DIFFERENTIAL & DRIVELINE

TABLE OF CONTENTS

page

DIFFERENTIAL & DRIVELINE - ELECTRICAL DIAGNOSTICS 1

page

DIFFERENTIAL & DRIVELINE - SERVICE INFORMATION 113

DIFFERENTIAL & DRIVELINE - ELECTRICAL DIAGNOSTICS

TABLE OF CONTENTS

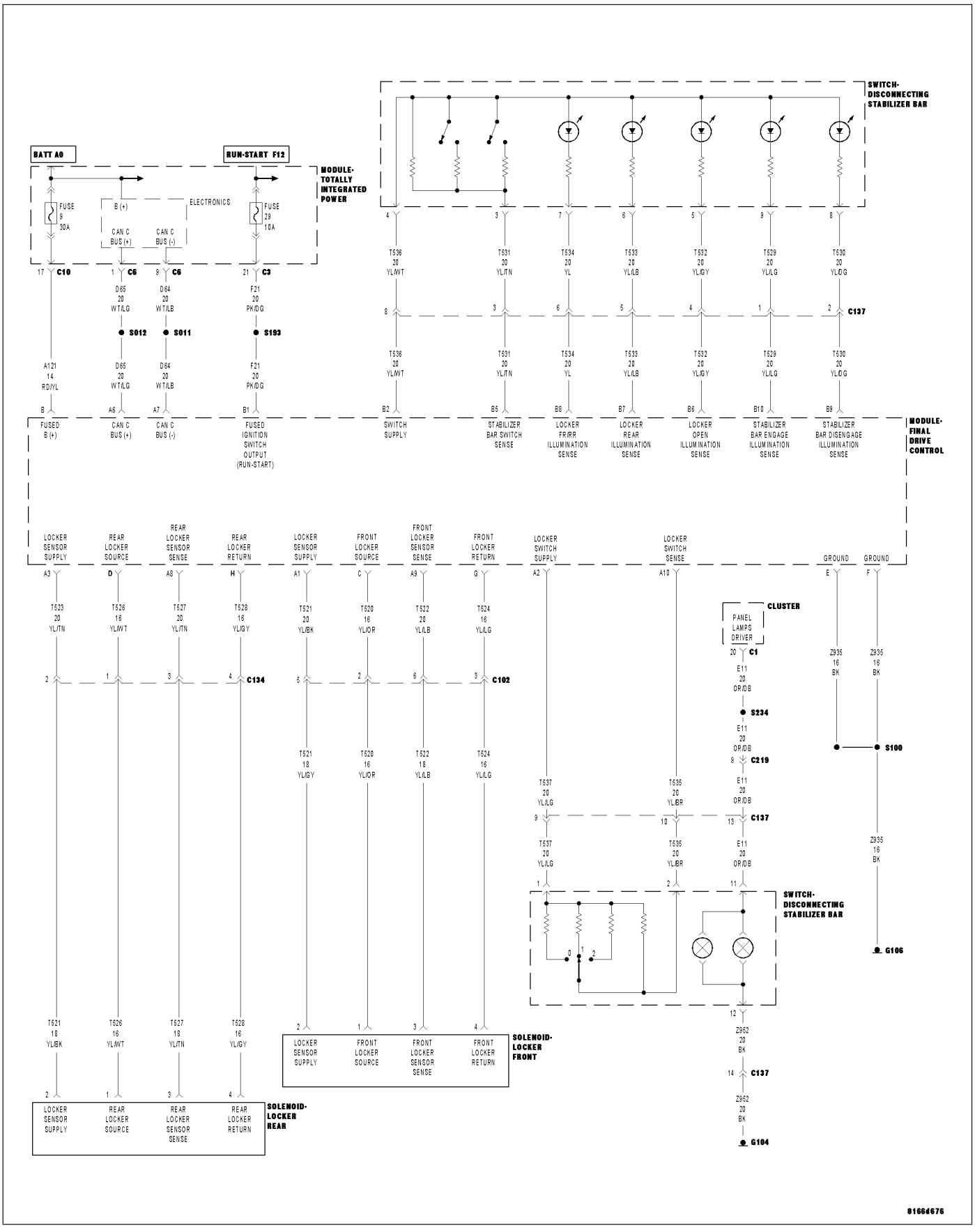
page

DIFFERENTIAL & DRIVELINE - ELECTRICAL DIAGNOSTICS
DIAGNOSIS AND TESTING
C143A - DIFFERENTIAL/LOCKER SELECT SWITCH PERFORMANCE 3
C143B-DIFFERENTIAL/LOCKER SELECT SWITCH CIRCUIT LOW 7
C143C-DIFFERENTIAL/LOCKER SELECT SWITCH CIRCUIT HIGH 11
C1417–FRONT DIFFERENTIAL CONTROL CIRCUIT LOW 15
C1418–FRONT DIFFERENTIAL CONTROL CIRCUIT HIGH 19
C1419–FRONT DIFFERENTIAL CONTROL CIRCUIT OPEN 23
C141D-REAR DIFFERENTIAL CONTROL CIRCUIT LOW 26
C141E–REAR DIFFERENTIAL CONTROL CIRCUIT HIGH 30
C141F–REAR DIFFERENTIAL CONTROL CIRCUIT OPEN 34
C1446-FRONT DIFFERENTIAL RETURN CIRCUIT LOW 37
C1447-FRONT DIFFERENTIAL RETURN CIRCUIT HIGH 40
C144A-REAR DIFFERENTIAL RETURN CIRCUIT LOW 44
C144B-REAR DIFFERENTIAL RETURN CIRCUIT HIGH 47
C144E-FRONT DIFFERENTIAL POSITION SENSOR PERFORMANCE 51
C1450-FRONT DIFFERENTIAL POSITION SENSOR CIRCUIT HIGH 55
C144F-FRONT DIFFERENTIAL POSITION SENSOR LOW 59
C1452-REAR DIFFERENTIAL POSITION SENSOR PERFORMANCE 62
C1453-REAR DIFFERENTIAL POSITION SENSOR LOW 66
C1454-REAR DIFFERENTIAL POSITION SENSOR CIRCUIT HIGH 69
C2100–BATTERY VOLTAGE LOW 73
C2101–BATTERY VOLTAGE HIGH 76
C2111-SENSOR SUPPLY 1 VOLTAGE CIRCUIT LOW 79
C2112-SENSOR SUPPLY 1 VOLTAGE CIRCUIT HIGH 82
C2126-SENSOR SUPPLY 2 VOLTAGE CIRCUIT LOW 85
C2127-SENSOR SUPPLY 2 VOLTAGE CIRCUIT HIGH 88
C230F-LOCKER/DIFFERENTIAL INDICATOR SUPPLY CIRCUIT PREFORMANCE 91
C2310-STABILIZER/DIFFERENTIAL INDICATOR SUPPLY CIRCUIT LOW 95
C2311-STABILIZER/DIFFERENTIAL INDICATOR SUPPLY CIRCUIT HIGH 99
C2324-STABILIZER BAR INDICATOR CONTROL CIRCUIT 104
U0100-LOST COMMUNICATION WITH ECM/PCM (FDCM) 109
U0155-NO CLUSTER BUS MESSAGE 111

DIFFERENTIAL & DRIVELINE - ELECTRICAL DIAGNOSTICS

DIAGNOSIS AND TESTING

C143A - DIFFERENTIAL/LOCKER SELECT SWITCH PERFORMANCE



For a complete wiring diagram **Refer to Section 8W**

- **When Monitored:**
  Ignition on.
- **Set Condition:**
  During switch operation, the FDCM senses the Disconnecting Stabilizer Bar Switch resistance is out of specification.

Possible Causes
SWITCH INTERMITTENT
DISCONNECTING STABILIZER BAR SWITCH
(T537) LOCKER SWITCH SUPPLY CIRCUIT
(T535) LOCKER SWITCH SENSE CIRCUIT OPEN/HIGH RESISTANCE
FDCM

1. DTC ACTIVE

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Turn the ignition on, engine not running

With the scan tool, read FDCM DTC(s).

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 5

2. DISCONNECTING STABILIZER BAR SWITCH OPERATION

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Turn the ignition off.

Disconnect the Disconnecting Stabilizer Bar Switch harness connector.

Remove the Disconnecting Stabilizer Bar Switch.

Measure the resistance on the Disconnecting Stabilizer Bar Switch between the Locker Switch Supply terminal and the Locker Switch Sense terminal.

The resistance must read as follows for each position of the switch.

- **UNLOCK: 5454 ohms +/- 5%**
- **RR: 1940 ohms +/- 5%**
- **FR/RR: 1075 ohms +/- 5%**

Does the ohmmeter read correctly for each position of the Disconnecting Stabilizer Bar Switch

Yes >> Go To 3

No >> Replace the Disconnecting Stabilizer Bar Switch.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

3. (T535) LOCKER SWITCH SENSE CIRCUIT OPEN

Disconnect the FDCM harness connector.

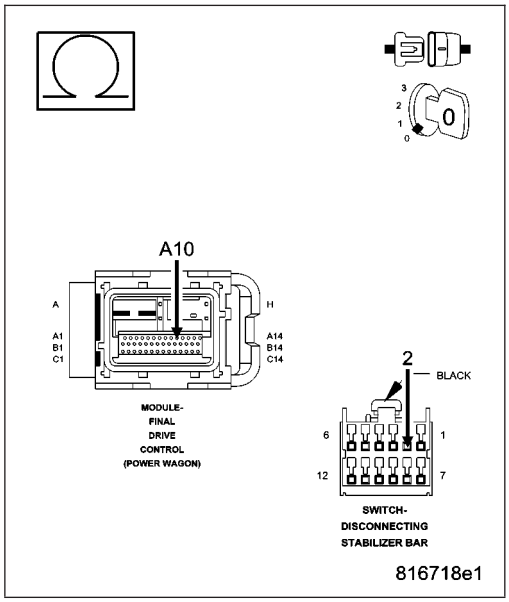
Measure the resistance of the (T535) Locker Switch Sense circuit between the Disconnecting Stabilizer Bar Switch and the FDCM harness connector.

Is the resistance below 5.0 ohms?

Yes >> Go To 4

No >> Repair the open or high resistance in the (T535) Locker Switch Sense circuit.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)



4. (T537) LOCKER SWITCH SUPPLY CIRCUIT OPEN

Measure the resistance of the (T537) Locker Switch Supply circuit between the Disconnecting Stabilizer Bar Switch and the FDCM harness connector.

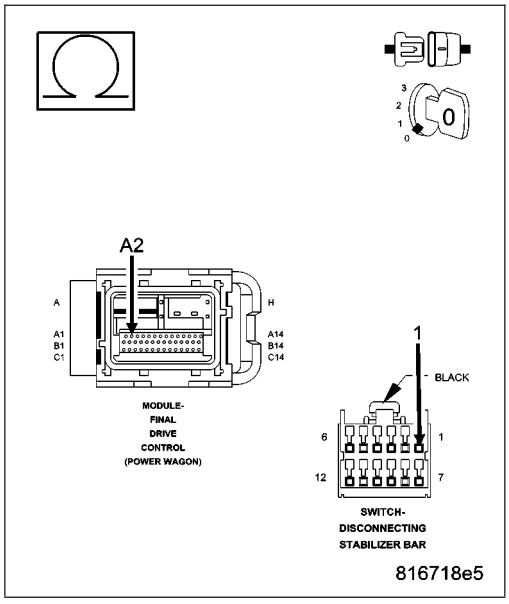
Is the resistance below 5.0 ohms?

Yes >> Replace the FDCM in accordance with the Service Information

Perform FDCM VERIFICATION TEST.

No >> Repair the open or high resistance in the (T537) Locker Switch Supply circuit.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)



5. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

While monitoring the TRAC State on the scan tool, move the switch to each position. The scan tool display must match the position on the actual switch.

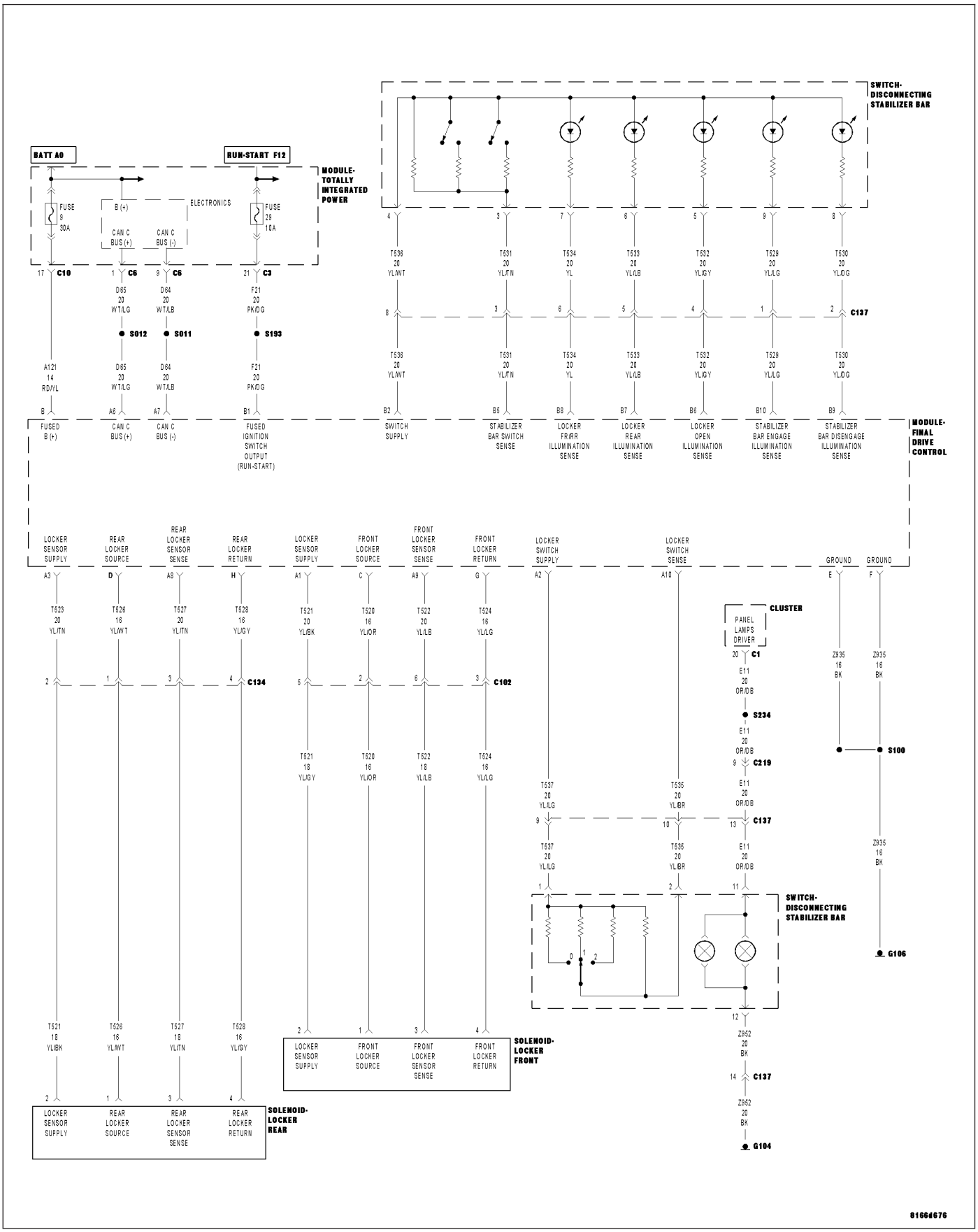
Were there any problems found?

Yes >> Repair as necessary.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C143B-DIFFERENTIAL/LOCKER SELECT SWITCH CIRCUIT LOW



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on.
- **Set Condition:**
  During switch operation, the FDCM senses the Disconnecting Stabilizer Bar Switch sense is below 0.25 volt.

Possible Causes
SWITCH INTERMITTENT
DISCONNECTING STABILIZER BAR SWITCH
(T537) LOCKER SWITCH SUPPLY CIRCUIT SHORTED TO GROUND
(T535) LOCKER SWITCH SENSE CIRCUIT SHORT TO GROUND
FDCM

1. DTC ACTIVE

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Turn the ignition on, engine not running

With the scan tool, read FDCM DTC(s).

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 5

2. DISCONNECTING STABILIZER BAR SWITCH OPERATION

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Turn the ignition off.

Disconnect the Disconnecting Stabilizer Bar Switch harness connector.

Remove the Disconnecting Stabilizer Bar Switch.

Measure the resistance on the Disconnecting Stabilizer Bar Switch between the Locker Switch Supply terminal and the Locker Switch Sense terminal.

The resistance must read as follows for each position of the switch.

- **UNLOCK: 5454 ohms +/- 5%**
- **RR: 1940 ohms +/- 5%**
- **FR/RR: 1075 ohms +/- 5%**

Does the ohmmeter read correctly for each position of the Disconnecting Stabilizer Bar Switch

Yes >> Go To 3

No >> Replace the Disconnecting Stabilizer Bar Switch.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

3. (T535) LOCKER SWITCH SENSE CIRCUIT SHORTED TO GROUND

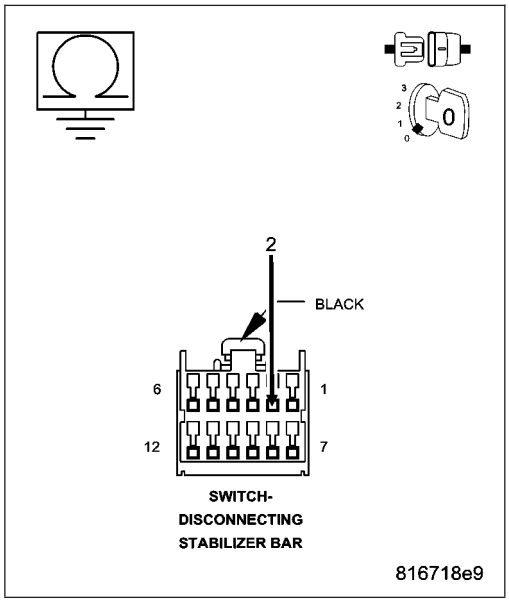
Disconnect the FDCM harness connector.

Measure the resistance of the (T535) Locker Switch Sense circuit in the Disconnecting Stabilizer Bar Switch harness connector to ground.

Is the resistance below 100 ohms?

Yes >> Repair the short to ground in the (T535) Locker Switch Sense circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4



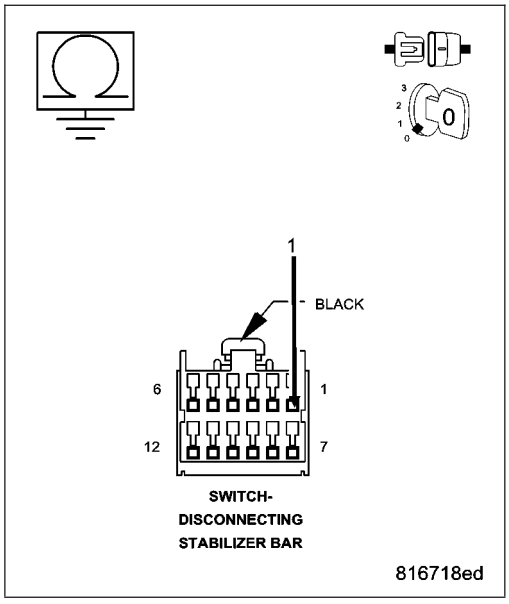
4. (T537) LOCKER SWITCH SUPPLY CIRCUIT SHORT TO GROUND

Measure the resistance of the (T537) Locker Switch Supply circuit in the Disconnecting Stabilizer Bar Switch harness connector to ground.

Is the resistance below 100 ohms?

Yes >> Repair the short to ground in the (T537) Locker Switch Supply circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Replace the FDCM in accordance with the Service Information
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)



5. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

While monitoring the TRAC State on the scan tool, move the switch to each position. The scan tool display must match the position on the actual switch.

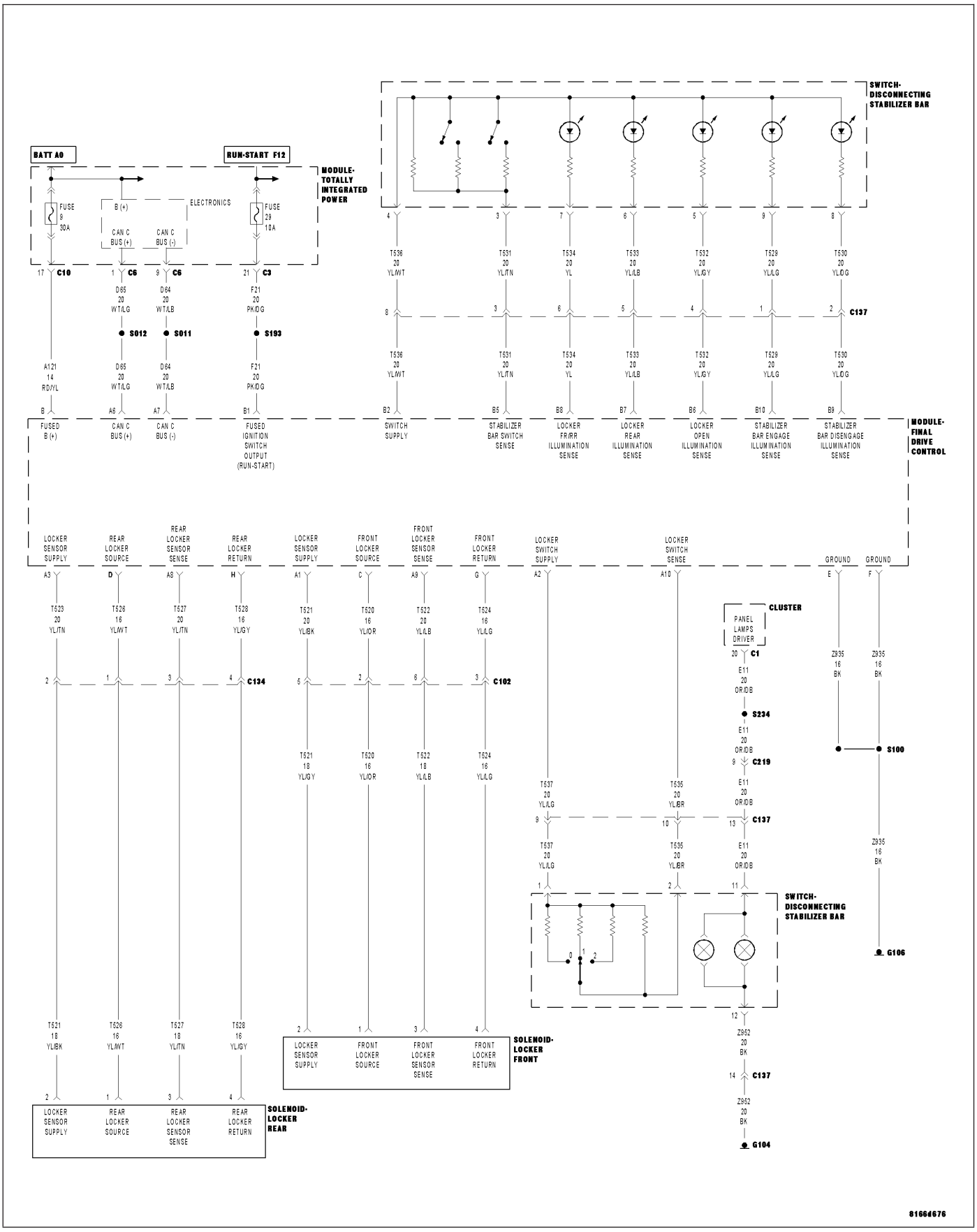
Were there any problems found?

Yes >> Repair as necessary.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C143C-DIFFERENTIAL/LOCKER SELECT SWITCH CIRCUIT HIGH



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on.
- **Set Condition:**
  During switch operation, the FDCM senses the Disconnecting Stabilizer Bar Switch Sense circuit is above 4.5 volts.

Possible Causes
SWITCH INTERMITTENT
DISCONNECTING STABILIZER SWTICH
(T535) LOCKER SWITCH SENSE CIRCUIT SHORT TO VOLTAGE
(T537) LOCKER SWITCH SUPPLY CIRCUIT SHORTED TO (T535) LOCKER SWITCH SENSE CIRCUIT
(T535) LOCKER SWITCH SENSE CIRCUIT OPEN
FDCM

1. DTC ACTIVE

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Turn the ignition on, engine not running

With the scan tool, read FDCM DTC(s).

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 6

2. DISCONNECTING STABILIZER SWTICH OPERATION

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Turn the ignition off.

Disconnect the Disconnecting Stabilizer Bar Switch harness connector.

Remove the Disconnecting Stabilizer Bar Switch.

Measure the resistance on the Disconnecting Stabilizer Bar Switch between the Locker Switch Supply terminal and the Locker Switch Sense terminal.

The resistance must read as follows for each position of the switch.

- **UNLOCK: 5454 ohms +/- 5%**
- **RR: 1940 ohms +/- 5%**
- **FR/RR: 1075 ohms +/- 5%**

Does the ohmmeter read correctly for each position of the Disconnecting Stabilizer Bar Switch

Yes >> Go To 3

No >> Replace the Disconnecting Stabilizer Bar Switch.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

3. (T535) LOCKER SWITCH SENSE CIRCUIT SHORTED TO VOLTAGE

Disconnect the FDCM harness connector.

Turn the ignition on.

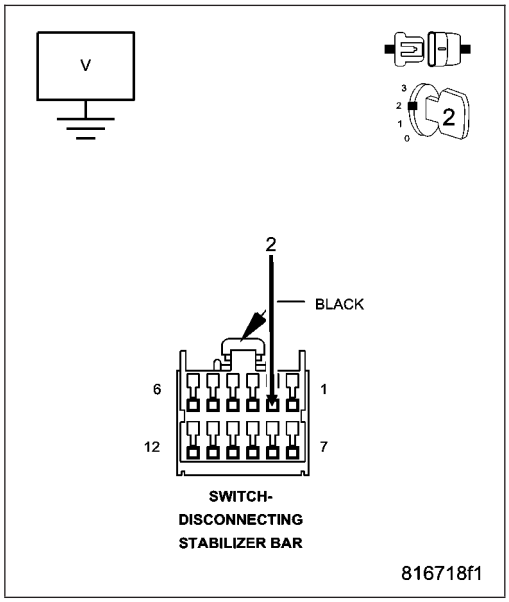
Measure the voltage of the (T535) Locker Switch Sense circuit in the Disconnecting Stabilizer Bar Switch harness connector.

Does the voltmeter indicate voltage present?

Yes >> Repair the short to voltage in the (T535) Locker Switch Sense circuit.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4



4. (T537) LOCKER SWITCH SUPPLY CIRCUIT SHORTED TO (T535) LOCKER SWITCH SENSE CIRCUIT

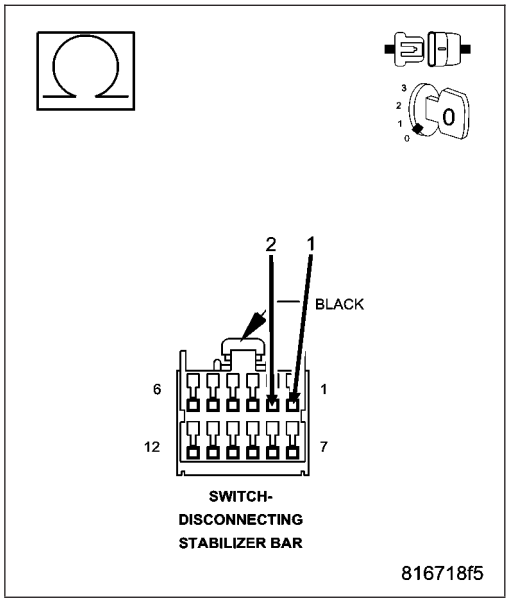
Measure the resistance between (T537) Locker Switch Supply circuit and the (T535) Locker Switch Sense circuit in the Disconnecting Stabilizer Bar Switch harness connector.

Is the resistance below 5.0 ohms?

Yes >> Repair the short between (T537) Locker Switch Supply circuit and the (T535) Locker Switch Sense circuit.

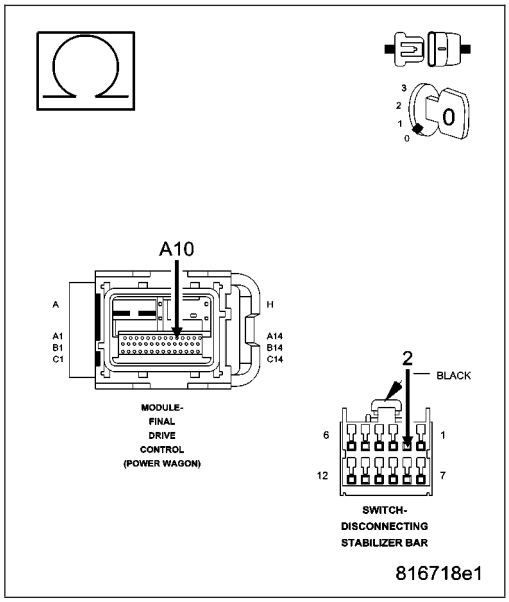
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 5



5. (T535) LOCKER SWITCH SENSE CIRCUIT OPEN

Measure the resistance of the (T535) Locker Switch Sense circuit between the Disconnecting Stabilizer Bar Switch and the FDCM harness connector.



Is the resistance below 5.0 ohms?

Yes >> Replace the FDCM in accordance with the Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Repair the open in the (T535) Locker Switch Sense circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

6. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

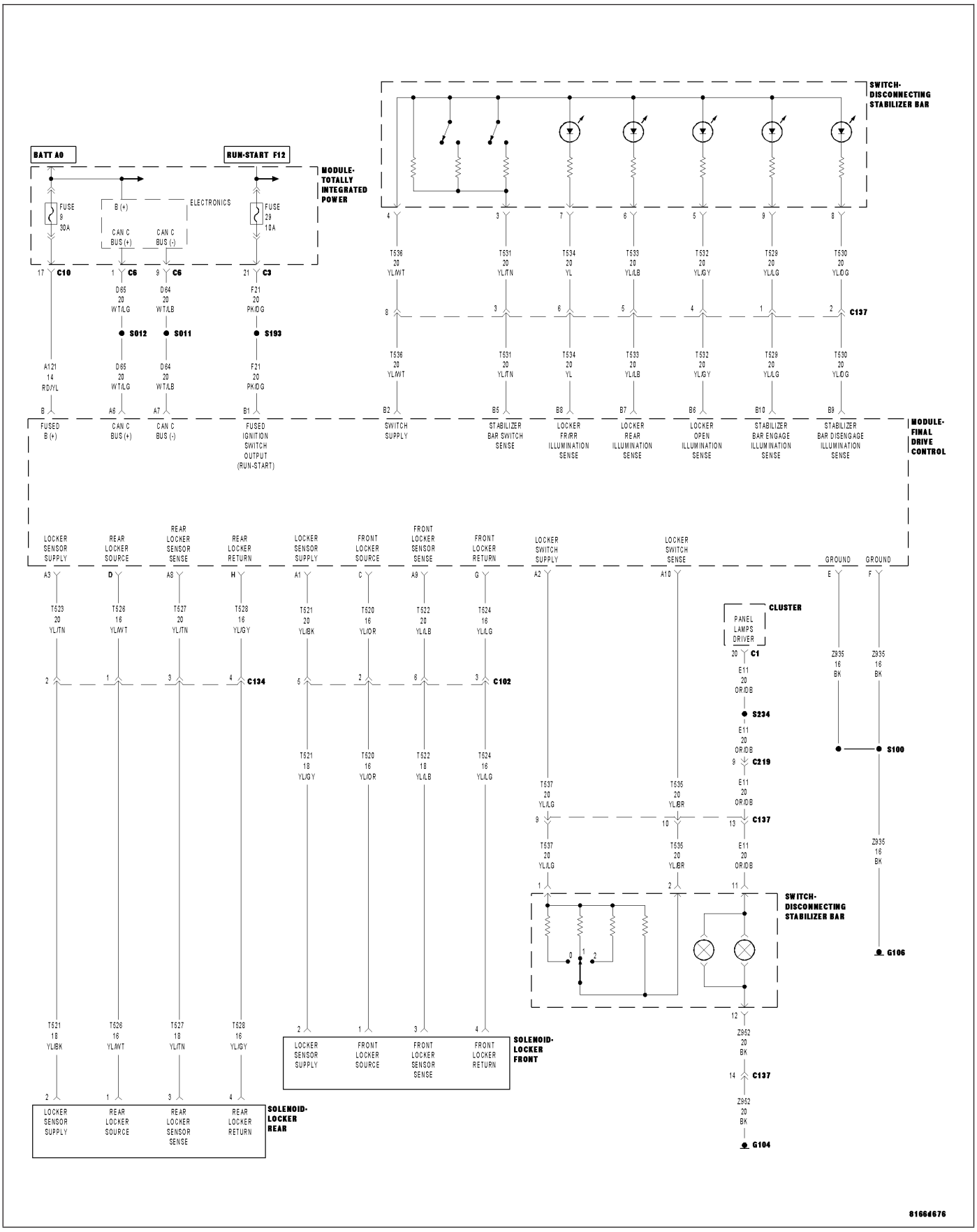
While monitoring the TRAC State on the scan tool, move the switch to each position. The scan tool display must match the position on the actual switch.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C1417–FRONT DIFFERENTIAL CONTROL CIRCUIT LOW



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on. Disconnecting Stabilizer Bar Switch in the FR/RR position.
- **Set Condition:**
  The FDCM detects the Front Locker Source circuit is shorted low.

Possible Causes
FRONT LOCKER SOLENOID
(T520) FRONT LOCKER SOURCE CIRCUIT SHORTED TO GROUND
(T520) FRONT LOCKER SOURCE CIRCUIT SHORTED TO FRONT LOCKER RETURN CIRCUIT
FDCM

Diagnostic Test

1. ACTIVE DTC

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Ignition on, engine not running.

With the scan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 6

2. FRONT LOCKER SOLENOID OPERATION

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Turn the ignition off.

Disconnect the Front Locker Solenoid harness connector.

Ignition on, engine not running.

Using a 12-volt test light, jump across from the (T520) Front Locker Source circuit and the (T524) Front Locker Return circuit in the Front Locker harness connector.

With the scan tool, actuate the Front Locker Solenoid.

Does the test light illuminate and flash on and off?

Yes >> Inspect the Front Locker Solenoid terminals and connectors for corrosion and/or dirt that may compromise the connection. If OK, replace the Front Locker Solenoid.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3

3. (T520) FRONT LOCKER SOURCE CIRCUIT SHORTED TO GROUND

Turn the ignition off.

Disconnect the FDCM harness connector.

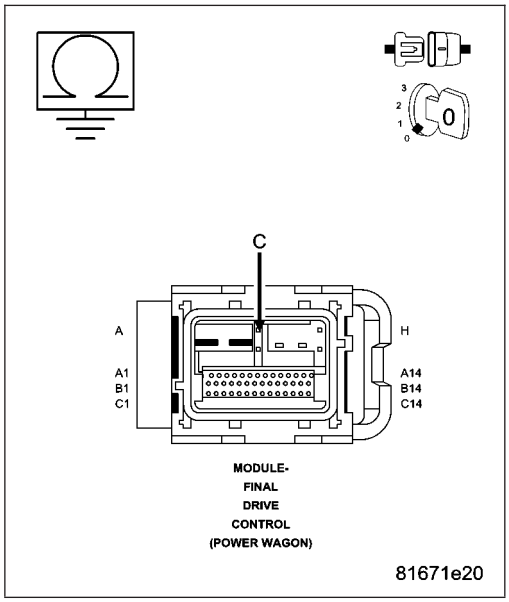
Measure the resistance of the (T520) Front Locker Source circuit at the FDCM harness connector to ground.

Is the resistance below 100 ohms?

Yes >> Repair the short to ground in the Front Locker Source circuit.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4



4. (T520) FRONT LOCKER SOURCE CIRCUIT SHORTED TO (T524) FRONT LOCKER RETURN CIRCUIT

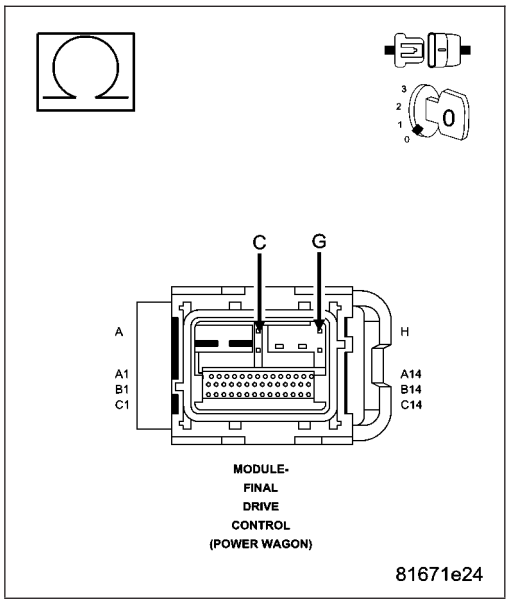
Measure the resistance between the (T520) Front Locker Source circuit and the (T524) Front Locker Return circuit in the FDCM harness connector.

Is the resistance below 100 ohms?

Yes >> Repair the short between (T520) Front Locker Source circuit and the (T524) Front Locker Return circuit.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 5



5. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.
Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

6. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

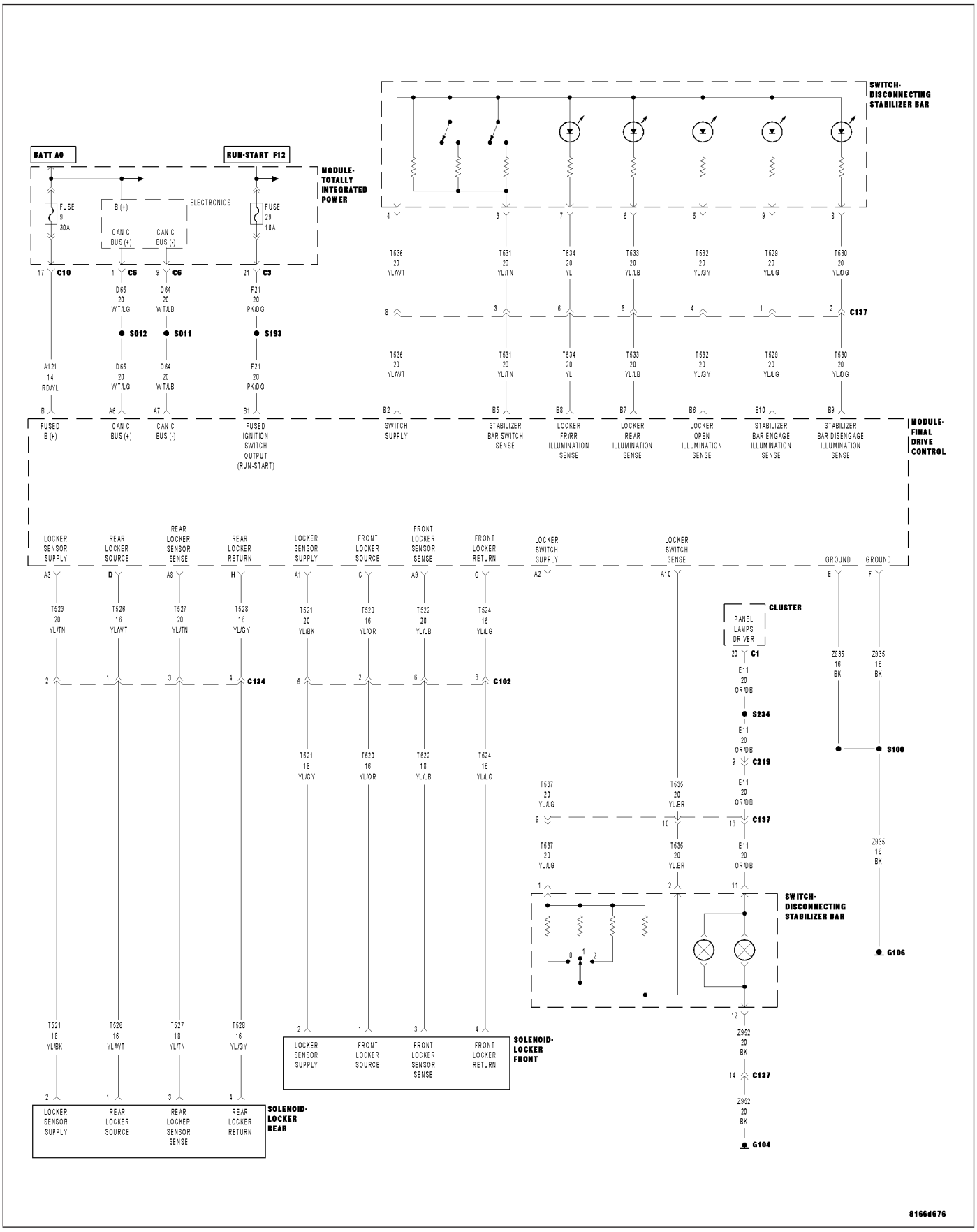
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C1418–FRONT DIFFERENTIAL CONTROL CIRCUIT HIGH



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on. Disconnecting Stabilizer Bar Switch the FR/RR position.
- **Set Condition:**
  The FDCM detects the Front Locker Source circuit is shorted high.

Possible Causes
FRONT LOCKER SOLENOID
(T520) FRONT LOCKER SOURCE CIRCUIT SHORTED TO BATTERY VOLTAGE
(T524) FRONT LOCKER RETURN CIRCUIT OPEN
FDCM

Diagnostic Test

1. ACTIVE DTC

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Ignition on, engine not running.

With the scan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 6

2. FRONT LOCKER SOLENOID OPERATION

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Turn the ignition off.

Disconnect the Front Locker Solenoid harness connector.

Ignition on, engine not running.

Using a 12-volt test light, jump across from the (T520) Front Locker Source circuit and the (T524) Front Locker Return circuit in the Front Locker harness connector.

With a scan tool, actuate the Front Locker Solenoid.

Does the test light flash on and off?

Yes >> Inspect the Front Locker Solenoid terminals and connectors for corrosion and/or dirt that may compromise the connection. If OK, replace the Front Locker Solenoid.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3

3. (T520) FRONT LOCKER SOURCE CIRCUIT SHORTED TO BATTERY VOLTAGE

Turn the ignition off.

Disconnect the FDCM harness connector.

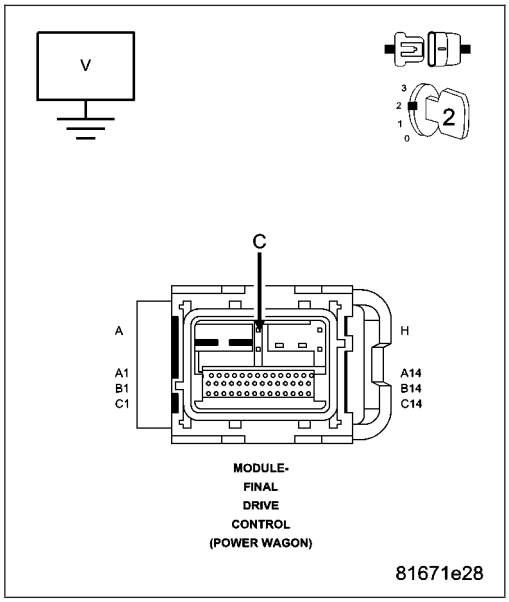
Turn the ignition on.

Measure the voltage on the (T520) Front Locker Source circuit at the FDCM harness connector.

Does the voltmeter indicate voltage present?

Yes >> Repair the short to voltage in the (T520) Front Locker Source circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4



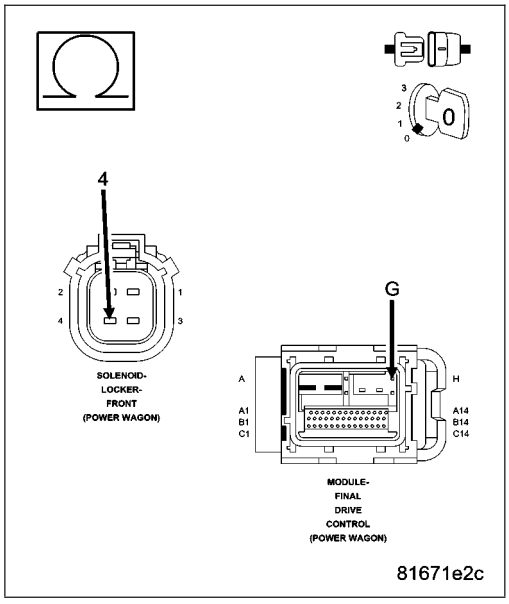
4. (T524) FRONT LOCKER RETURN CIRCUIT OPEN

Measure the resistance of the (T524) Front Locker Return circuit form the in the Front Locker Solenoid harness connector and the FDCM harness connector.

Is the resistance below 5.0 ohms?

Yes >> Go To 5

No >> Repair the open in the (T524) Front Locker Return circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)



5. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.

Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

6. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

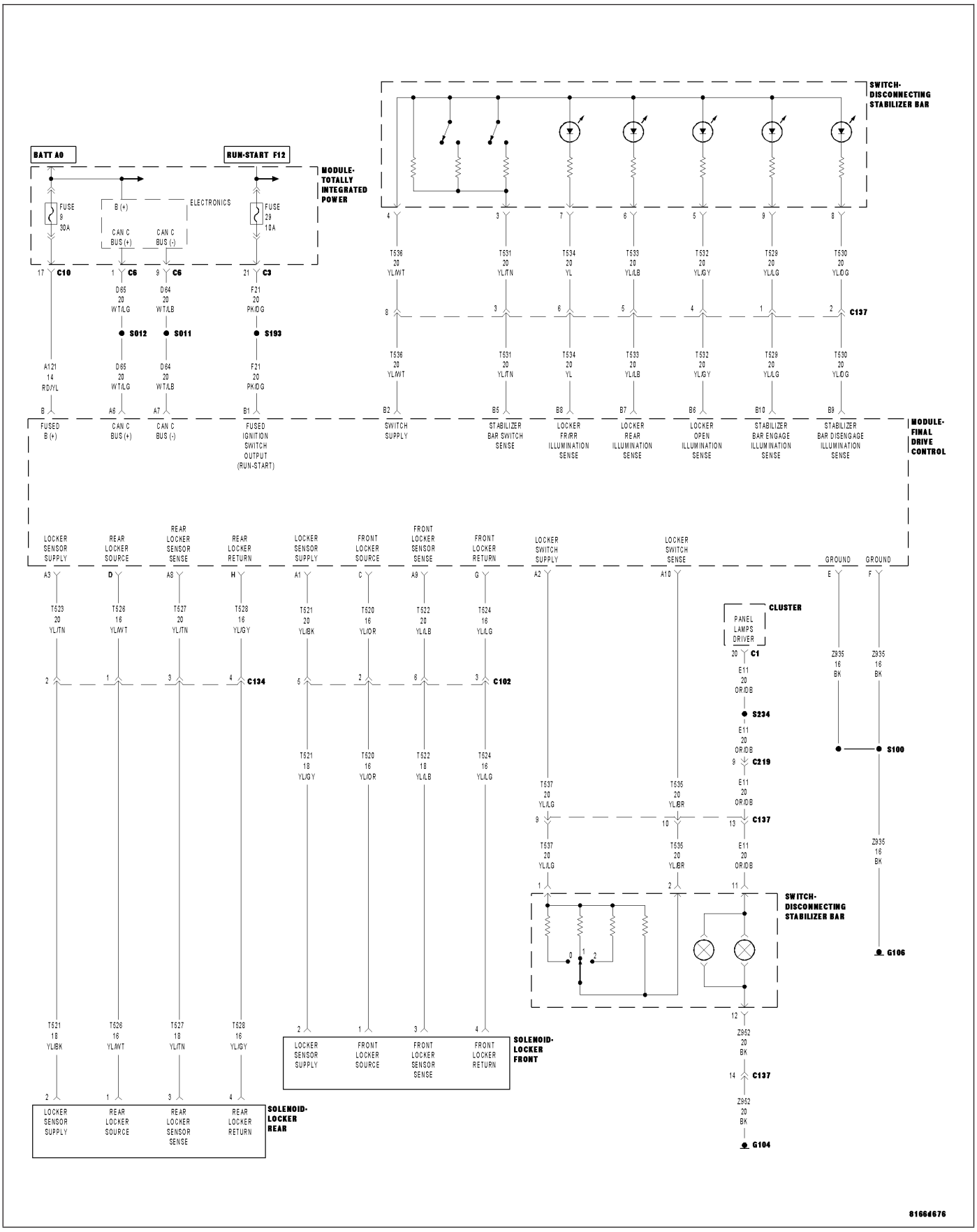
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C1419–FRONT DIFFERENTIAL CONTROL CIRCUIT OPEN



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on. Disconnecting Stabilizer Bar Switch in the FR/RR position.
- **Set Condition:**
  The FDCM detects the Front Locker Source circuit is open.

Possible Causes
FRONT LOCKER SOLENOID
(T520) FRONT LOCKER SOURCE CIRCUIT OPEN
FDCM

Diagnostic Test

1. ACTIVE DTC

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Ignition on, engine not running.

With the scan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 5

2. FRONT LOCKER SOLENOID OPERATION

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Turn the ignition off.

Disconnect the Front Locker Solenoid harness connector.

Ignition on, engine not running.

Using a 12-volt test light, jump across from the (T520) Front Locker Source circuit and the (T524) Front Locker Return circuit in the Front Locker harness connector.

With a scan tool, actuate the Front Locker Solenoid.

Does the test light flash on and off?

Yes >> Inspect the Front Locker Solenoid terminals and connectors for corrosion and/or dirt that may compromise the connection. If OK, replace the Front Locker Solenoid.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3

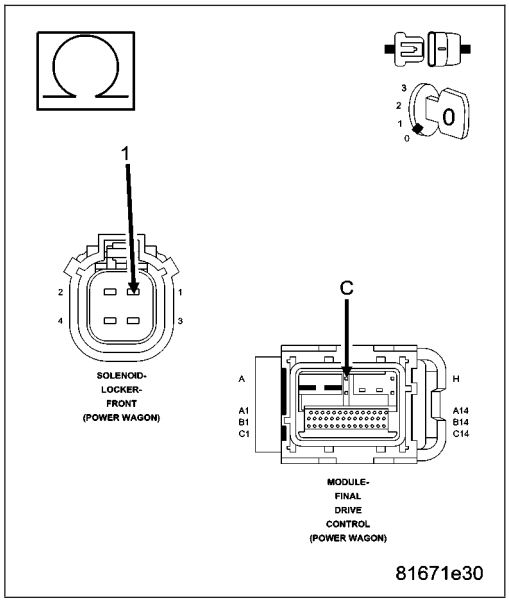
3. (T520) FRONT LOCKER SOURCE CIRCUIT OPEN

Turn the ignition off.

Disconnect the FDCM harness connector.

Turn the ignition on.

Measure the resistance of the (T520) Front Locker Source circuit from the FDCM harness connector and the Front Locker Solenoid harness connector.



Is the resistances below 5.0 ohms?

Yes >> Go To 4

No >> Repair the open in the Front Locker Source circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

4. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.

Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

5. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

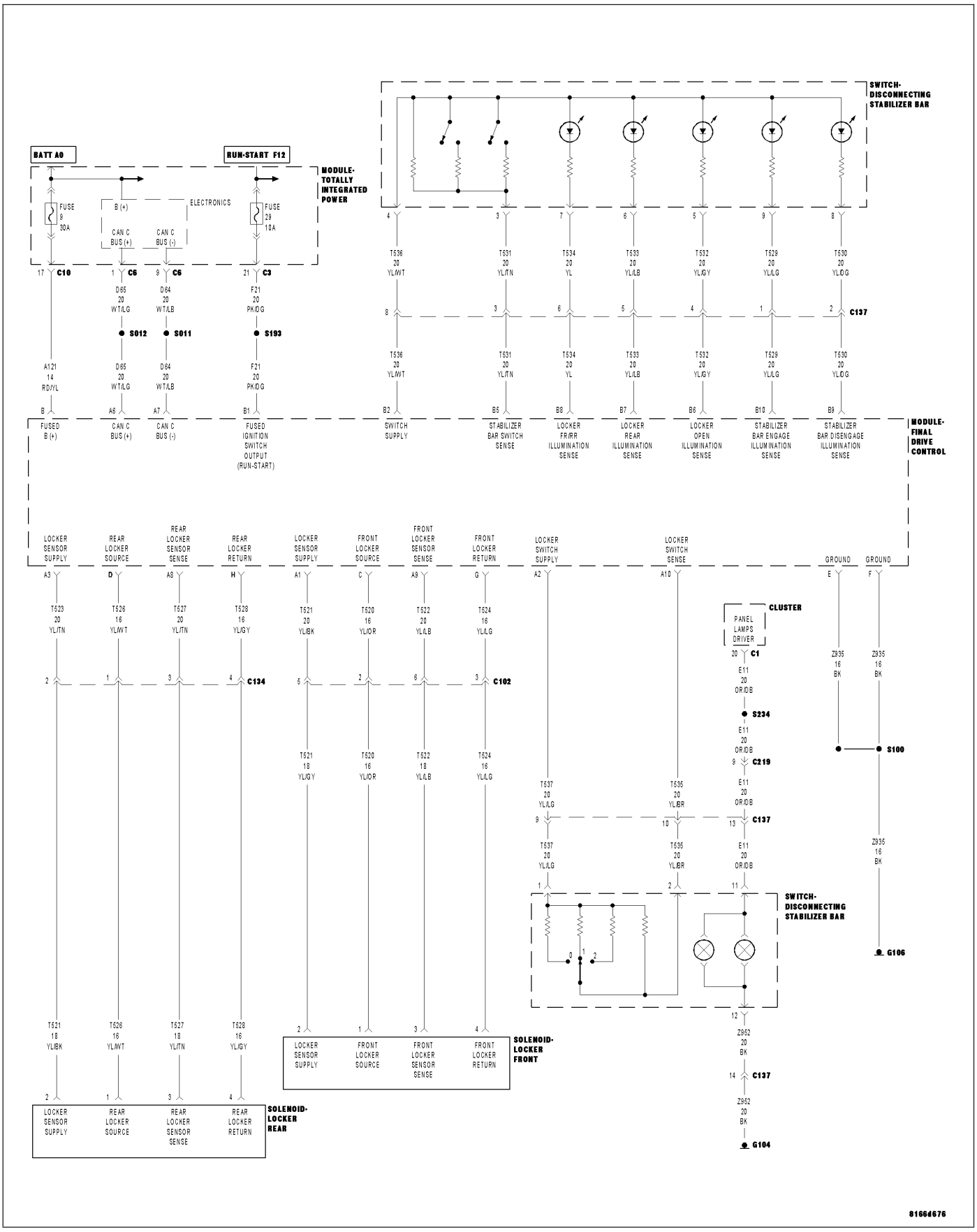
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C141D-REAR DIFFERENTIAL CONTROL CIRCUIT LOW



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on. Disconnecting Stabilizer Bar Switch in the RR or FR/RR position.
- **Set Condition:**
  The FDCM detects the Rear Locker Source circuit is shorted low.

Possible Causes
REAR LOCKER SOLENOID
(T526) REAR LOCKER SOURCE CIRCUIT SHORTED TO GROUND
(T528) REAR LOCKER SOURCE CIRCUIT SHORTED TO (T528) REAR LOCKER RETURN CIRCUIT
FDCM

Diagnostic Test

1. ACTIVE DTC

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Ignition on, engine not running.

With the scan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 6

2. REAR LOCKER SOLENOID OPERATION

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Turn the ignition off.

Disconnect the Rear Locker Solenoid harness connector.

Ignition on, engine not running.

Using a 12-volt test light, jump across from the (T526) Rear Locker Source circuit and the (T528) Rear Locker Return circuit in the Rear Locker harness connector.

With a scan tool, actuate the Rear Locker Solenoid.

Does the test light flash on and off?

Yes >> Inspect the Rear Locker Solenoid terminals and connectors for corrosion and/or dirt that may compromise the connection. If OK, replace the Rear Locker Solenoid.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3

3. (T526) REAR LOCKER SOURCE CIRCUIT SHORTED TO GROUND

Turn the ignition off.

Disconnect the FDCM harness connector.

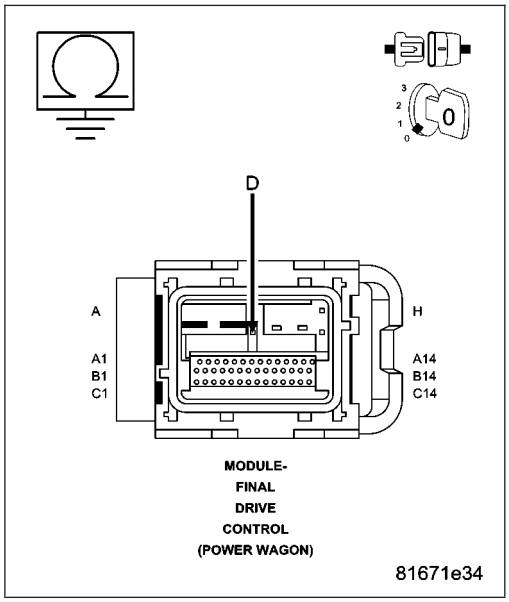
Measure the resistance of the (T526) Rear Locker Source circuit at the FDCM harness connector to ground.

Is the resistance below 100 ohms?

Yes >> Repair the short to ground in the Rear Locker Source circuit.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4



4. (T526) REAR LOCKER SOURCE CIRCUIT SHORTED TO (T528) REAR LOCKER RETURN CIRCUIT

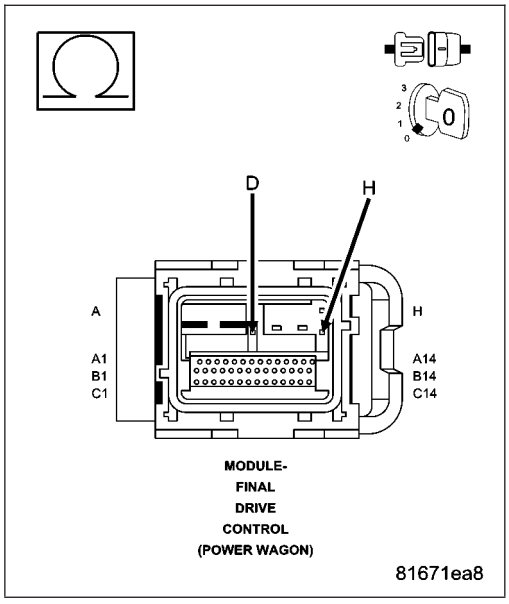
Measure the resistance between the (T526) Rear Locker Source circuit and the (T528) Rear Locker Return circuit in the FDCM harness connector.

Is the resistance below 100 ohms?

Yes >> Repair the short between (T526) Rear Locker Source circuit and the (T528) Rear Locker Return circuit.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 5



5. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.
Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

6. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

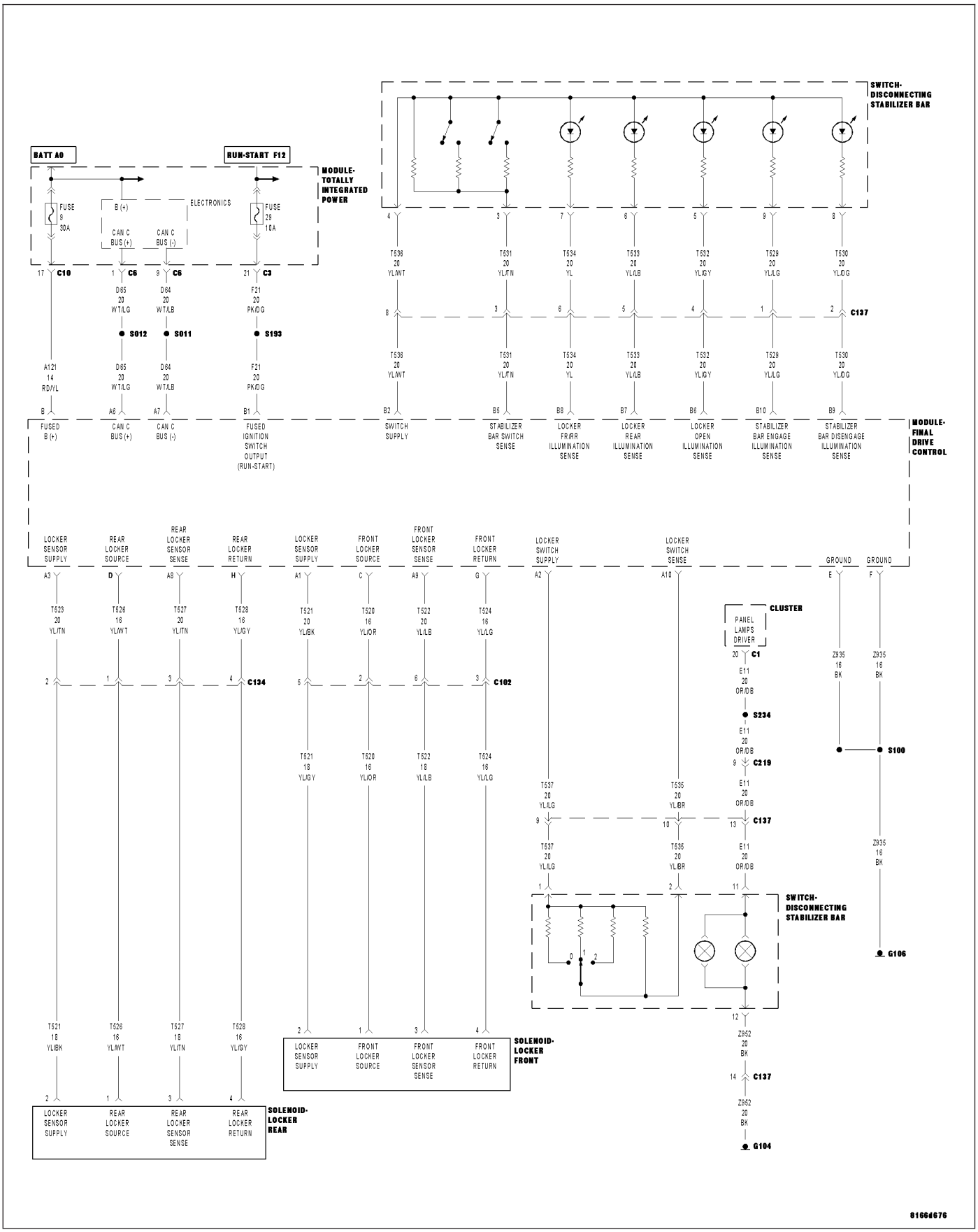
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C141E–REAR DIFFERENTIAL CONTROL CIRCUIT HIGH



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on. Disconnecting Stabilizer Bar Switch in the FR/RR position.
- **Set Condition:**
  The FDCM detects the Rear Locker Source circuit is shorted high.

Possible Causes
REAR LOCKER SOLENOID
(T526) REAR LOCKER SOURCE CIRCUIT SHORTED TO BATTERY VOLTAGE
(T528) REAR LOCKER RETURN CIRCUIT OPEN
FDCM

Diagnostic Test

1. ACTIVE DTC

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Ignition on, engine not running.

With the scan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 6

2. REAR LOCKER SOLENOID OPERATION

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Turn the ignition off.

Disconnect the Rear Locker Solenoid harness connector.

Ignition on, engine not running.

Using a 12-volt test light, jump across from the (T526) Rear Locker Source circuit and the (T528) Rear Locker Return circuit in the Rear Locker harness connector.

With a scan tool, actuate the Rear Locker Solenoid.

Does the test light flash on and off?

Yes >> Inspect the Rear Locker Solenoid terminals and connectors for corrosion and/or dirt that may compromise the connection. If OK, replace the Rear Locker Solenoid.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3

3. (T526) REAR LOCKER SOURCE CIRCUIT SHORTED TO BATTERY VOLTAGE

Turn the ignition off.

Disconnect the FDCM harness connector.

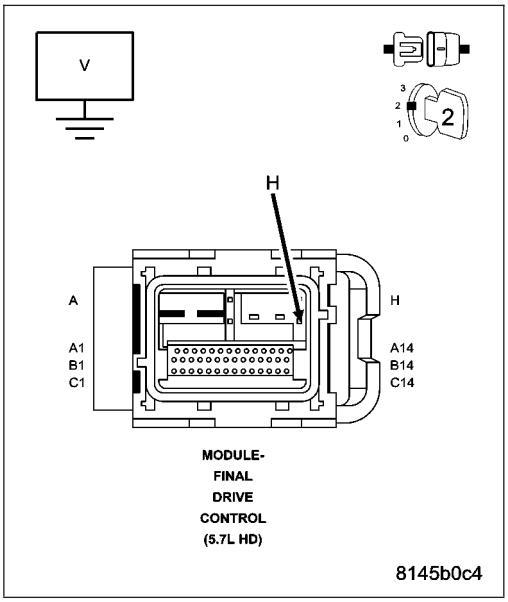
Turn the ignition on.

Measure the voltage on the (T526) Rear Locker Source circuit at the FDCM harness connector.

Does the voltmeter indicate voltage present?

Yes >> Repair the short to voltage in the (T526) Rear Locker Source circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4



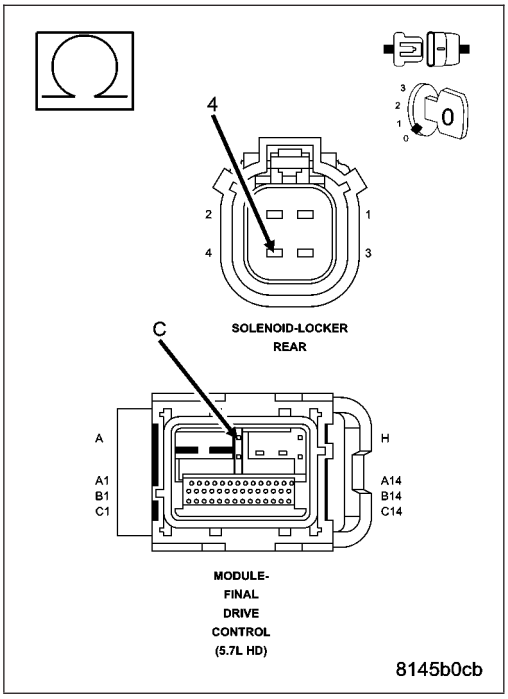
4. (T528) REAR LOCKER RETURN CIRCUIT OPEN

Measure the resistance of the (T528) Rear Locker Return circuit form the in the Rear Locker Solenoid harness connector and the FDCM harness connector.

Is the resistance below 5.0 ohms?

Yes >> Go To 5

No >> Repair the open in the (T528) Rear Locker Return circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)



5. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.
Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

6. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

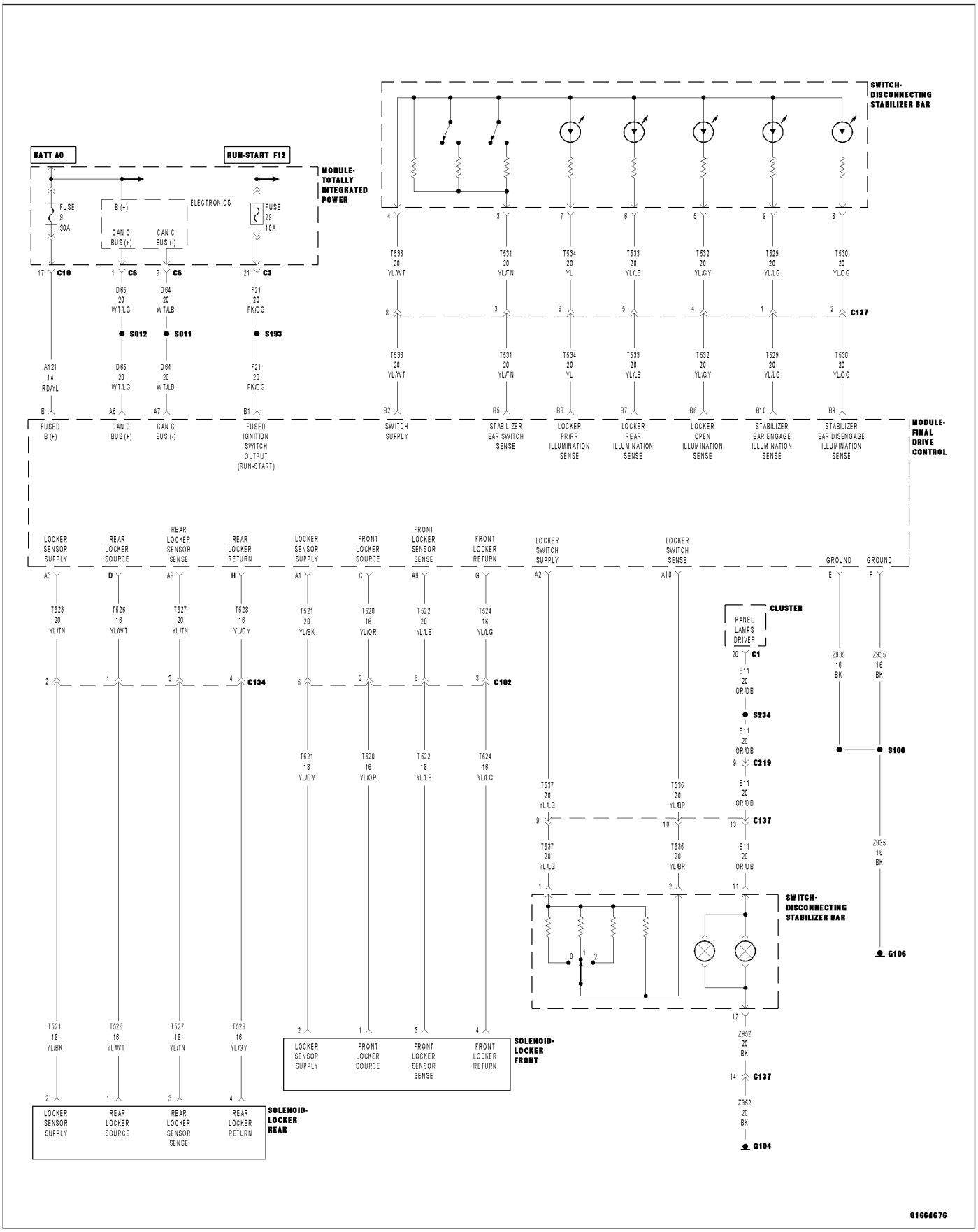
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C141F–REAR DIFFERENTIAL CONTROL CIRCUIT OPEN



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on. Disconnecting Stabilizer Bar Switch in the FR/RR position.
- **Set Condition:**
  The FDCM detects the Rear Locker Source circuit is open.

Possible Causes
REAR LOCKER SOLENOID
(T526) REAR LOCKER SOURCE CIRCUIT OPEN
FDCM

Diagnostic Test

1. ACTIVE DTC

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Ignition on, engine not running.

With the scan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 5

2. REAR LOCKER SOLENOID OPERATION

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Turn the ignition off.

Disconnect the Rear Locker Solenoid harness connector.

Ignition on, engine not running.

Using a 12-volt test light, jump across from the (T526) Rear Locker Source circuit and the (T528) Rear Locker Return circuit in the Rear Locker harness connector.

With a scan tool, actuate the Rear Locker Solenoid.

Does the test light flash on and off?

Yes >> Inspect the Rear Locker Solenoid terminals and connectors for corrosion and/or dirt that may compromise the connection. If OK, replace the Rear Locker Solenoid.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3

3. (T526) REAR LOCKER SOURCE CIRCUIT OPEN

Turn the ignition off.

Disconnect the FDCM harness connector.

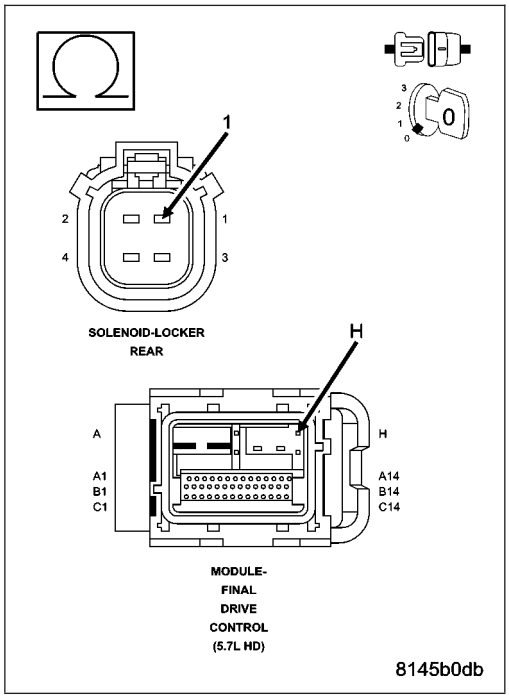
Turn the ignition on.

Measure the resistance of the (T526) Rear Locker Source circuit from the FDCM harness connector and the Rear Locker Solenoid harness connector.

Is the resistance below 5.0 ohms?

Yes >> Go To 4

No >> Repair the open in the Rear Locker Source circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)



4. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.

Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

5. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

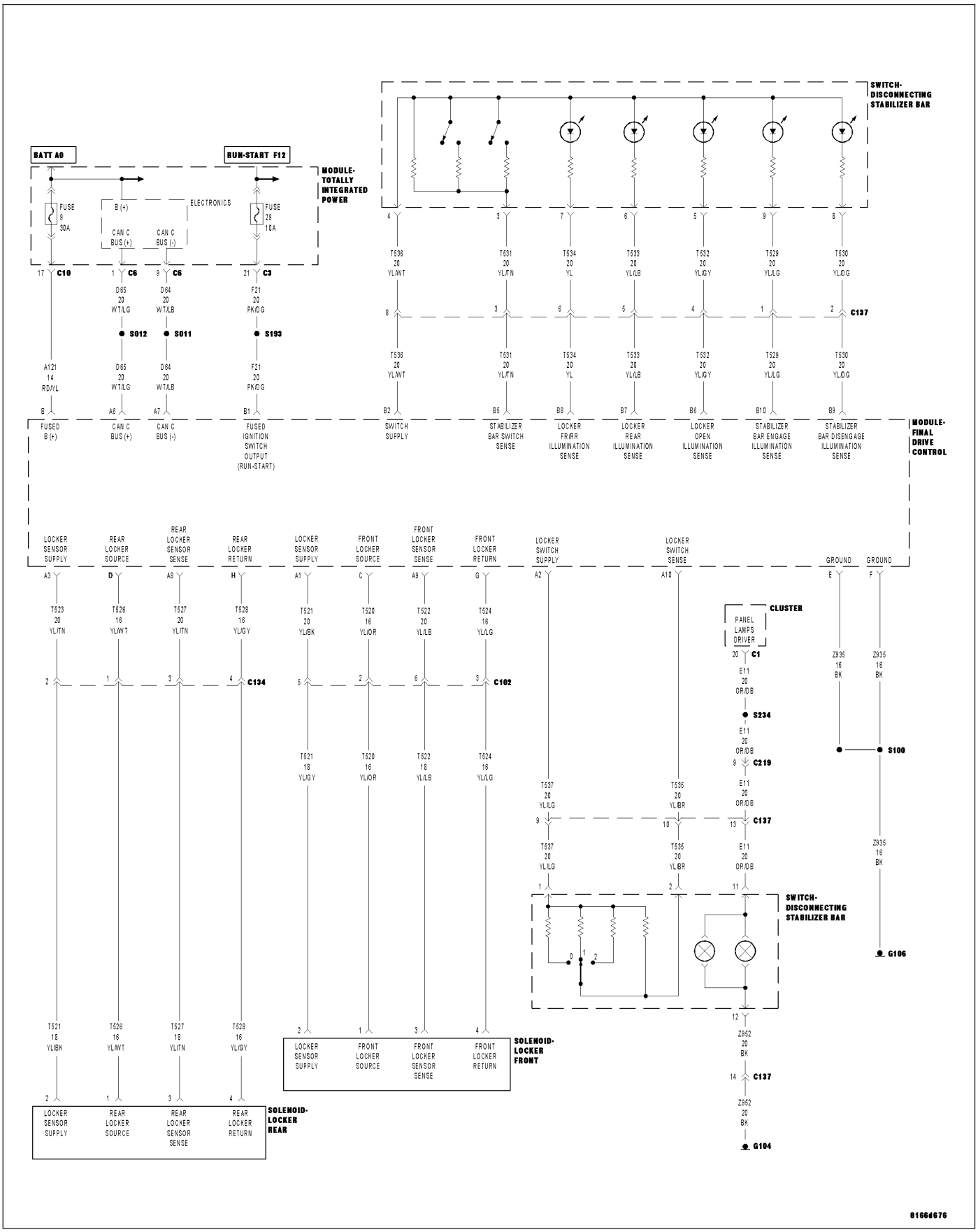
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C1446-FRONT DIFFERENTIAL RETURN CIRCUIT LOW



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on. Disconnecting Stabilizer Bar Switch in the FR/RR position.
- **Set Condition:**
  The FDCM detects the Front Locker Source circuit is shorted low.

Possible Causes
FRONT LOCKER SOLENOID
(T526) FRONT LOCKER RETURN CIRCUIT SHORTED TO GROUND
FDCM

Diagnostic Test

1. ACTIVE DTC

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Ignition on, engine not running.

With the scan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 5

2. FRONT LOCKER SOLENOID OPERATION

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Turn the ignition off.

Disconnect the Front Locker Solenoid harness connector.

Ignition on, engine not running.

Using a 12-volt test light, jump across from the (T520) Front Locker Source circuit and the (T524) Front Locker Return circuit in the Front Locker harness connector.

With a scan tool, actuate the Front Locker Solenoid.

Does the test light flash on and off?

Yes >> Inspect the Front Locker Solenoid terminals and connectors for corrosion and/or dirt that may compromise the connection. If OK, replace the Front Locker Solenoid.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3

3. (T524) FRONT LOCKER RETURN CIRCUIT SHORTED TO GROUND

Turn the ignition off.

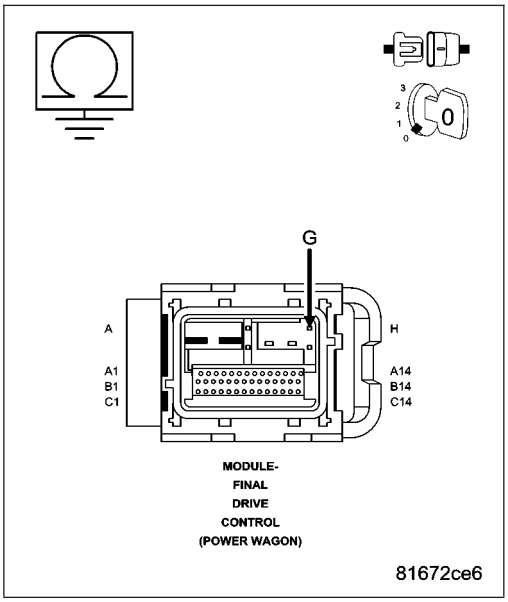
Disconnect the FDCM harness connector.

Measure the resistance of the (T524) Front Locker Return circuit in the FDCM harness connector to ground.

Is the resistance below 100 ohms?

Yes >> Repair the short to ground in (T524) Front Locker Return circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4



4. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.

Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

5. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

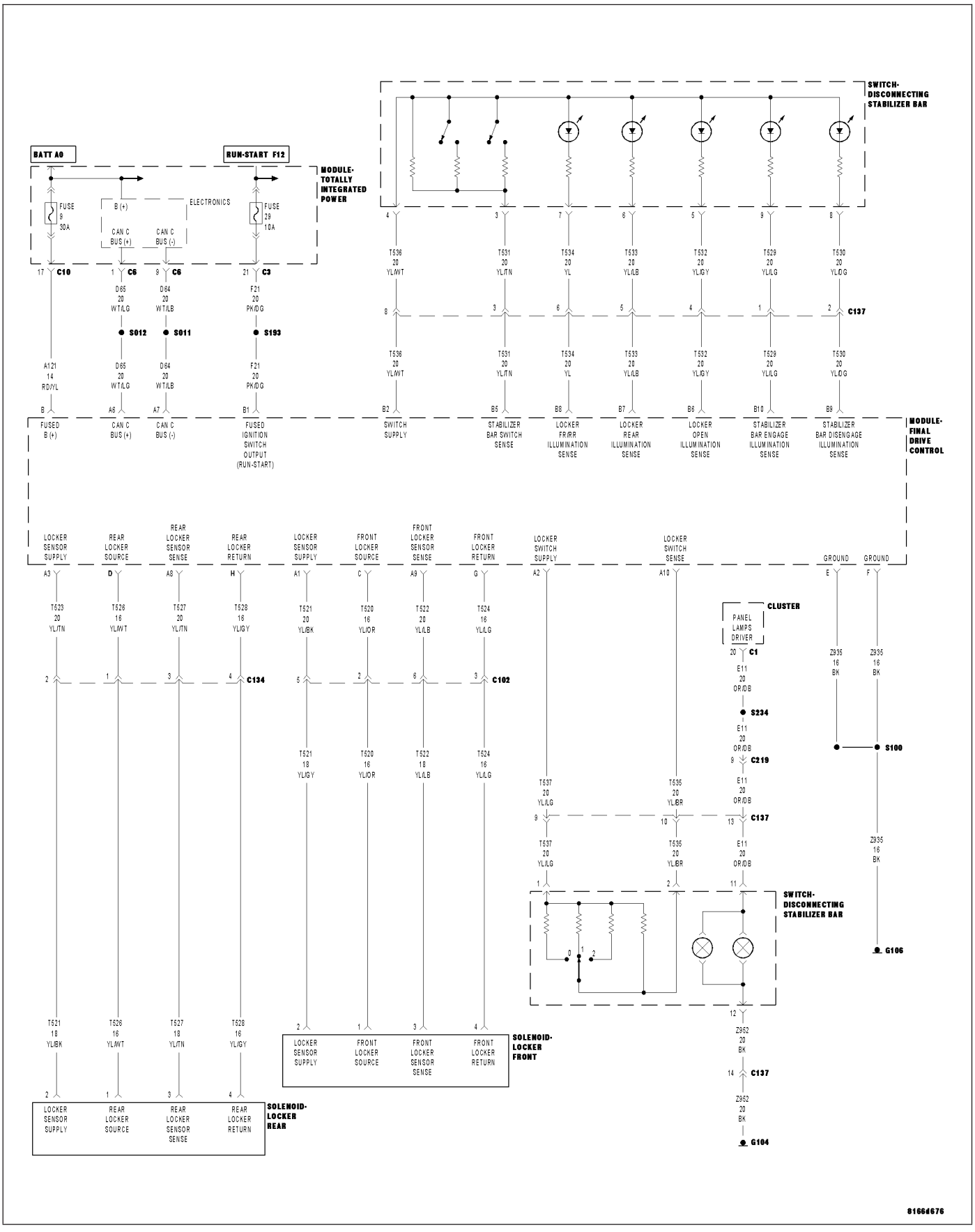
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C1447-FRONT DIFFERENTIAL RETURN CIRCUIT HIGH



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on. Disconnection Stabilizer Bar Switch in the FR/RR position.
- **Set Condition:**
  The FDCM detects the Front Locker Source circuit is shorted low.

Possible Causes
FRONT LOCKER SOLENOID
(T520) FRONT LOCKER SOURCE CIRCUIT SHORTED TO GROUND
(T524) FRONT LOCKER RETURN CIRCUIT SHORTED TO (T520) FRONT LOCKER SOURCE CIRCUIT
FDCM

Diagnostic Test

1. ACTIVE DTC

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Ignition on, engine not running.

With thescan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 6

2. FRONT LOCKER SOLENOID OPERATION

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Turn the ignition off.

Disconnect the Front Locker Solenoid harness connector.

Ignition on, engine not running.

Using a 12-volt test light, jump across from the (T520) Front Locker Source circuit and the (T524) Front Locker Return circuit in the Front Locker harness connector.

With ascan tool, actuate the Front Locker Solenoid.

Does the test light flash on and off?

Yes >> Inspect the Front Locker Solenoid terminals and connectors for corrosion and/or dirt that may compromise the connection. If OK, replace the Front Locker Solenoid.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3

3. (T524) FRONT LOCKER RETURN CIRCUIT SHORTED TO BATTERY VOLTAGE

Turn the ignition off.

Disconnect the FDCM harness connector.

Turn the ignition on.

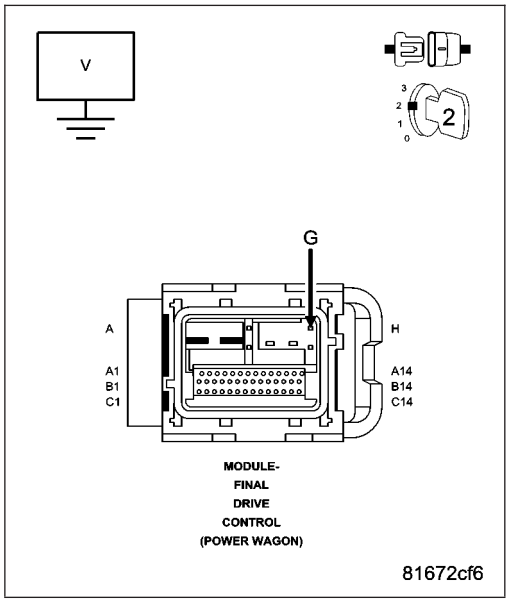
Measure the voltage of the (T524) Front Locker Return circuit at the FDCM harness connector.

Does the voltmeter indicate voltage present?

Yes >> Repair the short to voltage in the (T524) Front Locker Return circuit.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4



4. (T524) FRONT LOCKER RETURN CIRCUIT SHORTED TO (T520) FRONT LOCKER SOURCE CIRCUIT

Turn the ignition off.

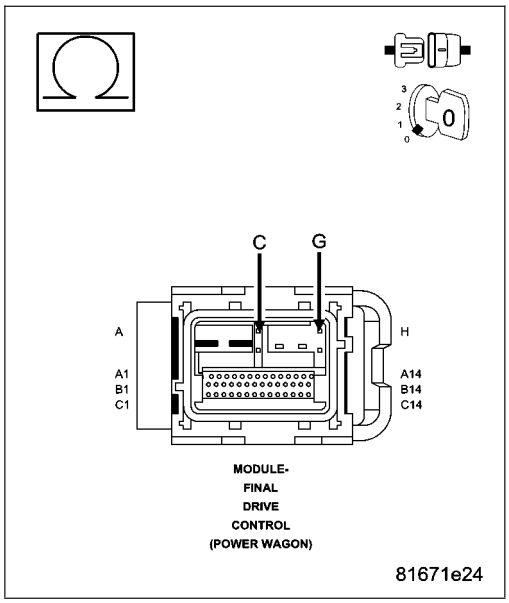
Measure the resistance between the (T520) Front Locker Source circuit and the (T524) Front Locker Return circuit in the FDCM harness connector.

Is the resistance below 100 ohms?

Yes >> Repair the short between (T520) Front Locker Source circuit and the (T524) Front Locker Return circuit.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 5



5. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.
Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

6. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

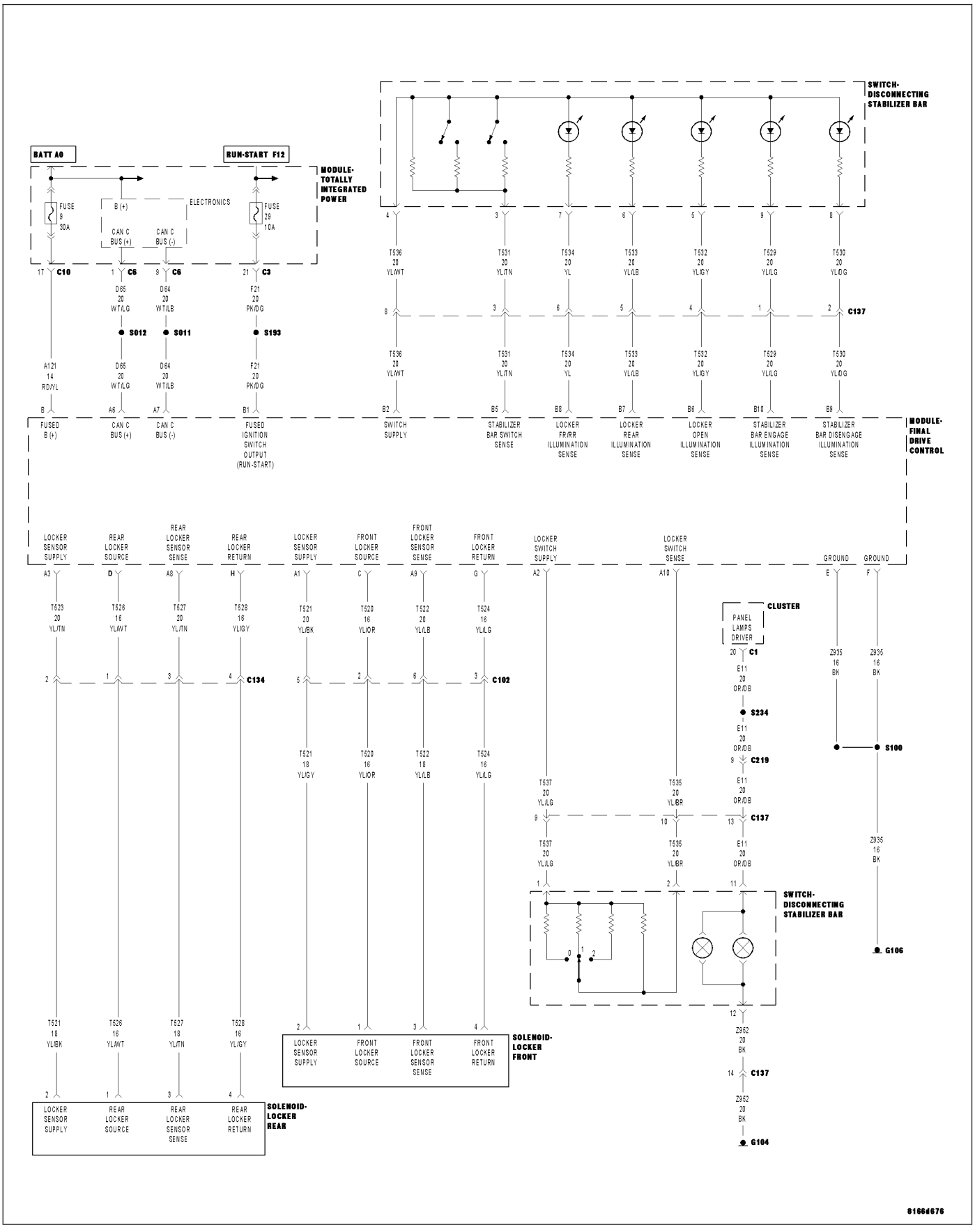
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C144A-REAR DIFFERENTIAL RETURN CIRCUIT LOW



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on. Disconnecting Stabilizer Bar Switch in the RR or FR/RR position.
- **Set Condition:**
  The FDCM detects the Rear Locker Source circuit is shorted low.

Possible Causes
REAR LOCKER SOLENOID
(T528) REAR LOCKER RETURN CIRCUIT SHORTED TO GROUND
FDCM

Diagnostic Test

1. ACTIVE DTC

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Ignition on, engine not running.

With the scan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 5

2. REAR LOCKER SOLENOID OPERATION

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Turn the ignition off.

Disconnect the Rear Locker Solenoid harness connector.

Ignition on, engine not running.

Using a 12-volt test light, jump across from the (T526) Rear Locker Source circuit and the (T528) Rear Locker Return circuit in the Rear Locker harness connector.

With a scan tool, actuate the Rear Locker Solenoid.

Does the test light flash on and off?

Yes >> Inspect the Rear Locker Solenoid terminals and connectors for corrosion and/or dirt that may compromise the connection. If OK, replace the Rear Locker Solenoid.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3

3. (T528) REAR LOCKER RETURN CIRCUIT SHORTED TO GROUND

Turn the ignition off.

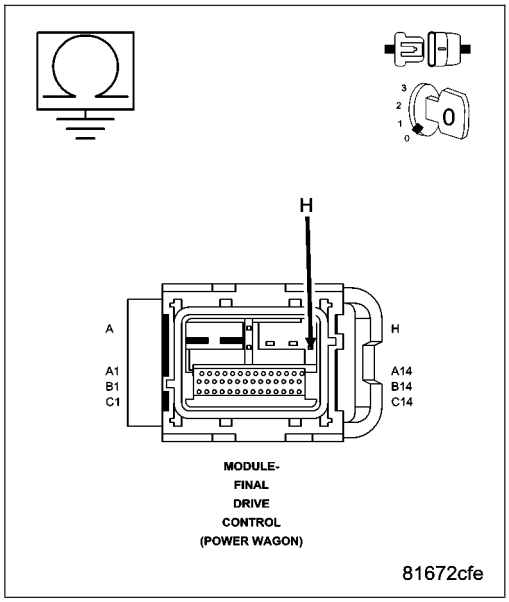
Disconnect the FDCM harness connector.

Measure the resistance of the (T528) Rear Locker Return circuit in the FDCM harness connector to ground.

Is the resistance below 100 ohms?

Yes >> Repair the short to ground in (T528) Rear Locker Return circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4



4. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.

Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

5. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

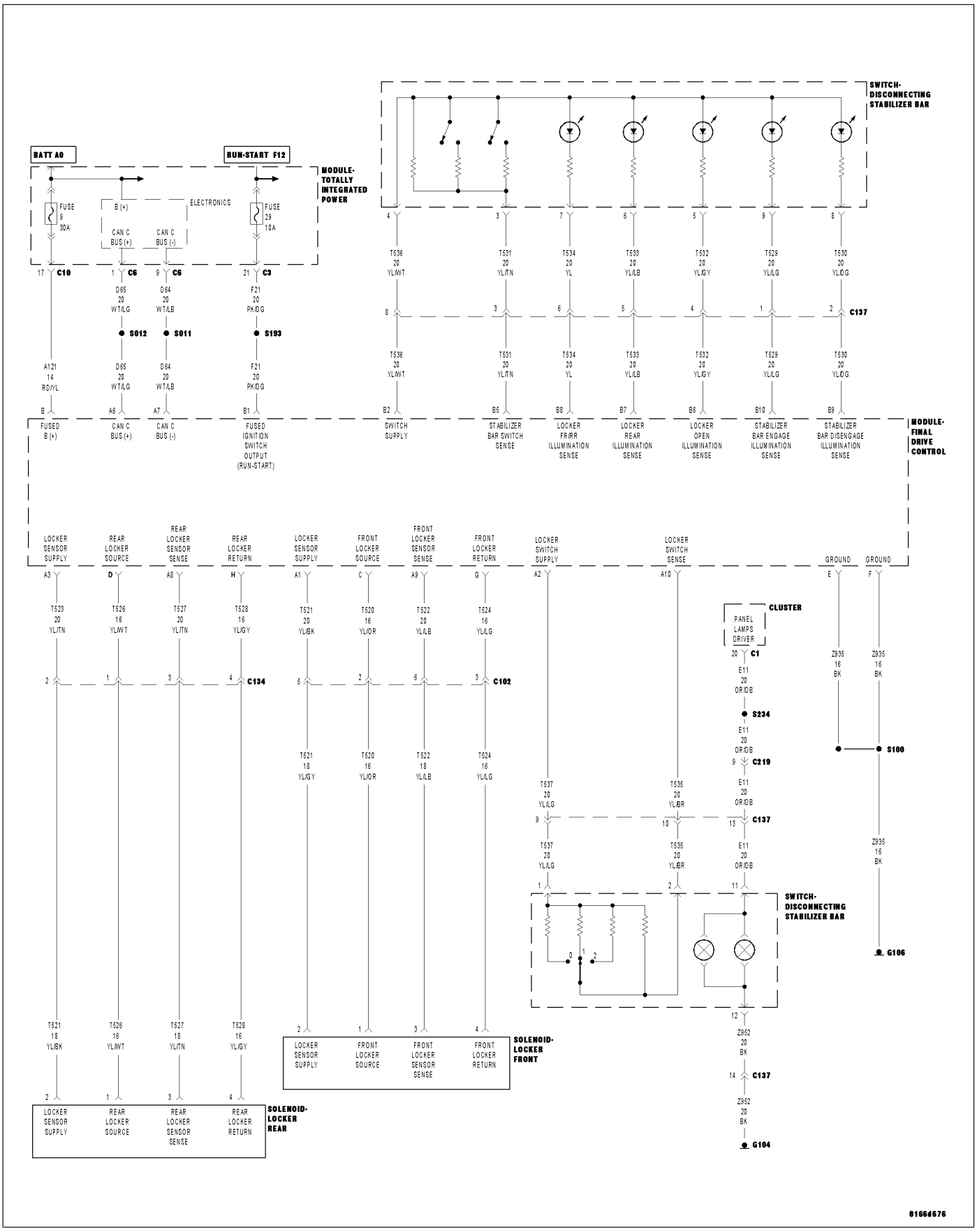
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C144B-REAR DIFFERENTIAL RETURN CIRCUIT HIGH



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on. Disconnecting Stabilizer Bar Switch in the RR or FR/RR position.
- **Set Condition:**
  The FDCM detects the Rear Locker Source circuit is shorted low.

Possible Causes
REAR LOCKER SOLENOID
(T526) REAR LOCKER SOURCE CIRCUIT SHORTED TO GROUND
(T528) REAR LOCKER RETURN CIRCUIT SHORTED TO (T526) REAR LOCKER SOURCE CIRCUIT
FDCM

Diagnostic Test

1. ACTIVE DTC

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Ignition on, engine not running.

With the scan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 6

2. REAR LOCKER SOLENOID OPERATION

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Turn the ignition off.

Disconnect the Rear Locker Solenoid harness connector.

Ignition on, engine not running.

Using a 12-volt test light, jump across from the (T526) Rear Locker Source circuit and the (T528) Rear Locker Return circuit in the Rear Locker harness connector.

With a scan tool, actuate the Rear Locker Solenoid.

Does the test light flash on and off?

Yes >> Inspect the Rear Locker Solenoid terminals and connectors for corrosion and/or dirt that may compromise the connection. If OK, replace the Rear Locker Solenoid.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3

3. (T528) REAR LOCKER RETURN CIRCUIT SHORTED TO BATTERY VOLTAGE

Turn the ignition off.

Disconnect the FDCM harness connector.

Turn the ignition on.

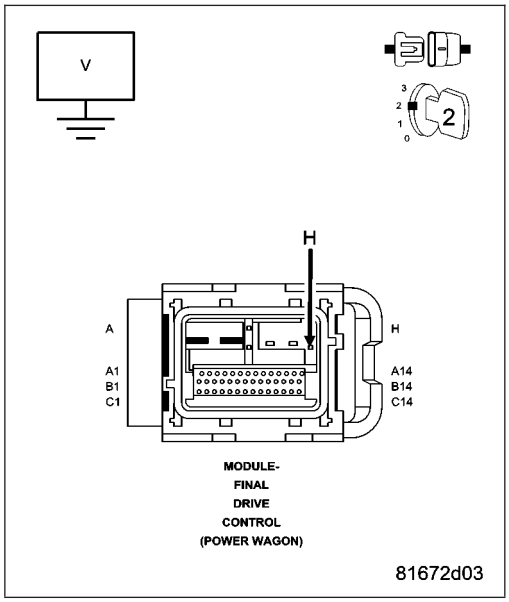
Measure the voltage of the (T528) Rear Locker Return circuit at the FDCM harness connector.

Does the voltmeter indicate voltage present?

Yes >> Repair the short to voltage in the (T528) Rear Locker Return circuit.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4



4. (T528) REAR LOCKER RETURN CIRCUIT SHORTED TO (T526) REAR LOCKER SOURCE CIRCUIT

Turn the ignition off.

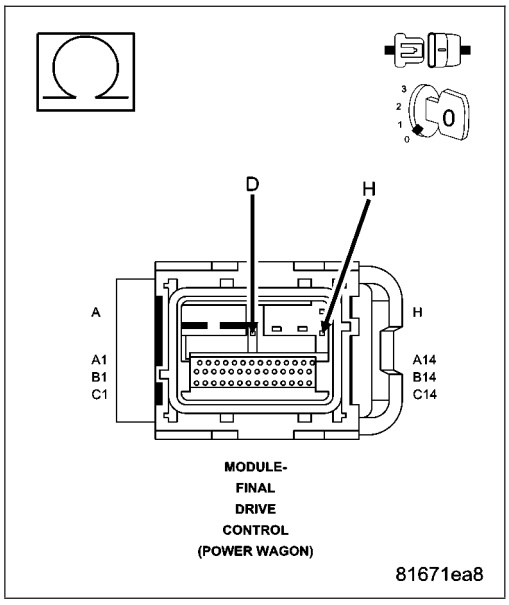
Measure the resistance between the (T526) Rear Locker Source circuit and the (T528) Rear Locker Return circuit in the FDCM harness connector.

Is the resistance below 100 ohms?

Yes >> Repair the short between (T526) Rear Locker Source circuit and the (T528) Rear Locker Return circuit.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 5



5. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.
Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

6. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

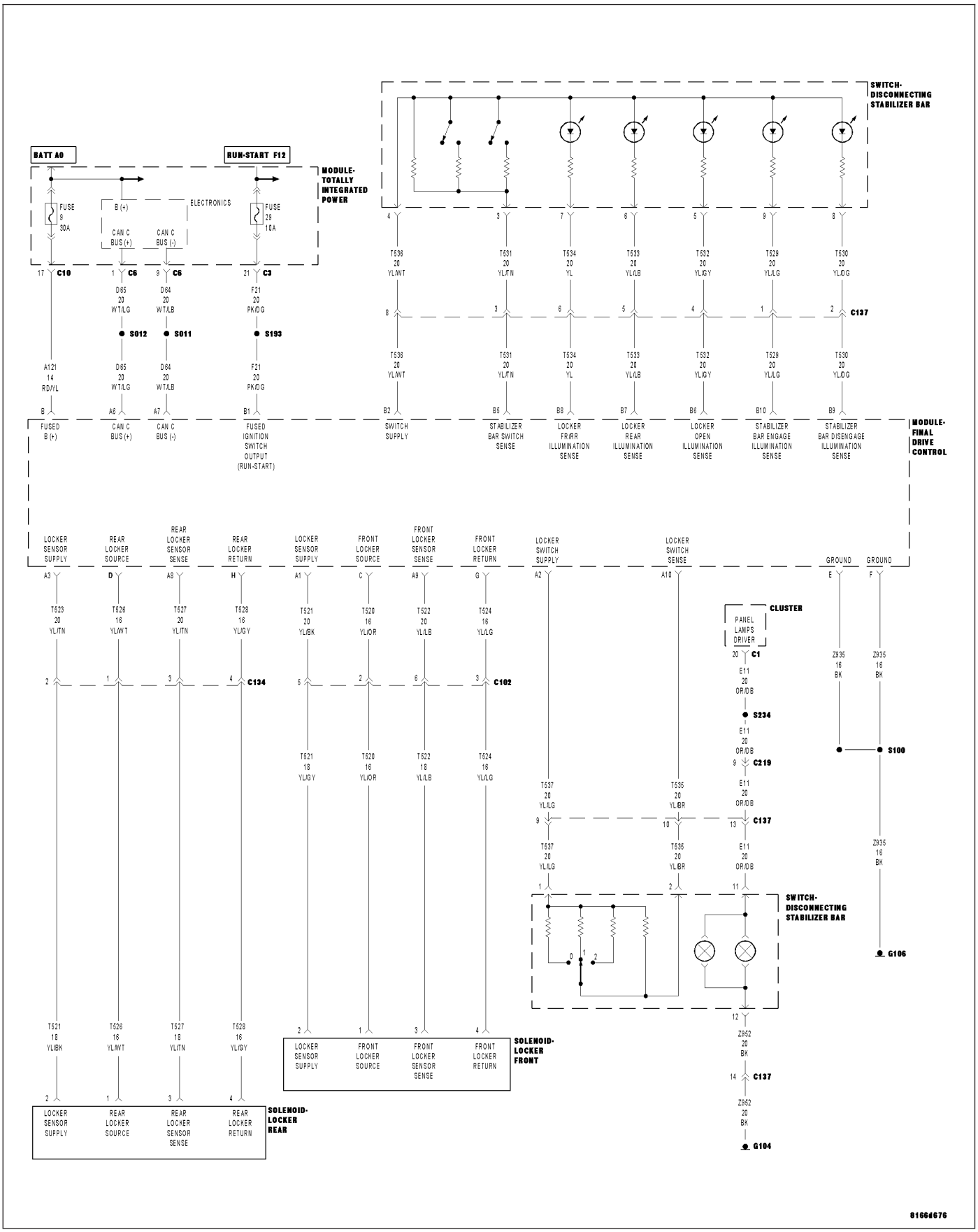
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C144E-FRONT DIFFERENTIAL POSITION SENSOR PERFORMANCE



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  The ignition on. Disconnecting Stabilizer Bar Switch in the FR/RR position.
- **Set Condition:**
  The FDCM detects that the Front Differential Position Sensor is in an unexpected state.

Possible Causes
(T522) FRONT DIFFERENTIAL POSITION SENSOR (WIRING, CONNECTOR AND/OR TERMINAL CONDITION)
FRONT DIFFERENTIAL POSITION SENSOR
(T522) FRONT LOCKER SENSOR SENSE OPEN
FDCM

Diagnostic Test

1. ACTIVE DTC

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Ignition on, engine not running.

With the scan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 6

2. FRONT DIFFERENTIAL POSITION SENSOR WIRING

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Using the scan tool, actuate the Front Locker Solenoid.

Monitor the Front Differential Position Sensor State.

Wiggle the related wiring harness from the FDCM to the Front Locker Solenoid connector at the axle.

With a scan tool, actuate the Front Locker Solenoid.

Does the state on the scan tool change while wiggling the wiring harness?

Yes >> Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Check the Locker Solenoid terminals and connectors for corrosion and/or dirt that may compromise the connection. Repair as necessary.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3

3. FRONT DIFFERENTIAL POSITION SENSOR OPERATION

Turn the ignition off.

Disconnect the Front Locker Solenoid harness connector.

Ignition on, engine not running.

Using a jumper wire, jumper across from the (T522) Front Locker Sensor Sense circuit and the (T521) Locker Sensor Supply circuit in the Front Locker Solenoid harness connector.

While monitoring the sensor state on the scan tool, tap the jumper wire on and off the (T522) Front Locker Sensor Sense circuit terminal. Hold the jumper wire on and off the terminal for a minimum of 3 seconds.

Does the state change on the scan tool while tapping the terminal?

Yes >> Replace the Front Locker Solenoid.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4

4. (T522) FRONT LOCKER SENSOR SENSE CIRCUIT OPEN

Turn the ignition off.

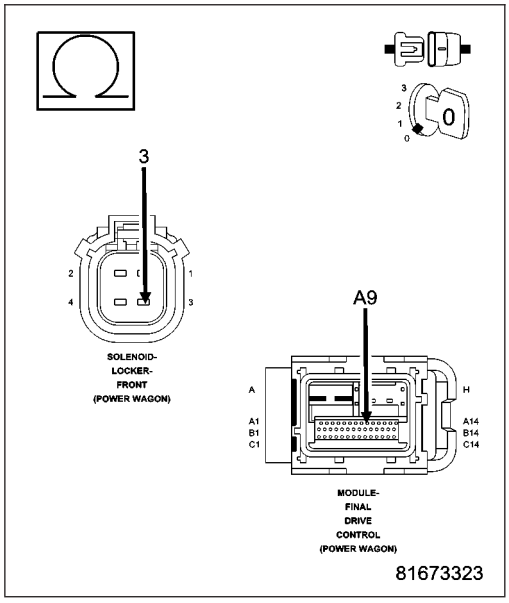
Disconnect the FDCM harness connector.

Measure the resistance of the (T522) Front Locker Sensor Sense circuit between the Front Locker Solenoid harness connector and the FDCM harness connector.

Is the resistance below 5.0 ohms?

Yes >> Go To 5

No >> Repair the open in the Front Locker Sensor Sense circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)



5. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.

Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

6. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

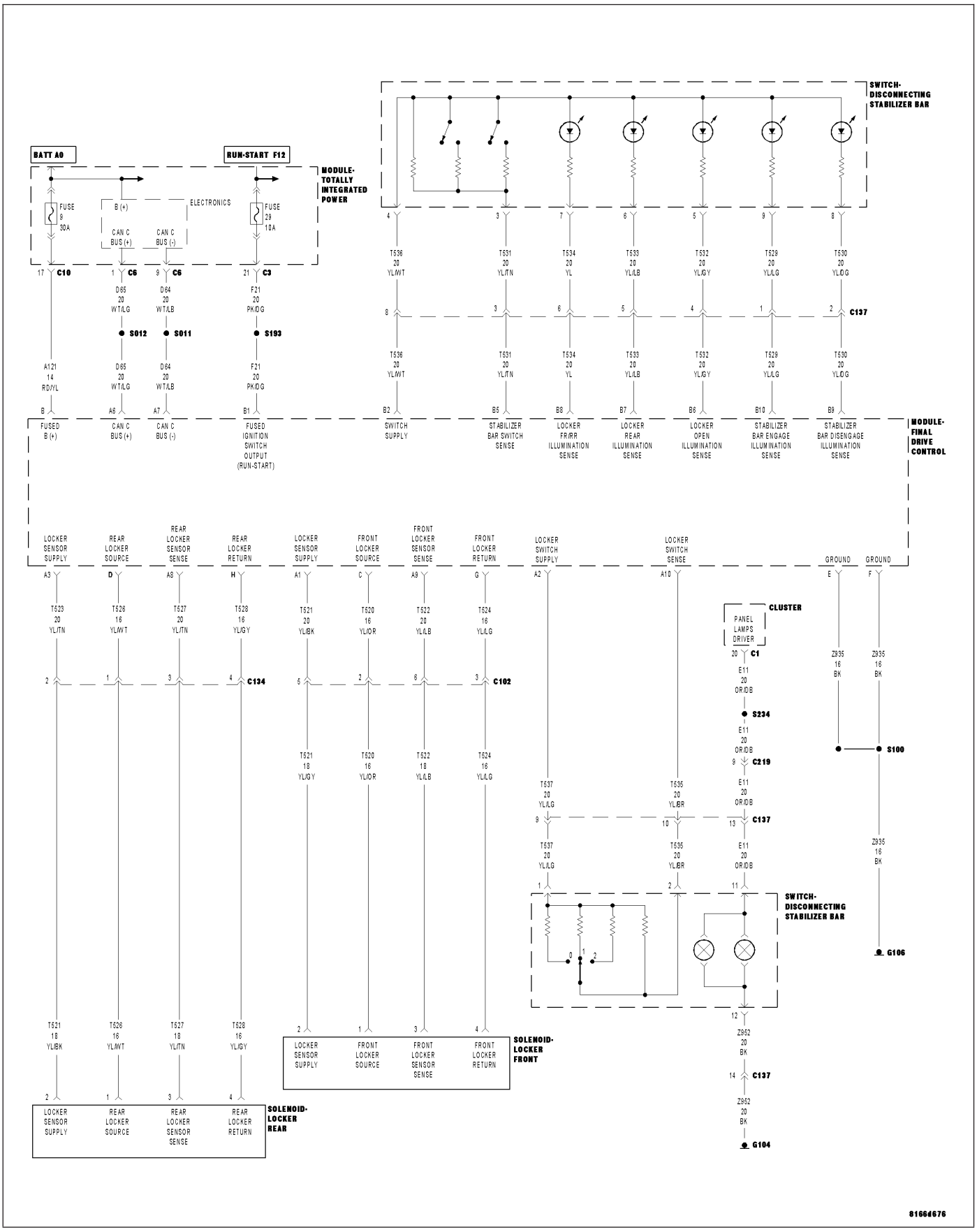
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C1450-FRONT DIFFERENTIAL POSITION SENSOR CIRCUIT HIGH



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on. Disconnecting Stabilizer Bar Switch in the FR/RR position.
- **Set Condition:**
  The FDCM detects that the Front Differential Position Sensor is shorted to voltage.

Possible Causes
(T522) FRONT LOCKER SENSOR SENSE SHORTED TO BATTERY VOLTAGE
FRONT DIFFERENTIAL POSITION SENSOR
(T522) FRONT LOCKER SENSOR SENSE OPEN
(T522) FRONT LOCKER SENSOR SENSE SHORTED TO (T521) LOCKER SENSOR SUPPLY
FDCM

Diagnostic Test

1. ACTIVE DTC

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Ignition on, engine not running.

With the scan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 7

2. (T522) FRONT LOCKER SENSOR SENSE SHORTED TO BATTERY VOLTAGE

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Turn the ignition off.

Disconnect the Front Locker Solenoid harness connector.

Disconnect the FDCM harness connector.

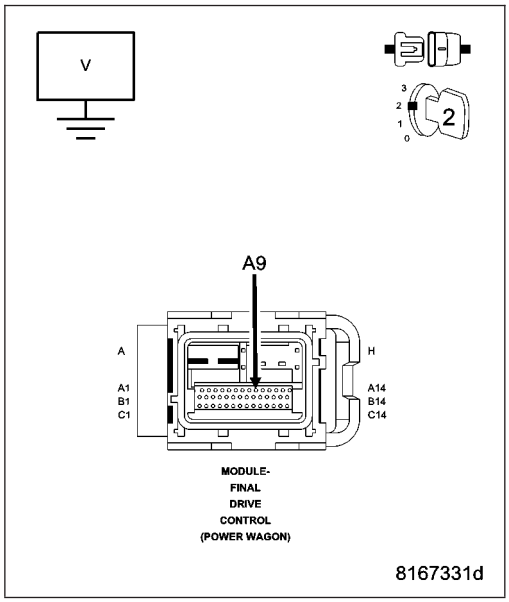
Turn the ignition on.

Measure the voltage on the (T522) Front Locker Sensor Sense circuit in the FDCM harness connector.

Does the voltmeter indicate voltage present?

Yes >> Repair the short to voltage in the (T522) Front Locker Sensor Sense circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3



3. FRONT DIFFERENTIAL POSITION SENSOR OPERATION

Turn the ignition off.

Connect the FDCM harness connector.

Ignition on, engine not running.

Using a jumper wire, jumper across from the (T522) Front Locker Sensor Sense circuit and the (T521) Locker Sensor Supply circuit in the Front Locker Solenoid harness connector.

While monitoring the sensor state on the scan tool, tap the jumper wire on and off the (T522) Front Locker Sensor Sense circuit terminal. Hold the jumper wire on and off the terminal for a minimum of 3 seconds.

Does the state change on the scan tool while tapping the terminal?

Yes >> Replace the Front Locker Solenoid.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4

4. (T522) FRONT LOCKER SENSOR SENSE CIRCUIT OPEN

Turn the ignition off.

Disconnect the FDCM harness connector.

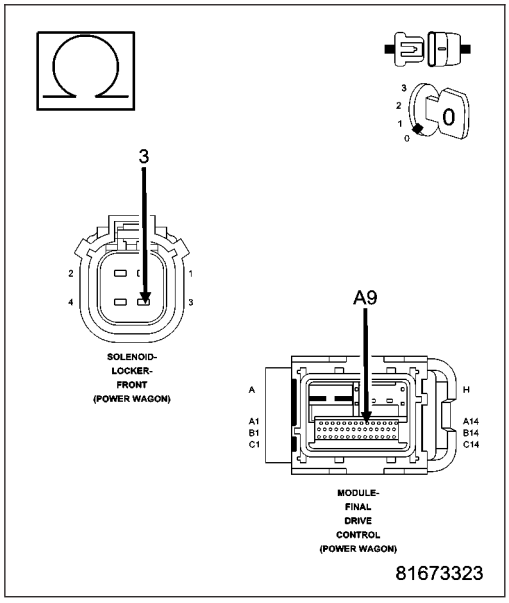
Measure the resistance of the (T522) Front Locker Sensor Sense circuit between the Front Locker Solenoid harness connector and the FDCM harness connector.

Is the resistance below 5.0 ohms?

Yes >> Go To 5

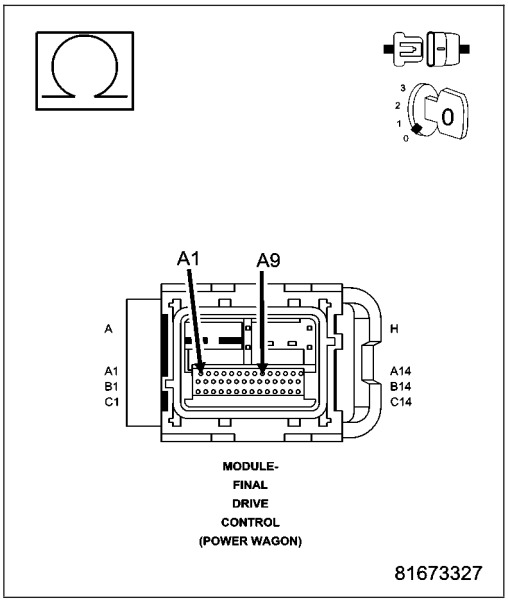
No >> Repair the open in the (T522) Front Locker Sensor Sense circuit.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)



5. (T522) FRONT LOCKER SENSOR SENSE CIRCUIT SHORTED TO (T521) LOCKER SENSOR 1 SUPPLY

Measure the resistance between the (T522) Front Locker Sensor Sense circuit and the (T521) Locker Sensor 1 Supply circuit in the FDCM harness connector.



Is the resistance below 5.0 ohms?

Yes >> Repair the short between the (T522) Front Locker Sensor Sense circuit and the (T521) Locker Sensor 1 Supply circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 6

6. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.
Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

7. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

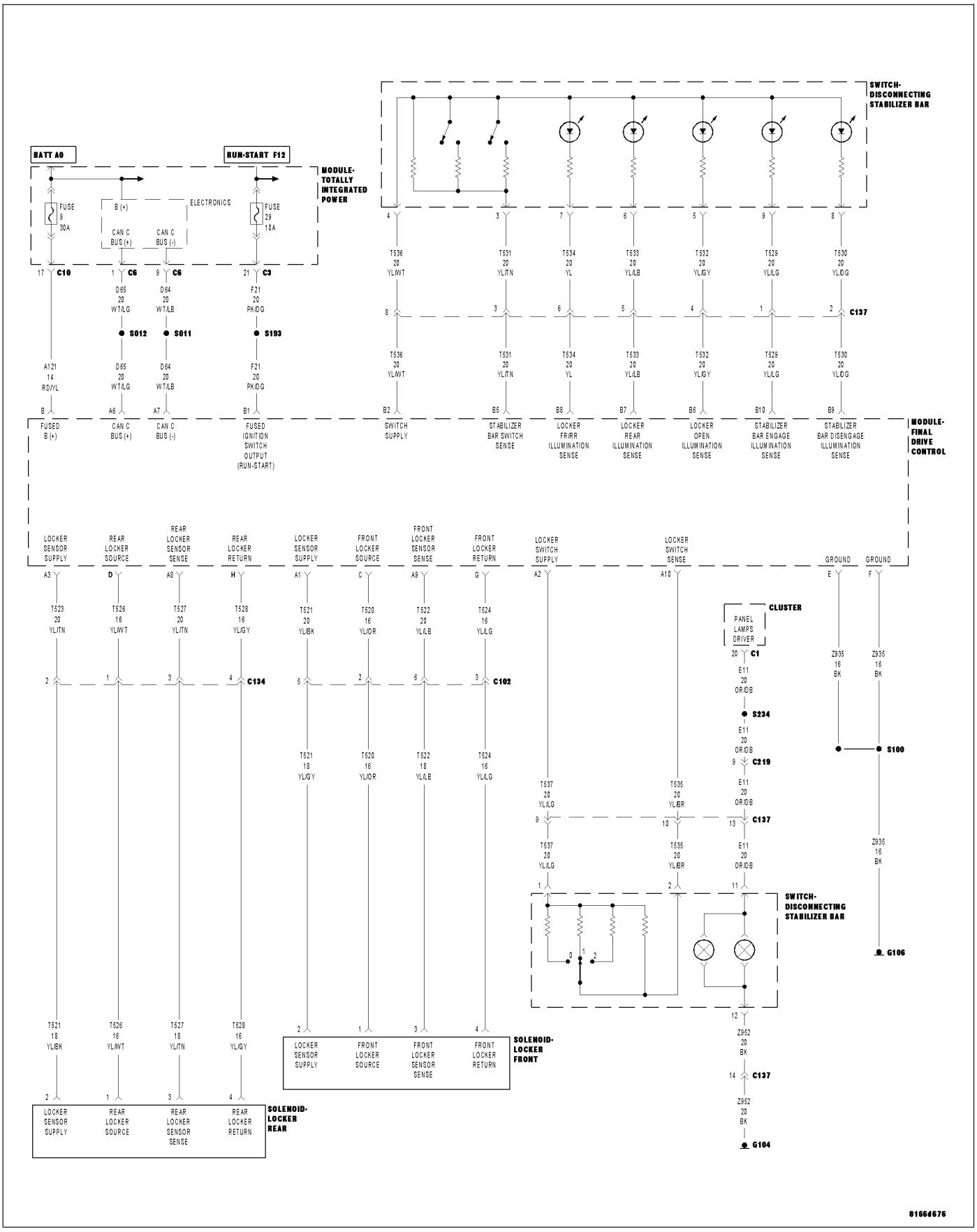
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C144F-FRONT DIFFERENTIAL POSITION SENSOR LOW



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on. Disconnecting Stabilizer Bar Switch in the FR/RR position.
- **Set Condition:**
  The FDCM detects that the Front Differential Position Sensor is short low.

Possible Causes
FRONT DIFFERENTIAL POSITION SENSOR
(T522) FRONT LOCKER SENSOR SENSE SHORTED TO GROUND
FDCM

Diagnostic Test

1. ACTIVE DTC

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Ignition on, engine not running.

With the scan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 5

2. FRONT DIFFERENTIAL POSITION SENSOR OPERATION

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Using the scan tool, ignition on, monitor the Front Locker Sensor state.

Disconnect the Front Locker Solenoid harness connector.

Does the state change on the scan tool from Locked to Unlocked?

Yes >> Replace the Front Locker Solenoid.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3

3. (T522) FRONT LOCKER SENSOR SENSE CIRCUIT SHORTED TO GROUND

Turn the ignition off.

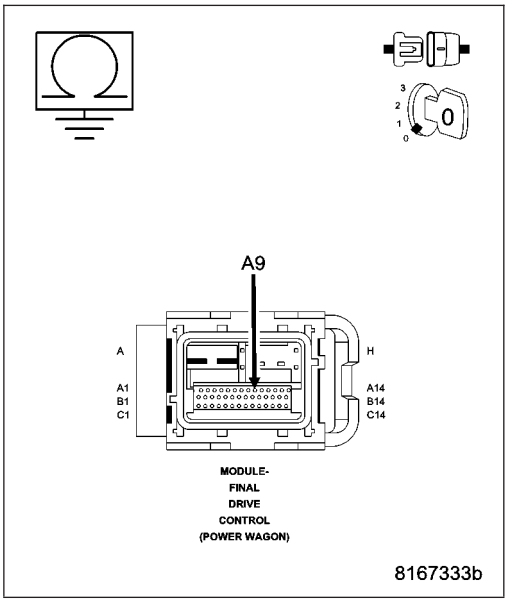
Disconnect the FDCM harness connector.

Measure the resistance of the (T522) Front Locker Sensor Sense circuit in the FDCM harness connector.

Is the resistance below 5.0 ohms?

Yes >> Repair the short to ground in the (T522) Front Locker Sensor Sense circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4



4. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.

Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

5. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

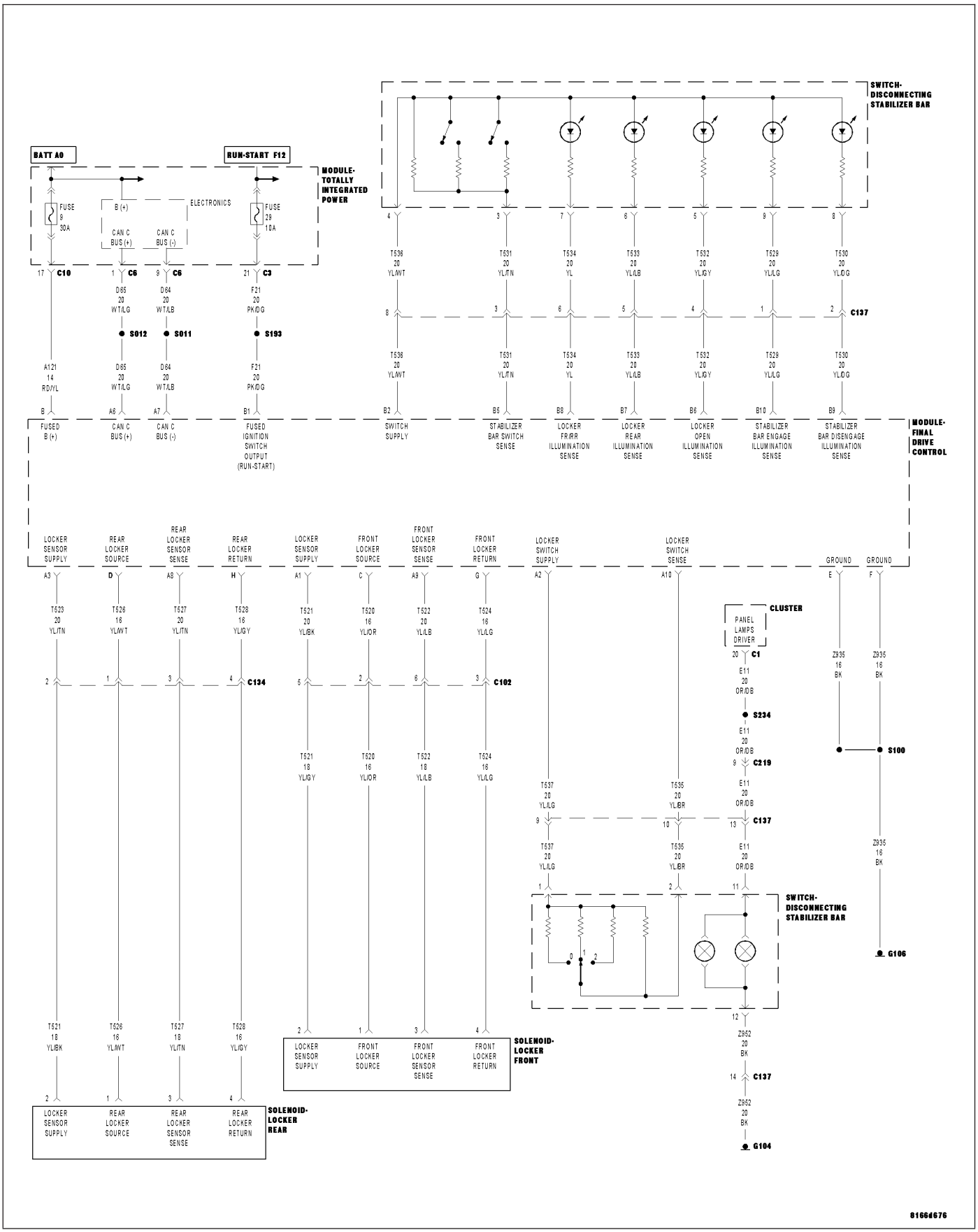
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST.

No >> Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

C1452-REAR DIFFERENTIAL POSITION SENSOR PERFORMANCE



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  The ignition on. Disconnecting Stabilizer Bar Switch in the RR or FR/RR position.
- **Set Condition:**
  The FDCM detects that the Rear Differential Position Sensor is in an unexpected state.

Possible Causes
REAR DIFFERENTIAL POSITION SENSOR (WIRING, CONNECTOR AND/OR TERMINAL CONDITION)
REAR DIFFERENTIAL POSITION SENSOR
REAR LOCKER SENSOR SENSE OPEN
FDCM

Diagnostic Test

1. ACTIVE DTC

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Ignition on, engine not running.

With the scan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 6

2. REAR DIFFERENTIAL POSITION SENSOR WIRING

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Using the scan tool, actuate the Rear Locker Solenoid.

Monitor the Rear Differential Position Sensor State.

Wiggle the related wiring harness from the FDCM to the Rear Locker Solenoid connector at the axle.

With a scan tool, actuate the Rear Locker Solenoid.

Does the state on the scan tool change while wiggling the wiring harness?

Yes >> Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Check the Locker Solenoid terminals and connectors for corrosion and/or dirt that may compromise the connection. Repair as necessary.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3

3. REAR DIFFERENTIAL POSITION SENSOR OPERATION

Turn the ignition off.

Disconnect the Rear Locker Solenoid harness connector.

Ignition on, engine not running.

Using a jumper wire, jumper across from the (T527) Rear Locker Sensor Sense circuit and the (T521) Locker Sensor Supply circuit in the Rear Locker Solenoid harness connector.

While monitoring the sensor state on the scan tool, tap the jumper wire on and off the (T527) Rear Locker Sensor Sense circuit terminal. Hold the jumper wire on and off the terminal for a minimum of 3 seconds.

Does the state change on the scan tool while tapping the terminal?

Yes >> Replace the Rear Locker Solenoid.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

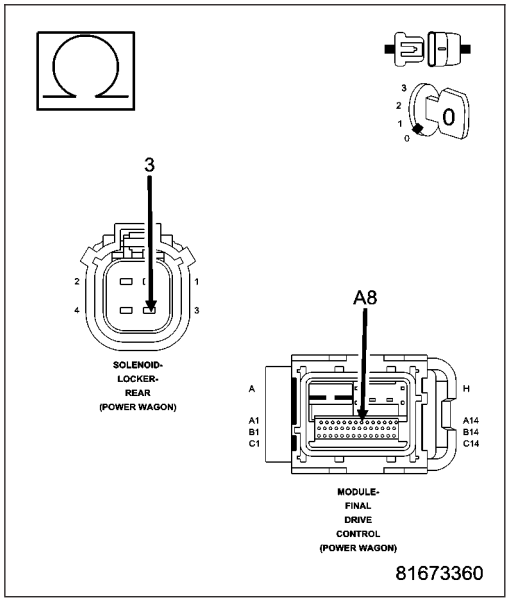
No >> Go To 4

4. (T527) REAR LOCKER SENSOR SENSE CIRCUIT OPEN

Turn the ignition off.

Disconnect the FDCM harness connector.

Measure the resistance of the (T527) Rear Locker Sensor Sense circuit between the Rear Locker Solenoid harness connector and the FDCM harness connector.



Is the resistance below 5.0 ohms?

Yes >> Go To 5

No >> Repair the open in the Rear Locker Sensor Sense circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

5. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.

Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

6. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

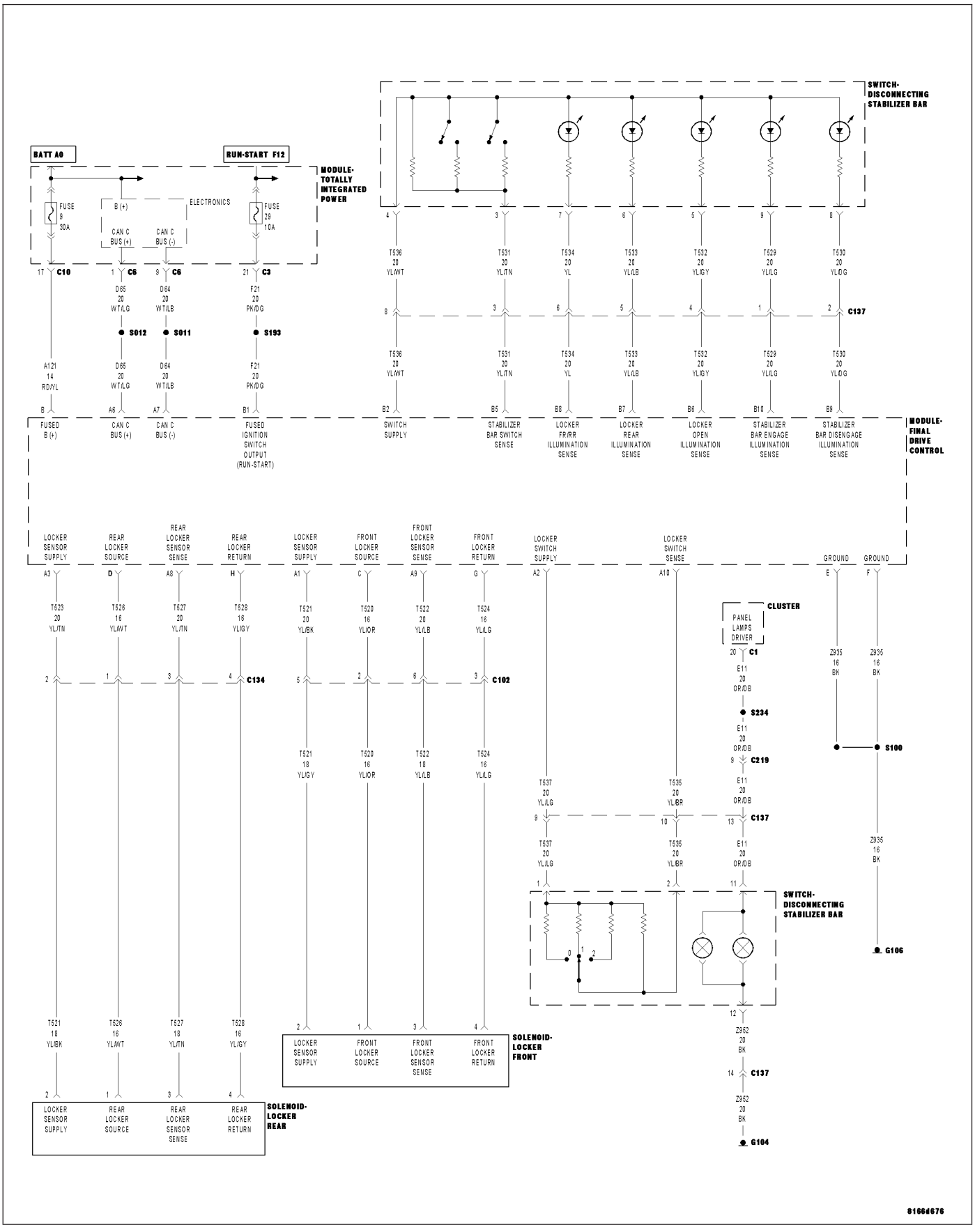
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C1453-REAR DIFFERENTIAL POSITION SENSOR LOW



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  The ignition on. Disconnecting Stabilizer Bar Switch in the FR/RR position.
- **Set Condition:**
  The FDCM detects that the Rear Differential Position Sensor is short low.

Possible Causes
FRONT DIFFERENTIAL POSITION SENSOR
(522) FRONT LOCKER SENSOR SENSE SHORTED TO GROUND
FDCM

Diagnostic Test

1. ACTIVE DTC

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Ignition on, engine not running.

With the scan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 5

2. REAR DIFFERENTIAL POSITION SENSOR OPERATION

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Using the scan tool, ignition on, monitor the Rear Locker Sensor state.

Disconnect the Rear Locker Solenoid harness connector.

Does the state change on the scan tool from Locked to Unlocked?

Yes >> Replace the Rear Locker Solenoid.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3

3. (T527) REAR LOCKER SENSOR SENSE CIRCUIT SHORTED TO GROUND

Turn the ignition off.

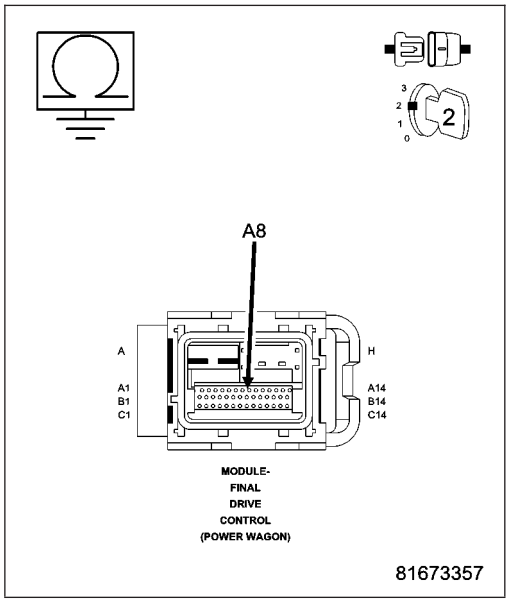
Disconnect the FDCM harness connector.

Measure the resistance of the (T527) Rear Locker Sensor Sense circuit in the FDCM harness connector.

Is the resistance below 5.0 ohms?

Yes >> Repair the short to ground in the Rear Locker Sensor Sense circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4



4. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.

Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

5. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

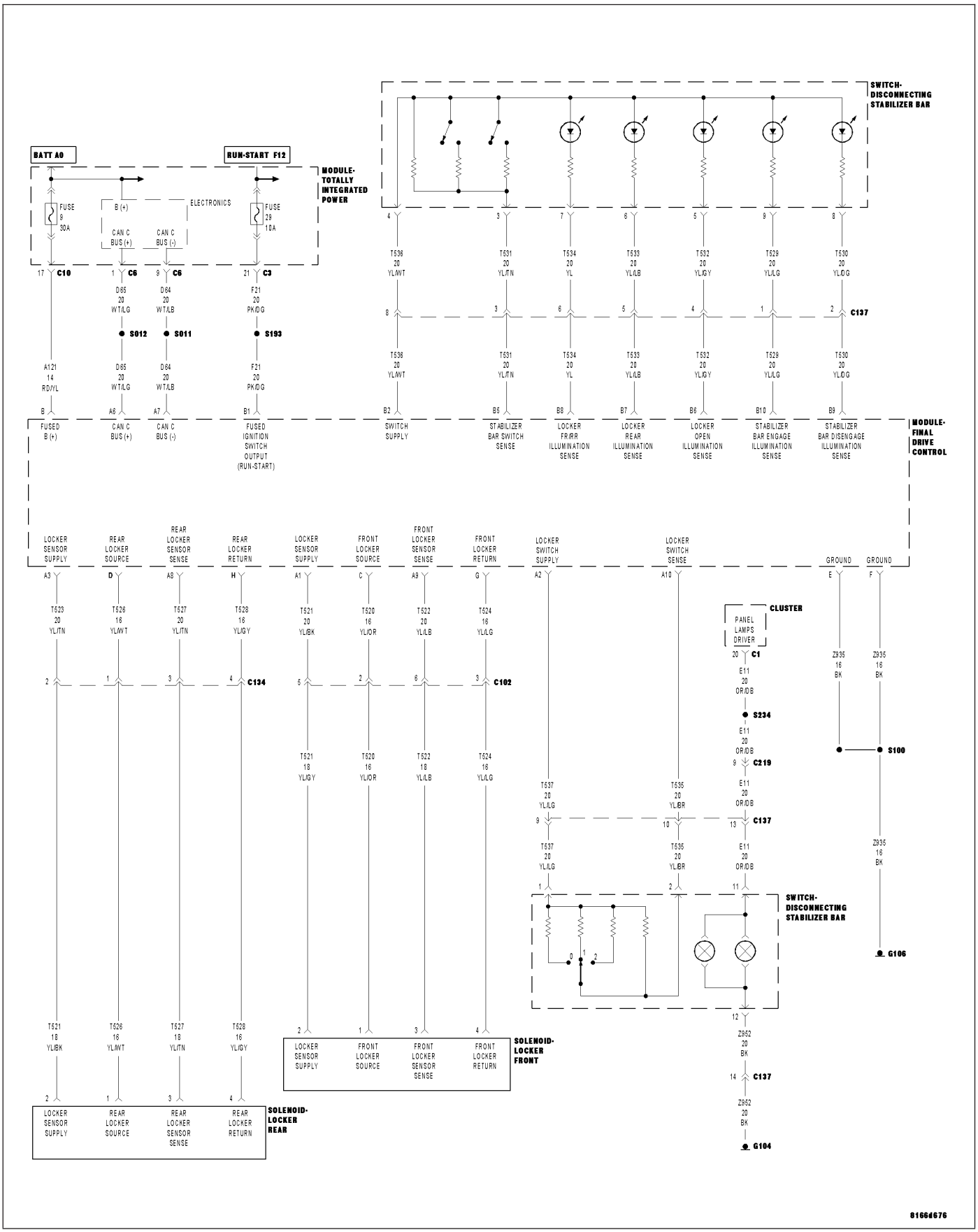
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C1454-REAR DIFFERENTIAL POSITION SENSOR CIRCUIT HIGH



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  The ignition on. Disconnecting Stabilizer Bar Switch in the RR or FR/RR position.
- **Set Condition:**
  The FDCM detects that the Rear Differential Position Sensor is shorted to voltage.

Possible Causes
(T527) REAR LOCKER SENSOR SENSE SHORTED TO BATTERY VOLTAGE
REAR DIFFERENTIAL POSITION SENSOR
(T527) REAR LOCKER SENSOR SENSE OPEN
(T527) REAR LOCKER SENSOR SENSE SHORTED TO (T521) LOCKER SENSOR SUPPLY
FDCM

Diagnostic Test

1. ACTIVE DTC

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Ignition on, engine not running.

With the scan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 7

2. (T527) REAR LOCKER SENSOR SENSE SHORTED TO BATTERY VOLTAGE

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Turn the ignition off.

Disconnect the Rear Locker Solenoid harness connector.

Disconnect the FDCM harness connector.

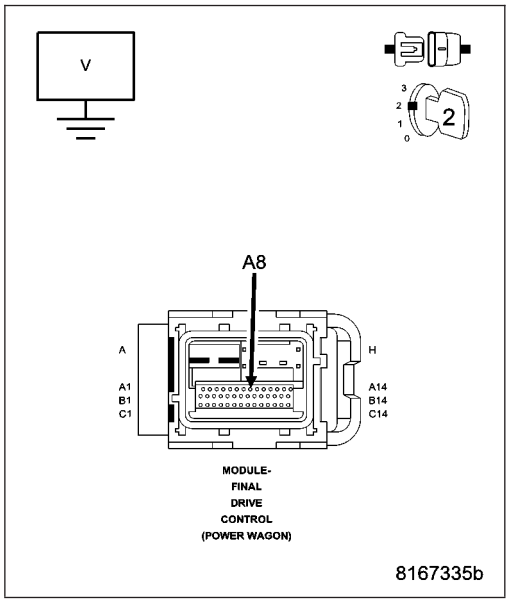
Turn the ignition on.

Measure the voltage on the (T527) Rear Locker Sensor Sense circuit in the FDCM harness connector.

Does the voltmeter indicate voltage present?

Yes >> Repair the short to voltage in the (T527) Rear Locker Sensor Sense circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3



3. REAR DIFFERENTIAL POSITION SENSOR OPERATION

Turn the ignition off.

Connect the FDCM harness connector.

Ignition on, engine not running.

Using a jumper wire, jumper across from the (T527) Rear Locker Sensor Sense circuit and the (T521) Locker Sensor Supply circuit in the Rear Locker Solenoid harness connector.

While monitoring the sensor state on the scan tool, tap the jumper wire on and off the (T527) Rear Locker Sensor Sense circuit terminal. Hold the jumper wire on and off the terminal for a minimum of 3 seconds.

Does the state change on the scan tool while tapping the terminal?

Yes >> Replace the Rear Locker Solenoid.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4

4. (T527) REAR LOCKER SENSOR SENSE CIRCUIT OPEN

Turn the ignition off.

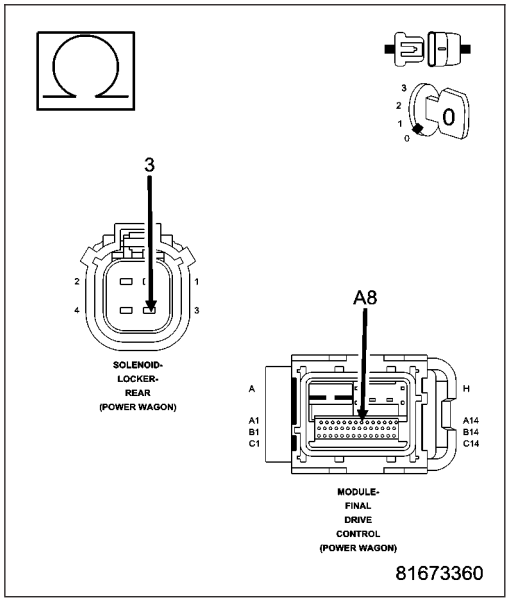
Disconnect the FDCM harness connector.

Measure the resistance of the (T527) Rear Locker Sensor Sense circuit between the Rear Locker Solenoid harness connector and the FDCM harness connector.

Is the resistance below 5.0 ohms?

Yes >> Go To 5

No >> Repair the open in the Rear Locker Sensor Sense circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)



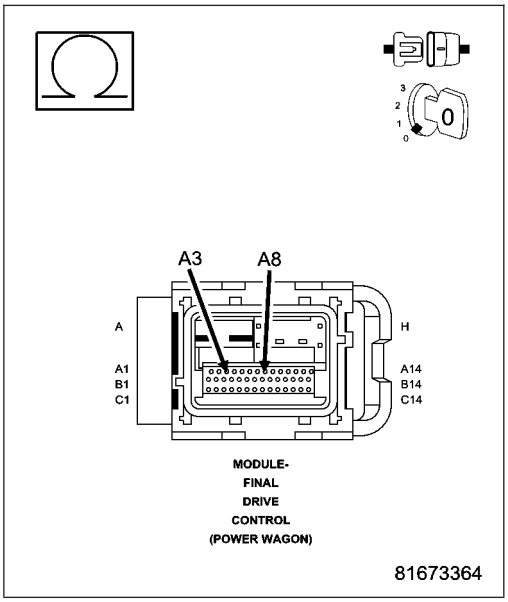
5. (T527) REAR LOCKER SENSOR SENSE CIRCUIT SHORTED TO (T523) LOCKER SENSOR 2 SUPPLY

Measure the resistance between the (T527) Rear Locker Sensor Sense circuit and the (T523) Locker Sensor 2 Supply circuit in the FDCM harness connector.

Is the resistance below 5.0 ohms?

Yes >> Repair the short between the (T527) Rear Locker Sensor Sense circuit and the (T523) Locker Sensor 2 Supply circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 6



6. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.
Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

7. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

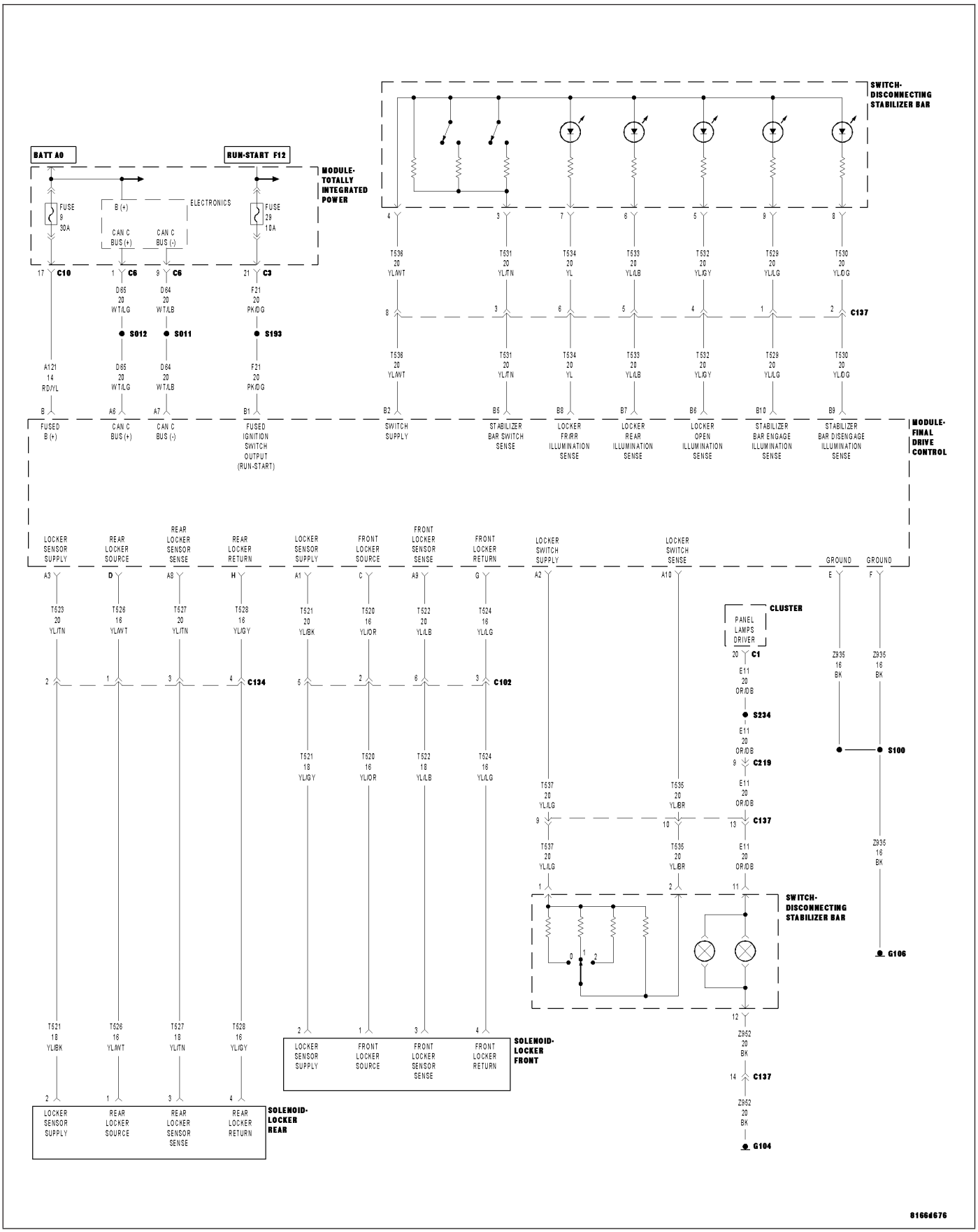
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C2100–BATTERY VOLTAGE LOW



For a complete wiring diagram **Refer to Section 8W**

- **When Monitored:**
  Continuously.
- **Set Condition:**
  The Final Drive Control Module detects that system voltage is below 9.0 volts for 60 seconds.

Possible Causes
INTERMITTENT BATTERY VOLTAGE LOW
CHARGING SYSTEM DTCS PRESENT
FINAL DRIVE CONTROL MODULE POWER CIRCUITS OPEN OR HIGH RESISTANCE
FINAL DRIVE CONTROL MODULE

Diagnostic Test

1. CHARGING SYSTEM DTCS PRESENT

Ignition on.

With the scan tool, select View DTCs in the Powertrain Control Module.

Are there any Charging System or related voltage DTCs present?

Yes >> Refer to the symptom list and perform any Charging System DTC diagnostic procedures before continuing with this test.

No >> Go to 2

2. DTC IS ACTIVE

With the scan tool, select View DTCs in the Final Drive Control Module.

Is the status Active for this DTC?

Yes >> Go to 3

No >> Go to 5

3. (A34) FUSED B+ CIRCUIT OPEN OR HIGH RESISTANCE

Turn the ignition off.

Disconnect the Final Drive Control Module harness connector.

Turn the ignition on.

With a 12–volt test light connected to ground, check the (A34) Fused B+ circuit in the Final Drive Control Module harness connector.

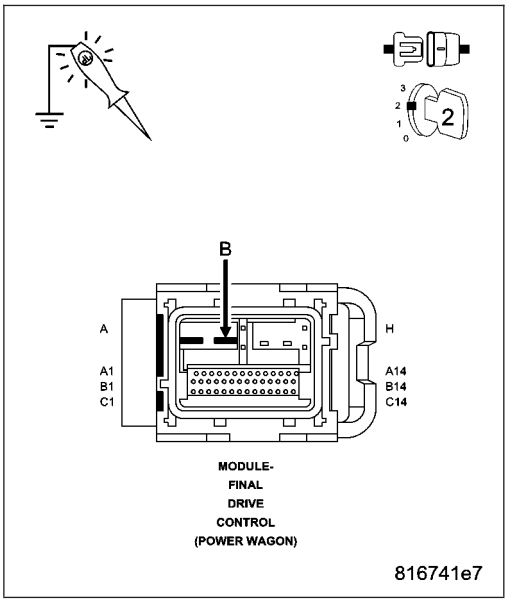
NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.

Does the test light illuminate brightly?

Yes >> Go to 4

No >> Repair the (A34) Fused B+ circuit for an open circuit or high resistance.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)



4. FINAL DRIVE CONTROL MODULE

View repair.

Repair

Replace the Final Drive Control Module in accordance with the Service information.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

5. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the wiring diagram/schematic as a guide, inspect the wiring and connectors.

While monitoring the scan tool data relative to this circuit, wiggle test the wiring and connectors.

Look for the data to change or for the DTC to reset during the wiggle test.

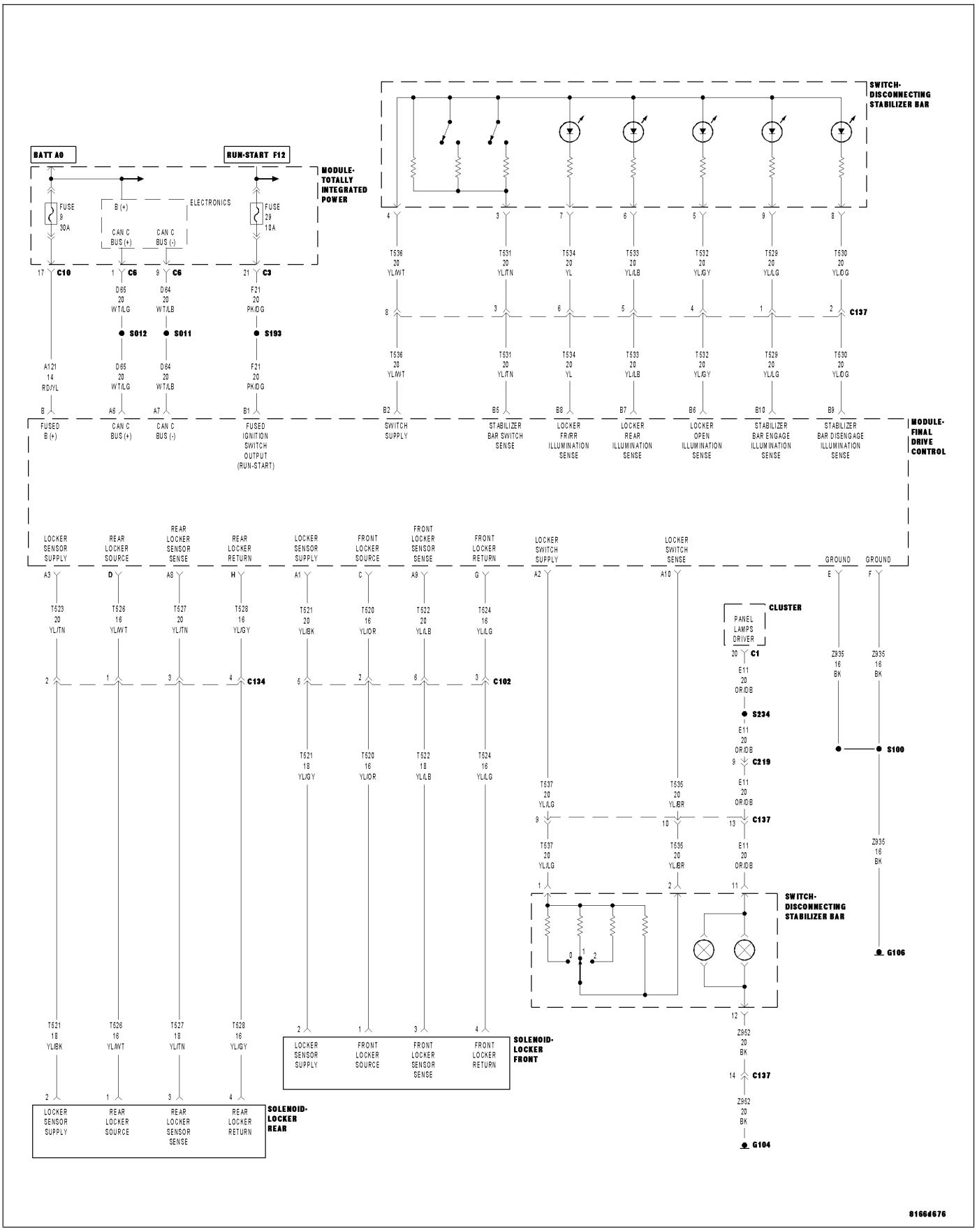
Were any problems found?

Yes >> Repair as necessary.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test complete.

C2101–BATTERY VOLTAGE HIGH



For a complete wiring diagram **Refer to Section 8W**

- **When Monitored:**
  Continuously.
- **Set Condition:**
  The Final Drive Control Module detects that system voltage is above 16.0 volts for 10 seconds with engine RPM greater than 350.

Possible Causes
INTERMITTENT BATTERY VOLTAGE HIGH
CHARGING SYSTEM DTCS PRESENT
FINAL DRIVE CONTROL MODULE GROUND CIRCUITS OPEN OR HIGH RESISTANCE
FINAL DRIVE CONTROL MODULE

Diagnostic Test

1. CHARGING SYSTEM DTCS PRESENT

Ignition on.

With the scan tool, select View DTCs in the Powertrain Control Module.

Are there any Charging System or related voltage DTCs present?

Yes >> Refer to the symptom list and perform any Charging System DTC diagnostic procedures before continuing with this test.

No >> Go to 2

2. DTC IS ACTIVE

With the scan tool, select View DTCs in the Final Drive Control Module.

Is the status Active for this DTC?

Yes >> Go to 3

No >> Go to 5

3. FINAL DRIVE CONTROL MODULE GROUND CIRCUITS OPEN OR HIGH RESISTANCE

Turn the ignition off.

Disconnect the Final Drive Control Module harness connector.

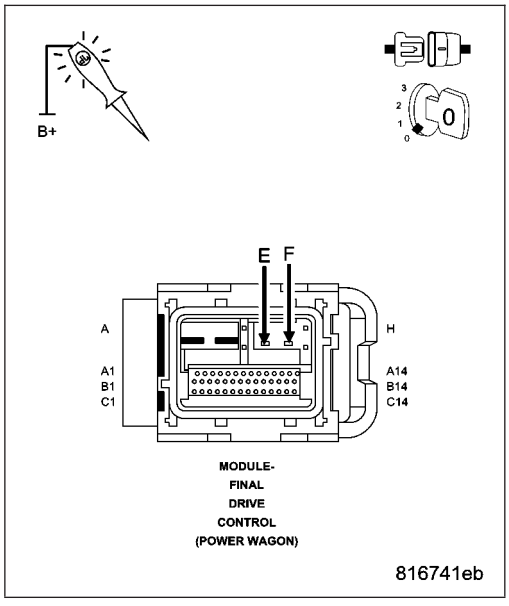
With a 12–volt test light connected to B+, check the Ground circuits in the Final Drive Control Module harness connector.

NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.

Does the test light illuminate brightly for each of the Ground circuits?

Yes >> Go to 4

No >> Repair the Ground circuit(s) for an open circuit or high resistance.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)



4. FINAL DRIVE CONTROL MODULE

View repair.

Repair

Replace the Final Drive Control Module in accordance with the Service information.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

5. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the wiring diagram/schematic as a guide, inspect the wiring and connectors.

While monitoring the scan tool data relative to this circuit, wiggle test the wiring and connectors.

Look for the data to change or for the DTC to reset during the wiggle test.

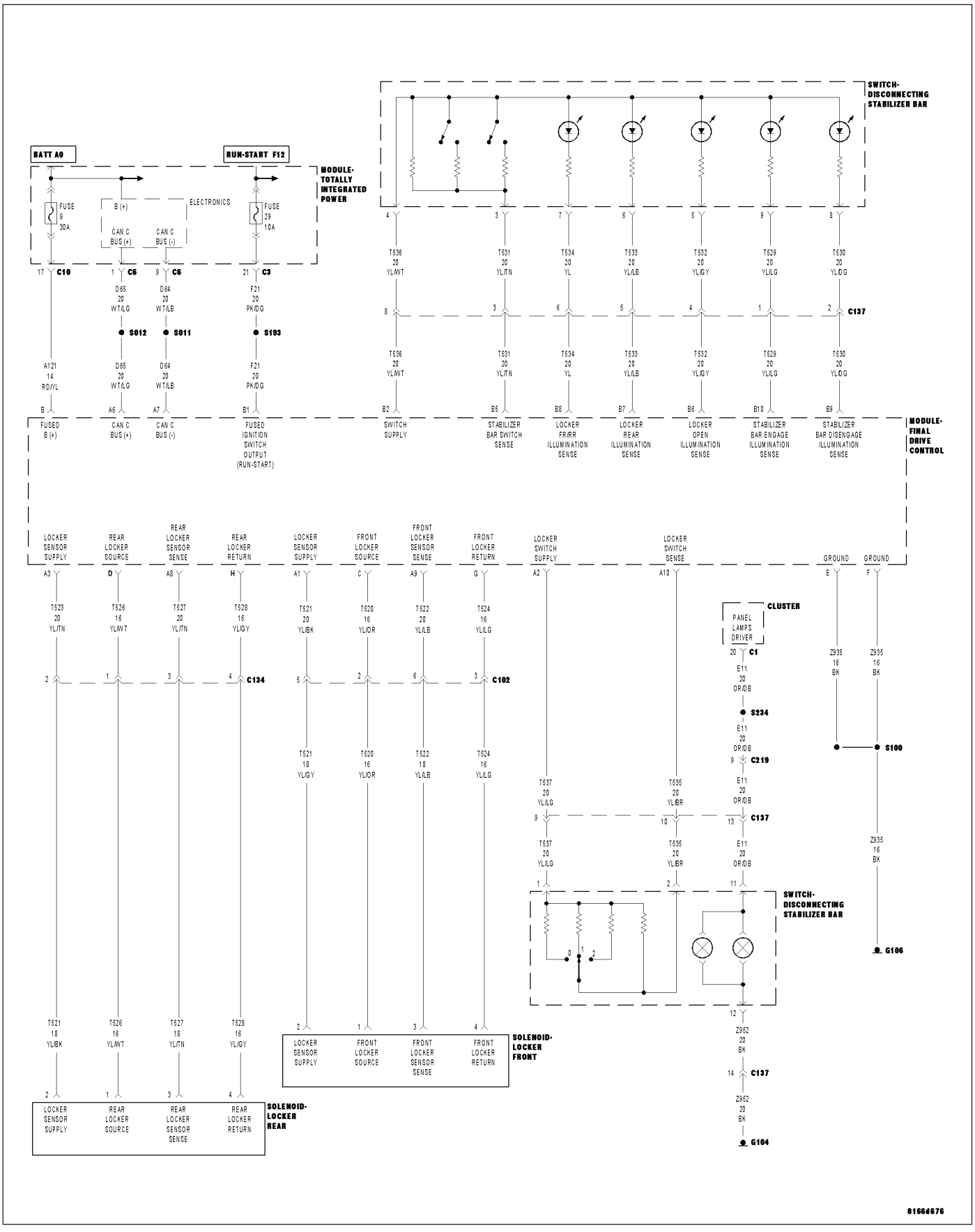
Were any problems found?

Yes >> Repair as necessary.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test complete.

C2111-SENSOR SUPPLY 1 VOLTAGE CIRCUIT LOW



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on.
- **Set Condition:**
  The FDCM recognizes the Locker Sensor Supply circuit voltage is too low.

Possible Causes
FRONT DIFFERENTIAL POSITION SENSOR
REAR DIFFERENTIAL POSITION SENSOR
(T521) LOCKER SENSOR SUPPLY 1 CIRCUIT SHORTED TO GROUND
FDCM

Diagnostic Test

1. ACTIVE DTC

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Ignition on, engine not running.

With a scan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 5

2. FRONT DIFFERENTIAL POSITION SENSOR

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Turn the ignition off.

Disconnect the Front Locker Solenoid harness connector.

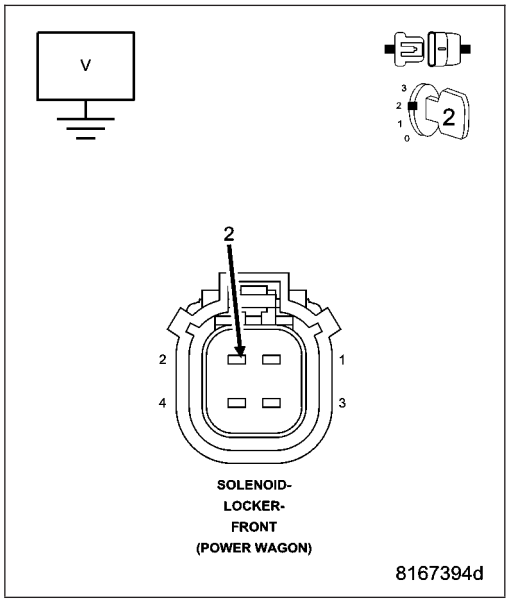
Turn the ignition on.

Measure the voltage of the (T521) Locker Sensor 1 Supply circuit in the Front Locker Solenoid harness connector.

Is the voltage between 4.5 and 5.0 volts?

Yes >> Replace the Front Locker Solenoid.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3



3. (T521) LOCKER SENSOR SUPPLY 1 CIRCUIT SHORTED TO GROUND

Turn the ignition off.

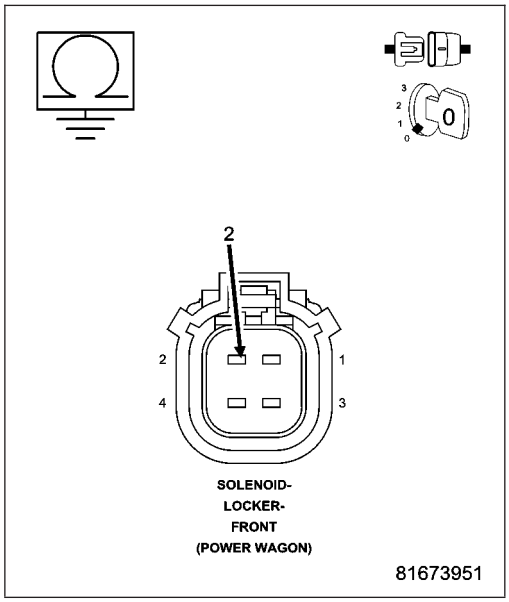
Disconnect the FDCM harness connector.

Measure the resistance of the (T521) Locker Sensor 1 Supply circuit at the FDCM harness connector.

Is the resistance below 100 ohms?

Yes >> Repair the short to ground in the (T521) Locker Sensor 1 Supply circuit shorted to ground.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4



4. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.

Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

5. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

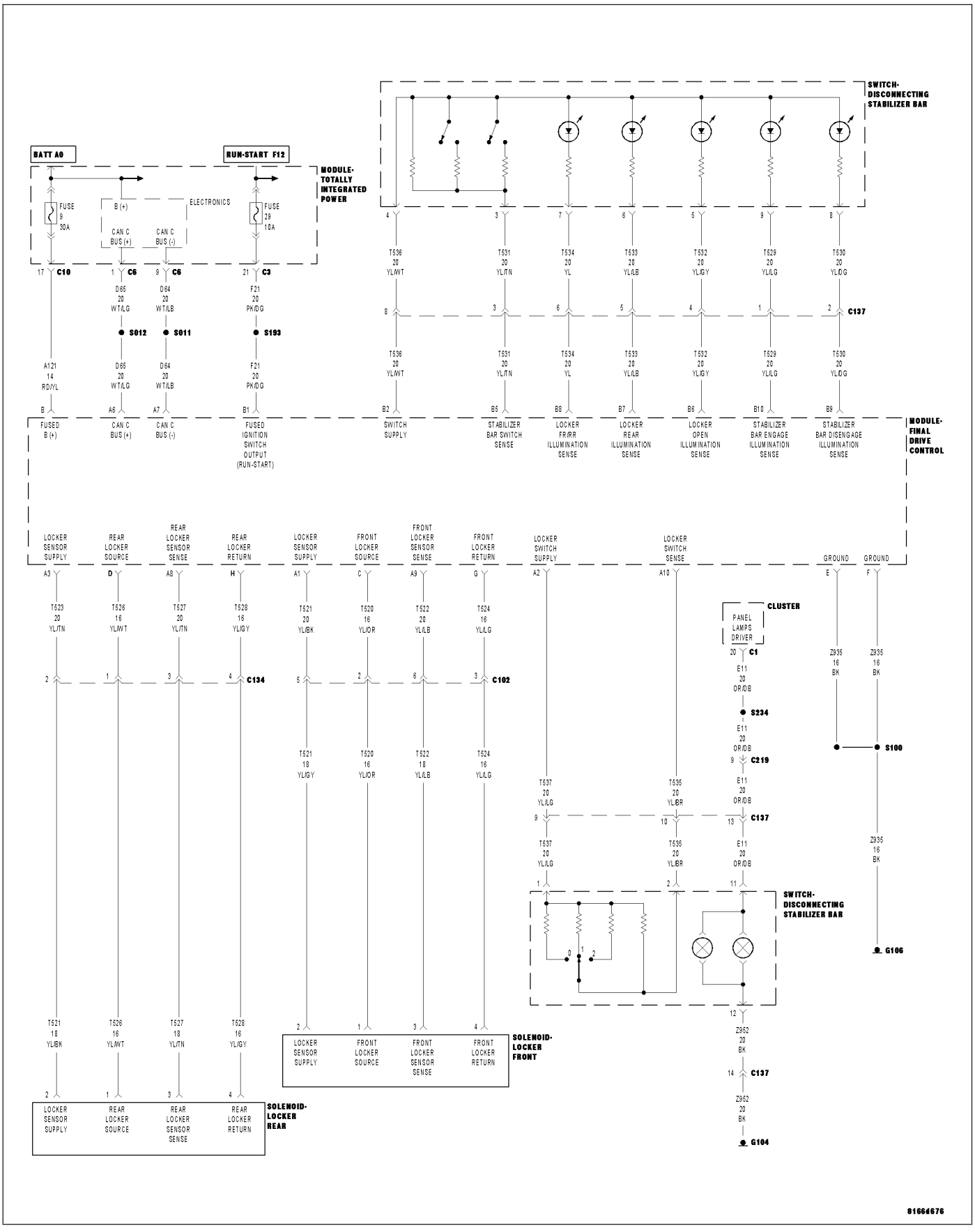
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C2112-SENSOR SUPPLY 1 VOLTAGE CIRCUIT HIGH



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on.
- **Set Condition:**
  The FDCM recognizes the Locker Sensor Supply circuit voltage is too high.

Possible Causes
FRONT DIFFERENTIAL POSITION SENSOR
REAR DIFFERENTIAL POSITION SENSOR
(T521) LOCKER SENSOR 1 SUPPLY CIRCUIT SHORTED TO VOLTAGE
FDCM

Diagnostic Test

1. ACTIVE DTC

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Ignition on, engine not running.

With a scan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 5

2. FRONT DIFFERENTIAL POSITION SENSOR

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Turn the ignition off.

Disconnect the Front Locker Solenoid harness connector.

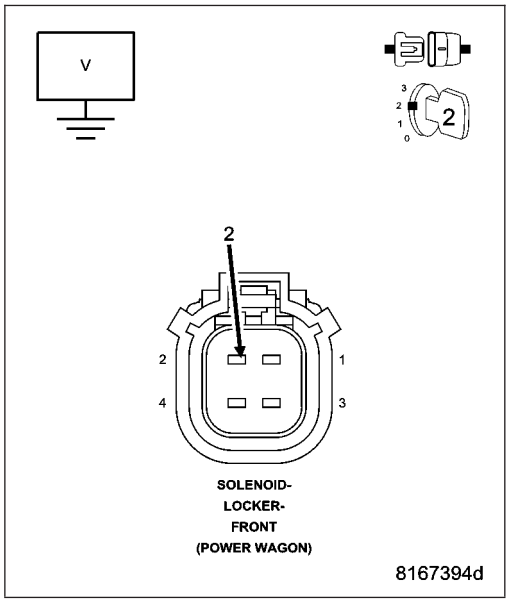
Turn the ignition on.

Measure the voltage of the (T521) Locker Sensor 1 Supply circuit in the Front Locker Solenoid harness connector.

Is the voltage above 4.5 volts?

Yes >> Replace the Front Locker Solenoid.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3



3. (T521) LOCKER SENSOR 1 SUPPLY CIRCUIT SHORTED TO VOLTAGE

Turn the ignition off.

Disconnect the FDCM harness connector.

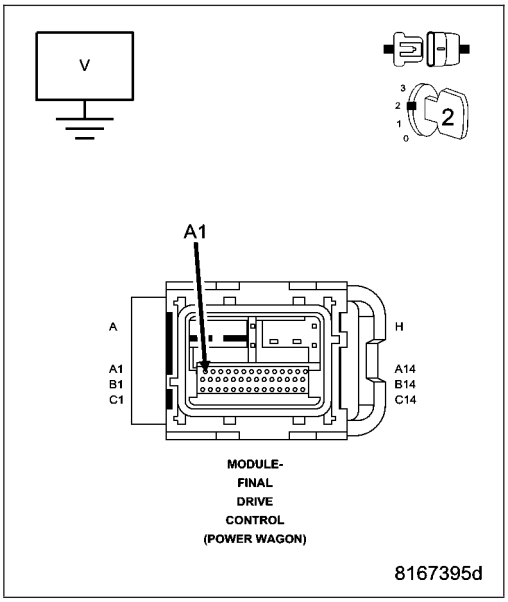
Turn the ignition on.

Measure the voltage of the (T521) Locker Sensor 1 Supply circuit at the FDCM harness connector.

Does the voltmeter indicate voltage present?

Yes >> Repair the short to voltage in the (T521) Locker Sensor 1 Supply circuit shorted to ground.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4



4. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.

Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

5. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

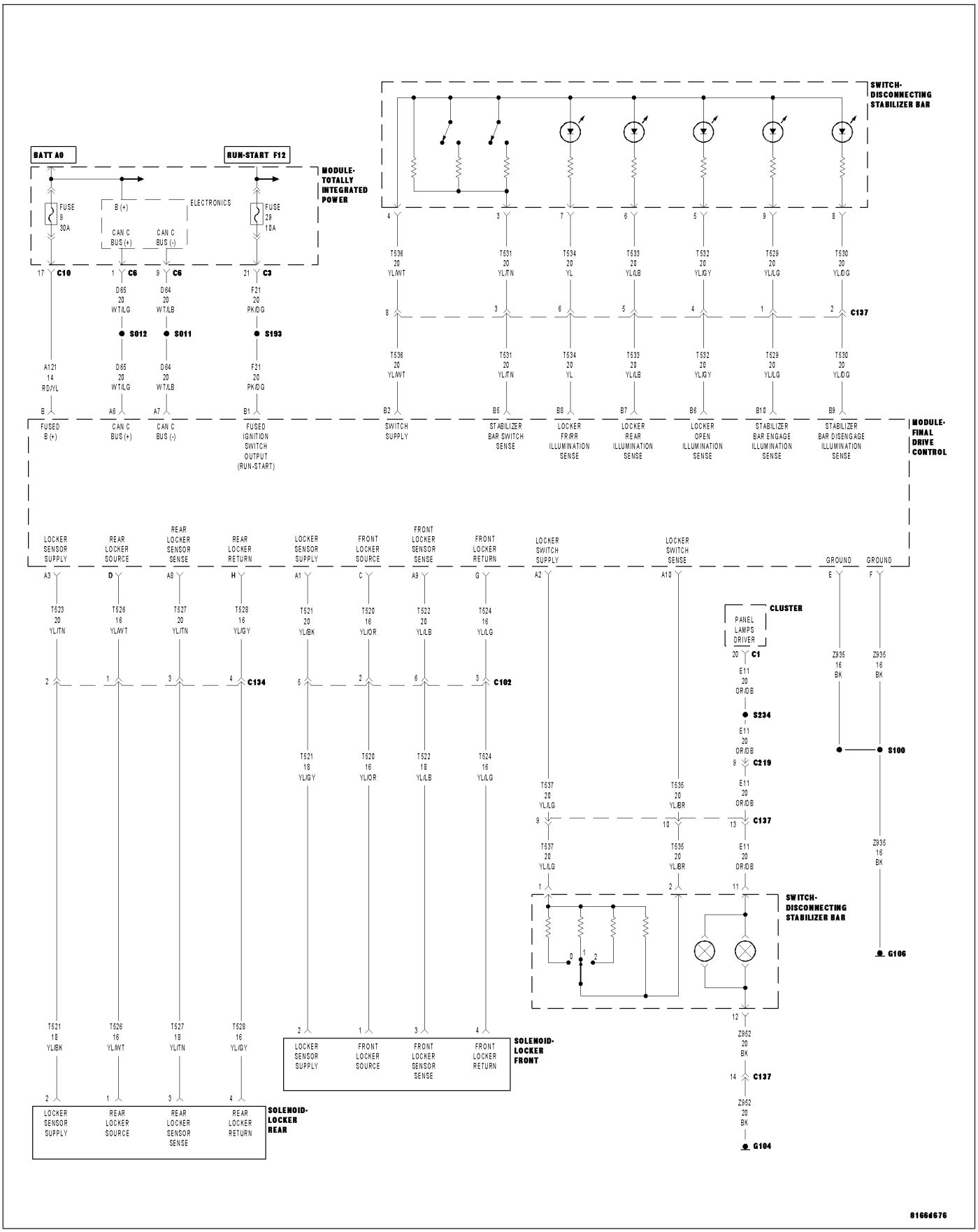
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C2126-SENSOR SUPPLY 2 VOLTAGE CIRCUIT LOW



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on.
- **Set Condition:**
  The FDCM recognizes the Locker Sensor Supply circuit voltage is too low.

Possible Causes
FRONT DIFFERENTIAL POSITION SENSOR
REAR DIFFERENTIAL POSITION SENSOR
(T523) LOCKER SENSOR SUPPLY 2 CIRCUIT SHORTED TO GROUND
FDCM

Diagnostic Test

1. ACTIVE DTC

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Ignition on, engine not running.

