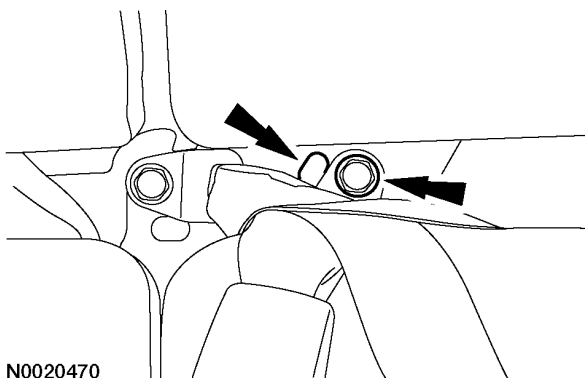
### Passenger safety belt buckle

**NOTE:** Be sure to note the routing of the safety belt buckle through the guide strap on the rear of the seat cushion to make sure of correct operation.

**NOTE:** Note the safety belt buckle anchor bolt bracket anti-rotation locator on the floor pan for installation.

2. Remove the safety belt buckle anchor bracket bolt from the safety belt buckle.

- To install, tighten to 41 Nm (30 lb-ft).



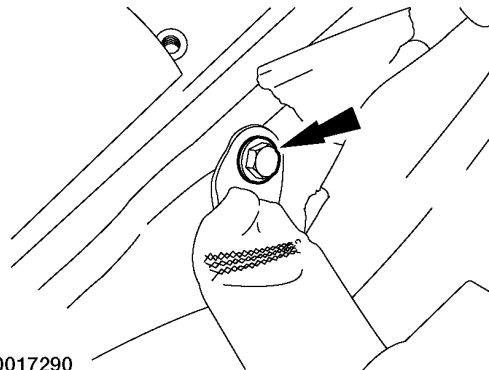
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### Center safety belt buckle

**NOTE:** Note the position and the routing of the safety belt buckle webbing and anchor bracket for installation.

3. Remove the safety belt buckle anchor bracket bolt and the safety belt buckle.

- To install, tighten to 41 Nm (30 lb-ft).



N0017290

### Passenger and Center safety belt buckles

4. To install, reverse the removal procedure.
5. Check the active restraint system for correct operation. For additional information, refer to Safety Belt System in this section.

## Glass, Frames and Mechanisms

### Specifications

**Table 10 Torque Specifications**

Description	Nm	lbf-in
Rear window glass clamp bolt	2	18
Front window glass clamp bolt	2	18
Window regulator nuts	9	80
Manual window crank screw	7	62



## Glass, Frames and Mechanisms Description and Operation

### Power Window System

#### Features and Operation

If equipped with power windows, the window control switch:

- will operate the power windows only when the ignition switch is in the ON or ACC position.
- is located on each front door trim panel.
- may be used to raise or lower the driver and passenger side windows from the LF window control switch, or the passenger window from the passenger switch.
- for the LH window, includes a one-touch down (OTD) feature for the driver door window, which is activated by pressing the LH window control switch to the 2nd detent position, then releasing it.
- can partially lower the driver side window when the LF window control switch is depressed to the 1st detent.
- will completely lower the driver side window when the LF window control switch is fully depressed and then released (2nd detent).

### Power Window System — Modes of Operation

There are 2 modes of operation for the power window system.

#### Manual Mode

When the LH front window control switch is pressed to the 1st detent, the LH front window will move down until 1 of the following conditions are met:

- The LH front window control switch has been released from the 1st detent.
- The LH front window control switch is pushed to the OTD position (2nd detent), causing the LF window to enter auto mode.

#### Auto Mode

Auto mode provides the OTD feature. The OTD feature is activated when the LH window control switch for the LH window is pressed to the 2nd detent.

Auto mode will be terminated when any of the following conditions are met:

- The LH window control switch is pushed to the UP position
- The LH window control switch is released (OFF position) and then moved to the DOWN position (1st detent) or OTD position (2nd detent)
- The delayed accessory relay is active

The OTD feature is integral to the LH front window control switch assembly.

### Rear Window Glass

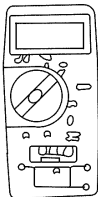
The rear glass:

- is standard tempered safety glass.
- is fixed to the rear of the cab with a formed weatherstrip.

## Glass, Frames and Mechanisms Diagnosis and Testing

Refer to Wiring Diagrams for schematic and connector information, and component testing.

**Table 11 Special Tools**

 <p>ST1137-A</p>	<p>Automotive Meter ZTSE4357</p>
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### Principles of Operation

The power window system operates under the control of the power window relay. The ignition switch will provide 12 volts to the relay coil, which actuates the relay and provides power to the power window system. The power window system can be operated from the driver window control switch or from the window control switch located on the passenger door panel. The driver window control switch has 2 modes of operation for the driver power window, manual and auto. The passenger window operates in the manual mode only.

Auto mode provides the one-touch down (OTD) feature for the driver front power window. The OTD function allows the driver front power window to be completely lowered when the driver window control switch is pressed to the 2nd detent position and then released. OTD is controlled internally by the driver window control switch.

### Inspection and Verification

1. Verify the customer concern by operating the power window system.
2. Visually inspect for obvious signs of mechanical and electrical damage. Refer to the following chart:

**Table 12 Visual Inspection Chart**

Mechanical	Electrical
<ul style="list-style-type: none"><li>• Window regulator electric drive</li><li>• Window glass</li></ul>	<ul style="list-style-type: none"><li>• Power distribution center (PDC) fuse 32 (40A)</li><li>• Wiring harness</li><li>• Loose or corroded connector(s)</li><li>• Circuitry</li></ul>

3. If the concern remains after the inspection, GO to the Symptom Chart.

**Table 13 Symptom Chart**

Condition	Possible Sources	Action
All power windows are inoperative	<ul style="list-style-type: none"> <li>Fuse.</li> <li>Circuitry.</li> <li>LH window control switch.</li> <li>Power window relay.</li> </ul>	Go to Pinpoint Test A.
The LH power window is inoperative	<ul style="list-style-type: none"> <li>Circuitry.</li> <li>LH window control switch.</li> <li>LH power window motor.</li> </ul>	Go to Pinpoint Test B.
The RH power window is inoperative	<ul style="list-style-type: none"> <li>Circuitry.</li> <li>LH window control switch.</li> <li>RH window control switch.</li> <li>LH power window motor.</li> </ul>	Go to Pinpoint Test C.
The one-touch down (OTD) feature is inoperative	<ul style="list-style-type: none"> <li>LH window control switch.</li> </ul>	INSTALL a new LH window control switch. REFER to Window Control Switch in this section.

**Pinpoint Tests**

*Pinpoint Test A: All Power Windows Are Inoperative*

**Normal Operation**

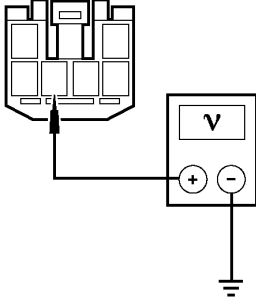
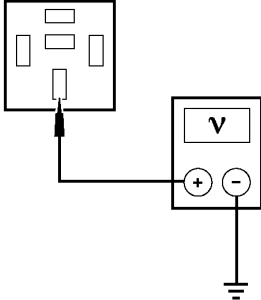
The power window relay controls power to the LH and RH power windows. When the ignition is in the ON position, the power window relay coil, which is grounded through circuit 57 (BK), receives battery voltage through circuit 296 (WH/VT), which turns the relay ON. When the power window relay is active,

it supplies 12 volts to the power window switches through circuit 170 (RD/LB).

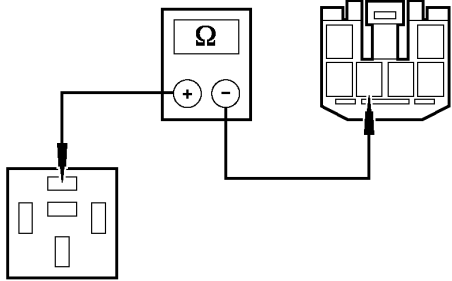
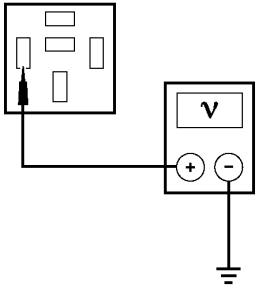
**Possible Causes**

- Fuse
- Power window relay
- Open in circuits 296 (WH/VT), 57 (BK) or 170 (RD/LB)

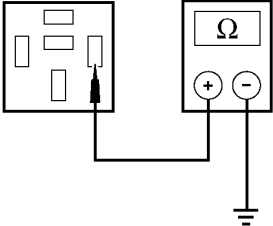
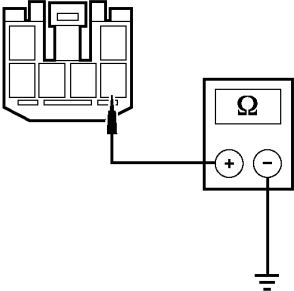
Table 14 PINPOINT TEST A: ALL POWER WINDOWS ARE INOPERATIVE

Test Step	Result / Action to Take
<p><b>A1 CHECK CIRCUIT 170 (RD/LB) FOR VOLTAGE</b></p> <ul style="list-style-type: none"> <li>• <b>Disconnect:</b> LH Window Control Switch C504.</li> <li>• Key in ON position.</li> <li>• Measure the voltage between LH window control switch C504-5, circuit 170 (RD/LB), harness side and ground.</li> </ul>  <p>N0020431</p> <p>Is the voltage greater than 10 volts?</p>	<p><b>Yes</b></p> <p>GO to A7.</p> <p><b>No</b></p> <p>GO to A2.</p>
<p><b>A2 CHECK THE POWER WINDOW RELAY</b></p> <ul style="list-style-type: none"> <li>• <b>Disconnect:</b> Power Window Relay</li> <li>• Carry out the power window relay component test. Refer to the Wiring Diagrams for component testing.</li> </ul> <p>Did the relay pass the component test?</p>	<p><b>Yes</b></p> <p>GO to A3.</p> <p><b>No</b></p> <p>INSTALL a new relay. TEST the system for normal operation.</p>
<p><b>A3 CHECK THE POWER SUPPLY TO THE RELAY</b></p> <ul style="list-style-type: none"> <li>• Measure the voltage between power window relay socket pin 30, circuit 170 (RD/LB) and ground.</li> </ul>  <p>N0019008</p> <p>Is the voltage greater than 10 volts?</p>	<p><b>Yes</b></p> <p>GO to A4.</p> <p><b>No</b></p> <p>VERIFY the power distribution center (PDC) fuse 32 (40A) is OK. If OK, REPAIR circuit 170 (RD/LB) for an open. TEST the system for normal operation.</p>

**Table 14 PINPOINT TEST A: ALL POWER WINDOWS ARE INOPERATIVE (cont.)**

Test Step	Result / Action to Take
<p><b>A4 CHECK CIRCUIT 170 (RD/LB) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li>Key in OFF position.</li> <li>Measure the resistance between power window relay socket pin 87, circuit 170 (RD/LB) and LH window control switch C504-5, circuit 170 (RD/LB) harness side.</li> </ul>  <p>N0019009</p> <p><b>Is the resistance less than 5 ohms?</b></p>	<p><b>Yes</b></p> <p>GO to A5.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>
<p><b>A5 CHECK CIRCUIT 296 (WH/VT) FOR VOLTAGE</b></p> <ul style="list-style-type: none"> <li>Key in ON position.</li> <li>Measure the voltage between power window relay socket pin 86, circuit 296 (WH/VT) and ground.</li> </ul>  <p>N0019010</p> <p><b>Is the voltage greater than 10 volts?</b></p>	<p><b>Yes</b></p> <p>GO to A6.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>

**Table 14 PINPOINT TEST A: ALL POWER WINDOWS ARE INOPERATIVE (cont.)**

Test Step	Result / Action to Take
<p><b>A6 CHECK POWER WINDOW RELAY CIRCUIT 57 (BK)</b></p> <ul style="list-style-type: none"> <li>Measure the resistance between power window relay socket pin 85, circuit 57 (BK) harness side and ground.</li> </ul>  <p>A0043703</p> <p>Is the resistance less than 5 ohms?</p>	<p><b>Yes</b></p> <p>The concern may have been caused by loose or corroded pins or a damaged connector. CHECK the power window relay sockets and power window switch C504 for corroded or pushed out pins and repair any obvious concerns. TEST the system for normal operation.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>
<p><b>A7 CHECK CIRCUIT 57 (BK) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li>Measure the resistance between LH window control switch C504-3, circuit 57 (BK).</li> </ul>  <p>N0019011</p> <p>Is the resistance less than 5 ohms?</p>	<p><b>Yes</b></p> <p>INSTALL a new LH window control switch. REFER to Window Control Switch in this section. TEST the system for normal operation.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>

*Pinpoint Test B: The LH Power Window Is Inoperative***Normal Operation**

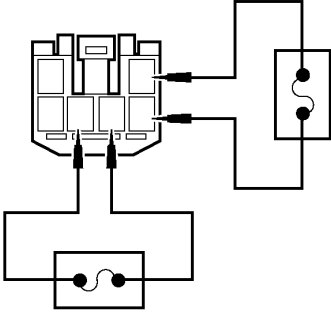
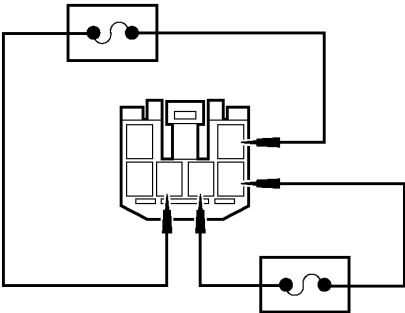
The LH window control switch receives battery voltage from the power window relay through circuit 170 (RD/LB) and ground through circuit 57 (BK). When the LH window control switch is pressed to the DOWN position, battery voltage is sent to the LH window motor through circuit 227 (YE) and ground through circuit 226 (WH/BK), and the window will

move downward. When the LH window control switch is pressed to the UP position, battery voltage is sent to the LH window motor through circuit 226 (WH/BK) and ground through circuit 227 (YE).

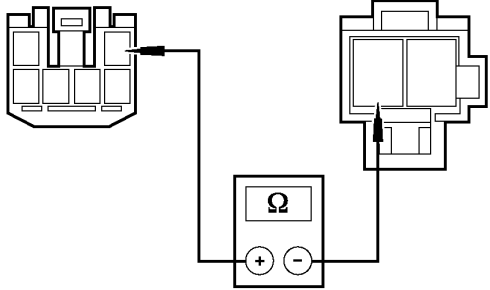
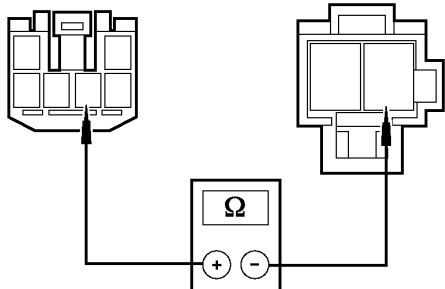
**Possible Causes**

- Open in circuits 170 (RD/LB), 57 (BK), 226 (WH/BK) or 227 (YE)
- LH power window motor

Table 15 PINPOINT TEST B: THE LH POWER WINDOW IS INOPERATIVE

Test Step	Result / Action to Take
<p><b>B1 CHECK THE LH POWER WINDOW MOTOR</b></p> <ul style="list-style-type: none"> <li>• <b>Disconnect:</b> LH Window Control Switch C504</li> <li>• Key in ON position.</li> <li>• Connect a fused jumper wire between LH window control switch C504-5, circuit 170 (RD/LB) harness side, and C504-4, circuit 227 (YE). Connect a second fused jumper wire between LH window control switch C504-3, circuit 57 (BK) and C504-1, circuit 226 (WH/BK). The window should operate in the UP direction.</li> </ul>  <p>N0019012</p> <ul style="list-style-type: none"> <li>• Connect a fused jumper wire between LH window control switch C504-5, circuit 170 (RD/LB) harness side, and C504-1, circuit 226 (WH/BK) harness side. Connect a second fused jumper wire between LH window control switch C504-3, circuit 57 (BK) and C504-4, circuit 227 (YE). The window should operate in the DOWN direction.</li> </ul>  <p>N0019013</p> <p><b>Did the LH window operate correctly?</b></p>	<p><b>Yes</b></p> <p>INSTALL a new LH window control switch. REFER to Window Control Switch in this section. TEST the system for normal operation.</p> <p><b>No</b></p> <p>GO to B2.</p>

**Table 15 PINPOINT TEST B: THE LH POWER WINDOW IS INOPERATIVE (cont.)**

Test Step	Result / Action to Take
<p><b>B2 CHECK CIRCUIT 226 (WH/BK) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li>• <b>Disconnect:</b> Jumper Wires.</li> <li>• <b>Disconnect:</b> LH Window Motor C518.</li> <li>• Measure the resistance between LH window control switch C504-1, circuit 226 (WH/BK) harness side and LH window motor C518-1, circuit 226 (WH/BK) harness side.</li> </ul>  <p>N0019014</p> <p>Is the resistance less than 5 ohms?</p>	<p><b>Yes</b></p> <p>GO to B3.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>
<p><b>B3 CHECK CIRCUIT 227 (YE) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li>• Measure the resistance between LH window control switch C504-4, circuit 227 (YE) harness side and LH window motor C518-2, circuit 227 (YE) harness side.</li> </ul>  <p>N0019015</p> <p>Is the resistance less than 5 ohms?</p>	<p><b>Yes</b></p> <p>INSTALL a new LH window regulator and motor. REFER to Door Window Regulator and Motor in this section. TEST the system for normal operation.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>

**Pinpoint Test C: The RH Power Window Is Inoperative****Normal Operation**

The RH front window control switch receives battery voltage through circuit 170 (RD/LB) when the power window relay is active. When the RH front window control switch is pressed to the DOWN position, the RH front window control switch receives ground

from the LH front window switch through circuit 226 (WH/BK). When operating the RH front window in the DOWN direction, the RH front window control switch supplies power to the RH front window motor through circuit 226 (WH/BK) and ground through circuit 227 (YE).

When the RH front window control switch is pressed to the UP position, the RH front window control switch



receives ground from the LH front window switch through circuit 227 (YE). When operating the RH front window in the UP direction, the RH front window control switch provides power to the RH front window motor through circuit 227 (YE) and ground through circuit 226 (WH/BK).

#### **RH Window Operation From LH Switch**

When the RH power window is operated in the DOWN direction from the LH window control switch, power is sent to the RH window control switch through circuit 226 (WH/BK), which transfers power to the RH front window motor through circuit 227 (YE). Ground is provided to the RH window switch through circuit 227 (YE), which transfers ground to the RH front window motor through circuit 226 (WH/BK).

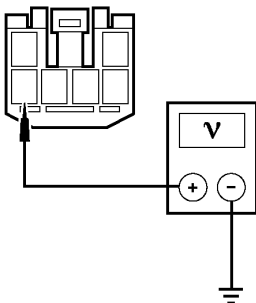
When the RH power window is operated in the UP direction from the LH window control switch, power

is sent to the RH window control switch through circuit 227 (YE), which transfers power to the front window motor through circuit 226 (WH/BK). Ground is provided to the RH window switch through circuit 226 (WH/BK), which transfers ground to the RH front window motor through circuit 227 (YE).

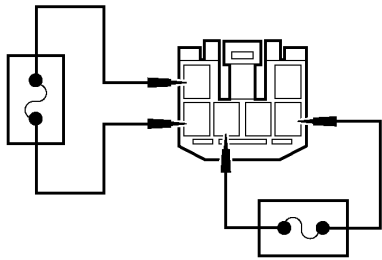
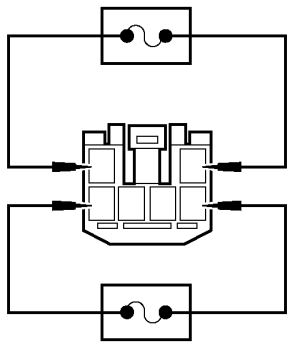
#### **Possible Causes**

- LH window control switch
- RH window control switch
- Open in circuits 170 (RD/LB), 226 (WH/BK) or 227 (YE)
- RH window motor

Table 16 PINPOINT TEST C: THE RH POWER WINDOW IS INOPERATIVE

Test Step	Result / Action to Take
<p><b>C1 CHECK CIRCUIT 170 (RD/LB) FOR VOLTAGE</b></p> <ul style="list-style-type: none"><li>• <b>Disconnect:</b> PRH Window Control Switch C604</li><li>• Key in ON position.</li><li>• Measure the voltage between RH window control switch C604-6, circuit 170 (RD/LB), harness side and ground.</li></ul>  <p>N0019016</p> <p><b>Is the voltage greater than 10 volts?</b></p>	<p><b>Yes</b></p> <p>Go to C2.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>

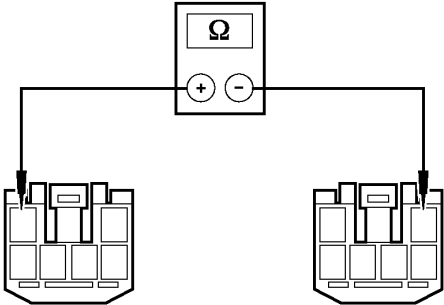
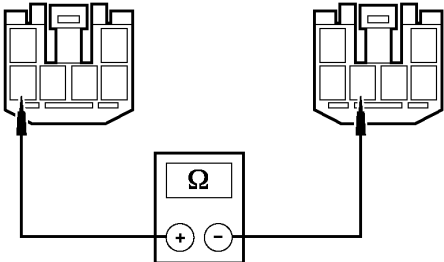
**Table 16 PINPOINT TEST C: THE RH POWER WINDOW IS INOPERATIVE (cont.)**

Test Step	Result / Action to Take
<p><b>C2 CHECK THE RH POWER WINDOW MOTOR</b></p> <ul style="list-style-type: none"> <li>Key in ON position.</li> <li>Connect a fused jumper wire between LH window control switch C604-6, circuit 170 (RD/LB) harness side, and C604-2, circuit 226 (WH/BK). Connect a second fused jumper wire between LH window control switch C604-5, circuit 226 (WH/BK), and C604-3, circuit 227 (YE). The window should operate in the UP direction.</li> </ul>  <p>N0019017</p> <ul style="list-style-type: none"> <li>Connect a fused jumper wire between LH window control switch C604-6, circuit 170 (RD/LB) harness side, and C604-3, circuit 227 (YE) harness side. Connect a second fused jumper wire between LH window control switch C604-1, circuit 227 (YE) and C604-2, circuit 226 (WH/BK). The window should operate in the DOWN direction.</li> </ul>  <p>N0019018</p> <p><b>Did the RH window operate correctly?</b></p>	<p><b>Yes</b></p> <p>INSTALL a new RH window control switch. REFER to Window Control Switch in this section. TEST the system for normal operation.</p> <p><b>No</b></p> <p>Go to C3.</p>

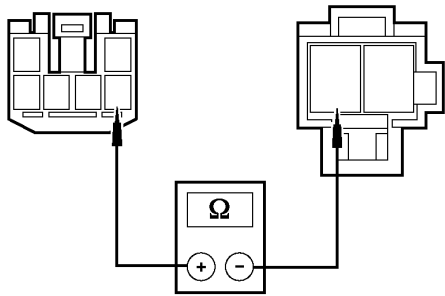
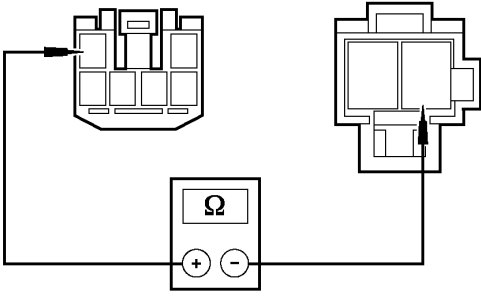
**Table 16 PINPOINT TEST C: THE RH POWER WINDOW IS INOPERATIVE (cont.)**

Test Step	Result / Action to Take
<b>C3 CHECK THE LH WINDOW CONTROL SWITCH</b> <ul style="list-style-type: none"> <li>Carry out the LH window control switch component test. Refer to the Wiring Diagrams for component testing.</li> </ul> <b>Did the LH window control switch pass the component test?</b>	<b>Yes</b> INSTALL a new RH window control switch. REFER to Window Control Switch in this section. TEST the system for normal operation.  <b>No</b> GO to C4.
<b>C4 CHECK THE LH WINDOW CONTROL SWITCH</b> <ul style="list-style-type: none"> <li>Carry out the LH window control switch component test. Refer to the Wiring Diagrams for component testing.</li> </ul> <b>Did the LH window control switch pass the component test?</b>	<b>Yes</b> GO to C5.  <b>No</b> INSTALL a new LH window control switch. REFER to Window Control Switch in this section. TEST the system for normal operation.
<b>C5 CHECK THE RH FRONT WINDOW CONTROL SWITCH</b> <ul style="list-style-type: none"> <li>Carry out the RH window control switch component test. Refer to the Wiring Diagrams for component testing.</li> </ul> <b>Did the RH window control switch pass the component test?</b>	<b>Yes</b> GO to C6.  <b>No</b> INSTALL a new RH window control switch. REFER to Window Control Switch in this section. TEST the system for normal operation.

**Table 16 PINPOINT TEST C: THE RH POWER WINDOW IS INOPERATIVE (cont.)**

Test Step	Result / Action to Take
<p><b>C6 CHECK LH WINDOW SWITCH CIRCUITS 226 (WH/BK) AND 227 (YE) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li>Measure the resistance between LH window control switch C504-2, circuit 227 (YE) harness side and RH window control switch C604-1, circuit 227 (YE) harness side.</li> </ul>  <p>N0019019</p> <ul style="list-style-type: none"> <li>Measure the resistance between LH window control switch C504-6, circuit 226 (WH/BK) harness side and RH window control switch C604-5, circuit 227 (YE) harness side.</li> </ul>  <p>N0019020</p> <p><b>Are the resistances less than 5 ohms?</b></p>	<p><b>Yes</b></p> <p>Go to C7.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>

**Table 16 PINPOINT TEST C: THE RH POWER WINDOW IS INOPERATIVE (cont.)**

Test Step	Result / Action to Take
<p><b>C7 CHECK RH WINDOW SWITCH CIRCUITS 226 (WH/BK) AND 227 (YE) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li>Measure the resistance between RH window control switch C604-3, circuit 227 (YE) harness side and RH window control switch C623-1, circuit 227 (YE) harness side.</li> </ul>  <p>N0034324</p> <ul style="list-style-type: none"> <li>Measure the resistance between RH window control switch C604-2, circuit 226 (WH/BK) harness side and RH window control switch C623-2, circuit 226 (WH/BK) harness side.</li> </ul>  <p>N0034325</p> <p><b>Are the resistances less than 5 ohms?</b></p>	<p><b>Yes</b></p> <p>INSTALL a new RH window regulator and motor. REFER to Door Window Regulator and Motor. TEST the system for normal operation.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>

**General Procedures****Windshield Reseal**

1. Remove the cowl trim panel.
2. Remove the interior mirror. For additional information, refer to Rear View Mirrors(Rear View Mirrors, page 10).
3. Remove the A-pillar trim panels. For additional information, refer to Interior Trim and Ornamentation(Interior Trim and Ornamentation, page 7).
4. Remove the overhead console. For additional information, refer to Instrument Panel and Console(Instrument Panel and Console, page 49).
5. Remove the sun visors.
6. Partially lower the front portion of the headliner and block with a suitable material. For additional information, refer to Interior Trim and Ornamentation(Interior Trim and Ornamentation, page 7).

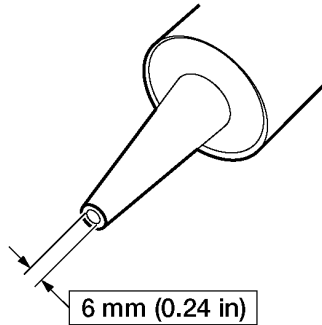
S16032

Read all safety instructions in the "Safety Information" section of this manual before doing any procedures.

Follow all warnings, cautions, and notes.

