Fire Suppression System

⚠ WARNING: The fire suppression system backup power supply must be depleted before lifting the vehicle or when repairing or replacing any of the following:

- Fire suppression system components
- Components located near the fire suppression manual switch
- Fuel tank and components located near the fuel tank
- Rear axle and components located near the rear axle

To deplete the backup power supply, disconnect the battery and wait at least 1 minute. Be sure to disconnect all auxiliary batteries and power supplies (if equipped). Failure to follow these instructions may result in serious personal injury.

The fire suppression system is designed to help reduce the risk of fire in high speed rear impacts. The fire suppression system deploys chemicals designed to suppress the spread of fire or potentially extinguish a fire, thereby providing more time for occupants to escape from a crashed vehicle.

The fire suppression system can be activated:

- automatically when a high speed, high energy rear impact has occurred.
- manually when other situations require fire suppression.

In the event of a fire suppression system manual deployment, the fire suppression manifold nozzles will deploy to near ground level and the underbody of the vehicle will be covered with fire suppressant fluid.

NOTICE: **After system deployment, the fire suppression manifold nozzles may need to be secured in the up position before driving the vehicle through an automatic car wash, or they may come in contact with the automatic car wash components.**

The suppressant contains no hazardous materials (but may cause minor skin or eye irritation) and can be readily cleaned up by flushing the vehicle underbody with water, or soap and water. Manual deployment should have no effect on vehicle handling.

NOTE: These components must be replaced with new components in the event of a fire suppression system manual deployment. A new fire suppression manual switch must be installed only if the switch cover was damaged during the manual activation.

The fire suppression system consists of the following components:

- Fire Suppression System Module (FSSM)
- Fire suppression manual switch
- Fire suppressors
- Fire suppression manifolds
- Fire suppression system indicator (part of the Instrument Cluster (IC))

Fire Suppression System Module (FSSM)

⚠ WARNING: The tightening torque of the fire suppression system module (FSSM) bolts and the FSSM orientation on the body of the vehicle is critical for correct system operation. Always tighten and orient the FSSM per specifications. Failure to do so may result in incorrect fire suppression system

Pinpoint Test G: The Doors Do Not Lock/Unlock Using The Keyless Entry Keypad

Refer to Wiring Diagrams Cell 117 , Remote Keyless Entry and Alarm for schematic and connector information.

Normal Operation

The Driver Door Module (DDM) monitors for a ground signal on the keyless entry keypad signal input circuits. When an individual keypad button is touched, an individual or combination of the input circuits is routed to ground. The DDM then determines which button was touched based on which circuit(s) are grounded. The keypad has a dedicated ground circuit. Once the DDM determines that the 5-digit personal entry code, or the factory set 5-digit entry code has been entered on the keypad, the DDM then unlocks the driver door.

To unlock all the doors, the 3/4 button must be pressed within 5 seconds of the 5-digit code being entered.

To release the luggage compartment lid, the 5/6 button must be pressed within 5 seconds of the 5-digit code being entered.

To lock all the doors, the 5-digit code does not need to be entered. Press the 7/8 and 9/0 buttons at the same time.

The keyless entry keypad has an anti-scan feature to help prevent theft. If a valid 5-digit code is not entered within 7 attempts (35 consecutive button presses), the keyless entry keypad will go into anti-scan. In anti-scan mode, the keypad illumination will flash and all input will be ignored except for pressing the 7/8 and 9/0 buttons, which will lock all doors.

- DTC B2695 (Keypad_A Switch Circuit Failure) - a continuous and on-demand DTC that sets when the DDM detects a short to ground on the keypad input circuit. This DTC may also set if any keyless entry keypad button is pressed for longer than 2 minutes.
- DTC B2696 (Keypad_B Switch Circuit Failure) - a continuous and on-demand DTC that sets when the DDM detects a short to ground on the keypad input circuit. This DTC may also set if any keyless entry keypad button is pressed for longer than 2 minutes.
- DTC B2697 (Keypad_C Switch Circuit Failure) - a continuous and on-demand DTC that sets when the DDM detects a short to ground on the keypad input circuit. This DTC may also set if any keyless entry keypad button is pressed for longer than 2 minutes.