With a scan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 5

2. REAR DIFFERENTIAL POSITION SENSOR

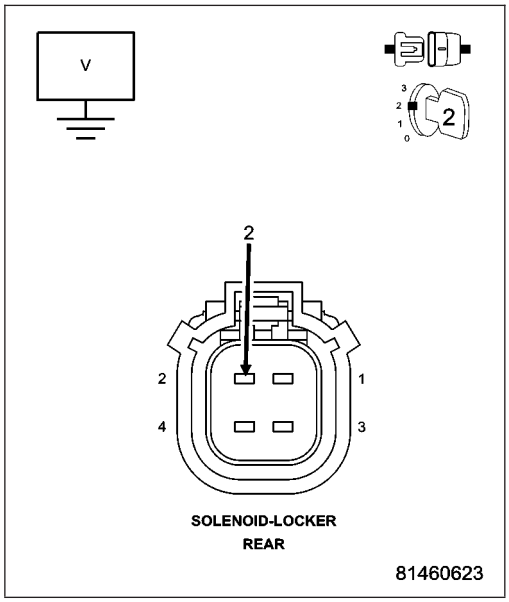
With the voltmeter still connected to the (T523) LOCKER SENSOR SUPPLY 2 CIRCUIT in the Front Locker Solenoid harness connector.

While monitoring the voltmeter, disconnect the Rear Locker Solenoid harness connector.

Is the voltage between 4.5 and 5.0 volts?

Yes >> Replace the Rear Locker Solenoid.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3



3. (T523) LOCKER SENSOR SUPPLY 2 CIRCUIT SHORTED TO GROUND

Turn the ignition off.

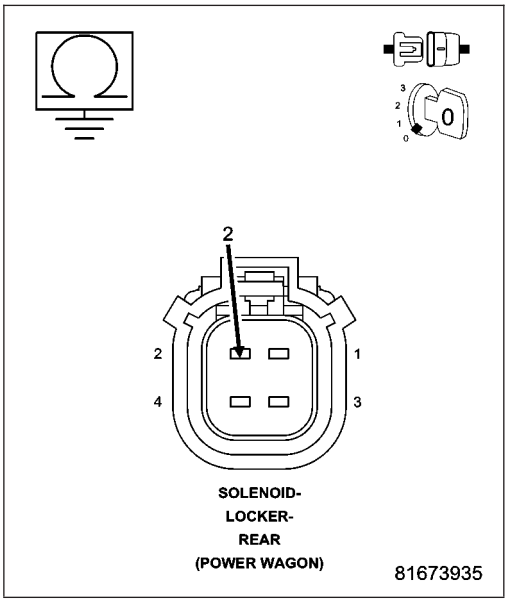
Disconnect the FDCM harness connector.

Measure the resistance of the (T523) LOCKER SENSOR SUPPLY 2 CIRCUIT at the FDCM harness connector.

Is the resistance below 100 ohms?

Yes >> Repair the short to ground in the (T523) LOCKER SENSOR SUPPLY 2 CIRCUIT shorted to ground.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4



4. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.

Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

5. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

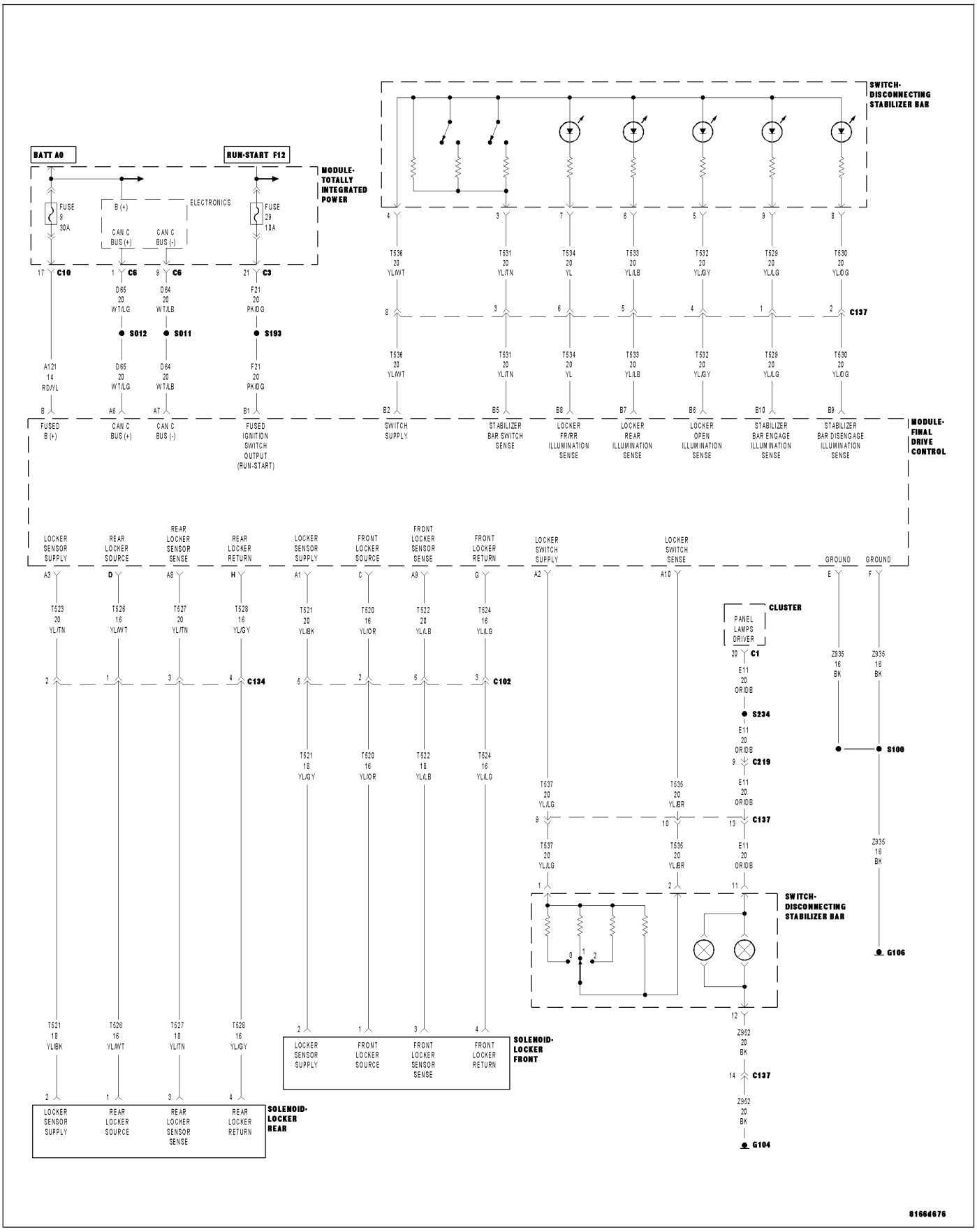
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C2127-SENSOR SUPPLY 2 VOLTAGE CIRCUIT HIGH



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on.
- **Set Condition:**
  The FDCM recognizes the Locker Sensor Supply circuit voltage is too high.

Possible Causes
FRONT DIFFERENTIAL POSITION SENSOR
REAR DIFFERENTIAL POSITION SENSOR
(T523) LOCKER SENSOR SUPPLY 2 CIRCUIT SHORTED TO VOLTAGE
FDCM

Diagnostic Test

1. ACTIVE DTC

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

Ignition on, engine not running.

With ascan tool, read DTCs.

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 5

2. REAR DIFFERENTIAL POSITION SENSOR

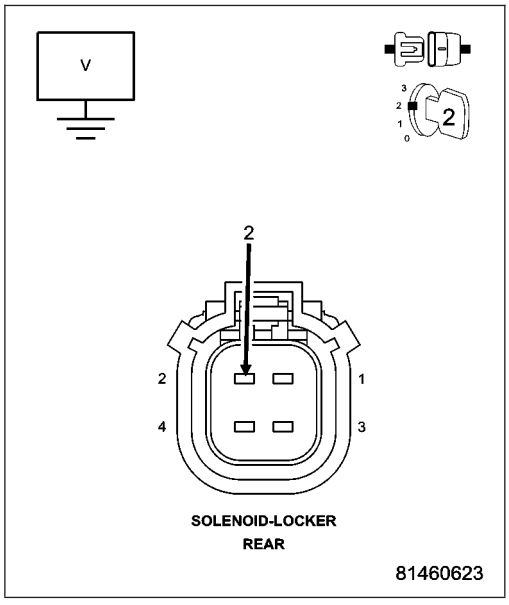
With the voltmeter still connected to the (T523) Locker Sensor Supply 2 circuit in the Front Locker Solenoid harness connector.

While monitoring the voltmeter, disconnect the Rear Locker Solenoid harness connector.

Is the voltage above 4.5 volts?

Yes >> Replace the Rear Locker Solenoid.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 3



3. (T523) LOCKER SENSOR SUPPLY 2 CIRCUIT SHORTED TO VOLTAGE

Turn the ignition off.

Disconnect the FDCM harness connector.

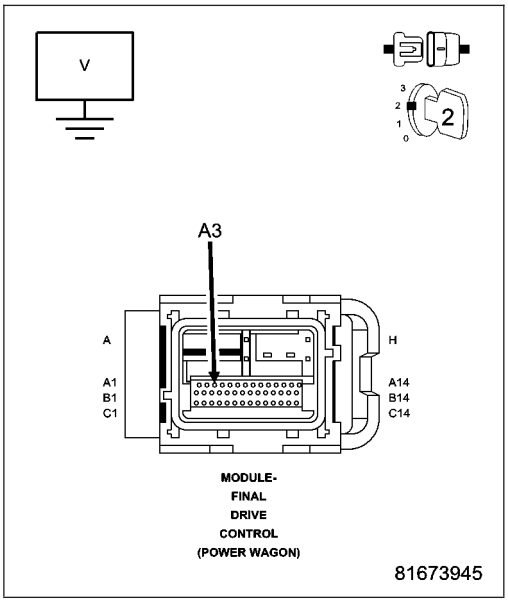
Turn the ignition on.

Measure the voltage of the (T523) Locker Sensor Supply 2 circuit at the FDCM harness connector.

Does the voltmeter indicate voltage present?

Yes >> Repair the short to voltage in the (T523) Locker Sensor Supply 2 circuit shorted to ground.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4



4. FDCM

NOTE: Before continuing, check the FDCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.

Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Replace and program the Final Drive Control Module in accordance with Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

5. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

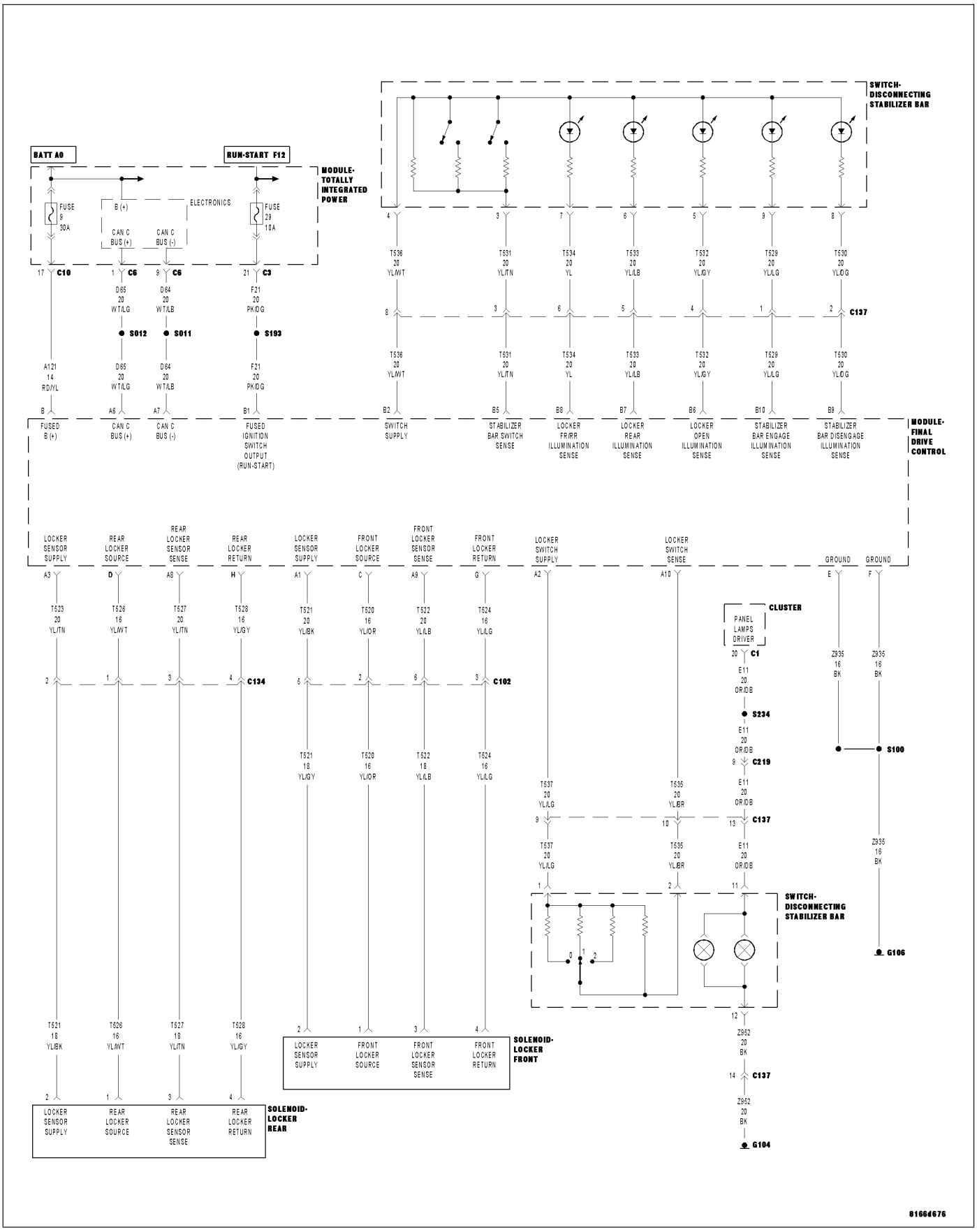
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C230F-LOCKER/DIFFERENTIAL INDICATOR SUPPLY CIRCUIT PREFORMANCE



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on.
- **Set Condition:**
  The FDCM sense an incorrect voltage on the Switch Supply circuit other than 12 volts.

Possible Causes
DISCONNECTING STABILIZER SWITCH
(T536) SWITCH SUPPLY CIRCUIT OPEN/HIGH RESISTANCE
(T532,T533 or T534) LOCKER ILLUMINATION SENSE CIRCUIT OPEN/HIGH RESISTANCE
FDCM

1. DTC ACTIVE

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Turn the ignition on, engine not running

With the scan tool, read FDCM DTC(s).

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 5

2. DISCONNECTING STABILIZER SWITCH OPERATION

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

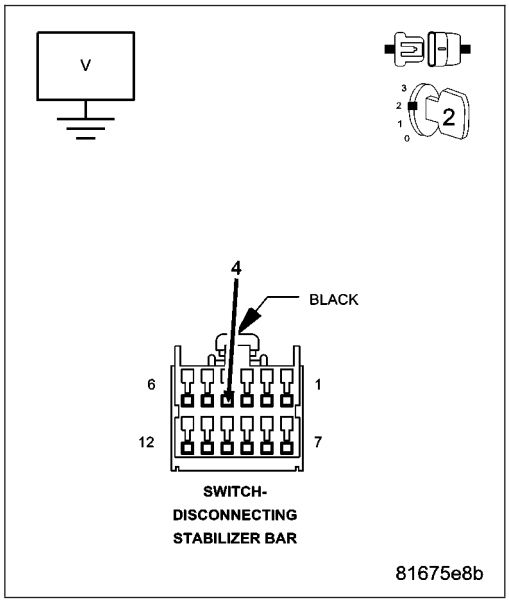
NOTE: If set along with this DTC, diagnose any Stabilizer Select Switch DTC(s) first before continuing.

Turn the ignition off.

Disconnect the Disconnecting Stabilizer Switch harness connector.

Turn the ignition on.

Measure the voltage on the (T536) Switch Supply circuit in the Disconnecting Stabilizer Switch harness connector.



Is the voltage 12 volts?

Yes >> Go To 3

No >> Check the (T536) Switch Supply circuit for an open or short to ground condition. If OK, replace the FDCM in accordance with the Service Information.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

3. DISCONNECTING STABILIZER SWITCH

Using a test light connected to battery voltage, probe the (T532) Locker Open Illumination Sense circuit in the Disconnecting Stabilizer Switch harness connector.

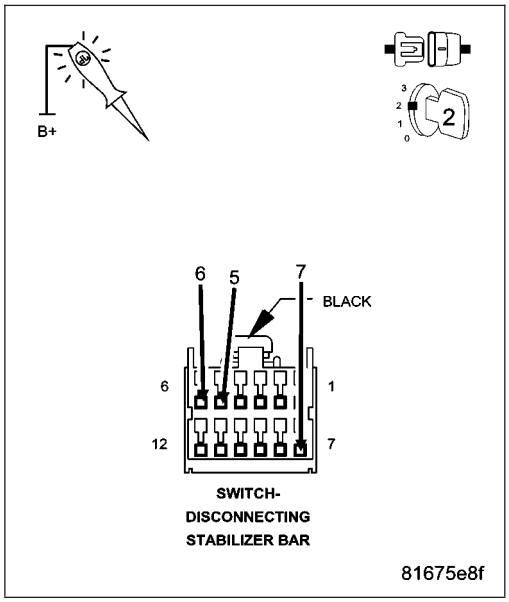
With the scan tool, select System Test and actuate the Locker Open Illumination LED. Select the blinking option.

NOTE: Repeat the above test for the (T533) Locker Rear Illumination Sense circuit terminal and (T534) Locker FR/RR Illumination Sense circuit one at a time.

Does the test light illuminate and flash on and off at each circuit?

Yes >> Replace the Disconnecting Stabilizer Switch.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go to 4



4. (T532, T533 or T534) LOCKER ILLUMINATION SENSE CIRCUIT OPEN/HIGH RESISTANCE

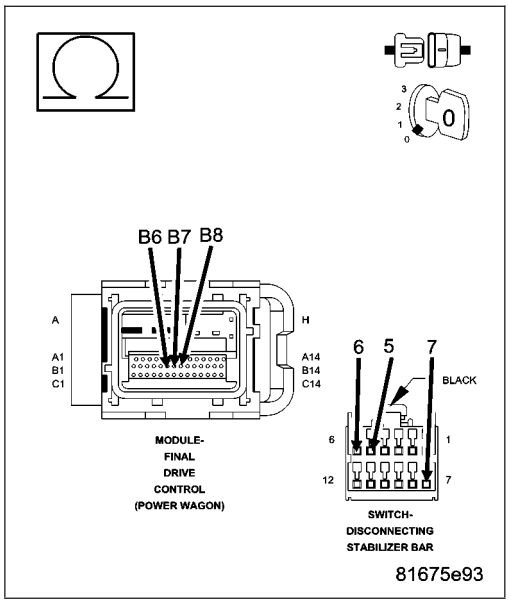
Measure the resistance of each of the following circuits between the FDCM harness connector and the Disconnecting Stabilizer Switch harness connector.

- (T532) Locker Open Illumination Sense circuit
- (T533) Locker Rear Illumination Sense circuit
- (T534) Locker FR/RR Illumination Sense circuit

Does the ohmmeter indicate each measurement below 5.0 ohms?

Yes >> Replace the FDCM in accordance with the Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Repair the open or high resistance in the Illumination Sense circuit that indicated the incorrect resistance reading.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)



5. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

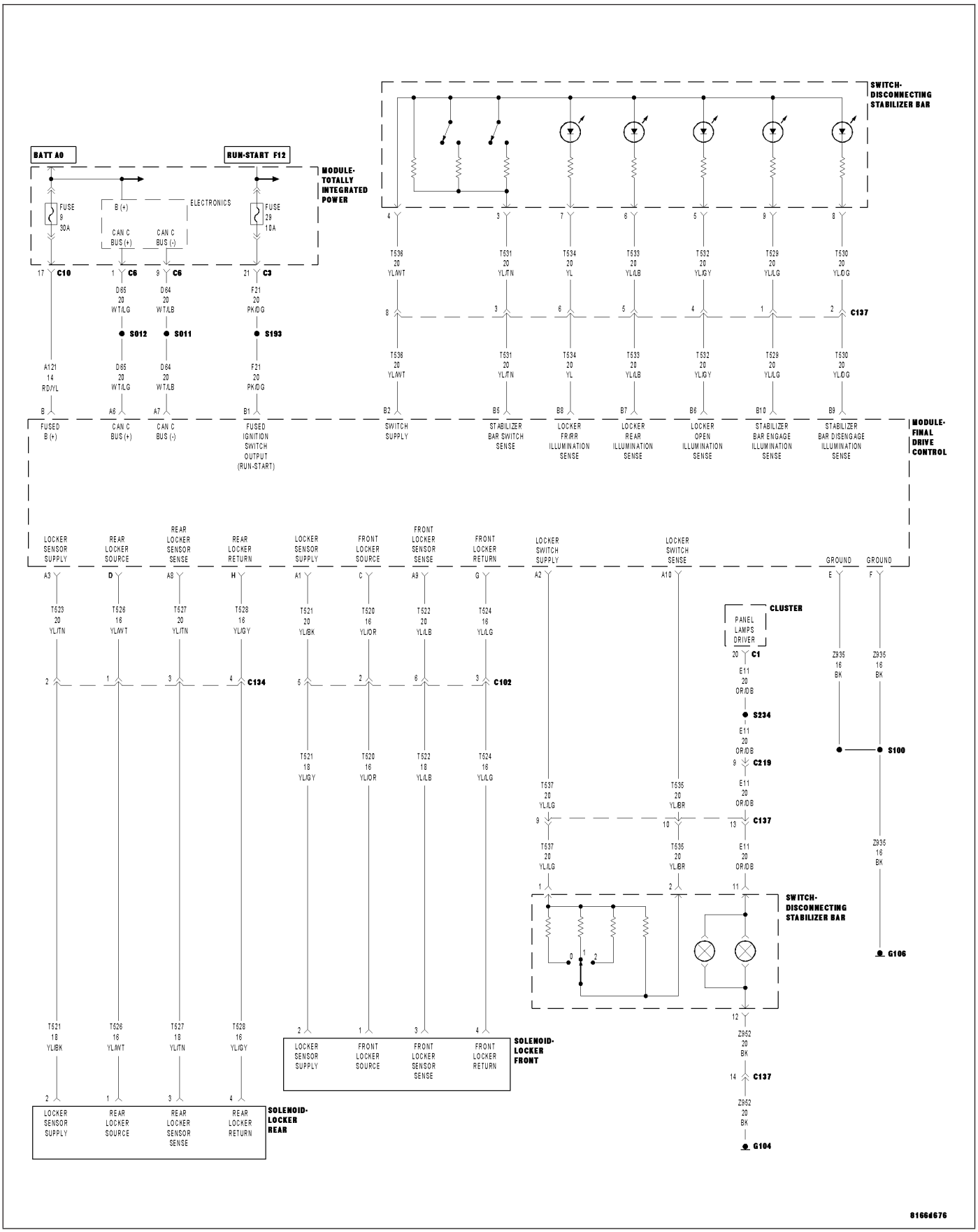
Using the scan tool, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C2310-STABILIZER/DIFFERENTIAL INDICATOR SUPPLY CIRCUIT LOW



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on.
- **Set Condition:**
  The FDCM sense an the voltage on the Switch Supply circuit is low.

Possible Causes
DISCONNECTING STABILIZER SWITCH
(T536) SWITCH SUPPLY CIRCUIT SHORTED TO GROUND
(T532,T533 or T534) LOCKER ILLUMINATION SENSE CIRCUIT SHORTED TO GROUND
FDCM

1. DTC ACTIVE

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

Turn the ignition on, engine not running

With the scan tool, read FDCM DTC(s).

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 5

2. DISCONNECTING STABILIZER SWITCH OPERATION

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.

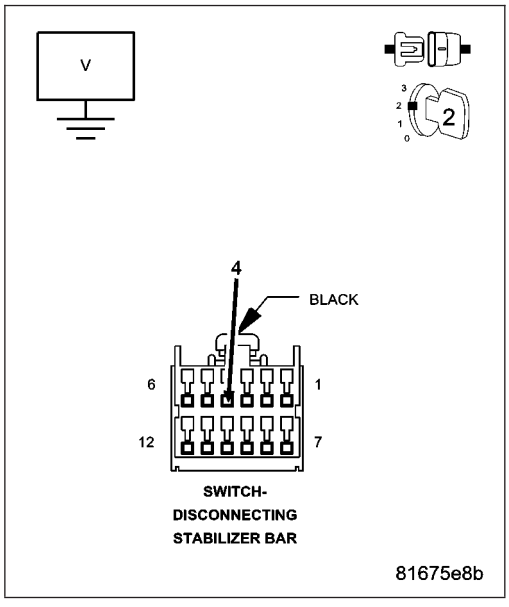
NOTE: If set along with this DTC, diagnose any Stabilizer Select Switch DTC(s) first before continuing.

Turn the ignition off.

Disconnect the Disconnecting Stabilizer Switch harness connector.

Turn the ignition on.

Measure the voltage on the (T536) Switch Supply circuit in the Axle Locker Switch harness connector.



Is the voltage 12 volts?

Yes >> Go To 3

No >> Check the (T536) Switch Supply circuit for an open or short to ground condition. If OK, replace the FDCM in accordance with the Service Information.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

3. DISCONNECTING STABILIZER SWITCH

Using a test light connected to battery voltage, probe the (T532) Locker Open Illumination Sense circuit in the Disconnecting Stabilizer Switch harness connector.

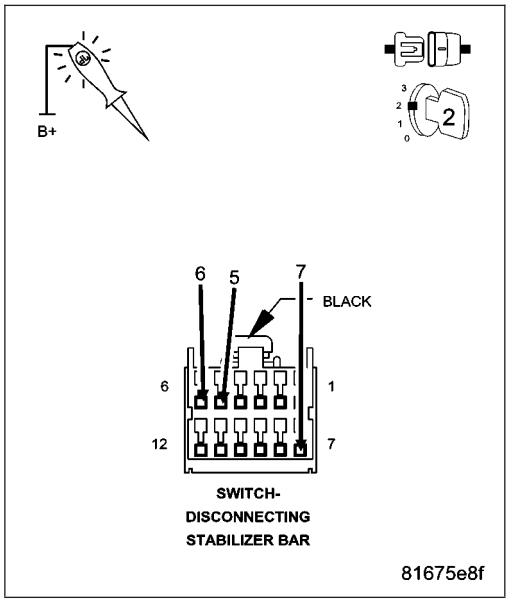
With the scan tool, select System Test and actuate the Locker Open Illumination LED. Select the blinking option.

NOTE: Repeat the above test for the (T533) Locker Rear Illumination Sense circuit terminal and (T534) Locker FR/RR Illumination Sense circuit one at a time.

Does the test light illuminate and flash on and off at each circuit?

Yes >> Replace the Disconnecting Stabilizer Switch.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go to 4



4. (T532, T533 or T534) LOCKER ILLUMINATION SENSE CIRCUIT SHORTED TO GROUND

Disconnect the Disconnecting Stabilizer Switch harness connector.

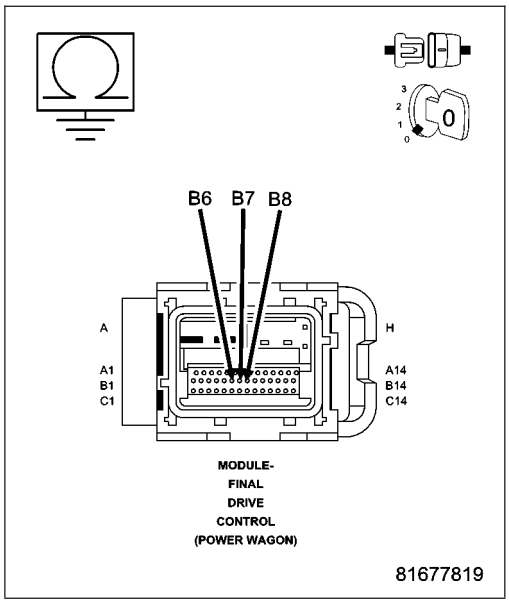
Measure the resistance of each of the following circuit at the FDCM harness connector to ground.

- (T532) Locker Open Illumination Sense circuit
- (T533) Locker Rear Illumination Sense circuit
- (T534) Locker FR/RR Illumination Sense circuit

Does the ohmmeter read below 100 ohms for any of the above circuit checks?

Yes >> Repair the short to ground in the Illumination Sense circuit that indicated the resistance reading below 100 ohms.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Replace the FDCM in accordance with the Service Information.Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)



5. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

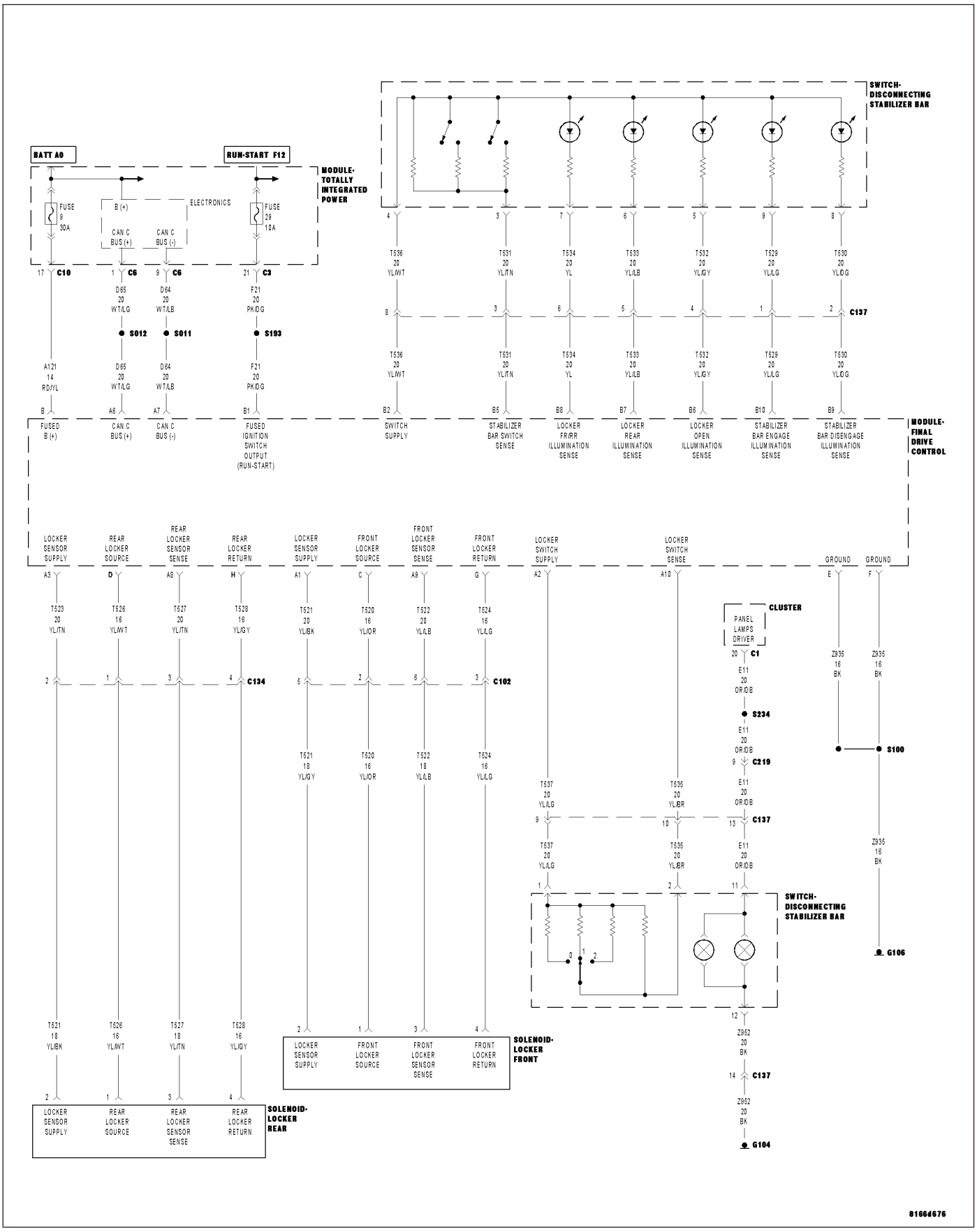
Using the DRBIII®, monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C2311-STABILIZER/DIFFERENTIAL INDICATOR SUPPLY CIRCUIT HIGH



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on.
- **Set Condition:**
  The FDCM sense an the voltage on the Switch Supply circuit is high.

Possible Causes
DISCONNECTING STABILIZER SWITCH
(T536) SWITCH SUPPLY CIRCUIT SHORTED TO VOLTAGE
T536) SWITCH SUPPLY CIRCUIT OPEN
(T532,T533 or T534) LOCKER ILLUMINATION SENSE CIRCUIT SHORTED TO VOLTAGE
(T532,T533 or T534) LOCKER ILLUMINATION SENSE CIRCUIT OPEN
FDCM

1. DTC ACTIVE

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

NOTE: If set along with this DTC, diagnose any Stabilizer Select Switch DTC(s) first before continuing.
Turn the ignition on, engine not running
With the scan tool read FDCM DTC(s).

Is the DTC active at this time?

Yes >> Go To 2

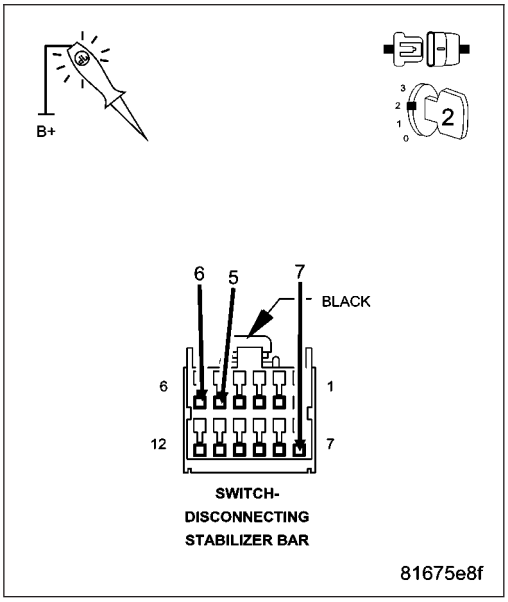
No >> Go To 7

2. DISCONNECTING STABILIZER BAR SWITCH

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.
Turn the ignition off.
Disconnect the Disconnecting Stabilizer Bar Switch harness connector.
Turn the ignition on.
Using a test light connected to battery voltage, probe the (T532) Locker Open Illumination Sense circuit in the Disconnecting Stabilizer Bar Switch harness connector.
With the scan tool select System Test and actuate the Locker Open Illumination LED. Select the blinking option.

NOTE: Repeat the above test for the (T533) Locker Rear Illumination Sense circuit and (T534) Locker FR/RR Illumination Sense circuit one at a time.

Does the test light illuminate and flash on and off at each circuit?



Yes >> Go to 3

No >> Go to 5

3. (T536) SWITCH SUPPLY CIRCUIT SHORTED TO VOLTAGE

Turn the ignition off.

Disconnect the Disconnecting Stabilizer Bar Switch harness connector

Disconnect the FDCM harness connector.

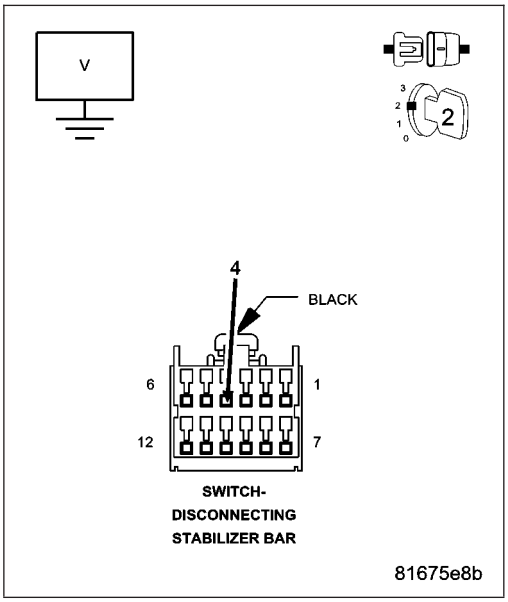
Turn the ignition on.

Measure the voltage on the (T536) Switch Supply circuit in the Disconnecting Stabilizer Switch harness connector.

Does the voltmeter indicate voltage present?

Yes >> Replace the Disconnecting Stabilizer Bar Switch.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4



4. (T536) SWITCH SUPPLY CIRCUIT OPEN

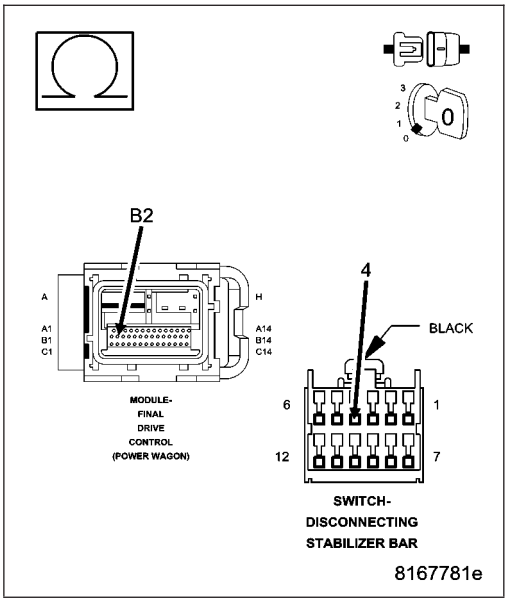
Turn the ignition off.

Measure the resistance of the (T536) Switch Supply circuit between the Disconnecting Stabilizer Switch harness connector and the FDCM harness connector.

Is the resistance below 5.0 ohms?

Yes >> Replace the FDCM in accordance with the Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Repair the open in the Switch Supply circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)



5. (T532, T533 or T534) LOCKER ILLUMINATION SENSE CIRCUIT SHORTED TO VOLTAGE

Disconnect the Disconnecting Stabilizer Switch harness connector.

Measure the voltage at each of the following circuit at the FDCM harness connector.

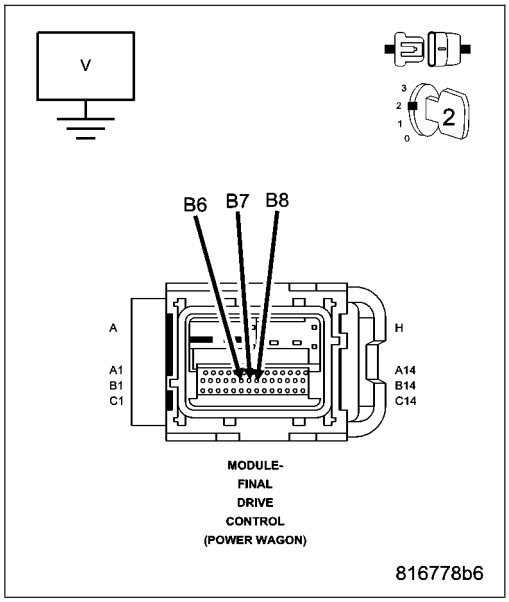
- (T532) Locker Open Illumination Sense circuit
- (T533) Locker Rear Illumination Sense circuit
- (T534) Locker FR/RR Illumination Sense circuit

Does the voltmeter indicate voltage present for any of the above circuit?

Yes >> Repair the Locker Illumination Sense circuit that indicated a short to voltage.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 6



6. (T532, T533 or T534) LOCKER ILLUMINATION SENSE CIRCUIT OPEN

Measure the resistance of each of the following circuits between the FDCM harness connector and the Disconnecting Stabilizer Switch harness connector.

- (T532) Locker Open Illumination Sense circuit
- (T533) Locker Rear Illumination Sense circuit
- (T534) Locker FR/RR Illumination Sense circuit

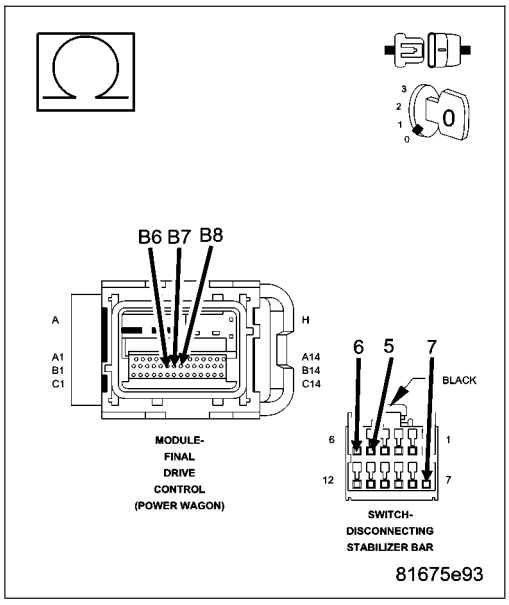
Does the ohmmeter indicate each measurement below 5.0 ohms?

Yes >> Replace the FDCM in accordance with the Service Information.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Repair the Locker Illumination Sense circuit that indicated an open circuit.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)



7. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

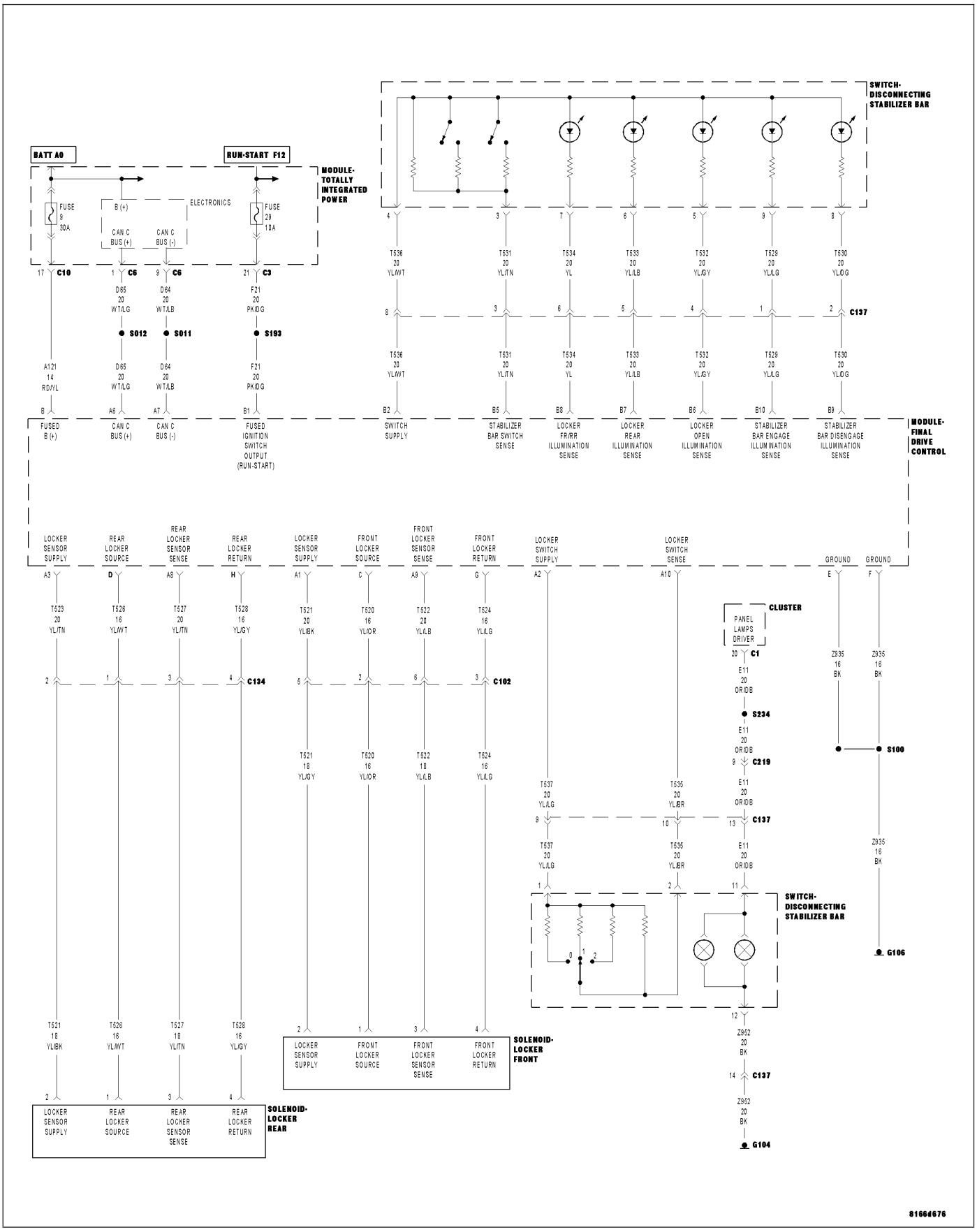
Using the scan tool monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

C2324-STABILIZER BAR INDICATOR CONTROL CIRCUIT



For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition on.
- **Set Condition:**
  The FDCM sense an the voltage on the Switch Supply circuit is high.

Possible Causes
DISCONNECTING STABILIZER SWITCH
(T536) SWITCH SUPPLY CIRCUIT SHORTED TO VOLTAGE
T536) SWITCH SUPPLY CIRCUIT OPEN
(T529 or T530) STABILIZER BAR ILLUMINATION SENSE CIRCUIT(S) SHORTED TO VOLTAGE
(T529 or T530) STABILIZER BAR ILLUMINATION SENSE CIRCUIT(S) OPEN
(T529 or T530) STABILIZER BAR ILLUMINATION SENSE CIRCUIT(S) SHORTED TO GROUND
FDCM

1. DTC ACTIVE

CAUTION: Before removing the FDCM harness connector, clean the connector and locking cam area of dirt and debris. Failure to do so can result in the connector being jammed or damage to the locking cams on the harness connector or module. Do not force the assist arm when releasing or installing the harness connector.

NOTE: If set along with this DTC, diagnose any Stabilizer Select Switch DTC(s) first before continuing.
Turn the ignition on, engine not running

With the scan tool read FDCM DTC(s).

Is the DTC active at this time?

Yes >> Go To 2

No >> Go To 8

2. DISCONNECTING STABILIZER BAR SWITCH

NOTE: Before continuing with the below diagnostic test, ensure the FDCM harness connector seal is installed correctly. Inspect the terminals on both harness connector and the module for damage. Failure to do so can result in misdiagnoses of the system.
Turn the ignition off.

Disconnect the Disconnecting Stabilizer Bar Switch harness connector.

Turn the ignition on.

Using a test light connected to battery voltage, probe the (T529) Stabilizer Bar Engage Illumination Sense circuit in the Disconnecting Stabilizer Bar Switch harness connector.

With the scan tool select System Test and actuate the Stabilizer Bar Engage Illumination LED. Select the blinking option.

NOTE: Repeat the above test for the Stabilizer Bar Disengage Illumination Sense circuit.

Does the test light illuminate and flash on and off at each circuit?

Yes >> Go to 3

No >> Go to 5

3. (T536) SWITCH SUPPLY CIRCUIT SHORTED TO VOLTAGE

Turn the ignition off.

Disconnect the Disconnecting Stabilizer Bar Switch harness connector

Disconnect the FDCM harness connector.

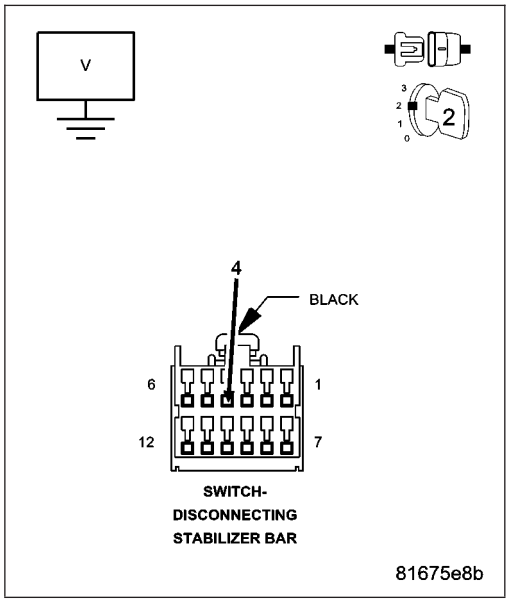
Turn the ignition on.

Measure the voltage on the (T536) Switch Supply circuit in the Disconnecting Stabilizer Switch harness connector.

Does the voltmeter indicate voltage present?

Yes >> Replace the Disconnecting Stabilizer Bar Switch.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 4



4. (T536) SWITCH SUPPLY CIRCUIT OPEN

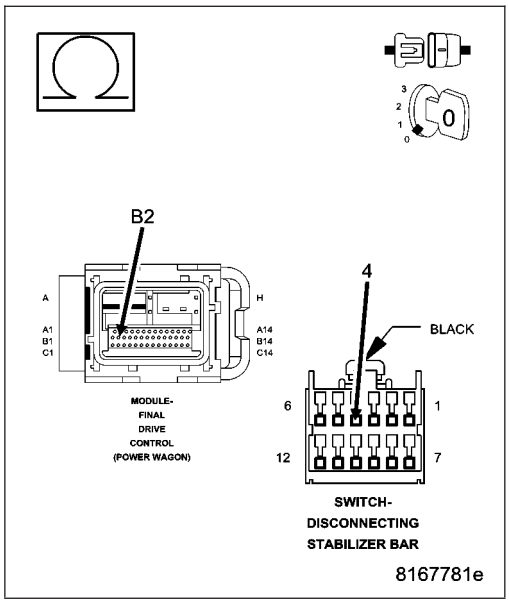
Turn the ignition off.

Measure the resistance of the (T536) Switch Supply circuit between the Disconnecting Stabilizer Switch harness connector and the FDCM harness connector.

Is the resistance below 5.0 ohms?

Yes >> Replace the FDCM in accordance with the Service Information.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Repair the open in the Switch Supply circuit.
Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)



5. (T529 or T530) STABILIZER BAR ILLUMINATION SENSE CIRCUIT(S) SHORTED TO VOLTAGE

Disconnect the Disconnecting Stabilizer Switch harness connector.

Disconnect the FDCM harness connector.

Measure the voltage at each of the following circuit at the FDCM harness connector.

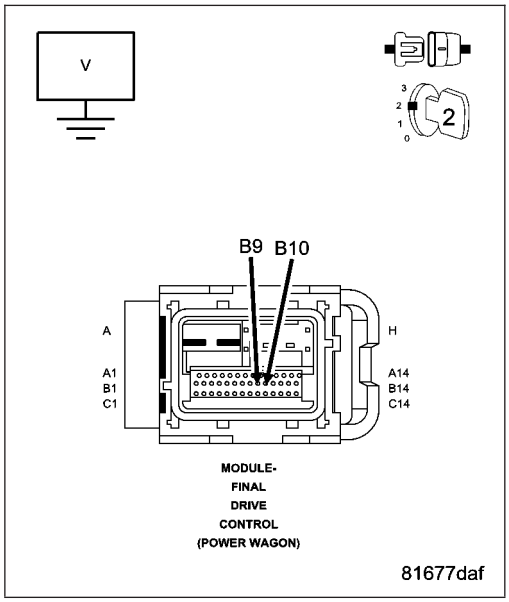
- (T529) Stabilizer Bar Engage Illumination Sense circuit
- (T530) Stabilizer Bar Disengage Illumination Sense circuit

Does the voltmeter indicate voltage present for any of the above circuit?

Yes >> Repair the Stabilizer Bar Illumination Sense circuit(s) that indicated a short to voltage.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 6



6. (T529 or T530) STABILIZER BAR ILLUMINATION SENSE CIRCUIT(S) SHORTED TO GROUND

Measure the resistance of each of the following circuit at the FDCM harness connector to ground.

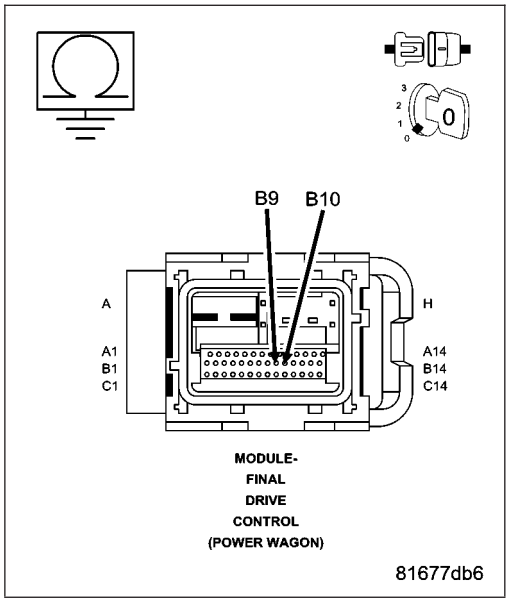
- (T529) Stabilizer Bar Engage Illumination Sense circuit
- (T530) Stabilizer Bar Disengage Illumination Sense circuit

Does the ohmmeter read below 100 ohms for any of the above circuit checks?

Yes >> Repair the short to ground in the Illumination Sense circuit that indicated the resistance reading below 100 ohms.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Go To 7



7. (T529 or T530) STABILIZER BAR ILLUMINATION SENSE CIRCUIT(S) OPEN

Measure the resistance of each of the following circuits between the FDCM harness connector and the Disconnecting Stabilizer Switch harness connector.

- (T529) Stabilizer Bar Engage Illumination Sense circuit
- (T530) Stabilizer Bar Disengage Illumination Sense circuit

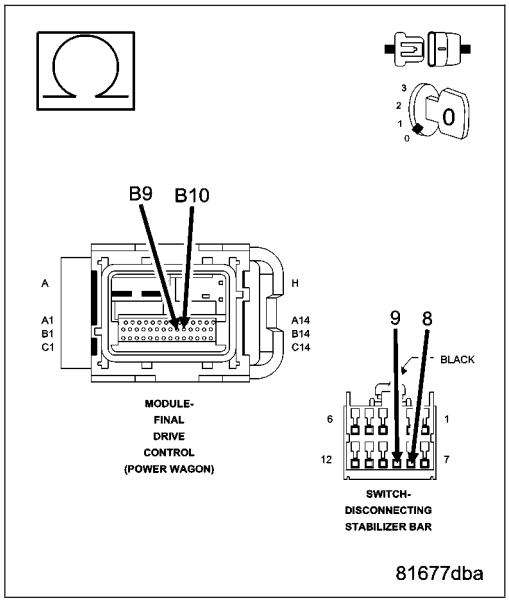
Does the ohmmeter indicate each measurement below 5.0 ohms?

Yes >> Replace the FDCM in accordance with the Service Information.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Repair the Stabilizer Bar Illumination Sense circuit(s) that indicated an open circuit.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)



8. INTERMITTENT WIRING AND CONNECTORS

The conditions necessary to set this DTC are not present at this time.

Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

Wiggle test the wiring harness and connectors while checking for shorted and open circuits.

Using the scan tool monitor the data related to this circuit while performing the wiggle test. Look for the data to change or for the DTC to reset.

Were there any problems found?

Yes >> Repair as necessary.

Perform FDCM VERIFICATION TEST. (Refer to 2 - SUSPENSION/ACTIVE CHASSIS - STANDARD PROCEDURE)

No >> Test Complete.

U0100-LOST COMMUNICATION WITH ECM/PCM (FDCM)

For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  - With the ignition on
  - Battery voltage between 10 and 16 volts
  - IOD fuse installed
  - FCM is configured correctly
- **Set Condition:**
  Bus messages not received from the ECM/PCM for approximately 2 to 5 seconds.

Possible Causes
CAN B OR CAN C BUS CIRCUITS OPEN OR SHORTED
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
FCM NOT CONFIGURED CORRECTLY
ECM/PCM POWER AND GROUND
ECM/PCM
MODULE THAT SET THIS DTC

Diagnostic Test

1. VERIFY DTC IS ACTIVE

NOTE: Ensure the IOD fuse is installed and battery voltage is between 10 and 16 volts before proceeding.
With the scan tool, read active DTCs.

Is this DTC active?

Yes >> Go To 2

No >> Refer to the Stored Lost Communication test procedure. Refer to the table of contents in this section.

2. CHECK FOR ANY OF THE FOLLOWING ACTIVE DTCS

With the scan tool, read all active DTCs from all modules.

NOTE: Check for FCM configuration, CAN B or C hardware electrical, VIN Missing/Mismatch, battery or ignition related DTCs.

Does the scan tool display any active DTCs to the conditions listed above?

Yes >> Diagnose and repair the DTC. Refer to the Index for a complete list of the symptoms.

No >> Go To 3

3. VERIFY THAT THE ECM/PCM IS ACTIVE ON THE BUS

Turn the ignition on.
With the scan tool, select Network Diagnostics.
Verify that the PCM is active on the bus.

Is the PCM active on the bus?

Yes >> Go To 4

No >> Refer to the No Response test procedure. Refer to the table of contents in this section.

4. CHECK FOR ADDITIONAL COMMUNICATION RELATED DTCS

With the scan tool, select Network Diagnostics.

Is there more than one module with active DTCs “Logged Against” the PCM?

Yes >> Replace the PCM in accordance with the service information.
Perform the appropriate VERIFICATION TEST.

No >> Replace the module that set this DTC in accordance with the service information.
Perform the appropriate VERIFICATION TEST.

U0155-NO CLUSTER BUS MESSAGE

For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  Ignition key on and battery voltage greater than 10.4 volts.
- **Set Condition:**
  No messages received from the MIC (Instrument Cluster) for more than 20 seconds. One Trip Fault. Three good trips to turn off the MIL.

Possible Causes
BUS CIRCUIT OPEN OR SHORTED
INSTRUMENT CLUSTER
PCM

Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - DIAGNOSIS AND TESTING for diagnostic procedures and for further possible causes.

Always perform the Pre-Diagnostic Troubleshooting procedure before proceeding (Refer to 9 - ENGINE - DIAGNOSIS AND TESTING).

Diagnostic Test

1. ACTIVE DTC

Ignition on, engine not running.
With the scan tool, erase DTCs.
Cycle the ignition key on and off several times.
With the scan tool, read DTCs.

Does the DTC reset?

Yes >> Go To 2

No >> Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).
Perform the POWERTRAIN VERIFICATION TEST. (Refer to 9 - ENGINE - STANDARD PROCEDURE)

2. COMMUNICATE WITH CLUSTER

With the scan tool, attempt to communicate with the Instrument cluster.

Can communication be established with the Instrument Cluster?

Yes >> Go To 3

No >> Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - DIAGNOSIS AND TESTING for diagnostic procedures and for further possible causes.
Perform the POWERTRAIN VERIFICATION TEST. (Refer to 9 - ENGINE - STANDARD PROCEDURE)

3. INSTRUMENT CLUSTER OPERATION

Start the engine
Allow the engine to idle.

Is the correct engine speed display in the instrument cluster (Tach)?

Yes >> Replace and program the Powertrain Control Module per Service Information.
Perform the POWERTRAIN VERIFICATION TEST. (Refer to 9 - ENGINE - STANDARD PROCEDURE)

No >> Refer to the Instrument Category and perform the appropriate symptom.
Perform the POWERTRAIN VERIFICATION TEST. (Refer to 9 - ENGINE - STANDARD PROCEDURE)

DIFFERENTIAL & DRIVELINE - SERVICE INFORMATION

TABLE OF CONTENTS

	page		page
PROPELLER SHAFT	114	**REAR AXLE - 9 1/4**	313
HALF SHAFT	166	**REAR AXLE - 10 1/2 AA**	351
FRONT AXLE - C205FD	178	**REAR AXLE - 11 1/2 AA**	398
FRONT AXLE - 9 1/4 AA	269	**REAR AXLE - 248RBI**	435

PROPELLER SHAFT

TABLE OF CONTENTS

page

PROPELLER SHAFT
DIAGNOSIS AND TESTING
PROPELLER SHAFT 115
STANDARD PROCEDURE
PROPELLER SHAFT ANGLE 117
LUBRICATION 120
SPECIFICATIONS
PROPELLER SHAFT 120
SPECIAL TOOLS 120
SHAFT-PROPELLER FRONT LD
REMOVAL 122
INSTALLATION 123
SHAFT-PROPELLER FRONT HD
REMOVAL 124
INSTALLATION 124
SHAFT-PROPELLER REAR LD
REMOVAL 125
INSTALLATION 128
SHAFT-PROPELLER REAR HD
REMOVAL 130
INSTALLATION 133
SHAFT-PROPELLER REAR SRT10
REMOVAL 135
INSTALLATION 137
BEARING-CENTER LD
REMOVAL 139
INSTALLATION 141
ADJUSTMENTS
BEARING CENTER 142
BEARING-CENTER HD
REMOVAL 143
INSTALLATION 145
ADJUSTMENTS
BEARING CENTER 146
BEARING-CENTER-SRT10
REMOVAL 147
INSTALLATION 149
ADJUSTMENTS
BEARING CENTER 150
UNIVERSAL JOINTS-SINGLE CARDAN
DISASSEMBLY
DISASSEMBLY - WITH INJECTED RING 151
DISASSEMBLY - WITH SNAP RINGS 153
ASSEMBLY
ASSEMBLY - WITH INJECTED RING 155
ASSEMBLY - WITH SNAP RINGS 159
UNIVERSAL JOINTS-DOUBLE CARDAN
DISASSEMBLY 160
ASSEMBLY 162

PROPELLER SHAFT

DIAGNOSIS AND TESTING

PROPELLER SHAFT

PROPELLER SHAFT VIBRATION

Out-of-round tires or wheels that are out of balance, will cause a low frequency vibration.

Driveline vibration can also be caused by loose or damaged engine mounts.

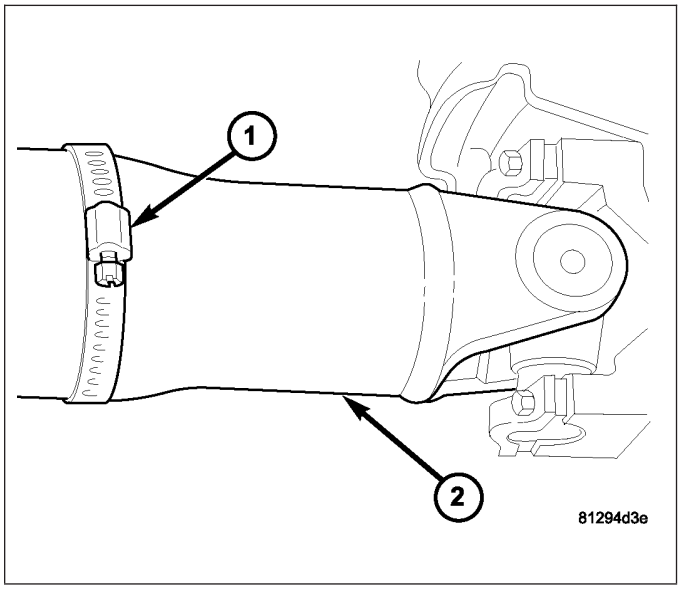
Propeller shaft vibration increases with vehicle speed. A vibration that occurs at a specific speed range, is not usually caused by an out of balance propeller shaft. Defective universal joints or an incorrect propeller shaft angle are usually the cause of such a vibration.

DRIVELINE VIBRATION

CONDITION	POSSIBLE CAUSE	CORRECTION
Propeller Shaft Noise	1) Undercoating or other foreign material on shaft.	1) Clean exterior of shaft and wash with solvent.
	2) Loose companion flange bolts.	2) Install new bolts and tighten to proper torque.
	3) Loose or bent U-joint yoke or excessive runout.	3) Install new yoke.
	4) Incorrect driveline angularity.	4) Measure and correct driveline angles.
	5) Rear spring center bolt not in seat.	5) Loosen spring U-bolts and seat center bolt.
	6) Worn U-joint bearings.	6) Install new U-joint.
	7) Propeller shaft damaged or out of balance.	7) Install new propeller shaft.
	8) Broken rear spring.	8) Install new rear spring.
	9) Excessive runout or unbalanced condition.	9) Re-index propeller shaft, test, and evaluate.
	10) Excessive drive pinion gear shaft runout.	10) Re-index propeller shaft and evaluate.
	11) Excessive axle yoke deflection.	11) Inspect and replace yoke if necessary.
	12) Excessive transfer case runout.	12) Inspect and repair as necessary.
Universal Joint Noise	1) Loose companion flange bolts.	1) Install new bolts and tighten to proper torque.
	2) Lack of lubrication.	2) Replace U-joints as necessary.

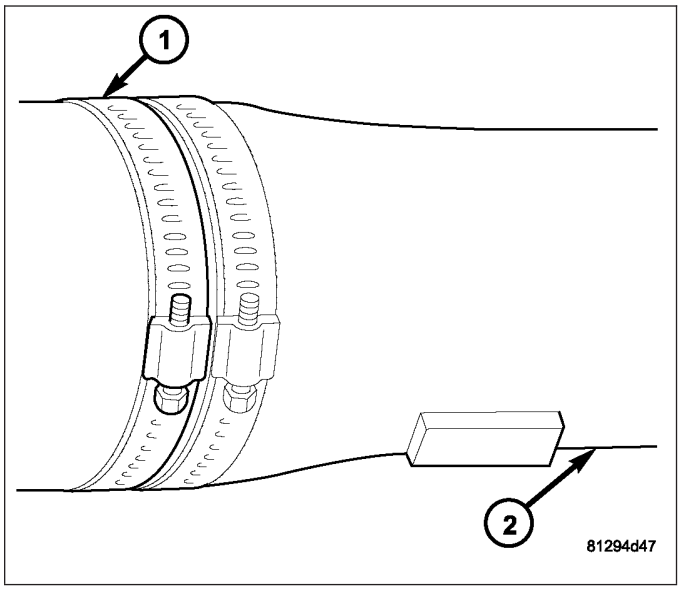
PROPELLER SHAFT BALANCE

If propeller shaft is suspected of being out of balance, use the following procedure.



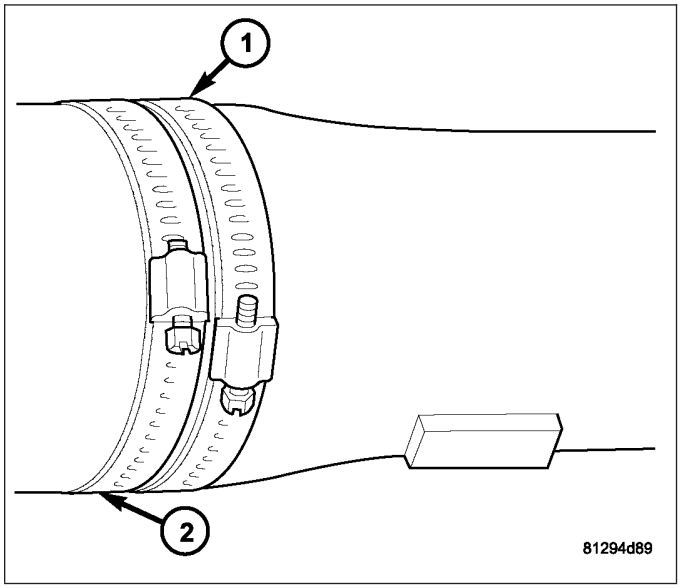
NOTE: Indexing propeller shaft 180 degrees relative to the yoke may eliminate some vibrations.

1. Raise and support vehicle.
2. Clean all foreign material from the propeller shaft and universal joints.
3. Inspect propeller shaft for missing balance weights, broken welds and bent areas. **If propeller shaft is bent, it must be replaced.**
4. Inspect universal joints for wear and properly installed.
5. Check propeller shaft bolt torques.
6. Remove wheels and install lug nuts to retain brake rotors.
7. Mark and number the shaft six inches from the pinion yoke end at four positions 90 degrees apart.
8. Run and accelerate vehicle until vibration occurs. Note the intensity and speed the vibration occurred. Stop the engine.
9. Install a screw clamp at position (1).
10. Start engine and check vibration. If there is little or no change move the clamp to the next positions. Repeat the vibration test.



NOTE: If there is no difference in vibration at this positions, the vibration may not be the propeller shaft.

11. If vibration decreased, install a second clamp (1) and repeat the test.
12. If additional clamp causes an additional vibration, separate the clamps 1/2 inch (1) above and below the mark. Repeat the vibration test.
13. Increase distance between the clamp screws (1) (2) and repeat test, until the least amount of vibration is noticed. Bend the slack end of the clamps so screws will not loosen.
14. If vibration remains unacceptable, repeat the procedure to the front end of the propeller shaft.
15. Install wheels and lower vehicle.



STANDARD PROCEDURE

PROPELLER SHAFT ANGLE

ONE PIECE PROPELLER SHAFT

This procedure applies to front and rear propeller shafts.

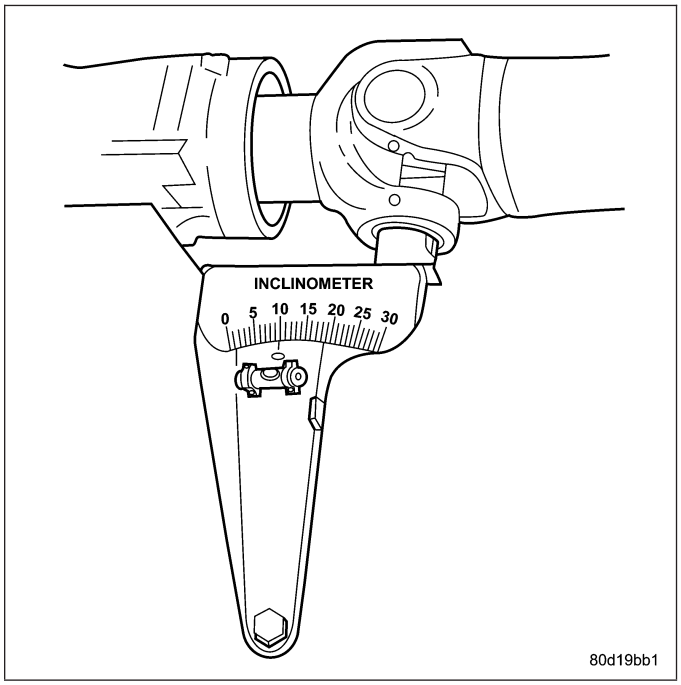
NOTE: To obtain output angle (A) on the front propeller shaft equipped with a C/V joint, place inclinometer on machined surface of the C/V joint.

1. Raise vehicle and support the axles as level as possible, allowing the wheels and propeller shaft to turn.
2. Remove universal joint snap rings if equipped, so inclinometer base sits flat.
3. Rotate shaft until transmission/transfer case output yoke bearing is facing downward.

NOTE: Always take measurements from front to rear and on the same side of the vehicle.

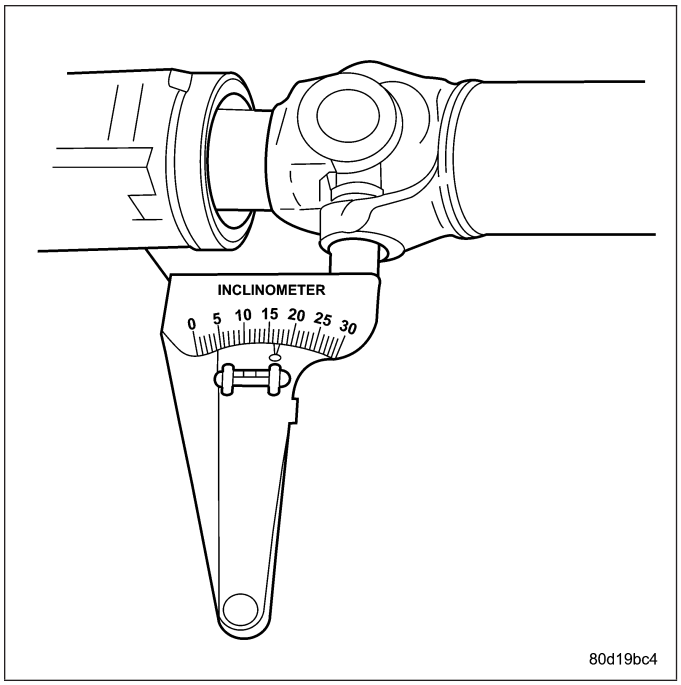
4. Place Inclinometer 7663 on yoke bearing cap or pinion flange ring parallel to the shaft. Center bubble in sight glass and record measurement (A).

This measurement will give you the transmission yoke Output Angle (A).



5. Rotate propeller shaft 90 degrees and place Inclinometer on yoke bearing parallel to the shaft. Center bubble in sight glass and record measurement. This measurement can also be taken at the rear end of the shaft.

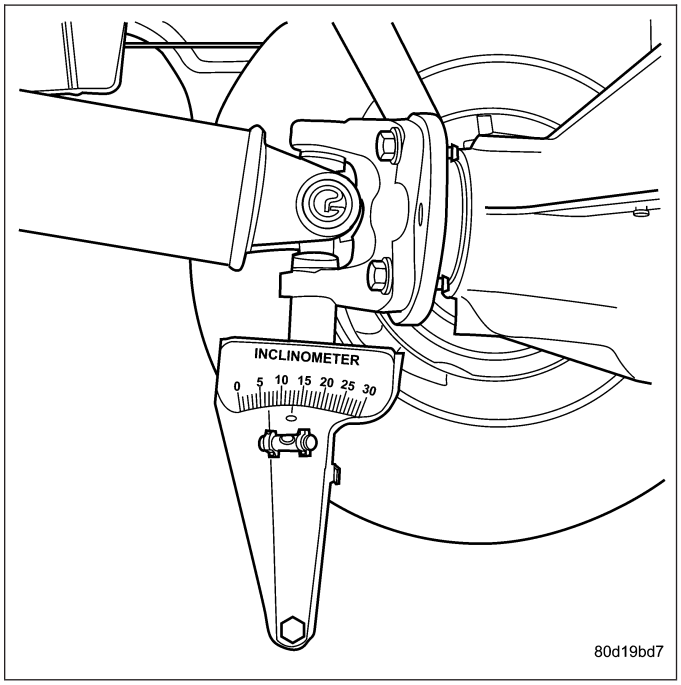
This measurement will give you the Propeller Shaft Angle (C).

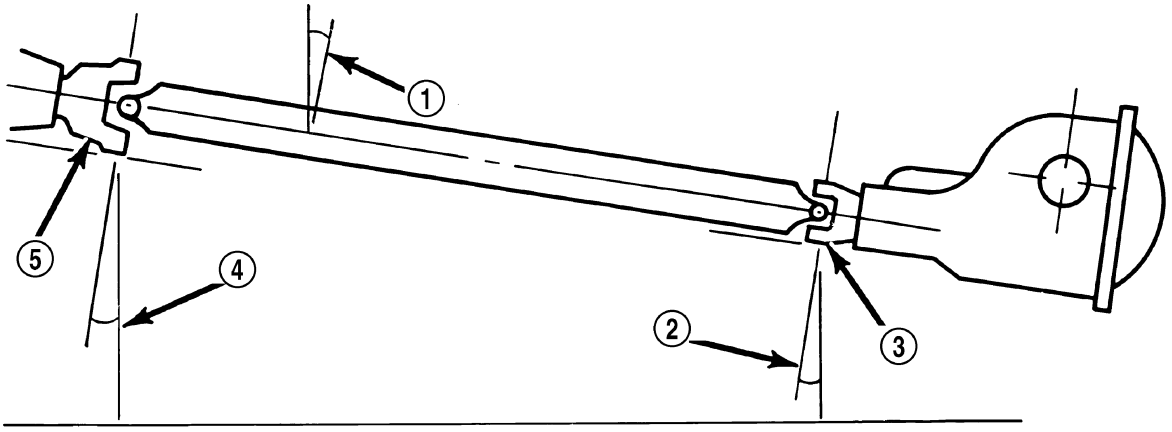


6. Rotate propeller shaft 90 degrees and place inclinometer on companion flange yoke bearing parallel to the shaft. Center bubble in sight glass and record measurement.

This measurement will give you the pinion Companion Flange Input Angle (B).

7. Subtract smaller figure from larger (C minus A) to obtain Transmission/Transfer Case **Output Operating Angle**.
8. Subtract smaller figure from larger (C minus B) to obtain axle **Input Operating Angle**.





Horizontal Level

(A) Output Yoke = 3.0°	or 4.9°	(B) Axle Input Yoke = 3.2°	or 4.9°
(C) Prop. Shaft = 4.9°	-3.0°	(C) Prop. Shaft = 4.9°	-3.2°
Transmission Output Operating Angle	1.9°	Axle Input Operating Angle	1.7°

Trans. Output Operating Angle	1.9°
Axle Input Operating Angle	-1.7°
Amount of U-Joint Cancellation	0.2°

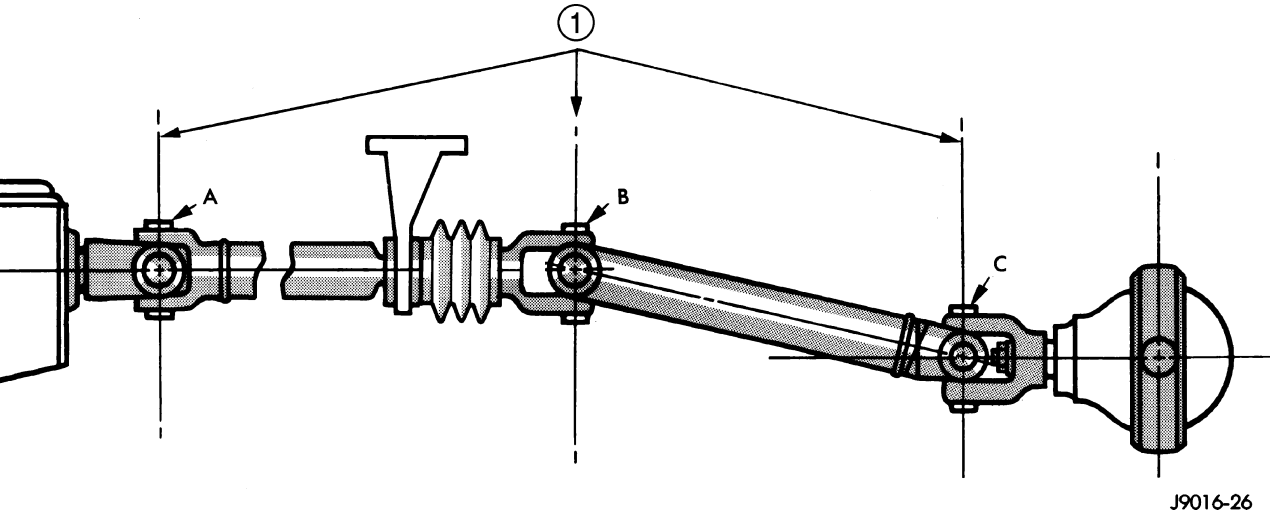
J9316-3

Refer to rules and example for additional information.

RULES

- Good cancellation of U-joint operating angles should be within 1 degree.
- Operating angles should be less than 3 degrees.
- Operating angles less than 10 degrees for double cardan U-joint.
- At least 1/2 of one degree continuous operating propeller shaft angle.

TWO PIECE PROPELLER SHAFT

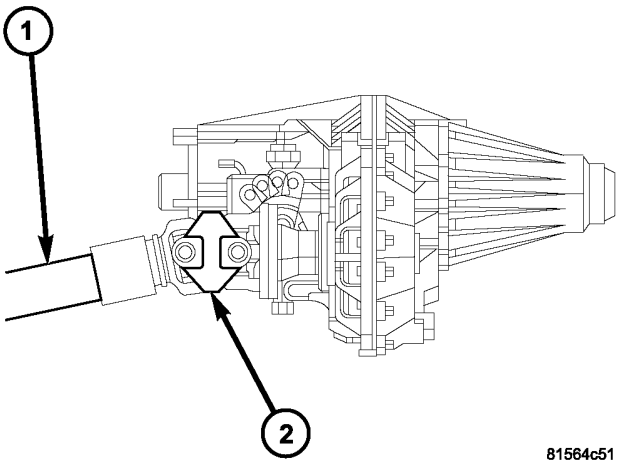


J9016-26

Two piece propeller shaft angles measurement is the same as a one-piece propeller shaft.

LUBRICATION

Vehicles with double cardan universal joint front propeller shaft (1) are equipped with a grease fitting (2). Grease the double cardan universal joint at each oil change.



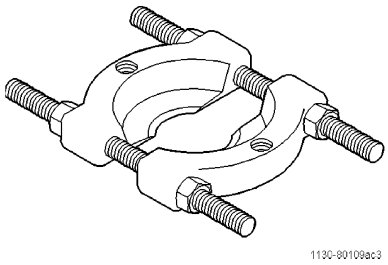
SPECIFICATIONS

PROPELLER SHAFT

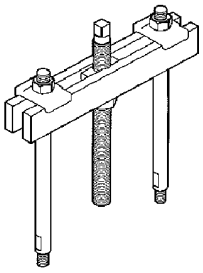
TORQUE SPECIFICATIONS

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Center Bearing Bolts	54	40	-
Transfer Case Flange Bolts	88	65	-
LD - Front Pinion Flange Bolts	115	85	-
HD - Front Pinion Flange Bolts	28	21	-
LD - Manual Transmission Flange Bolts	115	85	-
HD - Manual Transmission Flange Bolts	115	85	-
Rear Pinion Flange Bolts	115	85	-
SRT10 Rear Pinion Yoke Bolts	29	22	-

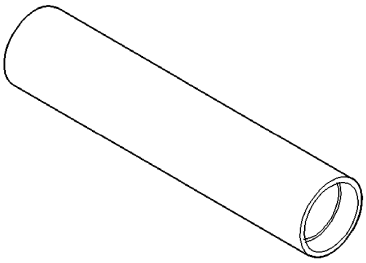
SPECIAL TOOLS



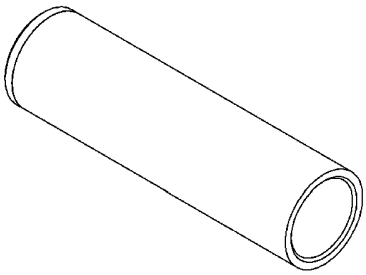
SPLITTER 1130



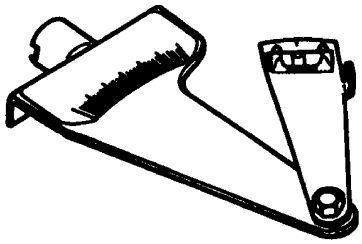
BRIDGE 938



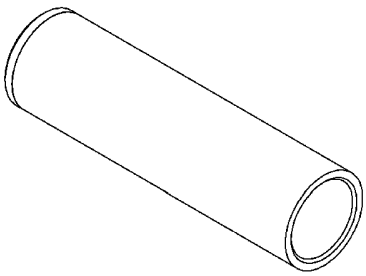
INSTALLER 6052



INSTALLER 6448A



INCLINOMETER 7663

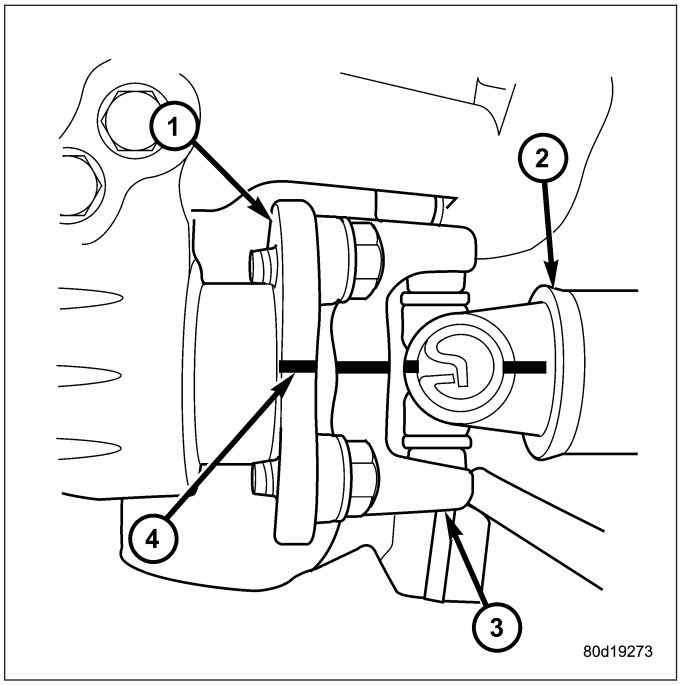


INSTALLER 9347

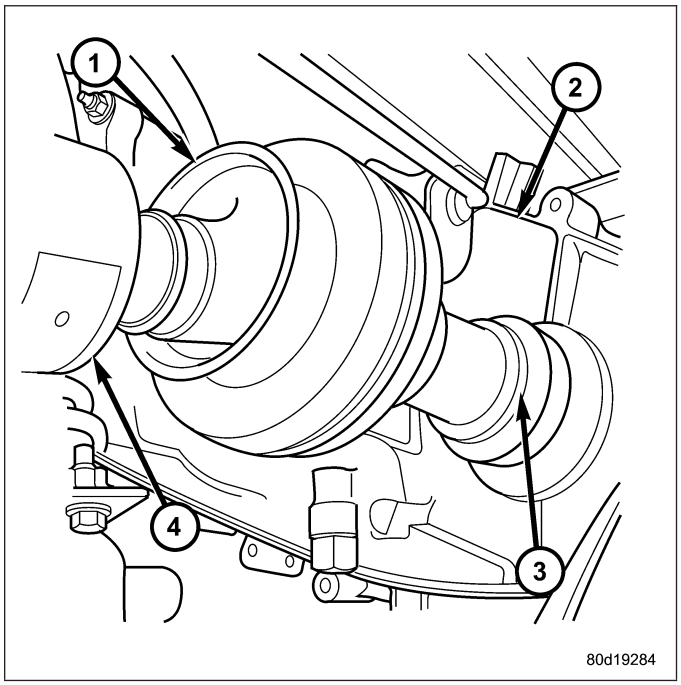
SHAFT-PROPELLER FRONT LD

REMOVAL

1. With vehicle in neutral, position vehicle on hoist.
2. Remove exhaust crossover pipe.
3. Mark a line across the axle companion flange (1), propeller shaft (2), flange yoke (3) and transfer case for installation reference.



4. Remove axle/transfer case companion flange bolts. Remove dust boot clamp (3) from the C/V jonit (1) end of the shaft if equipped.
5. Remove propeller shaft.

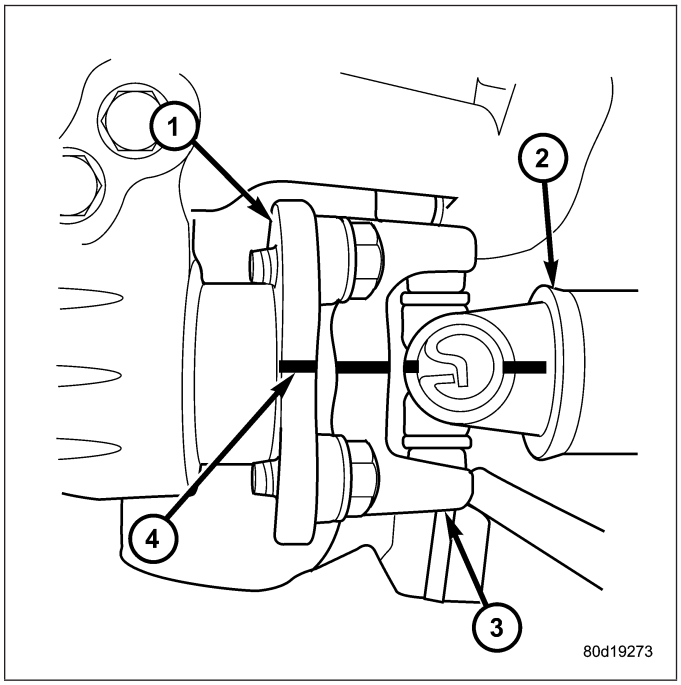


INSTALLATION

1. Install propeller shaft with all reference marks (4) aligned.
2. Install with dust boot clamp at transfer case end.
3. Install **new** axle companion flange bolts and tighten to 115 N·m (85 ft. lbs.).

NOTE: Companion flange bolts incorporate a Loctite® patch, new bolts should be used. If bolts are not available, clean bolts and apply Loctite® 242 to the threads.

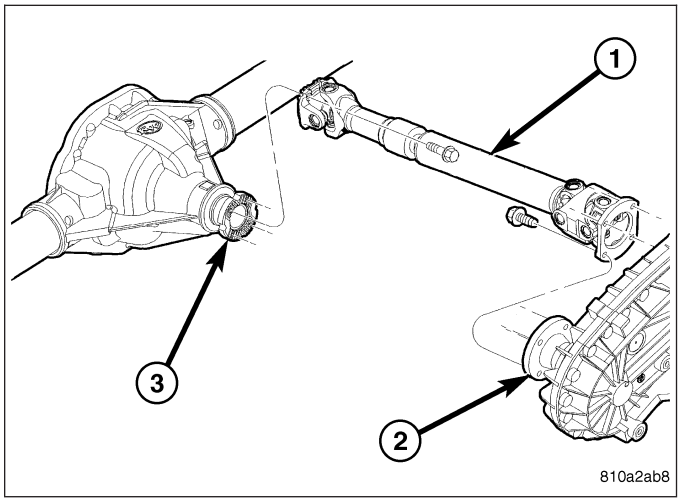
4. Install skid plate, if equipped.



SHAFT-PROPELLER FRONT HD

REMOVAL

1. With vehicle in neutral, position vehicle on hoist.
2. Remove exhaust crossover pipe.
3. Mark a line across axle (3)/transfer case (2) companion flange and propeller shaft flange yokes for installation reference.
4. Remove axle/transfer case companion flange bolts.
5. Remove propeller shaft.

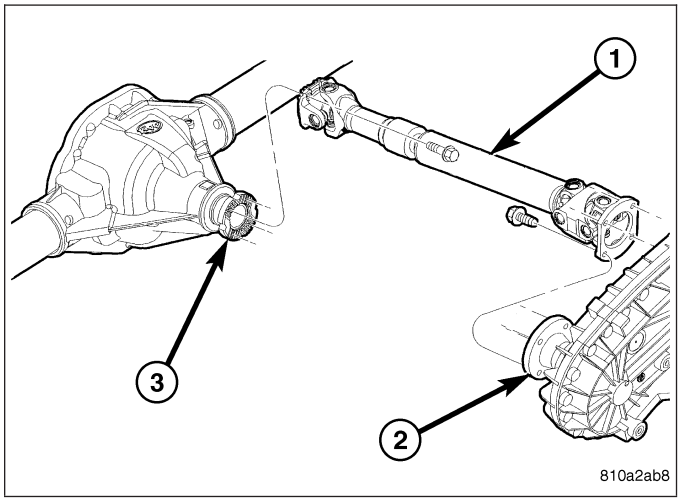


INSTALLATION

1. Install propeller shaft (1) with all reference marks aligned.
2. Install transfer case companion flange (2) bolts and tighten to 88 N·m (65 ft. lbs.).
3. Install **new** axle companion flange (3) bolts and tighten to 28 N·m (21 ft. lbs.).

NOTE: Companion flange bolts incorporate a Loctite® patch, new bolts should be used. If bolts are not available, clean bolts and apply Loctite® 242 to the threads.

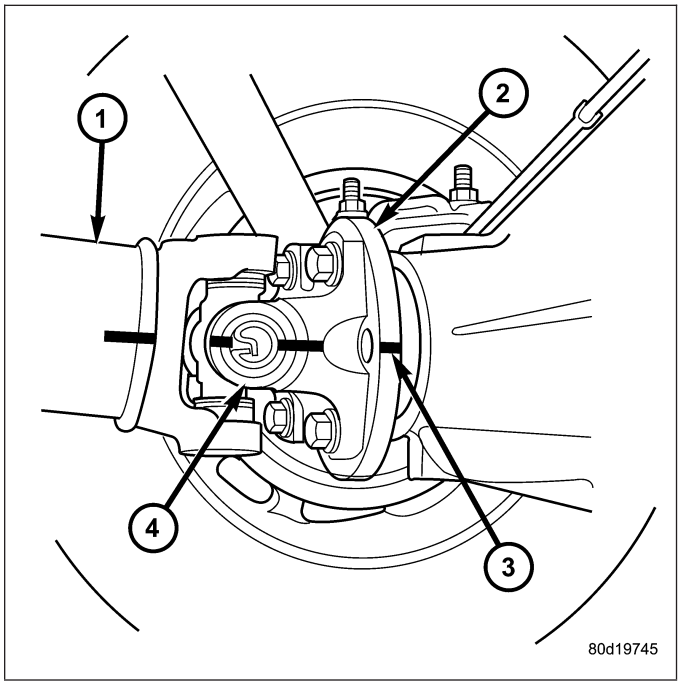
4. Install skid plate, if equipped.



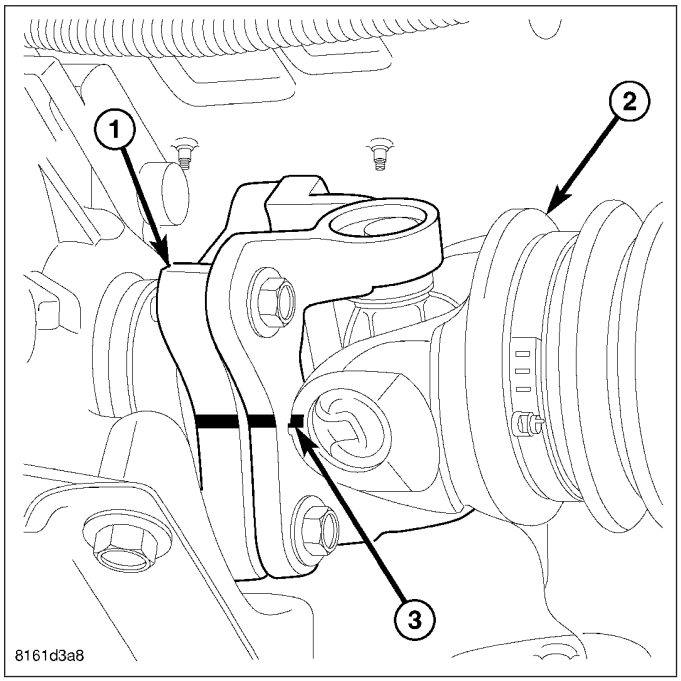
SHAFT-PROPELLER REAR LD

REMOVAL

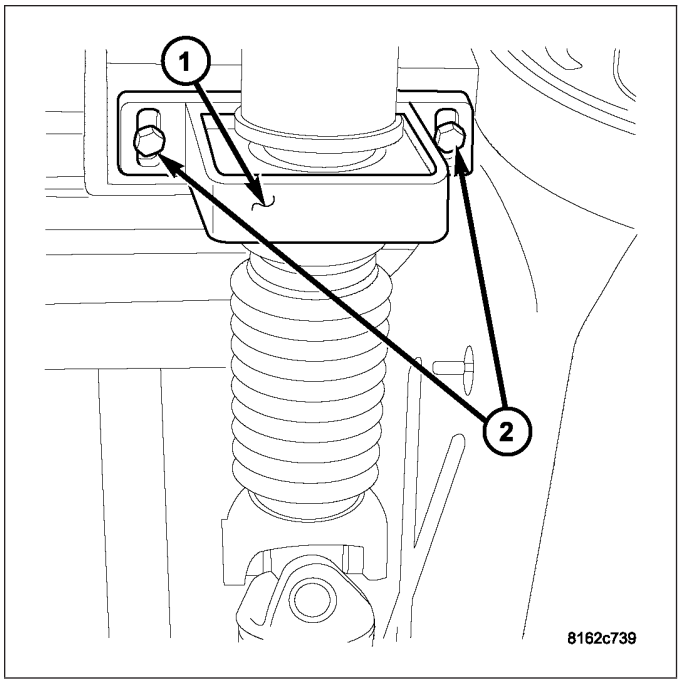
1. With vehicle in neutral, position vehicle on hoist.
2. Mark propeller shaft (1) pinion flange (2) and propeller shaft flange (4) with installation reference marks (3).



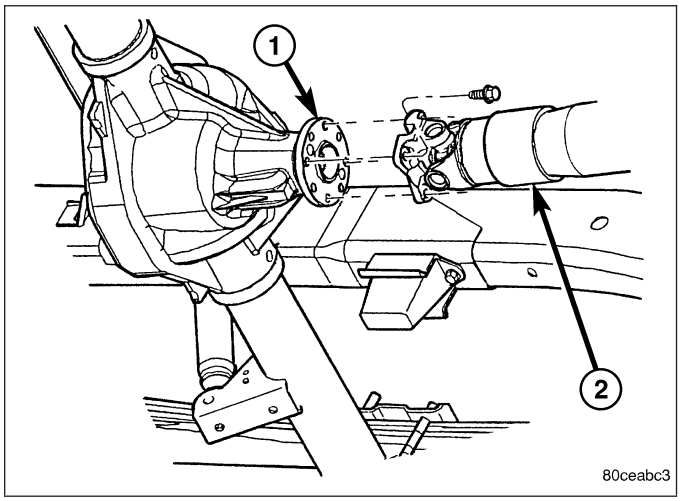
3. If equipped with manual transmission, mark manual transmission flange (1) and propeller shaft (2) flange for installation reference.



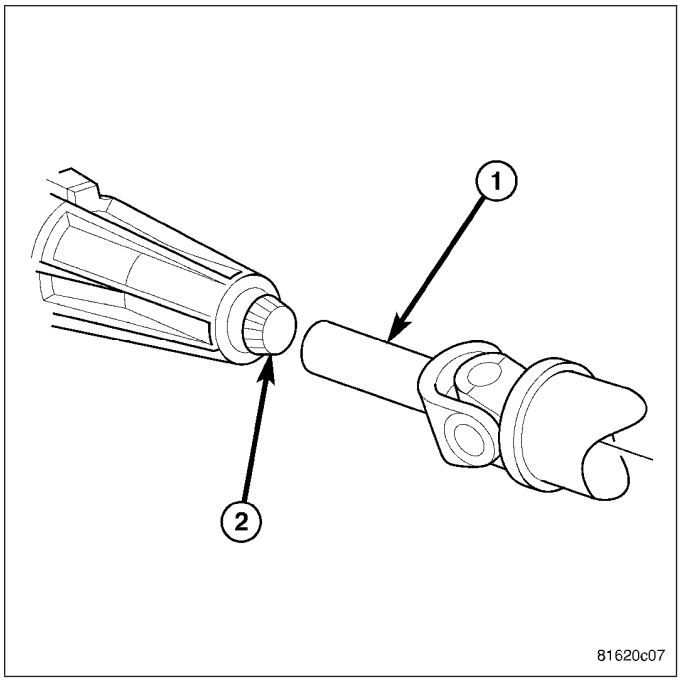
4. If equipped with a center bearing (1) mark an outline of the center bearing (1) on the center bearing bracket for installation reference. Then support propeller shaft and remove mounting bolts (2).



5. Remove pinion flange (1) bolts from propeller shaft (2).

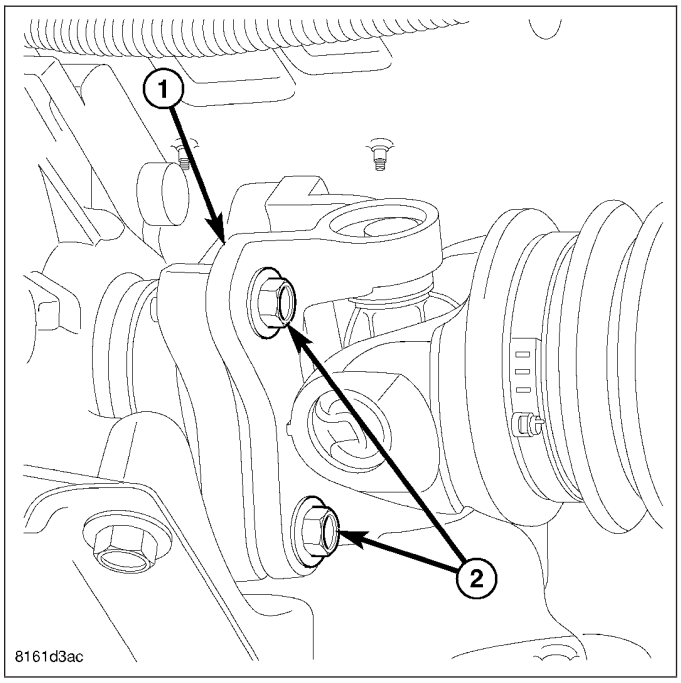


6. Slide propeller shaft back off automatic transmission/transfer case output shaft, then mark propeller shaft (1) and transmission/transfer case output shaft (2) for installation reference.



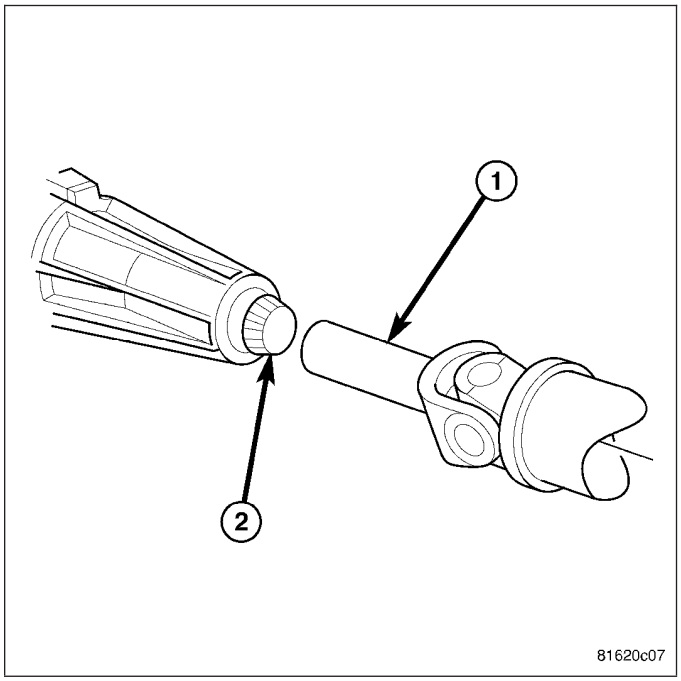
7. If equipped with manual transmission remove flange (1) bolts (2).
8. Remove propeller shaft from vehicle.

CAUTION: Failure to follow these instructions may result in a driveline vibration.

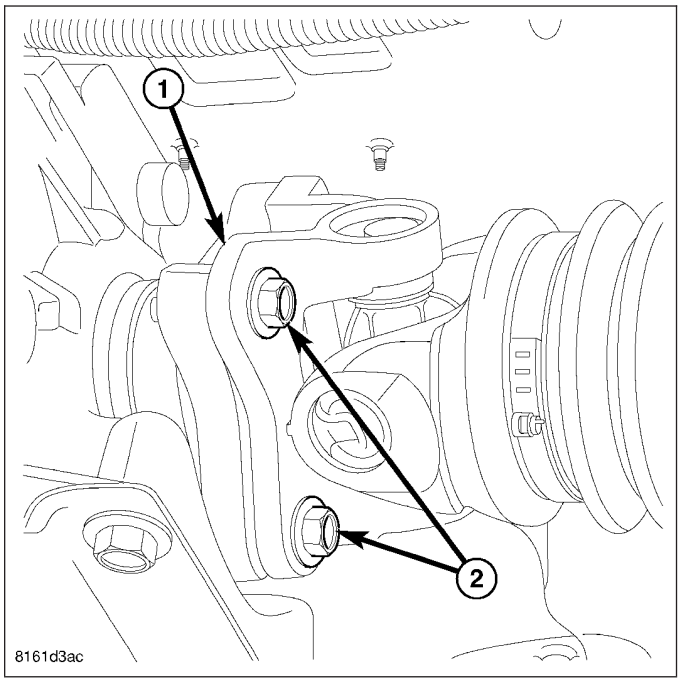


INSTALLATION

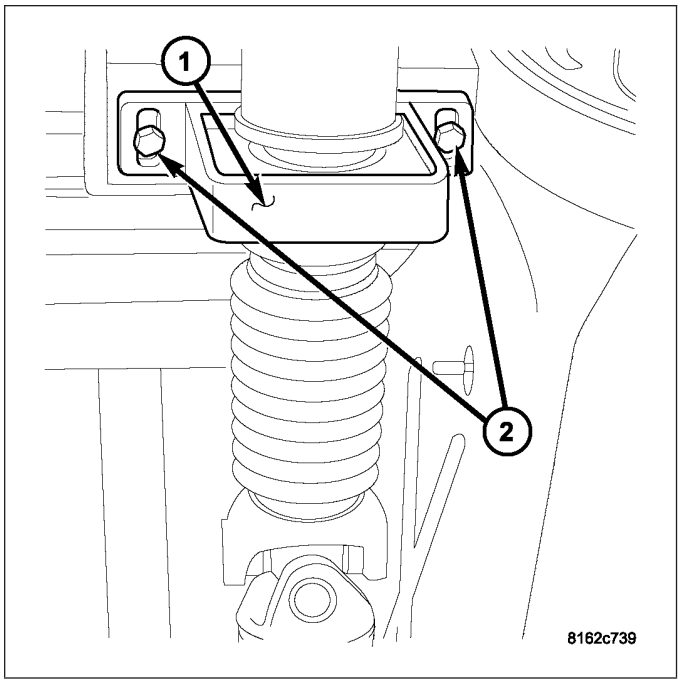
1. Slide slip yoke (1) onto automatic transmission/ transfer case output shaft (2) with reference marks aligned.



2. If equipped with manual transmission, align transmission flange (1) and propeller shaft reference marks. Install **new** flange bolts (2) and tighten to 115 N·m (85 ft. lbs.).

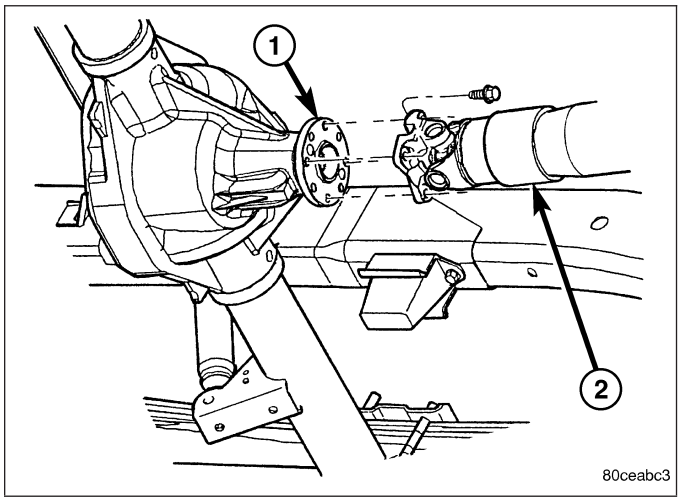


3. If two piece propeller shaft, align center bearing (1) with reference marks on cernter bearing bracket and tighten bolts (2) to 54 N·m (40 ft. lbs.).



4. Align reference marks on propeller shaft and pinion flange. Install **new** companion flange (1) bolts and tighten to 115 N·m (85 ft. lbs.)

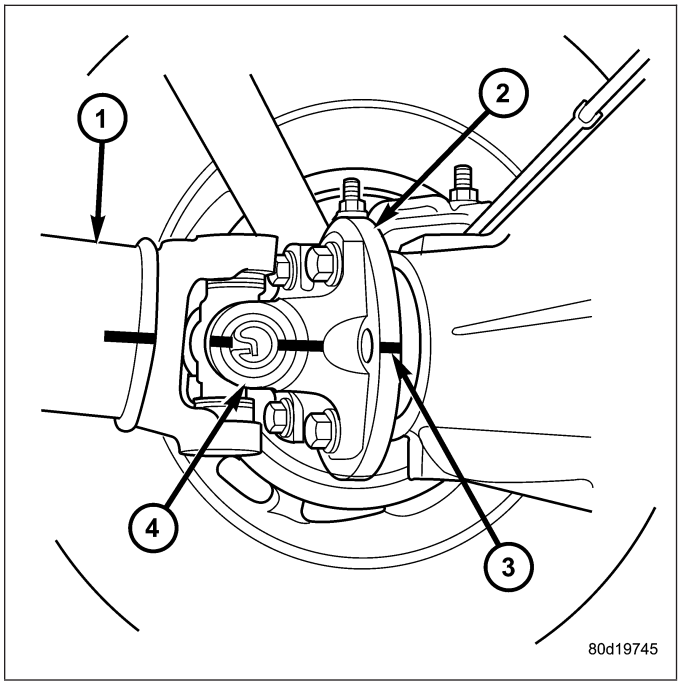
CAUTION: Failure to follow these instruction may result in a driveline vibration.



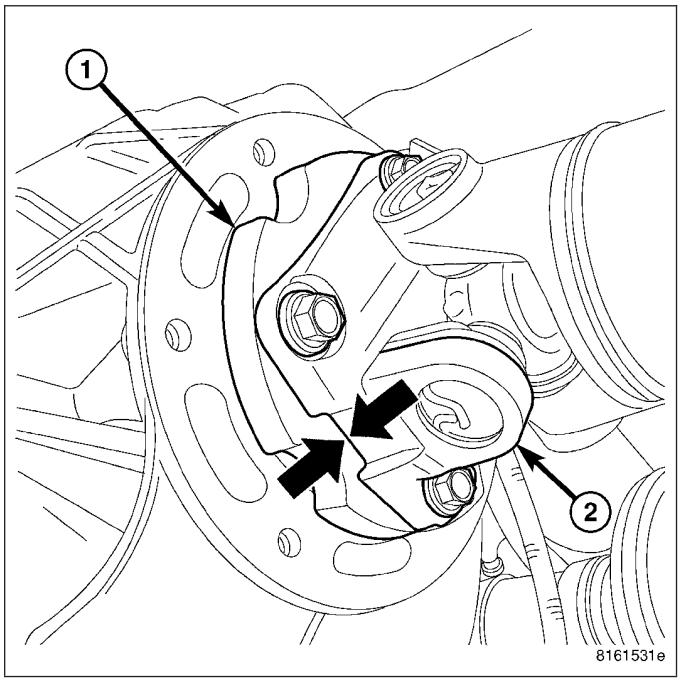
SHAFT-PROPELLER REAR HD

REMOVAL

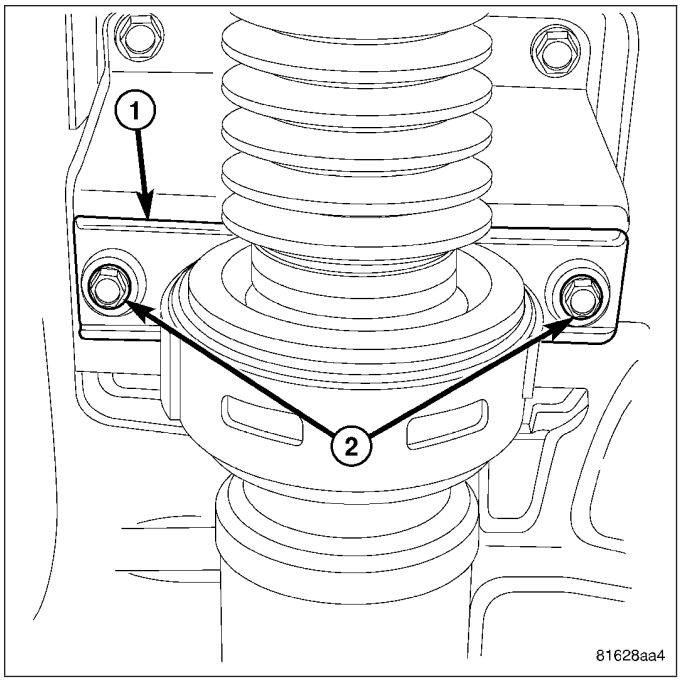
1. With vehicle in neutral, position vehicle on hoist.
2. Mark propeller shaft (1) pinion flange (2) and propeller shaft flange (4) with installation reference marks (3).



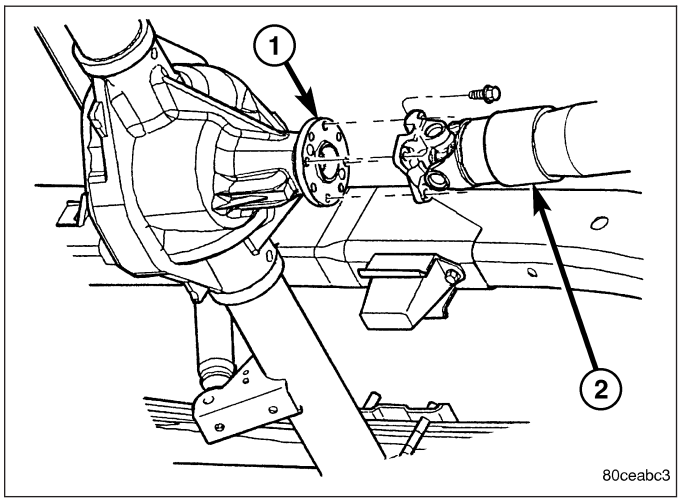
3. If equipped with manual transmission, mark manual transmission flange (1) and propeller shaft flange (2) for installation reference.



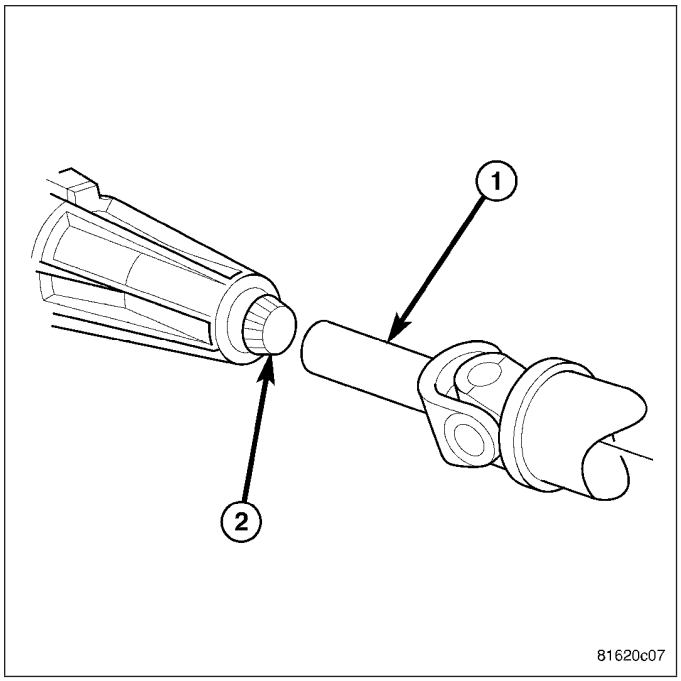
4. If equipped with a center bearing (1) mark an outline of the center bearing on the center bearing bracket for installation reference. Then support propeller shaft and remove center bearing bolts (2).



5. Remove pinion flange (1) bolts from propeller shaft (2).

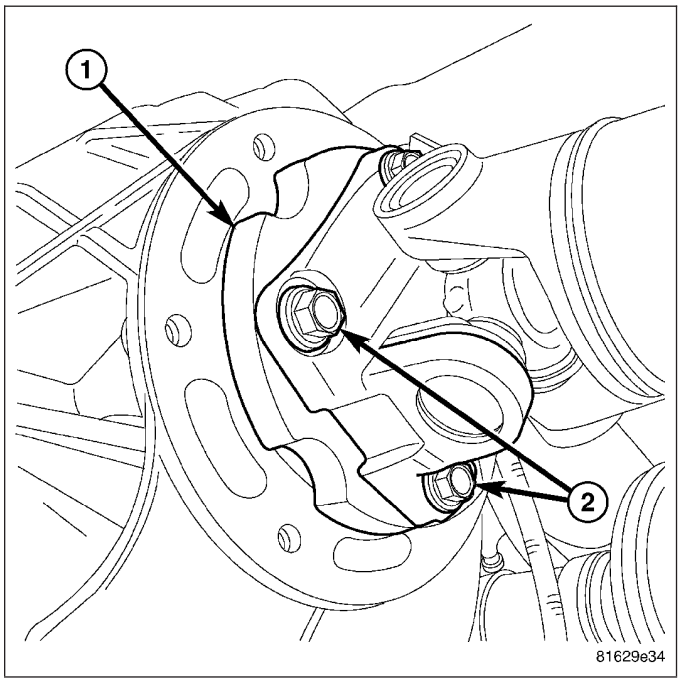


6. Slide propeller shaft back off automatic transmission/transfer case output shaft, then mark propeller shaft (1) and transmission/transfer case output shaft (2) for installation reference.



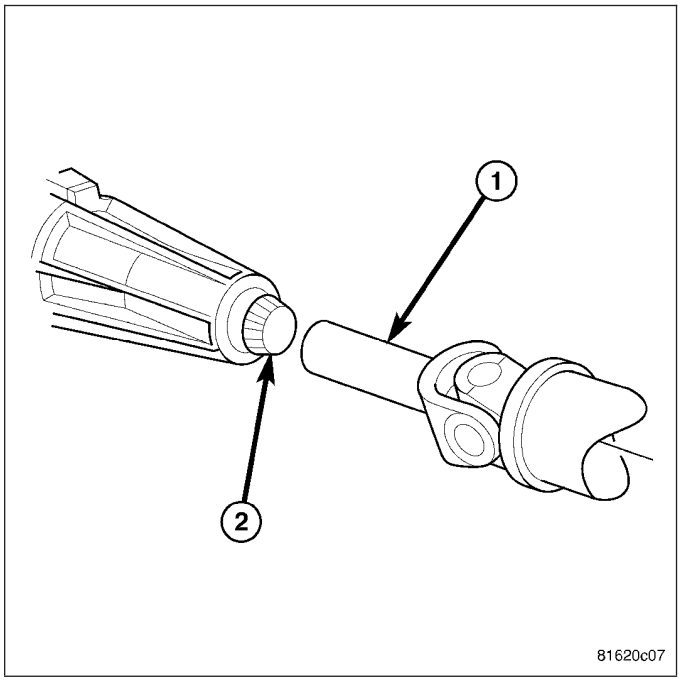
7. If equipped with manual transmission remove flange (1) bolts (2).
8. Remove propeller shaft from vehicle.

CAUTION: Failure to follow these instructions may result in a driveline vibration.

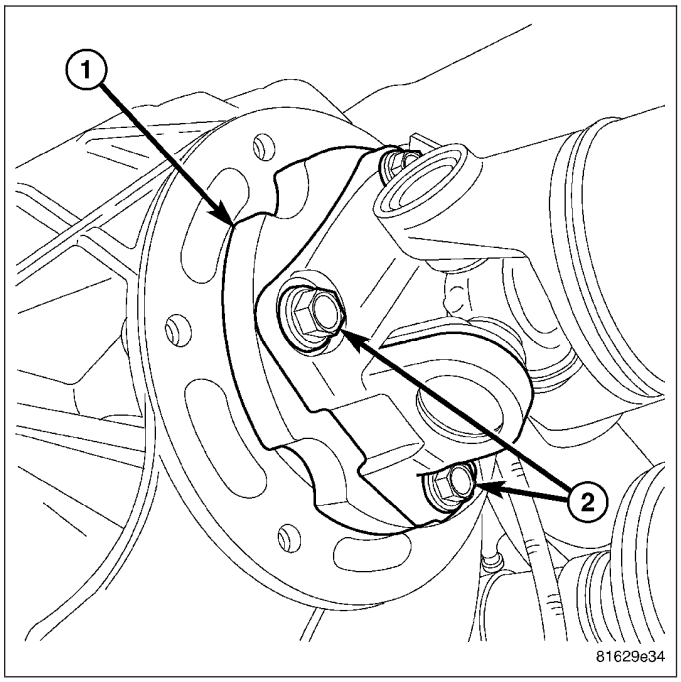


INSTALLATION

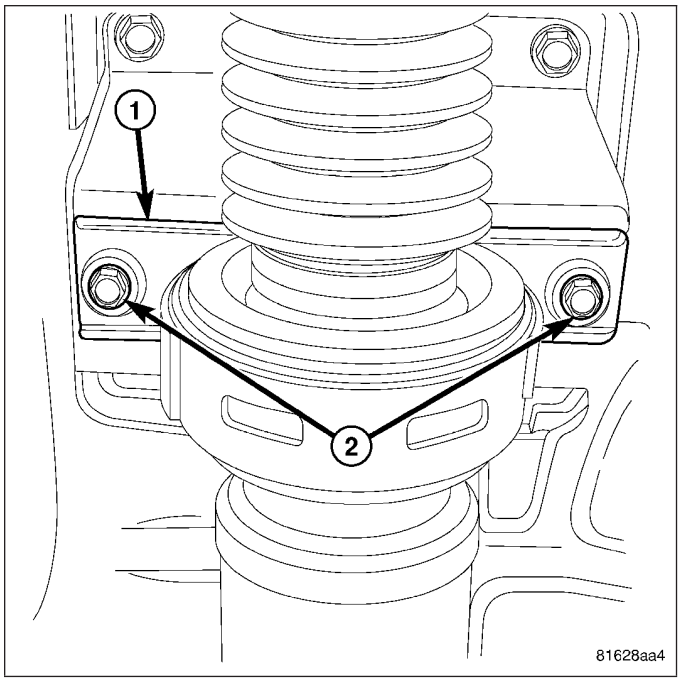
1. Slide slip yoke (1) onto automatic transmission/ transfer case output shaft (2) with reference marks aligned.



2. If equipped with manual transmission, align transmission flange (1) and propeller shaft reference marks. Install **new** flange bolts (2) and tighten to 115 N·m (85 ft. lbs.).

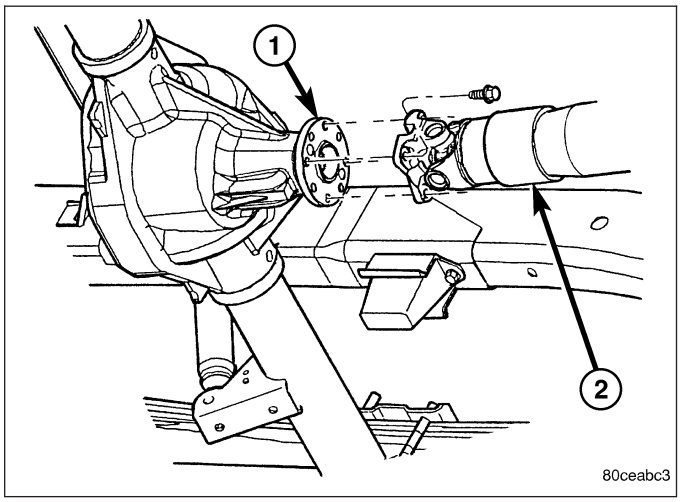


3. If two piece propeller shaft, align center bearing (1) with reference marks on center bearing bracket and tighten bolts (2) to 54 N·m (40 ft. lbs.).



4. Align reference marks on propeller shaft and pinion flange. Install **new** companion flange (1) bolts and tighten to 115 N·m (85 ft. lbs.)

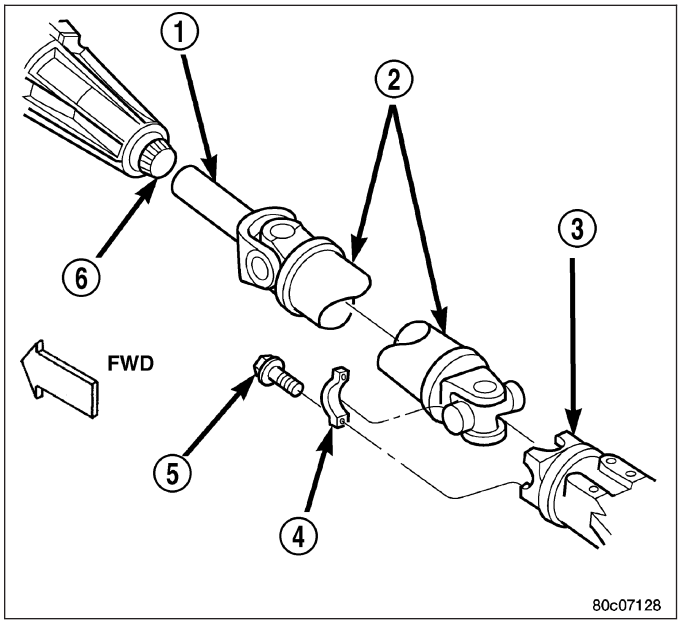
CAUTION: Failure to follow these instruction may result in a driveline vibration.



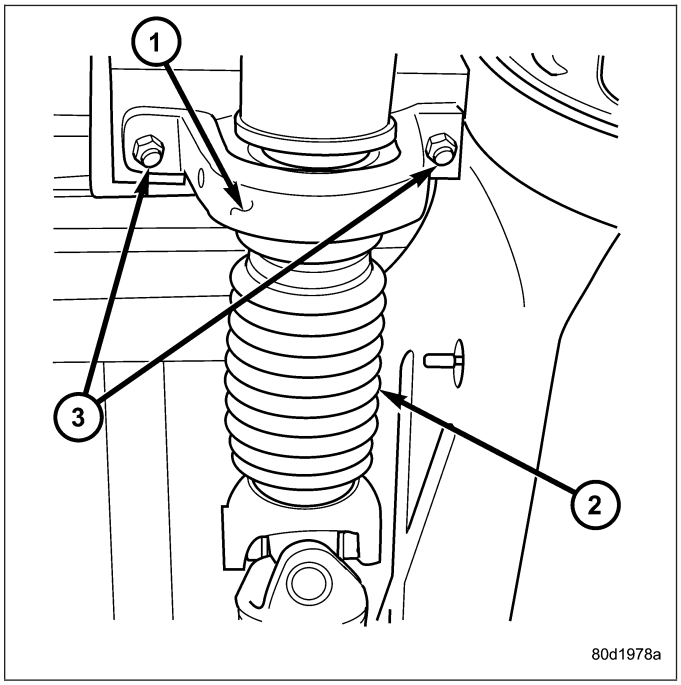
SHAFT-PROPELLER REAR SRT10

REMOVAL

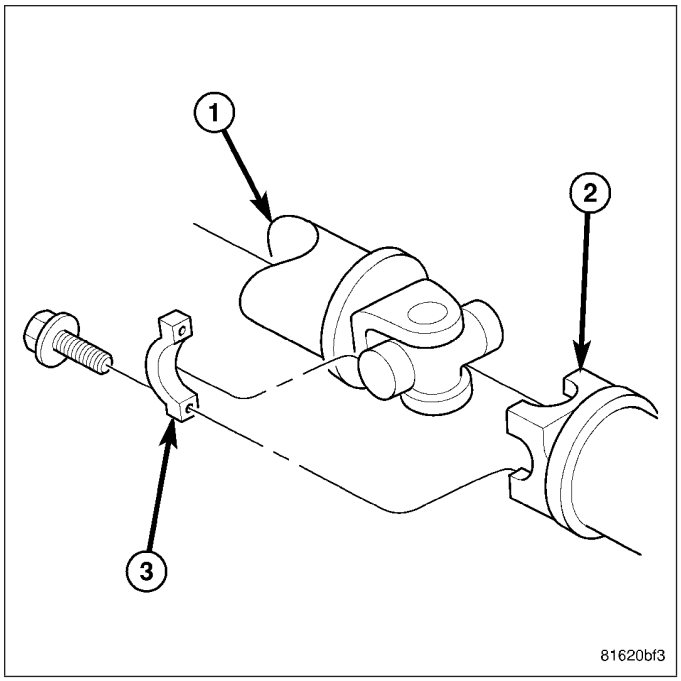
1. With vehicle in neutral, position vehicle on hoist.
2. Mark pinion yoke (3) and propeller shaft (2) yoke for installation reference.



3. Mark an outline of the center bearing (1) on the crossmember for installation reference, if equipped.
4. Remove center bearing mounting nuts (3), if equipped.

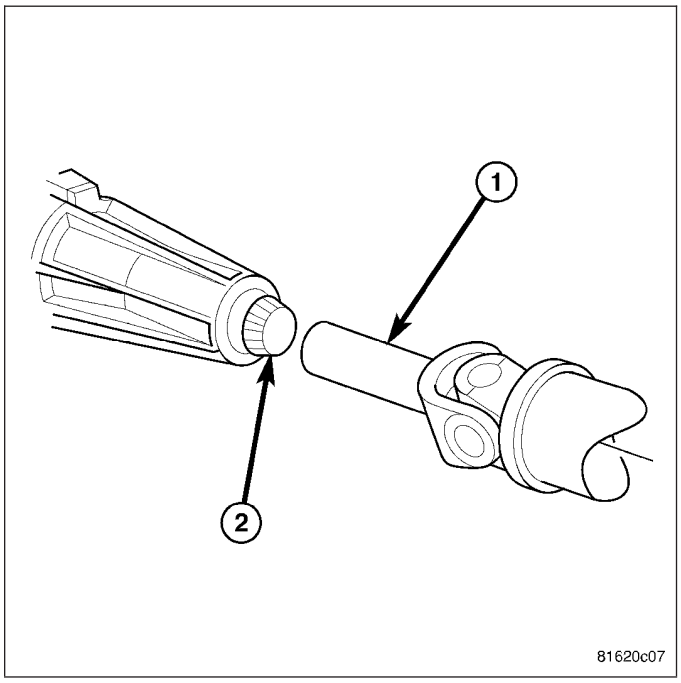


5. Remove propeller shaft (1) pinion yoke (2) clamp (3) bolts and clamps.



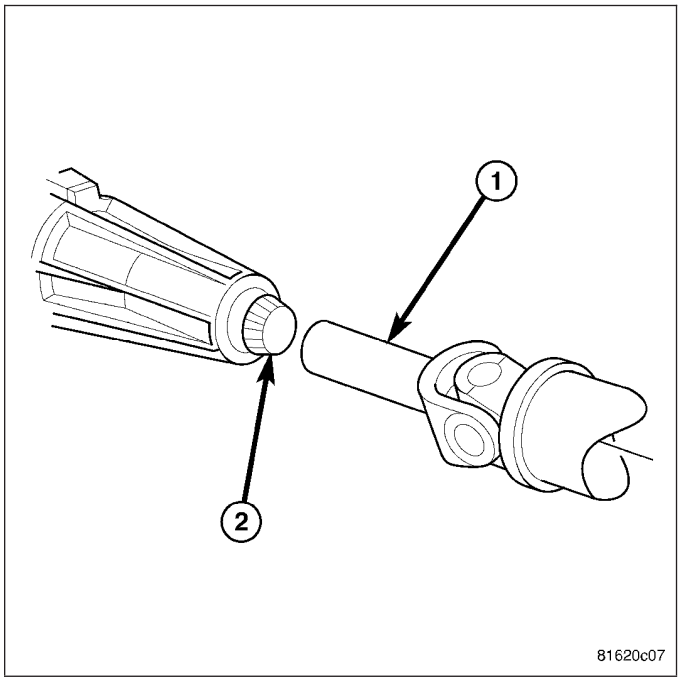
6. Slide propeller shaft (1) back off transmission output shaft (2) and mark shaft and transmission output shaft for installation reference.
7. Remove propeller shaft from vehicle.

CAUTION: Failure to follow these instructions may result in a driveline vibration.

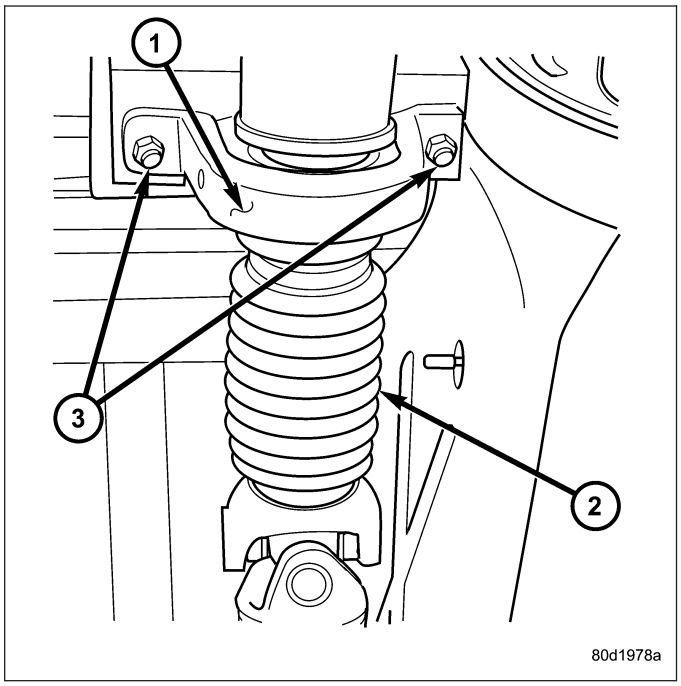


INSTALLATION

1. Slide slip yoke (1) onto the transmission/transfer case output shaft (2) with reference marks aligned.

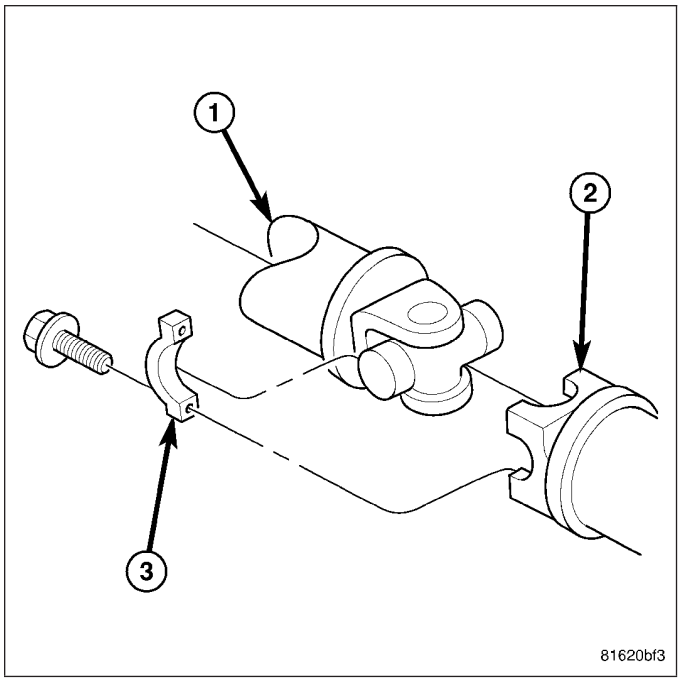


2. If two piece propeller shaft, align center bearing with reference marks on crossmember and tighten nuts to 54 N·m (40 ft. lbs.).



3. Align reference marks on propeller shaft (1) and pinion yoke (2).
4. Install **new** SRT-10 yoke clamp (3) bolts and tighten to 29 N·m (22 ft. lbs.)

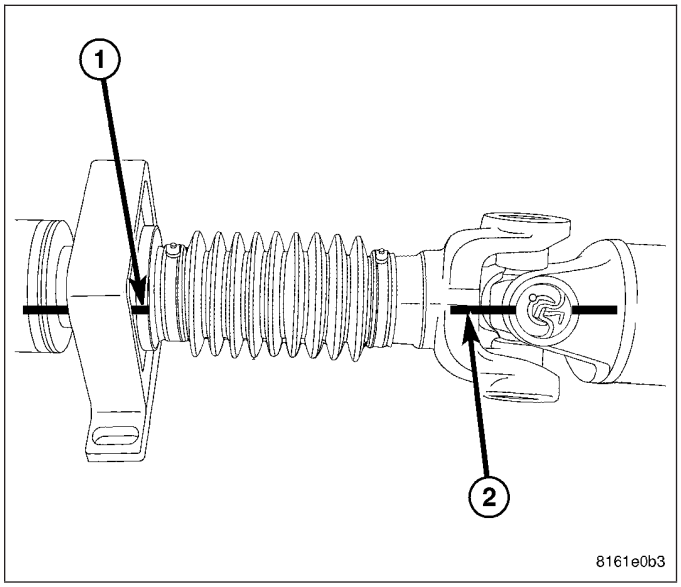
NOTE: Companion flange bolts incorporate a Loctite® patch, new bolts should be used. If bolts are not available, clean bolts and apply Loctite® 242 to the threads.



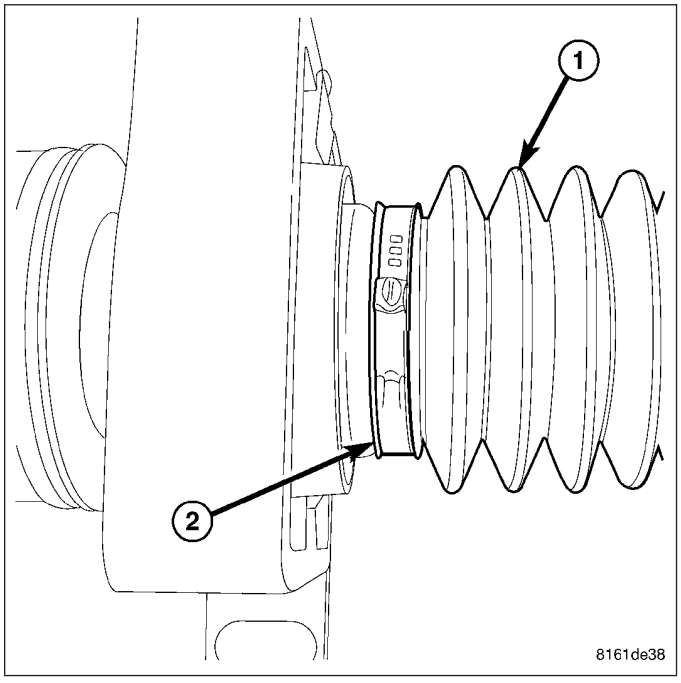
BEARING-CENTER LD

REMOVAL

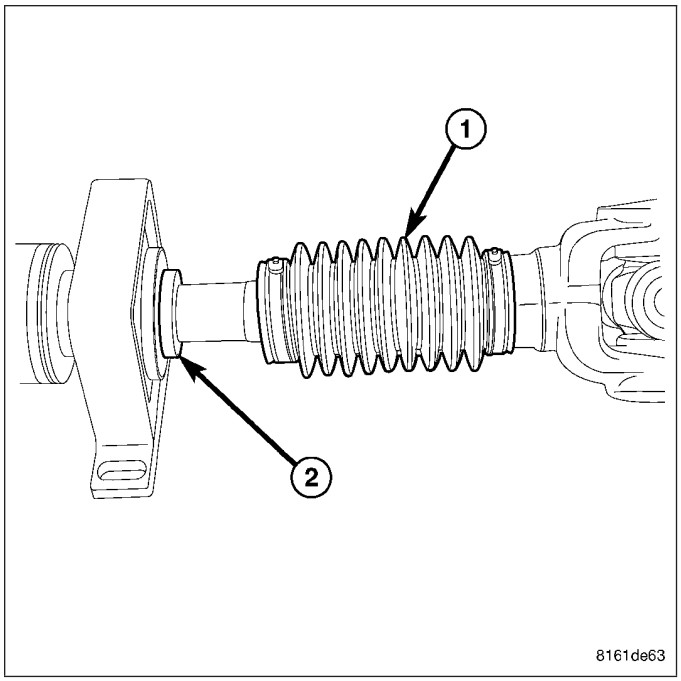
1. Remove rear propeller shaft.
2. Make installation reference marks on the shaft (1) and slip yoke (2).



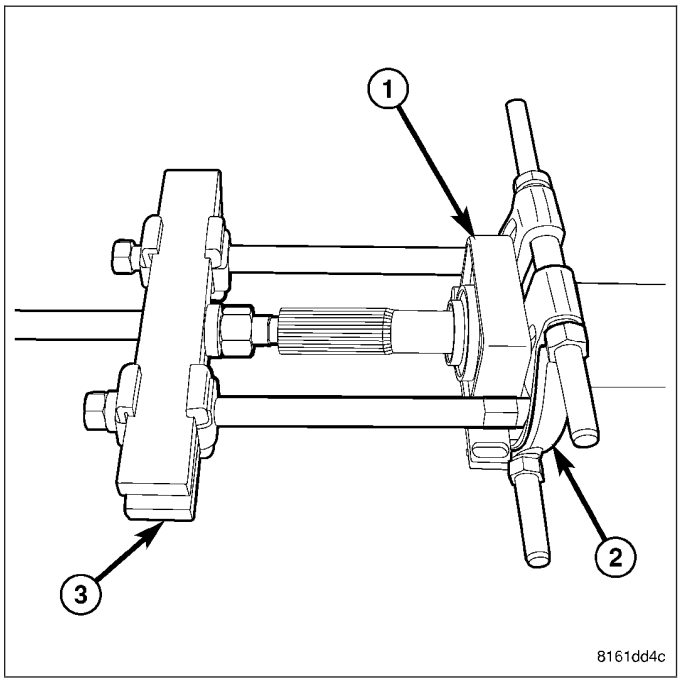
3. Remove slip joint boot (1) clamp (2).



4. Slide boot (1) off boot collar (2) and separate the two shafts.

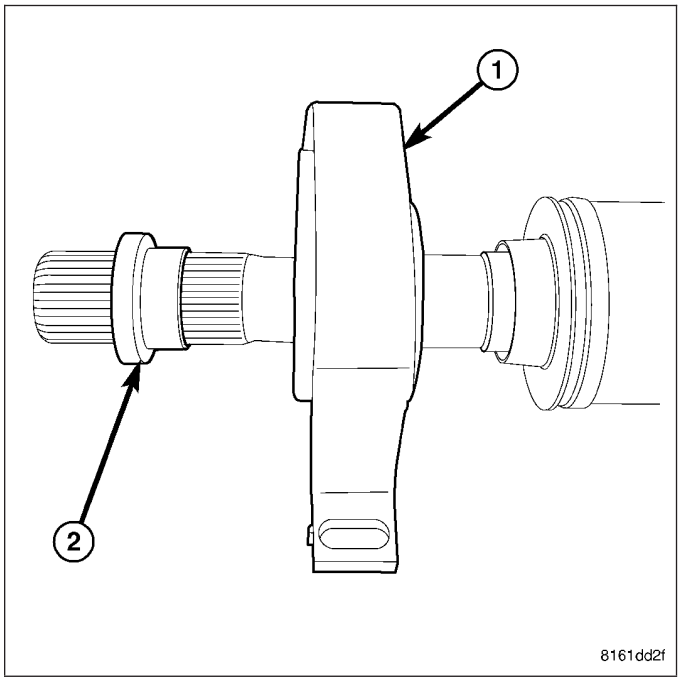


5. Position Bearing Splitter Tool 1130 (2) between slinger and center bearing (1).
6. Install Bridge 938 (3) on the splitter (2) and remove center bearing (1).

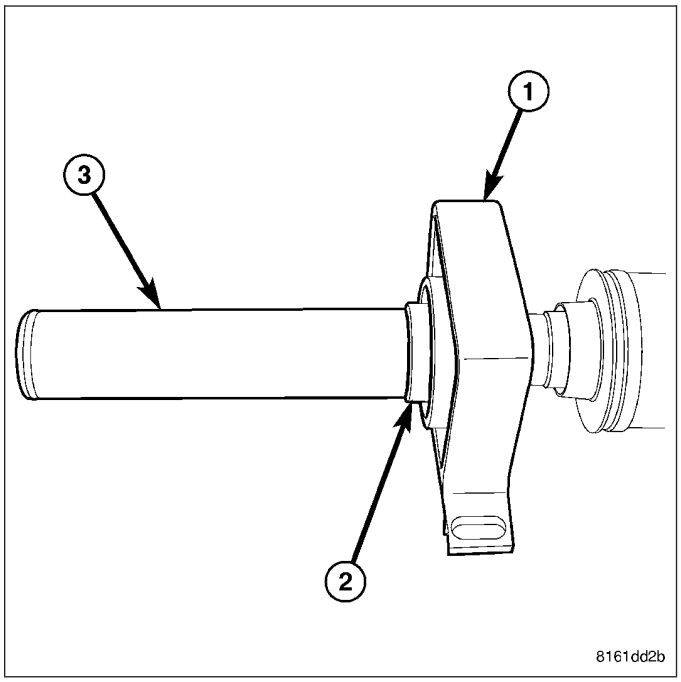


INSTALLATION

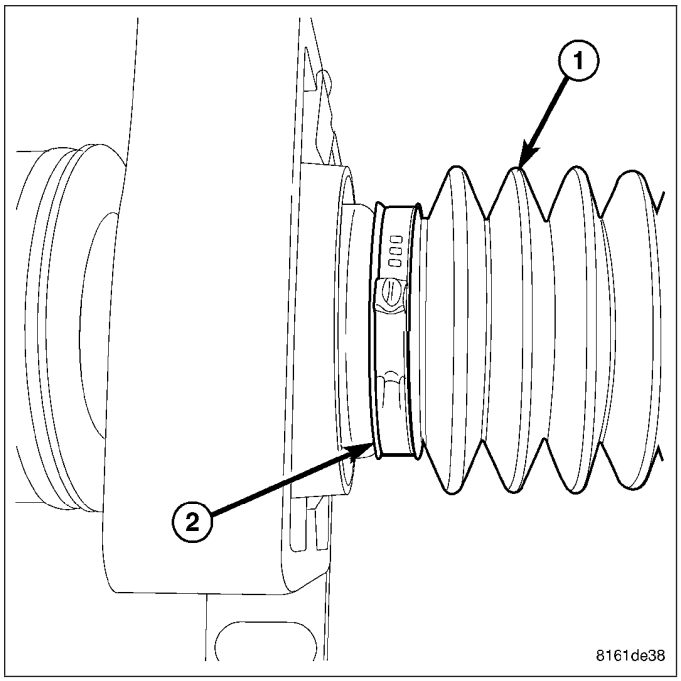
1. Install new slinger on shaft if removed and drive into position with appropriate installer tool.
2. Install new center bearing (1) and boot collar (2) on shaft.



3. Install bearing (1) and boot collar (2) on shaft with Installer 6052 (3).



4. Clean shaft splines and apply a coat of multi-purpose grease.
5. Align master splines and slide front and rear halfshafts together.
6. Position slip yoke boot (1) on boot collar and install clamp (2).
7. Install propeller shaft in vehicle.



ADJUSTMENTS

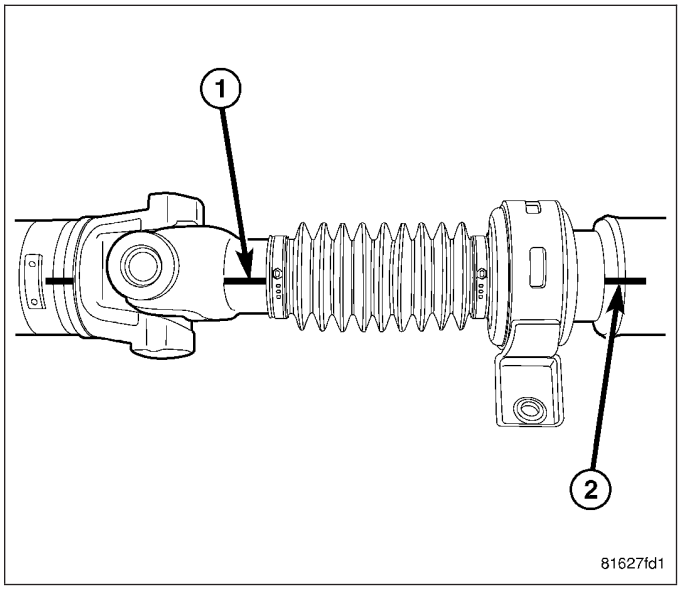
BEARING CENTER

Launch shudder is a vibration that occurs at first acceleration from a stop. Shudder vibration usually peaks at the engines highest torque output. Shudder is a symptom associated with vehicles using a two-piece propeller shaft. To decrease shudder, lower the center bearing in 3.0 mm (0.125 in.) increments. Use shim stock or fabricated plates. **Do not use washers.** Replace the original bolts with the appropriate increased length bolts.

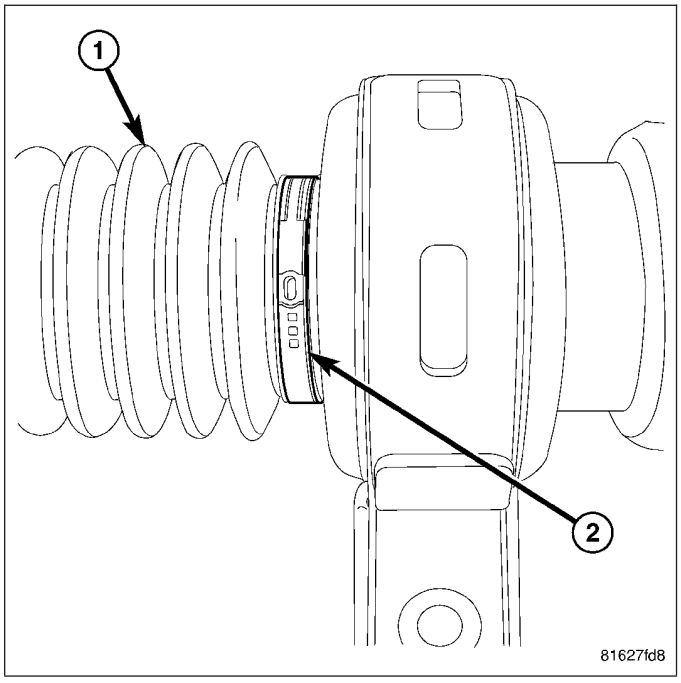
BEARING-CENTER HD

REMOVAL

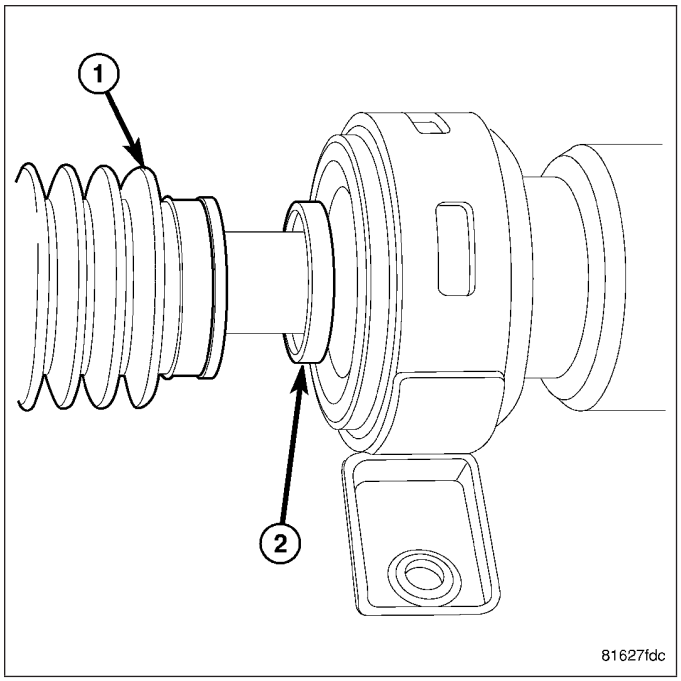
1. Remove rear propeller shaft.
2. Make installation reference marks on rear shaft (1) and front shaft (2).



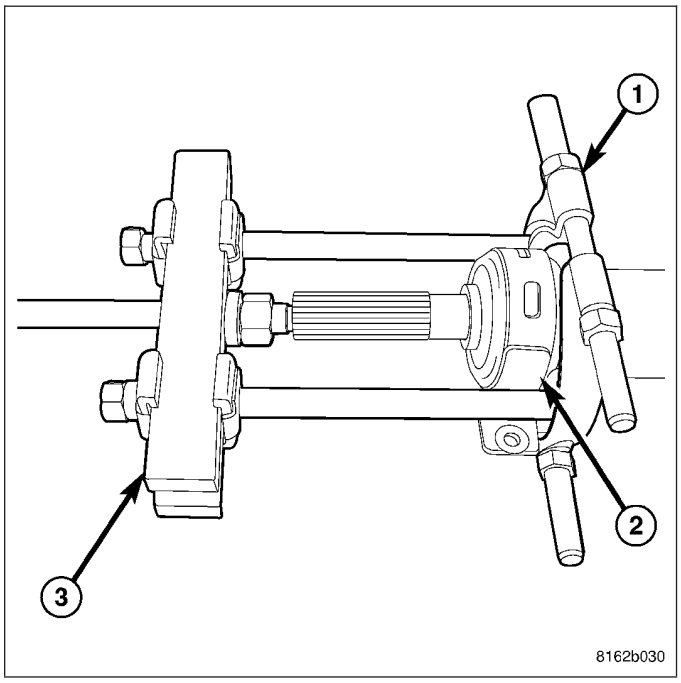
3. Remove slip joint boot (1) clamp (2).



4. Slide boot (1) off boot collar (2) and separate the two shafts.

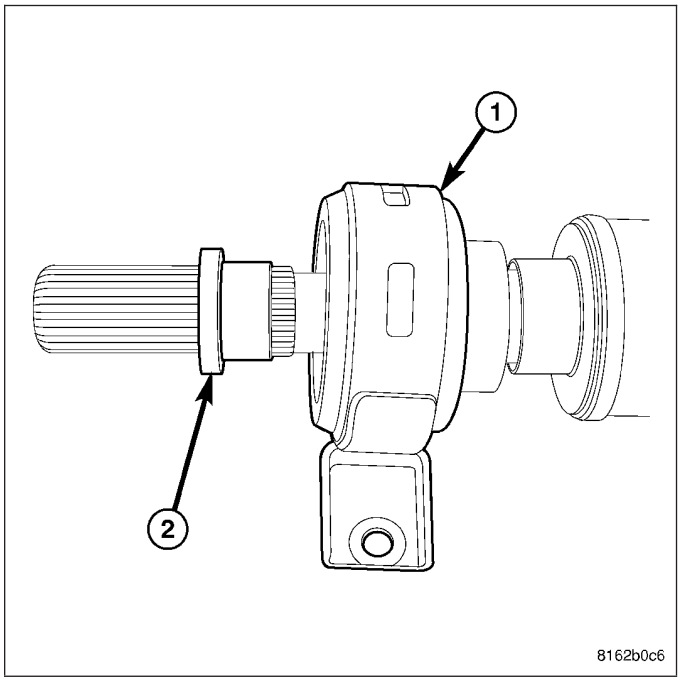


5. Position Bearing Splitter Tool 1130 (1) between propeller shaft and center bearing (2).
6. Install Bridge 938 (3) on the splitter (1) and remove center bearing.

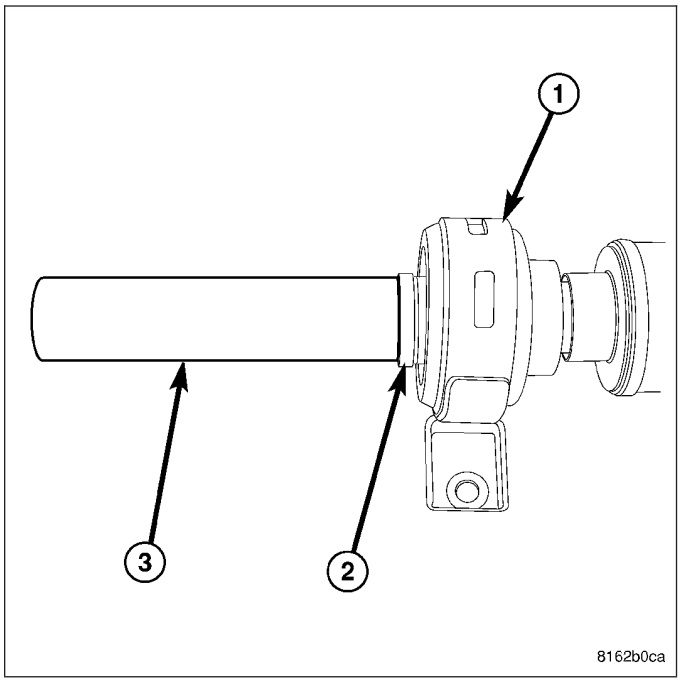


INSTALLATION

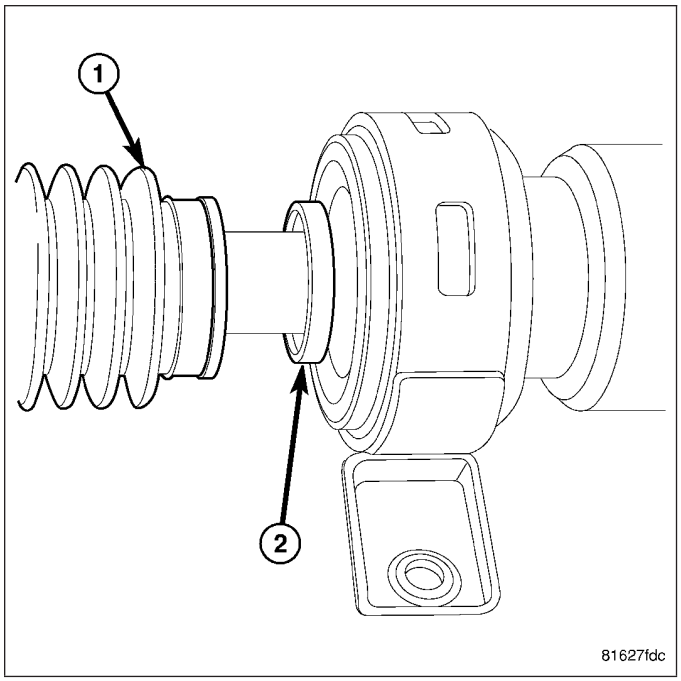
1. Slide center bearing (1) and boot collar (2) on shaft.



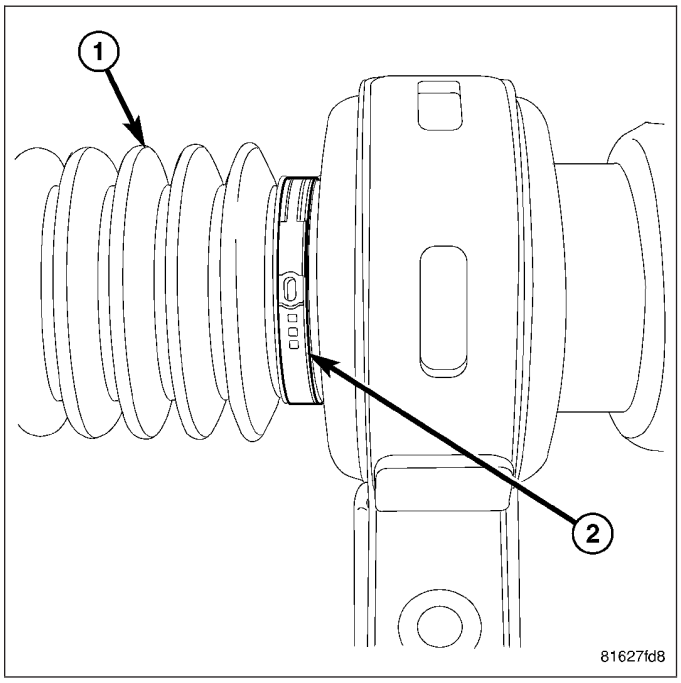
2. Install boot collar (2) and center bearing (1) with Installer 6448A.
3. Clean shaft splines and apply a coat of multi-purpose grease.
4. Align master splines and slide front and rear halfshafts together.



5. Slide slip yoke boot (1) on boot collar (2).



6. Install slip yoke boot (1) clamp (2).
7. Install propeller shaft in vehicle.



ADJUSTMENTS

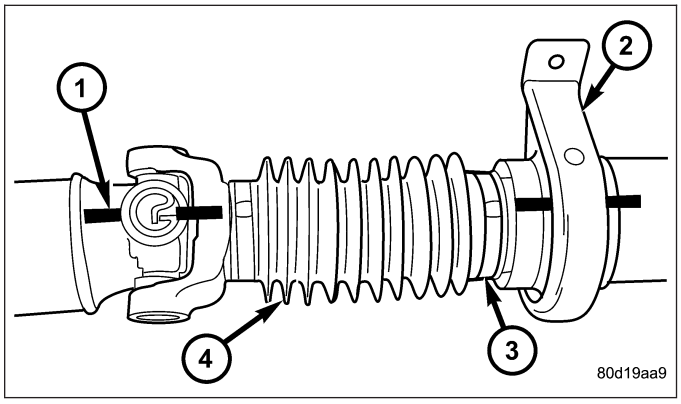
BEARING CENTER

Launch shudder is a vibration that occurs at first acceleration from a stop. Shudder vibration usually peaks at the engines highest torque output. Shudder is a symptom associated with vehicles using a two-piece propeller shaft. To decrease shudder, lower the center bearing in 3.0 mm (0.125 in.) increments. Use shim stock or fabricated plates. **Do not use washers.** Replace the original bolts with the appropriate increased length bolts.

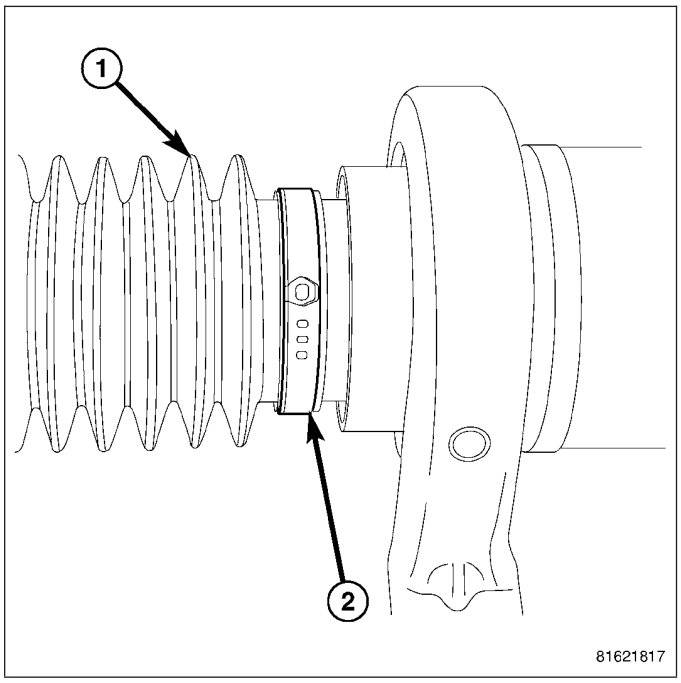
BEARING-CENTER-SRT10

REMOVAL

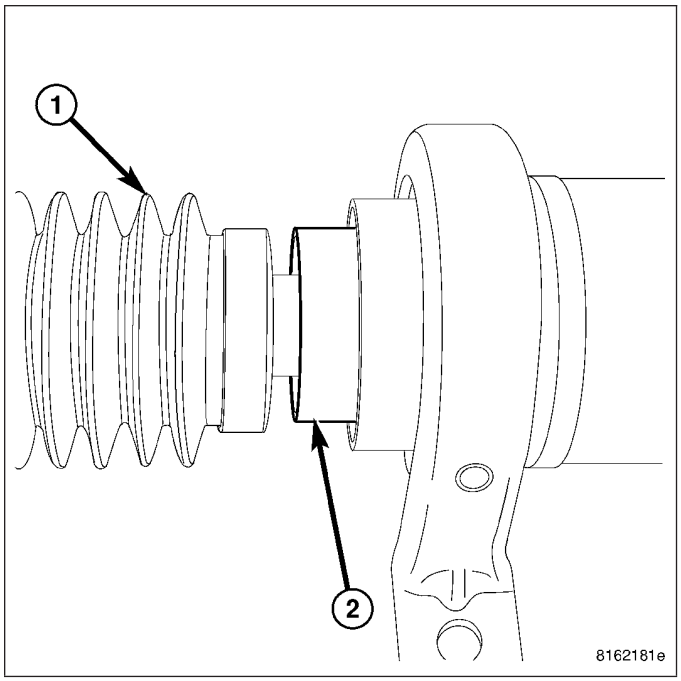
1. Remove rear propeller shaft.
2. Make installation reference marks on rear shaft (1) and front shaft (2).



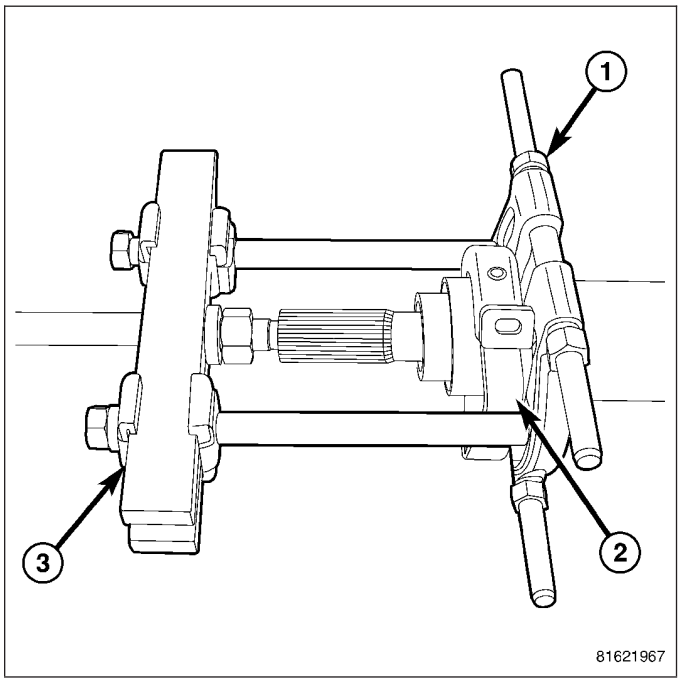
3. Remove slip joint boot (1) clamp (2).



4. Slide boot (1) off boot collar (2) and separate the two shafts.

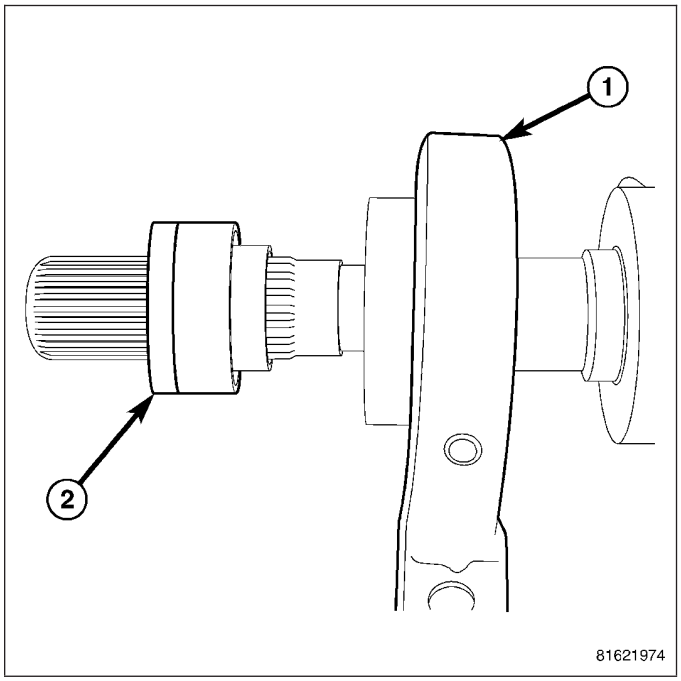


5. Position Bearing Splitter 1130 (1) between propeller shaft and center bearing (2).
6. Install Bridge 938 (3) on the splitter (1) and remove the bearing.

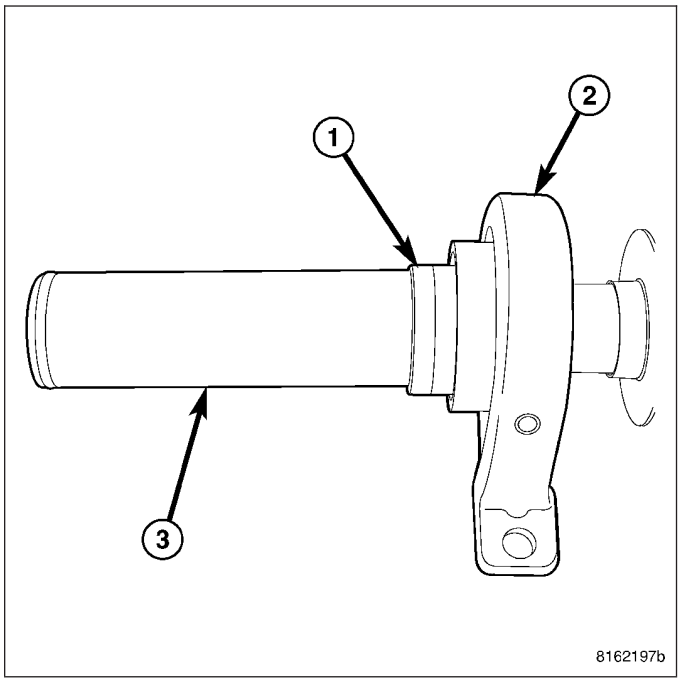


INSTALLATION

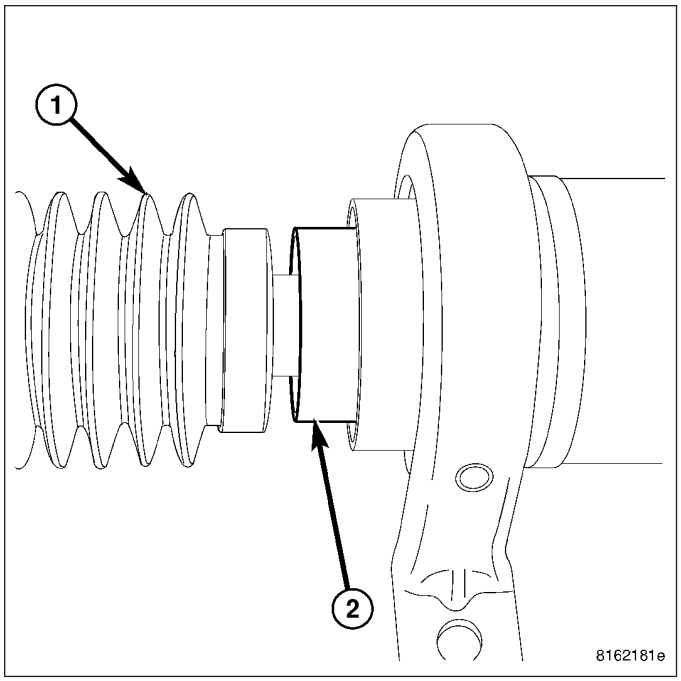
1. Slid center bearing (1) and boot collar (2) on shaft.



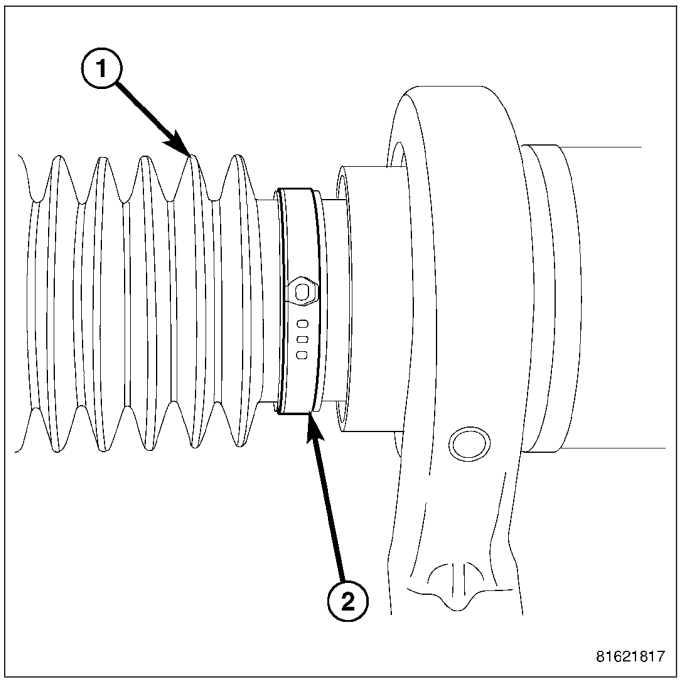
2. Install boot collar (1) and center bearing (2) with Installer 9347.
3. Clean shaft splines and apply a coat of multi-purpose grease.
4. Align master splines and slide front and rear halfshafts together.



5. Slide slip yoke boot (1) on boot collar (2).



6. Install slip yoke boot (1) and clamp (2).
7. Install propeller shaft in vehicle.



ADJUSTMENTS

BEARING CENTER

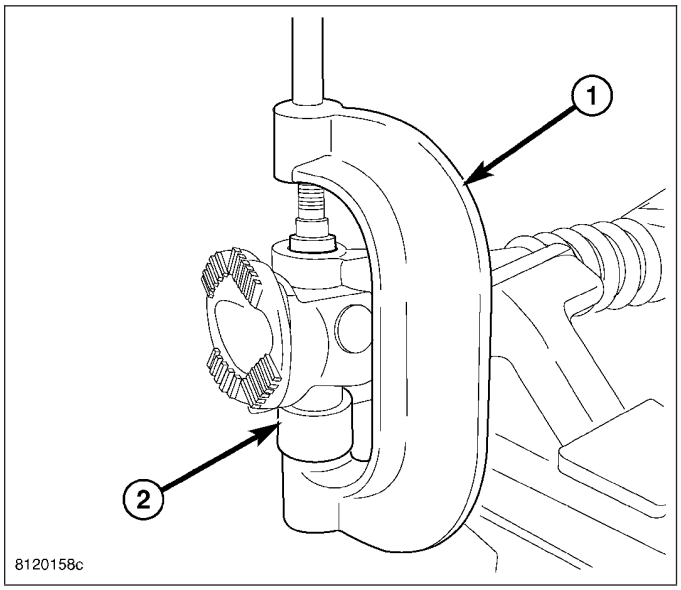
Launch shudder is a vibration that occurs at first acceleration from a stop. Shudder vibration usually peaks at the engines highest torque output. Shudder is a symptom associated with vehicles using a two-piece propeller shaft. To decrease shudder, lower the center bearing in 3.0 mm (0.125 in.) increments. Use shim stock or fabricated plates. **Do not use washers.** Replace the original bolts with the appropriate increased length bolts.

UNIVERSAL JOINTS-SINGLE CARDAN

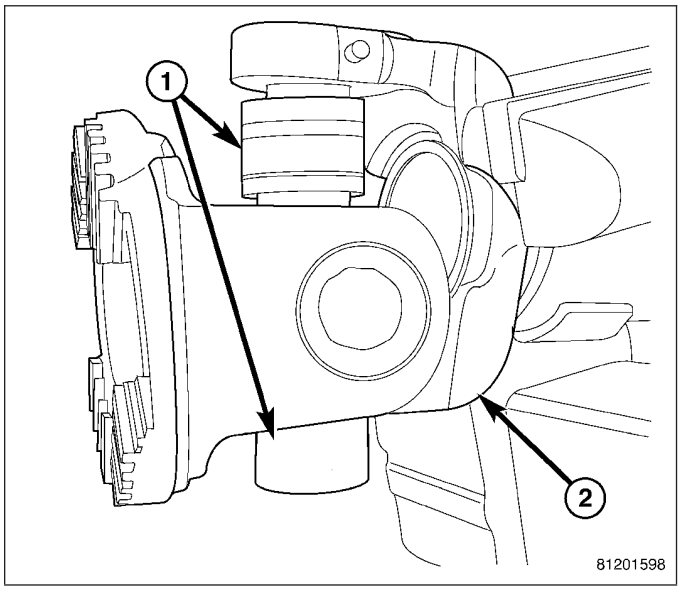
DISASSEMBLY

DISASSEMBLY - WITH INJECTED RING

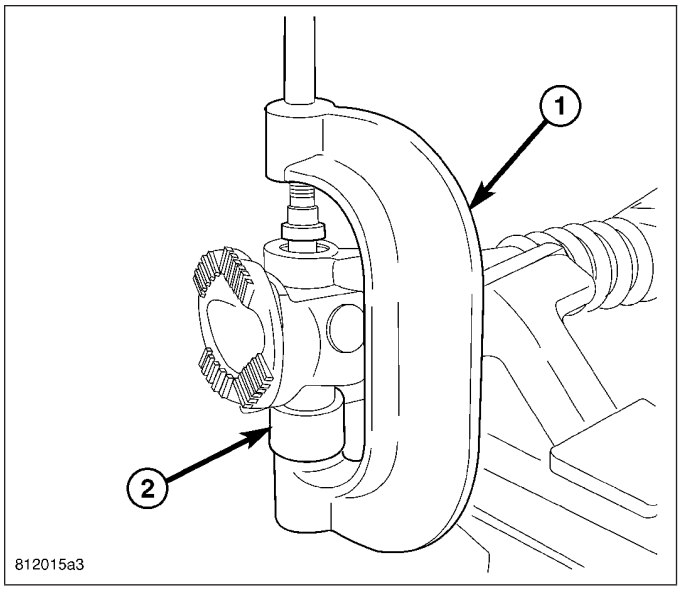
1. Place shaft yoke in vise.
2. Position U-joint press (1) with receiver (2) on propeller shaft yoke.



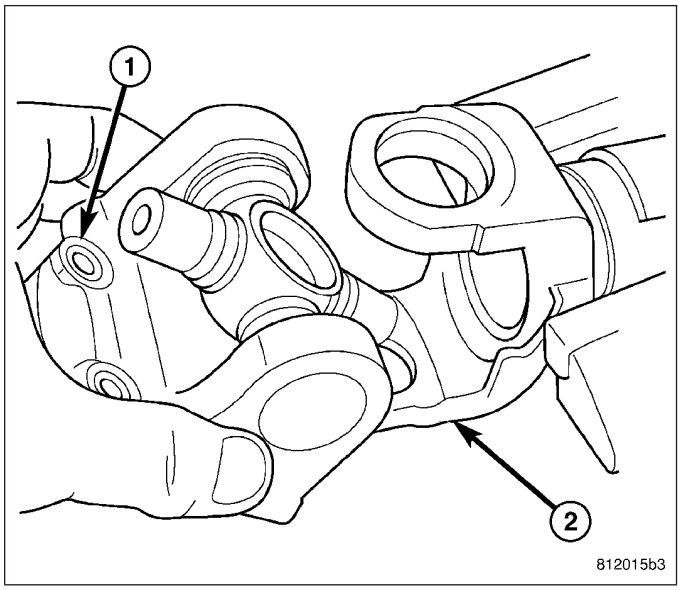
3. Pressed U-joint bearing caps (1) out of shaft yoke (2).
4. Remove lower bearing cap from shaft yoke.