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7. Clean the edge formed by the existing urethane and the glass on the inside at the top and sides, and outside on the bottom of the windshield with an alcohol-free cleaner.
8. Cut the urethane applicator tip to specification.



A0091931

**NOTE:** Use either a high-ratio electric or battery-operated caulk gun that will apply the urethane with less effort and a continuous bead.

9. Apply a bead of Essex 400-HV urethane adhesive to the cleaned area.

**NOTE:** Make sure that all gaps in the urethane adhesive are smoothed into one continuous bead.

10. Backfill the urethane application and clean the excess.

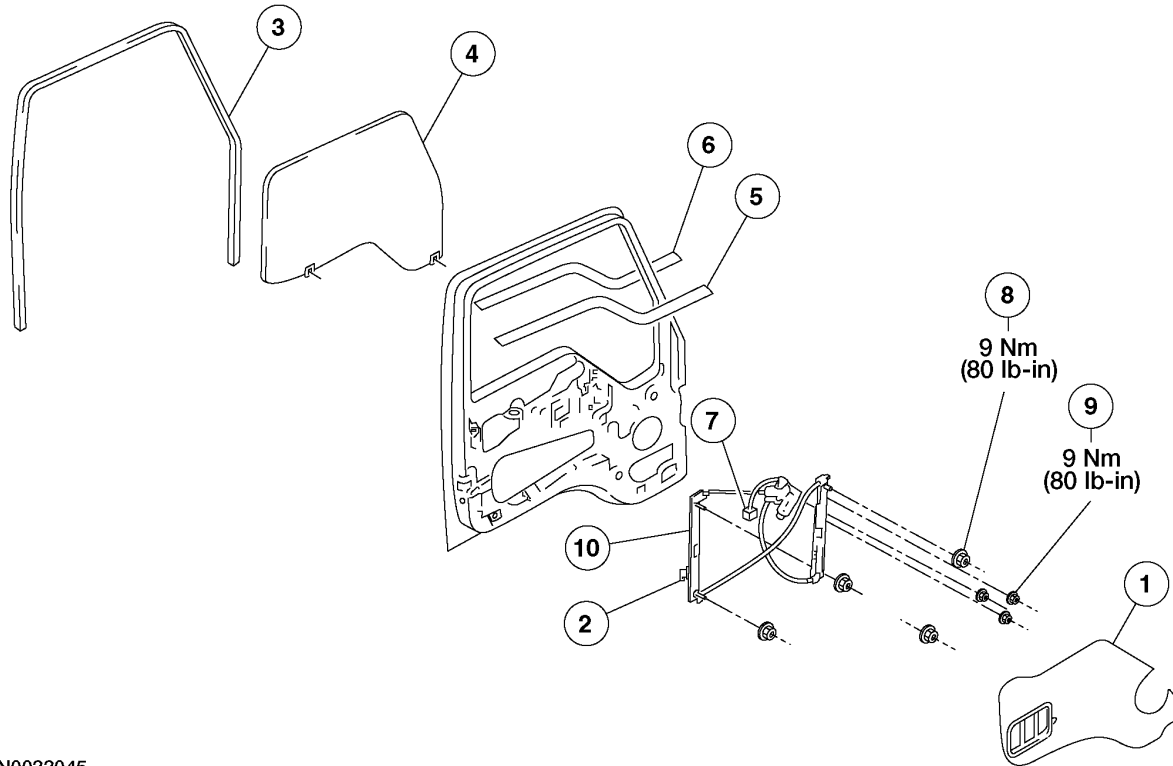
**CAUTION:** The urethane adhesive must cure for a minimum of one hour before testing for air or water leaks.

11. After the urethane has cured, check the windshield seal for air or water leaks through the urethane adhesive bead and add urethane adhesive as necessary.
12. Raise the headliner or, if equipped, the roof trim panel.
13. Install the sun visors.
14. Install the overhead console. For additional information, refer to Instrument Panel and Console(Instrument Panel and Console, page 49).
15. Install the windshield side garnish mouldings. For additional information, refer to Interior Trim and Ornamentation(Interior Trim and Ornamentation, page 7).
16. Install the interior mirror. For additional information, refer to Rear View Mirrors(Rear View Mirrors, page 10).
17. Install the cowl trim panel.
18. Clean the exterior and interior of the windshield glass with an alcohol-free cleaner.

### Removal and Installation

#### Glass, Frames and Mechanisms — Exploded View

**NOTE:** LH side shown, RH side similar.



N0033045

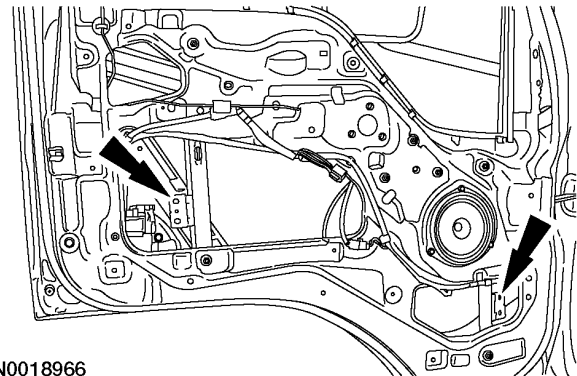
**Figure 56**

- |                                         |                                      |                                            |
|-----------------------------------------|--------------------------------------|--------------------------------------------|
| 1. Door weather shield                  | 5. Inner beltline moulding           | 9. Window regulator motor nut (3 required) |
| 2. Window glass clamp bolt (2 required) | 6. Outer beltline moulding (LH/RH)   | 10. Window regulator assembly (LH/RH)      |
| 3. Door window glass top run (LH/RH)    | 7. Electrical connector              |                                            |
| 4. Door window glass (LH/RH)            | 8. Window regulator nut (4 required) |                                            |

1. For additional information, refer to the procedures in this section.

### Door Window Regulator and Motor

1. Remove the door trim panel. For additional information, refer to Interior Trim and Ornamentation (Interior Trim and Ornamentation, page 7).
2. Position the door weathershield aside.
3. Position the window glass so that the glass clamp bolts are accessible from the openings inside the door.



N0018966

4. Remove the rear window glass clamp bolt.
  - To install, tighten to 9 Nm (80 lb-in).

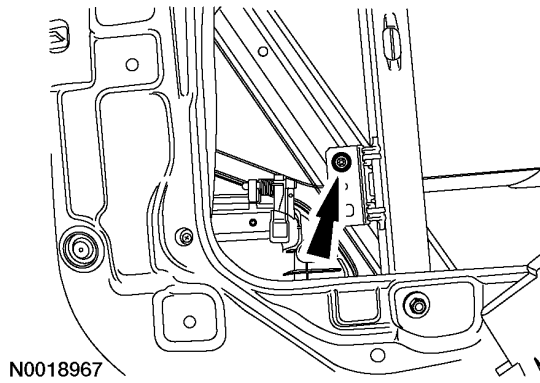
S16032

Read all safety instructions in the "Safety Information" section of this manual before doing any procedures.

Follow all warnings, cautions, and notes.

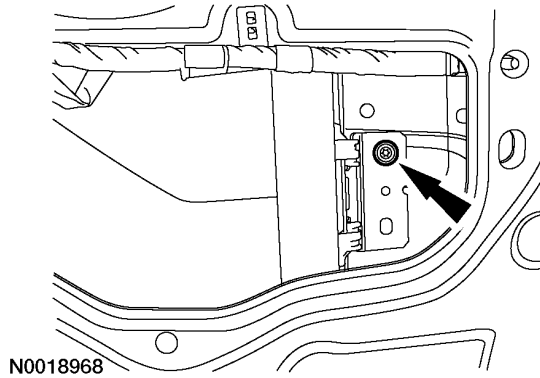
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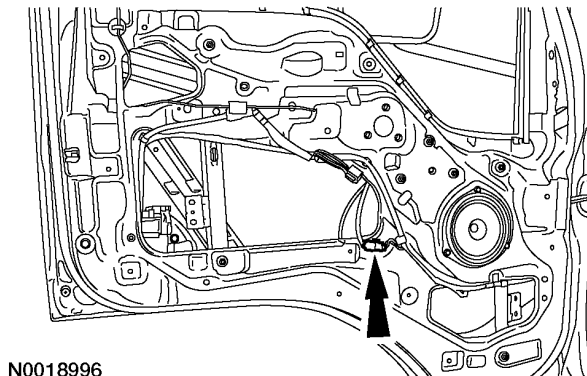
5. Remove the front window glass clamp bolt.

• To install, tighten to 9 Nm (80 lb-in).



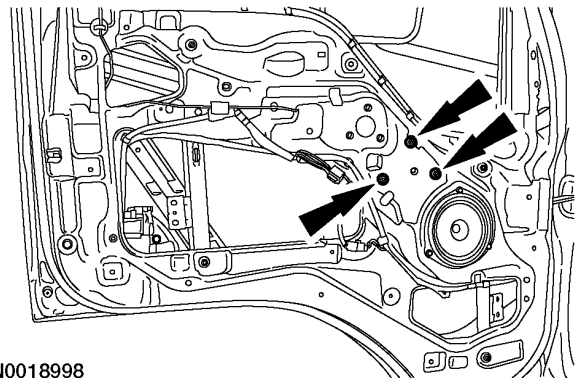
6. Raise the window glass and secure it in position with tape.

7. Disconnect the electrical connector.



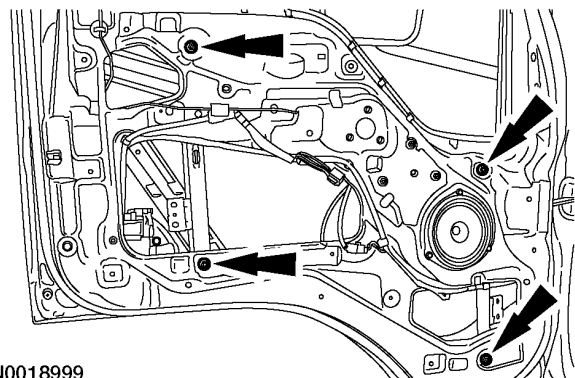
8. Remove the 3 window regulator motor nuts.

• To install, tighten to 9 Nm (80 lb-in).



9. Remove the 4 window regulator motor nuts.

• To install, tighten to 9 Nm (80 lb-in).



10. Remove the window regulator assembly.

11. To install, reverse the removal procedure.

### Door Window Glass

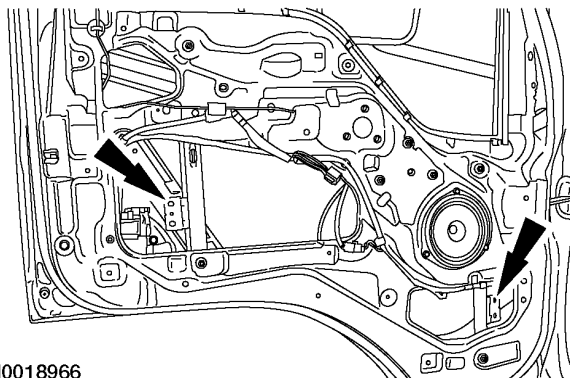
**! WARNING:** Always wear safety glasses and gloves when handling glass to avoid personal injury.

1. Remove the front door trim panel. For additional information, refer to Interior Trim and Ornamentation(Interior Trim and Ornamentation, page 7).

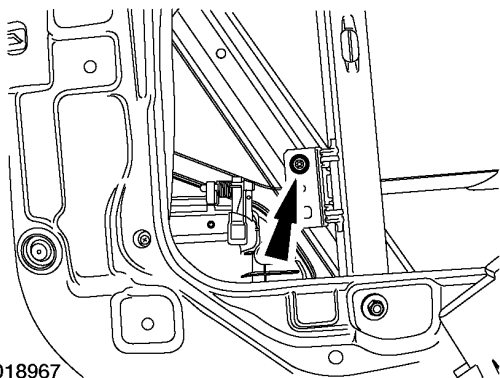
2. Position the door weathershield aside.

- To install, apply 2-sided tape as necessary to make sure the weathershield has a good seal.

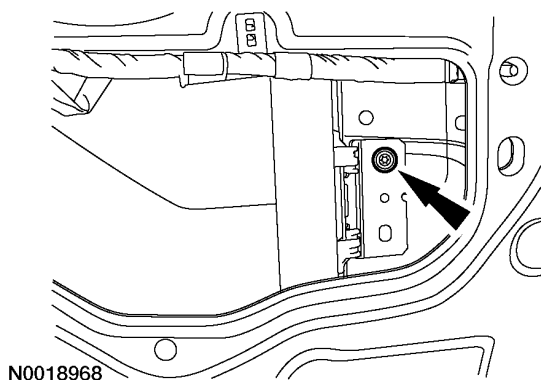
3. Position the window glass so that the glass clamp screws are accessible from the openings inside the door.



4. Remove the rear window glass clamp screw.



5. Remove the front window glass clamp screw.



6. Remove the window glass.
7. To install, reverse the removal procedure.

### Windshield Glass Removal

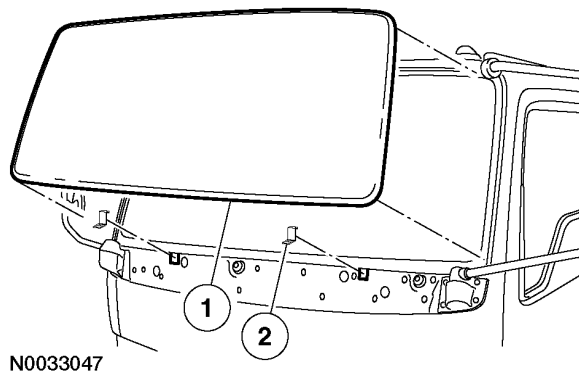


Figure 66

1. Windshield glass
2. Windshield glass stop blocks (2 required)

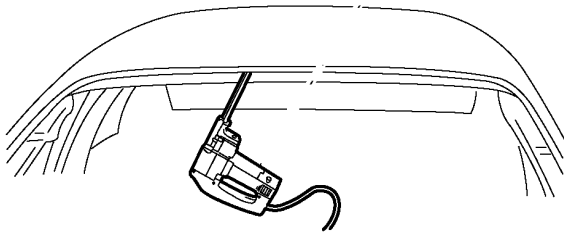
**! WARNING:** To prevent glass splinters from entering eyes or cutting hands, wear safety glasses and heavy gloves when cutting glass from the vehicle.

1. Remove the A-pillar trim panels. For additional information, refer to Interior Trim and Ornamentation (Interior Trim and Ornamentation, page 7).
2. Remove the interior mirror. For additional information, refer to Rear View Mirror (Rear View Mirrors, page 10).
3. Partially lower the front portion of the headliner near the windshield header and block with suitable material. For additional information, refer to Interior Trim and Ornamentation (Interior Trim and Ornamentation, page 7).
4. Remove the cowl trim panel.

**NOTE:** Lubricate the existing urethane adhesive with water to aid the special tool while cutting.

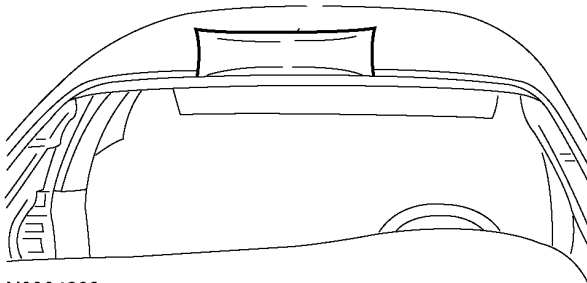
**NOTE:** Removing the windshield glass requires more than one technician.

5. Cut the urethane adhesive from the windshield glass starting at the top center and working toward the bottom corners.



N0004363

6. Using the special tool, distance the windshield glass from the body.



N0004369

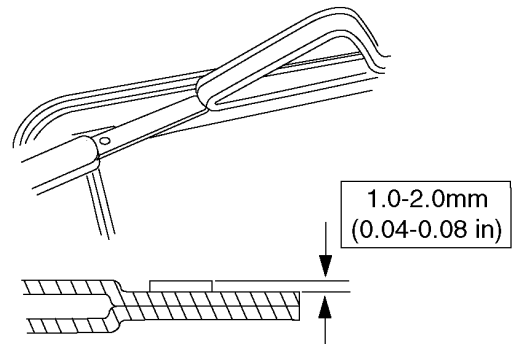
7. Using the special tool, cut the remaining urethane adhesive and remove the windshield glass.
8. Using a soft brush or vacuum, remove any dirt or foreign material from the pinch weld.

### Windshield Glass Installation

**CAUTION:** When installing urethane installed glass parts, the vehicle must not be driven until the urethane adhesive has cured. At temperatures above 21°C (70°F) and relative humidities above 50%, adequate cure time is typically 24 hours. (Refer to Essex drive away chart for the cure times, as temperatures and humidity will cause cure times to vary.) Inadequate or incorrect curing can adversely affect the bonding of the windshield glass.

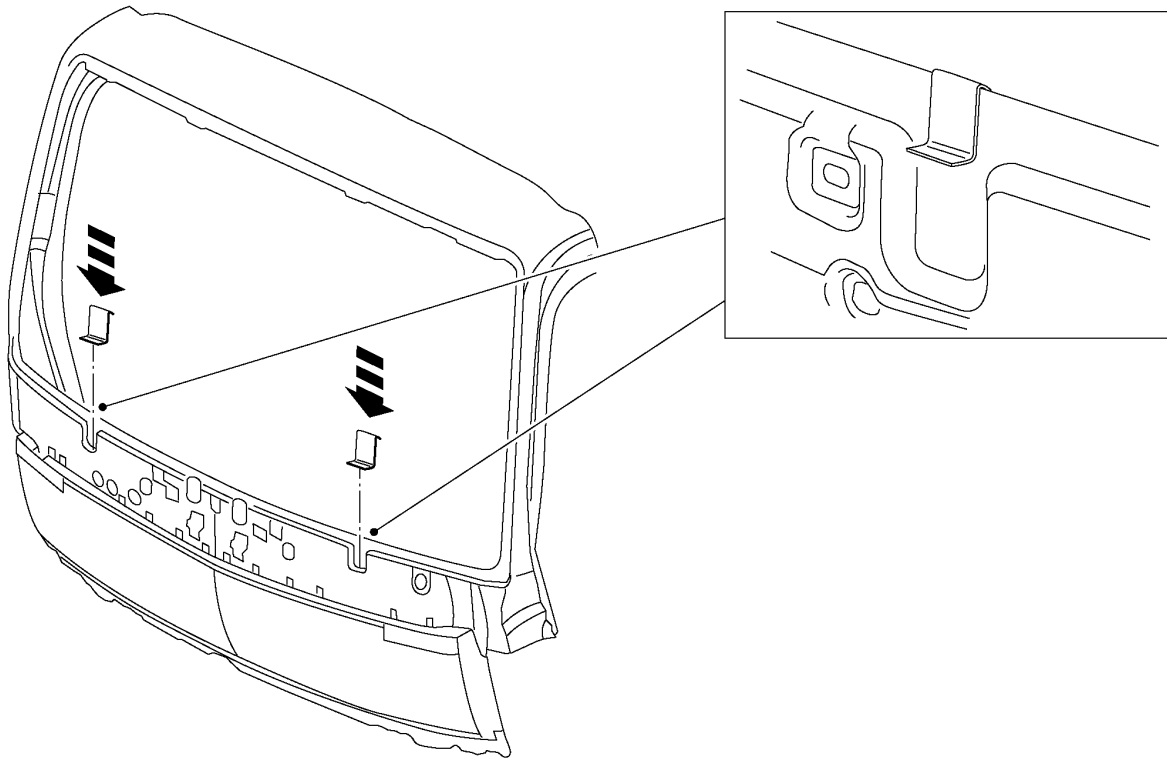
**NOTE:** Avoid scratching the pinch weld.

1. Trim the remaining urethane adhesive to specification. The urethane adhesive must be smooth and free of cuts and contamination after trimming. Avoid touching the urethane adhesive after preparation.



A0005586

2. Using a clean applicator, apply the Essex U-413 Urethane Metal Primer to any exposed metal on the pinch weld. Allow 6 to 10 minutes to dry.
3. If necessary, install new windshield glass stop blocks.
4. If reinstalling the original windshield glass, remove the original urethane adhesive from the glass.

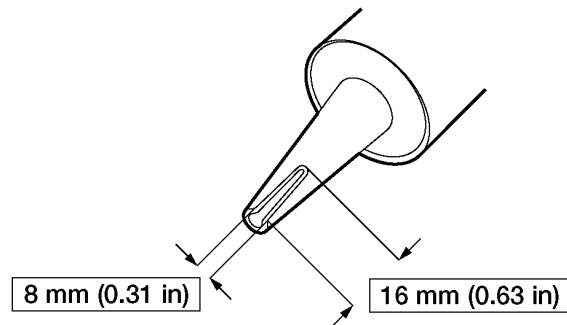


N0033051

5. Clean the windshield glass with a non-alcohol based window cleaner.

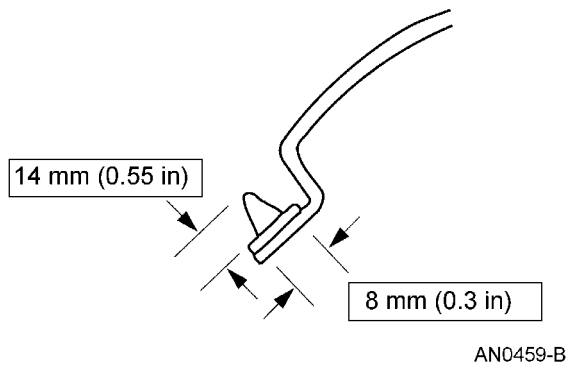
**CAUTION: Wipe off the urethane glass prep immediately after each application because it flash dries.**

6. If installing a new windshield glass, apply urethane glass prep twice around the glass surface to be urethaned.
7. If installing a new windshield glass, apply urethane glass primer to the same area that was prepped in the previous step. Allow 5 minutes to dry.
8. Cut the urethane adhesive applicator tip to specification.



A0016835

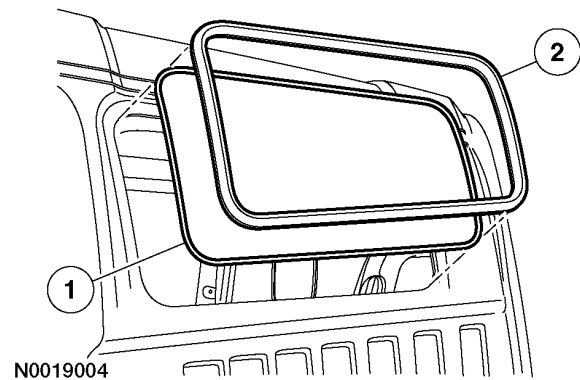
9. Apply a bead of Essex 400-HV Urethane Adhesive to the pinch weld.



**NOTE:** Before the urethane has set, partially lower the windows to prevent the glass from being pushed out of position when a door is closed.

10. Install the windshield glass.
11. After the glass is set, check for water leaks and add urethane adhesive where needed.
12. Install the cowl trim panel.
13. Install the headliner. For additional information, refer to Interior Trim and Ornamentation(Interior Trim and Ornamentation, page 7).
14. Install the interior mirror. For additional information, refer to Rear View Mirror(Rear View Mirrors, page 10).
15. Install the A-pillar trim panels. For additional information, refer to Interior Trim and Ornamentation(Interior Trim and Ornamentation, page 7).

## Rear Window Glass Removal



**Figure 73**

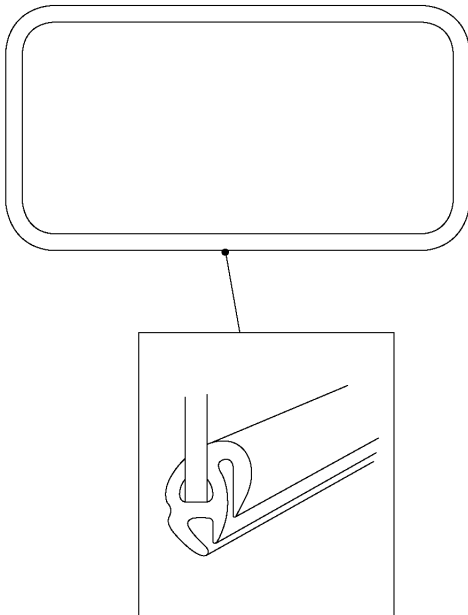
1. Rear window glass
2. Rear window weatherstrip

1. From inside the vehicle, release the edge of the weatherstrip
  - While working around the rear window glass, pull the outer edge of the rear window glass weatherstrip toward the center of the rear window glass.
  - Push the rear window and weatherstrip through the rear window opening to the outside of the vehicle.
2. Remove the weatherstrip from the rear window glass.

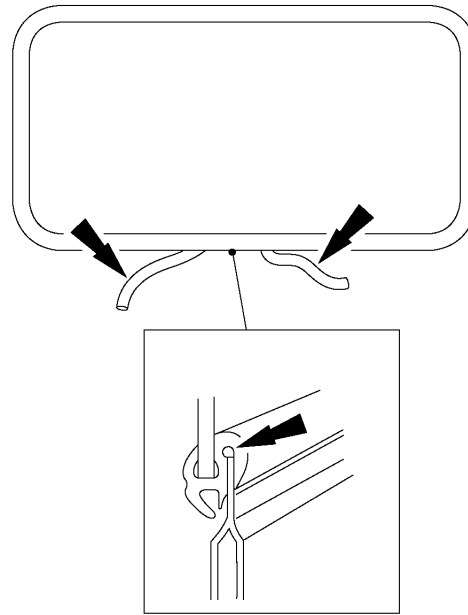
## Rear Window Glass Installation

**NOTE:** Installation of the rear window requires an assistant to push the rear window glass into the rear window opening from outside the vehicle.

1. Install the weatherstrip on the rear window glass.

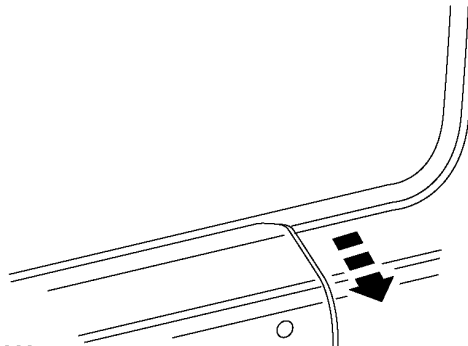


N0019006



N0019005

2. Install the window installation rope on the cab interior side of the rear window weatherstrip. Tie the window installation rope so that it slightly compresses the cab interior side of the rear window weatherstrip.
3. Lubricate the rear window weatherstrip with soapy water.
4. Position the rear window in the rear window opening.
5. Using the assistance of another technician outside the cab, seat the rear window glass and weatherstrip in the rear window opening.
  - Pull the installation rope from the window weatherstrip (technician inside the cab).
  - Push inward and downward on the rear window glass (technician outside the cab).



N0019007

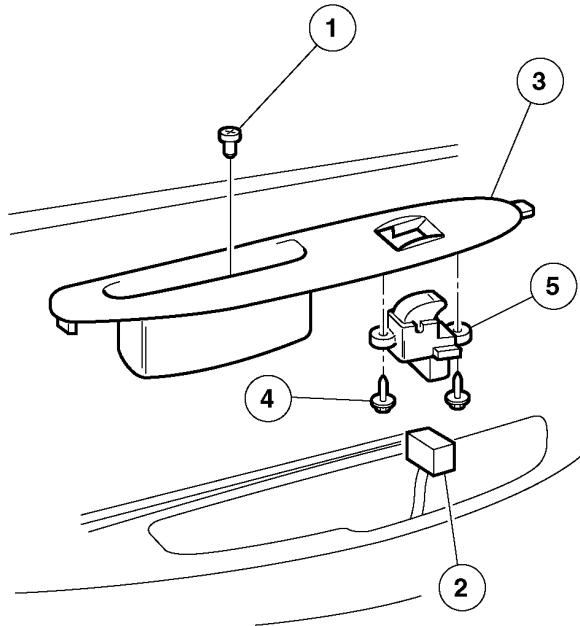
S16032

Read all safety instructions in the "Safety Information" section of this manual before doing any procedures.

Follow all warnings, cautions, and notes.