This pinpoint test is intended to diagnose the following:

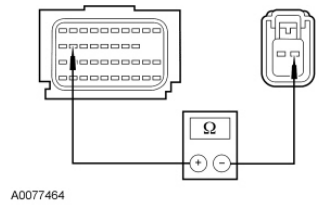
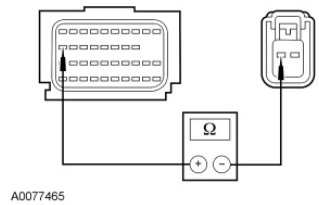
- Wiring, terminals or connectors
- Keyless entry keypad
- DDM

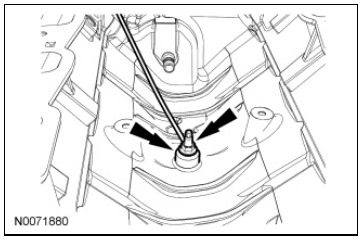
PINPOINT TEST G: THE DOORS DO NOT LOCK/UNLOCK USING THE KEYLESS ENTRY KEYPAD

NOTICE: **Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.**

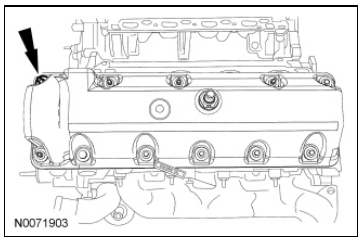
NOTE: Failure to disconnect the battery when instructed will result in false resistance readings. Refer to Section 414-01 .

Test Step	Result / Action to Take

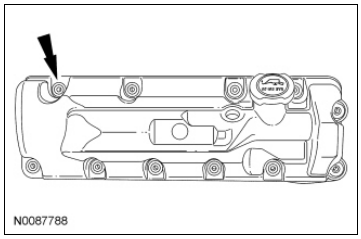
• Ignition OFF. • Depower the SRS . Refer to Supplemental Restraint System (SRS) Depowering and Repowering in this section. • Disconnect: LH Front Impact Severity Sensor C1465. • Disconnect: RCM C310a and C310b. • Measure the resistance between RCM C310b-19, circuit 617 (PK/OG), harness side and LH front impact severity sensor C1465-1, circuit 617 (PK/OG), harness side.  A0077464 • **Is the resistance less than 0.5 ohm?**	**Yes** GO to M29 . **No** REPAIR circuit 617 (PK/OG). GO to M44 .
M29 CHECK CIRCUIT 618 (VT/LG) FOR AN OPEN BETWEEN THE RCM AND LH FRONT IMPACT SEVERITY SENSOR	
• Measure the resistance between RCM C310b-20, circuit 618 (VT/LG), harness side and LH front impact severity sensor C1465-2, circuit 618 (VT/LG), harness side.  A0077465 • **Is the resistance less than 0.5 ohm?**	**Yes** GO to M30 . **No** REPAIR circuit 618 (VT/LG). GO to M44 .
M30 CHECK CIRCUIT 617 (PK/OG) FOR A SHORT TO CIRCUIT 618 (VT/LG) BETWEEN THE RCM AND LH FRONT IMPACT SEVERITY SENSOR	
• Measure the resistance between LH front impact severity sensor C1465-1, circuit 617 (PK/OG), harness side and LH front impact severity sensor C1465-2, circuit 618 (VT/LG), harness side.	**Yes** GO to M31 . **No** REPAIR circuits 617 (PK/OG) and 618 (VT/LG). GO to M44 .