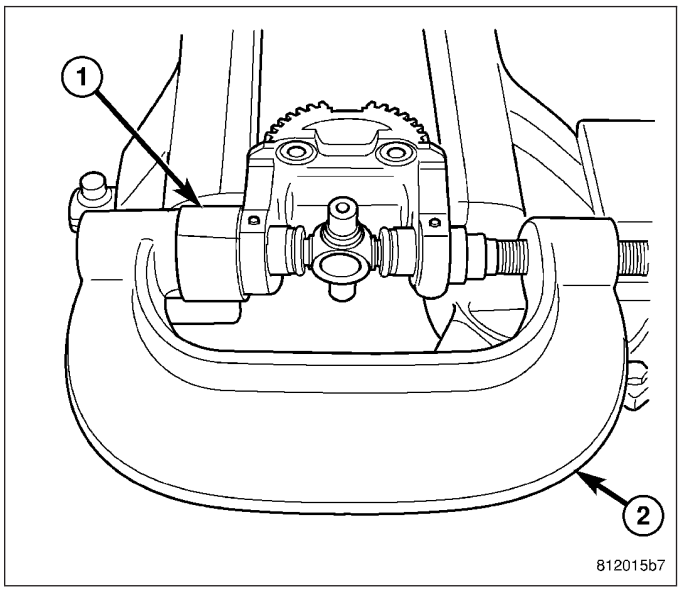
5. Turn shaft over and position press (1) with receiver (2) on shaft yoke.
6. Press remaining U-joint bearing cap out of shaft yoke.



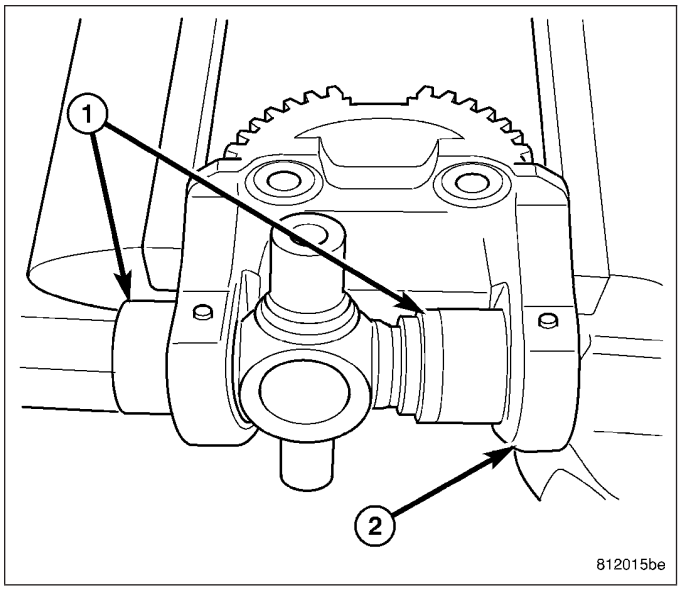
7. Remove flange (1) with U-joint out of shaft yoke (2).



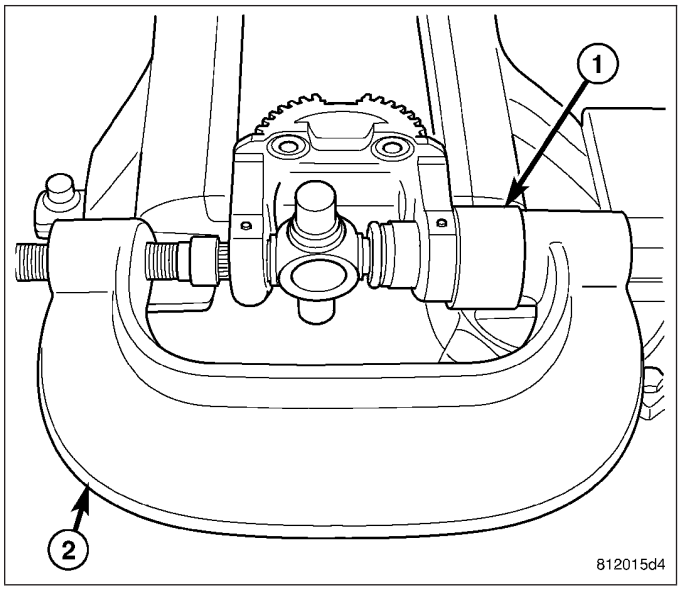
8. Position U-joint press (2) with receiver (1) on flange.



9. Press U-joint bearing caps (1) out of flange (2).
10. Remove bearing cap on the outside of the flange.

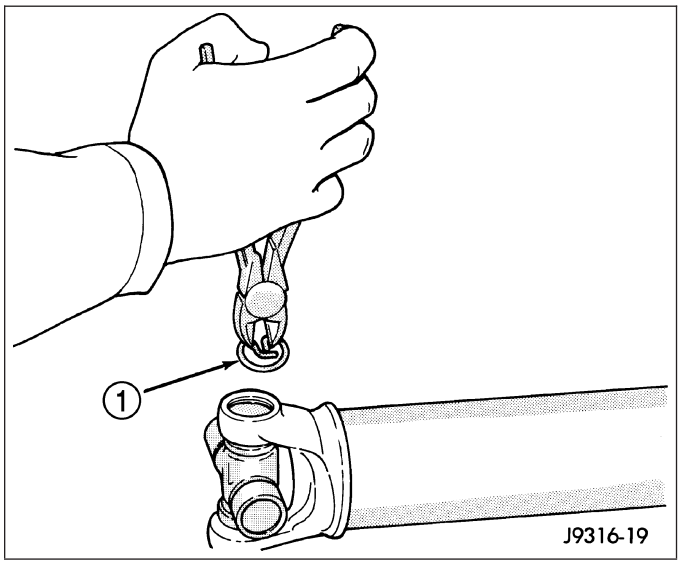


11. Position U-joint press (2) with receiver (1) on flange.
12. Press remaining U-joint bearing cap out of flange.
13. Remove U-joint from flange.

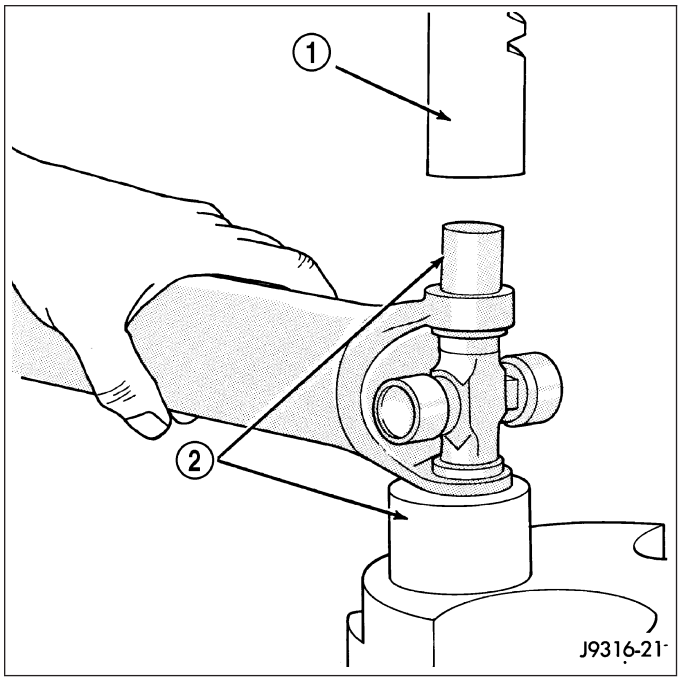


DISASSEMBLY - WITH SNAP RINGS

1. Tap outside of bearing cap with a drift to loosen snap ring.
2. Remove snap rings (1) from both sides of yoke.



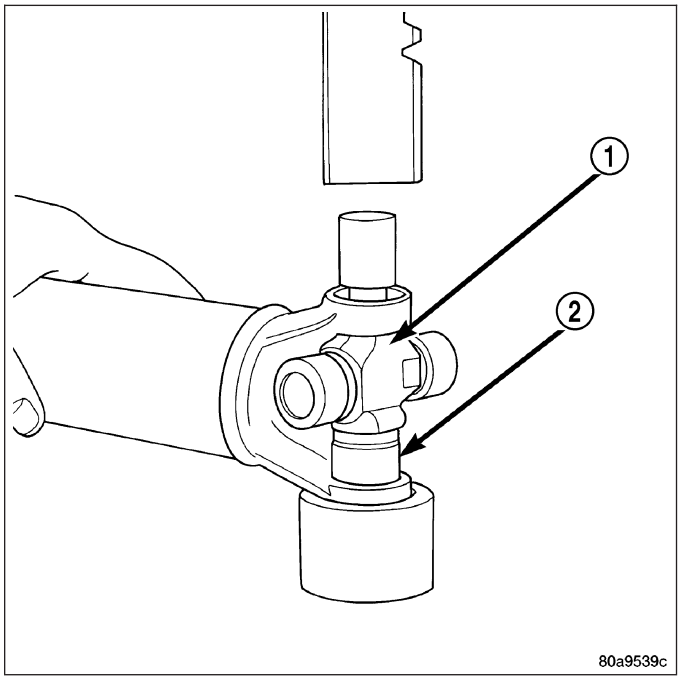
3. Position yoke with the grease fitting if equipped, pointing up.
4. Position a socket (2) with a inside diameter large enough to receive the bearing cap, beneath the yoke on a press.
5. Place another socket with an outside diameter smaller than bearing cap on the upper bearing cap and press (1) the lower cap through the yoke.



NOTE: If bearing cap will not pull out of the yoke after pressing, tap yoke ear near bearing cap to dislodge the cap.

6. Pull bearing cap of the yoke.
7. Turn yoke over in the press and straighten the cross (1). Press the cross until the remaining bearing cap (2) can be removed.

CAUTION: If cross or bearing cap are not straight during removal, the bearing cap will score the walls of the yoke bore and damage can occur.

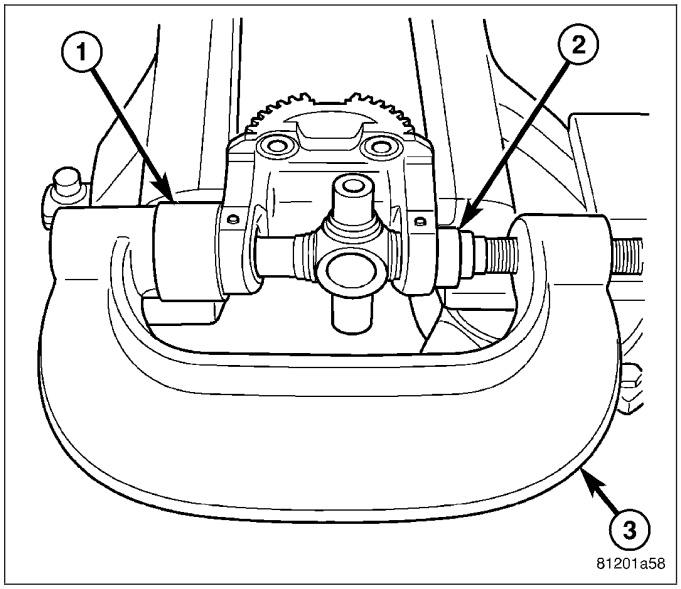


ASSEMBLY

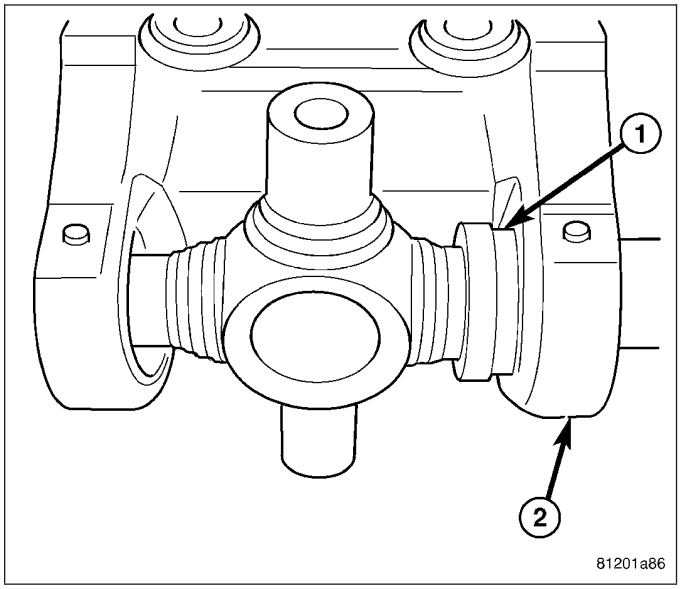
ASSEMBLY - WITH INJECTED RING

NOTE: Replacement joint has internal snap rings.

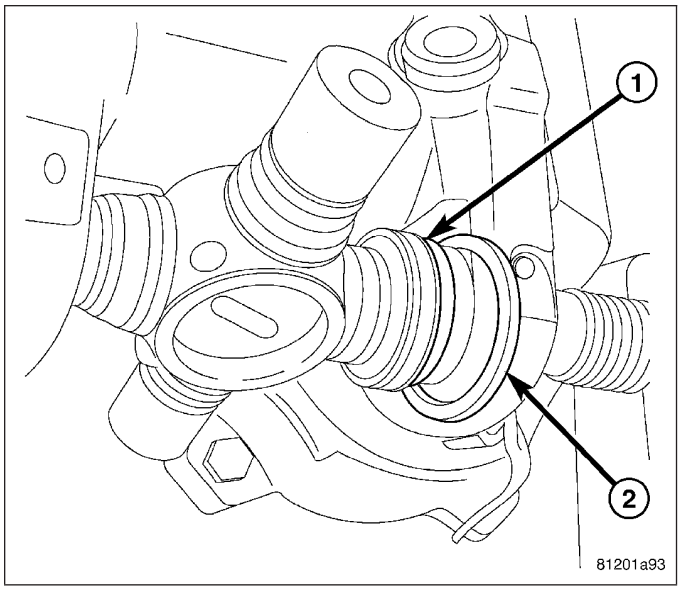
1. Place joint in flange with one bearing cap.
2. Position press (3) with receiver (1) on flange and bearing cap (2).



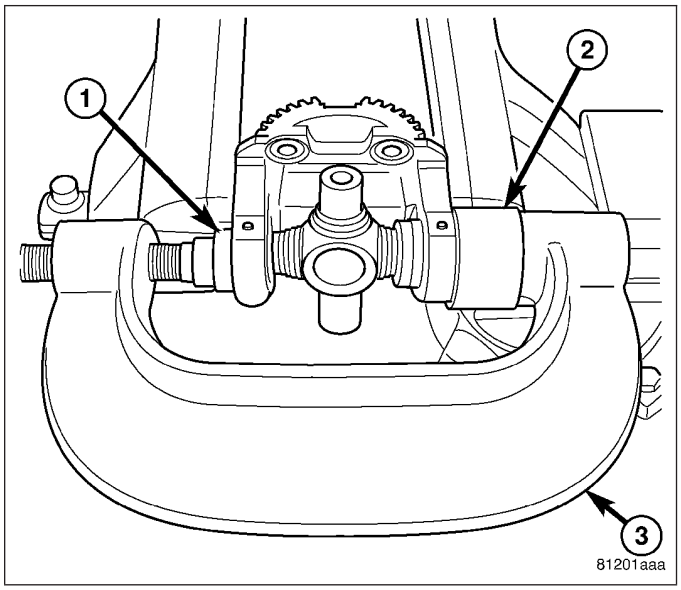
3. Press bearing cap until snap ring groove (1) is through the flange (2).



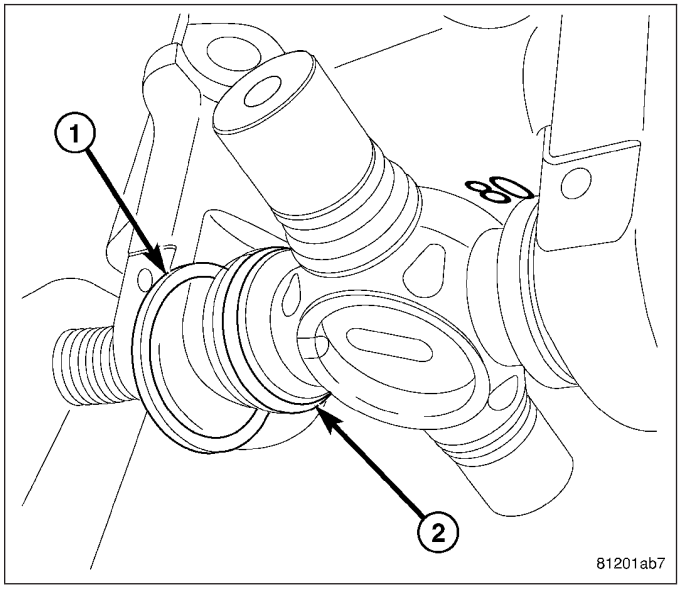
4. Install snap ring (2) on bearing (1).



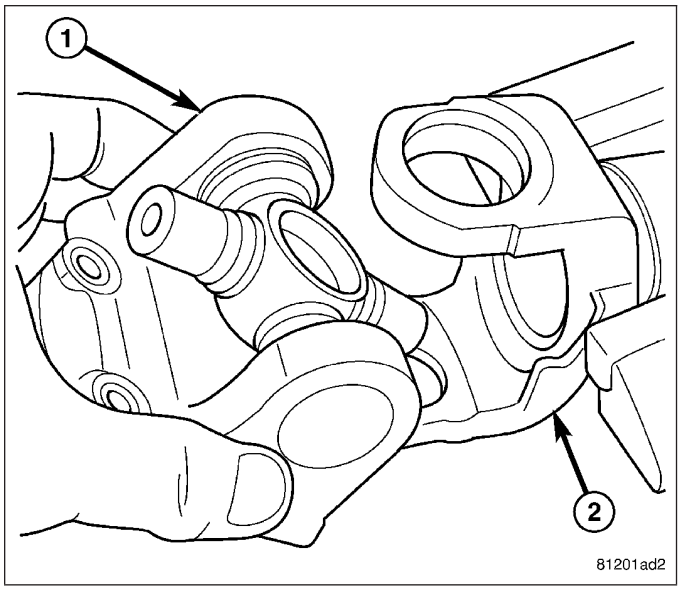
5. Position press (3) with receiver (2) on remaining bearing cap (1) and flange.
6. Press bearing cap until snap ring groove is through the flange.



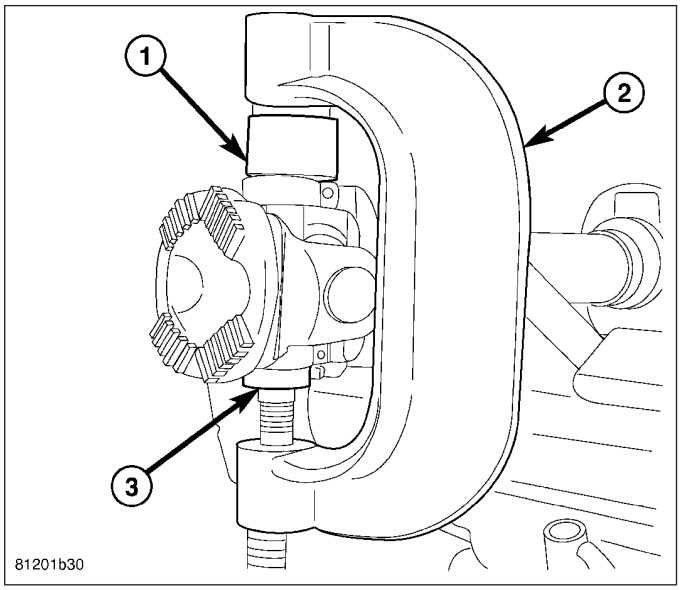
7. Install snap ring (1) on bearing cap (2).



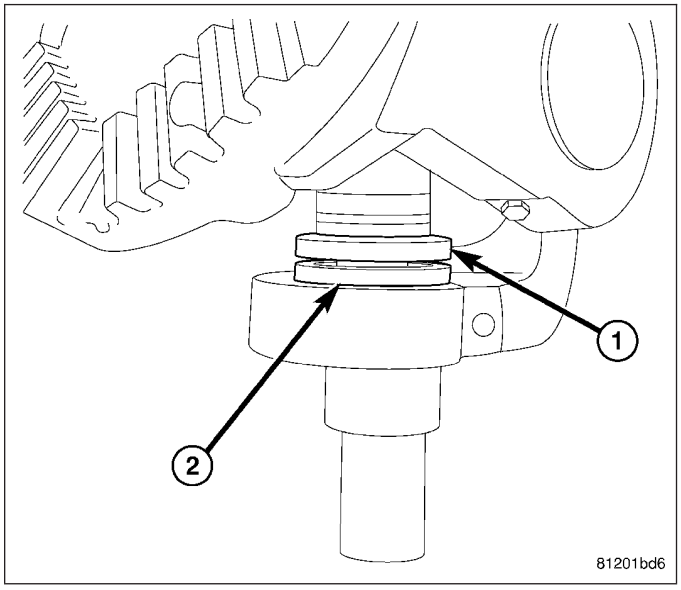
8. Install flange (1) with U-joint in yoke (2).



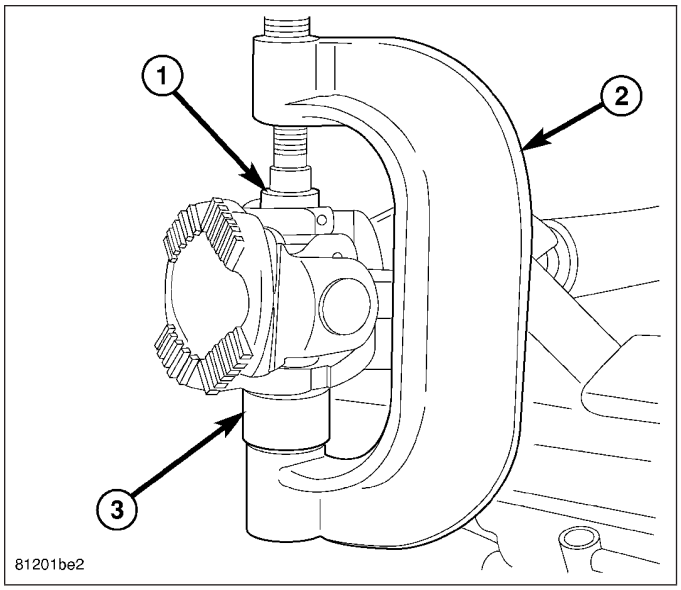
9. Position press (2) with receiver (1) and lower bearing cap (3) on yoke.
10. Press bearing cap until snap ring groove is through the yoke.



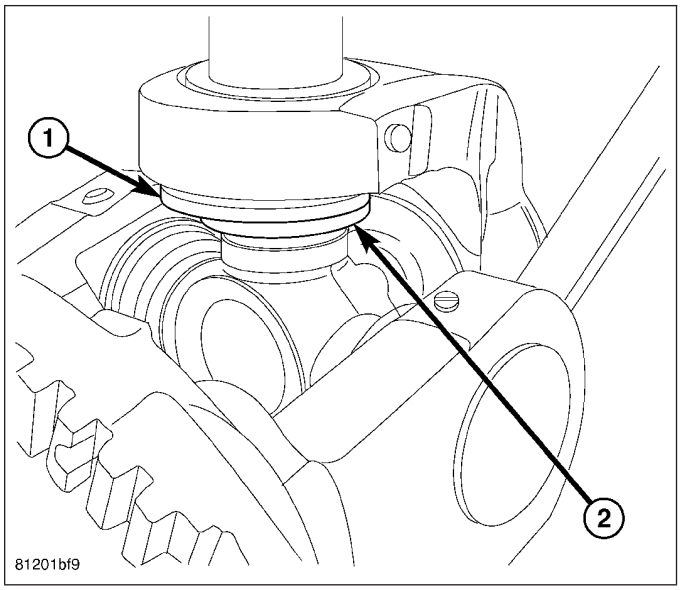
11. Install snap ring (2) on bearing cap (1).



12. Position press (2) with receiver (3) on remaining bearing cap (1) and yoke.
13. Press remaining bearing cap until snap ring groove is through the yoke.

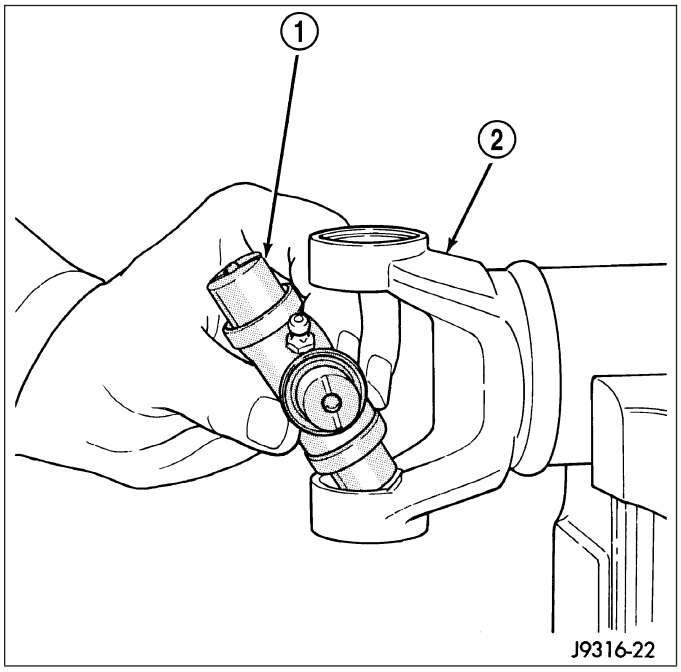


14. Install snap ring (2) on bearing cap (1).



ASSEMBLY - WITH SNAP RINGS

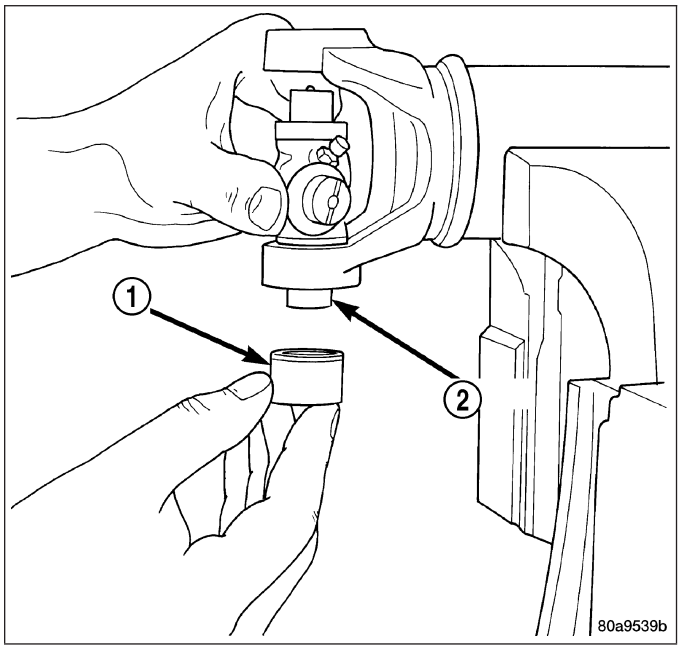
1. Apply (EP) N.L.G.I. Grade 1 or 2 grease to inside of yoke bores.
2. Position cross (1) in yoke (2) with lube fitting pointing up, if equipped.



3. Place a bearing cap (1) over the cross end (2) and align cap with yoke bore.
4. Press bearing cap into the yoke bore enough to clear snap ring groove.
5. Repeat Step 3 and Step 4 to install the opposite bearing cap.

NOTE: If joint is stiff or binding, strike the yoke with a soft hammer to seat the needle bearings.

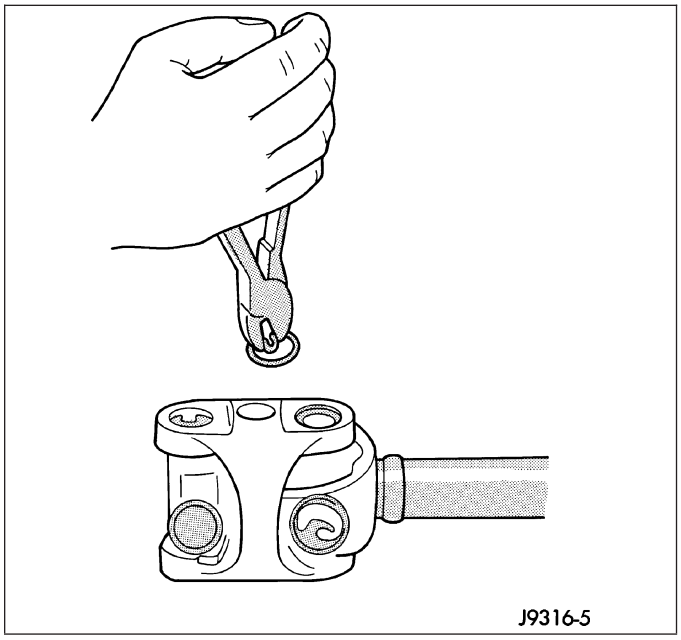
6. Add grease to lube fitting, if equipped.
7. Install propeller shaft.



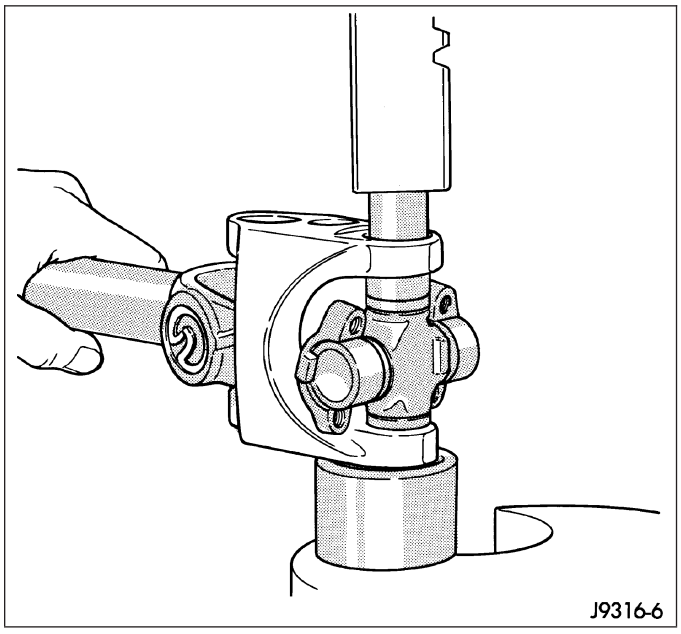
UNIVERSAL JOINTS-DOUBLE CARDAN

DISASSEMBLY

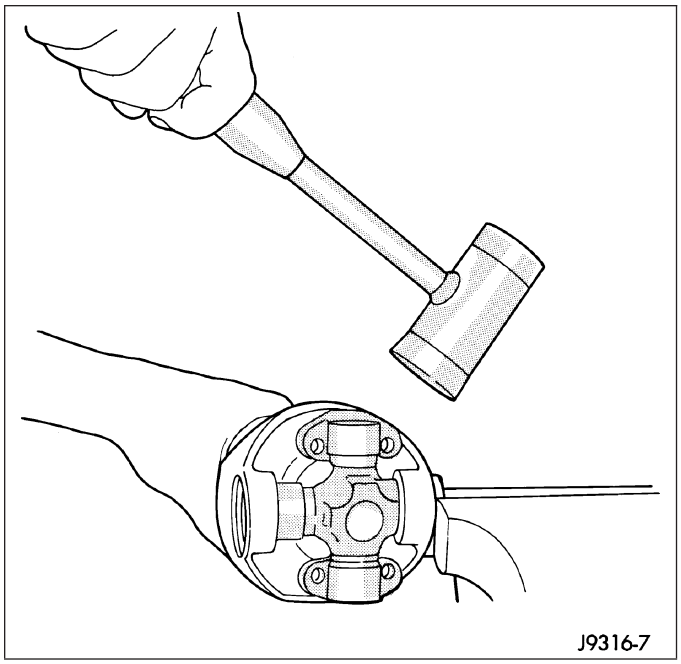
1. Remove propeller shaft.
2. Mark propeller shaft, link yoke and flange yoke for assembly reference.
3. Tap outside of the bearing cap assembly with drift to loosen snap rings.
4. Remove all bearing cap snap rings.
5. Remove grease fittings if equipped.
6. Position a socket on the press with an inside diameter large enough to receive the bearing cap under the link yoke.
7. Place another socket with an outside diameter smaller than the bearing cap on the upper bearing cap.



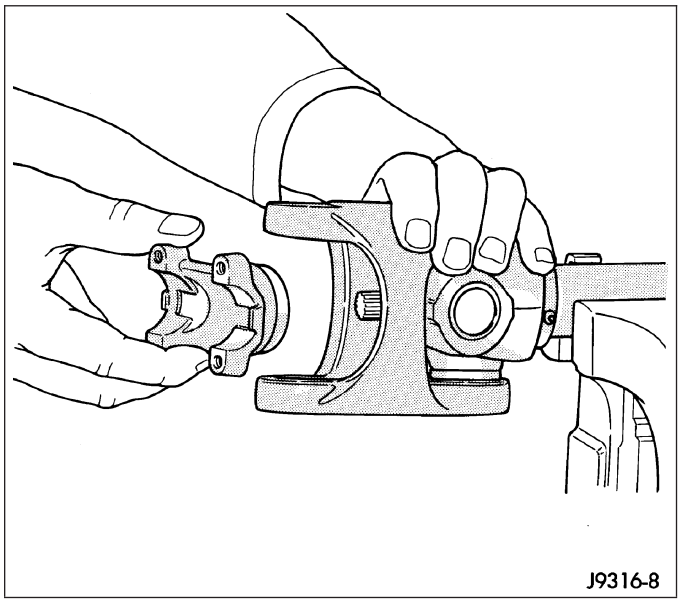
8. Press one bearing cap from outboard side of the link yoke, enough to grasp the cap with vise jaws.



9. Grasp protruding bearing cap with vise jaws and tap link yoke with a mallet to remove bearing cap.
10. Flip assembly and repeat Step 6, Step 7, Step 8 and Step 9 to remove the opposite bearing cap.



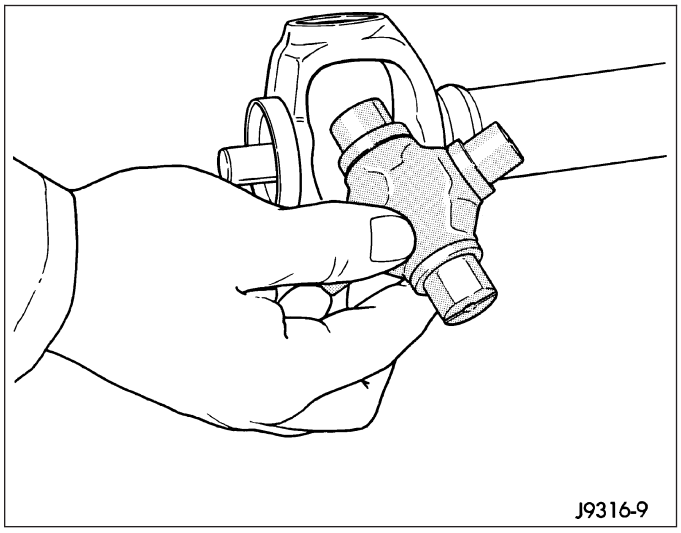
11. Remove cross centering kit assembly and spring.
12. Press remaining bearing caps out the other end of the link yoke.



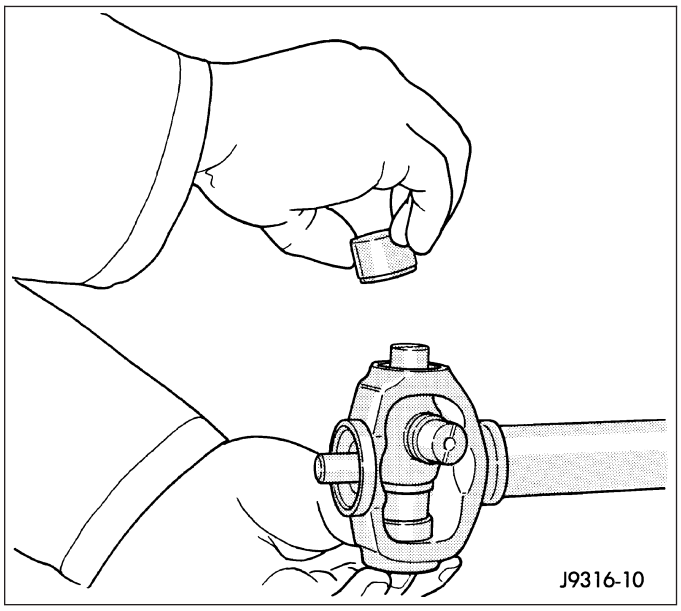
ASSEMBLY

CAUTION: All alignment marks on the link yoke and propeller shaft yoke must be aligned during assembled.

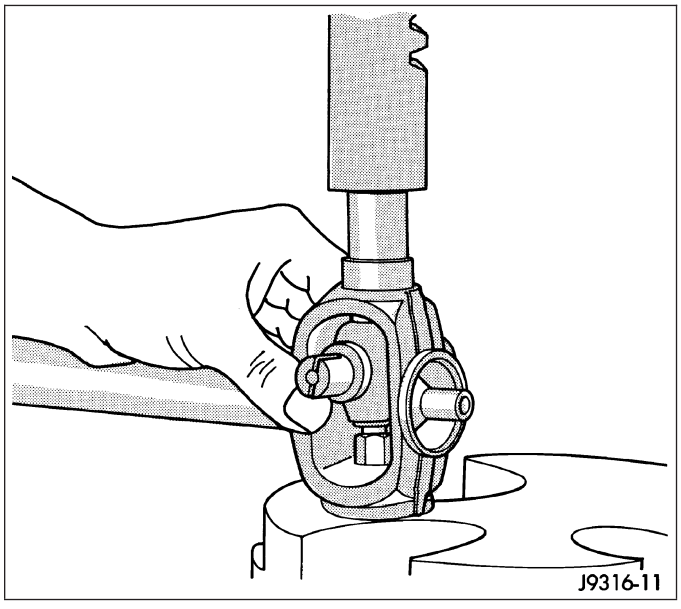
1. Apply (EP) N.L.G.I. Grade 1 or 2 grease to inside of yoke bores.
2. Fit cross into the propeller shaft yoke.



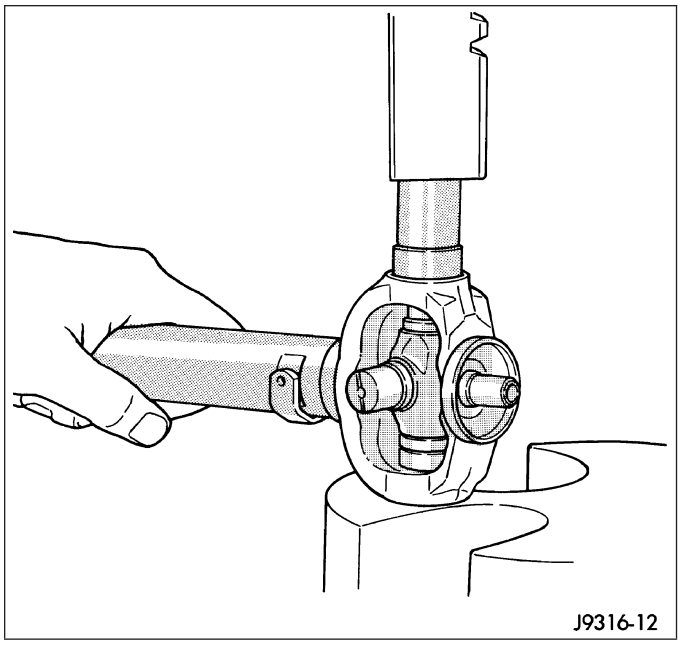
3. Place bearing cap over the trunnion and align cap with the yoke bore. Keep needle bearings upright in the bearing cap.



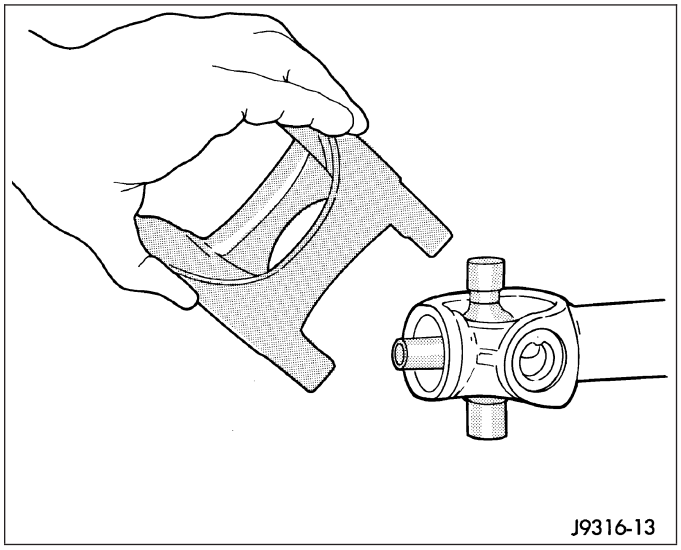
4. Press bearing cap into yoke bore enough to clear snap ring groove and install snap-ring.



5. Flip propeller shaft yoke and install other bearing cap onto the opposite trunnion and install a snap ring.

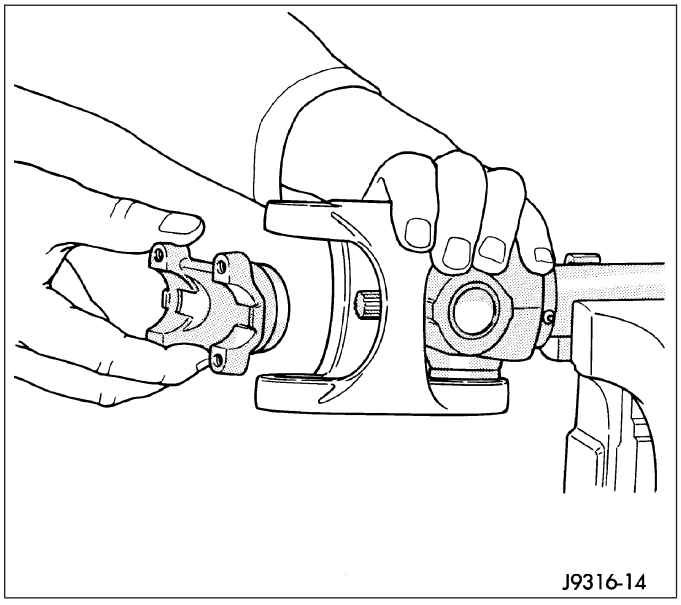


6. Fit link yoke onto remaining trunnions and press both bearing caps into place and install snap rings.

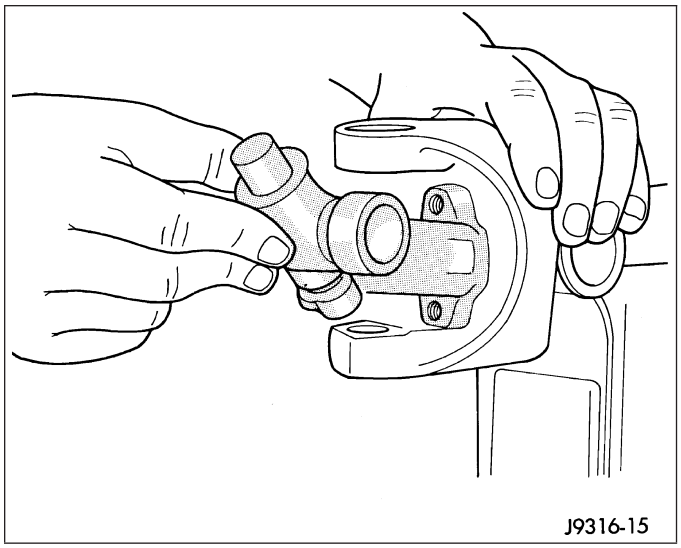


7. Install centering kit assembly inside the link yoke.

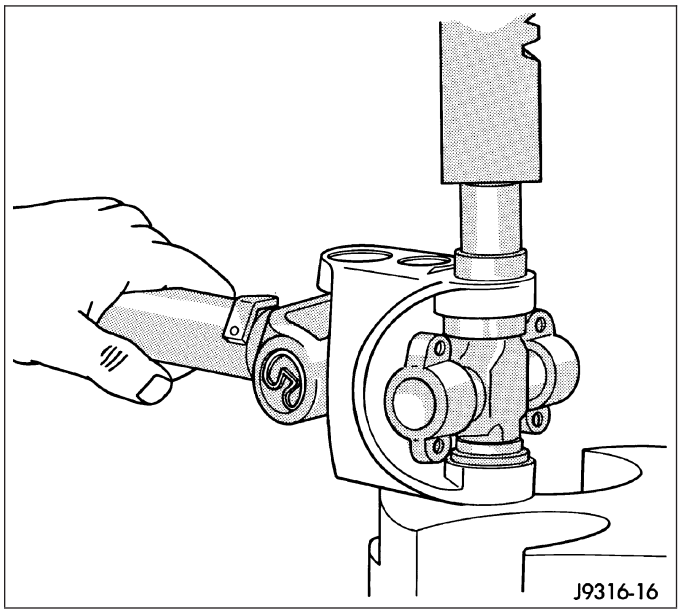
NOTE: Verify spring is properly positioned.



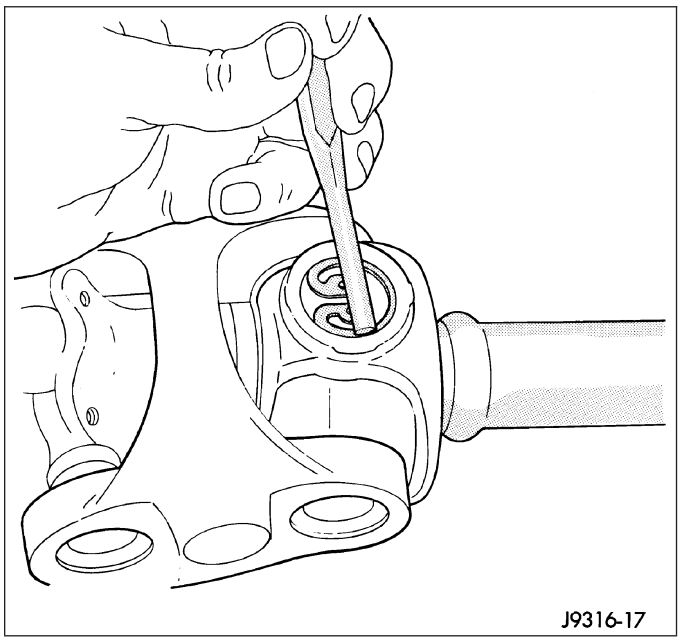
8. Place two bearing caps on opposite trunnions of the remaining cross. Fit open trunnions into the link yoke bores and bearing caps into the centering kit.



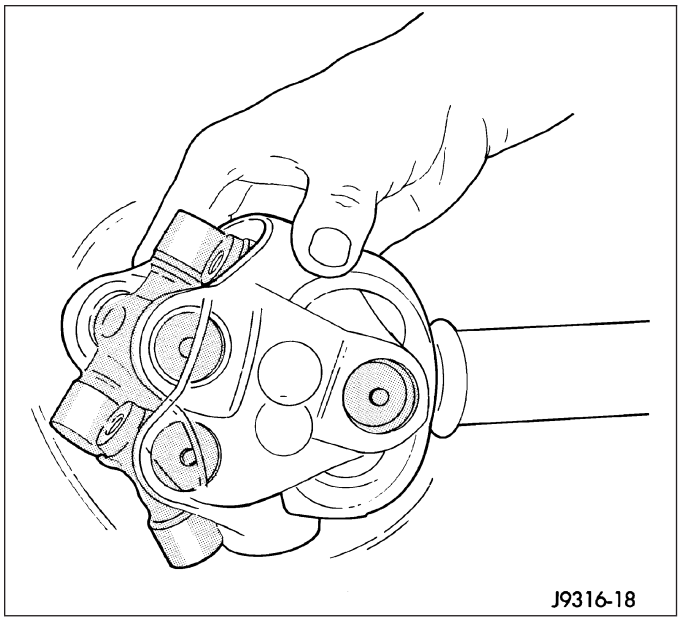
9. Press remaining two bearing caps into place and install snap rings.



10. Tap snap rings to seat them into the grooves.



11. Flexing the joint beyond center, the joint should snap over-center in both directions if correctly assembled.
12. Install propeller shaft.



HALF SHAFT

TABLE OF CONTENTS

page

HALF SHAFT
CAUTION 167
DIAGNOSIS AND TESTING
HALF SHAFT 167
REMOVAL 167
INSTALLATION 169
SPECIFICATIONS
HALF SHAFT 170
SPECIAL TOOLS 171
CV JOINT-OUTER
REMOVAL 172
INSTALLATION 174
CV JOINT-INNER
REMOVAL 176
INSTALLATION 177

HALF SHAFT

CAUTION

CAUTION:: Never grasp half shaft assembly by the boots. This may cause the boot to pucker or crease and reduce the service life of the boot.
Avoid over angulating or stroking the C/V joints when handling the half shaft.
Half shafts exposed to battery acid, transmission fluid, brake fluid, differential fluid or gasoline may cause the boots to deteriorate. Failure to follow these instruction will result in damage.

DIAGNOSIS AND TESTING

HALF SHAFT

Check inboard and outboard C/V joint for leaking grease. This is a sign of boot or boot clamp damage.

NOISE/VIBRATION IN TURNS

A clicking noise or vibration in turns could be caused by a damaged outer C/V or inner tripod joint seal boot or seal boot clamps. This will result in the loss/contamination of the joint grease, resulting in inadequate lubrication of the joint. Noise could also be caused by another component of the vehicle coming in contact with the half shafts.

CLUNKING NOISE DURING ACCELERATION

This noise may be a damaged or worn C/V joint. A torn boot or loose/missing clamp on the inner/outer joint which has allowed the grease to be lost will damage the C/V joint.

SHUDDER/VIBRATION DURING ACCELERATION

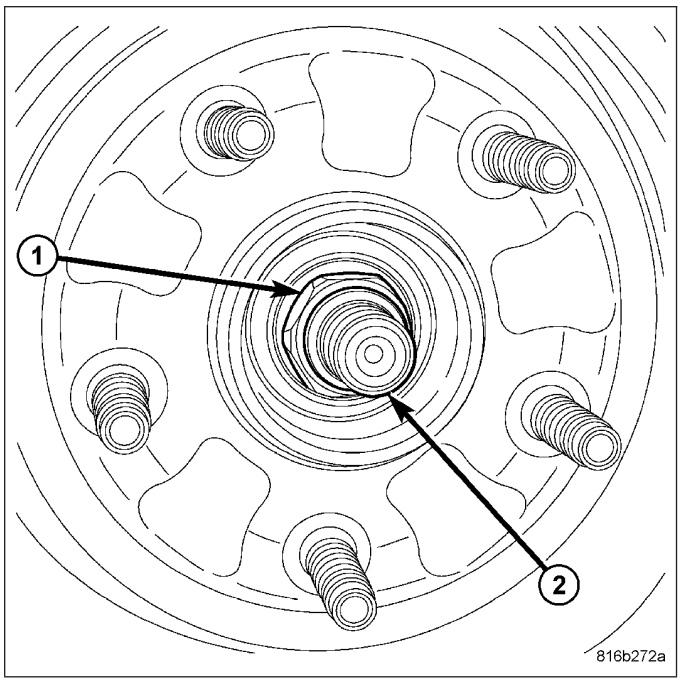
This could be a worn/damaged inner tripod joint or a sticking tripod joint. Improper wheel alignment may also cause a shudder or vibration.

VIBRATION AT HIGHWAY SPEEDS

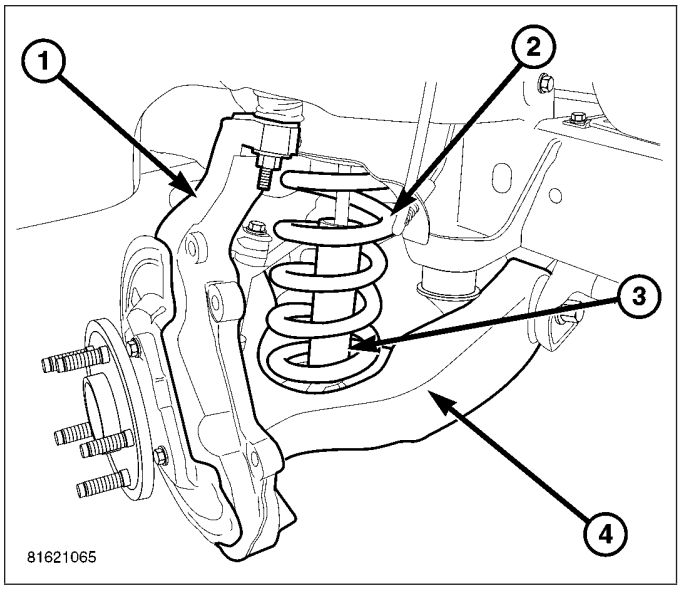
This problem could be a result of out of balance front tires or tire/wheel runout. Foreign material (mud, etc.) packed on the backside of the wheel(s) will also cause a vibration.

REMOVAL

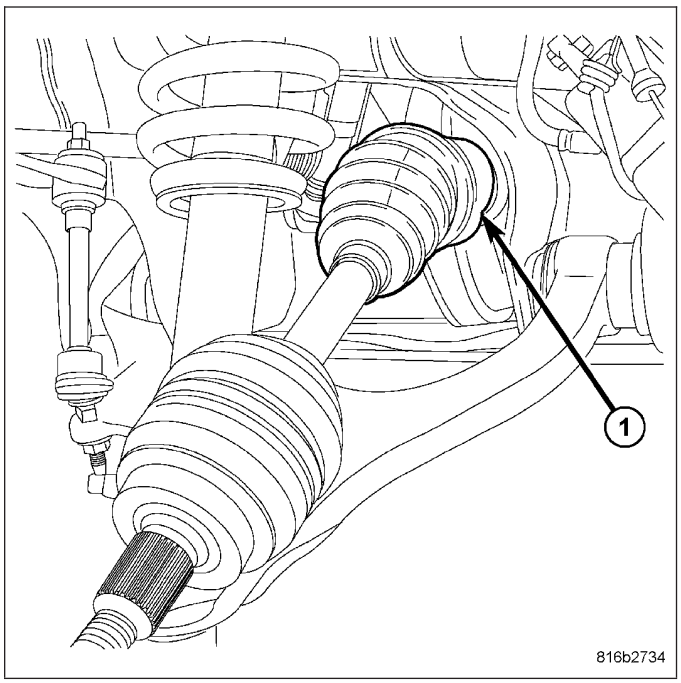
1. With vehicle in neutral, position vehicle on hoist.
2. Remove half shaft nut (1) from shaft (2).



3. Remove brake caliper and rotor.
4. Remove steering knuckle (1).

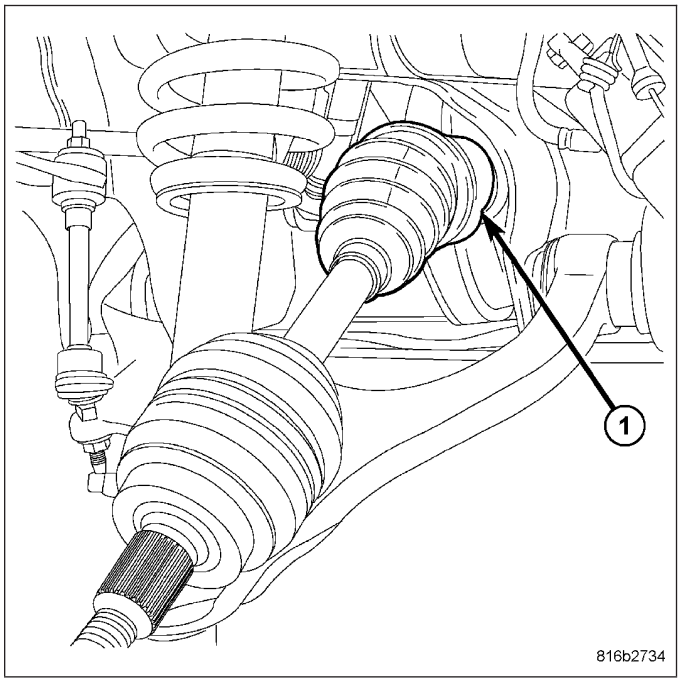


5. Disengage inner C/V joint (1) from axle shaft with two pry bars between the C/V housing and axle housing.
6. Remove half shaft from vehicle.

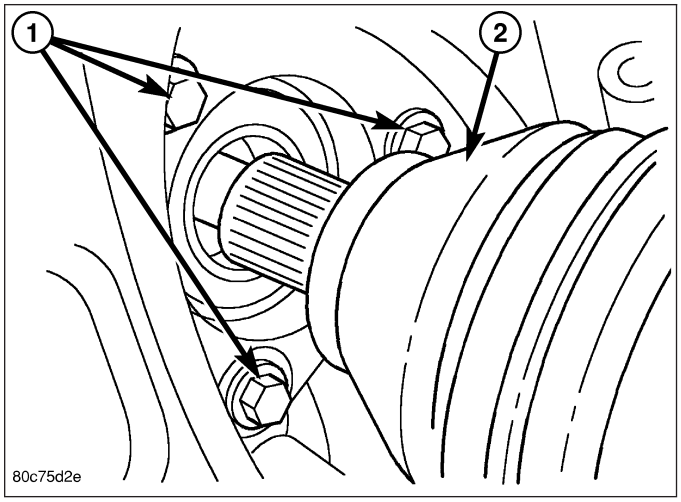


INSTALLATION

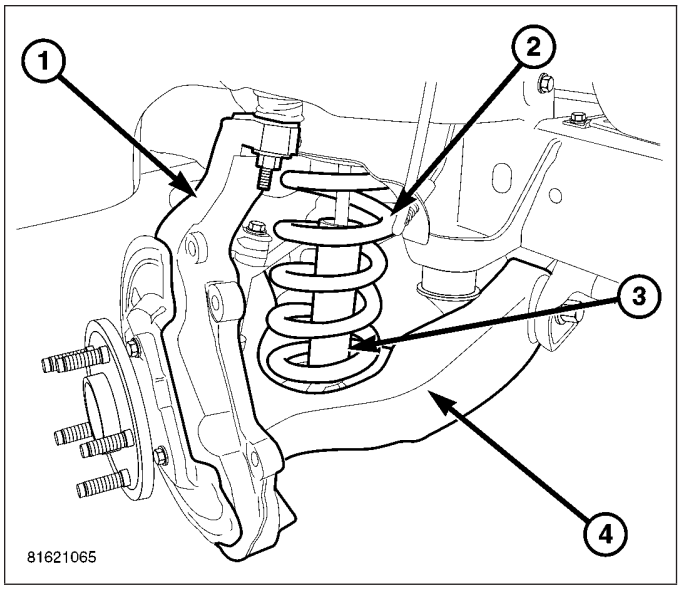
1. Install half shaft on axle shaft. Push inner C/V (1) firmly to engage axle shaft snap ring into the inner C/V housing.



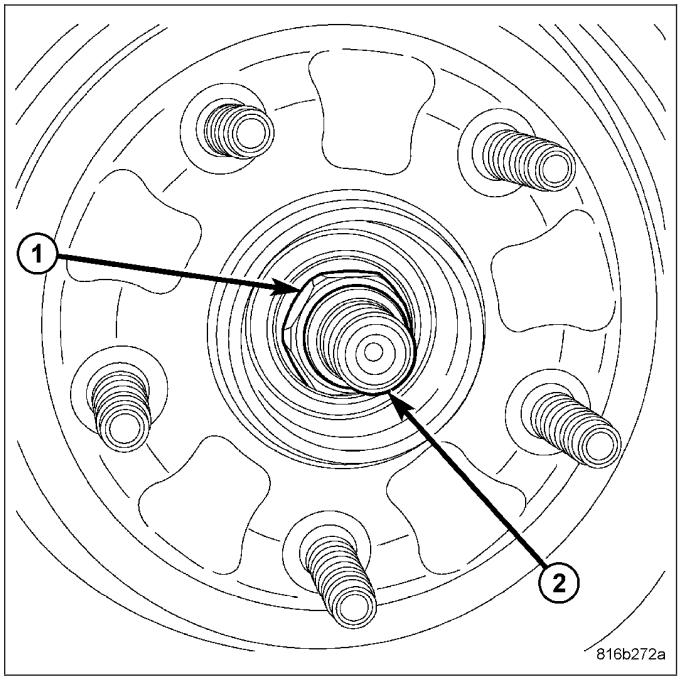
2. Clean hub bearing bore, hub bearing mating surface and half shaft splines.
3. Apply a light coating of grease to the front axle shaft output splines.
4. Install half shaft (2) into the knuckle.



5. Install steering knuckle (1).
6. Install brake rotor and caliper.



7. Install half shaft hub nut (1) and tighten to 251 N·m (185 ft. lbs.).



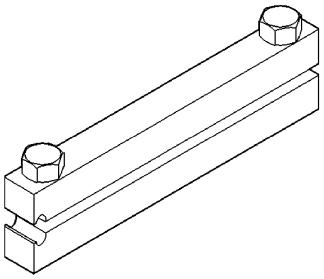
SPECIFICATIONS

HALF SHAFT

TORQUE SPECIFICATIONS

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Half Shaft Nut	251	185	-

SPECIAL TOOLS



INSTALLER C-4975A

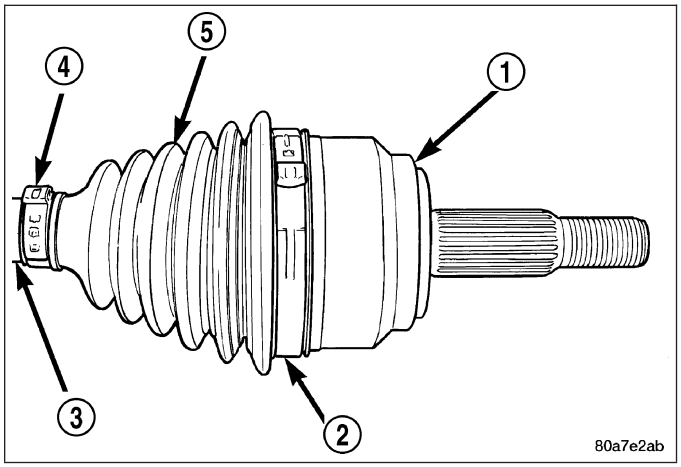
CV JOINT-OUTER

REMOVAL

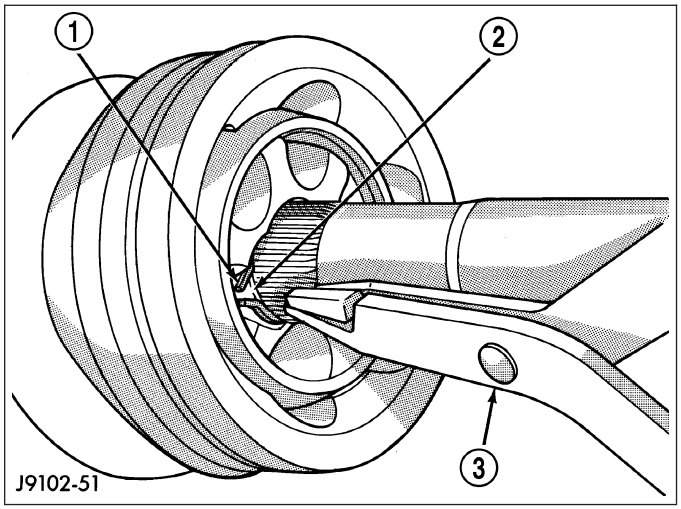
1. Clamp shaft in a vise (with soft jaws) and support C/V joint.

CAUTION: Do not damage C/V housing or half shaft.

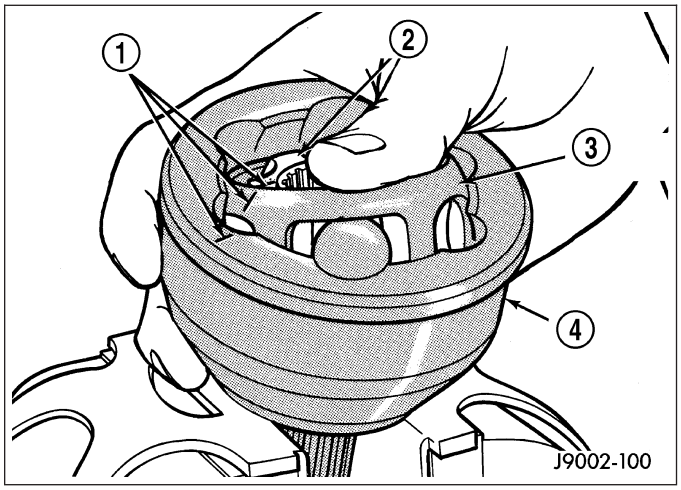
2. Remove clamps (2) (4) with a cut-off wheel or grinder.



3. Slide the boot down the shaft.
4. Remove lubricant to expose the C/V joint snap ring (1).
5. Spread snap ring (1) and slide the joint off the shaft.
6. Slide boot off the shaft and discard old boot.



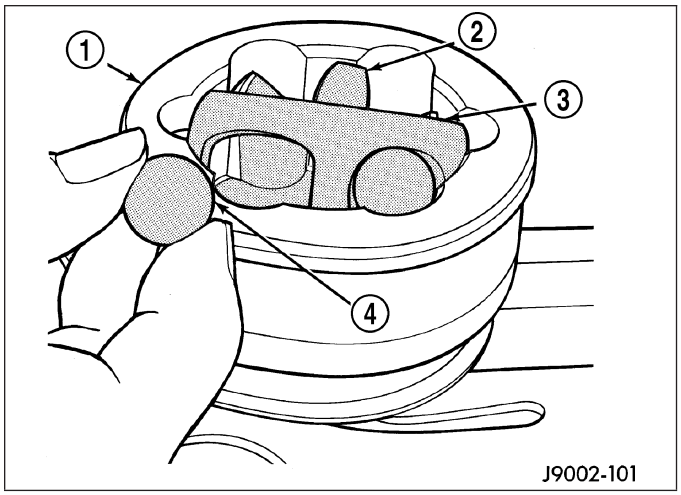
7. Mark alignment marks (1) on the inner race/hub (2), bearing cage (3) and housing with dabs of paint.
8. Clamp C/V joint in a vertical position in a soft jawed vise.



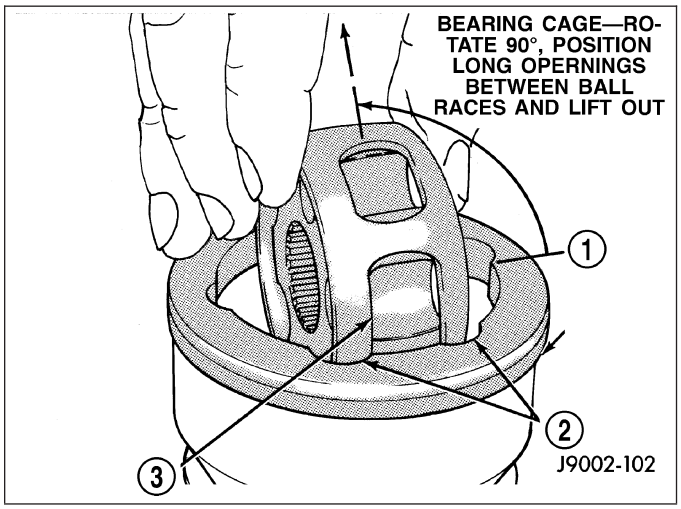
9. Press down one side of the bearing cage (3) to gain access to the ball at the opposite side.

NOTE: If joint is tight, use a hammer and brass drift to loosen the bearing hub. Do not contact the bearing cage with the drift.

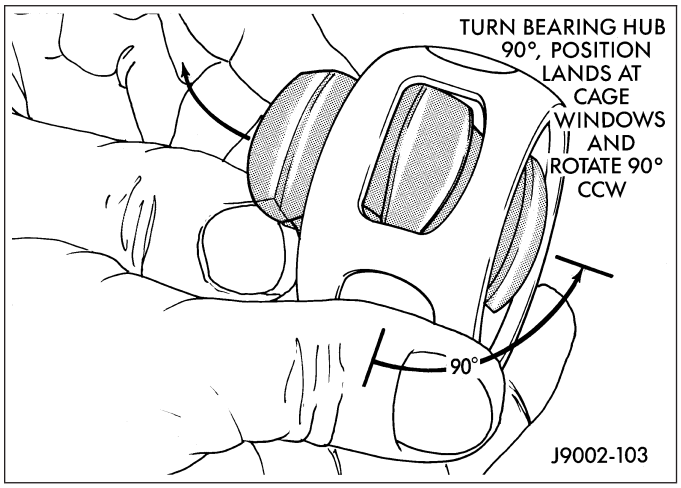
10. Remove ball (4) from the bearing cage (3).
11. Repeat step above until all six balls are removed from the bearing cage.



12. Lift cage and inner race (2) upward and out from the housing (1).



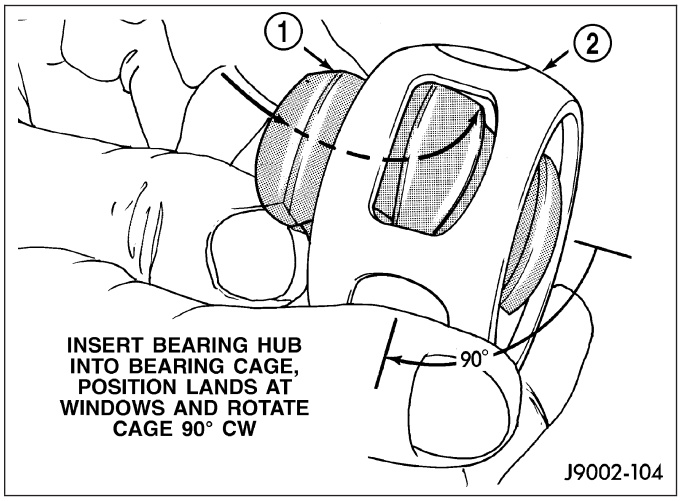
13. Turn inner race 90° in the cage and rotate the inner race/hub out of the cage.



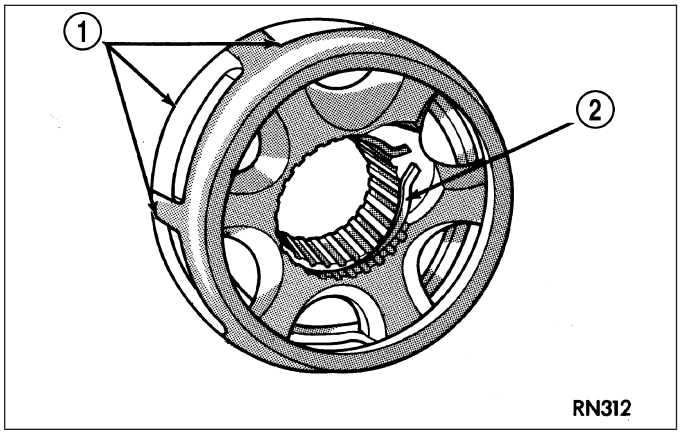
INSTALLATION

NOTE: If C/V joint is worn, replace entire C/V joint and boot.

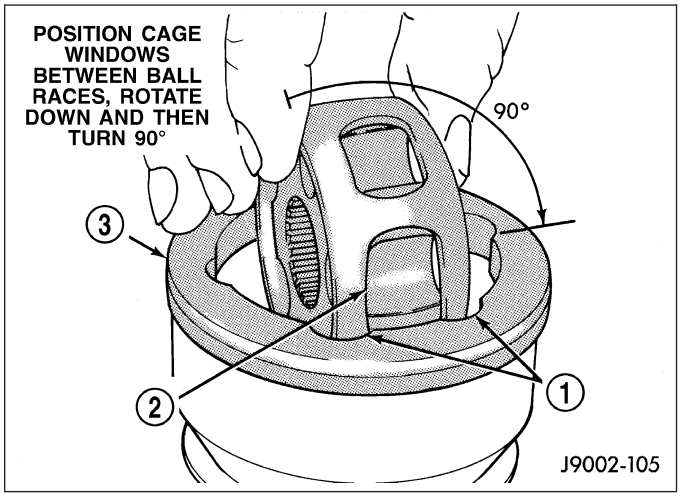
1. Clean all C/V joint components and shaft.
2. Apply a light coat of grease supplied with the joint/boot to the C/V joint components before assembling them.
3. Align the inner race (1) cage (2) and housing according to the alignment reference marks.
4. Insert the inner race (1) into the cage (2) and rotate race into the cage.



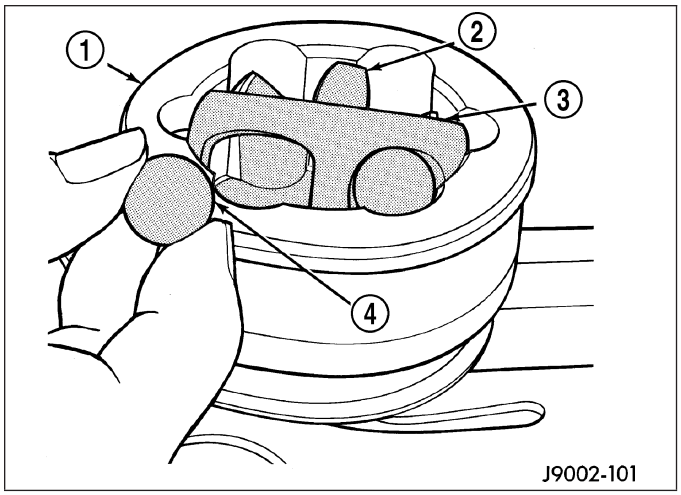
5. Rotate the inner race/hub (2) in the cage.



6. Insert cage (2) into the housing. Rotate the cage 90° into the housing (3) so the large bearing hub counterbore is facing outwards.
7. Apply the grease supplied with the joint/boot to the ball races. Spread the grease equally between all the races.



8. Tilt inner race/hub (1) and cage (3) and install the balls(4).
9. Place new clamps onto new boot and slide boot onto the shaft to it's original position.
10. Apply the rest of grease to the C/V joint and boot.

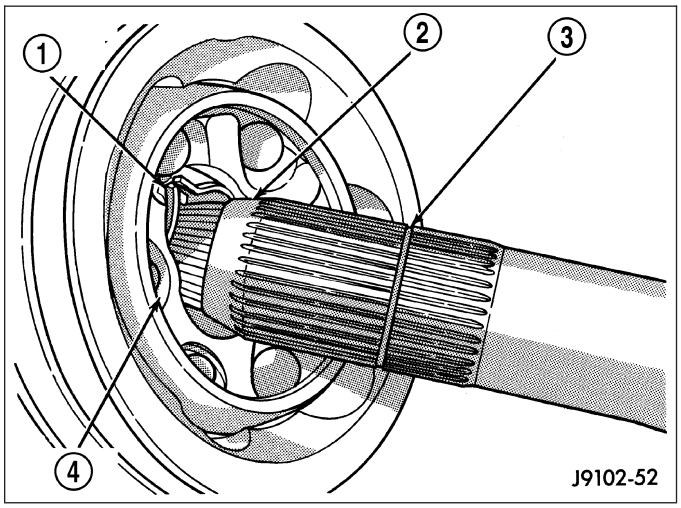


11. Install the joint onto the shaft (2). Push the joint onto the shaft until the snap ring (1) seats in the groove (3).

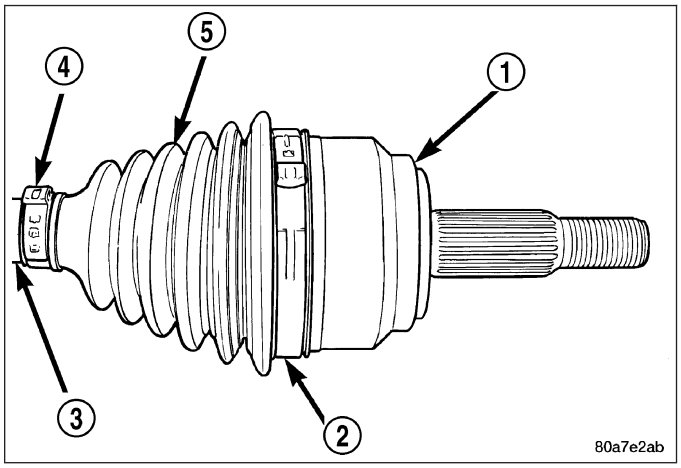
NOTE: Pull on the joint to verify the span ring has engaged.

12. Position the boot on the joint in it's original position.

NOTE: Verify boot is not twisted and remove any excess air.



13. Secure both boot (5) clamps (2) (4) with Clamp Installer C-4975A. Place tool on clamp bridge and tighten tool until jaws of the tool are closed.

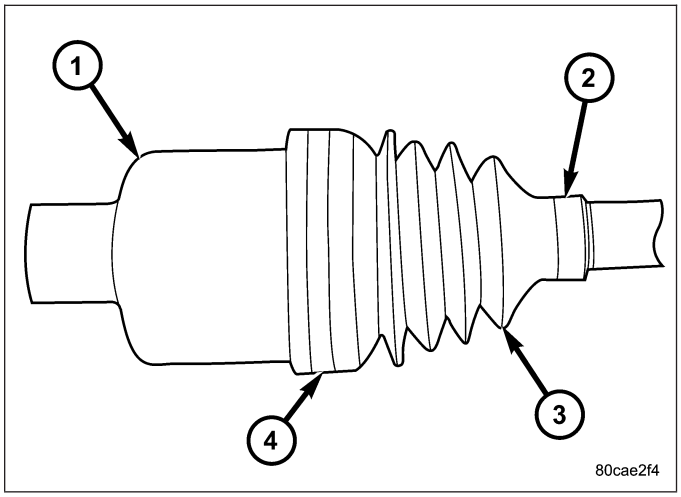


CV JOINT-INNER

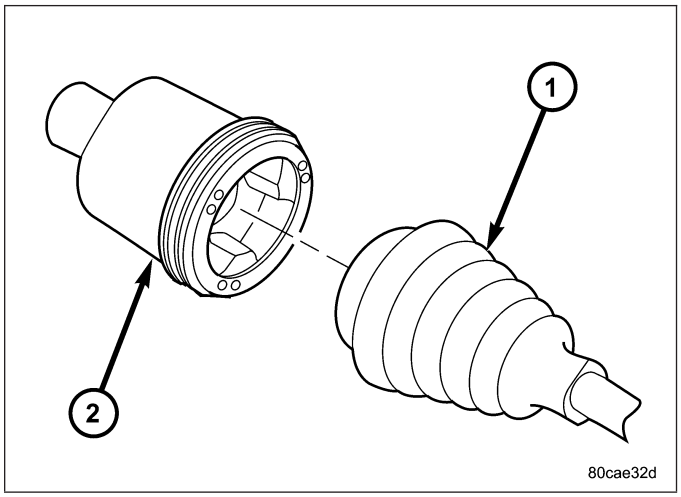
REMOVAL

1. Clamp shaft in vise (with soft jaws) and support C/V joint.
2. Remove clamps (2) (4) with a cut-off wheel or grinder.

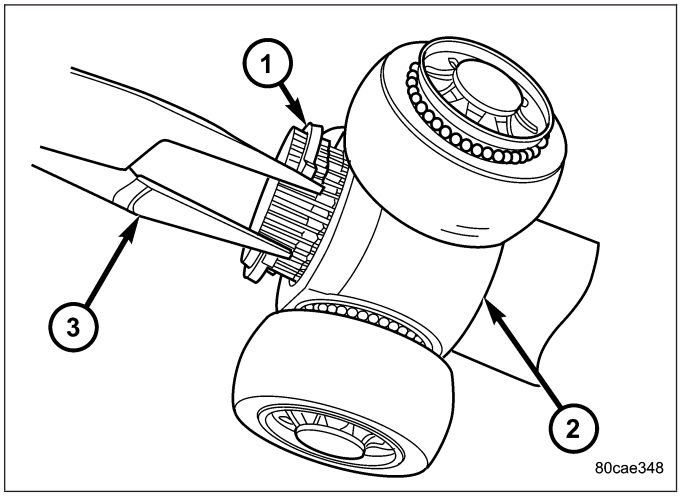
CAUTION: Do not damage C/V housing or half shaft with cut-off wheel or grinder.



3. Remove housing (2) from the half shaft and slide boot (1) down shaft.
4. Remove housing bushing from the housing.

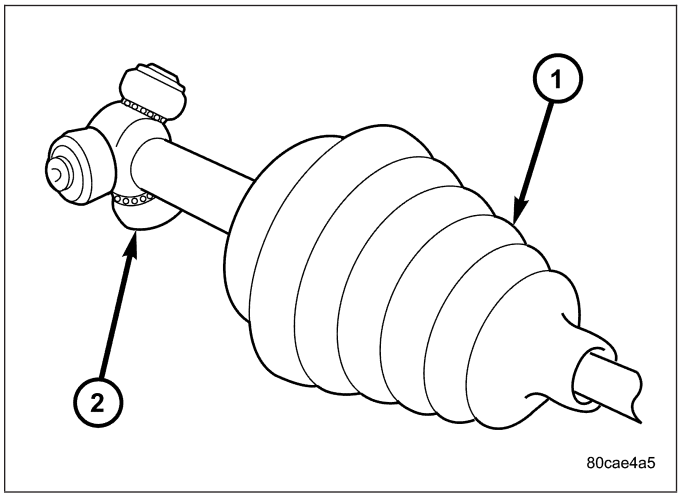


5. Remove tripod (2) snap ring (1).
6. Remove tripod (2) and boot from the half shaft.
7. Clean and inspect C/V components for excessive wear and damage. Replace the tripod as a unit only if necessary.

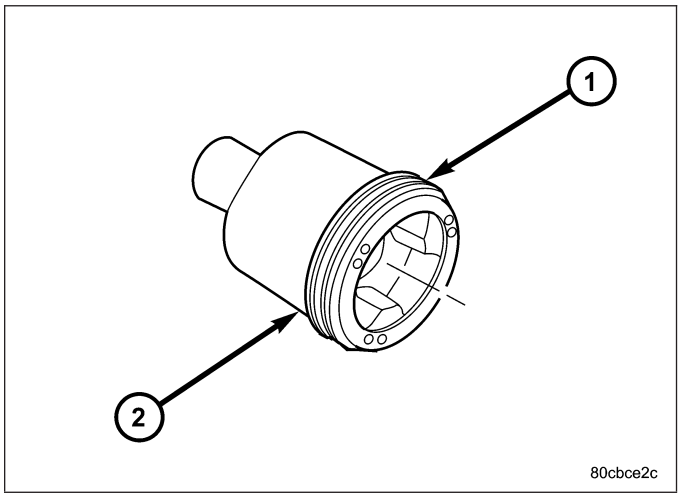


INSTALLATION

1. Clean all C/V joint components and shaft.
2. Slide **new** boot (1) down the half shaft.
3. Install tripod (2) and tripod snap ring on the half shaft.
4. Pack grease supplied with the joint/boot into the housing and boot.
5. Coat tripod with supplied grease.



6. Install **new** bushing (1) onto the housing (2).
7. Insert the tripod and shaft in the housing.



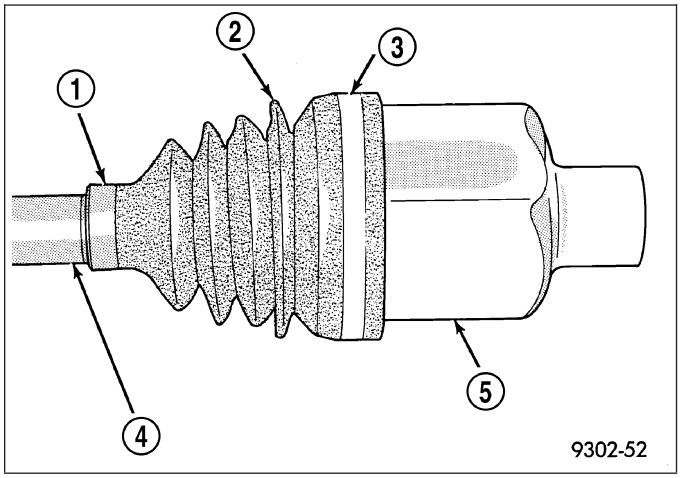
8. Position the boot (2) on the housing (5) and shaft (4) in it's original position.

NOTE: Verify boot is not twisted and remove any excess air.

9. Measure the distance from the end of the housing to the end of the boot on the shaft. This measurement should be 260 mm (10.25 in.).

NOTE: If measurement is not correct, allow more or less air into the boot.

10. Secure both boot clamps (1) (3) with Clamp Installer C-4975A. Place tool on clamp bridge and tighten tool until the jaws of the tool are closed.



FRONT AXLE - C205FD

TABLE OF CONTENTS

page

FRONT AXLE - C205FD
DIAGNOSIS AND TESTING
FRONT AXLE - C205FD 179
REMOVAL 182
INSTALLATION 186
ADJUSTMENTS
PINION DEPTH-BEARING PRELOAD-GEAR BACKLASH 190
SPECIFICATIONS
FRONT AXLE - C205FD 198
SPECIAL TOOLS-C205FD 200
COVER-DIFFERENTIAL
REMOVAL 205
INSTALLATION 205
ACTUATOR
REMOVAL 206
INSTALLATION 207
SEAL-DISCONNECT
REMOVAL 209
INSTALLATION 210
SHAFT-OUTPUT
REMOVAL 214
DISASSEMBLY 216
ASSEMBLY 217
INSTALLATION 219
SHAFT-INTERMEDIATE
REMOVAL 223
DISASSEMBLY 226

page

ASSEMBLY 227
INSTALLATION 227
BEARING-AXLE TUBE
REMOVAL 234
INSTALLATION 238
SHAFTS-AXLE
REMOVAL 246
INSTALLATION 247
SEAL-AXLE SHAFT
REMOVAL 248
INSTALLATION 249
BEARING-AXLE
REMOVAL 250
INSTALLATION 251
SEAL-PINION
REMOVAL 253
INSTALLATION 254
DIFFERENTIAL
REMOVAL 255
DISASSEMBLY 256
ASSEMBLY 258
INSTALLATION 260
BEARINGS-DIFFERENTIAL CASE
REMOVAL 261
INSTALLATION 261
GEAR-PINION/RING
REMOVAL 262
INSTALLATION 265

FRONT AXLE - C205FD

DIAGNOSIS AND TESTING

FRONT AXLE - C205FD

GEAR NOISE

Axle gear noise can be caused by insufficient lubricant, incorrect backlash, tooth contact, worn/damaged gears or the carrier housing not having the proper offset and squareness.

Gear noise usually happens at a specific speed range. The noise can also occur during a specific type of driving condition. These conditions are acceleration, deceleration, coast, or constant load.

When road testing, first warm-up the axle fluid by driving the vehicle at least 5 miles and then accelerate the vehicle to the speed range where the noise is the greatest. Shift out-of-gear and coast through the peak-noise range. If the noise stops or changes greatly check for:

- Insufficient lubricant.
- Incorrect ring gear backlash.
- Gear damage.

Differential side gears and pinions can be checked by turning the vehicle. The side gears are loaded during turns. They usually do not cause noise during straight-ahead driving when the gears are unloaded. A worn pinion mate shaft can also cause a snapping or a knocking noise.

BEARING NOISE

The axle shaft, differential and pinion bearings can all produce noise when worn or damaged. Bearing noise can be either a whining, or a growling sound.

Pinion bearings have a constant-pitch noise. This noise changes only with vehicle speed. Pinion bearing noise will be higher pitched because it rotates at a faster rate. Drive the vehicle and load the differential. If bearing noise occurs, the rear pinion bearing is the source of the noise. If the bearing noise is heard during a coast, the front pinion bearing is the source.

Differential bearings usually produce a low pitch noise. Differential bearing noise is similar to pinion bearing noise. The pitch of differential bearing noise is also constant and varies only with vehicle speed.

Axle/Output shaft bearings produce noise and vibration when worn or damaged. The noise generally will be constant with bearings loaded or unloaded. Where axle/output bearing damage is slight, the noise is usually not noticeable at speeds above 30 m.p.h.

Intermediate shaft bearings produce noise when worn or damaged. The noise will changes when the axle is in disconnect. Road test the vehicle and actuate the disconnect. This will load the bearings and change the noise level. Where axle bearing damage is slight, the noise is usually not noticeable at speeds above 30 m.p.h.

LOW SPEED KNOCK

Low speed knock is generally caused by:

- Worn U-joints/CV joint.
- Worn side-gear thrust washers.
- Worn pinion shaft bore.

VIBRATION

Vibration at the rear of the vehicle is usually caused by:

- Damaged drive shaft.
- Missing drive shaft balance weight(s).
- Worn or out of balance wheels.
- Loose wheel lug nuts.
- Worn U-joint(s).
- Loose/broken springs.
- Damaged axle shaft bearing(s).

- Loose pinion gear nut.
- Excessive pinion yoke run out.
- Bent axle shaft(s).

Check for loose or damaged front end components or engine/transmission mounts. These components can contribute to what appears to be a rear end vibration. Do not overlook engine accessories, brackets and drive belts.

All driveline components should be examined before starting any repair.

DRIVELINE SNAP

A snap or clunk noise when the vehicle is shifted into gear (or the clutch engaged) can be caused by:

- High engine idle speed.
- Transmission shift operation.
- Loose engine/transmission/transfer case mounts.
- Worn U-joints/CV joint.
- Loose spring mounts.
- Loose pinion gear nut and yoke.
- Excessive ring gear backlash.
- Excessive side gear to case clearance.

The source of a snap or a clunk noise can be determined with the assistance of a helper. Raise the vehicle on a hoist with the wheels free to rotate. Instruct the helper to shift the transmission into gear and listen for the noise. A mechanics stethoscope is helpful in isolating the source of a noise.

DIAGNOSTIC CHART

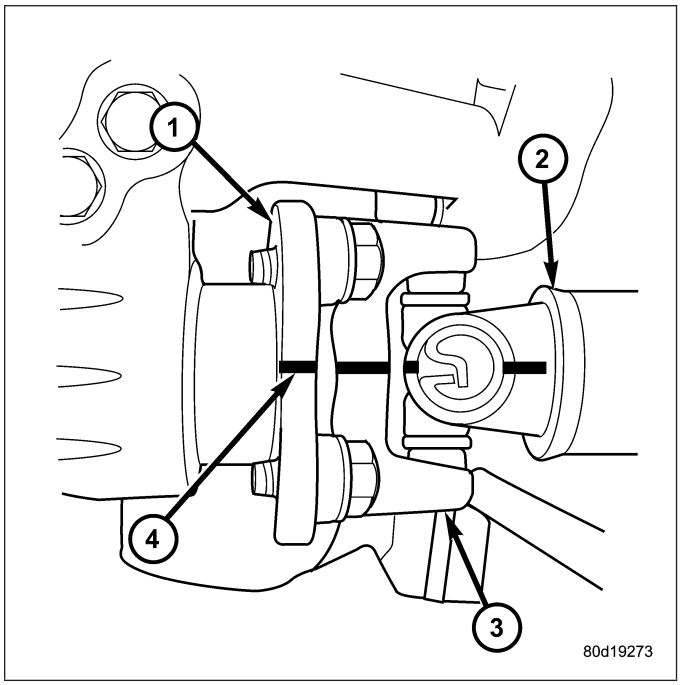
Condition	Possible Causes	Correction
Wheel Noise	1. Wheel loose.	1. Tighten loose nuts.
	2. Worn wheel bearing.	2. Replace bearing.
Axle Shaft Noise	1. Misaligned axle tube.	1. Inspect axle tube alignment. Correct as necessary.
	2. Bent or sprung axle shaft.	2. Inspect and correct as necessary.
	3. End-play in pinion bearings.	3. Refer to pinion pre-load information and correct as necessary.
	4. Excessive gear backlash between the ring gear and pinion.	4. Check adjustment of the ring gear and pinion backlash. Correct as necessary.
	5. Improper adjustment of pinion gear bearings.	5. Adjust the pinion bearings pre-load.
	6. Loose pinion yoke nut.	6. Tighten the pinion yoke nut.
	7. Scuffed gear tooth contact surfaces.	7. Inspect and replace as necessary.
Axle Shaft Broke	1. Misaligned axle tube.	1. Replace the broken shaft after correcting tube mis-alignment.
	2 Vehicle overloaded.	2. Replace broken shaft and avoid excessive weight on vehicle.
	3. Erratic clutch operation.	3. Replace broken shaft and avoid or correct erratic clutch operation.
	4. Grabbing clutch.	4. Replace broken shaft and inspect and repair clutch as necessary.

Condition	Possible Causes	Correction
Differential Cracked	1. Improper adjustment of the differential bearings.	1. Replace case and inspect gears and bearings for further damage. Set differential bearing pre-load properly.
	2. Excessive ring gear backlash.	2. Replace case and inspect gears and bearings for further damage. Set ring gear backlash properly.
	3. Vehicle overloaded.	3. Replace case and inspect gears and bearings for further damage. Avoid excessive vehicle weight.
	4. Erratic clutch operation.	4. Replace case and inspect gears and bearings for further damage. Avoid erratic use of clutch.
Differential Gears Scored	1. Insufficient lubrication.	1. Replace scored gears. Fill differential with the correct fluid type and quantity.
	2. Improper grade of lubricant.	2. Replace scored gears. Fill differential with the correct fluid type and quantity.
	3. Excessive spinning of one wheel/tire.	3. Replace scored gears. Inspect all gears, pinion bores, and shaft for damage. Service as necessary.
Loss Of Lubricant	1. Lubricant level too high.	1. Drain lubricant to the correct level.
	2. Worn axle shaft seals.	2. Replace seals.
	3. Cracked differential housing.	3. Repair as necessary.
	4. Worn pinion seal.	4. Replace seal.
	5. Worn/scored yoke.	5. Replace yoke and seal.
	6. Axle cover not properly sealed.	6. Remove, clean and seal cover.
Axle Overheating	1. Lubricant level low.	1. Fill differential to correct level.
	2. Improper grade of lubricant.	2. Fill differential with the correct fluid type and quantity.
	3. Bearing pre-loads too high.	3. Adjust bearing pre-loads.
	4. Insufficient ring gear backlash.	4. Adjust ring gear backlash.
Gear Teeth Broke	1. Overloading.	1. Replace gears. Examine other gears and bearings for possible damage.
	2. Erratic clutch operation.	2. Replace gears and examine the remaining parts for damage. Avoid erratic clutch operation.
	3. Ice-spotted pavement.	3. Replace gears and examine remaining parts for damage.
	4. Improper adjustments.	4. Replace gears and examine remaining parts for damage. Ensure ring gear backlash is correct.

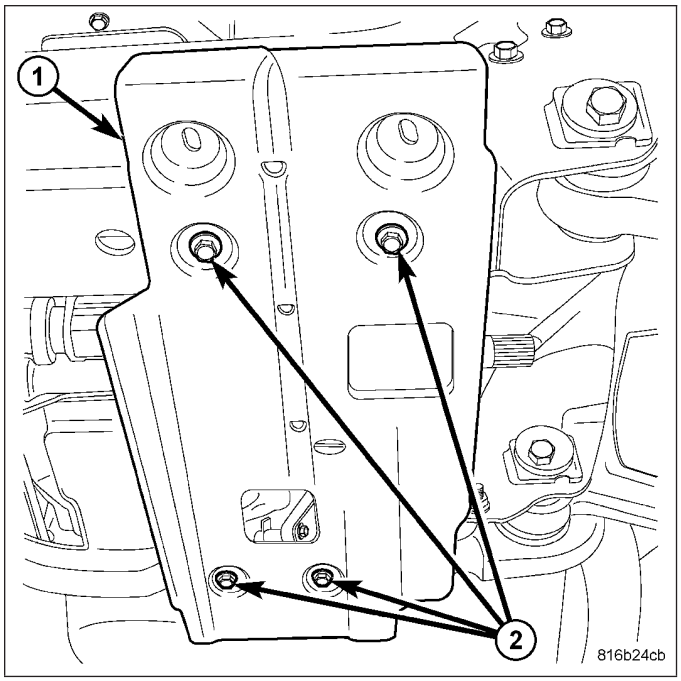
Condition	Possible Causes	Correction
Axle Noise	1. Insufficient lubricant.	1. Fill differential with the correct fluid type and quantity.
	2. Improper ring gear and pinion adjustment.	2. Check ring gear and pinion contact pattern.
	3. Unmatched ring gear and pinion.	3. Replace gears with a matched ring gear and pinion.
	4. Worn teeth on ring gear and pinion.	4. Replace ring gear and pinion.
	5. Loose pinion bearings.	5. Adjust pinion bearing pre-load.
	6. Loose differential bearings.	6. Adjust differential bearing pre-load.
	7. Ring gear run-out.	7. Measure ring gear run-out. Replace components as necessary.
	8. Loose differential bearing cap bolts.	8. Inspect differential components and replace as necessary. Ensure that the bearing caps are torqued tot he proper specification.
	9. Housing not machined properly.	9. Replace housing.

REMOVAL

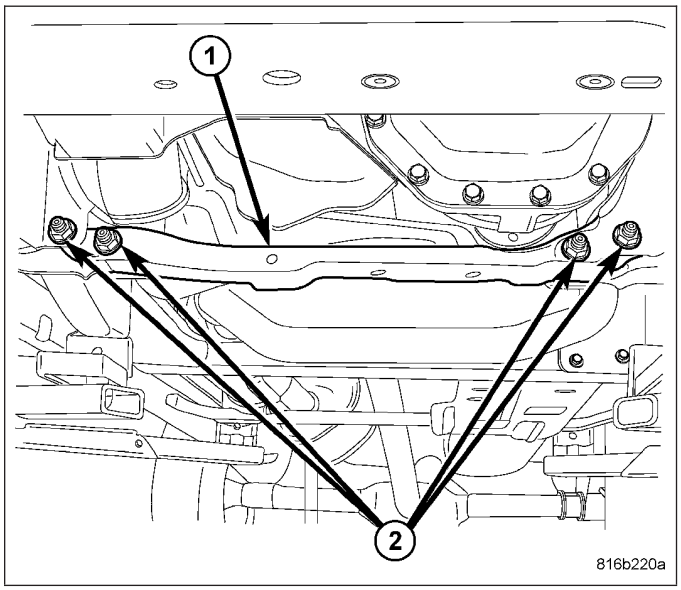
1. With vehicle in neutral, position vehicle on hoist.
2. Remove axle half shafts.
3. Mark (4) front propeller shaft (2) and companion flange (1). Remove front propeller shaft (2).



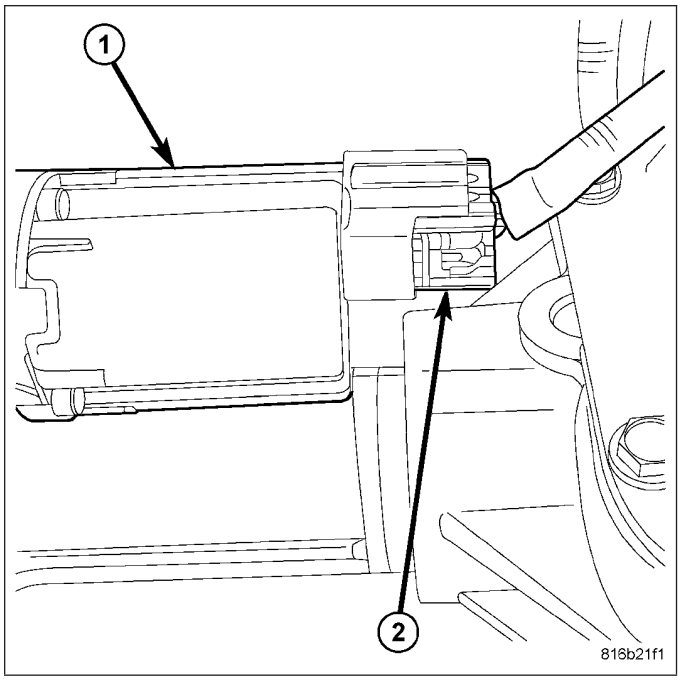
4. Remove skid plate (1) bolts (2) and remove skid plate.



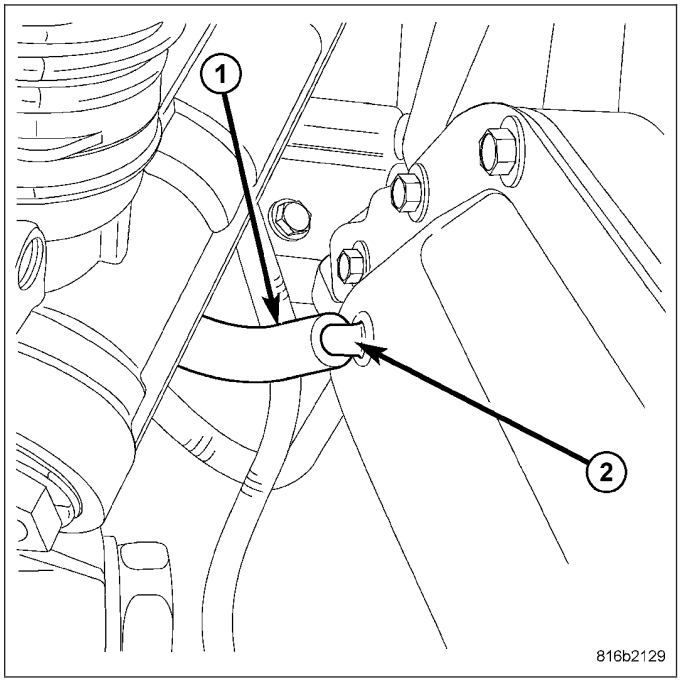
5. Remove suspension crossmember (1) nuts (2) and bolts. Remove crossmember.



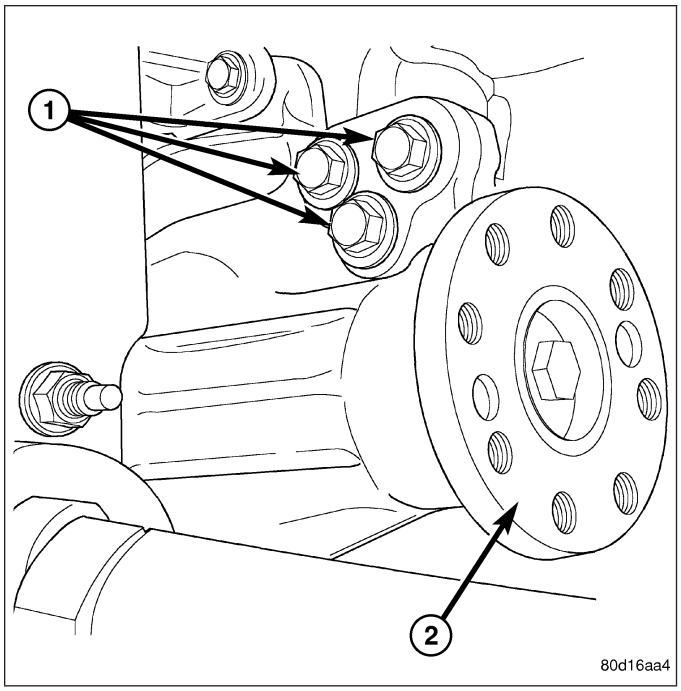
6. Remove disconnect actuator (1) wiring connector (2).



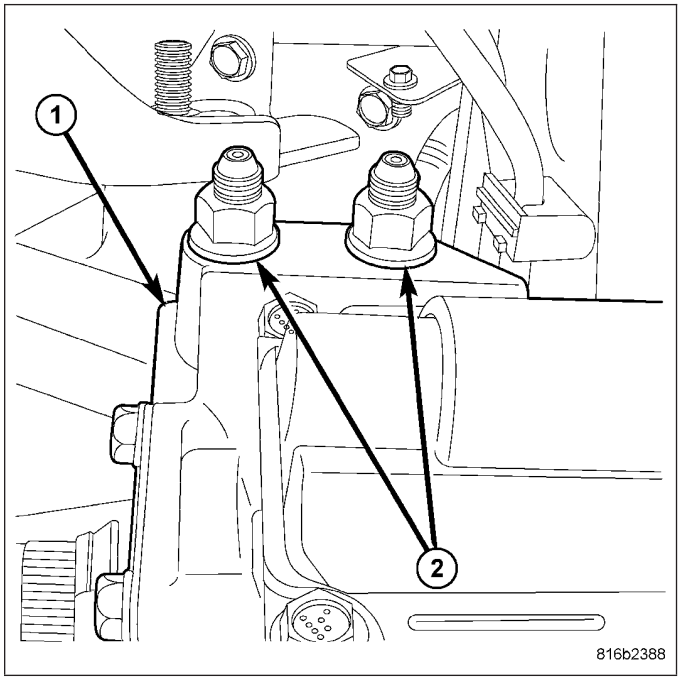
7. Remove vent hose (1) from differential cove tube (2).



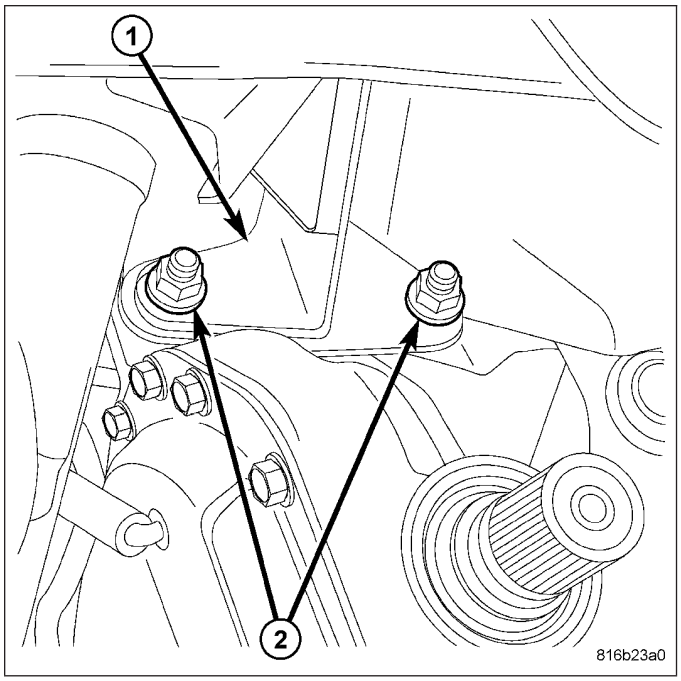
8. Support axle with hydraulic jack.
9. Remove axle housing pinion mounting bolts (1).



10. Remove axle shaft tube (1) mounting nuts (2) and bolts..

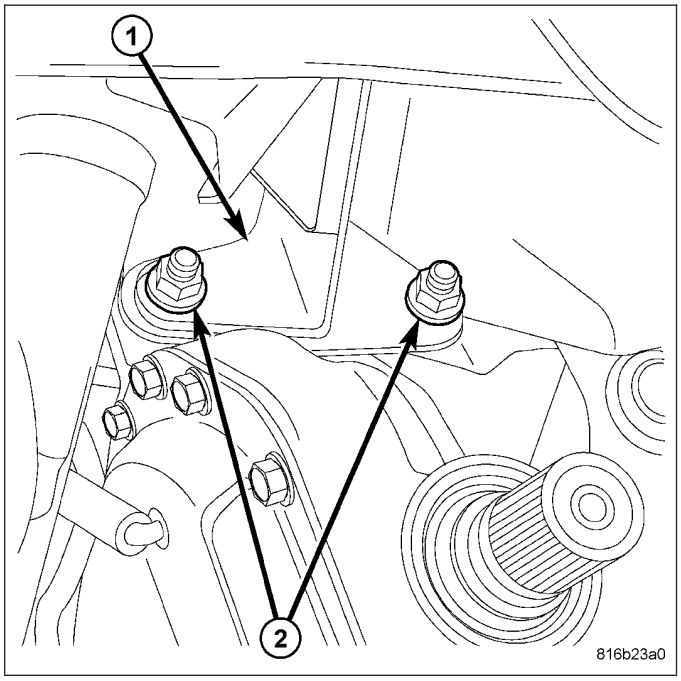


11. Remove differential housing to engine mounting (1) nuts (2). Leave bolts in differential housing.
12. Slide axle over with engine mount bolts to clear engine mount. Lower axle from the vehicle.

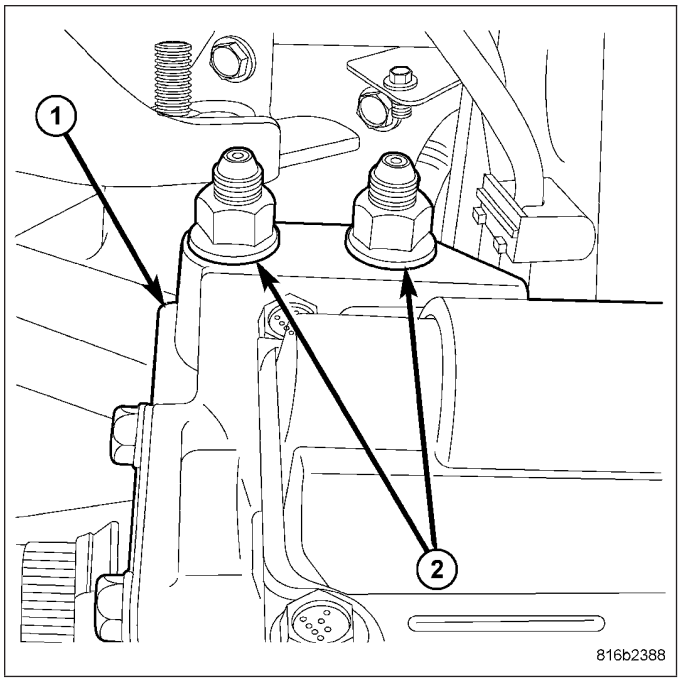


INSTALLATION

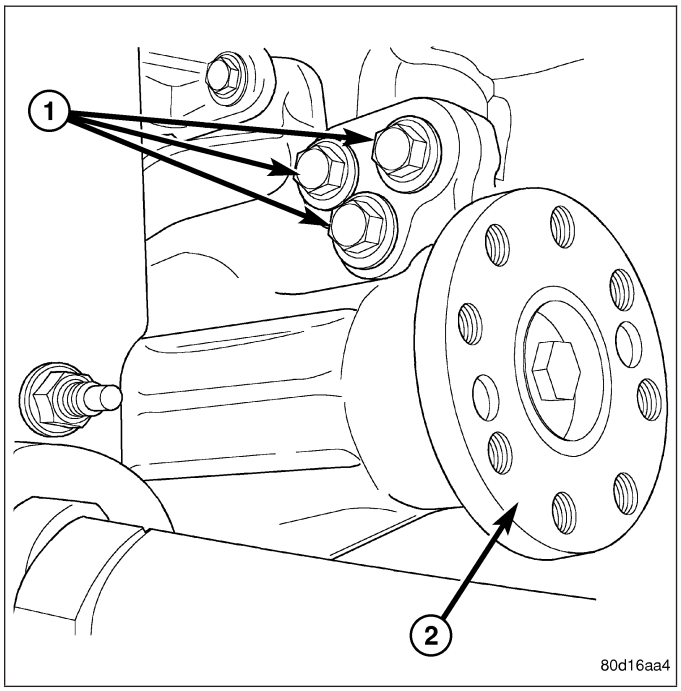
1. Raise axle and slide axle with engine mounting (1) bolts into engine mount.
2. Install engine mount nuts and tighten to 95 N·m (70 ft. lbs.).



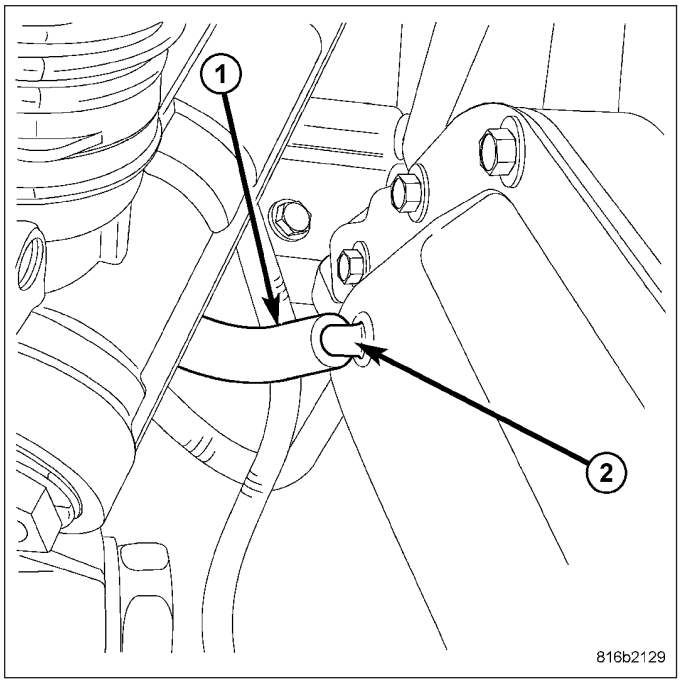
3. Install axle shaft tube (1) mounting bolts and nuts (2). Tighten nuts (2) to 95 N·m (70 ft. lbs.)..



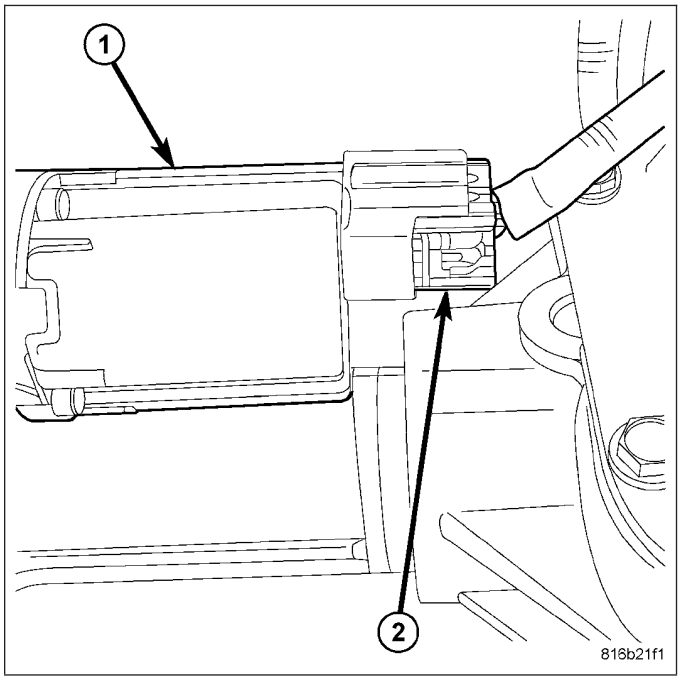
4. Install axle housing pinion nose mounting bolts (1) and tighten to 95 N·m (70 ft. lbs.).



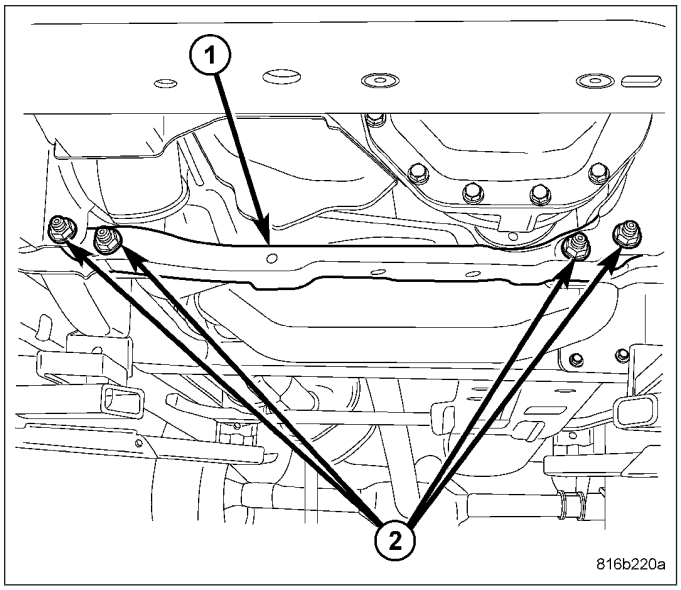
5. Install vent hose (1) on differential cover tube (2).



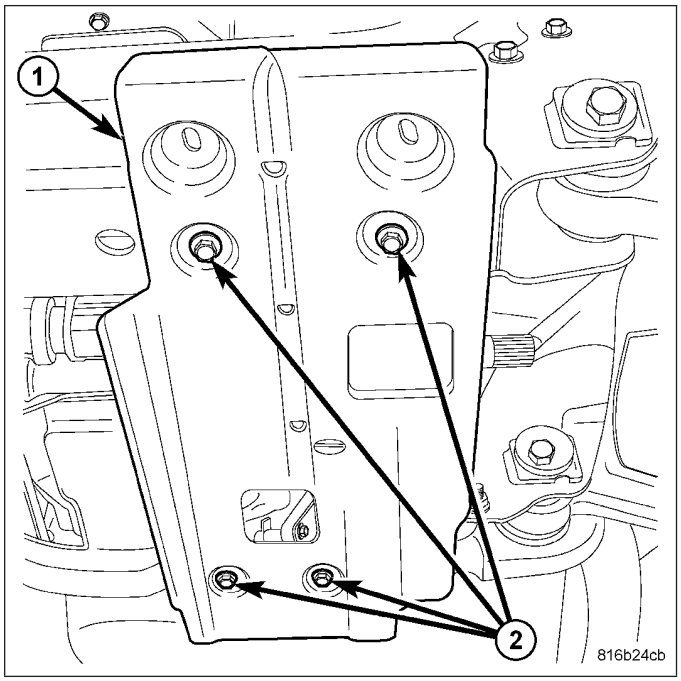
6. Install disconnect actuator (1) wiring connector (2).



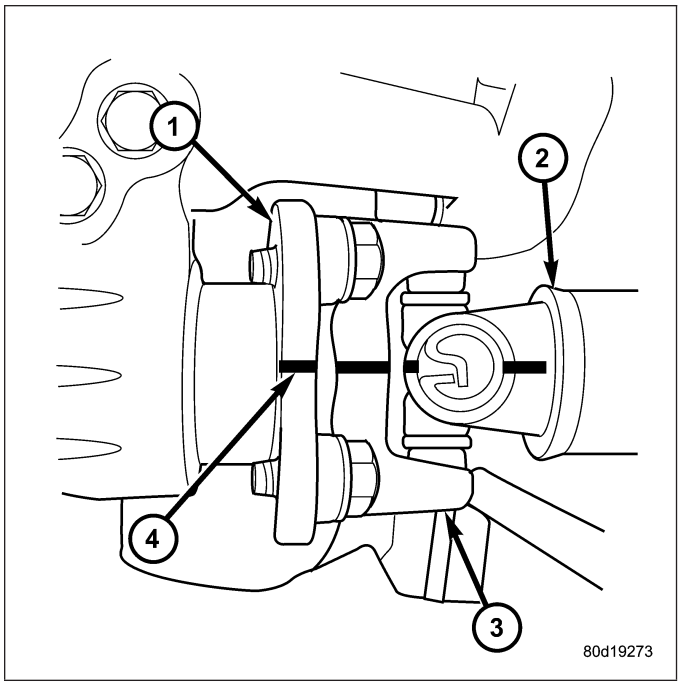
7. Install suspension crossmember (1), bolts and nuts (2).



8. Install skid plate (1) and bolts (2).



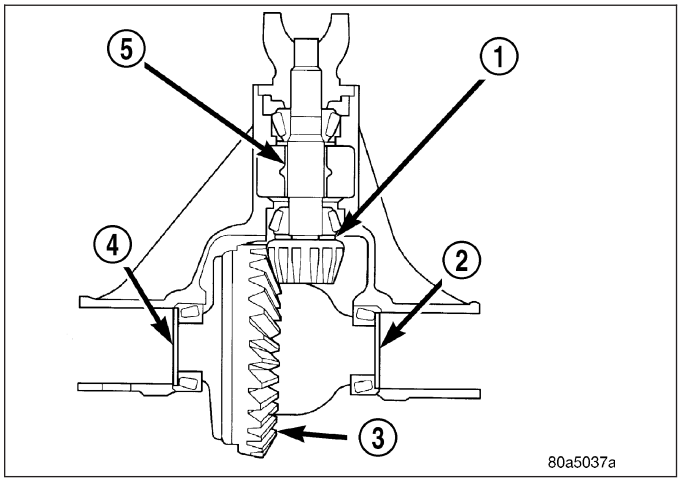
9. Install front propeller shaft (2) with reference marks (4) aligned and tighten bolts to 115 N·m (85 ft. lbs.).
10. Install axle half shafts.



ADJUSTMENTS

PINION DEPTH-BEARING PRELOAD-GEAR BACKLASH

Ring gear (3) and pinion are supplied as a matched sets. Identifying numbers for the ring gear and pinion are painted onto the pinion gear shaft and the side of the ring gear. A plus (+) number, minus (–) number or zero (0) along with the gear set sequence number (01 to 99) is on each gear. This first number is the amount (in thousandths of an inch) the depth varies from the standard depth setting of a pinion marked with a (0). The next two numbers are the sequence number of the gear set. The standard depth provides the best teeth contact pattern. Compensation for pinion depth variance is achieved with select shims (1) located between the rear pinion bearing cone and pinion gear head.



If installing a new gear, note the depth variance number of the original and replacement pinion. Add or subtract this number from the original depth shim/oil slinger to compensate for the difference in the depth variances. The numbers represent thousands of an inch deviation from the standard. If the number is negative, add that value to the required thickness of the depth shims. If the number is positive, subtract that value from the thickness of the depth shim.

Pinion Gear Depth Variance Chart: Note where Old and New Pinion Marking columns intersect. Intersecting figure represents plus or minus the amount needed.

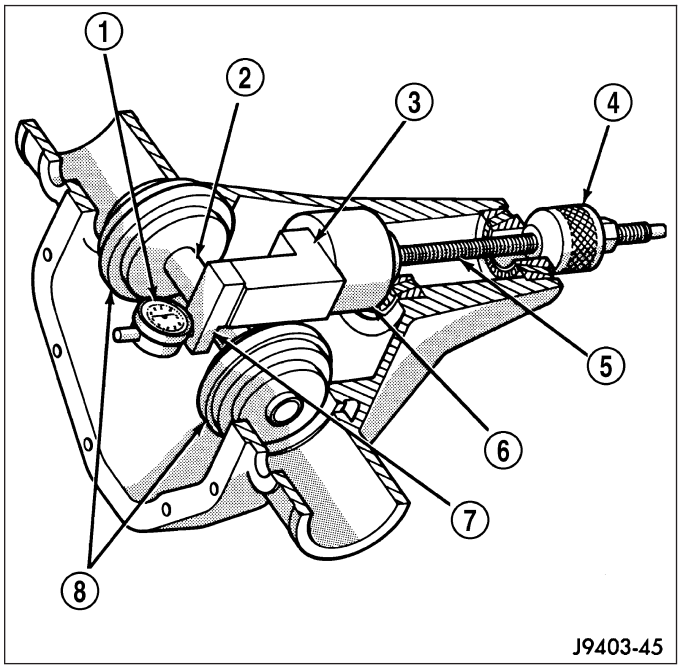
PINION GEAR DEPTH VARIANCE

Original Pinion Gear Depth Variance	New Pinion Gear Depth Variance									
	−4	−3	−2	−1	0	+1	+2	+3	+4	
+4		+0.008	+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0
+3		+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	−0.001
+2		+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	−0.001	−0.002
+1		+0.005	+0.004	+0.003	+0.002	+0.001	0	−0.001	−0.002	−0.003
0		+0.004	+0.003	+0.002	+0.001	0	−0.001	−0.002	−0.003	−0.004
−1		+0.003	+0.002	+0.001	0	−0.001	−0.002	−0.003	−0.004	−0.005
−2		+0.002	+0.001	0	−0.001	−0.002	−0.003	−0.004	−0.005	−0.006
−3		+0.001	0	−0.001	−0.002	−0.003	−0.004	−0.005	−0.006	−0.007
−4		0	−0.001	−0.002	−0.003	−0.004	−0.005	−0.006	−0.007	−0.008

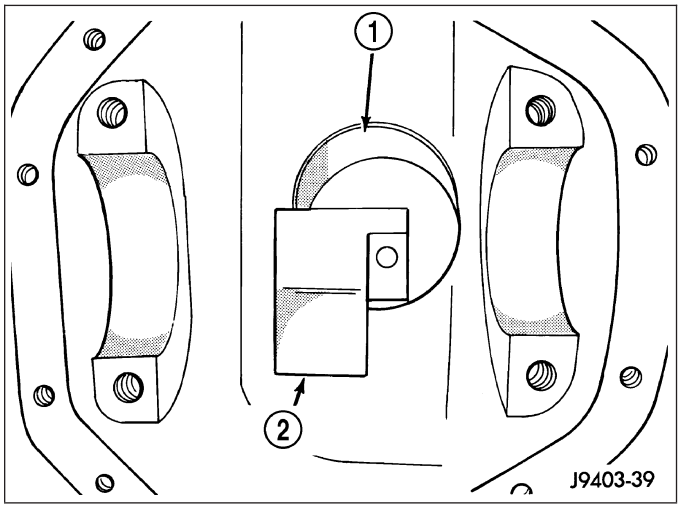
PINION DEPTH MEASUREMENT

Measurements are taken with pinion cups and pinion bearings installed in housing. Take measurements with a Pinion Gauge Set, Pinion Block 8177 (6), Arbor Discs 8541(8) and Dial Indicator C-3339 (1).

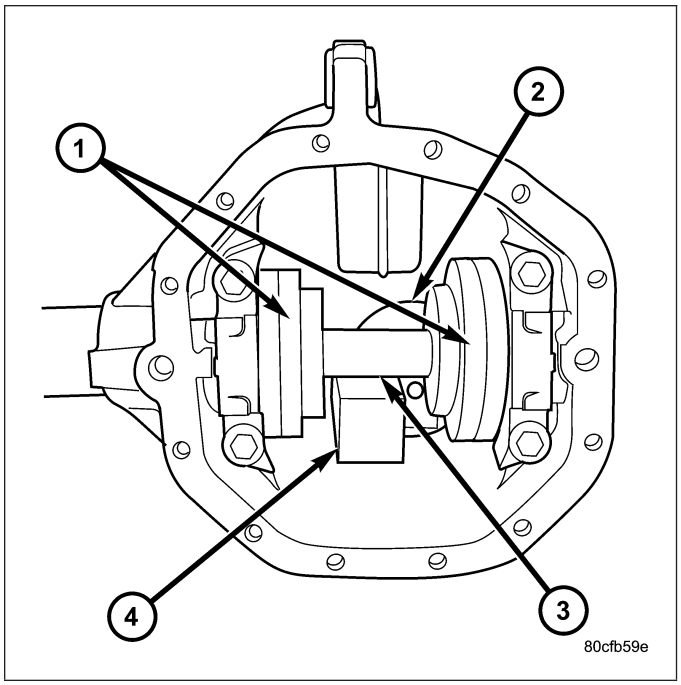
1. Assemble Pinion Height Block 6739 (3), Pinion Block 8177 (6) and rear pinion bearing onto Screw 6741 (5).



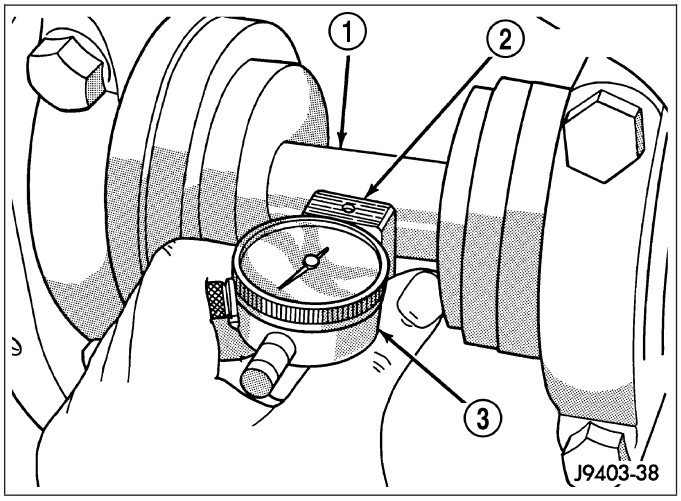
2. Insert assembled height gauge components (1) (2), rear bearing and screw into the housing through the pinion bearing cups.
3. Install front pinion bearing and Cone-Nut 6740 onto the screw. Tighten cone-nut until Torque To Rotate the screw is 2.0 N·m (18 in. lbs.).



4. Place Arbor Discs 8541 (1) on Arbor D-115-3 (3) in position in the housing side bearing cradles. Install differential bearing caps on arbor discs (1) and tighten cap bolts to specification.
5. Assemble Dial Indicator C-3339 into Scooter Block D-115-2.
6. Place Scooter Block/Dial Indicator in position in the housing so dial probe and scooter block are flush against the surface of the pinion height block. Hold scooter block in place and zero the dial indicator. Tighten dial indicator face lock screw.

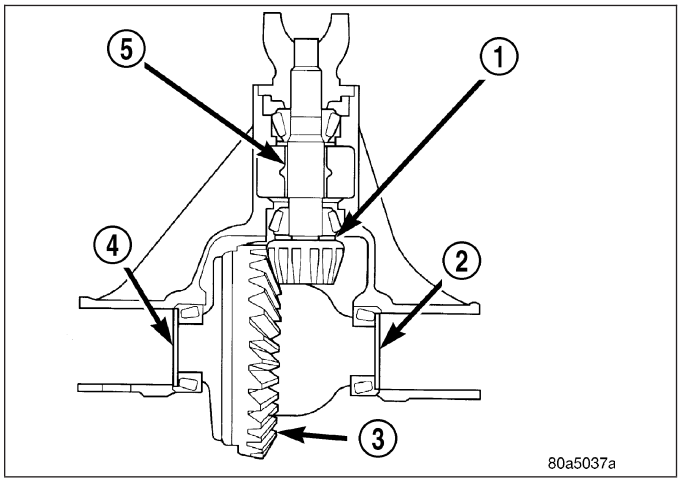


7. Slide the dial indicator (3) probe across the gap between the pinion height block and the arbor bar (1) with the scooter block (2) against the pinion height block. Slide the dial probe to the crest of the arbor bar and record the highest reading.
8. Select a shim equal to the dial indicator reading plus the drive pinion gear depth variance number marked on the shaft of the pinion gear using the opposite sign on the variance number. For example, if the depth variance is –2, add +0.002 in. to the dial indicator reading.
9. Remove the pinion depth gauge components from the housing.



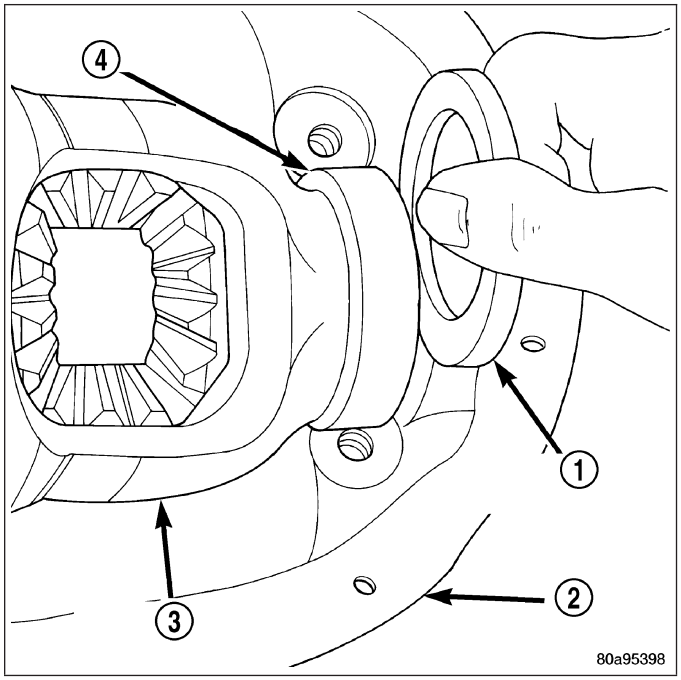
DIFFERENTIAL BEARING PRELOAD

Differential side bearing preload and gear backlash is achieved by selective shims (2) (4) inserted between the bearing cup and the housing. The proper shim thickness can be determined using slip-fit Dummy Bearings 8398 in place of the differential side bearings and a Dial Indicator C-3339. Before measuring differential bearing preload and gear backlash, measure pinion gear depth and prepare pinion for installation. Pinion gear depth is essential to establishing gear backlash and tooth contact patterns. After measuring shim thickness to take up differential side play, install pinion and measure gear backlash shim thickness. Overall shim thickness is the dial indicator reading and preload specification added together. The gear backlash measurement determines the shim thickness used on the ring gear (3) side of the differential case. Subtract gear backlash shim thickness from overall shim thickness to determine shim thickness for pinion gear side of the differential.

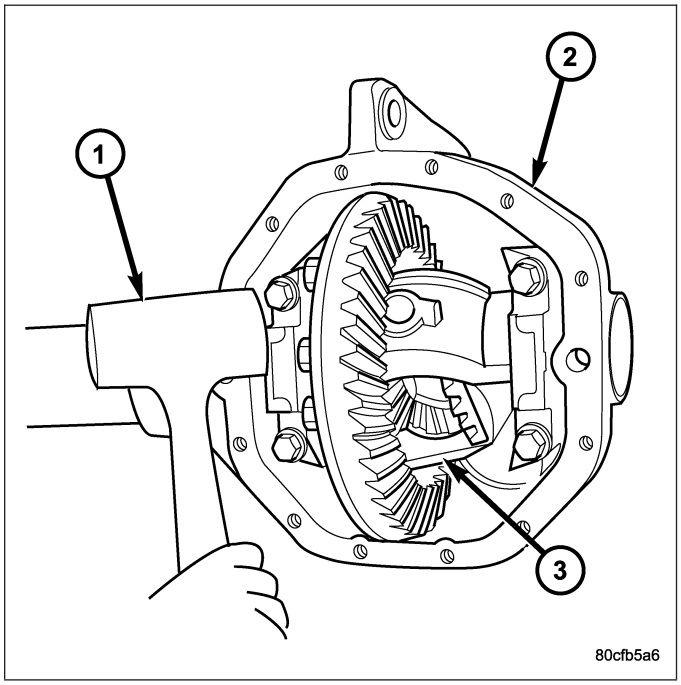


SHIM SELECTION

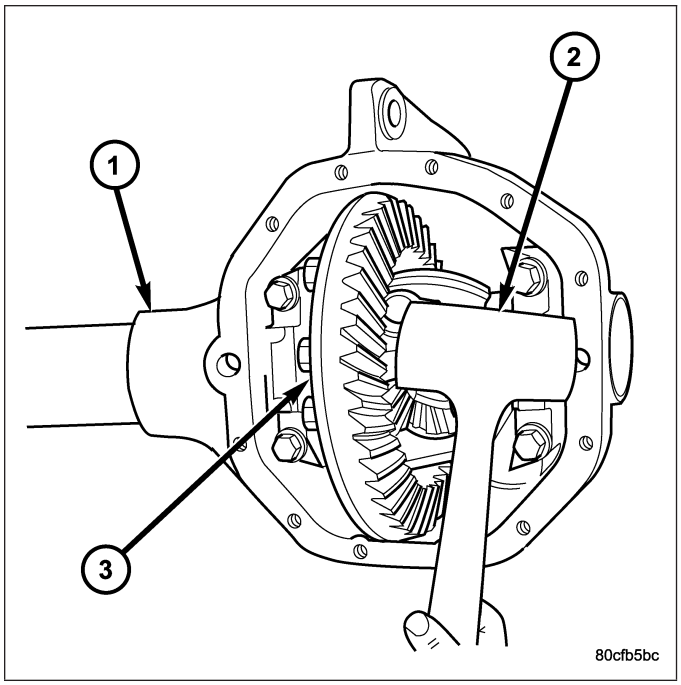
1. Remove side bearings from differential case.
2. Install ring gear if necessary, on differential case and tighten bolts to specification.
3. Install Dummy Bearings 8398 (4) on differential case.
4. Install differential case in the housing.
5. Insert Dummy Shims 8107 (1) starting point shims between both dummy bearings (4) and the housing.



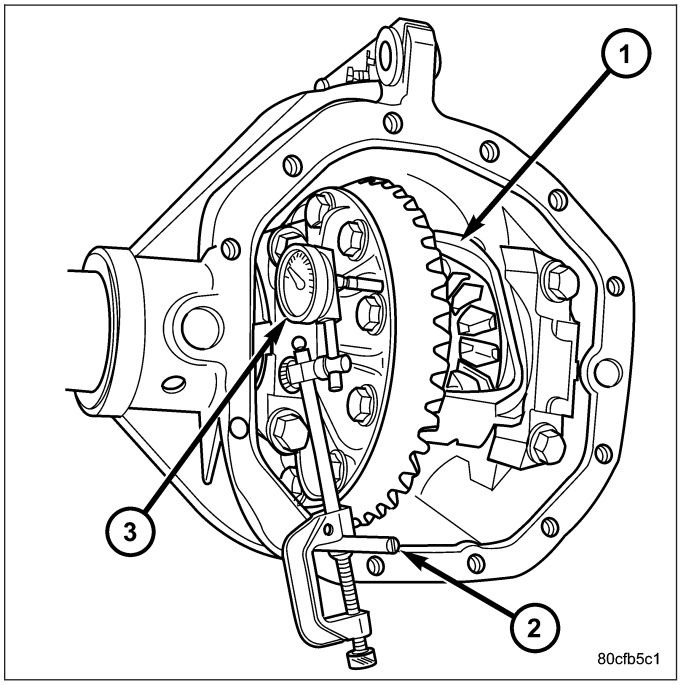
6. Install the marked bearing caps in their correct positions. Install and snug the bolts.
7. Seat the differential (3) dummy bearing to pinion side of the differential housing (2).



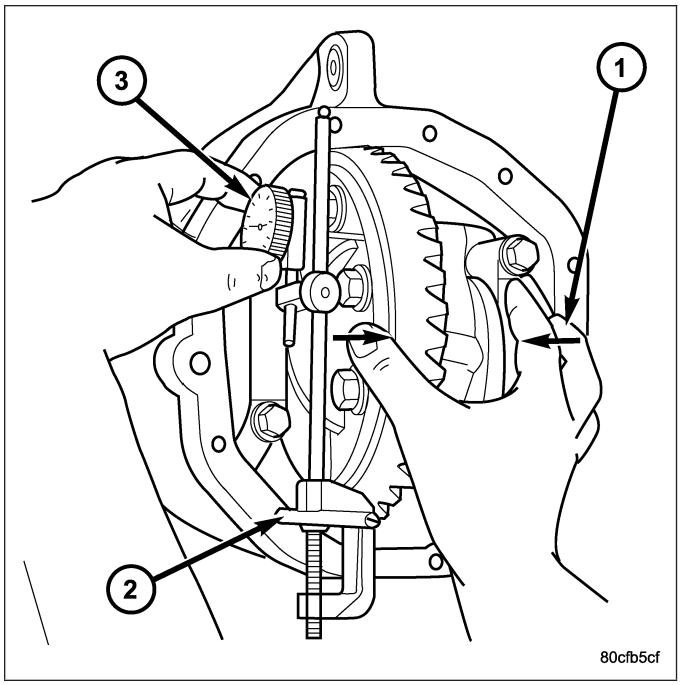
8. Seat the differential dummy bearing to the ring gear side (3) of the differential housing.



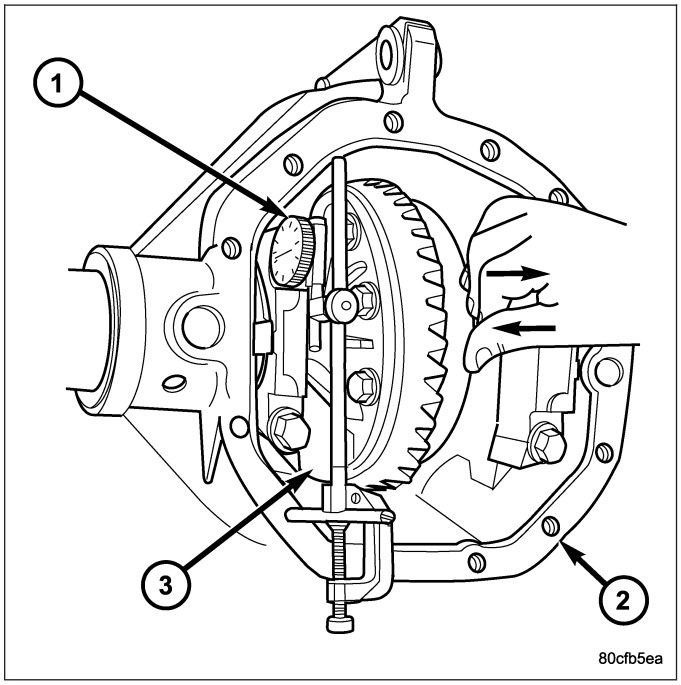
9. Install Pin C-3288-B (2) in cover bolt hole below ring gear.
10. Attach Dial Indicator C-3339 (3) to post and position dial indicator plunger on a flat surface on a ring gear bolt head.



11. Push and hold differential to the pinion gear side (1) of the housing and zero dial indicator (3).



12. Push and hold differential case to the ring gear side (3) and record dial indicator (1) reading.
13. Add the dial indicator reading to the starting point shim thicknesses to determine the total shim thickness necessary to achieve zero differential end play.
14. Add 0.2 mm (0.008 in) to the zero end play total. This new total represents the shims needed to preload the new differential case bearings.
15. Rotate dial indicator out of the way on pilot stud.
16. Remove differential case, dummy bearings and dummy shims from the housing.
17. Install the pinion gear in the housing. Install the companion flange and establish the correct pinion rotating torque.
18. Install differential case and Dummy Bearings in the housing with a single dummy shim on the ring gear side of the axle and tighten retaining cap bolts.
19. Position the dial indicator plunger on a flat surface between the ring gear bolt heads.



20. Push and hold differential case toward pinion.
21. Zero dial indicator face to pointer.
22. Push and hold differential case to ring gear side of the housing.
23. Record dial indicator reading.
24. Subtract 0.05 mm (0.002 in.) from the dial indicator reading to compensate for backlash between ring and pinion gears. Add the resulting measurement to the thickness of the single dummy shim. This is the thickness of shim required to achieve proper backlash.
25. Subtract the backlash shim thickness from the total preload shim thickness. The remainder is the shim thickness required on the pinion side of the housing.
26. Rotate dial indicator out of the way on pilot stud.
27. Remove differential case, dummy bearings and dummy shim from the housing.
28. Install new side bearing cones and cups on differential case.

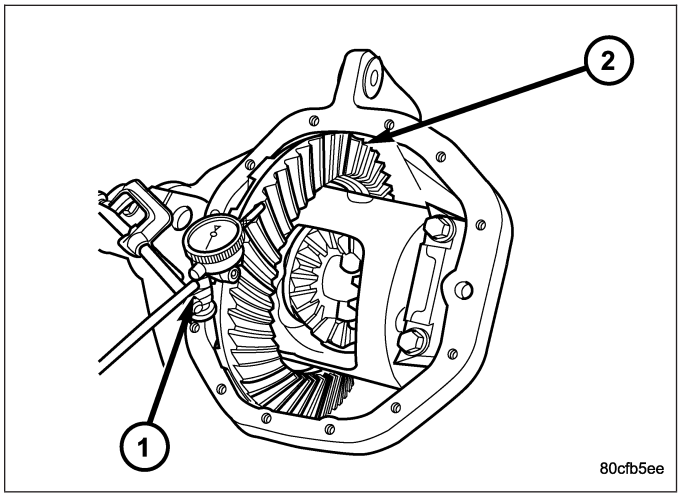
29. Install Spreader W-129-B and Adapter Plates 8142-A on the housing and spread open enough to receive differential case.

CAUTION: Never spread over 0.50 mm (0.020 in). If the housing is over-spread, it could be distorted or damaged.

30. Place the side bearing shims in the differential housing against the housing shoulder.
31. Install the differential case in the housing.
32. Rotate the differential case several times to seat the side bearings.

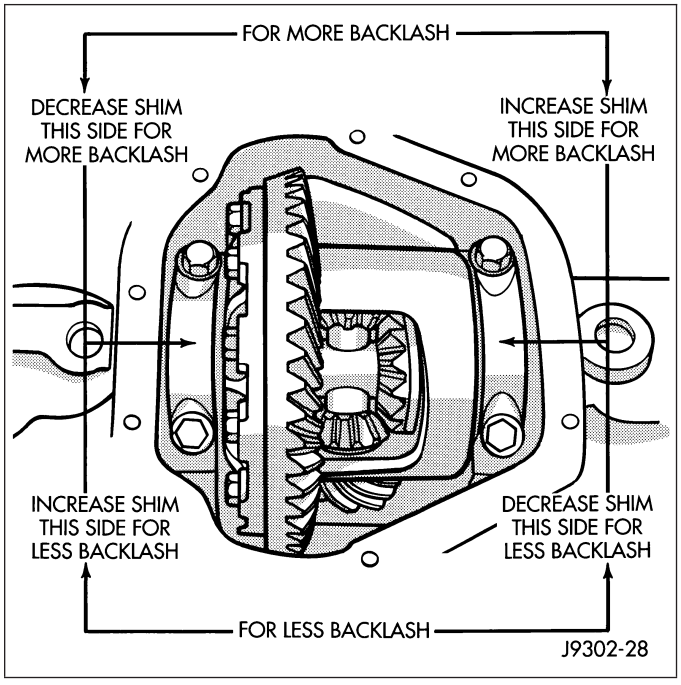
GEAR BACKLASH

1. Position the dial indicator (1) plunger against a ring gear tooth (2).
2. Push and hold ring gear upward while not allowing the pinion gear to rotate.
3. Zero dial indicator face to pointer.



4. Push and hold ring gear downward while not allowing the pinion gear to rotate. Dial indicator reading should be between 0.12 mm (0.005 in.) and 0.20 mm (0.008 in.). If backlash is not within specifications transfer the necessary amount of shim thickness from one side of the differential housing to the other.
5. Verify differential case and ring gear runout by measuring ring to pinion gear backlash at eight locations around the ring gear. Readings should not vary more than 0.05 mm (0.002 in.). If readings vary more than specified, the ring gear or the differential case is defective.

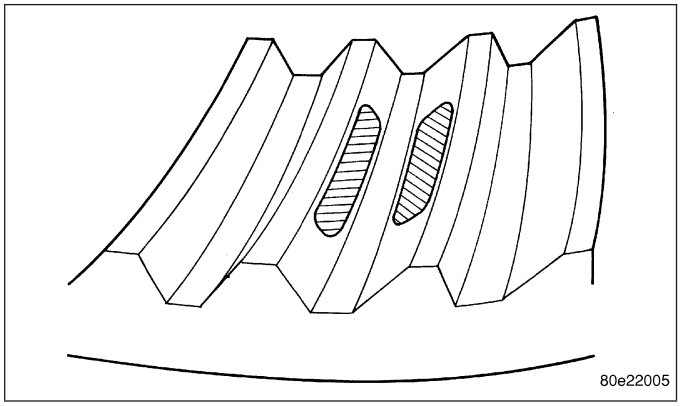
After the proper backlash is achieved, perform the Gear Contact Pattern procedure.



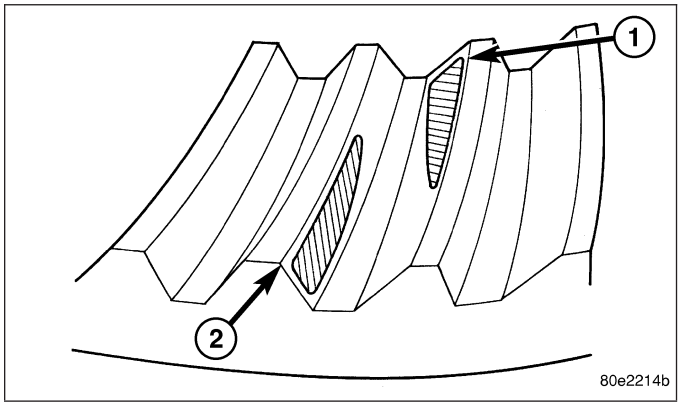
GEAR CONTACT PATTERN

1. Wipe clean each tooth of the ring gear.
2. Apply gear marking compound to all of the ring gear teeth.
3. Verify bearing cap bolts are torque specification.
4. Apply the brakes lightly to create at 14 N·m (10 ft. lbs.) pinion rotating torque.
5. Rotate the pinion/pinion yoke 4 full revolutions in each directions.
6. Read gear tooth contact pattern.

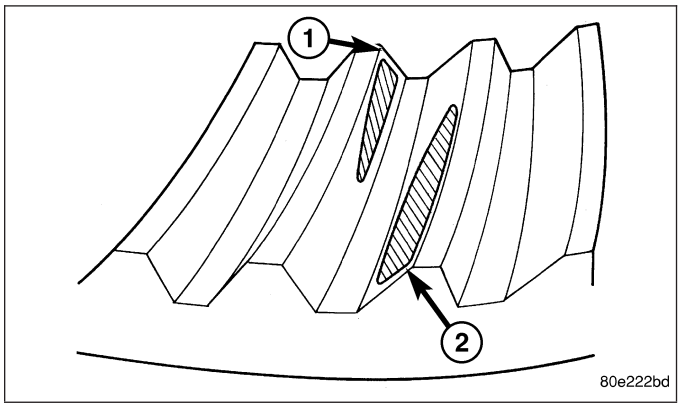
Gear contact pattern correct. Backlash and pinion depth is correct.



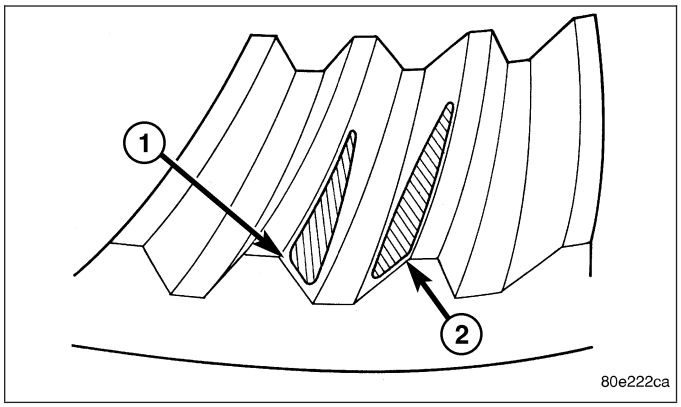
Ring gear too far away from pinion gear coast side toe (1) drive side heel (2). Decrease backlash by moving the ring closer to the pinion gear.



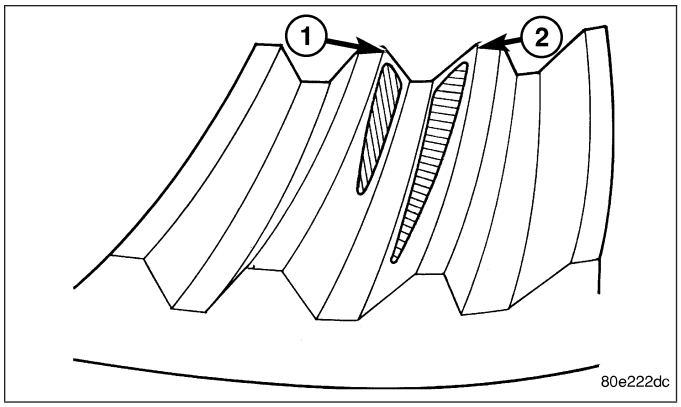
Ring gear too close to pinion gear drive side toe (1) coast side heel (2). Increase backlash, by moving the ring away from the pinion gear.



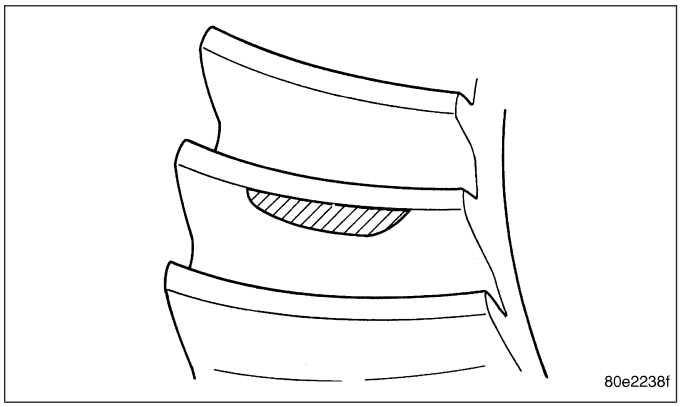
Ring gear too far away from pinion gear drive side heel (1) coast side heel (2). Decrease backlash, by moving the ring closer to the pinion gear.



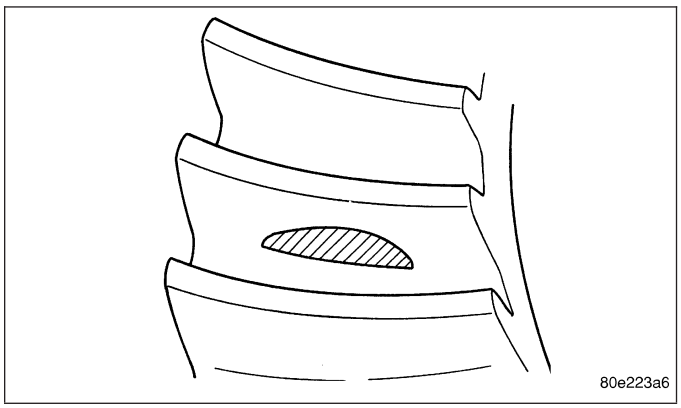
Ring gear too close to pinion gear drive side toe (1) coast side toe (2). Increase backlash, by moving the ring away from the pinion gear.



Pinion gear set too low. Increase pinion gear height, by increasing the pinion depth shim thickness.



Pinion gear set too high. Decrease pinion depth, by decreasing the pinion depth shim thickness.



SPECIFICATIONS

FRONT AXLE - C205FD

AXLE SPECIFICATIONS

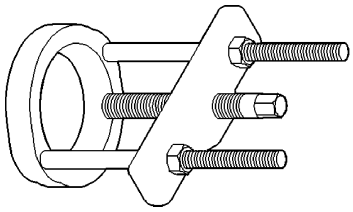
DESCRIPTION	SPECIFICATION
Axle Ratio	3.21,3.55, 3.92
Differential Case Flange Runout	0.076 mm (0.003 in.)
Differential Side Gear Clearance	0-0.15 mm (0-0.006 in.)
Ring Gear Diameter	205 mm (8.00 in.)
Ring Gear Backlash	0.12-0.20 mm (0.005-0.008 in.)
Ring Gear Runout	0.12 mm (0.005 in.)
Pinion Torque To Rotate - New Bearings	2.0-2.8 N·m (18-25 in. lbs.)

DESCRIPTION	SPECIFICATION
Pinion Torque To Rotate - Original Bearings	1-2 N·m (10-20 in. lbs.)

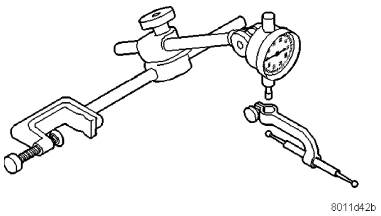
TORQUE SPECIFICATIONS

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Mounting Nuts	95	70	-
Differential Fill Hole Plug	34	25	-
Differential Cover Bolts	23	17	-
Bearing Cap Bolts	61	45	-
Ring Gear Bolts	108	80	-
Pinion Nut	271-475	200-350	-
Electric Actuator	27	20	-
Disconnect Seal	28	21	-

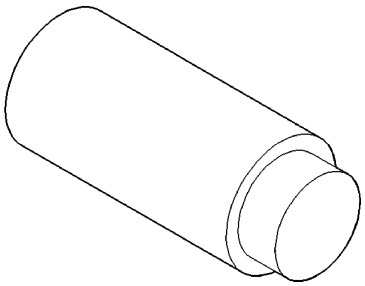
SPECIAL TOOLS-C205FD



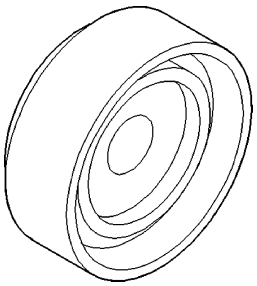
PULLER C-293-PA



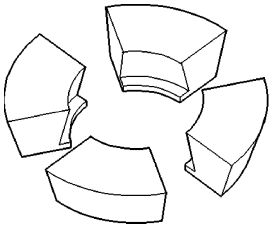
DIAL INDICATOR C-3339



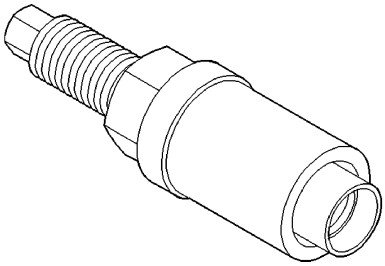
PLUG C-293-3



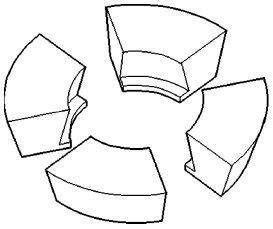
INSTALLER C-3716-A



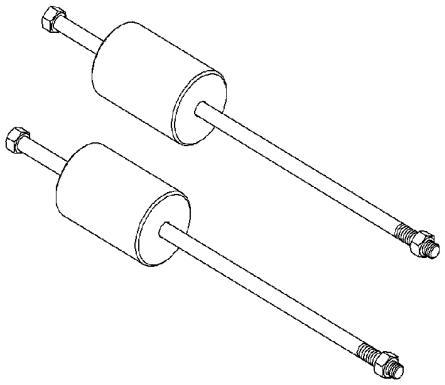
ADAPTERS C-293-42



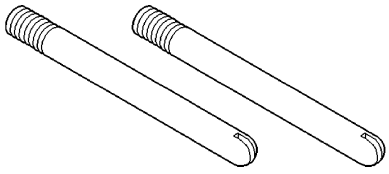
FLANGE INSTALLER C-3718



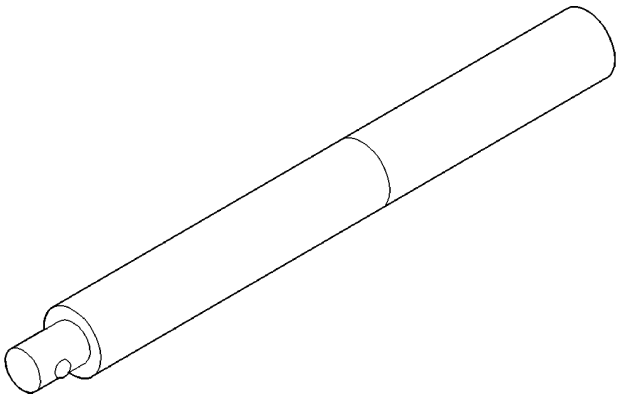
ADAPTERS C-293-48



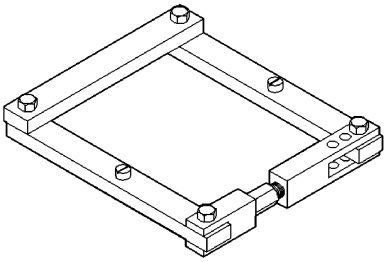
SLIDE HAMMER C-3752



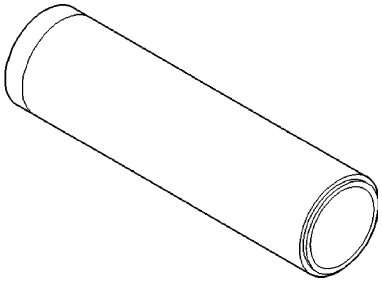
PINS C-3288-B



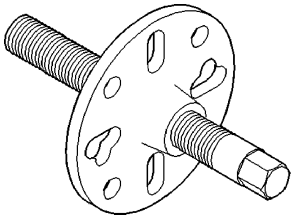
HANDLE C-4171



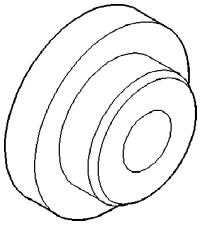
SPREADER W-129-B



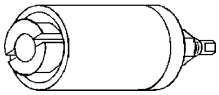
INSTALLER W-262



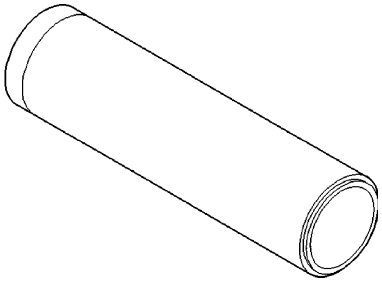
PULLER C-452



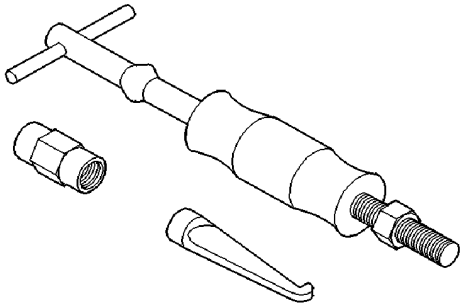
INSTALLER 5063



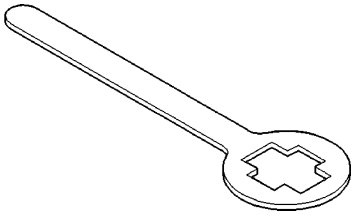
REMOVER C-4660-A



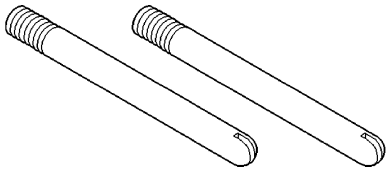
INSTALLER 6448A



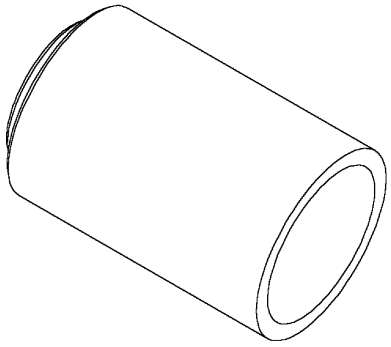
SLIDE HAMMER C-637



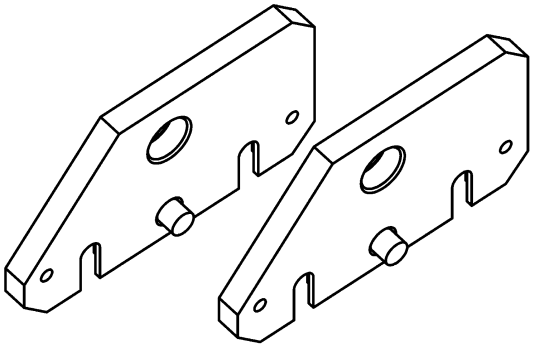
FLANGE HOLDER 6719A



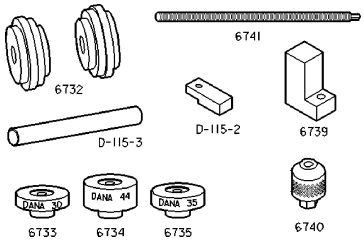
PINS MD998412



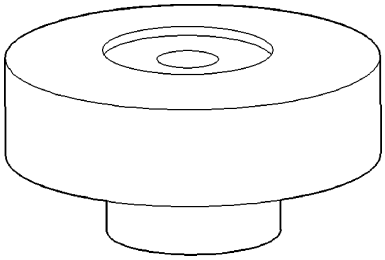
INSTALLER - 6761



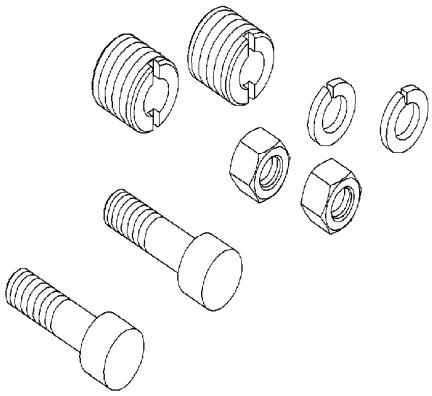
ADAPTER PLATES 8142A



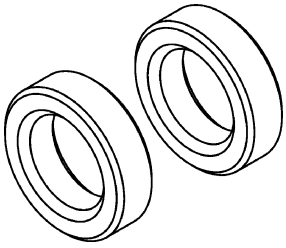
PINION DEPTH SET 6775



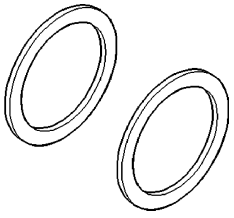
PINION BLOCK 8177



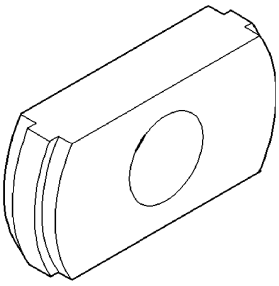
ADAPTER KIT 6987B



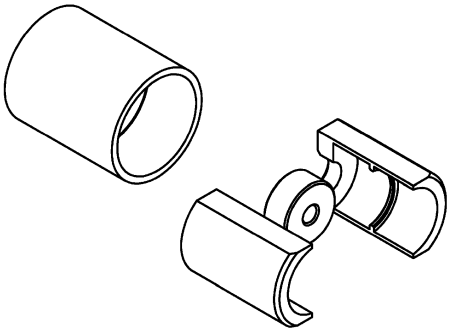
DUMMY BEARING 8398



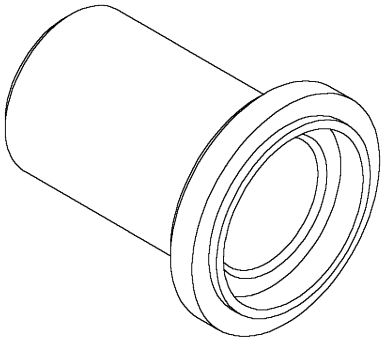
DUMMY SHIM 8107



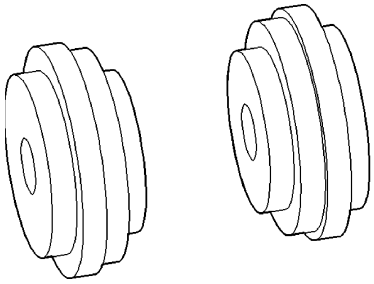
REMOVER 8401



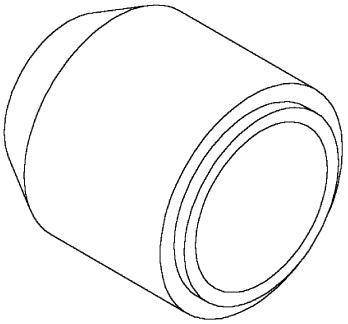
REMOVER 8420A



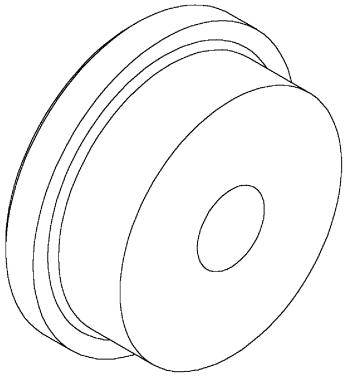
INSTALLER 8694



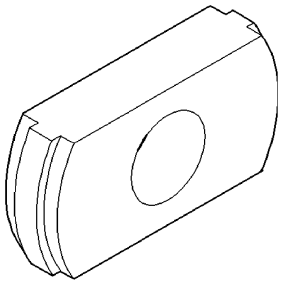
ARBOR DISCS 8541



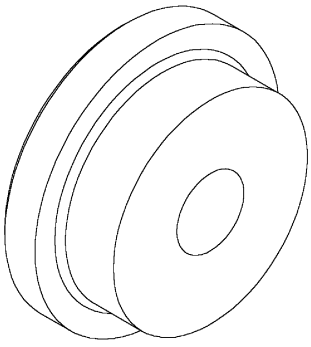
INSTALLER 8695



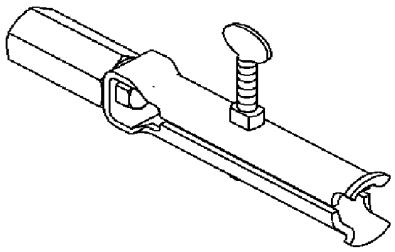
INSTALLER 8692



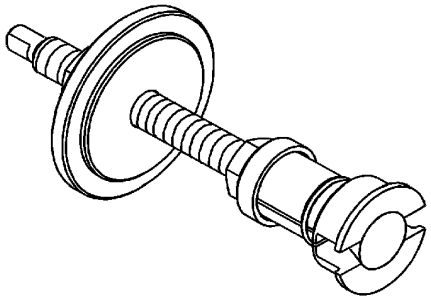
REMOVER 8831



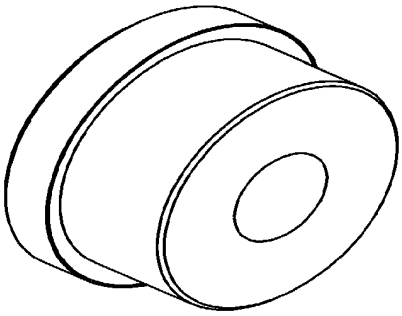
CUP INSTALLER 8693



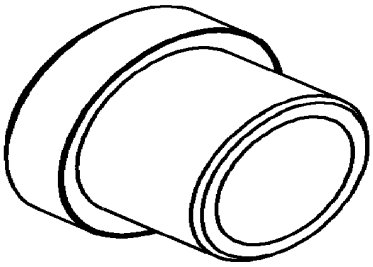
PULLER 9585



REMOVER 9766



INSTALLER 9767

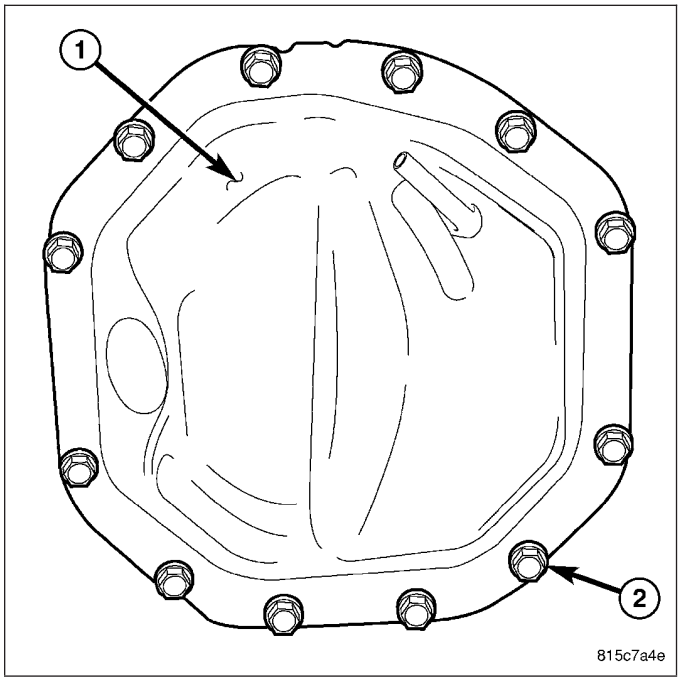


INSTALLER 9768

COVER-DIFFERENTIAL

REMOVAL

1. With vehicle in neutral, position vehicle on hoist.
2. Remove vent hose.
3. Remove differential cover (1) bolts (2).
4. Remove cover and drain lubricant.

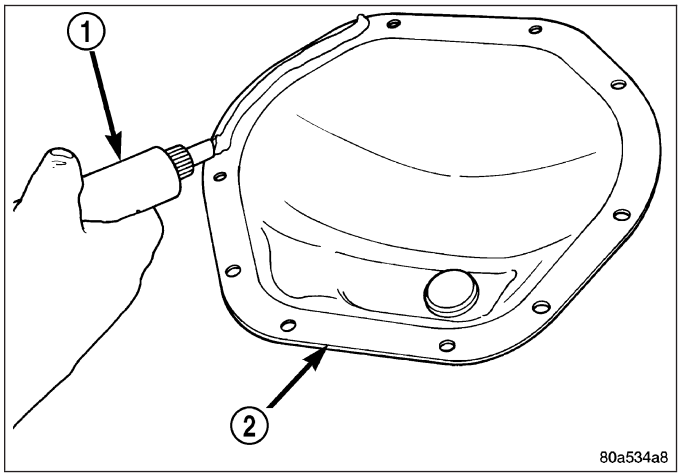


INSTALLATION

1. Apply a 4 mm (0.15 in.) bead of Mopar Silicone Rubber Sealant (1) or equivalent to the cover (2).

CAUTION: If housing cover is not installed within 3 to 5 minutes, the cover must be cleaned and new RTV applied. Failure to follow these instructions will result in a leak.

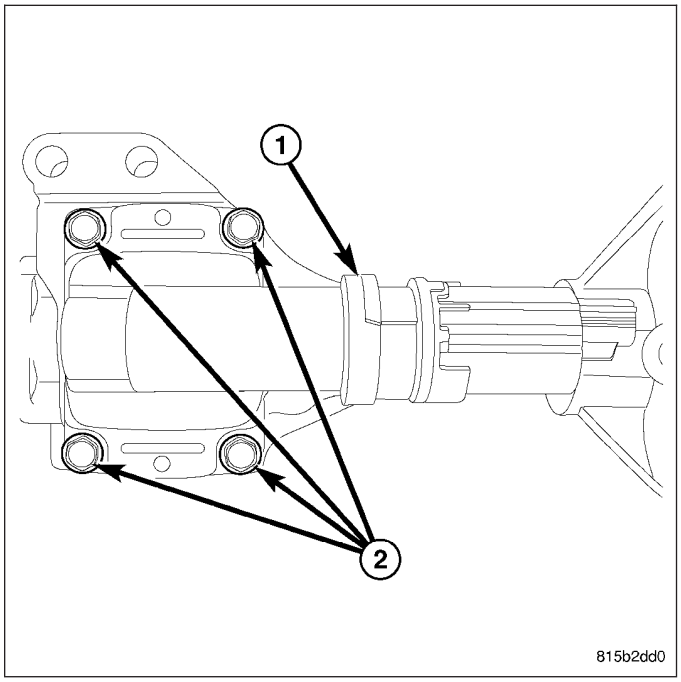
2. Install cover (2) and identification tag. Tighten cover bolts in a criss-cross pattern to 23 N·m (17 ft. lbs.).
3. Fill differential to specifications.
4. Install fill plug.



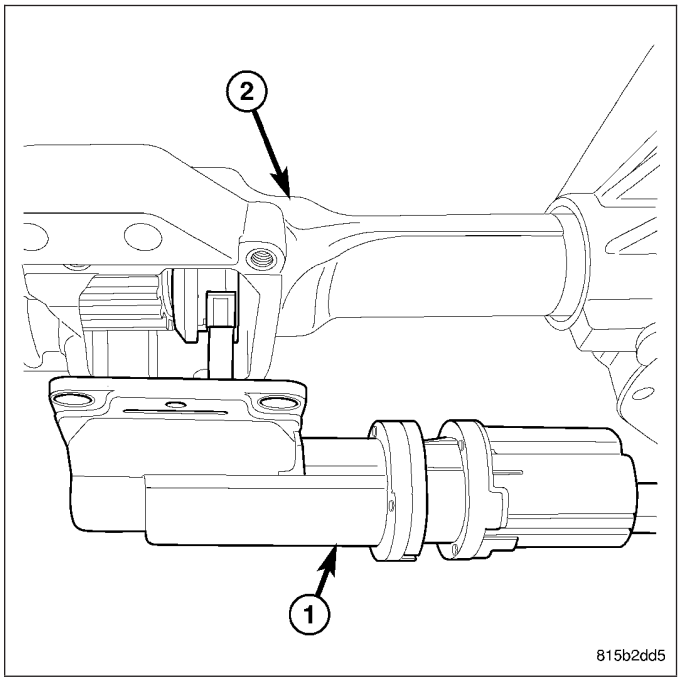
ACTUATOR

REMOVAL

1. Remove actuator wiring connector.
2. Remove actuator (1) bolts (2).

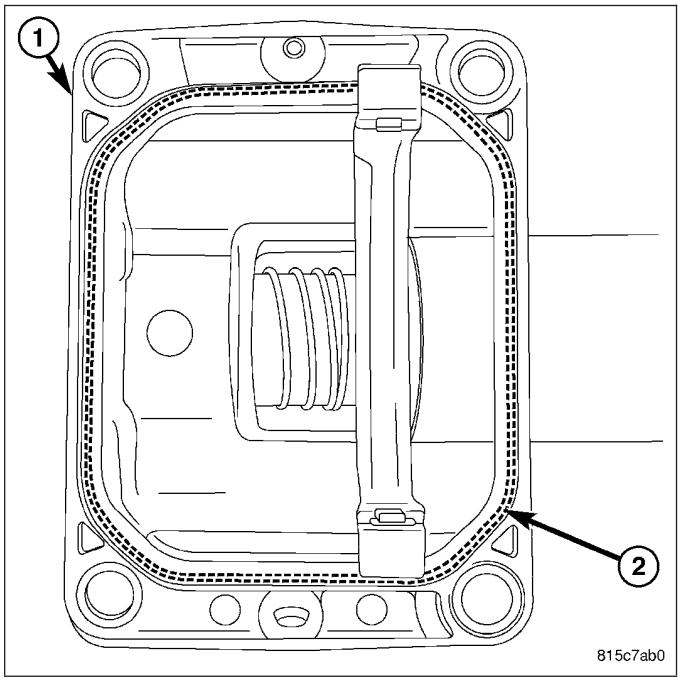


3. Remove actuator (1) from disconnect pocket (2).

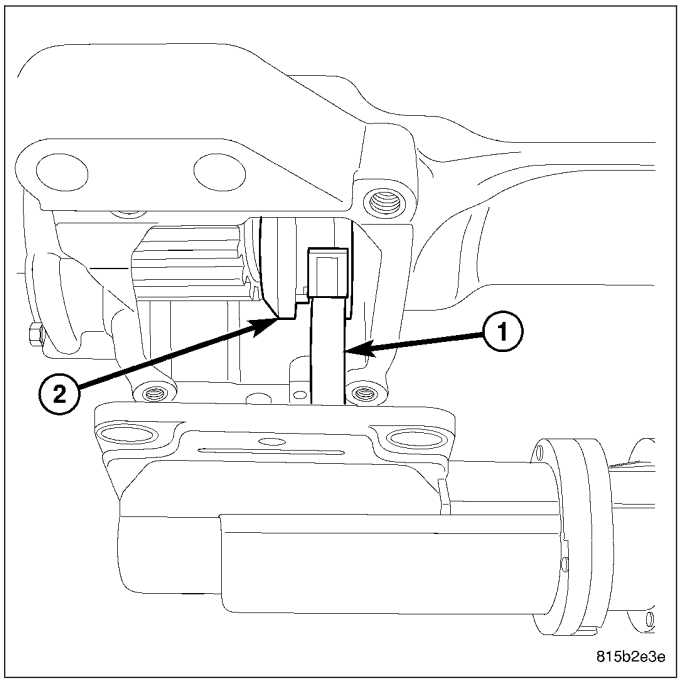


INSTALLATION

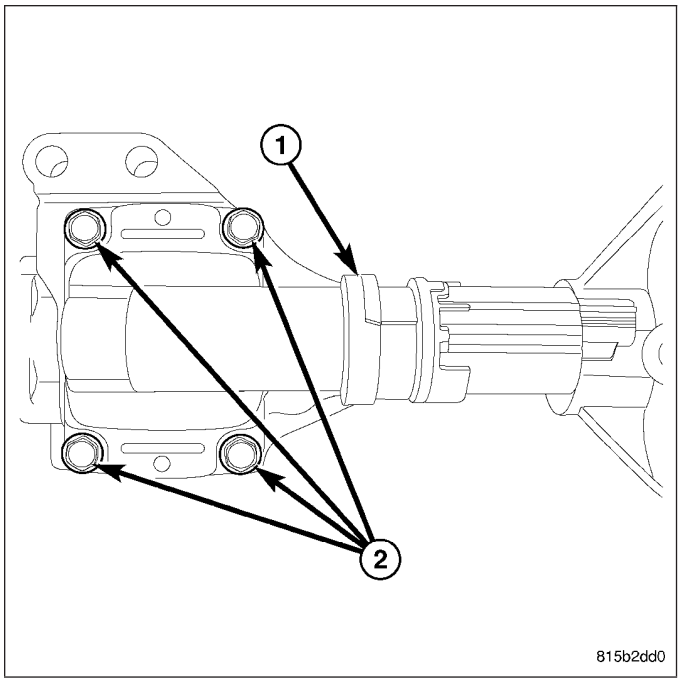
1. Clean actuator (1) sealing surface and install new gasket (2) if necessary.