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## Window Control Switch Removal and Installation



N0019003

**Figure 77**

1. Screw
2. Electrical connector
3. Window control switch bezel
4. Screws (2 required)
5. Window control switch (LH/RH)

1. Remove the window control switch bezel.
  - Remove the screw.
2. Disconnect the electrical connector.
3. Remove the window control switch screws.
4. Remove the window control switch.
5. To install, reverse the removal procedure.

## Instrument Panel and Console

## Specifications

**Table 17 Torque Specifications**

Description	Nm	lb-ft	lbf-in
Floor console retaining screws	6	—	53
Overhead console retaining bolts	9	—	80
Windshield washer reservoir retaining screw	6	—	53
Glove compartment retaining screws	4	—	35
Center glove compartment retaining screws	4	—	35
Center storage compartment retaining screw	4	—	35
Steering column cover retaining screws	4	—	35
Lower steering column bolts	22	16	—
Steering column retaining nuts	22	16	—
Brake fluid reservoir-to-instrument panel bolts	11	8	—
Instrument panel retaining bolts	11	8	—

## Removal and Installation

## Instrument Panel

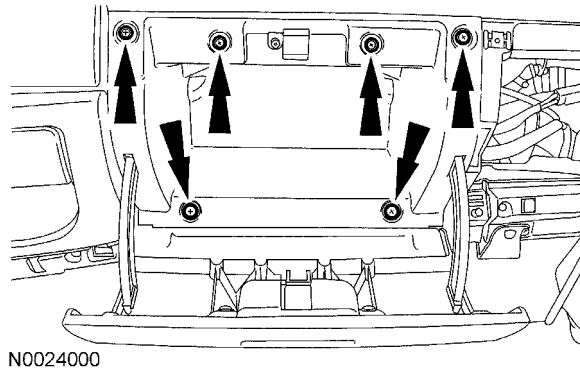
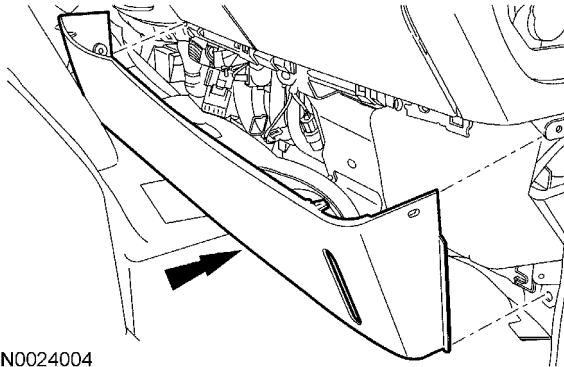
1. Remove the A-pillar trim panels. For additional information, refer to Interior Trim and Ornamentation (Interior Trim and Ornamentation, page 7).
2. Remove the instrument panel end trim panels.
3. Remove the lower RH finish panel from the instrument panel.

S16032

Read all safety instructions in the "Safety Information" section of this manual before doing any procedures.

Follow all warnings, cautions, and notes.

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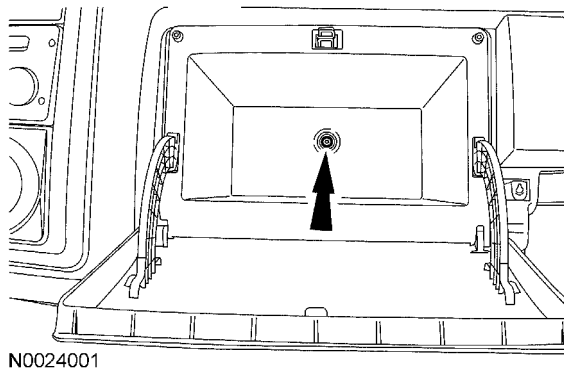
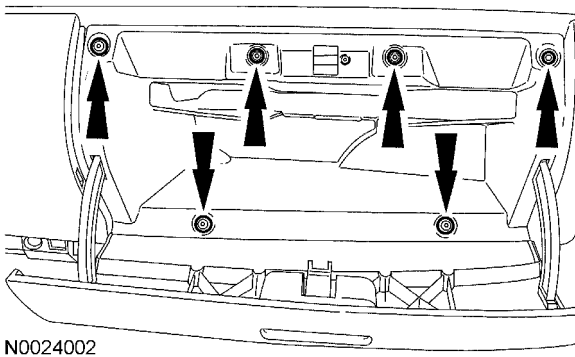


4. Remove the 6 glove compartment retaining screws and the glove compartment.

- To install, tighten to 4 Nm (35 lb-in).

7. Remove the center storage compartment retaining screw and the center storage compartment.

- To install, tighten to 4 Nm (35 lb-in).



5. Remove the windshield washer reservoir. For additional information, refer to Wipers and Washers (Wipers and Washers, page 86).

6. Remove the 6 center glove compartment retaining screws and the center glove compartment.

- To install, tighten to 4 Nm (35 lb-in).

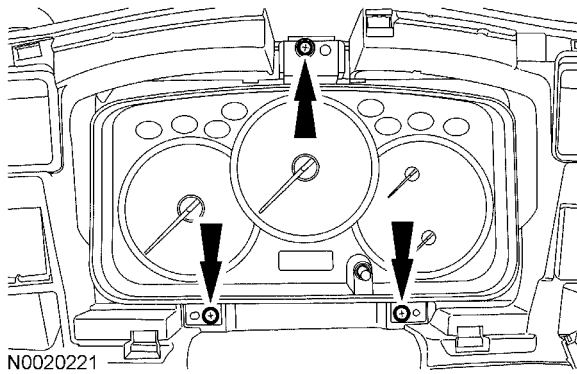
8. Remove the ashtray.

9. Remove the center lower instrument panel finish panel.

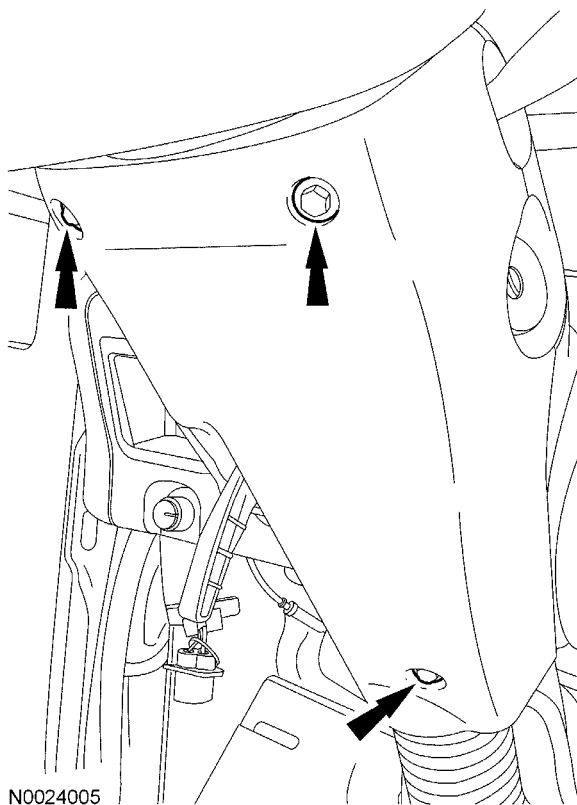
10. Remove the instrument cluster finish panel. For additional information, refer to Instrument Cluster Finish Panel in this section.

11. Remove the 3 instrument cluster retaining screws.



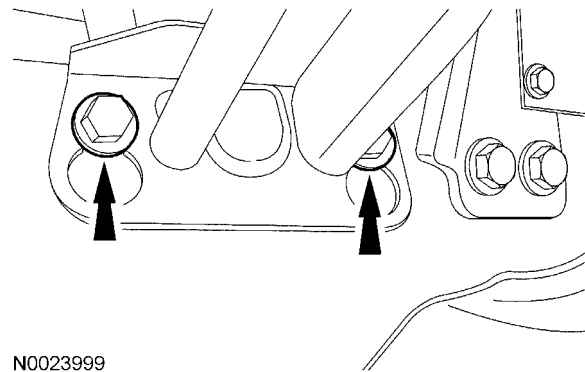


12. Disconnect the instrument cluster electrical connector.
13. Remove the instrument cluster.
14. Remove the 3 steering column cover screws.
  - To install, tighten to 4 Nm (35 lb-in).

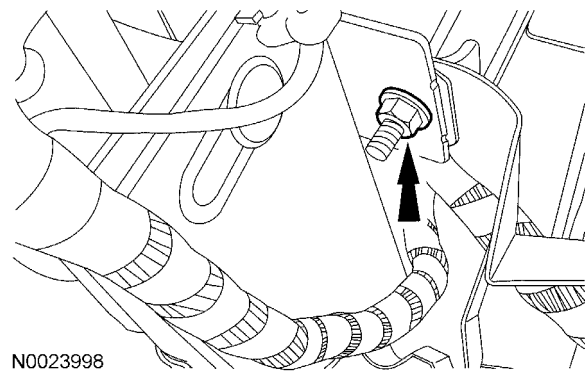


15. Remove the steering column covers.
16. Loosen the 2 lower steering column bolts.

- To install, tighten to 22 Nm (16 lb-ft).

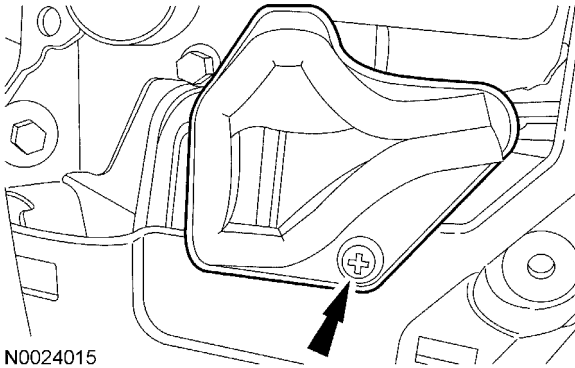


- NOTE:** RH retaining nut shown, LH similar.
17. Remove the 2 steering column retaining nuts.
    - To install, tighten to 22 Nm (16 lb-ft).



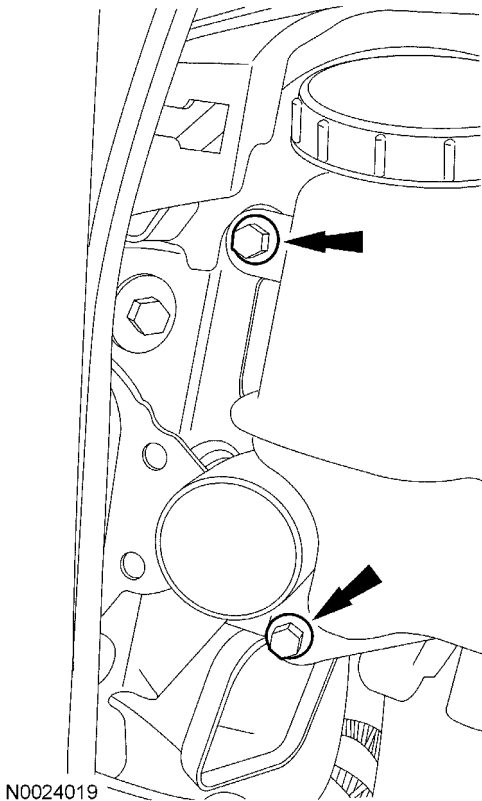
18. Remove the audio unit. For additional information, refer to Audio Unit.
19. Remove the climate control assembly. For additional information, refer to Climate Control.
20. Disconnect the hazard switch electrical connector.
21. Disconnect the 2 cruise control switch electrical connectors.
22. Disconnect the routing fasteners on the steering column support.
23. Disconnect the routing fastener on the LH instrument panel support.
24. Disconnect the routing fastener located in the opening for the climate control assembly.

25. Remove the screw and the A/C duct from the LH side of the instrument panel.



26. Remove the 2 brake fluid reservoir-to-instrument panel bolts.

- To install, tighten to 11 Nm (8 lb-ft).



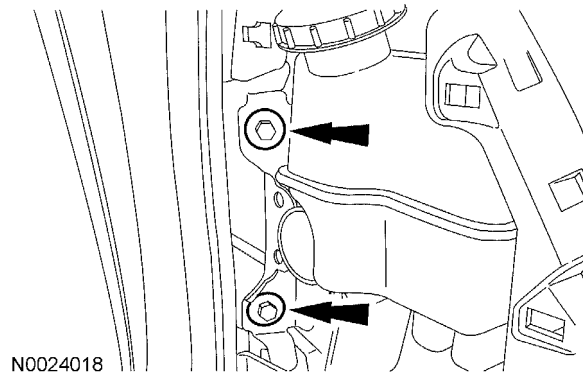
27. Remove the 3 upper instrument panel retaining bolt covers.

28. Remove the 3 upper instrument panel retaining bolts.

- To install, tighten to 11 Nm (8 lb-ft).

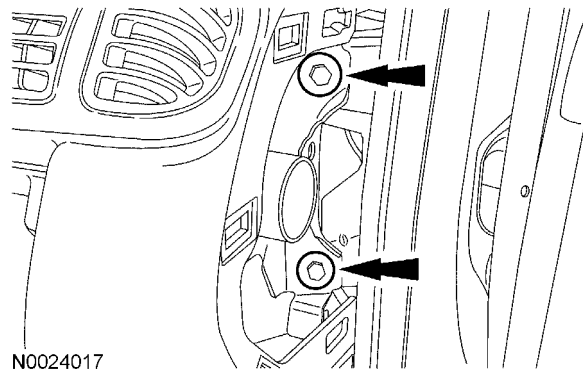
29. Remove the 2 instrument panel retaining bolts located at the LH side of the instrument panel.

- To install, tighten to 11 Nm (8 lb-ft).



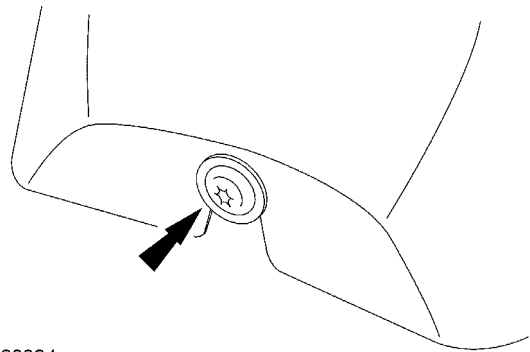
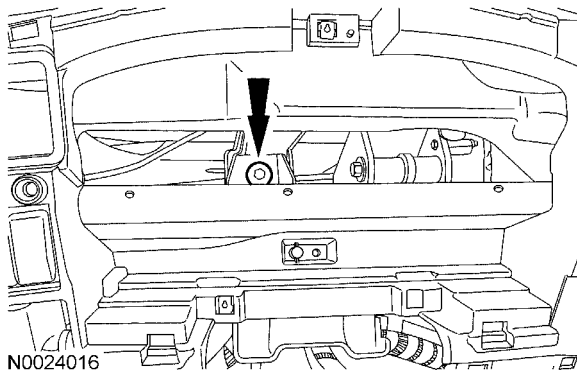
30. Remove the 2 instrument panel retaining bolts located at the RH side of the instrument panel.

- To install, tighten to 11 Nm (8 lb-ft).



31. Remove the instrument panel retaining bolt located in the opening for the instrument cluster.

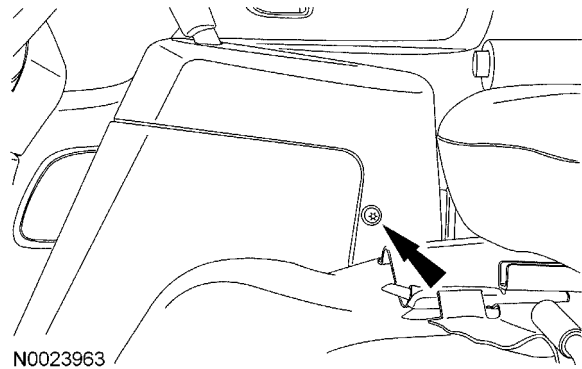
- To install, tighten to 11 Nm (8 lb-ft).



32. Remove the instrument panel retaining bolt located at the LH side of the instrument panel.
  - To install, tighten to 11 Nm (8 lb-ft).
33. Position the brake fluid reservoir away from the instrument panel.
34. Remove the instrument panel from the vehicle.
35. To install, reverse the removal procedure.

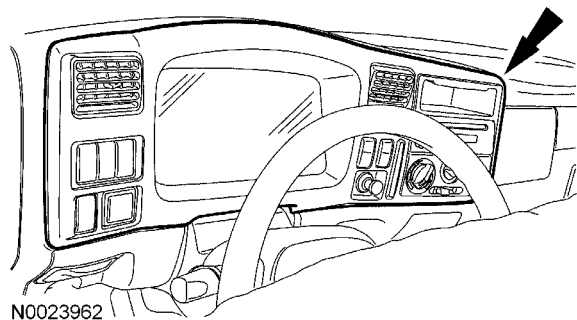
**NOTE:** LH side shown, RH side similar.

2. Remove the 2 side retaining screws from the floor console.



### Instrument Cluster Finish Panel

1. Pull the instrument panel cluster finish panel to release the retaining clips.



3. Remove the transmission shift select handle.
  - Remove the transmission shift select handle retaining screw.
  - Disconnect the electrical connector.
4. Remove the floor console.
5. To install, reverse the removal procedure.

2. Disconnect the electrical connector.
3. Remove the instrument panel cluster finish panel.
4. To install, reverse the removal procedure.

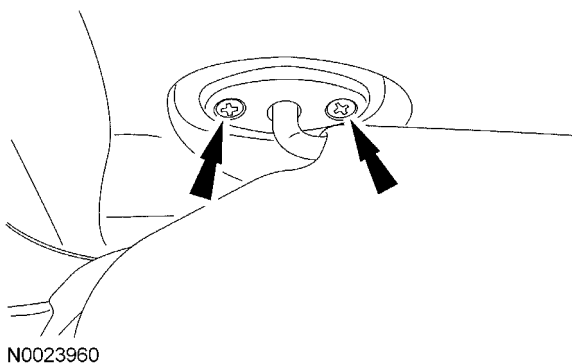
### Overhead Console

**NOTE:** LH side shown, RH side similar.

1. Remove the 4 sunvisor retaining screws.

### Floor Console

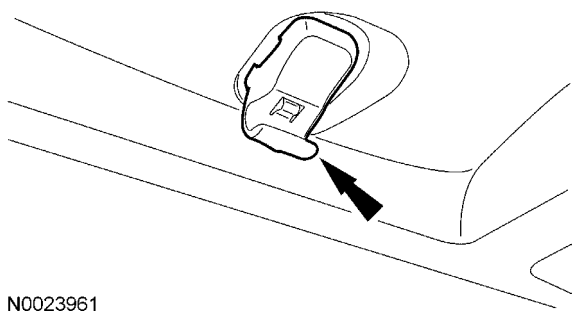
1. Remove the retaining screw at the front of the floor console.



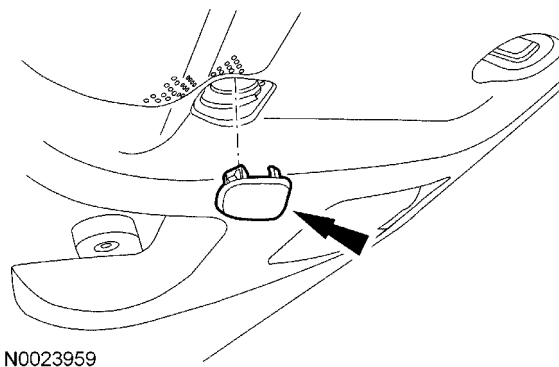
2. Remove the sunvisors.

**NOTE:** LH side shown, RH side similar.

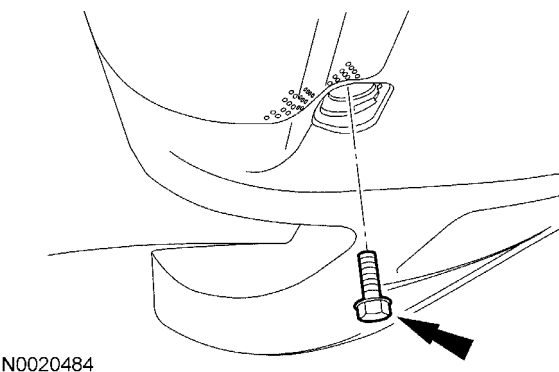
3. Remove the 2 sunvisor retaining clips.



4. Remove the interior mirror. For additional information, refer to Rear View Mirrors(Rear View Mirrors, page 10).
5. Remove the 4 overhead console retaining bolt covers.



6. Remove the 4 overhead console retaining bolts.
  - To install, tighten to 9 Nm (80 lb-in).



7. Remove the overhead console.
8. To install, reverse the removal procedure.

## Acceleration Control

### Specifications

**Table 18 Torque Specifications**

Description	Nm	lb-ft	lb-in
Accelerator pedal assembly bolts	22	16	—

### Acceleration Control Description and Operation

The diesel engine uses an accelerator sensor assembly located on the accelerator pedal assembly. This drive-by-wire system is entirely electronic and,

except for the accelerator pedal assembly, does not use mechanically moving parts. The accelerator sensor assembly is not adjustable.

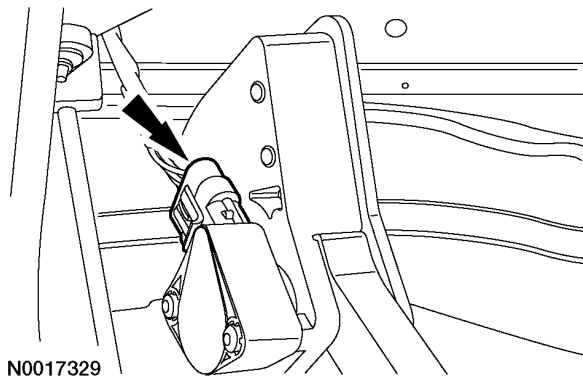
### Acceleration Control Diagnosis and Testing

Refer to the engine manual EGES-305.

### Accelerator Pedal Removal and Installation

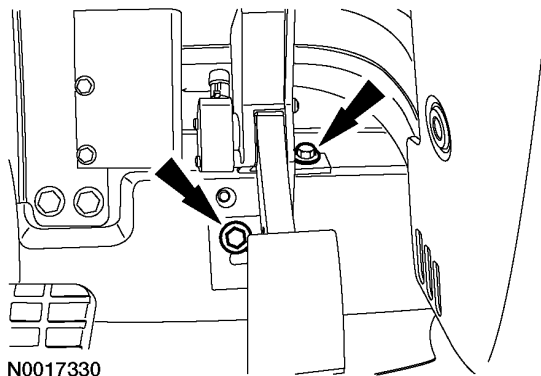
**CAUTION:** Make sure the ignition switch is in the OFF position prior to working on the electronic engine controls.

1. Turn the ignition switch to the OFF position.
2. Disconnect the accelerator pedal assembly electrical connector.



3. Remove the bolts and the accelerator pedal assembly.

- To install, tighten to 22 Nm (16 lb-ft).



4. To install, reverse the removal procedure.

## Handles, Locks, Latches and Entry Systems

### Specifications

**Table 19 Torque Specifications**

Description	Nm	lbf-ft	lbf-in
Door latch screws	6	—	53
Exterior door handle bolts	14	10	—
Cab latch handle bolts	25	18	—
Cab latch bolts	25	18	—

### Handles, Locks, Latches and Entry Systems Description and Operation

#### Cab Latch

The cab latch consists of the following components:

- Cab latch handle and safety catch
- RH and LH side cab latch

#### Door Latch

The door latches consist of the following components:

- Interior door handles
- Exterior door handles
- Front door latches
- Push rods
- Front door latch remote controls

#### Remote Keyless Entry (RKE)

The remote keyless entry (RKE) system consists of the following:

- Remote keyless entry (RKE) module
- RKE transmitter(s)

The RKE transmitter initiates the following electronic system functions:

- Unlocks the driver door

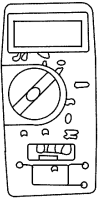
- Unlocks all doors
- Locks all doors
- Activates/deactivates the panic alarm
- Sounds the horn once when LOCK is pressed twice within 3 seconds and the doors are closed

The RKE transmitters have a minimum operating range of 10 m (33 feet).

### Locks, Latches and Entry Systems Diagnosis and Testing

Refer to Wiring Diagrams for schematic and connector information.

**Table 20 Special Tools**

 <p>ST1137-A</p>	<p>Automotive Meter ZTSE4357</p>
----------------------------------------------------------------------------------------------------	--------------------------------------

### Principles of Operation

The power door locks are controlled by the remote keyless entry (RKE) transmitter (if equipped), the door lock switch, which is internal to the LH door latch remote control and the door lock timer, which is mounted behind the center glove compartment. The internal door lock switch is hardwired to the door lock timer, and will cause the door lock timer to simultaneously LOCK both doors when the LH door lock push rod is set to the LOCK (DOWN) position,

or UNLOCK both doors when the LH door lock push rod is set to the UNLOCK (UP) position. The RH door latch remote control does not have a door lock switch and cannot be used to automatically LOCK or UNLOCK the doors. When the door lock timer receives a LOCK or UNLOCK signal from the remote keyless entry (RKE) module (if equipped), or the LH side door lock switch, the door lock timer will LOCK or UNLOCK both doors.

### Inspection and Verification

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

**Table 21 Visual Inspection Chart**

Mechanical	Electrical
<ul style="list-style-type: none"> <li>• Binding latch mechanisms</li> <li>• Binding linkage</li> <li>• Misaligned door</li> </ul>	<ul style="list-style-type: none"> <li>• Central junction box (CJB) fuse(s):               <ul style="list-style-type: none"> <li>— 9 (20A)</li> <li>— 26 (15A)</li> </ul> </li> <li>• Circuitry</li> <li>• Door lock timer</li> <li>• Door latch remote control</li> </ul>

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the concern is not visually evident, determine the symptom and proceed to the Symptom Chart.

**Table 22 Symptom Chart**

Condition	Possible Sources	Action
A single door lock is inoperative	<ul style="list-style-type: none"> <li>• Circuitry.</li> <li>• Door latch remote control.</li> <li>• Door lock timer.</li> </ul>	Go to Pinpoint Test A.
All door locks are inoperative	<ul style="list-style-type: none"> <li>• Fuse.</li> <li>• Circuitry.</li> <li>• Door latch remote control.</li> <li>• Door lock timer.</li> </ul>	Go to Pinpoint Test B.
The door locks operate only one way	<ul style="list-style-type: none"> <li>• Circuitry.</li> <li>• Door lock actuator.</li> <li>• Door lock timer.</li> </ul>	Go to Pinpoint Test C.
The doors do not lock or unlock using the remote keyless entry (RKE) remote transmitter	<ul style="list-style-type: none"> <li>• Fuse.</li> <li>• RKE remote transmitter.</li> <li>• Door lock timer.</li> </ul>	Go to Pinpoint Test D.
The remote keyless entry (RKE) transmitter has poor range performance	<ul style="list-style-type: none"> <li>• Aftermarket system.</li> <li>• High power devices.</li> <li>• TV/radio transmission towers.</li> <li>• RKE remote transmitter.</li> <li>• RKE module.</li> </ul>	Go to Pinpoint Test E.

**Pinpoint Tests***Pinpoint Test A: A Single Door Lock Is Inoperative***Normal Operation**

When both doors are locked and the LH door lock rod is moved to the UNLOCK position, or the UNLOCK button on the remote keyless entry (RKE) remote transmitter (if equipped) is pressed, ground is sent to the door lock timer through circuit 119 (PK/YE). When the door lock timer receives ground on circuit 119 (PK/YE), the door lock timer will simultaneously send 12 volts to both door lock actuators through circuit 118 (PK/OG), and ground through circuit 117 (PK/BK) and the doors will UNLOCK.

When both doors are unlocked and the LH side door lock rod is moved to the LOCK position, 12 volts from circuit 120 (PK/LG) is sent to the door lock timer through circuit 119 (PK/YE). If equipped with RKE and

the LOCK button on the RKE remote transmitter is pressed, the RKE module sends reference voltage to the door lock timer through circuit 129 (LG). When the door lock timer receives reference voltage on circuit 119 (PK/YE), or on circuit 129 (LG) (if equipped with RKE), the door lock timer will simultaneously send 12 volts to both door lock actuators through circuit 117 (PK/BK), and ground through circuit 118 (PK/OG) and the doors will LOCK.