36. Loosen the 6 studs and 5 bolts and remove the LH valve cover.
    - Discard the gasket.



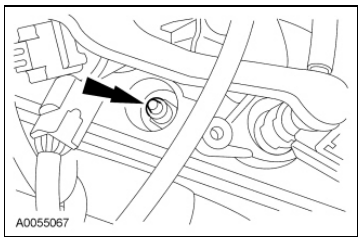
37. Loosen the 7 studs and 4 bolts and remove the RH valve cover.
    - Discard the gasket.



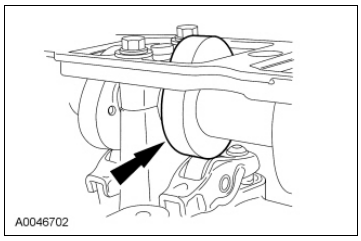
38. ***NOTICE:*** **Only use hand tools when removing or installing the spark plugs, damage may occur to the cylinder head or spark plug.**

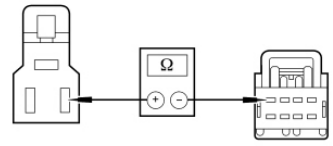
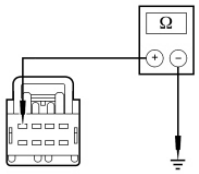
    NOTE: Use compressed air to remove any foreign material from the spark plug well before removing the spark plugs.

    Remove the 8 spark plugs.



39. Position the lobe of the camshaft upward.



 N0068532 • **Is the resistance less than 5 ohms?**	
H5 CHECK CIRCUIT 417 (VT/OG) FOR A SHORT TO GROUND	
• Measure the resistance between VDM C2131b-4, circuit 417 (VT/OG), harness side and ground.  N0068533 • **Is the resistance greater than 10,000 ohms?**	**Yes** GO to H6 . **No** REPAIR circuit 417 (VT/YE). CLEAR the DTCs. REPEAT the self-test.
H6 CHECK THE AIR SUSPENSION SWITCH	
• Push the air suspension switch to the ON position. • Measure the resistance between air suspension switch pin 1, component side and pin 2, component side. • **Is the resistance less than 5 ohms?**	**Yes** GO to H7 . **No** INSTALL a new air suspension switch. REFER to Air Suspension Switch in this section. CLEAR the DTCs. REPEAT the self-test.
H7 VERIFY VDM CONNECTIONS	
• Check VDM connectors C2131a and C2131b for damage or loose connections. • **Are the module connections OK?**	**Yes** INSTALL a new VDM . REFER to Vehicle Dynamics Module (VDM) in this section. **No** REPAIR the VDM connectors. CLEAR the DTCs. REPEAT the self-test.

Pinpoint Test I: The Air Compressor is Inoperative

Refer to Wiring Diagrams Cell 41 , Vehicle Dynamic Suspension for schematic and connector information.

Normal Operation

When the Vehicle Dynamics Module (VDM) engages the air suspension relay, fused battery voltage is supplied from Battery Junction Box (BJB) fuse 112 (30A) to the relay along circuit 1053 (LB/PK), the voltage travels through the relay and to the air suspension compressor along circuit 538 (GY/RD). The compressor is provided a ground path along circuit 57 (BK).

Fuel Tank Draining

Special Tool(s)

 ST1134A	Fuel Storage Tanker 164-R3202 or equivalent

⚠ WARNING: Do not smoke, carry lighted tobacco or have an open flame of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited. Failure to follow these instructions may result in serious personal injury.

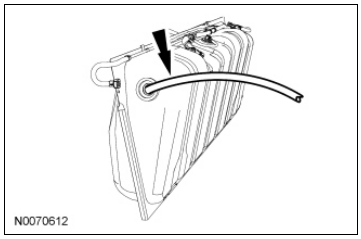
⚠ WARNING: Do not carry personal electronic devices such as cell phones, pagers or audio equipment of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited. Failure to follow these instructions may result in serious personal injury.