2. Align actuator shift fork (1) with disconnect collar (2) and install actuator on disconnect pocket.



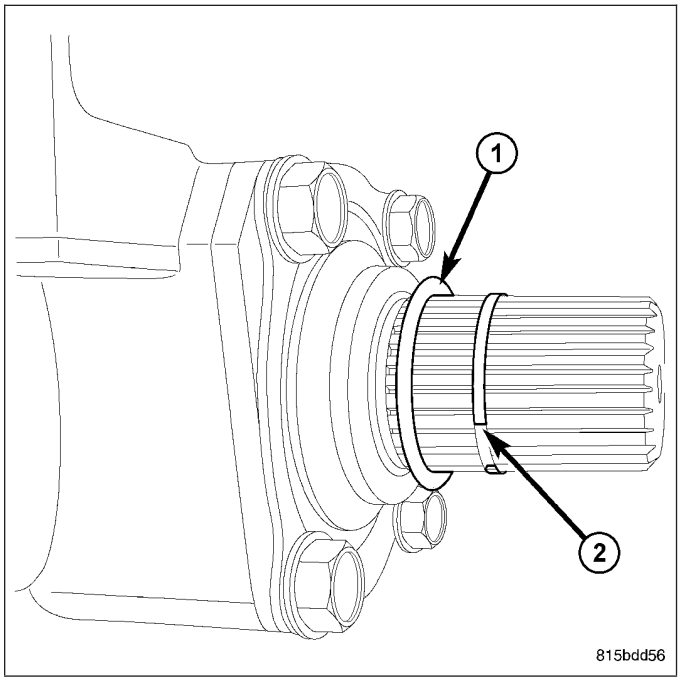
3. Install actuator (1) bolts (2) and tighten to 27 N·m (20 ft. lbs.).
4. Install disconnect actuator wiring connector.
5. Verify differential fluid level and add fluid if necessary.



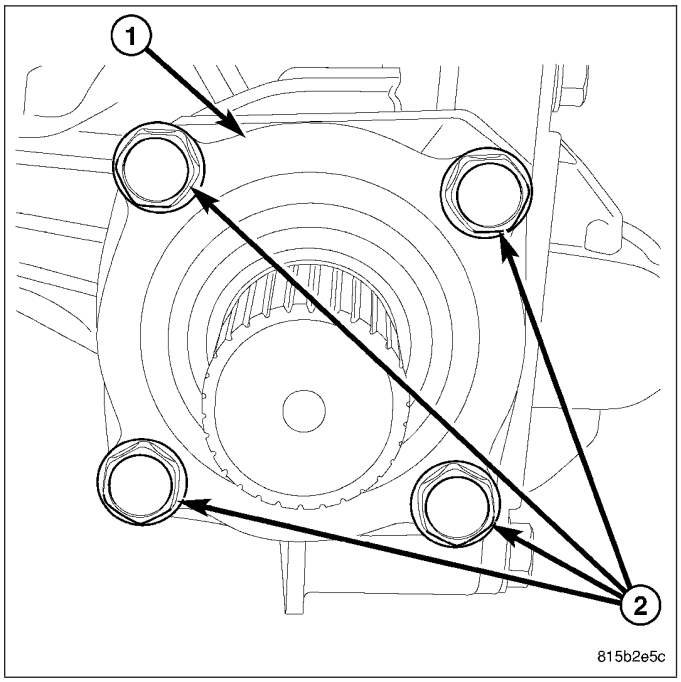
SEAL-DISCONNECT

REMOVAL

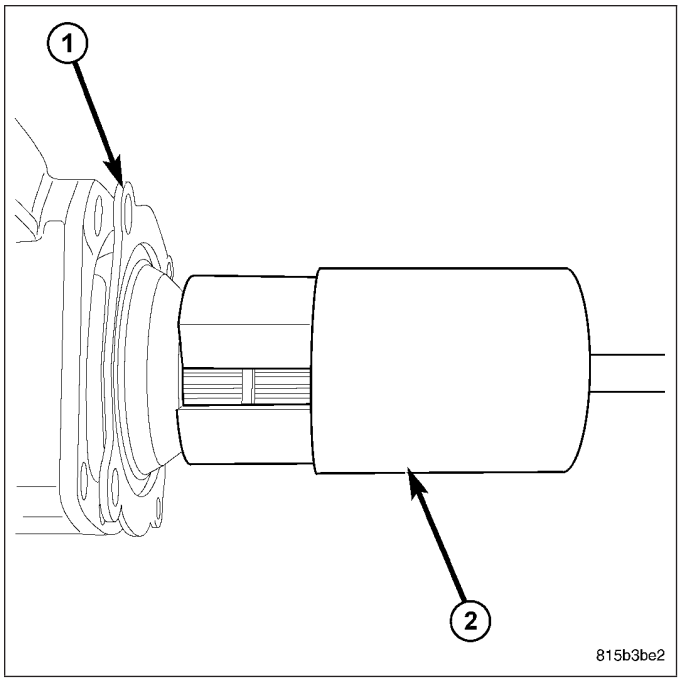
1. Remove half shaft from disconnect side of the axle.
2. Remove O-ring (1) and snap ring (2) from the output shaft.



3. Remove disconnect seal (1) bolts (2).

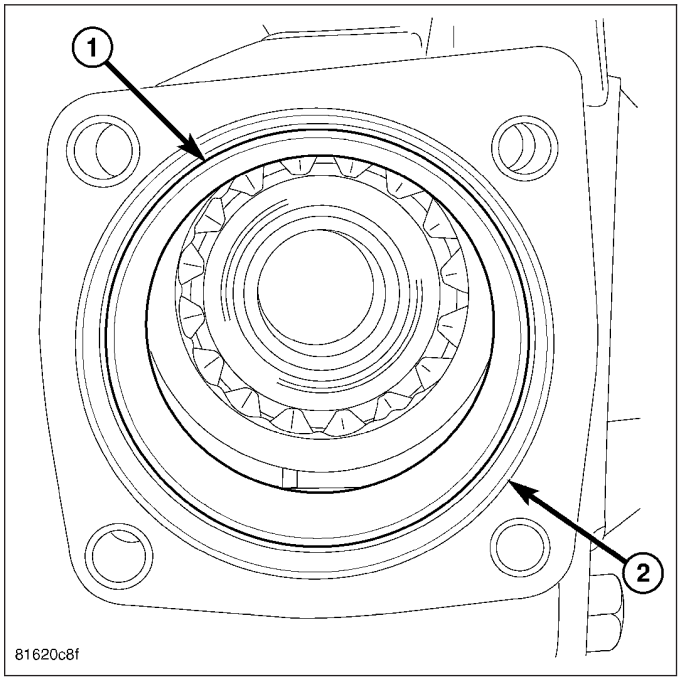


4. Remove output shaft and disconnect seal (1) with Remover 8420A (2) and Slide Hammer C-3752.

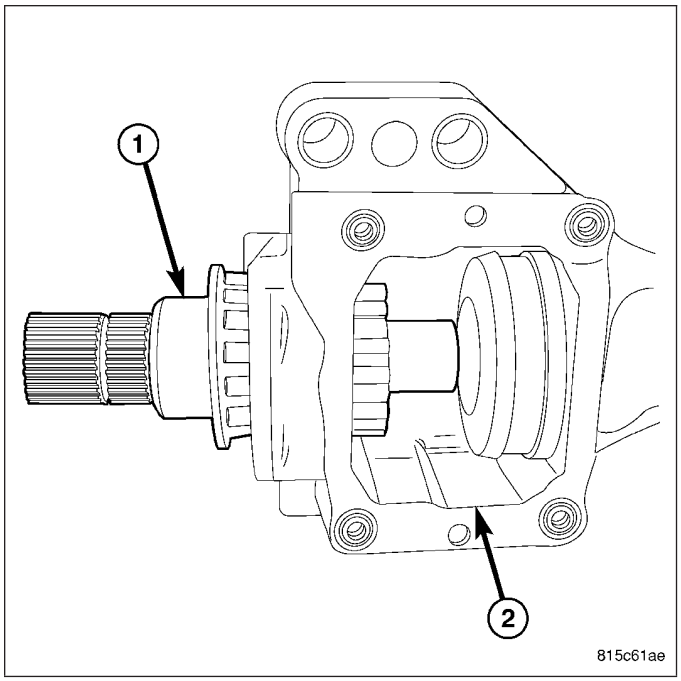


INSTALLATION

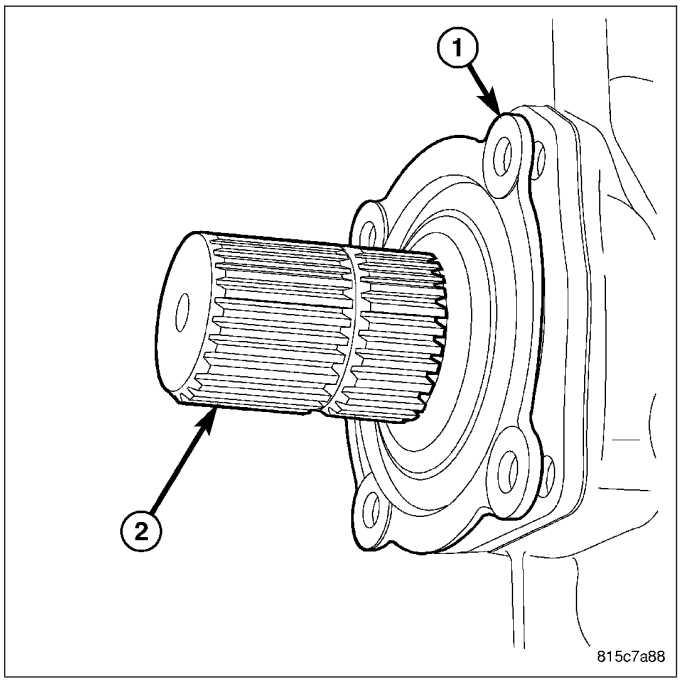
1. Verify output shaft bearing cup (1) is seated in disconnect pocket (2).



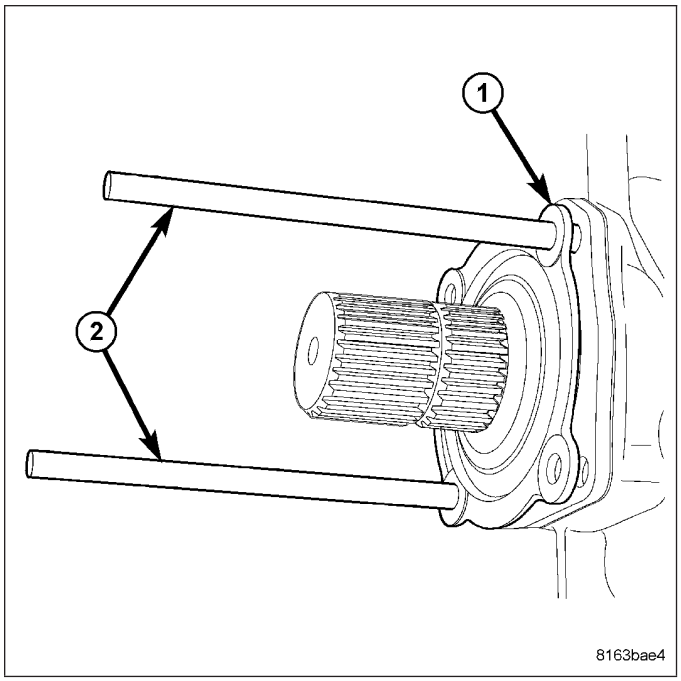
2. Install output shaft (1) in disconnect pocket (2).



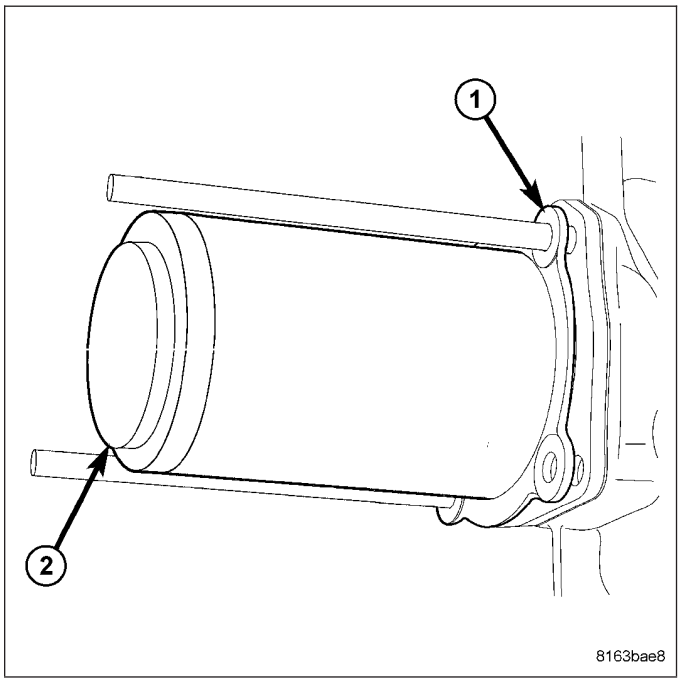
3. Install disconnect seal (1) on output shaft (2).



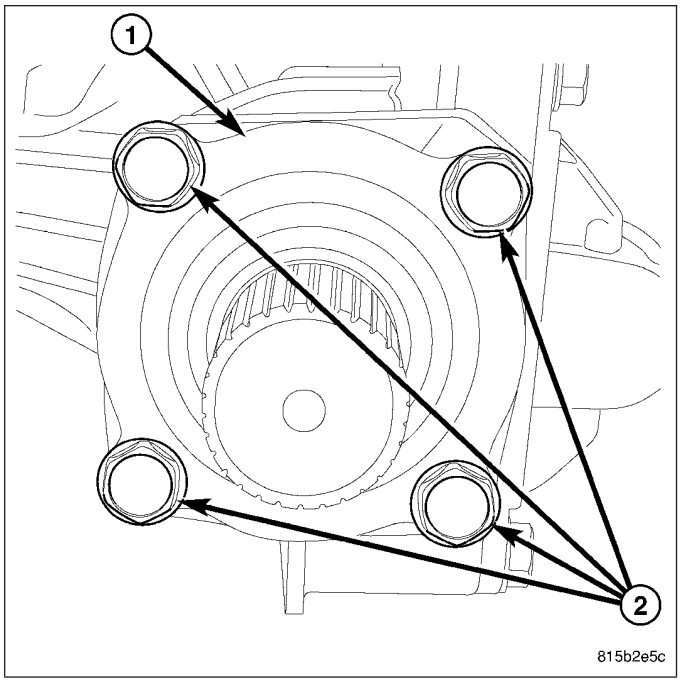
4. Align disconnect seal (1) with bolt holes in disconnect pocket with Pins MD998412 (2).



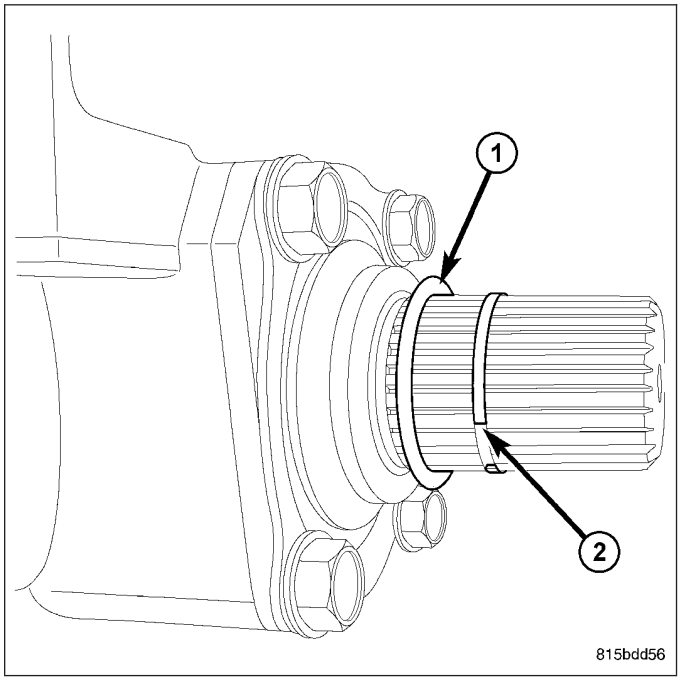
5. Install disconnect seal (1) in disconnect pocket with Installer 6761(2) and a hammer.



6. Install disconnect seal (1) bolts (2) and tighten to 28 N·m (21 ft. lbs.).



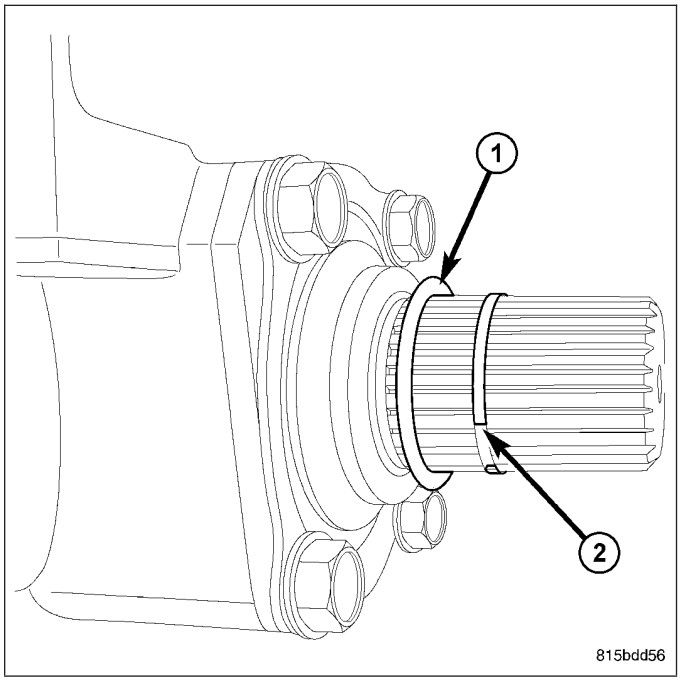
7. Install output shaft O-ring (1) and snap ring (2).
8. Install half shaft.
9. Verify differential fluid level and add fluid if necessary.



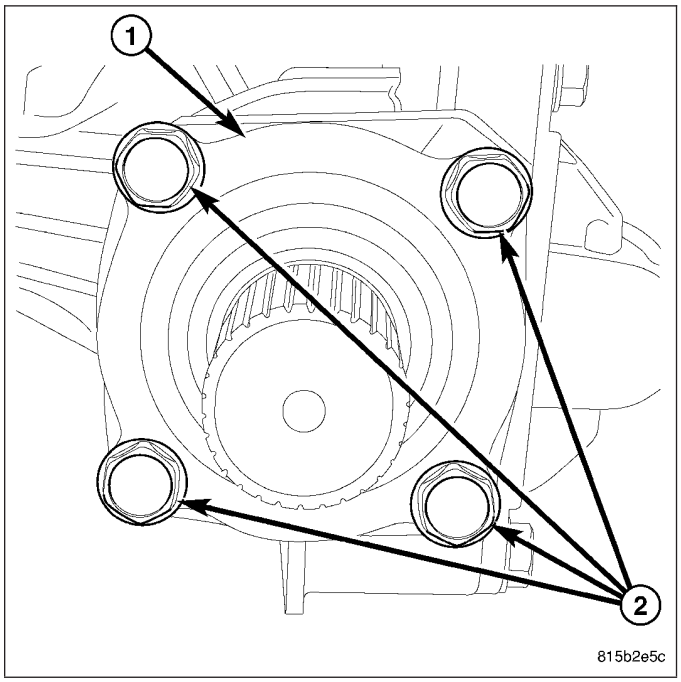
SHAFT-OUTPUT

REMOVAL

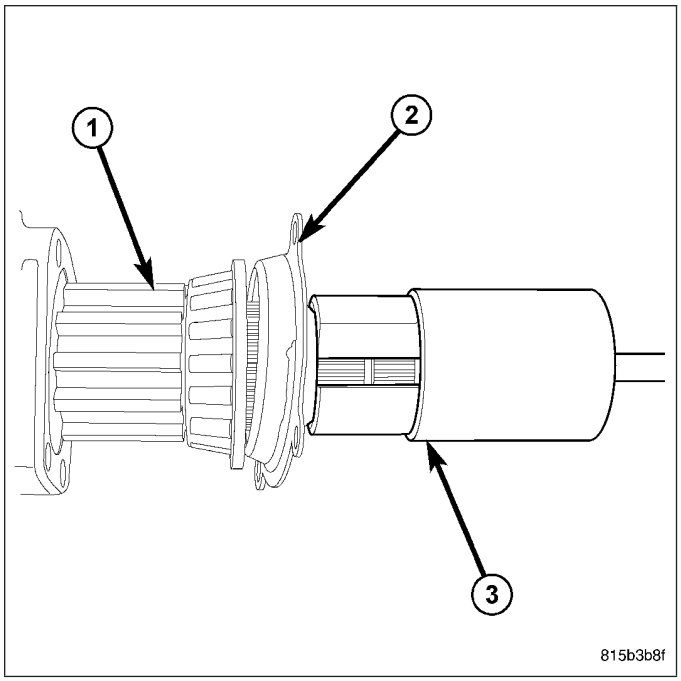
1. Remove half shaft from disconnect side of the axle.
2. Remove O-ring (1) and snap ring (2) from output shaft.



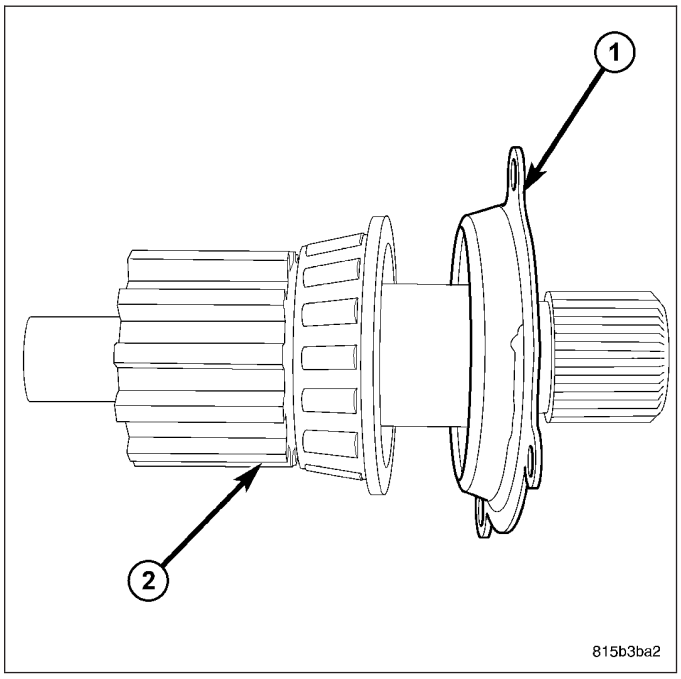
3. Remove disconnect seal (1) bolts (2).



4. Remove output shaft (1) and disconnect seal (2) with Remove 8420A (3) and Slide Hammer C-3752.

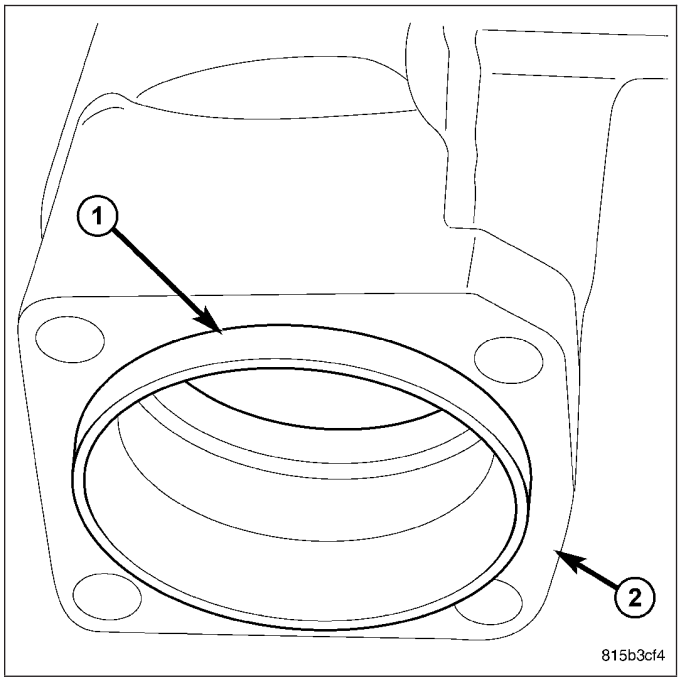


5. Remove disconnect seal (1) from output shaft (2).

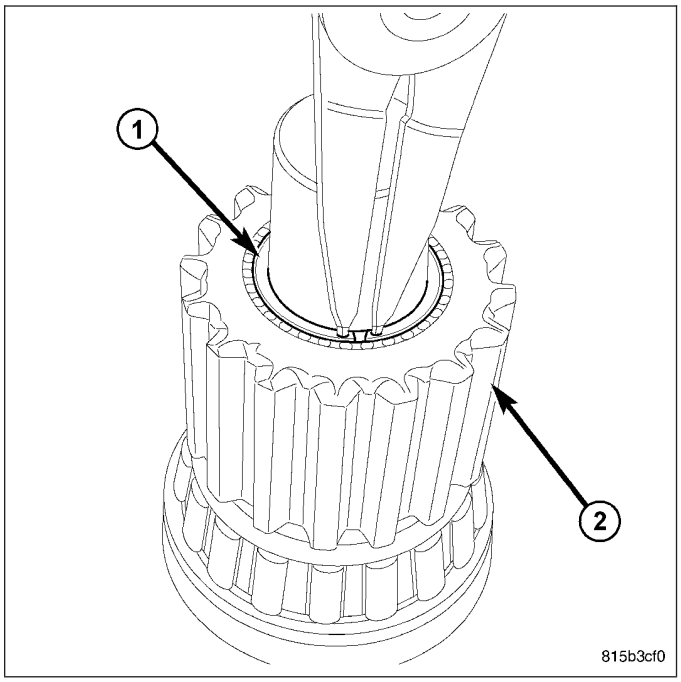


DISASSEMBLY

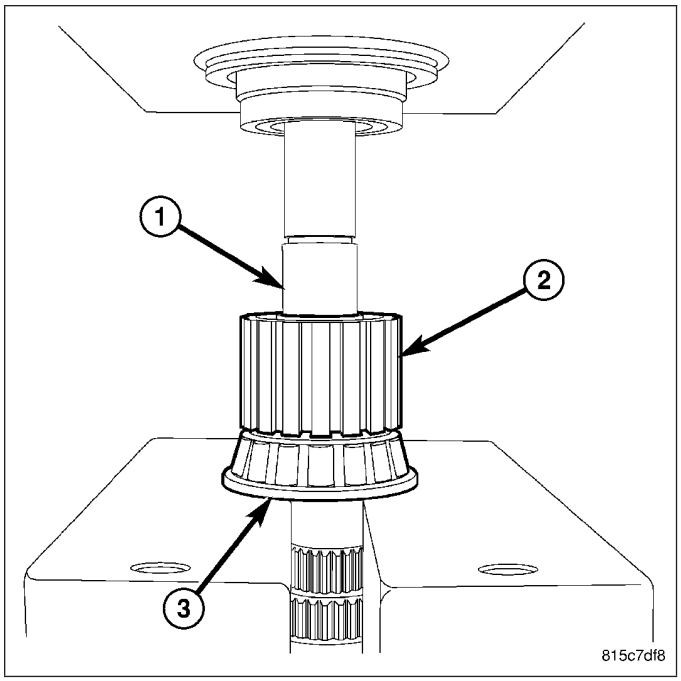
1. Remove output shaft bearing cup (1) from axle tube (2).



2. Remove snap ring (1) from output shaft (2).

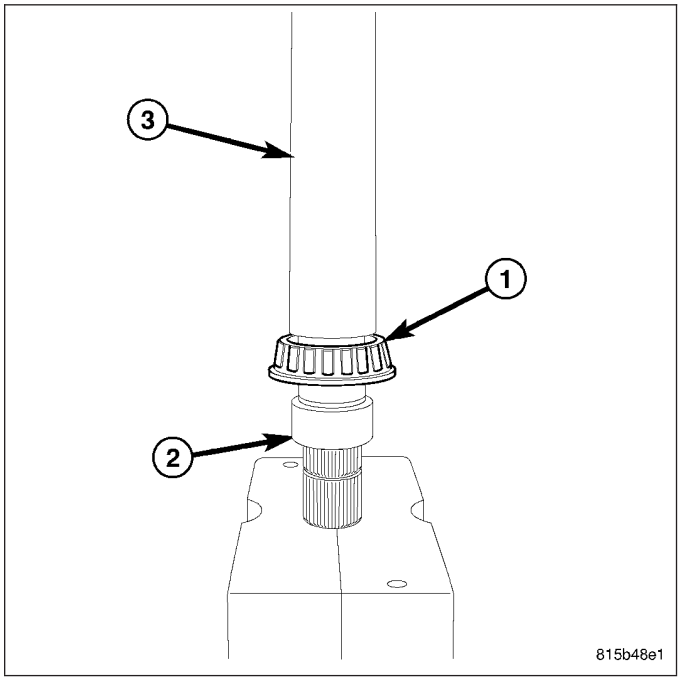


3. Press output shaft (1) out of disconnect spline (2) and bearing (3).

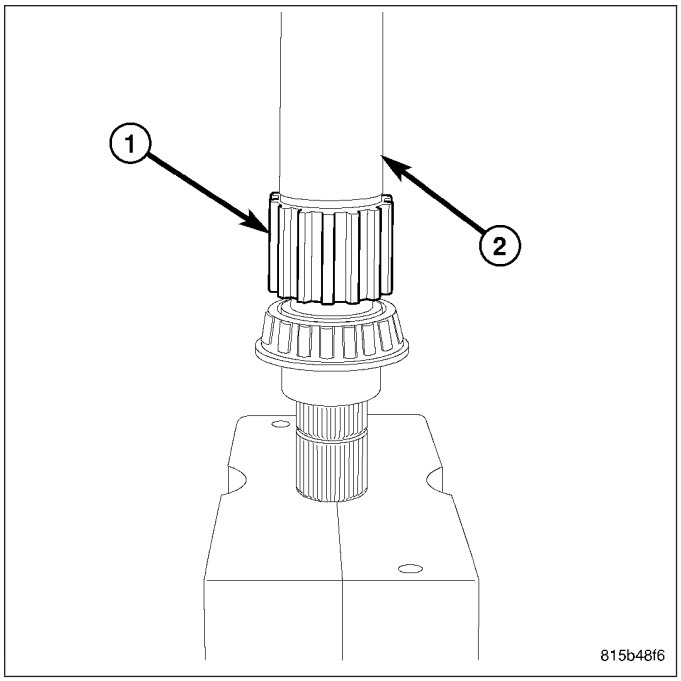


ASSEMBLY

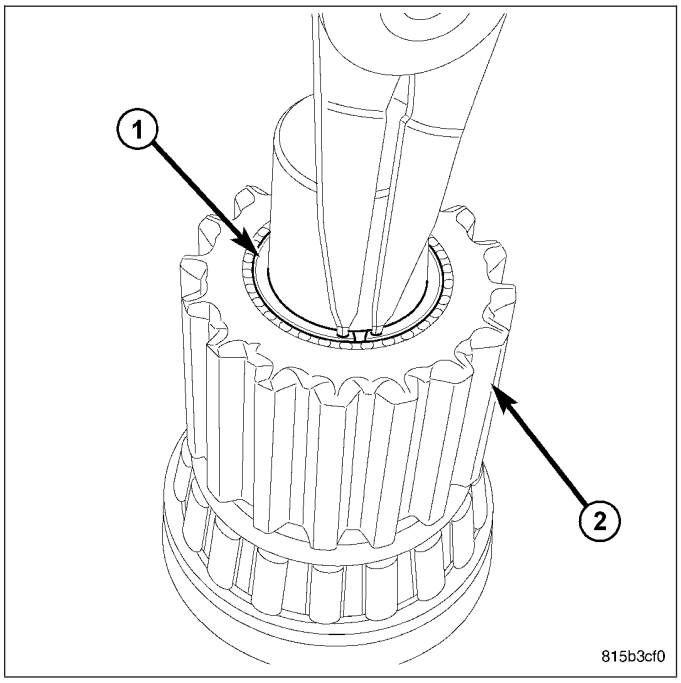
1. Press output shaft bearing (1) on output shaft (2) with Installer W-262 (3).



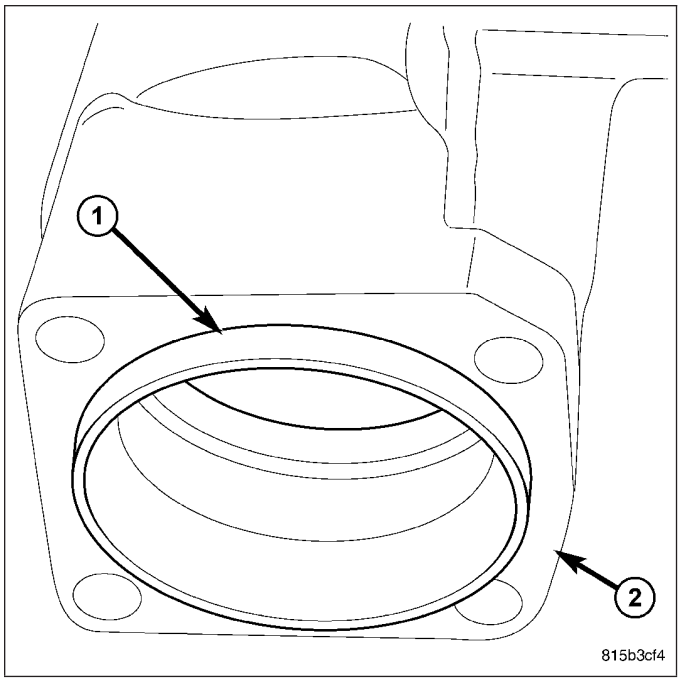
2. Press output shaft disconnect spline (1) on output shaft with Installer W-262 (2).



3. Install disconnect spline (2) snap ring (1).

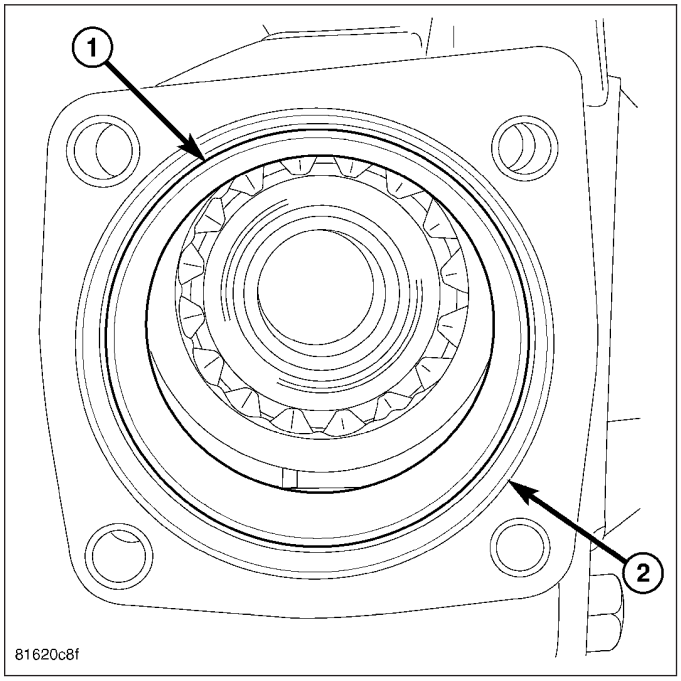


4. Install output shaft bearing cup (1) in disconnect pocket (2).

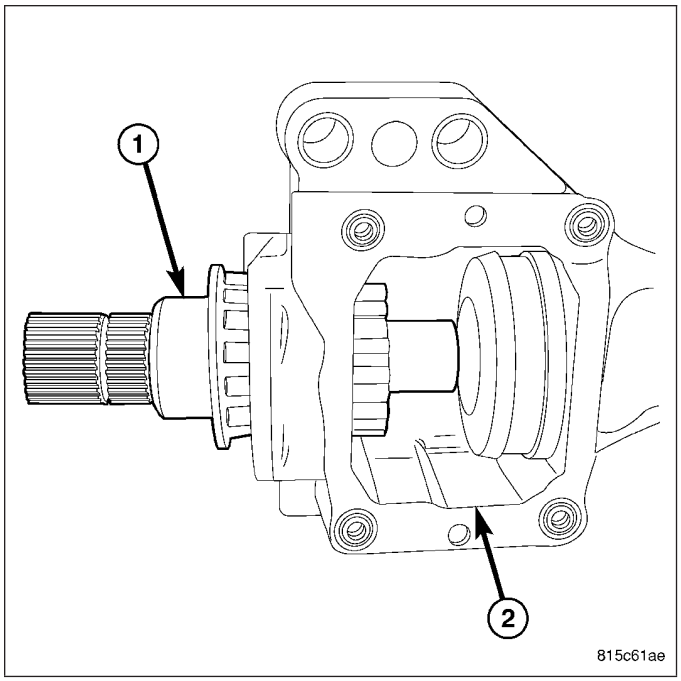


INSTALLATION

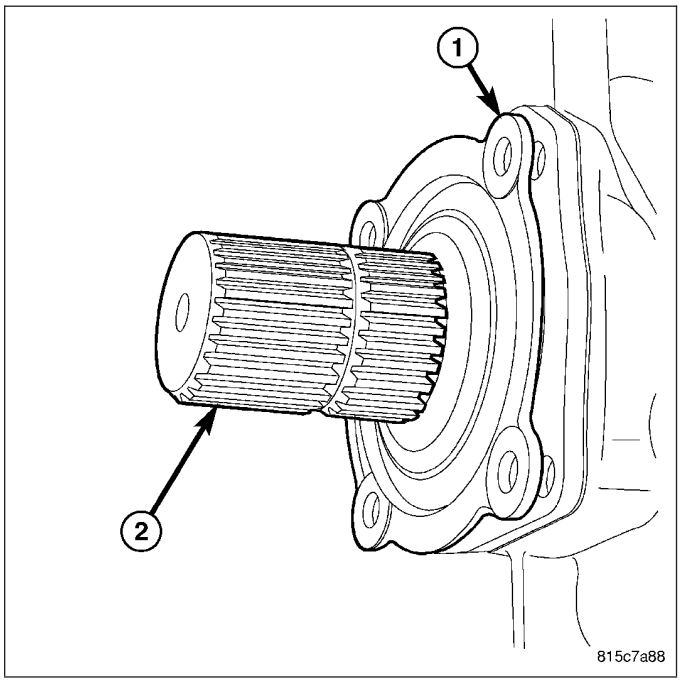
1. Verify output shaft bearing cup (1) is seated in disconnect pocket (2).



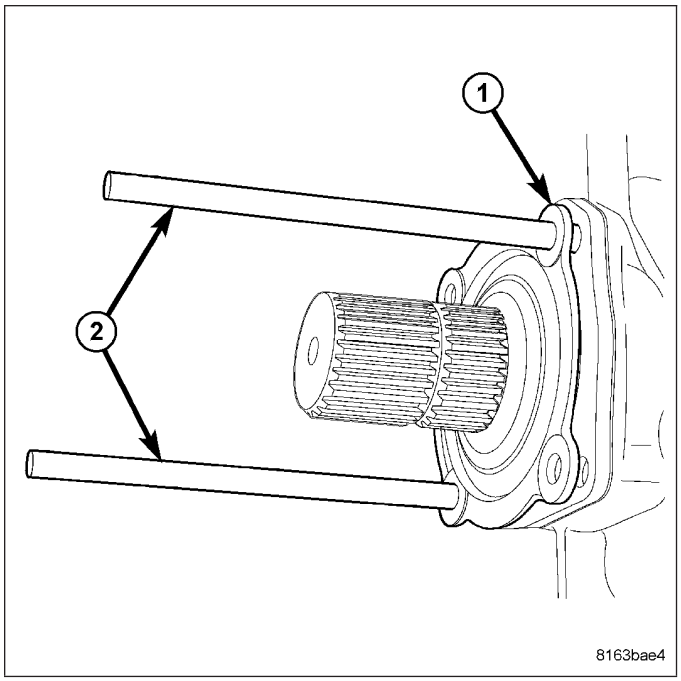
2. Install output shaft (1) in disconnect pocket (2).



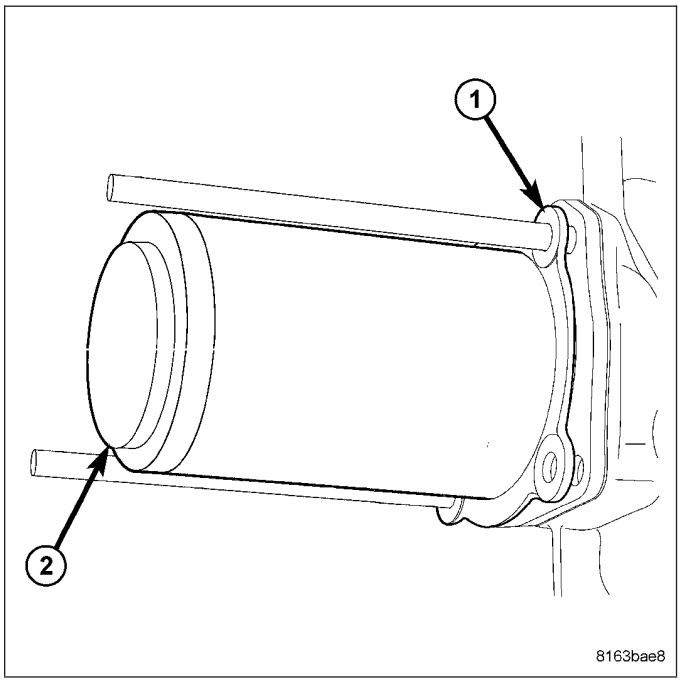
3. Install disconnect seal (1) on output shaft (2).



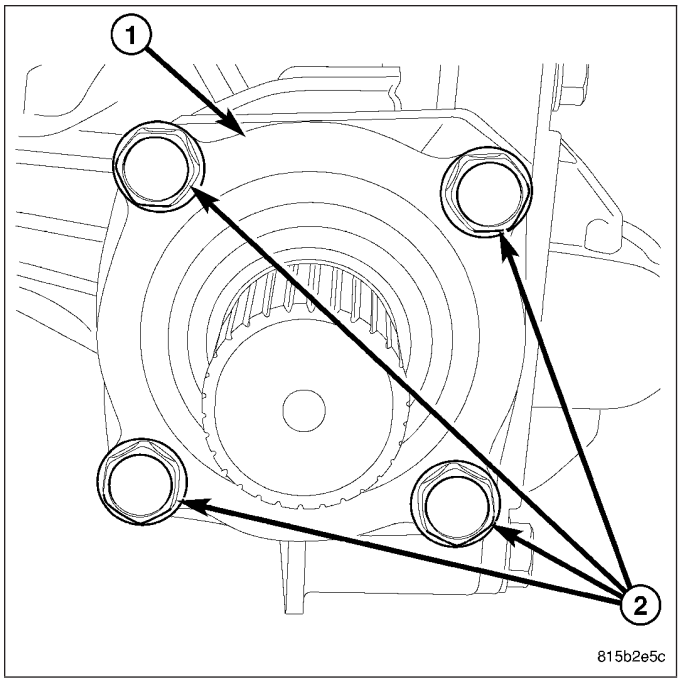
4. Align disconnect seal (1) with bolt holes in disconnect pocket with Pins MD998412 (2).



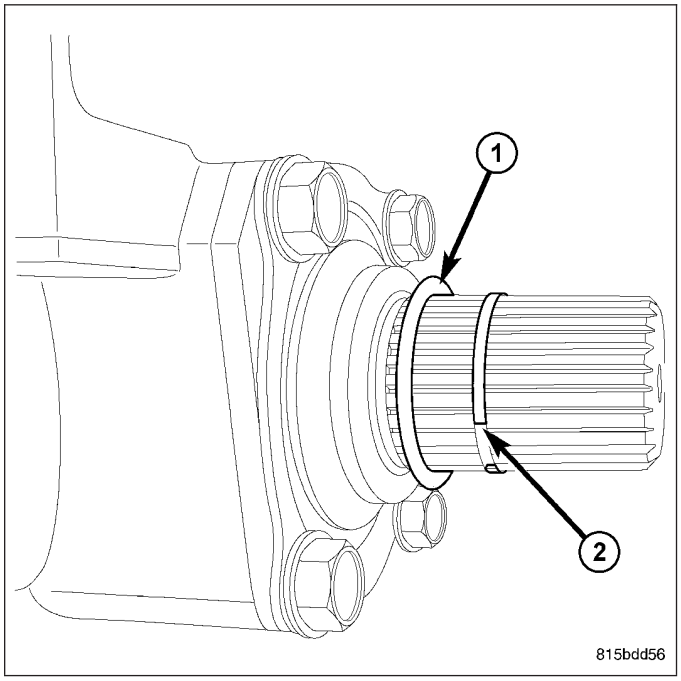
5. Install disconnect seal (1) in disconnect pocket with Installer 6761 (2) and a hammer.



6. Install disconnect seal (1) bolts (2) and tighten to 28 N·m (21 ft. lbs.).



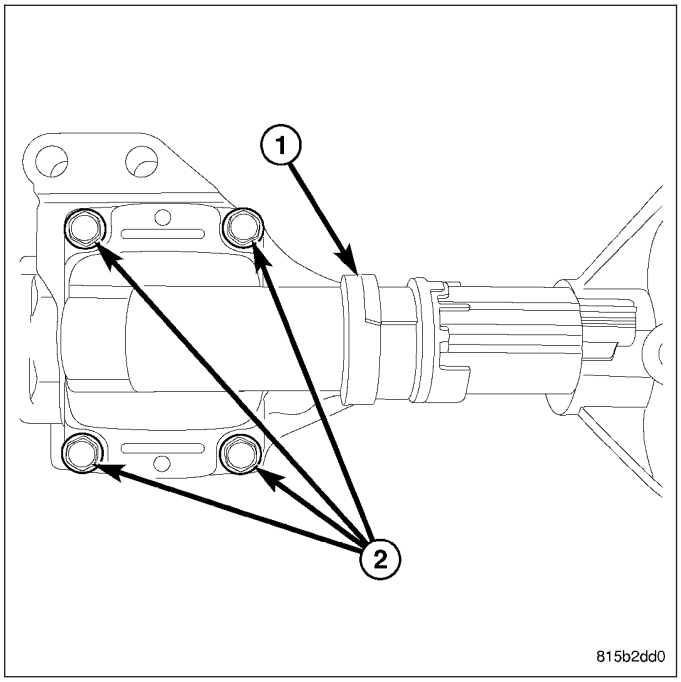
7. Install output shaft O-ring (1) and snap ring (2).
8. Install half shaft.
9. Verify differential fluid level and add fluid if necessary.



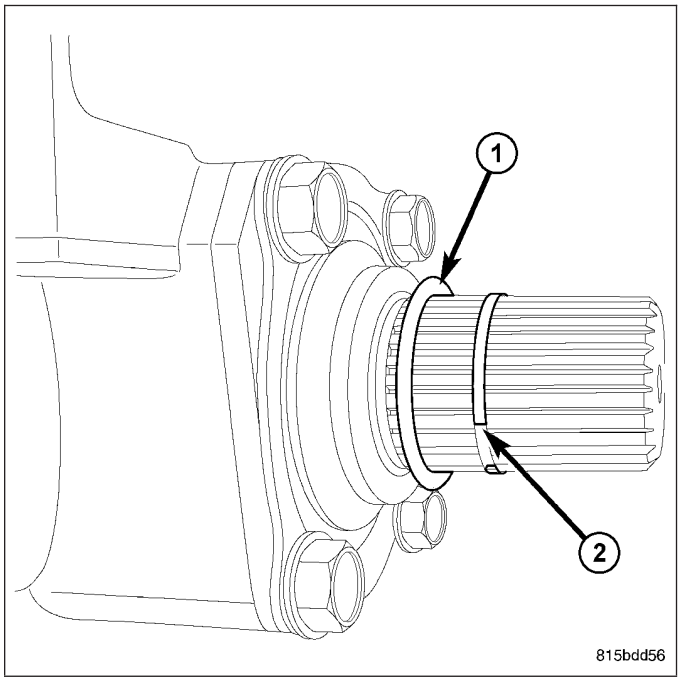
SHAFT-INTERMEDIATE

REMOVAL

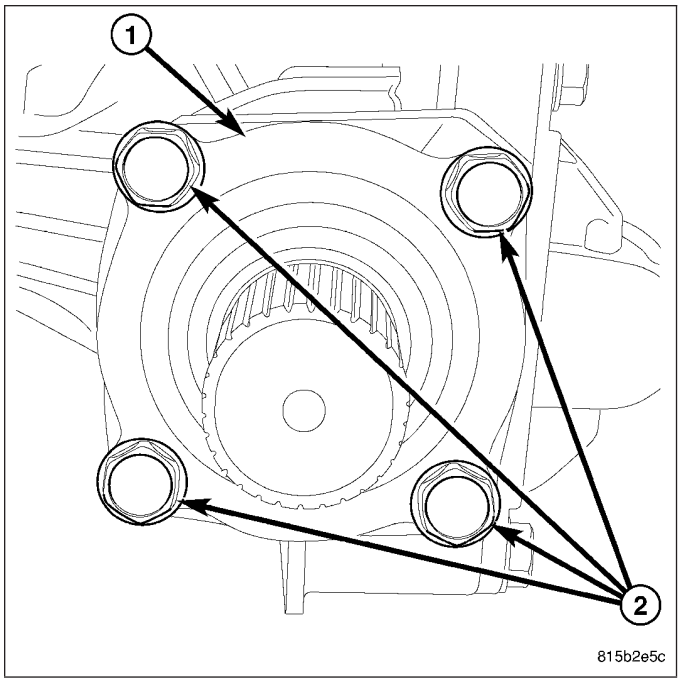
1. Remove half shaft from disconnect side of the axle.
2. Remove disconnect actuator wiring connector.
3. Remove disconnect actuator (1) bolts (2) and remove actuator.



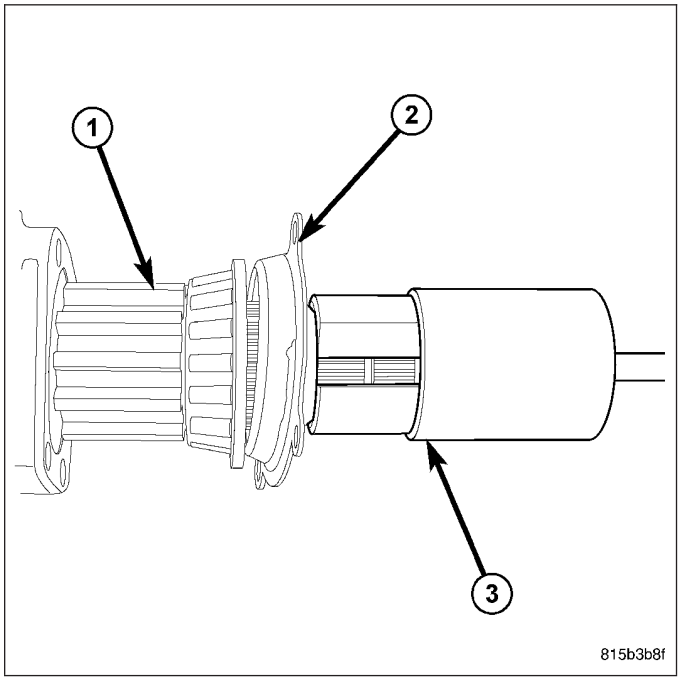
4. Remove O-ring (1) and snap ring (2) from output shaft.



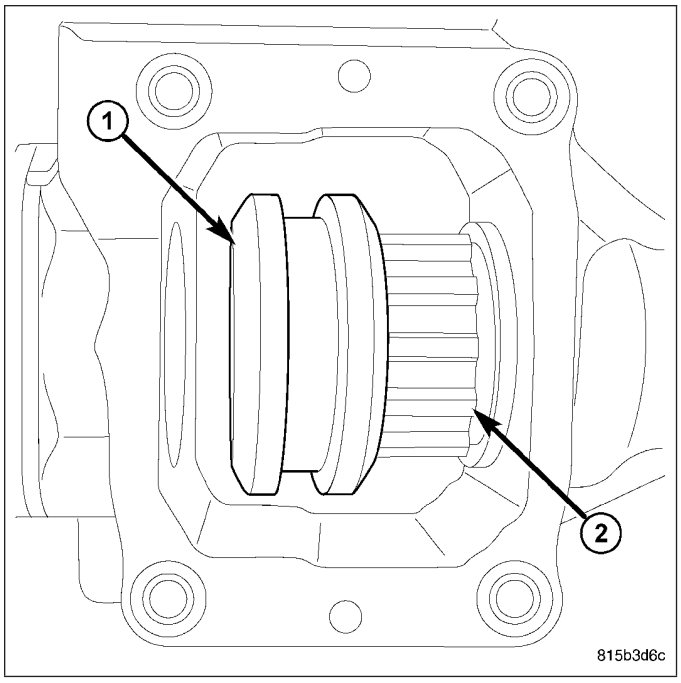
5. Remove disconnect seal (1) bolts (2).



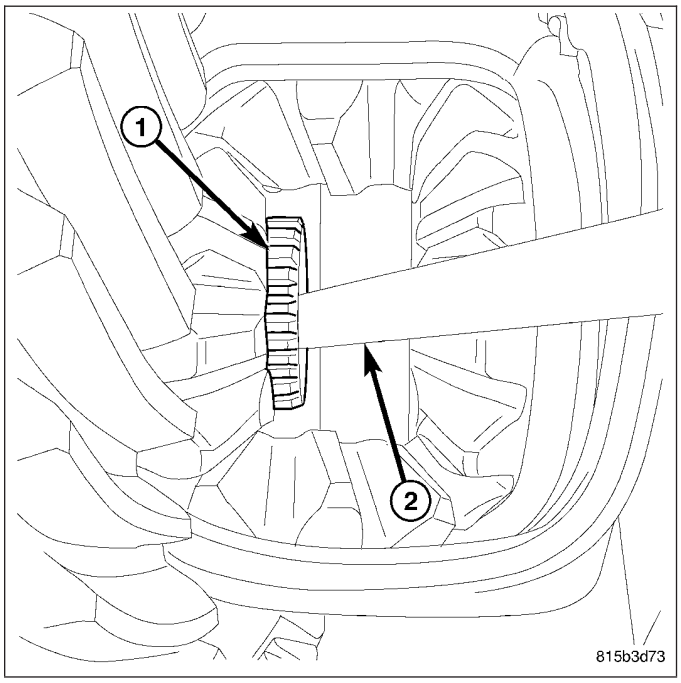
6. Remove output shaft (1) and disconnect seal (2) with Remover 8420A (3) and Slide Hammer C-3752.



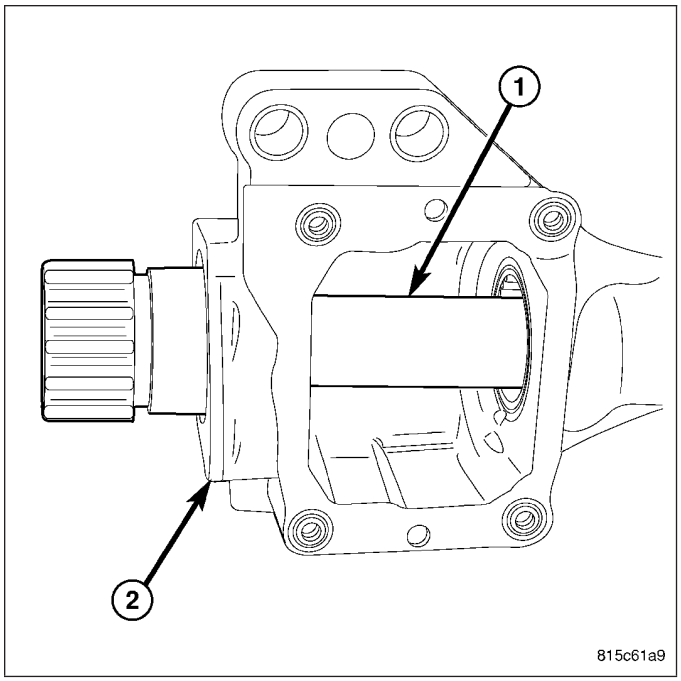
7. Slide disconnect collar (1) from intermediate shaft (2) and remove through disconnect pocket.



8. Remove differential cover.
9. Drive intermediate shaft (1) out of side gear with a hammer and brass punch (2).

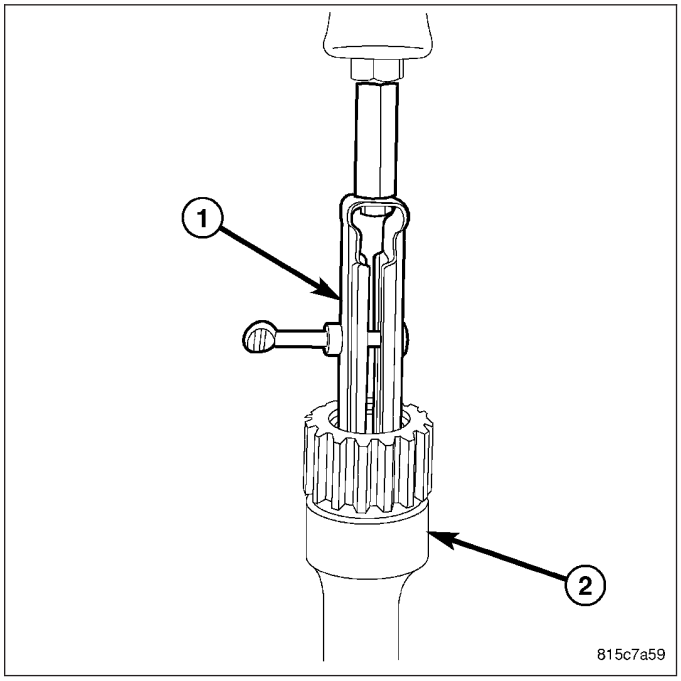


10. Remove intermediate shaft (1) from axle tube (2).



DISASSEMBLY

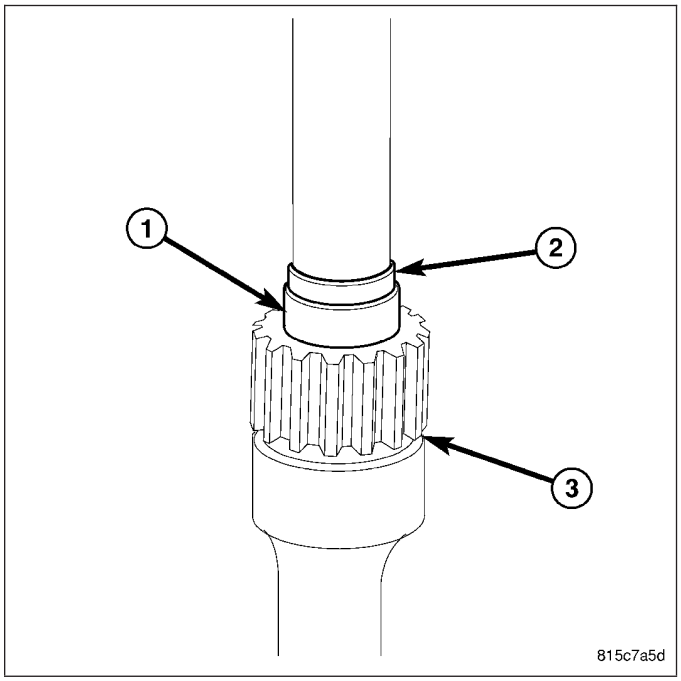
1. Secure intermediate shaft in vise.
2. Remove output shaft bearing from intermediate shaft (2), with Puller 9585 (1) and Slide Hammer C-637.



ASSEMBLY

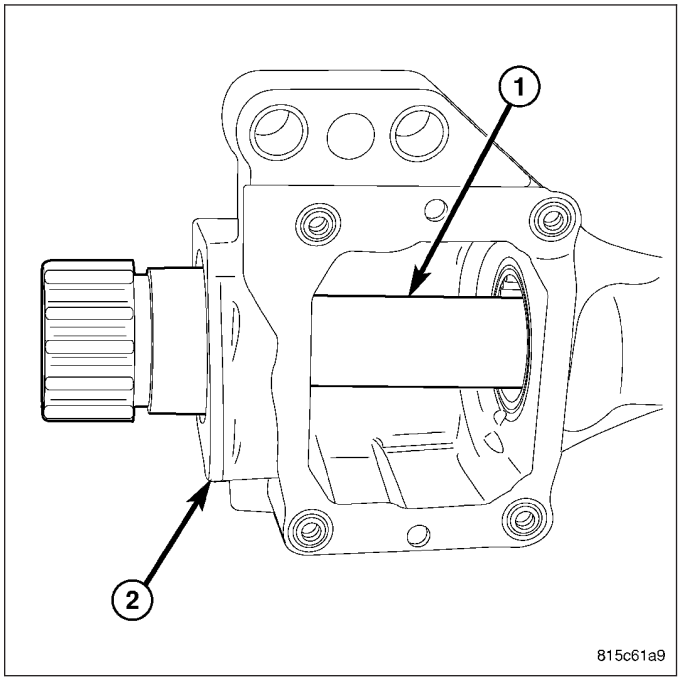
1. Install output shaft bearing (1) in intermediate shaft (3) with Installer 9768 (2) and Handle C-4171.

CAUTION: Bearing must be installed with lettering facing outwards. Failure to follow these instructions will damage the bearing.

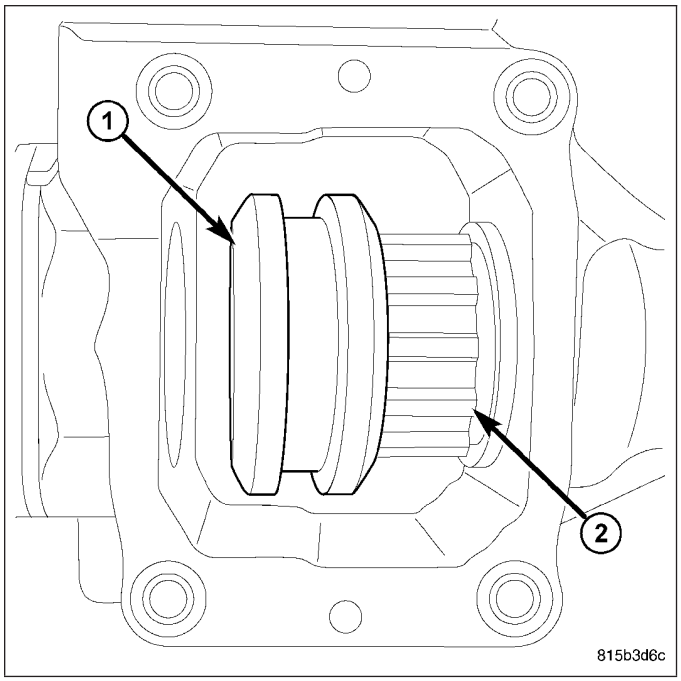


INSTALLATION

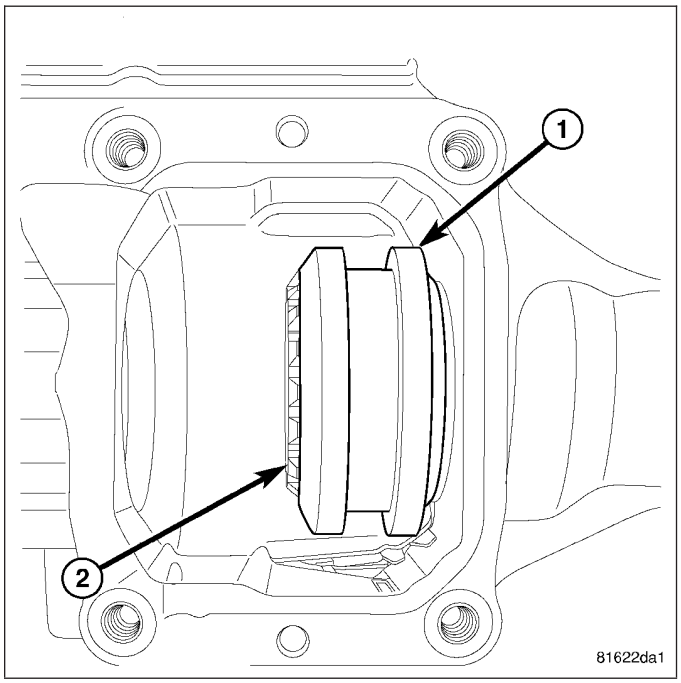
1. Install **new** intermediate shaft snap ring.
2. Install shaft (1) into axle tube (2) and side gear. Verify intermediate shaft snap ring is seated in side gear.



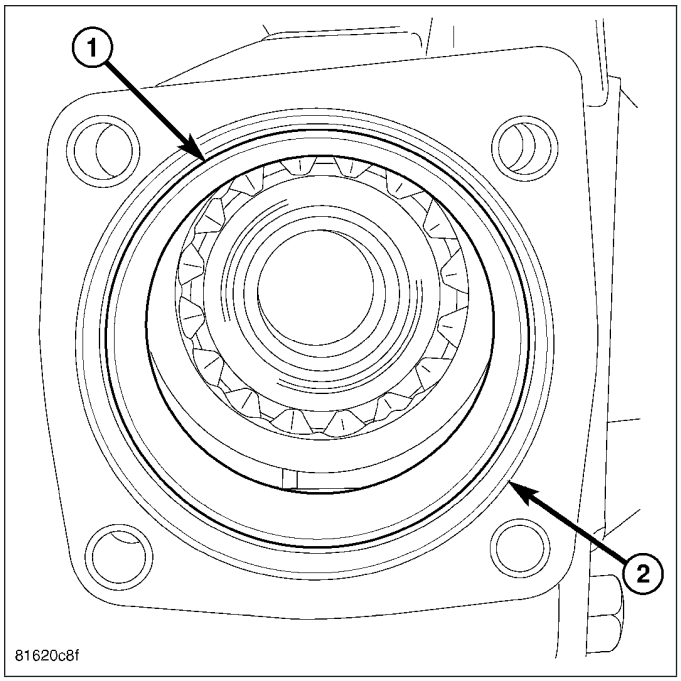
3. Install disconnect collar (1) through disconnect pocket onto intermediate shaft (2).



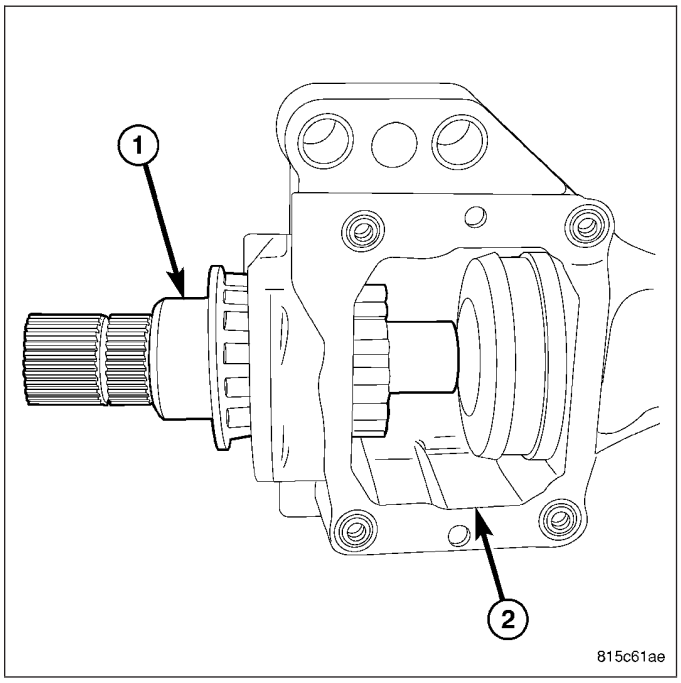
4. Position disconnect collar (1) on intermediate shaft (2), so collar is in 2WD position.



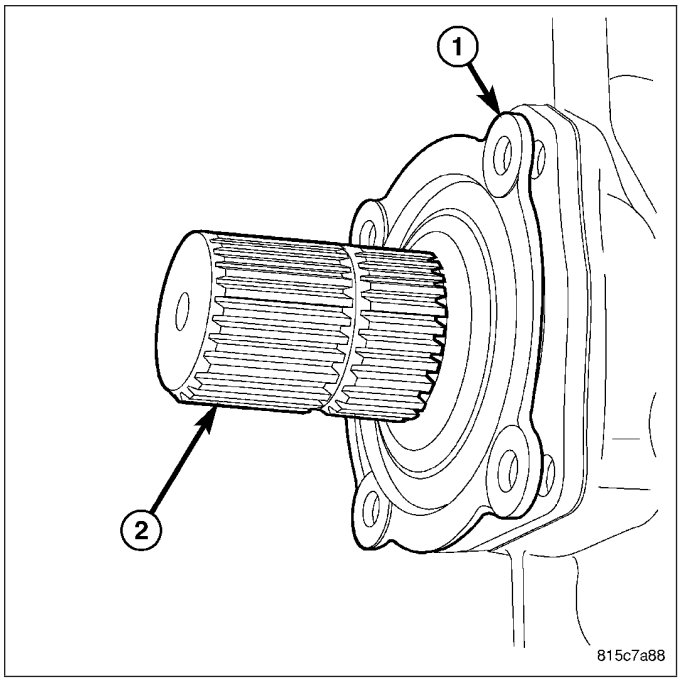
5. Verify output shaft bearing cup (1) is seated in the disconnect pocket (2).



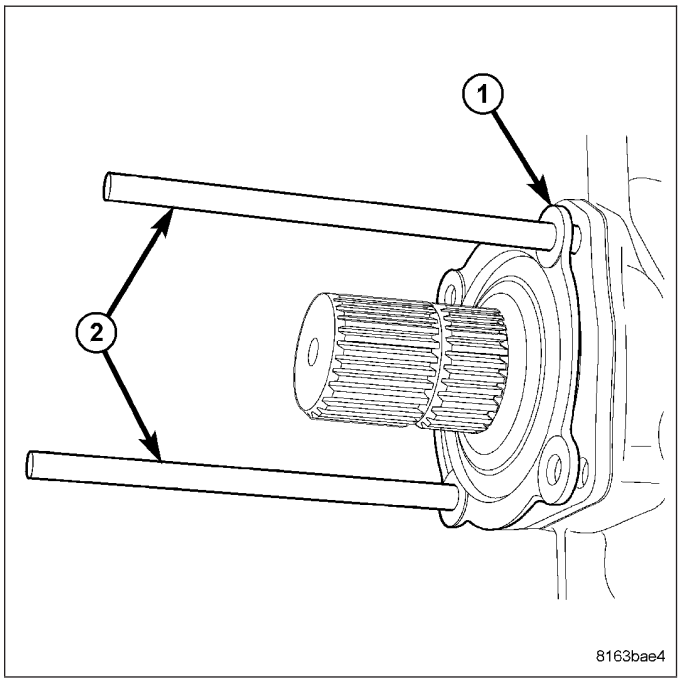
6. Install output shaft (1) with bearing into disconnect pocket (2).



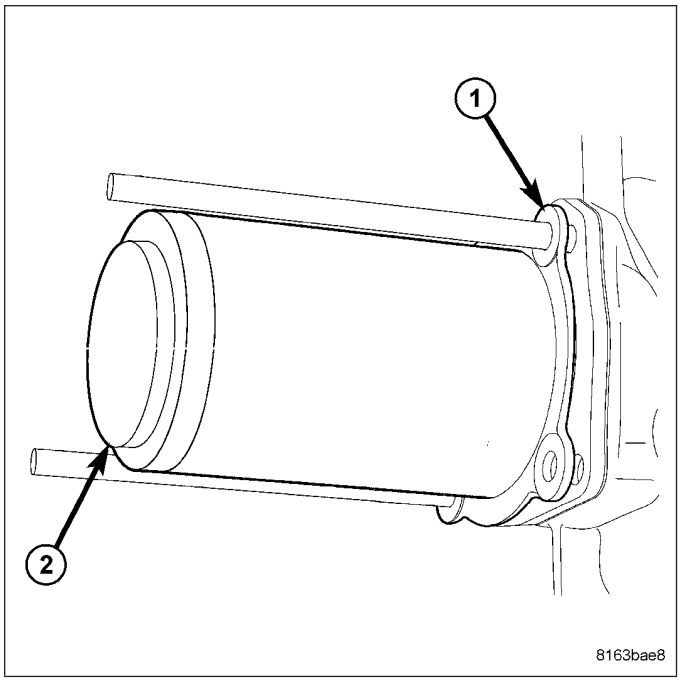
7. Install disconnect seal (1) on output shaft (2).



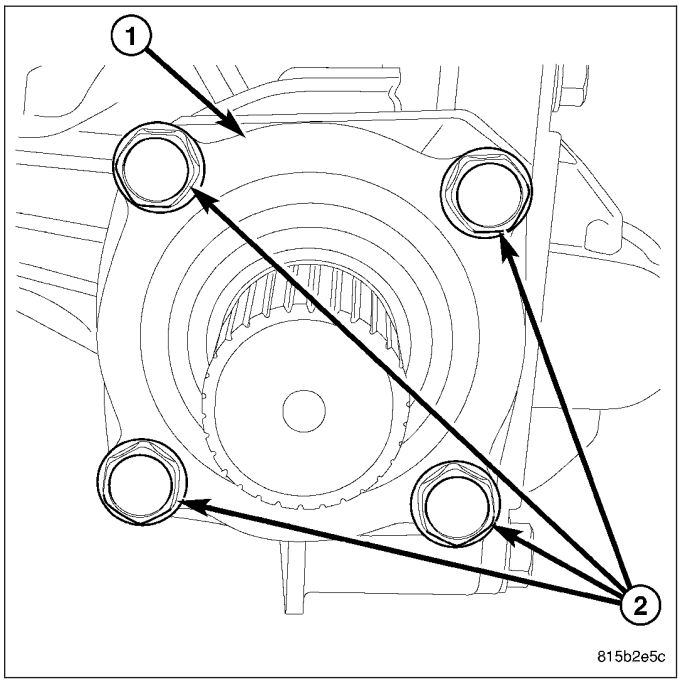
8. Align disconnect seal (1) with bolt holes in disconnect pocket with Pins MD998412 (2).



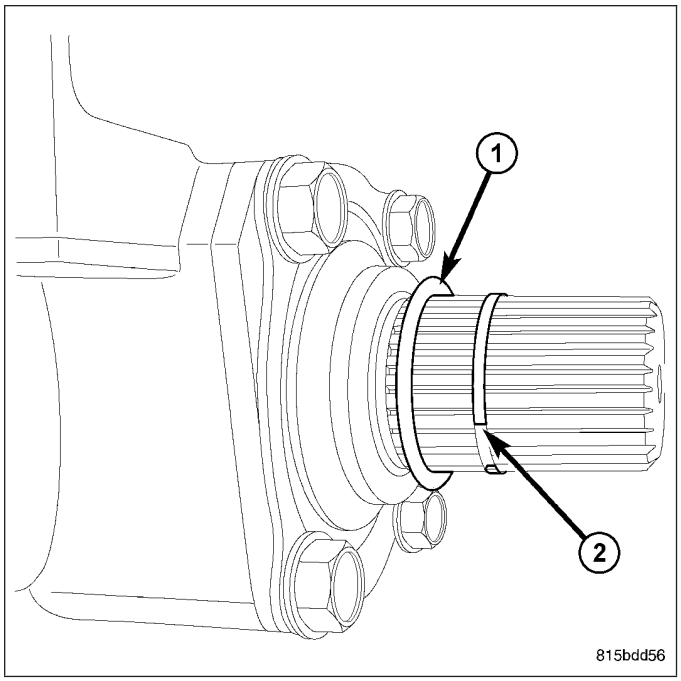
9. Install disconnect seal (1) in disconnect pocket with Installer 6761 (2) and a hammer.



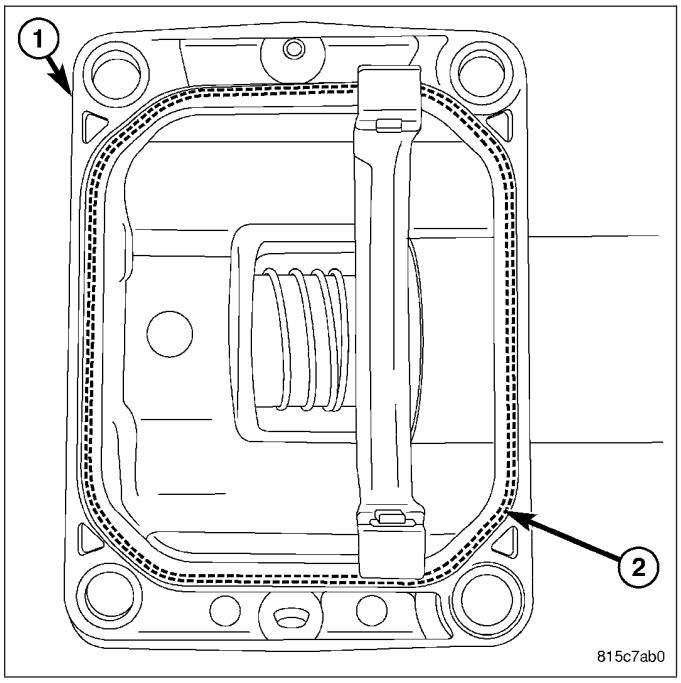
10. Install disconnect seal (1) bolts (2) and tighten to 28 N·m (21 ft. lbs.).



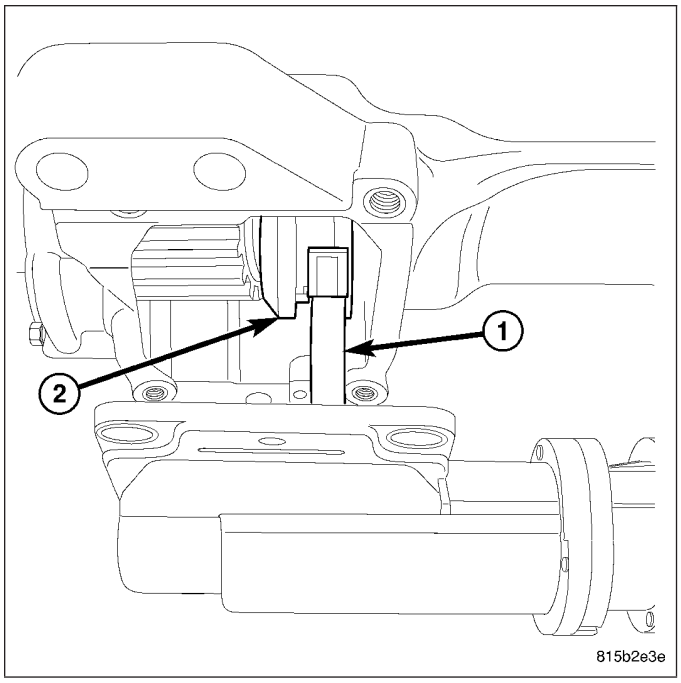
11. Install output shaft O-ring (1) and snap ring (2).



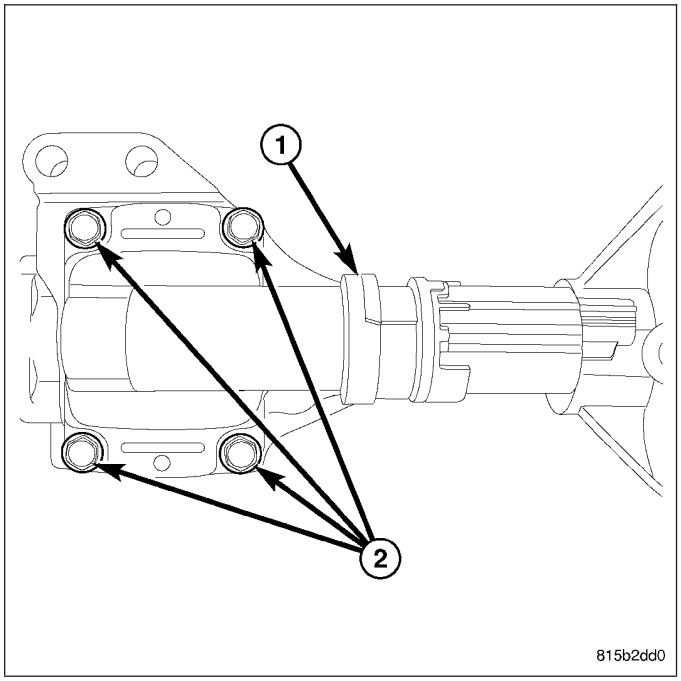
12. Clean actuator (1) sealing surface and install new gasket (2) if necessary.



13. Align actuator shift fork (1) with disconnect collar (2) and install actuator on disconnect pocket.



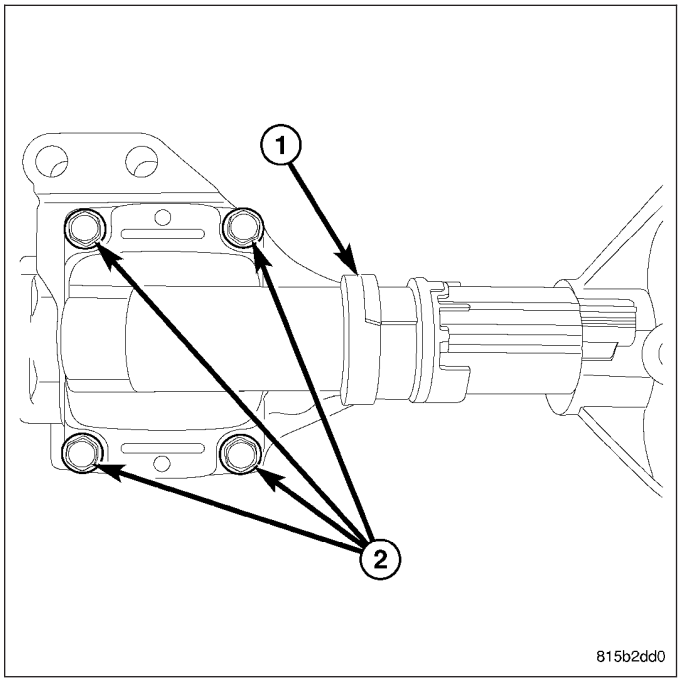
14. Install disconnect actuator (1) bolts (2) and tighten to 27 N·m (20 ft. lbs.).
15. Install disconnect actuator wiring connector.
16. Install differential cover and fill differential to specification.
17. Install half shaft.



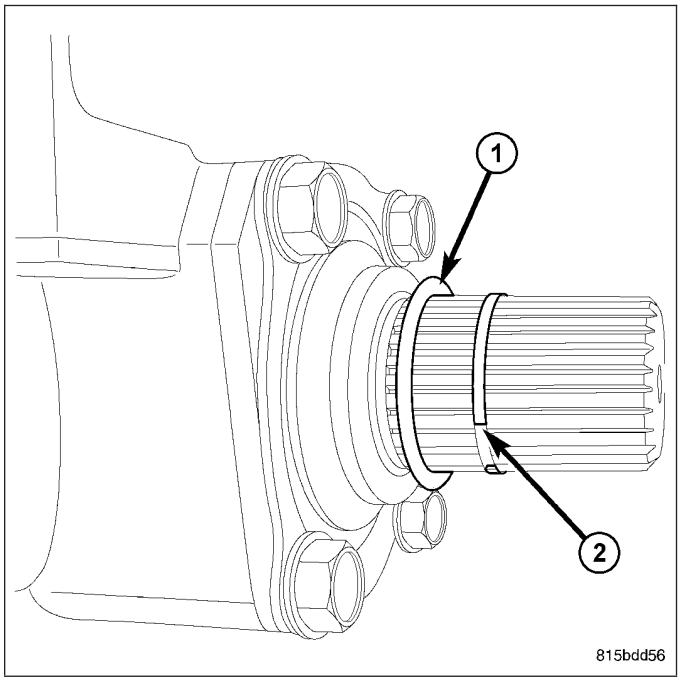
BEARING-AXLE TUBE

REMOVAL

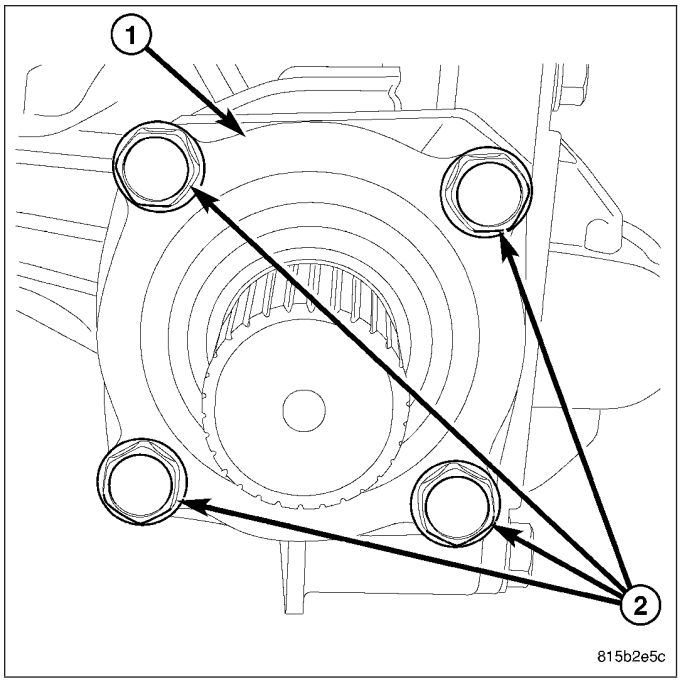
1. Remove half shaft from disconnect side of the axle.
2. Remove disconnect actuator wiring connector.
3. Remove disconnect actuator (1) bolts (2) and remove actuator from disconnect pocket.



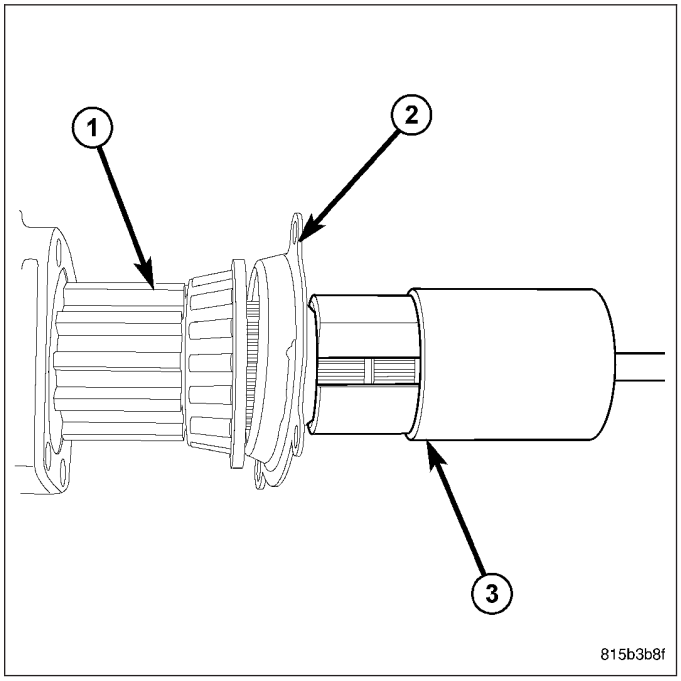
4. Remove O-ring (1) and snap ring (2) from output shaft.



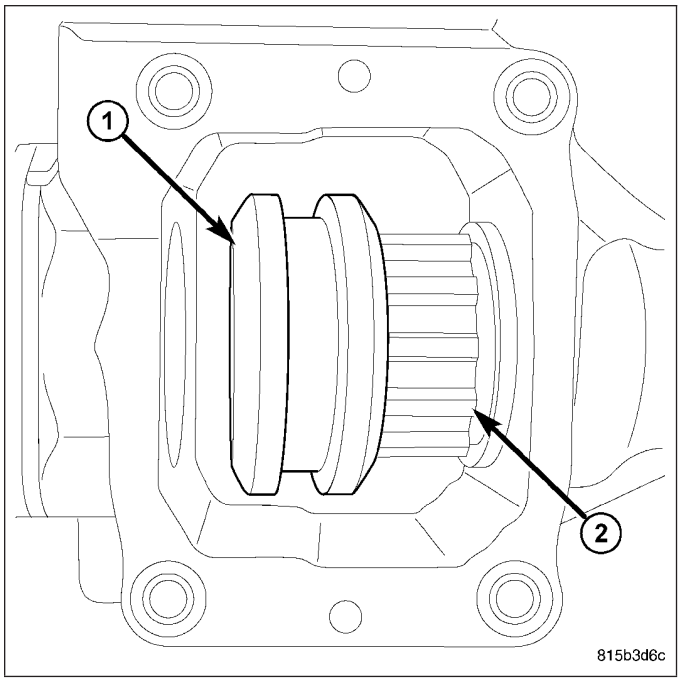
5. Remove disconnect seal (1) bolts (2).



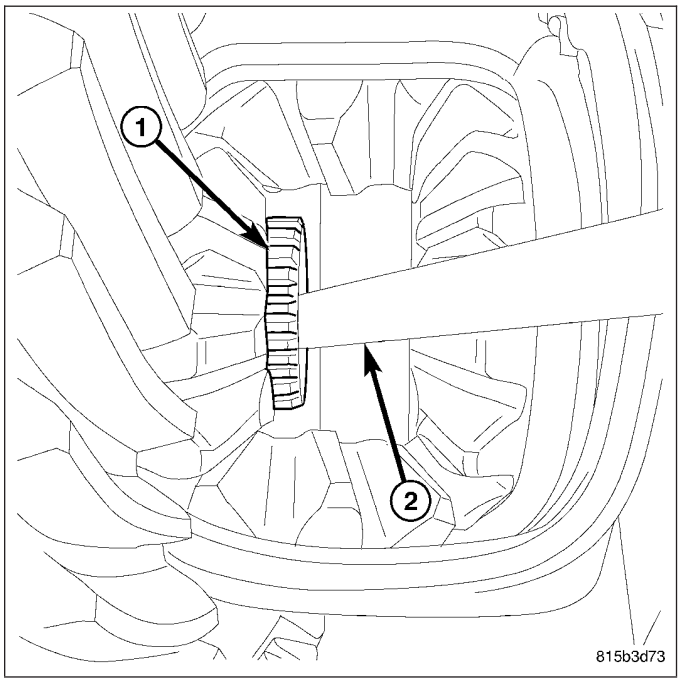
6. Remove output shaft (1) and disconnect seal (2) with Remover 8420A (3) and Slide Hammer C-3752.



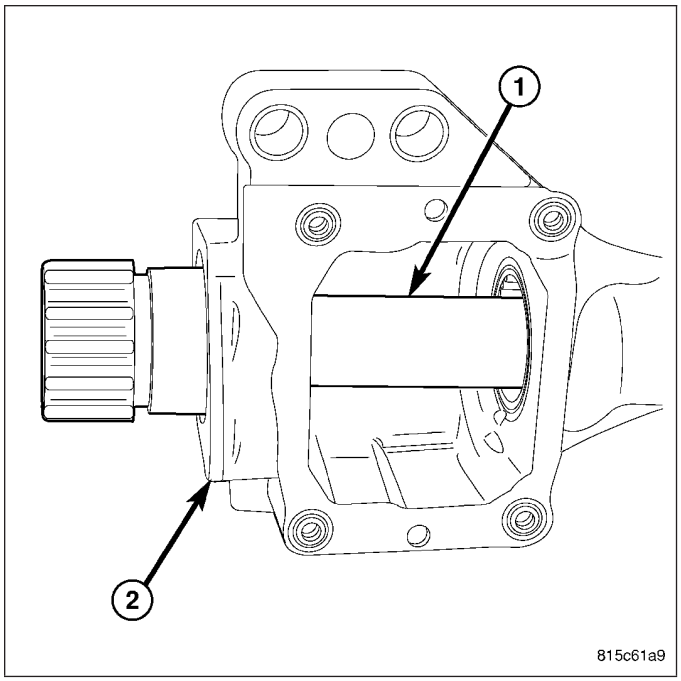
7. Slide disconnect collar (1) from intermediate shaft (2) and remove through disconnect pocket.



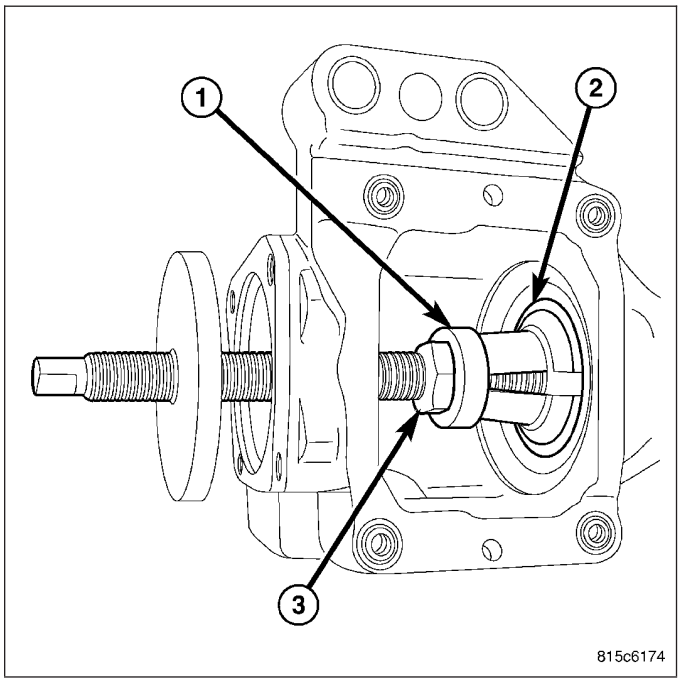
8. Remove differential cover.
9. Drive intermediate shaft (1) out of side gear with a hammer and brass punch (2).



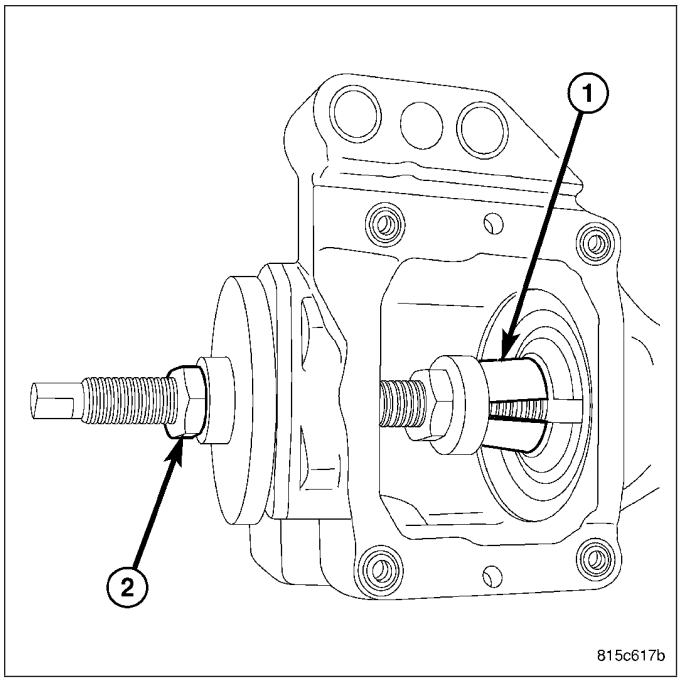
10. Remove intermediate shaft (1) from disconnect pocket (2).



11. Install Puller 9766 (1) in intermediate shaft bearing (2) then tighten nut (3) to expand tool in bearing.



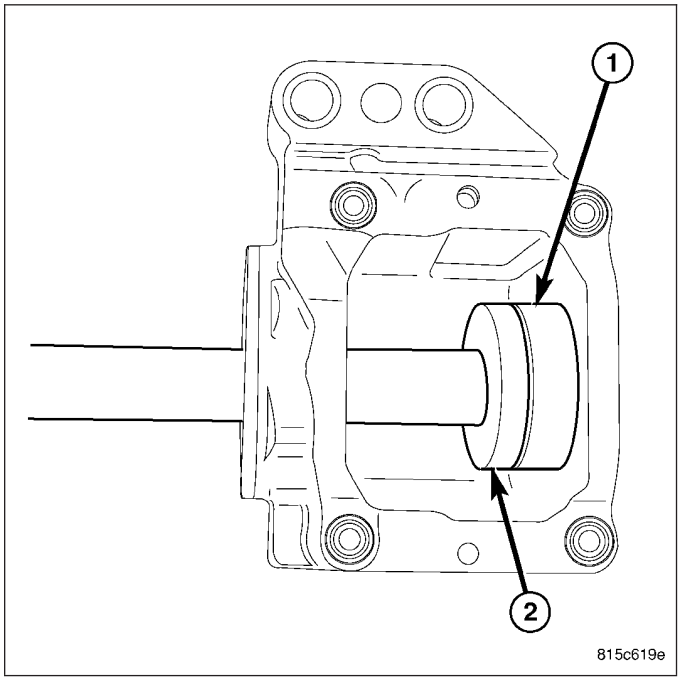
12. Tighten puller (1) nut (2) to remove intermediate shaft bearing from disconnect pocket.



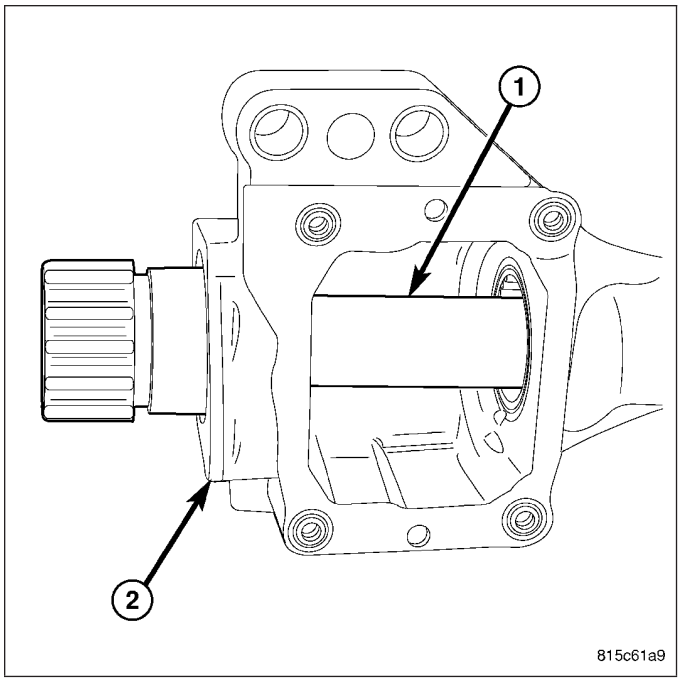
INSTALLATION

1. Install intermediate shaft bearing (1) with Installer 9767 (2) and Handle C-4171.

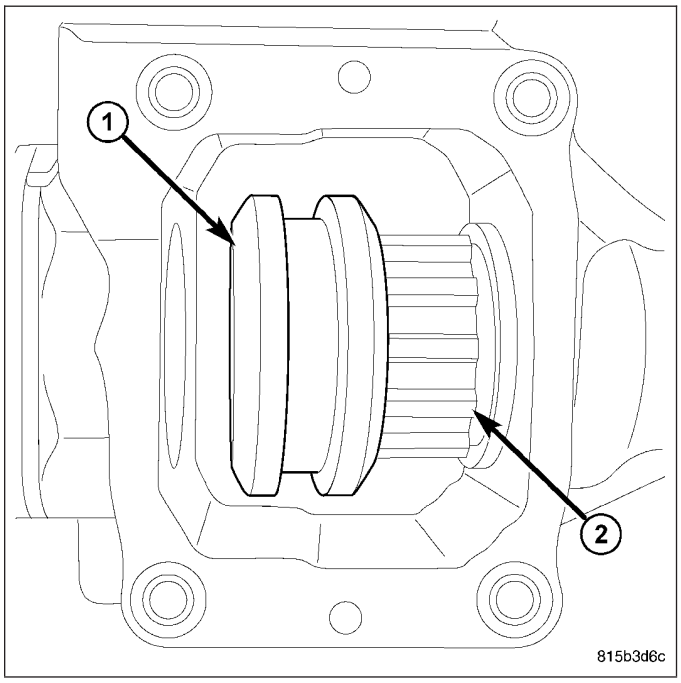
CAUTION: Bearing must be installed with lettering facing outwards. Failure to follow these instructions will damage the bearing.



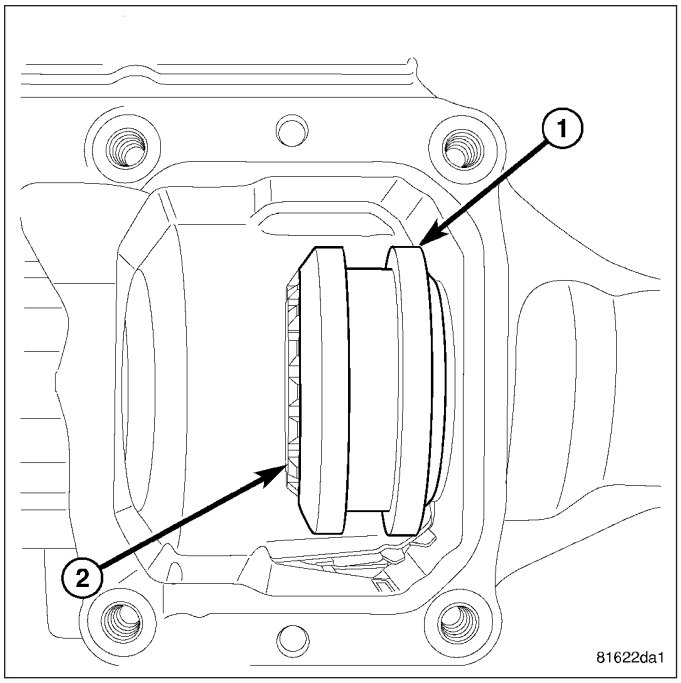
2. Install **new** intermediate shaft snap ring.
3. Install intermediate shaft (1) through disconnect pocket (2) and verify intermediate shaft snap ring is seated in side gear.



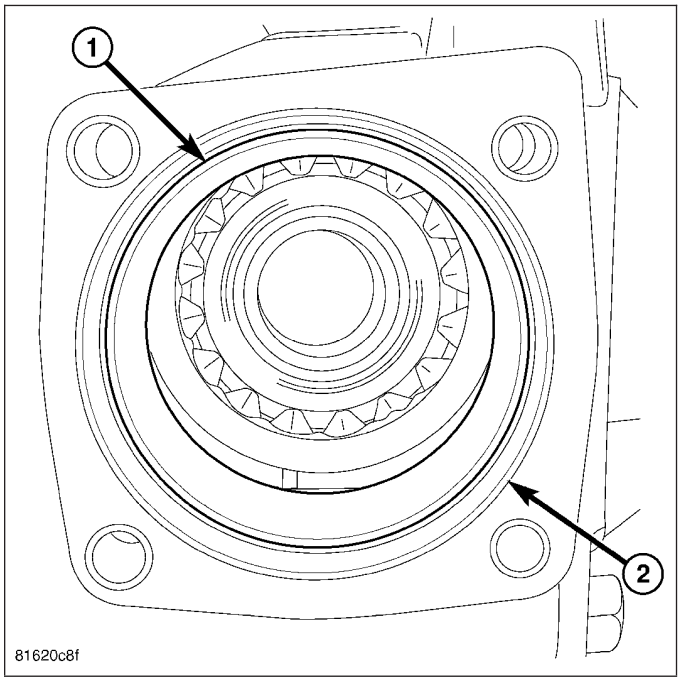
4. Install disconnect collar (1) through disconnect pocket onto intermediate shaft (2).



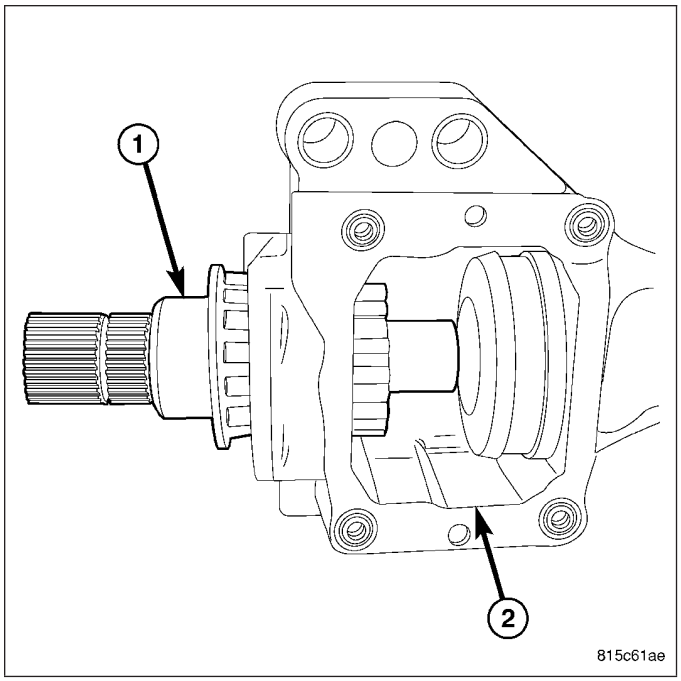
5. Position disconnect collar (1) on intermediate shaft (2) in 2WD position.



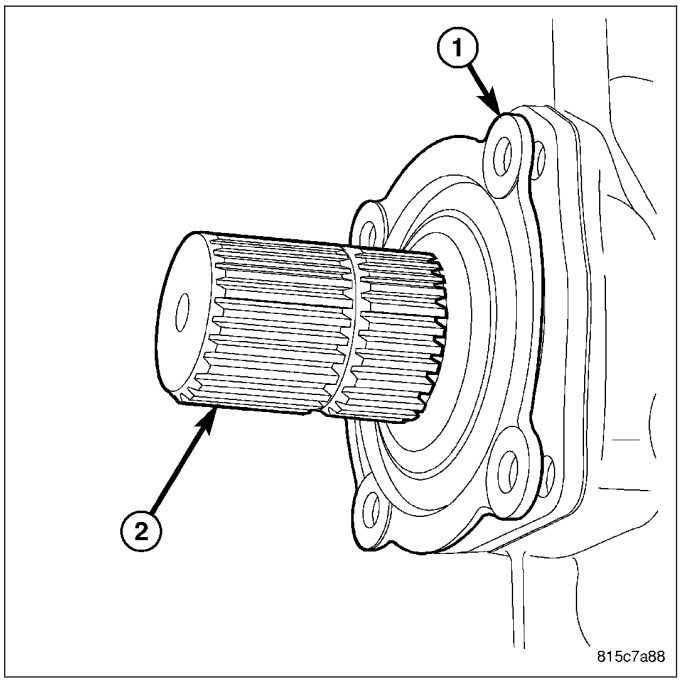
6. Verify output shaft bearing cup (1) is seated in disconnect pocket (2).



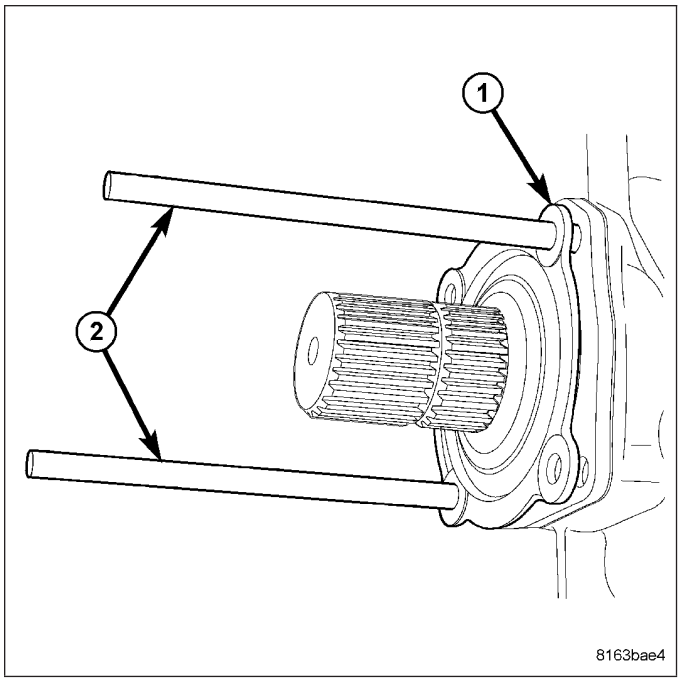
7. Install output shaft (1) in disconnect pocket (2).



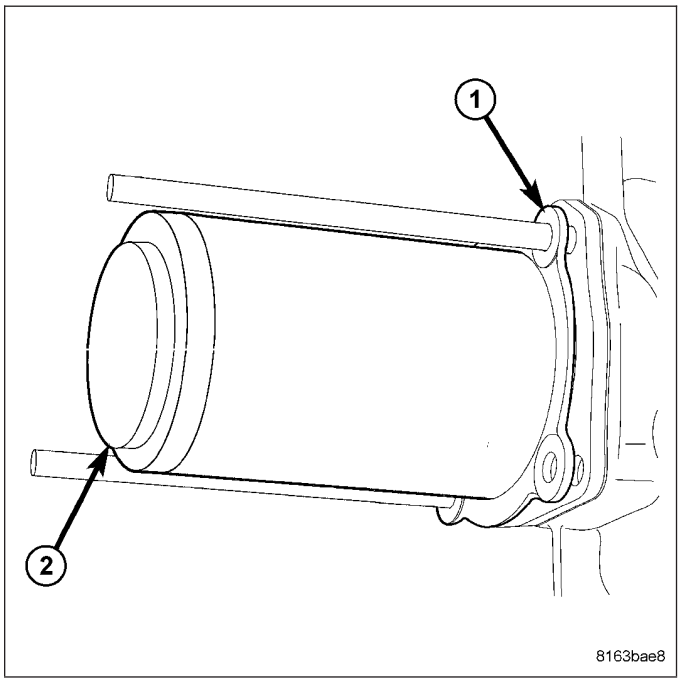
8. Install disconnect seal (1) on output shaft (2).



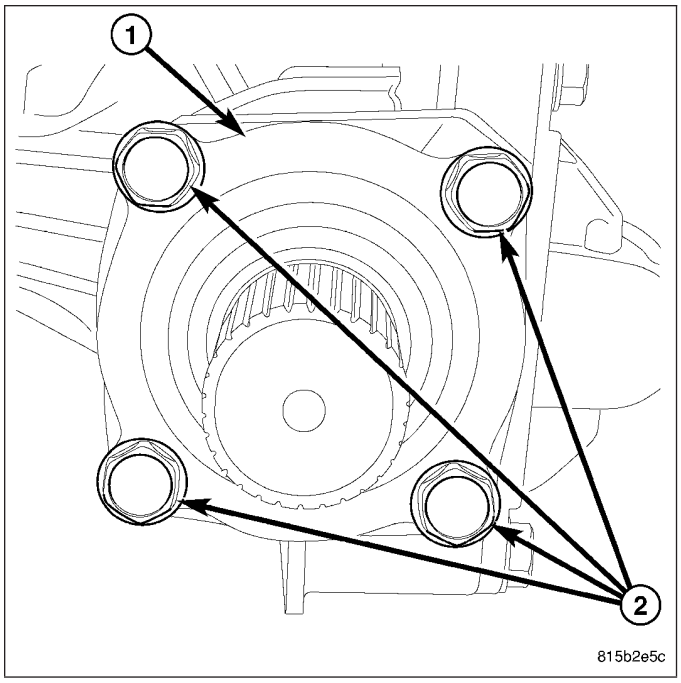
9. Align disconnect seal (1) with bolt holes in disconnect pocket with Pins MD998412 (2).



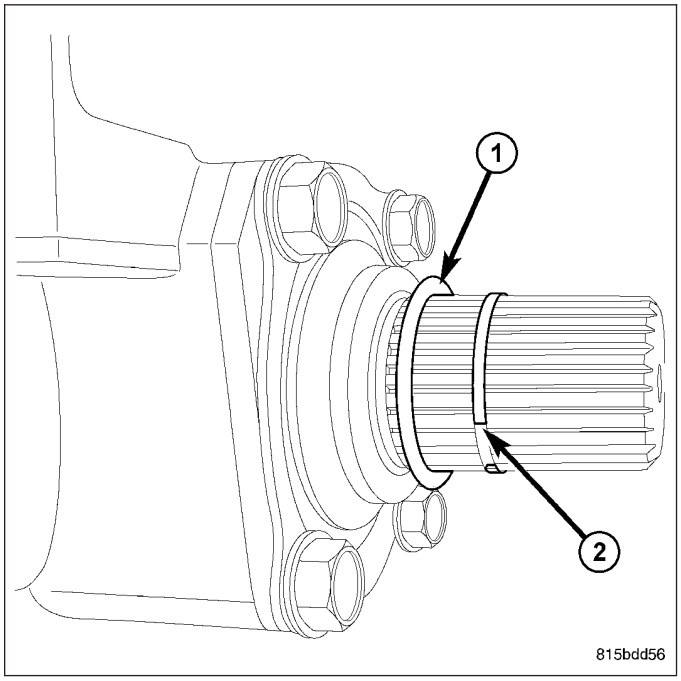
10. Install disconnect seal (1) in disconnect pocket with Installer 6761 (2) and a hammer.



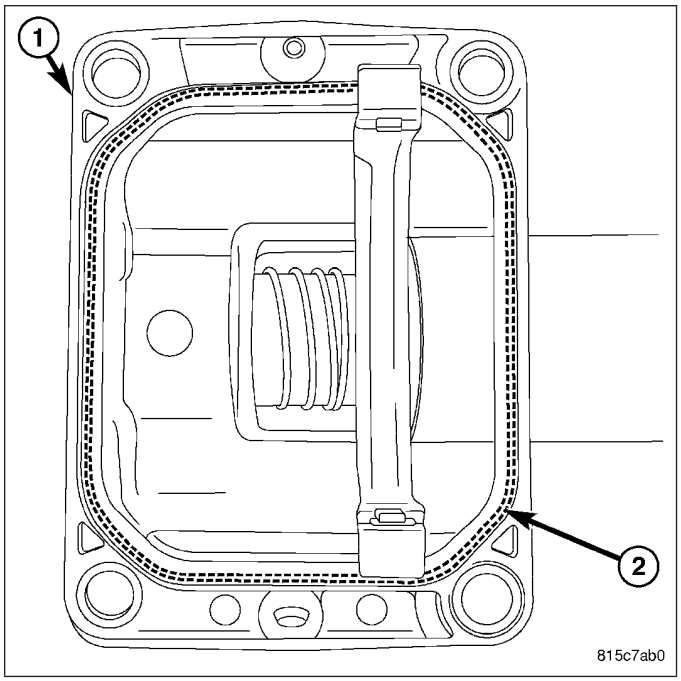
11. Install disconnect seal (1) bolts (2) and tighten to 28 N·m (21 ft. lbs.).



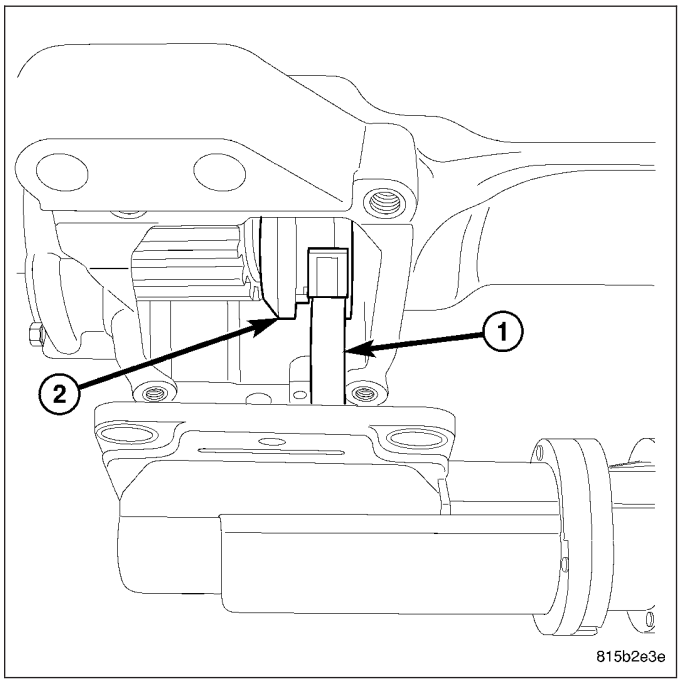
12. Install output shaft O-ring (1) and snap ring (2).



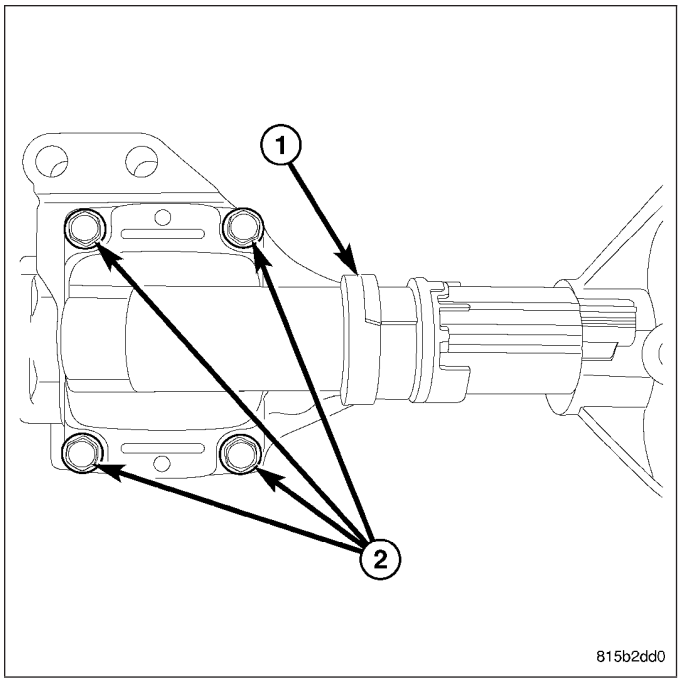
13. Clean actuator (1) sealing surface and install new gasket (2) if necessary.



14. Align actuator shift fork (1) with disconnect collar (2) and install actuator on disconnect pocket.



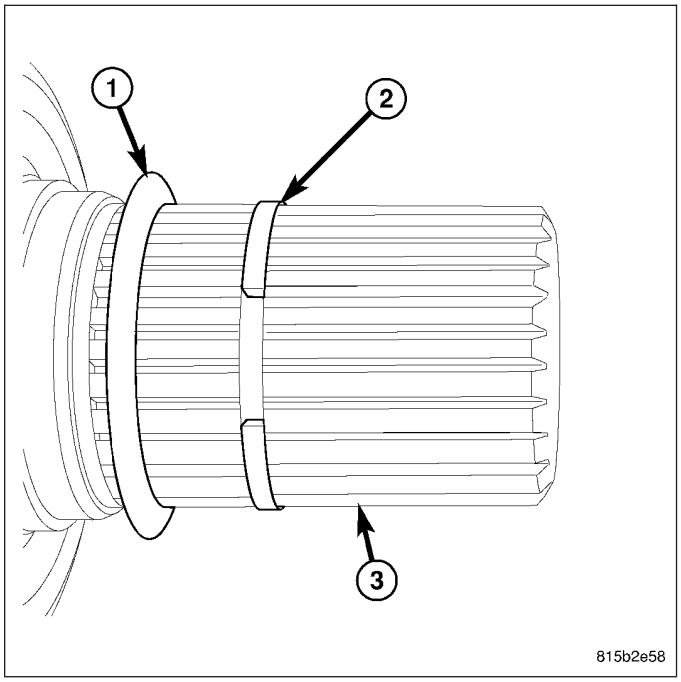
15. Install disconnect actuator (1) bolts (2) and tighten to 27 N·m (20 ft. lbs.).
16. Install disconnect actuator wiring connector.
17. Install differential cover and fill differential to specification.
18. Install half shaft.



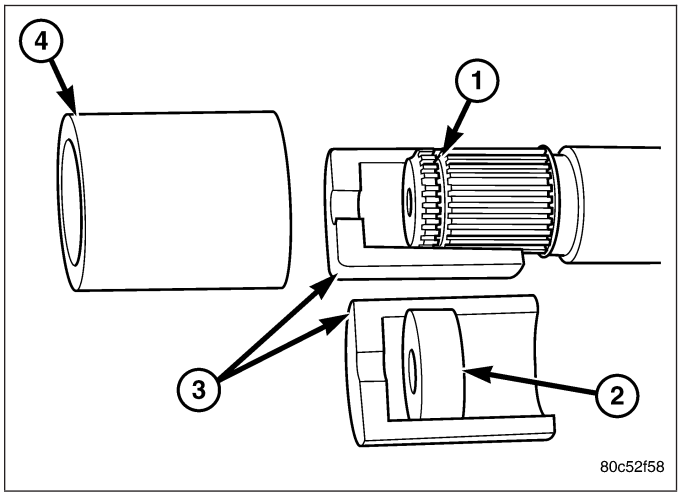
SHAFTS-AXLE

REMOVAL

1. Remove half shaft from vehicle.
2. Clean axle seal area.
3. Remove O-ring (1) and snap ring (2) from axle shaft (3).

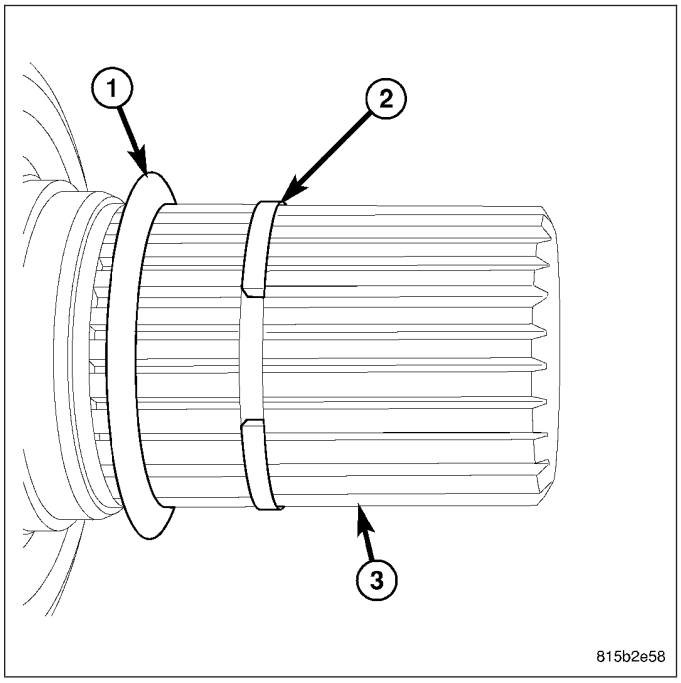


4. Remove axle with Remove 8420A (2,3,4) and Slide Hammer C-3752.



INSTALLATION

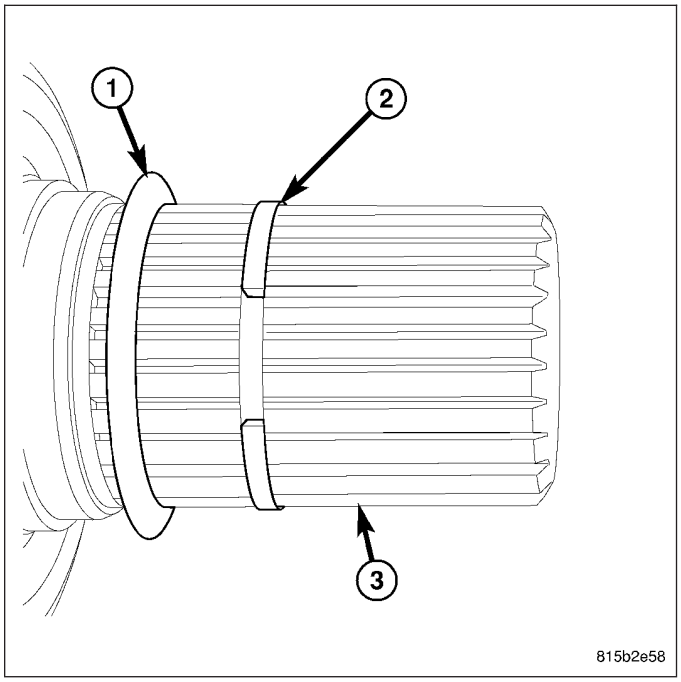
1. Lubricate bearing bore and seal lip with gear lubricant.
2. Install axle shaft with **new** snap ring and verify axle shaft snap ring is seated in side gear.
3. Install o-ring (1) and snap ring (2) on axle shaft (3).
4. Install half shaft.
5. Verify differential fluid level and add fluid if necessary.



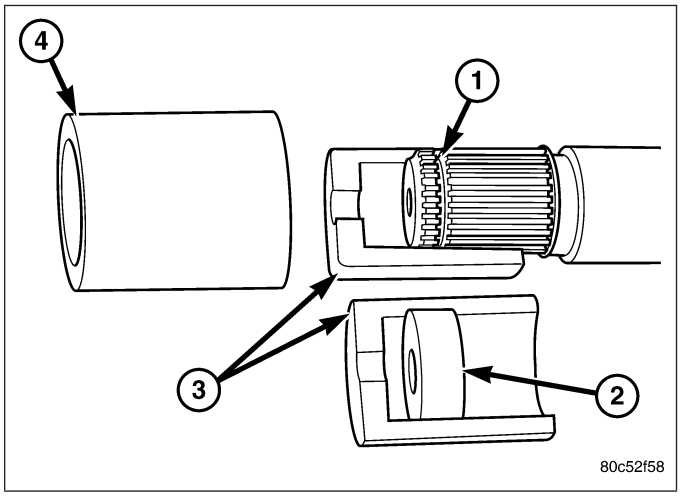
SEAL-AXLE SHAFT

REMOVAL

1. Remove half shaft from vehicle.
2. Clean axle seal area.
3. Remove O-ring (1) and snap ring (2) from axle shaft (3).

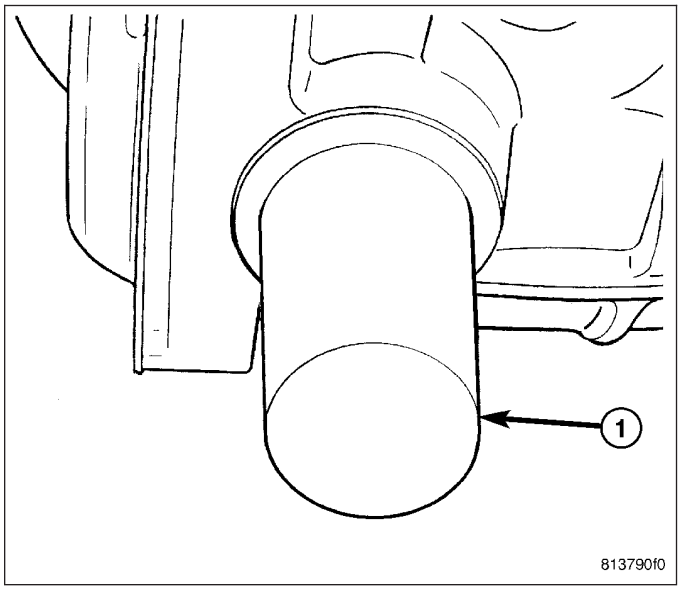


4. Remove axle with Remove 8420A (2,3,4) and Slide Hammer C-3752.
5. Remove axle shaft seal with a seal puller.

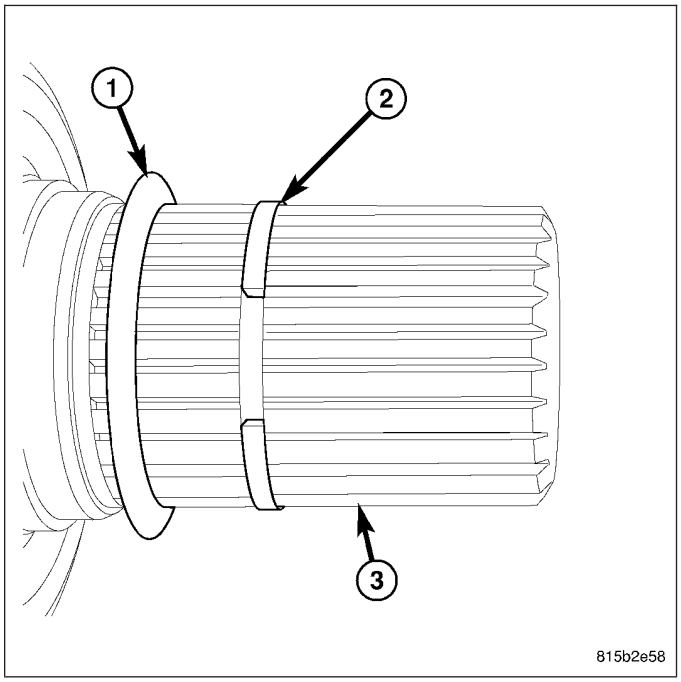


INSTALLATION

1. Wipe axle shaft tube bore clean.
2. Install **new** axle shaft seal with Installer 8694 (1).
3. Install axle shaft with **new** snap ring and verify axle shaft snap ring is seated in side gear.



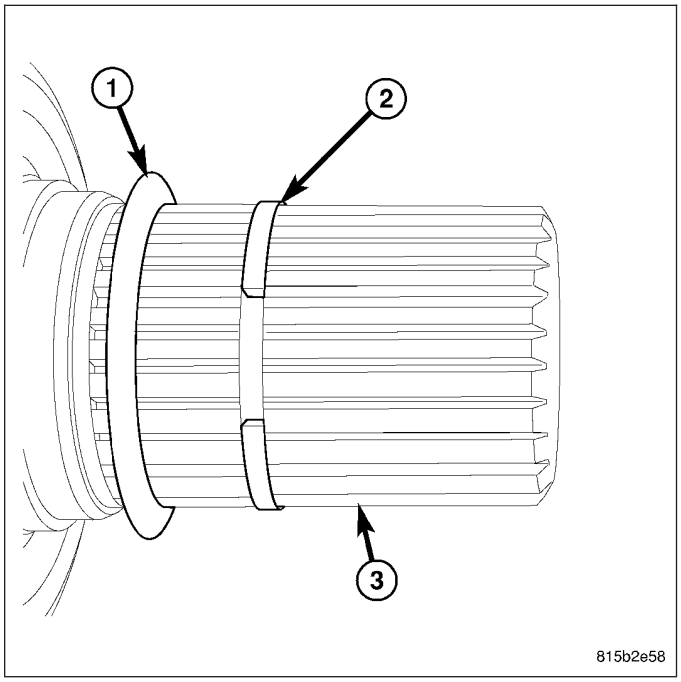
4. Install o-ring (1) and snap ring (2) on axle shaft (3).
5. Install half shaft.
6. Verify differential fluid level and add fluid if necessary.



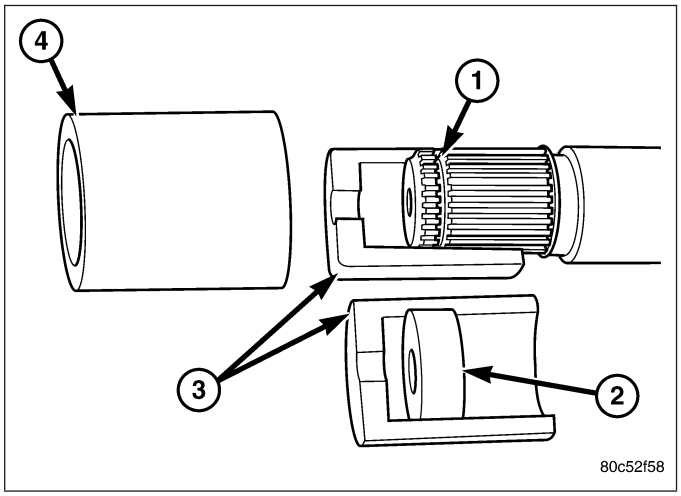
BEARING-AXLE

REMOVAL

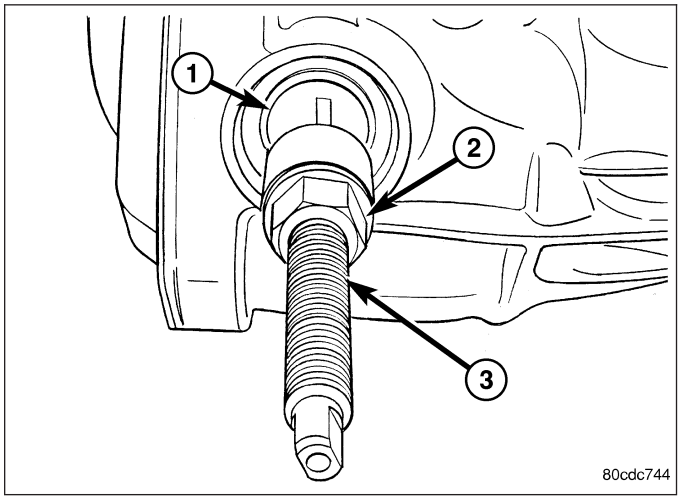
1. Remove half shaft from vehicle.
2. Clean axle seal area.
3. Remove O-ring (1) and snap ring (2) from axle shaft (3).



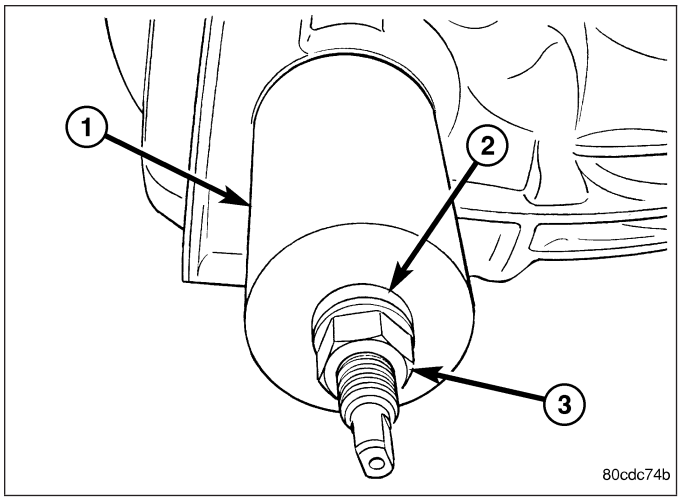
4. Remove axle with Remove 8420A (2) (3) Collar 8420-3 (4) and Slide Hammer C-3752.
5. Remove axle shaft seal with a seal puller.



6. Install axle shaft bearing Remover C-4660-A (3) in the bearing (1). Then tighten the nut (2) to spread remover in the bearing.



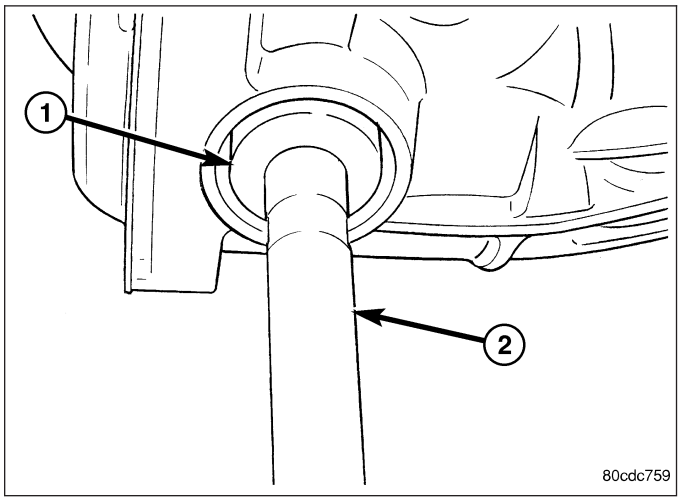
7. Install bearing remove cup (1) bearing (2) and nut (3). Tighten nut (3) to draw the bearing out.



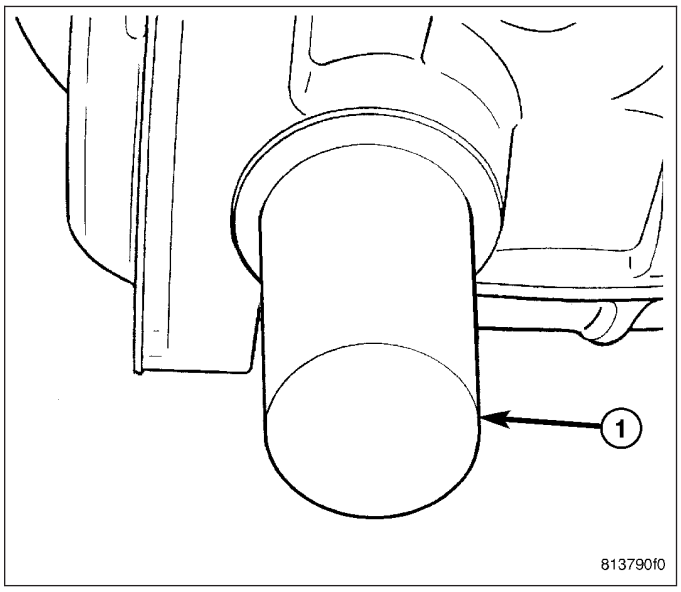
INSTALLATION

1. Wipe axle shaft bearing bore clean.
2. Install axle shaft bearing with Installer 5063 (1) and Handle C-4171 (2).

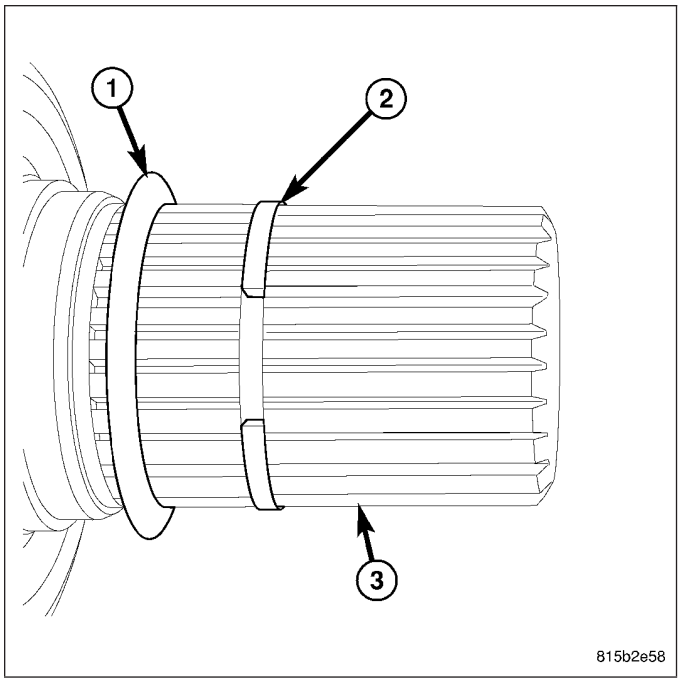
CAUTION: Bearing must be installer with lettering facing outwards. Failure to follow these instructions will damage the bearing.



3. Install a **new** axle shaft seal with Installer 8694 (1).
4. Lubricate seal lip with gear lubricant.



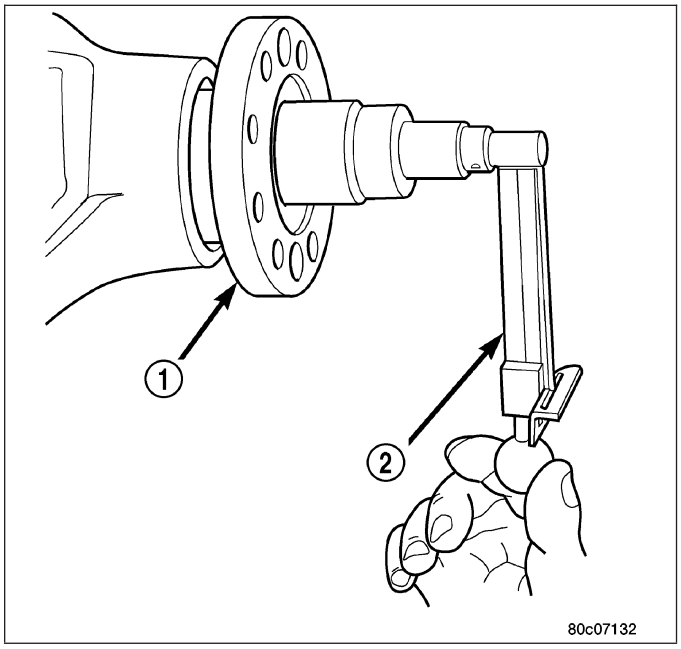
5. Install axle shaft with **new** snap ring and verify axle shaft snap ring is seated in side gear.
6. Install axle shaft (3) O-ring (1) and snap ring (2).
7. Install half shaft.
8. Verify differential fluid level and add fluid if necessary.



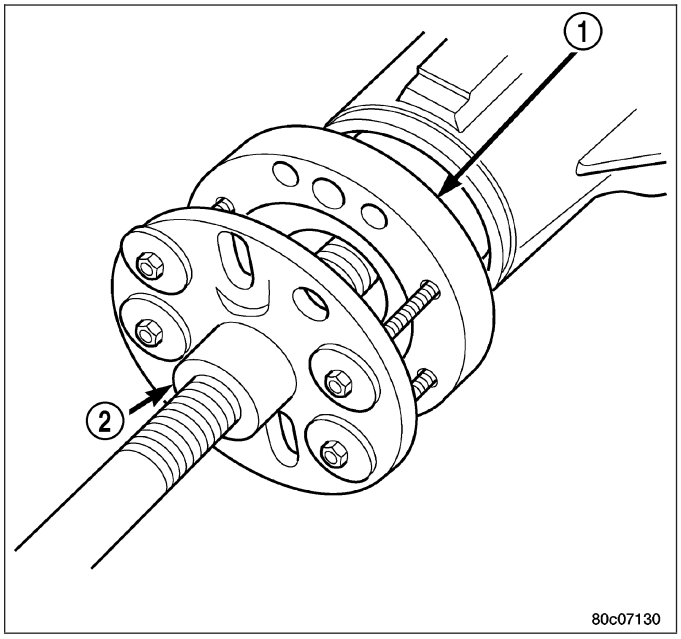
SEAL-PINION

REMOVAL

1. With axle in 2WD remove front propeller shaft and left half shaft.
2. Rotate pinion gear three or four times and verify pinion rotates smoothly.
3. Measure and record pinion Torque To Rotate with an inch pound torque wrench (2), for installation reference.
4. Position Holder 6719 against the companion flange (1) and install a four bolts and washers into the threaded holes and tighten the bolts.
5. Remove pinion nut.

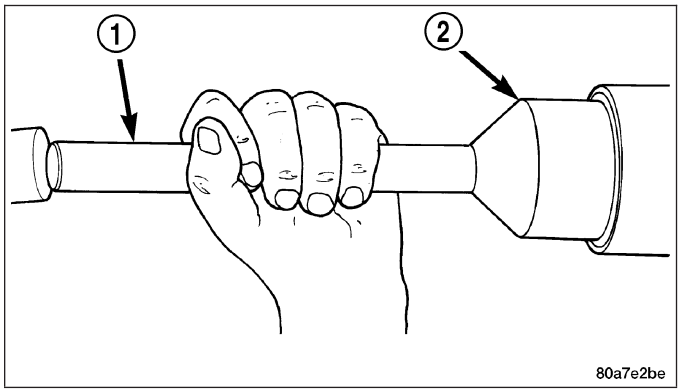


6. Remove companion flange with (1) Remover C-452 (2).
7. Remove pinion seal with a seal puller or a slide hammer mounted screw.



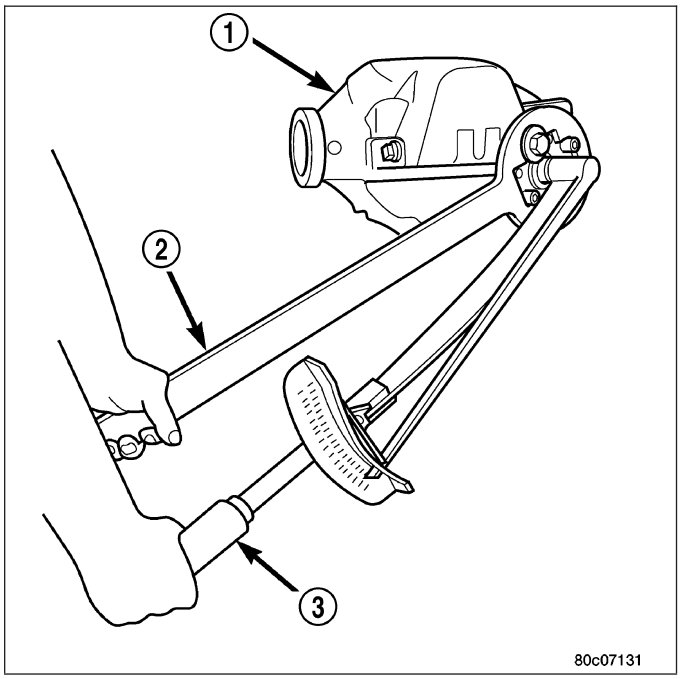
INSTALLATION

1. Apply a light coating of gear lubricant on the lip of pinion seal.
2. Install seal with Installer 8695 (2) and Handle C-4171 (1).
3. Install companion flange onto the pinion with Installer C-3718 and Holder 6719A.



4. Position holder (2) against the companion flange and install four bolts and washers into the threaded holes. Tighten the bolt and washer so that the holder is held to the flange.
5. Install a **new** pinion nut onto the pinion shaft and tighten the pinion nut until there is zero bearing end-play

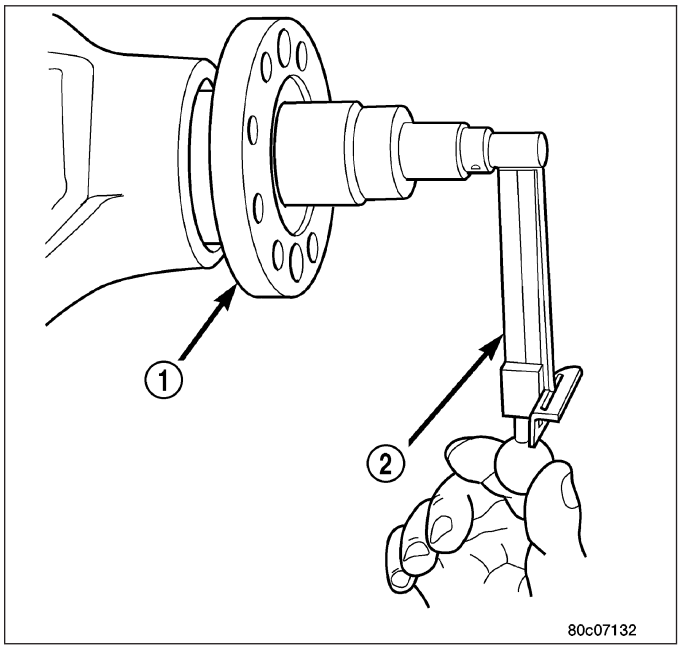
CAUTION: Do not exceed 271 N·m (200 ft. lbs.) the minimum tightening torque when installing the companion flange at this point. Never loosen pinion nut to decrease pinion bearing rotating torque and never exceed specified preload torque. Failure to follow these instruction will damage the axle.



6. Measure pinion Torque To Rotate with an inch pound torque wrench (2). Pinion Torque To Rotate should be equal to the reading recorded during removal plus an additional 0.56 N·m (5 in. lbs.).
7. If rotating torque is low, tighten the pinion nut in 6.8 N·m (5 ft. lbs.) increments until pinion Torque To Rotate is achieved.

CAUTION: If maximum tightening torque 475 N·m (350 ft. lbs.) is reached prior to reaching the required rotating torque, the collapsible spacer may have been damaged. Failure to follow these instruction will damage the axle.

8. Install propeller shaft and half shafts.



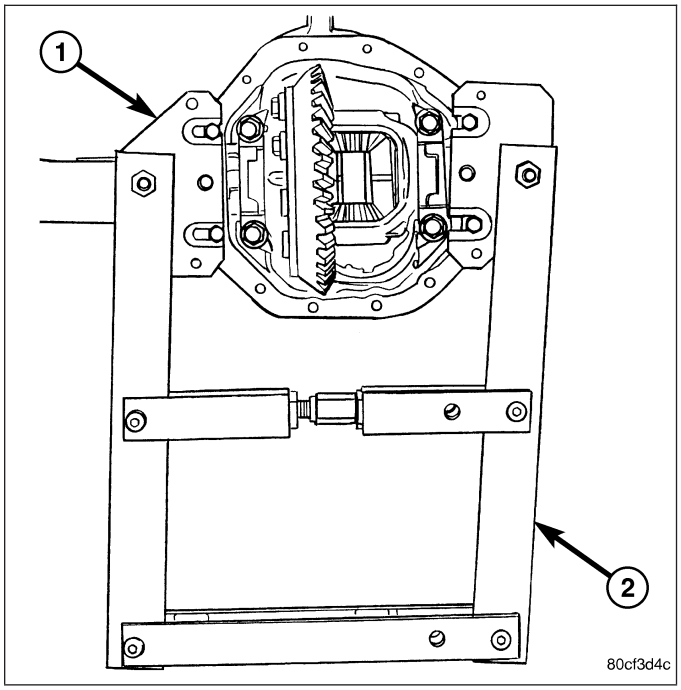
DIFFERENTIAL

REMOVAL

1. Remove differential housing cover and drain fluid.
2. Remove axle shafts.
3. Loosen bearing cap bolts.

NOTE: Differential bearing cap reference numbers are stamped on caps and machined flat on the housing. If reference numbers cannot be found, make new marks for later reference.

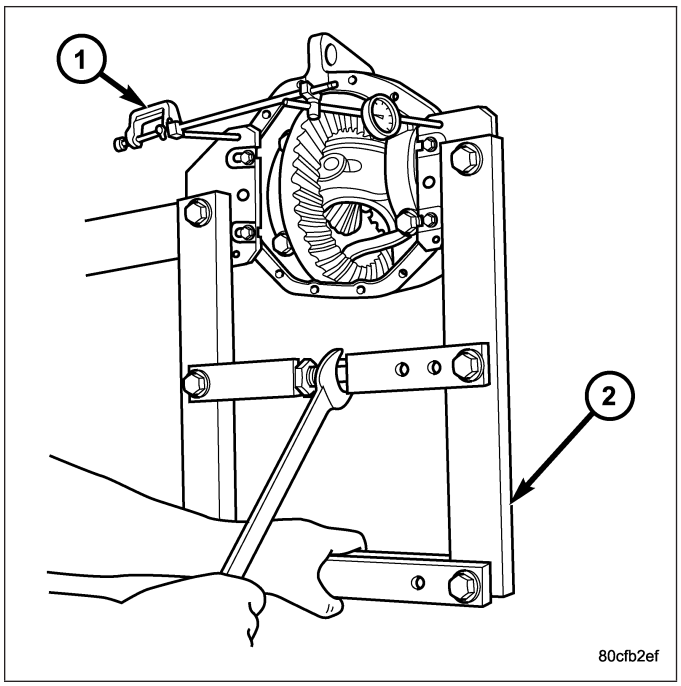
4. Install Adapter Plates 8142-A (1) onto the housing.
5. Install Spreader W-129-B (2) onto the adapter plates (1) and tighten the turnbuckle finger-tight.



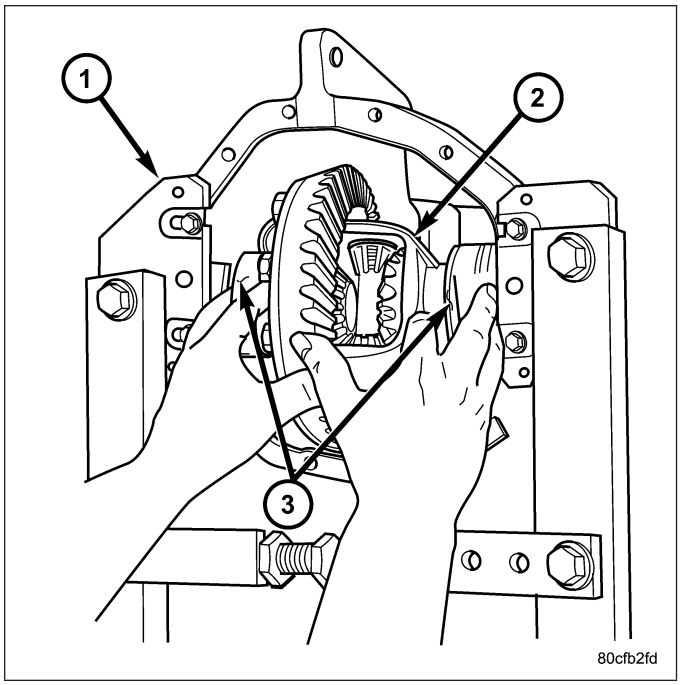
6. Install a Pilot Stud L-4438 at the left side of the differential housing. Attach Dial Indicator C-3339 (1) to pilot stud. Load the indicator plunger against the opposite side of the housing and zero the indicator.
7. Spread the housing to remove the differential case from the housing. Measure the distance with the dial indicator.

CAUTION: Never spread housing over 0.50 mm (0.020 in). Failure to follow these instructions will damage the housing.

8. Remove dial indicator.
9. While holding the differential case in position, remove bearing cap bolts and caps.

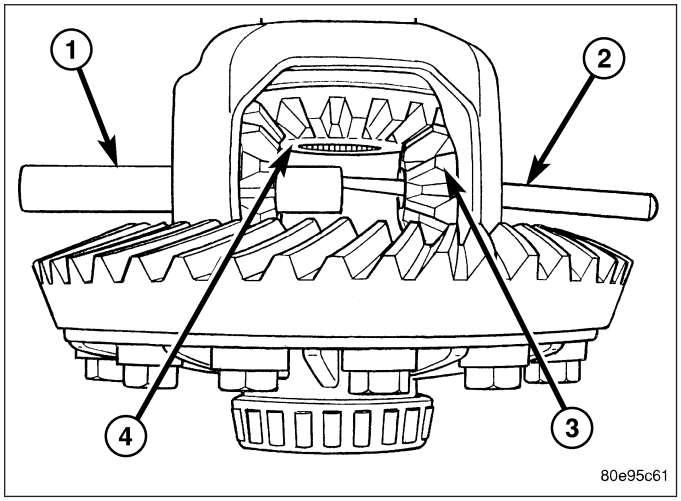


10. Remove differential (2) from the housing (1). Ensure differential bearing cups (3) and shims remain in position on the differential bearings.
11. Tag differential bearing cups and shims to indicate location.
12. Remove spreader from housing.

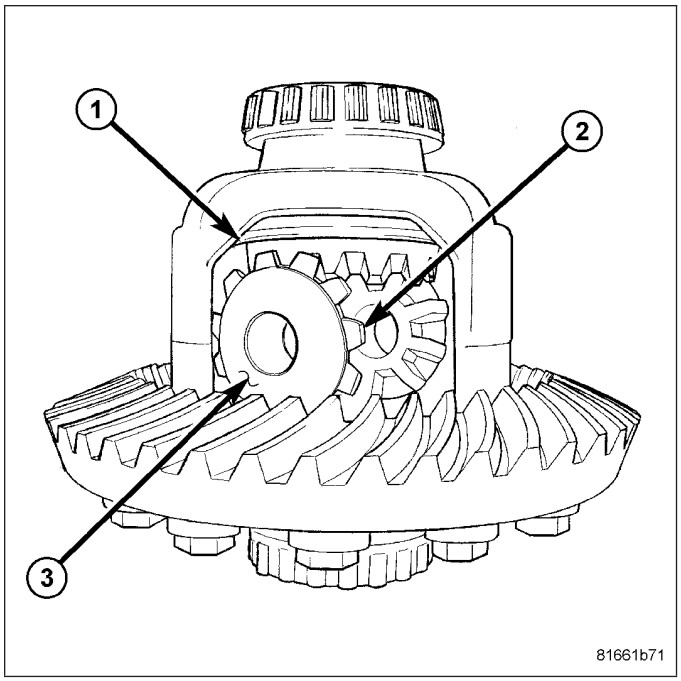


DISASSEMBLY

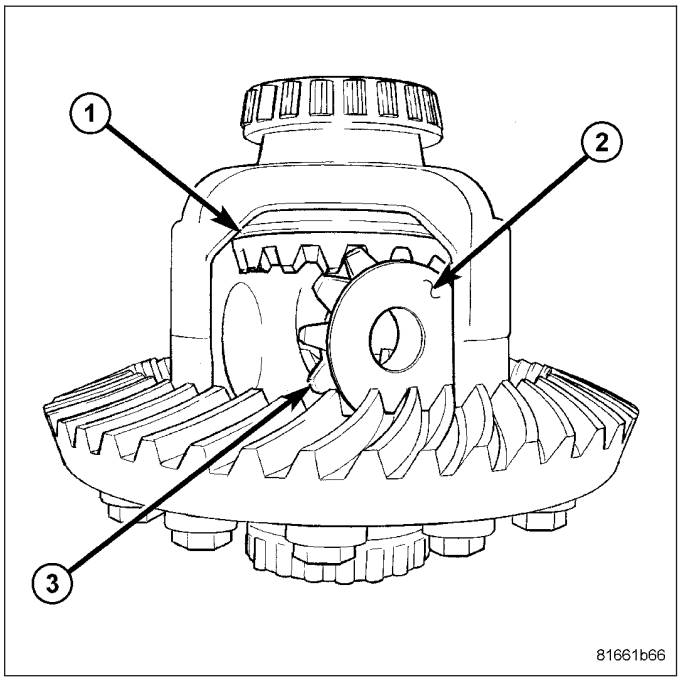
1. Remove pinion mate shaft lock roll pin and remove pinion mate shaft (1) with a punch (2) from pinion gears (3).



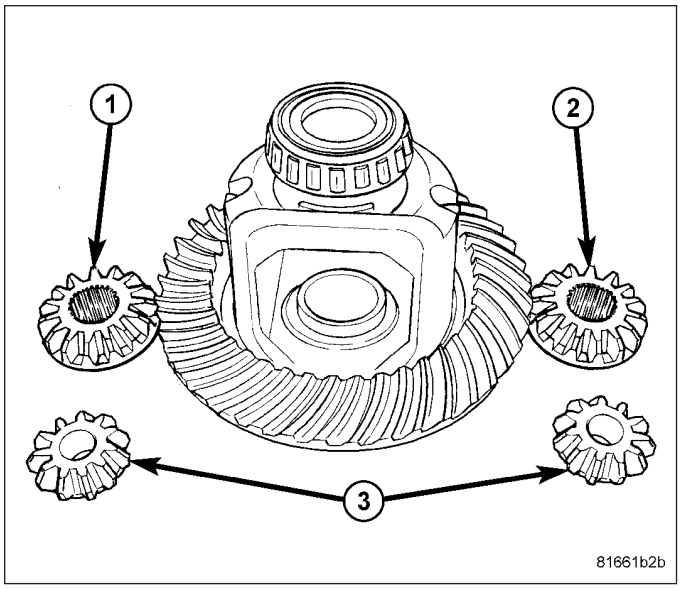
2. Rotate one pinion gear (2) with thrust washer (3) to the differential window (1) and remove gear and thrust washer.



3. Rotate remaining pinion gear (3) with thrust washer (2) to the differential window (1) and remove gear and washer.



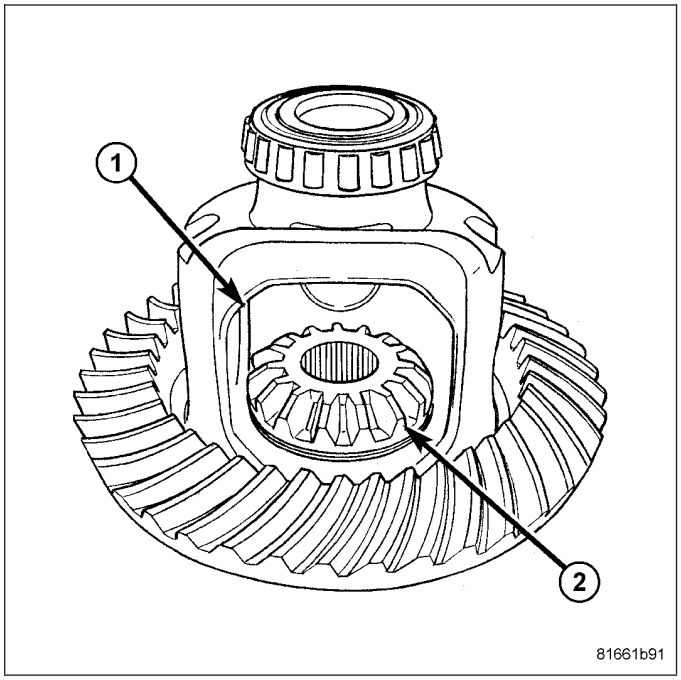
4. Remove differential side gears (1, 2) and thrust washers.



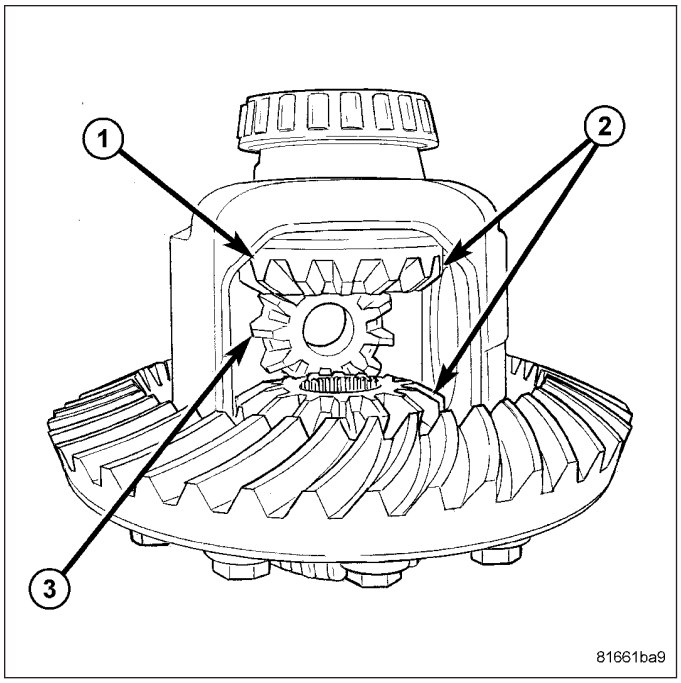
ASSEMBLY

NOTE: If same gears and thrust washers are being used, install them into their original locations.

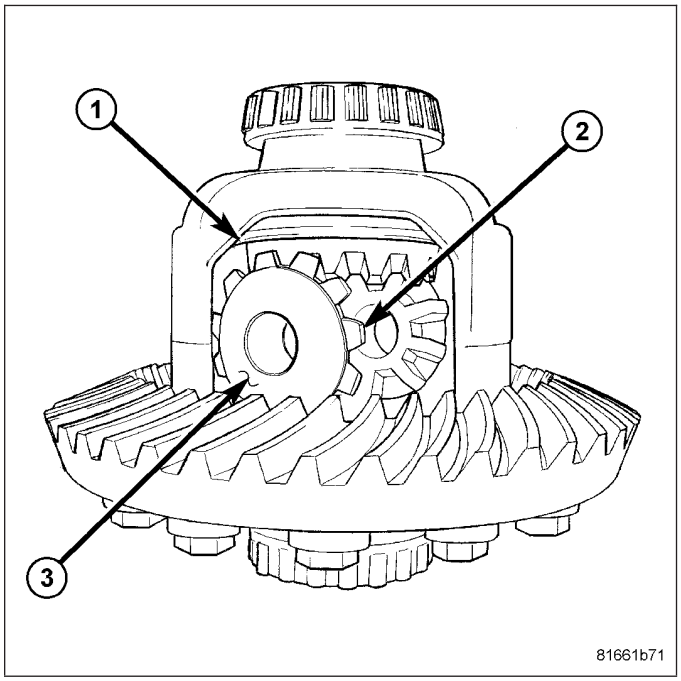
1. Lubricate all differential components with axle lubricant.
2. Install differential side gears (2) and thrust washers through differential window (1).



3. Install first pinion gear (3) with thrust washer into differential window (1) and side gears (2). Rotate pinion gear into the case.



4. Install remaining pinion gear (2) and thrust washer (3). Rotate gears to align hole in the pinion gears with hole in the differential case.
5. Slide pinion shaft into the case and through the pinion gears. Install pinion mate shaft roll pin and stake pin in case.



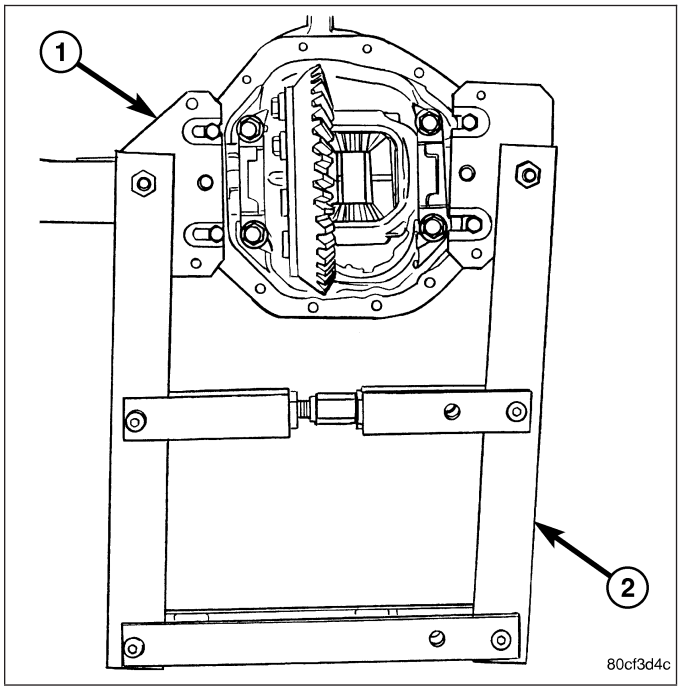
INSTALLATION

NOTE: If replacement differential bearings or differential case are replaced, Refer to adjustments for Differential Bearing Preload and Gear Backlash procedures.

1. Install Spreader W-129-B (2) with the Adapter Plates 8142-A (1) and install the safety hold-down clamps. Tighten the tool turnbuckle finger-tight.
2. Install a Pilot Stud L-4438 at the left side of the differential housing. Attach Dial Indicator C-3339 to pilot stud. Load indicator plunger against the opposite side of the housing and zero the indicator.
3. Spread housing and measure distance with the dial indicator.

CAUTION: Never spread housing over 0.50 mm (0.020 in). Failure to follow these instruction will damage the housing.

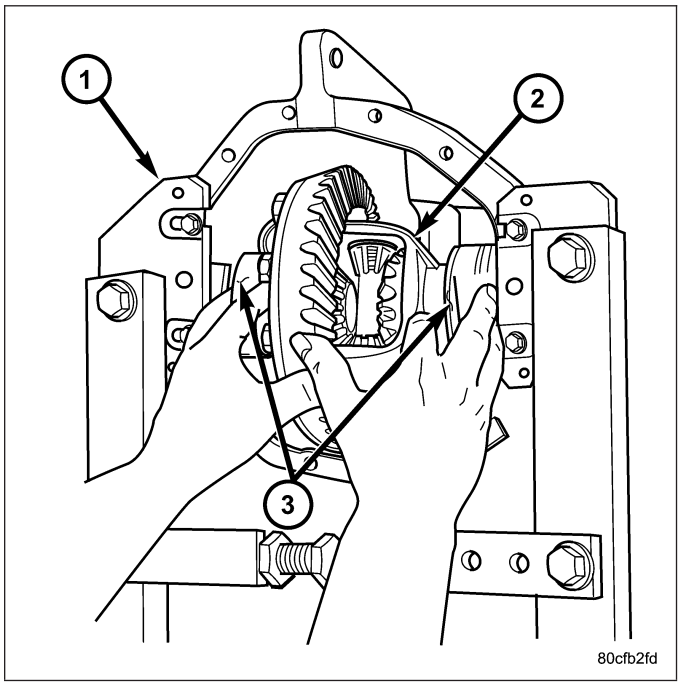
4. Remove dial indicator.



5. Install differential case (2) in the housing (1). Ensure differential bearing cups (3) remain in position on the bearings and the differential preload shims are seated in the housing. Tap differential case to ensure bearings cups are seated in the housing.
6. Install bearing caps to their original locations and loosely install cap bolts.
7. Remove housing spreader.
8. Tighten the bearing cap bolts to 61 N·m (45 ft. lbs.).
9. Install axle shafts.
10. Apply a bead of orange Mopar Axle RTV sealant or equivalent to the housing cover.

CAUTION: If cover is not installed within 3 to 5 minutes, the cover must be cleaned and new RTV applied. Failure to follow these instruction will cause a leak.

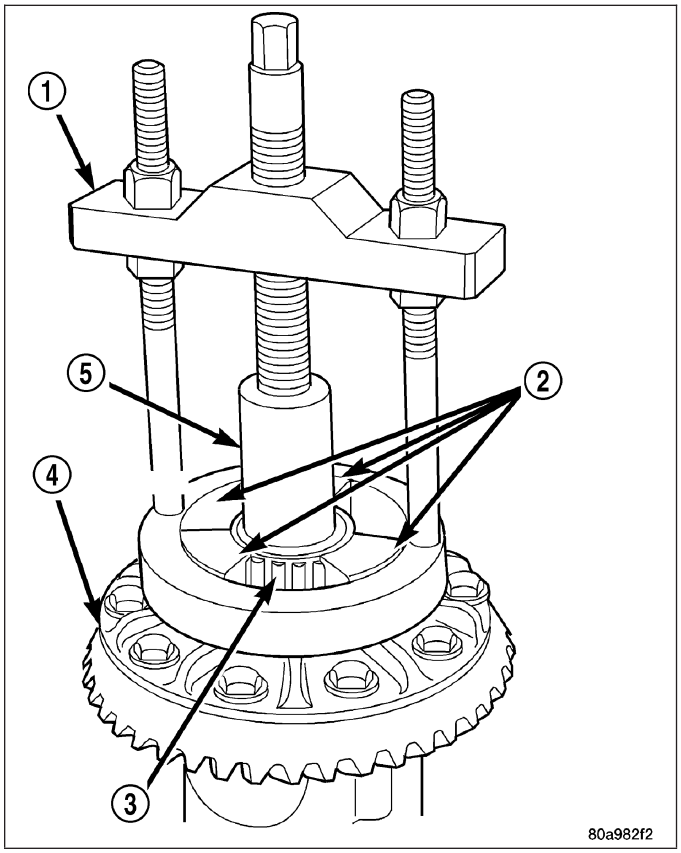
11. Install cover and tighten bolts in a criss-cross pattern to 23 N·m (17 ft. lbs.).
12. Fill differential with lubricant.



BEARINGS-DIFFERENTIAL CASE

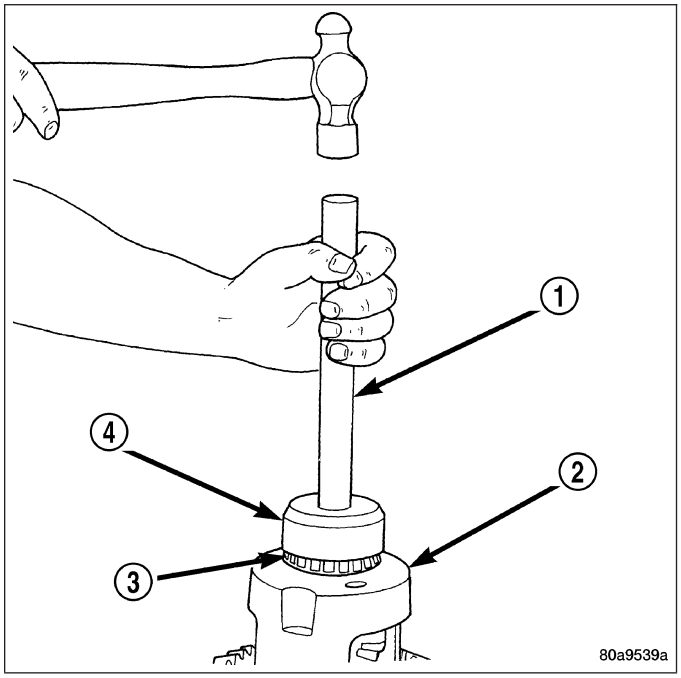
REMOVAL

1. Remove differential from housing.
2. Remove bearings (3) from differential case (4) with Puller C-293-PA (1) Adapters C-293-48 (2) and Plug C-293-3 (5).



INSTALLATION

1. Install differential case bearings (3) with Installer C-3716-A (4) and Handle C-4171(1).
2. Install differential into the housing.

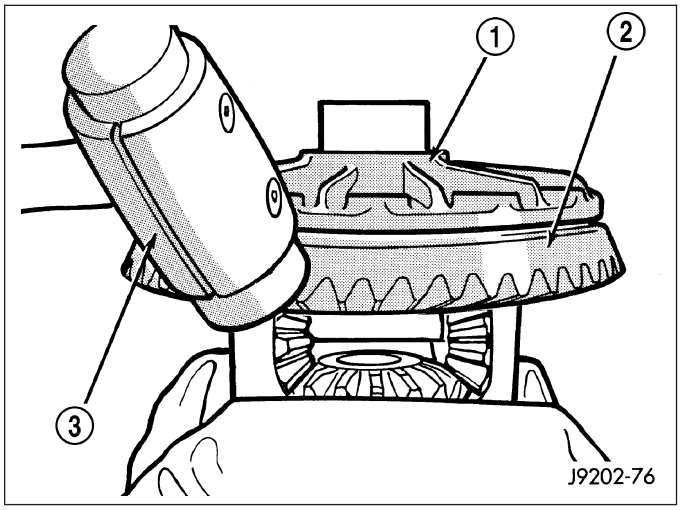


GEAR-PINION/RING

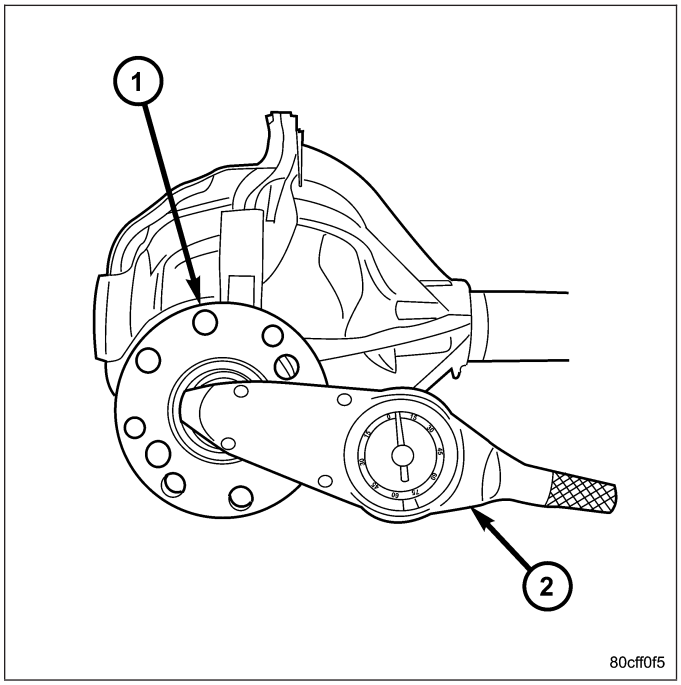
REMOVAL

NOTE: The ring gear and pinion are serviced in a matched set. Never replace one without replacing the other.

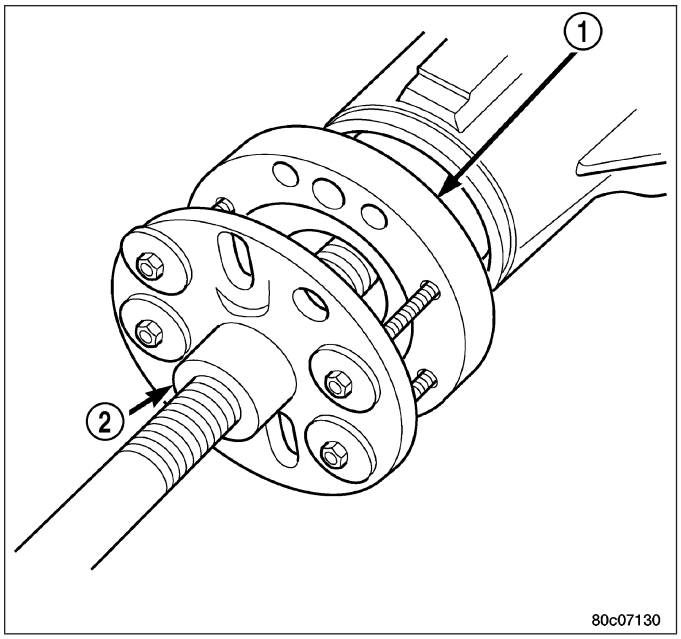
1. Remove differential from housing.
2. Place differential case (1) in a vise with soft jaw.
3. Remove bolts holding ring gear to differential case.
4. Drive ring gear (2) from differential case (1) with a soft hammer (3).