**Possible Causes**

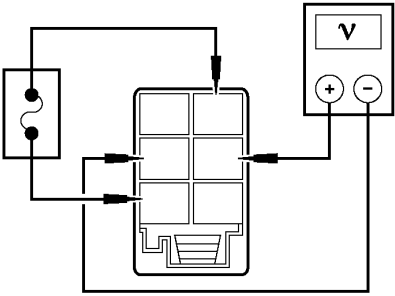
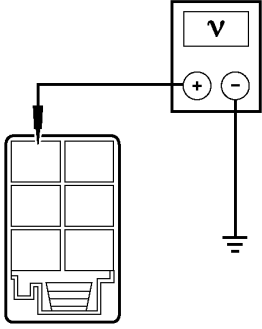
- Binding or stuck door lock mechanism
- Inoperative LH or RH door latch remote control
- Open in circuits 57 (BK), 118 (PK/OG) or 119 (PK/YE)
- Inoperative door lock timer

**Table 23 PINPOINT TEST A: A SINGLE DOOR LOCK IS INOPERATIVE**

Test Step	Result / Action to Take
<b>A1 CHECK THE MANUAL OPERATION OF THE SUSPECT DOOR LOCK</b> <ul style="list-style-type: none"><li>Manually operate the inoperative door lock.</li><li>Check for binding or a stuck condition.</li></ul> <b>Is the lock stuck or binding?</b>	<b>Yes</b> REPAIR binding components as necessary. TEST the system for normal operation.  <b>No</b> GO to A2.



**Table 23 PINPOINT TEST A: A SINGLE DOOR LOCK IS INOPERATIVE (cont.)**

Test Step	Result / Action to Take
<p><b>A2 CHECK CIRCUIT 117 (PK/BK)</b></p> <ul style="list-style-type: none"> <li>• <b>Disconnect:</b> LH Door Latch Remote Control C552 or RH Door Latch Remote Control C641</li> <li>• <b>NOTE:</b> In a normally operating system, voltage on circuit 117 (PK/BK) will only be present for a short period of time after the fused jumper wire is connected. It may be necessary to remove and reconnect the fused jumper wire in order to measure the voltage.</li> </ul> <p>For an inoperative LH door lock, while measuring the voltage between LH door latch remote control C552-3, circuit 118 (PK/OG) harness side and LH door latch remote control C552-4, circuit 117 (PK/BK) harness side, momentarily connect a fused jumper wire between LH door latch remote control C552-1, circuit 57 (BK) harness side and LH door latch remote control C552-6, circuit 119 (PK/YE) harness side.</p>  <p>N0033566</p> <ul style="list-style-type: none"> <li>• For an inoperative RH door lock, measure the voltage between RH door latch remote control C641-5, circuit 117 (PK/BK) harness side and ground, while operating the LH door lock switch.</li> </ul>  <p>N0025056</p> <p><b>Is the voltage greater than 10 volts at any time?</b></p>	<p><b>Yes</b></p> <p>GO to A3.</p> <p><b>No</b></p> <p>GO to A4.</p>

**Table 23 PINPOINT TEST A: A SINGLE DOOR LOCK IS INOPERATIVE (cont.)**

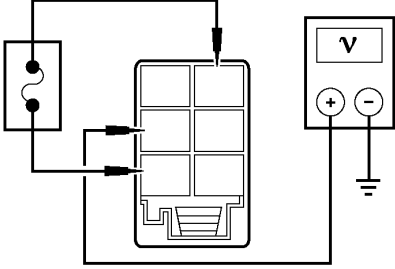
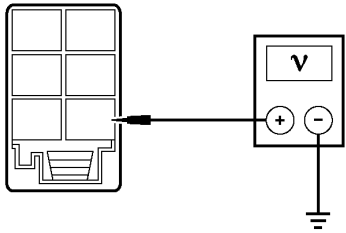
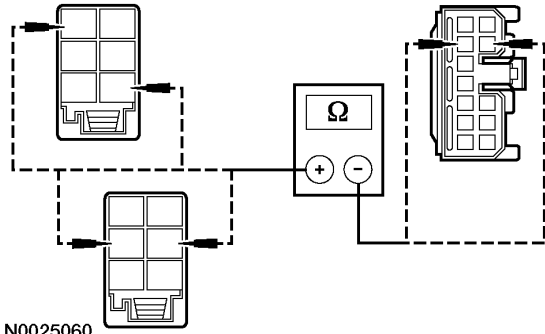
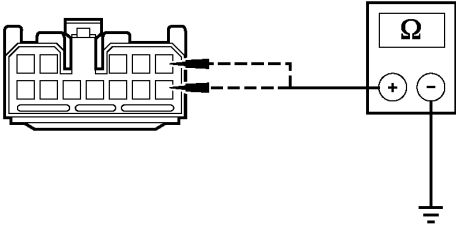
Test Step	Result / Action to Take
<p><b>A3 CHECK CIRCUIT 118 (PK/OG)</b></p> <ul style="list-style-type: none"> <li>NOTE: In a normally operating system, voltage on circuit 118 (PK/OG) will only be present for a short period of time after the fused jumper wire is connected. It may be necessary to remove and reconnect the fused jumper wire in order to measure the resistance.</li> </ul> <p>For an inoperative LH door lock, while measuring the voltage between LH door latch remote control C552-3, circuit 118 (PK/OG) harness side and ground, momentarily connect a fused jumper wire between LH door latch remote control C552-1, circuit 57 (BK) harness side and LH door latch remote control C552-6, circuit 119 (PK/YE) harness side.</p>  <p>N0033565</p> <ul style="list-style-type: none"> <li>For an inoperative RH door lock, measure the voltage between RH door latch remote control C641-2, circuit 118 (PK/OG) harness side and ground, while operating the LH door lock switch.</li> </ul>  <p>N0025059</p> <p><b>Is the voltage greater than 10 volts at any time?</b></p>	<p><b>Yes</b></p> <p>INSTALL a new LH or RH door latch remote control. REFER to Door Latch Remote Control in this section. TEST the system for normal operation.</p> <p><b>No</b></p> <p>GO to A4.</p>

Table 23 PINPOINT TEST A: A SINGLE DOOR LOCK IS INOPERATIVE (cont.)

Test Step	Result / Action to Take									
<p><b>A4 CHECK CIRCUITS 117 (PK/BK) AND 118 (PK/OG) FOR AN OPEN</b></p> <ul style="list-style-type: none"><li><b>Disconnect:</b> Door Lock Timer Module C2333</li><li>Using the following table, measure the resistance between door lock timer C2333 and the inoperative door latch remote control connector, harness side:</li></ul> <table><tr><th>Door Lock Timer C2333</th><th>LH Door Latch Remote Control C552</th><th>RH Door Latch Remote Control C641</th></tr><tr><td>C2333-7, circuit 117 (PK/BK)</td><td>C552-4, circuit 117 (PK/BK)</td><td>C641-5, circuit 117 (PK/BK)</td></tr><tr><td>C2333-2, circuit 118 (PK/OG)</td><td>C552-3, circuit 118 (PK/OG)</td><td>C641-2, circuit 118 (PK/OG)</td></tr></table> <div><p>N0025060</p></div> <p><b>Are the resistances less than 5 ohms?</b></p>	Door Lock Timer C2333	LH Door Latch Remote Control C552	RH Door Latch Remote Control C641	C2333-7, circuit 117 (PK/BK)	C552-4, circuit 117 (PK/BK)	C641-5, circuit 117 (PK/BK)	C2333-2, circuit 118 (PK/OG)	C552-3, circuit 118 (PK/OG)	C641-2, circuit 118 (PK/OG)	<p><b>Yes</b></p> <p>GO to A5.</p> <p><b>No</b></p> <p>REPAIR the circuit(s) in question. TEST the system for normal operation.</p>
Door Lock Timer C2333	LH Door Latch Remote Control C552	RH Door Latch Remote Control C641								
C2333-7, circuit 117 (PK/BK)	C552-4, circuit 117 (PK/BK)	C641-5, circuit 117 (PK/BK)								
C2333-2, circuit 118 (PK/OG)	C552-3, circuit 118 (PK/OG)	C641-2, circuit 118 (PK/OG)								

**Table 23 PINPOINT TEST A: A SINGLE DOOR LOCK IS INOPERATIVE (cont.)**

Test Step	Result / Action to Take
<b>A5 CHECK DOOR LOCK TIMER CIRCUIT 57 (BK) FOR AN OPEN</b> <ul style="list-style-type: none"> <li>Measure the resistance between door lock timer C2333-5, circuit 57 (BK) harness side and ground; and between door lock timer C2333-12, circuit 57 (BK) harness side and ground.</li> </ul>  <p>N0025111</p> <p>Are both resistances less than 5 ohms?</p>	<p><b>Yes</b></p> <p>GO to A6.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>
<b>A6 CHECK THE DOOR LOCK TIMER FOR CORRECT OPERATION</b> <ul style="list-style-type: none"> <li>Disconnect all door lock timer connectors.</li> <li>Check for: <ul style="list-style-type: none"> <li>corrosion.</li> <li>pushed-out pins.</li> <li>damaged connectors.</li> </ul> </li> <li>Connect all door lock timer connectors and make sure they seat correctly.</li> <li>Operate the system and verify the concern is still present.</li> </ul> <p>Is the concern still present?</p>	<p><b>Yes</b></p> <p>INSTALL a new door lock timer. REFER to Door Lock Timer in this section. TEST the system for normal operation.</p> <p><b>No</b></p> <p>The system is operating correctly at this time. Concern may have been caused by a loose or corroded connector. TEST the system for normal operation.</p>

**Pinpoint Test B: All Door Locks Are Inoperative****Normal Operation**

When both doors are locked and the LH door lock rod is moved to the UNLOCK position, or the UNLOCK button on the remote keyless entry (RKE) remote transmitter (if equipped) is pressed, ground is sent to the door lock timer through circuit 119 (PK/YE). When the door lock timer receives ground on circuit 119 (PK/YE), the door lock timer will simultaneously send 12 volts to both door lock actuators through circuit 118 (PK/OG), and ground through circuit 117 (PK/BK) and the doors will UNLOCK.

When both doors are unlocked and the LH side door lock rod is moved to the LOCK position, 12 volts from circuit 120 (PK/LG) is sent to the door lock timer through circuit 119 (PK/YE). If equipped with RKE and the LOCK button on the RKE remote transmitter is pressed, the RKE module sends 12 volts to the door lock timer through circuit 129 (LG). When the door lock timer receives 12 volts on circuit 119 (PK/YE), or on circuit 129 (LG) (if equipped with RKE), the door lock timer will simultaneously send 12 volts to both door lock actuators through circuit 117 (PK/BK), and ground through circuit 118 (PK/OG) and the doors will LOCK.

**Possible Causes**

- Fuse
- Open in circuits 57 (BK), 117 (PK/BK), 118 (PK/OG), 119 (PK/YE), 120 (PK/LG) or 1679 (WH/YE)
- Door lock timer

**Table 24 PINPOINT TEST B: ALL DOOR LOCKS ARE INOPERATIVE**

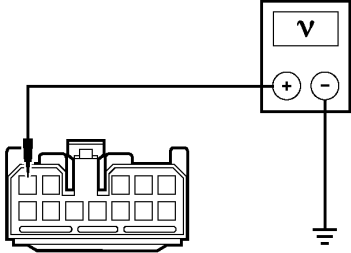
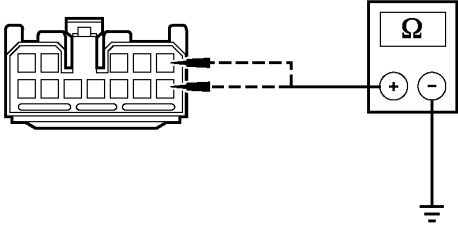
Test Step	Result / Action to Take
<p><b>B1 CHECK CIRCUIT 1679 (WH/YE) FOR VOLTAGE</b></p> <ul style="list-style-type: none"> <li>• <b>Disconnect:</b> Door Lock Timer C2333</li> <li>• Measure the voltage between door lock timer C2333-1, circuit 1679 (WH/YE) and ground.</li> </ul>  <p>N0025112</p> <p><b>Is the voltage greater than 10 volts?</b></p>	<p><b>Yes</b></p> <p>GO to B2.</p> <p><b>No</b></p> <p>VERIFY the power distribution center (PDC) fuse 9 (20A) is OK. If OK, REPAIR circuit 1679 (WH/YE) for an open. TEST the system for normal operation.</p>
<p><b>B2 CHECK DOOR LOCK TIMER CIRCUIT 57 (BK) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li>• Measure the resistance between door lock timer C2333-5, circuit 57 (BK) harness side, and door lock timer C2333-12, circuit 57 (BK) harness side.</li> </ul>  <p>N0025111</p> <p><b>Are the resistances less than 5 ohms?</b></p>	<p><b>Yes</b></p> <p>GO to B3.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>

Table 24 PINPOINT TEST B: ALL DOOR LOCKS ARE INOPERATIVE (cont.)

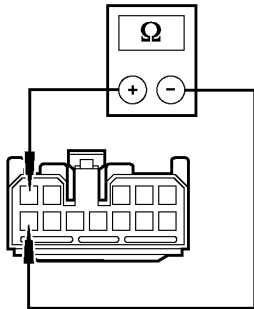
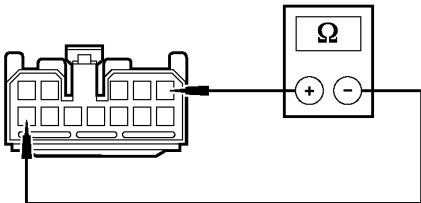
Test Step	Result / Action to Take
<p><b>B3 CHECK THE LH DOOR LATCH REMOTE CONTROL</b></p> <ul style="list-style-type: none"> <li>• <b>Disconnect:</b> LH Door Latch Remote Control C552</li> <li>• Set the LH door latch remote control to the UNLOCK position.</li> <li>• Measure the resistance between LH door latch remote control C2333-1, circuit 57 (BK) component side, and LH door latch remote control C2333-6, circuit 119 (PK/YE) component side.</li> </ul>  <p>N0033563</p> <ul style="list-style-type: none"> <li>• Set the LH door latch remote control to the LOCK position.</li> <li>• Measure the resistance between LH door latch remote control C2333-6, circuit 119 (PK/YE) component side, and LH door latch remote control C2333-5, circuit 119 (PK/YE) component side.</li> </ul>  <p>N0033564</p> <p><b>Are the resistances less than 5 ohms?</b></p>	<p><b>Yes</b></p> <p>GO to B4.</p> <p><b>No</b></p> <p>INSTALL a new LH door latch remote control. REFER to Door Latch Remote Control in this section. TEST the system for normal operation.</p>

Table 24 PINPOINT TEST B: ALL DOOR LOCKS ARE INOPERATIVE (cont.)

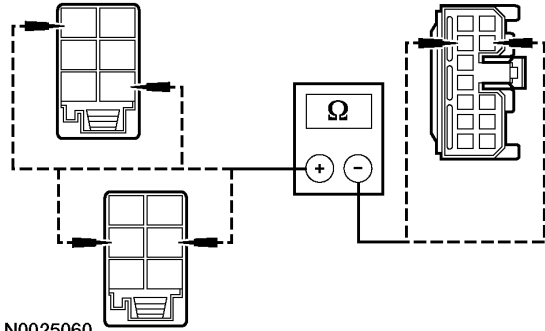
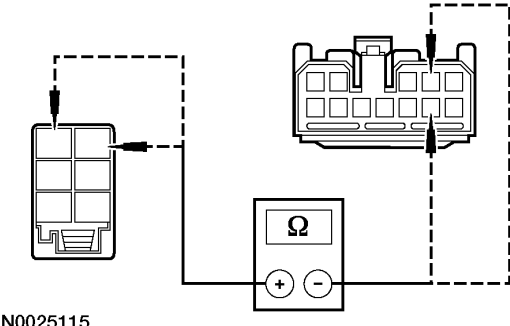
Test Step	Result / Action to Take									
<p><b>B4 CHECK CIRCUITS 117 (PK/BK) AND 118 (PK/OG) FOR AN OPEN</b></p> <ul style="list-style-type: none"><li><b>Disconnect:</b> RH Door Latch Remote Control C641</li><li>Using the following table, measure the resistance between door lock timer C2333, LH door latch remote control C552, RH door latch remote control C641 and harness side:</li></ul> <table><tr><th>Door Lock Timer C2333</th><th>LH Door Latch Remote Control C552</th><th>RH Door Latch Remote Control C641</th></tr><tr><td>C2333-7, circuit 117 (PK/BK)</td><td>C552-4, circuit 117 (PK/BK)</td><td>C641-5, circuit 117 (PK/BK)</td></tr><tr><td>C2333-2, circuit 118 (PK/OG)</td><td>C552-3, circuit 118 (PK/OG)</td><td>C641-2, circuit 118 (PK/OG)</td></tr></table> <div><p>N0025060</p></div> <p><b>Are the resistances less than 5 ohms?</b></p>	Door Lock Timer C2333	LH Door Latch Remote Control C552	RH Door Latch Remote Control C641	C2333-7, circuit 117 (PK/BK)	C552-4, circuit 117 (PK/BK)	C641-5, circuit 117 (PK/BK)	C2333-2, circuit 118 (PK/OG)	C552-3, circuit 118 (PK/OG)	C641-2, circuit 118 (PK/OG)	<p><b>Yes</b></p> <p>GO to B5.</p> <p><b>No</b></p> <p>REPAIR the circuit(s) in question. TEST the system for normal operation.</p>
Door Lock Timer C2333	LH Door Latch Remote Control C552	RH Door Latch Remote Control C641								
C2333-7, circuit 117 (PK/BK)	C552-4, circuit 117 (PK/BK)	C641-5, circuit 117 (PK/BK)								
C2333-2, circuit 118 (PK/OG)	C552-3, circuit 118 (PK/OG)	C641-2, circuit 118 (PK/OG)								

Table 24 PINPOINT TEST B: ALL DOOR LOCKS ARE INOPERATIVE (cont.)

Test Step	Result / Action to Take						
<p><b>B5 CHECK CIRCUITS 119 (PK/YE) AND 120 (PK/LG) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li>Using the following table, measure the resistance between door lock timer C2333, and LH door latch remote control C552, harness side:</li> </ul> <table border="1"> <thead> <tr> <th>Door Lock Timer C2333</th><th>LH Door Latch Remote Control C552</th></tr> </thead> <tbody> <tr> <td>C2333-4, circuit 119 (PK/YE)</td><td>C552-6, circuit 119 (PK/YE)</td></tr> <tr> <td>C2333-11, circuit 120 (PK/LG)</td><td>C552-5, circuit 120 (PK/LG)</td></tr> </tbody> </table>  <p>N0025115</p> <p>Are the resistances less than 5 ohms?</p>	Door Lock Timer C2333	LH Door Latch Remote Control C552	C2333-4, circuit 119 (PK/YE)	C552-6, circuit 119 (PK/YE)	C2333-11, circuit 120 (PK/LG)	C552-5, circuit 120 (PK/LG)	<p><b>Yes</b></p> <p>GO to B6.</p> <p><b>No</b></p> <p>REPAIR the circuit(s) in question. TEST the system for normal operation.</p>
Door Lock Timer C2333	LH Door Latch Remote Control C552						
C2333-4, circuit 119 (PK/YE)	C552-6, circuit 119 (PK/YE)						
C2333-11, circuit 120 (PK/LG)	C552-5, circuit 120 (PK/LG)						
<p><b>B6 CHECK LH DOOR LATCH REMOTE CONTROL CIRCUIT 57 (BK) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li>Measure the resistance between LH door latch remote control C552-1, circuit 57 (BK) and ground.</li> </ul> <p>Is the resistance less than 5 ohms?</p>	<p><b>Yes</b></p> <p>GO to B7.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>						
<p><b>B7 CHECK THE DOOR LOCK TIMER FOR CORRECT OPERATION</b></p> <ul style="list-style-type: none"> <li>Disconnect all door lock timer connectors.</li> <li>Check for: <ul style="list-style-type: none"> <li>corrosion.</li> <li>pushed-out pins.</li> <li>damaged connectors.</li> </ul> </li> <li>Connect all door lock timer connectors and make sure they seat correctly.</li> <li>Operate the system and verify the concern is still present.</li> </ul> <p>Is the concern still present?</p>	<p><b>Yes</b></p> <p>INSTALL a new door lock timer. REFER to Door Lock Timer in this section. TEST the system for normal operation.</p> <p><b>No</b></p> <p>The system is operating correctly at this time. Concern may have been caused by a loose or corroded connector. TEST the system for normal operation.</p>						



*Pinpoint Test C: The Door Locks Only Operate One Way*

**Normal Operation**

When both doors are locked and the LH door lock rod is moved to the UNLOCK position, or the UNLOCK button on the remote keyless entry (RKE) remote transmitter (if equipped) is pressed, ground is sent to the door lock timer through circuit 119 (PK/YE). When the door lock timer receives ground on circuit 119 (PK/YE), the door lock timer will simultaneously send 12 volts to both door lock actuators through circuit 118 (PK/OG) and ground through circuit 117 (PK/BK) and the doors will UNLOCK.

When both doors are unlocked and the LH side door lock rod is moved to the LOCK position, 12 volts from circuit 120 (PK/LG) is sent to the door lock timer through circuit 119 (PK/YE). If equipped with RKE and

the LOCK button on the RKE remote transmitter is pressed, the RKE module sends 12 volts to the door lock timer through circuit 129 (LG). When the door lock timer receives 12 volts on circuit 119 (PK/YE), or on circuit 129 (LG) (if equipped with RKE), the door lock timer will simultaneously send 12 volts to both door lock actuators through circuit 117 (PK/BK) and ground through circuit 118 (PK/OG) and the doors will LOCK.

**Possible Causes**

- Open in circuits 57 (BK), 117 (PK/BK), 118 (PK/OG) or 120 (PK/LG)
- Circuit 119 (PK/YE) shorted to ground or power
- Inoperative door lock timer
- Inoperative door latch remote control

**Table 25 PINPOINT TEST C: THE DOOR LOCKS ONLY OPERATE ONE WAY**

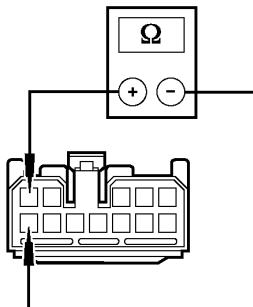
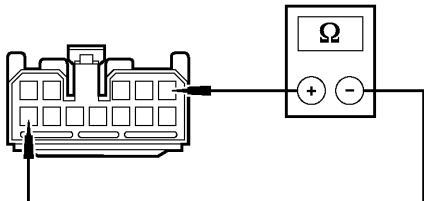
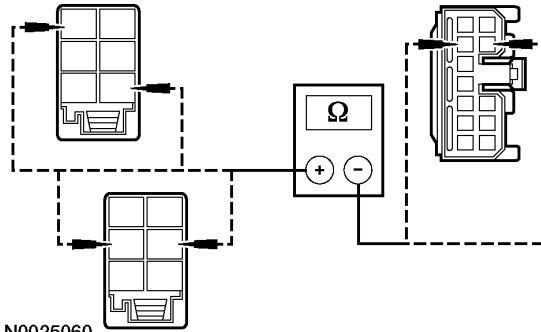
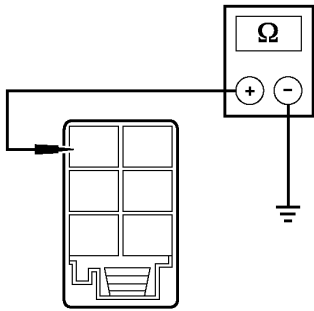
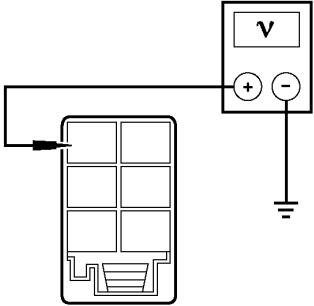
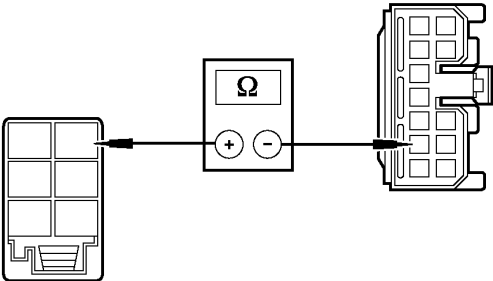
Test Step	Result / Action to Take
<p><b>C1 CHECK LH DOOR LATCH REMOTE CONTROL</b></p> <ul style="list-style-type: none"> <li>• <b>Disconnect:</b> LH Door Latch Remote Control C552</li> <li>• Set the LH door latch remote control to the UNLOCK position.</li> <li>• Measure the resistance between LH door latch remote control C2333-1, circuit 57 (BK) component side, and LH door latch remote control C2333-6, circuit 119 (PK/YE) component side.</li> </ul>  <p>N0033563</p> <ul style="list-style-type: none"> <li>• Set the LH door latch remote control to the LOCK position.</li> <li>• Measure the resistance between LH door latch remote control C2333-6, circuit 119 (PK/YE) component side, and LH door latch remote control C2333-5, circuit 119 (PK/YE) component side.</li> </ul>  <p>N0033564</p> <p><b>Are the resistances less than 5 ohms?</b></p>	<p><b>Yes</b></p> <p>Go to C2.</p> <p><b>No</b></p> <p>INSTALL a new LH door latch remote control. REFER to Door Latch Remote Control in this section. TEST the system for normal operation.</p>

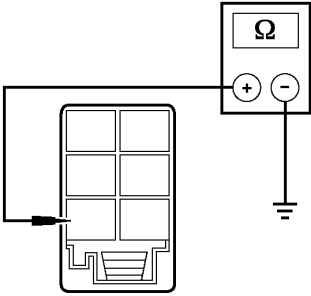
Table 25 PINPOINT TEST C: THE DOOR LOCKS ONLY OPERATE ONE WAY (cont.)