⚠ WARNING: When handling fuel, always observe fuel handling precautions and be prepared in the event of fuel spillage. Spilled fuel may be ignited by hot vehicle components or other ignition sources. Failure to follow these instructions may result in serious personal injury.

⚠ WARNING: Always disconnect the battery ground cable at the battery when working on an evaporative emission (EVAP) system or fuel-related component. Highly flammable mixtures are always present and may be ignited. Failure to follow these instructions may result in serious personal injury.

1. Remove the fuel tank filler pipe. For additional information, refer to Section 310-01 .

2. Using the Fuel Storage Tanker and a suitable fuel drain tube, extract the remaining fuel from the fuel tank.



missing for less than 5 seconds and the brake warning indicator was ON, the indicator remains in the ON state until the next good message is received. If the message remains missing or invalid for greater than 5 seconds, the IC sets a U-code DTC and the output becomes a default action for the indicator or gauge. Each indicator or gauge utilizes a different default strategy depending on the nature of the indication. If the messaged input to the cluster returns at any time, the normal function of the gauge or indicator resumes.

NOTE: Whenever a message is suspected as missing and confirmed by a missing message DTC (U-code), it is important to look for other symptoms that may also be present in the IC and throughout the vehicle. Once a DTC is set in the IC , it may be helpful to review the complete message list available in Section 418-00 to see what other modules also rely on the same message and run the self-test for those modules. If the message is missing from other modules, the same DTC may also be set in those modules. Confirmation of missing messages common to multiple modules may indicate that the originating module is the source of the concern or the communication network may be experiencing some concerns.

IC Prove-Out

The IC and other vehicle modules carry out a display prove-out to verify that all module controlled warning/indicator lamps and monitored systems are functioning correctly within the IC . When the ignition switch is cycled to the ON position with the engine off, the indicators illuminate to prove-out according to the following table:

Indicator	Indicator Type	Prove-Out Duration
Air bag	Warning	6 seconds on then 2 seconds off
ABS	Warning	3 seconds
Air suspension	Informational	5 seconds
Brake	Warning	3 seconds
Charge	Informational	Engine start up
Check fuel cap	Informational	No prove-out
Door ajar	Warning	No prove-out
Engine over-temperature	Warning	3 seconds
Fire suppression (police only)	Informational	5 seconds
High beam	Informational	No prove-out
Low engine oil pressure	Warning	Engine startup
Low fuel	Informational (if equipped)	3 seconds
Malfunction Indicator Lamp (MIL)	Warning	Engine startup
Overdrive (O/D) off	Informational	No prove-out
Powertrain malfunction (wrench)	Informational	3 seconds
RH/LH turn signals	Informational	No prove-out
Safety belt	Warning	65 seconds if the safety belt is unbuckled, turns off when the safety belt is buckled
Cruise control	Informational	No prove-out
Tire Pressure Monitoring System (TPMS)	Warning	3 seconds
Traction control	Informational	3 seconds

If the Integrated Diagnostic System (IDS) does not communicate with the VCM :

- Check the VCM connection to the vehicle.
- Check the scan tool connection to the VCM .
- GO to Pinpoint Test N , to diagnose No Power To The Scan Tool.

4. Establish a scan tool session.
   - **NOTE:** The scan tool first attempts to communicate with the PCM, after establishing communication with the PCM, the scan tool then attempts to communicate with all other modules on the vehicle.

     If an IDS session cannot be established with the vehicle, (IDS may state "No communication can be established with the PCM"):

     - Choose "NO" when the scan tool prompts whether or not to retry communication.
     - Enter either a PCM part number, tear tag or calibration number to identify the vehicle and start a session (the PCM part number and 4-character tear tag are printed on the PCM label).
     - GO to Pinpoint Test A , to diagnose The PCM Does Not Respond To The Scan Tool.

5. Carry out the network test.
   - If the network test passes, retrieve and record the continuous memory DTCs and proceed to Step 6.
   - If the network test fails, GO to Symptom Chart to diagnose the failed communication network.
   - If a module fails to communicate during the network test, GO to Symptom Chart .