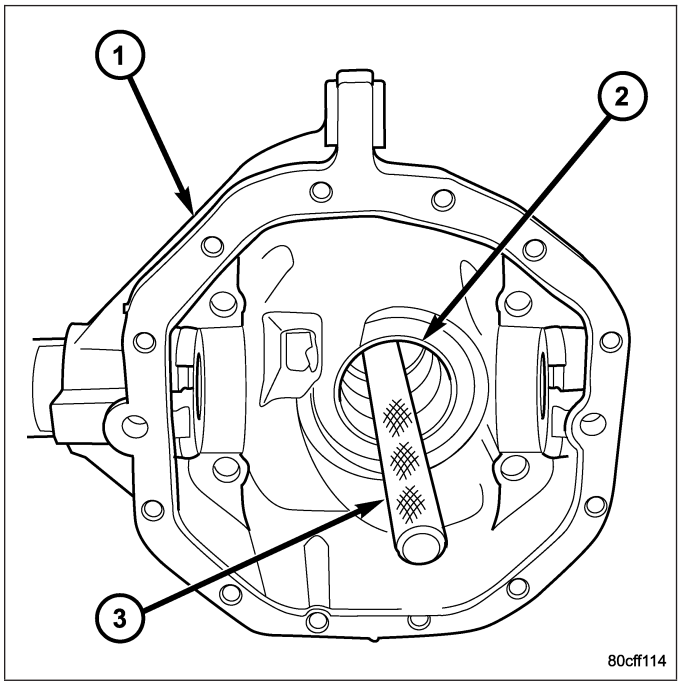
5. Mark companion yoke and companion flange for installation reference.
6. Remove companion flange bolts and tie the propeller shaft to the vehicle underbody.
7. Rotate companion flange (1) three or four times and verify flange rotates smoothly.
8. Record pinion rotating torque an inch pound torque wrench (2) for installation reference.



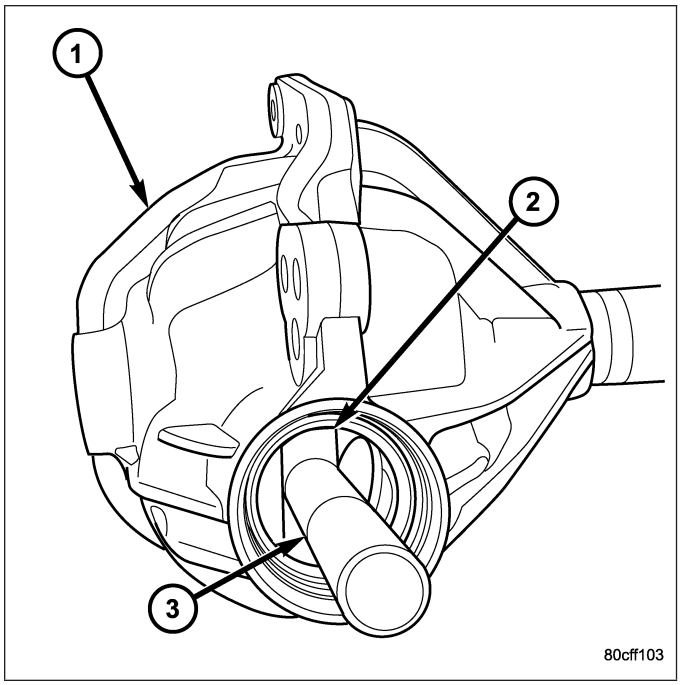
9. Install bolts into two of the threaded holes in the companion flange 180° apart.
10. Position Holder 6719 against the companion flange (1) and install a bolt and washer into one of the remaining threaded holes. Tighten the bolts so that the Holder 6719 is held to the flange.
11. Remove the pinion nut.
12. Remove the companion flange with Remover C-452 (2).



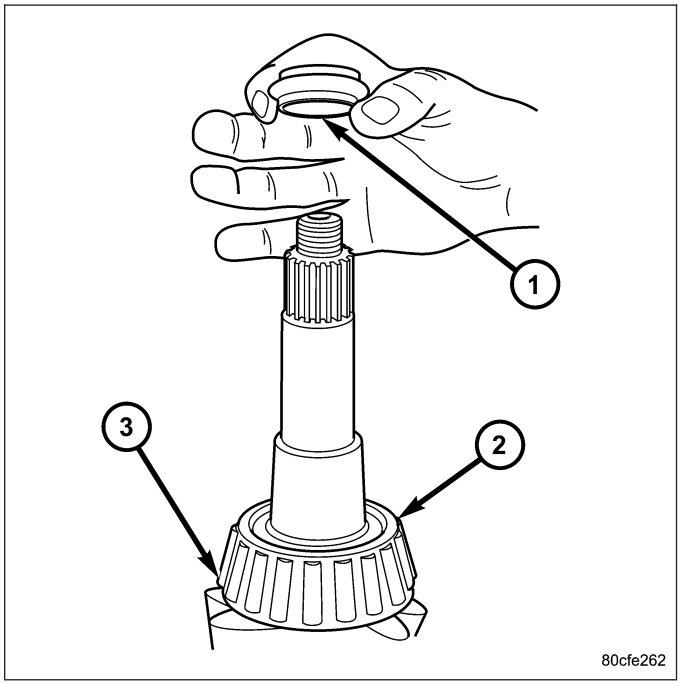
13. Remove pinion from differential housing.
14. Remove pinion seal with a pry tool or a slide hammer mounted screw.
15. Remove oil slinger, if equipped and front pinion bearing.
16. Remove front pinion bearing cup with Remover 8831 (2) and Handle C-4171 (3).



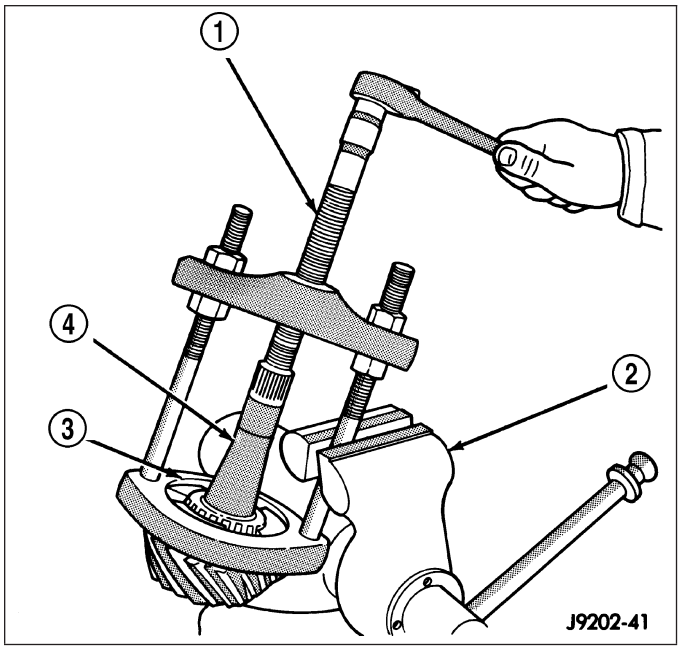
17. Remove rear pinion bearing cup from housing (1) with Remover 8401 (2) and Handle C-4171(3).



18. Remove collapsible spacer (1) from pinion.



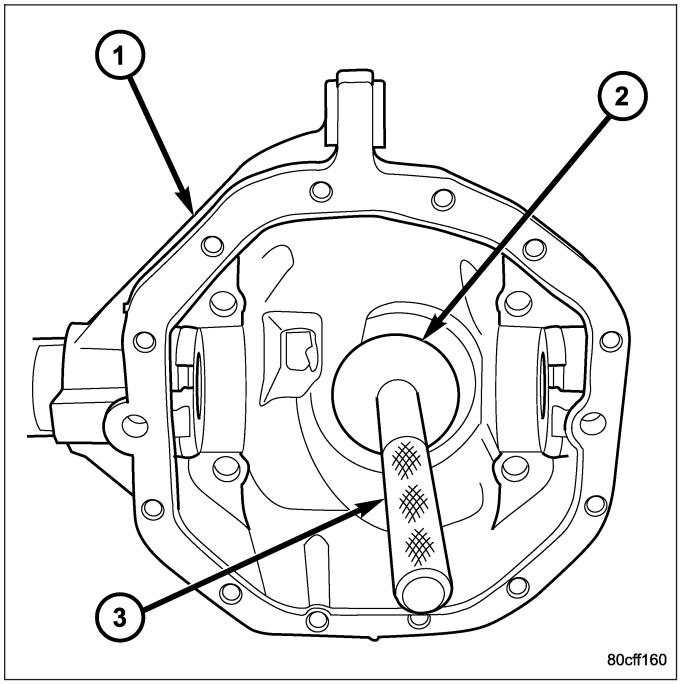
19. Remove rear pinion bearing with Puller/Press C-293-PA (1) and Adapters C-293-42 (3).
20. Remove depth shims from pinion shaft and record thickness of shims.



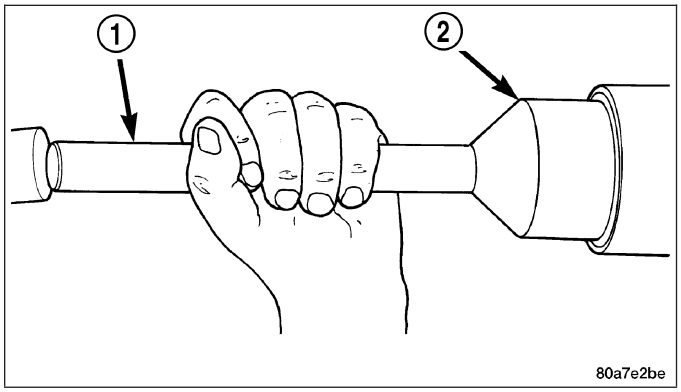
INSTALLATION

NOTE: The ring gear and pinion are serviced in a matched set. Never replace one gear without replacing the other matching gear. If ring and pinion gears or bearings are replaced, Refer to Adjustments for Pinion Gear Depth Setting.

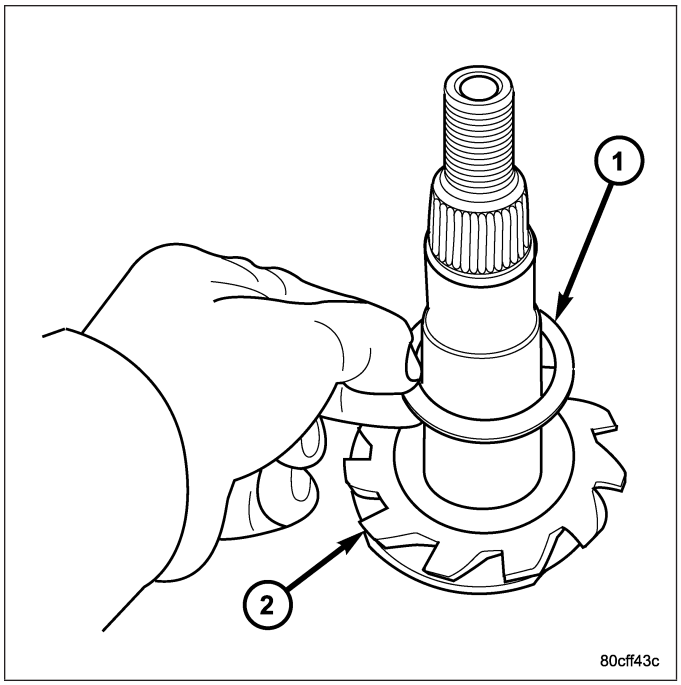
1. Apply Mopar Door Ease or equivalent lubricant to outside surface of the bearing cups.
2. Install rear pinion bearing cup with Installer 8692 (2) and Handle C-4171 (3).



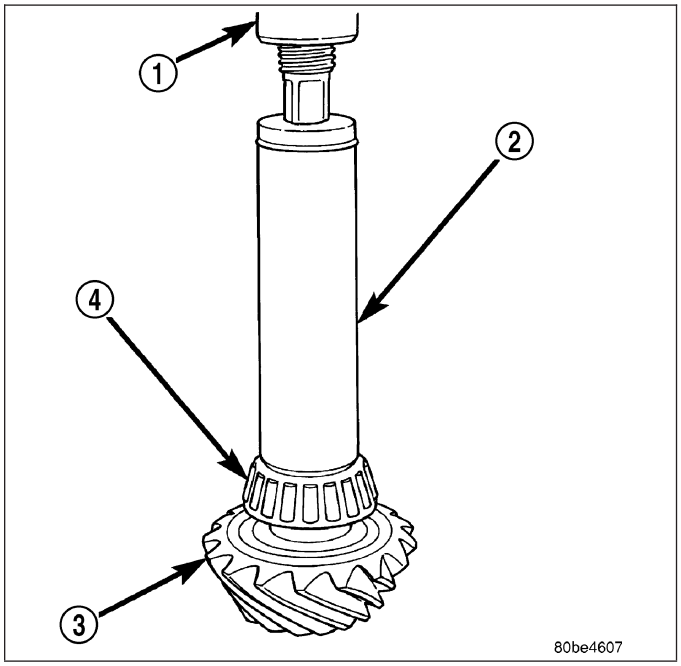
3. Install front pinion bearing cup with Installer 8693 and Handle C-4171.
4. Lubricate front pinion bearing and install bearing in the housing.
5. Apply a light coating of gear lubricant on the lip of pinion seal.
6. Install pinion seal with Installer 8695 (2) and Handle C-4171 (1).



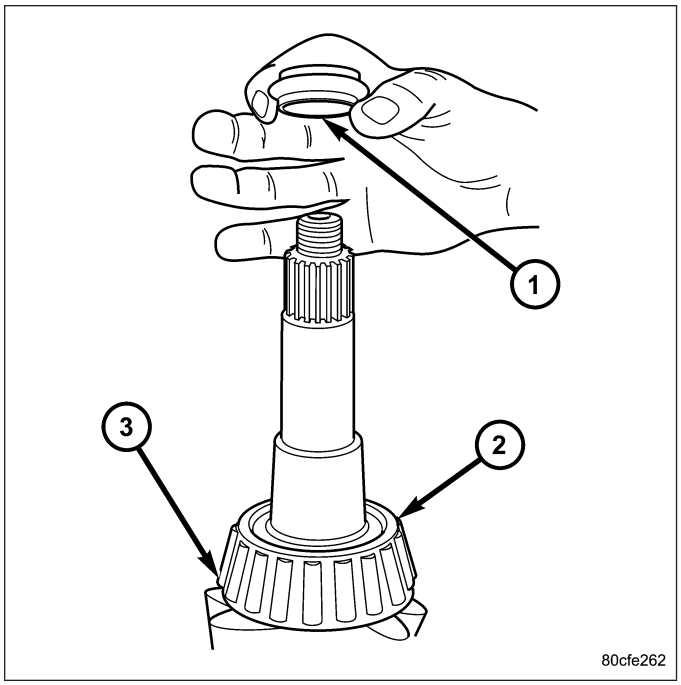
7. Place pinion depth shim (1) on the pinion shaft (2).



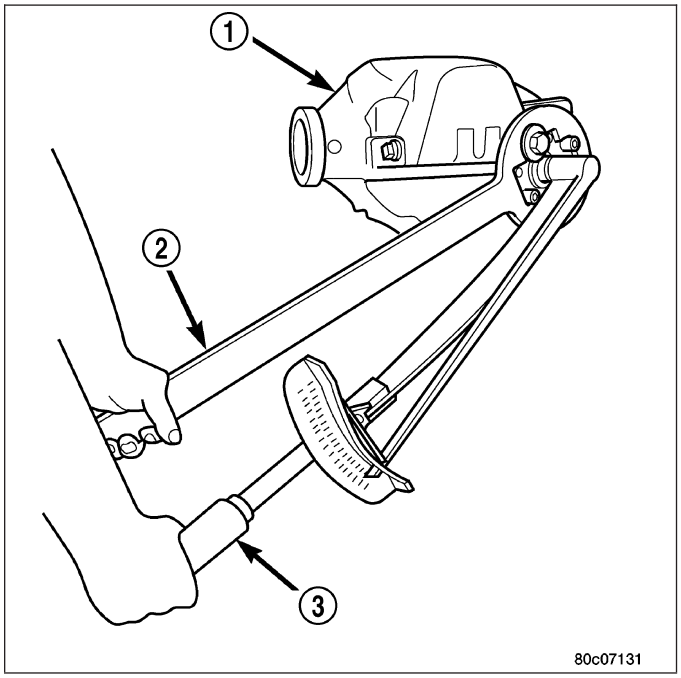
8. Install rear pinion bearing (4) with Installer 6448A (2) and a press (1).



9. Install **new** collapsible spacer (1) onto the pinion shaft.
10. Lubricate rear pinion bearing and install the pinion gear in the housing.

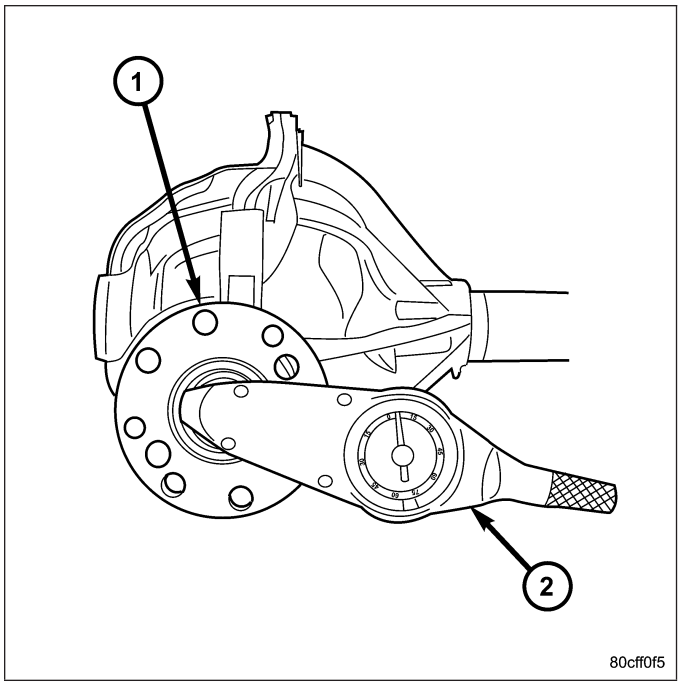


11. Install companion flange with Installer C-3718 and Holder 6719 (2).
12. Install **new** pinion nut and tighten to 271 N·m (200 ft. lbs.).
13. Using Holder 6719 and a torque wrench set at 475 N·m (350 ft. lbs.). Tighten pinion nut until bearing end play is taken up.



14. Slowly tighten the nut in 6.8 N·m (5 ft. lbs.) increments until Torque To Rotate is achieved. Measure Torque To Rotate frequently to avoid overcrushing the collapsible spacer. The pinion Torque To Rotate is:
    - Original Bearings: 1 to 2.5 N·m (10 to 20 in. lbs.)
    - New Bearings: 2.0 to 2.8 N·m (18 to 25 in. lbs.)

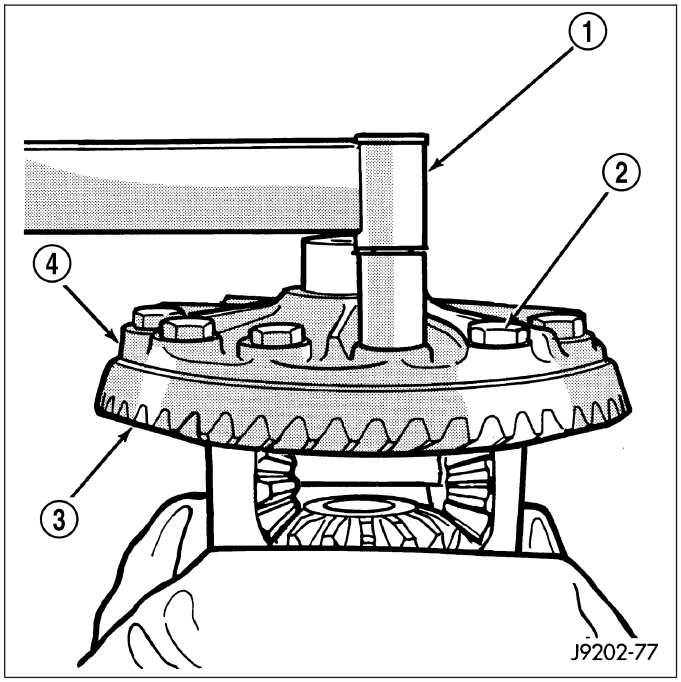
CAUTION: Never loosen pinion nut to decrease pinion bearing rotating torque and never exceed specified preload torque. Failure to follow these instructions will result in damage.



15. Invert differential case (4) and start two ring gear (3) bolts to provide ring gear bolt hole alignment.
16. Invert differential case in the vise.
17. Install **new** ring gear bolts and alternately tighten to 108 N·m (80 ft. lbs.).

CAUTION: Never reuse the ring gear bolts. Failure to follow these instruction will result in damage.

18. Install differential in housing and verify gear mesh, backlash and contact pattern.



FRONT AXLE - 9 1/4 AA

TABLE OF CONTENTS

page

FRONT AXLE - 9 1/4 AA
DIAGNOSIS AND TESTING
FRONT AXLE - 9 1/4 AA 270
REMOVAL 273
INSTALLATION 275
ADJUSTMENTS
PINION DEPTH-BEARING PRELOAD-GEAR BACKLASH 276
SPECIFICATIONS
FRONT AXLE - 9 1/4 AA 280
SPECIAL TOOLS 281
SHAFT-AXLE
REMOVAL 285
DISASSEMBLY 286
ASSEMBLY 287
INSTALLATION 288
SEAL-AXLE SHAFT
REMOVAL 290
INSTALLATION 292
SEAL-PINION
REMOVAL 293
INSTALLATION 294

page

DIFFERENTIAL
REMOVAL 295
DISASSEMBLY 296
ASSEMBLY 297
INSTALLATION 298
BEARING-DIFFERENTIAL CASE
REMOVAL 299
INSTALLATION 299
DIFFERENTIAL-ELECTRIC LOCKER
DESCRIPTION 300
DIAGNOSIS AND TESTING
DIFFERENTIAL-ELECTRIC LOCKER 300
REMOVAL 300
DISASSEMBLY 302
ASSEMBLY 303
INSTALLATION 305
BEARINGS-EL DIFFERENTIAL CASE
REMOVAL 307
INSTALLATION 307
GEAR-PINION/RING
REMOVAL 308
INSTALLATION 309

FRONT AXLE - 9 1/4 AA

DIAGNOSIS AND TESTING

FRONT AXLE - 9 1/4 AA

GEAR NOISE

Axle gear noise can be caused by insufficient lubricant, incorrect backlash, tooth contact, worn/damaged gears or the carrier housing not having the proper offset and squareness.

Gear noise usually happens at a specific speed range. The noise can also occur during a specific type of driving condition. These conditions are acceleration, deceleration, coast, or constant load.

When road testing, first warm-up the axle fluid by driving the vehicle at least 5 miles and then accelerate the vehicle to the speed range where the noise is the greatest. Shift out-of-gear and coast through the peak-noise range. If the noise stops or changes greatly check for:

- Insufficient lubricant.
- Incorrect ring gear backlash.
- Gear damage.

Differential side gears and pinions can be checked by turning the vehicle. The side gears are loaded during turns. They usually do not cause noise during straight-ahead driving when the gears are unloaded. A worn pinion mate shaft can also cause a snapping or a knocking noise.

BEARING NOISE

The axle shaft, differential and pinion bearings can all produce noise when worn or damaged. Bearing noise can be either a whining, or a growling sound.

Pinion bearings have a constant-pitch noise. This noise changes only with vehicle speed. Pinion bearing noise will be higher pitched because it rotates at a faster rate. Drive the vehicle and load the differential. If bearing noise occurs, the rear pinion bearing is the source of the noise. If the bearing noise is heard during a coast, the front pinion bearing is the source.

Differential bearings usually produce a low pitch noise. Differential bearing noise is similar to pinion bearing noise. The pitch of differential bearing noise is also constant and varies only with vehicle speed.

Axle shaft bearings produce noise and vibration when worn or damaged. The noise generally changes when the bearings are loaded. Road test the vehicle. Turn the vehicle sharply to the left and to the right. This will load the bearings and change the noise level. Where axle bearing damage is slight, the noise is usually not noticeable at speeds above 30 m.p.h.

LOW SPEED KNOCK

Low speed knock is generally caused by:

- Worn U-joint(s).
- Worn side-gear thrust washers.
- Worn pinion shaft bore.

VIBRATION

Vibration at the front/rear of the vehicle is usually caused by:

- Damaged drive shaft.
- Missing drive shaft balance weight(s).
- Worn or out of balance wheels.
- Loose wheel lug nuts.
- Worn U-joint(s).
- Loose/broken springs.
- Damaged axle shaft bearing(s).
- Loose pinion gear nut.
- Excessive pinion yoke run out.

- Bent axle shaft(s).

Check for loose or damaged front end components or engine/transmission mounts. These components can contribute to what appears to be a vibration. Do not overlook engine accessories, brackets and drive belts.

DRIVELINE SNAP

A snap or clunk noise when the vehicle is shifted into gear (or the clutch engaged) can be caused by:

- High engine idle speed.
- Transmission shift operation.
- Loose engine/transmission/transfer case mounts.
- Worn U-joints.
- Loose spring mounts.
- Loose pinion gear nut and yoke.
- Excessive ring gear backlash.
- Excessive side gear to case clearance.

The source of a snap or a clunk noise can be determined with the assistance of a helper. Raise the vehicle on a hoist with the wheels free to rotate. Instruct the helper to shift the transmission into gear and listen for the noise. A mechanics stethoscope is helpful in isolating the source of a noise.

DIAGNOSTIC CHART

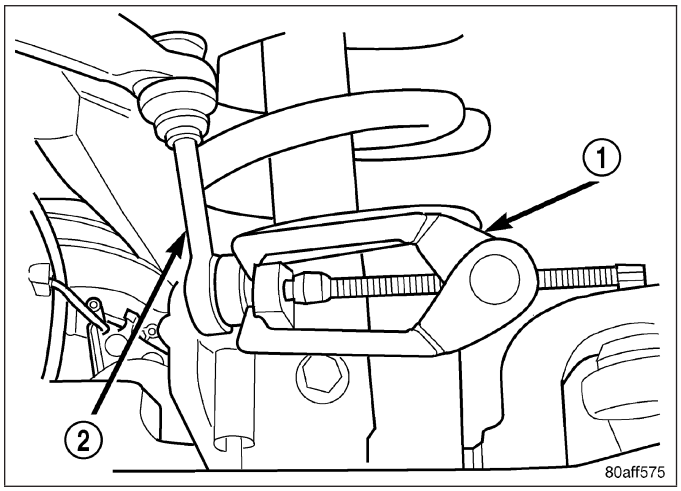
Condition	Possible Causes	Correction
Wheel Noise	1. Wheel loose.	1. Tighten loose nuts.
	2. Worn wheel bearing.	2. Replace bearing.
Axle Shaft Noise	1. Misaligned axle tube.	1. Inspect axle tube alignment. Correct as necessary.
	2. Bent or sprung axle shaft.	2. Inspect and correct as necessary.
	3. End-play in pinion bearings.	3. Refer to pinion pre-load information and correct as necessary.
	4. Excessive gear backlash between the ring gear and pinion.	4. Check adjustment of the ring gear and pinion backlash. Correct as necessary.
	5. Improper adjustment of pinion gear bearings.	5. Adjust the pinion bearings pre-load.
	6. Loose pinion yoke nut.	6. Tighten the pinion yoke nut.
	7. Scuffed gear tooth contact surfaces.	7. Inspect and replace as necessary.
Axle Shaft Broke	1. Misaligned axle tube.	1. Replace the broken shaft after correcting tube mis-alignment.
	2 Vehicle overloaded.	2. Replace broken shaft and avoid excessive weight on vehicle.
	3. Erratic clutch operation.	3. Replace broken shaft and avoid or correct erratic clutch operation.
	4. Grabbing clutch.	4. Replace broken shaft and inspect and repair clutch as necessary.

Condition	Possible Causes	Correction
Differential Cracked	1. Improper adjustment of the differential bearings.	1. Replace case and inspect gears and bearings for further damage. Set differential bearing pre-load properly.
	2. Excessive ring gear backlash.	2. Replace case and inspect gears and bearings for further damage. Set ring gear backlash properly.
	3. Vehicle overloaded.	3. Replace case and inspect gears and bearings for further damage. Avoid excessive vehicle weight.
	4. Erratic clutch operation.	4. Replace case and inspect gears and bearings for further damage. Avoid erratic use of clutch.
Differential Gears Scored	1. Insufficient lubrication.	1. Replace scored gears. Fill differential with the correct fluid type and quantity.
	2. Improper grade of lubricant.	2. Replace scored gears. Fill differential with the correct fluid type and quantity.
	3. Excessive spinning of one wheel/tire.	3. Replace scored gears. Inspect all gears, pinion bores, and shaft for damage. Service as necessary.
Loss Of Lubricant	1. Lubricant level too high.	1. Drain lubricant to the correct level.
	2. Worn axle shaft seals.	2. Replace seals.
	3. Cracked differential housing.	3. Repair as necessary.
	4. Worn pinion seal.	4. Replace seal.
	5. Worn/scored yoke.	5. Replace yoke and seal.
	6. Axle cover not properly sealed.	6. Remove, clean and seal cover.
Axle Overheating	1. Lubricant level low.	1. Fill differential to correct level.
	2. Improper grade of lubricant.	2. Fill differential with the correct fluid type and quantity.
	3. Bearing pre-loads too high.	3. Adjust bearing pre-loads.
	4. Insufficient ring gear backlash.	4. Adjust ring gear backlash.
Gear Teeth Broke	1. Overloading.	1. Replace gears. Examine other gears and bearings for possible damage.
	2. Erratic clutch operation.	2. Replace gears and examine the remaining parts for damage. Avoid erratic clutch operation.
	3. Ice-spotted pavement.	3. Replace gears and examine remaining parts for damage.
	4. Improper adjustments.	4. Replace gears and examine remaining parts for damage. Ensure ring gear backlash is correct.

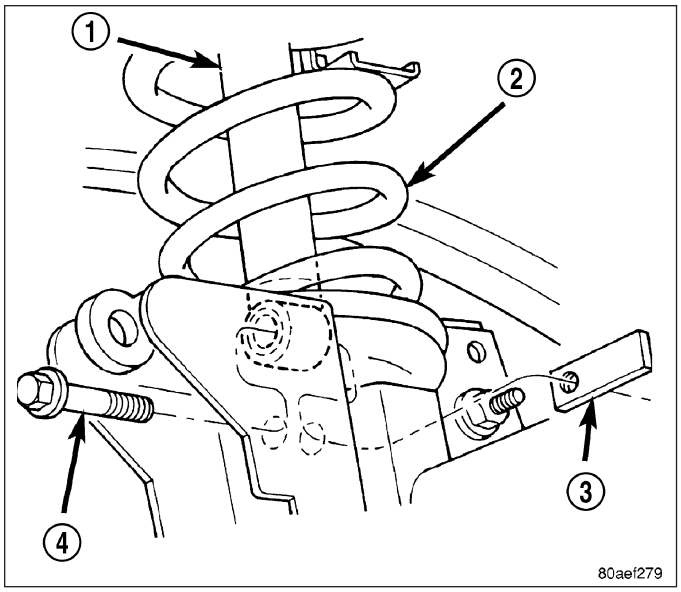
Condition	Possible Causes	Correction
Axle Noise	1. Insufficient lubricant.	1. Fill differential with the correct fluid type and quantity.
	2. Improper ring gear and pinion adjustment.	2. Check ring gear and pinion contact pattern.
	3. Unmatched ring gear and pinion.	3. Replace gears with a matched ring gear and pinion.
	4. Worn teeth on ring gear and pinion.	4. Replace ring gear and pinion.
	5. Loose pinion bearings.	5. Adjust pinion bearing pre-load.
	6. Loose differential bearings.	6. Adjust differential bearing pre-load.
	7. Ring gear run-out.	7. Measure ring gear run-out. Replace components as necessary.
	8. Loose differential bearing cap bolts.	8. Inspect differential components and replace as necessary. Ensure that the bearing caps are torqued to the proper specification.
	9. Housing not machined properly.	9. Replace housing.

REMOVAL

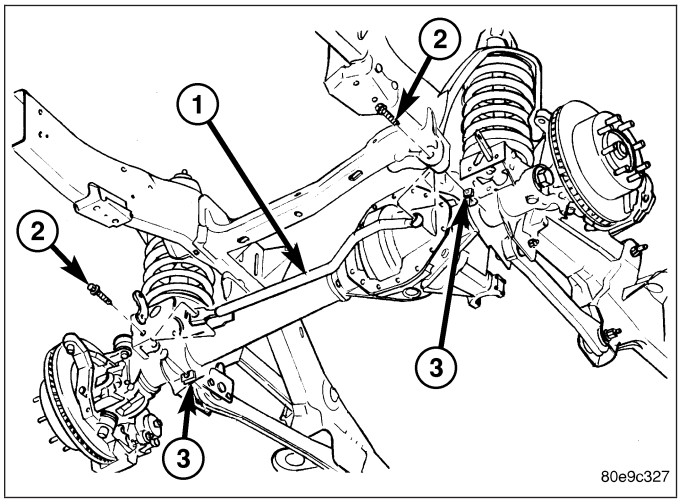
1. With vehicle in neutral, position vehicle on hoist.
2. Remove brake calipers and rotors.
3. Disconnect ABS wheel speed sensors.
4. Disconnect axle vent hose.
5. Remove front propeller shaft.
6. Remove stabilizer bar links (2) at the axle brackets with Puller C-3894A (1).



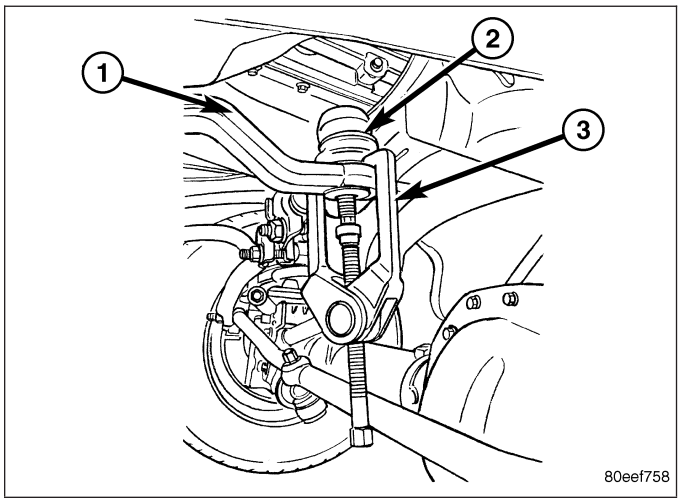
7. Remove shock absorbers (1) bolts (4) from axle brackets.



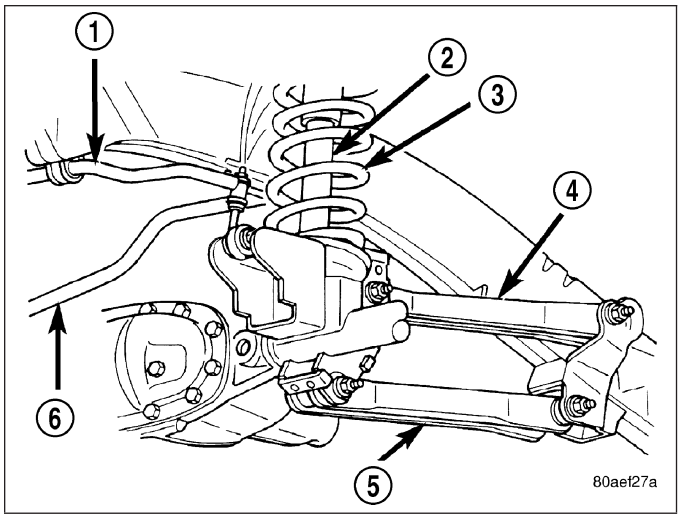
8. Remove track bar (1) bolt (2) from the axle bracket.



9. Remove tie rod and drag link (2) with Puller C-3894A (3) from the steering knuckles.

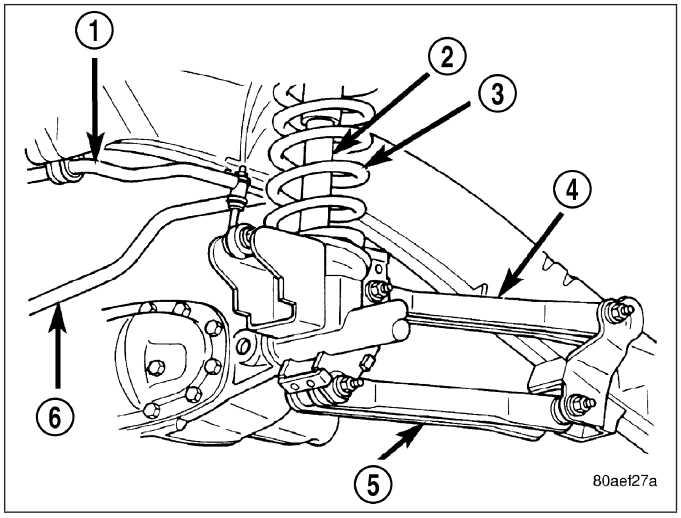


10. Position lift under the axle assembly and secure axle to lift.
11. Mark suspension alignment cams for installation reference.
12. Remove upper suspension arms (4) and lower suspension arms (5) from the axle bracket.
13. Lower the axle. The coil springs will drop with the axle.
14. Remove coil springs from the axle bracket.



INSTALLATION

CAUTION: Suspension components with rubber bushings should be tightened with the weight of the vehicle on the suspension. Failure to follow these instructions will result in damage.



1. Support the axle on a suitable lifting device.
2. Secure axle to lifting device.
3. Position the axle under the vehicle.
4. Install springs (3), retainer clip and bolts.
5. Raise axle and align it with the spring pads.
6. Position upper (4) and lower suspension arms (5) in the axle brackets. Install bolts, nuts and align the suspension alignment cams to the reference marks. Do not tighten at this time.
7. Connect track bar (6) to the axle bracket and install the bolt. Do not tighten at this time.
8. Install shock absorber (2) and stabilizer bar (1)
9. Install drag link and tie rod to the steering knuckles.
10. Install ABS wheel speed sensors.
11. Install rotors and brake calipers.
12. Connect the axle vent hose.
13. Install front propeller shaft.
14. With vehicle on the ground, tighten upper suspension arm nuts at axle to 149 N·m (110 ft. lbs.). Tighten upper suspension arm nuts at frame to 149 N·m (110 ft. lbs.).
15. With vehicle on the ground, tighten lower suspension arm nuts at axle to 190 N·m (140 ft. lbs.). Tighten the lower suspension arm nuts at frame to 190 N·m (140 ft. lbs.).
16. Tighten track bar bolt at the axle bracket to 176 N·m (130 ft. lbs.).
17. Check front wheel alignment.

ADJUSTMENTS

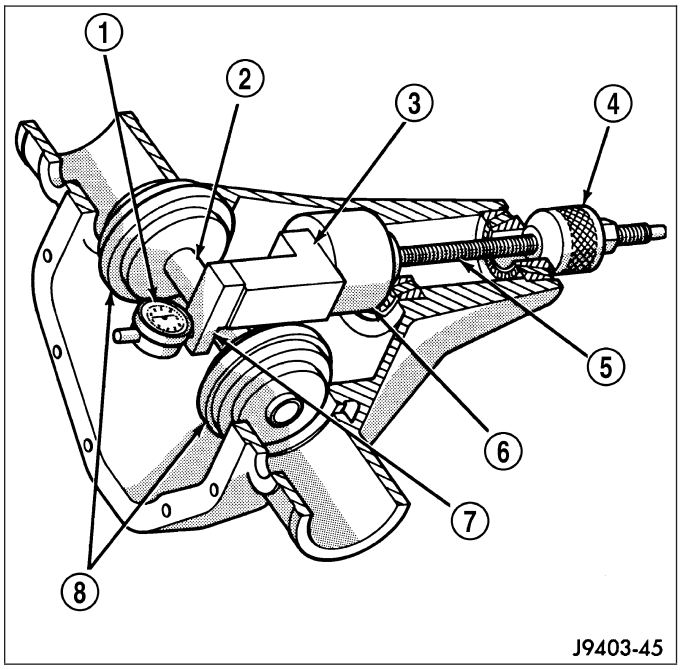
PINION DEPTH-BEARING PRELOAD-GEAR BACKLASH

PINION DEPTH MEASUREMENT

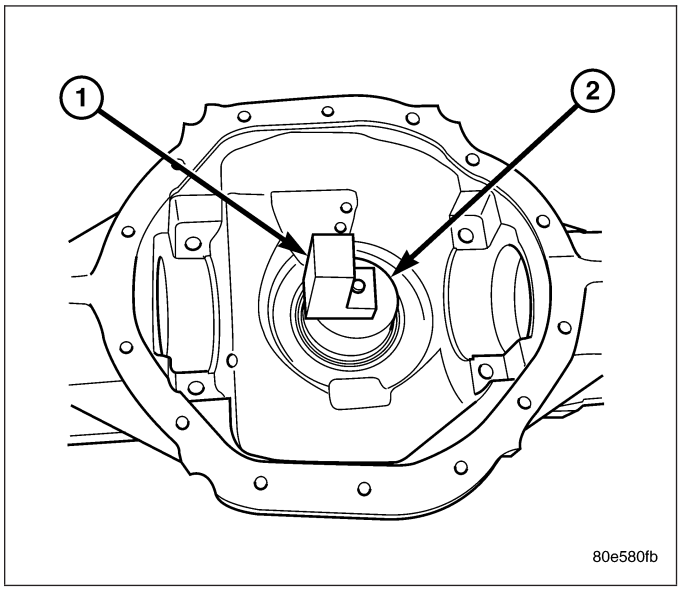
Ring and pinion gears are supplied as matched sets. Compensation for pinion depth variance is achieved with a select shim. located between the rear pinion bearing and pinion gear head.

Measurements are taken with pinion bearing cups and pinion bearings installed in the housing. Take measurements with Pinion Gauge Set and Dial Indicator C-3339.

1. Assemble Pinion Height Block 6739 (3), Pinion Block 8878 (6) and rear pinion bearing onto Screw 6741 (5).

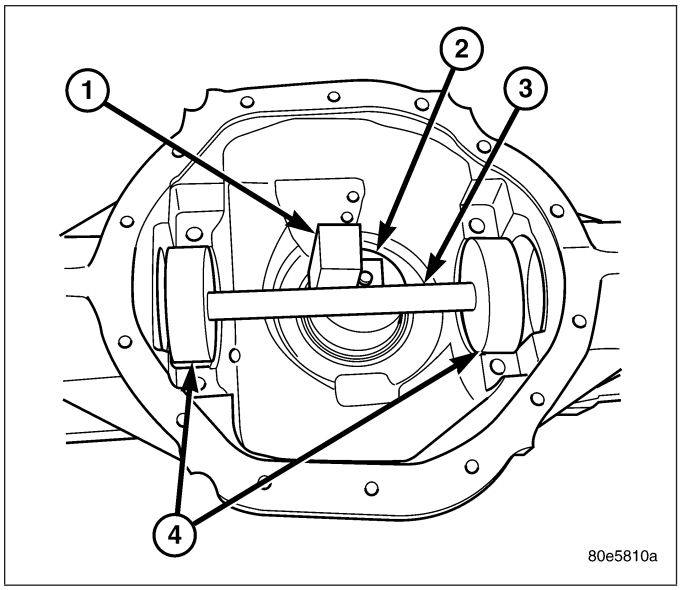


2. Insert assembled pinion height block (1), pinion block (2), rear bearing and screw into the housing through pinion bearing cups.
3. Install front pinion bearing and Cone-Nut 6740 onto the screw. Tighten cone-nut until Torque To Rotate the screw is 1.7-2.26 N·m (15-20 in. lbs.).

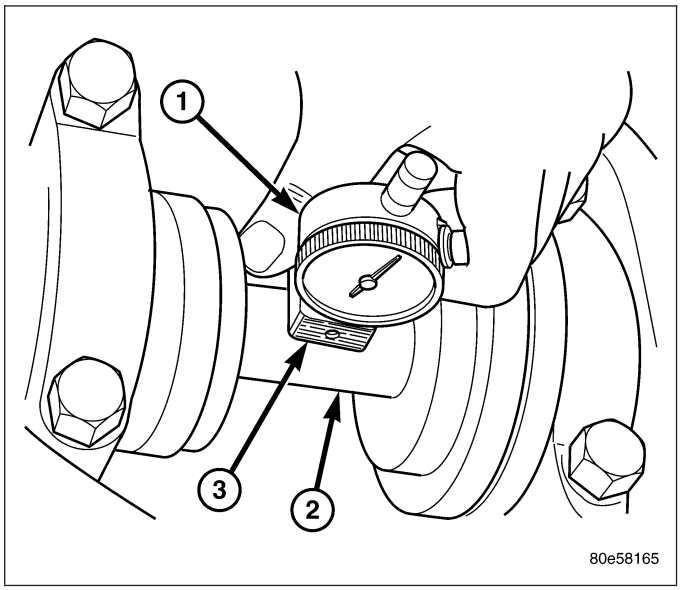


4. Place Arbor Disc 8289 (4) on Arbor D-115-3 (3) in position in the housing side bearing cradles.
5. Install differential bearing caps on arbor discs and snug the bearing cap bolts. Then cross tighten cap bolts to 85 N·m (63 ft. lbs.).

NOTE: Arbor (3) should rotate freely in the arbor disc (4).

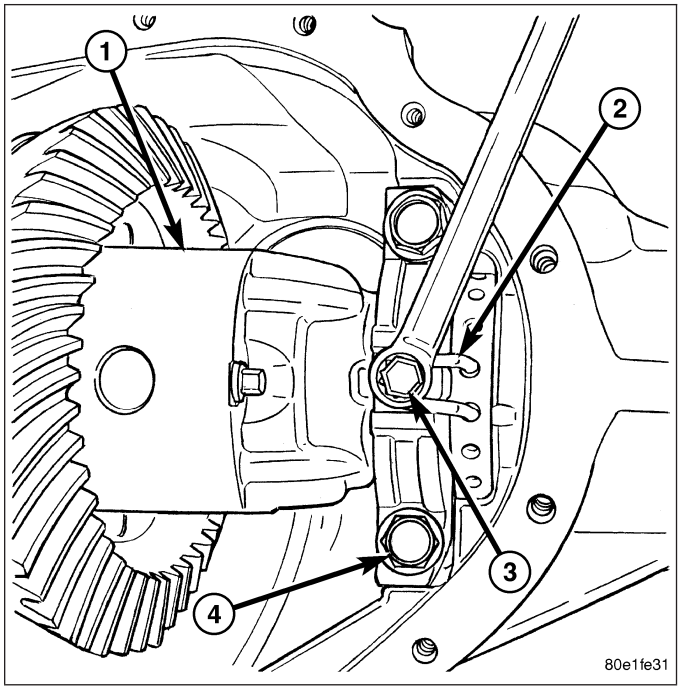


6. Assemble Dial Indicator C-3339 (1) into Scooter Block D-115-2 (3) and secure set screw.
7. Position Scooter Block/Dial Indicator flush on the pinion height block. Hold scooter block and zero the dial indicator (1).
8. Slowly slide the scooter block across the pinion height block over to the arbor. Move scooter block till dial indicator crests the arbor (2), then record the highest reading.
9. Select a shim equal to the dial indicator reading.
10. Install the select shim between the rear pinion bearing and the pinion gear head.

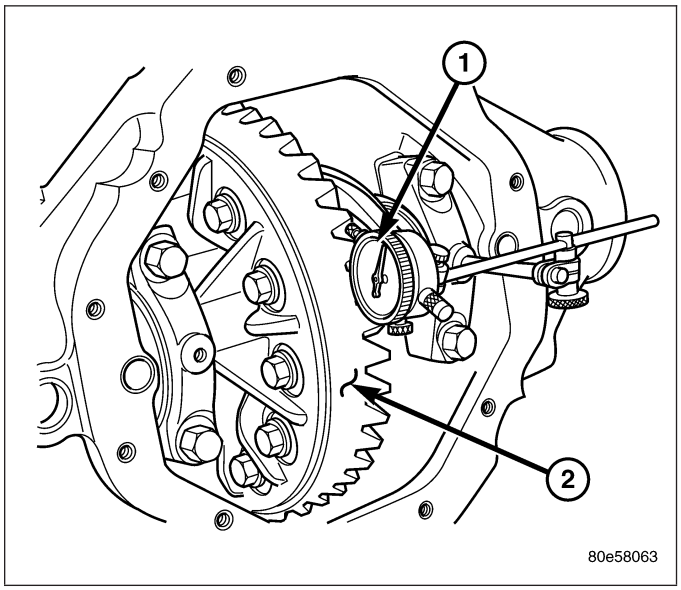


DIFFERENTIAL BEARING PRELOAD AND GEAR BACKLASH

Backlash is adjusted by moving the adjusters in and out or both. By moving the adjusters the case/ring gear will move closer or further away from the pinion. In most cases this adjustment can be used to achieve the correct gear tooth pattern and set the case bearing preload.



1. Remove adjuster lock bolts (3) and adjuster locks (2).
2. **Loosen** the differential bearing caps.
3. Slide differential case (1) toward the pinion gear until the gears make contact/zero backlash. If zero backlash cannot be obtained, turn the pinion side adjuster until zero backlash is obtained.
4. Holding the differential case toward the pinion gear, turn bearing adjusters with Wrench 8883 until they make contact with the differential bearings/cups.
5. Back off the ring gear side adjuster 4 holes, to obtain initial ring gear backlash.
6. Install ring gear side adjuster lock and bolt. **Do not tighten** adjuster lock bolt at this time.
7. Tighten pinion gear side adjuster firmly against the differential case bearing cup.
8. Rotate the pinion several times to seat the differential bearings.
9. Loosen pinion gear side adjuster until it is no longer in contact with the bearing cup, then tighten it until it makes contact.
10. Tighten pinion gear side adjuster an additional:
    - **New Bearings:** 6 Adjuster Holes
    - **Original Bearings:** 4 Adjuster Holes
11. Install pinion gear side adjuster lock and bolt.
12. Tighten bearing cap bolts to 85 N·m (63 ft. lbs.).
13. Tighten adjuster lock bolts to 25 N·m (18 ft. lbs.).
14. Measure ring gear backlash with a Dial Indicator C-3339 (1) and Dial Indicator Stud L-4438 at eight points around the drive side of the ring gear (2). The backlash should be 0.08-0.25 mm (0.003-0.010 in) with a preferred backlash of 0.13-0.18 mm (0.005-0.007 in).

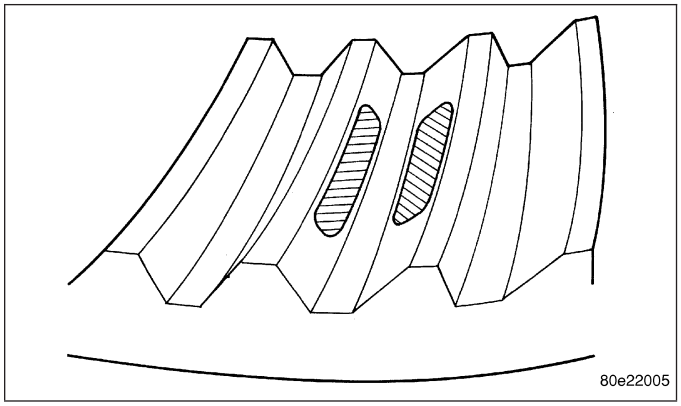


NOTE: Backlash measurement should not vary more than 0.05 mm (0.002 in) between measuring points. If measurement does vary inspect the gears for burrs, the differential case flange and ring gear mounting.

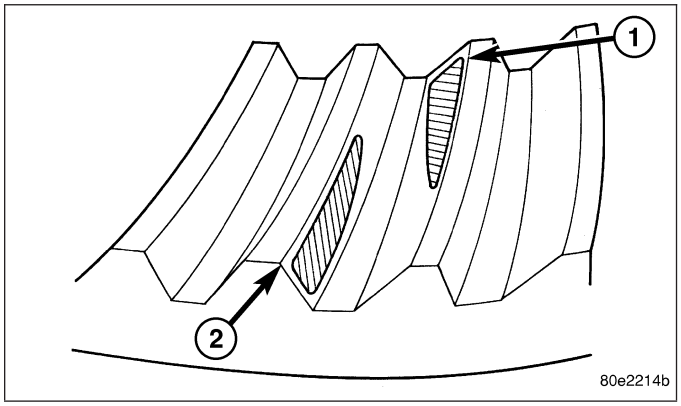
GEAR TOOTH CONTACT PATTERN

1. Wipe clean each tooth of the ring gear.
2. Apply gear marking compound to all of the ring gear teeth.
3. Verify bearing cap bolts are torque to specification.
4. Apply the brakes lightly to create a 14 N·m (10 ft. lbs.) pinion rotating torque.
5. Rotate the pinion/pinion yoke 4 full revolutions in each directions.
6. Read gear tooth contact pattern.

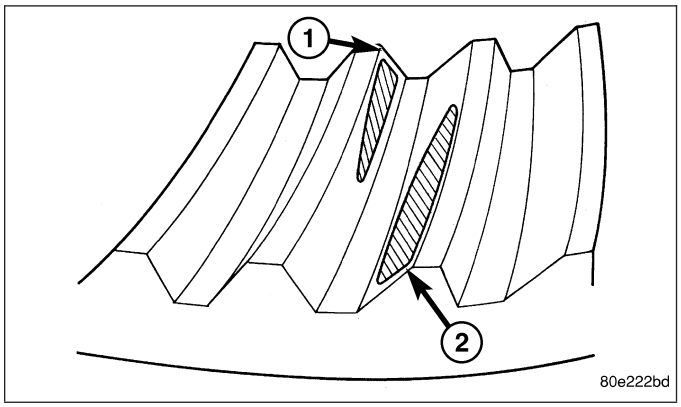
Gear contact pattern is correct. Backlash and pinion depth is correct.



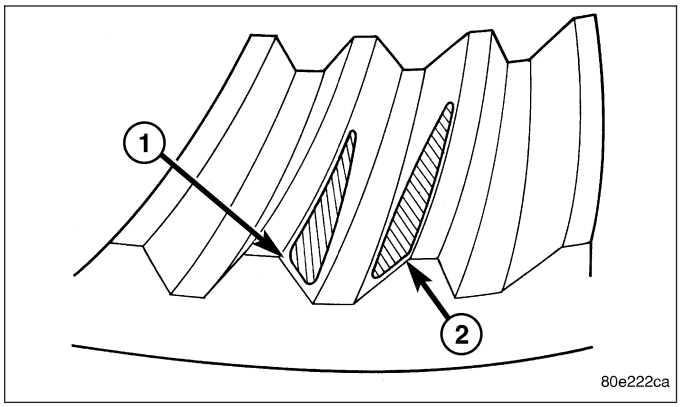
Ring gear too far away from pinion gear, coast side toe (1) and drive side heel (2). Decrease backlash, by moving the ring closer to the pinion gear using the adjusters.



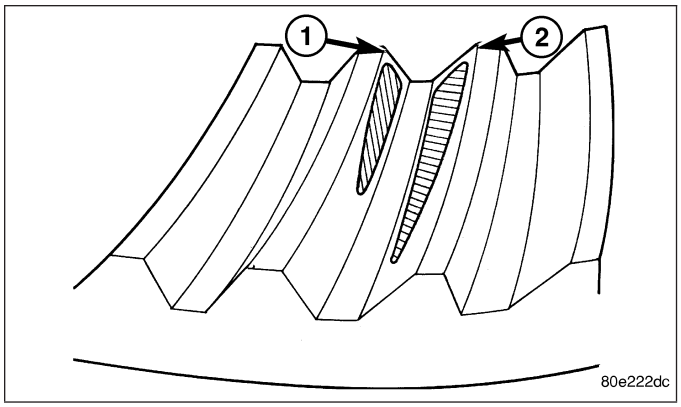
Ring gear too close to pinion gear, drive side toe (1) and coast side heel (2). Increase backlash, by moving the ring away from the pinion gear using the adjusters.



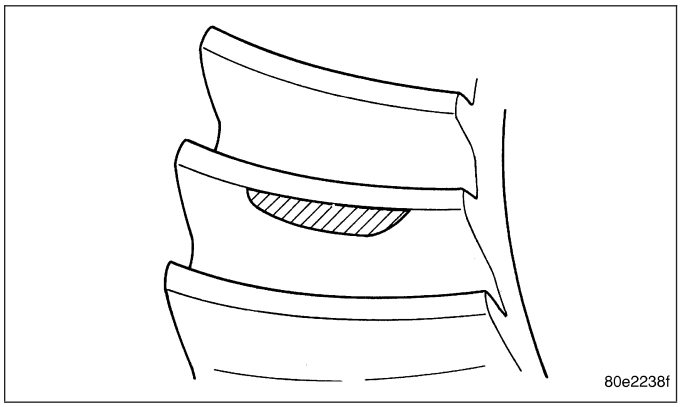
Ring gear too far away from pinion gear, drive side heel (1) and coast side heel (2). Decrease backlash, by moving the ring closer to the pinion gear using the adjusters.



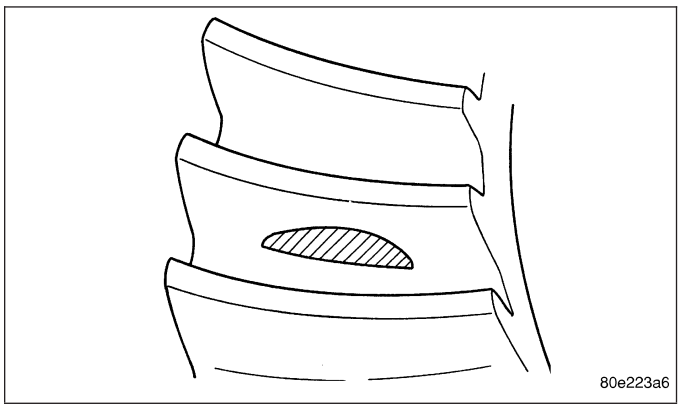
Ring gear too close to pinion gear, drive side toe (1) and coast side toe (2). Increase backlash, by moving the ring away from the pinion gear using the adjusters.



Pinion gear set too low. Increase pinion gear height, by increasing the pinion depth shim thickness.



Pinion gear set too high. Decrease pinion depth, by decreasing the pinion depth shim thickness.



SPECIFICATIONS

FRONT AXLE - 9 1/4 AA

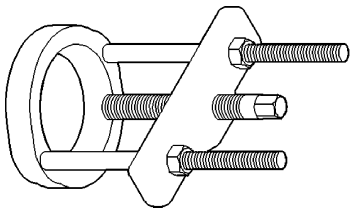
AXLE SPECIFICATIONS

DESCRIPTION	SPECIFICATION
Axle Ratio	3.73, 4.10, 4.56
Ring Gear Diameter	235 mm (9.25 in.)
Ring Gear Backlash	0.13-0.18 mm (0.005-0.007 in.)
Pinion Torque To Rotate - New Bearing	1.7-2.8 N·m (15-25 in. lbs.)
Pinion Torque To Rotate - Original Bearing	1.1-2.2 N·m (10-20 in. lbs.)
Total Torque To Rotate - New Bearing	3.4-5.6 N·m (30-50 in. lbs.)
Total Torque To Rotate - Original Bearing	2.8-5.1 N·m (25-45 in. lbs.)

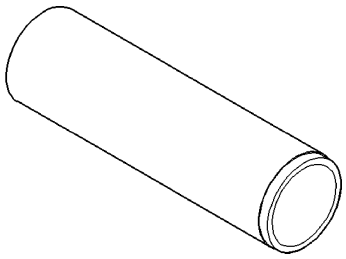
TORQUE SPECIFICATIONS

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Fill Hole Plug	32	24	-
Differential Cover Bolts	40	30	-
Bearing Cap Bolts	85	63	-
Ring Gear Bolts	140	103	-
Axle Nut	356	263	-
Pinion Shaft Lock Bolt	52	38	-
Adjuster Lock Bolt	25	18	-

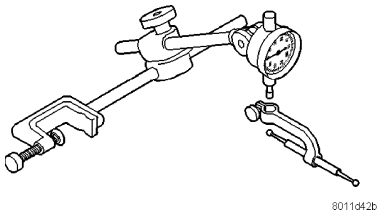
SPECIAL TOOLS



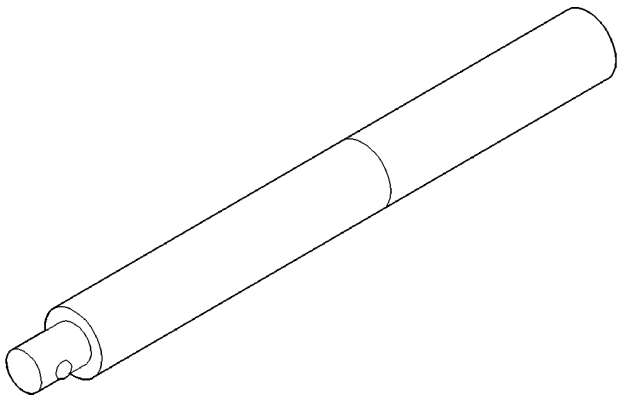
PULLER C-293-PA



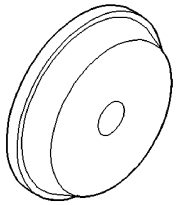
INSTALLER C-3095-A



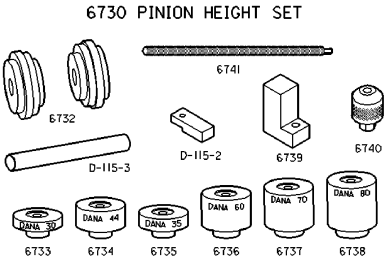
DIAL INDICATOR SET C-3339



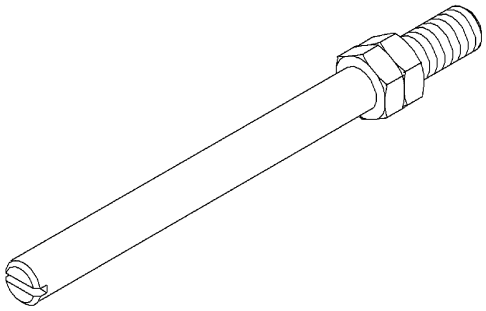
HANDLE C-4171



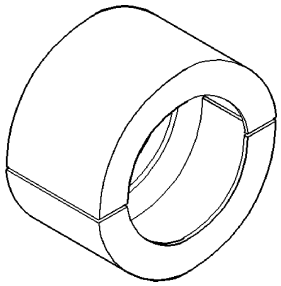
INSTALLER D-146



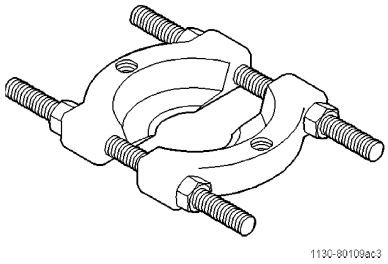
PINION DEPTH SET 6730



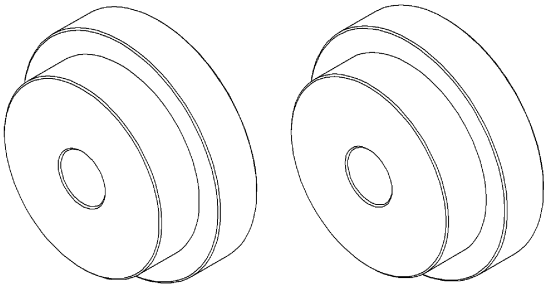
STUD L-4438



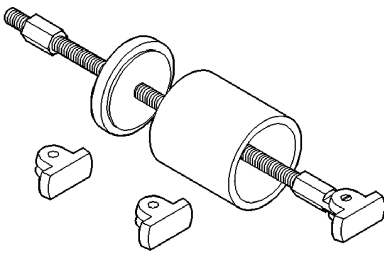
JAWS 8243



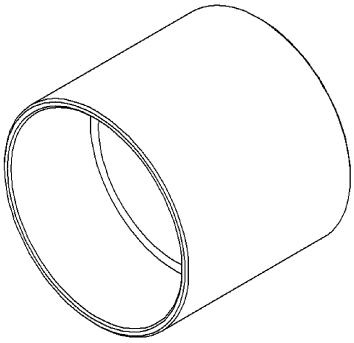
SPLITTER 1130



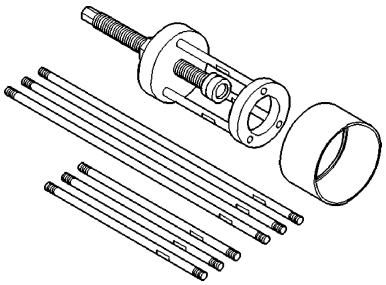
ARBOR DISCS 8289



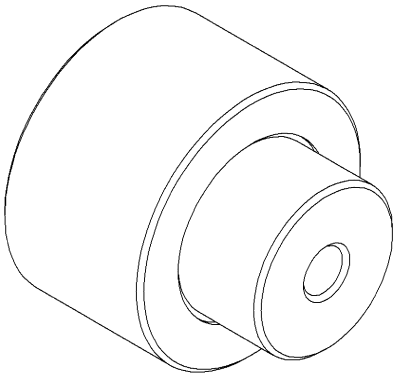
REMOVER 6310



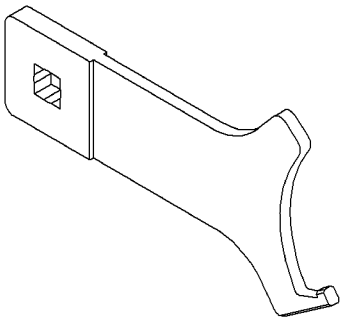
RECEIVER 8498



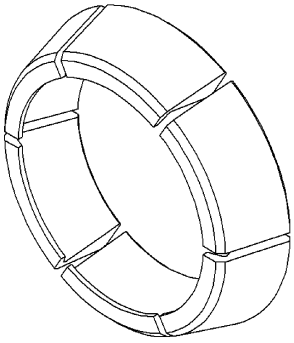
PULLER 6444



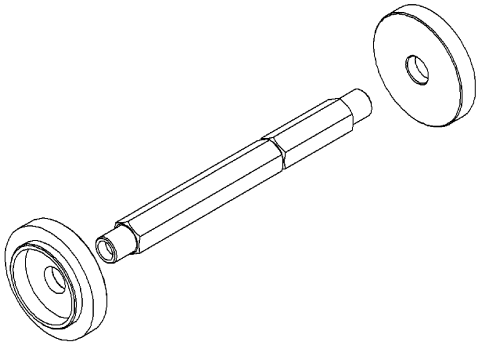
PINION BLOCK 8878



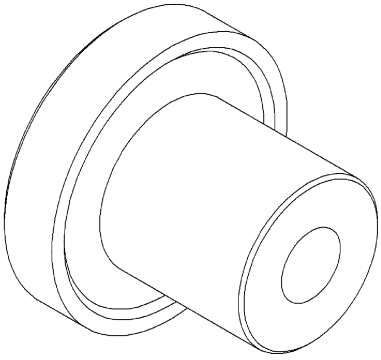
ADJUSTER WRENCH 8883



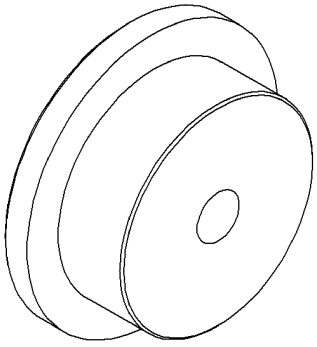
ADAPTERS 8879



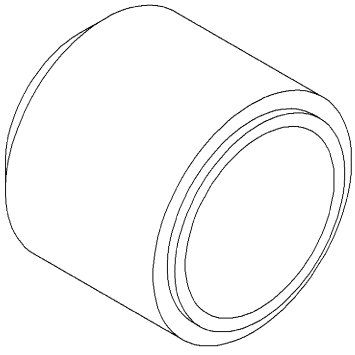
INSTALLER 8885



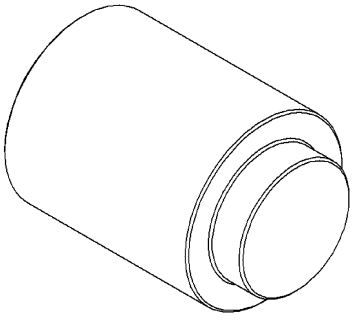
INSTALLER 8881



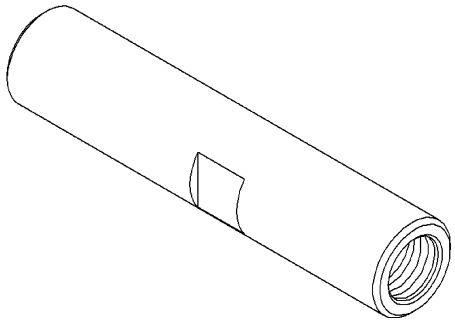
INSTALLER 8886



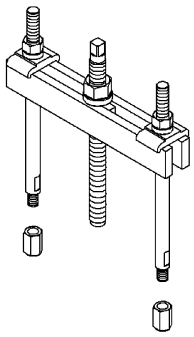
INSTALLER 8882



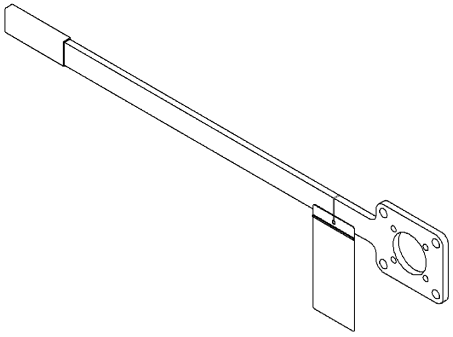
PLUG 8888



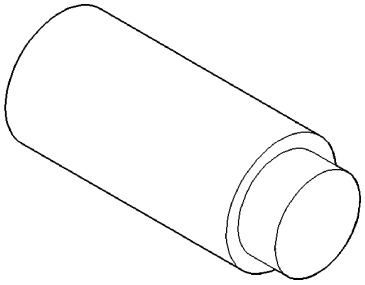
DRIVER 8976



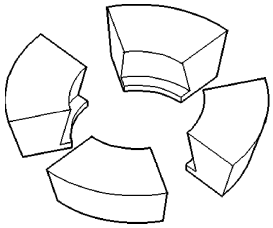
BRIDGE 938



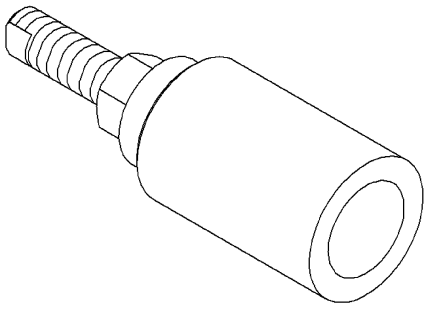
WRENCH 8979



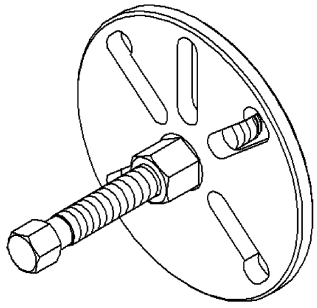
PLUG 9611



ADAPTERS 9613



INSTALLER 8982

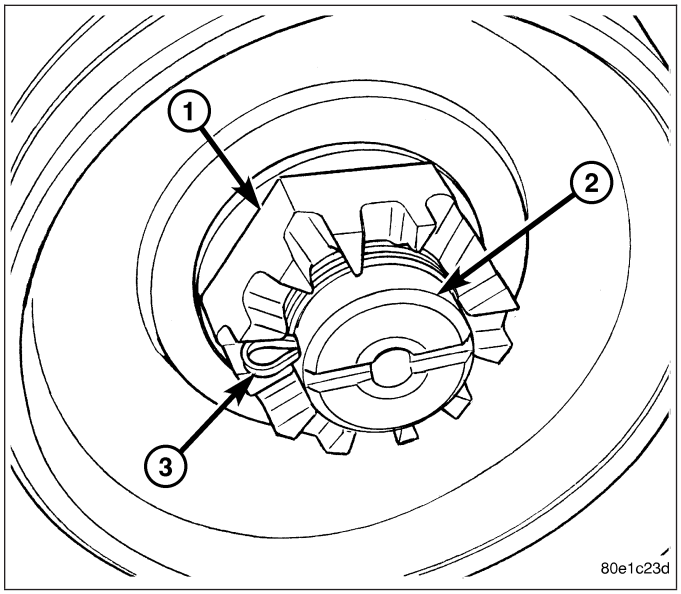


PULLER 8992

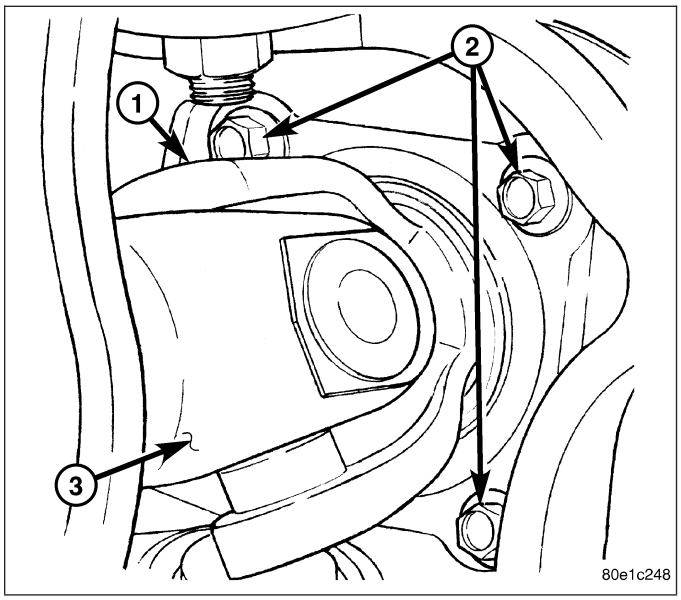
SHAFT-AXLE

REMOVAL

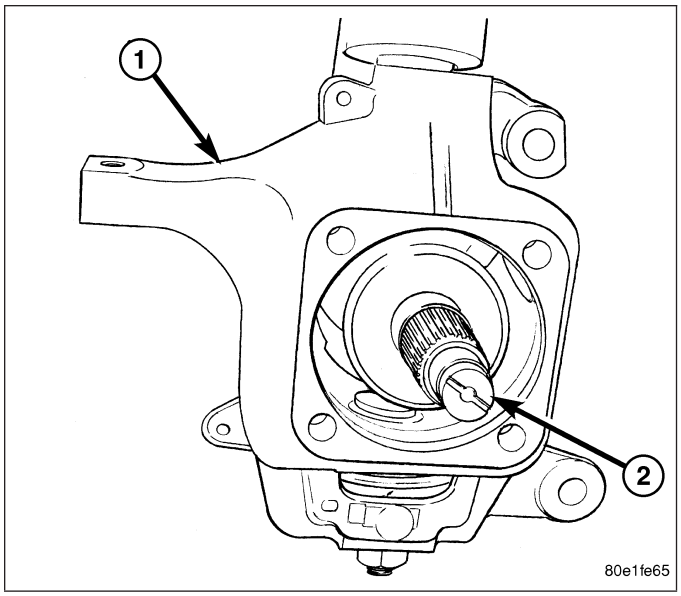
1. With the vehicle in neutral, position vehicle on hoist.
2. Remove brake caliper, rotor and ABS wheel speed sensor if equipped.
3. Remove axle shaft (2) cotter pin (3), hub nut (1) and washer.



4. Remove four hub bearing bolts (2) from the back of the steering knuckle.
5. Remove hub bearing from the steering knuckle.



6. Remove axle shaft (2) from steering knuckle (1) and axle housing.

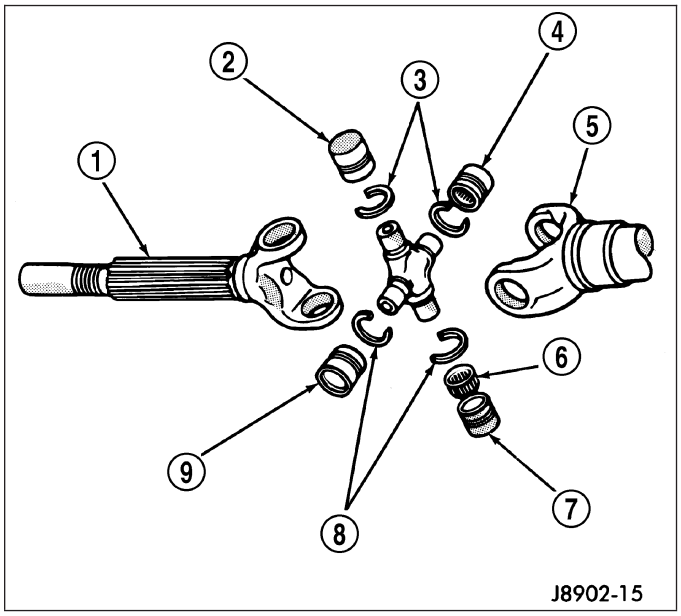


DISASSEMBLY

Single cardan U-joint components are not serviceable. If defective they must be replaced as a unit.

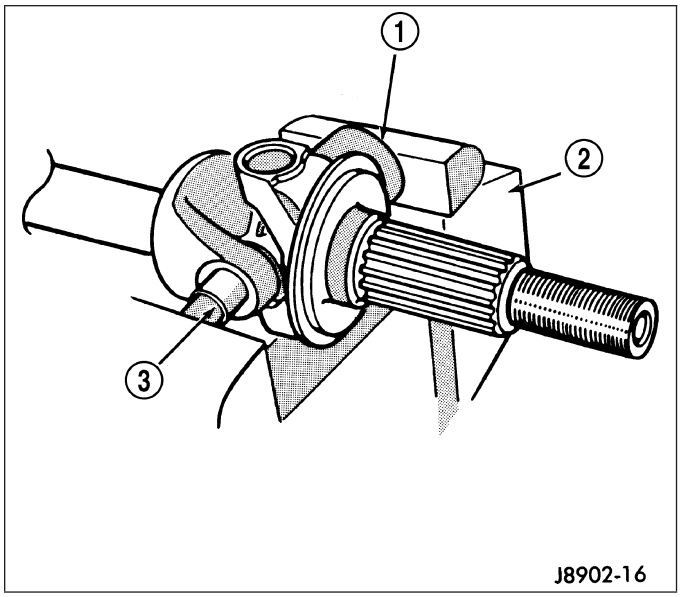
CAUTION: Clamp only the narrow forged portion of the yoke in the vise. Failure to follow these instructions will damage the yoke.

1. Remove the bearing cap (7) retaining snap rings (8).



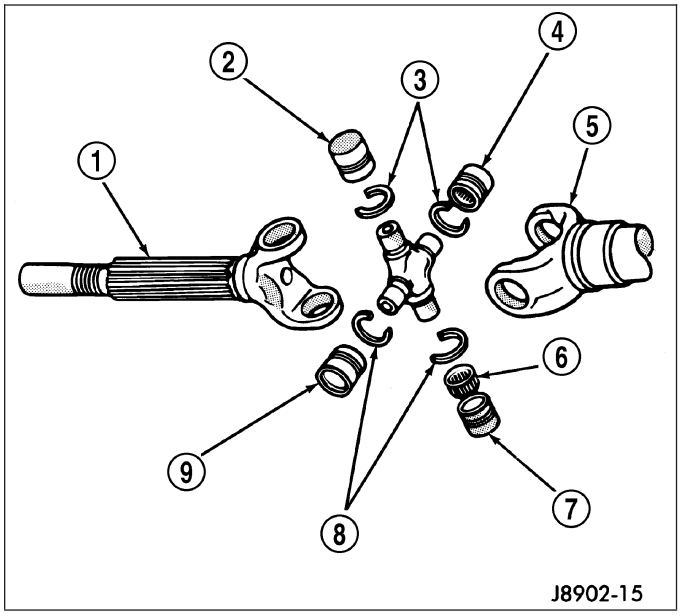
NOTE: Saturate the bearing caps with penetrating oil prior to removal.

2. Locate a socket (1) with an inside diameter that is larger than the bearing cap. Place the socket (receiver) against the yoke and around the perimeter of the bearing cap to be removed.
3. Locate a socket (3) with an outside diameter that is smaller than the bearing cap. Place the socket (driver) against the opposite bearing cap.
4. Position the yoke with the sockets in a vise (2).
5. Tighten the vise jaws to force the bearing cap into the larger socket (receiver).
6. Release the vise jaws. Remove the sockets and bearing cap that was partially forced out of the yoke.
7. Repeat the above procedure for the remaining bearing cap and remove spider from the propeller shaft yoke.



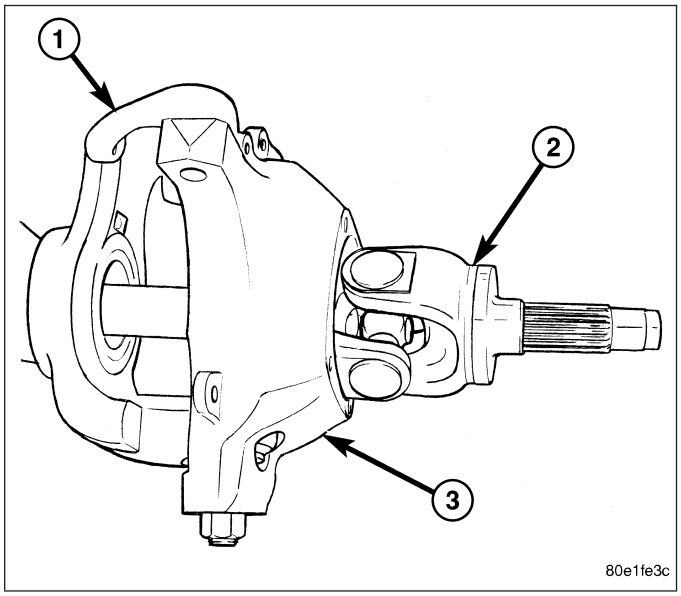
ASSEMBLY

1. Pack the bearing caps 1/3 full of wheel bearing lubricant. Apply extreme pressure (EP), lithium-base lubricant to aid in installation.
2. Position the spider in the yoke (1) (5). Insert the seals and bearings (2) (7). Tap the bearing caps into the yoke bores far enough to hold the spider in position.
3. Place the socket (driver) against one bearing cap. Position yoke with the socket in a vise.
4. Tighten vise to force the bearing caps into the yoke. Force the caps enough to install the retaining clips.
5. Install the bearing cap retaining clips (3) (8).
6. Install axle shaft.

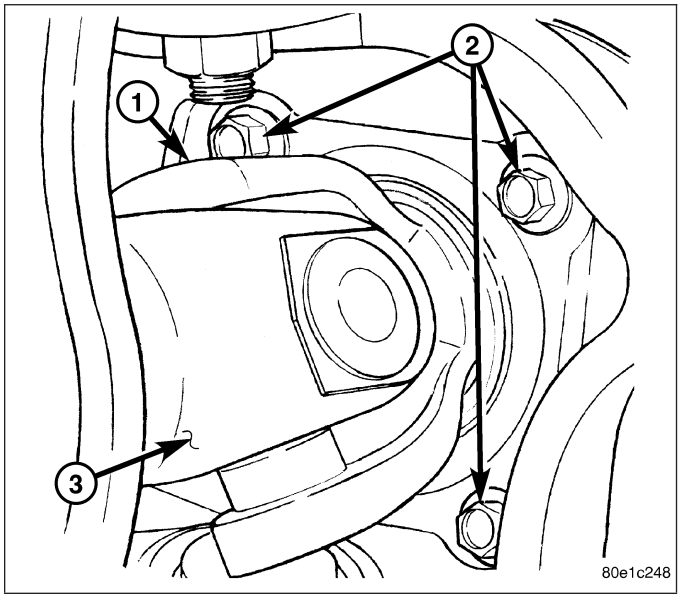


INSTALLATION

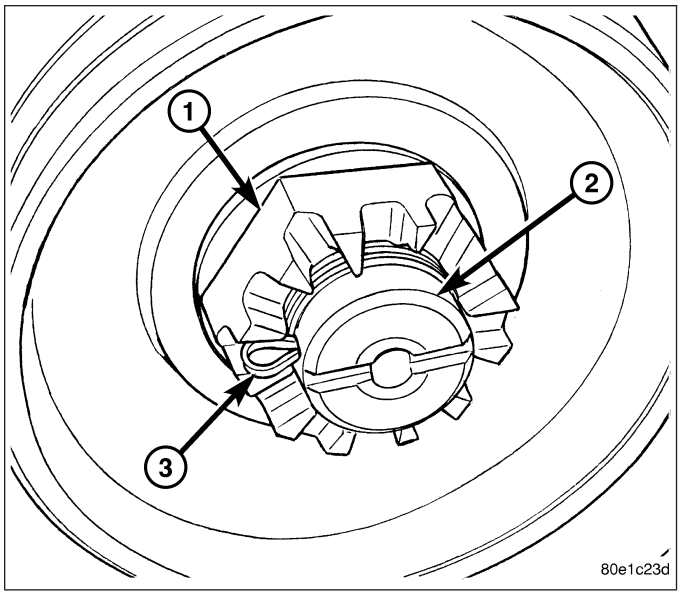
1. Clean axle shaft and apply a thin film of gease to the shaft splines and hub bore.
2. Install axle shaft (2) through the steering knuckle (3) and into the differential side gears.



3. Install hub bearing in the knuckle.
4. Install hub bearing bolts (2) and tighten to 202 N·m (149 ft. lbs.).



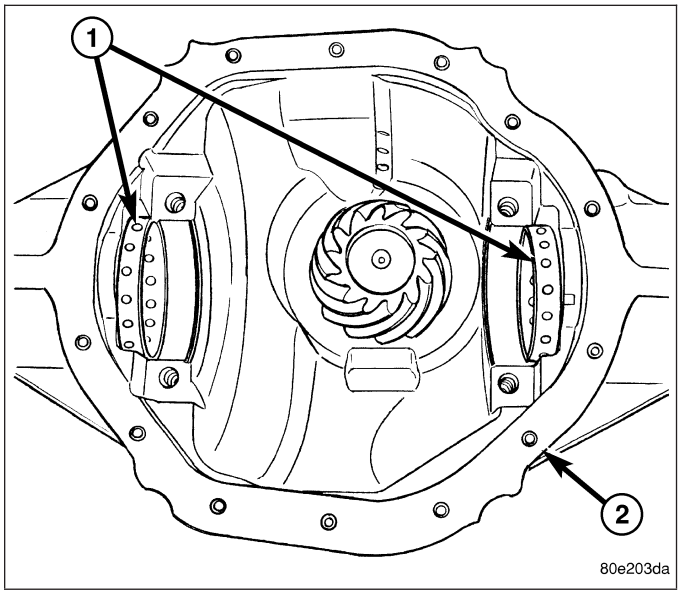
5. Install ABS wheel speed sensor, brake rotor and caliper.
6. Install axle (2) washer and nut (1). Tighten axle nut to 179 N·m (132 ft. lbs.).
7. Rotate axle several 5 to 10 times to seat the wheel bearing.
8. Tighten axle nut (1) to final torque of 356 N·m (263 ft. lbs.).
9. Align nut to next cotter pin hole and install new cotter pin (3).



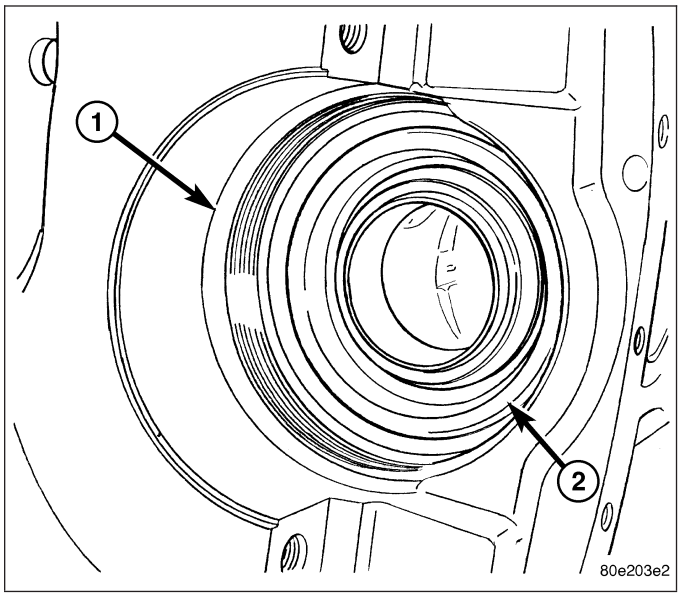
SEAL-AXLE SHAFT

REMOVAL

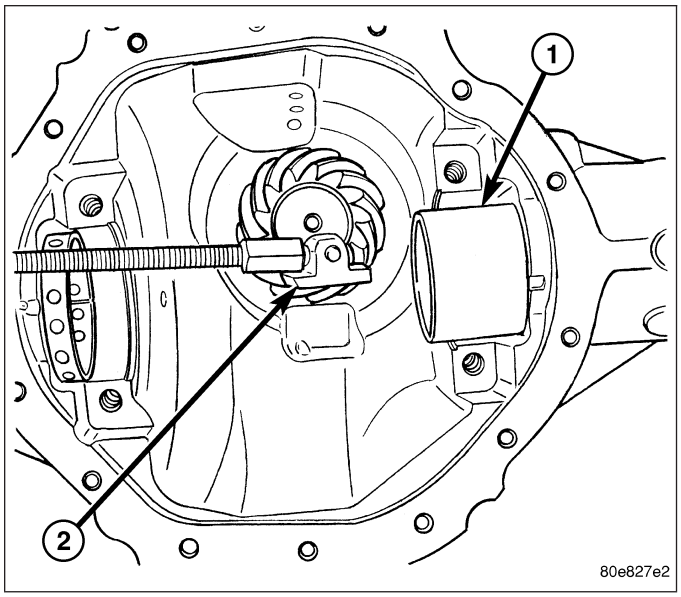
1. Remove hub bearings and axle shafts.
2. Remove differential from differential housing (2).
3. Remove differential bearing adjusters (1).



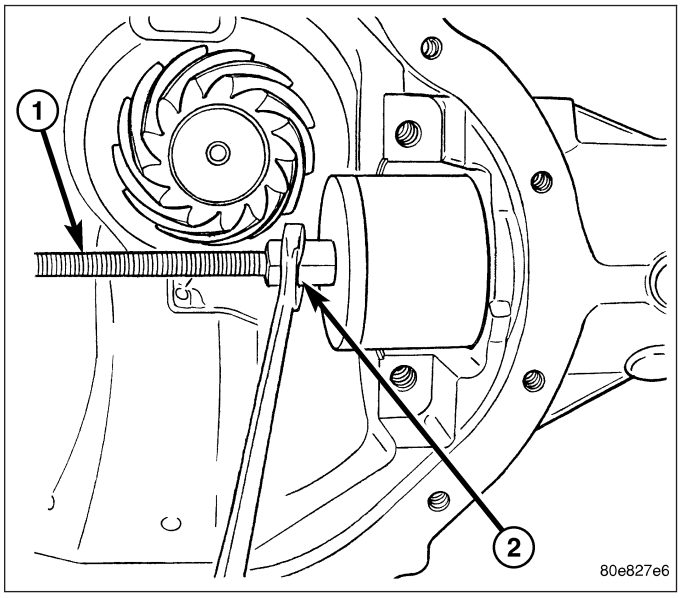
4. Remove axle seals (2) located behind adjusters with Receiver 8498 and Extractor 6310.



5. Install Receiver 8498 (1) into the adjuster bore.
6. Install Extractor Rod 6310 with Extractor Foot 6310-9 (2) through the receiver and axle seal.



7. Install Extractor Plate 6310-2 and Nut 6310-7 (2) on the extractor rod (1).
8. Tighten nut (2) on extractor rod (1) to pull seal into the receiver.

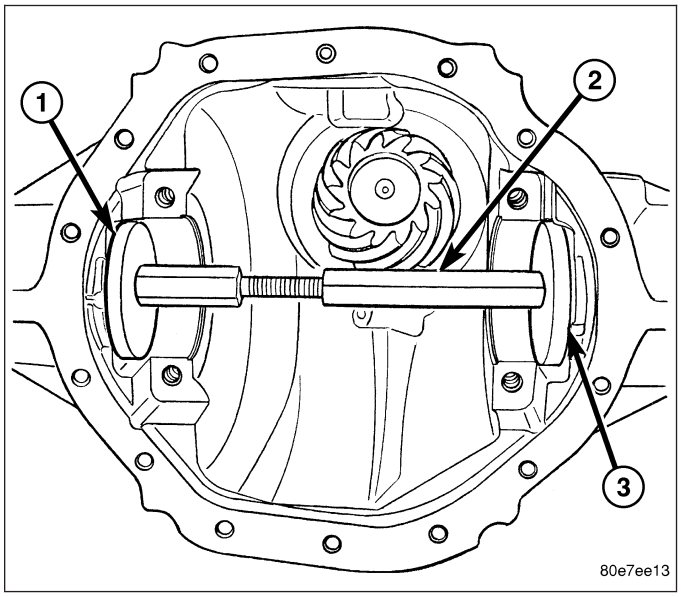


INSTALLATION

1. Install axle seal on Installer Cups 8885-2 (1) (3) and position cups with seals into the housing.

NOTE: Seals are installed with the axle guide facing outward.

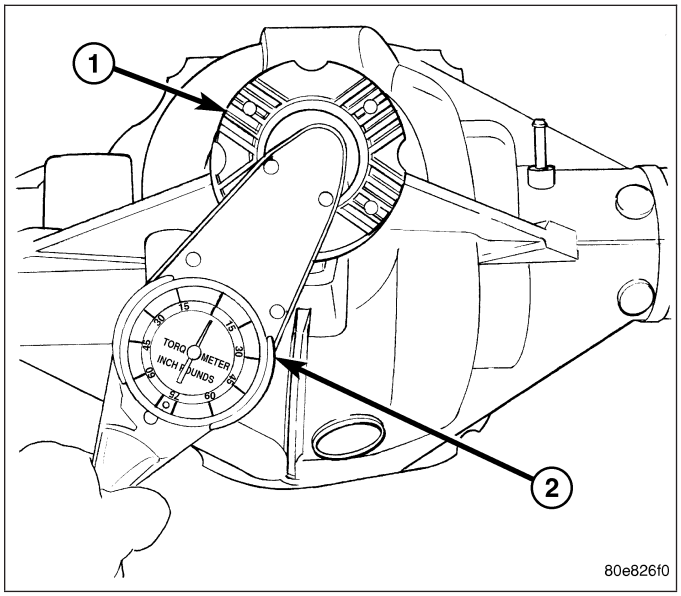
2. Install Turnbuckle 8885-1(2) into installer cups and expand the turnbuckle until the seals bottom out in the housing.
3. Install differential in housing.
4. Install axle shaft and hub bearings.



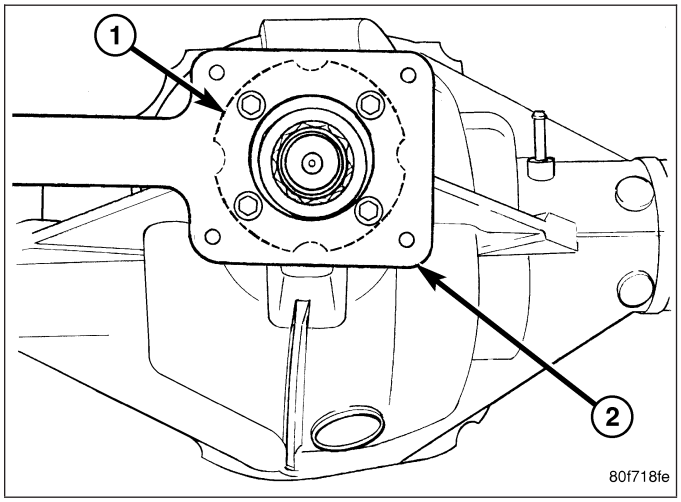
SEAL-PINION

REMOVAL

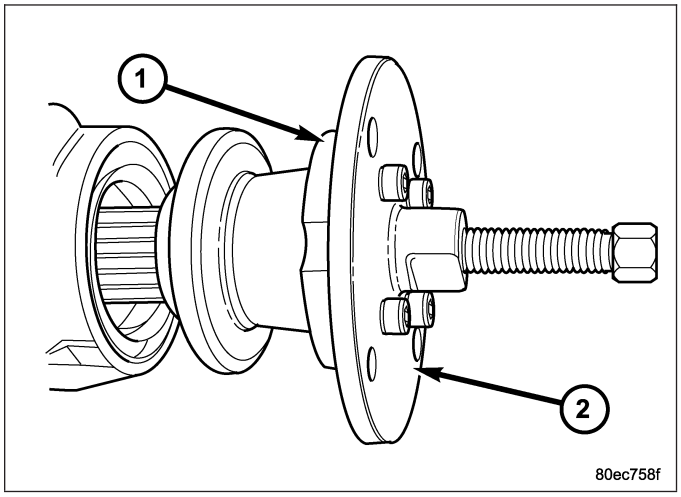
1. Mark propeller shaft and pinion flange (1) for installation reference.
2. Remove propeller shaft.
3. Remove hub bearings and axle shafts.
4. Rotate pinion gear three or four times.
5. Measure and record torque to rotate the pinion gear with an inch pound torque wrench (2).



6. Hold pinion flange (1) with Flange Wrench 8979 (2) and remove pinion flange nut and washer.

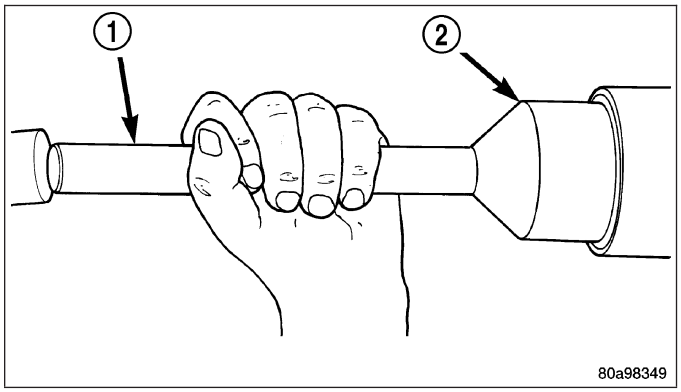


7. Remove pinion flange (1) with Pinion Flange Puller 8992 (2).
8. Remove pinion shaft seal with a seal puller or slide hammer mounted screw.

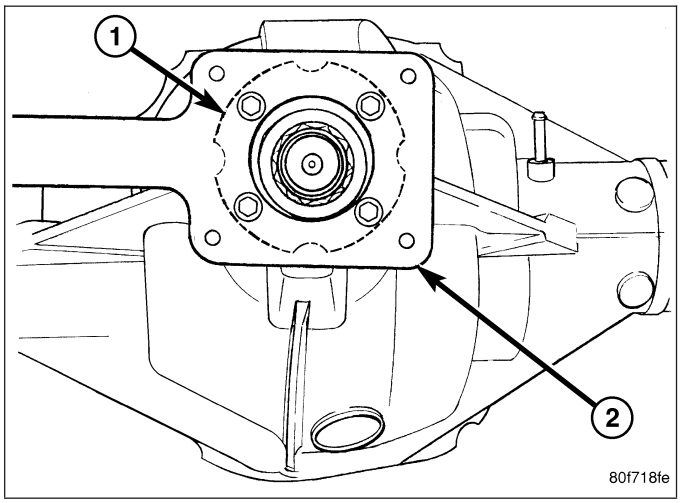


INSTALLATION

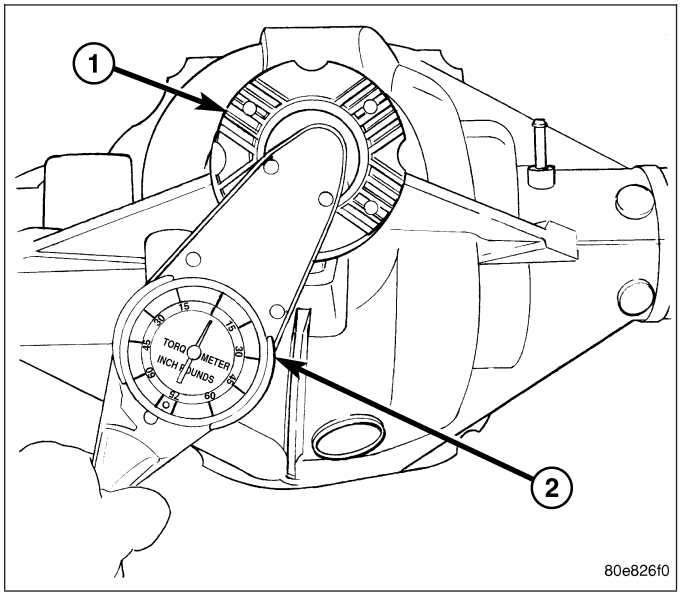
1. Install **new** pinion seal with Installer 8882 (2) and Handle C-4171 (1).
2. Apply a light coat of teflon thread sealant, to pinion flange splines.



3. Lightly tap pinion flange onto the pinion, until a few threads are showing.
4. Install flange washer and **new** pinion nut.
5. Hold flange (1) with Flange Wrench 8979 (2) and tighten pinion nut until pinion end play is taken up.



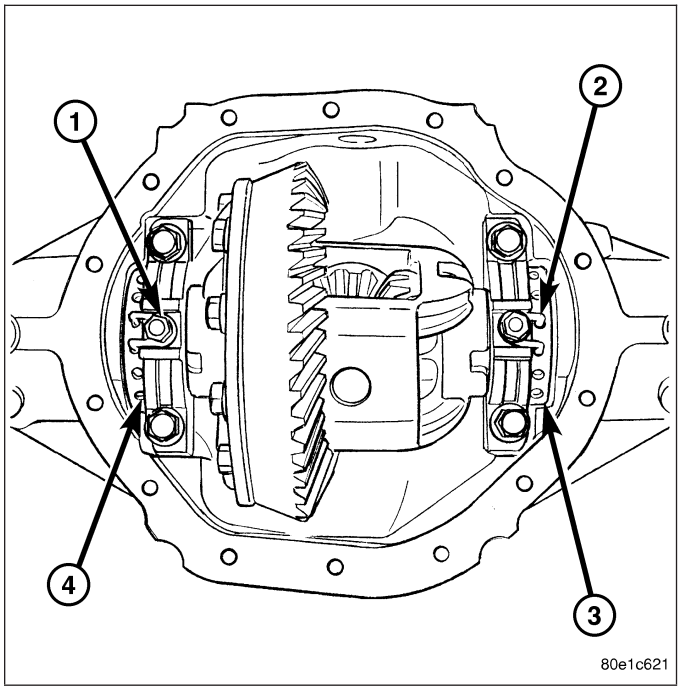
6. Rotate pinion flange (1) several times to seat bearings.
7. Measure pinion Torque To Rotate inch pound torque wrench (2) and compare it to recorded measurement. Tighten pinion nut in small increments, until pinion Torque To Rotate is 0.40-0.57 N·m (3-5 in. lbs.) greater than recorded measurement.
8. Rotate pinion several times then verify pinion Torque To Rotate again.
9. Install axle shafts and hub bearings.
10. Install propeller shaft with reference marks aligned.



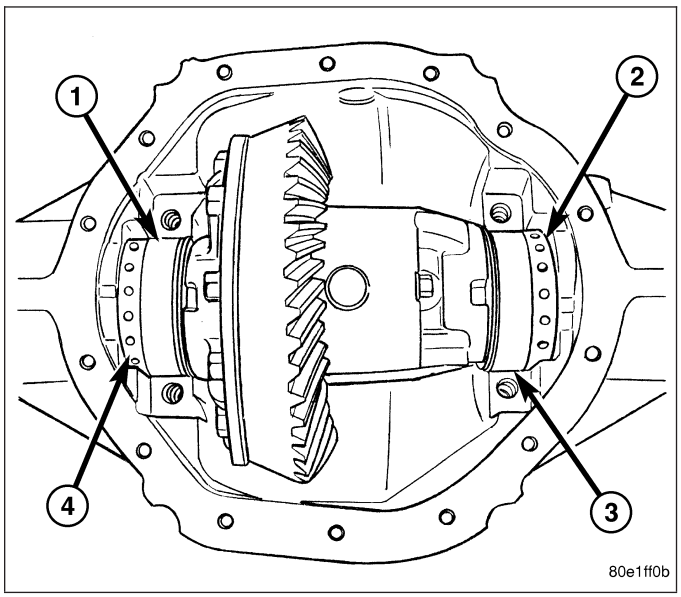
DIFFERENTIAL

REMOVAL

1. Remove differential housing cover and drain lubricant from the housing.
2. Remove hub bearings and axle shafts.
3. Remove adjuster lock bolts (1) and adjuster locks (2).
4. Mark bearing caps (4) left and right for installation reference.
5. Remove bearing cap bolts and remove bearing caps.

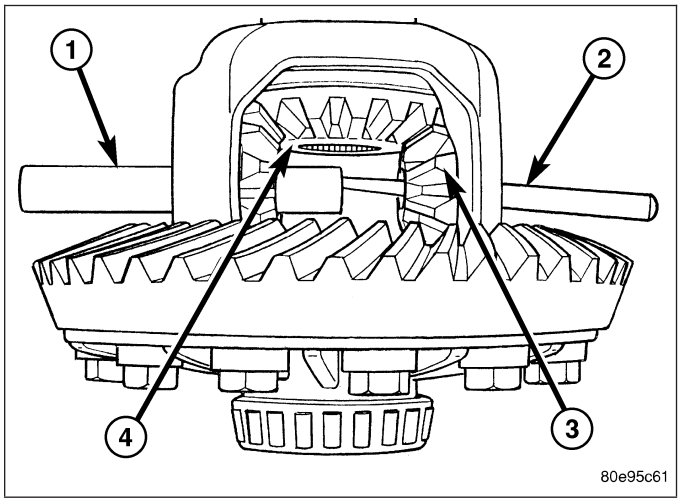


6. Loosen differential bearing adjusters (2) (4) with Wrench 8883.
7. Remove differential case from the housing.
8. Remove bearing cups (1) (3) and tag them left and right for installation reference.

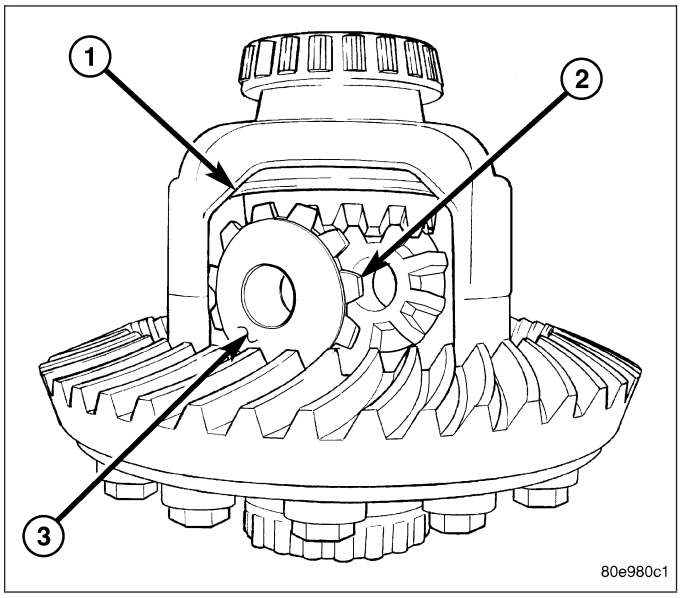


DISASSEMBLY

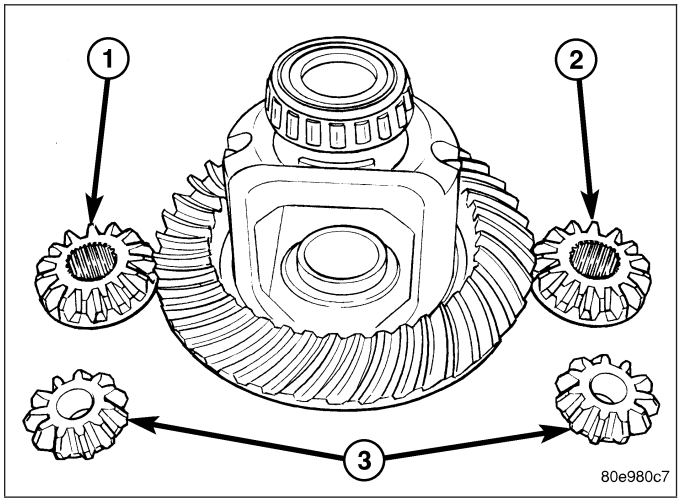
1. Remove pinion shaft lock bolt.
2. Remove pinion shaft (1) from pinion gears (3) with a punch (2).



3. Rotate differential pinion gears (2) to differential window (1) and remove pinion gears and thrust washers (3).



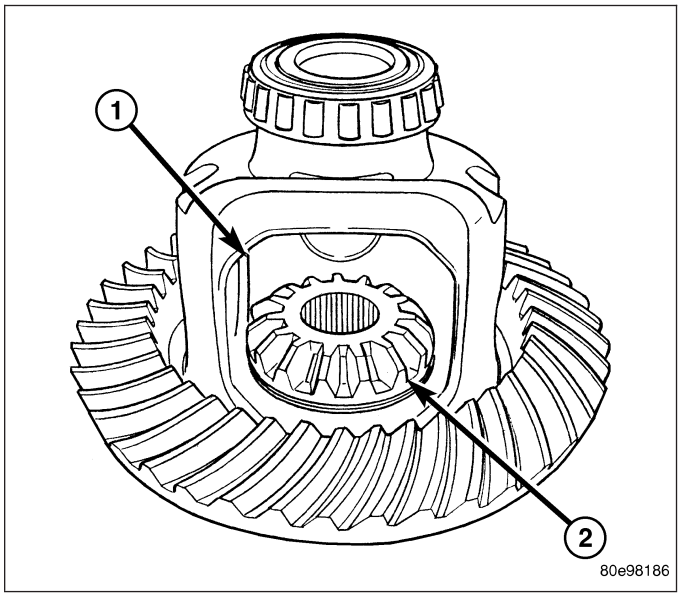
4. Remove differential side gears (1) (2) and thrust washers.



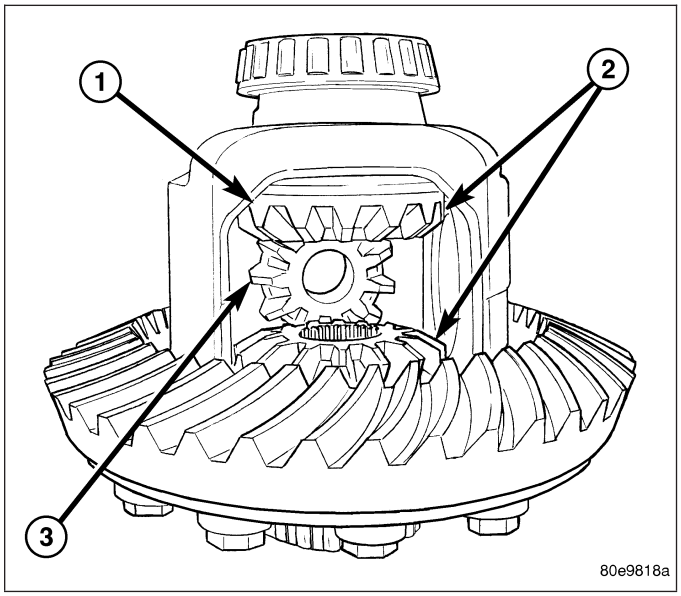
ASSEMBLY

NOTE: If same gears and thrust washers are being used, install them into original locations.

1. Lubricate all differential components with axle lubricant.
2. Install differential side gears (2) and thrust washers.



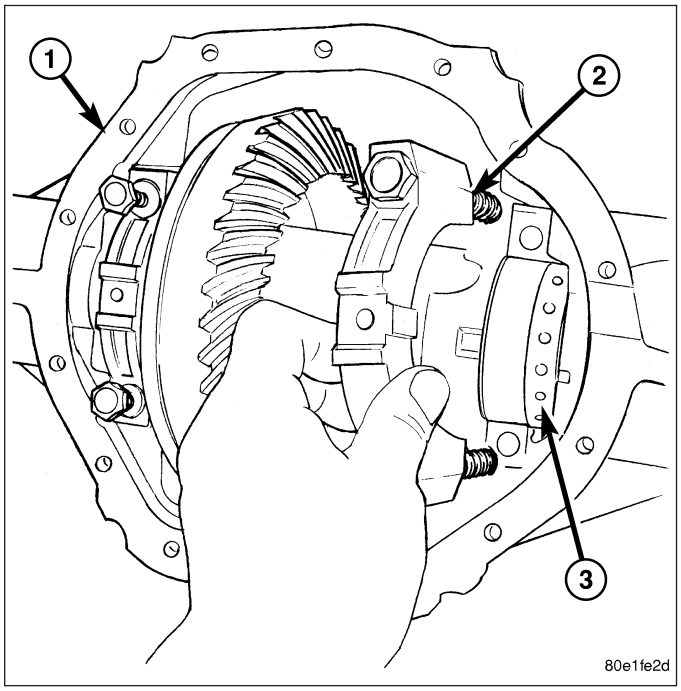
3. Rotate one pinion gear (3) with thrust washer into the differential case. Then rotate the other pinion gear with thrust washer into the differential case.
4. Align hole in the pinion gears with hole in the differential case.
5. Install pinion shaft.
6. Install **new** pinion shaft lock bolt and tighten to 52 N·m (38 ft. lbs.).



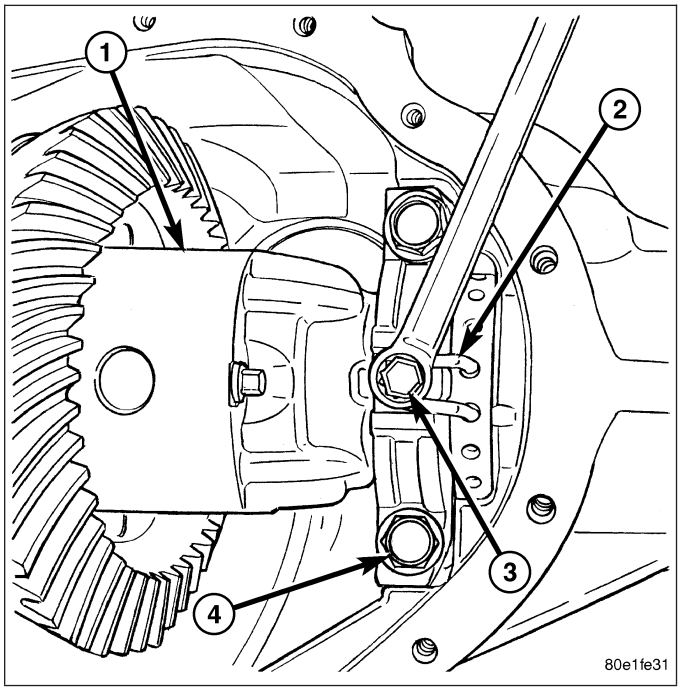
INSTALLATION

1. Clean the housing cavity with a flushing oil, light engine oil or lint free cloth.
2. Lubricate differential case bearing.
3. Install differential case with bearings cups into the housing (1).
4. Install bearing caps (2) and bolts. Tighten the bearing cap bolts finger-tight.

NOTE: Do not torque bearing cap and bolts at this time.



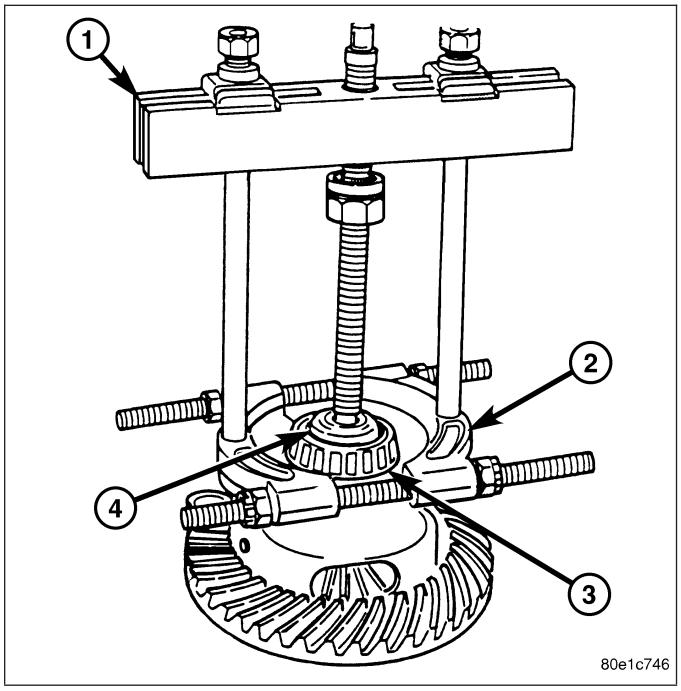
5. Slide differential case toward the pinion gear until the gears make contact/zero backlash. If zero backlash cannot be obtained, turn the pinion side adjuster until zero backlash is obtained.
6. Holding the differential case toward the pinion gear, turn bearing adjusters with Wrench 8883 until they make contact with the differential bearings/cups.
7. Back off the ring gear side adjuster 4 holes, to obtain initial ring gear backlash.
8. Install ring gear side adjuster lock and bolt. Do not tighten adjuster lock bolt at this time.
9. Tighten pinion gear side adjuster firmly against the differential case bearing cup.
10. Rotate the pinion several times to seat the differential bearings.
11. Loosen pinion gear side adjuster until it is no longer in contact with the bearing cup.
12. Tighten pinion gear side adjuster until it just makes contact with the bearing cup.
13. Tighten pinion gear side adjuster an additional:
    - **New Bearings:** 6 Adjuster Holes
    - **Original Bearings:** 4 Adjuster Holes
14. Install pinion gear side adjuster lock and bolt. Do not tighten adjuster lock bolt at this time.
15. Tighten bearing cap bolts (4) to 85 N·m (63 ft. lbs.).
16. Tighten adjuster lock bolts (3) to 25 N·m (18 ft. lbs.).
17. Measure ring gear backlash and check gear tooth contact pattern. Refer to Adjustments for procedure.
18. Install axle shafts and hub bearings.
19. Install differential housing gasket and cover. Tighten cover bolts to 40 N·m (30 ft. lbs.).
20. Fill differential with lubricant.
21. Install fill plug and tighten to 32 N·m (24 ft. lbs.).



BEARING-DIFFERENTIAL CASE

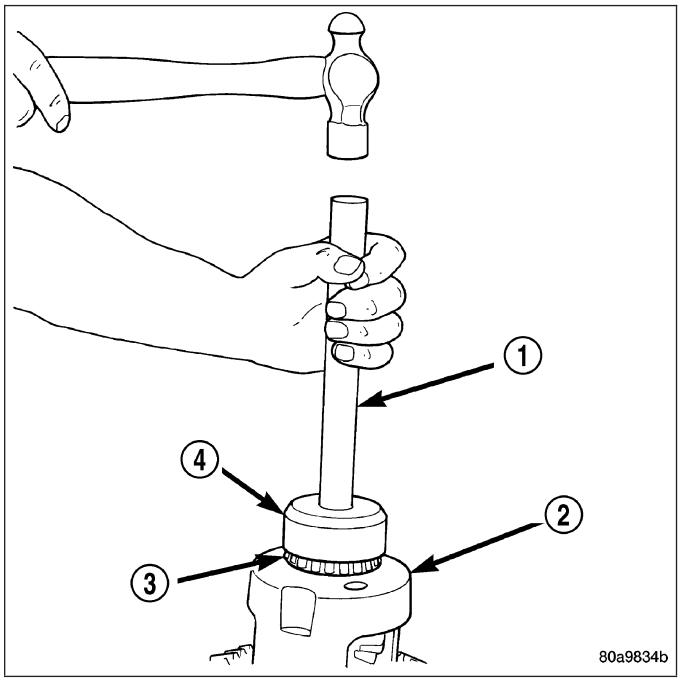
REMOVAL

1. Remove the differential case from the housing.
2. Install Plug 8888 (4) into the end of the case.
3. Remove differential case bearings (3) with Bearing Splitter 1130 (2) and Bridge 938 (1).



INSTALLATION

1. Set differential case (2) on Plug 8888.
2. Install differential case bearings (3) with Installer 8881 (4) and Handle C-4171 (1).
3. Install differential case into housing.



DIFFERENTIAL-ELECTRIC LOCKER

DESCRIPTION

The electric locker differential has an electromagnetic coil on the ring gear side of the differential. When the coil is energized a dog clutch is engaged in the differential case which locks both axles. A magnetic target sensor mounted on the bearing cap is used to indicate the system has been activated.

DIAGNOSIS AND TESTING

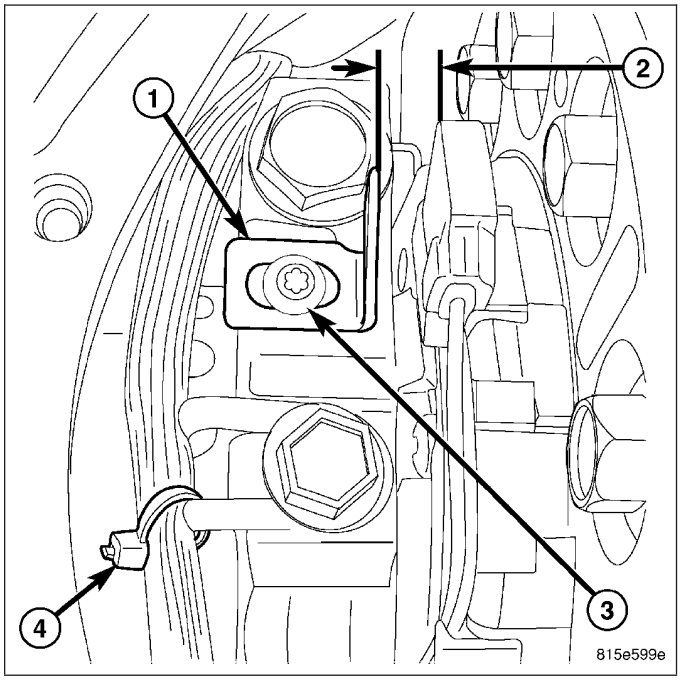
DIFFERENTIAL-ELECTRIC LOCKER

1. Lift one front wheel of the ground.
2. Turn key to the on position.
3. Place vehicle in drive/first gear and transfer case in LOW LOCK.
4. Activate locker switch.
5. Manually rotate the wheel that is off the ground. The wheel should lock once the dog clutch is aligned.
6. Turn off locker switch.
7. Manually rotate the wheel that is off the ground. The wheel should turn.

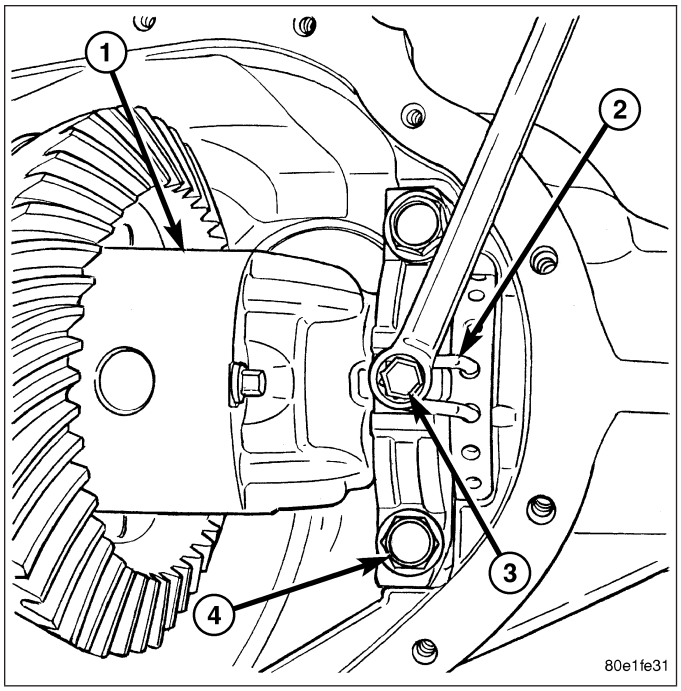
NOTE: Only the locker actuator with sensor is serviced. Internal differential components are serviced as a differential case assembly.

REMOVAL

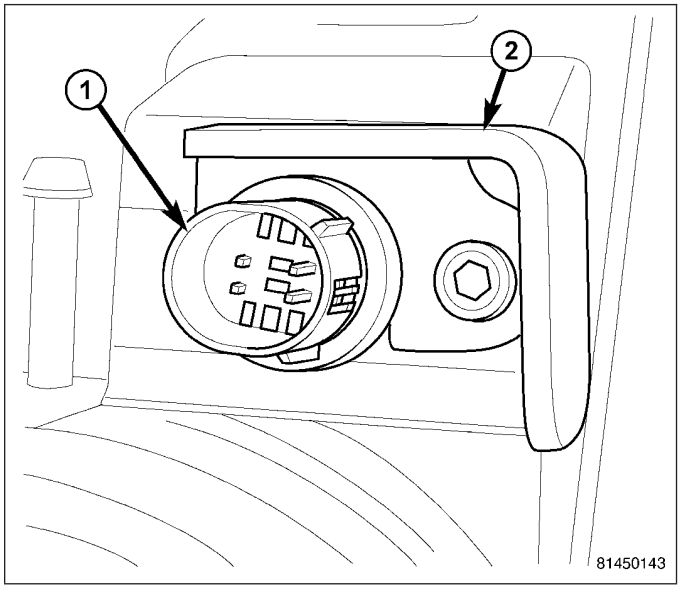
1. Remove differential housing cover and drain lubricant from the housing.
2. Remove hub bearings and axle shafts.
3. Cut sensor wire tie strap (4) from aduster lock.
4. Remove sensor target magnet (1) from bearing cap.



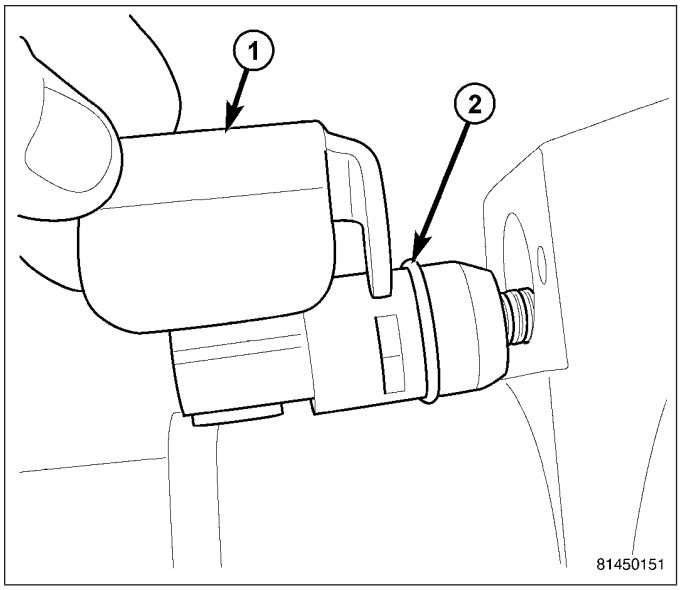
5. Remove adjuster lock bolts (3) and adjuster locks (2).



6. Remove electric locker connector (1) retainer (2) bolt from differential housing.



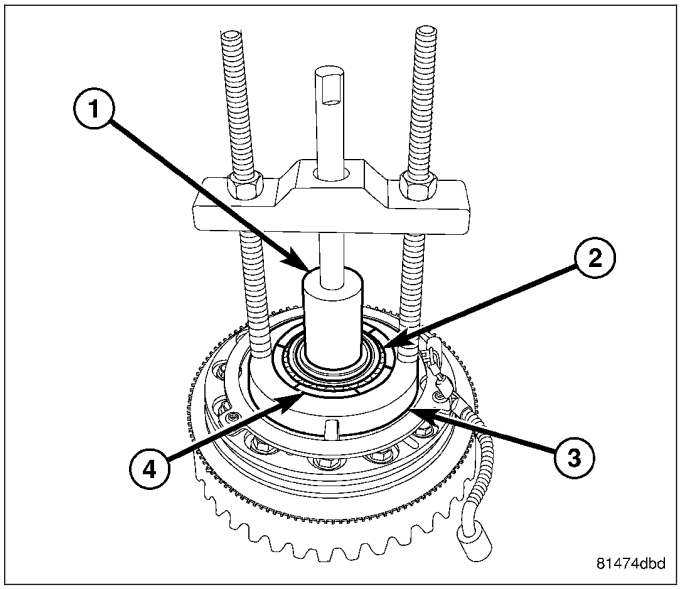
7. Remove retainer (1) and connector (2) from differential housing.
8. Remove retainer (1) from connector (2) and remove o-ring (3) from connector.
9. Mark bearing caps left and right for installation reference.
10. Loosen bearing cap bolts and loosen adjusters with Wrench 8883.
11. Remove bearing cap bolts and bearing caps.
12. Slid electric locker connector through differential housing.
13. Remove differential case and bearing cups from the housing.
14. Tag bearing cups left and right for installation reference.



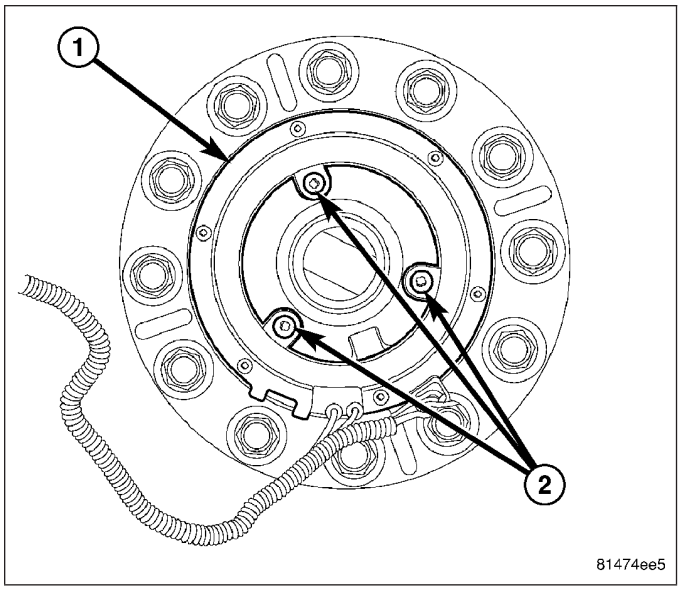
DISASSEMBLY

NOTE: Internal differential components are serviced with the case.

1. Bend anti-rotation tabs outward.
2. Install Plug 9611(1) into coil side of the case.
3. Remove differential case bearing (2) with Puller C-293-PA (3) and Adapters 9613 (4).



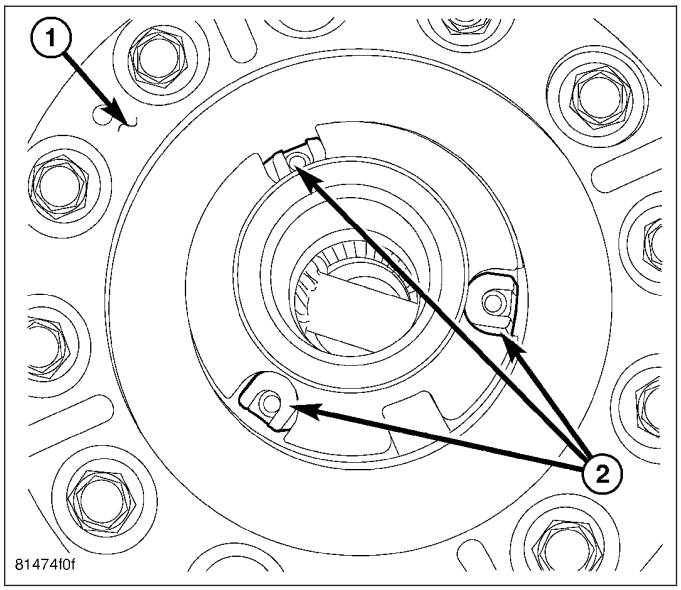
4. Remove coil (1) mounting bolts (2).
5. Remove coil (1) with harness.



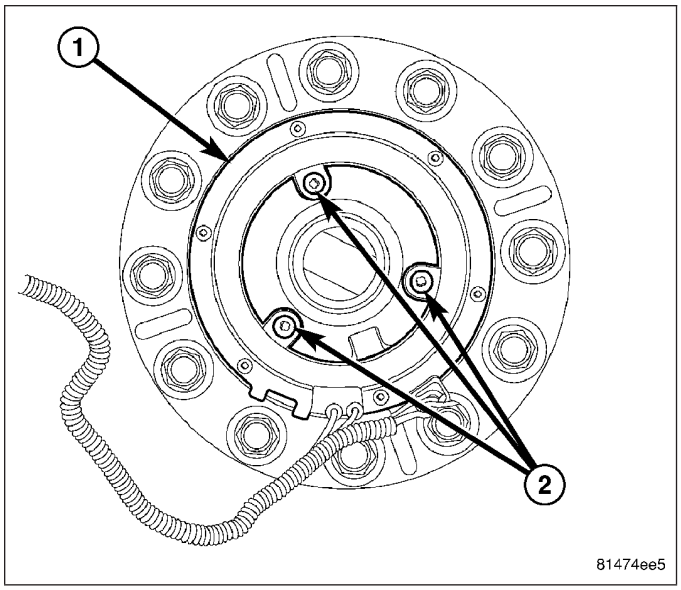
ASSEMBLY

NOTE: Internal differential components are serviced with the case.

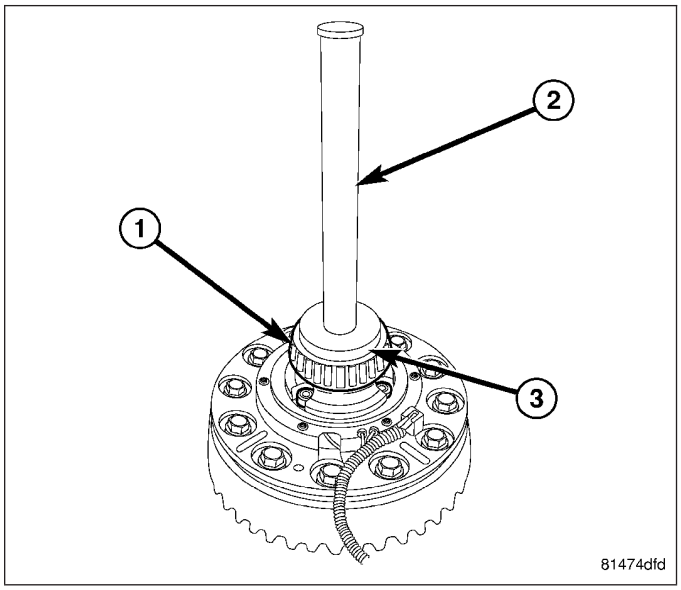
1. Position locker coil on differential case (1) mounting location (2).



2. Clean coil bolts and apply Mopar® Lock & Seal adhesive to the threads.
3. Install coil (1) and bolts (2).

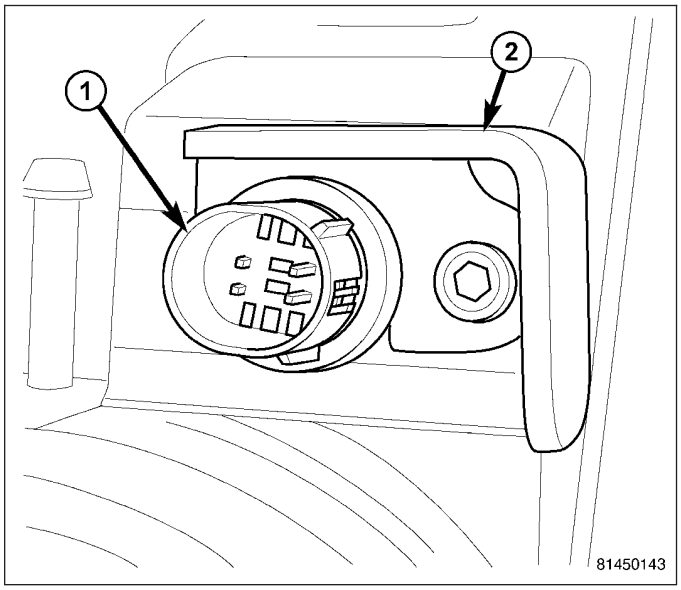


4. Install differential case bearing (1) with Handle C-4171 (2) and Installer 9612 (3).



INSTALLATION

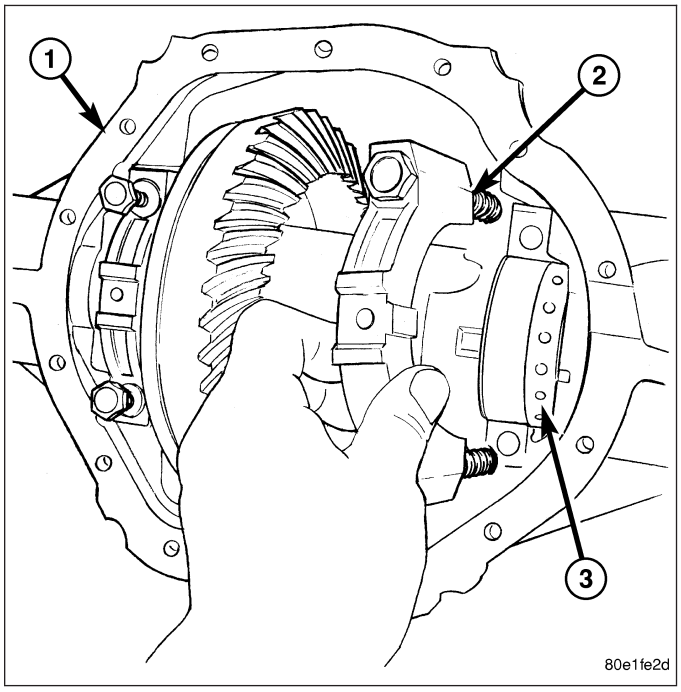
1. Clean the housing cavity with a flushing oil, light engine oil or lint free cloth.
2. Lubricate differential case bearing.
3. Install differential case with bearings cups into the housing.
4. Slide electric locker connector through differential housing.
5. Install O-ring on electric locker connector.
6. Install electric locker connector (1) with retainer (2) in differential housing.
7. Install connector retainer and bolt.



8. Install bearing caps (2) and tighten bearing cap bolts finger-tight.

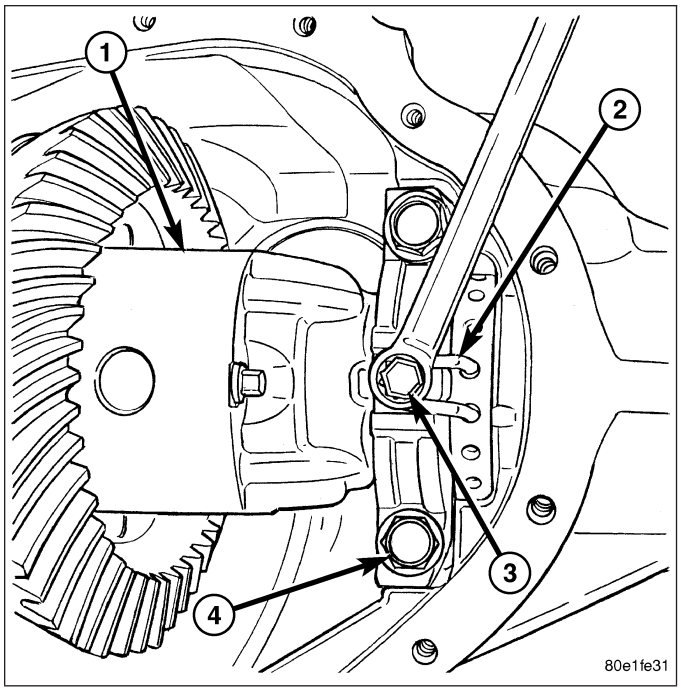
NOTE: Do not torque bearing cap and bolts at this time.

9. Slide differential case toward the pinion gear until the gears make contact/zero backlash. If zero backlash cannot be obtained, turn the pinion side adjuster until zero backlash is obtained.
10. Holding the differential case toward the pinion gear, turn bearing adjusters with Wrench 8883 until they make contact with the differential bearings/cups.
11. Back off the ring gear side adjuster 4 holes, to obtain initial ring gear backlash.
12. Install ring gear side adjuster lock and bolt. Do not tighten adjuster lock bolt at this time.
13. Tighten pinion gear side adjuster firmly against the differential case bearing cup.
14. Rotate the pinion several times to seat the differential bearings.

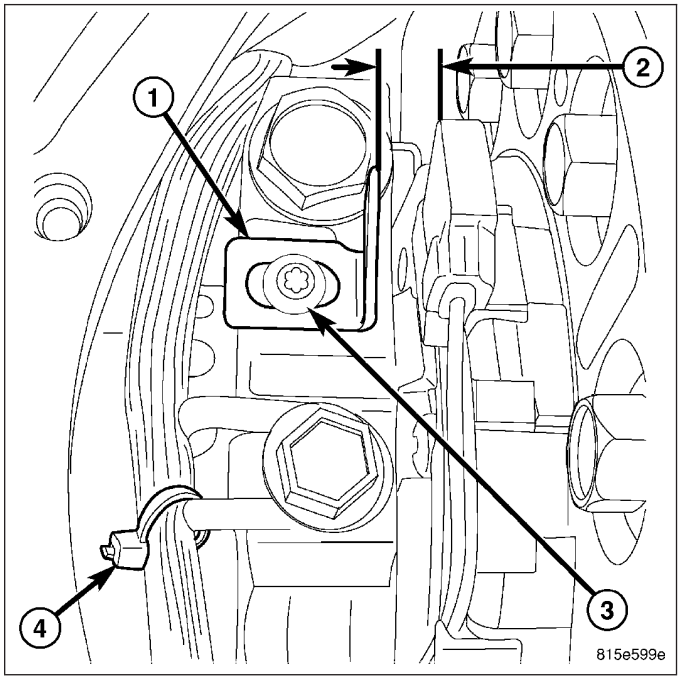


15. Loosen pinion gear side adjuster until it is no longer in contact with the bearing cup.
16. Tighten pinion gear side adjuster until it just makes contact with the bearing cup.
17. Tighten pinion gear side adjuster an additional:
    - **New Bearings:** 6 Adjuster Holes
    - **Original Bearings:** 4 Adjuster Holes

18. Tighten bearing cap bolts (4) to 85 N·m (63 ft. lbs.).
19. Install adjuster locks (2) and tighten bolts (3) to 25 N·m (18 ft. lbs.).



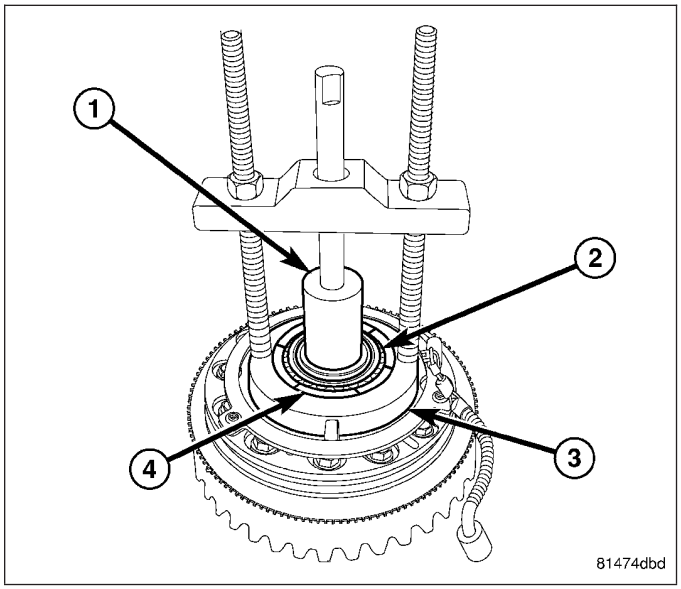
20. Install sensor target magnet (1) on bearing cap.
21. Energize locker and verify dog clutch is engaged.
22. Set sensor air gap (2) to 5.05 mm ± 0.25 mm (0.20 in. ± 0.01 in.).
23. Tighten sensor target magnet bolt (3) to 7 N·m (62 in. lbs.).
24. Install sensor wire tie strap (4) to aduster lock and de-energize coil.
25. Measure ring gear backlash and check gear tooth contact pattern. Refer to Adjustments for procedure.
26. Install axle shafts and hub bearings.
27. Install differential housing gasket and cover. Tighten cover bolts to 40 N·m (30 ft. lbs.).
28. Fill differential with lubricant.
29. Install fill plug and tighten to 32 N·m (24 ft. lbs.).



BEARINGS-EL DIFFERENTIAL CASE

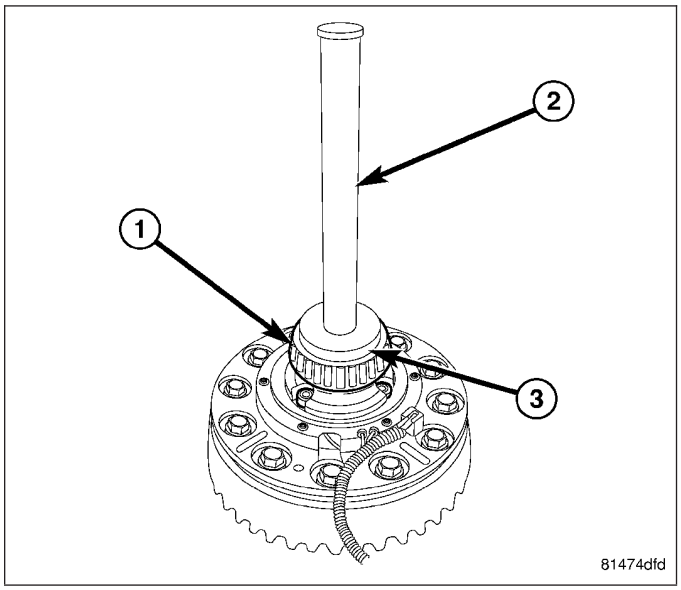
REMOVAL

1. Remove the differential case from the housing.
2. Bend anti-rotation tabs outwards.
3. Install Plug 9611 (1) into the end of the case.
4. Remove differential case bearings (2) with Puller C-293-PA (3) and Adapters 9613 (4).



INSTALLATION

1. Install differential case bearings (1) with Handle C-4171 (2) and Installer 9612 (3).
2. Bend anti-rotation tabs back to original location.

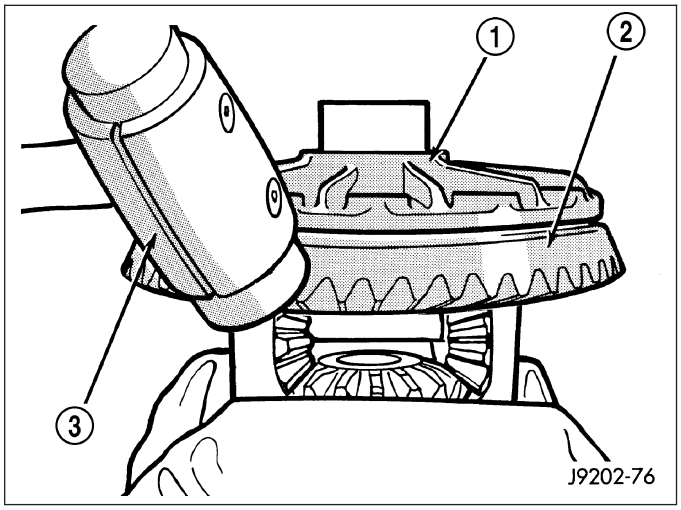


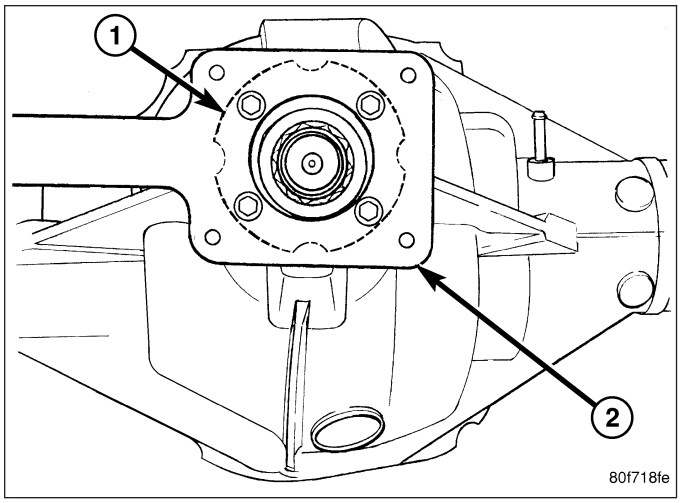
GEAR-PINION/RING

REMOVAL

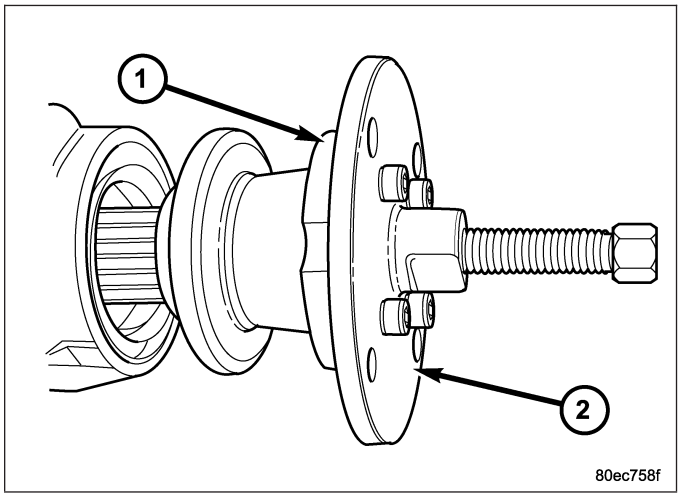
NOTE: The ring and pinion gears are service in a matched set. Never replace the ring gear/pinion gear without replacing the other matching gear.

1. Mark pinion flange and propeller shaft for installation alignment.
2. Disconnect propeller shaft from pinion flange and remove propeller shaft.
3. Remove axle shafts.
4. Remove differential from housing.
5. Place differential case in a vise with soft metal jaw protectors
6. Remove bolts holding ring gear to differential case.
7. Drive ring gear (2) from differential case (1) with a soft hammer (3).
8. Hold pinion flange (1) with Flange Wrench 8979 (2) and remove pinion flange nut and washer.





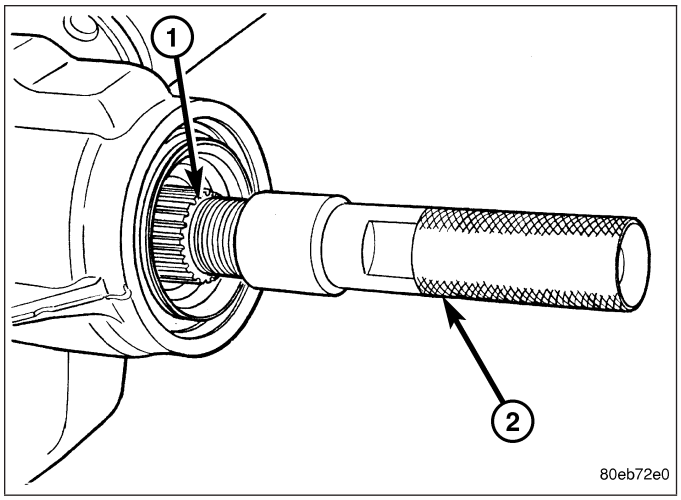
9. Remove pinion flange (1) from pinion with Pinion Flange Puller 8992 (2).



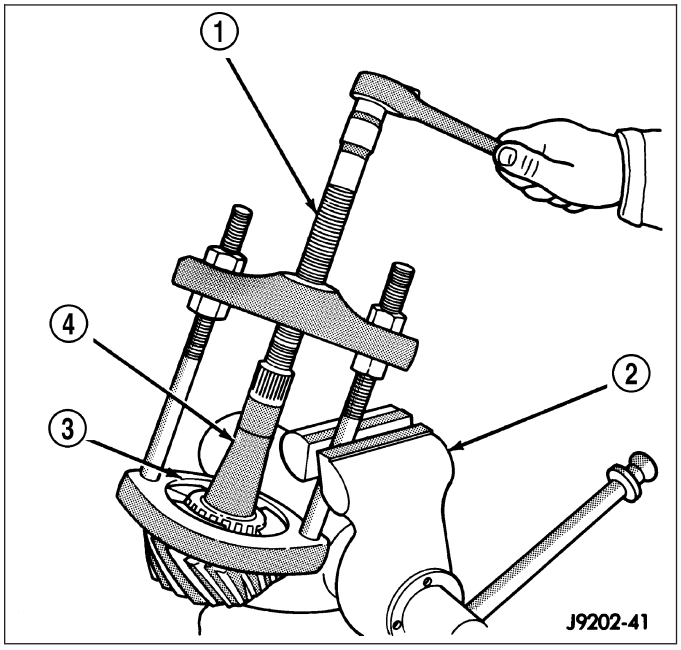
10. Remove pinion gear (1) from housing with Pinion Driver 8976 (2) and a hammer.

NOTE: Thread drive on shaft until it bottoms out.

11. Remove pinion seal with a slide hammer or pry bar.
12. Remove and discard front pinion bearing.
13. Remove collapsible spacer from the pinion shaft.

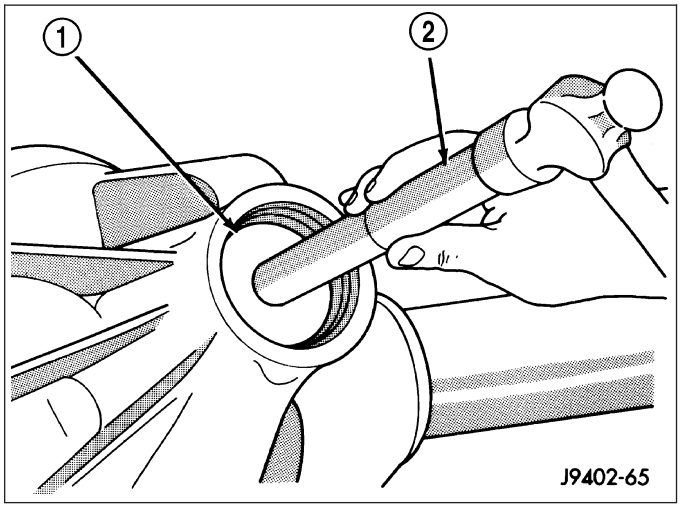


14. Remove rear pinion bearing with Puller C-293-PA (1) and Adapters 8879 (4).
15. Remove pinion depth shim from the pinion gear shaft and record thickness of the shims.
16. Remove front pinion bearing cup from the housing with a punch and hammer and discard cup.
17. Remove rear pinion bearing cup from the housing with a punch and hammer, if bearing is replaced.

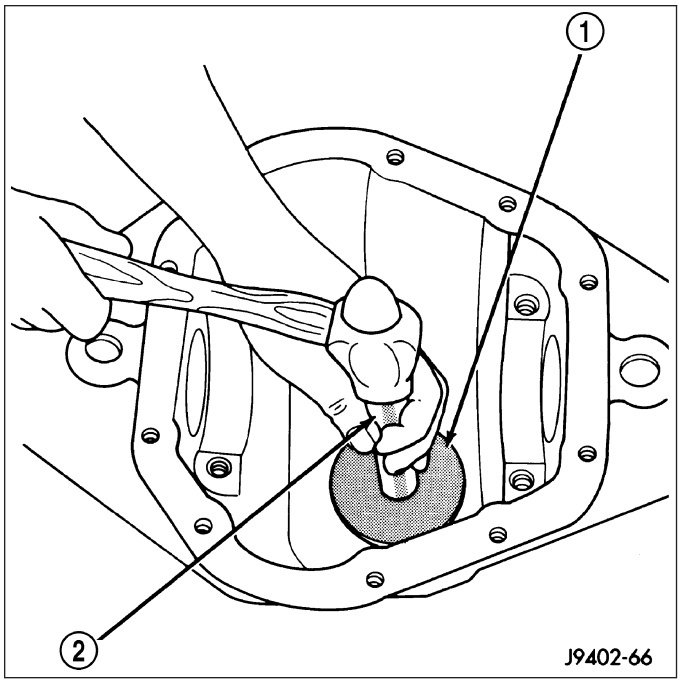


INSTALLATION

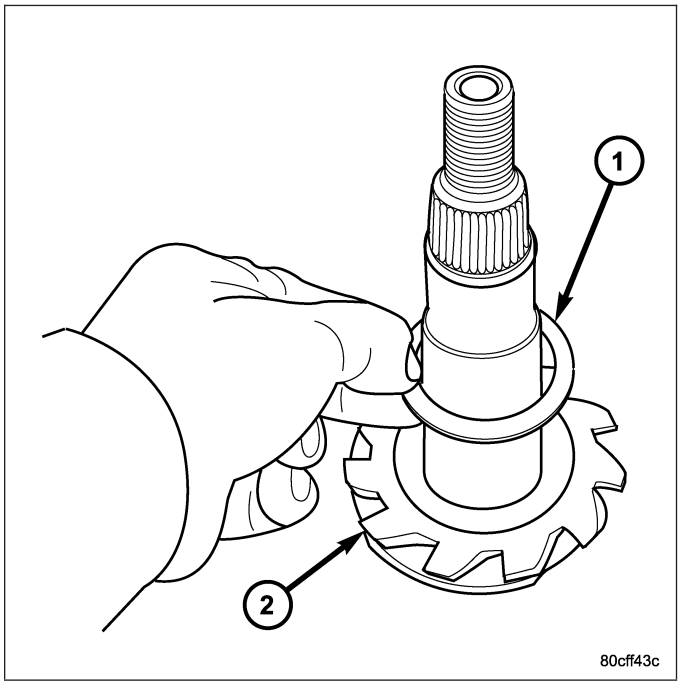
1. Install front pinion bearing cup with Installer D-146 (1) and Handle C-4171 (2).



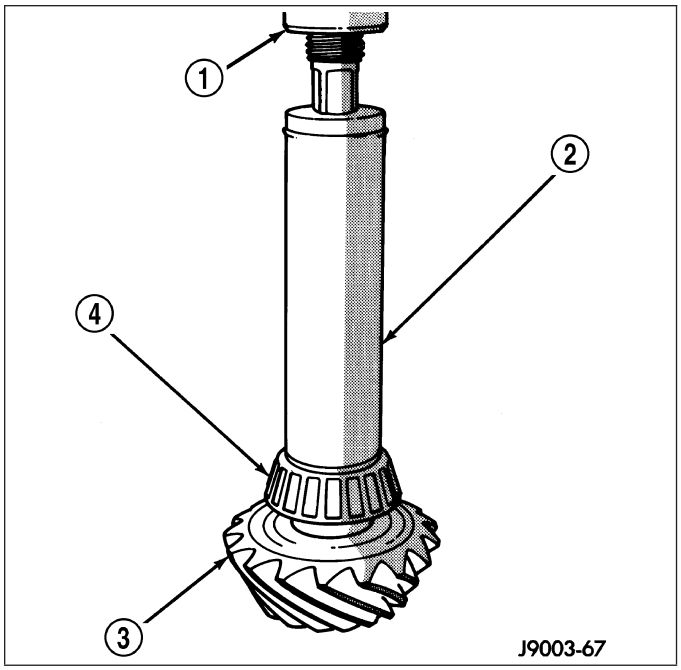
2. Install rear pinion bearing cup with Installer 8886 (1) and Handle C-4171 (2), if bearing is replaced.



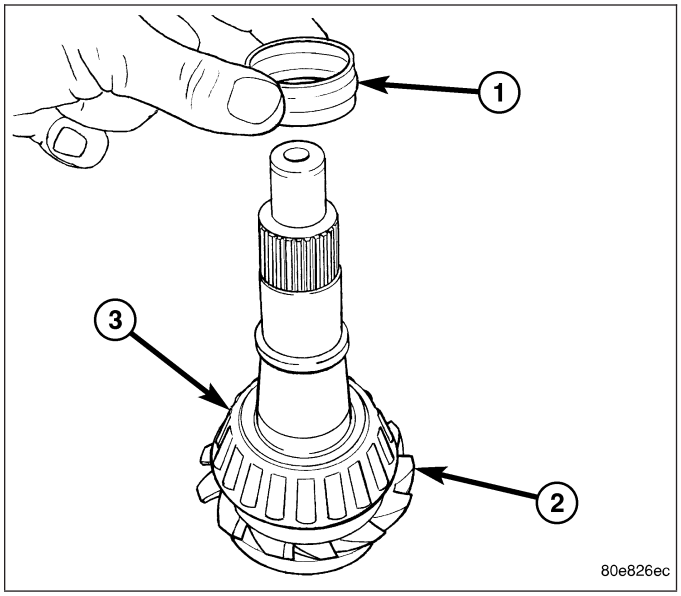
3. Install pinion depth shim (1) on the pinion gear (2) shaft.



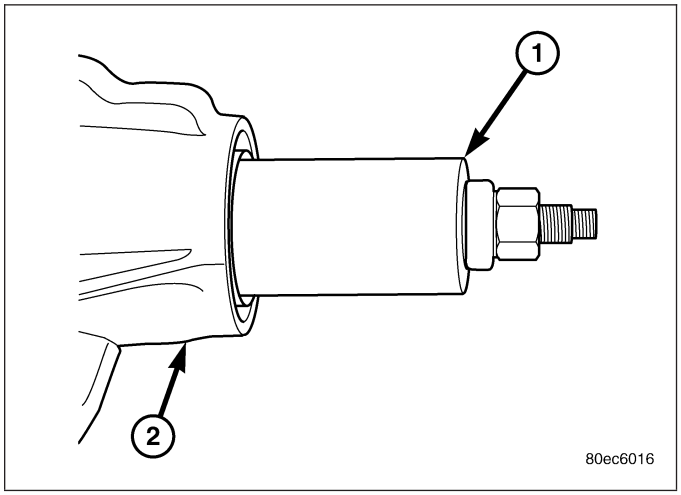
4. Install rear pinion bearing (4) with Installer C-3095-A (2) and a press (1).



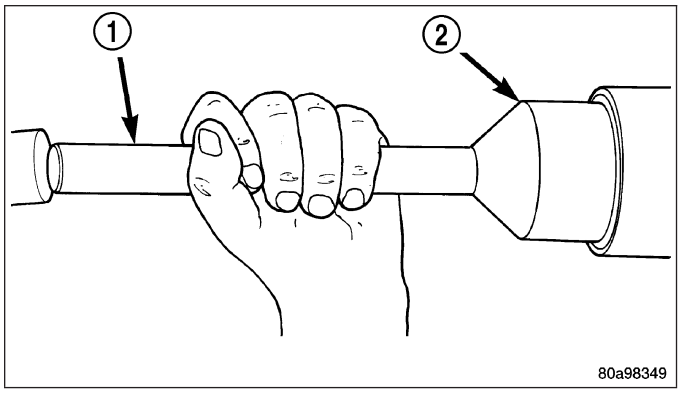
5. Install **new** collapsible spacer (1) on pinion gear (2).
6. Lubricate pinion and bearings (3).



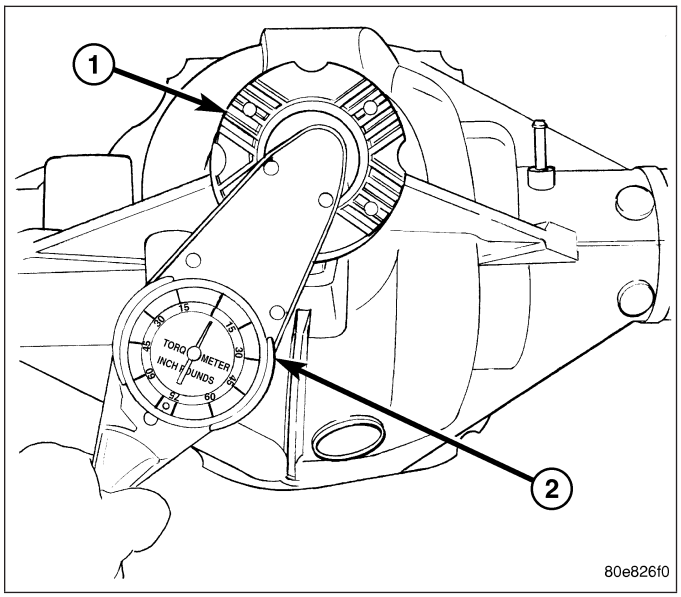
7. Install pinion in housing (2) and place front pinion bearing on pinion shaft. Draw pinion shaft into the front bearing with Installer 8982 (1).



8. Install **new** pinion seal with Installer 8882 (2) and Handle C-4171 (1).
9. Apply a light coat of teflon sealant to the pinion flange splines.
10. Hold pinion and lightly tap the pinion flange onto the pinion shaft, until a few threads are showing.
11. Install pinion flange washer and **new** pinion nut.
12. Hold pinion flange with Flange Wrench 8979 and tighten pinion nut until end play is taken up.



13. Rotate pinion several times to seat bearings.
14. Measure pinion (1) Torque To Rotate with an inch pound torque wrench (2). Tighten pinion nut in small increments until pinion Torque To Rotate is:
    - **New Pinion Bearings:** 1.7-2.8 N·m (15-25 in. lbs.)
    - **Original Pinion Bearings:** 1.1-2.2 N·m (10-20 in. lbs.)
15. Rotate pinion several times then verify pinion Torque To Rotate again.
16. Position the ring gear on differential case and start two **new** ring gear bolts.
17. Install the rest of the **new** ring gear bolts and tighten them alternately to seat the ring gear.
18. Torque ring gear bolts to 140 N·m (103 ft. lbs.).
19. Install differential in housing.
20. Measure Total Torque to Rotate with an inch pound torque wrench. The Total Torque to Rotate is:
    - **New Bearings:** 3.4-5.6 N·m (30-50 in. lbs.)
    - **Original Bearings:** 2.8-5.1 N·m (25-45 in. lbs.)
21. Install axle shafts.
22. Verify ring gear backlash and gear contact pattern.
23. Install propeller shaft with the reference marks aligned.
24. Install differential cover with gasket and tighten to 40 N·m (30 ft. lbs.).
25. Fill differential with fluid and tighten fill plug to 32 N·m (24 ft. lbs.).



REAR AXLE - 9 1/4

TABLE OF CONTENTS

page

REAR AXLE - 9 1/4
DIAGNOSIS AND TESTING
REAR AXLE - 9 1/4 314
REMOVAL 317
INSTALLATION 318
ADJUSTMENTS
PINION DEPTH-BEARING PRELOAD-GEAR BACKLASH 319
SPECIFICATIONS
REAR AXLE - 9 1/4 324
SPECIAL TOOLS 325
COVER-DIFFERENTIAL
REMOVAL 328
INSTALLATION 328
SHAFT-AXLE
REMOVAL 329
INSTALLATION 330
SEAL-AXLE SHAFT
REMOVAL 331
INSTALLATION 331
BEARING-AXLE
REMOVAL 332
INSTALLATION 332
SEAL-PINION
REMOVAL 333
INSTALLATION 334
DIFFERENTIAL
REMOVAL 336
DISASSEMBLY 336
ASSEMBLY 337
INSTALLATION 338
DIFFERENTIAL-TRAC-LOK
OPERATION-TRAC-LOK® 340
DIAGNOSIS AND TESTING
DIFFERENTIAL-TRAC-LOK® 340
BEARINGS-DIFFERENTIAL CASE
REMOVAL 342
INSTALLATION 342
GEAR-PINION/RING
REMOVAL 343
INSTALLATION 347

REAR AXLE - 9 1/4

DIAGNOSIS AND TESTING

REAR AXLE - 9 1/4

GEAR NOISE

Axle gear noise can be caused by insufficient lubricant, incorrect backlash, incorrect pinion depth, tooth contact, worn/damaged gears, or the carrier housing not having the proper offset and squareness.

Gear noise usually happens at a specific speed range. The noise can also occur during a specific type of driving condition. These conditions are acceleration, deceleration, coast, or constant load.

When road testing, first warm-up the axle fluid by driving the vehicle at least 5 miles and then accelerate the vehicle to the speed range where the noise is the greatest. Shift out-of-gear and coast through the peak-noise range. If the noise stops or changes greatly check for:

- Insufficient lubricant.
- Incorrect ring gear backlash.
- Gear damage.

Differential side gears and pinions can be checked by turning the vehicle. They usually do not cause noise during straight-ahead driving when the gears are unloaded. The side gears are loaded during vehicle turns. A worn pinion shaft can also cause a snapping or a knocking noise.

BEARING NOISE

The axle shaft, differential and pinion bearings can all produce noise when worn or damaged. Bearing noise can be either a whining, or a growling sound.

Pinion bearings have a constant-pitch noise. This noise changes only with vehicle speed. Pinion bearing noise will be higher pitched because it rotates at a faster rate. Drive the vehicle and load the differential. If bearing noise occurs, the rear pinion bearing is the source of the noise. If the bearing noise is heard during a coast, the front pinion bearing is the source.

Differential bearings usually produce a low pitch noise. Differential bearing noise is similar to pinion bearing noise. The pitch of differential bearing noise is also constant and varies only with vehicle speed.

Axle shaft bearings produce noise and vibration when worn or damaged. The noise generally changes when the bearings are loaded. Road test the vehicle. Turn the vehicle sharply to the left and to the right. This will load the bearings and change the noise level. Where axle bearing damage is slight, the noise is usually not noticeable at speeds above 30 mph.

LOW SPEED KNOCK

Low speed knock is generally caused by:

- Worn U-joint.
- Worn side gear thrust washers.
- Worn pinion shaft bore.

VIBRATION

Vibration at the rear of the vehicle is usually caused by a:

- Damaged drive shaft.
- Missing drive shaft balance weight(s).
- Worn or out-of-balance wheels.
- Loose wheel lug nuts.
- Worn U-joint(s).
- Loose/broken springs.
- Damaged axle shaft bearing(s).
- Loose pinion gear nut.
- Excessive pinion yoke run out.

- Bent axle shaft(s).

Check for loose or damaged front-end components or engine/transmission mounts. These components can contribute to what appears to be a rear end vibration. Do not overlook engine accessories, brackets and drive belts.

NOTE: All driveline components should be examined before starting any repair.

DRIVELINE SNAP

A snap or clunk noise when the vehicle is shifted into gear (or the clutch engaged), can be caused by:

- High engine idle speed.
- Transmission shift operation.
- Loose engine/transmission/transfer case mounts.
- Worn U-joints.
- Loose spring mounts.
- Loose pinion gear nut and yoke.
- Excessive ring gear backlash.
- Excessive side gear to case clearance.

The source of a snap or a clunk noise can be determined with the assistance of a helper. Raise the vehicle on a hoist with the wheels free to rotate. Instruct the helper to shift the transmission into gear. Listen for the noise, a mechanics stethoscope is helpful in isolating the source of a noise.

DIAGNOSTIC CHART

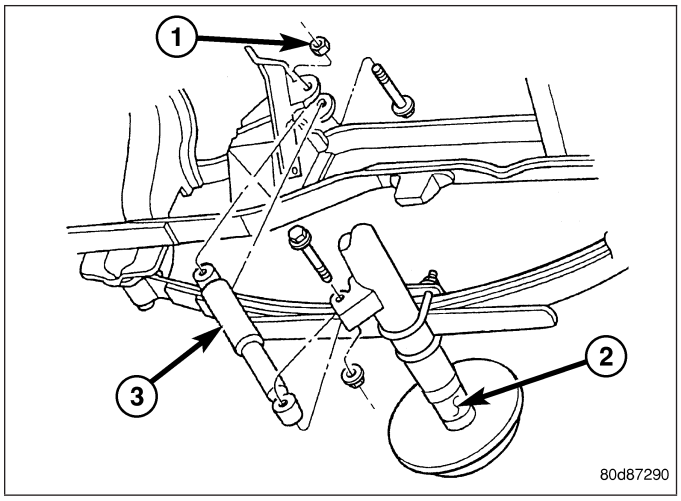
Condition	Possible Causes	Correction
Wheel Noise	1. Wheel loose.	1. Tighten loose nuts.
	2. Worn wheel bearing.	2. Replace bearing.
Axle Shaft Noise	1. Misaligned axle tube.	1. Inspect axle tube alignment. Correct as necessary.
	2. Bent or sprung axle shaft.	2. Inspect and correct as necessary.
Axle Shaft Broke	1. Misaligned axle tube.	1. Replace the broken shaft after correcting tube mis-alignment.
	2 Vehicle overloaded.	2. Replace broken shaft and avoid excessive weight on vehicle.
	3. Erratic clutch operation.	3. Replace broken shaft and avoid or correct erratic clutch operation.
	4. Grabbing clutch.	4. Replace broken shaft and inspect and repair clutch as necessary.

Condition	Possible Causes	Correction
Differential Cracked	1. Improper adjustment of the differential bearings.	1. Replace case and inspect gears and bearings for further damage. Set differential bearing pre-load properly.
	2. Excessive ring gear backlash.	2. Replace case and inspect gears and bearings for further damage. Set ring gear backlash properly.
	3. Vehicle overloaded.	3. Replace case and inspect gears and bearings for further damage. Avoid excessive vehicle weight.
	4. Erratic clutch operation.	4. Replace case and inspect gears and bearings for further damage. Avoid erratic use of clutch.
Differential Gears Scored	1. Insufficient lubrication.	1. Replace scored gears. Fill differential with the correct fluid type and quantity.
	2. Improper grade of lubricant.	2. Replace scored gears. Fill differential with the correct fluid type and quantity.
	3. Excessive spinning of one wheel/tire.	3. Replace scored gears. Inspect all gears, pinion bores, and shaft for damage. Service as necessary.
Loss Of Lubricant	1. Lubricant level too high.	1. Drain lubricant to the correct level.
	2. Worn axle shaft seals.	2. Replace seals.
	3. Cracked differential housing.	3. Repair as necessary.
	4. Worn pinion seal.	4. Replace seal.
	5. Worn/scored yoke.	5. Replace yoke and seal.
	6. Axle cover not properly sealed.	6. Remove, clean and seal cover.
Axle Overheating	1. Lubricant level low.	1. Fill differential to correct level.
	2. Improper grade of lubricant.	2. Fill differential with the correct fluid type and quantity.
	3. Bearing pre-loads too high.	3. Adjust bearing pre-loads.
	4. Insufficient ring gear backlash.	4. Adjust ring gear backlash.
Gear Teeth Broke	1. Overloading.	1. Replace gears. Examine other gears and bearings for possible damage.
	2. Erratic clutch operation.	2. Replace gears and examine the remaining parts for damage. Avoid erratic clutch operation.
	3. Ice-spotted pavement.	3. Replace gears and examine remaining parts for damage.
	4. Improper adjustments.	4. Replace gears and examine remaining parts for damage. Ensure ring gear backlash is correct.

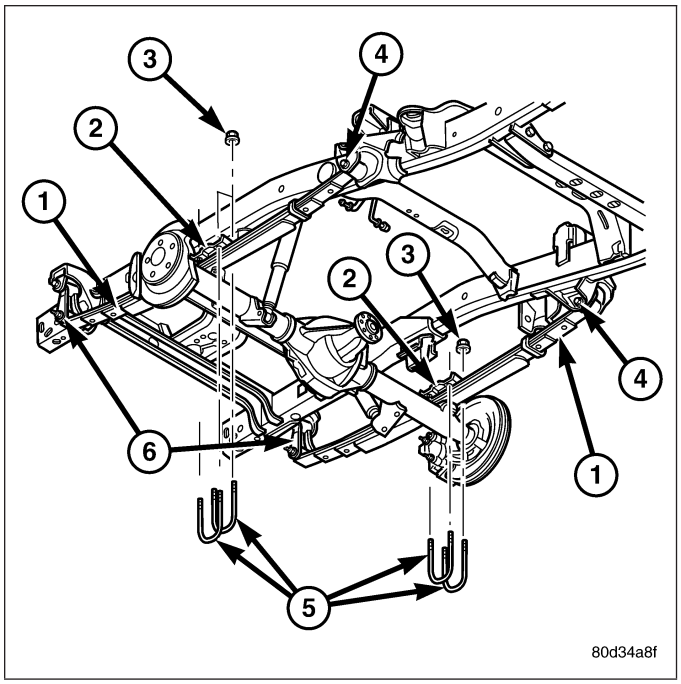
Condition	Possible Causes	Correction
Axle Noise	1. Insufficient lubricant.	1. Fill differential with the correct fluid type and quantity.
	2. Improper ring gear and pinion adjustment.	2. Check ring gear and pinion contact pattern. Adjust backlash or pinion depth.
	3. Unmatched ring gear and pinion.	3. Replace gears with a matched ring gear and pinion.
	4. Worn teeth on ring gear and pinion.	4. Replace ring gear and pinion.
	5. Loose pinion bearings.	5. Adjust pinion bearing pre-load.
	6. Loose differential bearings.	6. Adjust differential bearing pre-load.
	7. Ring gear run-out.	7. Measure ring gear run-out. Replace components as necessary.
	8. Loose differential bearing cap bolts.	8. Inspect differential components and replace as necessary. Ensure that the bearing caps are torqued to the proper specification.
	9. Housing not machined properly.	9. Replace housing.

REMOVAL

1. With vehicle in neutral, position vehicle on hoist.
2. Position a lift under axle and secure axle to lift.
3. Remove all brake components.
4. Remove axle vent hose.
5. Mark propeller shaft and companion flange for installation alignment reference.
6. Remove propeller shaft.
7. Remove shock absorbers (3) from axle (2).