Test Step	Result / Action to Take									
<p><b>C2 CHECK CIRCUITS 117 (PK/BK) AND 118 (PK/OG) FOR AN OPEN</b></p> <ul style="list-style-type: none"><li><b>Disconnect:</b> RH Door Latch Remote Control C641</li><li>Using the following table, measure the resistance between door lock timer C2333, LH door latch remote control C552, RH door latch remote control C641 and harness side:</li></ul> <table><thead><tr><th>Door Lock Timer C2333</th><th>LH Door Latch Remote Control C552</th><th>RH Door Latch Remote Control C641</th></tr></thead><tbody><tr><td>C2333-7, circuit 117 (PK/BK)</td><td>C552-4, circuit 117 (PK/BK)</td><td>C641-5, circuit 117 (PK/BK)</td></tr><tr><td>C2333-2, circuit 118 (PK/OG)</td><td>C552-3, circuit 118 (PK/OG)</td><td>C641-2, circuit 118 (PK/OG)</td></tr></tbody></table>  <p>N0025060</p> <p>Are the resistances less than 5 ohms?</p>	Door Lock Timer C2333	LH Door Latch Remote Control C552	RH Door Latch Remote Control C641	C2333-7, circuit 117 (PK/BK)	C552-4, circuit 117 (PK/BK)	C641-5, circuit 117 (PK/BK)	C2333-2, circuit 118 (PK/OG)	C552-3, circuit 118 (PK/OG)	C641-2, circuit 118 (PK/OG)	<p><b>Yes</b></p> <p>Go to C3.</p> <p><b>No</b></p> <p>REPAIR the circuit(s) in question. TEST the system for normal operation.</p>
Door Lock Timer C2333	LH Door Latch Remote Control C552	RH Door Latch Remote Control C641								
C2333-7, circuit 117 (PK/BK)	C552-4, circuit 117 (PK/BK)	C641-5, circuit 117 (PK/BK)								
C2333-2, circuit 118 (PK/OG)	C552-3, circuit 118 (PK/OG)	C641-2, circuit 118 (PK/OG)								
<p><b>C3 CHECK CIRCUIT 119 (PK/YE) FOR A SHORT TO GROUND</b></p> <ul style="list-style-type: none"><li>Measure the resistance between LH door latch remote control C552-6, circuit 119 (PK/YE) harness side and ground.</li></ul>  <p>N0028607</p> <p>Is the resistance less than 5 ohms?</p>	<p><b>Yes</b></p> <p>GO to C4.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>									

**Table 25 PINPOINT TEST C: THE DOOR LOCKS ONLY OPERATE ONE WAY (cont.)**

Test Step	Result / Action to Take
<p><b>C4 CHECK CIRCUIT 119 (PK/YE) FOR A SHORT TO POWER</b></p> <ul style="list-style-type: none"> <li>Measure the voltage between LH door latch remote control C552-6, circuit 119 (PK/YE) harness side and ground.</li> </ul>  <p>N0028608</p> <p><b>Is voltage present?</b></p>	<p><b>Yes</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p> <p><b>No</b></p> <p>GO to C5.</p>
<p><b>C5 CHECK CIRCUIT 120 (PK/LG) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li><b>Disconnect:</b> Door Lock Timer C2333.</li> <li>Measure the resistance between door lock timer C2333-11, circuit 120 (PK/LG) harness side, and LH door latch remote control C552-5, circuit 120 (PK/LG) harness side.</li> </ul>  <p>N0028609</p> <p><b>Is the resistance less than 5 ohms?</b></p>	<p><b>Yes</b></p> <p>GO to C6.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>

**Table 25 PINPOINT TEST C: THE DOOR LOCKS ONLY OPERATE ONE WAY (cont.)**

Test Step	Result / Action to Take
<p><b>C6 CHECK LH DOOR LATCH REMOTE CONTROL CIRCUIT 57 (BK) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li>Measure the resistance between LH door latch remote control C552-1, circuit 57 (BK) and ground.</li> </ul>  <p>N0028611</p> <p><b>Is the resistance less than 5 ohms?</b></p>	<p><b>Yes</b></p> <p>Go to C7.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>
<p><b>C7 CHECK THE DOOR LOCK TIMER FOR CORRECT OPERATION</b></p> <ul style="list-style-type: none"> <li>Disconnect all door lock timer connectors.</li> <li>Check for: <ul style="list-style-type: none"> <li>corrosion.</li> <li>pushed-out pins.</li> <li>damaged connectors.</li> </ul> </li> <li>Connect all door lock timer connectors and make sure they seat correctly.</li> <li>Operate the system and verify the concern is still present.</li> </ul> <p><b>Is the concern still present?</b></p>	<p><b>Yes</b></p> <p>INSTALL a new door lock timer. REFER to Door Lock Timer in this section. TEST the system for normal operation.</p> <p><b>No</b></p> <p>The system is operating correctly at this time. Concern may have been caused by a loose or corroded connector. TEST the system for normal operation.</p>

*Pinpoint Test D: The Doors Do Not Lock Or Unlock Using The Remote Keyless Entry Transmitter*

### Normal Operation

When both doors are locked and the LH door lock rod is moved to the UNLOCK position, or the UNLOCK button on the remote keyless entry (RKE) remote transmitter (if equipped) is pressed, ground is sent to the door lock timer through circuit 119 (PK/YE). When the door lock timer receives ground on circuit 119 (PK/YE), the door lock timer will simultaneously send 12 volts to both door lock actuators through circuit 118 (PK/OG), and ground through circuit 117 (PK/BK) and the doors will UNLOCK.

When both doors are unlocked and the LH side door lock rod is moved to the LOCK position, 12 volts from circuit 120 (PK/LG) is sent to the door lock timer through circuit 119 (PK/YE). If equipped with RKE and the LOCK button on the RKE remote transmitter is pressed, the RKE module sends 12 volts to the door lock timer through circuit 129 (LG). When the door lock timer receives 12 volts on circuit 119 (PK/YE), or on circuit 129 (LG) (if equipped with RKE), the door lock timer will simultaneously send 12 volts to both door lock actuators through circuit 117 (PK/BK) and ground through circuit 118 (PK/OG), and the doors will LOCK.

**Possible Causes**

- Open in circuits 57 (BK), 119 (PK/YE), 129 (LG), 489 (PK/BK) or 2002 (OG/BK)
- Fuse
- Inoperative RKE module
- Inoperative RKE remote transmitter
- Inoperative door lock timer

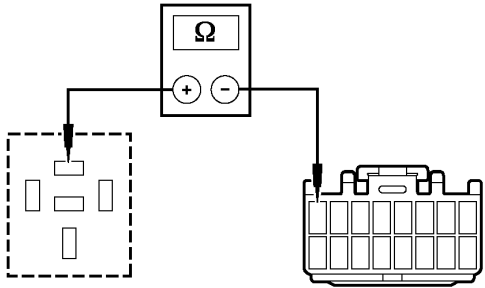
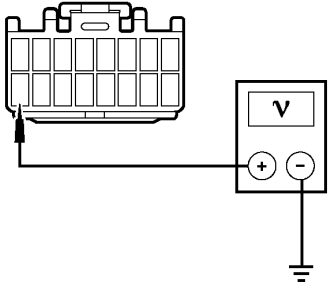
**Table 26 PINPOINT TEST D: THE DOORS DO NOT LOCK OR UNLOCK USING THE REMOTE KEYLESS ENTRY TRANSMITTER**

Test Step	Result / Action to Take
<b>D1 CHECK FOR THE CORRECT RKE TRANSMITTERS</b> <ul style="list-style-type: none"> <li>• Check that the correct RKE transmitters are being used with the vehicle. Make sure the RKE transmitters are ones provided with the OEM system and not from an aftermarket system, or a dealer-installed system that may have been installed on the vehicle.</li> </ul> <b>Are all the correct RKE transmitters present?</b>	<b>Yes</b> Go to D2.  <b>No</b> The system cannot be tested without the correct RKE transmitters. INFORM the customer that all the correct RKE transmitters need to be present to proceed with diagnosis of the system.
<b>D2 CHECK THE OPERATION OF THE RKE TRANSMITTER WITH THE KEY IN THE OFF POSITION</b> <ul style="list-style-type: none"> <li>• Key in OFF position.</li> <li>• Check the operation of the RKE transmitter. Attempt to LOCK and UNLOCK the doors with the RKE transmitter.</li> </ul> <b>Does the system operate correctly now?</b>	<b>Yes</b> The system is operating normally. REVIEW the correct operation of the RKE system with the customer.  <b>No</b> Go to D3.
<b>D3 CHECK THE POWER DOOR LOCK SYSTEM FOR CORRECT OPERATION</b> <ul style="list-style-type: none"> <li>• Verify the door lock/unlock operation by actuating the driver door lock control switch.</li> </ul> <b>Do both doors lock and unlock correctly?</b>	<b>Yes</b> GO to D4.  <b>No</b> GO to Pinpoint Test B to diagnose the inoperative door locks.

**Table 26 PINPOINT TEST D: THE DOORS DO NOT LOCK OR UNLOCK USING THE REMOTE KEYLESS ENTRY TRANSMITTER (cont.)**

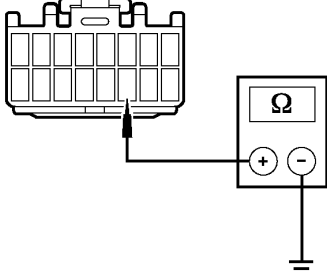
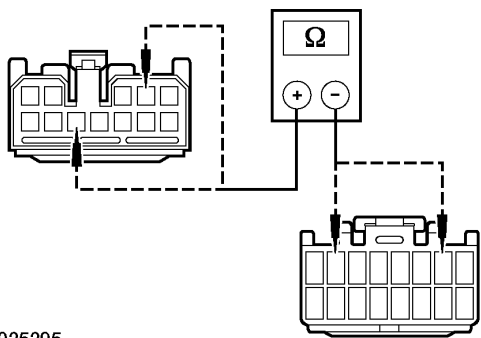
Test Step	Result / Action to Take
<b>D4 CHECK FOR COMPLETE FUNCTIONALITY OF THE RKE TRANSMITTER(S)</b> <ul style="list-style-type: none"> <li>Check all the RKE transmitter buttons for correct operation.</li> </ul> <b>Do any of the other buttons (panic button) operate correctly?</b>	<b>Yes</b> GO to D5.  <b>No</b> INSTALL a new RKE module with new remote transmitters. INFORM the customer that they must discard all original remote transmitters. TEST the system for normal operation.
<b>D5 CHECK THE RKE TRANSMITTER BATTERY</b> <ul style="list-style-type: none"> <li>Check the keyless entry remote transmitter battery and verify that it is the correct type.</li> </ul> <b>Does the battery have sufficient voltage (at least 2.5 V) and is it the correct type (CR2025)?</b>	<b>Yes</b> GO to D6.  <b>No</b> INSTALL a new battery. TEST the system for normal operation.
<b>D6 CHECK THE RKE SYSTEM FOR NORMAL OPERATION WITH A KNOWN GOOD TRANSMITTER</b> <ul style="list-style-type: none"> <li>Using the customer's second RKE transmitter or a known good RKE transmitter that is correct for the vehicle, attempt to LOCK and UNLOCK the doors.</li> </ul> <b>Do the doors LOCK and UNLOCK with the known good RKE transmitter?</b>	<b>Yes</b> INSTALL a new RKE module with new remote transmitters. INFORM the customer that they must discard all original remote transmitters. TEST the system for normal operation.  <b>No</b> Go to D7.

**Table 26 PINPOINT TEST D: THE DOORS DO NOT LOCK OR UNLOCK USING THE REMOTE KEYLESS ENTRY TRANSMITTER (cont.)**

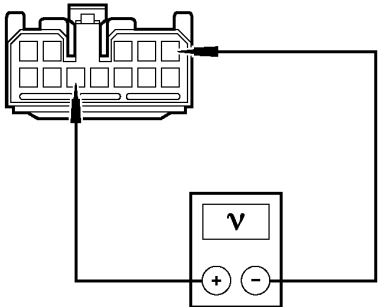
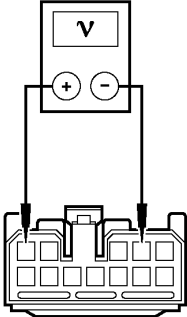
Test Step	Result / Action to Take
<p><b>D7 CHECK CIRCUIT 489 (PK/BK) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li>• Key in OFF position.</li> <li>• <b>Disconnect:</b> Instrument Cluster Relay</li> <li>• <b>Disconnect:</b> RKE Module C272</li> <li>• Measure the resistance between instrument cluster relay socket pin 87, circuit 489 (PK/BK) and RKE module C272-1, circuit 489 (PK/BK) harness side.</li> </ul>  <p>N0025187</p> <p><b>Is the resistance less than 5 ohms?</b></p>	<p><b>Yes</b></p> <p>GO to D8.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>
<p><b>D8 CHECK CIRCUIT 2002 (OG/BK) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li>• <b>Disconnect:</b> RKE Module C272</li> <li>• Measure the voltage between RKE module C272-9, circuit 2002 (OG/BK) and ground.</li> </ul>  <p>N0025188</p> <p><b>Is the voltage at least 10 volts?</b></p>	<p><b>Yes</b></p> <p>GO to D9.</p> <p><b>No</b></p> <p>VERIFY the power distribution center (PBC) fuse 26 (15A) is OK. If OK, REPAIR circuit 2002 (OG/BK) for an open. TEST the system for normal operation.</p>



**Table 26 PINPOINT TEST D: THE DOORS DO NOT LOCK OR UNLOCK USING THE REMOTE KEYLESS ENTRY TRANSMITTER (cont.)**

Test Step	Result / Action to Take						
<p><b>D9 CHECK CIRCUIT 57 (BK) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li>Measure the resistance between RKE module C272-14, circuit 57 (BK) and ground.</li> </ul>  <p>N0025294</p> <p>Is the resistance less than 5 ohms?</p>	<p><b>Yes</b></p> <p>GO to D10.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>						
<p><b>D10 CHECK CIRCUIT 119 (PK/YE) AND 129 (LG) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li><b>Disconnect:</b> Door Lock Timer C2333</li> <li>Using the following table, measure the resistance between door lock timer C2333 and RKE module C272 harness side:</li> </ul> <table border="1"> <thead> <tr> <th>Door Lock Timer C2333</th><th>RKE Module C272</th></tr> </thead> <tbody> <tr> <td>C2333-4, circuit 119 (PK/YE)</td><td>C272-2, circuit 119 (PK/YE)</td></tr> <tr> <td>C2333-8, circuit 129 (LG)</td><td>C272-7, circuit 129 (LG)</td></tr> </tbody> </table>  <p>N0025295</p> <p>Are the resistances less than 5 ohms?</p>	Door Lock Timer C2333	RKE Module C272	C2333-4, circuit 119 (PK/YE)	C272-2, circuit 119 (PK/YE)	C2333-8, circuit 129 (LG)	C272-7, circuit 129 (LG)	<p><b>Yes</b></p> <p>GO to D11.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>
Door Lock Timer C2333	RKE Module C272						
C2333-4, circuit 119 (PK/YE)	C272-2, circuit 119 (PK/YE)						
C2333-8, circuit 129 (LG)	C272-7, circuit 129 (LG)						

**Table 26 PINPOINT TEST D: THE DOORS DO NOT LOCK OR UNLOCK USING THE REMOTE KEYLESS ENTRY TRANSMITTER (cont.)**

Test Step	Result / Action to Take
<p><b>D11 CHECK RKE MODULE OUTPUT TO THE DOOR LOCK TIMER</b></p> <ul style="list-style-type: none"> <li>• <b>Connect:</b> RKE Module C272</li> <li>• <b>Disconnect:</b> LH Door Latch Remote Control</li> <li>• While pressing the LOCK button on the RKE transmitter, measure the voltage between door lock timer C2333-5, circuit 129 (LG) and door lock timer C2333-8, circuit 57 (BK) harness side.</li> </ul>  <p>N0025300</p> <ul style="list-style-type: none"> <li>• While pressing the UNLOCK button on the RKE transmitter, measure the voltage between door lock timer C2333-1, circuit 1679 (WH/YE) and door lock timer C2333-4, circuit 119 (PK/YE) harness side.</li> </ul>  <p>N0025304</p> <p><b>Are both voltages greater than 10 volts at any time?</b></p>	<p><b>Yes</b></p> <p>INSTALL a new door lock timer. REFER to Door Lock Timer in this section. TEST the system for normal operation.</p> <p><b>No</b></p> <p>GO to D12.</p>

**Table 26 PINPOINT TEST D: THE DOORS DO NOT LOCK OR UNLOCK USING THE REMOTE KEYLESS ENTRY TRANSMITTER (cont.)**

Test Step	Result / Action to Take
<b>D12 CHECK THE RKE MODULE FOR CORRECT OPERATION</b> <ul style="list-style-type: none"> <li>• Disconnect all RKE module connectors.</li> <li>• Check for: <ul style="list-style-type: none"> <li>— corrosion.</li> <li>— pushed-out pins.</li> <li>— damaged connectors.</li> </ul> </li> <li>• Connect all RKE module connectors and make sure they seat correctly.</li> <li>• Operate the system and verify the concern is still present.</li> </ul> <b>Is the concern still present?</b>	<p><b>Yes</b></p> <p>INSTALL a new RKE module. REFER to Multifunction Electronic Modules in S08307. TEST the system for normal operation.</p> <p><b>No</b></p> <p>The system is operating correctly at this time. Concern may have been caused by a loose or corroded connector. TEST the system for normal operation.</p>

*Pinpoint Test E: The Remote Keyless Entry Transmitter Has Poor Range Performance*

#### Normal Operation

The RKE transmitter sends a radio signal to the remote keyless entry (RKE) module based on the user selected RKE transmitter button that was pressed. The RKE module then carries out the selected action.

#### Possible Causes

- RKE transmitter
- Environmental interference

- RKE module

**NOTE:** All remote keyless entry (RKE) transmitters must be present to begin diagnosis of the RKE system.

**NOTE:** Aftermarket or dealer-installed systems may adversely affect the RKE system operation. These systems should be disconnected before diagnosing any RKE concerns.

**Table 27 PINPOINT TEST E: THE REMOTE KEYLESS ENTRY TRANSMITTER HAS POOR RANGE PERFORMANCE**

Test Step	Result / Action to Take
<b>E1 CHECK FOR THE CORRECT RKE TRANSMITTERS</b> <ul style="list-style-type: none"> <li>Check that the correct RKE transmitters are being used with the vehicle. Make sure the RKE transmitters are ones provided with the OEM system and not from an aftermarket system, or a dealer-installed system that may have been installed on the vehicle.</li> </ul> <b>Are all the correct RKE transmitters present?</b>	<b>Yes</b> Go to E2.  <b>No</b> The system cannot be tested without the correct RKE transmitters. INFORM the customer that all the correct RKE transmitters need to be present to proceed with diagnosis of the system.
<b>E2 CHECK ALL THE RKE TRANSMITTERS FOR POOR RANGE PERFORMANCE</b> <p><b>NOTE:</b> The 3 m (10 ft) measurement of range is not the standard but is a guideline that clearly indicates a vehicle is experiencing poor range performance.</p> <ul style="list-style-type: none"> <li>From within 3 m (10 feet) of the vehicle, check all RKE transmitters for poor range performance.</li> </ul> <b>Do all RKE transmitters experience poor range?</b>	<b>Yes</b> Go to E3.  <b>No</b> INSTALL a new RKE module with new remote transmitters. CLEAR the DTCs. TEST the system for normal operation.
<b>E3 CHECK THE LOCATION OF THE VEHICLE AND THE APPROACH ANGLES AROUND THE VEHICLE</b> <ul style="list-style-type: none"> <li>Make sure the poor performance is consistent in nature and is not from one approaching angle.</li> <li>RKE transmitter range performance may be degraded in certain locations. For example, if the vehicle is within 0.8 km (0.5 miles) of high-power devices or radio/TV towers, the operating distance of the transmitters may be reduced.</li> </ul> <b>Is the poor range performance consistent around the vehicle?</b>	<b>Yes</b> GO to E4.  <b>No</b> The system is operating correctly at this time. TEST the system for normal operation.
<b>E4 CHECK THE RKE MODULE FOR CORRECT OPERATION</b> <ul style="list-style-type: none"> <li>Disconnect all RKE module connectors.</li> <li>Check for: <ul style="list-style-type: none"> <li>corrosion.</li> <li>pushed-out pins.</li> <li>damaged connectors.</li> </ul> </li> <li>Connect all RKE module connectors and make sure they seat correctly.</li> <li>Operate the system and verify the concern is still present.</li> </ul> <b>Is the concern still present?</b>	<b>Yes</b> INSTALL a new RKE module. REFER to Multifunction Electronic Modules. TEST the system for normal operation.  <b>No</b> The system is operating correctly at this time. Concern may have been caused by a loose or corroded connector. TEST the system for normal operation.

*Pinpoint Test F: The Panic Feature Does Not Operate Correctly*

**Normal Operation**

When the remote keyless entry (RKE) module receives a command from the RKE remote transmitter indicating an activation of the panic alarm, the RKE module energizes the horn relay as an audible alarm.

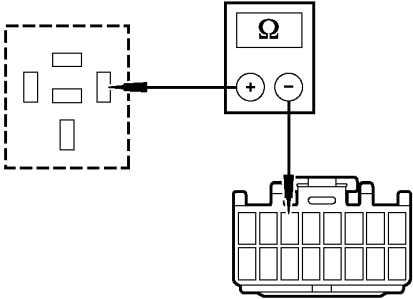
**Possible Causes**

- Remote keyless entry (RKE) transmitter
- Horn
- RKE module

**Table 28 PINPOINT TEST F: THE PANIC FEATURE DOES NOT OPERATE CORRECTLY**

Test Step	Result / Action to Take
<b>F1 VERIFY THE OPERATION OF THE HORN</b> <ul style="list-style-type: none"> <li>• Operate the horn through the steering wheel switch.</li> </ul> <b>Does the horn operate correctly?</b>	<b>Yes</b> Go to F2.  <b>No</b> REFER to Horn in S08307 to diagnose the inoperative horn.
<b>F2 CHECK THE REMOTE KEYLESS ENTRY (RKE) TRANSMITTER OPERATION</b> <ul style="list-style-type: none"> <li>• Unlock and lock the doors using the RKE transmitter buttons.</li> </ul> <b>Do the doors lock and unlock correctly?</b>	<b>Yes</b> Go to F3.  <b>No</b> GO to Pinpoint Test E to diagnose the inoperative RKE system.

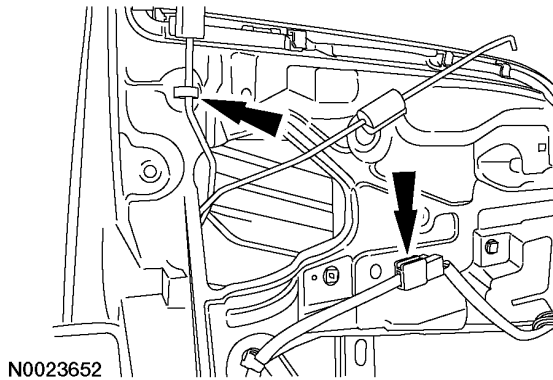
**Table 28 PINPOINT TEST F: THE PANIC FEATURE DOES NOT OPERATE CORRECTLY (cont.)**

Test Step	Result / Action to Take
<p><b>F3 CHECK CIRCUIT 6 (YE/LG) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li>• <b>Disconnect:</b> RKE Module C272</li> <li>• <b>Disconnect:</b> Horn relay.</li> <li>• Measure the resistance between RKE module C272-3, circuit 6 (YE/LG) and horn relay socket pin 85, circuit 6 (YE/LG) harness side.</li> </ul>  <p>N0025325</p> <p><b>Is the resistance less than 5 ohms?</b></p>	<p><b>Yes</b></p> <p>GO to F4.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>
<p><b>F4 CHECK THE RKE MODULE FOR CORRECT OPERATION</b></p> <ul style="list-style-type: none"> <li>• Disconnect all RKE module connectors.</li> <li>• Check for: <ul style="list-style-type: none"> <li>— corrosion.</li> <li>— pushed-out pins.</li> <li>— damaged connectors.</li> </ul> </li> <li>• Connect all RKE module connectors and make sure they seat correctly.</li> <li>• Operate the system and verify the concern is still present.</li> </ul> <p><b>Is the concern still present?</b></p>	<p><b>Yes</b></p> <p>INSTALL a new RKE module. REFER to Multifunction Electronic Modules in S08307. TEST the system for normal operation.</p> <p><b>No</b></p> <p>The system is operating correctly at this time. Concern may have been caused by a loose or corroded connector. TEST the system for normal operation.</p>

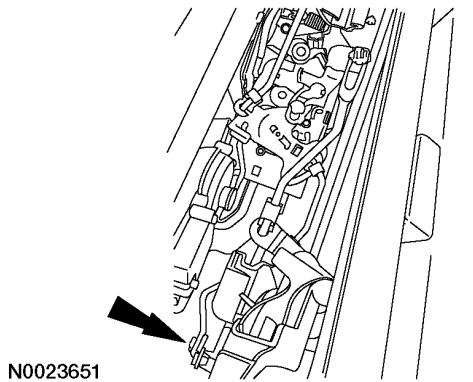
**Removal and Installation****Door Latch**

**NOTE:** LH side shown, RH side similar.

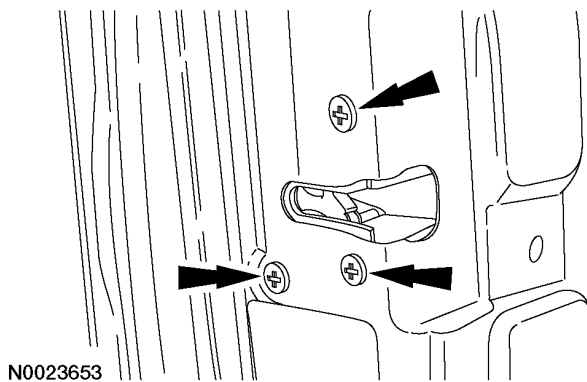
1. Remove the exterior door handle. For additional information, refer to Exterior Door Handle in this section.
2. Disengage the interior door lock push rod from the retainer and disconnect the electrical connector.



3. Disconnect the exterior door lock push rod.



4. Remove the 3 screws and the door latch assembly.
  - To install, tighten to 6 Nm (53 lb-in).

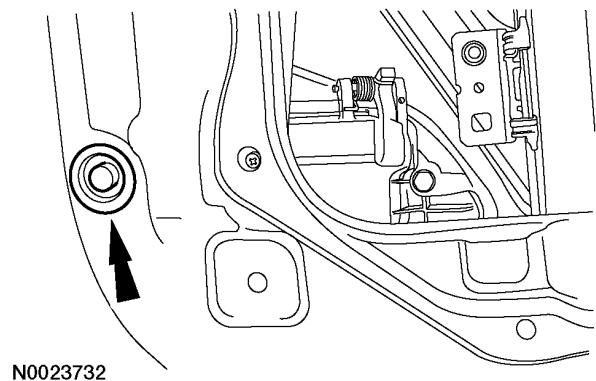


5. To install, reverse the removal procedure.

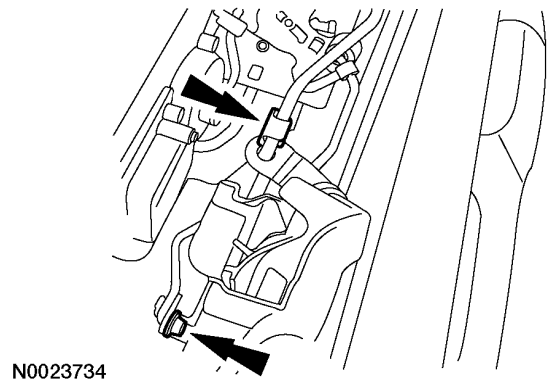
### Exterior Door Handle

**NOTE:** LH side shown, RH side similar.

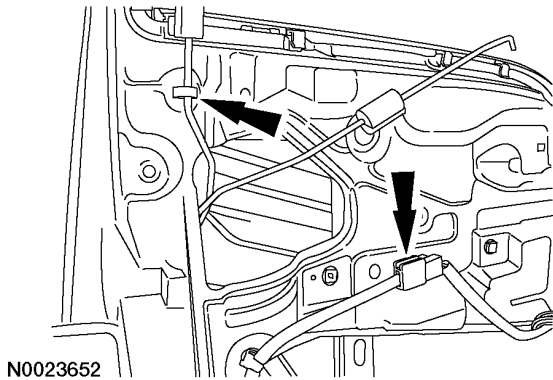
1. Remove the door trim panel. For additional information, refer to Interior Trim and Ornamentation (Interior Trim and Ornamentation, page 7).
2. Remove the access hole plug.



3. Disconnect the door latch and door lock linkages from the latch assembly.



4. Disconnect the electrical connector and the door lock push rod.

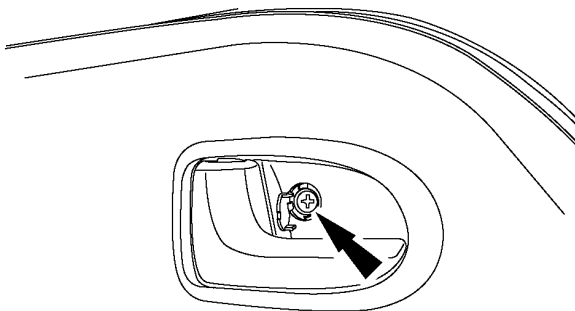


5. Remove the 2 bolts and the exterior door handle.
  - To install, tighten to 14 Nm (10 lb-ft).
6. To install, reverse the removal procedure.