6. Retrieve and review the DTCs.
   - If the DTCs retrieved are related to the concern, go to DTC Charts. Follow the non-network DTC diagnostics (B-codes, C-codes, P-codes) prior to the network DTC diagnostics (U-codes). For all other DTCs, refer to the Diagnostic Trouble Code (DTC) Chart in Section 419-10 .
   - If no DTCs related to the concern are retrieved, GO to Symptom Chart .

DTC Charts

NOTE: Network DTCs (U-codes) are often a result of intermittent concerns such as damaged wiring or low battery voltage occurrences. Additionally, vehicle repair procedures such as module reprogramming will often set network DTCs. Replacing a module to resolve a network DTC is unlikely to resolve the concern. To prevent repeat network DTC concerns, inspect all network wiring, especially connectors. Test the vehicle battery, refer to Section 414-01 .

NOTE: DTC U1900 sets in a module that is reporting a communication fault from another module on the data bus. The module that reports the fault is not the problem module.

Communication Network DTC Chart

DTC	Description	Source	Action
U0073	Control Module Communication Bus A Off	ABS module	The module could not communicate on the network at a point in time. The fault is currently

Rear View Mirrors - Exterior

Special Tool(s)

 ST3093-A	Fluke 77-IV Digital Multimeter FLU77-4 or equivalent

Principles of Operation

The movement of the LH and RH exterior mirror glass is controlled by the exterior mirror control switch and the LH and RH exterior mirror motors. Adjusting the exterior mirror switch to the LH or RH position determines which exterior mirror motor will be controlled. The exterior mirror control switch logic is the selected movement request from the exterior mirror control switch. When the exterior mirror control switch is adjusted to the left, right, up or down position, the exterior mirror control switch will supply voltage and ground to the selected exterior mirror motor to move the exterior mirror glass to the desired position.

The exterior mirrors use a jumper harness between the vehicle wire harness connector and the exterior mirror motor. The exterior mirror jumper harness is integral to the exterior mirror. Before replacing an exterior mirror or mirror motor, inspect the jumper harness for open and shorted circuits or damaged and pushed-out pins. If a concern with the exterior mirror jumper harness exists, attempt to repair the jumper harness.

Heated Exterior Mirror

The rear window defrost switch controls the operation of the heated exterior rear view mirrors. The heated exterior rear view mirrors only operate when the rear window defrost system is operating. The heated eior rear view mirror power is supplied by the rear defrost relay through Battery Junction Box (BJB) fuse 24 (10A), which isolates the heated exterior mirrors from the rear window defrost system in the event of a concern.

Inspection and Verification

⚠ WARNING: If equipped with fire suppression system, refer to Section 100-02B for Important Safety Warnings. Failure to follow this instruction may result in serious personal injury.

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

Visual Inspection Chart

Mechanical	Electrical
• Exterior mirror • Exterior mirror control switch • Exterior mirror glass	• Battery Junction Box (BJB) fuse 24 (10A) • Central Junction Box (CJB) fuse(s): ♦ 2 (7.5A) ♦ 9 (7.5)

Bumper Bracket - Rear

Removal

NOTICE: **Never apply heat to the bumper isolator and bracket. Heat could cause the material inside the bumper isolator and bracket to expand and leak. Heat may also crack the metal housing. Always remove the bumper isolator and bracket before carrying out body frame service near them.**

1. Remove the rear bumper. For additional information, refer to Bumper - Rear in this section.

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

   Remove the bolt and the rear bumper bracket.