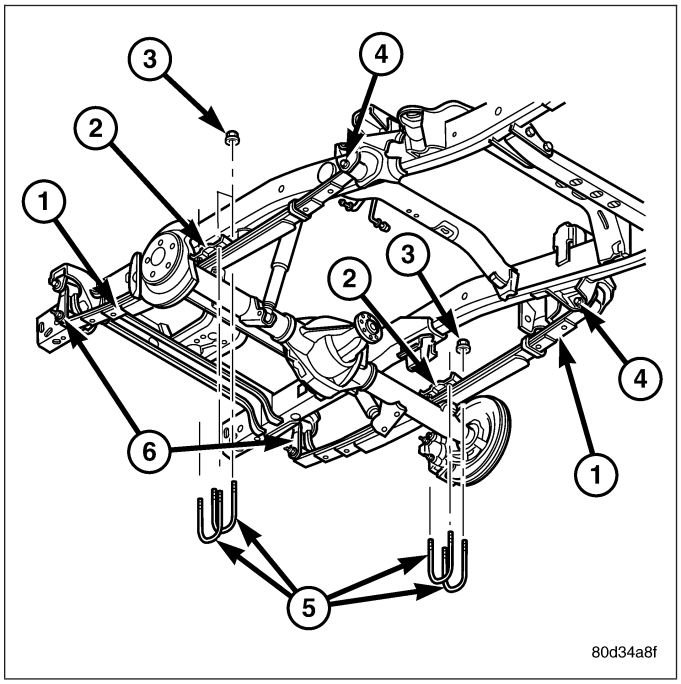


8. Remove U-bolts (5) from axle.
9. Remove axle from the vehicle.



INSTALLATION

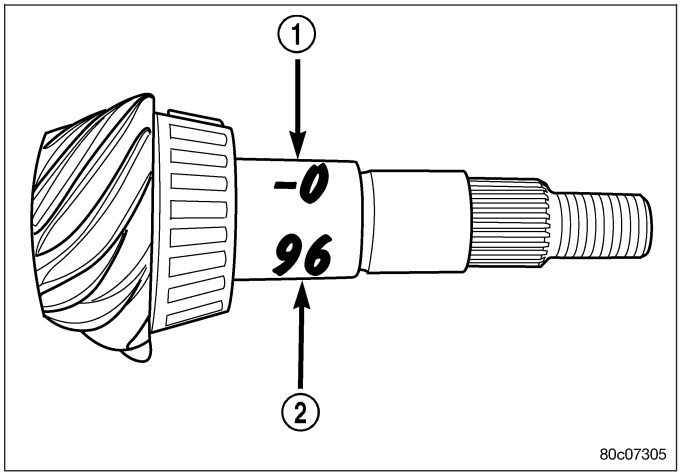
1. Raise axle with lift and align to the leaf spring centering bolts.
2. Install axle U-bolts (5) and tighten to 149 N·m (110 ft. lbs.).
3. Install shock absorbers to axle and tighten to specification.
4. Install all brake components.
5. Install axle vent hose.
6. Install propeller shaft with reference marks aligned and tighten to specification.
7. Fill differential to specifications.



ADJUSTMENTS

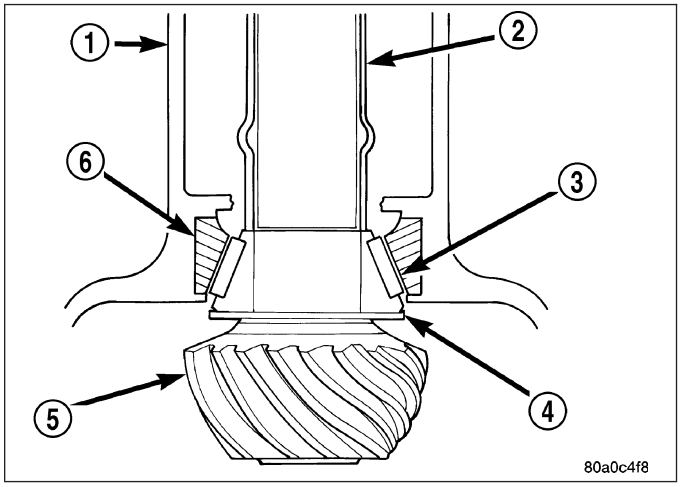
PINION DEPTH-BEARING PRELOAD-GEAR BACKLASH

Ring gear and pinion are supplied as matched sets. Identifying numbers for the ring gear and pinion are painted onto the pinion gear shaft and the side of the ring gear. A plus (+) number, minus (–) number or zero (0) along with the gear set sequence number (2) (01 to 99) is on each gear. This first number is the amount (in thousandths of an inch) the depth varies (1) from the standard depth setting of a pinion marked with a (0). The next two numbers are the sequence number of the gear set. The standard depth provides the best teeth contact pattern.



Compensation for pinion gear (5) depth variance is achieved with select shims (4). The shims are placed behind the rear pinion bearing (3).

If installing a new gear, note the depth variance number of the original and replacement pinion. Add or subtract this number from the original depth shim/oil slinger to compensate for the difference in the depth variances. The numbers represent thousands of an inch deviation from the standard. If the number is negative, add that value to the required thickness of the depth shims. If the number is positive, subtract that value from the thickness of the depth shim.



Pinion Gear Depth Variance Chart: Note where Old and New Pinion Marking columns intersect. Intersecting figure represents plus or minus the amount needed.

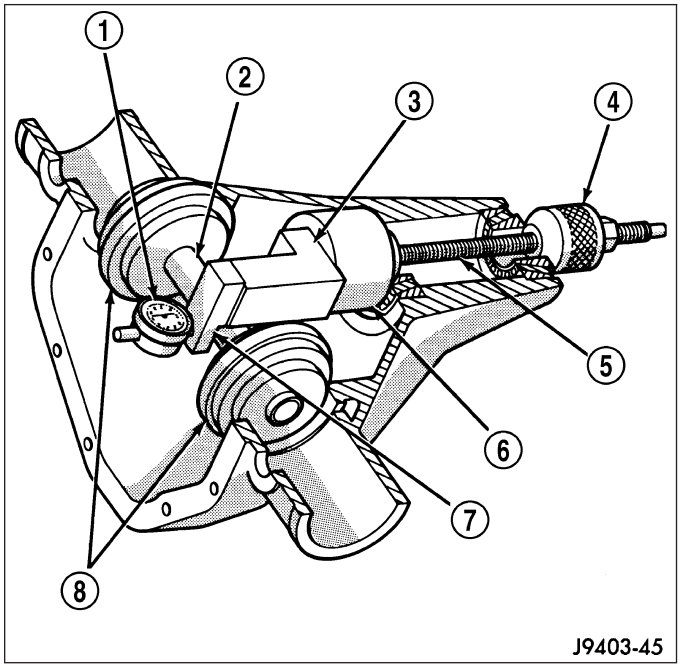
PINION GEAR DEPTH VARIANCE

Original Pinion Gear Depth Variance	Replacement Pinion Gear Depth Variance									
	−4	−3	−2	−1	0	+1	+2	+3	+4	
+4		+0.008	+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0
+3		+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	−0.001
+2		+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	−0.001	−0.002
+1		+0.005	+0.004	+0.003	+0.002	+0.001	0	−0.001	−0.002	−0.003
0		+0.004	+0.003	+0.002	+0.001	0	−0.001	−0.002	−0.003	−0.004
−1		+0.003	+0.002	+0.001	0	−0.001	−0.002	−0.003	−0.004	−0.005
−2		+0.002	+0.001	0	−0.001	−0.002	−0.003	−0.004	−0.005	−0.006
−3		+0.001	0	−0.001	−0.002	−0.003	−0.004	−0.005	−0.006	−0.007
−4		0	−0.001	−0.002	−0.003	−0.004	−0.005	−0.006	−0.007	−0.008

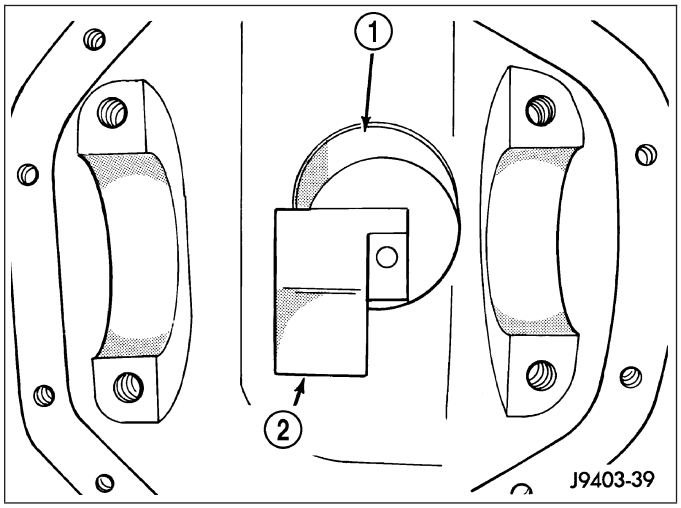
PINION DEPTH MEASUREMENT

Measurements are taken with pinion bearing cups and pinion bearings installed in the housing. Take measurements with Pinion Gauge Set and Dial Indicator C-3339 (1).

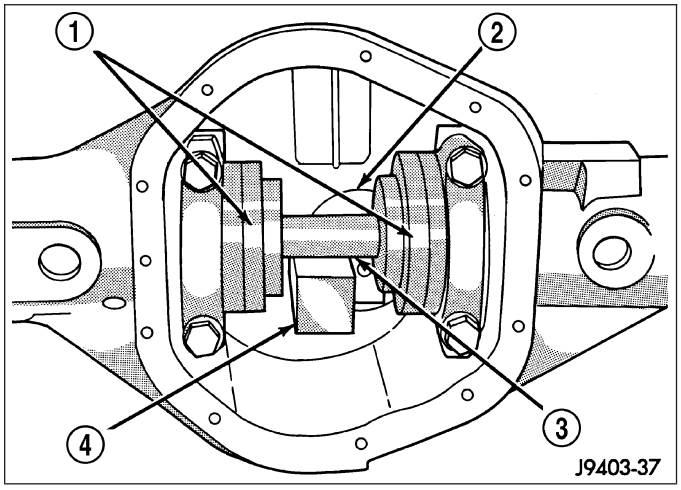
1. Assemble Pinion Height Block 6739 (3), Pinion Block 8542 (6) and rear pinion bearing onto Screw 6741 (5).



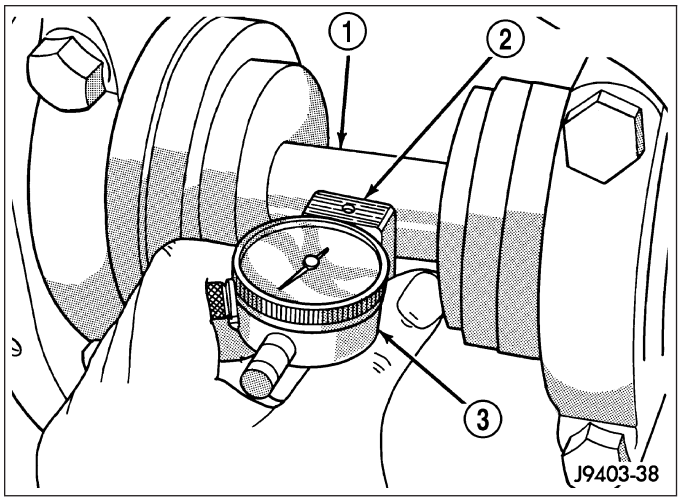
2. Insert pinion block (1), pinion height block (2), rear bearing, and screw into the housing through pinion bearing cups.
3. Install front pinion bearing and Cone-Nut 6740 onto the screw. Tighten cone-nut until Torque To Rotate the screw is 1.7 N·m (15 in. lbs.).



4. Place Arbor Disc 8541 (1) on Arbor D-115-3 (3) in position in the housing side bearing cradles. Install differential bearing caps on arbor discs and tighten cap bolts to 41 N·m (30 ft. lbs.).



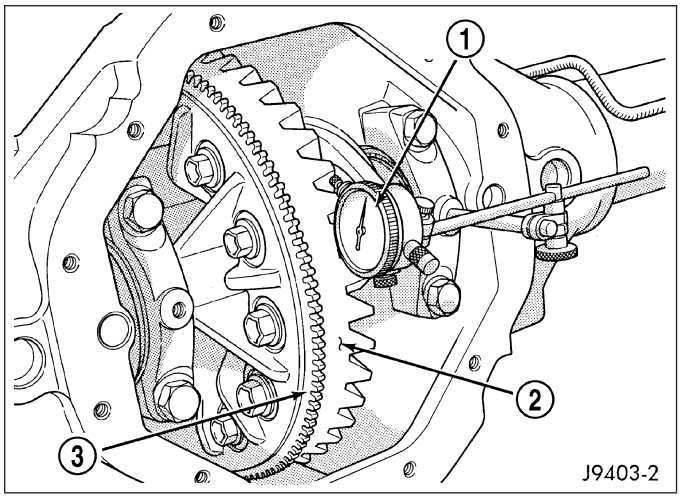
5. Assemble Dial Indicator C-3339 (3) into Scooter Block D-115-2 (2) and secure set screw.
6. Place Scooter Block/Dial Indicator in position in axle housing so dial probe and scooter block are flush against the rearward surface of the pinion height block. Hold scooter block in place and zero the dial indicator. Tighten dial indicator face lock screw.
7. Slide the dial indicator probe across the gap between the pinion height block and the arbor bar (1) with the scooter block against the pinion height block. Continue moving the dial probe to the crest of the arbor bar and record the highest reading.
8. Select a shim equal to the dial indicator reading plus the drive pinion gear depth variance number marked on the shaft of the pinion. For example, if the depth variance is –2, add +0.002 in. to the dial indicator reading.



DIFFERENTIAL BEARING PRELOAD AND GEAR BACKLASH

The following must be considered when adjusting bearing preload and gear backlash:

- The maximum ring gear backlash variation is 0.076 mm (0.003 in.).
- Mark the gears so the same teeth are meshed during all backlash measurements.
- Maintain the torque while adjusting the bearing preload and ring gear backlash.
- Excessive adjuster torque will introduce a high bearing load and cause premature bearing failure. Insufficient adjuster torque can result in excessive differential case free-play and ring gear noise.
- Insufficient adjuster torque will not support the ring gear correctly and can cause excessive differential case free-play and ring gear noise.



NOTE: The differential bearing cups will not always immediately follow the threaded adjusters as they are moved during adjustment. To ensure accurate bearing cup responses to the adjustments:

- **Maintain the gear teeth engaged (meshed) as marked.**
- **The bearings must be seated by rapidly rotating the pinion gear a half turn back and forth.**
- **Do this five to ten times each time the threaded adjusters are adjusted.**

1. Through the axle tube use Wrench C-4164 to adjust each threaded adjuster inward until the differential bearing free-play is eliminated. Allow some ring gear (2) backlash approximately 0.25 mm (0.01 in.) between the ring and pinion gear. Seat the bearing cups with the procedure described above.
2. Install dial indicator (1) and position the plunger against the drive side of a ring gear tooth. Measure the backlash at 4 positions, 90 degrees apart around the ring gear. Locate and mark the area of minimum backlash.
3. Rotate the ring gear to the position of the least backlash. Mark the gear so that all future backlash measurements will be taken with the same gear teeth meshed.
4. Loosen the right-side, tighten the left-side threaded adjuster. Obtain backlash of 0.076 to 0.102 mm (0.003-0.004 in.) with each adjuster tightened to 14 N·m (10 ft. lbs.). Seat the bearing cups with the procedure described above.
5. Tighten the differential bearing cap bolts 136 N·m (100 ft. lbs.).
6. Tighten the right-side threaded adjuster to 102 N·m (75 ft. lbs.). Seat the bearing cups with the procedure described above. Continue to tighten the right-side adjuster and seat bearing cups until the torque remains constant at 102 N·m (75 ft. lbs.)

7. Measure the ring gear (2) backlash. The range of backlash is 0.12 to 0.20 mm (0.005 to 0.008 in.).
8. Continue increasing the torque at the right-side threaded adjuster until the specified backlash is obtained.

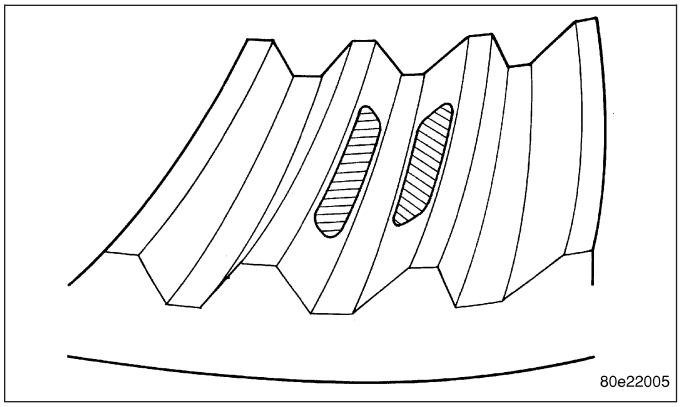
NOTE: The left-side threaded adjuster torque should have approximately 102 N·m (75 ft. lbs.). If the torque is considerably less, the complete adjustment procedure must be repeated.

9. Tighten the left-side threaded adjuster until 102 N·m (75 ft. lbs.) torque is indicated. Seat the bearing rollers with the procedure described above. Do this until the torque remains constant.
10. Install the threaded adjuster locks and tighten the lock screws to 10 N·m (90 in. lbs.).

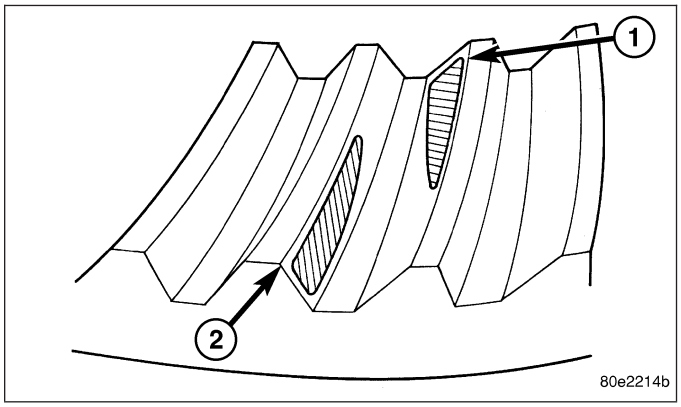
GEAR CONTACT PATTERN

1. Wipe clean each tooth of the ring gear.
2. Apply gear marking compound to all of the ring gear teeth.
3. Verify bearing cap bolts are torque to specification.
4. Apply parking brakes lightly to create at 14 N·m (10 ft. lbs.) pinion rotating torque.
5. Rotate the pinion/pinion yoke 4 full revolutions in each directions.
6. Read gear tooth contact pattern.

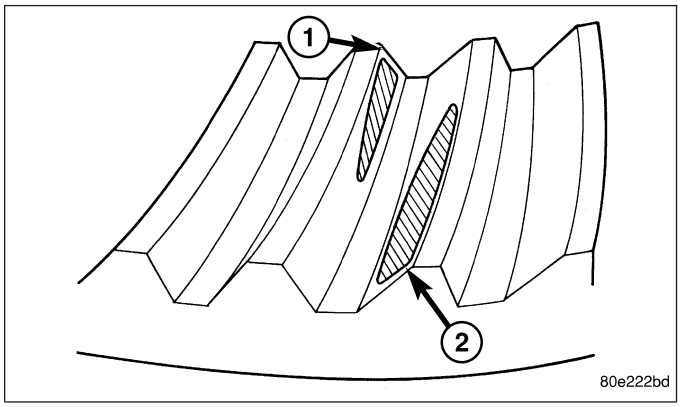
Gear contact pattern is correct. Backlash and pinion depth is correct.



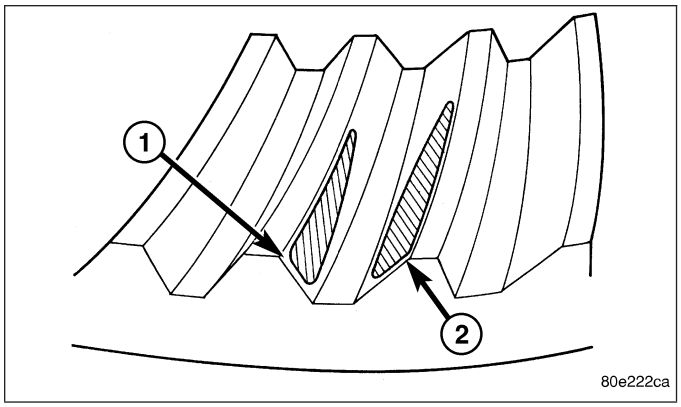
Ring gear too far away from pinion gear, coast side toe (1) and drive side heel (2). Decrease backlash, by moving the ring closer to the pinion gear using the adjusters.



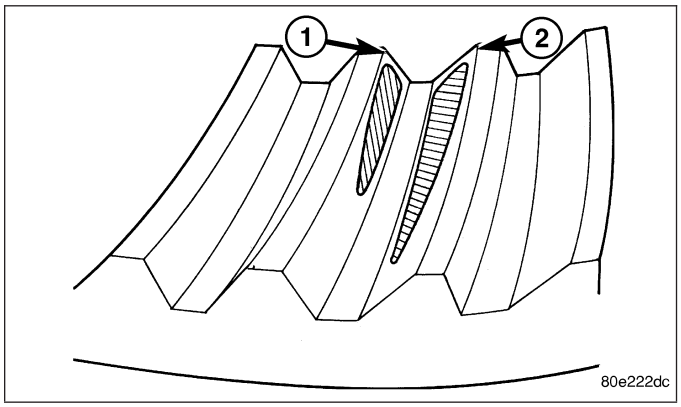
Ring gear too close to pinion gear, drive side toe (1) and coast side heel (2). Increase backlash, by moving the ring away from the pinion gear using the adjusters.



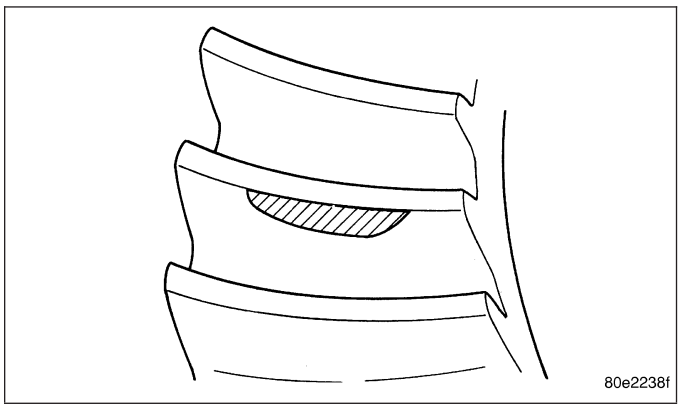
Ring gear too far away from pinion gear, drive side heel (1) and coast side heel (2). Decrease backlash, by moving the ring closer to the pinion gear using the adjusters.



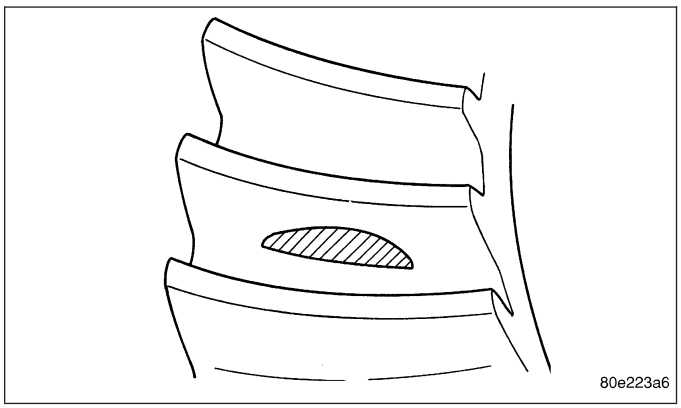
Ring gear too close to pinion gear, drive side toe (1) and coast side toe (2). Increase backlash, by moving the ring away from the pinion gear using the adjusters.



Pinion gear set too low. Increase pinion gear height, by increasing the pinion depth shim thickness.



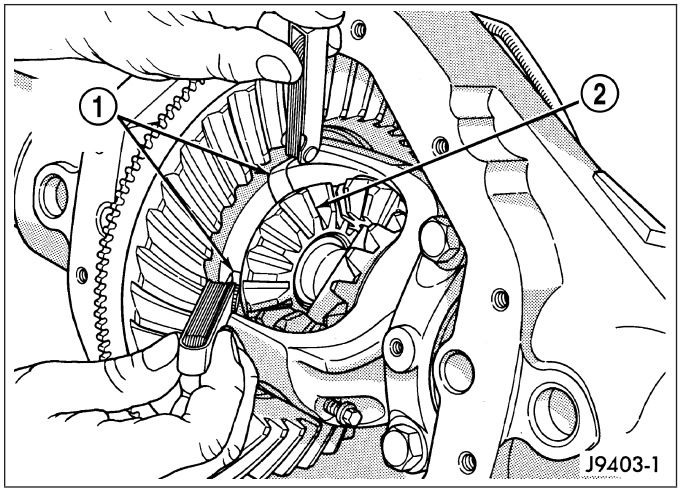
Pinion gear set too high. Decrease pinion depth, by decreasing the pinion depth shim thickness.



SIDE GEAR CLEARANCE

When measuring side gear (2) clearance, check each gear independently. If it necessary to replace a side gear, replace both gears as a matched set.

1. Install the axle shafts and C-locks and pinion mate shaft.
2. Measure each side gear clearance. Insert a matched pair of feeler gauge (1) blades between the gear and differential housing on opposite sides of the hub.
3. If side gear clearances are no more than 0.005 inch. Determine if the axle shaft is contacting the pinion mate shaft. **Do not remove the feeler gauges, inspect the axle shaft with the feeler gauge inserted behind the side gear.** If the end of the axle shaft is not contacting the pinion mate shaft, the side gear clearance is acceptable.
4. If clearance is more than 0.005 inch (axle shaft not contacting mate shaft), record the side gear clearance. Remove the thrust washer and measure its thickness with a micrometer. Add the washer thickness to the recorded side gear clearance. The sum of gear clearance and washer thickness will determine required thickness of replacement thrust washer.



SIDE GEAR CLEARANCE	0.007
THRUST WASHER THICKNESS	+ 0.033
TOTAL	0.040
	→ 0.040
REPLACEMENT WASHER THICKNESS	− 0.037
NEW SIDE GEAR CLEARANCE	0.003

J9203-31

In some cases, the end of the axle shaft will move and contact the mate shaft when the feeler gauge is inserted. The C-lock is preventing the side gear from sliding on the axle shaft.

5. If there is no side gear clearance, remove the C-lock from the axle shaft. Use a micrometer to measure the thrust washer thickness. Record the thickness and re-install the thrust washer. Assemble the differential case without the C-lock installed and re-measure the side gear clearance.
6. Compare both clearance measurements. If the difference is less than 0.012 inch (0.305 mm), add clearance recorded when the C-lock was installed to thrust washer thickness measured. The sum will determine the required thickness of the replacement thrust washer.
7. If clearance is 0.012 inch (0.305 mm) or greater, both side gears must be replaced (matched set) and the clearance measurements repeated.
8. If clearance (above) continues to be 0.012 inch (0.305 mm) or greater, the case must be replaced.

SPECIFICATIONS

REAR AXLE - 9 1/4

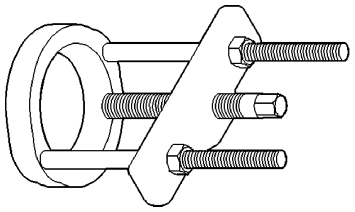
AXLE SPECIFICATIONS

DESCRIPTION	SPECIFICATION
Axle Ratio	3.21, 3.55, 3.92
Differential Case Flange Runout	0.076 mm (0.003 in.)
Differential Case Clearance	0.12 mm (0.005 in.)
Ring Gear Diameter	235 mm (9.25 in.)
Ring Gear Backlash	0.12-0.20 mm (0.005-0.008 in.)
Ring Gear Runout	0.12 mm (0.005 in.)
Pinion Torque To Rotate - New Bearings	1.7-4 N·m (15-35 in. lbs.)
Pinion Torque To Rotate - Original Bearings	1-2 N·m (10-20 in. lbs.)

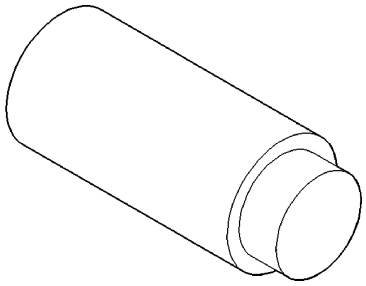
TORQUE SPECIFICATIONS

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Differential Cover Bolts	41	30	-
Bearing Cap Bolts	136	100	-
Ring Gear Bolts	157	115	-
Pinion Nut Minimum	285	210	-
Adjuster Lock Screw	10	7.5	90
Backing Plate Bolts	65	48	-
Pinion Mate Shaft Lock Screw	11	8	-
Axle U-Bolt Nuts	149	110	-

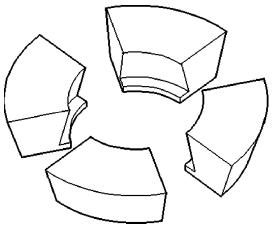
SPECIAL TOOLS



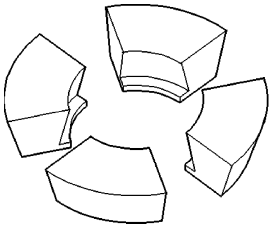
PULLER C-293-PA



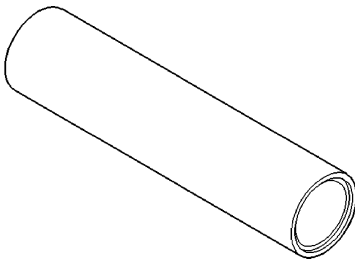
PLUG C-293-3



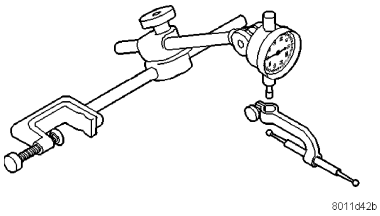
ADAPTERS C-293-37



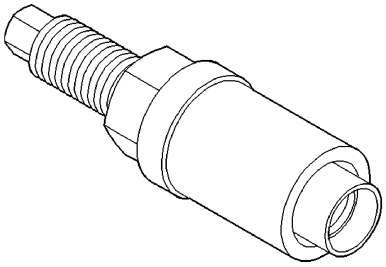
ADAPTERS C-293-47



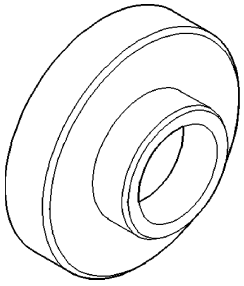
INSTALLER C-3095-A



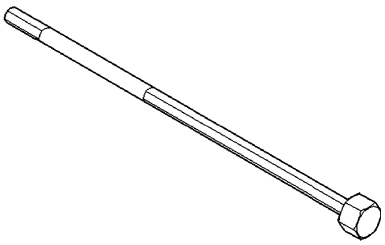
DIAL INDICATOR SET C-3339



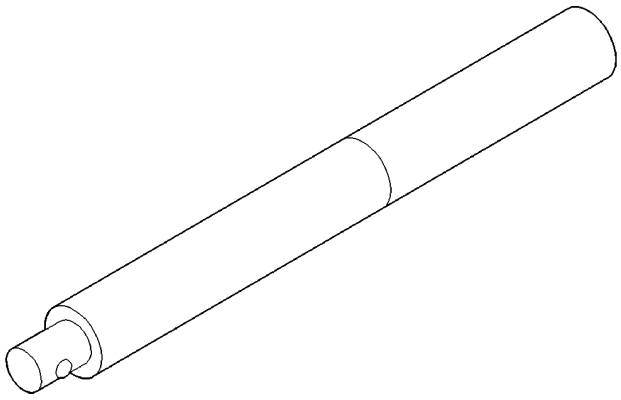
INSTALLER C-3718



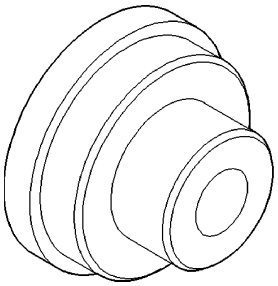
INSTALLER C-4076-B



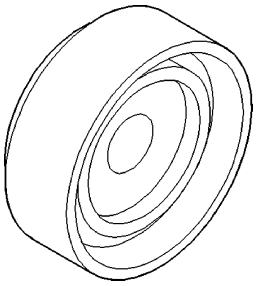
WRENCH C-4164



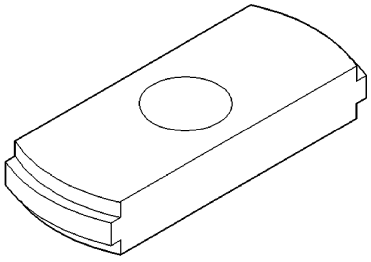
HANDLE C-4171



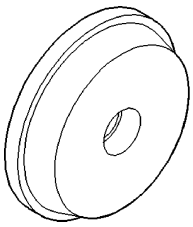
INSTALLER C-4198



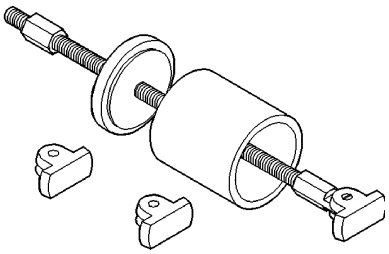
INSTALLER C-4213



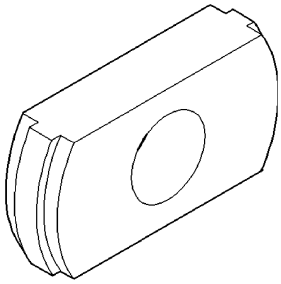
REMOVER C-4307



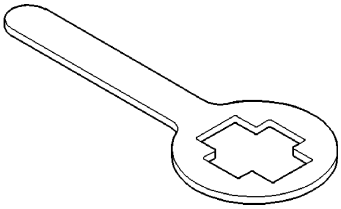
INSTALLER C-4308



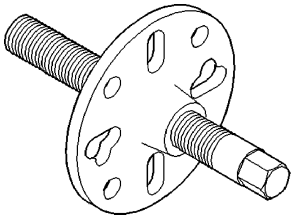
REMOVER 6310



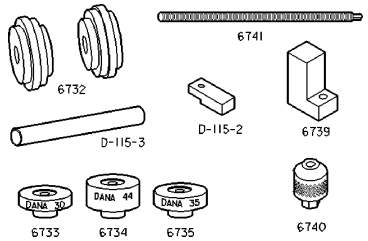
INSTALLER C-4345



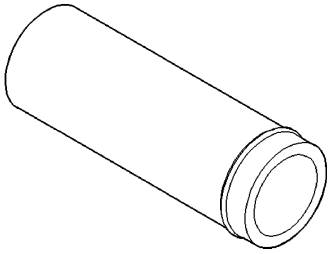
HOLDER 6719A



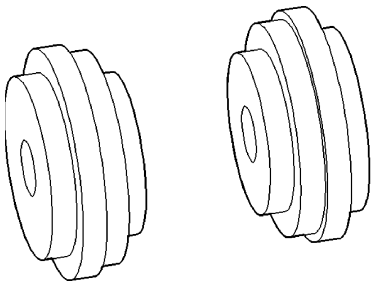
PULLER C-452



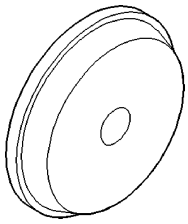
PINION GAUGE SET 6730/6774/6775



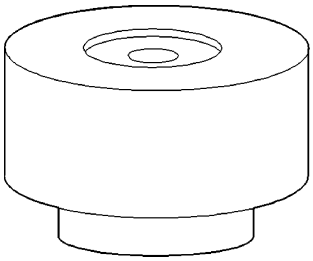
HANDLE C-4735



ARBOR DISCS 8541



INSTALLER D-129



PINION BLOCK 8542

COVER-DIFFERENTIAL

REMOVAL

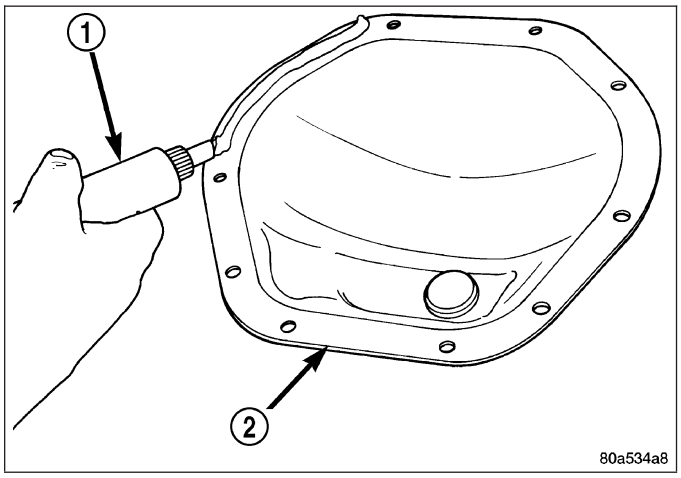
1. With vehicle in neutral, position vehicle on hoist.
2. Remove drain plug.
3. Remove cover bolts.
4. Remove cover and drain lubricant.

INSTALLATION

1. Apply a 6.35mm (1/4 in.) bead of Mopar Silicone Rubber Sealant (1) or equivalent to the cover (2).

CAUTION: If housing cover is not installed within 3 to 5 minutes, the cover must be cleaned and new RTV applied. Failure to follow these instructions will result in a leak.

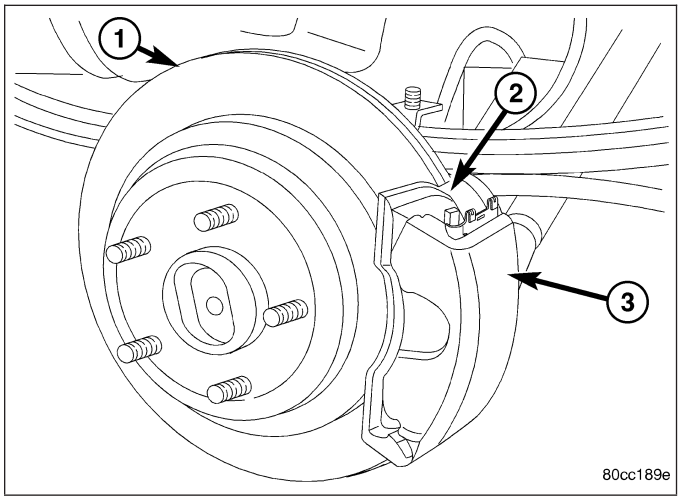
2. Install cover and identification tag. Tighten cover bolts in a criss-cross pattern to 41 N·m (30 ft. lbs.).
3. Fill differential to specifications.
4. Install fill plug.



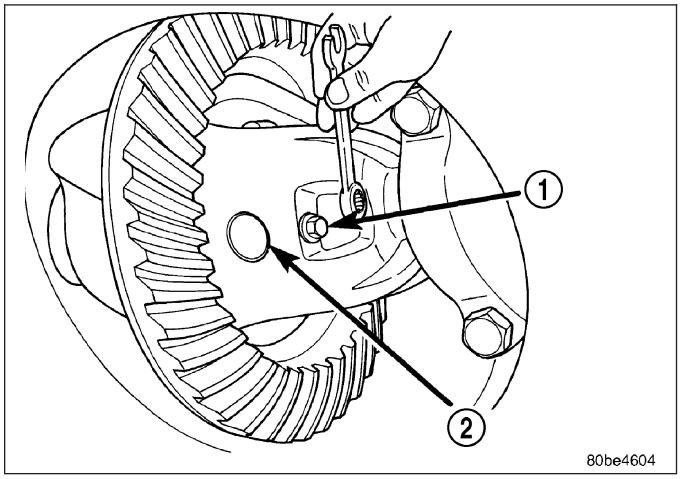
SHAFT-AXLE

REMOVAL

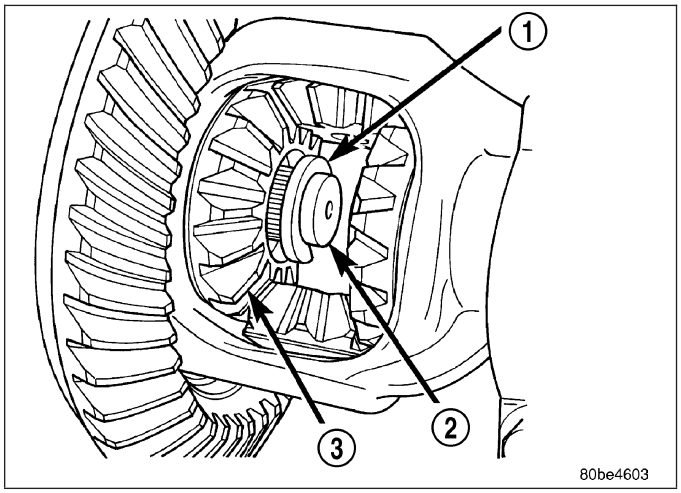
1. With vehicle in neutral, position vehicle on hoist.
2. Remove wheel and tire assembly.
3. Remove brake caliper (3), adapter (2) and rotor (1).



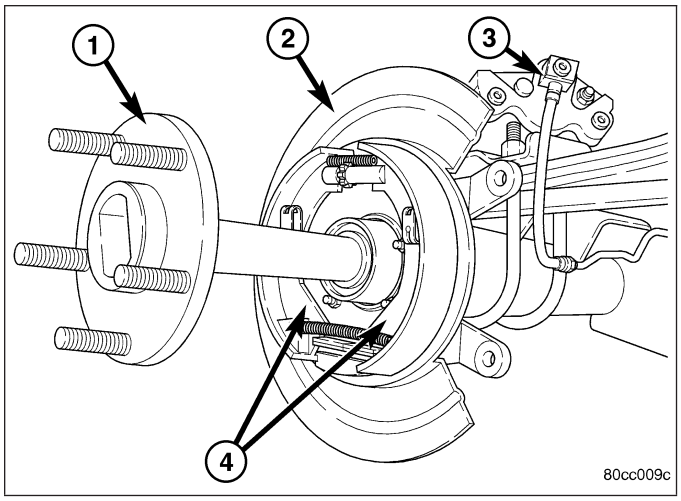
4. Remove differential housing cover and drain lubricant.
5. Rotate differential case so pinion mate shaft lock screw is accessible. Remove lock screw (1) and pinion mate shaft (2) from differential case.



6. Push axle shaft (2) inward and remove C-lock (1) from the axle shaft.



7. Remove axle shaft (1) carefully to prevent damage to the shaft bearing and seal in the axle tube.

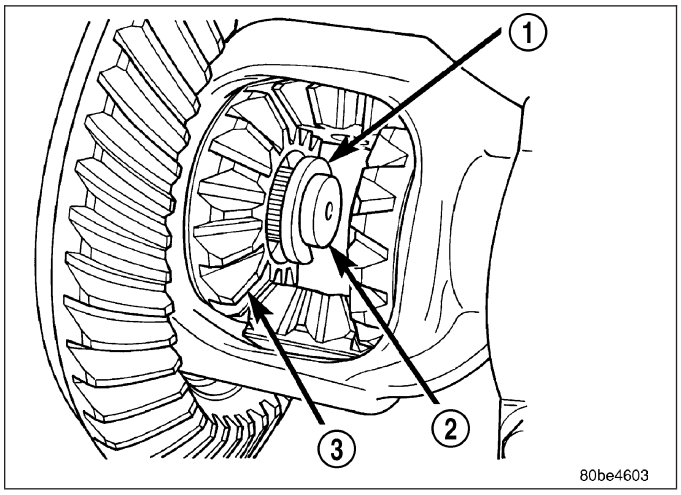


INSTALLATION

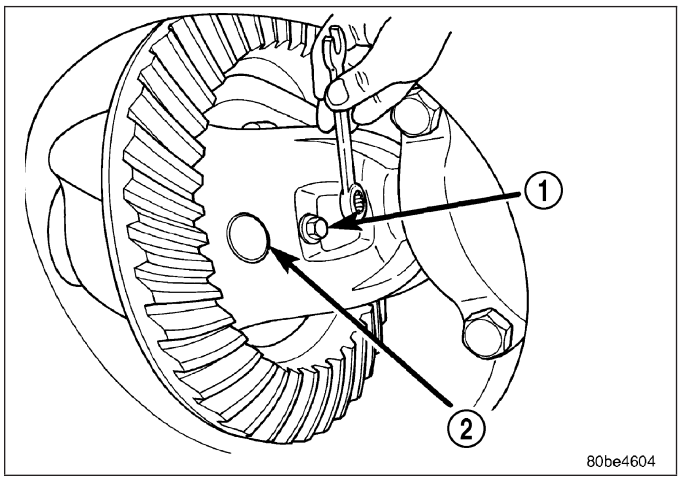
1. Lubricate bearing bore and seal lip with gear lubricant.
2. Install axle shaft and engage into side gear splines.

NOTE: Use care to prevent shaft splines from damaging axle shaft seal.

3. Insert C-lock (1) in end of axle shaft (2) then push axle shaft outward to seat C-lock in side gear (3).



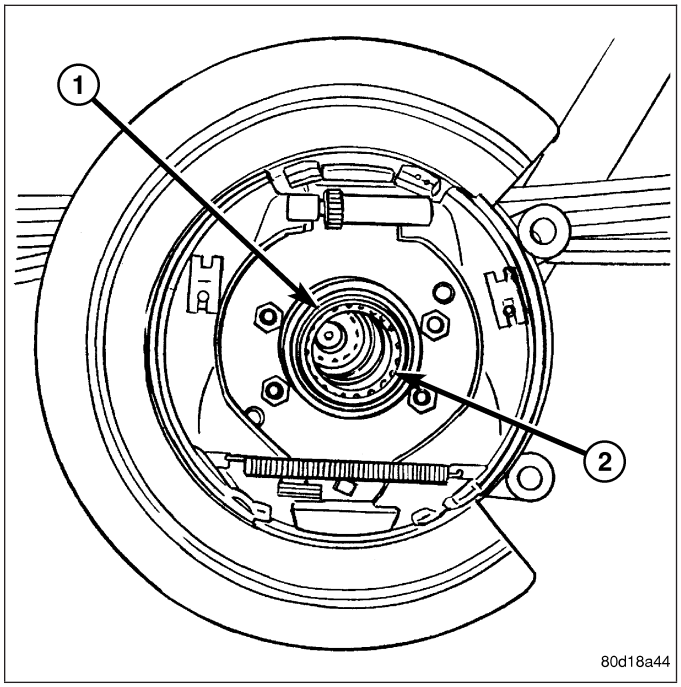
4. Insert pinion shaft into differential case and through thrust washers and differential pinions.
5. Align hole in pinion mate shaft (2) with hole in the differential case and install lock screw (1) with Loctite® on the threads. Tighten lock screw to 11 N·m (8 ft. lbs.).
6. Install differential cover and fill with gear lubricant to the bottom of the fill plug hole.
7. Install brake rotor, caliper adapter and caliper.
8. Install wheel and tire.



SEAL-AXLE SHAFT

REMOVAL

1. Remove axle shaft.
2. Remove axle shaft seal (1) from the axle tube with a seal puller.

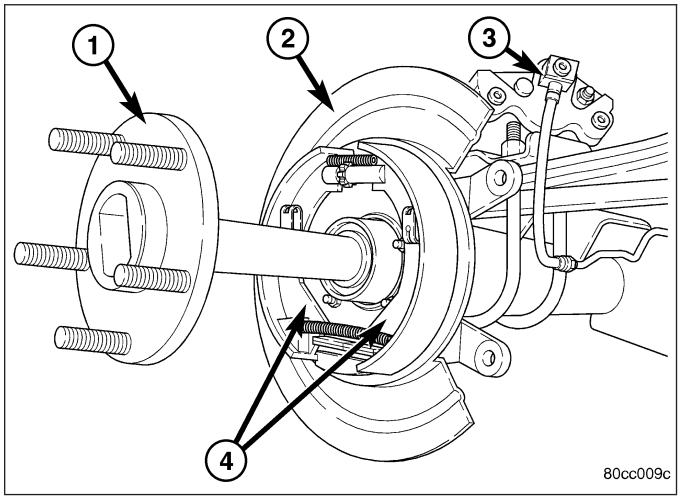


INSTALLATION

1. Wipe the axle tube bore clean. Remove any old sealer or burrs from the tube.
2. Coat the lip of the **new** seal with axle lubricant and install a seal with Installer C-4076-B and Handle C-4735.

NOTE: When tool contacts the axle tube, the seal is installed to the correct depth.

3. Install the axle shaft (1).
4. Install differential cover and fill with gear lubricant to the bottom of the fill plug hole.



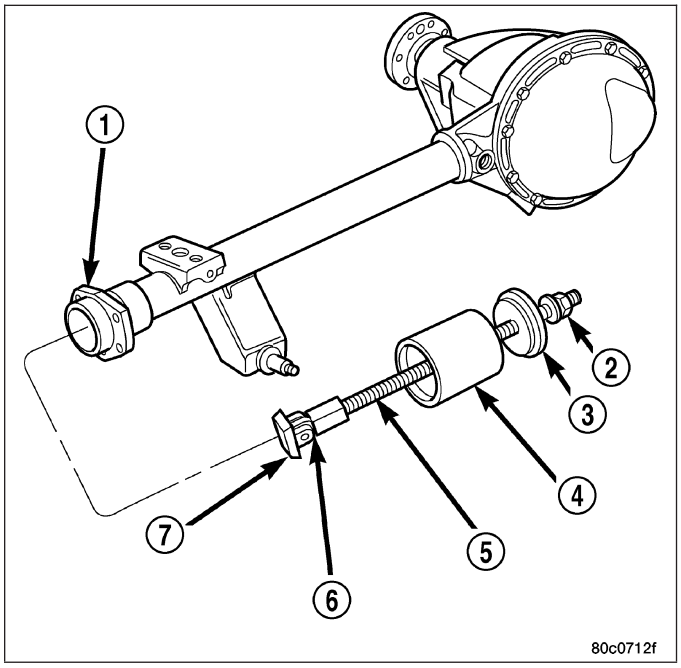
BEARING-AXLE

REMOVAL

1. Remove axle shaft.
2. Remove axle shaft seal from axle tube with a small pry bar.

NOTE: The seal and bearing can be removed at the same time with the bearing removal tool.

3. Remove axle shaft bearing with Bearing Remover 6310 (2) (3) (4) (5) and Foot 6310-9 (7).

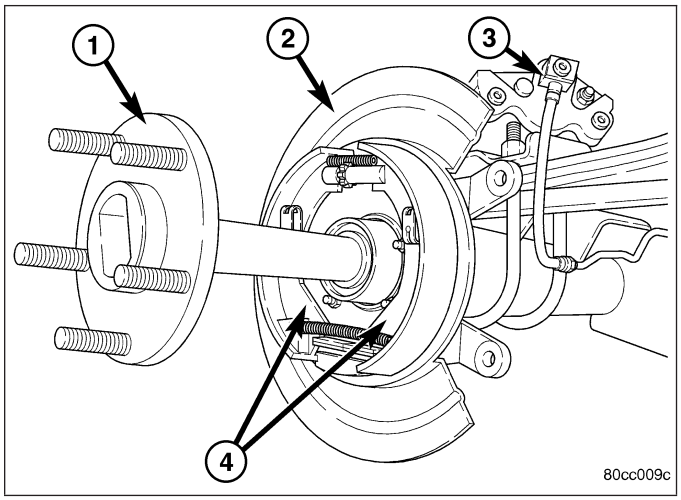


INSTALLATION

1. Wipe axle tube bore clean and remove any old sealer or burrs from the tube.
2. Install axle shaft bearing with Installer C-4198 and Handle C-4171. Drive bearing in until tool contacts the axle tube.

NOTE: Bearing is installed with the bearing part number against the installer.

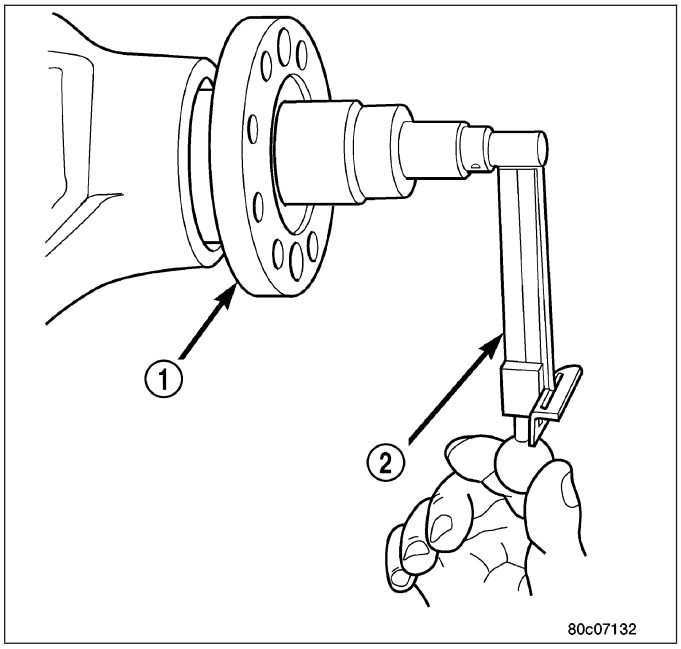
3. Coat lip of the **new** axle seal with axle lubricant and install with Installer C-4076-B and Handle C-4735.
4. Install the axle shaft (1).
5. Install differential cover and fill with gear lubricant to the bottom of the fill plug hole.



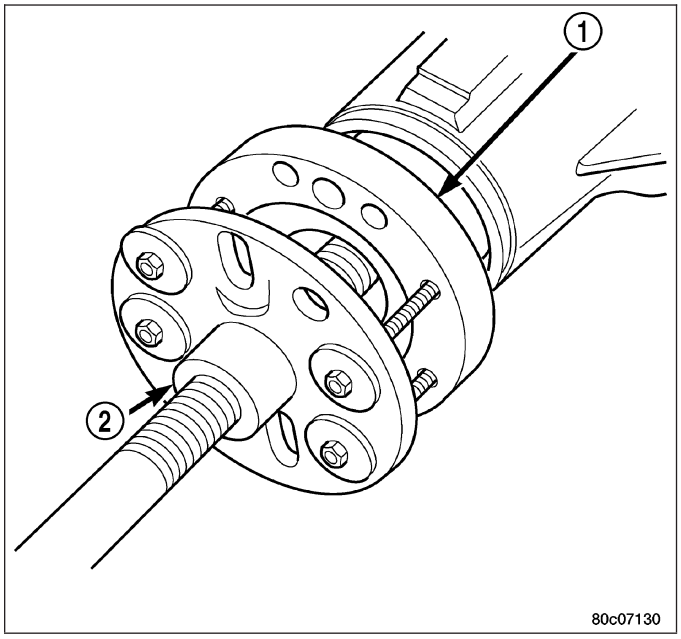
SEAL-PINION

REMOVAL

1. Mark universal joint, companion flange and pinion shaft for installation reference.
2. Remove propeller shaft from the companion flange.
3. Remove the brake rotors to prevent any drag.
4. Rotate companion flange (1) three or four times and record pinion rotating torque with an inch pound torque wrench (2).

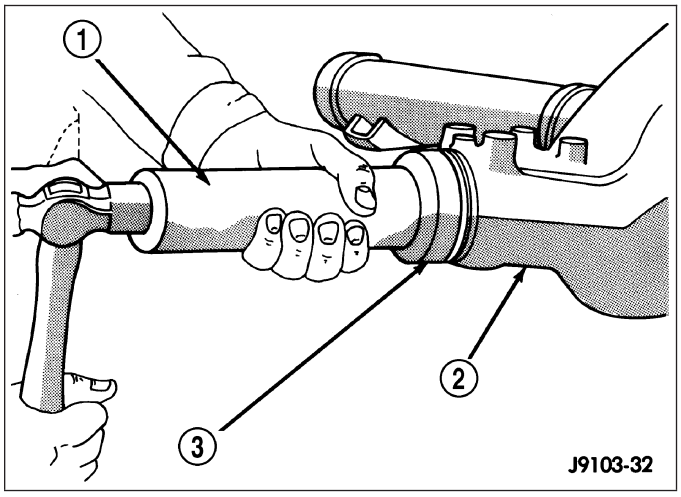


5. Install two bolts into the companion flange threaded holes, 180° apart. Position Holder 6719A against the companion flange and install and tighten two bolts and washers into the remaining holes.
6. Hold the companion flange with Holder 6719A and remove pinion nut and washer.
7. Remove companion flange with Puller C-452 (2).
8. Remove pinion seal with seal puller or slide-hammer mounted screw.



INSTALLATION

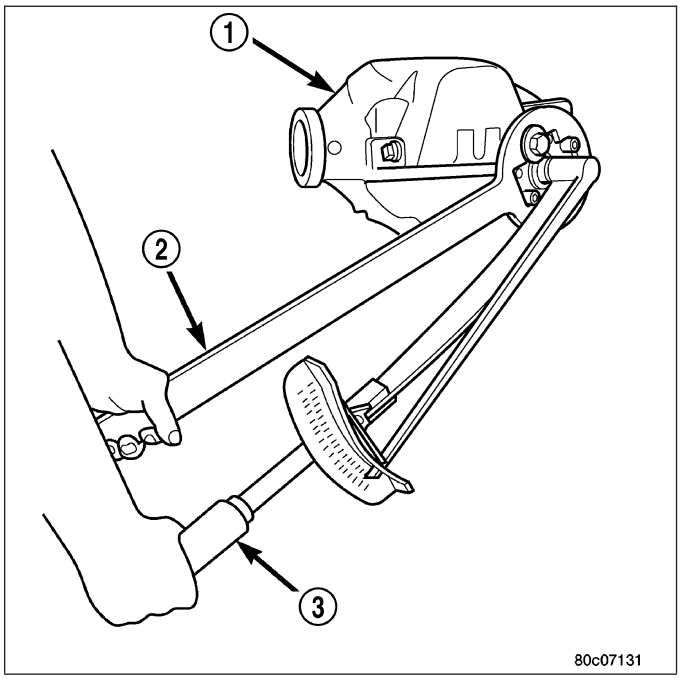
1. Apply a light coating of gear lubricant on the lip of pinion seal.
2. Install **new** pinion seal (3) with Handle C-4735 and Installer C-4076-B (1).



3. Install companion flange on the end of the shaft with the reference marks aligned.
4. Install two bolts into the threaded holes in the companion flange, 180° apart.
5. Position Holder 6719A (2) against the companion flange and install a bolt and washer into one of the remaining threaded holes. Tighten the bolts so holder is held to the flange.
6. Install companion flange on pinion shaft with Installer C-3718 and Holder 6719A (2).
7. Install pinion washer and a **new** pinion nut. The convex side of the washer must face outward.

CAUTION: Never exceed the minimum tightening torque 285 N·m (210 ft. lbs.) when installing the companion flange retaining nut at this point. Failure to follow these instructions will damage the collapsible spacer.

8. Hold companion flange with Holder 6719A (2) and tighten the pinion nut with a torque set to 285 N·m (210 ft. lbs.). Rotate pinion several revolutions to ensure the bearing rollers are seated.

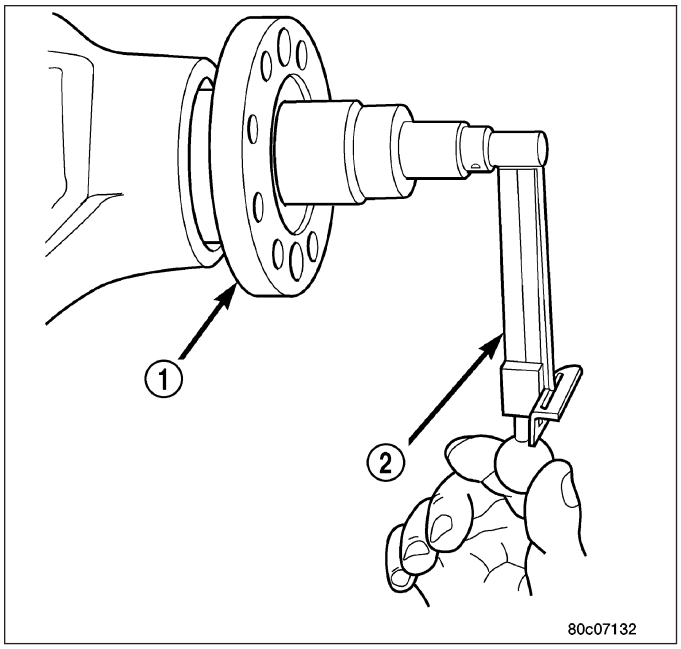


9. Measure pinion Torque To Rotate with an inch pound torque wrench (2). Pinion Torque To Rotate should be equal to the reading recorded during removal plus an additional 0.56 N·m (5 in. lbs.).

CAUTION: Never loosen pinion nut to decrease pinion bearing rotating torque and never exceed specified preload torque. If rotating torque is exceeded, a new collapsible spacer must be installed.

10. If torque to rotate is low, use Holder 6719 to hold the companion flange (1) and tighten pinion nut in 6.8 N·m (5 ft. lbs.) increments until pinion Torque To Rotate is achieved.

NOTE: The bearing rotating torque should be constant during a complete revolution of the pinion. If the rotating torque varies, this indicates a binding condition.



NOTE: The seal replacement is unacceptable if the final pinion nut torque is less than 285 N·m (210 ft. lbs.).

11. Install propeller shaft with the installation reference marks aligned.
12. Install brake rotors.
13. Check the differential lubricant level.

DIFFERENTIAL

REMOVAL

1. Remove filler plug from the differential cover.
2. Remove differential cover and drain the lubricant.
3. Clean housing cavity with flushing oil, light engine oil or a lint free cloth.

NOTE: Do not use steam, kerosene or gasoline to clean the housing.

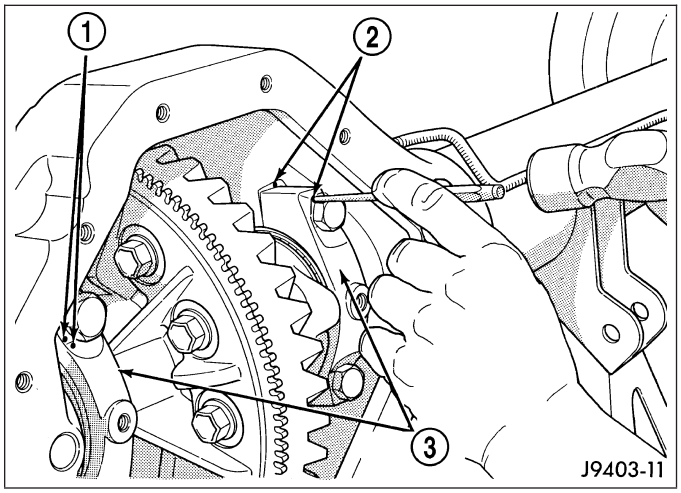
4. Remove axle shafts.
5. Remove RWAL/ABS sensor from housing.

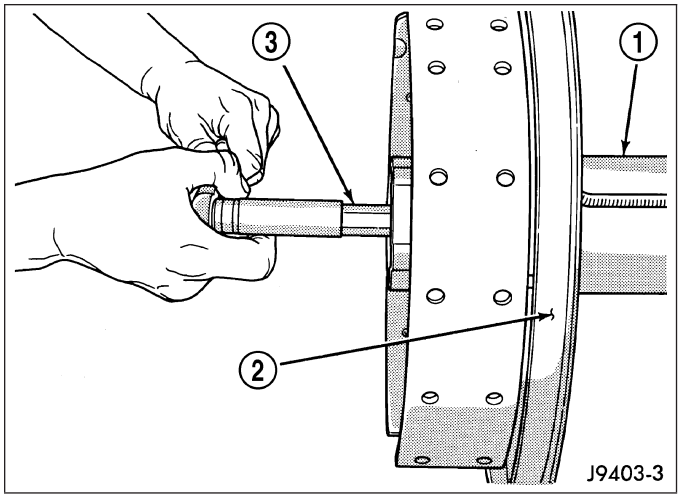
NOTE: Side play resulting from bearing races being loose on case hubs requires replacement of the differential case.

6. Mark differential housing and bearing caps (3) for installation reference.
7. Remove bearing threaded adjuster lock from each bearing cap.
8. Loosen differential bearing cap bolts.
9. Loosen differential bearing adjusters through the axle tubes (1) with Wrench C-4164 (3).
10. Hold differential case while removing bearing caps and adjusters.

NOTE: Tag the differential bearing cups and threaded adjusters to indicate their location.

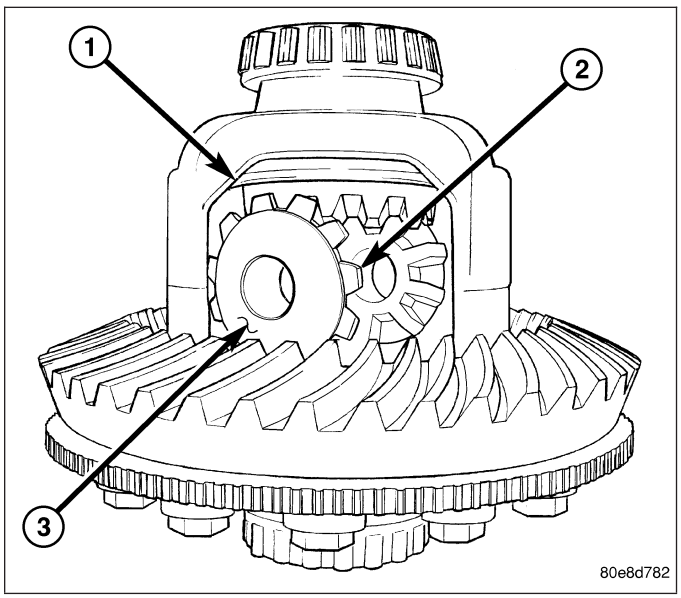
11. Remove differential case.



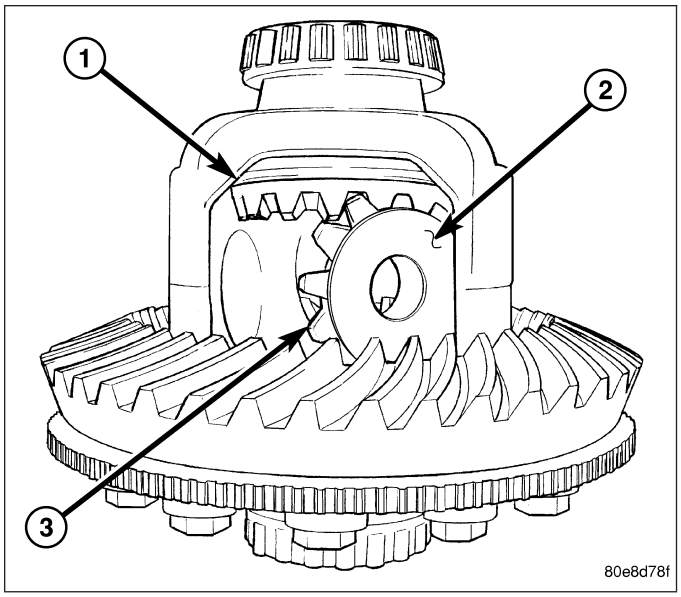


DISASSEMBLY

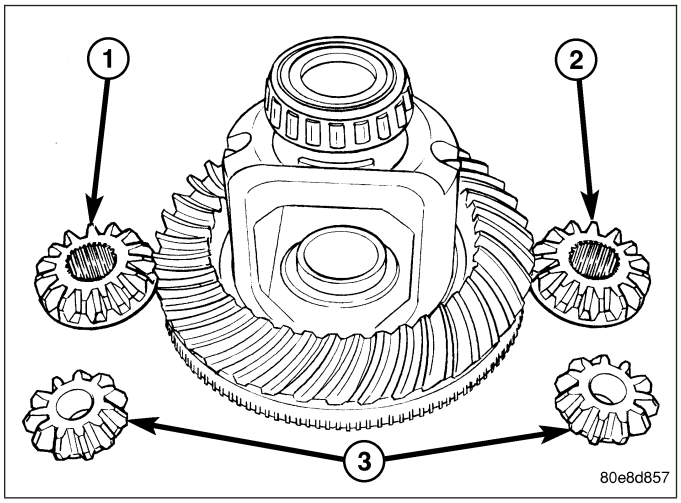
1. Rotate one pinion gear (2) with thrust washer (3) to the differential window (1) and remove gear and thrust washer.



2. Rotate remaining pinion gear (3) with thrust washer (2) to the differential window (1) and remove gear and washer.



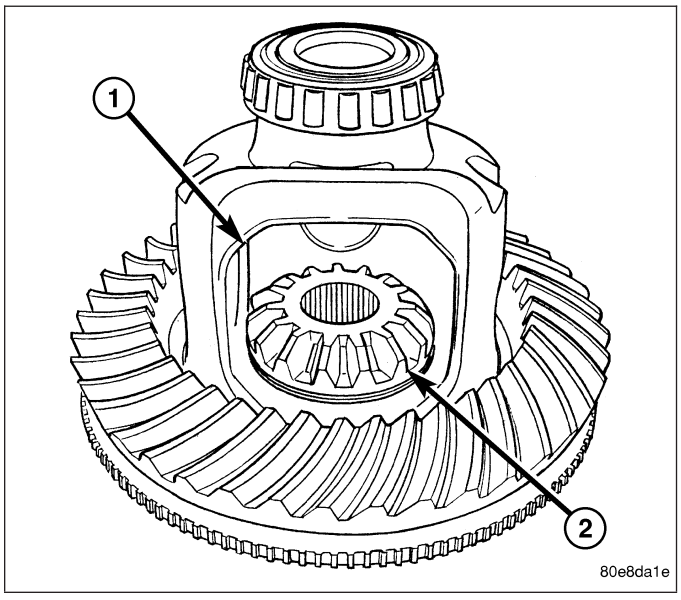
3. Remove differential side gears (1) (2) and thrust washers.



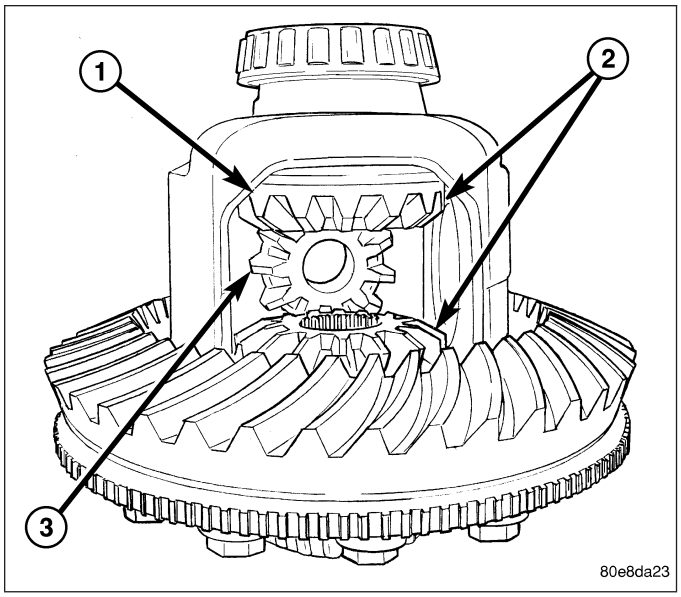
ASSEMBLY

NOTE: If same gears and thrust washers are being used, install them into their original locations.

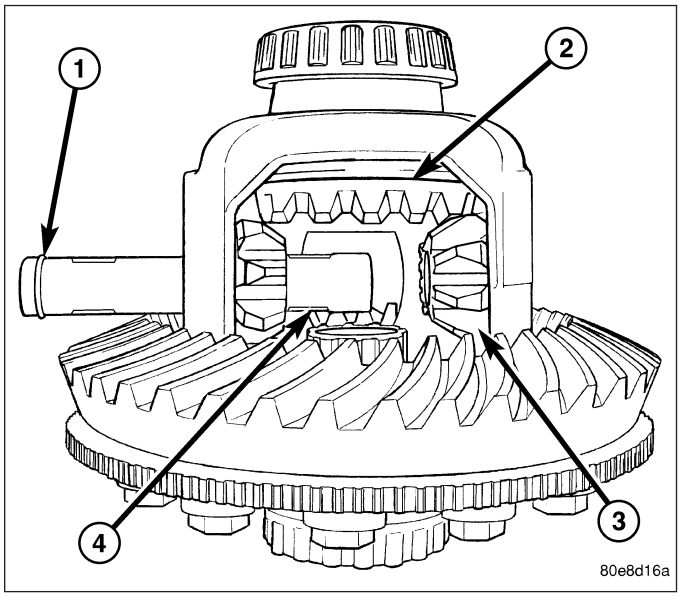
1. Lubricate all differential components with axle lubricant.
2. Install differential side gears (2) and thrust washers through differential window (1).



3. Install first pinion gear (3) with thrust washer into differential window (1) and side gears (2). Rotate pinion gear into the case.



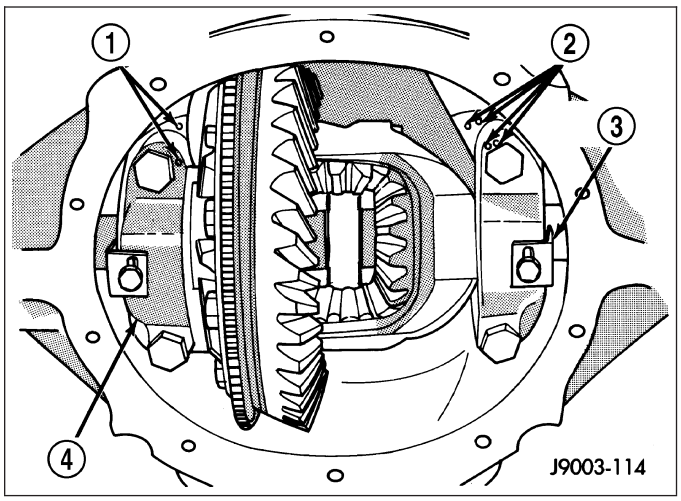
4. Install remaining pinion gear and thrust washer. Rotate gears to align hole in the pinion gears with hole in the differential case.
5. Slide pinion shaft (4) into the case and through the pinion gears (3) to align the gears.



INSTALLATION

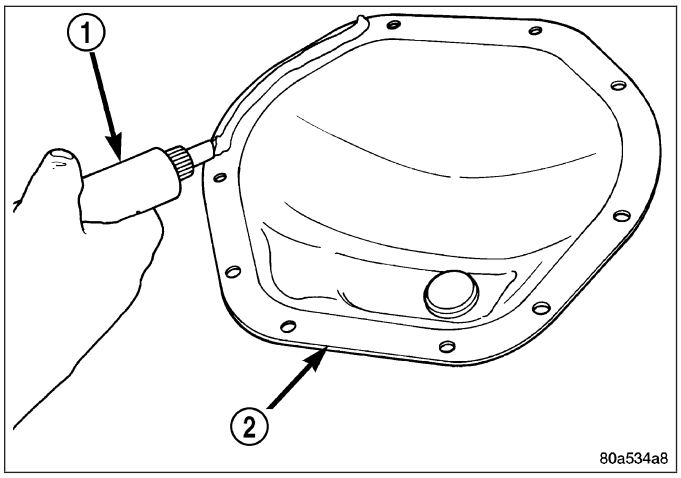
1. Apply a coating of hypoid gear lubricant to the differential bearings, bearing cups, and threaded adjusters. A dab of grease can be used to keep the adjusters in position.
2. Install differential assembly into the housing.
3. Install differential bearing caps (4) in their original locations.
4. Install bearing cap bolts and tighten the upper bolts to 14 N·m (10 ft. lbs.). Tighten lower bolts finger-tight until the bolt head is seated. Then perform the differential bearing preload and adjustment procedure.

NOTE: Be sure that all bearing cap bolts are tightened to their final torque of 136 N·m (100 ft. lbs.) before proceeding.



5. Install axle shafts.

6. Apply a bead of orange Mopar™ Axle RTV Sealant (1) or equivalent to the cover (2).



CAUTION: If cover is not installed within 3 to 5 minutes, the cover must be cleaned and new RTV applied. Failure to follow these instruction will result in a leak.

7. Install cover and any identification tag and tighten cover bolts to 41 N·m (30 ft. lbs.).
8. Fill differential with lubricant to bottom of the fill plug hole.

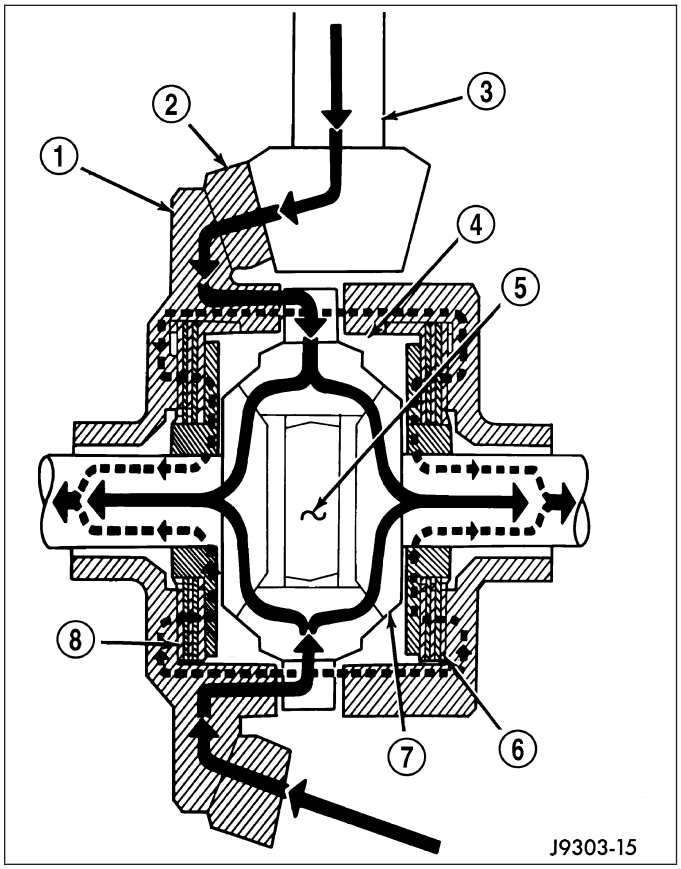
NOTE: Trac-lok® differential equipped vehicles should be road tested by making 10 to 12 slow figure-eight turns. This maneuver will pump the lubricant through the clutch discs to eliminate a possible chatter noise complaint.

DIFFERENTIAL-TRAC-LOK

OPERATION-TRAC-LOK®

This differential clutches are engaged by two concurrent forces. The first being the preload force exerted through Belleville spring washers within the clutch packs (6) (8). The second is the separating forces generated by the side gears (7) as torque is applied through the ring gear (2).

This design provides the differential action needed for turning corners and for driving straight ahead during periods of unequal traction. When one wheel looses traction, the clutch packs transfer additional torque to the wheel having the most traction. This differential resist wheel spin on bumpy roads and provide more pulling power when one wheel looses traction. Pulling power is provided continuously until both wheels loose traction. If both wheels slip due to unequal traction, Trac-lok® operation is normal. In extreme cases of differences of traction, the wheel with the least traction may spin.



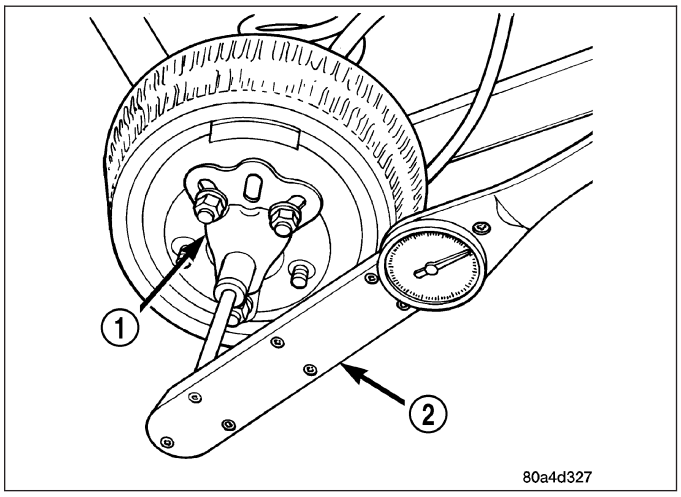
DIAGNOSIS AND TESTING

DIFFERENTIAL-TRAC-LOK®

A common problem of the Trac-Lok® differential is a chatter noise when turning corners. Before removing the unit for repair, drain, flush and refill the axle with the specified lubricant. Add a container of Mopar Limited Slip Additive after repair service or during a lubricant change.

After changing the lubricant, drive the vehicle and make 10 to 12 slow, figure-eight turns. This maneuver will pump lubricant through the clutches. This will correct the condition in most instances. If the chatter persists, clutch damage could have occurred.

The differential can be tested without removing the differential case by measuring rotating torque. Make sure brakes are not dragging during this measurement.



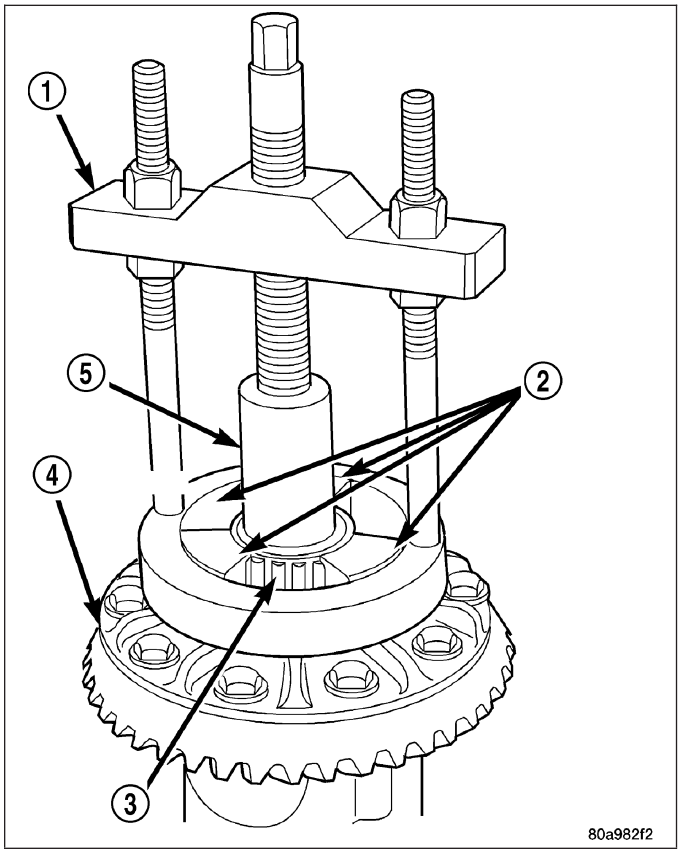
1. Place blocks in front and rear of both front wheels.
2. Raise one rear wheel until it is completely off the ground.
3. Engine off, transmission in neutral, and parking brake off.
4. Remove wheel and bolt Torque Check Tool 6790 (1) or equivalent tool to studs.
5. Use torque wrench (2) on Torque Check Tool (1) to rotate wheel and read rotating torque.

6. If rotating torque is less than 41 N·m (30 ft. lbs.) or more than 271 N·m (200 ft. lbs.) on either wheel the unit must be replaced.

BEARINGS-DIFFERENTIAL CASE

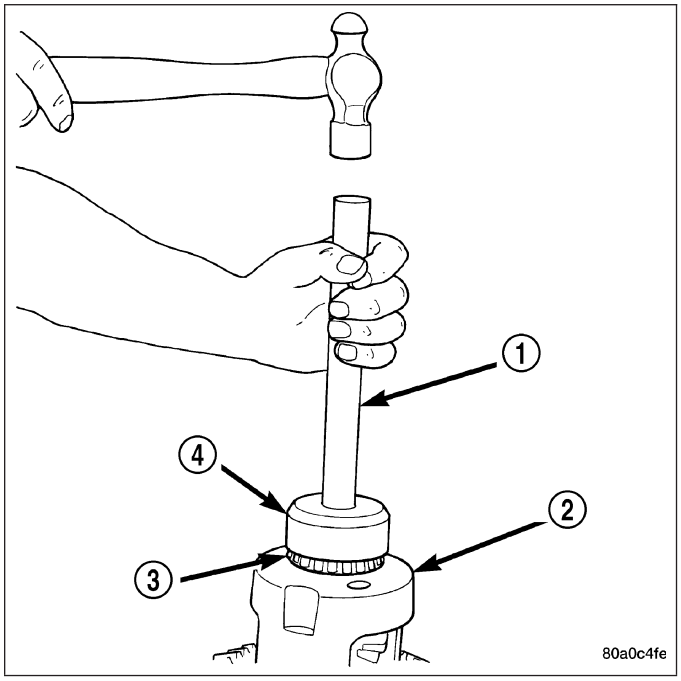
REMOVAL

1. Remove differential case from axle housing.
2. Remove differential bearings (3) from the case with Puller/Press C-293-PA (1) and Adapters C-293-47 (2) and Plug C-293-3 (5).



INSTALLATION

1. Install differential side bearings (3) with Installer C-4213 (4) and Handle C-4171 (1).
2. Install differential case into housing.

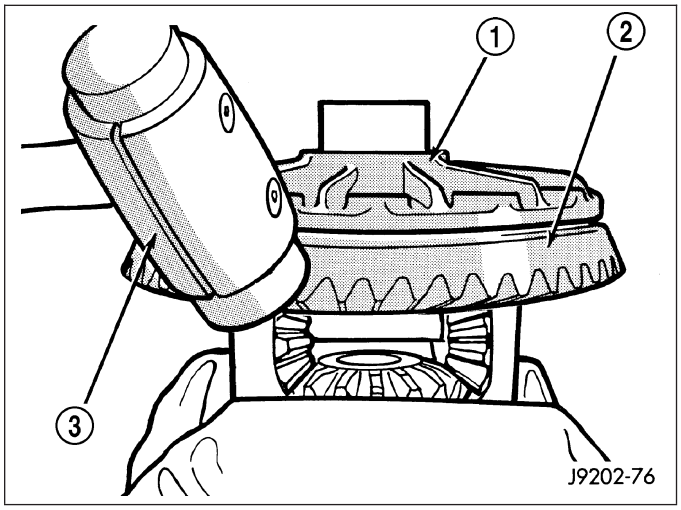


GEAR-PINION/RING

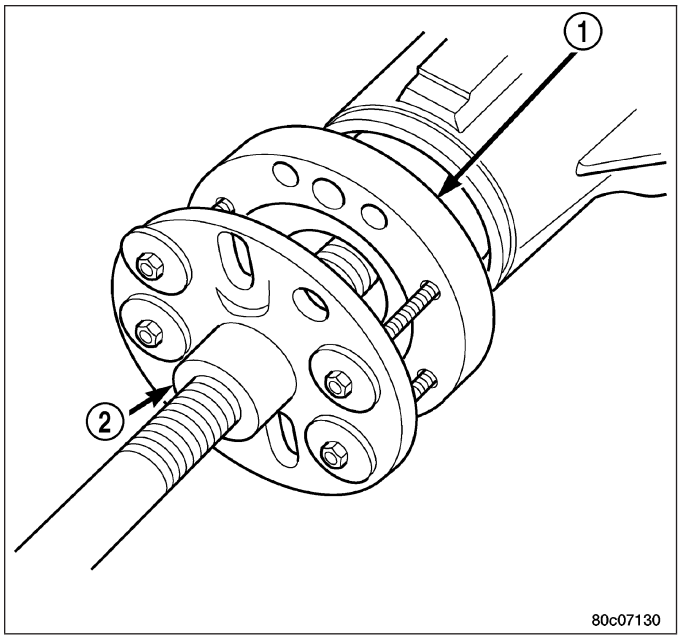
REMOVAL

NOTE: The ring gear and pinion are serviced in a matched set. Never replace one gear without replacing the other matching gear.

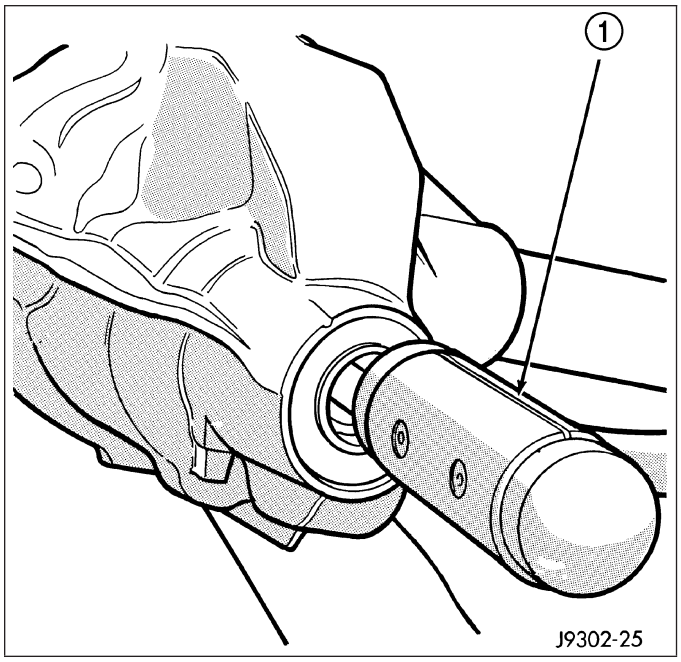
1. Mark companion flange and propeller shaft for installation reference.
2. Remove propeller shaft.
3. Remove axle shafts.
4. Remove differential from the differential housing.
5. Place differential case (1) in a vise with soft metal jaw protectors.
6. Remove ring gear bolts from the differential case.
7. Drive ring gear (2) off the differential case (1) with a soft hammer (3).



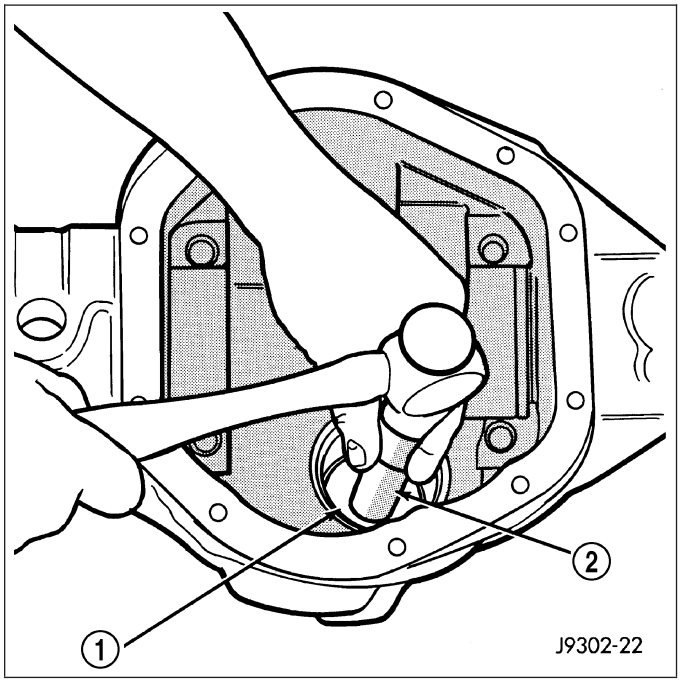
8. Install bolts into two of the threaded holes in the companion flange 180° apart.
9. Position Holder 6719A against the companion flange and install a bolt and washer into one of the remaining threaded holes. Tighten the bolts so the Holder 6719A is held to the flange.
10. Use Holder 6719A to hold companion flange and remove the companion flange nut and washer.
11. Remove companion flange (1) with Puller C-452 (2).



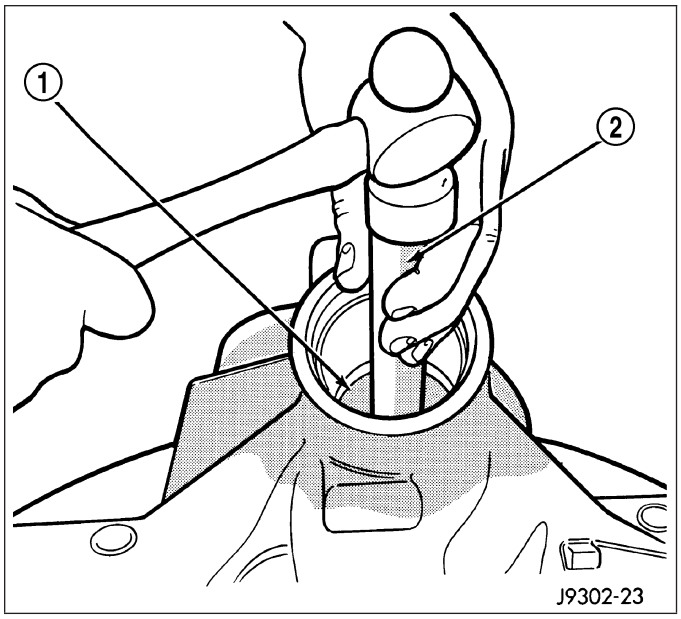
12. Remove pinion gear from the housing with a soft hammer (1).
13. Remove pinion seal with a pry tool or slide-hammer mounted screw.
14. Remove front pinion bearing and oil slinger if equipped.



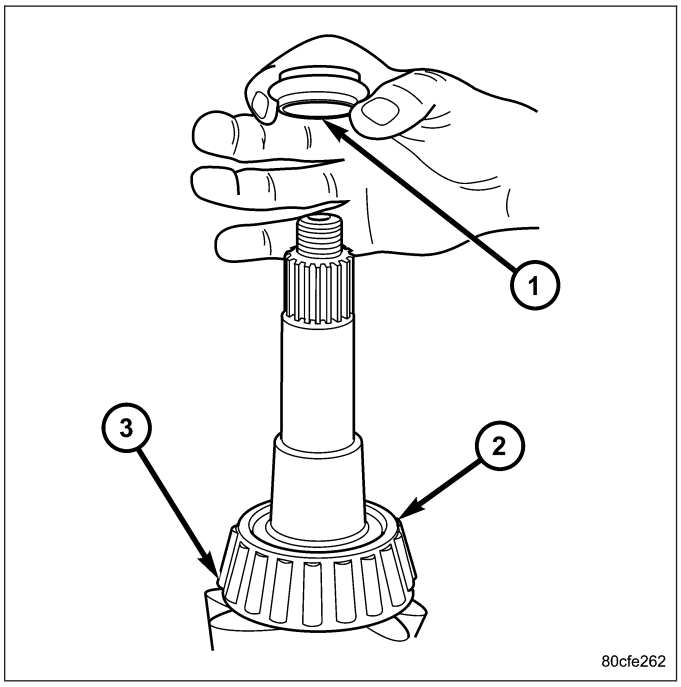
15. Remove front pinion bearing cup with Remover C-4345 (1) and Handle C-4171 (2).



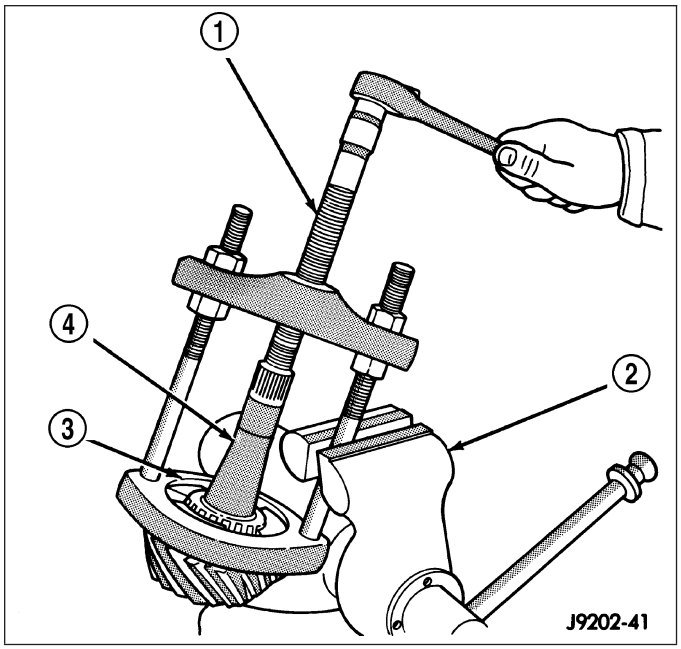
16. Remove rear pinion bearing cup from housing with Remover C-4307 (1) and Handle C-4171 (2).



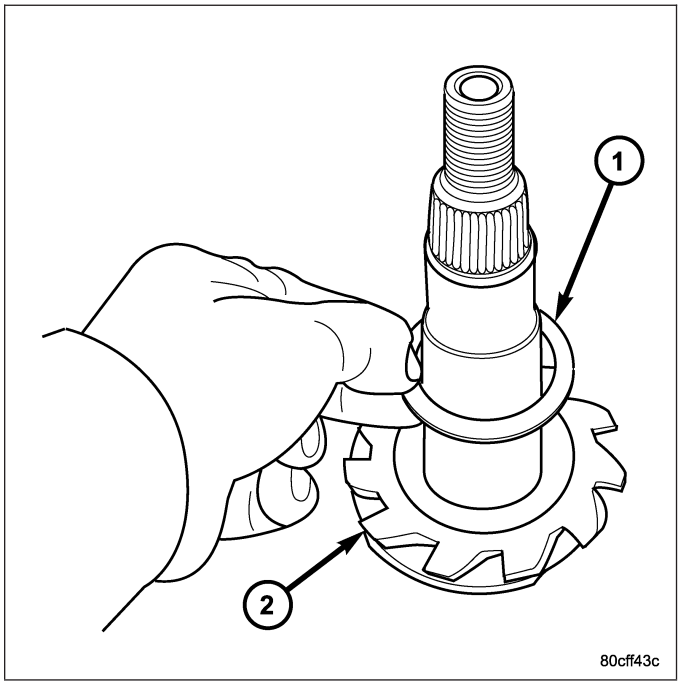
17. Remove collapsible spacer (1) from the pinion shaft.



18. Remove rear pinion bearing from the pinion shaft (4) with Puller C-293-PA (1) and Adapters C-293-37 (3).



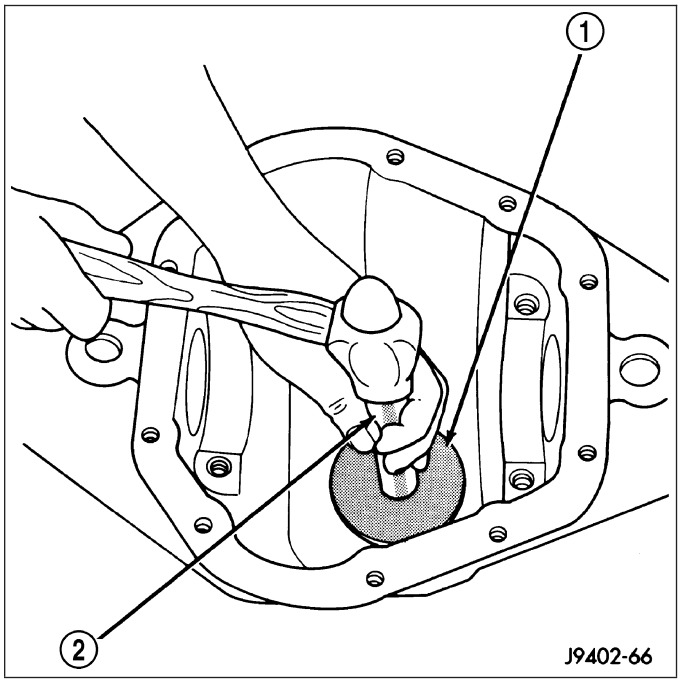
19. Remove pinion depth shim (1) from the pinion shaft (2) and record shim thickness.



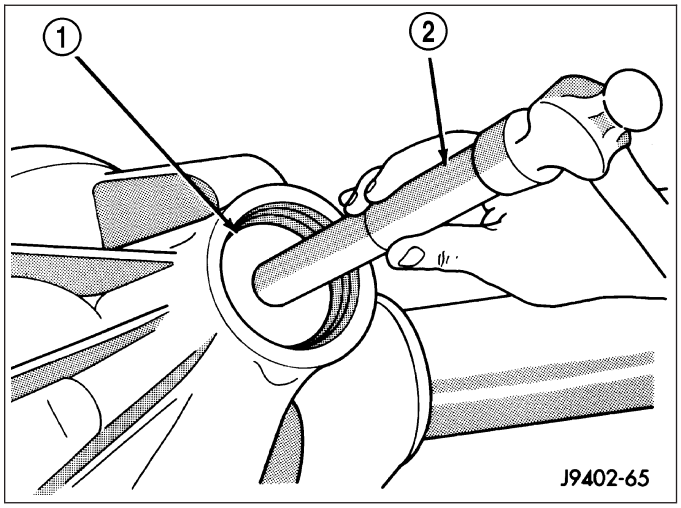
INSTALLATION

NOTE: The ring gear and pinion are serviced in a matched set. Do not replace one gear without replacing the other matching gear. If ring and pinion gears or bearings are replaced, Refer to Adjustments for Pinion Gear Depth Setting.

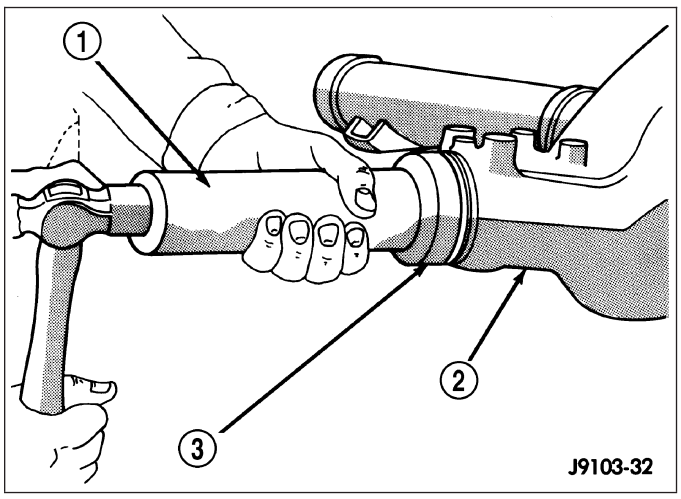
1. Install rear pinion bearing cup with Installer C-4308 (1) and Handle C-4171 (2) and verify cup is seated.



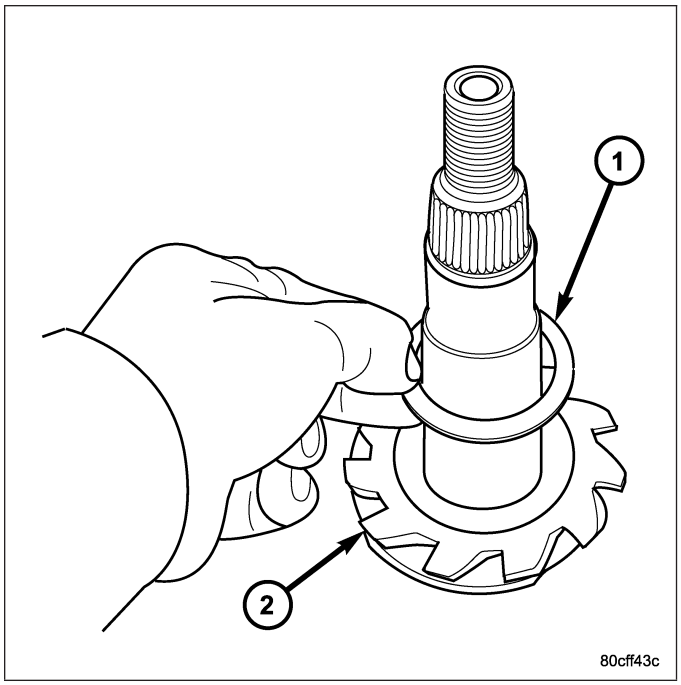
2. Install front pinion bearing cup with Installer D-129 (1) and Handle C-4171 (2) and verify cup is seated.
3. Lubricate and install front pinion bearing into the housing.



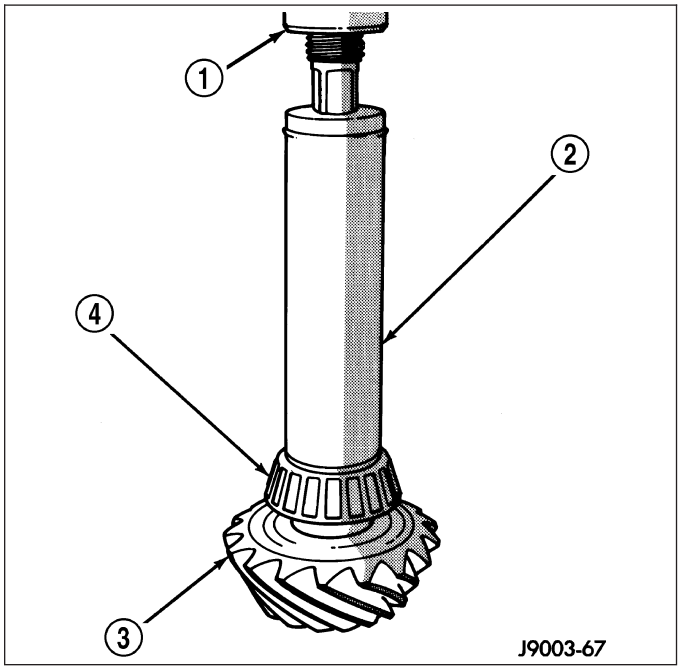
4. Apply a light coating of gear lubricant on the lip of pinion seal. Install seal with Installer C-4076-B (3) and Handle C-4735 (1).



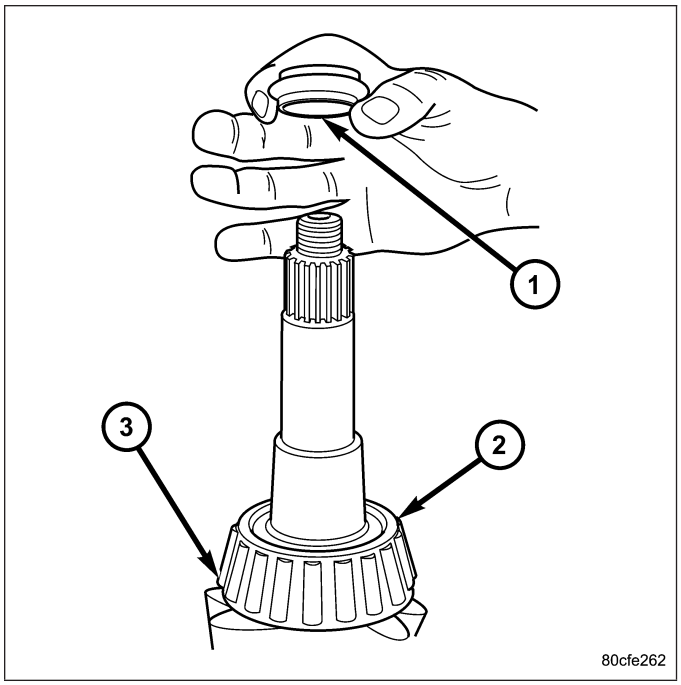
5. Install pinion depth shim (1) on the pinion gear shaft (2).



6. Install rear bearing (4) on the pinion (3) with Installer C-3095-A (2) and a press (1).



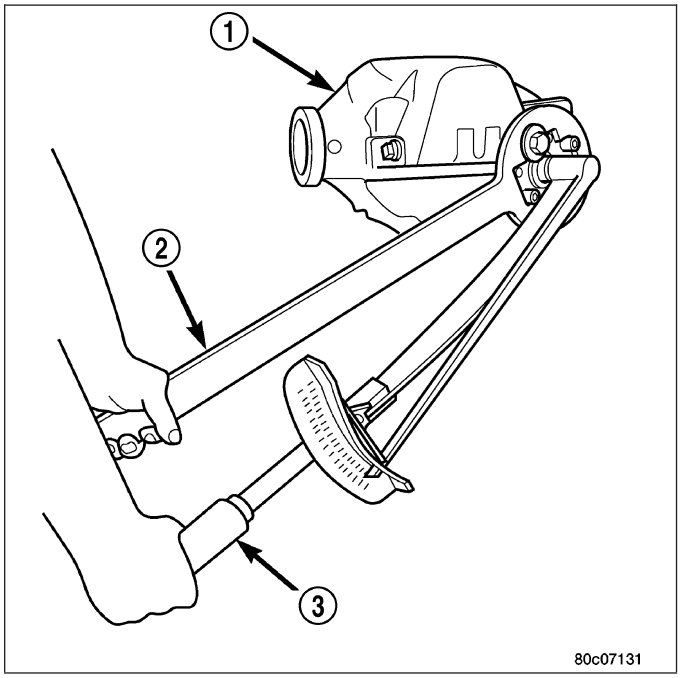
7. Install a **new** collapsible spacer (1) on the pinion shaft.
8. Lubricate rear pinion bearing and install pinion gear into the housing.
9. Install companion flange with Installer C-3718 and Holder 6719A.



10. Install bolts into two of the threaded holes in the companion flange 180° apart.
11. Position Holder 6719A (2) against the companion flange and install a bolt and washer into one of the remaining threaded holes. Tighten the bolts so the Holder 6719A is held to the flange.
12. Install companion flange washer and a **new** nut on the pinion and tighten the nut until there is zero bearing end-play.
13. With a torque wrench (3) tighten the nut to 285 N·m (210 ft. lbs.).

CAUTION: Never loosen pinion nut to decrease pinion rotating torque and never exceed specified preload torque. Failure to follow these instructions will damage the collapsible spacer.

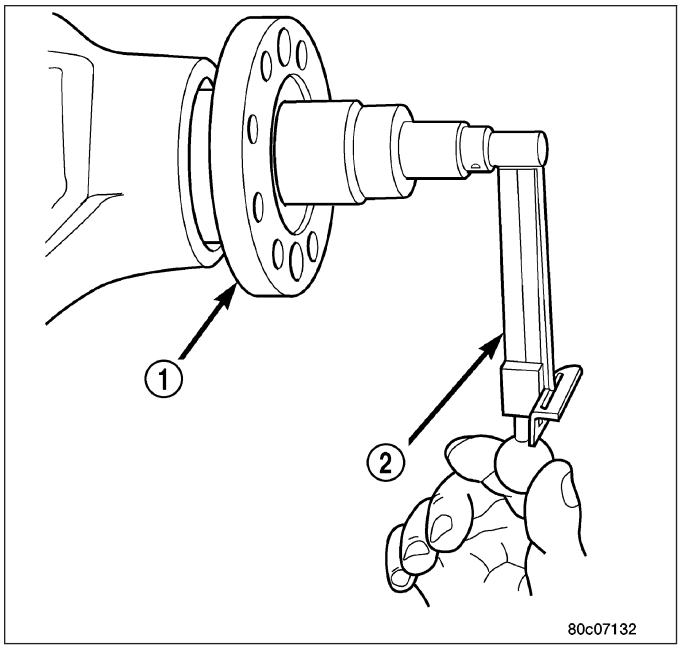
14. Slowly tighten the nut in 6.8 N·m (5 ft. lbs.) increments until pinion Torque to Rotate is achieved.



15. Measure pinion Torque To Rotate with an inch pound torque wrench (2). The pinion Torque To Rotate is:
    - Original Bearings: 1 to 3 N·m (10 to 20 in. lbs.).
    - New Bearings: 1.7 to 5 N·m (15 to 35 in. lbs.).

NOTE: Measure pinion Torque to Rotate frequently to avoid over crushing the collapsible spacer.

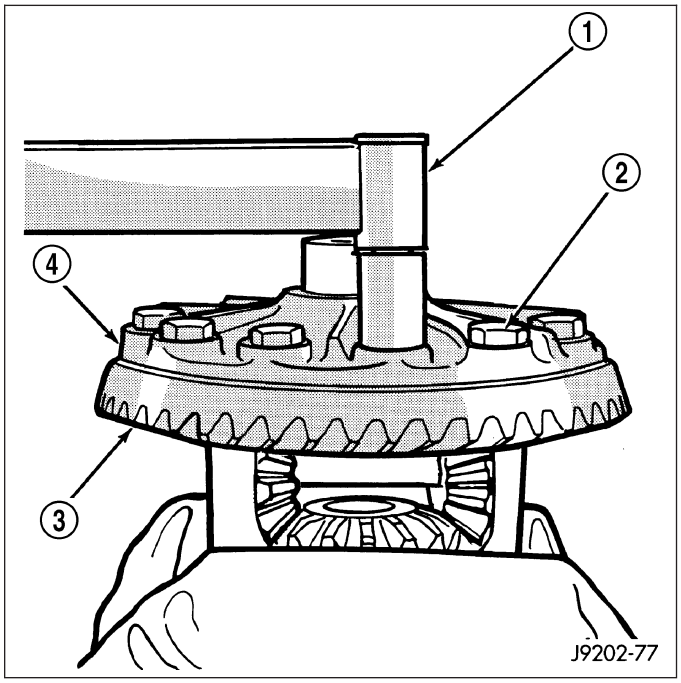
16. Position exciter ring on differential case. With a brass drift, slowly and evenly tap the exciter ring into position.



17. Position ring gear (3) on the differential case (4) and start two ring gear bolts (2). This will provide case-to-ring gear bolt hole alignment.
18. Invert the differential case in the vise.
19. Install **new** ring gear bolts and alternately tighten to 156 N·m (115 ft. lbs.).

CAUTION: Never reuse the ring gear bolts. Failure to follow these instruction will result in damage.

20. Install differential in housing and verify gear mesh, backlash and contact pattern.
21. Install axle shafts.
22. Install differential cover and fill with gear lubricant.
23. Install propeller shaft with reference marks aligned.



REAR AXLE - 10 1/2 AA

TABLE OF CONTENTS

page

REAR AXLE - 10 1/2 AA
DIAGNOSIS AND TESTING
REAR AXLE - 10 1/2 AA 352
REMOVAL 355
INSTALLATION 356
ADJUSTMENTS
PINION DEPTH-BEARING PRELOAD-GEAR BACKLASH 357
SPECIFICATIONS
REAR AXLE - 10 1/2 AA 361
SPECIAL TOOLS 363
SHAFT-AXLE
REMOVAL 367
INSTALLATION 367
BEARINGS-AXLE HUB
REMOVAL 368
INSTALLATION 369
SEAL-PINION
REMOVAL 370
INSTALLATION 371
DIFFERENTIAL
REMOVAL 372
DISASSEMBLY 373
ASSEMBLY 374
INSTALLATION 376
BEARINGS-DIFFERENTIAL CASE
REMOVAL 378
INSTALLATION 378
DIFFERENTIAL-TRAC-RITE
DESCRIPTION 379
OPERATION 380
CLEANING 380
DIFFERENTIAL-ELECTRIC LOCKER
DESCRIPTION 381
DIAGNOSIS AND TESTING
DIFFERENTIAL-ELECTRIC LOCKER 381
REMOVAL 382
DISASSEMBLY 384
ASSEMBLY 386
INSTALLATION 387
BEARINGS-EL DIFFERENTIAL CASE
REMOVAL 390
INSTALLATION 390
GEAR-PINION/RING
REMOVAL 391
INSTALLATION 393

REAR AXLE - 10 1/2 AA

DIAGNOSIS AND TESTING

REAR AXLE - 10 1/2 AA

GEAR NOISE

Axle gear noise can be caused by insufficient lubricant, incorrect backlash, incorrect pinion depth, tooth contact, worn/damaged gears, or the carrier housing not having the proper offset and squareness.

Gear noise usually happens at a specific speed range. The noise can also occur during a specific type of driving condition. These conditions are acceleration, deceleration, coast, or constant load.

When road testing, first warm-up the axle fluid by driving the vehicle at least 5 miles and then accelerate the vehicle to the speed range where the noise is the greatest. Shift out-of-gear and coast through the peak-noise range. If the noise stops or changes greatly check for:

- Insufficient lubricant.
- Incorrect ring gear backlash.
- Gear damage.

Differential side gears and pinions can be checked by turning the vehicle. The side gears are loaded during turns. They usually do not cause noise during straight-ahead driving when the gears are unloaded. A worn pinion shaft can also cause a snapping or a knocking noise.

BEARING NOISE

The axle shaft, differential and pinion bearings can all produce noise when worn or damaged. Bearing noise can be either a whining, or a growling sound.

Pinion bearings have a constant-pitch noise. This noise changes only with vehicle speed. Pinion bearing noise will be higher pitched because it rotates at a faster rate. Drive the vehicle and load the differential. If bearing noise occurs, the rear pinion bearing is the source of the noise. If the bearing noise is heard during a coast, the front pinion bearing is the source.

Differential bearings usually produce a low pitch noise. Differential bearing noise is similar to pinion bearing noise. The pitch of differential bearing noise is also constant and varies only with vehicle speed.

Axle shaft bearings produce noise and vibration when worn or damaged. The noise generally changes when the bearings are loaded. Road test the vehicle. Turn the vehicle sharply to the left and to the right. This will load the bearings and change the noise level. Where axle bearing damage is slight, the noise is usually not noticeable at speeds above 30 m.p.h.

LOW SPEED KNOCK

Low speed knock is generally caused by:

- Worn U-joint(s).
- Worn side-gear thrust washers.
- Worn pinion shaft bore.

VIBRATION

Vibration at the rear of the vehicle is usually caused by:

- Damaged drive shaft.
- Missing drive shaft balance weight(s).
- Worn or out-of-balance wheels.
- Loose wheel lug nuts.
- Worn U-joint(s).
- Loose/broken springs.
- Damaged axle shaft bearing(s).
- Loose pinion gear nut.
- Excessive pinion yoke run out.

- Bent axle shaft(s).

Check for loose or damaged front-end components or engine/transmission mounts. These components can contribute to what appears to be a rear end vibration. Do not overlook engine accessories, brackets and drive belts.

NOTE: All driveline components should be examined before starting any repair.

DRIVELINE SNAP

A snap or clunk noise when the vehicle is shifted into gear (or the clutch engaged), can be caused by:

- High engine idle speed.
- Transmission shift operation.
- Loose engine/transmission/transfer case mounts.
- Worn U-joints.
- Loose spring mounts.
- Loose pinion gear nut and yoke.
- Excessive ring gear backlash.
- Excessive side gear to case clearance.

The source of a snap or a clunk noise can be determined with the assistance of a helper. Raise the vehicle on a hoist with the wheels free to rotate. Instruct the helper to shift the transmission into gear and listen for the noise. A mechanics stethoscope is helpful in isolating the source of a noise.

DIAGNOSTIC CHART

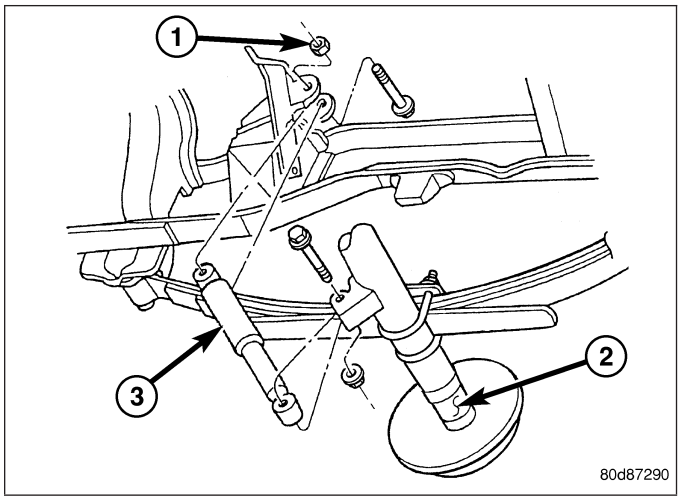
Condition	Possible Causes	Correction
Wheel Noise	1. Wheel loose.	1. Tighten loose nuts.
	2. Worn wheel bearing.	2. Replace bearing.
Axle Shaft Noise	1. Misaligned axle tube.	1. Inspect axle tube alignment. Correct as necessary.
	2. Bent or sprung axle shaft.	2. Inspect and correct as necessary.
Axle Shaft Broke	1. Misaligned axle tube.	1. Replace the broken shaft after correcting tube mis-alignment.
	2 Vehicle overloaded.	2. Replace broken shaft and avoid excessive weight on vehicle.
	3. Erratic clutch operation.	3. Replace broken shaft and avoid or correct erratic clutch operation.
	4. Grabbing clutch.	4. Replace broken shaft and inspect and repair clutch as necessary.

Condition	Possible Causes	Correction
Differential Cracked	1. Improper adjustment of the differential bearings.	1. Replace case and inspect gears and bearings for further damage. Set differential bearing pre-load properly.
	2. Excessive ring gear backlash.	2. Replace case and inspect gears and bearings for further damage. Set ring gear backlash properly.
	3. Vehicle overloaded.	3. Replace case and inspect gears and bearings for further damage. Avoid excessive vehicle weight.
	4. Erratic clutch operation.	4. Replace case and inspect gears and bearings for further damage. Avoid erratic use of clutch.
Differential Gears Scored	1. Insufficient lubrication.	1. Replace scored gears. Fill differential with the correct fluid type and quantity.
	2. Improper grade of lubricant.	2. Replace scored gears. Fill differential with the correct fluid type and quantity.
	3. Excessive spinning of one wheel/tire.	3. Replace scored gears. Inspect all gears, pinion bores, and shaft for damage. Service as necessary.
Loss Of Lubricant	1. Lubricant level too high.	1. Drain lubricant to the correct level.
	2. Worn axle shaft seals.	2. Replace seals.
	3. Cracked differential housing.	3. Repair as necessary.
	4. Worn pinion seal.	4. Replace seal.
	5. Worn/scored yoke.	5. Replace yoke and seal.
	6. Axle cover not properly sealed.	6. Remove, clean and seal cover.
Axle Overheating	1. Lubricant level low.	1. Fill differential to correct level.
	2. Improper grade of lubricant.	2. Fill differential with the correct fluid type and quantity.
	3. Bearing pre-loads too high.	3. Adjust bearing pre-loads.
	4. Insufficient ring gear backlash.	4. Adjust ring gear backlash.
Gear Teeth Broke	1. Overloading.	1. Replace gears. Examine other gears and bearings for possible damage.
	2. Erratic clutch operation.	2. Replace gears and examine the remaining parts for damage. Avoid erratic clutch operation.
	3. Ice-spotted pavement.	3. Replace gears and examine remaining parts for damage.
	4. Improper adjustments.	4. Replace gears and examine remaining parts for damage. Ensure ring gear backlash is correct.

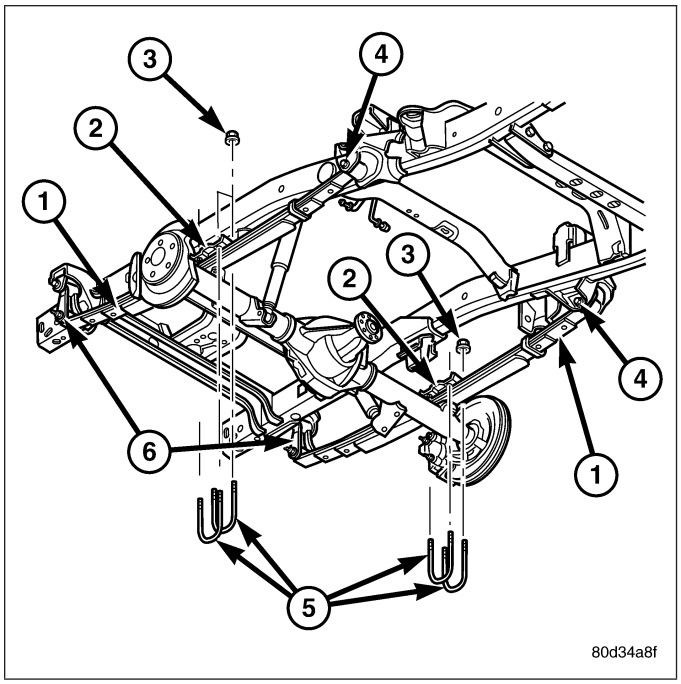
Condition	Possible Causes	Correction
Axle Noise	1. Insufficient lubricant.	1. Fill differential with the correct fluid type and quantity.
	2. Improper ring gear and pinion adjustment.	2. Check ring gear and pinion contact pattern. Adjust backlash or pinion depth.
	3. Unmatched ring gear and pinion.	3. Replace gears with a matched ring gear and pinion.
	4. Worn teeth on ring gear and pinion.	4. Replace ring gear and pinion.
	5. Loose pinion bearings.	5. Adjust pinion bearing pre-load.
	6. Loose differential bearings.	6. Adjust differential bearing pre-load.
	7. Ring gear run-out.	7. Measure ring gear run-out. Replace components as necessary.
	8. Loose differential bearing cap bolts.	8. Inspect differential components and replace as necessary. Ensure that the bearing caps are torqued tot he proper specification.
	9. Housing not machined properly.	9. Replace housing.

REMOVAL

1. With vehicle in neutral, position vehicle on hoist.
2. Position a lift under axle and secure lift to the axle.
3. Remove all brake components.
4. Remove axle vent hose.
5. Mark propeller shaft and companion flange for installation alignment reference.
6. Remove propeller shaft.
7. Remove shock absorbers (3) from axle (2).

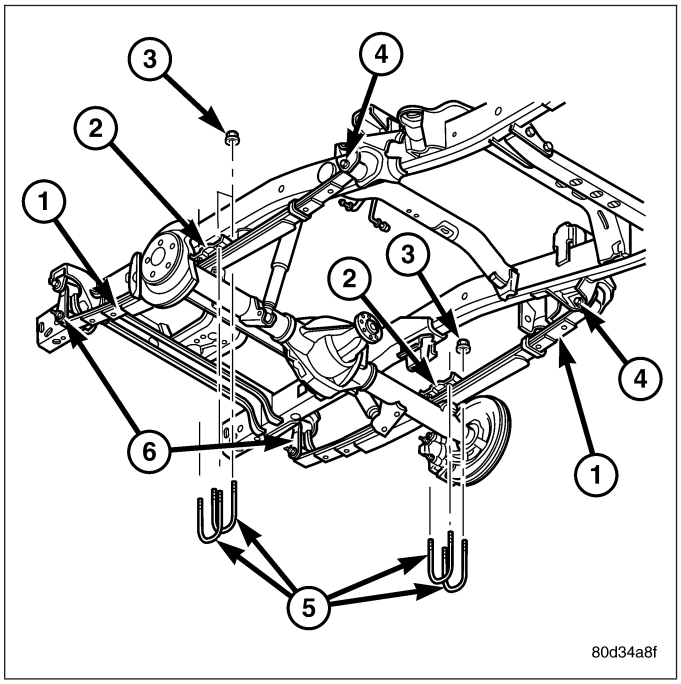


8. Remove U-bolts (5) from axle.
9. Remove axle from the vehicle.



INSTALLATION

1. Raise axle with lift and align to the leaf spring centering bolts.
2. Install axle U-bolts (5) and tighten to 149 N·m (110 ft. lbs.).
3. Install shock absorbers to axle and tighten to specification.
4. Install all brake components.
5. Install axle vent hose.
6. Install propeller shaft with reference marks aligned and tighten to specification.
7. Fill differential to specifications.



ADJUSTMENTS

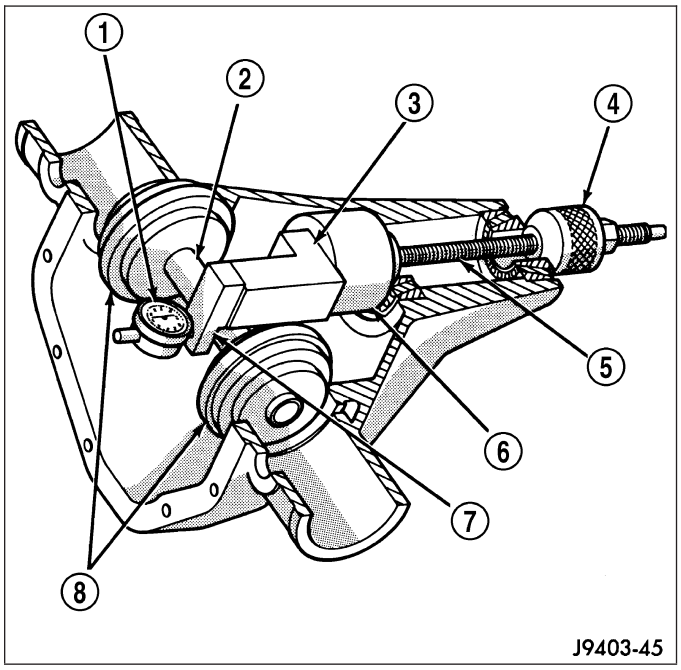
PINION DEPTH-BEARING PRELOAD-GEAR BACKLASH

PINION DEPTH MEASUREMENT

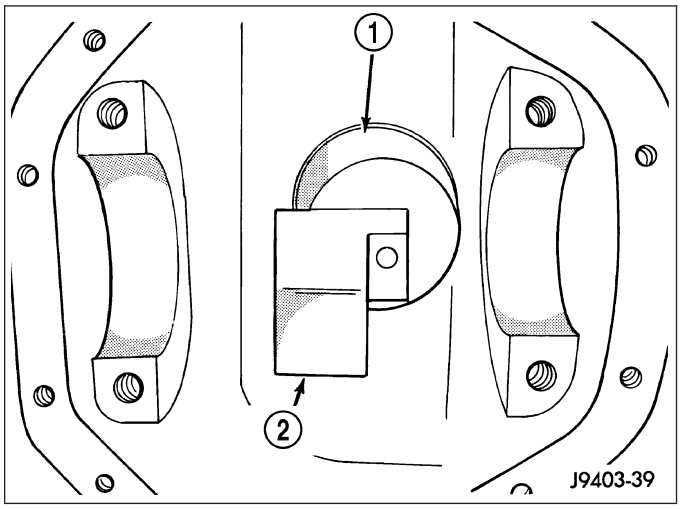
Ring and pinion gears are supplied as matched sets. Compensation for pinion depth variance is achieved with a select shim. The shim is located between the rear pinion bearing and the pinion gear head.

Measurements are taken with pinion bearing cups and pinion bearings installed in the housing. Take measurements with Pinion Gauge Set and Dial Indicator C-3339.

1. Assemble Pinion Height Block 6739 (3), Pinion Block 8899 (6) and rear pinion bearing onto Screw 6741 (5).



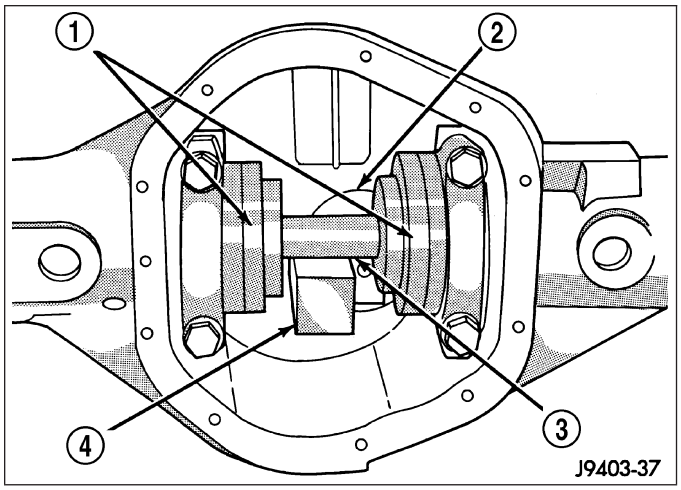
2. Insert pinion block (1), pinion height block (2), rear bearing and screw into the housing through pinion bearing cups.
3. Install front pinion bearing and Cone-nut 6740 onto the screw. Tighten cone-nut until Torque To Rotate the screw is 1.7-2.26 N·m (15-20 in. lbs.).



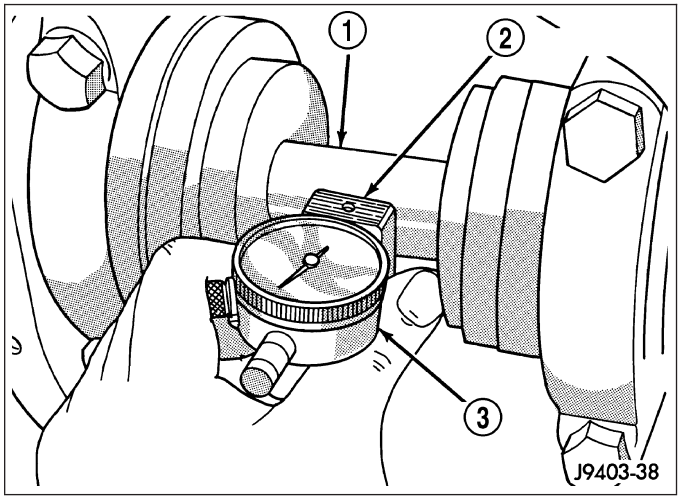
4. Place Arbor Discs 6732 (1) on Arbor D-115-3 (3) in position in the housing side bearing cradles.
5. Install differential bearing caps on arbor discs (1) and snug the bearing cap bolts. Then cross tighten cap bolts to 165 N·m (122 ft. lbs.).

NOTE: Arbor should rotate freely in the arbor discs.

6. Assemble Dial Indicator C-3339 into Scooter Block D-115-2 and secure set screw.



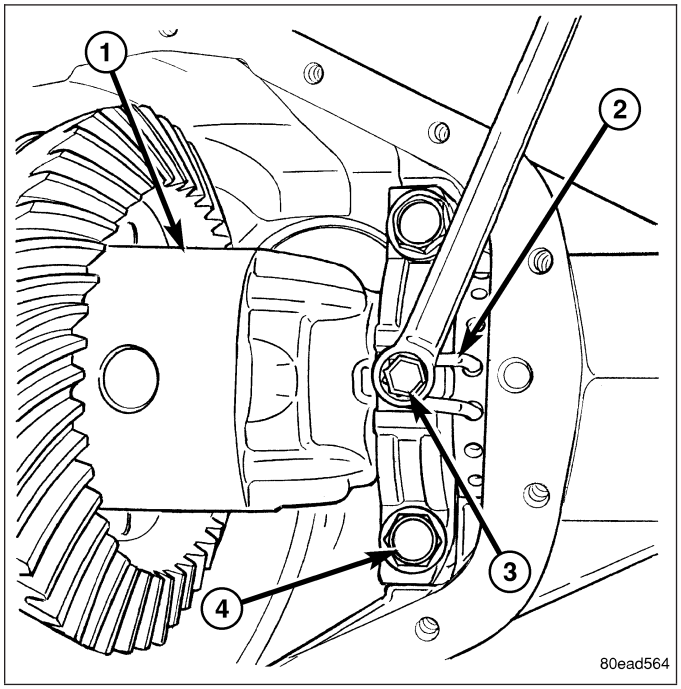
7. Position scooter block (2) with dial indicator (3) flush on the pinion height block. Hold scooter block and zero the dial indicator.
8. Slowly slide the scooter block (2) across the pinion height block over to the arbor (1). Move the scooter block till dial indicator crests the arbor, then record the highest reading.
9. Select a shim equal to the dial indicator reading.
10. Install the select shim between the rear pinion bearing and the pinion gear head.



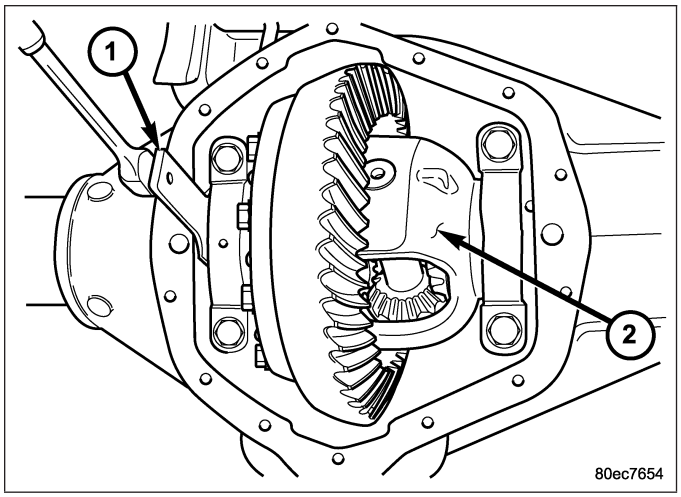
DIFFERENTIAL CASE BEARING PRELOAD AND GEAR BACKLASH

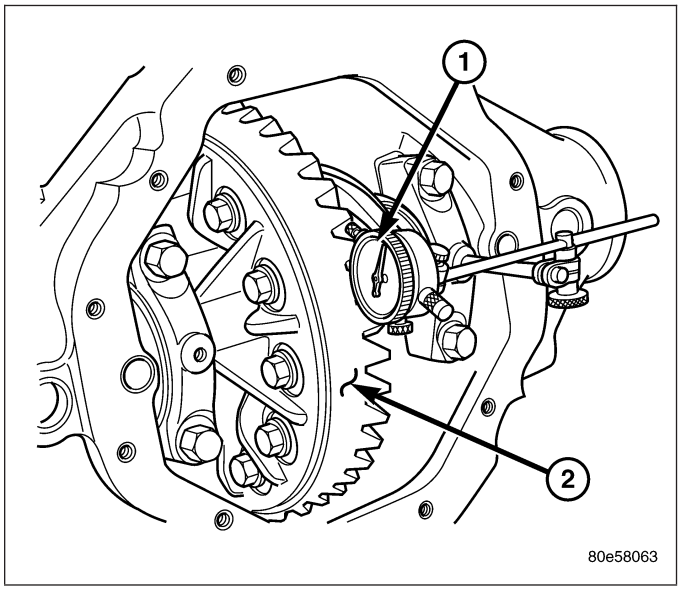
Backlash is adjusted by moving the adjusters in and out or both. By moving the adjusters the case/ring gear will move closer or further away from the pinion. In most cases this adjustment can be used to achieve the correct gear tooth pattern and set the case bearing preload.

1. Remove adjuster lock bolts (3) and adjuster locks (2).
2. **Loosen** the differential bearing cap bolts (4).
3. Slide differential case (1) toward the pinion gear until the gears make contact/zero backlash. If zero backlash cannot be obtained, turn the pinion side adjuster until zero backlash is obtained.



4. Holding the differential case (2) toward the pinion gear, turn bearing adjusters with Adjuster Wrench 8883 (1) until they make contact with the differential bearings/cups.
5. Back off the ring gear side adjuster 4 holes, to obtain initial ring gear backlash.
6. Install ring gear side adjuster lock and bolt. **Do not tighten** adjuster lock bolt at this time.
7. Tighten pinion gear side adjuster firmly against the differential case bearing cup.
8. Rotate the pinion several times to seat the deferential bearings.
9. Loosen pinion gear side adjuster until it is no longer in contact with the bearing cup, then tighten it until it makes contact.
10. Tighten pinion gear side adjuster an additional:
    - **New Bearings:** 6 Adjuster Holes
    - **Original Bearings:** 4 Adjuster Holes
11. Install pinion gear side adjuster lock and bolt.
12. Tighten bearing cap bolts to 165 N·m (122 ft. lbs.).
13. Tighten adjuster lock bolts to 25 N·m (18 ft. lbs.).
14. Measure ring gear (2) backlash with a Dial Indicator C-3339 (1) and Pilot Stud L-4438 at eight points around the drive side of the ring gear. The backlash should be 0.08-0.25 mm (0.003-0.010 in) with a preferred backlash of 0.13-0.18 mm (0.005-0.007 in).



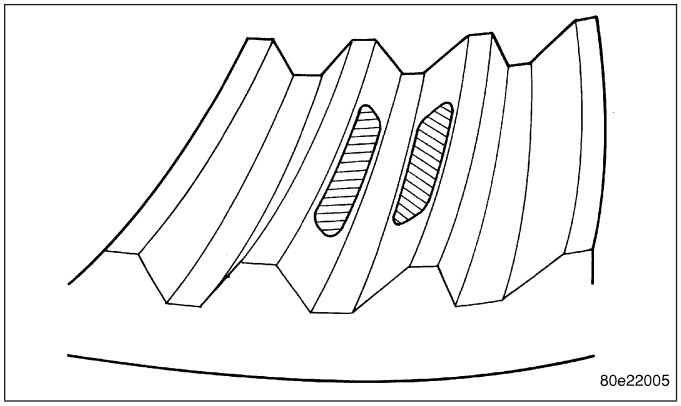


NOTE: Backlash measurement should not vary more than 0.05 mm (0.002 in) between measuring points. If measurement does vary inspect the gears for burrs, the differential case flange and ring gear mounting.

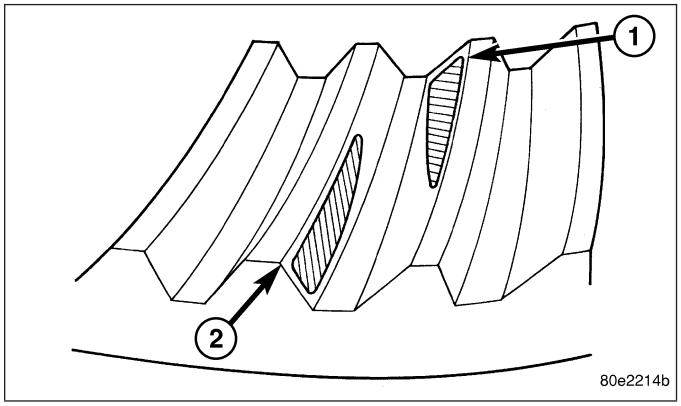
GEAR TOOTH CONTACT PATTERN

1. Wipe clean each tooth of the ring gear.
2. Apply gear marking compound to all of the ring gear teeth.
3. Verify bearing cap bolts are torqued to specification.
4. Apply parking brakes lightly to create at 14 N·m (10 ft. lbs.) pinion rotating torque.
5. Rotate the pinion/pinion yoke 4 full revolutions in each directions.
6. Read gear tooth contact pattern.

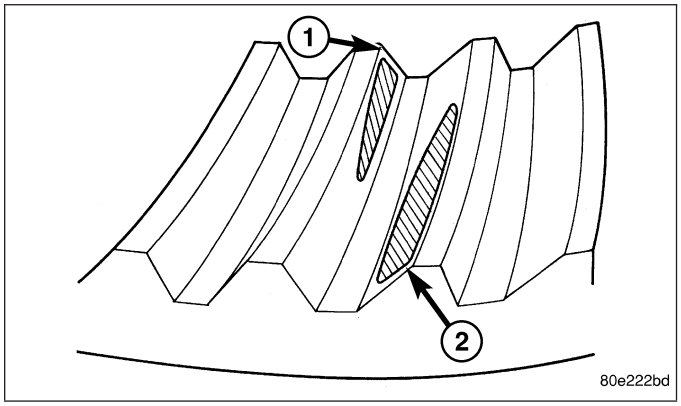
Gear contact pattern correct. Backlash and pinion depth is correct.



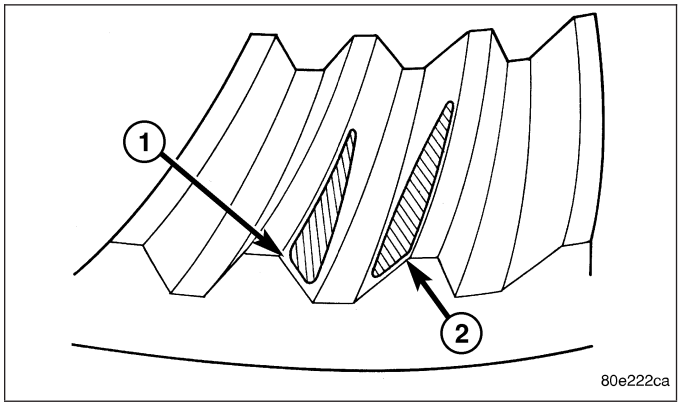
Ring gear too far away from pinion gear, coast side toe (1) and drive side heel (2). Decrease the backlash, by moving the ring closer to the pinion gear using the adjusters.



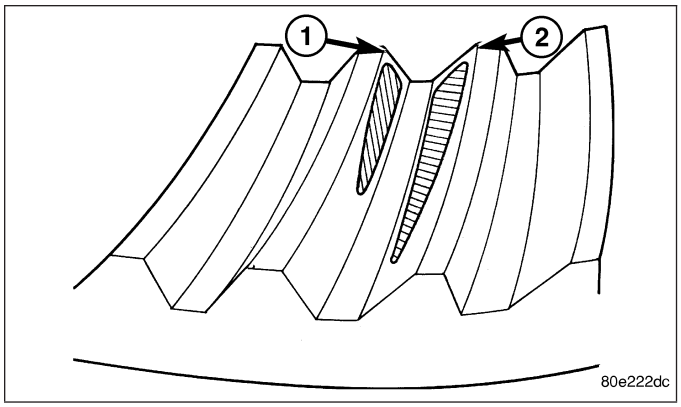
Ring gear too close to pinion gear, drive side toe (1) and coast side heel (2). Increase the backlash, by moving the ring away from the pinion gear using the adjusters.



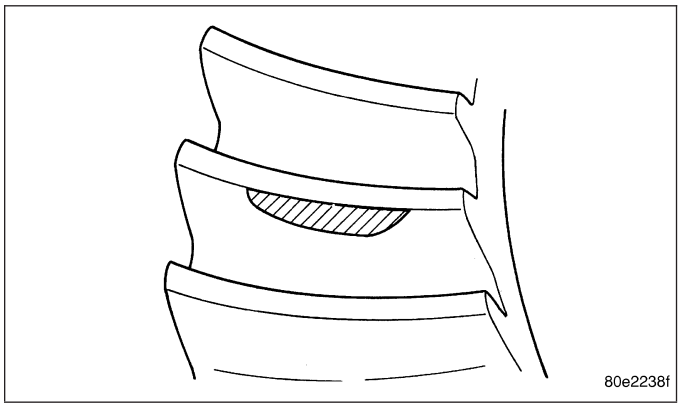
Ring gear too far away from pinion gear, drive side heel (1) and coast side heel (2). Decrease the backlash, by moving the ring closer to the pinion gear using the adjusters.



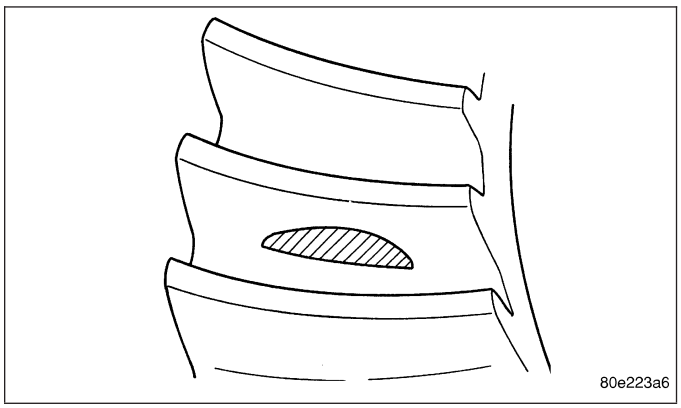
Ring gear too close to pinion gear, drive side toe (1) and coast side toe (2). Increase the backlash, by moving the ring away from the pinion gear using the adjusters.



Pinion gear is set too low. Increase the pinion gear height, by increasing the pinion depth shim thickness.



Pinion gear is set too high. Decrease the pinion depth, by decreasing the pinion depth shim thickness.



SPECIFICATIONS

REAR AXLE - 10 1/2 AA

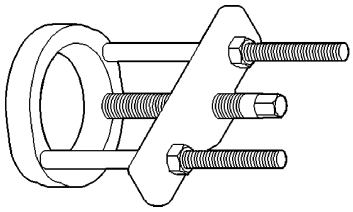
AXLE SPECIFICATIONS

DESCRIPTION	SPECIFICATION
Axle Ratio	3.73, 4.10, 4.56
Ring Gear Diameter	266 mm (10.5 in.)
Ring Gear Backlash	0.13-0.18 mm (0.005-0.007 in.)
Pinion Torque To Rotate - New Bearings	1.69-2.82 N·m (15-25 in. lbs.)
Pinion Torque To Rotate - Original Bearings	1-2 N·m (10-20 in. lbs.)
Total Torque To Rotate - New Bearings	3.4-5.6 N·m (30-50 in. lbs.)
Total Torque To Rotate - Original Bearings	2.8-5.1 N·m (25-45 in. lbs.)

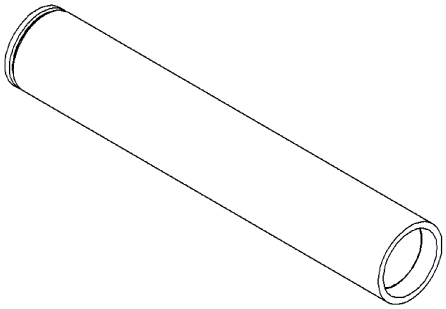
TORQUE SPECIFICATIONS

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Fill Hole Plug	32	24	-
Differential Cover Bolts	40	30	-
Bearing Cap Bolts	165	122	-
Ring Gear Bolts	237	175	-
Axle Flange Bolts	129	95	-
Adjuster Lock Bolt	25	18	-
Sensor Target Magnet Bolt	7	-	62

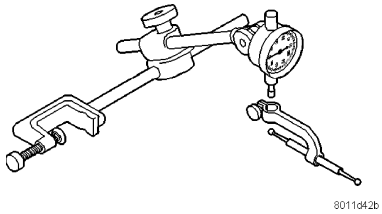
SPECIAL TOOLS



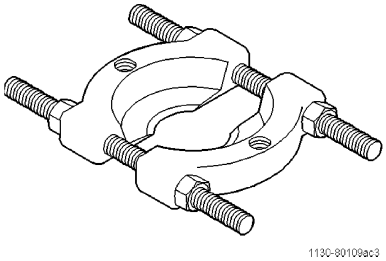
PULLER C-293-PA



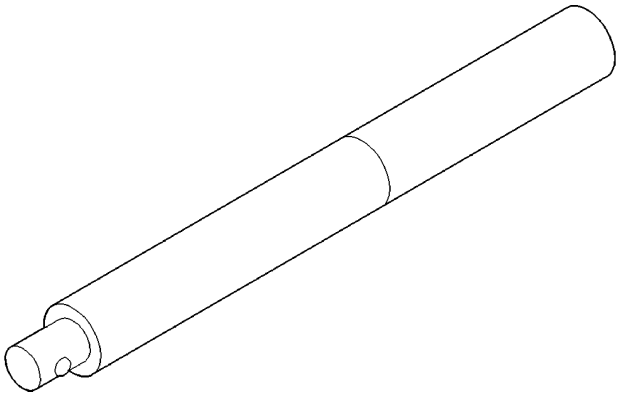
INSTALLER MD-998805



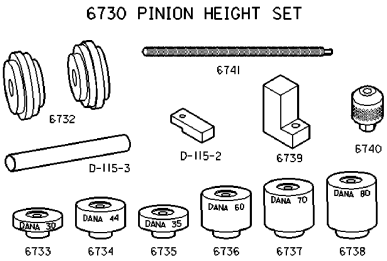
DIAL INDICATOR C-3339



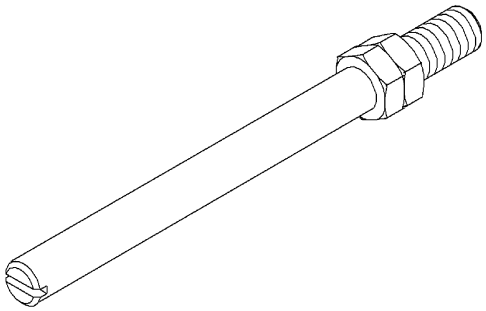
SPLITTER 1130



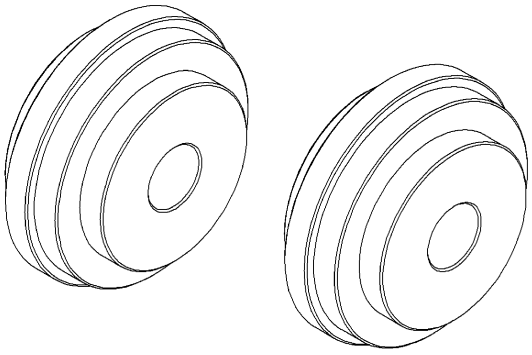
HANDLE C-4171



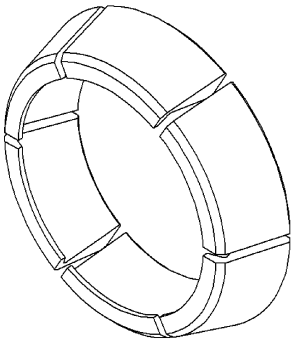
PINION DEPTH GAUGE 6730



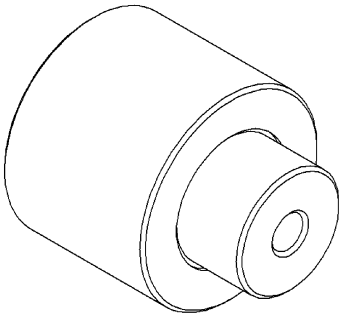
PILOT STUD L-4438



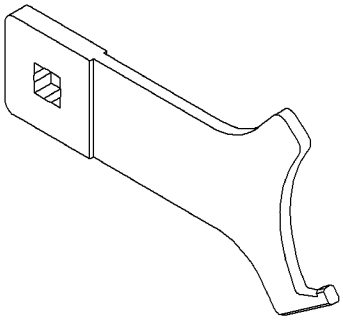
ARBOR DISCS 6732



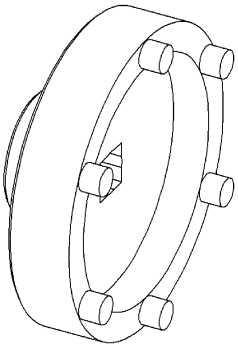
ADAPTERS 8879



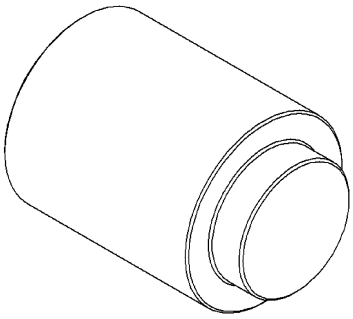
PINION BLOCK 8899



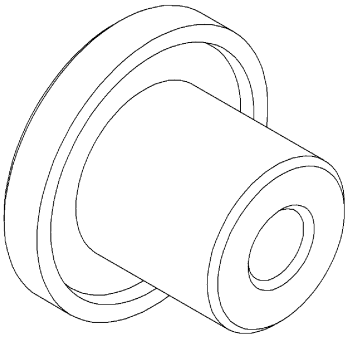
ADJUSTER WRENCH 8883



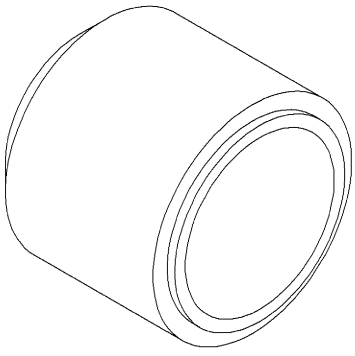
SOCKET 8954



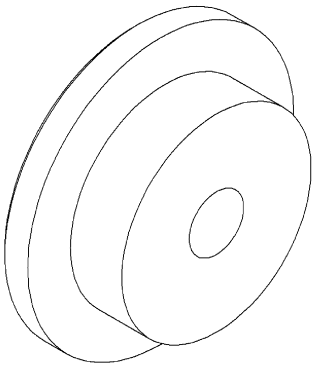
PLUG 8888



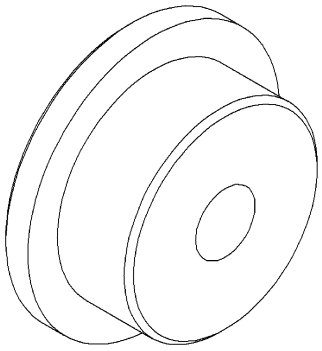
INSTALLER 8956



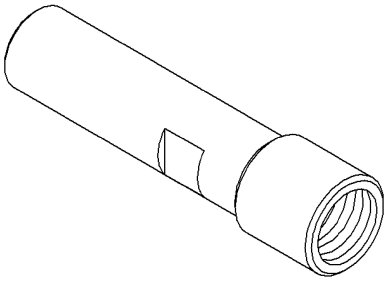
INSTALLER 8896



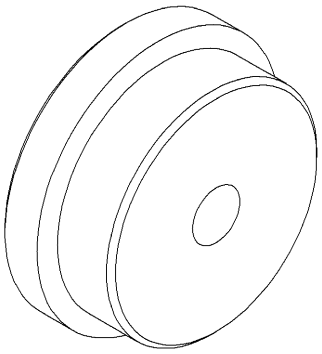
INSTALLER 8959



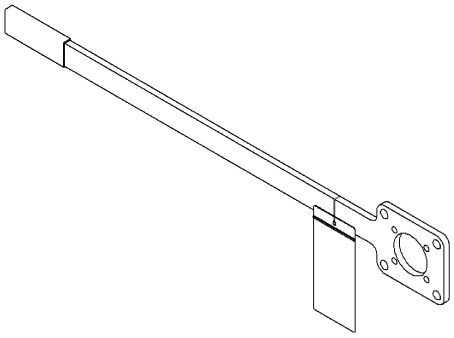
INSTALLER 8960



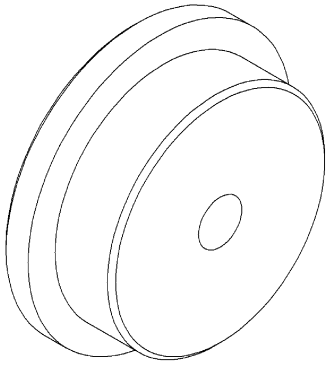
DRIVER 8977



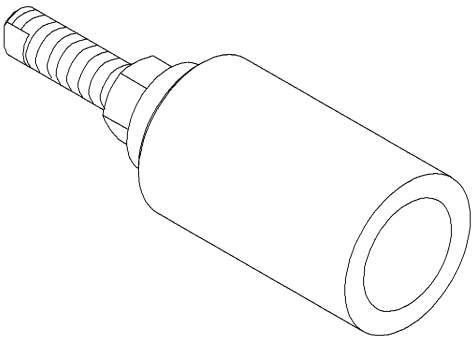
INSTALLER 8961



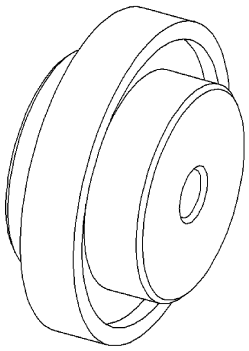
WRENCH 8979



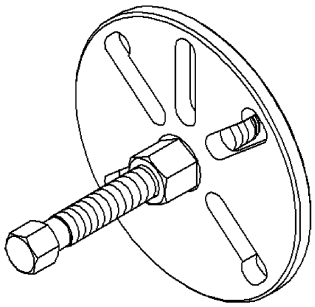
INSTALLER 8962



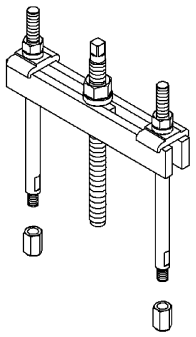
INSTALLER 8981



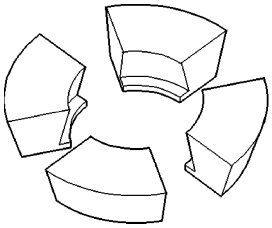
INSTALLER 8963



PULLER 8992



BRIDGE 938

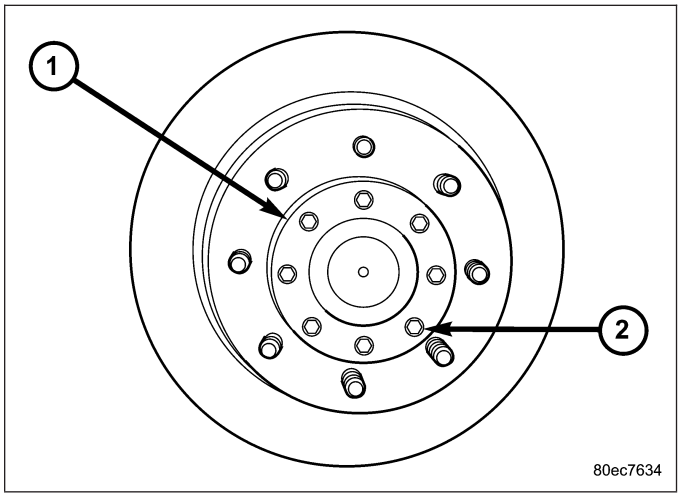


ADAPTERS 9614

SHAFT-AXLE

REMOVAL

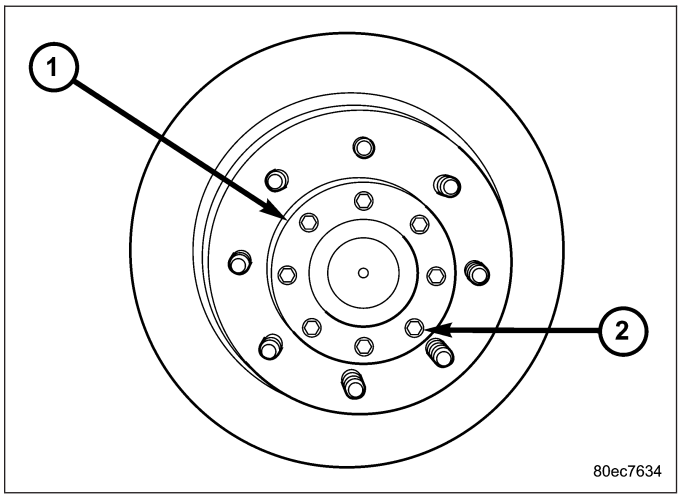
1. Remove axle shaft flange (1) bolts (2).
2. Slide axle shaft out of the axle tube.
3. Remove axle shaft gasket.



INSTALLATION

NOTE: Axle flange bolts must be replaced or cleaned existing bolts apply Mopar™ Lock N' Seal or Loctite® 242 on the threads.

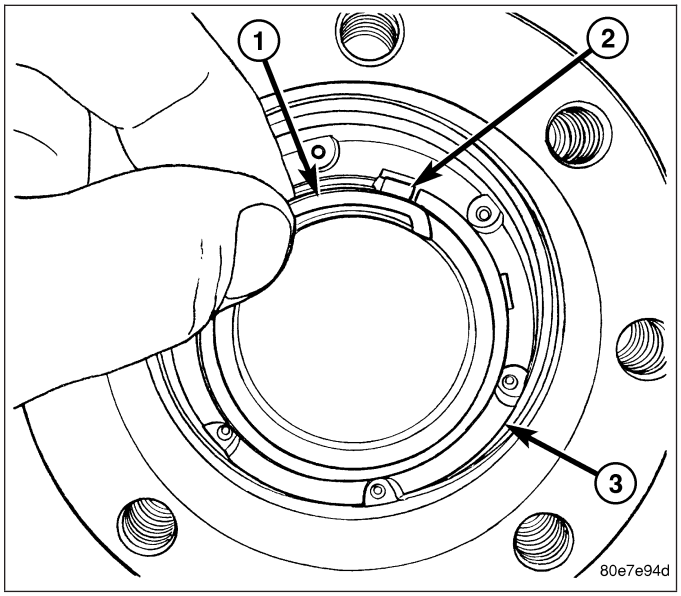
1. Clean axle flange and hub.
2. Install new axle shaft gasket.
3. Slide axle shaft into the axle tube.
4. Install axle shaft flange (1) bolts (2) and tighten to 129 N·m (95 ft. lbs.).



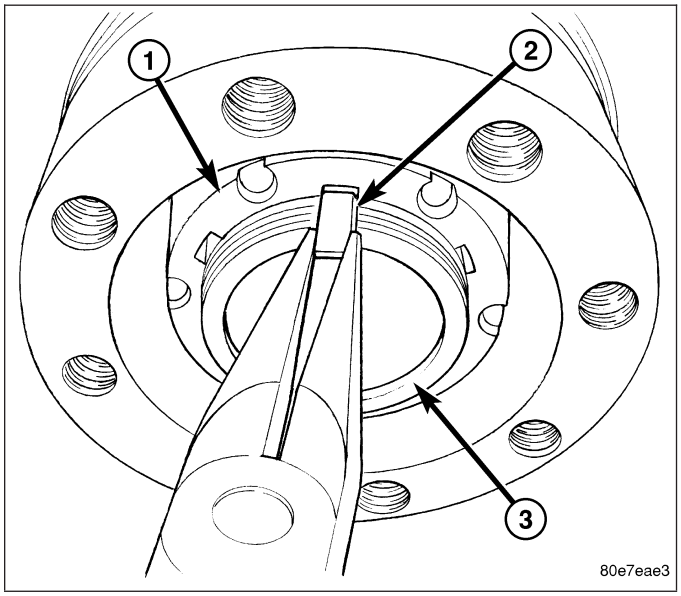
BEARINGS-AXLE HUB

REMOVAL

1. Remove axle shaft flange bolts and remove axle shaft.
2. Remove retainer ring (1) from axle shaft tube.



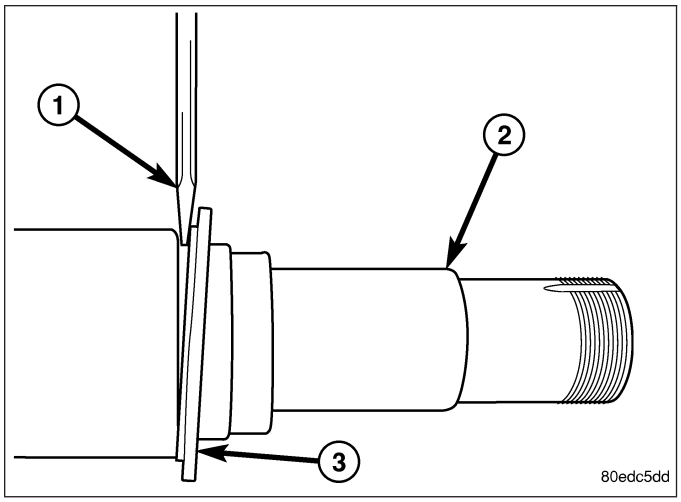
3. Remove hub bearing nut (1) locking key (2) from axle tube (3).
4. Remove hub bearing nut with Socket 8954.
5. Remove hub and bearings from the axle.



6. Pry out hub bearing seal from the back of the hub.

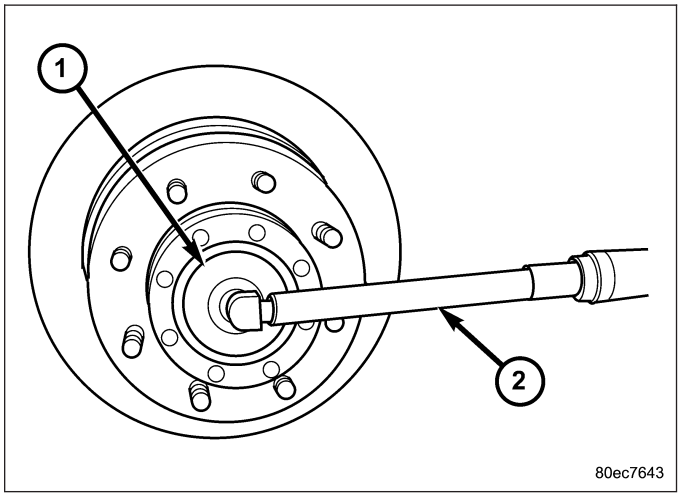
NOTE: The inner part of the seal (3) may stay on the axle tube (2). This part must also be removed with pry bar (1).

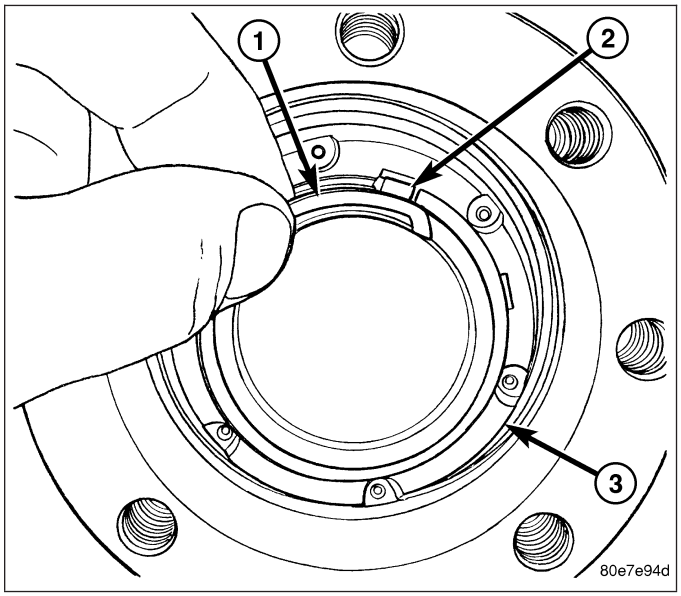
7. Remove rear bearing.
8. Remove hub bearing cups with a hammer and drift.



INSTALLATION

1. Install outer hub bearing cup with Installer 8961 and Handle C-4171.
2. Install inner hub bearing cup with Installer 8962 and Handle C-4171.
3. Pack bearings with the appropriate grease.
4. Install rear bearing and install **new** grease seal with Installer 8963 and Handle C-4171.
5. Slide hub on the axle tube and install front bearing into the hub.
6. Install hub bearing nut with Socket 8954 (1) and torque wrench (2) to 30 N·m (22 ft. lbs.) while rotating the hub.
7. Back off nut about 30° and align next hub nut key slot with axle tube key slot and install locking key. End play should be 0.025-0.25 mm (0.001-0.010 in.).
8. Install retainer ring (1) with ring end in the key slot (2).
9. Install new axle shaft gasket and install axle shaft.

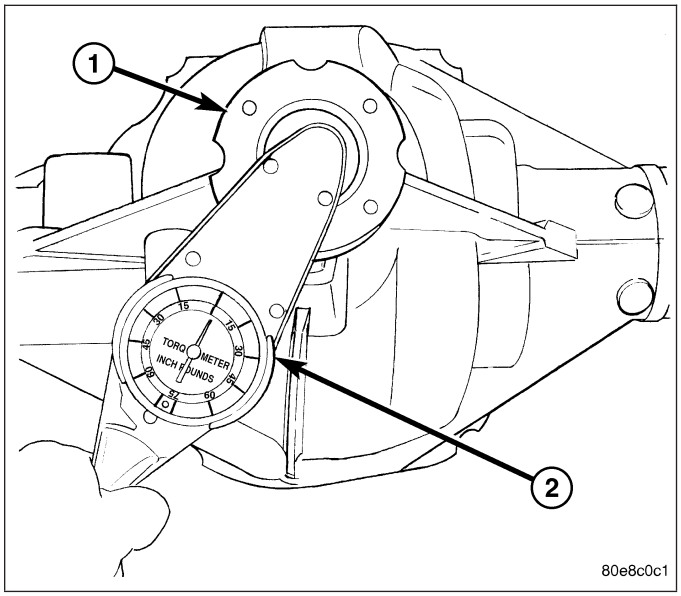




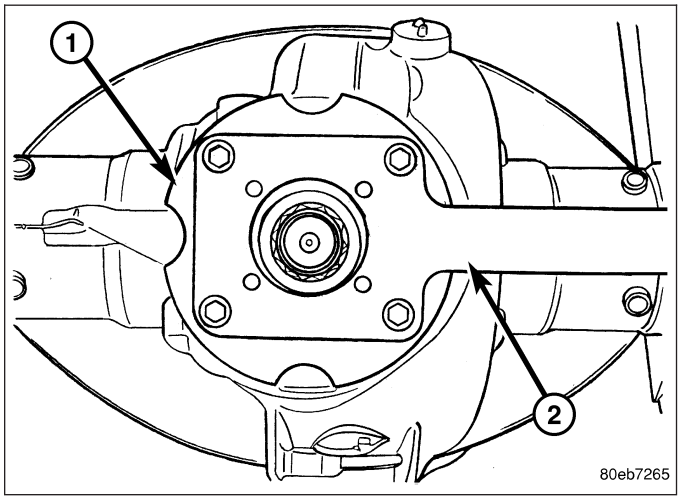
SEAL-PINION

REMOVAL

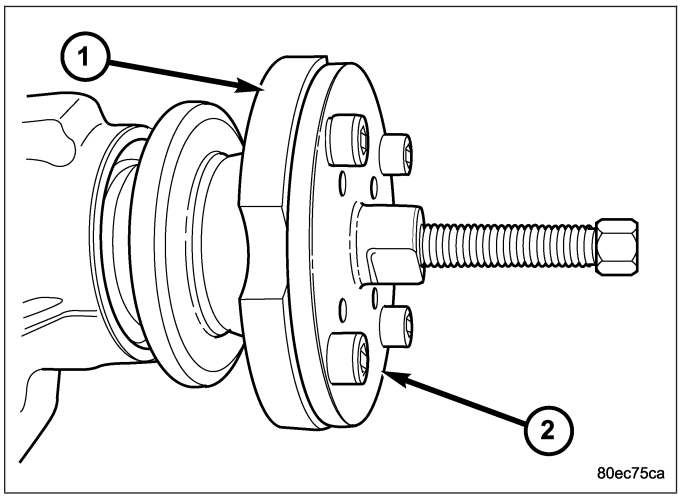
1. Remove axle shafts.
2. Mark propeller shaft and pinion flange for installation reference and remove shaft.
3. Rotate pinion gear three or four times.
4. Measure and record the amount of torque necessary to rotate the pinion gear (1) with an inch pound torque wrench (2).



5. Hold pinion flange (1) with Wrench 8979 (2) and remove pinion flange nut and washer.

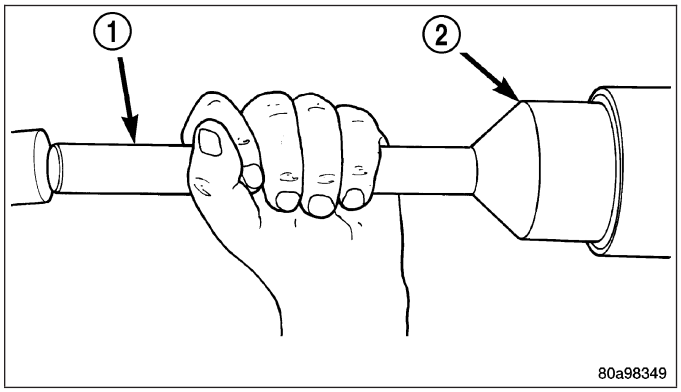


6. Remove pinion flange (1) with Puller 8992 (2).
7. Remove pinion shaft seal with a pry tool or slide hammer mounted screw.

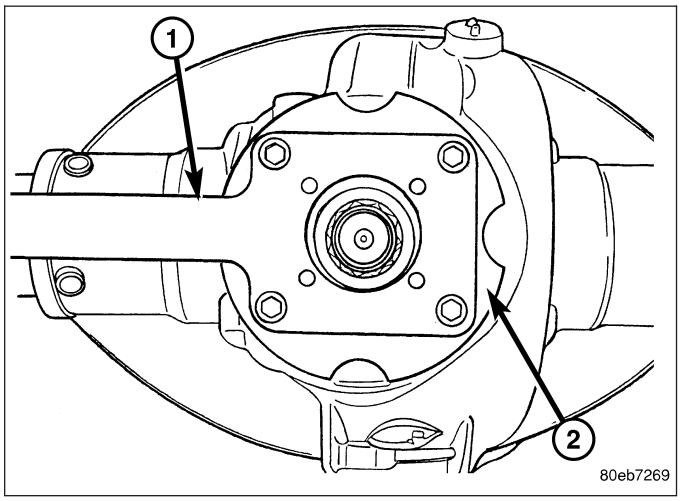


INSTALLATION

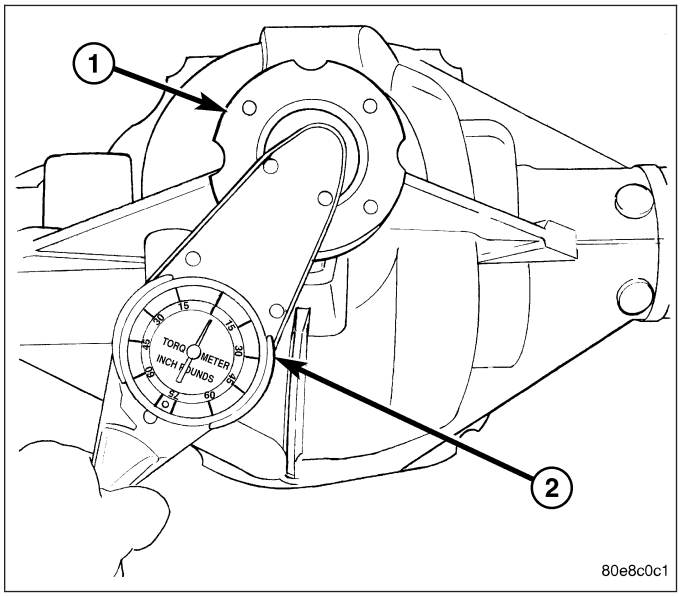
1. Install **new** pinion seal with Installer 8896 (2) and Handle C-4171 (1).



2. Apply a light coat of teflon sealant to the pinion flange splines.
3. Lightly tap the pinion flange onto the pinion until a few threads are showing.
4. Install flange washer and **new** pinion nut.
5. Hold flange (2) with Flange Wrench 8979 (1) and tighten pinion nut until pinion end play is taken up.



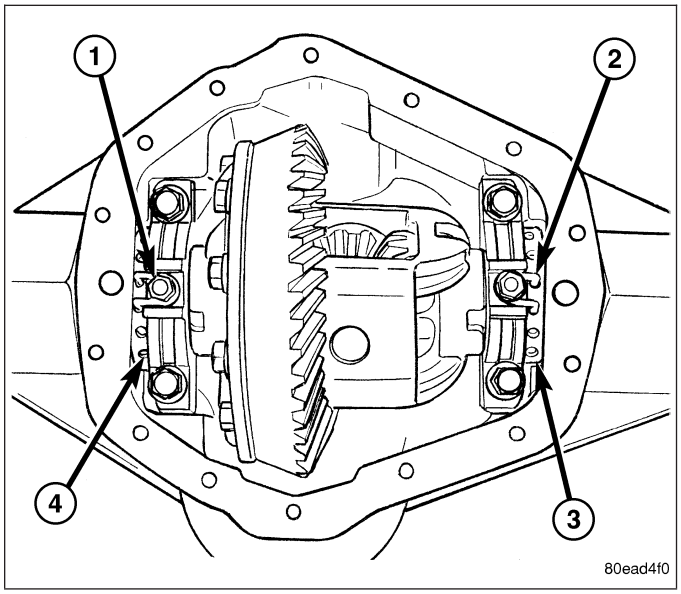
6. Rotate pinion several times to seat bearings.
7. Measure pinion (1) Torque To Rotate with an inch pound torque wrench (2) and compare it to recorded measurement.
8. Tighten pinion nut in small increments, until pinion Torque To Rotate is 0.40-0.57 N·m (3-5 in. lbs.) greater than recorded measurement.
9. Rotate pinion several times then verify pinion Torque To Rotate again.
10. Install axle shafts.
11. Install propeller shaft with reference marks aligned.
12. Check and fill differential if necessary.