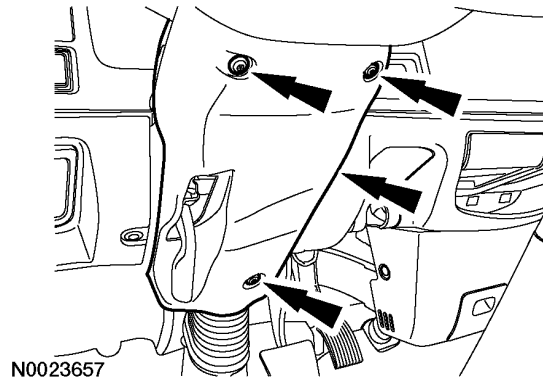
### Interior Door Handle

**NOTE:** LH side shown, RH side similar.

1. Open the cover and remove the screw from the interior door handle.



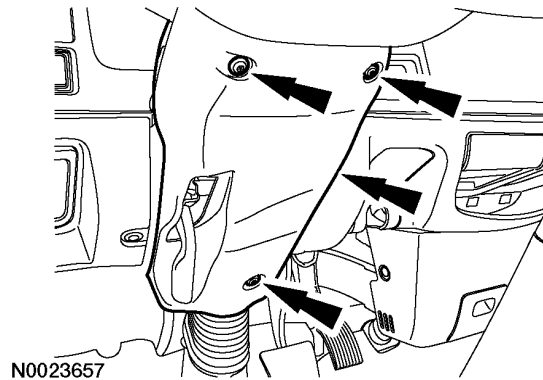
2. Rotate the handle, then slide it downward to remove it from the link rod.



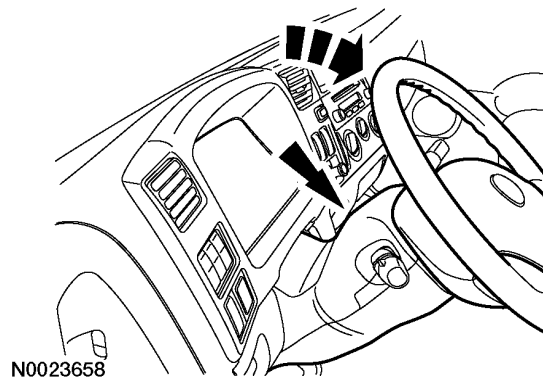
3. To install, reverse the removal procedure.

### Ignition Lock Cylinder

1. Remove the lower steering column cover.
  - Remove the 3 screws.

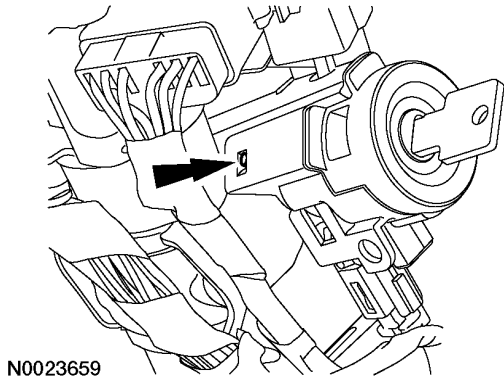


2. Tilt the steering wheel to the full DOWN position and remove the upper steering column cover.

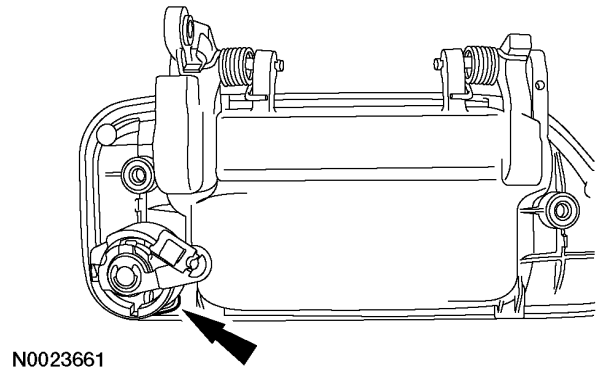




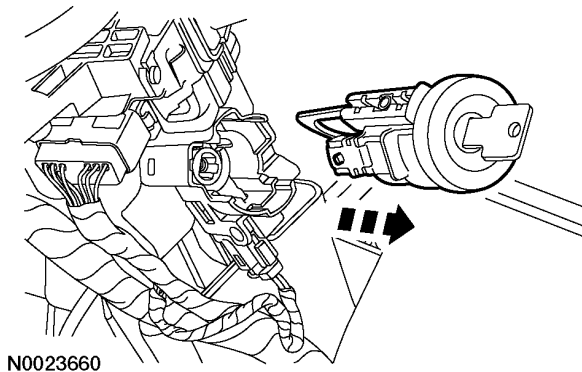
3. Turn the ignition to the ACCESSORY position.
4. Using a small screwdriver, depress the locking tab.



- Remove the clip.



5. Remove the ignition lock cylinder.

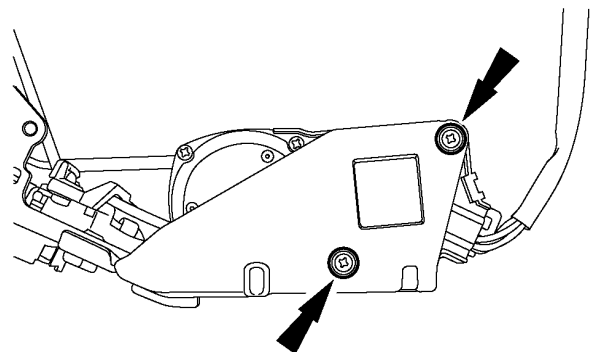


3. To install, reverse the removal procedure.

### Door Latch Remote Control

**NOTE:** LH side shown, RH side similar.

1. Remove the door latch assembly. For additional information, refer to Door Latch in this section.
2. Remove the 2 screws.



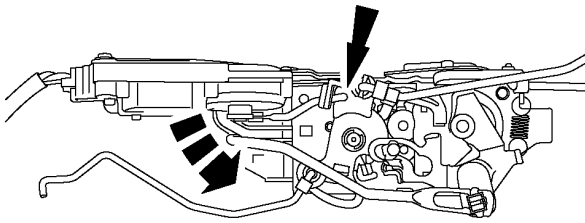
6. To install, reverse the removal procedure.

### Door Lock Cylinder

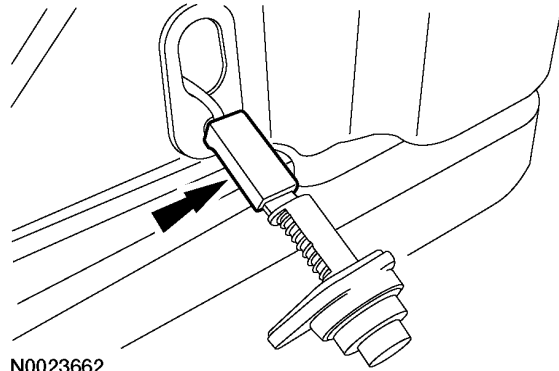
**NOTE:** LH side shown, RH side similar.

1. Remove the exterior door handle. For additional information, refer to Exterior Door Handle in this section.
2. Remove the door lock cylinder.

3. Remove the door lock remote control.
  - Rotate the door lock remote control, then disengage the linkage from the door latch.



N0023656



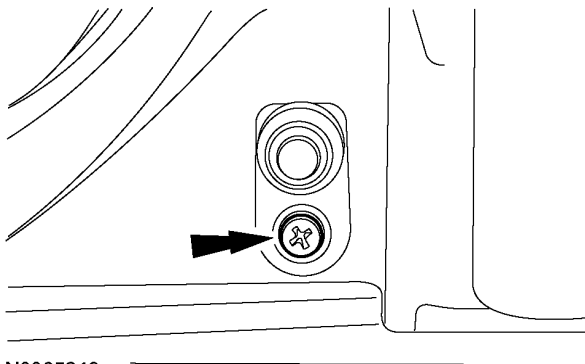
N0023662

4. To install, reverse the removal procedure.

### Door Ajar Switch

**NOTE:** LH side shown, RH side similar.

1. Remove the screw.



N0025346

2. Remove the door ajar switch.

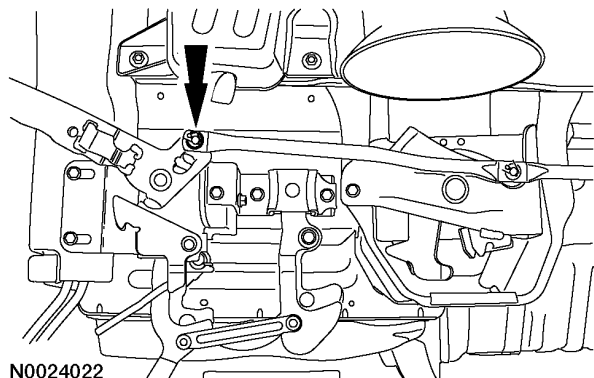
- Disconnect the electrical connector.

3. To install, reverse the removal procedure.

### Cab Latch

#### Handle and safety catch

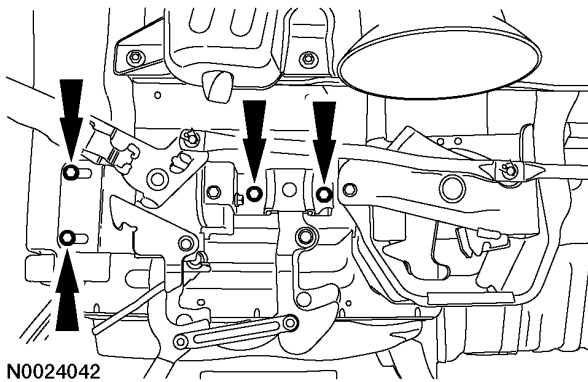
1. Disconnect the linkage.



N0024022

2. Remove the 4 bolts.

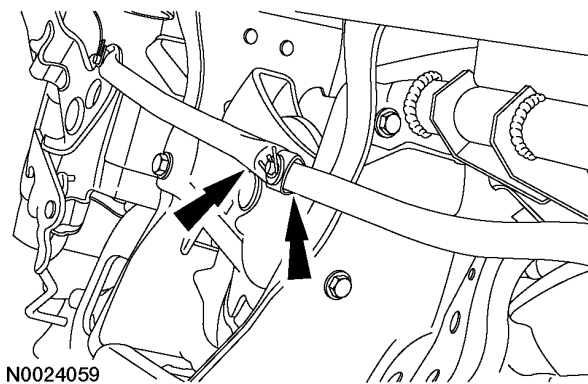
- To install, tighten to 25 Nm (18 lb-ft).



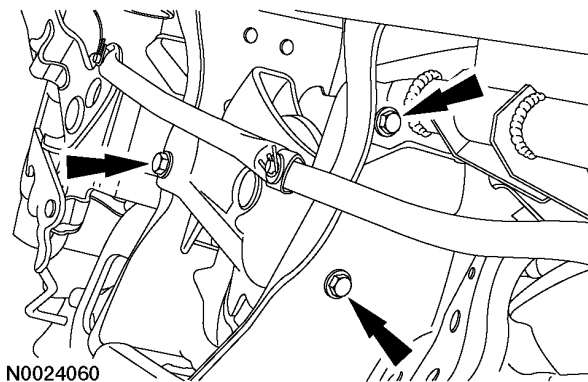
3. Remove the cab latch handle and safety catch.

#### LH tilt latch

4. Disconnect the link rods.

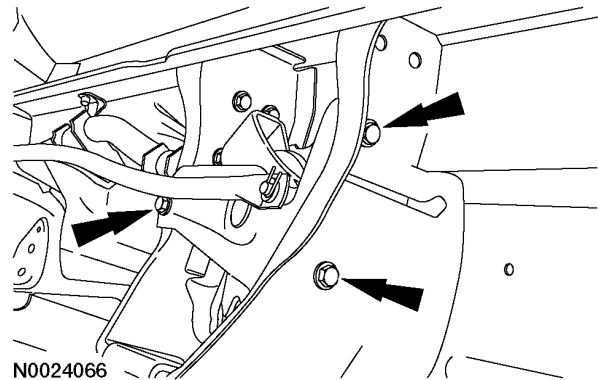


5. Remove the LH cab latch.
  - Remove the 3 bolts.
  - To install, tighten to 25 Nm (18 lb-ft).



#### RH tilt latch

6. Disconnect the link rod.
7. Remove the RH cab latch.
  - Remove the 3 bolts.
  - To install, tighten to 25 Nm (18 lb-ft).

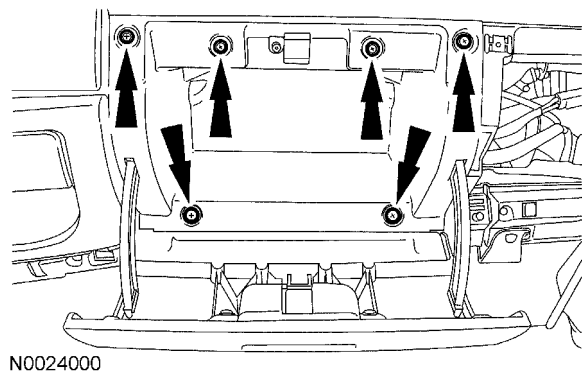


#### Handle and safety catch and LH and RH latches

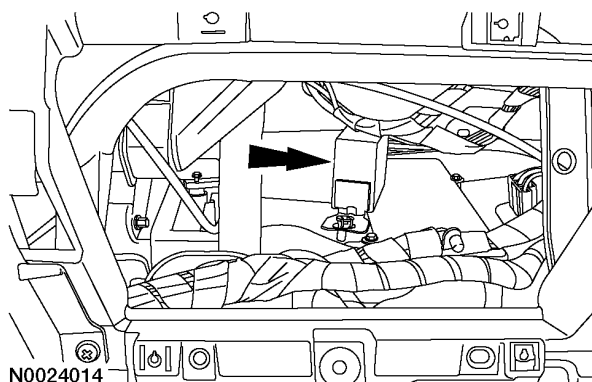
8. To install, reverse the removal procedure.

#### Door Lock Timer

1. Remove the center glove compartment.
  - Remove the 6 screws.



2. Remove the door lock timer.
  - Disconnect the electrical connector.
  - Disengage the push-type fastener.



3. To install, reverse the removal procedure.

## Wipers and Washers

### Specifications

**Table 29 General Specifications**

Item	Specification
LH side windshield wiper blade to the bottom of the windshield	65.0 mm (2.6 in)
RH side windshield wiper blade to the bottom of the windshield	75 mm (2.95 in)

**Table 30 Torque Specifications**

Description	Nm	lbf-ft	lbf-in
Mounting arm and pivot shaft nuts	9	—	80
Pivot arm nut	19	14	—
Upper bracket screw	3	—	27
Lower bracket screw	10	—	89
Windshield washer pump motor-to-bracket screws	10	—	89
Washer bottle-to-bracket screws	6	—	52
Windshield wiper motor-to-cowl bolts	6	—	52

### Description and Operation

#### Wipers and Washers

The wiper and washer system consists of the following components:

- Windshield wiper blades
- Windshield wiper pivot arms
- Windshield wiper mounting arm and pivot shaft
- Windshield wiper motor
- Windshield washer fluid reservoir
- Windshield washer fluid pump
- Windshield wiper/washer switch (part of multifunction switch)

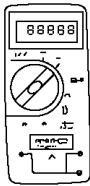
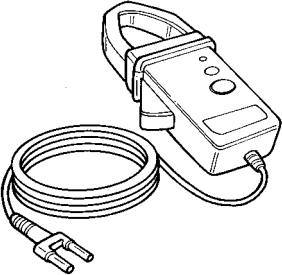
#### Windshield Wiper/Washer Switch

The windshield wiper/washer switch is an integral component of the steering column multifunction switch. For additional information, refer to Steering Column Switches in S05017.

#### Wipers and Washers Diagnosis and Testing

Refer to Wiring Diagrams for schematic and connector information.

**Table 31 Special Tools**

 <p>ST2913-A</p>	<p>Automotive Meter ZTSE4357</p>
	<p>Amp Clamp ZTSE4575</p>

**Principles of Operation**

The power distribution center (PDC) wiper relay supplies power to the multifunction switch and the windshield wiper motor when the ignition is in the ON or ACCESSORY position. The multifunction switch contains an integrated module, which is not serviceable. The integrated module controls the INTERMITTENT SPEED and PARK modes.

Auto mode provides the one-touch down (OTD) feature for the driver front power window. The OTD function allows the driver front power window to be completely lowered when the driver window control switch is pressed to the 2nd detent position and then released. OTD is controlled internally by the driver window control switch.

**High Speed Windshield Wipers**

The high speed output of the multifunction switch is hardwired directly to the windshield wiper motor. When the multifunction switch is set to the HIGH SPEED position, power is supplied to the windshield wiper motor high speed input. The windshield wiper motor will cycle in the high speed mode until the multifunction switch is set to a different position. If the multifunction switch is turned to the OFF position while operating in the high speed mode, the integrated module in the multifunction switch will cycle the wiper

motor at low speed until the wiper motor reaches the PARK position, and the park switch inside the wiper motor provides a ground signal. The module will remove power from the wiper motor low speed input when it receives the ground signal from the park switch.

**Low Speed Windshield Wipers**

The low speed output of the multifunction switch is hardwired directly to the windshield wiper motor. When the multifunction switch is set to the LOW SPEED position, power is supplied to the windshield wiper motor low speed input. The windshield wiper motor will cycle in the low speed mode until the multifunction switch is set to a different position. If the multifunction switch is turned to the OFF position while operating in the low speed mode, the integrated module in the multifunction switch will cycle the wiper motor at low speed until the wiper motor reaches the PARK position, and the park switch inside the wiper motor provides a ground signal. The module will remove power from the wiper motor low speed input when it receives the ground signal from the park switch.

**Intermittent Speed Windshield Wipers**

The multifunction switch has 3 intermittent speed positions, which determine the length of time the wiper motor will dwell between each sweep. When the multifunction switch is set to one of the INTERMITTENT SPEED positions, the integral multifunction switch module will provide power to the low speed input, and the windshield wiper motor will cycle for 1 sweep, followed by a delay.

**Washer System**

The power feed for the washer pump motor is hardwired to the multifunction switch. When the windshield washer portion of the multifunction switch is moved to the ON position, battery voltage is sent to the washer pump motor, which will operate until the windshield washer portion of the multifunction switch is moved to the OFF position.

**Inspection and Verification**

1. Verify the customer concern by operating the system.

2. Visually inspect the following for obvious signs of mechanical and electrical damage.
3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible). GO to the Symptom Chart.

**Table 32 Visual Inspection Chart**

<b>Mechanical</b>	<b>Electrical</b>
<ul style="list-style-type: none"><li>• Windshield washer hoses</li><li>• Wiper linkage</li><li>• Multifunction switch</li></ul>	<ul style="list-style-type: none"><li>• Power distribution center (PDC) fuse 27 (25A)</li><li>• Circuitry</li><li>• Windshield wiper motor</li></ul>

**Table 33 Symptom Chart**

Condition	Possible Sources	Action
The windshield wipers are inoperative	<ul style="list-style-type: none"> <li>• Multifunction switch.</li> <li>• Fuse.</li> <li>• Circuitry.</li> <li>• Wiper relay.</li> <li>• Windshield wiper motor.</li> </ul>	Go to Pinpoint Test A.
The windshield wipers stay on continuously	<ul style="list-style-type: none"> <li>• Windshield wiper motor.</li> <li>• Multifunction switch.</li> <li>• Circuitry.</li> </ul>	Go to Pinpoint Test B.
The HIGH/LOW windshield wiper speeds do not operate correctly	<ul style="list-style-type: none"> <li>• Multifunction switch.</li> <li>• Circuitry.</li> <li>• Windshield wiper motor.</li> </ul>	Go to Pinpoint Test C.
The intermittent windshield wiper speed does not operate correctly	<ul style="list-style-type: none"> <li>• Multifunction switch.</li> </ul>	INSTALL a new multifunction switch. REFER to Steering Column Switches in S05017.
The windshield washer pump is inoperative	<ul style="list-style-type: none"> <li>• Washer pump.</li> <li>• Multifunction switch.</li> <li>• Windshield wiper motor.</li> <li>• Circuitry.</li> </ul>	Go to Pinpoint Test D.
The windshield wipers do not park in the correct position	<ul style="list-style-type: none"> <li>• Windshield wiper motor.</li> <li>• Pivot arm adjustment.</li> <li>• Linkage.</li> </ul>	REFER to Wiper Blade and Pivot Arm Adjustment in this section, and correct any obvious concerns. If the concern is still present, Go to Pinpoint Test E.

**Pinpoint Tests**

*Pinpoint Test A: The Windshield Wipers Are Inoperative*

**Normal Operation**

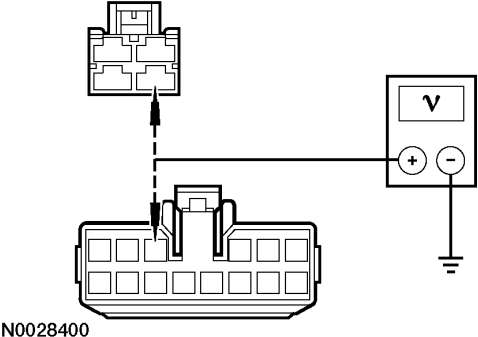
When the ignition switch is in the ON or ACCESSORY position, the windshield wiper motor and multifunction switch receive power from the wiper relay through circuit 1671 (RD). The windshield wiper motor is grounded directly to the chassis through the windshield wiper mounting bolt. The high and low speed outputs of the multifunction switch are hardwired directly to the windshield wiper motor through circuits 1674 (DB/OG) and 1675 (BK/PK). The wipers will operate in low speed mode when

the multifunction switch provides battery voltage to the wiper motor through circuit 1674 (DB/OG). The wipers will operate in high speed mode when the multifunction switch provides battery voltage to the wiper motor through circuit 1675 (BK/PK).

**Possible Causes**

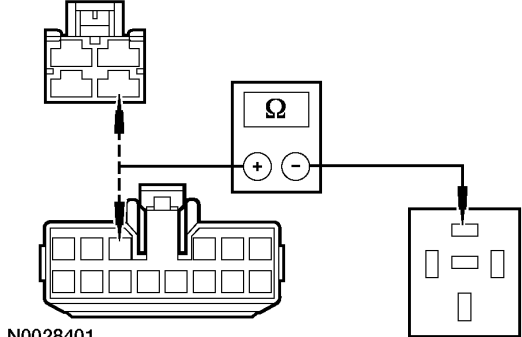
- Fuse
- Open in circuits 1671 (RD), 1674 (DB/OG) or 1675 (BK/PK)
- Windshield wiper relay
- Multifunction switch
- Windshield wiper motor

**Table 34 PINPOINT TEST A: THE WINDSHIELD WIPERS ARE INOPERATIVE**

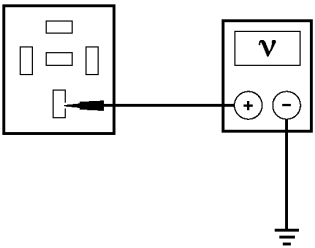
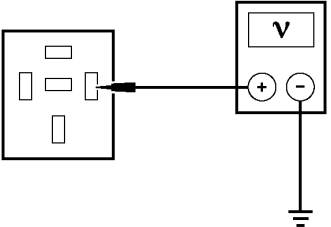
Test Step	Result / Action to Take
<p><b>A1 CHECK CIRCUIT 1671 (RD) FOR VOLTAGE</b></p> <ul style="list-style-type: none"> <li>• <b>Disconnect:</b> Multifunction Switch C202b</li> <li>• <b>Disconnect:</b> Windshield Wiper Motor C125</li> <li>• Key in ON position.</li> <li>• Measure the voltage between windshield wiper motor C125-D, circuit 1671 (RD) and ground; and between multifunction switch C202b-3, circuit 1671 (RD) and ground.</li> </ul>  <p>N0028400</p> <p><b>Is the voltage greater than 10 volts?</b></p>	<p><b>Yes</b></p> <p>GO to A2.</p> <p><b>No</b></p> <p>GO to A3.</p>
<p><b>A2 CHECK THE MULTIFUNCTION SWITCH</b></p> <ul style="list-style-type: none"> <li>• Key in OFF position.</li> <li>• <b>Disconnect:</b> Multifunction Switch C202b</li> <li>• Carry out the multifunction switch component test. Refer to the Wiring Diagrams for component testing.</li> </ul> <p><b>Is the multifunction switch OK?</b></p>	<p><b>Yes</b></p> <p>GO to A8.</p> <p><b>No</b></p> <p>INSTALL a new multifunction switch. TEST the system for normal operation.</p>



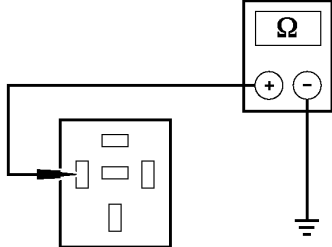
**Table 34 PINPOINT TEST A: THE WINDSHIELD WIPERS ARE INOPERATIVE (cont.)**

Test Step	Result / Action to Take						
<p><b>A3 CHECK CIRCUIT 1671 (RD) FOR AN OPEN</b></p> <ul style="list-style-type: none"><li>Key in OFF position.</li><li><b>Disconnect:</b> Windshield Wiper Relay</li><li>Using the following table, measure the resistance between multifunction switch C202b harness side, windshield wiper motor C125 harness side, and the windshield wiper relay socket pin 87, harness side:</li></ul> <table border="1"><thead><tr><th>Multifunction Switch C202b</th><th>Windshield Wiper Motor C125</th><th>Windshield Wiper Relay Socket Pin 87</th></tr></thead><tbody><tr><td>C202b-7, circuit 1671 (RD)</td><td>C125-D, circuit 1671 (RD)</td><td>windshield wiper relay socket pin 87, circuit 1671 (RD)</td></tr></tbody></table>  <p>N0028401</p> <p><b>Are all resistances less than 5 ohms?</b></p>	Multifunction Switch C202b	Windshield Wiper Motor C125	Windshield Wiper Relay Socket Pin 87	C202b-7, circuit 1671 (RD)	C125-D, circuit 1671 (RD)	windshield wiper relay socket pin 87, circuit 1671 (RD)	<p><b>Yes</b></p> <p>GO to A4.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>
Multifunction Switch C202b	Windshield Wiper Motor C125	Windshield Wiper Relay Socket Pin 87					
C202b-7, circuit 1671 (RD)	C125-D, circuit 1671 (RD)	windshield wiper relay socket pin 87, circuit 1671 (RD)					
<p><b>A4 CHECK THE WINDSHIELD WIPER RELAY</b></p> <ul style="list-style-type: none"><li>Carry out the windshield wiper relay component test. Refer to the Wiring Diagrams for component testing.</li></ul> <p><b>Is the windshield wiper relay OK?</b></p>	<p><b>Yes</b></p> <p>GO to A5.</p> <p><b>No</b></p> <p>INSTALL a new windshield wiper relay. TEST the system for normal operation.</p>						

**Table 34 PINPOINT TEST A: THE WINDSHIELD WIPERS ARE INOPERATIVE (cont.)**

Test Step	Result / Action to Take
<p><b>A5 CHECK CIRCUIT 1672 (DB) FOR VOLTAGE</b></p> <ul style="list-style-type: none"> <li>Measure the voltage between windshield wiper relay socket pin 30, circuit 1672 (DB) harness side and ground.</li> </ul>  <p>N0028402</p> <p><b>Is the voltage greater than 10 volts?</b></p>	<p><b>Yes</b></p> <p>GO to A6.</p> <p><b>No</b></p> <p>VERIFY the power distribution center (PDC) fuse 27 (25A). If OK, REPAIR circuit 1672 (DB) for an open.</p>
<p><b>A6 CHECK CIRCUIT 298 (VT/OG) FOR VOLTAGE</b></p> <ul style="list-style-type: none"> <li>Key in ON position.</li> <li>Measure the voltage between windshield wiper relay socket pin 85, circuit 298 (VT/OG) harness side and ground.</li> </ul>  <p>N0028403</p> <p><b>Is the voltage greater than 10 volts?</b></p>	<p><b>Yes</b></p> <p>GO to A7.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>

**Table 34 PINPOINT TEST A: THE WINDSHIELD WIPERS ARE INOPERATIVE (cont.)**

Test Step	Result / Action to Take
<p><b>A7 CHECK CIRCUIT 57 (BK) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li>Measure the resistance between wiper relay socket pin 86, circuit 57 (BK) and ground.</li> </ul>  <p>N0028404</p> <p><b>Is the resistance less than 5 ohms?</b></p>	<p><b>Yes</b></p> <p>CHECK all windshield wiper motor connector, multifunction switch connector and PDC windshield wiper relay pins for looseness, corrosion, dirt or damage and REPAIR any obvious concerns. TEST the system for normal operation.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>
<p><b>A8 CHECK THE WINDSHIELD WIPER MOTOR</b></p> <ul style="list-style-type: none"> <li>Carry out the windshield wiper motor component test. Refer to the windshield wiper motor component test in this section.</li> </ul> <p><b>Did the windshield wiper motor pass the component test?</b></p>	<p><b>Yes</b></p> <p>VERIFY the wiper motor ground bolt and connector are not loose, corroded or damaged and correct any obvious concerns. TEST the system for normal operation. If concern is still present, INSTALL a new windshield wiper motor. REFER to Windshield Wiper Motor in this section.</p> <p><b>No</b></p> <p>INSTALL a new windshield wiper motor. REFER to Windshield Wiper Motor in this section.</p>

*Pinpoint Test B: The Windshield Wipers Stay On Continuously*

### Normal Operation

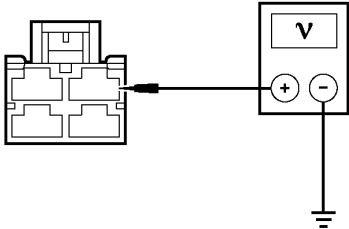
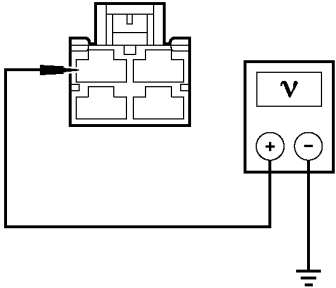
When the ignition switch is in the ON or ACCESSORY position, the windshield wiper motor and multifunction switch receive power from the wiper relay through circuit 1671 (RD). The windshield wiper motor is grounded directly to the chassis through the windshield wiper mounting bolt. The high and low speed outputs of the multifunction switch are hardwired directly to the windshield wiper motor through circuits 1674 (DB/OG) and 1675 (BK/PK).