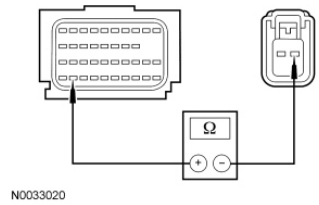
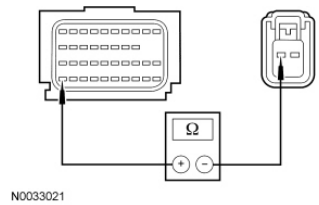
Installation

1. Inspection must be made prior to reusing the bumper isolator and bracket. If the bumper isolator and bracket do not meet any one of the inspection criteria listed below, install a new bumper isolator and bracket.
   - There must be no visible fluid leaks.
   - There must be no deformation to the inner or outer cylinders.
   - At ambient temperatures, the outer cylinder must not turn (by hand), relative to the inner cylinder.
   - Place the bumper isolator and bracket in an arbor press or an equivalent press mechanism, and stroke the bumper isolator and bracket approximately 13 mm (1/2 in) to determine whether it returns to its original length. If it does not return to its original length, it must be replaced. A bumper isolator and bracket that does not return to its original length may have developed loss of pressure or fluid that would prevent it from functioning correctly in subsequent impacts.

   pe="disc">
2. Minor straightening of the bumper isolator and bracket is permissible, provided there are no visible leaks and the bumper isolator and bracket function correctly.

2. Install the rear bumper bracket and bolt.
   - Tighten to 90 Nm (66 lb-ft).

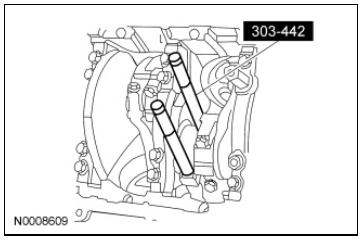
3. Install the rear bumper. For additional information, refer to Bumper - Rear in this section.

• Ignition OFF. • Depower the SRS . Refer to Supplemental Restraint System (SRS) Depowering and Repowering in this section. • Disconnect: RH Front Impact Severity Sensor C1466. • Disconnect: RCM C310a and C310b. • Measure the resistance between RCM C310b-39, circuit 619 (PK/WH), harness side and RH front impact severity sensor C1466-1, circuit 619 (PK/WH), harness side.  • **Is the resistance less than 0.5 ohm?**	**Yes** GO to M39 . **No** REPAIR circuit 619 (PK/WH). GO to M44 .
M39 CHECK CIRCUIT 620 (VT/LB) FOR AN OPEN BETWEEN THE RCM AND RH FRONT IMPACT SEVERITY SENSOR	
• Measure the resistance between RCM C310b-40, circuit 620 (VT/LB), harness side and RH front impact severity sensor C1466-2, circuit 620 (VT/LB), harness side.  • **Is the resistance less than 0.5 ohm?**	**Yes** GO to M40 . **No** REPAIR circuit 620 (VT/LB). GO to M44 .
M40 CHECK CIRCUIT 619 (PK/WH) FOR A SHORT TO CIRCUIT 620 (VT/LB) BETWEEN THE RCM AND RH FRONT IMPACT SEVERITY SENSOR	
• Measure the resistance between RH front impact severity sensor C1466-1, circuit 619 (PK/WH), harness side and RH front impact severity sensor C1466-2, circuit 620 (VT/LB), harness side.	**Yes** GO to M41 . **No** REPAIR circuits 619 (PK/WH) and 620 (VT/LB). GO to M44 .

NOTE: SRS components should only be disconnected or reconnected when instructed to do so within a pinpoint test step. Failure to follow this instruction may result in incorrect diagnosis of the SRS .

NOTE: Most faults are due to connector and/or wiring concerns. Carry out a thorough inspection and verification before proceeding with the Pinpoint Test.