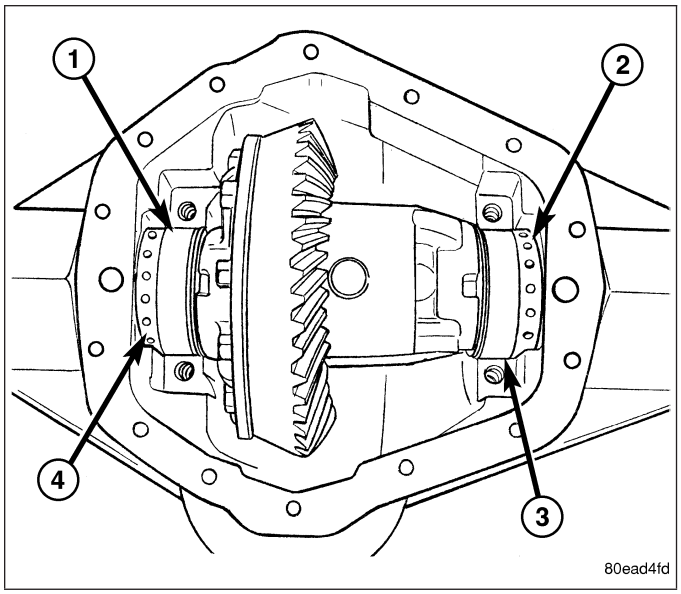
DIFFERENTIAL

REMOVAL

1. Remove lubricant fill hole plug from the differential housing cover.
2. Remove differential housing cover and drain the lubricant from housing.
3. Remove axle shafts.
4. Remove adjuster lock bolts (1) and adjuster locks (2).
5. Mark bearing caps (4) left and right for installation reference.
6. Remove bearing cap bolts and remove bearing caps.

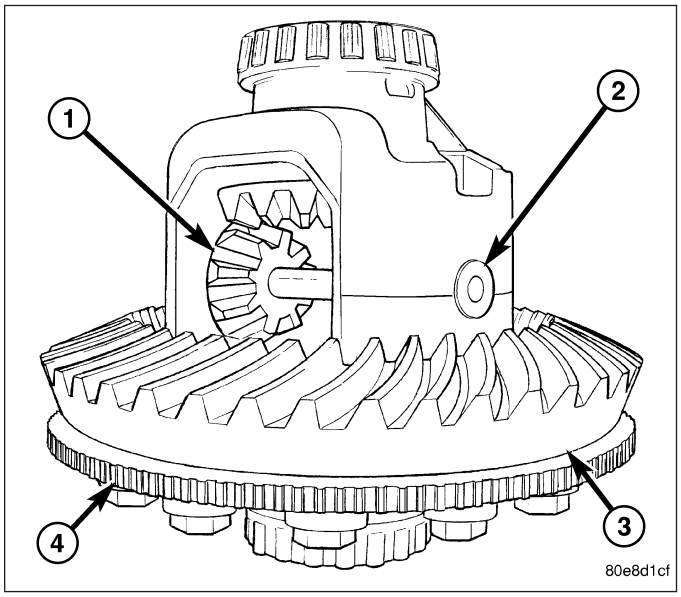


7. Loosen differential bearing (1) (3) adjusters (2) (4) with Adjuster Wrench 8883.
8. Remove differential case from the housing.
9. Remove bearing cups (1) (3) and tag them left and right for installation reference.

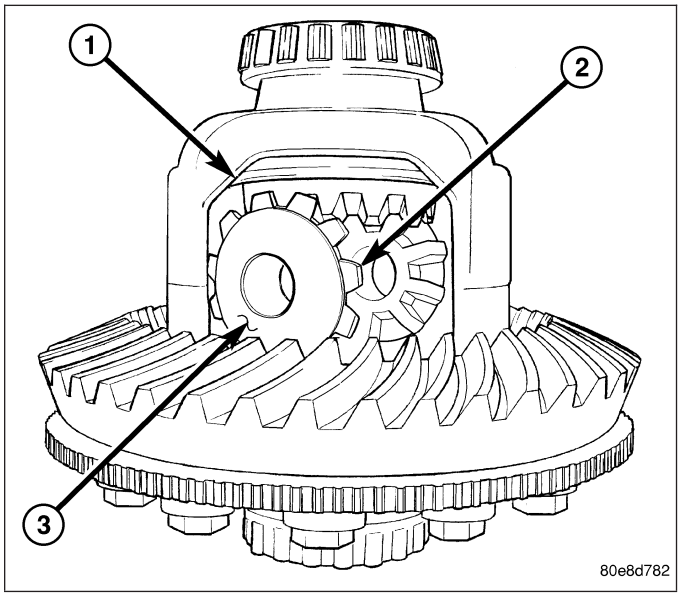


DISASSEMBLY

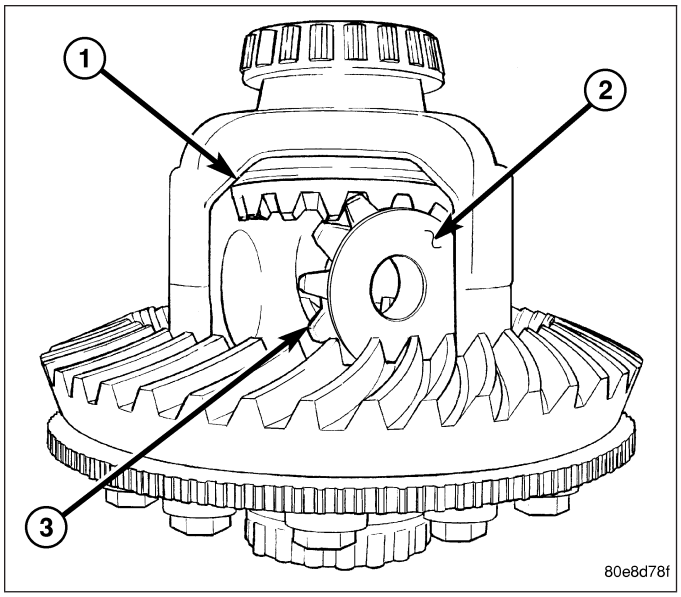
1. Remove pinion shaft (2) with a hammer and punch from the side with the hole in the pinion shaft.



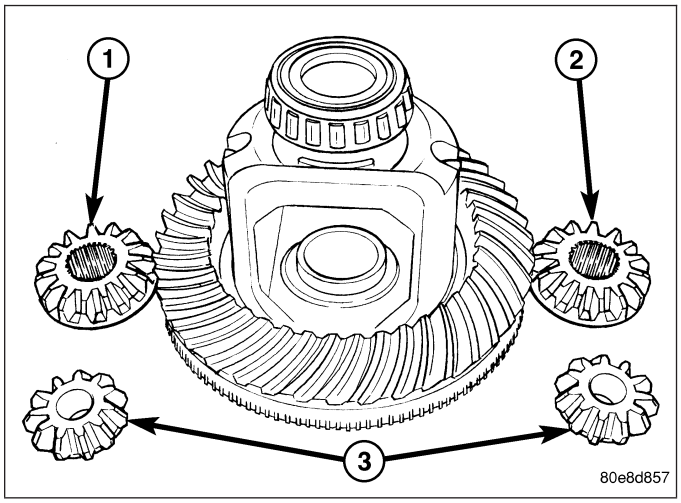
2. Rotate one pinion gear (2) with thrust washer (3) to the differential window (1) and remove the gear.



3. Rotate other pinion gear (3) with thrust washer (2) to the differential window (1) and remove the gear.



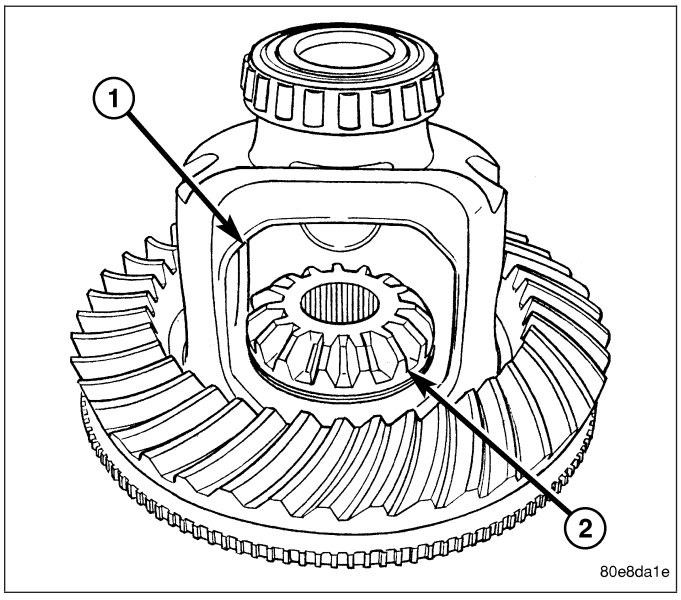
4. Remove differential side gears (1) (2) and thrust washers.



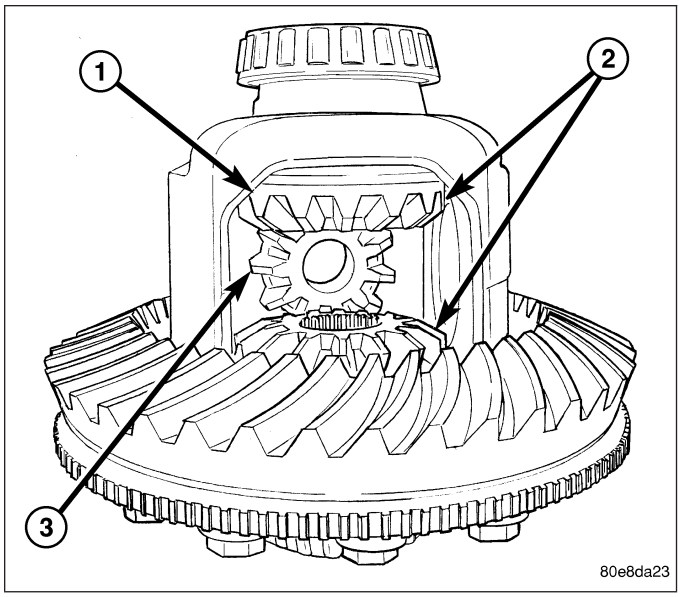
ASSEMBLY

NOTE: If the same gears and thrust washers are being used, install them into their original locations.

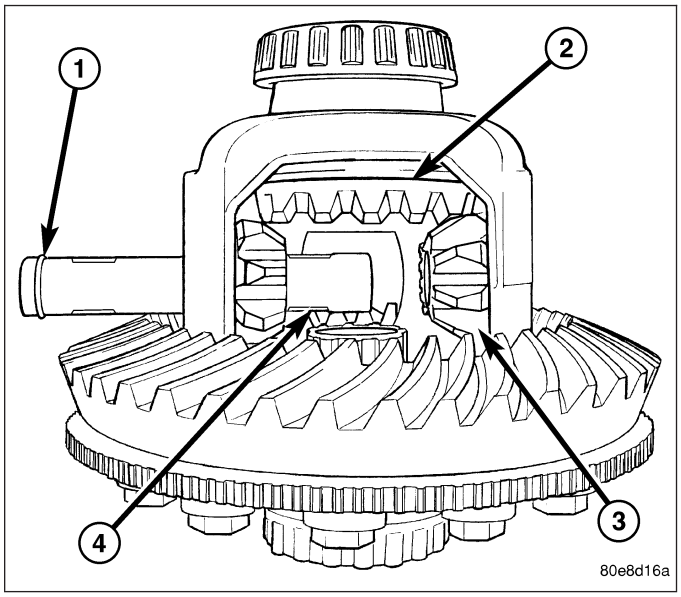
1. Lubricate all differential components with axle lubricant.
2. Install differential side gears (2) with thrust washers through differential window (1).



3. Install first pinion gear (3) into the differential window (1) and side gears (2). Rotate the pinion gear to the back of the case.
4. Install other pinion gear and thrust washer. Rotate the gears to align hole in the pinion gears with hole in the differential case.



5. Slide pinion shaft (4) into the case and through the pinion gears (3). Tap the shaft to seat the pinion shaft snap-ring (1) into the case.



INSTALLATION

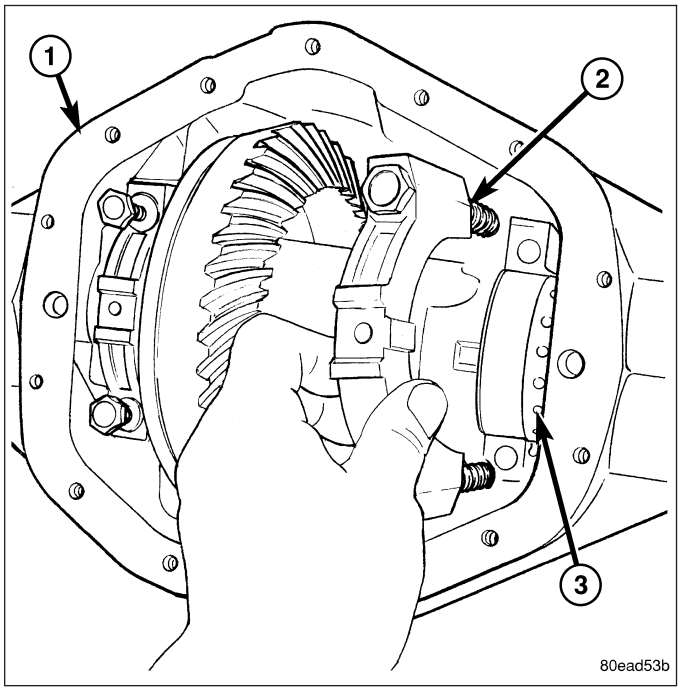
1. Clean housing (1) cavity with a flushing oil, light engine oil or lint free cloth.

CAUTION: Do not use water, steam, kerosene or gasoline for cleaning.

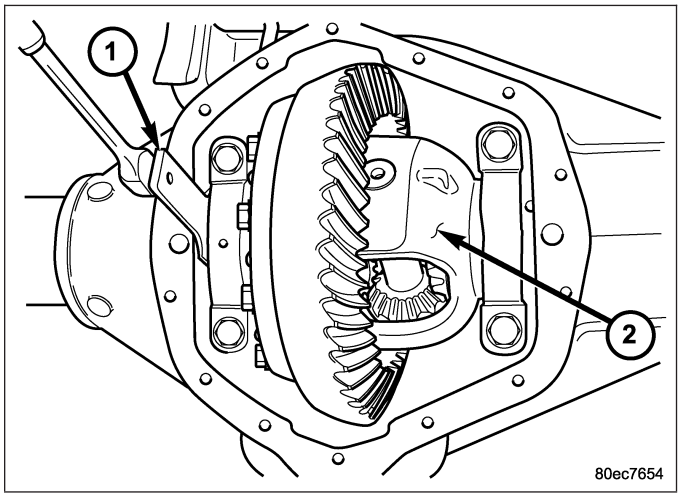
2. Lubricate differential case bearing.
3. Install differential case with bearings cups into the housing.

NOTE: A light coat of grease on the cups will hold them in place during installation.

4. Install bearing caps (2) and bolts. Tighten bearing cap bolts finger-tight.

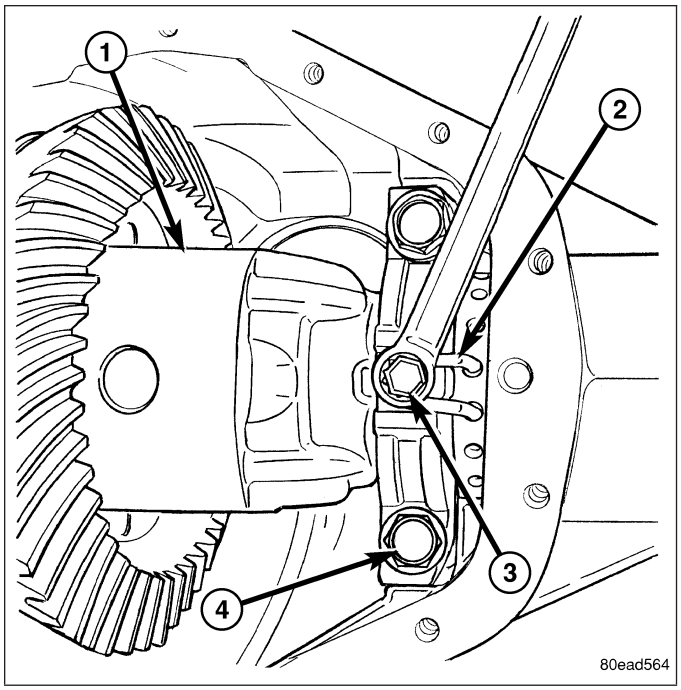


5. Slide differential case (2) toward the pinion gear until the gears make contact/zero backlash. If zero backlash cannot be obtained, turn the pinion side adjuster until zero backlash is obtained.
6. Holding the differential case toward the pinion gear, turn bearing adjusters with Adjuster Wrench 8883 (1) until they make contact with the differential bearings/cups.
7. Back off the ring gear side adjuster 4 holes, to obtain initial ring gear backlash.
8. Install ring gear side adjuster lock and bolt. Do not tighten adjuster lock bolt at this time.
9. Tighten pinion gear side adjuster firmly against the differential case bearing cup.
10. Rotate the pinion several times to seat the differential bearings.



11. Loosen pinion gear side adjuster until it is no longer in contact with the bearing cup.
12. Tighten pinion gear side adjuster until it just makes contact with the bearing cup.
13. Tighten pinion gear side adjuster an additional:
    - **New Bearings** 6 Adjuster Holes
    - **Original Bearings** 4 Adjuster Holes
14. Install pinion gear side adjuster lock and bolt. Do not tighten adjuster lock bolt at this time.

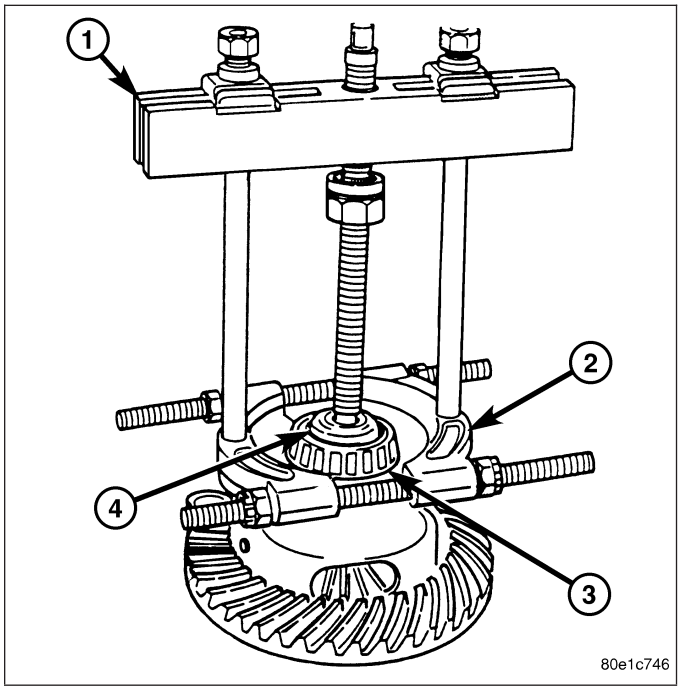
15. Tighten bearing cap bolts to 165 N·m (122 ft. lbs.).
16. Tighten adjuster (2) lock bolts (3) to 25 N·m (18 ft. lbs.).
17. Measure ring gear backlash and check gear tooth contact pattern. Refer to Adjustments for procedure.
18. Install axle shafts.
19. Install differential housing gasket and cover. Tighten cover bolts to 40 N·m (30 ft. lbs.).
20. Fill axle with lubricant, refer to Lubrication & Maintenance for capacity and lubricant type.
21. Install fill plug and tighten to 32 N·m (24 ft. lbs.).



BEARINGS-DIFFERENTIAL CASE

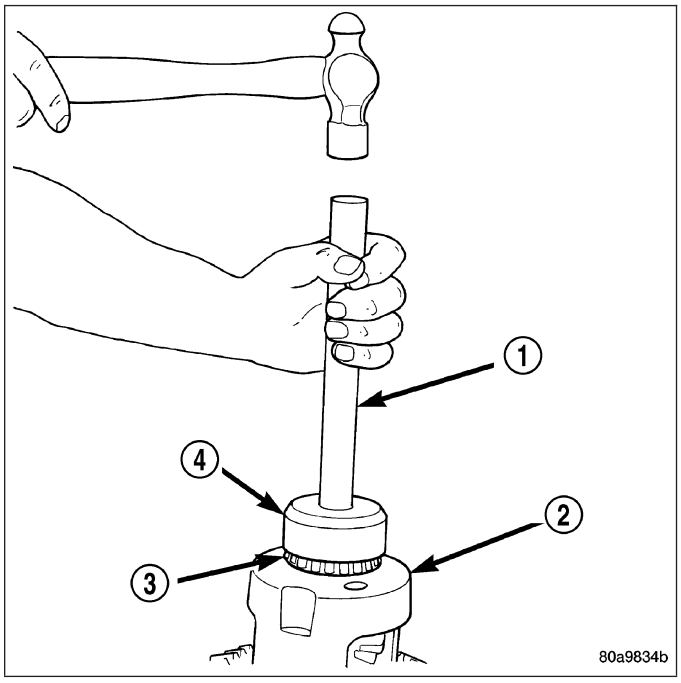
REMOVAL

1. Remove differential case from the housing.
2. Install Plug 8888 (4) into the end of the case.
3. Remove differential case bearings (3) with Bearing Splitter 1130 (2) and Bridge 938 (1).



INSTALLATION

1. Install open and Trac-Rite differential case (2) bearings (3) with Installer 8956 (4) and Handle C-4171 (1).
2. Install differential case into housing.

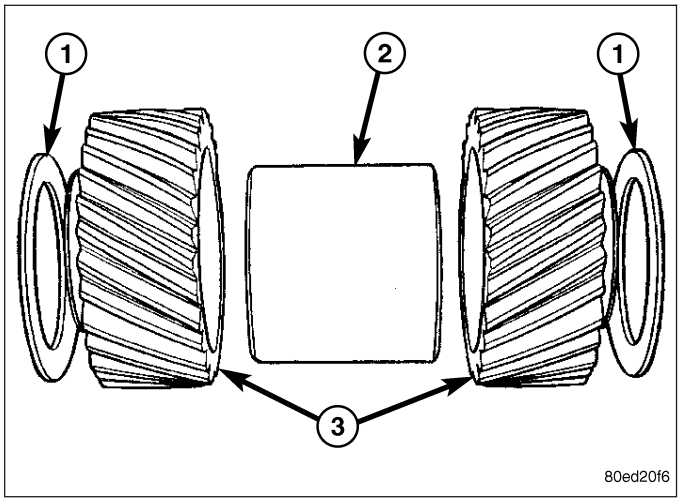


DIFFERENTIAL-TRAC-RITE

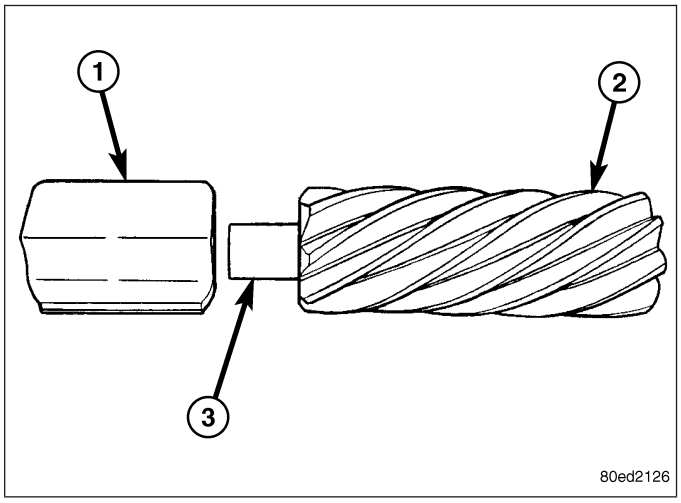
DESCRIPTION

CAUTION: The differential is serviced as an assembly only do not attempt to disassemble. Failure to follow these instructions will result in damage to the differential.

The Trac-Rite™ differential is a helical gear differential. The differential has two side gears (3), two thrust washers (1) and one spacer (2).



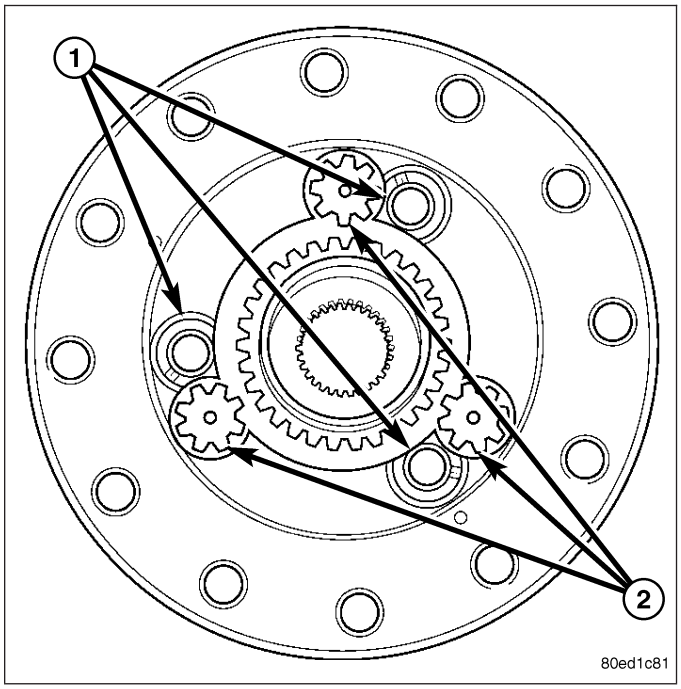
It also has six pinion brake shoes (1) which pivot on the six pinion gear (2) shafts (3).



OPERATION

CAUTION: The differential is serviced as an assembly only do not attempt to disassemble. Failure to follow these instructions will result in damage to the differential.

When one wheel begins to spin the pinion gears (2) on that side, are forced toward the pinion brake shoes (1). The pinion brake shoes then cause frictional drag on the opposite pinion gears and the side gear. These friction forces transfer the power to the opposite wheel. Once the frictional forces are overcome, differentiation will occur. The torque will be continually biased by the frictional forces to the high traction wheel.



CLEANING

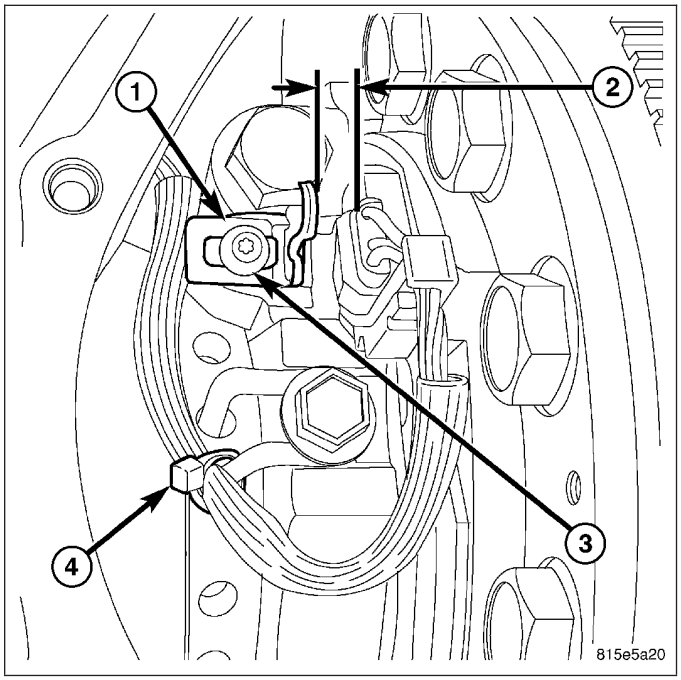
CAUTION: The differential is serviced as an assembly only do not attempt to disassemble. Failure to follow these instructions will result in damage to the differential.

Flush the differential case and gears through openings in the case with light oil.

DIFFERENTIAL-ELECTRIC LOCKER

DESCRIPTION

The electric locker differential has an electromagnet coil on the ring gear side of the differential. When the coil is energized a of dog clutch is engaged in the differential case which locks both axles. A magnetic target sensor (1) mounted on the bearing cap is used to indicate the system has been activated.



DIAGNOSIS AND TESTING

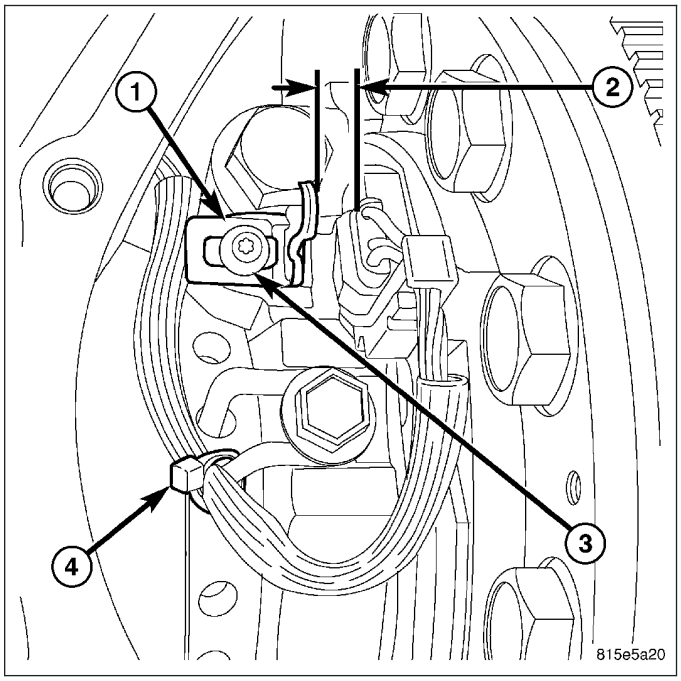
DIFFERENTIAL-ELECTRIC LOCKER

1. Lift one rear wheel off the ground.
2. Turn key to the on position.
3. Place vehicle in drive/first gear and transfer case in LOW LOCK.
4. Activate locker switch.
5. Manually rotate the wheel that is off the ground. The wheel should lock once the dog clutch is aligned.
6. Turn off locker switch.
7. Manually rotate the wheel that is off the ground. The wheel should turn.

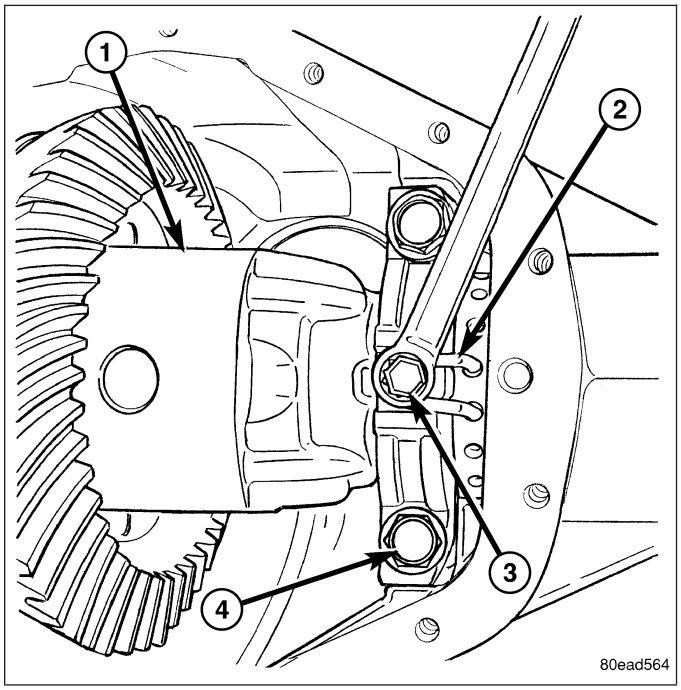
NOTE: Only the locker actuator with sensor are serviced. Internal differential components are serviced as a differential case assembly.

REMOVAL

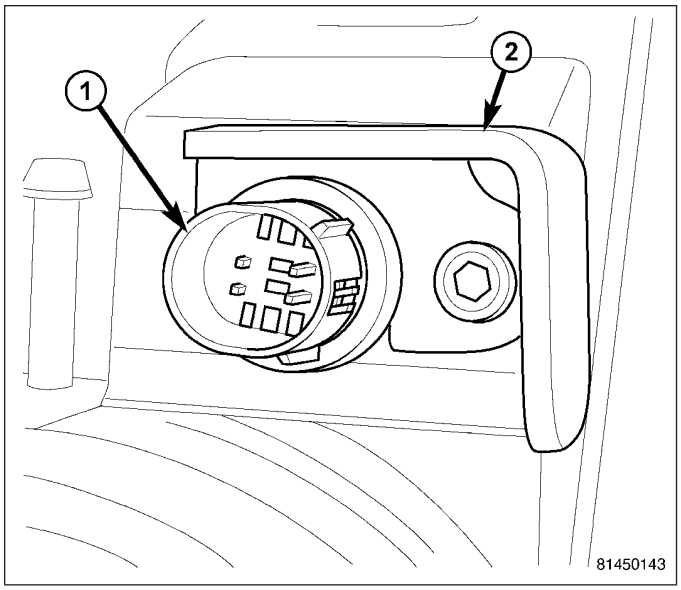
1. Remove lubricant fill hole plug from the differential housing cover.
2. Remove differential housing cover and drain the lubricant from housing.
3. Remove axle shafts.
4. Cut sensor wire tie strap (4) from adjuster lock.
5. Remove sensor target magnet (1) from bearing cap.



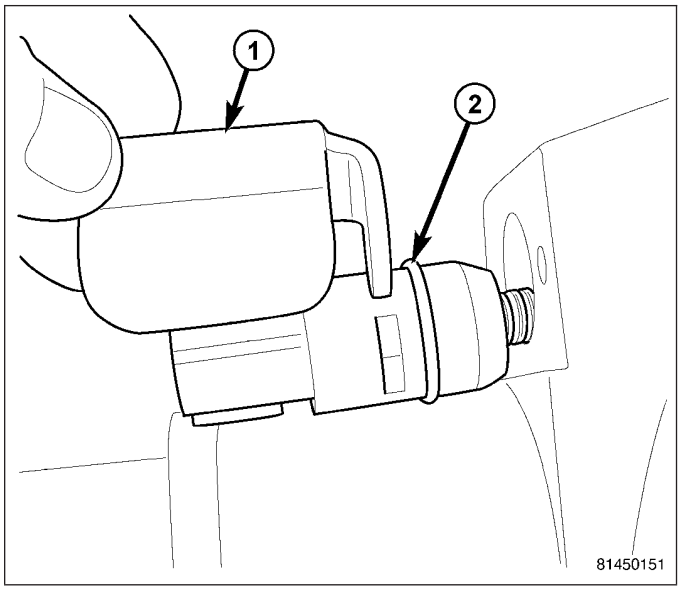
6. Remove adjuster lock bolts (3) and adjuster locks (2).



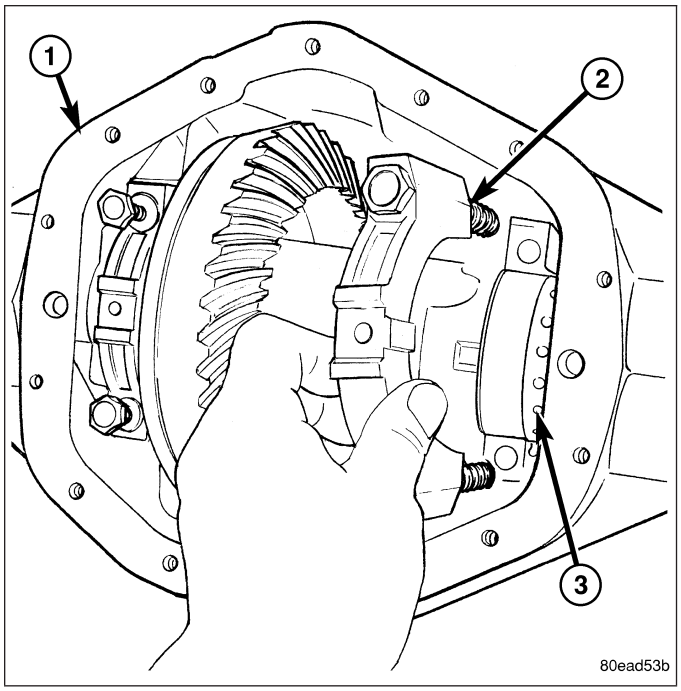
7. Remove electric locker connector (1) retainer (2) bolt from differential housing.
8. Remove connector (1) and retainer (2) from differential housing.



9. Remove retainer (1) from connector and remove o-ring (2) from connector.



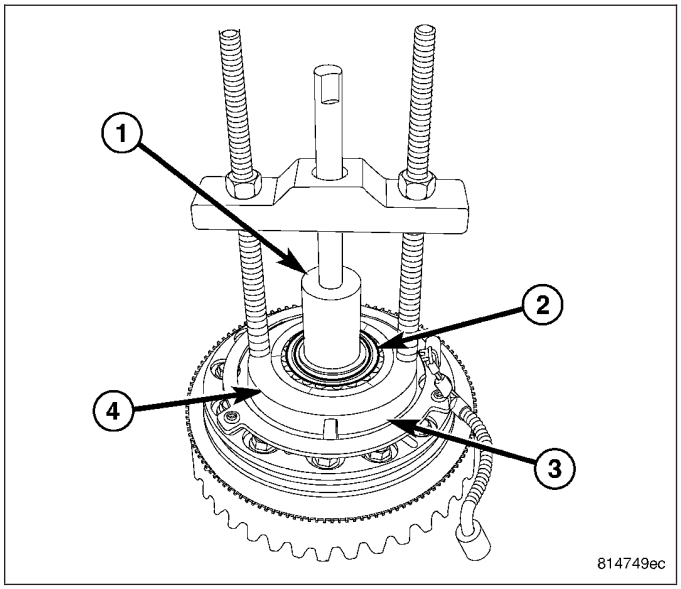
10. Mark bearing caps (2) left and right for installation reference.
11. Remove bearing cap bolts and remove bearing caps (2).
12. Loosen differential bearing adjusters (3) with Adjuster Wrench 8883.
13. Slid electric locker connector through differential housing.
14. Remove differential case with bearing cups from the housing.
15. Tag bearing cups left and right for installation reference.



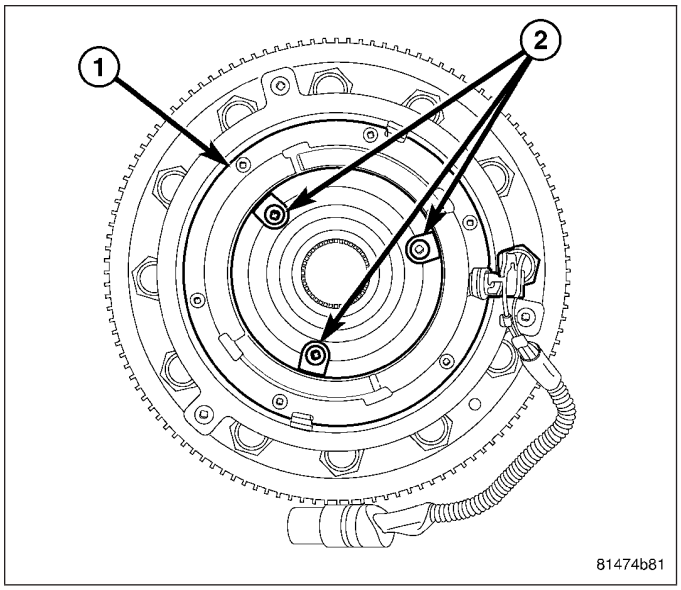
DISASSEMBLY

NOTE: Internal differential components are serviced with the case.

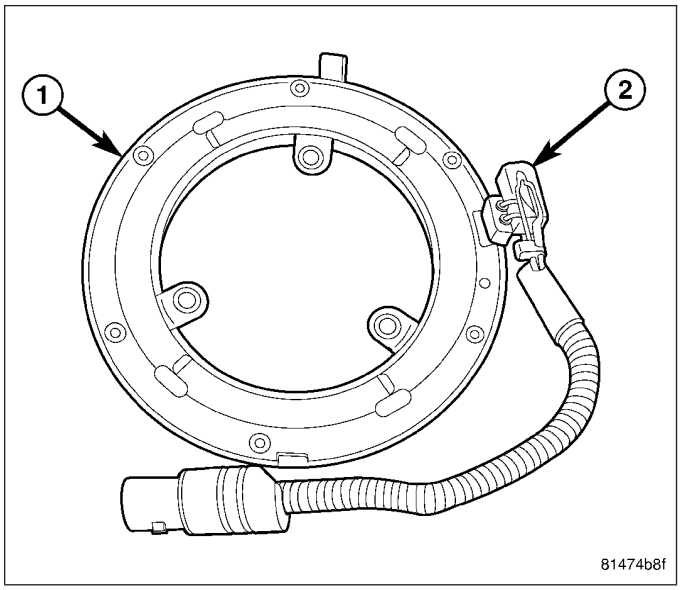
1. Install Plug 8888 (1) into coil side of the case.
2. Remove differential case bearing (2) with Puller C-293-PA (3) and Adapters 9614 (4).



3. Remove coil (1) mounting bolts (2).



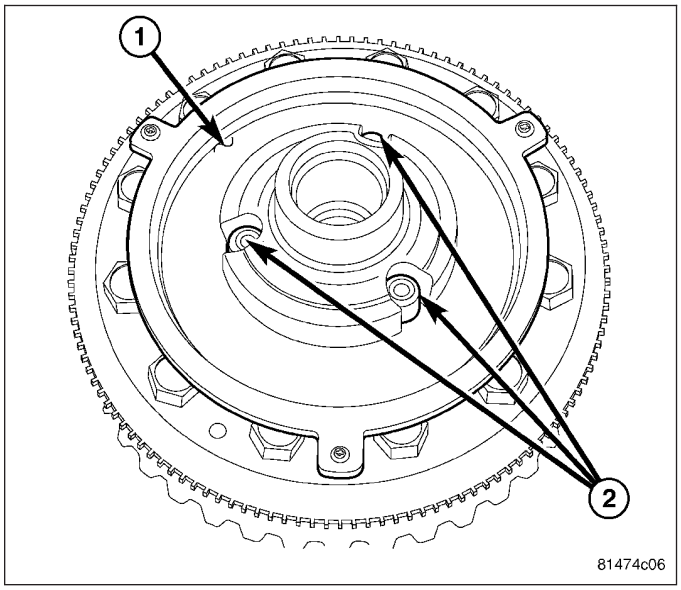
4. Remove coil (1) with sensor (2) and harness.



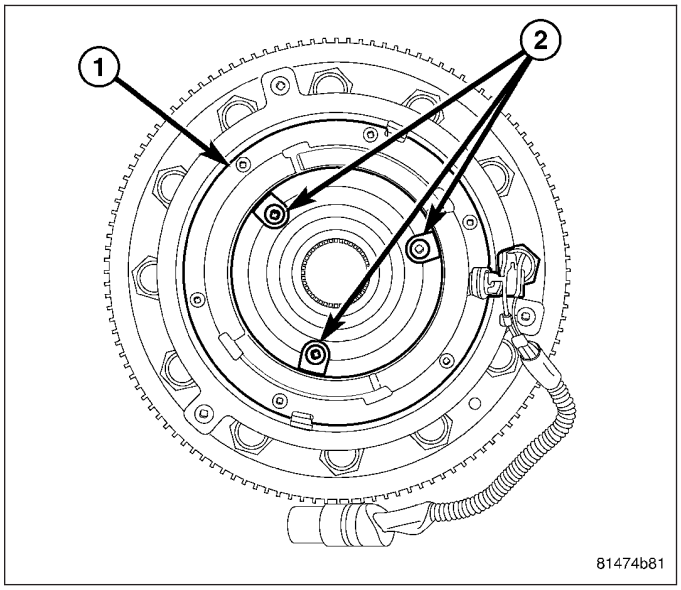
ASSEMBLY

NOTE: Internal differential components are serviced with the case.

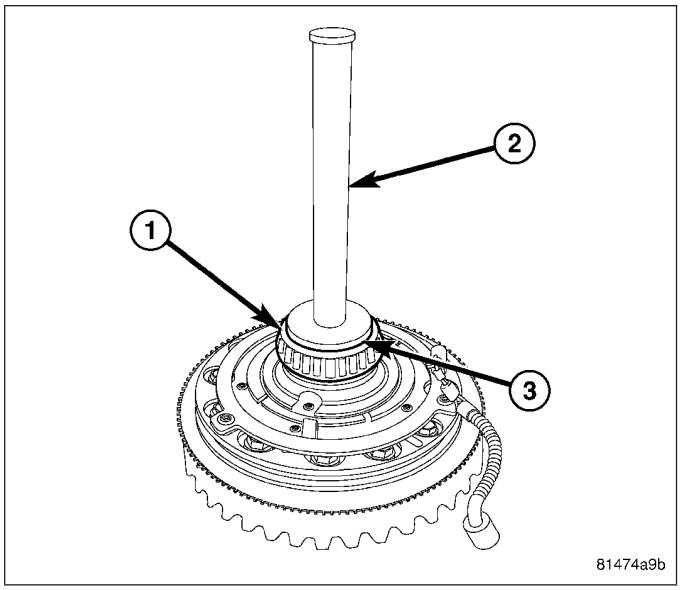
1. Position coil on differential case (1) mounting location (2).



2. Clean coil bolts then apply Mopar® Lock & Seal adhesive to the threads
3. Install coil (1) and bolts (2).

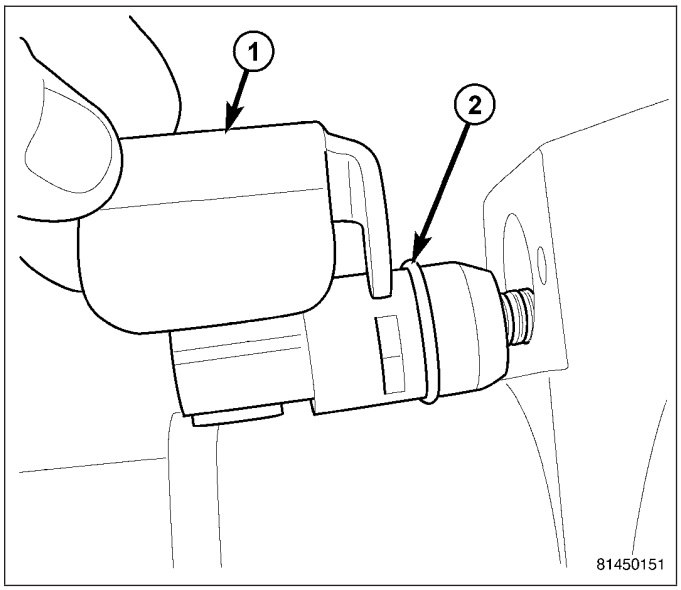


4. Install differential bearing (1) with Handle C-4171 (2) and Installer 8956 (3).



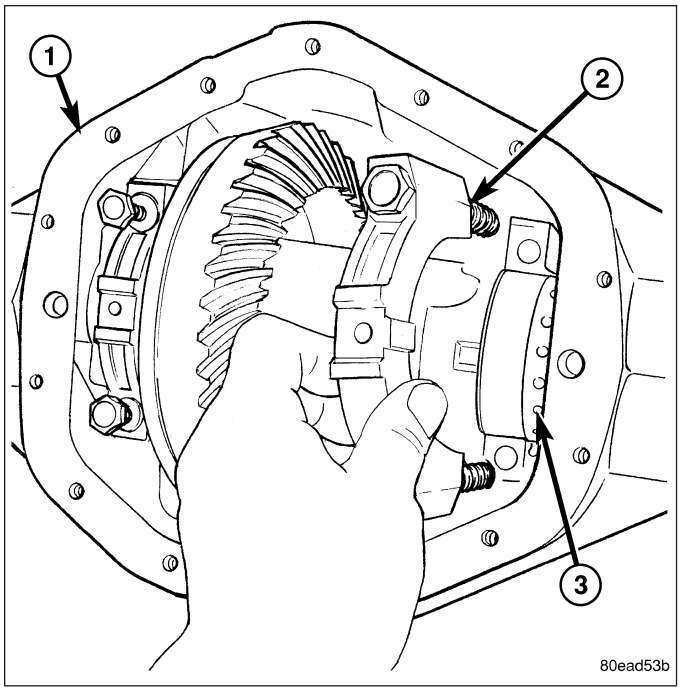
INSTALLATION

1. Clean the housing cavity with a flushing oil, light engine oil or lint free cloth.
2. Lubricate differential case bearing.
3. Install differential case with bearings cups into the housing.
4. Slide electric locker connector through differential housing.
5. Install o-ring (2) on electric locker connector.
6. Install electric locker connector retainer (1) and install connector with retainer in differential housing.
7. Install connector retainer bolt.

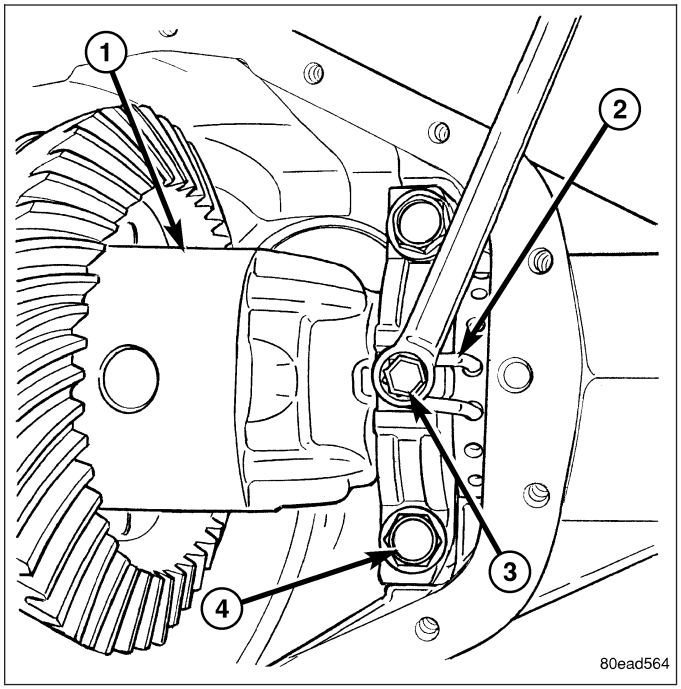


8. Install bearing caps (2) and tighten bearing cap bolts finger-tight.

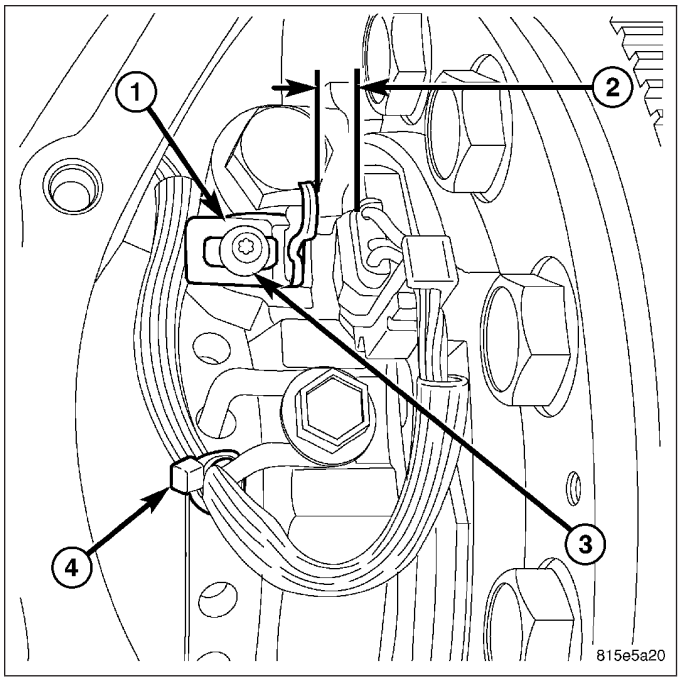
NOTE: Do not torque bearing cap and bolts at this time.



9. Slide differential case toward the pinion gear until the gears make contact/zero backlash. If zero backlash cannot be obtained, turn the pinion side adjuster until zero backlash is obtained.
10. Holding the differential case toward the pinion gear, turn bearing adjusters with Adjuster Wrench 8883 until they make contact with the differential bearings/cups.
11. Back off the ring gear side adjuster 4 holes, to obtain initial ring gear backlash.
12. Install ring gear side adjuster lock and bolt. Do not tighten adjuster lock bolt at this time.
13. Tighten pinion gear side adjuster firmly against the differential case bearing cup.
14. Rotate the pinion several times to seat the differential bearings.
15. Loosen pinion gear side adjuster until it is no longer in contact with the bearing cup.
16. Tighten pinion gear side adjuster until it just makes contact with the bearing cup.
17. Tighten pinion gear side adjuster an additional:
    - **New Bearings:** 6 Adjuster Holes
    - **Original Bearings:** 4 Adjuster Holes
18. Install pinion gear side adjuster lock and bolt. Do not tighten adjuster lock bolt at this time.
19. Tighten bearing cap bolts (4) to 165 N·m (122 ft. lbs.).
20. Tighten adjuster (2) lock bolts (3) to 25 N·m (18 ft. lbs.).



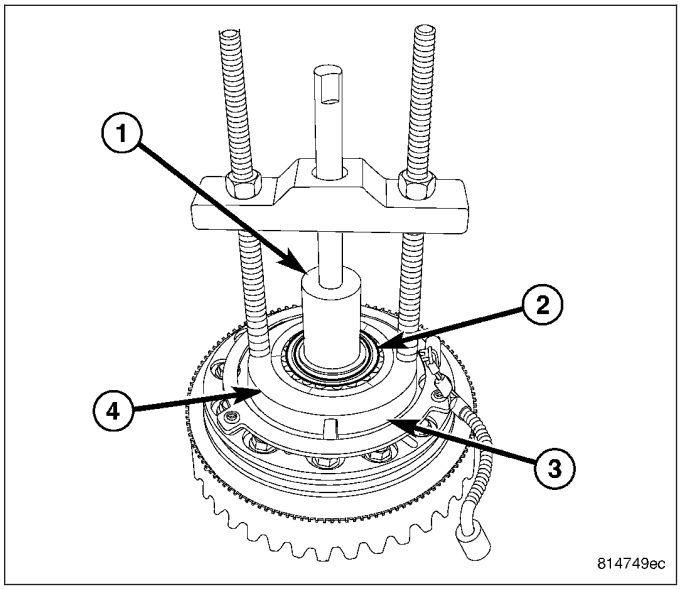
21. Install sensor target magnet (1) on bearing cap.
22. Energize locker and verify dog clutch is engaged.
23. Set sensor air gap (2) to 5.5 mm ± 0.25 mm (0.21 in. ± 0.01 in.).
24. Tighten sensor target magnet bolt (3) to 7 N·m (62 in. lbs.).
25. Install sensor wire tie strap (4) to adjuster lock and de-energize coil.
26. Measure ring gear backlash and check gear tooth contact pattern. Refer to Adjustments for procedure.
27. Install axle shafts.
28. Install differential housing gasket and cover. Tighten cover bolts to 40 N·m (30 ft. lbs.).
29. Fill axle with lubricant, refer to Lubrication & Maintenance for capacity and lubricant type.
30. Install fill plug and tighten to 32 N·m (24 ft. lbs.).



BEARINGS-EL DIFFERENTIAL CASE

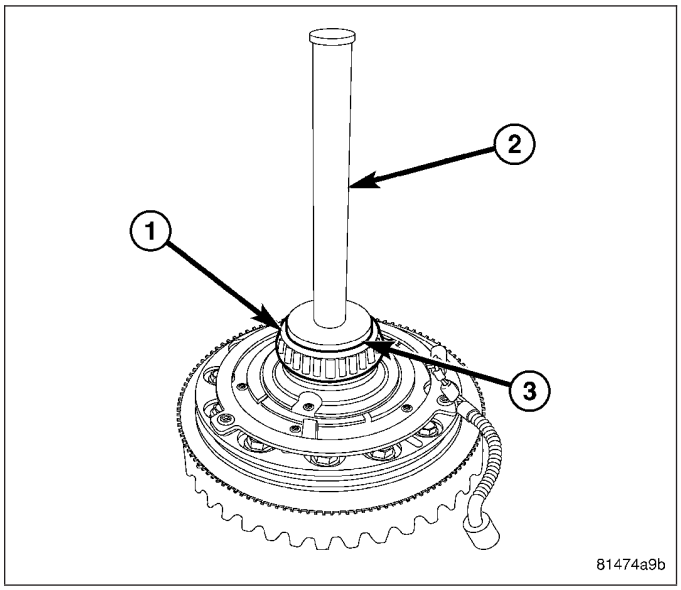
REMOVAL

1. Remove the differential case from the housing.
2. Install Plug 8888 (1) into the end of the case.
3. Remove differential case bearings (2) with Puller C-293-PA (3) and Adapters 9614 (4).



INSTALLATION

1. Install differential bearings (1) with Handle C-4171 (2) and Installer 8956 (3).



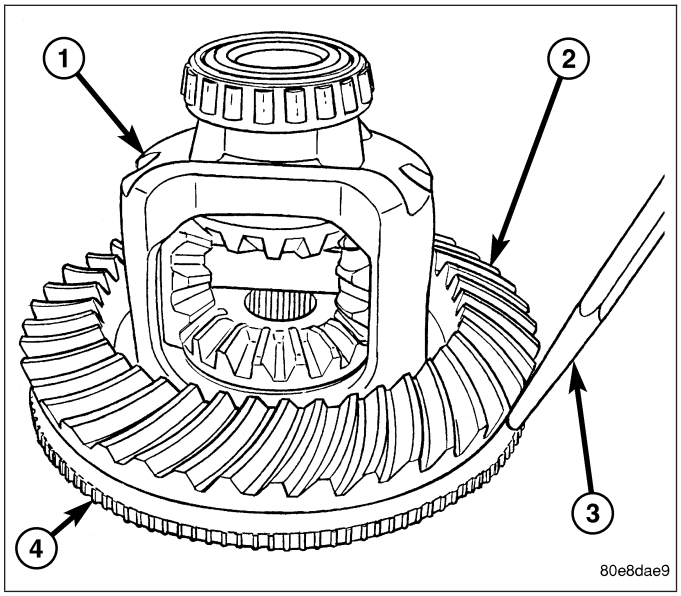
GEAR-PINION/RING

REMOVAL

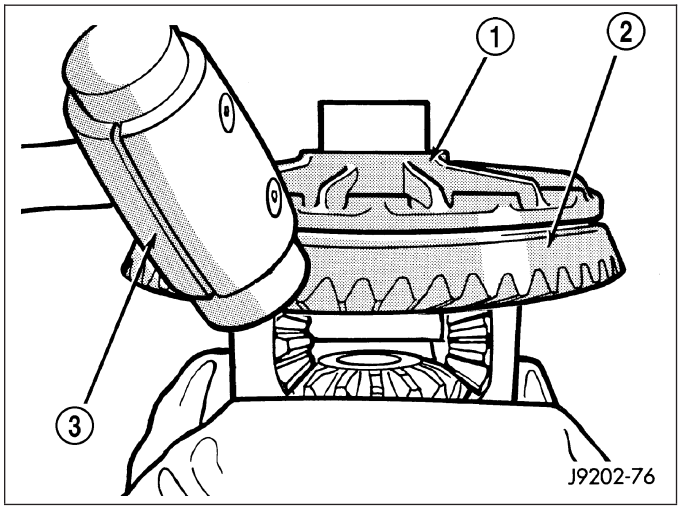
NOTE: The ring and pinion gears are service in a matched set. Never replace the ring gear/pinion gear without replacing the other matching gear.

1. Mark pinion flange and propeller shaft for installation alignment.
2. Disconnect propeller shaft from pinion flange and remove propeller shaft.
3. Remove differential from axle housing.
4. Place differential on Plug 8888 and drive exciter ring (4) off the differential case (1) with a hammer and punch (3).

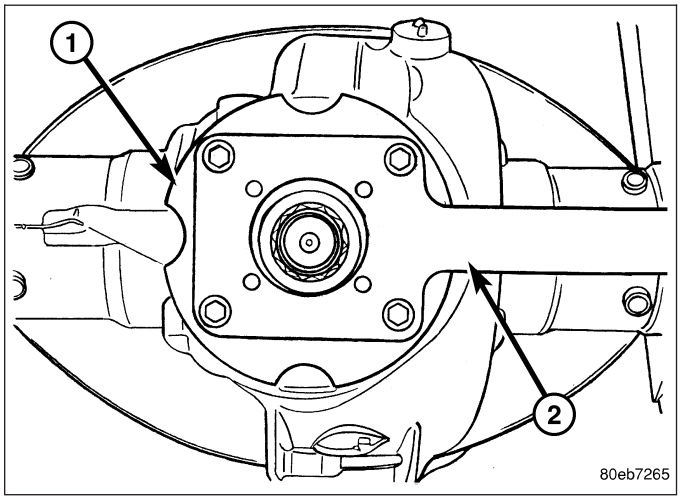
NOTE: Do not remove the exciter ring if it is not being replaced.



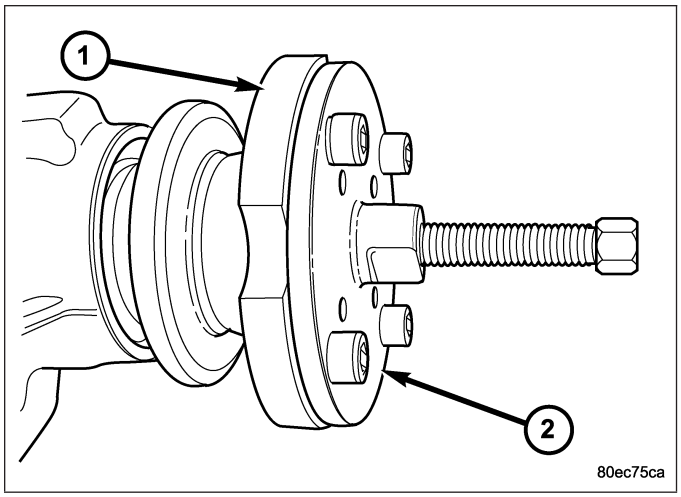
5. Place differential case in a vise with soft metal jaw protectors.
6. Remove bolts holding ring gear to differential case.
7. Drive ring gear (2) from differential case (1) with a soft hammer (3).



8. Hold pinion flange (1) with Flange Wrench 8979 (2) and remove pinion flange nut and washer.



9. Remove pinion flange (1) from the pinion with Flange Puller 8992 (2).



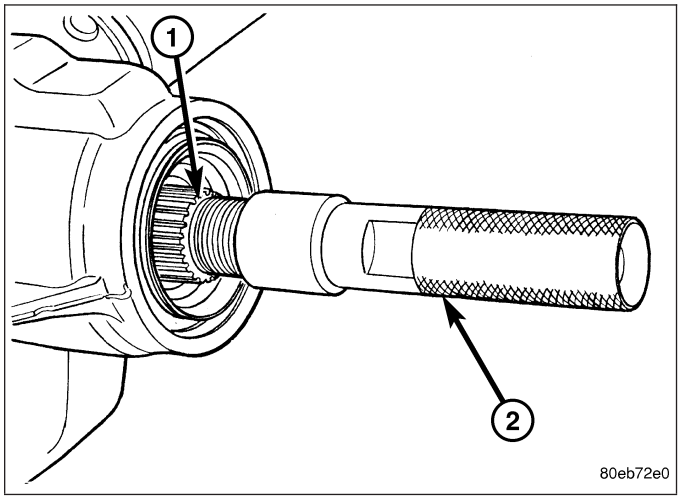
10. Remove pinion gear (1) from housing, with Pinion Driver 8977 (2) and a hammer.

NOTE: Thread the driver on the pinion shaft till it bottoms out.

11. Remove pinion seal with a slide hammer or pry bar.
12. Remove and discard front pinion bearing.

CAUTION: Do not reuse front pinion bearing/cup.

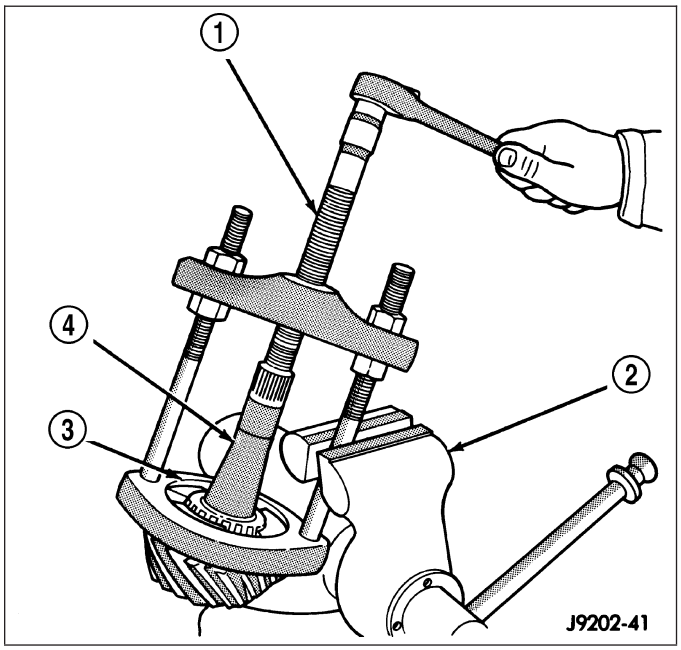
13. Remove collapsible spacer from the pinion shaft.



14. Remove rear pinion bearing with Puller C-293-PA (1) and Adapter Blocks 8879 (4).
15. Remove pinion depth shim from pinion gear shaft and record shim thickness.
16. Remove front pinion bearing cup from the housing with a punch and hammer and discard cup.

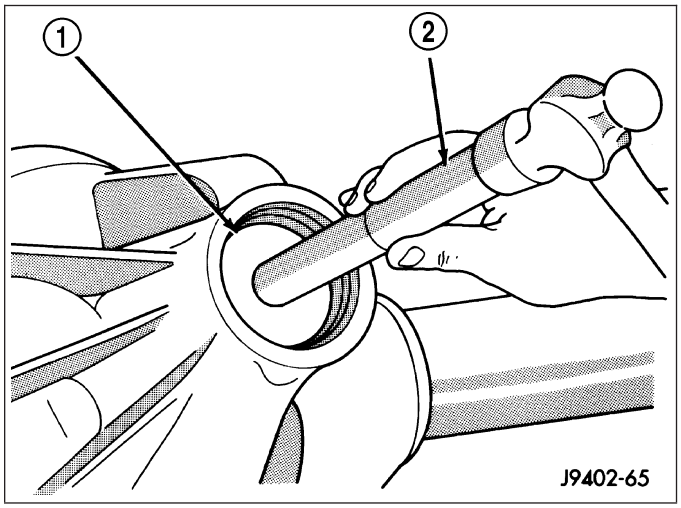
CAUTION: Do not reuse front pinion bearing/cup.

17. Remove rear pinion bearing cup from the housing with a punch and hammer, if bearing is going to be replaced.

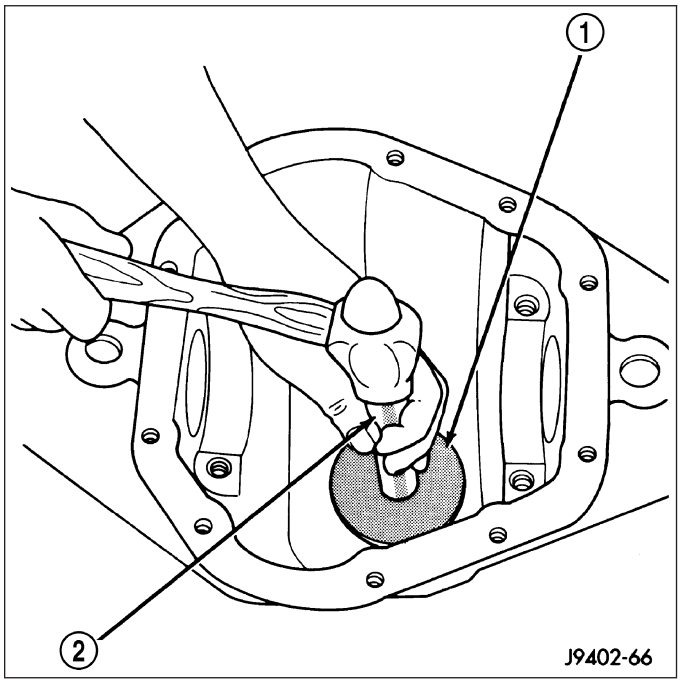


INSTALLATION

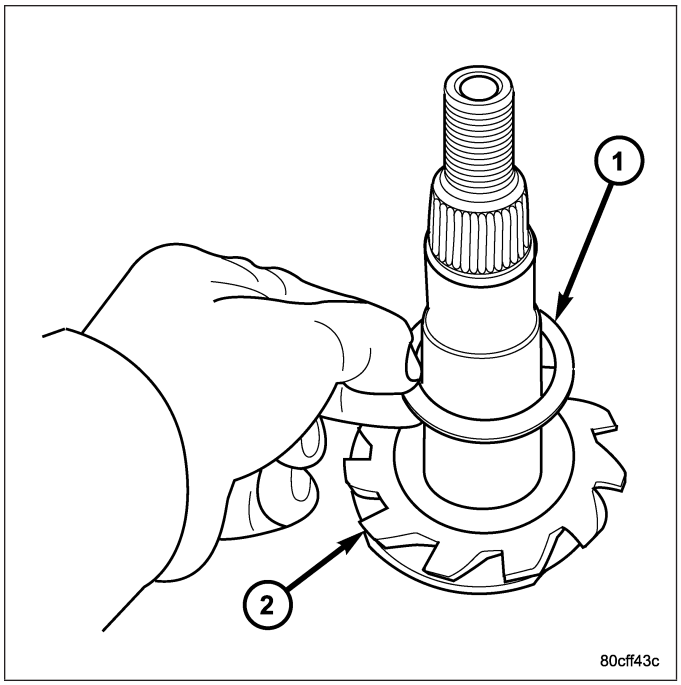
1. Install new front pinion bearing cup with Installer 8960 (1) and Handle C-4171 (2).



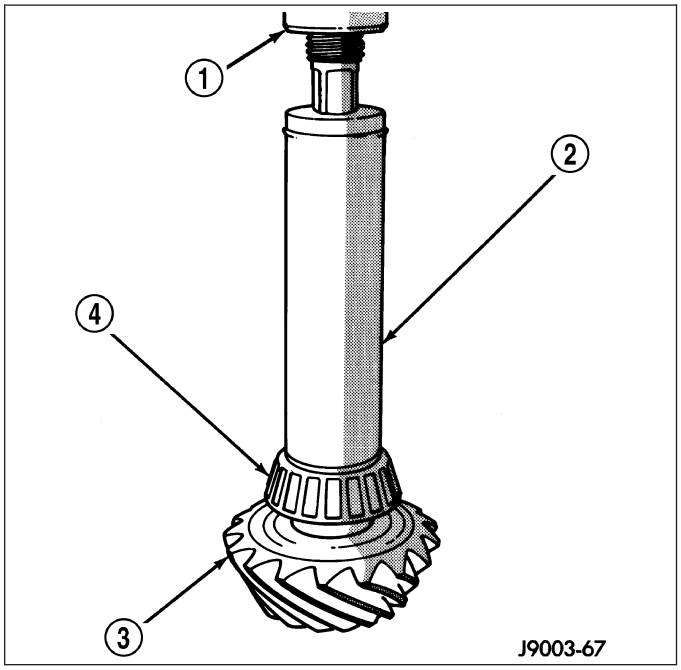
2. Install new rear pinion bearing cup with Installer 8959 (1) and Handle C-4171 (2).



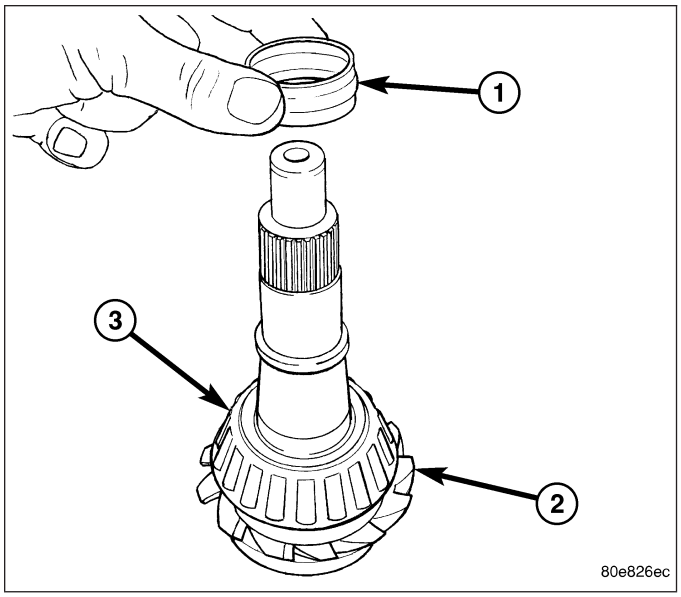
3. Install pinion depth shim (1) on the pinion gear shaft (2).



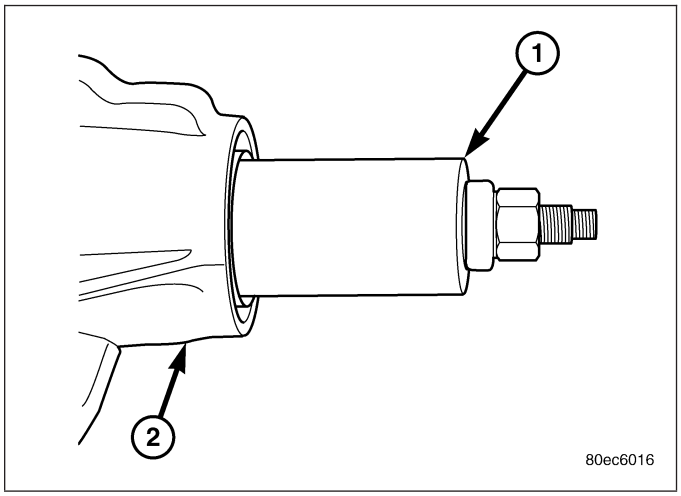
4. Install rear pinion bearing (4) on pinion (3) with Installer MD-998805 (2) and a press (1).



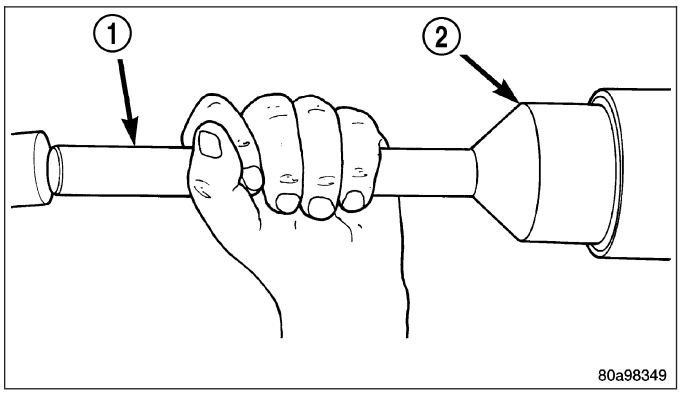
5. Install **new** collapsible spacer (1) on pinion gear (2).



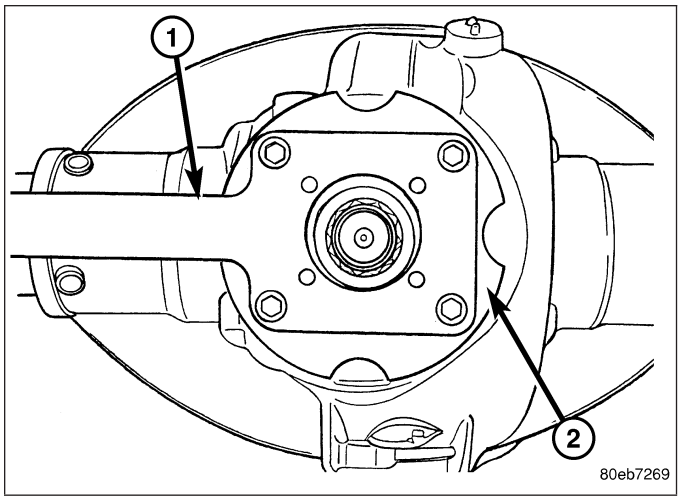
6. Lubricate pinion and bearings.
7. Install pinion into housing (2) and place front pinion bearing onto the pinion shaft. Draw pinion shaft into the front bearing with Installer 8981 (1).



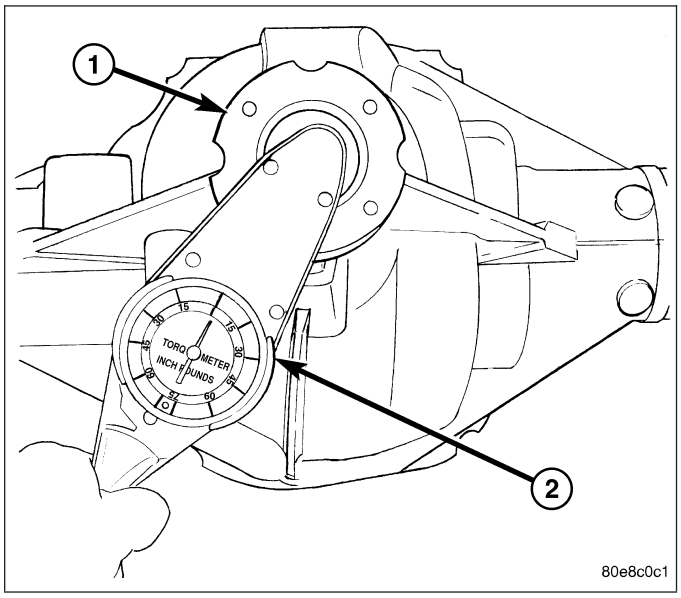
8. Install **new** pinion seal with Installer 8896 (2) and Handle C-4171 (1).



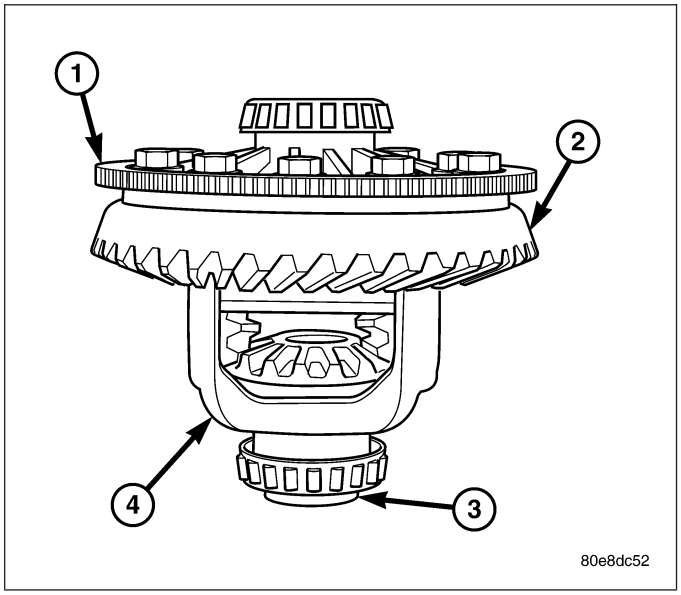
9. Apply a light coat of teflon sealant to the pinion flange splines.
10. Hold the pinion and lightly tap the pinion flange onto the pinion, until a few threads are showing.
11. Install pinion flange washer and **new** pinion nut.
12. Hold pinion flange (2) with Flange Wrench 8979 (1) and tighten pinion nut until pinion end play is taken up.



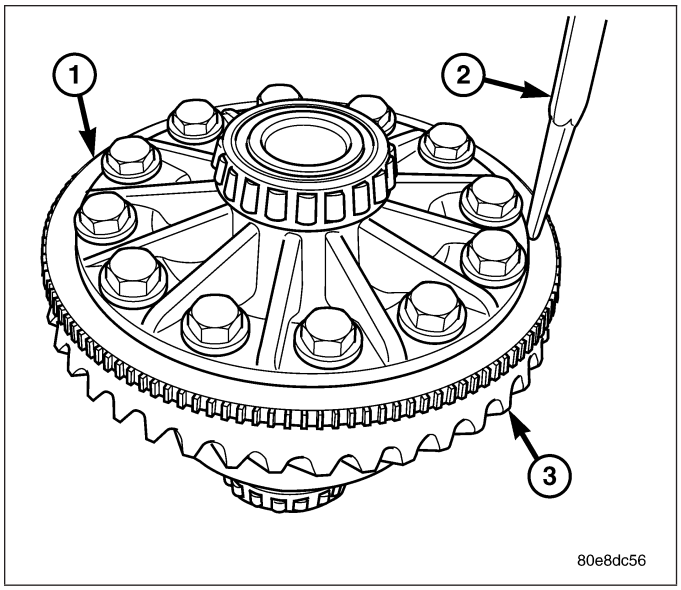
13. Rotate pinion several times to seat bearings.
14. Measure pinion (1) Torque To Rotate with an inch pound torque wrench (2). Tighten pinion nut in small increments until pinion Torque To Rotate is:
    - **New Pinion Bearings:** 1.7-2.8 N·m (15-25 in. lbs.)
    - **Original Pinion Bearings:** 1.1-2.2 N·m (10-20 in. lbs.)
15. Rotate pinion several times then verify pinion Torque To Rotate again.



16. Position ring gear (2) on differential case (4) and start two **new** ring gear bolts.
17. Install the rest of the **new** ring gear bolts and tighten them alternately to seat the ring gear.
18. Torque ring gear bolts to 237 N·m (175 ft. lbs.).



19. If exciter ring was removed, position differential assembly on differential Plug 8888 and place exciter ring on the differential case.
20. Install exciter ring (1) on the differential case evenly with a hammer and brass punch (2). Drive the ring down until it is seated against the ring gear (3).



CAUTION: Do not damage exciter ring teeth during installation.

21. Install differential into the housing.
22. Verify ring gear backlash and gear contact pattern.
23. Measure Total Torque to Rotate with an inch pound torque wrench. Total Torque to Rotate is:
    - **New Bearings:** 3.4-5.6 N·m (30-50 in. lbs.)
    - **Original Bearings:** 2.8-5.1 N·m (25-45 in. lbs.)
24. Install axle shafts.
25. Install the propeller shaft with the reference marks aligned.
26. Install differential cover with gasket and tighten bolts to 40 N·m (30 ft. lbs.).
27. Fill differential with fluid and tighten fill plug to 32 N·m (24 ft. lbs.).

REAR AXLE - 11 1/2 AA

TABLE OF CONTENTS

page

REAR AXLE - 11 1/2 AA
DIAGNOSIS AND TESTING
REAR AXLE - 11 1/2 AA 399
REMOVAL 402
INSTALLATION 403
ADJUSTMENTS
PINION DEPTH-BEARING PRELOAD-GEAR BACKLASH 404
SPECIFICATIONS
REAR AXLE - 11 1/2 AA 408
SPECIAL TOOLS 410
SHAFT-AXLE
REMOVAL 413
INSTALLATION 413
BEARINGS-AXLE HUB
REMOVAL 414
INSTALLATION 415
SEAL-PINION
REMOVAL 416
INSTALLATION 417
DIFFERENTIAL
REMOVAL 418
DISASSEMBLY 419
ASSEMBLY 421
INSTALLATION 422
DIFFERENTIAL-TRAC-RITE
DESCRIPTION 424
OPERATION 425
CLEANING 425
BEARINGS-DIFFERENTIAL CASE
REMOVAL 426
INSTALLATION 426
GEAR-PINION/RING
REMOVAL 428
INSTALLATION 430

REAR AXLE - 11 1/2 AA

DIAGNOSIS AND TESTING

REAR AXLE - 11 1/2 AA

GEAR NOISE

Axle gear noise can be caused by insufficient lubricant, incorrect backlash, incorrect pinion depth, tooth contact, worn/damaged gears, or the carrier housing not having the proper offset and squareness.

Gear noise usually happens at a specific speed range. The noise can also occur during a specific type of driving condition. These conditions are acceleration, deceleration, coast, or constant load.

When road testing, first warm-up the axle fluid by driving the vehicle at least 5 miles and then accelerate the vehicle to the speed range where the noise is the greatest. Shift out-of-gear and coast through the peak-noise range. If the noise stops or changes greatly check for:

- Insufficient lubricant.
- Incorrect ring gear backlash.
- Gear damage.

Differential side gears and pinions can be checked by turning the vehicle. The side gears are loaded during turns. They usually do not cause noise during straight-ahead driving when the gears are unloaded. A worn pinion shaft can also cause a snapping or a knocking noise.

BEARING NOISE

The axle shaft, differential and pinion bearings can all produce noise when worn or damaged. Bearing noise can be either a whining, or a growling sound.

Pinion bearings have a constant-pitch noise. This noise changes only with vehicle speed. Pinion bearing noise will be higher pitched because it rotates at a faster rate. Drive the vehicle and load the differential. If bearing noise occurs, the rear pinion bearing is the source of the noise. If the bearing noise is heard during a coast, the front pinion bearing is the source.

Differential bearings usually produce a low pitch noise. Differential bearing noise is similar to pinion bearing noise. The pitch of differential bearing noise is also constant and varies only with vehicle speed.

Axle shaft bearings produce noise and vibration when worn or damaged. The noise generally changes when the bearings are loaded. Road test the vehicle. Turn the vehicle sharply to the left and to the right. This will load the bearings and change the noise level. Where axle bearing damage is slight, the noise is usually not noticeable at speeds above 30 mph.

LOW SPEED KNOCK

Low speed knock is generally caused by:

- Worn U-joint(s).
- Worn side gear thrust washers.
- Worn pinion shaft bore.

VIBRATION

Vibration at the rear of the vehicle is usually caused by:

- Damaged drive shaft.
- Missing drive shaft balance weight(s).
- Worn or out-of-balance wheels.
- Loose wheel lug nuts.
- Worn U-joint(s).
- Loose/broken springs.
- Damaged axle shaft bearing(s).
- Loose pinion gear nut.
- Excessive pinion yoke run out.

- Bent axle shaft(s).

Check for loose or damaged front-end components or engine/transmission mounts. These components can contribute to what appears to be a rear end vibration. Do not overlook engine accessories, brackets and drive belts.

NOTE: All driveline components should be examined before starting any repair.

DRIVELINE SNAP

A snap or clunk noise when the vehicle is shifted into gear (or the clutch engaged), can be caused by:

- High engine idle speed.
- Transmission shift operation.
- Loose engine/transmission/transfer case mounts.
- Worn U-joints.
- Loose spring mounts.
- Loose pinion gear nut and yoke.
- Excessive ring gear backlash.
- Excessive side gear to case clearance.

The source of a snap or a clunk noise can be determined with the assistance of a helper. Raise the vehicle on a hoist with the wheels free to rotate. Instruct the helper to shift the transmission into gear and listen for the noise. A mechanics stethoscope is helpful in isolating the source of a noise.

DIAGNOSTIC CHART

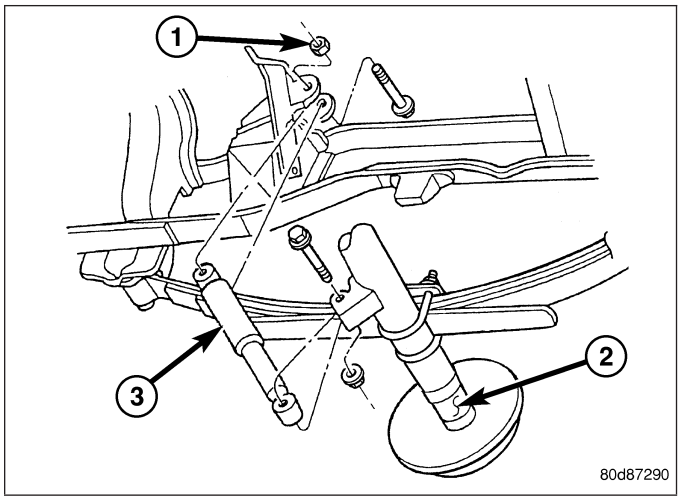
Condition	Possible Causes	Correction
Wheel Noise	1. Wheel loose.	1. Tighten loose nuts.
	2. Worn wheel bearing.	2. Replace bearing.
Axle Shaft Noise	1. Misaligned axle tube.	1. Inspect axle tube alignment. Correct as necessary.
	2. Bent or sprung axle shaft.	2. Inspect and correct as necessary.
Axle Shaft Broke	1. Misaligned axle tube.	1. Replace the broken shaft after correcting tube mis-alignment.
	2 Vehicle overloaded.	2. Replace broken shaft and avoid excessive weight on vehicle.
	3. Erratic clutch operation.	3. Replace broken shaft and avoid or correct erratic clutch operation.
	4. Grabbing clutch.	4. Replace broken shaft and inspect and repair clutch as necessary.

Condition	Possible Causes	Correction
Differential Cracked	1. Improper adjustment of the differential bearings.	1. Replace case and inspect gears and bearings for further damage. Set differential bearing pre-load properly.
	2. Excessive ring gear backlash.	2. Replace case and inspect gears and bearings for further damage. Set ring gear backlash properly.
	3. Vehicle overloaded.	3. Replace case and inspect gears and bearings for further damage. Avoid excessive vehicle weight.
	4. Erratic clutch operation.	4. Replace case and inspect gears and bearings for further damage. Avoid erratic use of clutch.
Differential Gears Scored	1. Insufficient lubrication.	1. Replace scored gears. Fill differential with the correct fluid type and quantity.
	2. Improper grade of lubricant.	2. Replace scored gears. Fill differential with the correct fluid type and quantity.
	3. Excessive spinning of one wheel/tire.	3. Replace scored gears. Inspect all gears, pinion bores, and shaft for damage. Service as necessary.
Loss Of Lubricant	1. Lubricant level too high.	1. Drain lubricant to the correct level.
	2. Worn axle shaft seals.	2. Replace seals.
	3. Cracked differential housing.	3. Repair as necessary.
	4. Worn pinion seal.	4. Replace seal.
	5. Worn/scored yoke.	5. Replace yoke and seal.
	6. Axle cover not properly sealed.	6. Remove, clean and seal cover.
Axle Overheating	1. Lubricant level low.	1. Fill differential to correct level.
	2. Improper grade of lubricant.	2. Fill differential with the correct fluid type and quantity.
	3. Bearing pre-loads too high.	3. Adjust bearing pre-loads.
	4. Insufficient ring gear backlash.	4. Adjust ring gear backlash.
Gear Teeth Broke	1. Overloading.	1. Replace gears. Examine other gears and bearings for possible damage.
	2. Erratic clutch operation.	2. Replace gears and examine the remaining parts for damage. Avoid erratic clutch operation.
	3. Ice-spotted pavement.	3. Replace gears and examine remaining parts for damage.
	4. Improper adjustments.	4. Replace gears and examine remaining parts for damage. Ensure ring gear backlash is correct.

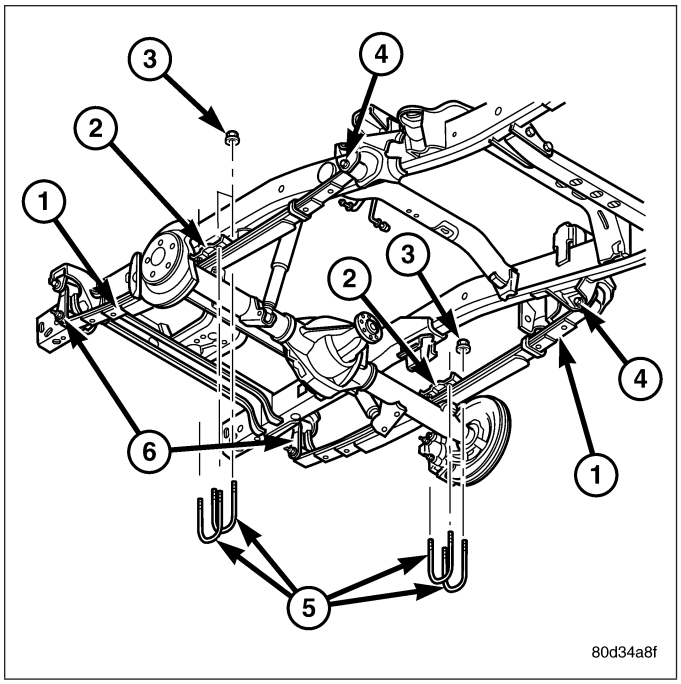
Condition	Possible Causes	Correction
Axle Noise	1. Insufficient lubricant.	1. Fill differential with the correct fluid type and quantity.
	2. Improper ring gear and pinion adjustment.	2. Check ring gear and pinion contact pattern. Adjust backlash or pinion depth.
	3. Unmatched ring gear and pinion.	3. Replace gears with a matched ring gear and pinion.
	4. Worn teeth on ring gear and pinion.	4. Replace ring gear and pinion.
	5. Loose pinion bearings.	5. Adjust pinion bearing pre-load.
	6. Loose differential bearings.	6. Adjust differential bearing pre-load.
	7. Ring gear runt out.	7. Measure ring gear run-out. Replace components as necessary.
	8. Loose differential bearing cap bolts.	8. Inspect differential components and replace as necessary. Ensure that the bearing caps are torqued to the proper specification.
	9. Housing not machined properly.	9. Replace housing.

REMOVAL

1. With vehicle in neutral, position vehicle on hoist.
2. Position a lift under axle and secure lift to the axle.
3. Remove all brake components.
4. Mark propeller shaft and companion flange for installation alignment reference.
5. Remove propeller shaft.
6. Remove axle vent hose.
7. Remove shock absorbers (3) from axle (2).

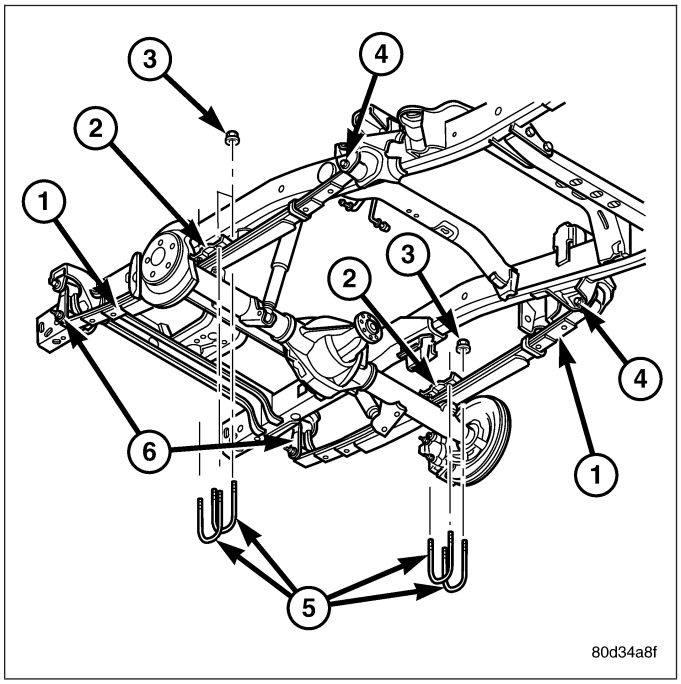


8. Remove U-bolts (4) from axle.
9. Remove axle from the vehicle.



INSTALLATION

1. Raise axle with lift and align to the leaf spring (1) centering bolts.
2. Install axle U-bolts (5) and tighten to 149 N·m (110 ft. lbs.).
3. Install shock absorbers to axle and tighten to specification.
4. Install all brake components.
5. Install propeller shaft with reference marks aligned and tighten to specification.
6. Install axle vent hose.
7. Fill differential to specifications.
8. Remove lift from axle and lower the vehicle.



ADJUSTMENTS

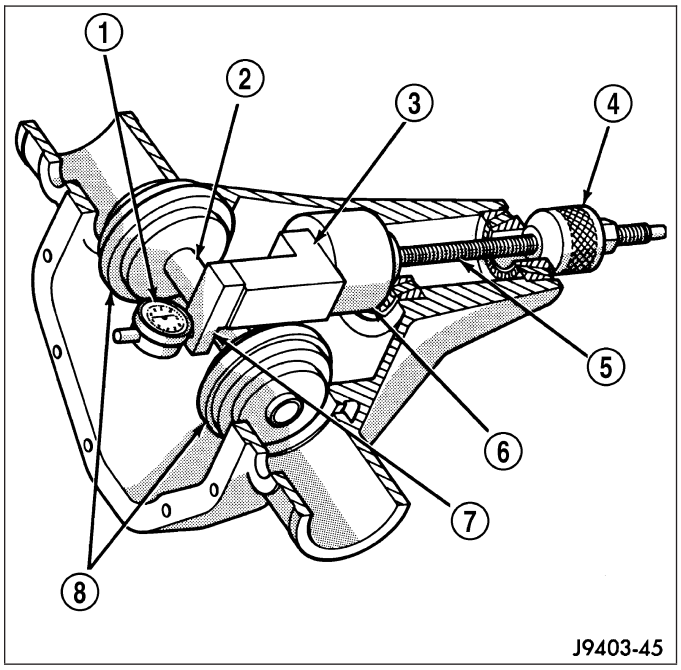
PINION DEPTH-BEARING PRELOAD-GEAR BACKLASH

PINION DEPTH MEASUREMENT

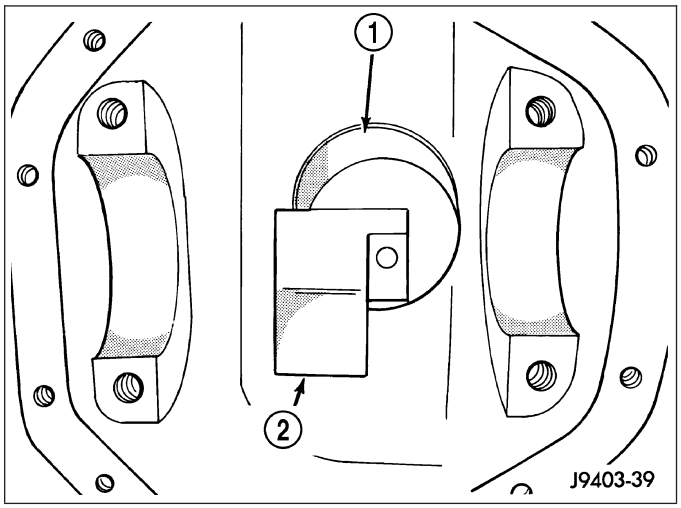
Ring and pinion gears are supplied as matched sets. Compensation for pinion depth variance is achieved with a select shim, located between the rear pinion bearing and pinion gear head.

Measurements are taken with pinion bearing cups and pinion bearings installed in the housing. Take measurements with Pinion Gauge Set and Dial Indicator C-3339 (1).

1. Assemble Pinion Height Block 6739 (3), Pinion Block 8897 (6) and rear pinion bearing onto Screw 6741 (5).

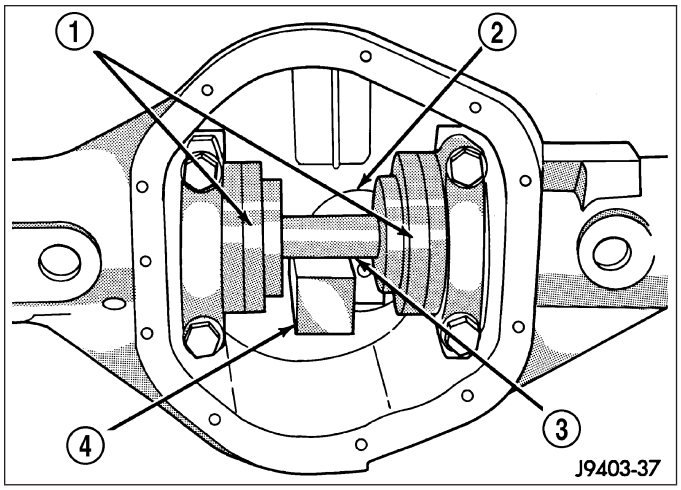


2. Insert assembled pinion block (1), pinion height block (2), rear bearing and screw into the housing through pinion bearing cups.
3. Install front pinion bearing and Cone-nut 6740 onto the screw. Tighten cone-nut until Torque To Rotate the screw is 1.7-2.26 N·m (15-20 in. lbs.).

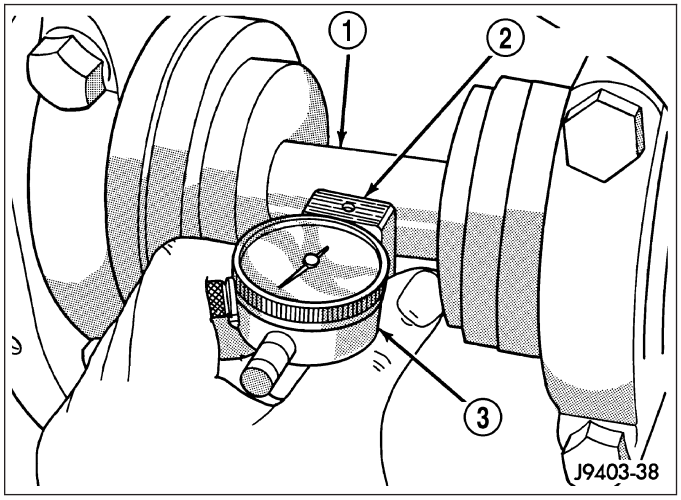


4. Place Arbor Discs 8289 (1) on Arbor D-115-3 (3) in position in the housing side bearing cradles.
5. Install differential bearing caps on arbor discs and snug the bearing cap bolts. Then cross tighten cap bolts to 281 N·m (207 ft. lbs.).

NOTE: Arbor should rotate freely in the arbor discs.



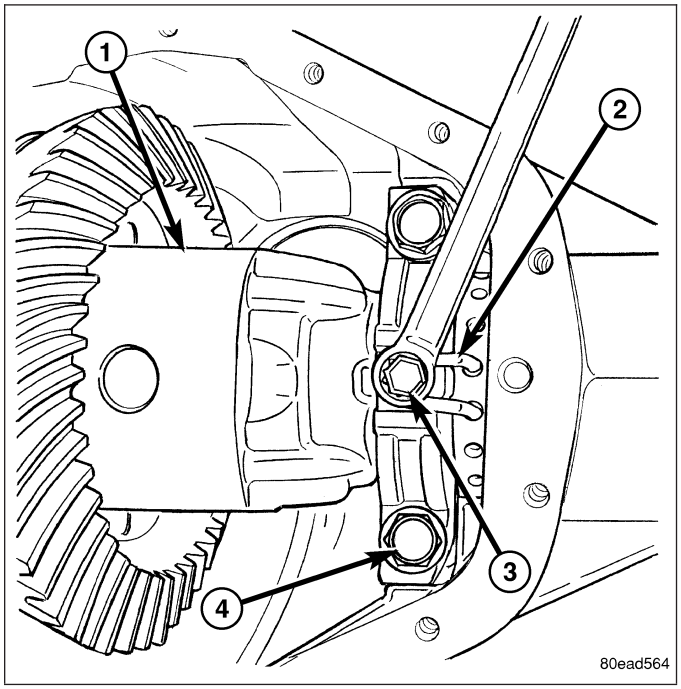
6. Assemble Dial Indicator C-3339 (3) into Scooter Block D-115-2 (2) and secure set screw.
7. Position Scooter Block/Dial Indicator flush on the pinion height block. Hold scooter block and zero the dial indicator.
8. Slowly slide the scooter block across the pinion height block over to the arbor. Move the scooter block till dial indicator crests the arbor (1), then record the highest reading.
9. Select a shim equal to the dial indicator reading.
10. Install the select shim between the rear pinion bearing and the pinion gear head.



DIFFERENTIAL CASE BEARING PRELOAD AND GEAR BACKLASH

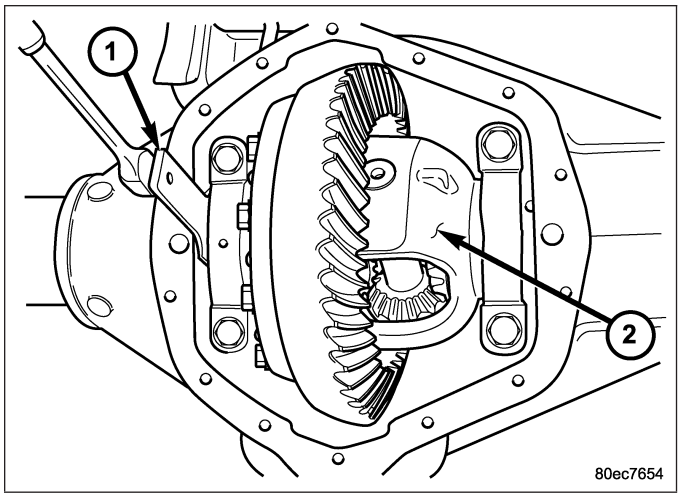
Backlash is adjusted by moving the adjusters in and out or both. By moving the adjusters the case/ring gear will move closer or further away from the pinion. In most cases this adjustment can be used to achieve the correct gear tooth pattern and set the case bearing preload.

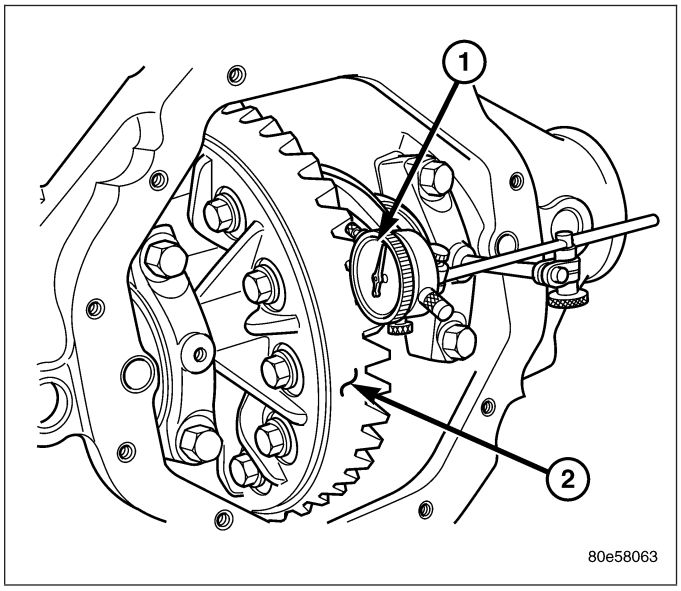
1. Remove adjuster lock bolts (3) and adjuster locks (2).
2. **Loosen** the differential bearing caps (4).
3. Slide differential case toward the pinion gear until the gears make contact/zero backlash. If zero backlash cannot be obtained, turn the pinion side adjuster until zero backlash is obtained.



4. Holding the differential case (2) toward the pinion gear, turn bearing adjusters with Adjuster Wrench 8883 (1) until adjuster makes contact with the differential bearings/cups.
5. Back off the ring gear side adjuster 4 holes, to obtain initial ring gear backlash.
6. Install ring gear side adjuster lock and bolt. **Do not tighten** adjuster lock bolt at this time.
7. Tighten pinion gear side adjuster firmly against the differential case bearing cup.
8. Rotate the pinion several times to seat the deferential bearings.
9. Loosen pinion gear side adjuster until it is no longer in contact with the bearing cup, then tighten it until it makes contact.
10. Tighten pinion gear side adjuster an additional:
    - **New Bearings:** 6 Adjuster Holes
    - **Original Bearings:** 4 Adjuster Holes
11. Install pinion gear side adjuster lock and bolt.
12. Tighten bearing cap bolts to 281 N·m (207 ft. lbs.).
13. Tighten adjuster lock bolts to 25 N·m (18 ft. lbs.).
14. Measure ring gear backlash with a Dial Indicator C-3339 (1) and Pilot Stud L-4438 at eight points around the drive side of the ring gear (2). The backlash should be 0.08-0.25 mm (0.003-0.010 in) with a preferred backlash of 0.13-0.18 mm (0.005-0.007 in).

NOTE: Backlash measurement should not vary more than 0.05 mm (0.002 in) between measuring points. If measurement does vary inspect the gears for burrs, the differential case flange and ring gear mounting.

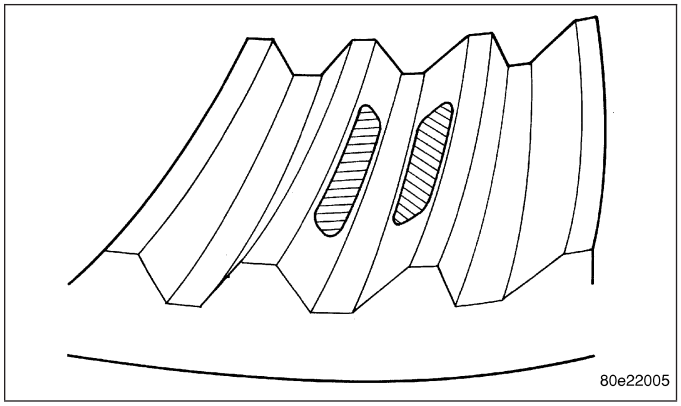




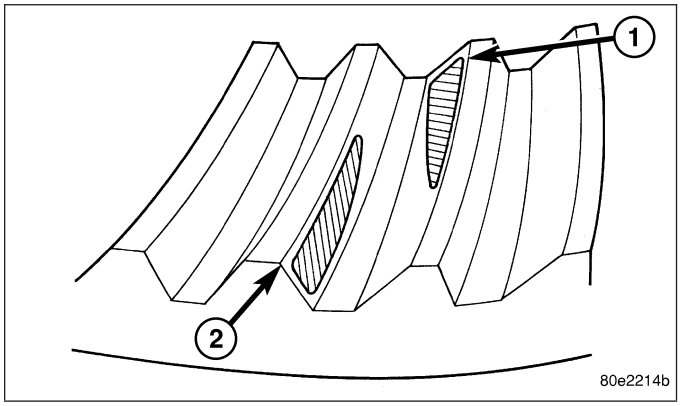
GEAR TOOTH CONTACT PATTERN

1. Wipe clean each tooth of the ring gear.
2. Apply gear marking compound to all of the ring gear teeth.
3. Verify bearing cap bolts are torque specification.
4. Apply parking brakes lightly to create at 14 N·m (10 ft. lbs.) pinion rotating torque.
5. Rotate the pinion/pinion yoke 4 full revolutions in each directions.
6. Read gear tooth contact pattern.

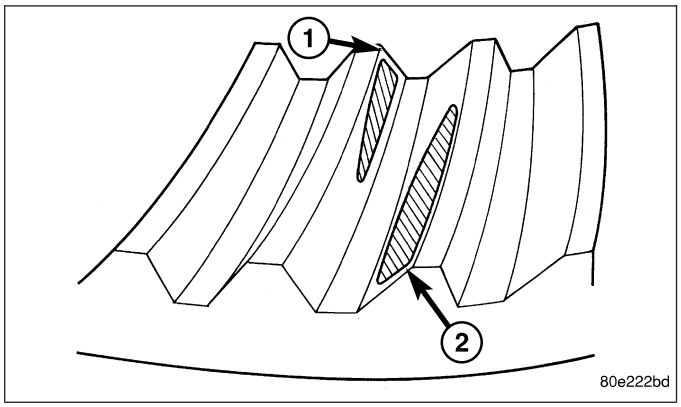
Gear contact pattern correct. Backlash and pinion depth is correct.



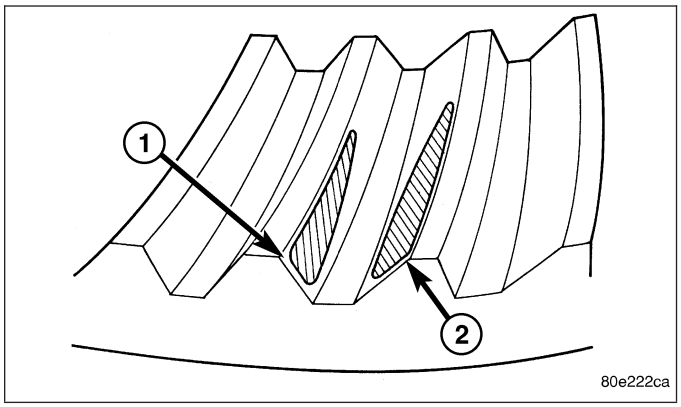
Ring gear too far away from pinion gear, coast side toe (1) and drive side heel (2). Decrease backlash, by moving the ring closer to the pinion gear using the adjusters.



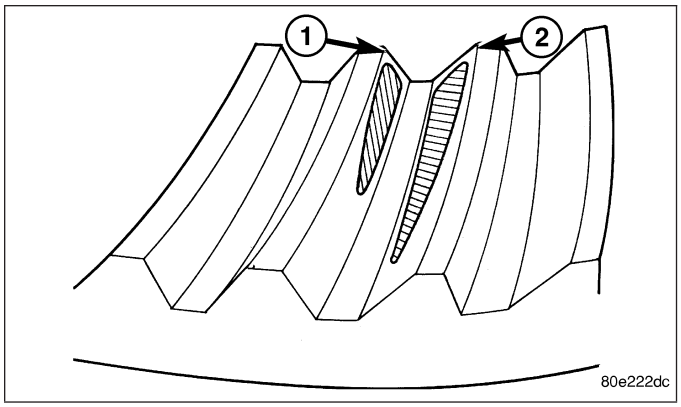
Ring gear too close to pinion gear, drive side toe (1) and coast side heel (2). Increase backlash, by moving the ring away from the pinion gear using the adjusters.



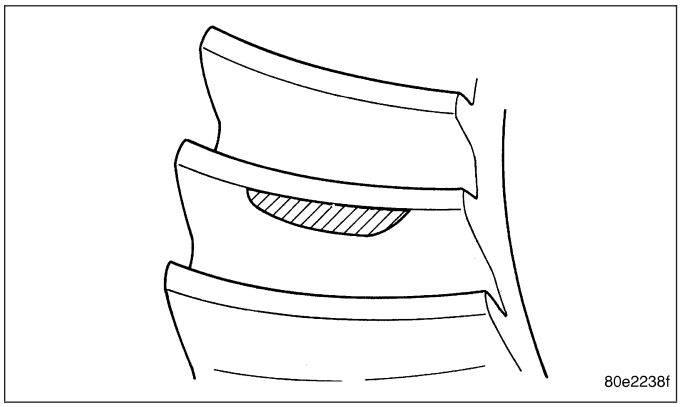
Ring gear too far away from pinion gear, drive side heel (1) and coast side heel (2). Decrease backlash, by moving the ring closer to the pinion gear using the adjusters.



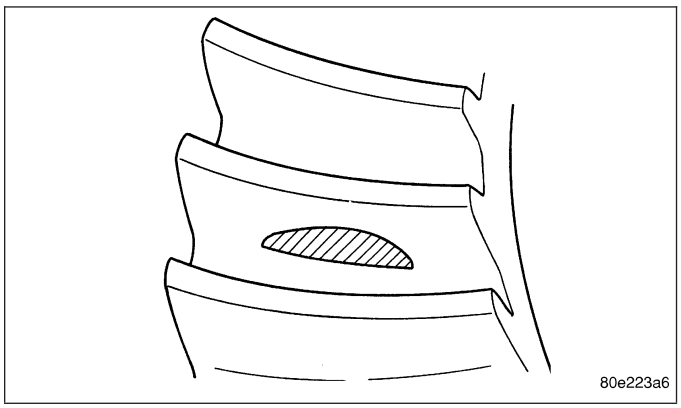
Ring gear too close to pinion gear, drive side toe (1) coast side toe (2). Increase backlash, by moving the ring away from the pinion gear using the adjusters.



Pinion gear is set too low. Increase pinion gear height, by increasing the pinion depth shim thickness.



Pinion gear is set too high. Decrease pinion depth, by decreasing the pinion depth shim thickness.



SPECIFICATIONS

REAR AXLE - 11 1/2 AA

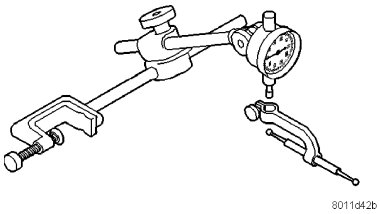
AXLE SPECIFICATIONS

DESCRIPTION	SPECIFICATION
Axle Ratio	3.73, 4.10
Ring Gear Diameter	292 mm (11.5 in.)
Ring Gear Backlash	0.13-0.18 mm (0.005-0.007 in.)
Pinion Torque To Rotate - New Bearings	1.69-2.82 N·m (15-25 in. lbs.)
Pinion Torque To Rotate - Original Bearings	1-2 N·m (10-20 in. lbs.)
Total Torque to Rotate - New Bearing	3.4-5.6 N·m (30-50 in. lbs.)
Total Torque to Rotate - Original Bearing	2.8-5.1 N·m (25-45 in. lbs.)

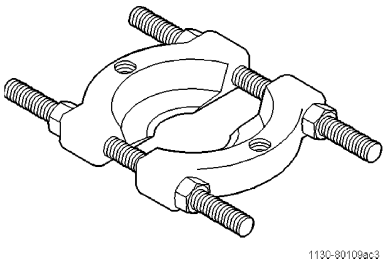
TORQUE SPECIFICATIONS

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Fill Hole Plug	32	24	-
Differential Cover Bolts	40	30	-
Bearing Cap Bolts	281	207	-
Ring Gear Bolts	237	175	-
Axle Flange Bolts	129	95	-
Adjuster Lock Bolt	25	18	-

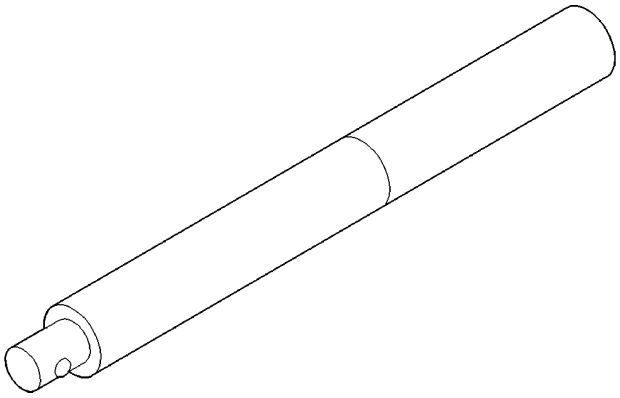
SPECIAL TOOLS



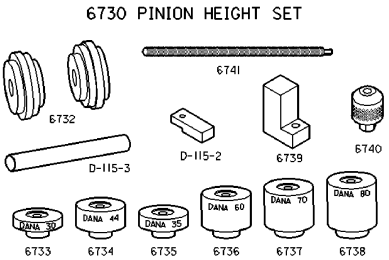
DIAL INDICATOR C-3339



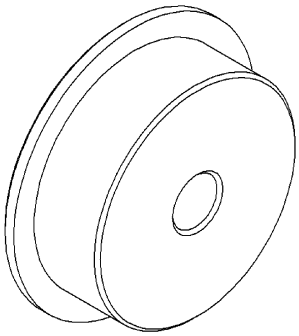
SPLITTER 1130



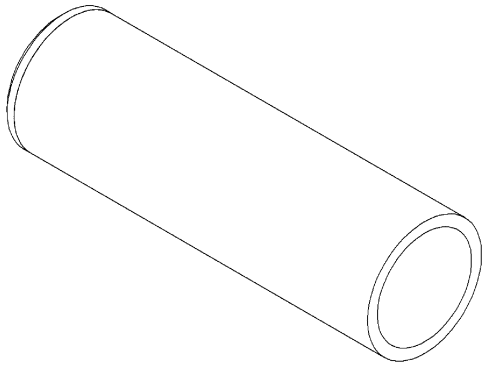
HANDLE C-4171



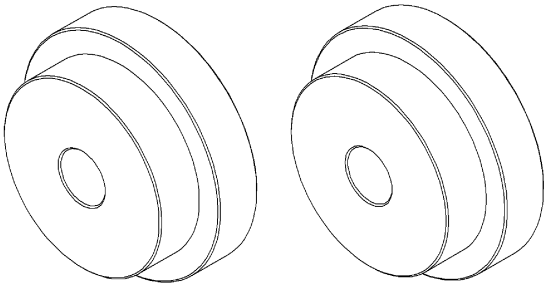
PINION DEPTH GAUGE 6730



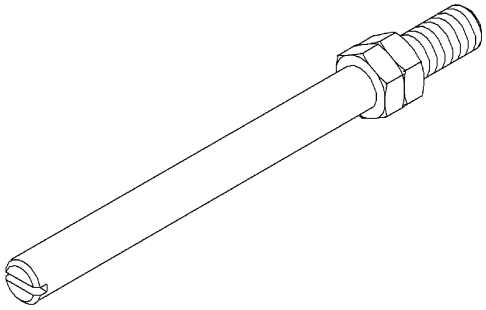
INSTALLER 8153



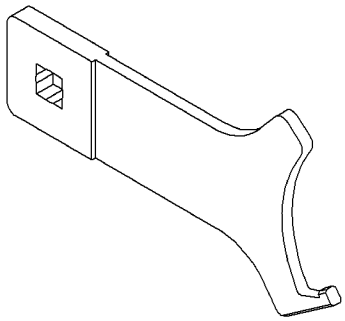
INSTALLER D-389



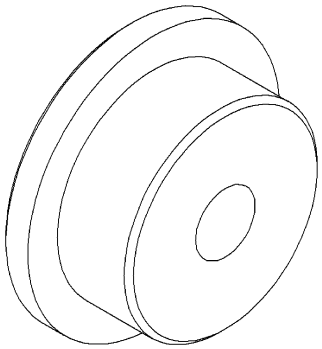
ARBOR DISCS 8289



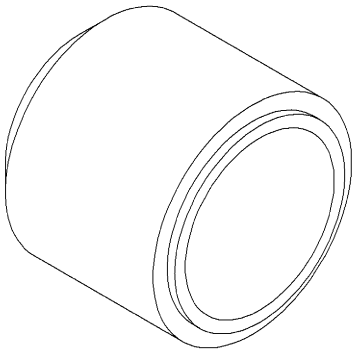
PILOT STUD L-4438



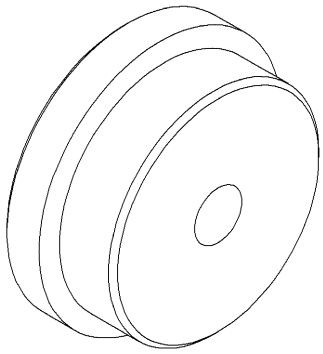
ADJUSTER WRENCH 8883



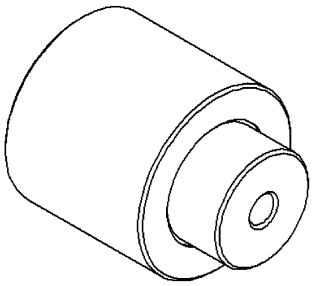
INSTALLER 8960



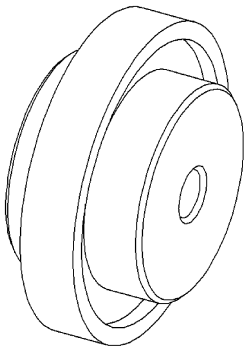
INSTALLER 8896



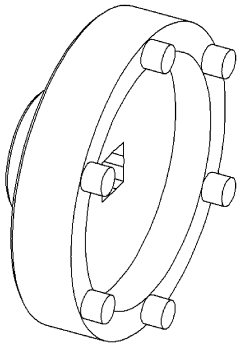
INSTALLER 8961



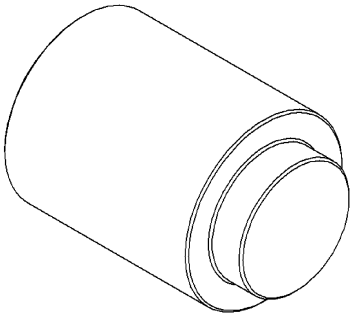
PINION BLOCK 8897



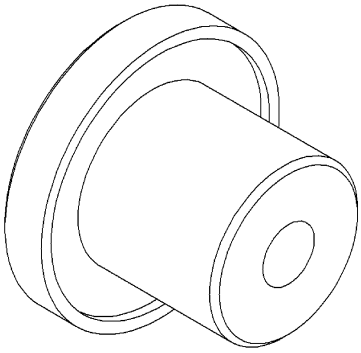
INSTALLER 8963



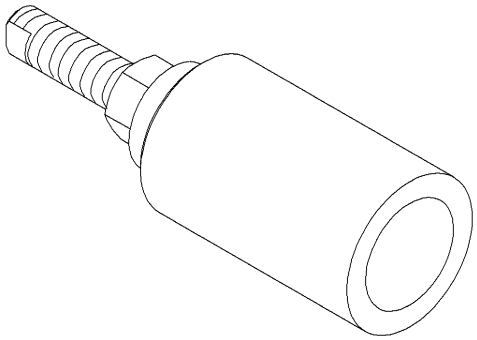
SOCKET 8954



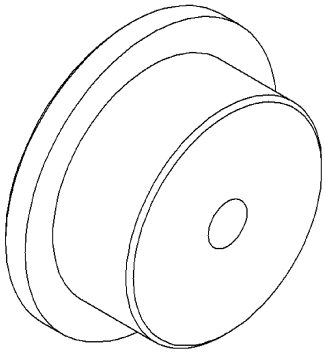
PLUG 8964



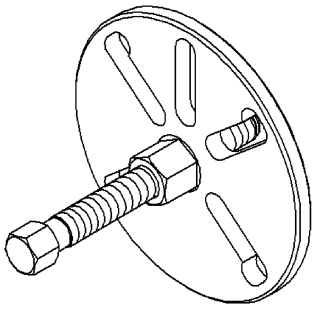
INSTALLER 8965



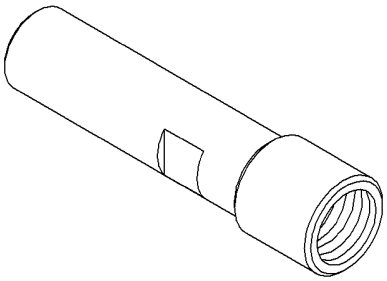
INSTALLER 8981



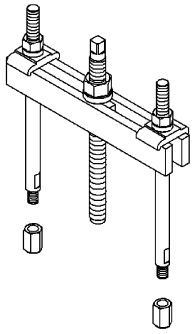
INSTALLER 8968



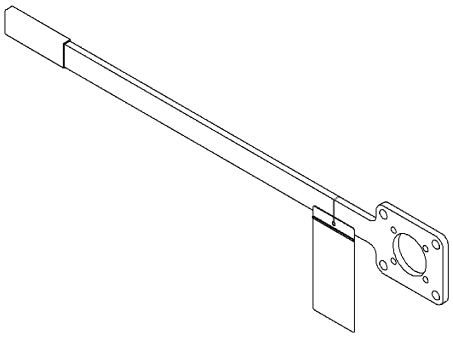
PULLER 8992



DRIVER 8977



BRIDGE 938

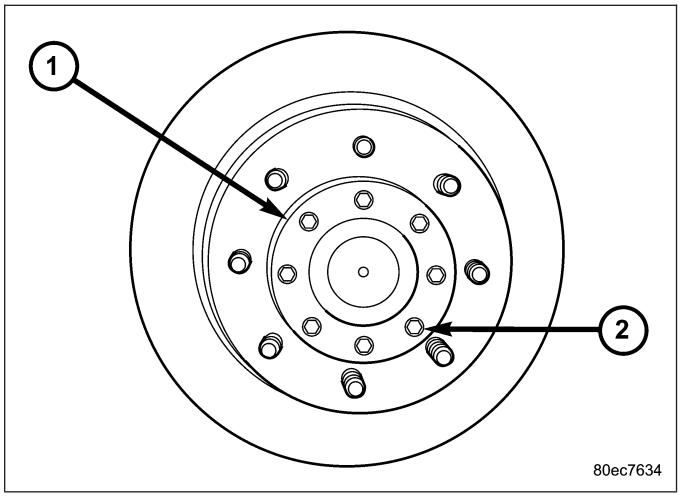


FLANGE WRENCH 8979

SHAFT-AXLE

REMOVAL

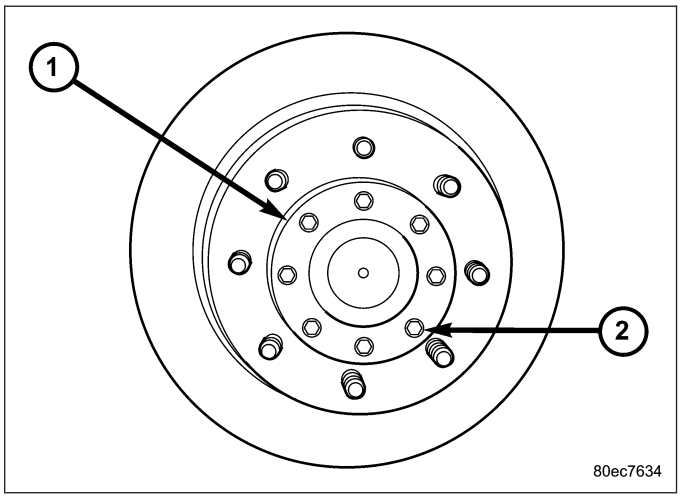
1. Remove axle shaft flange (1) bolts (2).
2. Slide axle shaft out of the axle tube.
3. Remove axle shaft gasket.



INSTALLATION

NOTE: Axle flange bolts must be replaced or use Mopar™ Lock N' Seal or Loctite® 242 on cleaned existing bolts.

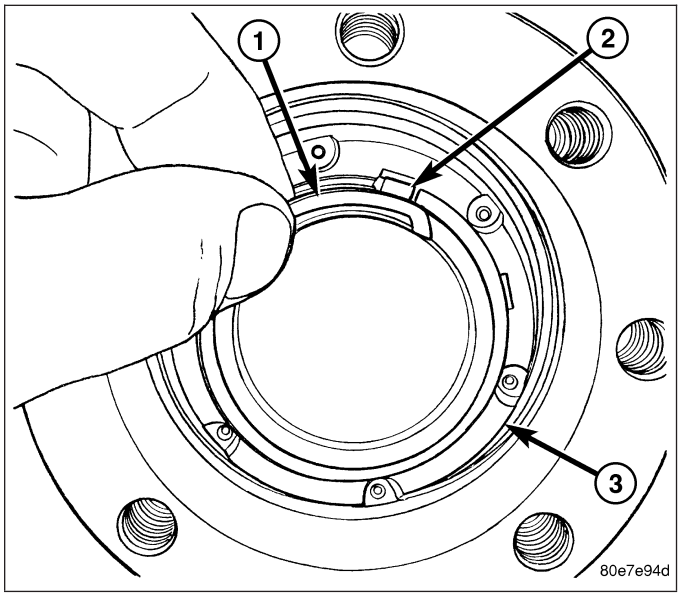
1. Clean axle flange and hub.
2. Install new axle shaft gasket.
3. Slide axle shaft into the axle tube.
4. Install axle shaft flange (1) bolts (2) and tighten to 129 N·m (95 ft. lbs.).



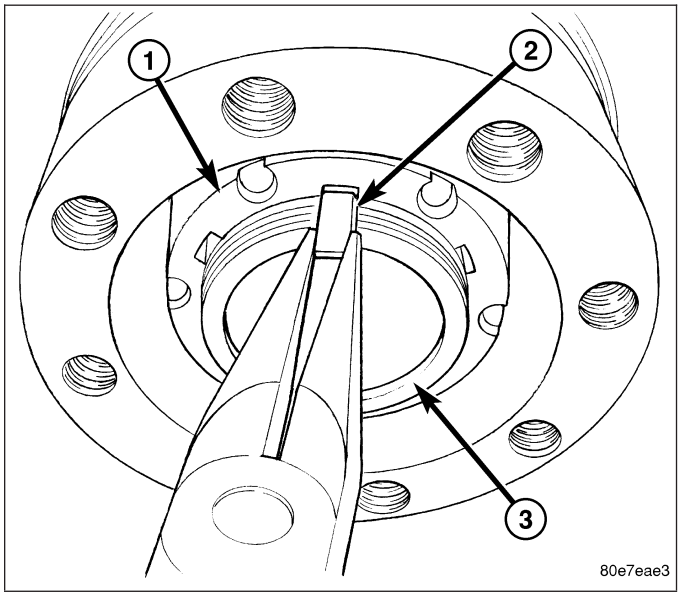
BEARINGS-AXLE HUB

REMOVAL

1. Remove axle shaft flange bolts and remove shaft.
2. Remove retainer ring (1) from the axle shaft tube.



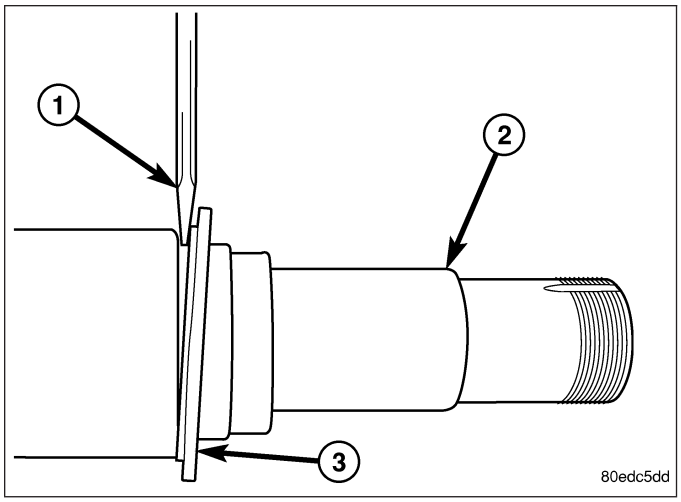
3. Remove hub bearing nut (1) locking key (2) form axle tube (3).
4. Remove hub bearing nut with Socket 8954.
5. Remove hub and bearings from the axle.



6. Pry out hub bearing seal from the back of the hub.

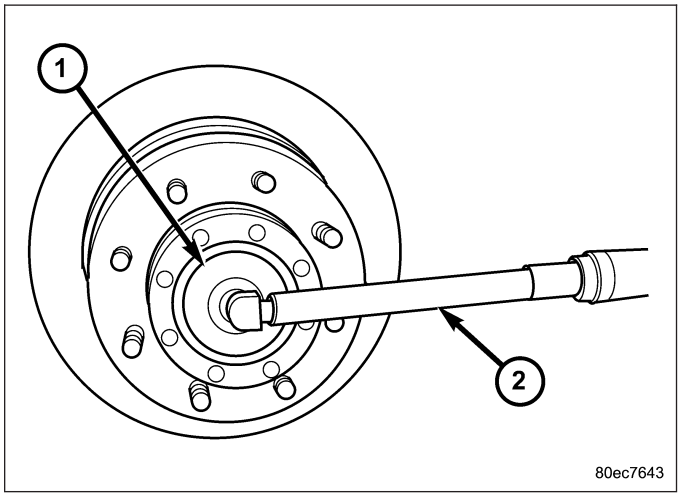
NOTE: The inner part of the seal (3) may stay on the axle tube (2). This part must also be removed with a pry bar (1).

7. Remove rear bearing.
8. Remove hub bearing cups with a hammer and drift.



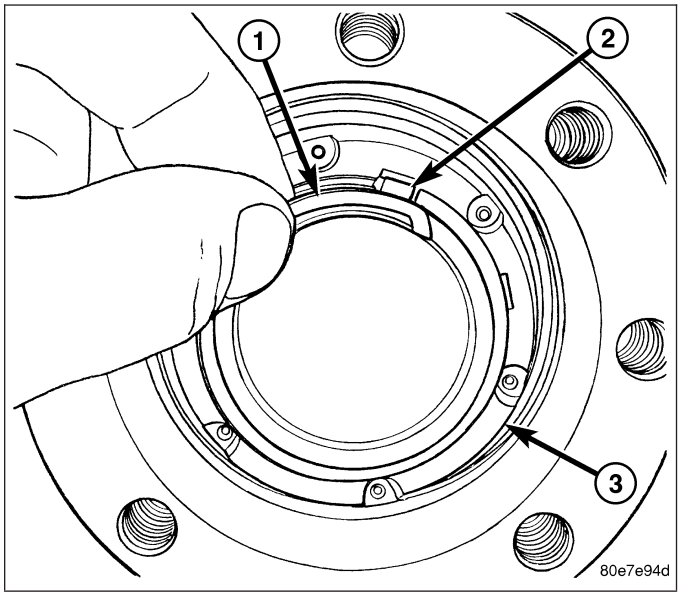
INSTALLATION

1. Install outer hub bearing cup with Installer 8961 and Handle C-4171.
2. Install inner hub bearing cup with Installer 8153 and Handle C-4171.
3. Pack bearings with the appropriate wheel bearing grease.
4. Install rear bearing and install **new** grease seal with Installer 8963 and Handle C-4171.
5. Slide hub on the axle tube and install front bearing into the hub.
6. Install hub bearing nut with Socket 8954 (1) and tighten with torque wrench (2) to 30 N·m (22 ft. lbs.) while rotating the hub.
7. Back off nut about 30° and align next hub nut key slot with axle tube key slot and install locking key.



NOTE: End play should be 0.025-0.25 mm (0.01-0.001 in.)

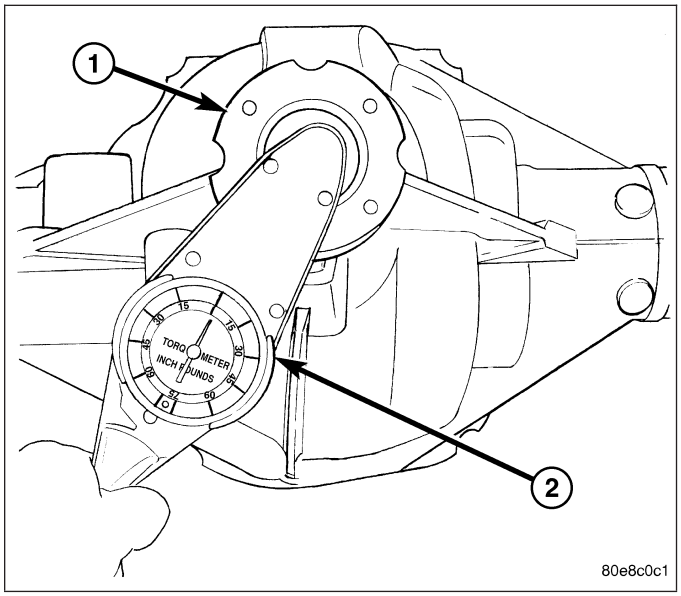
8. Install retainer ring (1) with ring end in the key slot (2).
9. Install new axle shaft gasket and install the axle shaft.



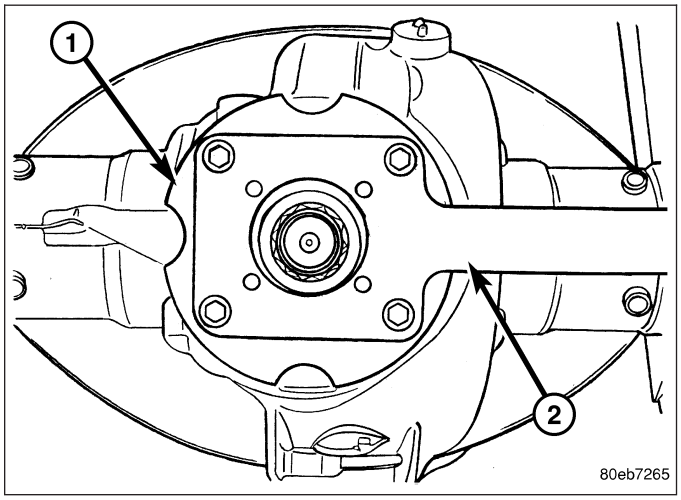
SEAL-PINION

REMOVAL

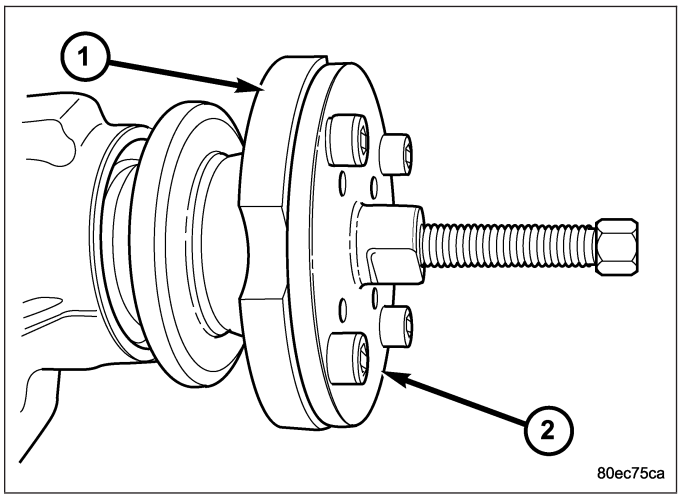
1. Remove axle shafts.
2. Mark the propeller shaft and pinion flange for installation reference.
3. Remove propeller shaft.
4. Rotate pinion gear (1) three or four times.
5. Measure and record the amount of torque necessary to rotate the pinion gear with an inch pound torque wrench (2).



6. Hold pinion flange (1) with Flange Wrench 8979 (2) and remove pinion flange nut.

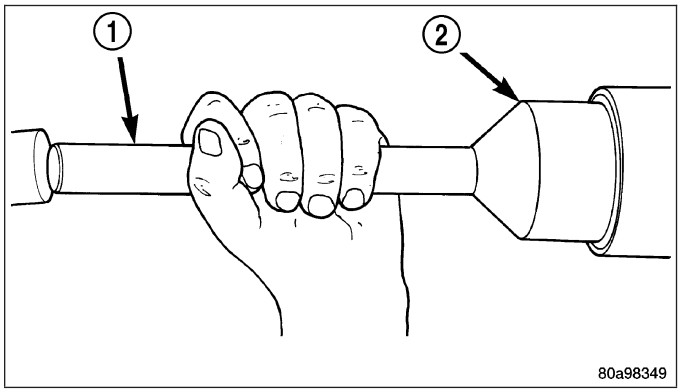


7. Remove pinion flange (1) with Pinion Flange Puller 8992 (2).
8. Remove pinion shaft seal with a seal puller or slide hammer mounted screw.

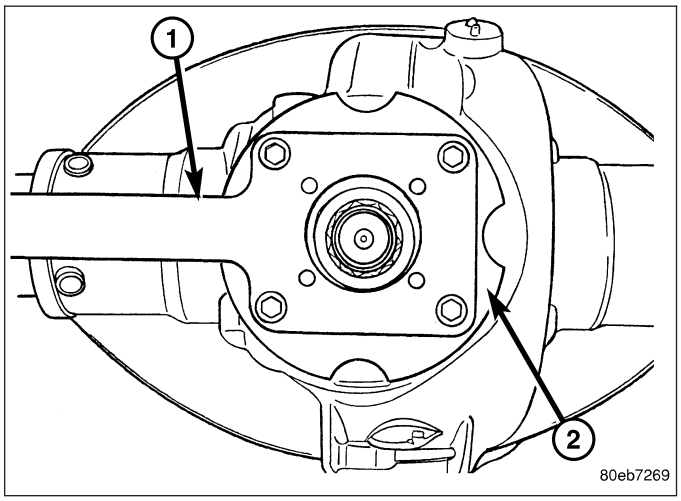


INSTALLATION

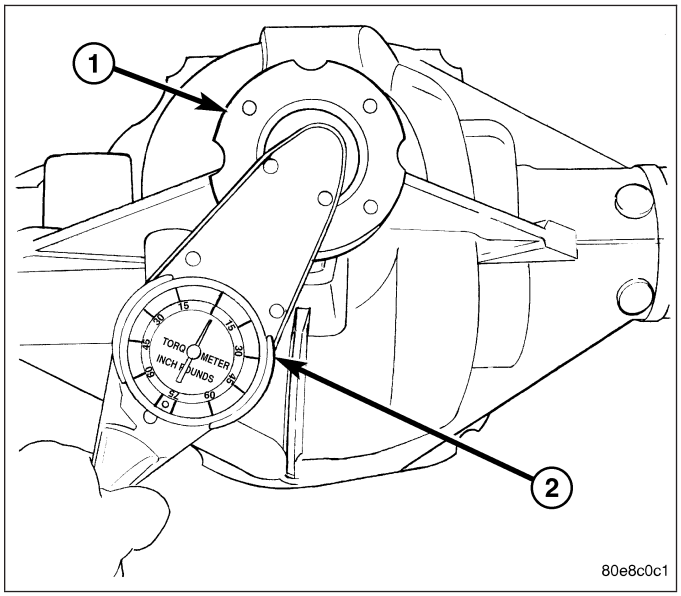
1. Install **new** pinion seal with Handle C-4171 (1) and Installer 8896 (2).
2. Apply a light coat of teflon sealant to the pinion flange splines.
3. Lightly tap the pinion flange onto the pinion until a few threads are showing.
4. Install flange washer and **new** pinion nut.



5. Hold pinion flange (2) with Flange Wrench 8979 (1) and tighten pinion nut until pinion end play is taken up.



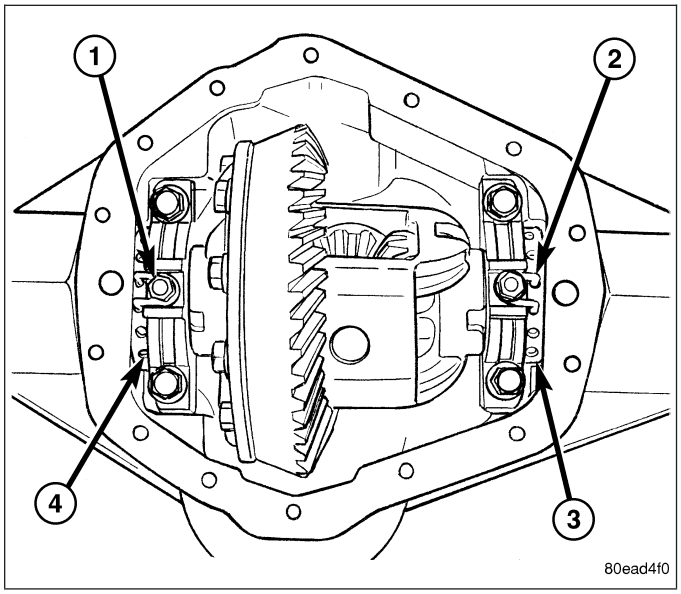
6. Rotate pinion several times to seat bearings.
7. Measure pinion (1) Torque To Rotate with an inch pound torque wrench (2) and compare it to recorded measurement. Tighten pinion nut in small increments, until pinion Torque To Rotate is 0.40-0.57 N·m (3-5 in. lbs.) greater than recorded measurement.
8. Rotate pinion several times then verify pinion Torque To Rotate again.
9. Install axle shafts.
10. Install propeller shaft with reference marks aligned.
11. Check differential fluid level.



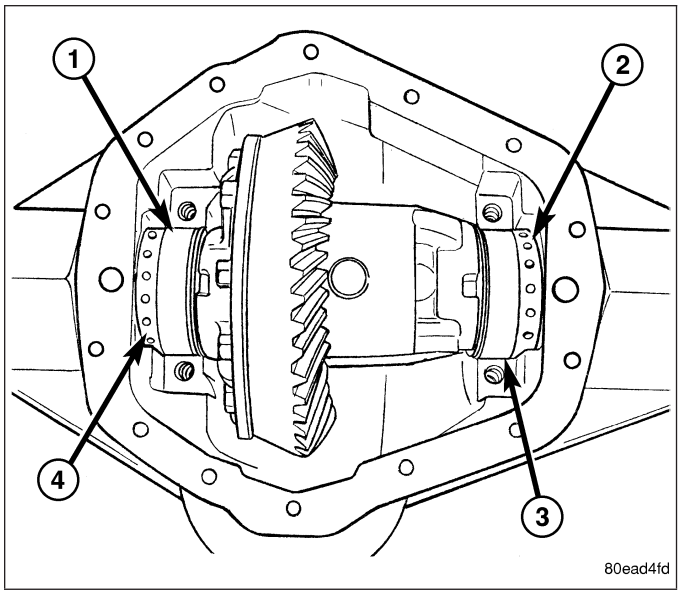
DIFFERENTIAL

REMOVAL

1. Remove fill hole plug from the differential housing cover.
2. Remove differential housing cover and drain the lubricant.
3. Remove axle shafts.
4. Remove adjuster (3) lock bolts (1) and adjuster locks (2).

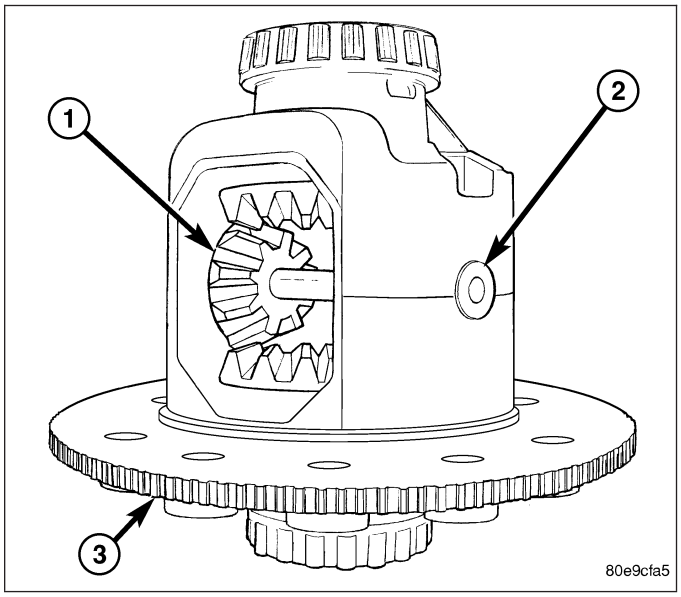


5. Mark bearing caps left and right for installation reference.
6. Remove bearing cap bolts and remove bearing caps.
7. Loosen differential bearing (1) (3) adjusters (2) (4) with Adjuster Wrench 8883.
8. Remove differential case from the housing.
9. Remove bearing cups (1) (3) and tag them left and right for installation reference.

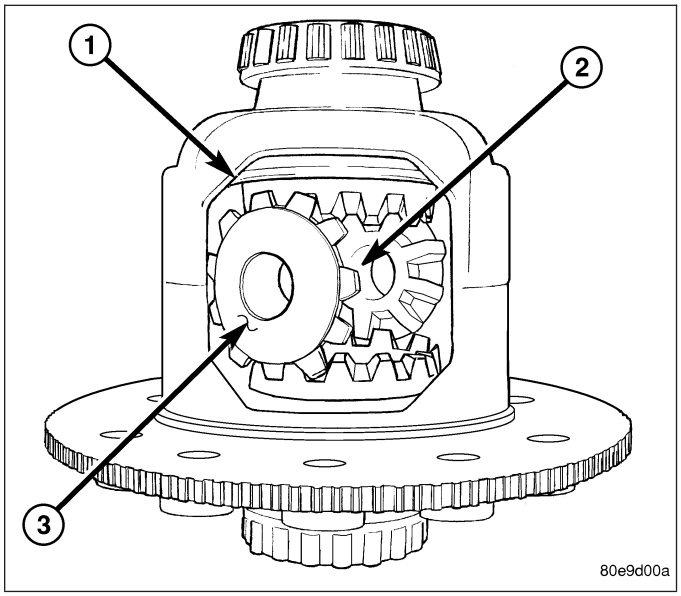


DISASSEMBLY

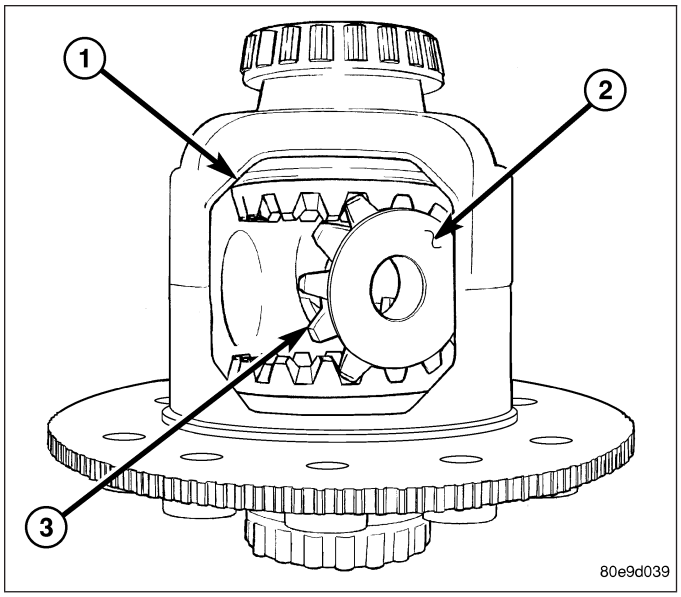
1. Remove ring gear.
2. Remove pinion shaft (2) with a hammer and punch from the side with the hole in the pinion shaft.



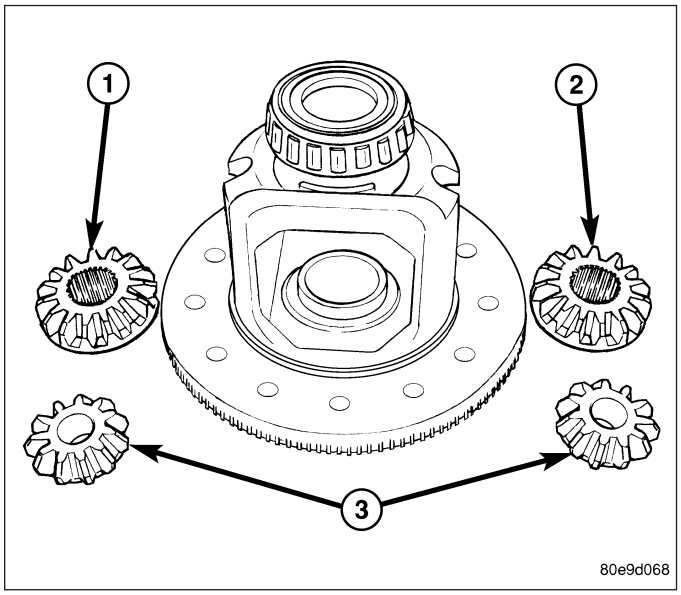
3. Rotate one pinion gear (2) with thrust washer (3) to the differential window (1) and remove the gear.



4. Rotate the other pinion gear (3) with thrust washer (2) to the differential window (1) and remove the gear.



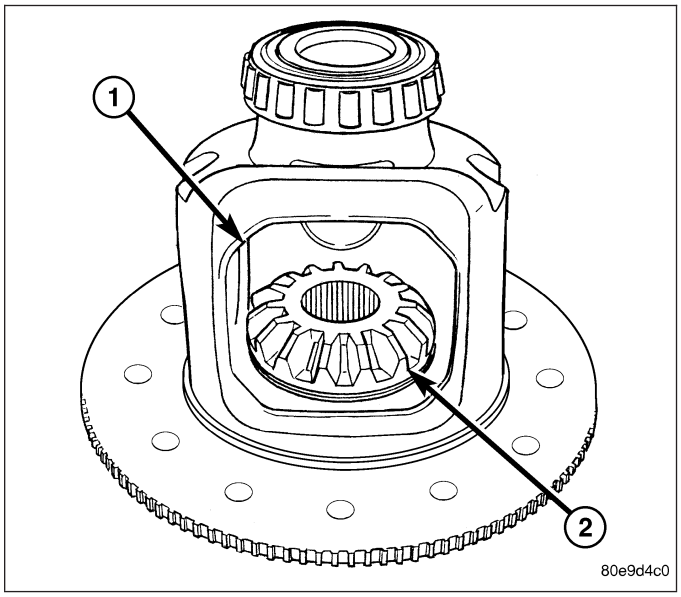
5. Remove differential side gears (1) (2) and thrust washers.



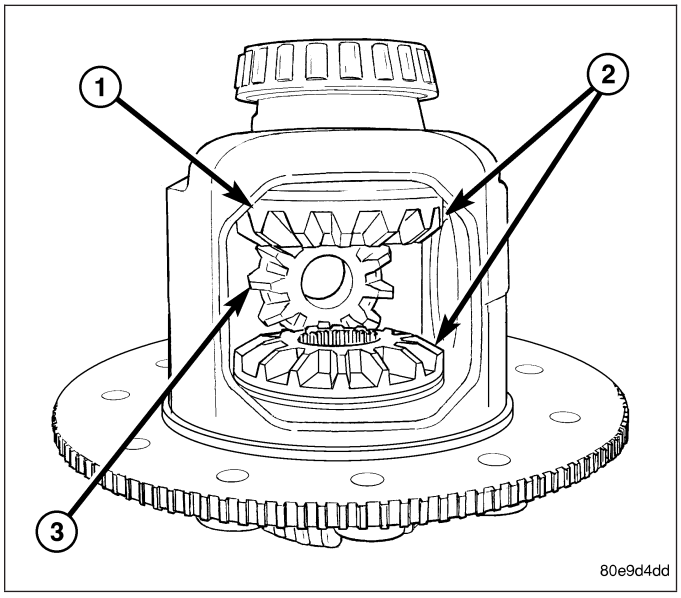
ASSEMBLY

NOTE: If the same gears and thrust washers are being used, install them into their original locations.

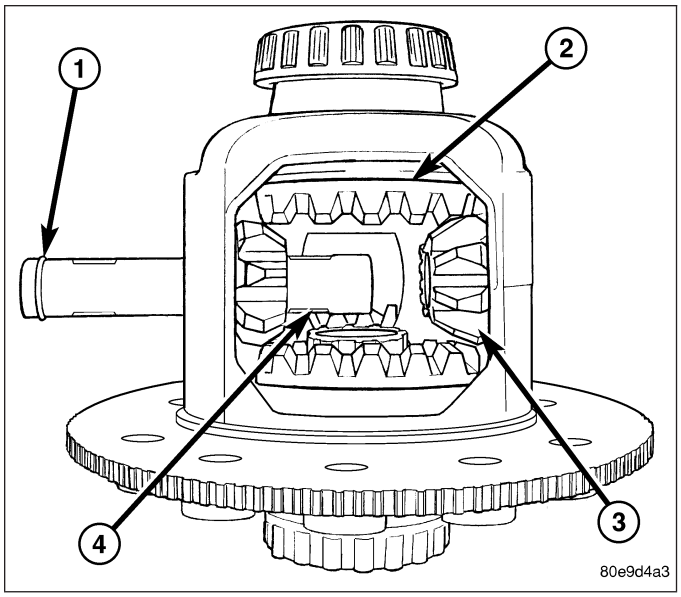
1. Lubricate all differential components with axle lubricant.
2. Install differential side gears (2) and thrust washers through the differential window (1).



3. Install first pinion gear (3) into the differential window (1) and side gears (2). Rotate the pinion gear to the back of the case.
4. Install the other pinion gear and thrust washer. Rotate the gears to align hole in the pinion gears with hole in the differential case.



5. Slide pinion shaft (4) into the case and through the pinion gears (3). Tap the shaft to seat the pinion shaft snap-ring (1) into the case.
6. Install ring gear.



INSTALLATION

1. Clean the housing cavity with a flushing oil, light engine oil or lint free cloth.

NOTE: Do not use water, steam, kerosene or gasoline for cleaning.

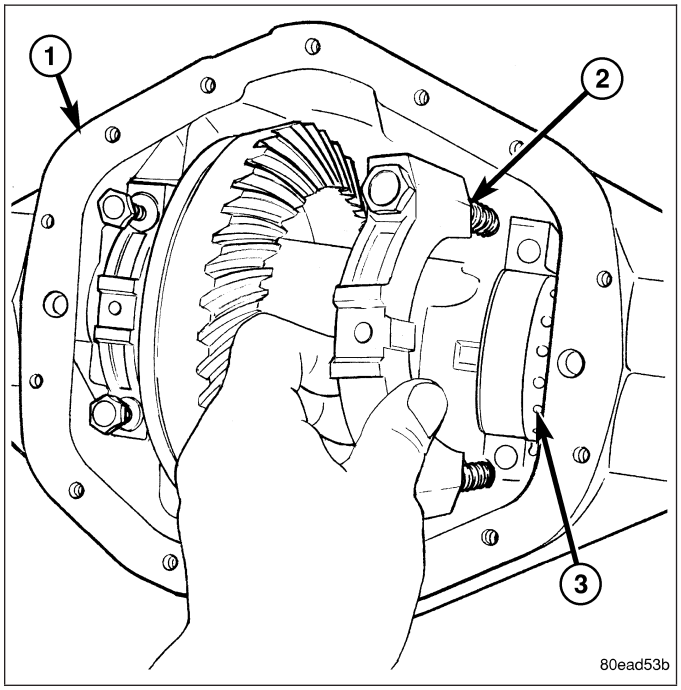
2. Lubricate differential case bearing.
3. Install differential case with bearings cups into the housing.

NOTE: A light coat of grease on the cups will hold them in place during installation.

4. Install bearing caps (2) and bolts. Tighten the bearing cap (2) bolts finger-tight.

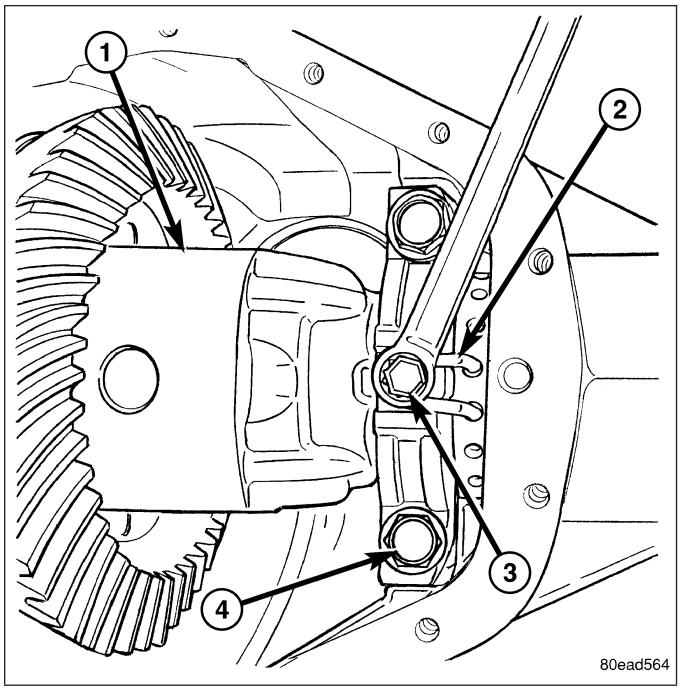
NOTE: Do not torque bearing cap and bolts at this time.

5. Slide differential case toward the pinion gear until the gears make contact/zero backlash. If zero backlash cannot be obtained, turn the pinion side adjuster until zero backlash is obtained.



6. Holding the differential case toward the pinion gear, turn bearing adjusters (3) with Adjuster Wrench 8883 until they make contact with the differential bearings/cups.
7. Back off the ring gear side adjuster 4 holes, to obtain initial ring gear backlash.
8. Install ring gear side adjuster lock and bolt. Do not tighten adjuster lock bolt at this time.
9. Tighten pinion gear side adjuster firmly against the differential case bearing cup.
10. Rotate the pinion several times to seat the differential bearings.
11. Loosen pinion gear side adjuster until it is no longer in contact with the bearing cup.
12. Tighten pinion gear side adjuster until it just makes contact with the bearing cup.
13. Tighten pinion gear side adjuster an additional:
    - **New Bearings** 6 Adjuster Holes
    - **Original Bearings** 4 Adjuster Holes
14. Install pinion gear side adjuster lock and bolt. Do not tighten adjuster lock bolt at this time.

15. Tighten bearing cap bolts (4) to 281 N·m (207 ft. lbs.).
16. Tighten adjuster lock bolts (3) to 25 N·m (18 ft. lbs.).
17. Measure ring gear backlash and check gear tooth contact pattern. Refer to Adjustments for procedure.
18. Install axle shaft gasket and install axle shafts.
19. Install differential housing gasket and cover. Tighten cover bolts to 40 N·m (30 ft. lbs.).
20. Fill axle with lubricant, refer to Lubrication & Maintenance for capacity and lubricant type.
21. Install fill plug and tighten to 32 N·m (24 ft. lbs.).

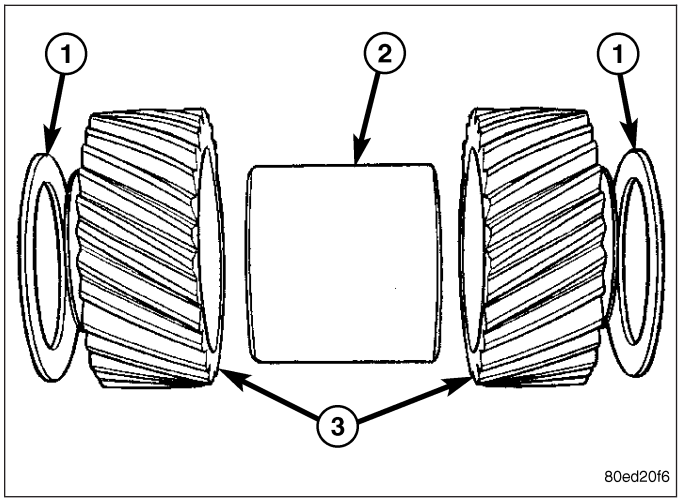


DIFFERENTIAL-TRAC-RITE

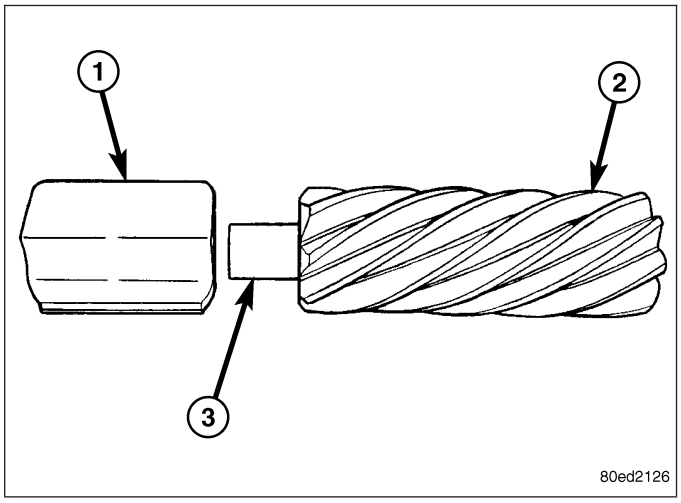
DESCRIPTION

CAUTION: The differential is serviced as an assembly only do not attempt to disassemble. Failure to follow these instructions will result in damage to the differential.

The Trac-Rite™ differential is a helical gear differential. The differential has two side gears (3), two thrust washers (1) and one spacer (2).



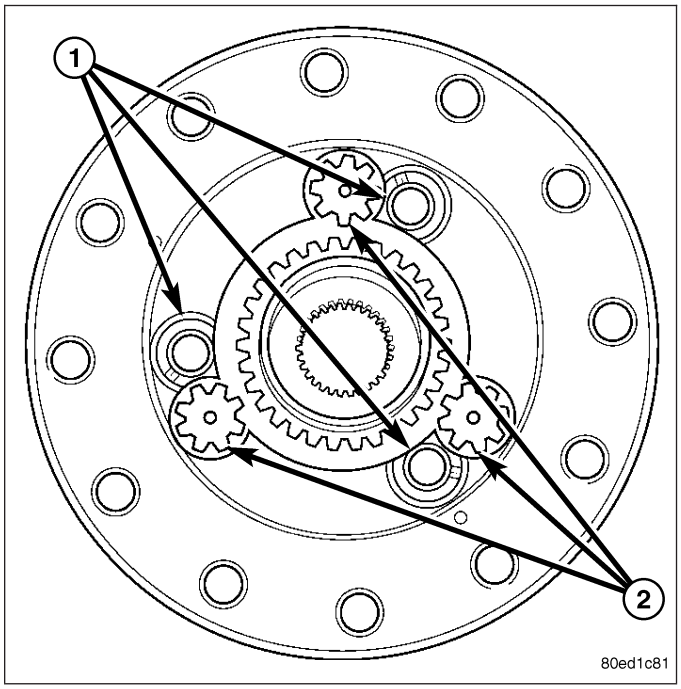
It also has six pinion brake shoes (1) which pivot on the six pinion gear (2) shafts (3).



OPERATION

CAUTION: The differential is serviced as an assembly only do not attempt to disassemble. Failure to follow these instructions will result in damage to the differential.

When one wheel begins to spin the pinion gears (2) on that side, are forced toward the pinion brake shoes (1). The pinion brake shoes then cause frictional drag on the opposite pinion gears and the side gear. These friction forces transfer the power to the opposite wheel. Once the frictional forces are overcome, differentiation will occur. The torque will be continually biased by the frictional forces to the high traction wheel.



CLEANING

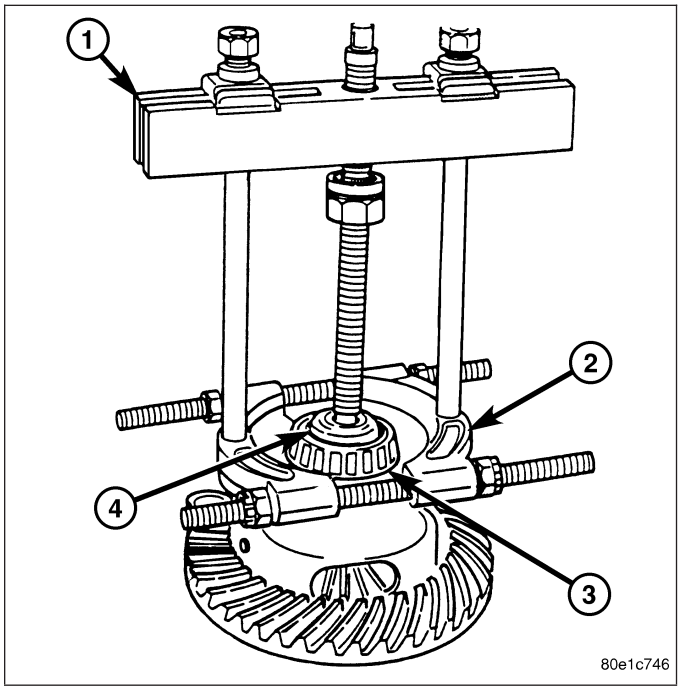
CAUTION: The differential is serviced as an assembly only do not attempt to disassemble. Failure to follow these instructions will result in damage to the differential.

Flush the differential case and gears through openings in the case with light oil.

BEARINGS-DIFFERENTIAL CASE

REMOVAL

1. Remove differential case from the housing.
2. Install Plug 8964 (4) into the end of the case.
3. Remove differential case bearings (3) with Bearing Splitter 1130 (2) and Bridge 938 (1).

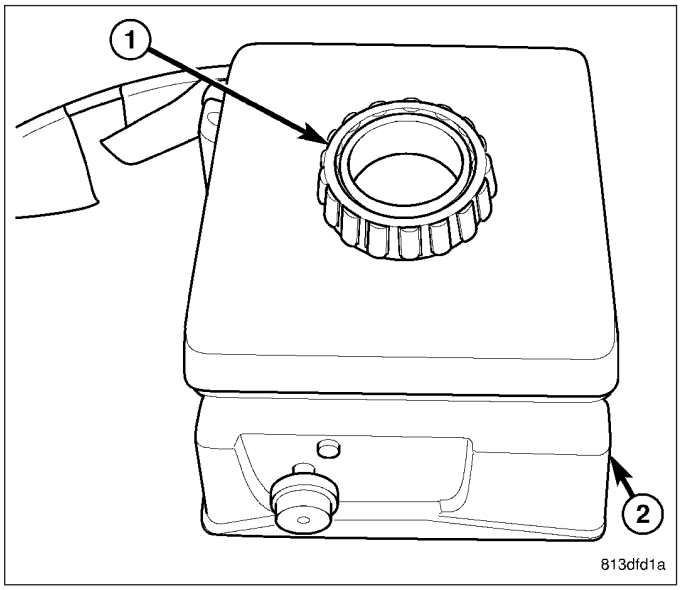


INSTALLATION

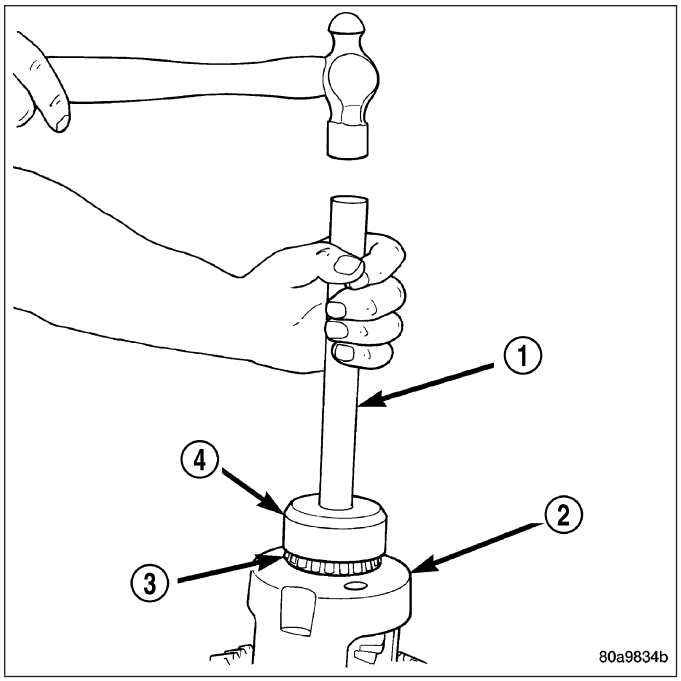
WARNING: Use welding gloves when handling heated components. Failure to follow these instructions will result in personal injury.

CAUTION: A bearing heater (2) is used to install Trac-Rite™ differential case bearings (1). Use only a bearing heater/hot plate and follow manufacture's instructions. Heat components to 100 - 177 Celsius (212° - 350° Max Fahrenheit). Never use an open flame to heat components. Never leave components on heater for and extended amount of time. If component is discolored after heating the component has been overheated and must not be used. Failure to follow these instructions will result in component damage.

1. Heat Trac-Rite™ differential case bearings (1) with bearing heater (2).
2. With welding gloves or tongs install bearings on differential case.



3. Install open differential case (2) bearings (3) with Installer 8965 (4) and Handle C-4171 (1).
4. Install differential case into housing.

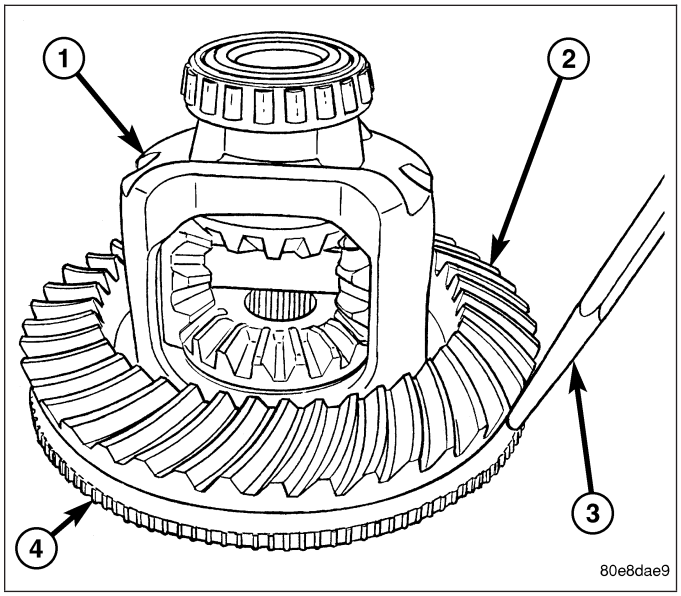


GEAR-PINION/RING

REMOVAL

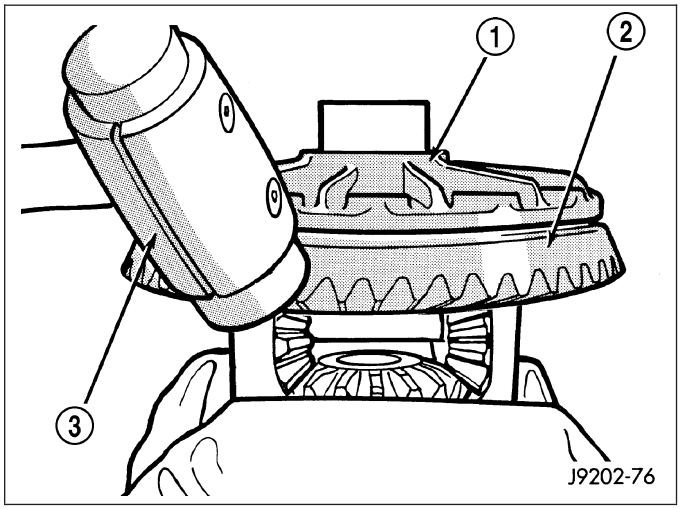
NOTE: The ring and pinion gears are service in a matched set. Never replace the ring gear/pinion gear without replacing the other matching gear.

1. Mark pinion flange and propeller shaft for installation alignment.
2. Remove propeller shaft.
3. Remove differential from the housing.
4. Place differential case (1) on Plug 8964. Drive exciter ring (4) off the differential case with a hammer and punch (3).

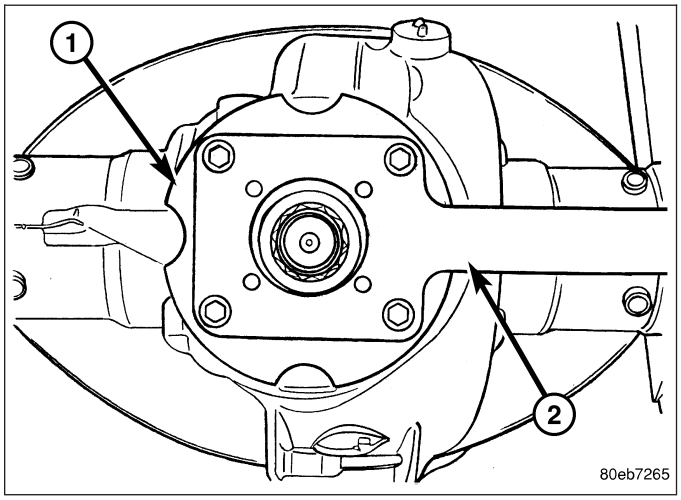


NOTE: Do not remove the exciter ring if it is not being replaced.