The wipers will operate in low speed mode when the multifunction switch provides battery voltage to the wiper motor through circuit 1674 (DB/OG). The wipers will operate in high speed mode when the multifunction switch provides battery voltage to the wiper motor through circuit 1675 (BK/PK).

### Possible Causes

- Multifunction switch
- Circuit 1674 (DB/OG) or 1675 (BK/PK) shorted to power

**Table 35 PINPOINT TEST B: THE WINDSHIELD WIPERS STAY ON CONTINUOUSLY**

Test Step	Result / Action to Take
<b>B1 CHECK THE MULTIFUNCTION SWITCH</b> <ul style="list-style-type: none"> <li>Key in OFF position.</li> <li><b>Disconnect:</b> Multifunction Switch C202b</li> <li>Carry out the multifunction switch component test. Refer to Wiring Diagrams for component testing.</li> </ul> <b>Is the multifunction switch OK?</b>	<b>Yes</b> GO to B2.  <b>No</b> INSTALL a new multifunction switch. TEST the system for normal operation.
<b>B2 CHECK CIRCUIT 1674 (DB/OG) FOR VOLTAGE</b> <ul style="list-style-type: none"> <li>Key in ON position.</li> <li><b>Disconnect:</b> Windshield Wiper Motor C125</li> <li>Measure the voltage between windshield wiper motor C125-B, circuit 1674 (DB/OG) harness side and ground.</li> </ul>  <p>N0025359</p> <b>Is any voltage present?</b>	<b>Yes</b> REPAIR the circuit. TEST the system for normal operation.  <b>No</b> GO to B3.
<b>B3 CHECK CIRCUIT 1675 (BK/PK) FOR VOLTAGE</b> <ul style="list-style-type: none"> <li>Measure the voltage between windshield wiper motor C125-A, circuit 1675 (BK/PK) harness side and ground.</li> </ul>  <p>N0025360</p> <b>Is any voltage present?</b>	<b>Yes</b> REPAIR the circuit. TEST the system for normal operation.  <b>No</b> INSTALL a new multifunction switch. TEST the system for normal operation.

*Pinpoint Test C: The HIGH/LOW Windshield Wiper Speeds Do Not Operate Correctly*      **Normal Operation**

When the ignition switch is in the ON or ACCESSORY position, the windshield wiper motor and multifunction switch receive power from the wiper relay through circuit 1671 (RD). The windshield wiper motor is grounded directly to the chassis through the windshield wiper mounting bolt. The high and low speed outputs of the multifunction switch are hardwired directly to the windshield wiper motor through circuits 1674 (DB/OG) and 1675 (BK/PK). The wipers will operate in low speed mode when the multifunction switch provides battery voltage to the wiper motor through circuit 1674 (DB/OG). The wipers will operate in high speed mode when the multifunction switch provides battery voltage to the wiper motor through circuit 1675 (BK/PK).

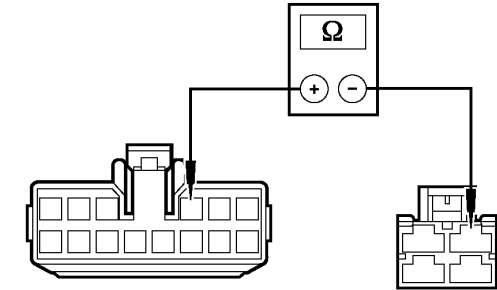
#### Possible Causes

- Multifunction switch
- Open in circuits 1674 (DB/OG) or 1675 (BK/PK)
- Windshield wiper motor

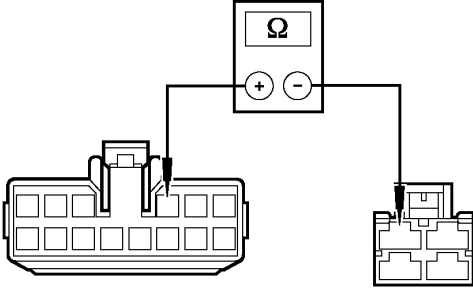
**Table 36 PINPOINT TEST C: THE HIGH/LOW WINDSHIELD WIPER SPEEDS DO NOT OPERATE CORRECTLY**

Test Step	Result / Action to Take
<b>C1 CHECK THE MULTIFUNCTION SWITCH</b> <ul style="list-style-type: none"> <li>• Key in OFF position.</li> <li>• <b>Disconnect:</b> Multifunction Switch C202b</li> <li>• Carry out the multifunction switch component test. Refer to Wiring Diagrams for component testing.</li> </ul> <b>Is the multifunction switch OK?</b>	<p><b>Yes</b></p> <p>Go to C2.</p> <p><b>No</b></p> <p>INSTALL a new multifunction switch. TEST the system for normal operation.</p>

Table 36 PINPOINT TEST C: THE HIGH/LOW WINDSHIELD WIPER SPEEDS DO NOT OPERATE CORRECTLY (cont.)

Test Step	Result / Action to Take
<p><b>C2 CHECK CIRCUIT 1674 (DB/OG) FOR AN OPEN</b></p> <ul style="list-style-type: none"><li>• <b>Disconnect:</b> Windshield Wiper Motor C125</li><li>• Measure the resistance between multifunction switch C202b-4, circuit 1674 (DB/OG) harness side and windshield wiper motor C125-b, circuit 1674 (DB/OG) harness side.</li></ul> <div><p>N0025361</p></div> <p>Is the resistance less than 5 ohms?</p>	<p><b>Yes</b></p> <p>Go to C3.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>

**Table 36 PINPOINT TEST C: THE HIGH/LOW WINDSHIELD WIPER SPEEDS DO NOT OPERATE CORRECTLY (cont.)**

Test Step	Result / Action to Take
<p><b>C3 CHECK CIRCUIT 1675 (BK/PK) FOR AN OPEN</b></p> <ul style="list-style-type: none"> <li>• <b>Disconnect:</b> Windshield Wiper Motor C125</li> <li>• Measure the resistance between multifunction switch C202b-6, circuit 1675 (BK/PK) harness side and windshield wiper motor C125-A, circuit 1675 (BK/PK) harness side.</li> </ul>  <p>N0025362</p> <p><b>Is the resistance less than 5 ohms?</b></p>	<p><b>Yes</b></p> <p>GO to C4.</p> <p><b>No</b></p> <p>REPAIR the circuit. TEST the system for normal operation.</p>
<p><b>C4 CHECK THE WINDSHIELD WIPER MOTOR</b></p> <ul style="list-style-type: none"> <li>• Carry out the windshield wiper motor component test. Refer to the windshield wiper motor component test in this section.</li> </ul> <p><b>Did the windshield wiper motor pass the component test?</b></p>	<p><b>Yes</b></p> <p>VERIFY the wiper motor ground bolt and connector are not loose, corroded or damaged and correct any obvious concerns. TEST the system for normal operation. If concern is still present, INSTALL a new windshield wiper motor. REFER to Windshield Wiper Motor in this section.</p> <p><b>No</b></p> <p>INSTALL a new windshield wiper motor. REFER to Windshield Wiper Motor in this section.</p>

*Pinpoint Test D: The Windshield Washer Pump Is Inoperative*

**Normal Operation**

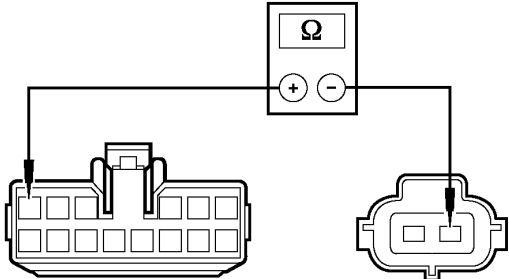
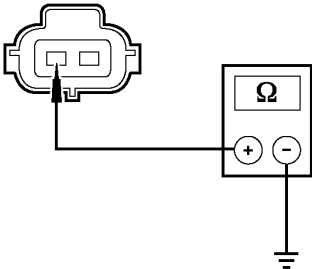
When the ignition switch is in the ON or ACCESSORY position, the windshield wiper motor and multifunction switch receive power from the wiper relay through circuit 1671 (RD). The windshield washer motor uses circuit 57 (BK) for ground. When the windshield washer portion of the multifunction switch is moved to the ON position, battery voltage is sent to the

windshield washer pump motor through circuit 941 (BK/WH), and the motor operates until the windshield washer portion of the multifunction switch is moved to the OFF position.

**Possible Causes**

- Multifunction switch
- Windshield washer pump motor
- Open in circuits 941 (BK/WH) or 57 (BK)

**Table 37 PINPOINT TEST D: THE WINDSHIELD WASHER PUMP IS INOPERATIVE**

Test Step	Result / Action to Take
<b>D1 CHECK THE MULTIFUNCTION SWITCH</b> <ul style="list-style-type: none"> <li>Key in OFF position.</li> <li><b>Disconnect:</b> Multifunction Switch C202b</li> <li>Carry out the multifunction switch component test. Refer to Wiring Diagrams for component testing.</li> </ul> <b>Is the multifunction switch OK?</b>	<b>Yes</b> Go to D2.  <b>No</b> INSTALL a new multifunction switch. TEST the system for normal operation.
<b>D2 CHECK CIRCUIT 941 (BK/WH) FOR AN OPEN</b> <ul style="list-style-type: none"> <li><b>Disconnect:</b> Washer Pump Motor C137</li> <li>Measure the resistance between washer pump motor C137-B, circuit 941 (BK/WH) harness side and multifunction switch C202b-1, circuit 941 (BK/WH) harness side.</li> </ul>  <p>N0028415</p> <b>Is the resistance less than 5 ohms?</b>	<b>Yes</b> Go to D3.  <b>No</b> REPAIR the circuit. TEST the system for normal operation.
<b>D3 CHECK CIRCUIT 57 (BK) FOR AN OPEN</b> <ul style="list-style-type: none"> <li>Measure the resistance between washer pump motor C137-A, circuit 57 (BK/WH) harness side and ground.</li> </ul>  <p>N0028416</p> <b>Is the resistance less than 5 ohms?</b>	<b>Yes</b> INSTALL a new washer pump motor. REFER to Washer Pump and Reservoir in this section. TEST the system for normal operation.  <b>No</b> REPAIR the circuit. TEST the system for normal operation.

*Pinpoint Test E: The Windshield Wipers Do Not Park In The Correct Position*

**Normal Operation**



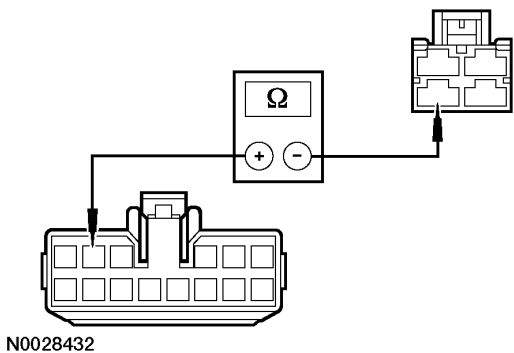
When the ignition switch is in the ON or ACCESSORY position, the windshield wiper motor and multifunction switch receive power from the wiper relay through circuit 1671 (RD). The windshield wiper motor is grounded directly to the chassis through the windshield wiper mounting bolt. The high and low speed outputs of the multifunction switch are hardwired directly to the windshield wiper motor through circuits 1674 (DB/OG) and 1675 (BK/PK). The wipers will operate in low speed mode when the multifunction switch provides battery voltage to the wiper motor through circuit 1674 (DB/OG). The wipers will operate in high speed mode when the multifunction switch provides battery voltage to the wiper motor through circuit 1675 (BK/PK). If the

multifunction switch is turned to the OFF position while operating in the high or low speed modes, the integrated module in the multifunction switch will cycle the wiper motor at low speed until the wiper motor reaches the PARK position, and the park switch inside the wiper motor provides a ground signal. The module will remove power from the wiper motor low speed input when it receives the ground signal from the park switch.

**Possible Causes**

- Multifunction switch
- Windshield wiper motor
- Circuit 63 (RD) open

**Table 38 PINPOINT TEST E: THE WINDSHIELD WIPERS DO NOT PARK IN THE CORRECT POSITION**

Test Step	Result / Action to Take
<b>E1 CHECK THE MULTIFUNCTION SWITCH</b> <ul style="list-style-type: none"> <li>Key in OFF position.</li> <li><b>Disconnect:</b> Multifunction Switch C202b</li> <li>Carry out the multifunction switch component test. Refer to Wiring Diagrams for component testing.</li> </ul> <b>Is the multifunction switch OK?</b>	<b>Yes</b> Go to E2.  <b>No</b> INSTALL a new multifunction switch. TEST the system for normal operation.
<b>E2 CHECK CIRCUIT 63 (RD) FOR AN OPEN</b> <ul style="list-style-type: none"> <li><b>Disconnect:</b> Windshield Wiper Motor C125</li> <li>Key in ON position.</li> <li>Measure the resistance between windshield wiper motor C125-C, circuit 63 (RD) harness side and multifunction switch C202b-C, circuit 63 (RD) harness side.</li> </ul>  <p>N0028432</p> <b>Is the resistance less than 5 ohms?</b>	<b>Yes</b> VERIFY the wiper mouning arms and pivot shafts are not binding and REPAIR any obvious concerns. If the wiper pivot arms and shafts are OK, INSTALL a new windshield wiper motor. TEST the system for normal operation.  <b>No</b> REPAIR the circuit. TEST the system for normal operation.

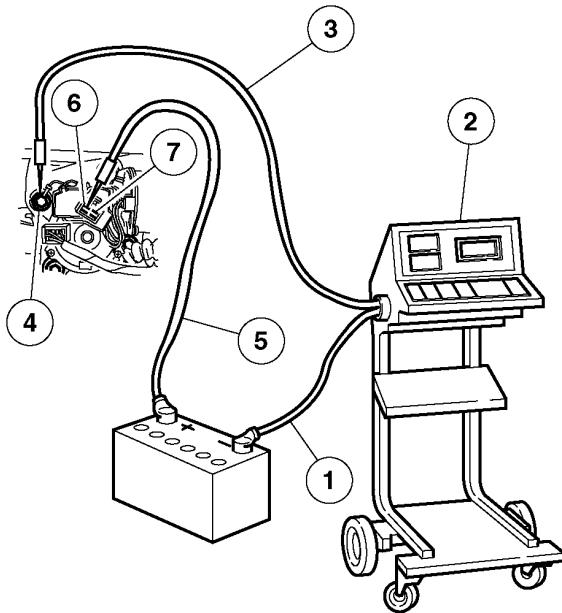
**Windshield Wiper Motor Component Test**

**CAUTION:** Do not handle the windshield wiper motor abusively when diagnosing the wiper operations. Failure to follow this caution may result in damage to the motor magnets and will make the windshield wiper motor inoperative. Rough handling of new windshield wiper motors may also damage the motor magnets.

If the windshield wiper motor does not pass any of the following tests, install a new windshield wiper motor. Refer to Windshield Wiper Motor in this section.

Use the Alternator, Regulator, Battery and Starter Tester (ARBST) to test the windshield wiper motor on the vehicle.

To test the windshield wiper motor, disconnect the windshield wiper mounting arm and pivot shaft from the windshield wiper motor. Refer to Wiper Mounting Arm and Pivot Shaft in this section.



N0029610

Disconnect the windshield wiper motor. Connect the (1) green lead from (2) (ARBST) to the battery negative (-) post. Connect the (3) red lead from ARBST to the wiper motor (4) common brush terminal (external ground wire).

### Low Speed

Test the LOW SPEED mode by connecting a (5) cable from the battery positive (+) post to the (6) low speed brush terminal (terminal 1, component side) and measure the current draw. If the current draw is greater than 3.5 amperes, install a new windshield wiper motor.

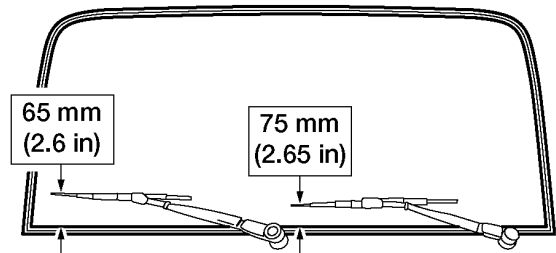
### High Speed

Test the HIGH SPEED mode by connecting a cable from the battery positive (+) post to the (7) high speed brush terminal (terminal 2, component side) and measure the current draw. If the current draw is greater than 5.5 amperes, install a new windshield wiper motor.

## General Procedures

### Wiper Blade and Pivot Arm Adjustment

1. Cycle and park the windshield wipers.
2. Verify the distance between the center of the LH and RH windshield wiper blades and the bottom of the windshield glass is within specification.



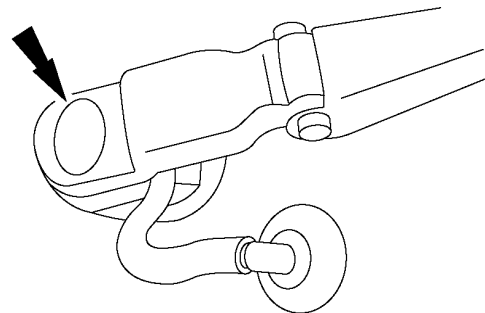
N0033405

3. If the distance is not within specification, remove the windshield wiper pivot arms and reposition to specification. For additional information, refer to Wiper Pivot Arm in this section.

## Removal and Installation

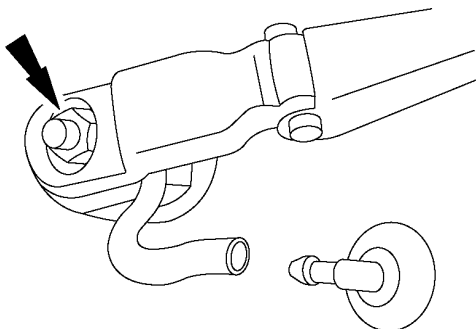
### Wiper Pivot Arm

1. Remove the pivot arm cover.



N0024194

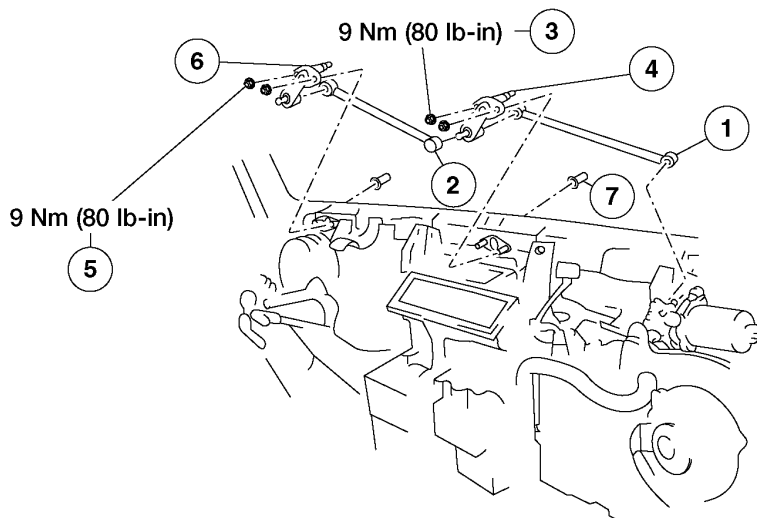
2. Remove the pivot arm nut and the pivot arm.
  - To install, tighten to 19 Nm (14 lb-ft).



N0024195

3. To install, reverse the removal procedure.

### Wiper Mounting Arm and Pivot Shaft



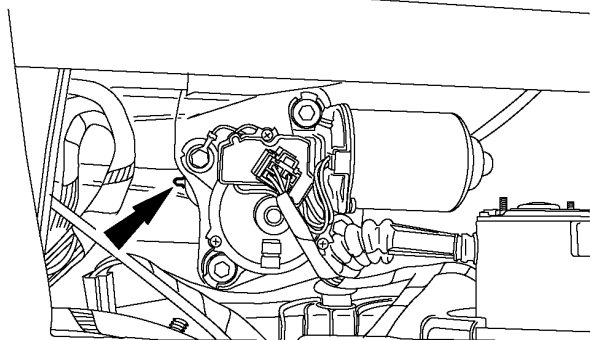
N0033406

**Figure 128**

- |                         |                                    |                                    |
|-------------------------|------------------------------------|------------------------------------|
| 1. Pivot Arm Assembly   | 4. RH Mounting Arm and Pivot Shaft | 6. LH Mounting Arm and Pivot Shaft |
| 2. LH Pivot Arm Linkage | 5. Nut                             | 7. Grommet                         |

### LH and RH mounting arm and pivot shaft

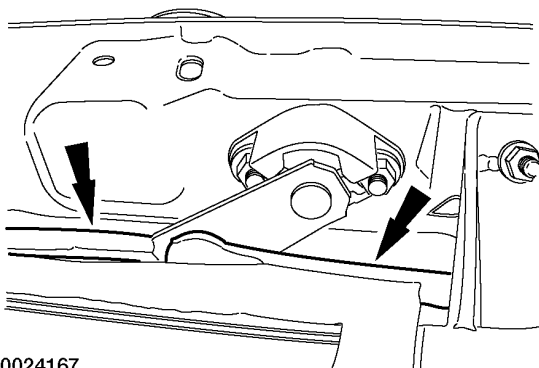
1. Remove the instrument panel. For additional information, refer to Instrument Panel and Console (Instrument Panel and Console, page 49).
2. Disconnect the pivot arm linkage from the wiper motor.



N0024166

**RH mounting arm and pivot shaft only**

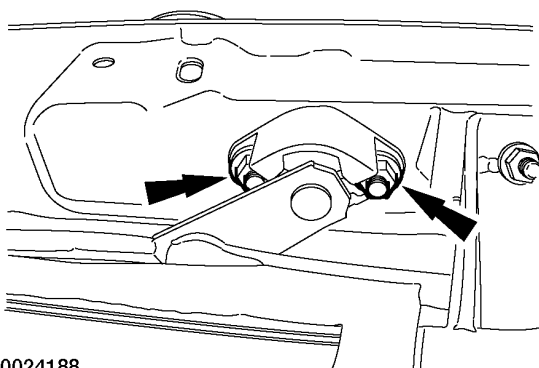
3. Disconnect the pivot arm linkages.



N0024167

4. Remove the 2 nuts and the RH mounting arm and pivot shaft.

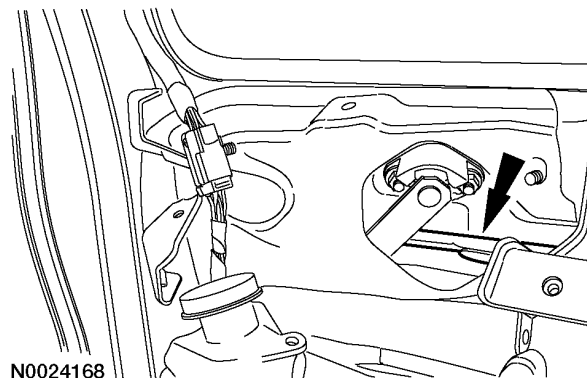
- To install, tighten to 9 Nm (80 lb-in).



N0024188

**LH mounting arm and pivot shaft only**

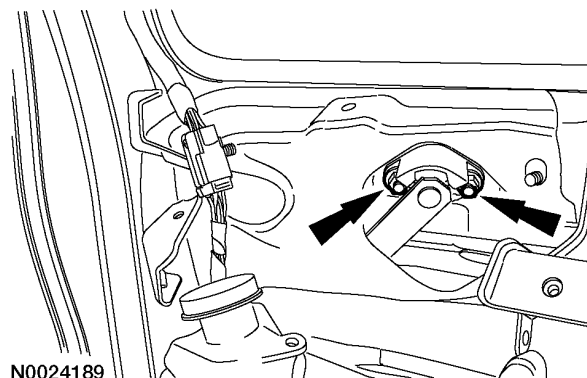
5. Disconnect the pivot arm linkage.



N0024168

6. Remove the 2 nuts and the LH mounting arm and pivot shaft.

- To install, tighten to 9 Nm (80 lb-in).



N0024189

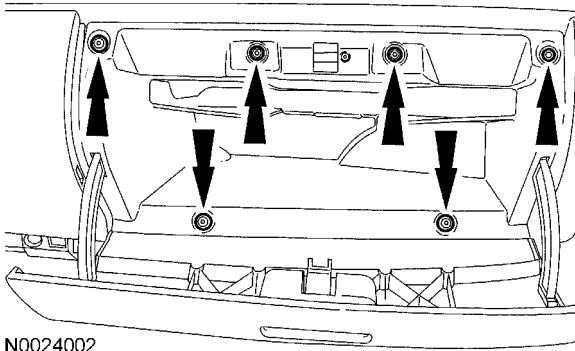
**LH and RH mounting arm and pivot shaft**

7. To install, reverse the removal procedure.

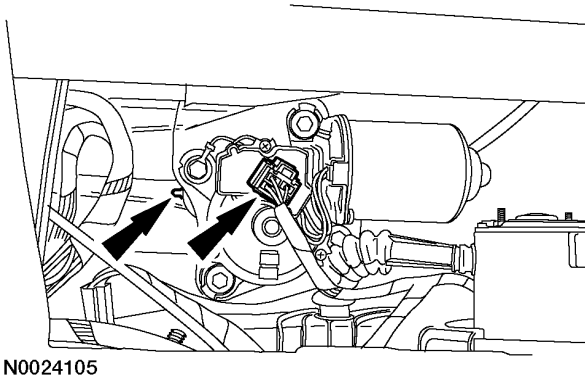
**Windshield Wiper Motor**

1. Remove the glove compartment.

- Remove the 6 screws.