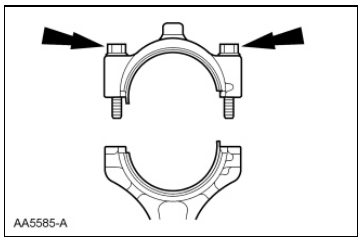
Test Step	Result / Action to Take
Q1 RETRIEVE SRS DTCs	
• Enter the following diagnostic mode on the scan tool: Self Test â RCM . • **Was DTC B2435 retrieved on-demand during self-test?**	**Yes** The fault condition is still present. This fault cannot be cleared until it is corrected and the DTC is no longer retrieved on-demand during self test. GO to Q2 . **No** This is an intermittent fault when present as a CMDTC only (DTC not retrieved on demand). The fault condition is not present at this time. GO to Q3 .
Q2 CHECK THE DRIVER SAFETY BELT BUCKLE SWITCH	
• Ignition OFF. • Depower the SRS . Refer to Supplemental Restraint System (SRS) Depowering and Repowering in this section. • Install a known good driver safety belt buckle. Refer to Section 501-20A . • Repower the SRS . **Do not** prove out the SRS at this time. Refer to Supplemental Restraint System (SRS) Depowering and Repowering in this section. • Ignition ON. • Enter the following diagnostic mode on the scan tool: Self Test â RCM . • **Was DTC B2435 retrieved on-demand during self-test?**	**Yes** INSTALL a new RCM . REFER to Restraints Control Module (RCM) in this section. GO to Q4 . **No** Fault corrected. GO to Q4 .
Q3 CHECK FOR AN INTERMITTENT FAULT	
• Enter the following diagnostic mode on the scan tool: Self Test â RCM . • **Was DTC B2435 retrieved on-demand during self-test?**	**Yes** The fault condition is now present. This fault cannot be cleared until it is corrected and the DTC is no longer retrieved on-demand during self test. GO to Q2 . **No** CHECK for causes of the intermittent fault. ATTEMPT to recreate the hard fault by flexing the wire harness and cycling the ignition key frequently. ACTIVATE other systems in the same wire harness. **Do not install any new SRS components at this time. SRS components should only be installed when directed to do so in the pinpoint**



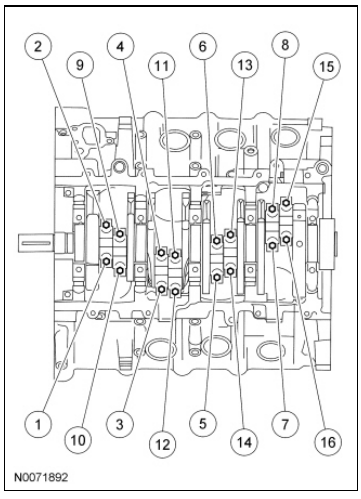
18. ***NOTICE:*** **The rod cap installation must keep the same orientation as marked during disassembly or engine damage may occur.**

    NOTE: The connecting rod caps have a cracked design and must make mate with the connecting rod ends. Excessive bearing clearance will result if not mated correctly.

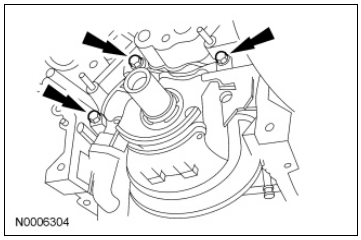
    Position the lower bearing and connecting rod bearing cap, and install the 2 new bolts loosely.



19. Tighten the 16 connecting rod bearing cap bolts in 3 stages, in the sequence shown.
    - Stage 1: Tighten to 23 Nm (17 lb-ft).
    - Stage 2: Tighten to 43 Nm (32 lb-ft).
    - Stage 3: Rotate an additional 90-120 degrees.

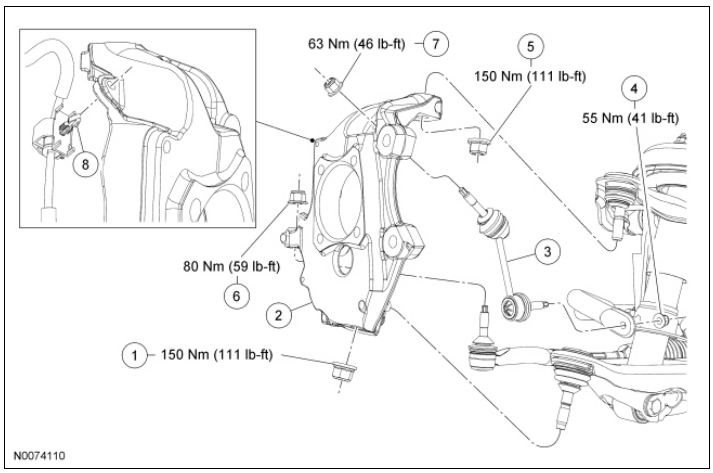


20. Position the oil pump and install the 3 bolts.
    - Tighten to 10 Nm (89 lb-in).

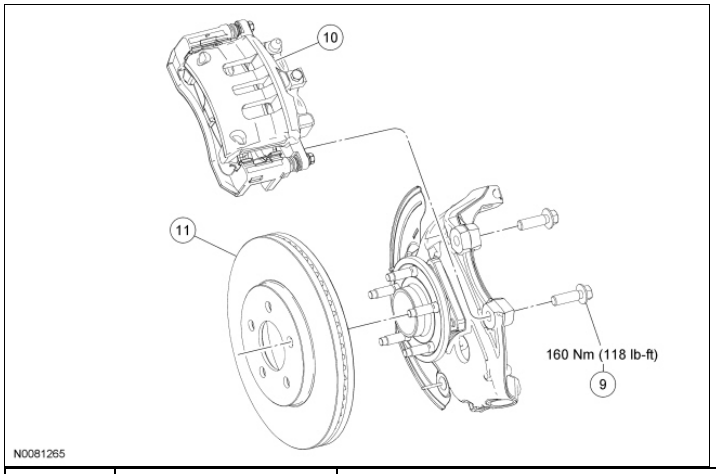


Both cylinder heads

Wheel Knuckle



Item	Part Number	Description
1	W710298	Lower ball joint nut
2	3K170 RH/ 3K171 LH	Wheel knuckle
3	3B438	Stabilizer bar link
4	W520213	Stabilizer bar link lower nut
5	W710298	Upper ball joint nut
6	W520214	Outer tie-rod end nut
7	W520213	Stabilizer bar link upper nut
8	-	Wheel speed sensor wiring harness retainer (part of 2C204)



Item	Part Number	Description
9	W707589	Brake caliper anchor plate bolt (2 required)
10	-	Brake caliper and anchor plate assembly
11	1125	Brake disc

Removal and Installation

Line Pressure Chart

Application	Range	Idle		WOT	
		EPC	Line Pressure	EPC	Line Pressure
All	P, N	34-276 kPa (5-40 psi)	276-689 kPa (40-100 psi)	N/A	N/A
	O/D , 2, 1	34-276 kPa (5-40 psi)	276-689 kPa (40-100 psi)	689-793 kPa (100-115 psi)	1,172-1,586 kPa (170-230 psi)
	R	172-207 kPa (25-30 psi)	483-862 kPa (70-125 psi)	586-655 kPa (85-95 psi)	1,124-2,068 kPa (250-300 psi)

Band and Clutch Application Chart A

Gear	Overdrive Band	Intermediate Clutch	Low/ Reverse Band	Reverse Clutch	Forward Clutch	Direct Clutch
Reverse			A	A		
1st Gear Manual Low			A		A	
2nd Gear Manual	A	A			A	
1st Gear (D) Overdrive (O/D)					A	
2nd Gear (D) O/D		A			A	
3rd Gear (D) O/D		A			A	A
4th Gear (D) O/D	A	A				A

A = Applied

Band and Clutch Application Chart B

Gear	Intermediate One-Way Clutch	Low One-Way Clutch	Solenoid States		
			SSA	SSB	TCC
Park			ON	OFF	HD
Reverse		NE	ON	OFF	HD
Neutral			ON	OFF	HD
1st Gear Manual Low		H	ON	OFF	HD
2nd Gear Manual	H	OR	OFF	OFF	EC