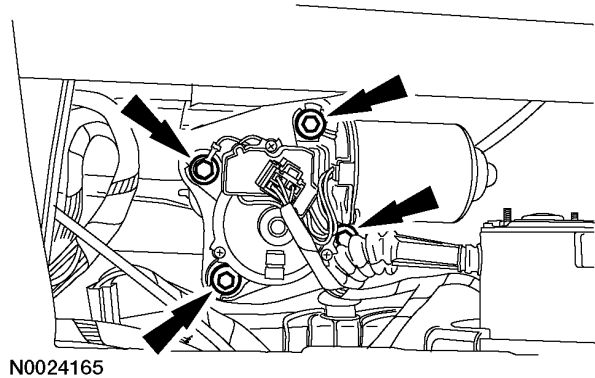


2. Disconnect the pivot arm linkage and the electrical connector.



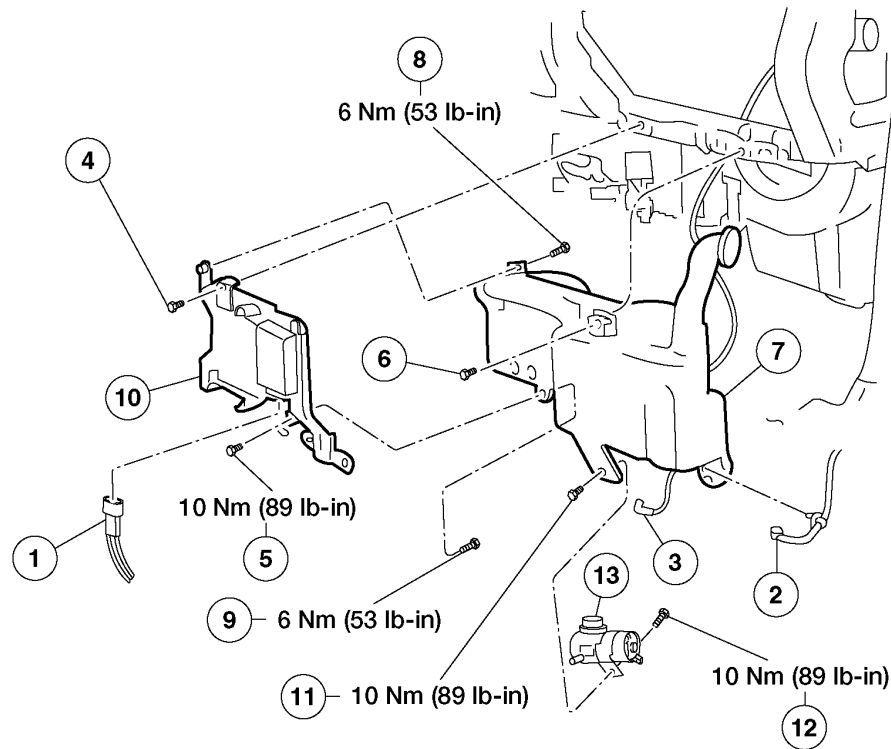
3. Remove the 4 bolts.

- To install, tighten to 6 Nm (53 lb-in).



4. Remove the windshield wiper motor.
5. To install, reverse the removal procedure.

## Washer Pump and Reservoir



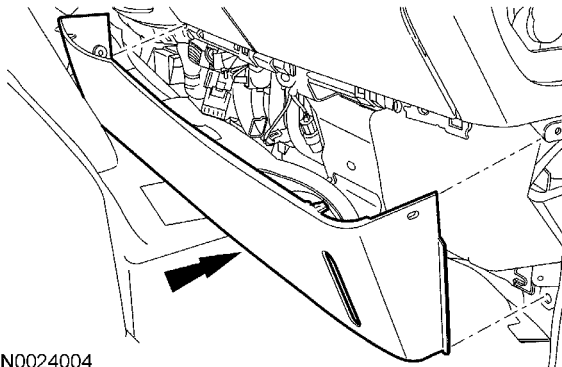
N0033413

Figure 137

- |                                                                         |                                                       |                                                       |
|-------------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|
| 1. Remote keyless entry (RKE) module electrical connector (if equipped) | 5. Lower bracket screw                                | 9. Lower windshield washer reservoir-to-bracket screw |
| 2. Windshield washer pump electrical connector                          | 6. Windshield washer reservoir upper screw            | 10. Bracket                                           |
| 3. Windshield washer hose                                               | 7. Windshield washer pump and reservoir               | 11. Washer pump screw                                 |
| 4. Upper bracket screw                                                  | 8. Upper windshield washer reservoir-to-bracket screw | 12. Washer pump nut                                   |
|                                                                         |                                                       | 13. Washer pump                                       |

1. Remove the lower RH finish panel.

2. If equipped with remote keyless entry (RKE), disconnect the RKE module electrical connector and the windshield washer hose.



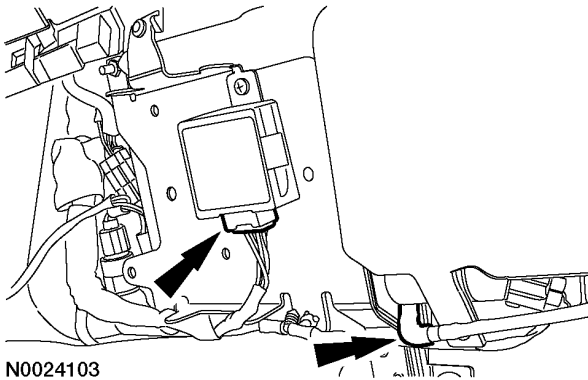
N0024004

S16032

Read all safety instructions in the "Safety Information" section of this manual before doing any procedures.

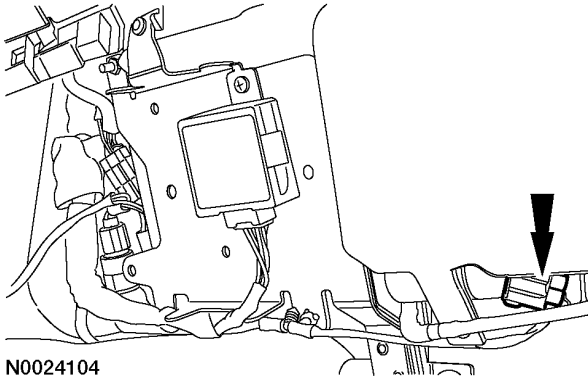
Follow all warnings, cautions, and notes.

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N0024103

3. Disconnect the windshield washer pump electrical connector.



N0024104

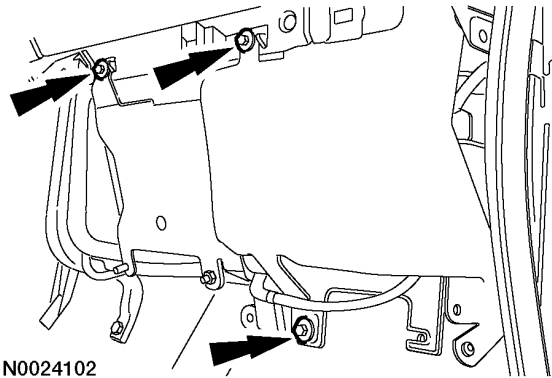


**WARNING:** Windshield washer solution contains methanol, which is poisonous. Observe all cautions and warnings indicated on label of washer solution container.

**NOTE:** To prevent spilling windshield washer fluid, drain the windshield washer reservoir before removal.

4. Remove the upper and lower bracket screws and the upper windshield washer reservoir screw.

- To install, tighten the lower bracket screws to 10 Nm (89 lb-in).



N0024102

5. Remove the windshield washer reservoir and pump assembly.

6. Remove the bracket.

- Remove the 2 screws.
- To install, tighten to 6 Nm (53 lb-in).

**CAUTION:** Do not make electrical connection prior to filling the windshield washer reservoir. Do not operate the windshield washer pump prior to filling the windshield washer reservoir.

7. To install, reverse the removal procedure.

- If installing a new bracket, transfer all components as necessary.
- Fill the windshield washer reservoir.

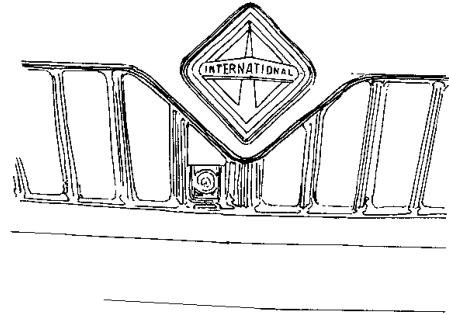


## Full Frame and Body Mounting

### Specifications

**Table 39 Torque Specifications**

Description	Nm	lbf-ft
A/C line to evaporator core (Outlet line)	65	48
A/C line to evaporator core (Inlet line)	23	17
Body tilt support rod bolts	22	16
Brake pipe fittings	16	12
Pinch bolt and nut	48	35
Transmission support crossmember nuts and bolts	130	96
Transmission insulator nuts	129	95



### Description and Operation

#### Frame and Body Mounting

The frame is made up of steel channel 2-piece rails and bolted crossmembers.

The body features a 42-degree tilt angle for access and opens with torsion bar assist.

There are 5 wheelbase options:

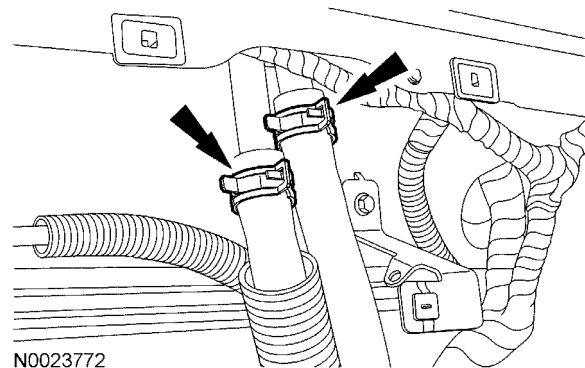
- 113-inch
- 137-inch
- 149-inch
- 167-inch
- 185-inch

### Removal and Installation

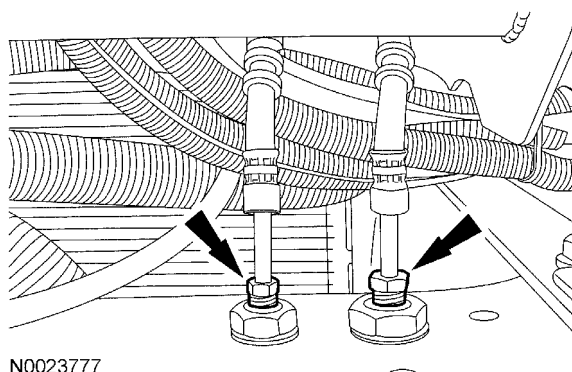
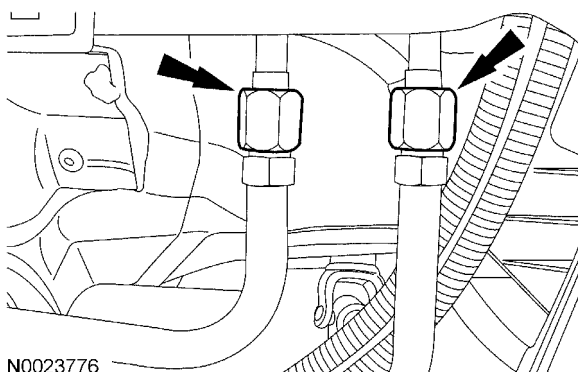
#### Body

1. Remove the radiator grille retaining screw.

2. Remove the radiator grille.
3. Recover the refrigerant. For additional information, refer to Climate Control System.
4. Drain the cooling system. For additional information, refer to the Engine Operation and Maintenance Manual.
5. Disconnect the 2 coolant lines from the heater core.
  - Position the clamps off of the heater core pipes.
  - Disconnect the coolant lines from the heater core pipes.

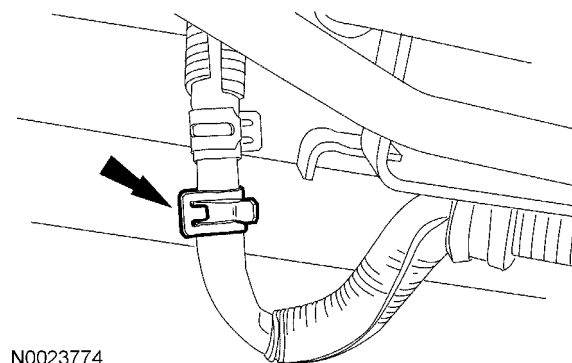
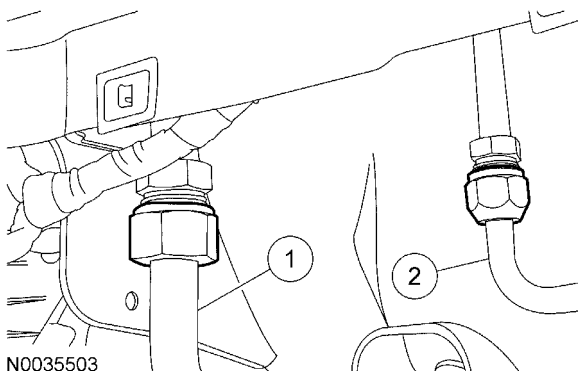


6. Disconnect the power steering lines.



7. Disconnect the A/C lines at the fittings from the evaporator core.

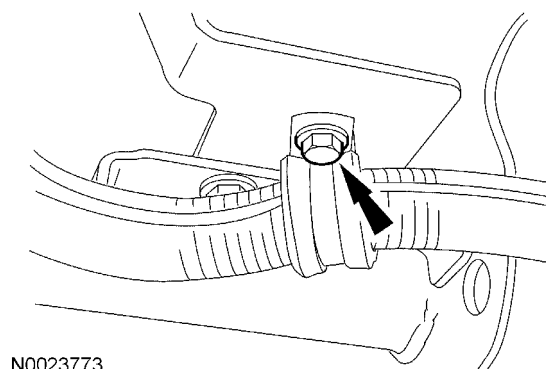
9. Disconnect the hose.



**Figure 145**

1. Disconnect the A/C line. • To install, tighten to 65 Nm (48 lb-ft).
  2. Disconnect the A/C line. • To install, tighten to 23 Nm (17 lb-ft).
8. Disconnect the brake pipes at the fittings.  
• To install, tighten to 16 Nm (12 lb-ft).

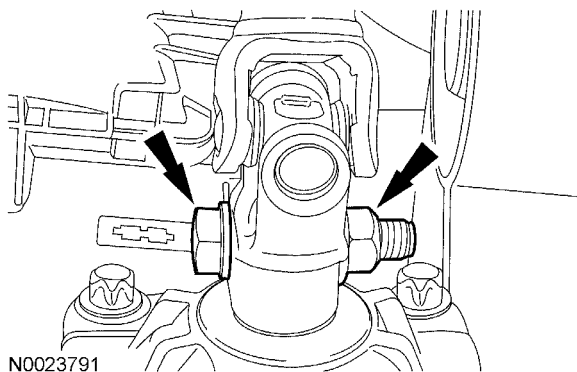
10. Remove the hose routing bolt.



11. Tilt the body forward.

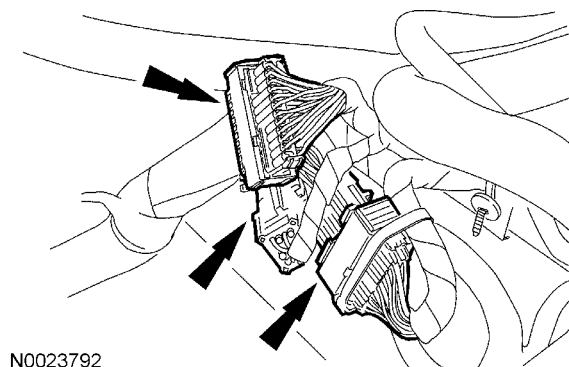
12. Remove the pinch bolt and nut.

- To install, tighten to 48 Nm (35 lb-ft).



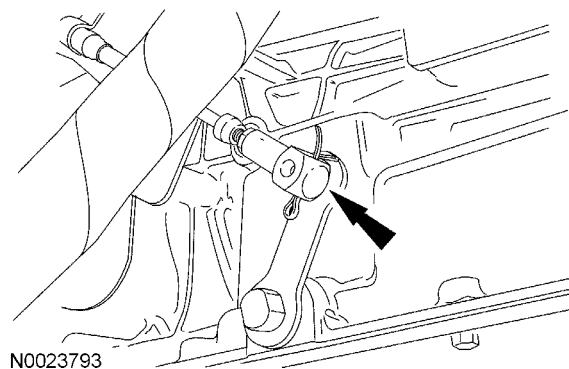
13. Separate the intermediate shaft from the steering gear.

14. Disconnect the 3 wiring harness connectors.

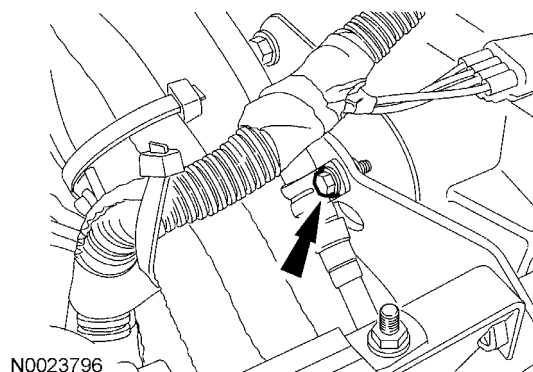


15. Support the body.

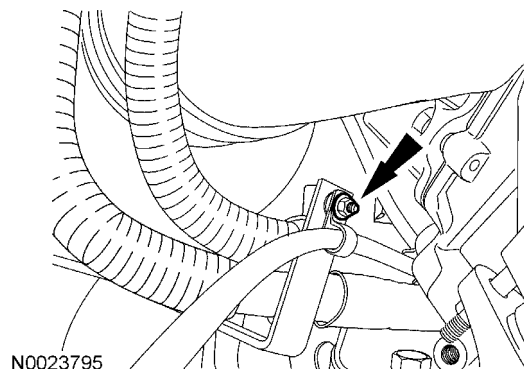
16. Disconnect the transmission shift cable from the transmission.



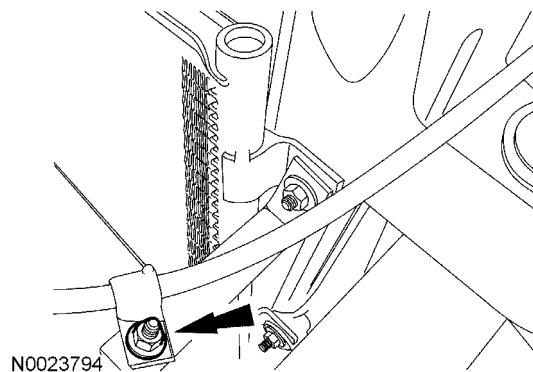
17. Remove the transmission shift cable routing bolt.



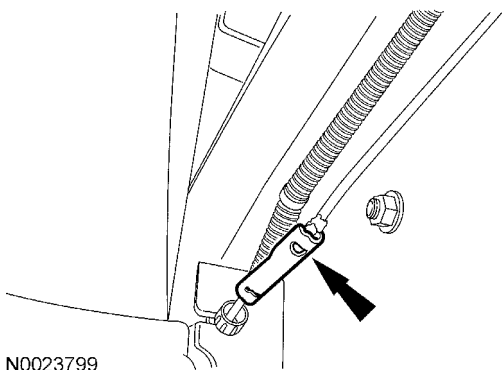
18. Remove the transmission shift cable routing nut.



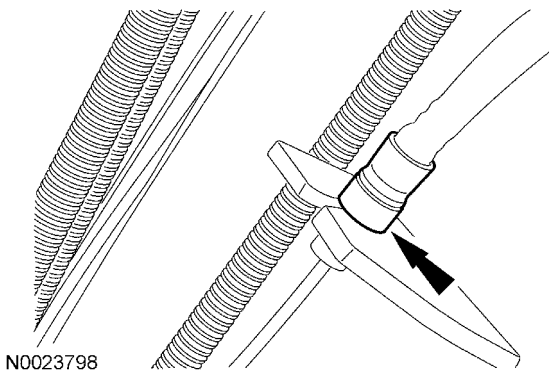
19. Remove the transmission shift cable routing nut.



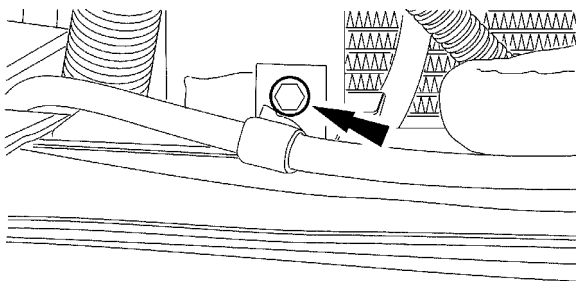
20. Disconnect the park brake cable at the tension clip.



21. Remove the park brake cable from the bracket.

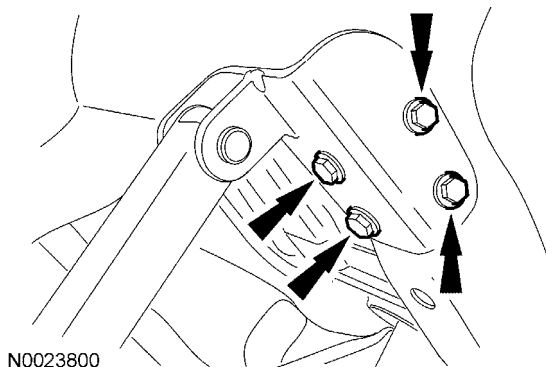


22. Remove the park brake cable routing bolt.



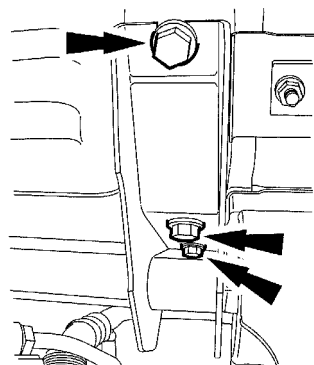
23. Remove the 4 body tilt support rod bolts.

- To install, tighten to 22 Nm (16 lb-ft).



**NOTE:** RH shown, LH similar.

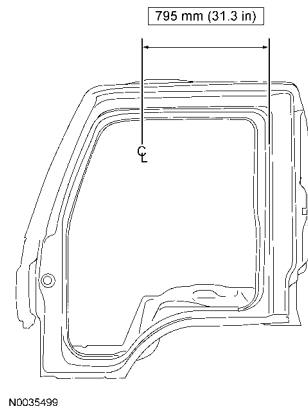
24. Remove the 6 body tilt hinge-to-body bolts.



N0023803

**CAUTION:** The lifting device should be blocked or clamped so that it cannot slip while the cab is suspended. Failure to secure the lifting device adequately may allow the cab to shift and fall.

25. Measure 795 mm (31.3 in) from the inside rear of the cab and position the lifting device.



26. Remove the body from the frame.

27. To install, reverse the removal procedure.

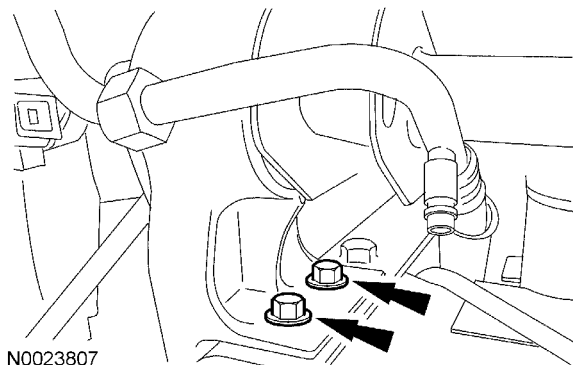
- Bleed the brake system. For additional information, refer to Brake System in S04049.
- Fill the cooling system. For additional information, refer to the Engine Operation and Maintenance Manual.
- Charge the A/C system. For additional information, refer Climate Control System.

### Body — Tilt Hinge

1. Remove the body. For additional information, refer to Body in this section.

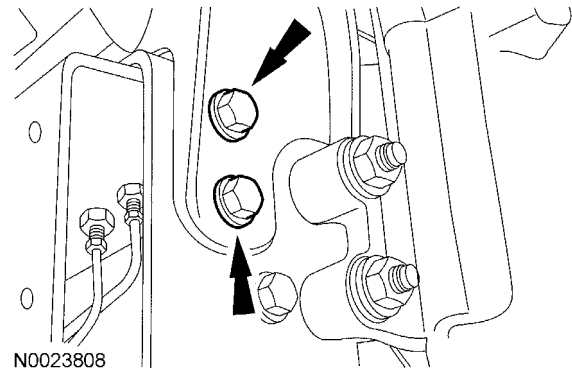
**NOTE:** RH shown, LH similar.

2. Remove the 4 body tilt hinge-to-frame top bolts.



**NOTE:** RH shown, LH similar.

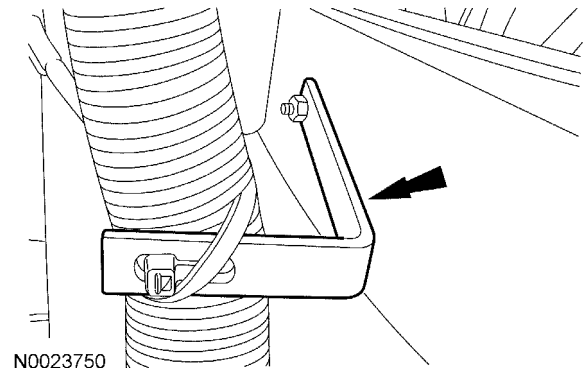
3. Remove the 4 body tilt hinge-to-frame side bolts.



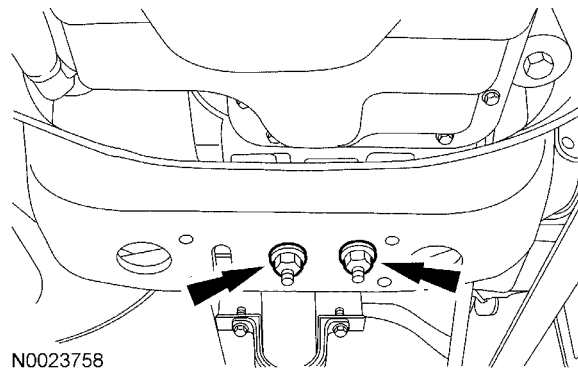
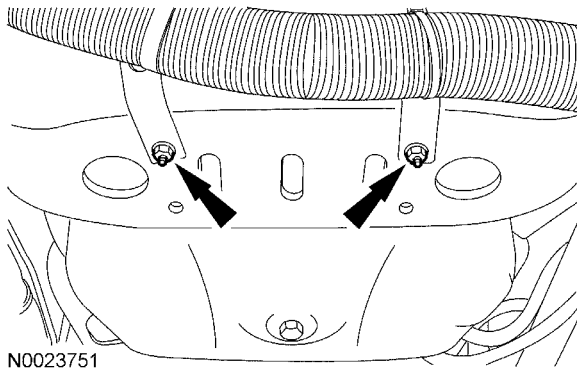
4. To install, reverse the removal procedure.

### Crossmember — Front

1. Raise and support the vehicle. For additional information, refer to Jacking and Lifting in S10019.
2. Separate the wiring harness bracket from the LH side of the front crossmember.



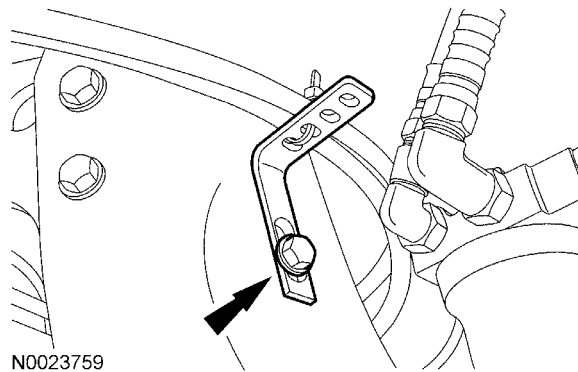
3. Separate the remaining 2 wiring harness brackets from the front crossmember.



4. Remove the 8 front crossmember nuts and bolts.
5. Remove the front crossmember.
6. To install, reverse the removal procedure.

#### Transmission Support Crossmember

1. Raise and support the vehicle. For additional information, refer to Jacking and Lifting in S10019.
2. Support the transmission.
3. Remove the transmission insulator nuts.
  - To install, tighten to 129 Nm (95 lb-ft).



4. Remove the cable routing bracket from the transmission support crossmember.
5. Remove the transmission support crossmember retaining nuts and bolts.
  - To install, tighten to 130 Nm (96 lb-ft).
6. Remove the transmission support crossmember.
7. To install, reverse the removal procedure.