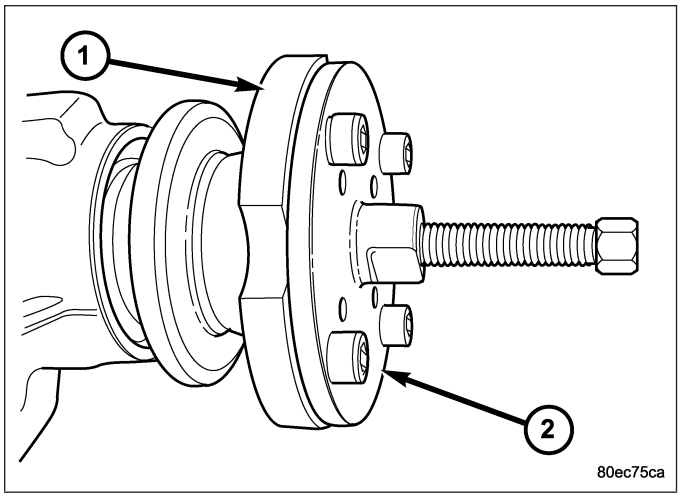
5. Place differential case in a vise with soft metal jaw protectors.
6. Remove bolts holding ring gear to differential case.
7. Drive ring gear (2) from differential case (1) with a soft hammer (3).



8. Hold pinion flange (1) with Flange Wrench 8979 (2) and remove pinion flange nut.



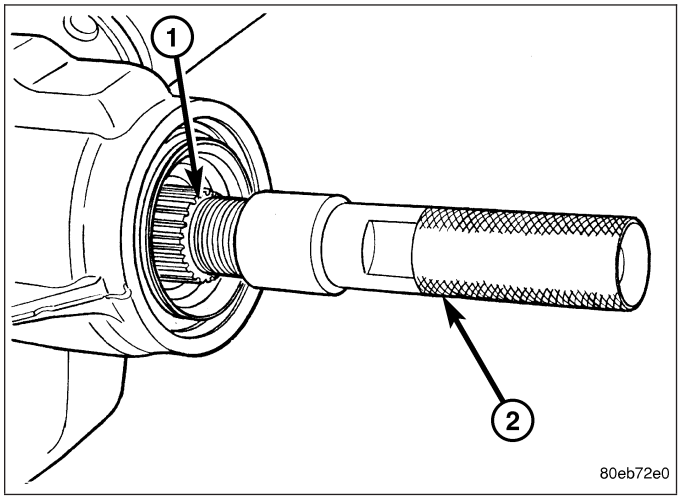
9. Remove pinion flange (1) from pinion with pinion Puller 8992 (2).



10. Remove pinion gear (1) from housing with pinion Driver 8977 (2) and a hammer.

NOTE: Thread the driver on the pinion shaft till it bottoms out.

11. Remove pinion seal with a slide hammer or pry bar.



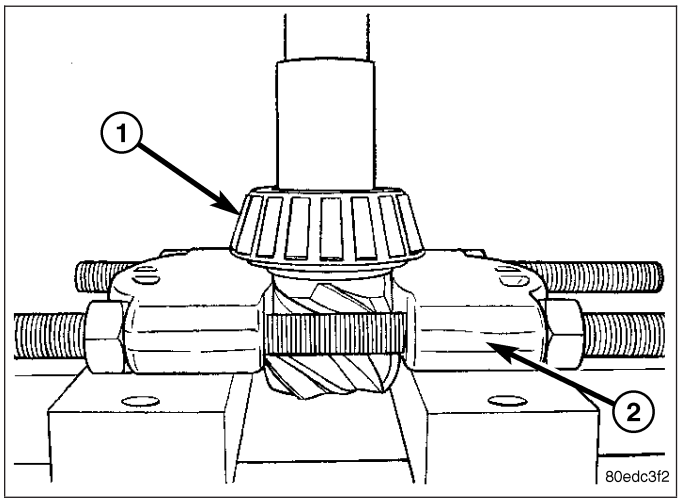
12. Remove front pinion bearing and discard bearing.

NOTE: Do not reuse front pinion bearing/cup.

13. Remove collapsible spacer from the pinion shaft.
14. Remove rear pinion bearing (1) with Bearing Splitter 1130 (2) and a press.
15. Remove pinion depth shim from the pinion gear shaft and record thickness of the shims.
16. Remove front pinion bearing cup from the housing with a punch and hammer, and discard cup.

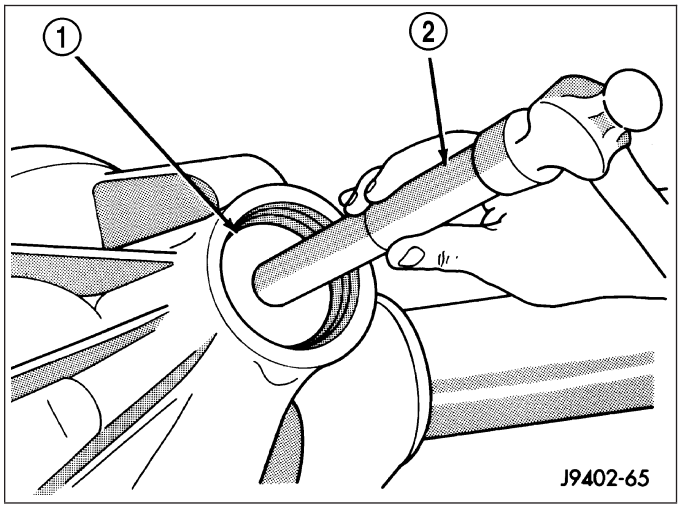
NOTE: Do not reuse front pinion bearing/cup.

17. Remove rear pinion bearing cup from the housing with a punch and hammer, if bearing is going to be replaced.

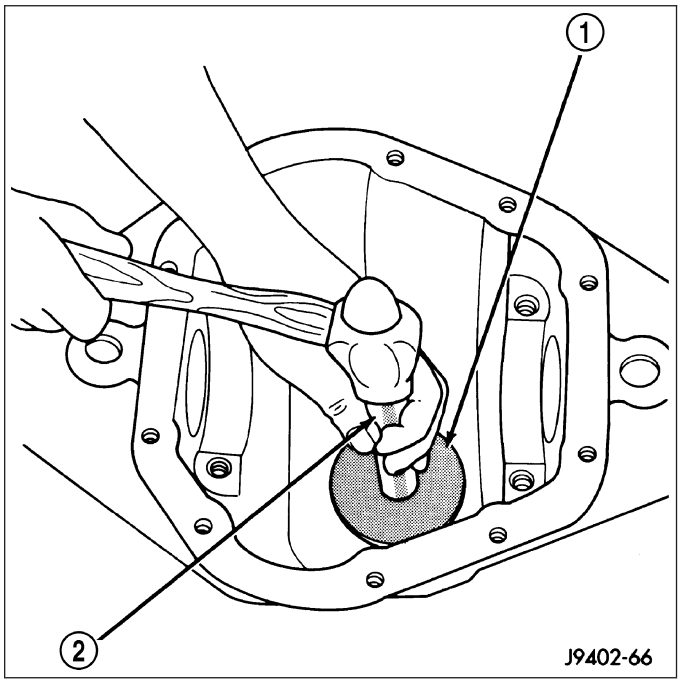


INSTALLATION

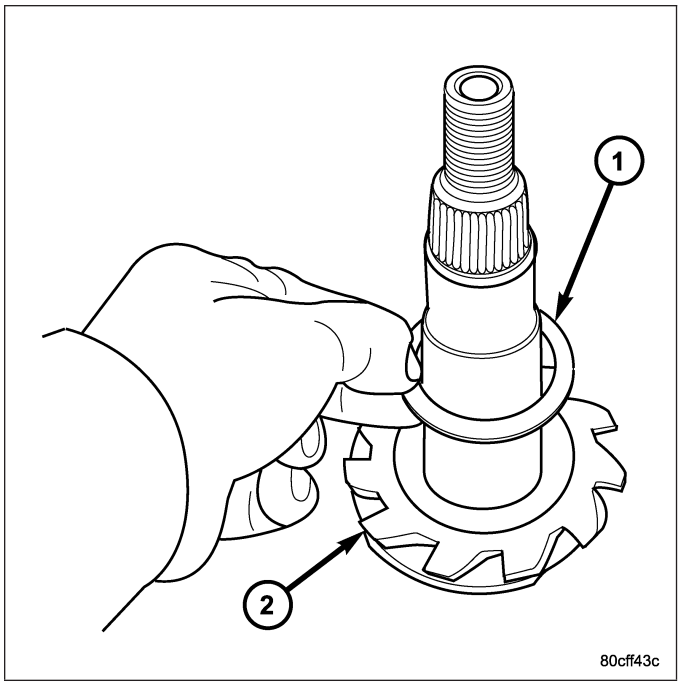
1. Install new front pinion bearing cup with Installer 8960 (1) and Handle C-4171 (2).



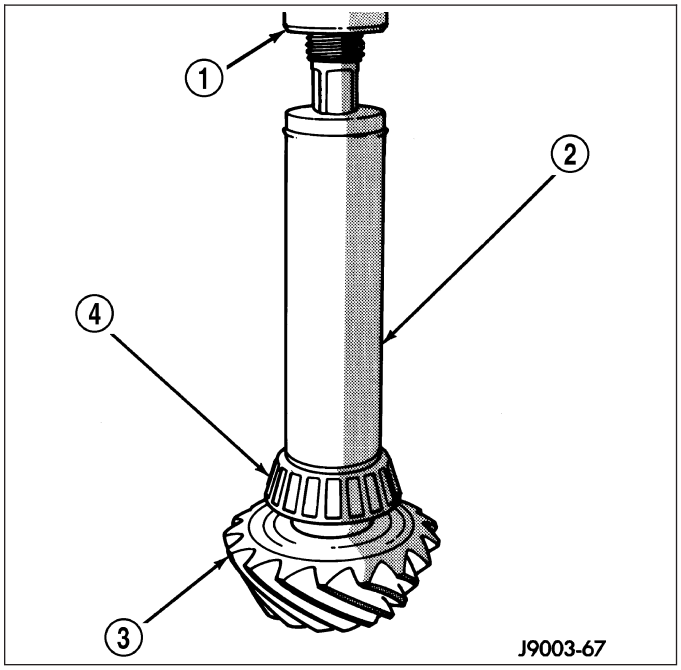
2. Install new rear pinion bearing cup with Installer 8968 (1) and Handle C-4171 (2).



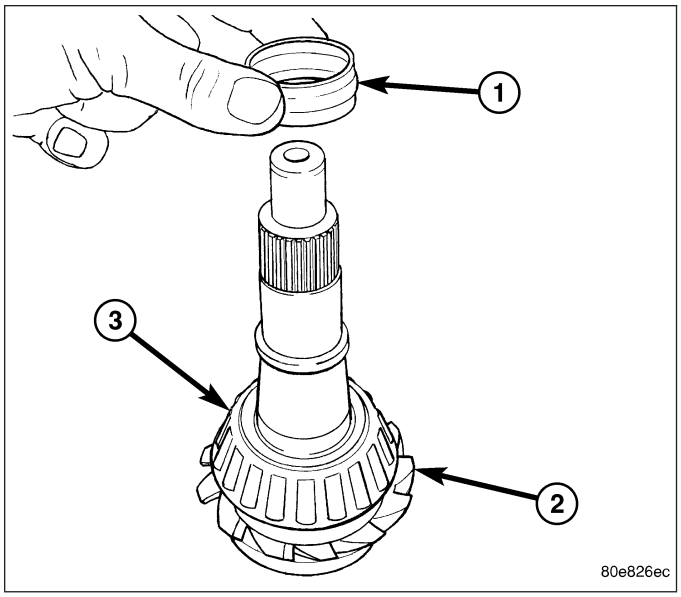
3. Install pinion depth shim (1) on the pinion gear shaft (2).



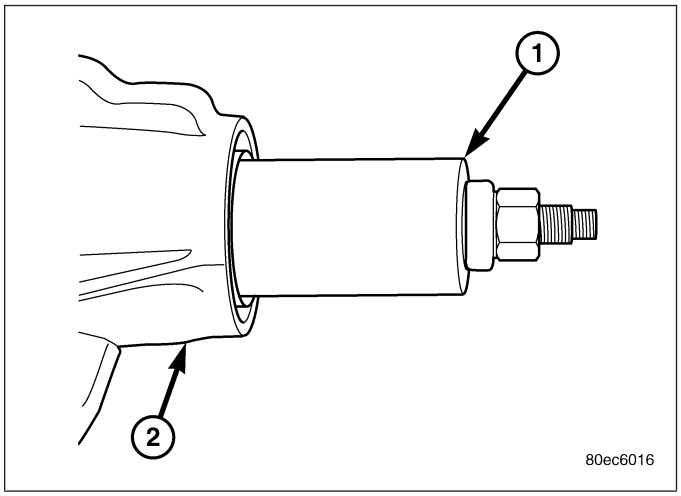
4. Install rear pinion bearing (4) with Installer D-389 (1) and a press (1).



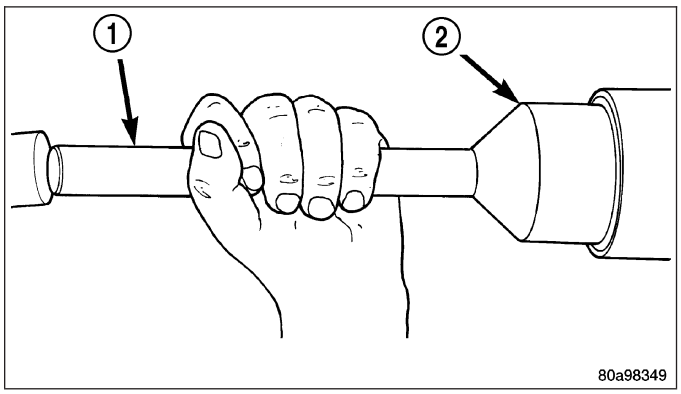
5. Install **new** collapsible spacer (1) on the pinion (2).
6. Lubricate pinion and bearings.



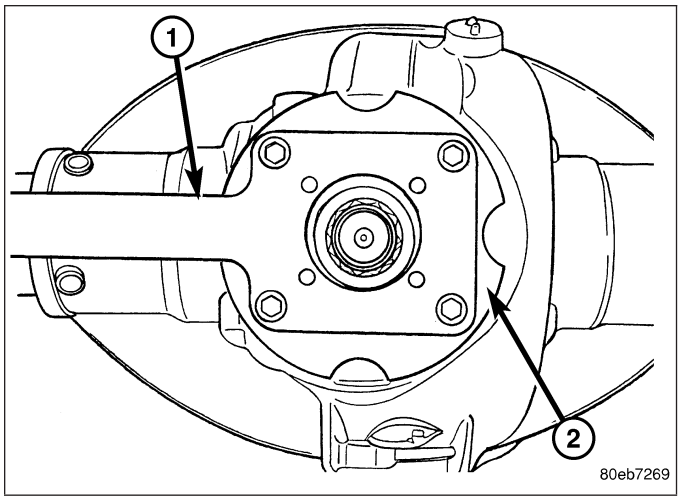
7. Install pinion into the housing (2) and place front pinion bearing onto the pinion shaft. Draw the pinion shaft into the front bearing with Installer 8981 (1).



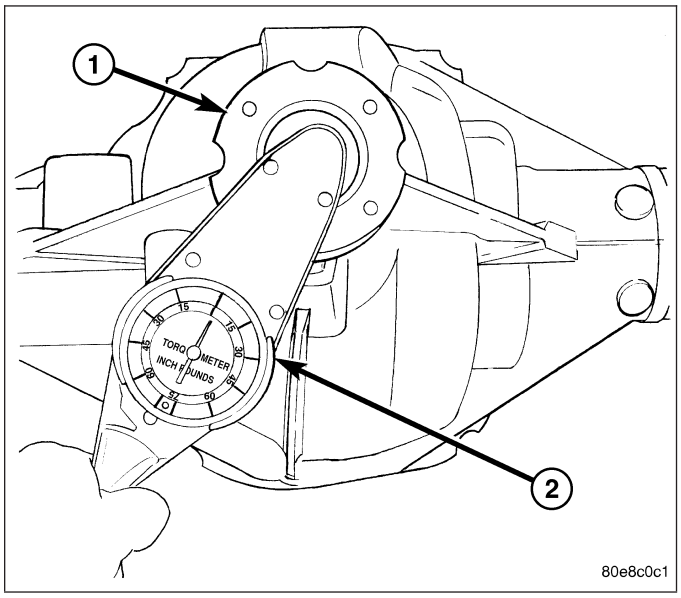
8. Install **new** pinion seal with Installer 8896 (2) and Handle C-4171 (1).



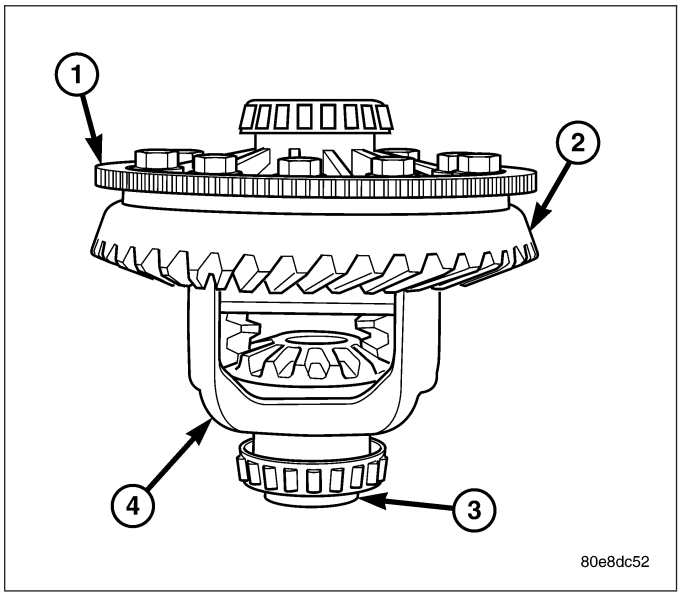
9. Rotate pinion several times to seat bearings.
10. Apply a light coat of teflon sealant to the pinion flange splines.
11. Hold pinion and lightly tap the pinion flange (2) onto the pinion, until a few threads are showing.
12. Install pinion flange washer and **new** pinion nut.
13. Hold pinion flange (2) with Flange Wrench 8979 (1) and tighten pinion nut until pinion end play is taken up.



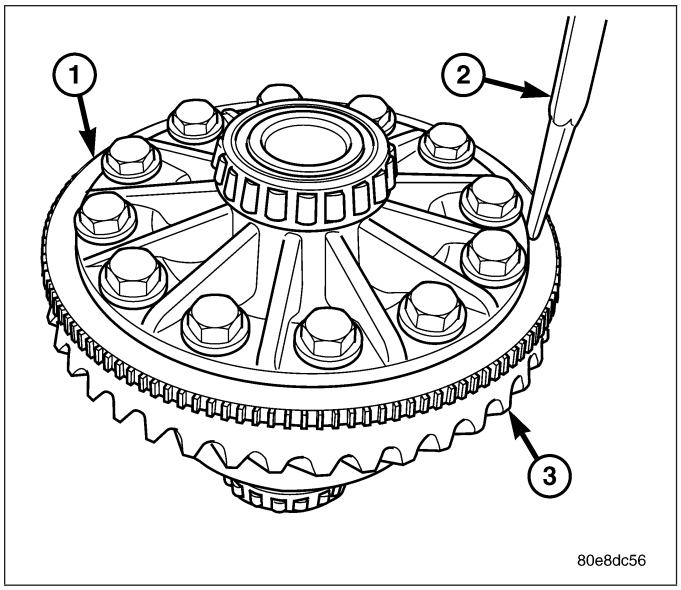
14. Measure pinion Torque To Rotating (1) with an inch pound torque wrench (2). Tighten pinion nut in small increments until pinion Torque To Rotating is:
    - **New Pinion Bearings:** 1.7-2.8 N·m (15-25 in. lbs.)
    - **Original Pinion Bearings:** 1.1-2.2 N·m (10-20 in. lbs.)
15. Rotate pinion several times then verify pinion rotating torque again.



16. Position the ring gear (2) on differential case (4) and start two **new** ring gear bolts.
17. Install the rest of the **new** ring gear bolts and tighten them alternately to seat the ring gear.
18. Torque ring gear bolts to 237 N·m (175 ft. lbs.).



19. If exciter ring was removed, position differential assembly on differential Plug 8965 and place exciter ring (1) on the differential case.
20. Install the exciter ring on the differential case evenly with a hammer and brass punch (2). Drive the ring down until it is seated against the ring gear (2).
21. Install differential in housing and verify gear backlash and gear contact pattern.
22. Measure Total Torque to Rotate with an inch pound torque wrench. Total Torque to Rotate is:
    - **New Bearings:** 3.4-5.6 N·m (30-50 in. lbs.)
    - **Original Bearings:** 2.8-5.1 N·m (25-45 in. lbs.)
23. Install axle shafts.
24. Install the propeller shaft with the reference marks aligned.
25. Install differential cover with gasket and tighten bolts to 40 N·m (30 ft. lbs.).
26. Fill differential with fluid and tighten fill plug to 32 N·m (24 ft. lbs.).



REAR AXLE - 248RBI

TABLE OF CONTENTS

page

REAR AXLE - 248RBI
DIAGNOSIS AND TESTING
REAR AXLE - 248RBI 436
REMOVAL
REMOVAL-MANUAL TRANSMISSION 439
REMOVAL-AUTOMATIC TRANSMISSION 441
INSTALLATION
INSTALLATION-MANUAL TRANSMISSION . . . 442
INSTALLATION-AUTOMATIC TRANSMISSION 444
ADJUSTMENTS
PINION DEPTH-BEARING PRELOAD-GEAR BACKLASH 445
SPECIFICATIONS
REAR AXLE - 248RBI 453
SPECIAL TOOLS 454
SHAFT-AXLE
REMOVAL 457
INSTALLATION 459
SEAL-AXLE SHAFT
REMOVAL 461
INSTALLATION 461

page

BEARING-AXLE
REMOVAL 462
INSTALLATION 463
SEAL-PINION
REMOVAL 464
INSTALLATION 464
DIFFERENTIAL-TRAC-LOK
DESCRIPTION 466
OPERATION 466
DIAGNOSIS AND TESTING DIFFERENTIAL-TRAC-LOK 467
REMOVAL 467
DISASSEMBLY 471
ASSEMBLY 474
INSTALLATION 476
BEARINGS-DIFFERENTIAL CASE
REMOVAL 479
INSTALLATION 479
GEAR-PINION/RING
REMOVAL 480
INSTALLATION 484

REAR AXLE - 248RBI

DIAGNOSIS AND TESTING

REAR AXLE - 248RBI

GEAR NOISE

Axle gear noise can be caused by insufficient lubricant, incorrect backlash, incorrect pinion depth, tooth contact, worn/damaged gears, or the carrier housing not having the proper offset and squareness.

Gear noise usually happens at a specific speed range. The noise can also occur during a specific type of driving condition. These conditions are acceleration, deceleration, coast, or constant load.

When road testing, first warm-up the axle fluid by driving the vehicle at least 5 miles and then accelerate the vehicle to the speed range where the noise is the greatest. Shift out-of-gear and coast through the peak-noise range. If the noise stops or changes greatly:

- Check for insufficient lubricant.
- Incorrect ring gear backlash.
- Gear damage.

Differential side gears and pinions can be checked by turning the vehicle. They usually do not cause noise during straight-ahead driving when the gears are unloaded. The side gears are loaded during vehicle turns. A worn pinion shaft can also cause a snapping or a knocking noise.

BEARING NOISE

The axle shaft, differential and pinion bearings can all produce noise when worn or damaged. Bearing noise can be either a whining, or growling sound.

Pinion bearings have a constant-pitch noise. This noise changes with vehicle speed. Pinion bearing noise will be high pitched because it rotates at a faster rate. Drive the vehicle and load the differential. If bearing noise occurs, the rear pinion bearing is the source of the noise. If bearing noise is heard during a coast, the front pinion bearing is the source.

Differential bearings usually produce a low pitch noise. Differential bearing noise is similar to pinion bearing noise. The pitch of differential bearing noise is also constant and varies only with vehicle speed.

Axle shaft bearings produce noise and vibration when worn or damaged. The noise generally changes when the bearings are loaded. Road test the vehicle turning the vehicle sharply to the left and to the right. This will load the bearings and change the noise level. Where axle bearing damage is slight, the noise is usually not noticeable at speeds above 30 mph.

LOW SPEED KNOCK

Low speed knock is generally caused by a worn U-joint or by worn side–gear thrust washers. A worn pinion shaft bore will also cause low speed knock.

VIBRATION

Vibration at the rear of the vehicle is usually caused by a:

- Damaged drive shaft.
- Missing drive shaft balance weight(s).
- Worn or out-of-balance wheels.
- Loose wheel lug nuts.
- Worn U-joint(s).
- Loose/broken springs.
- Damaged axle shaft bearing(s).
- Loose pinion gear nut.
- Excessive pinion yoke run out.
- Bent axle shaft(s).

Check for loose or damaged front-end components or engine/transmission mounts. These components can contribute to what appears to be a rear end vibration. Do not overlook engine accessories, brackets and drive belts.

NOTE: All driveline components should be examined before starting any repair.

DRIVELINE SNAP

A snap or clunk noise when the vehicle is shifted into gear (or the clutch engaged), can be caused by:

- High engine idle speed.
- Transmission shift operation.
- Loose engine/transmission/transfer case mounts.
- Worn U-joints.
- Loose spring mounts.
- Loose pinion gear nut and yoke.
- Excessive ring gear backlash.
- Excessive side gear to case clearance.

The source of a snap or a clunk noise can be determined with the assistance of a helper. Raise the vehicle on a hoist with the wheels free to rotate. Instruct the helper to shift the transmission into gear. Listen for the noise, a mechanics stethoscope is helpful in isolating the source of a noise.

DIAGNOSTIC CHART

Condition	Possible Causes	Correction
Wheel Noise	1. Wheel loose.	1. Tighten loose nuts.
	2. Worn wheel bearing.	2. Replace bearing.
Axle Shaft Noise	1. Misaligned axle tube.	1. Inspect axle tube alignment. Correct as necessary.
	2. Bent or sprung axle shaft.	2. Inspect and correct as necessary.
Axle Shaft Broke	1. Misaligned axle tube.	1. Replace the broken shaft after correcting tube mis-alignment.
	2 Vehicle overloaded.	2. Replace broken shaft and avoid excessive weight on vehicle.
	3. Erratic clutch operation.	3. Replace broken shaft and avoid or correct erratic clutch operation.
	4. Grabbing clutch.	4. Replace broken shaft and inspect and repair clutch as necessary.
Differential Cracked	1. Improper adjustment of the differential bearings.	1. Replace case and inspect gears and bearings for further damage. Set differential bearing pre-load properly.
	2. Excessive ring gear backlash.	2. Replace case and inspect gears and bearings for further damage. Set ring gear backlash properly.
	3. Vehicle overloaded.	3. Replace case and inspect gears and bearings for further damage. Avoid excessive vehicle weight.
	4. Erratic clutch operation.	4. Replace case and inspect gears and bearings for further damage. Avoid erratic use of clutch.

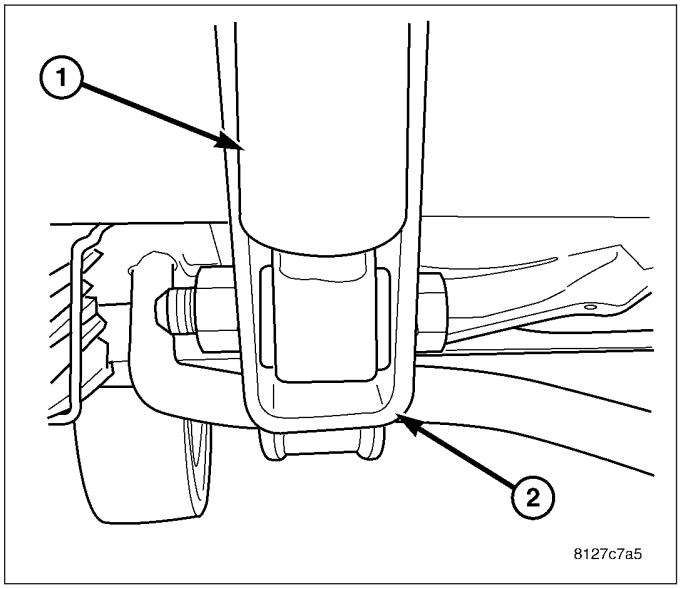
Condition	Possible Causes	Correction
Differential Gears Scored	1. Insufficient lubrication.	1. Replace scored gears. Fill differential with the correct fluid type and quantity.
	2. Improper grade of lubricant.	2. Replace scored gears. Fill differential with the correct fluid type and quantity.
	3. Excessive spinning of one wheel/tire.	3. Replace scored gears. Inspect all gears, pinion bores, and shaft for damage. Service as necessary.
Loss Of Lubricant	1. Lubricant level too high.	1. Drain lubricant to the correct level.
	2. Worn axle shaft seals.	2. Replace seals.
	3. Cracked differential housing.	3. Repair as necessary.
	4. Worn pinion seal.	4. Replace seal.
	5. Worn/scored yoke.	5. Replace yoke and seal.
	6. Axle cover not properly sealed.	6. Remove, clean and seal cover.
Axle Overheating	1. Lubricant level low.	1. Fill differential to correct level.
	2. Improper grade of lubricant.	2. Fill differential with the correct fluid type and quantity.
	3. Bearing pre-loads too high.	3. Adjust bearing pre-loads.
	4. Insufficient ring gear backlash.	4. Adjust ring gear backlash.
Gear Teeth Broke	1. Overloading.	1. Replace gears. Examine other gears and bearings for possible damage.
	2. Erratic clutch operation.	2. Replace gears and examine the remaining parts for damage. Avoid erratic clutch operation.
	3. Ice-spotted pavement.	3. Replace gears and examine remaining parts for damage.
	4. Improper adjustments.	4. Replace gears and examine remaining parts for damage. Ensure ring gear backlash is correct.

Condition	Possible Causes	Correction
Axle Noise	1. Insufficient lubricant.	1. Fill differential with the correct fluid type and quantity.
	2. Improper ring gear and pinion adjustment.	2. Check ring gear and pinion contact pattern. Adjust backlash or pinion depth.
	3. Unmatched ring gear and pinion.	3. Replace gears with a matched ring gear and pinion.
	4. Worn teeth on ring gear and pinion.	4. Replace ring gear and pinion.
	5. Loose pinion bearings.	5. Adjust pinion bearing pre-load.
	6. Loose differential bearings.	6. Adjust differential bearing pre-load.
	7. Ring gear runt-out.	7. Measure ring gear run-out. Replace components as necessary.
	8. Loose differential bearing cap bolts.	8. Inspect differential components and replace as necessary. Ensure that the bearing caps are torqued to the proper specification.
	9. Housing not machined properly.	9. Replace housing.

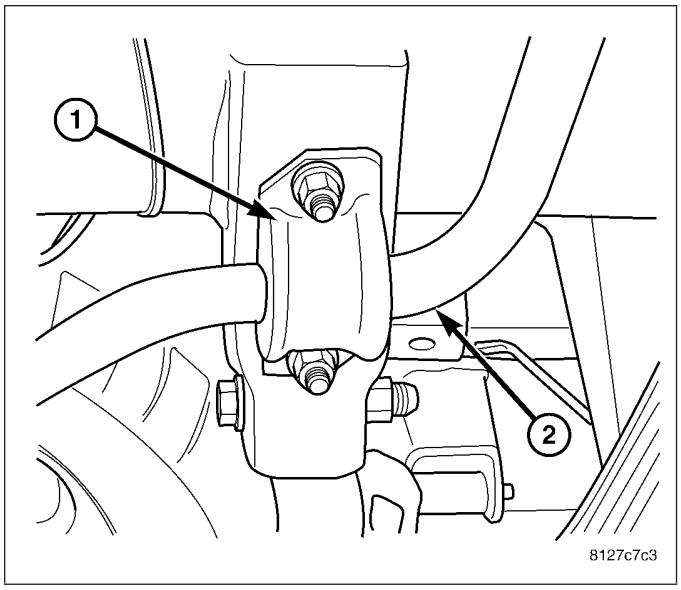
REMOVAL

REMOVAL-MANUAL TRANSMISSION

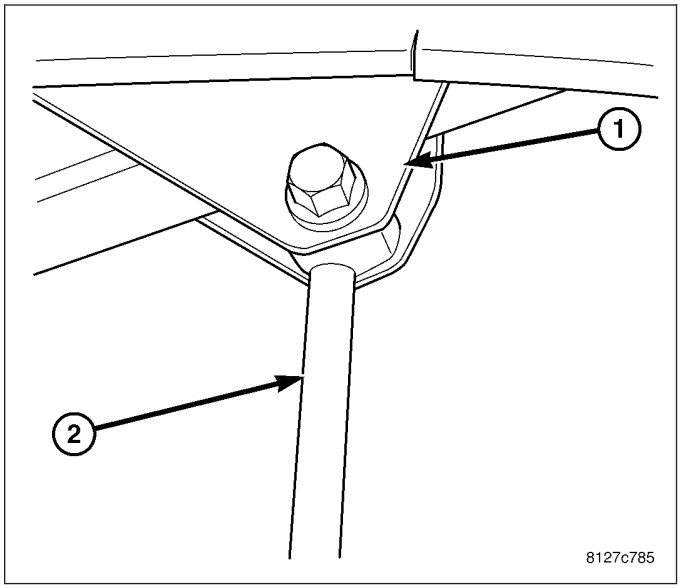
1. With vehicle in neutral, position vehicle on hoist.
2. Position a lift under axle and secure lift to the axle.
3. Remove all brake components.
4. Remove propeller shaft.
5. Remove power hop damper from the frame, then the differential cover bracket.
6. Remove shock absorbers (1) from axle bracket (2).



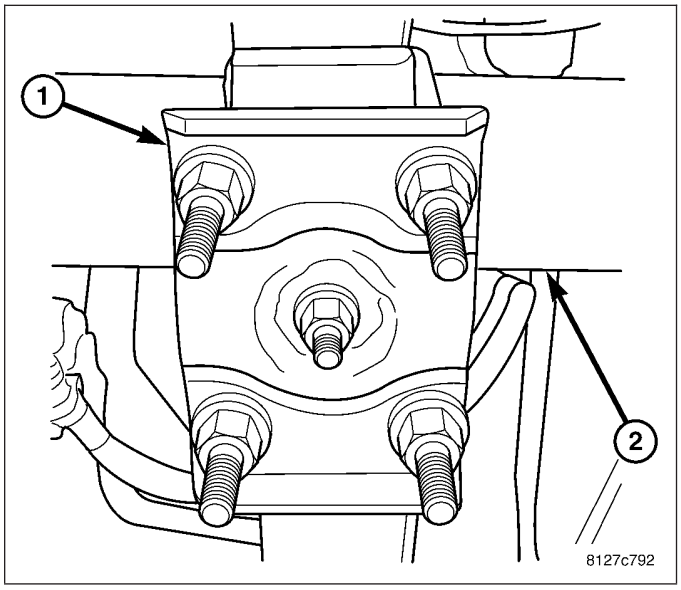
7. Remove stabilizer bar (2) clamps (1) from the axle.



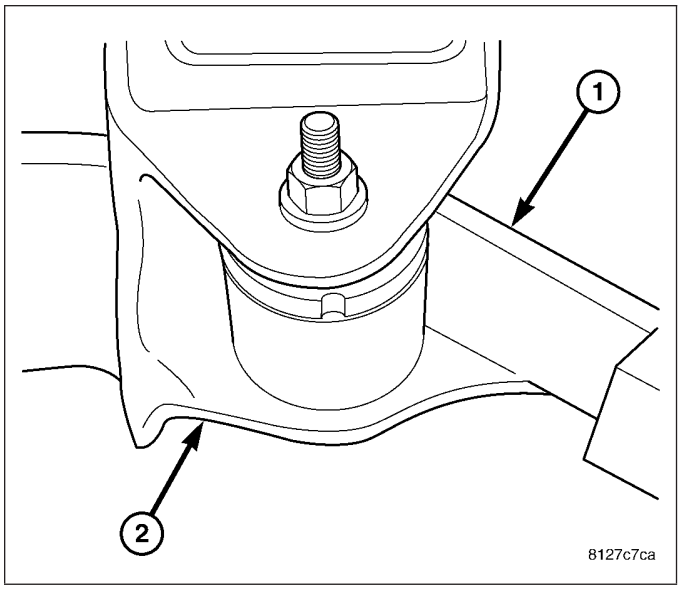
8. Loosen stabilizer link (2) bolts and swing bar forward.



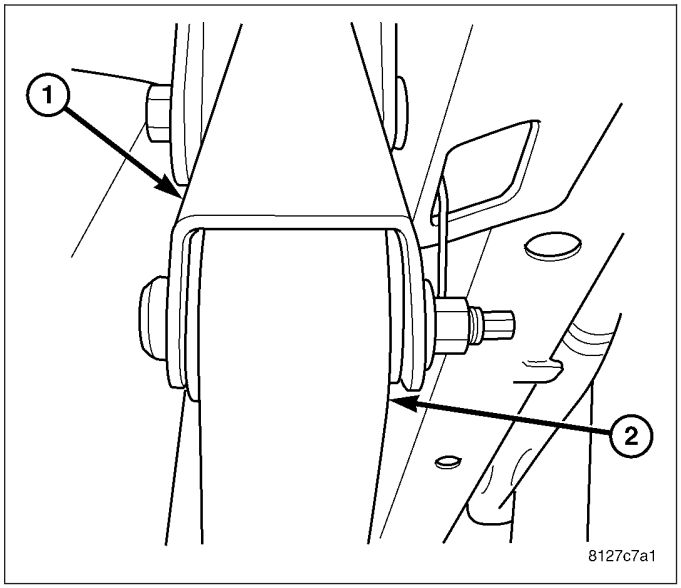
9. Remove spring plate (1) U-bolts from axle (2).



10. Loosen spring (1) bolts at frame bracket (2).

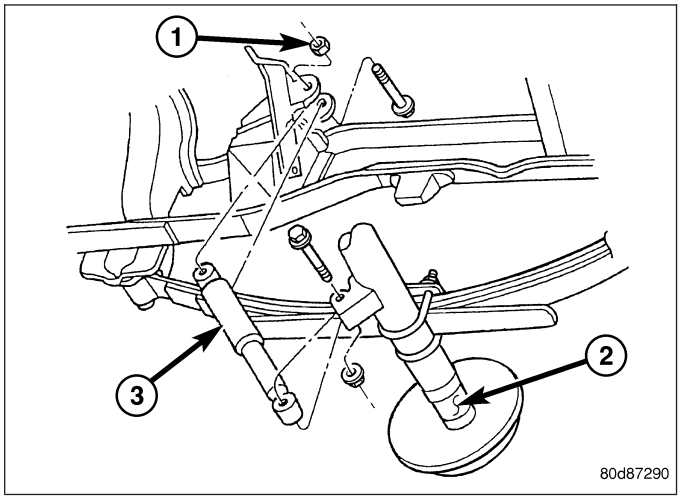


11. Remove spring (2) shackle (1) bolts and swing springs forward.
12. Lower axle from the vehicle.

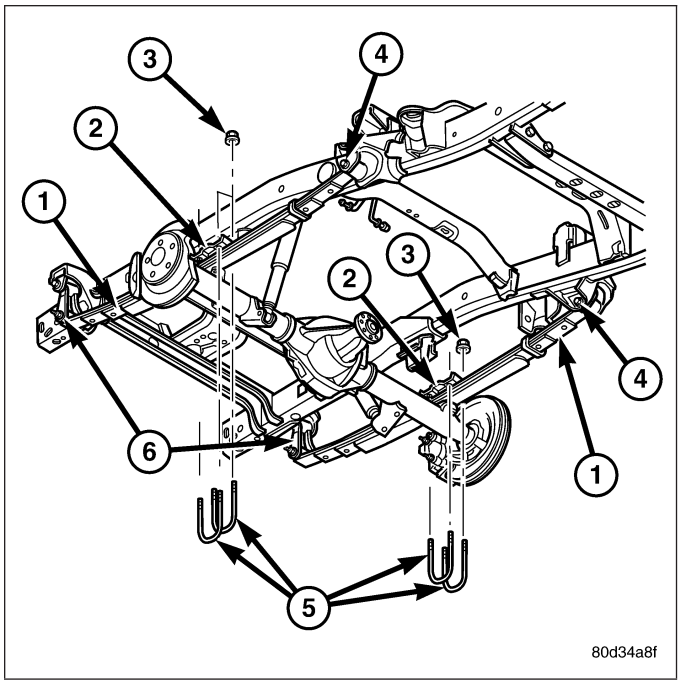


REMOVAL-AUTOMATIC TRANSMISSION

1. With vehicle in neutral, position vehicle on hoist.
2. Position a lift under axle and secure axle to lift.
3. Remove all brake components.
4. Remove axle vent hose.
5. Mark propeller shaft and companion flange for installation alignment reference.
6. Remove propeller shaft.
7. Remove shock absorbers (3) from axle (2).



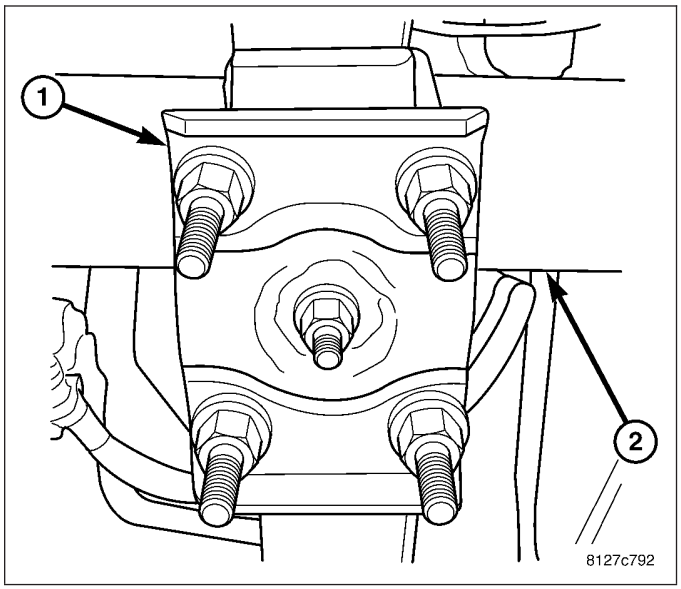
8. Remove U-bolts (5) from axle.
9. Remove axle from the vehicle.



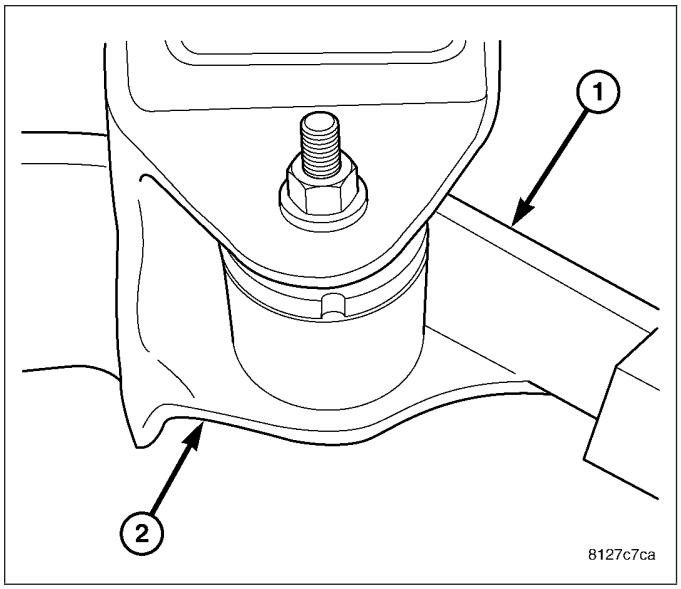
INSTALLATION

INSTALLATION-MANUAL TRANSMISSION

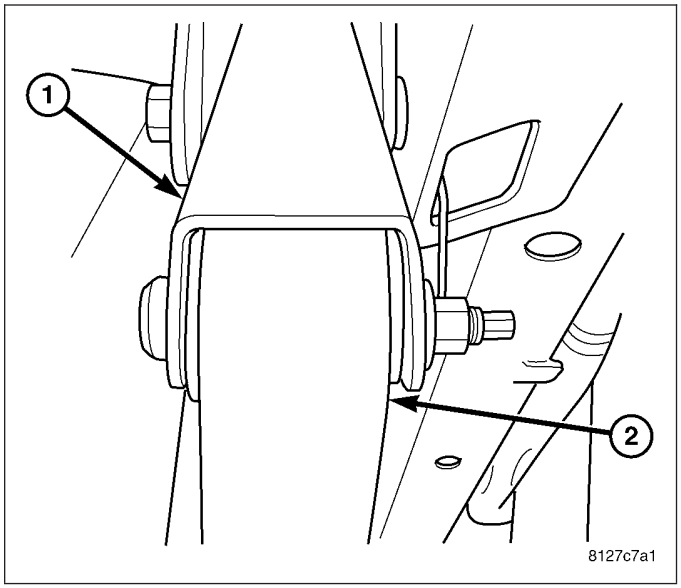
1. Raise axle and align to the leaf spring centering bolts.
2. Raise leaf springs and install shackle bolts and nuts finger tight.
3. Install axle (2) spring plate (1) and tighten U-bolt nuts to 149 N·m (110 ft. lbs.).
4. Install shock absorbers.
5. Install power hop damper to differential cover bracket and tighten to 102 N·m (75 ft. lbs.). Then compress the damper and install it on the frame and tighten to specification.
6. Install all brake components.
7. Install stabilizer bar bolts and tighten to specification.
8. Install propeller shaft and tighten to specification.



9. Remove supports and lower the vehicle so that the weight is being supported by the tires.
10. Tighten spring (1) bracket (2) nuts to specification.

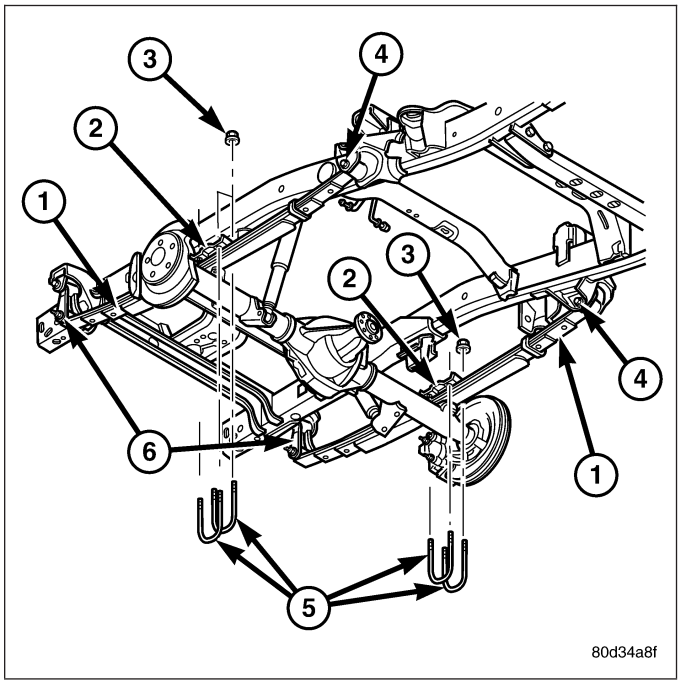


11. Tighten spring (2) shackle (1) nuts to specification.
12. Install all brake components.
13. Install axle vent hose.
14. Install propeller shaft with reference marks aligned and tighten to specification.
15. Fill differential to specifications.

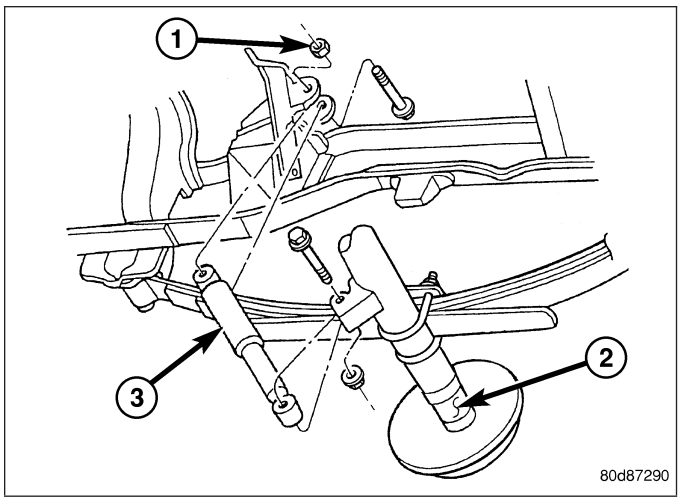


INSTALLATION-AUTOMATIC TRANSMISSION

1. Raise axle with lift and align to the leaf spring centering bolts.
2. Install axle U-bolts (5) and tighten to specifications.



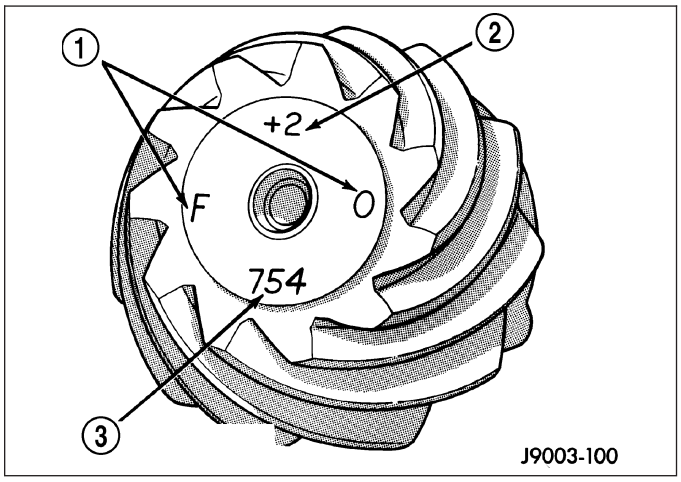
3. Install shock absorbers (3) to axle (2) and tighten to specifications.
4. Install all brake components.
5. Install axle vent hose.
6. Install propeller shaft with reference marks aligned and tighten to specification.
7. Fill differential to specifications.



ADJUSTMENTS

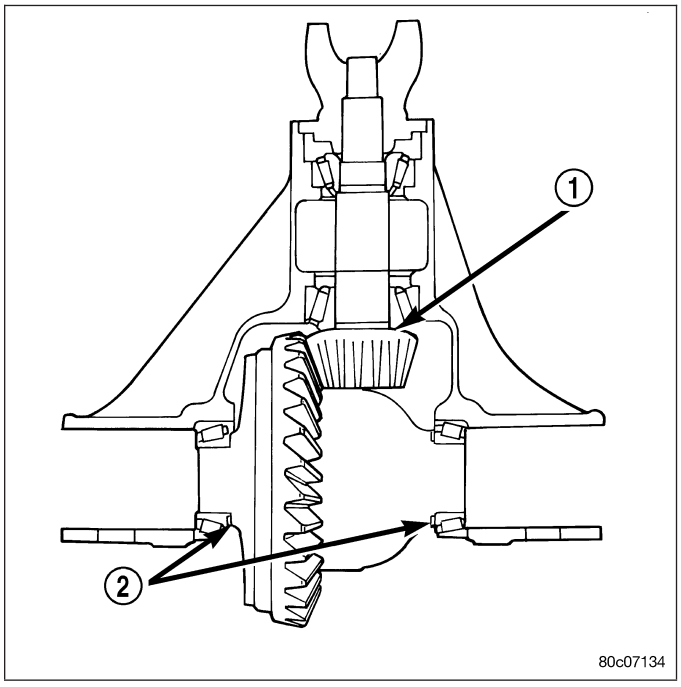
PINION DEPTH-BEARING PRELOAD-GEAR BACKLASH

Ring and pinion gears are supplied as matched sets. Identifying numbers (3) for the ring and pinion gears are etched into the face of each gear. A plus (+) number, minus (–) number or zero (0) is etched into the face of the pinion gear (2). This number is the amount (in thousandths of an inch) the depth varies from the standard depth setting of a pinion etched with a (0). The standard depth provides the best gear tooth contact pattern.



Compensation for pinion depth variance is achieved with a select shim (1). The shims are located between the rear pinion bearing and pinion gear head.

If installing a new gear, note the depth variance number of the original and replacement pinion. Add or subtract this number from the original depth shim/oil slinger to compensate for the difference in the depth variances. The numbers represent thousands of an inch deviation from the standard. If the number is negative, add that value to the required thickness of the depth shims. If the number is positive, subtract that value from the thickness of the depth shim.



Pinion Gear Depth Variance Chart: Note where Old and New Pinion Marking columns intersect. Intersecting figure represents plus or minus the amount needed.

PINION GEAR DEPTH VARIANCE

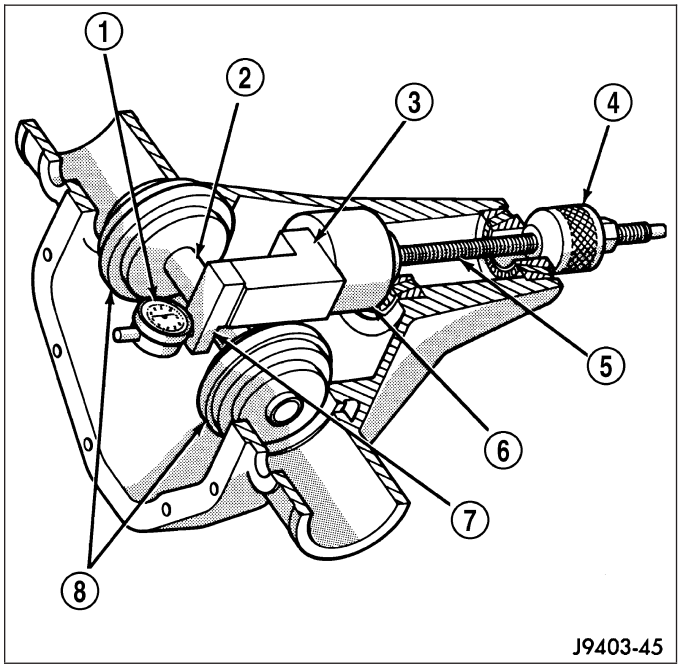
Original Pinion Gear Depth Variance	Replacement Pinion Gear Depth Variance									
	−4	−3	−2	−1	0	+1	+2	+3	+4	
+4		+0.008	+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0
+3		+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	−0.001
+2		+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	−0.001	−0.002

Original Pinion Gear Depth Variance	Replacement Pinion Gear Depth Variance									
	−4	−3	−2	−1	0	+1	+2	+3	+4	
+1		+0.005	+0.004	+0.003	+0.002	+0.001	0	−0.001	−0.002	−0.003
0		+0.004	+0.003	+0.002	+0.001	0	−0.001	−0.002	−0.003	−0.004
−1		+0.003	+0.002	+0.001	0	−0.001	−0.002	−0.003	−0.004	−0.005
−2		+0.002	+0.001	0	−0.001	−0.002	−0.003	−0.004	−0.005	−0.006
−3		+0.001	0	−0.001	−0.002	−0.003	−0.004	−0.005	−0.006	−0.007
−4		0	−0.001	−0.002	−0.003	−0.004	−0.005	−0.006	−0.007	−0.008

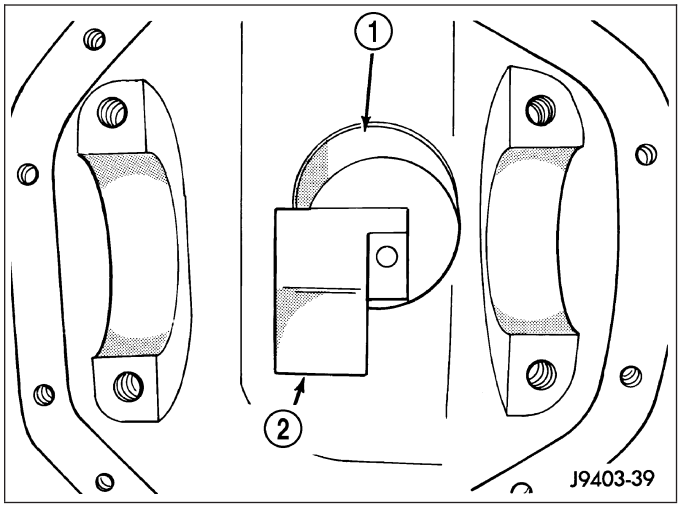
PINION DEPTH MEASUREMENT

Measurements are taken with pinion bearing cups and pinion bearings installed in the housing. Take measurements with Pinion Gauge Set and Dial Indicator C-3339 (1).

1. Assemble Pinion Height Block 6739 (3), Pinion Block 6736 (6) and rear pinion bearing onto Screw 6741 (5).



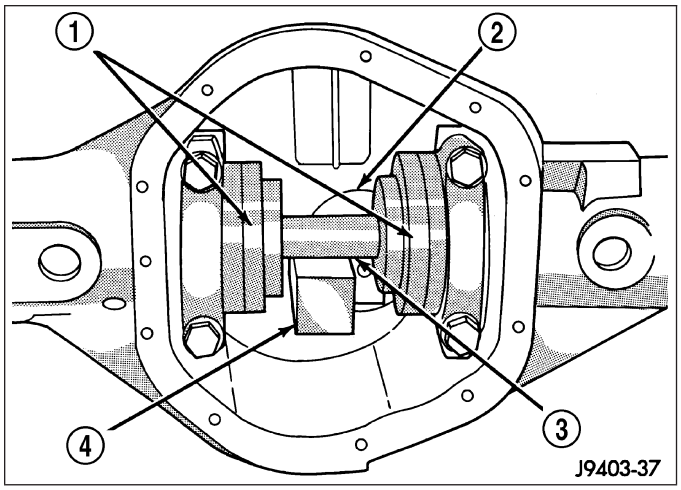
2. Insert assembled pinion block (1), pinion height block (2), rear bearing and screw into the housing through pinion bearing cups.
3. Install front pinion bearing and Cone-nut 6740 onto the screw. Tighten cone-nut until Torque To Rotate the screw is 2.2 N·m (20 in. lbs.).



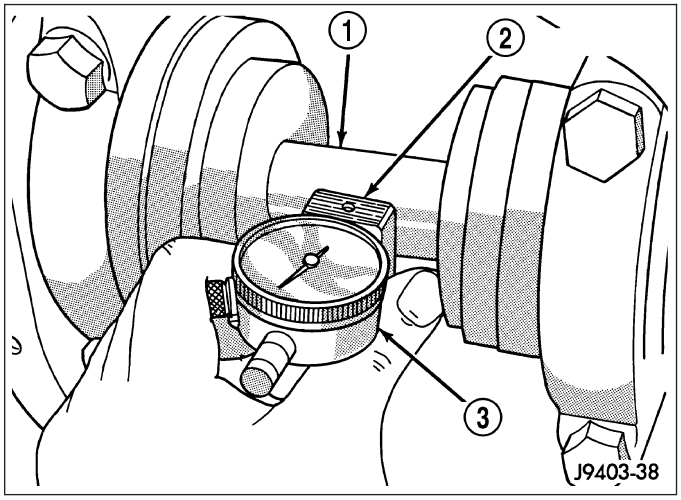
4. Place Arbor Disc 6732 (1) on Arbor D-115-3 (3) in position in the housing side bearing cradles.

NOTE: Arbor Discs 6732 (1) has different step diameters to fit other axles. Choose proper step for axle being serviced.

5. Install differential bearing caps on arbor discs and snug the bearing cap bolts. Then cross tighten cap bolts to 108 N·m (80 ft. lbs.).

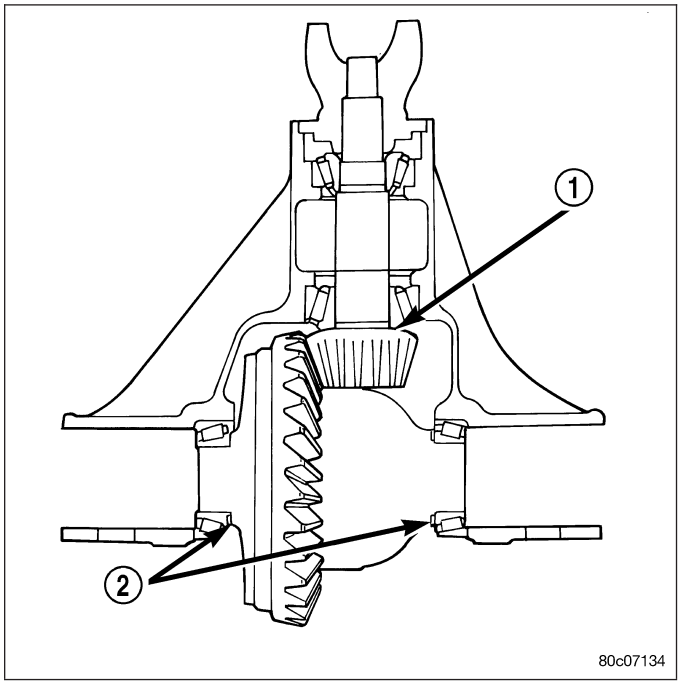


6. Assemble Dial Indicator C-3339 (3) into Scooter Block D-115-2 (2) and secure set screw.
7. Position Scooter Block/Dial Indicator flush on the pinion height block. Hold scooter block and zero the dial indicator.
8. Slowly slide the scooter block across the pinion height block over to the arbor. Move the scooter block till dial indicator crests the arbor (1), then record the highest reading.
9. Select a shim equal to the dial indicator reading plus the pinion depth variance number etched in the face of the pinion. For example, if the depth variance is –2, add +0.002 in. to the dial indicator reading.



DIFFERENTIAL SIDE BEARING PRELOAD

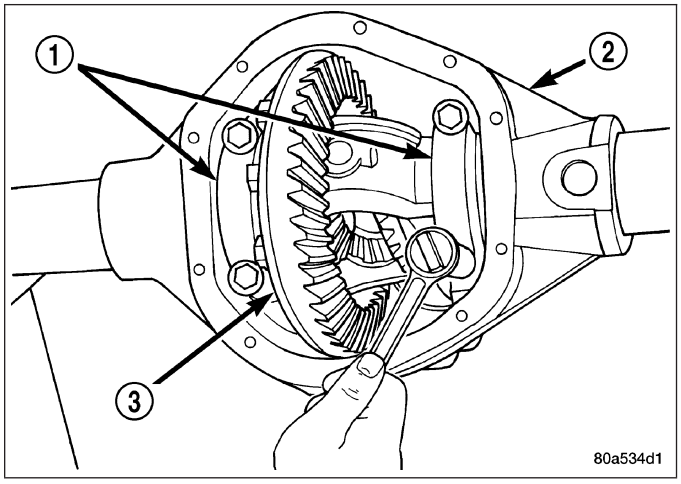
Differential side bearing preload and gear backlash is achieved by selective shims (2) positioned behind the differential side bearing cones. The proper shim thickness can be determined using slip-fit Dummy Bearings D-343 in place of the differential side bearings and a Dial Indicator C-3339. Before measuring differential bearing preload and gear backlash, measure pinion gear depth and prepare pinion for installation. Pinion gear depth is essential to establishing gear backlash and tooth contact patterns. After measuring shim thickness to take up differential side play, install pinion and measure gear backlash shim thickness. Overall shim thickness is the dial indicator reading and preload specification added together. The gear backlash measurement determines the shim thickness used on the ring gear side of the differential case. Subtract gear backlash shim thickness from overall shim thickness to determine shim thickness for pinion gear side of the differential. Differential shim measurements are performed with spreader W-129-B removed.



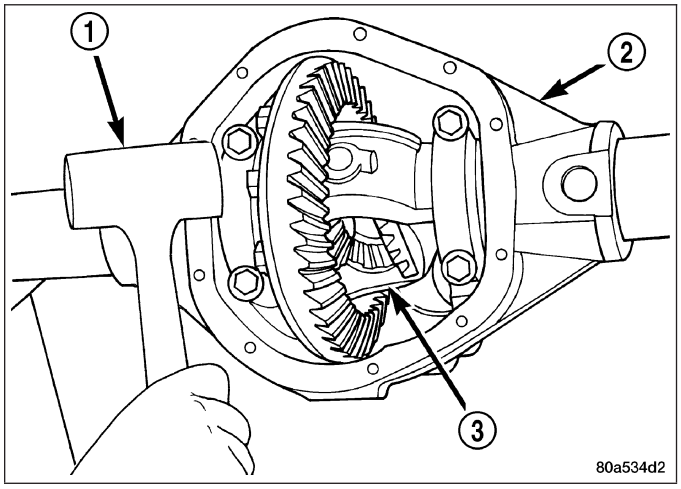
SHIM SELECTION

NOTE: It is difficult to salvage the differential side bearings during the removal procedure. Install replacement bearings if necessary.

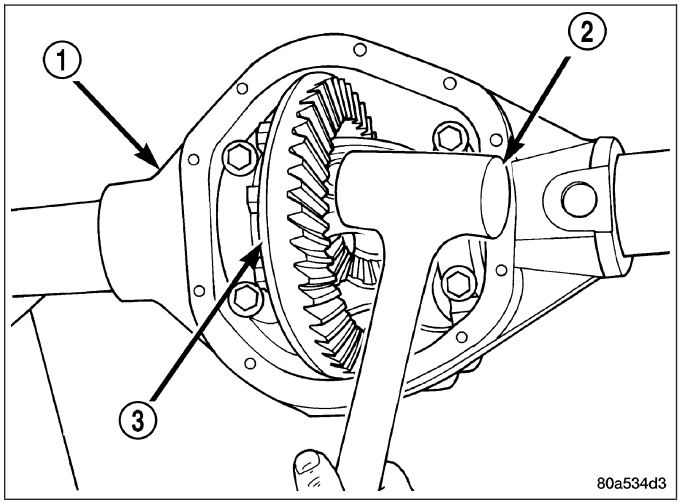
1. Remove differential side bearings from differential case.
2. Remove factory installed shims from differential case.
3. Install ring gear on differential case and tighten bolts to specification.
4. Install dummy bearings D-343 on differential case.
5. Install differential case (3) in the housing (2).
6. Install the marked bearing caps (1) in their correct positions and snug the bolts.



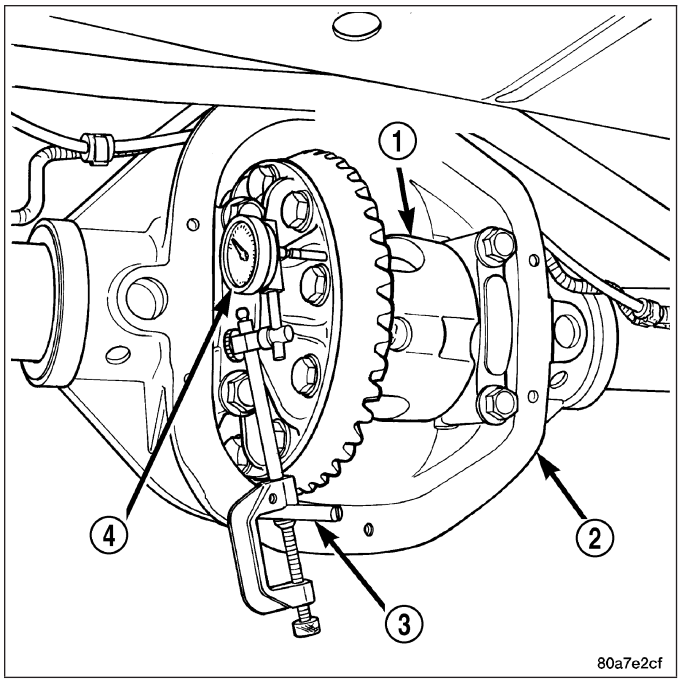
7. Seat the differential dummy bearing to the pinion side of the housing (2) with a dead-blow hammer (1).



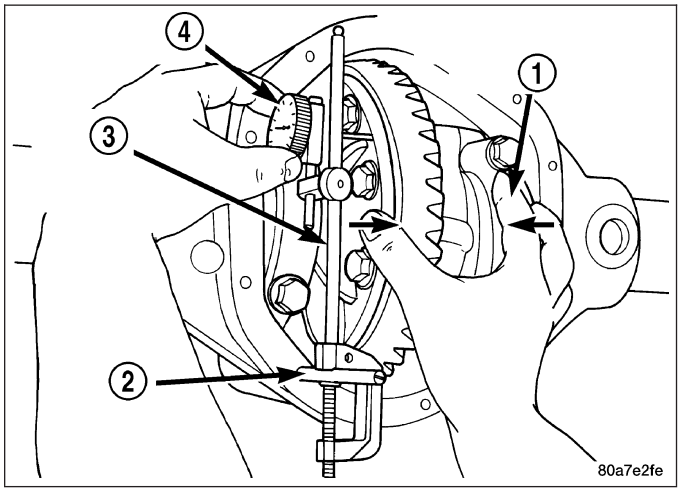
8. Seat the differential dummy bearing to the ring gear side of the housing (1) with a dead-blow hammer (2).



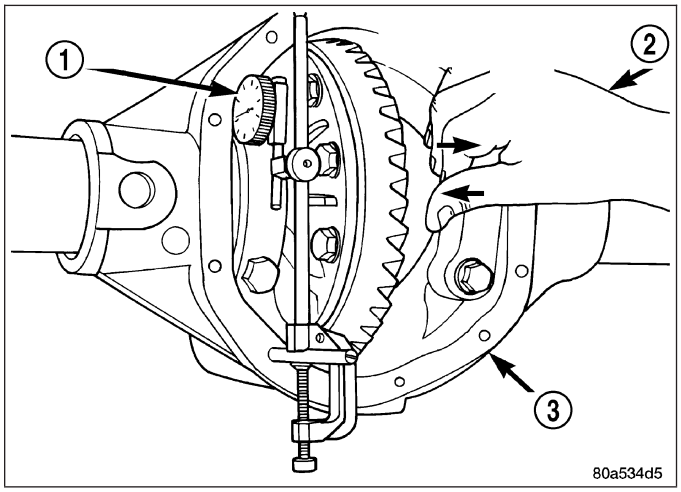
9. Thread Pilot Stud C-3288-B (3) into rear cover bolt hole below ring gear.
10. Attach the Dial Indicator C-3339 (4) to pilot stud. Position the dial indicator plunger on a flat surface between the ring gear bolt heads.



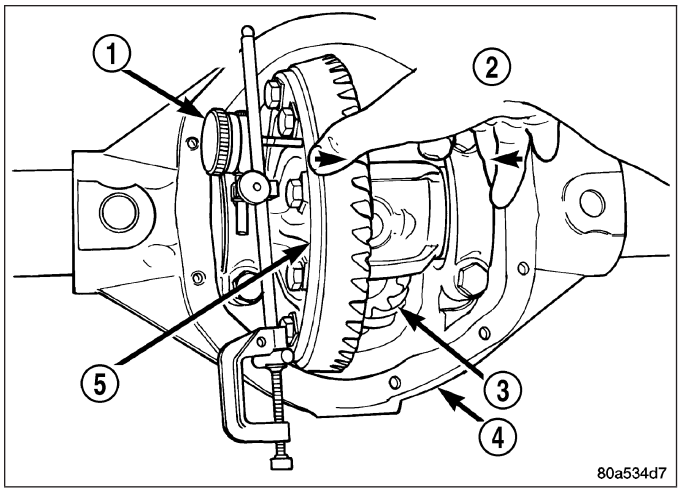
11. Push and hold differential case (1) to pinion gear side of the housing and zero dial indicator (4).



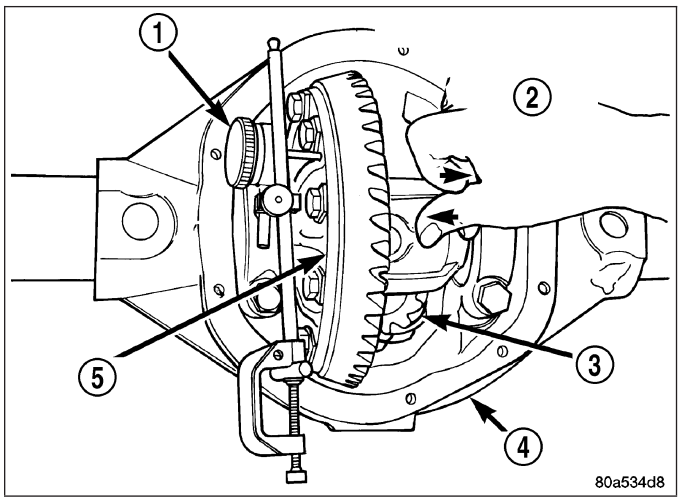
12. Push and hold differential case to ring gear side of the housing (3) and record the dial indicator (1) reading.
13. Add 0.38 mm (0.015 in.) to the recorded zero end play total. This total represents the thickness of shims needed to preload the new bearings when the differential is installed.
14. Rotate dial indicator out of the way on the pilot stud.
15. Remove differential case and dummy bearings from the housing.
16. Install the pinion gear in the housing. Install the pinion yoke and establish the correct pinion Torque To Rotating.



17. Install differential case (5) and dummy bearings D-343 in the housing (without shims), install bearing caps and tighten bolts snug.
18. Seat ring gear side dummy bearing.
19. Position the dial indicator plunger on a flat surface between the ring gear bolt heads.
20. Push and hold differential case (5) toward pinion gear (3) and zero the dial indicator (1).



21. Push and hold differential case (5) to ring gear side (2) of the housing and record dial indicator (1) reading.
22. This is the shim thickness needed on the ring gear side of the differential case for proper backlash.
23. Subtract the backlash shim thickness from the total preload shim thickness. The remainder is the shim thickness required on the pinion side of the housing.
24. Rotate dial indicator out of the way on pilot stud.
25. Remove differential case and dummy bearings from the housing.
26. Install the selected side bearing shims onto the differential case hubs.
27. Install side bearings on differential case hubs with Install C-4190 and Handle C-4171.



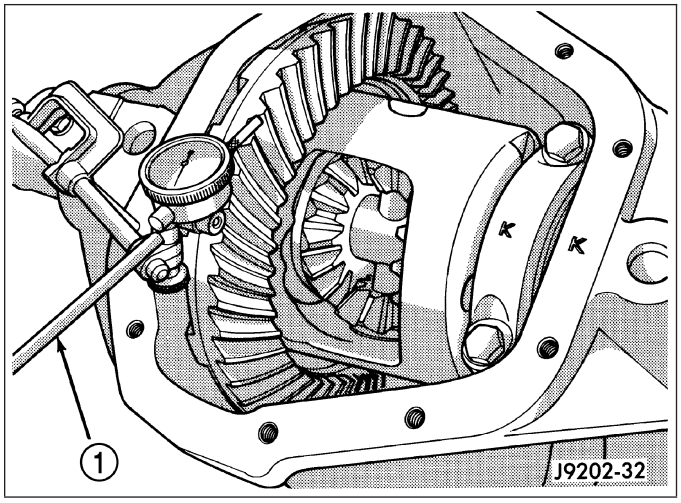
28. Install bearing cups on differential.
29. Install Spreader W-129-B and some items from Adapter Set 6987 on the housing and spread open enough to receive differential case.

CAUTION: Never spread housing over 0.50 mm (0.020 in.). Failure to follow these instructions will damage the housing.

30. Install differential case into the housing.
31. Remove spreader from the housing.

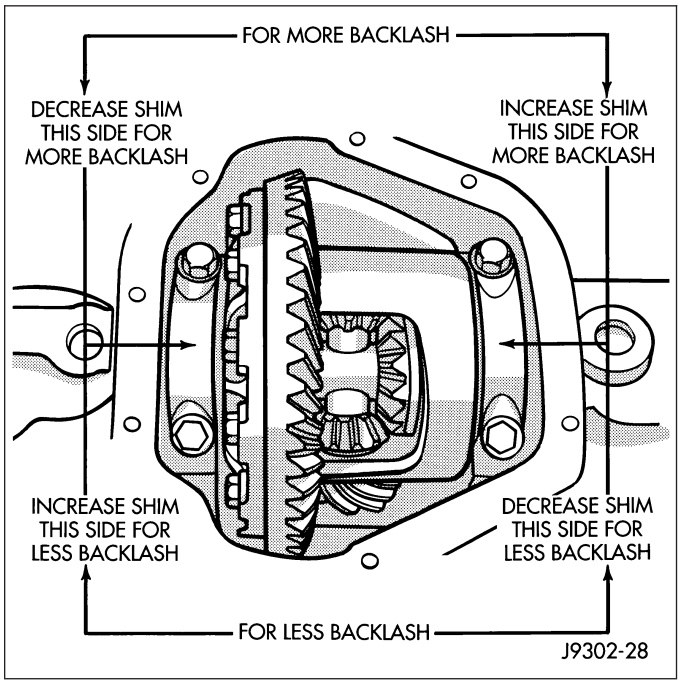
GEAR BACKLASH

1. Rotate the differential case several times to seat the side bearings.
2. Position the indicator plunger (1) against a ring gear tooth.
3. Push and hold ring gear upward while not allowing the pinion gear to rotate.
4. Zero dial indicator face to pointer.



5. Push and hold ring gear downward while not allowing the pinion gear to rotate. Dial indicator reading should be between 0.12 mm (0.005 in.) and 0.20 mm (0.008 in.). If backlash is not within specifications transfer the necessary amount of shim thickness from one side of the housing to the other.
6. Verify differential case and ring gear runout by measuring ring to pinion gear backlash at eight locations around the ring gear. Readings should not vary more than 0.05 mm (0.002 in.). If readings vary more than specified, the ring gear or the differential case is defective.

After the proper backlash is achieved, perform Gear Contact Pattern Analysis procedure.

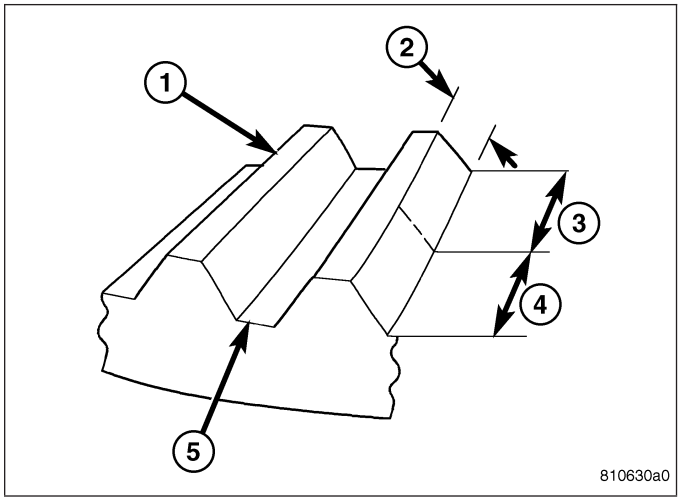


GEAR CONTACT PATTERN

The ring gear and pinion teeth contact patterns will show if the pinion depth is correct in the axle housing. It will also show if the ring gear backlash has been adjusted correctly. The backlash can be adjusted within specifications to achieve desired tooth contact patterns.

The TOP LAND (1) of the gear tooth is the top surface of the tooth. The PROFILE (2) of the gear tooth is the depth of the tooth. The TOE (3) of the gear is the portion of the tooth surface at the end towards the center. The HEEL (4) of the gear is the portion of the tooth at the outer-end. The ROOT (5) of the gear tooth is the lowest portion of the tooth.

NOTE: If the PROFILE across the gear tooth is the same it is a 3 Axis cut gear. If the PROFILE across the gear tooth is tapered it is a 2 Axis cut gear.



DRIVE SIDE HEEL TOE	CONDITION	COAST SIDE TOE HEEL	CONDITION	ACTION REQUIRED
	**Desirable pattern.** The drive pattern should be centered on the tooth. There should be some clearance between the pattern and the top of the tooth.		**Desirable pattern.** The coast pattern should be centered on the tooth, but may be slightly toward the toe. There should be some clearance between the pattern and the top of the tooth.	None
	**Top toe contact**		**Top heel contact**	Backlash correct. Thicker pinion position shim required.
	**Root heel contact**		**Root toe contact**	Backlash correct. Thinner pinion position shim required.
	**Top heel contact**		**Top toe contact**	Pinion position shim correct. Decrease backlash.
	**Root toe contact**		**Root heel contact**	Pinion position shim correct. Increase backlash.

8106361d

1. Apply a thin coat of hydrated ferric oxide or equivalent, to the drive and coast side of the ring gear teeth.
2. Wrap, twist and hold a shop towel around the pinion yoke to increase the turning resistance of the pinion. This will provide a more distinct contact pattern.
3. Using a boxed end wrench on a ring gear bolt, Rotate the differential case one complete revolution in both directions while a load is being applied from shop towel.

The areas on the ring gear teeth with the greatest degree of contact against the pinion teeth will squeegee the compound to the areas with the least amount of contact. Note and compare patterns on the ring gear teeth to Gear Tooth Contact Patterns chart and adjust pinion depth and gear backlash as necessary.

DIFFERENTIAL BEARING PRELOAD CHECK

The final check on the differential assembly before installing the axles is torque to rotate pinion and differential combined. This will verify the correct differential bearing preload.

Total Torque to Rotate the differential is: Pinion Torque to Rotate plus 0.33 to 0.56 N·m (3 to 5 in. lbs.).

SPECIFICATIONS

REAR AXLE - 248RBI

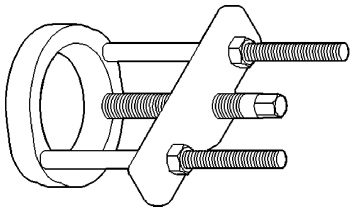
AXLE SPECIFICATIONS

DESCRIPTION	SPECIFICATION
Axle Ratio	4.56
Ring Gear Diameter	248 mm (9.75 in.)
Ring Gear Backlash	0.12-0.20 mm (0.005-0.008 in.)
Pinion Torque To Rotate - Original Bearings	1-3 N·m (10-20 in. lbs.)
Pinion Torque To Rotate - New Bearings	1.7-3.9 N·m (15-35 in. lbs.)
Total Torque To Rotate - Pinion Torque To Rotate Plus	0.33 to 0.56 N·m (3 to 5 in. lbs.)

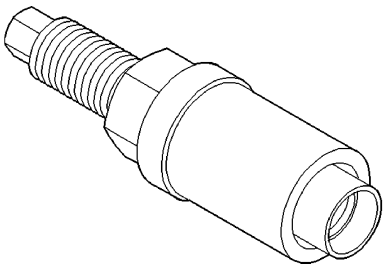
TORQUE SPECIFICATIONS

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Fill Hole Plug	27	20	-
Differential Cover Bolts	48	35	-
Bearing Cap Bolts	108	80	-
Ring Gear Bolt	177	130	-
Pinion Nut	292-447	215-330	-
Pinion Mate Shaft Bolt	27	20	-
Power Hop Bracket Bolts	41	30	-
Power Hop Damper Bolt	102	75	-

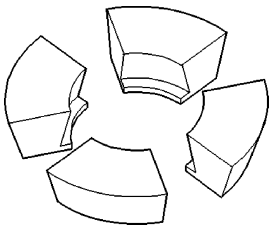
SPECIAL TOOLS



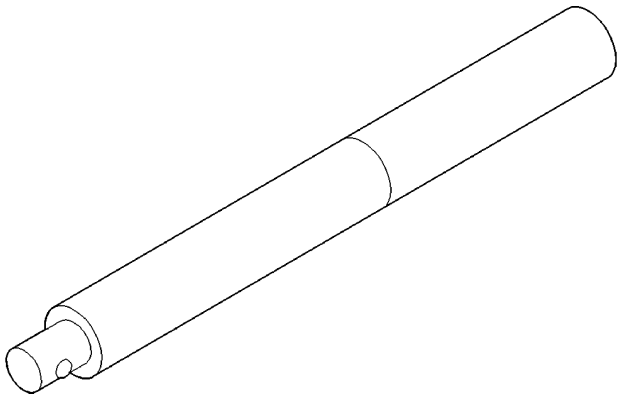
PULLER C-293-PA



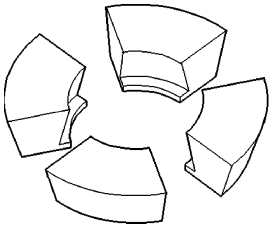
INSTALLER C-3718



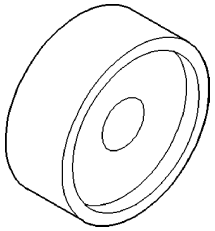
ADAPTERS C-293-37



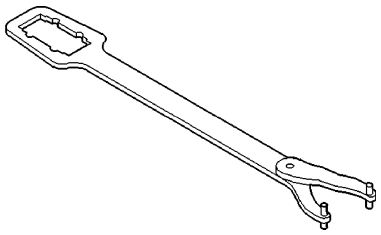
HANDLE C-4171



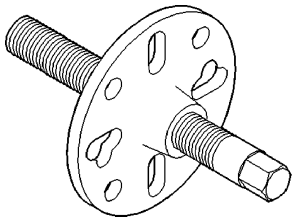
ADAPTERS C-293-62



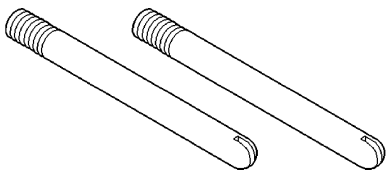
INSTALLER C-4190



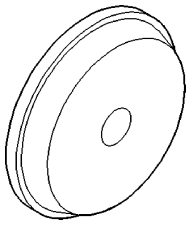
WRENCH C-3281



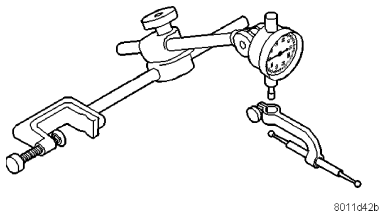
PULLER C-452



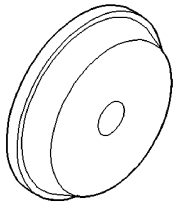
PILOT STUDS C-3288-B



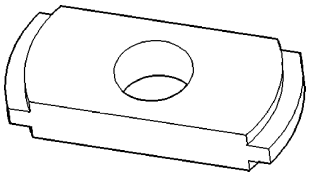
INSTALLER D-111



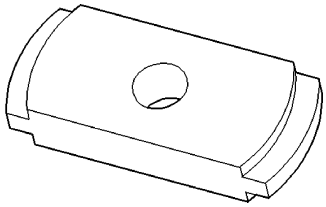
DIAL INDICATOR C-3339



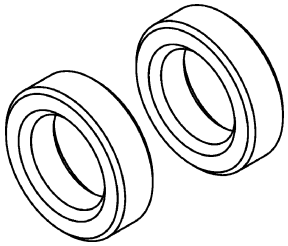
INSTALLER D-146



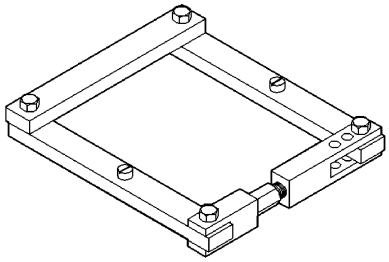
REMOVER D-158



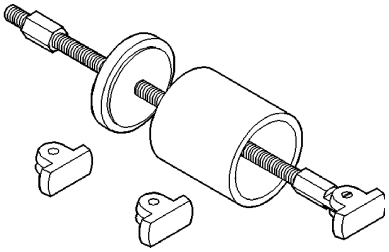
REMOVER D-162



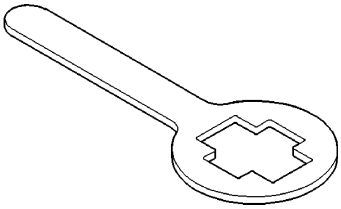
DUMMY BEARINGS D-343



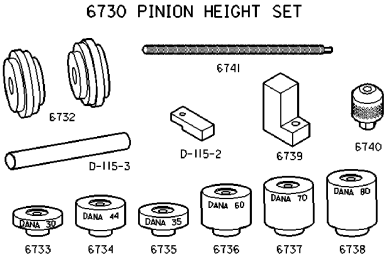
SPREADER W-129-B



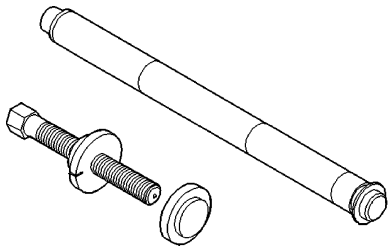
REMOVER 6310



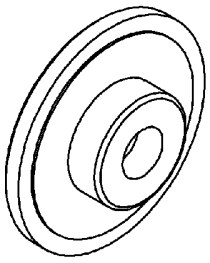
HOLDER 6719A



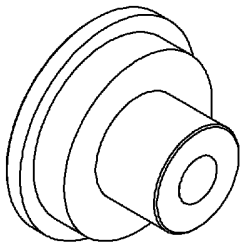
PINION DEPTH TOOLS 6730



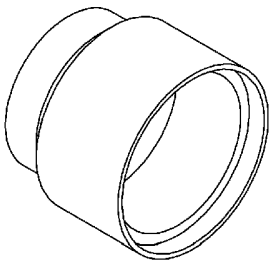
TRAC-LOK TOOLS 6960



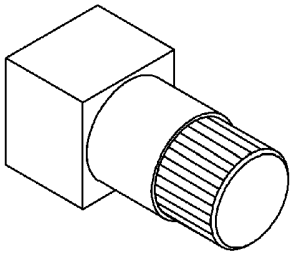
INSTALLER 9343



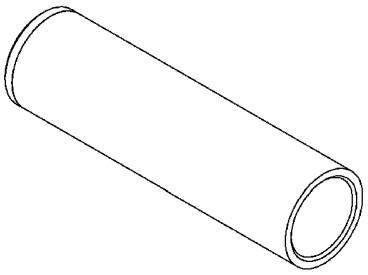
INSTALLER 9344



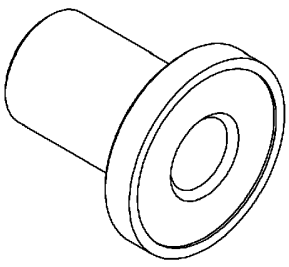
RECEIVER 9345



FIXTURE 9346



INSTALLER 9347

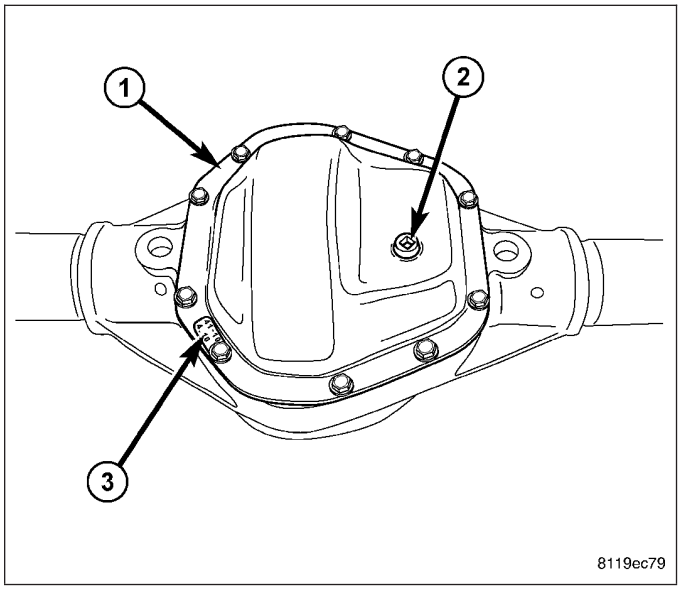


INSTALLER 9348

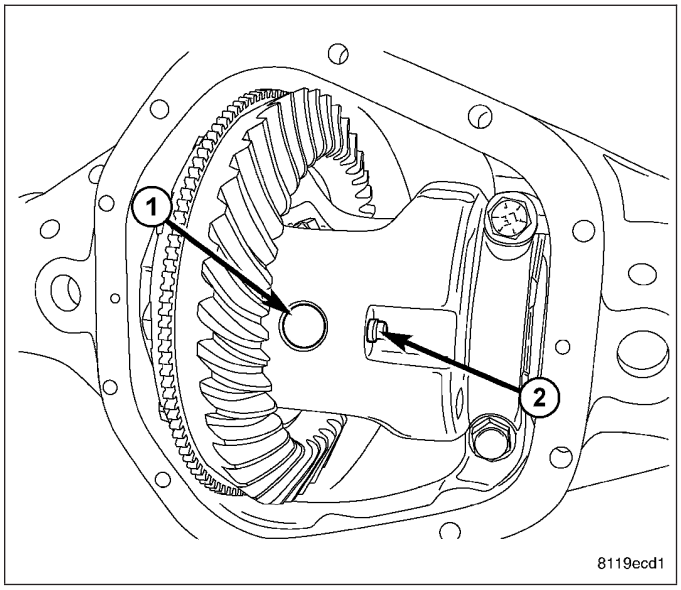
SHAFT-AXLE

REMOVAL

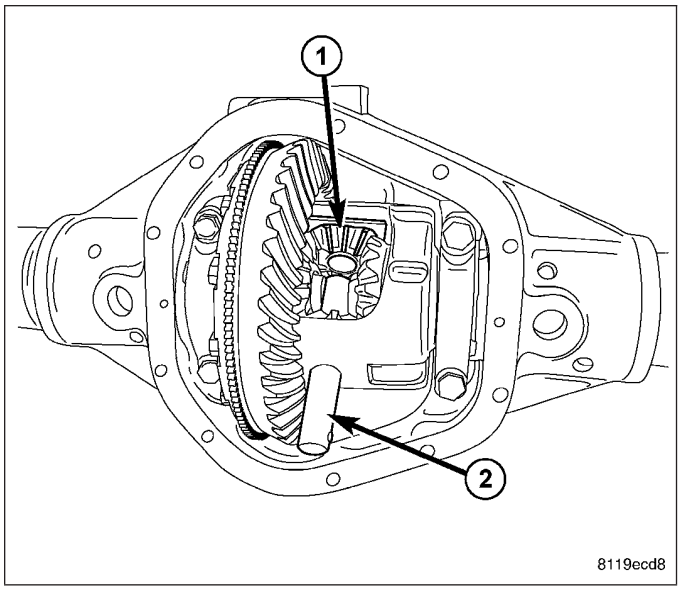
1. With vehicle in neutral, position vehicle on hoist.
2. Remove brake caliper adapter with caliper and remove rotor.
3. Remove differential housing cover fill plug (2) axle ratio tag (3) and cover (1). Drain lubricant.



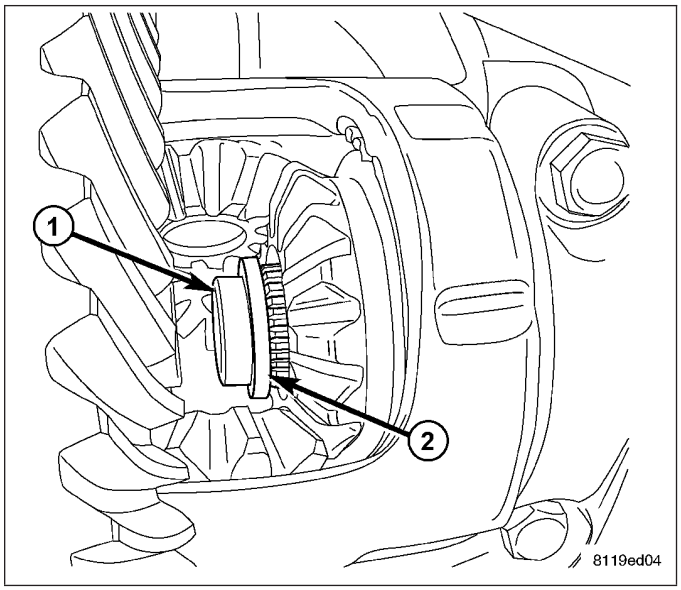
4. Remove pinion mate shaft (1) lock screw (2).



5. Remove pinion mate shaft (2) from differential case.

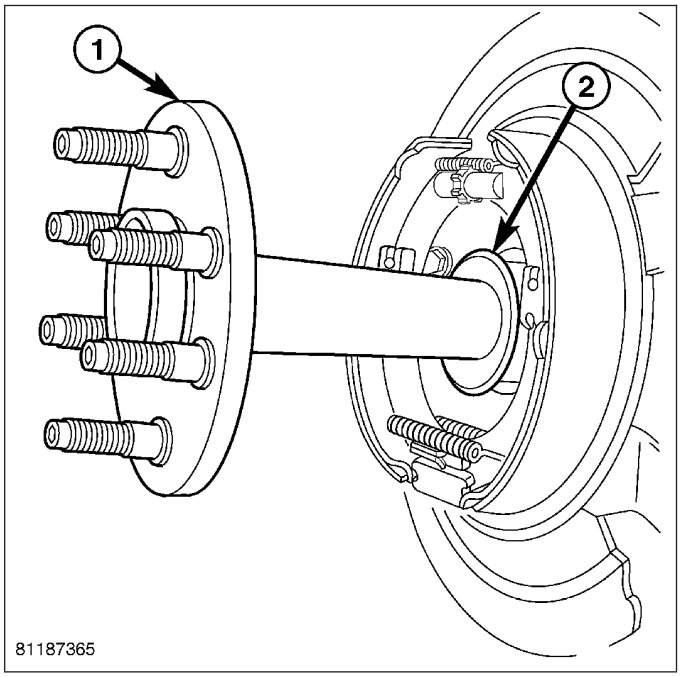


6. Push axle shaft (1) inward and remove axle shaft C-lock (2).
7. Remove axle shaft.

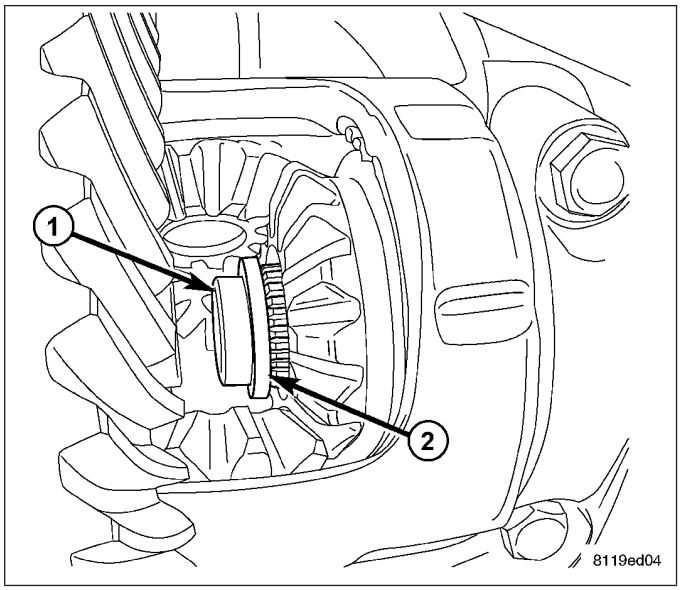


INSTALLATION

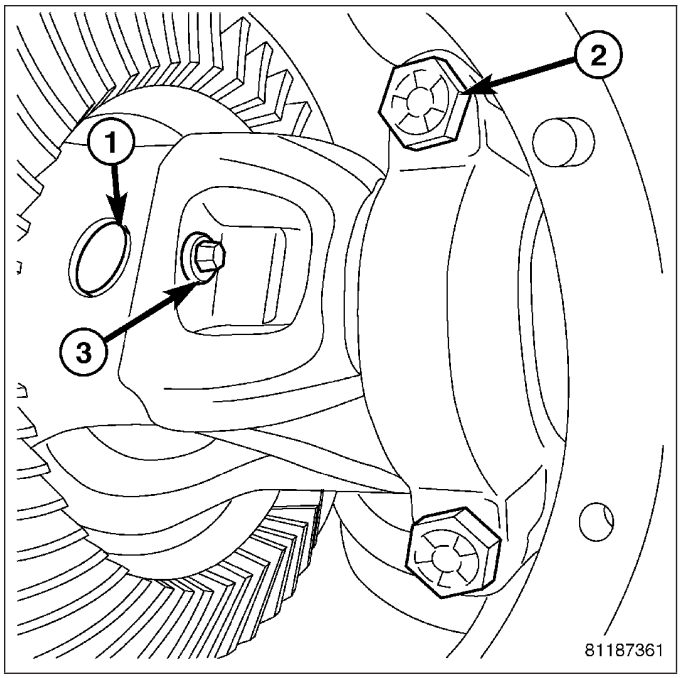
1. Lubricate bearing bore and seal lip with gear lubricant.
2. Insert axle shaft (1) through seal (2), bearing and engage into side gear splines.



3. Insert C-lock (2) in end of axle shaft (1) then push axle shaft outward to seat C-lock in side gear.
4. Insert pinion mate shaft into differential case and through thrust washer and pinion gear.



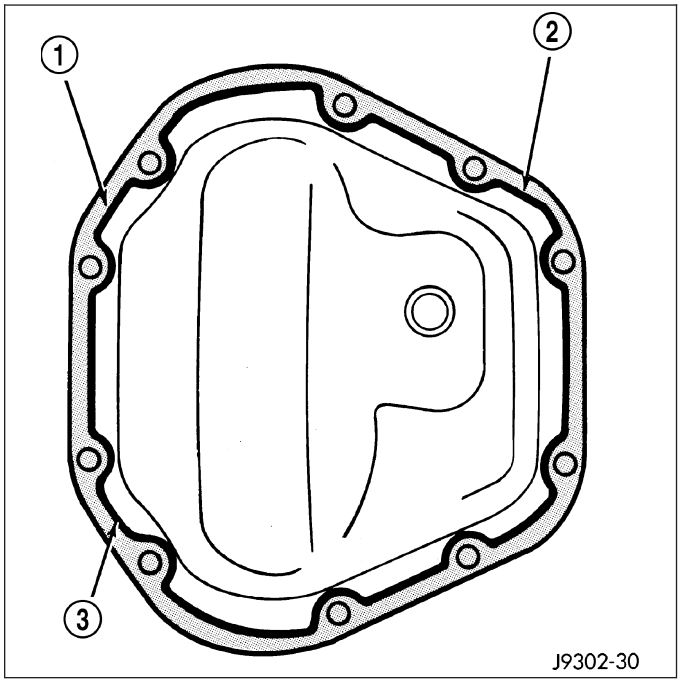
5. Align hole in pinion mate shaft (1) with hole in differential case and install lock screw (3) with Loctite® 242 or equivalent. Tighten lock screw to 27 N·m (20 ft. lbs.).



6. Apply a bead of orange Mopar™ Axle RTV sealant (2) or equivalent to the housing cover (1).

CAUTION: If housing cover is not installed within 3 to 5 minutes, the cover must be cleaned and new RTV applied. Failure to follow these instructions will result in a leak.

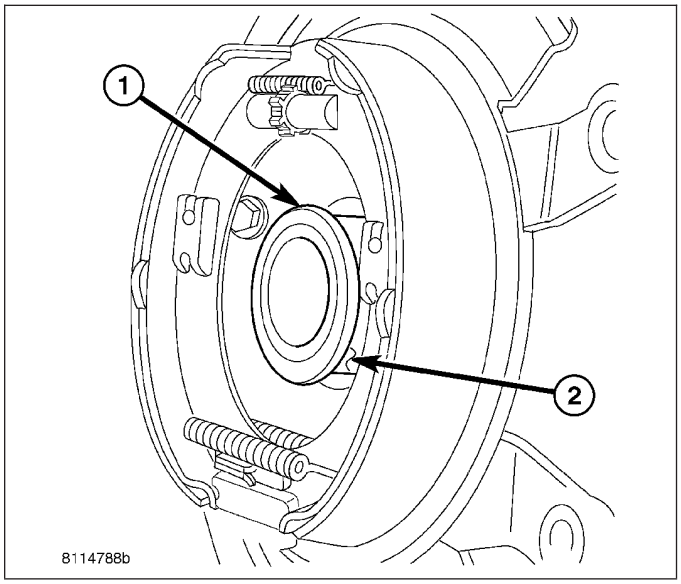
7. Install cover and tighten bolts in a criss-cross pattern to 48 N·m (35 ft. lbs.).
8. Fill differential lubricant to bottom of the fill plug hole.
9. Install fill hole plug and tighten to 27 N·m (20 ft. lbs.).
10. Install brake rotor and caliper adapter with caliper.



SEAL-AXLE SHAFT

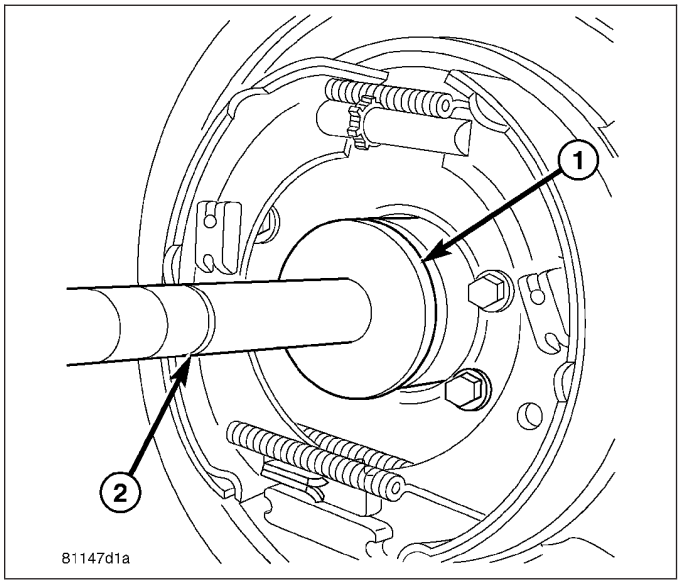
REMOVAL

1. Remove axle shaft.
2. Remove axle shaft seal (1) from the end of the axle tube (2) with a seal puller.



INSTALLATION

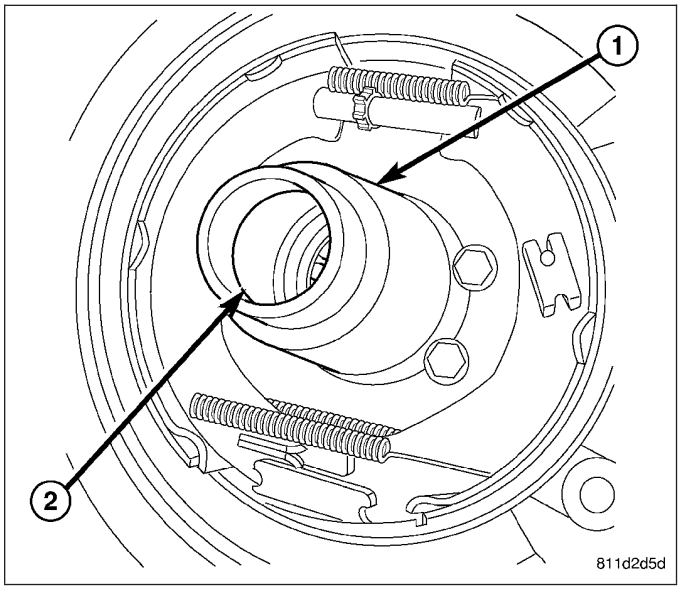
1. Remove any old sealer/burrs from axle tube.
2. Coat **new** seal lip with axle lubricant and install seal with Installer 9343 (1) and Handle C-4171 (2).
3. Install axle shaft.



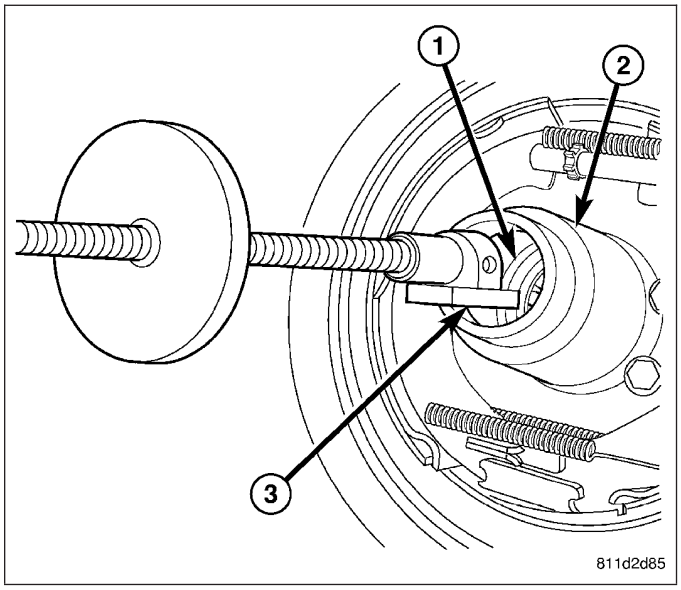
BEARING-AXLE

REMOVAL

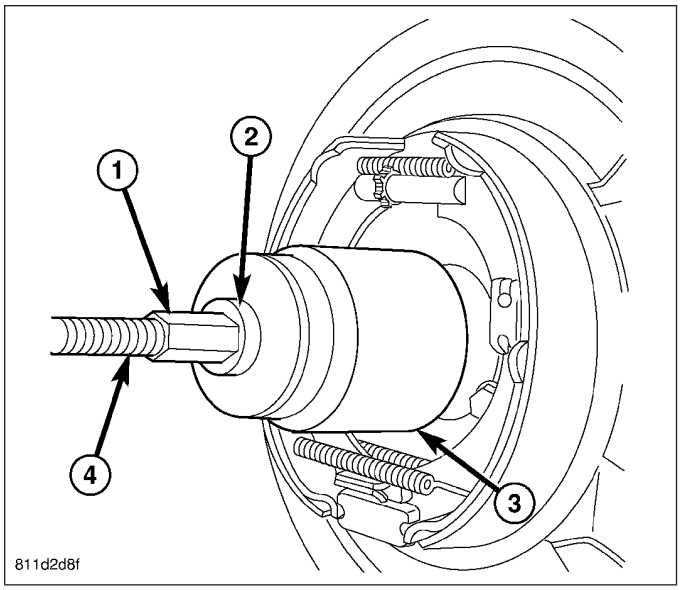
1. Remove axle shaft.
2. Remove axle seal with pry bar.
3. Position bearing (2) Receiver 9345 (1) on axle tube.



4. Insert bearing Remover 6310 with Foot 6310-9 (3) through receiver (2) and bearing (1).



5. Tighten Remove 6310 nut (1) to pull bearing into the receiver (3).

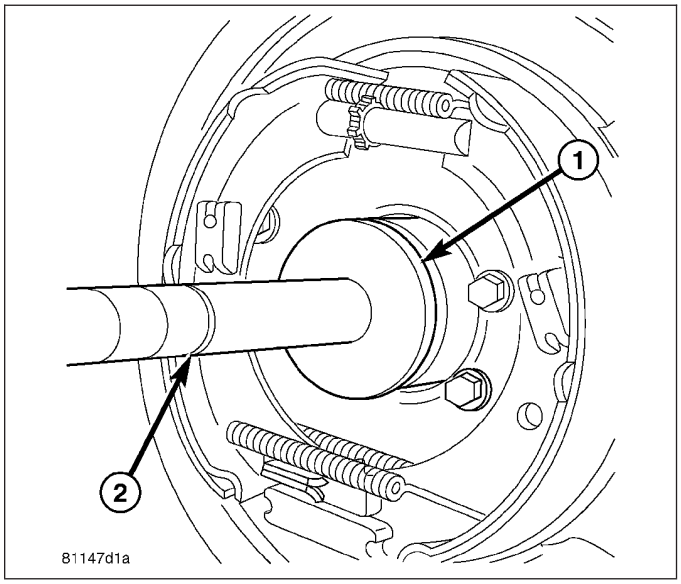


INSTALLATION

1. Remove any old sealer/burrs from axle tube.
2. Install axle shaft bearing with Installer 9344 (1) and Handle C-4171 (2). Drive bearing in until tool contacts the axle tube.

NOTE: Bearing is installed with the bearing part number against the installer.

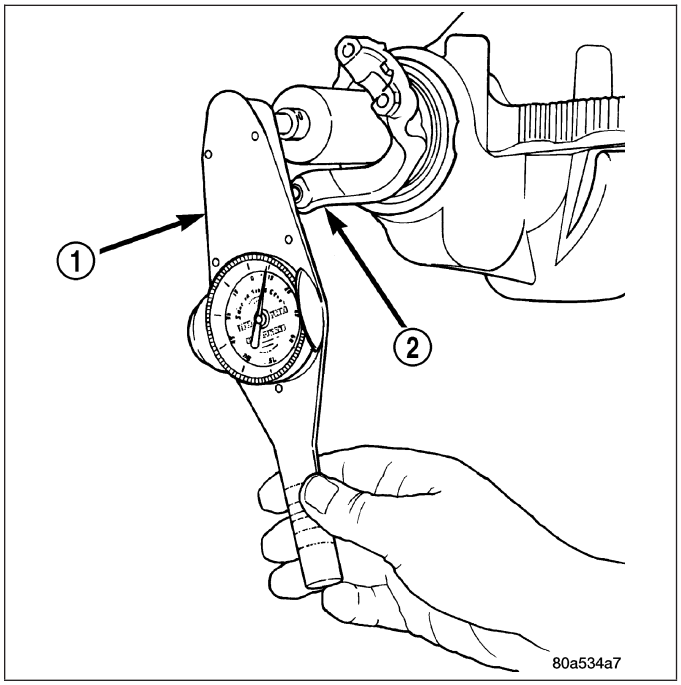
3. Coat **new** axle seal lip with axle lubricant and install with Installer 9343 and Handle C-4171.
4. Install axle shaft.



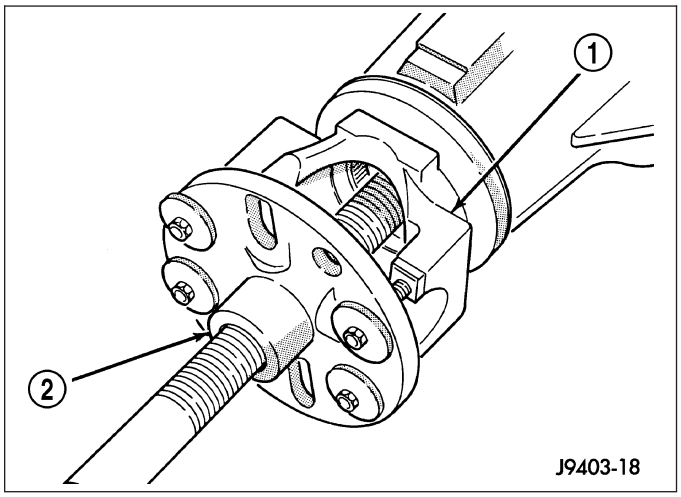
SEAL-PINION

REMOVAL

1. Remove propeller shaft.
2. Remove brake calipers to prevent any drag.
3. Rotate pinion yoke three or four times.
4. Measure and record pinion (2) Torque To Rotate with an inch pound torque wrench (1).

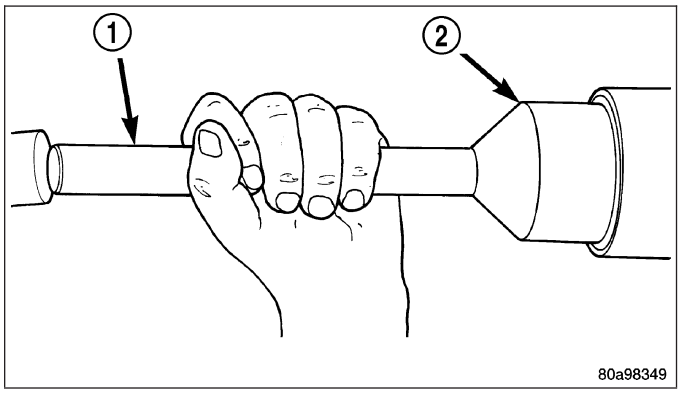


5. Hold yoke with Puller 6719A and remove pinion shaft nut and washer.
6. Remove pinion yoke (1) with Remover C-452 (2).
7. Remove pinion seal with seal puller or slide-hammer mounted screw.



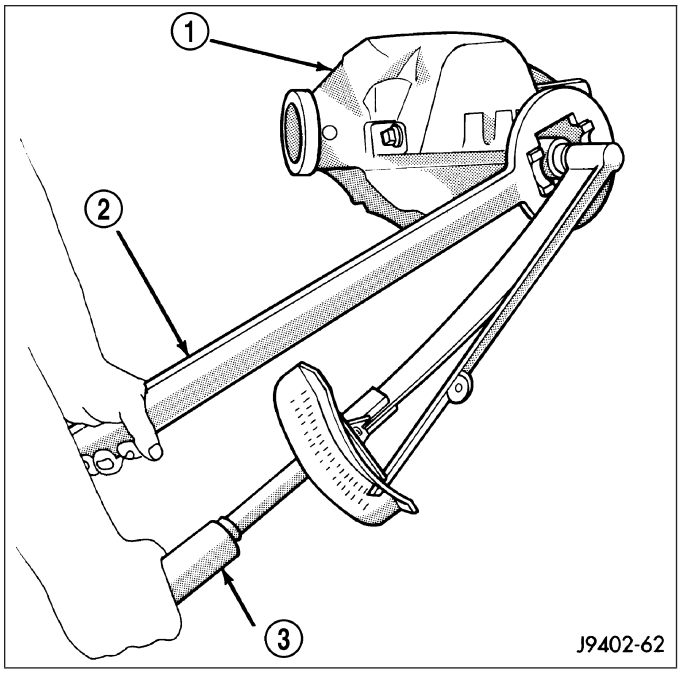
INSTALLATION

1. Coat lip of pinion seal with gear lubricant.
2. Install **new** pinion seal with Installer 9348 (2) and Handle C-4171 (1).
3. Install yoke on pinion shaft with Installer C-3718 and Holder 6719A.
4. Install pinion yoke washer with the **concave surface** against the yoke end.
5. Install **new** pinion nut.



CAUTION: Never exceed minimum tightening torque when installing the pinion yoke retaining nut at this point. Failure to heed caution may result in damage.

6. Hold pinion yoke with Holder 6719A (2) and tighten nut with torque wrench (3) to 292 N·m (215 ft. lbs.). Rotate pinion shaft several revolutions to ensure bearing rollers are seated.



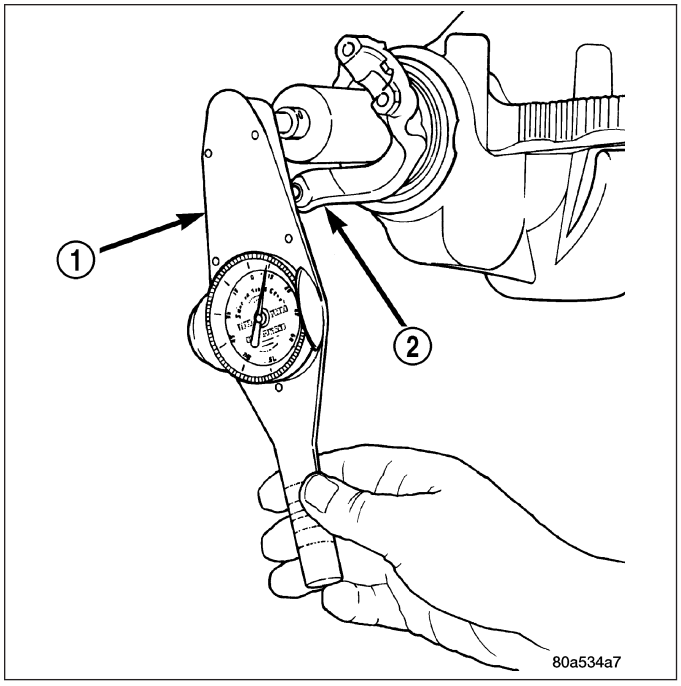
7. Measure pinion (2) Torque to Rotate with a inch pound torque wrench (1). Pinion Torque To Rotate is equal to the reading recorded during removal, plus 0.56 N·m (5 in. lbs.).

CAUTION: Never loosen pinion nut to decrease pinion rotating torque and never exceed specified preload torque. Failure to follow these instructions will result in damage.

8. If rotating torque is low, use Yoke Holder 6719 to hold the pinion yoke and tighten the pinion shaft nut in 6.8 N·m (5 ft. lbs.) increments until pinion Torque To Rotate is achieved.

NOTE: The rotating torque should be constant during a complete revolution of the pinion. If the rotating torque varies, this indicates a binding condition.

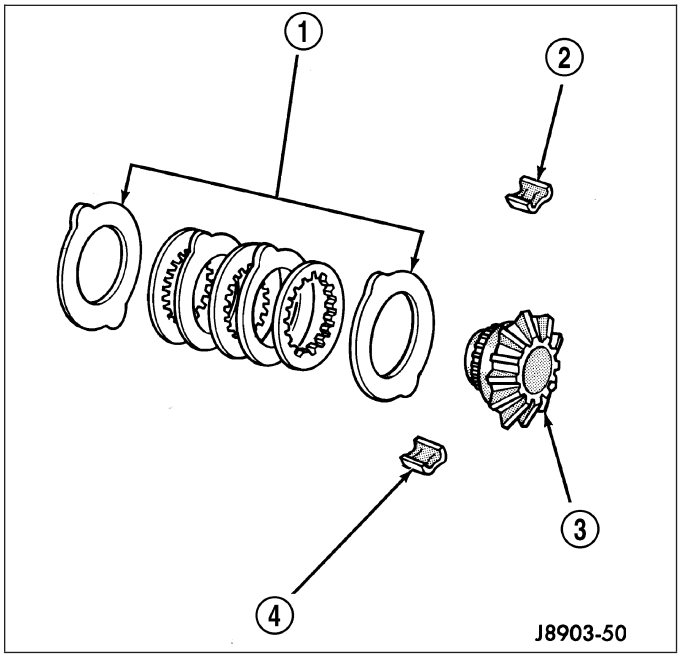
9. Install brake components.
10. Install propeller shaft.



DIFFERENTIAL-TRAC-LOK

DESCRIPTION

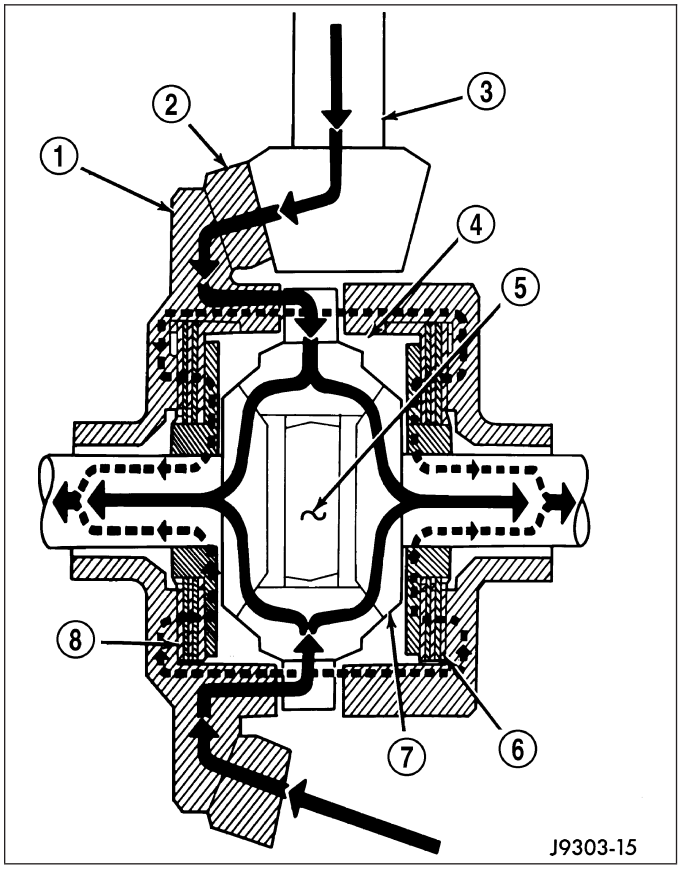
The Trac-Lok® differential has a one-piece differential case and similar components as a standard differential, plus two clutch disc packs (1) attached to the side gears (3) with retainers (2) (4). Differential bearing preload and ring gear backlash are adjusted with shims located between the differential case bearing cups and housing. Pinion bearing preload is set and maintained by the use of a collapsible spacer.



OPERATION

This differentials clutches are engaged by two concurrent forces. The first being the preload force exerted through Belleville spring washers within the clutch packs (6) (8). The second is the separating forces generated by the side gears (7) as torque is applied through the ring gear.

This design provides the differential action needed for turning corners and for driving straight ahead during periods of unequal traction. When one wheel looses traction, the clutch packs transfer additional torque to the wheel having the most traction. This differential resist wheel spin on bumpy roads and provide more pulling power when one wheel looses traction. Pulling power is provided continuously until both wheels loose traction. If both wheels slip due to unequal traction, Trac-lok® operation is normal. In extreme cases of differences of traction, the wheel with the least traction may spin.



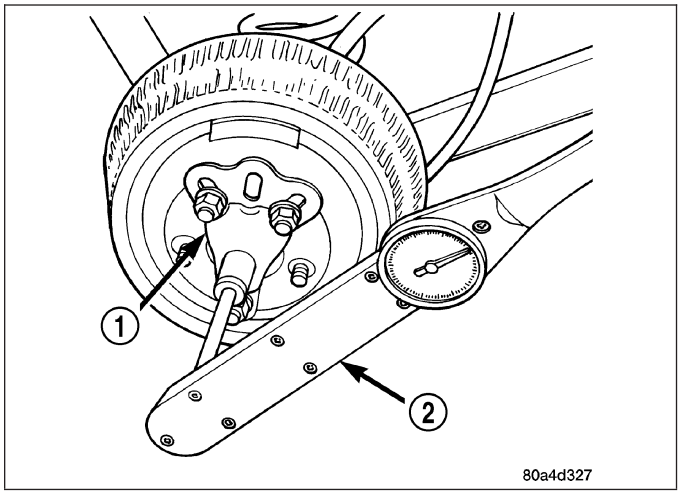
DIAGNOSIS AND TESTING

DIFFERENTIAL-TRAC-LOK

A common problem of the Trac-Lok® differential is a chatter noise when turning corners. Before removing the unit for repair, drain, flush and refill axle with specified lubricant and 118 ml (4 ounce) of Mopar® Limited Slip Additive.

After changing lubricant, drive vehicle and make 10 to 12 slow figure-eight turns. This will pump lubricant through the clutches. This will correct the chatter noise condition in most instances. If chatter persists, clutch damage could have occurred.

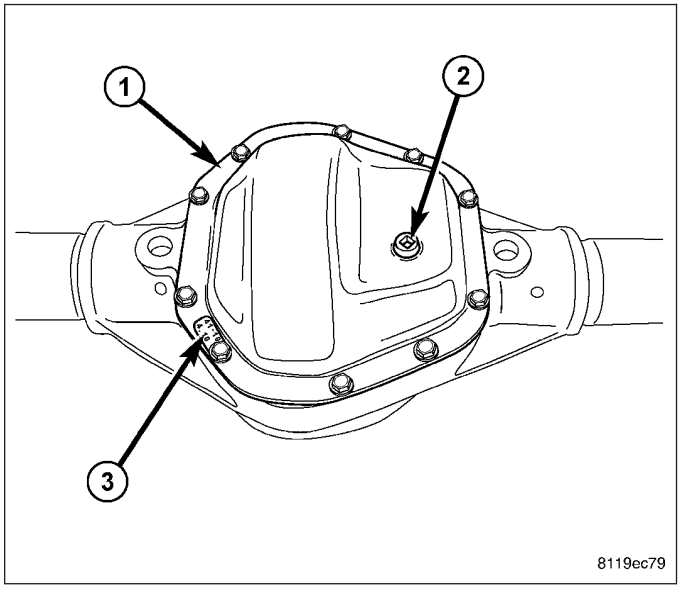
The differential can be tested without removing the differential case by measuring rotating torque. Make sure brakes are not dragging during this measurement.



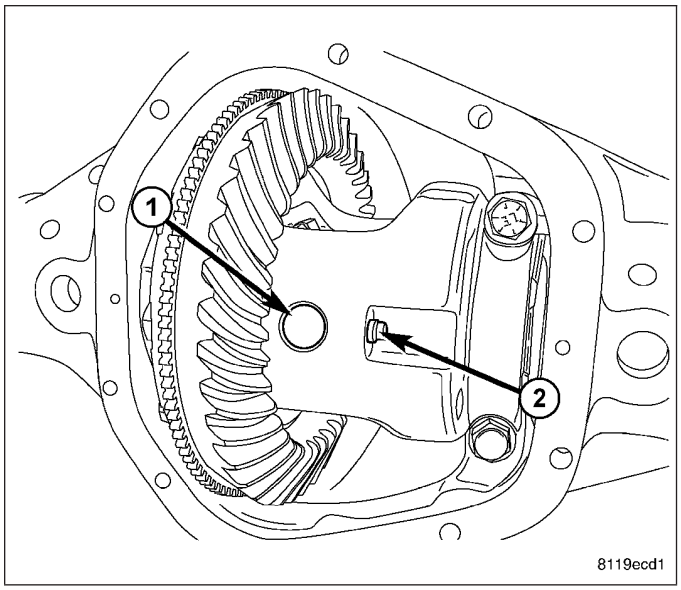
1. Place blocks in front and rear of both front wheels.
2. Raise one rear wheel until it is completely off the ground.
3. Engine off, transmission in neutral, and parking brake off.
4. Remove wheel and bolt Special Tool 6790 (1) or equivalent tool to studs.
5. Use torque wrench (2) on special tool to rotate wheel and read rotating torque.
6. If rotating torque is less than 41 N·m (30 ft. lbs.) or more than 271 N·m (200 ft. lbs.) on either wheel the unit should be serviced.

REMOVAL

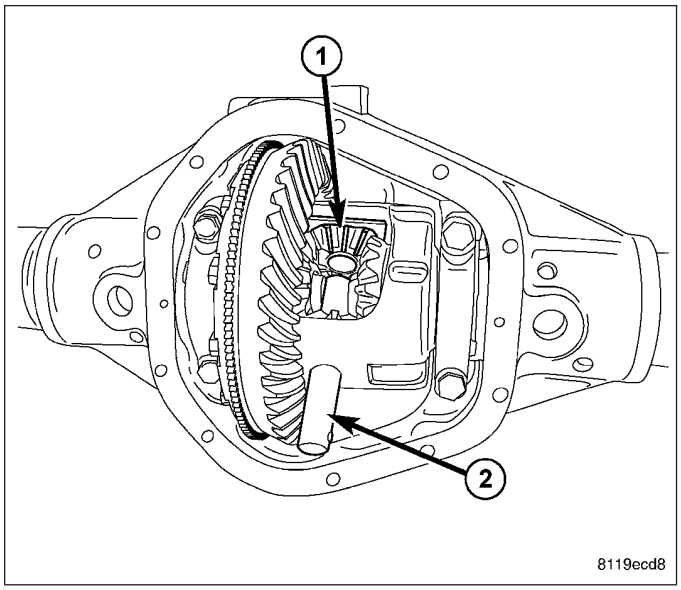
1. Remove drain plug (2) from differential cover (1) and drain lubricant.
2. Clean housing cavity with a flushing oil, light engine oil or lint free cloth.



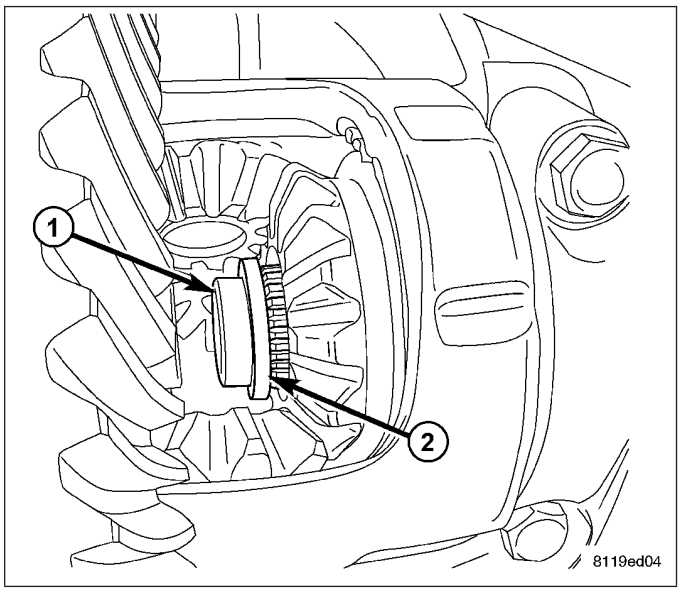
3. Remove pinion mate shaft (1) lock screw (2).



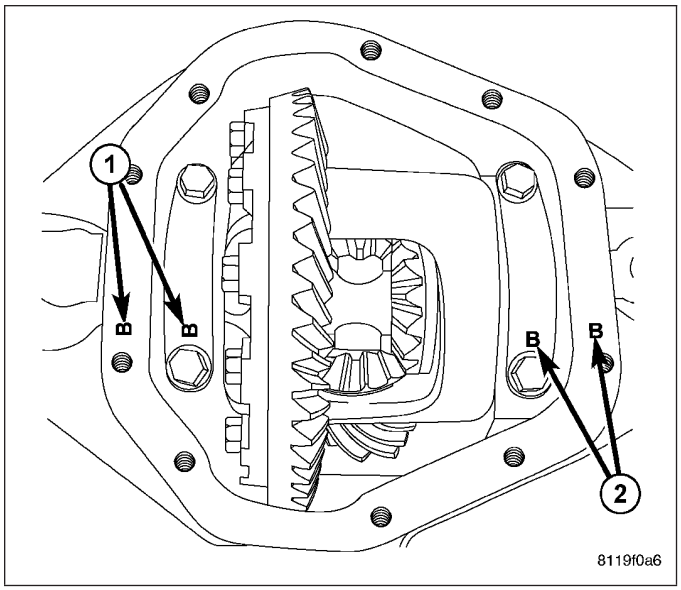
4. Remove pinion mate shaft (2).



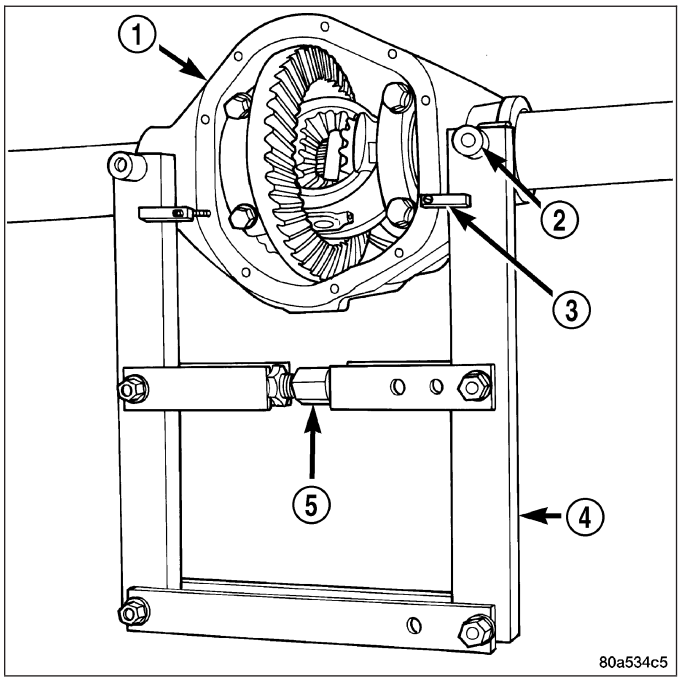
5. Push axle shafts (1) inward and remove axle shafts C-locks (2).
6. Remove axle shafts.



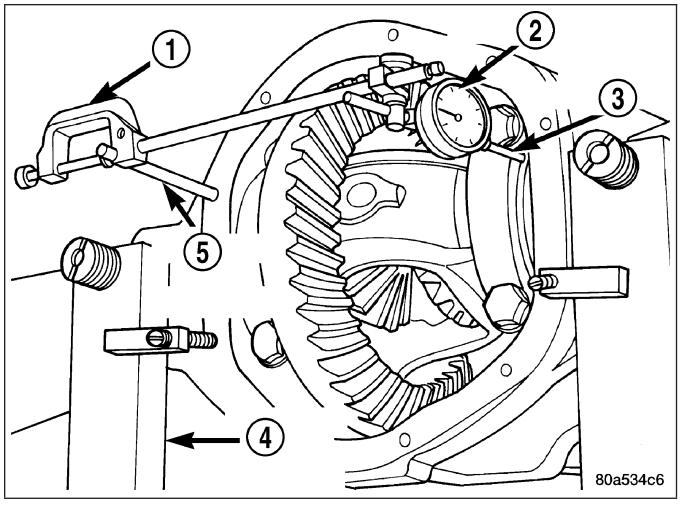
7. Note bearing cap and housing sealing surface location marks (1).
8. Remove differential bearing caps.



9. Position Spreader W-129-B (4) with tool dowel pins (2) seated in the locating holes. Install hold-down clamps (3) and tighten turnbuckle (5) finger-tight.



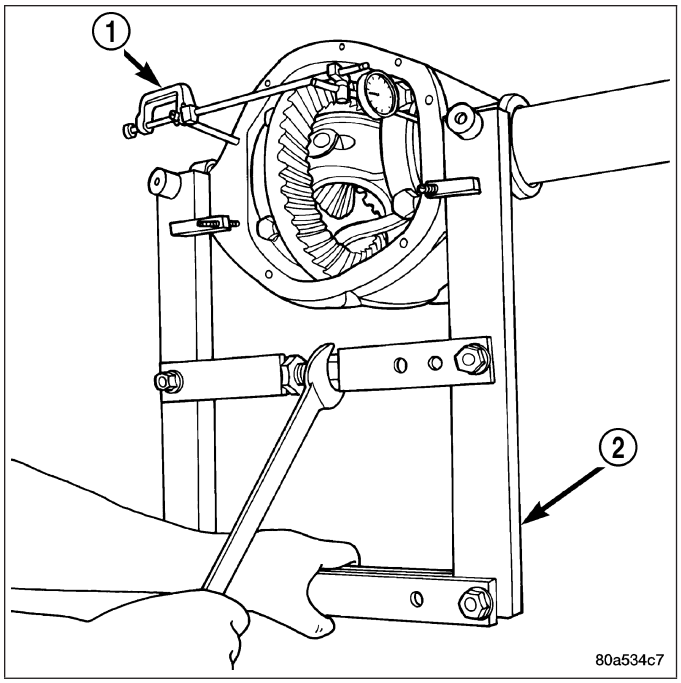
10. Install Pilot Stud C-3288-B (5) on left side of the housing and attach dial indicator (2) to the pilot stud. Load indicator plunger against the opposite side of the housing and zero indicator.



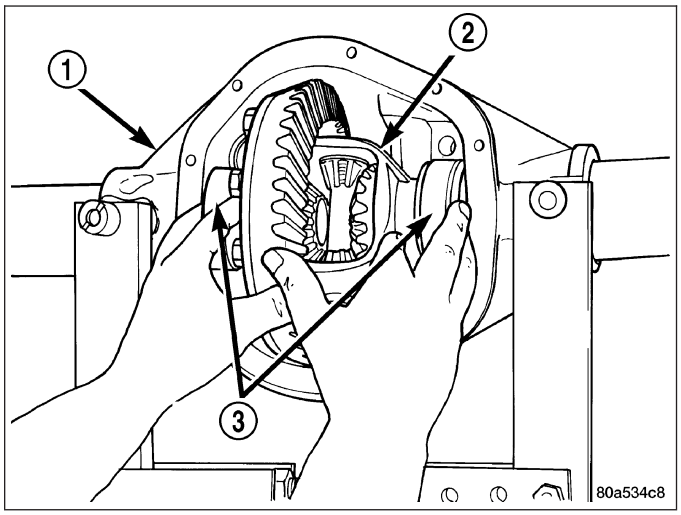
11. Spread (2) housing while measuring the distance with the dial indicator (1).

CAUTION: Never spread the housing over 0.50 mm (0.020 in). If housing is over-spread, it could be distorted or damaged.

12. Remove dial indicator.
13. Hold differential case in position and remove differential bearing caps.
14. Pry differential case loose from housing.

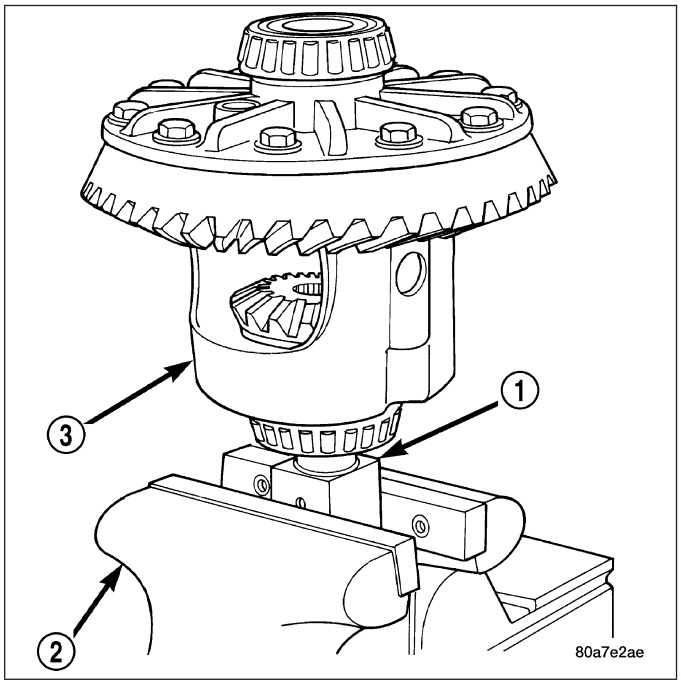


15. Remove case (2) from housing (1) and tag bearing cups (3) and shims location.
16. Remove spreader.

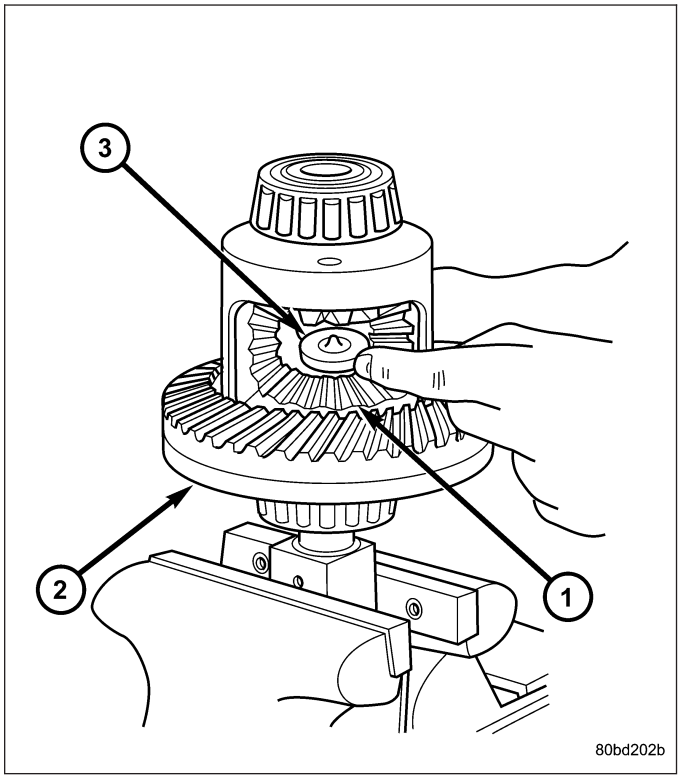


DISASSEMBLY

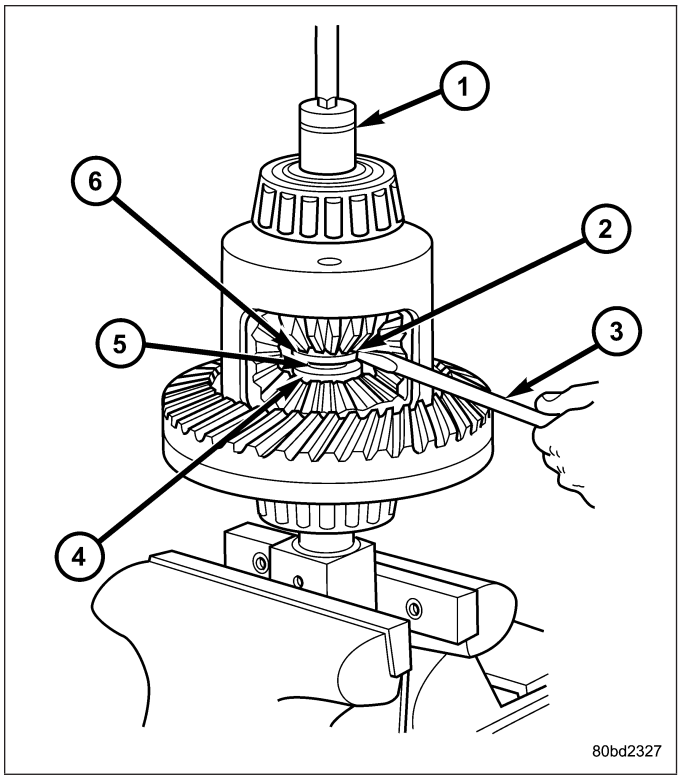
1. Clamp Holding Fixture 9346 (1) in vise (2) and set differential case (3) on fixture.
2. Remove pinion gear mate shaft screw.
3. Remove pinion gear mate shaft.



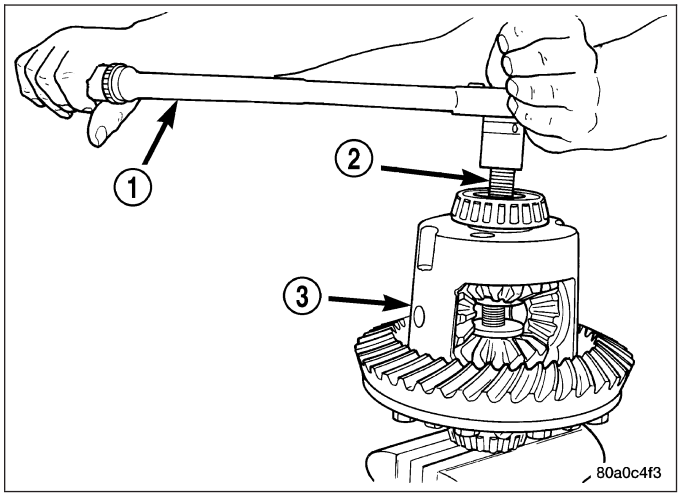
4. Lubricate and install disc (3), that is not threaded from Trac-Lok® Tool Kit 6960 into the lower side gear (1).



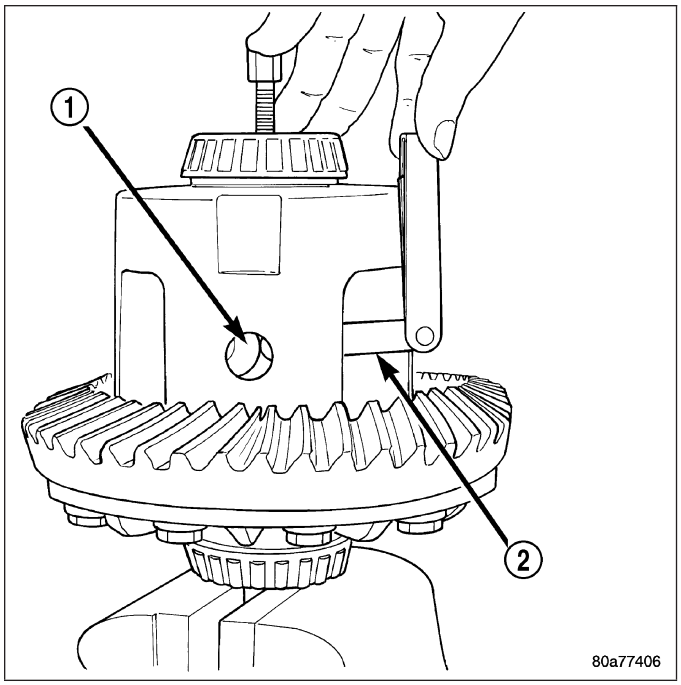
5. Install threaded disc (6) from Trac-Lok® Tool Kit 6960 into top side gear. Thread forcing screw (5) from Trac-Lok® Tool Kit 6960 through top disc until it comes in contact with lower disc (4).
6. Position a small screw driver (3) in slot of top disc (2) to prevent disc from turning.



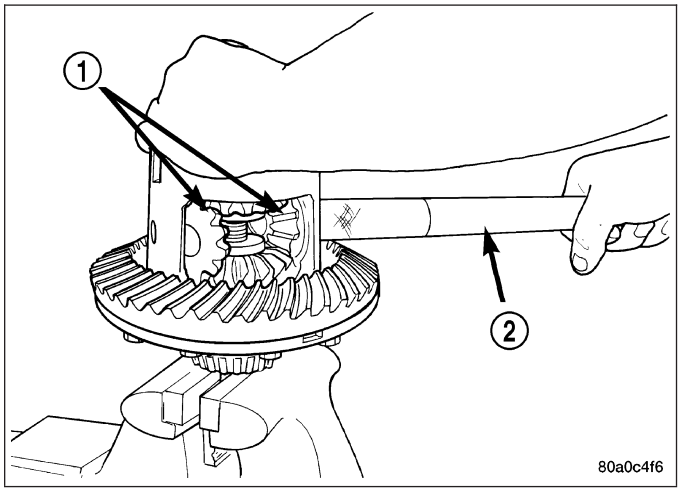
7. Tighten forcing screw (2) with torque wrench (1) to 122 N·m (90 ft. lbs.) maximum to compress Belleville springs in clutch packs.



8. With a feeler gauge (2) remove thrust washers (1) from behind the pinion gears.



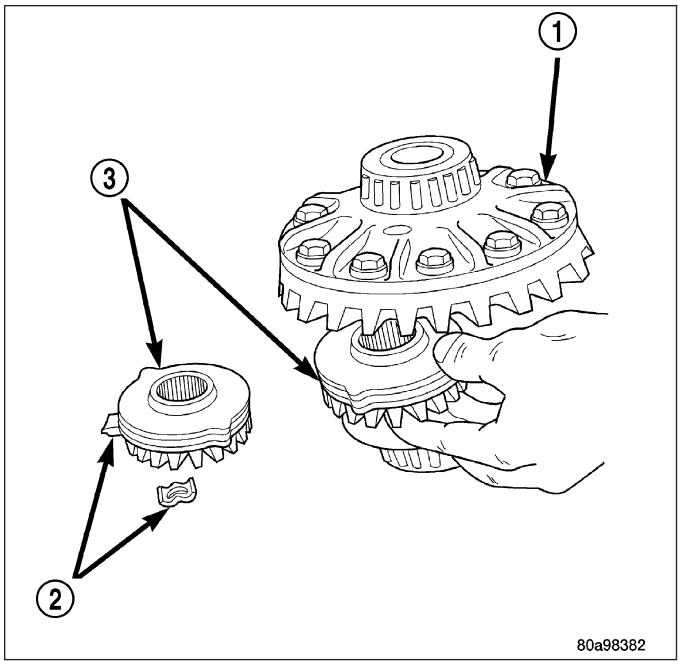
9. Insert turning bar (2) from tool kit into pinion mate shaft hole in the case.
10. Loosen forcing screw in small increments until the clutch pack tension is relieved and differential case can be turned using turning bar.
11. Rotate differential case until the pinion gears (1) can be removed.
12. Remove pinion gears from differential case.



13. Remove forcing screw and discs.
14. Remove top side gear (3) with clutch pack (3) and retainer (2).

NOTE: Keep plates in correct order during removal.

15. Remove differential case from fixture. Remove lower side gear, clutch pack retainer and clutch pack.

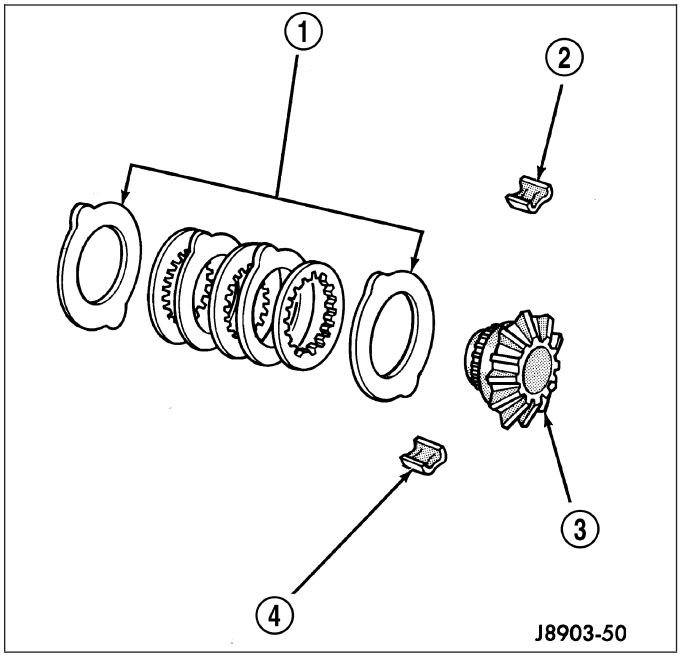


ASSEMBLY

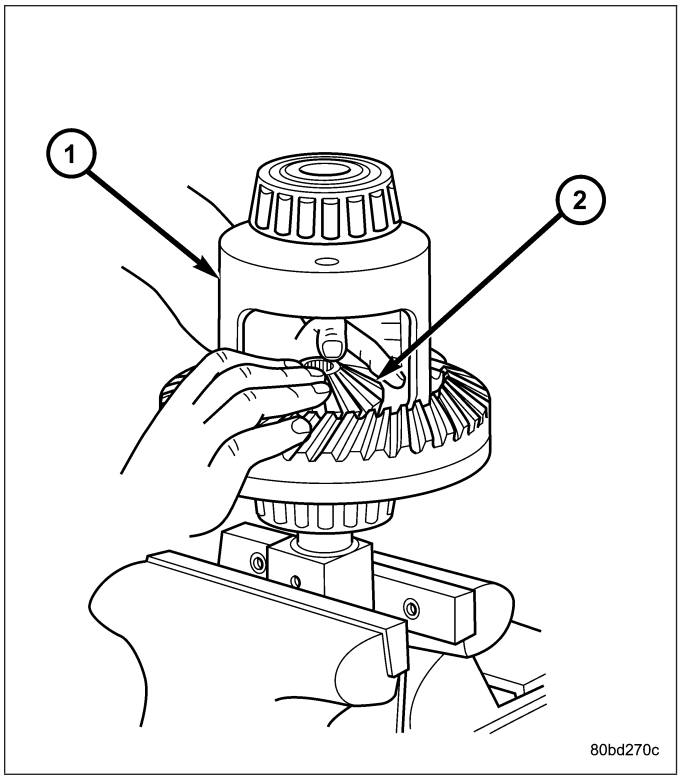
Clean all components in cleaning solvent and dry components with compressed air. Inspect clutch pack plates (1) for wear, scoring or damage. Replace both clutch packs if any one component in either pack is damaged. Inspect side gears and pinions. Replace any gear that is worn, cracked, chipped or damaged. Inspect differential case and pinion shaft. Replace if worn or damaged.

NOTE: New Plates and discs with fiber coating (no grooves or lines) must be presoaked in Friction Modifier before assembly. Soak plates and discs for a minimum of 20 minutes.

1. Lubricate each component with gear lubricant before assembly.
2. Assemble clutch discs (1) into packs and secure disc packs with retaining clips (4).
3. Position differential case on the Holding Fixture 9346.



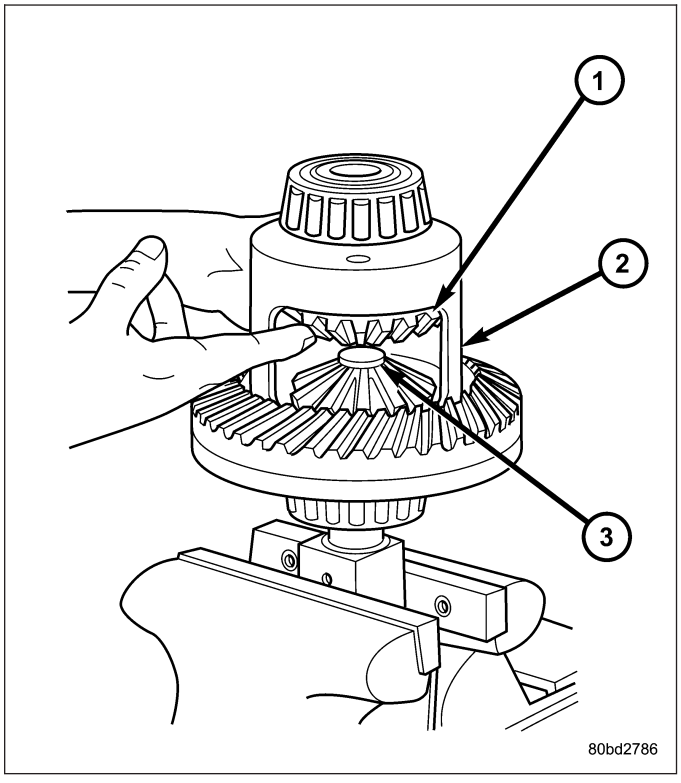
4. Position assembled clutch disc packs on the side gear hubs.
5. Install lower clutch pack (2) with side gear (2) in the differential case (1) and verify clutch pack retaining clips are in position.
6. Install lubricated disc from Trac-Lok® Tool Kit 6960 into lower side gear.



7. Install upper clutch disc pack (1) with side gear (1) and verify clutch pack retaining clips are in position.
8. Hold assembly in position and install threaded disc from tool kit into top side gear.
9. Install forcing screw from Trac-Lok® Tool Kit 6960 and tighten screw to slightly compress clutch disc.
10. Place pinion gears in position in side gears and verify that the pinion mate shaft hole is aligned.
11. Rotate case with turning bar until pinion mate shaft holes in pinion gears align with holes in case.

NOTE: It may be necessary to slightly tighten the forcing screw in order to install the pinion gears.

12. Tighten forcing screw to 122 N·m (90 ft. lbs.) maximum to compress the Belleville springs.
13. Lubricate and install thrust washers behind pinion gears and align washers with a small screw driver. Insert mate shaft into each pinion gear to verify alignment.
14. Remove Forcing Screw, Discs and Threaded Adapter.



15. Install pinion gear mate shaft and align holes in shaft and case.
16. Install pinion mate shaft screw.

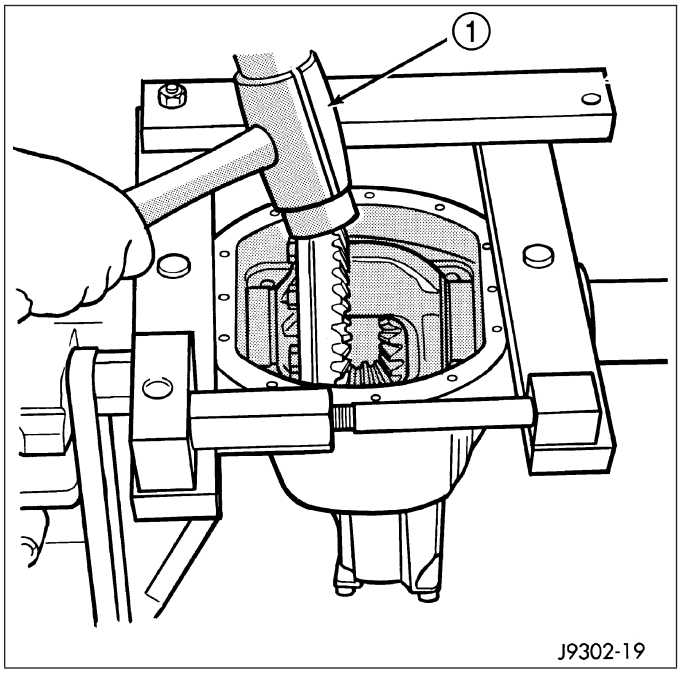
INSTALLATION

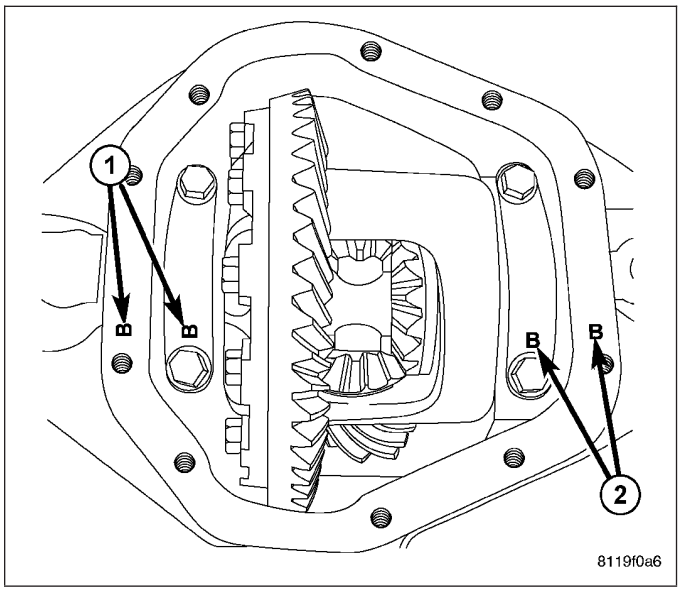
NOTE: If differential bearings or differential case are replaced, differential side bearing shim requirements may change.

1. Position Spreader W-129-B with tool dowel pins seated in the locating holes. Install hold down clamps and tighten the tool turnbuckle finger-tight.
2. Install Pilot Stud C-3288-B on left side of the differential housing and attach dial indicator to the pilot stud. Load the indicator plunger against the opposite side of the housing and zero dial indicator.
3. Spread housing while measuring the distance with the dial indicator.

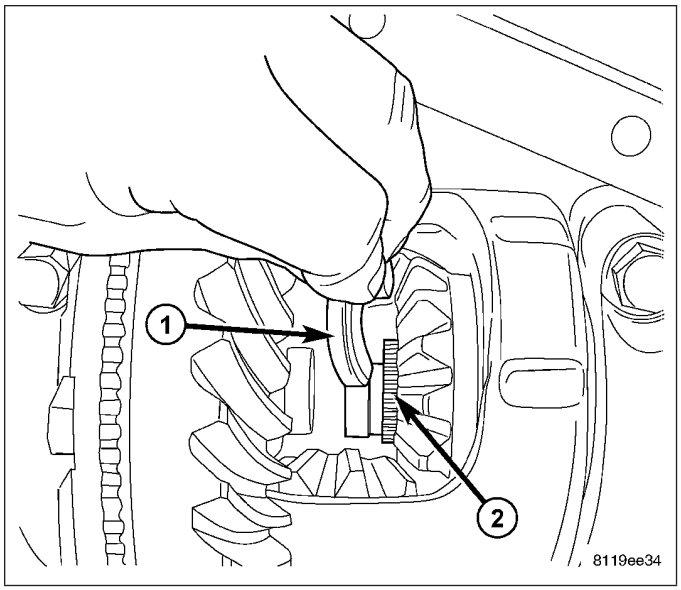
CAUTION: Never spread the housing over 0.50 mm (0.020 in). Failure to follow these instructions will damage the case.

4. Remove dial indicator.
5. Install differential into the housing. Tap differential case with a soft hammer (1) to ensure bearings are seated.
6. Remove spreader.
7. Install bearing caps in their original locations (1) (2) and tighten bearing cap bolts in a criss-cross pattern to 108 N·m (80 ft. lbs.).

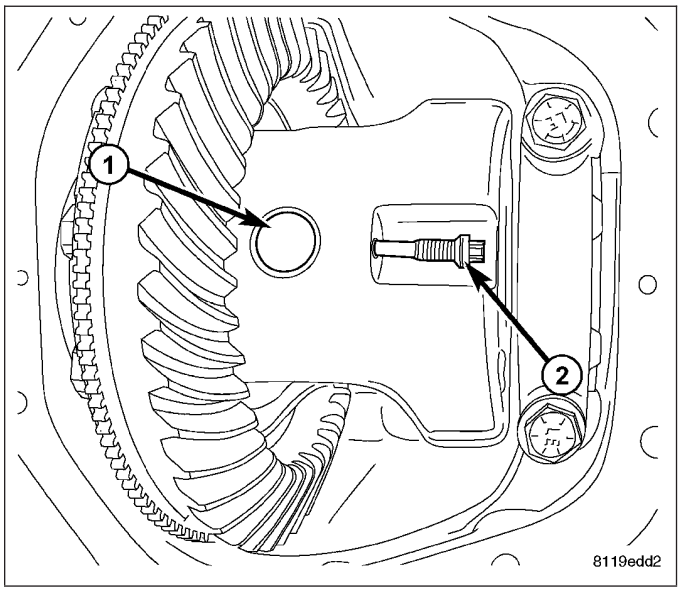




8. Install axle shafts.
9. Install axle shaft (1) C-locks (2).



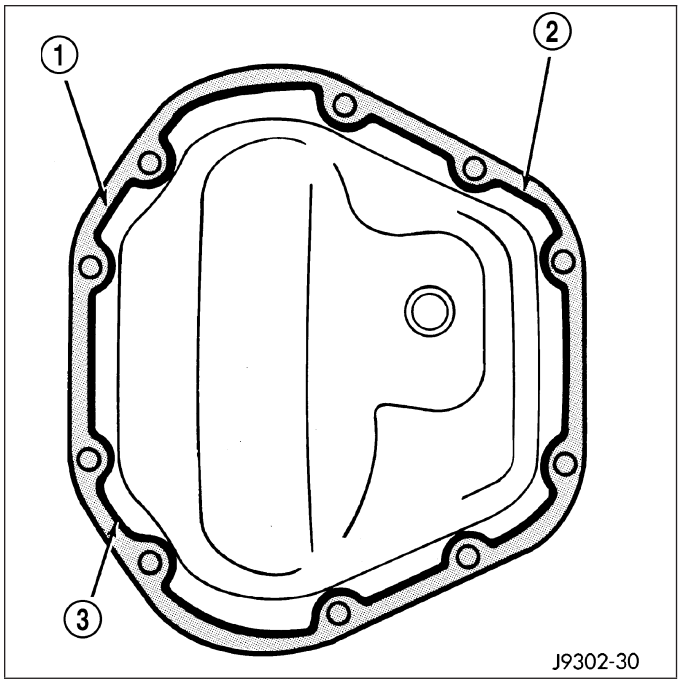
10. Install pinion mate shaft (1) and install mate shaft lock screw (2) and tighten to 27 N·m (20 ft. lbs.).



11. Apply a bead of orange Mopar™ Axle RTV sealant (2) or equivalent to the housing cover (1).

CAUTION: If housing cover is not installed within 3 to 5 minutes, the cover must be cleaned and new RTV applied. Failure to follow these instructions will result in a leak.

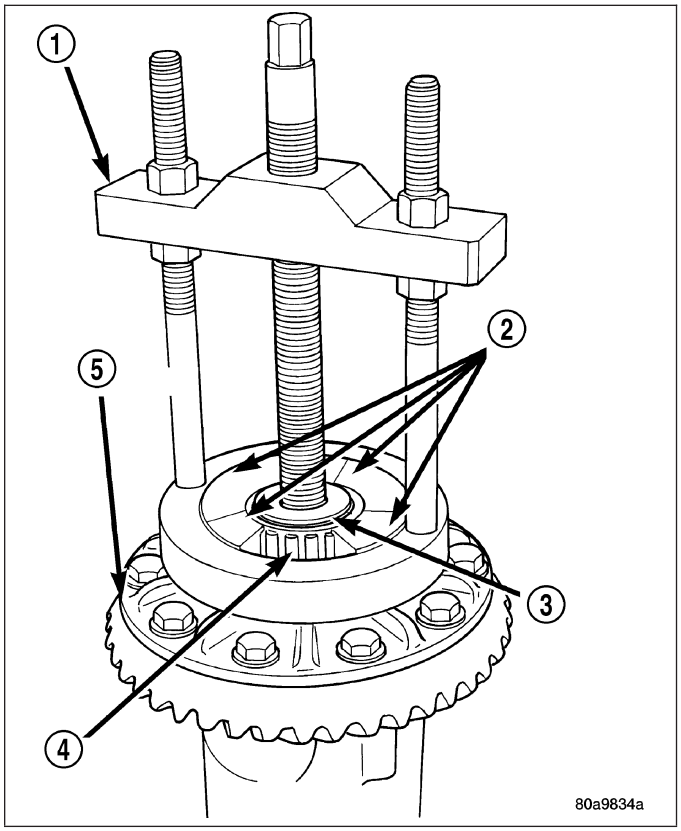
12. Install cover and tighten bolts in a criss-cross pattern to 48 N·m (35 ft. lbs.).
13. Fill differential lubricant to bottom of the fill plug hole.
14. Install fill hole plug and tighten to 27 N·m (20 ft. lbs.).



BEARINGS-DIFFERENTIAL CASE

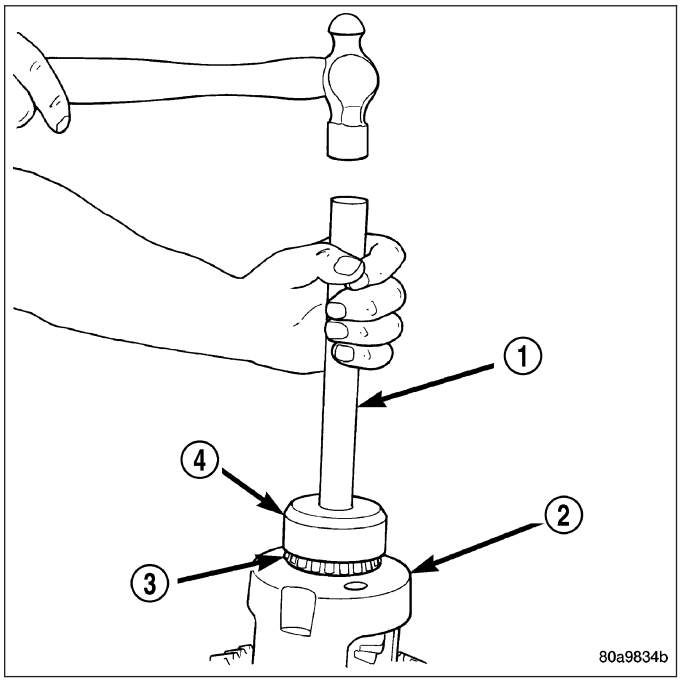
REMOVAL

1. Remove differential case from housing.
2. Remove bearings (4) from differential case (5) with Puller/Press C-293-PA (1), Adapters C-293-62 (2) and Disc 8139-2 (3).



INSTALLATION

1. Install differential side bearings (3) with installer C-4190 (4) and Handle C-4171 (1).
2. Install differential case (2) into the housing.

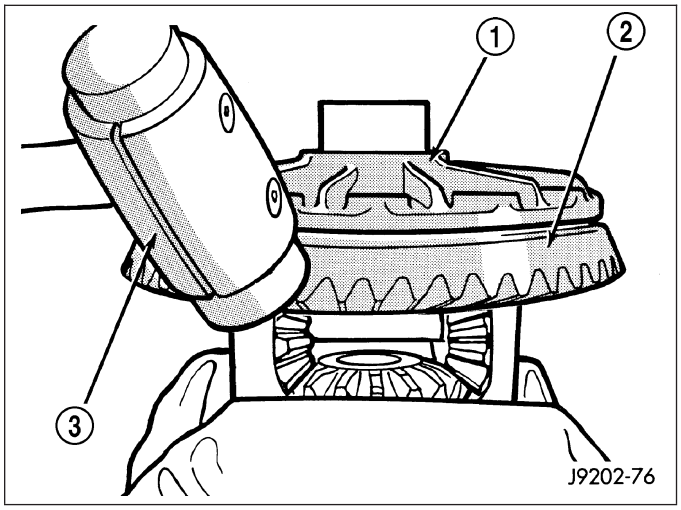


GEAR-PINION/RING

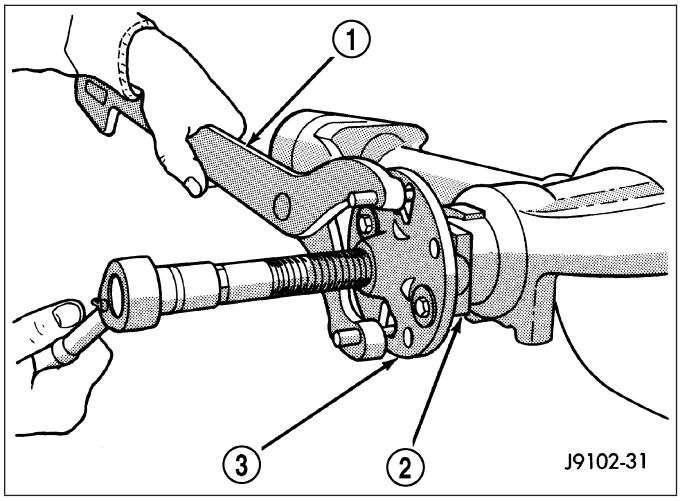
REMOVAL

NOTE: The ring and pinion gears are service as a matched set. Never replace ring gear without replacing the matched pinion gear.

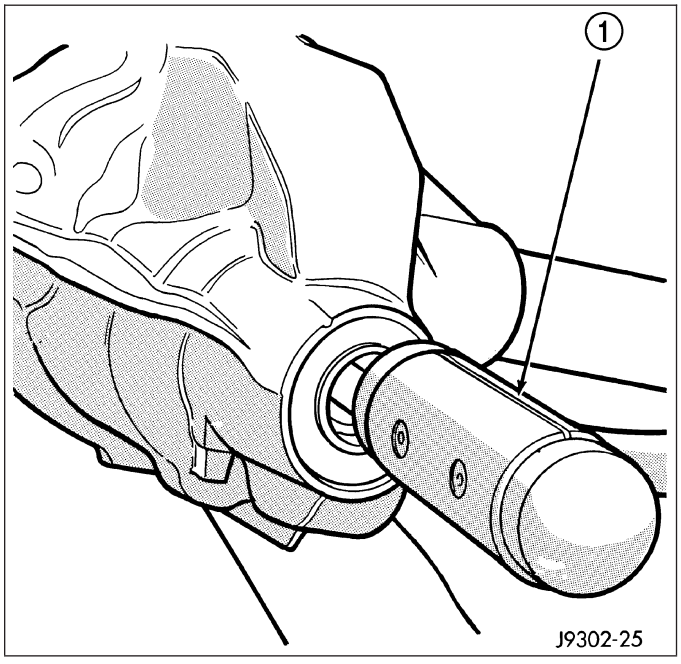
1. Remove differential from housing.
2. Place differential case (1) in a vise with soft metal jaw protectors.
3. Remove bolts holding ring gear to differential case.
4. Drive ring gear (2) from the differential case (1) with a soft hammer (3).
5. Remove exciter ring from the differential case by slowly tapping the ring with a brass drift.



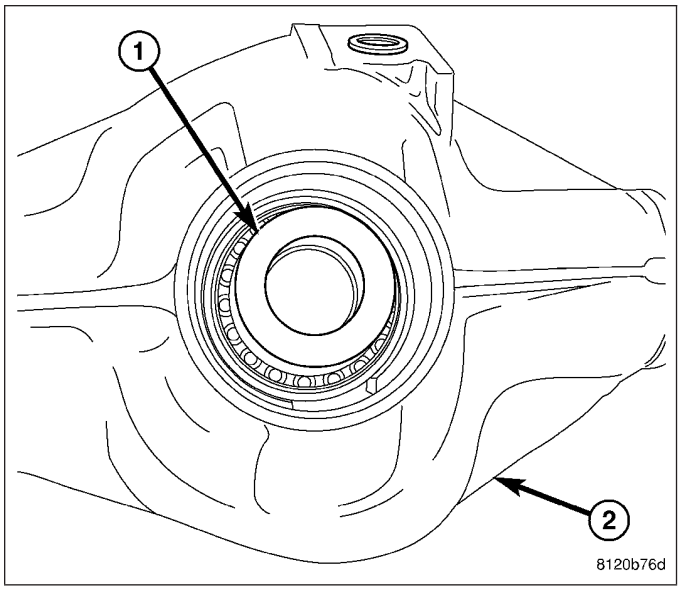
6. Hold yoke with Holder 6719A and remove pinion yoke nut and washer.
7. Remove pinion yoke (2) with Puller C-452 (3) and Wrench C-3281 (1).



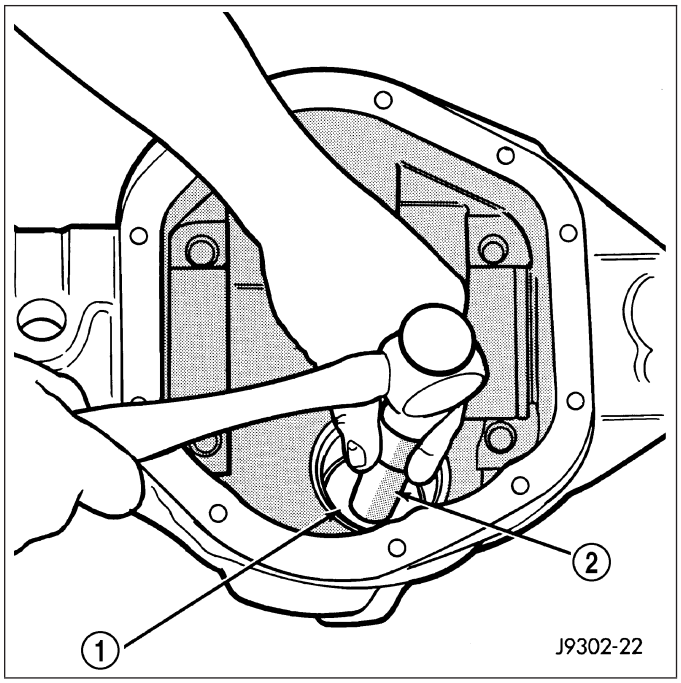
8. Remove pinion gear from housing with a soft hammer (1).



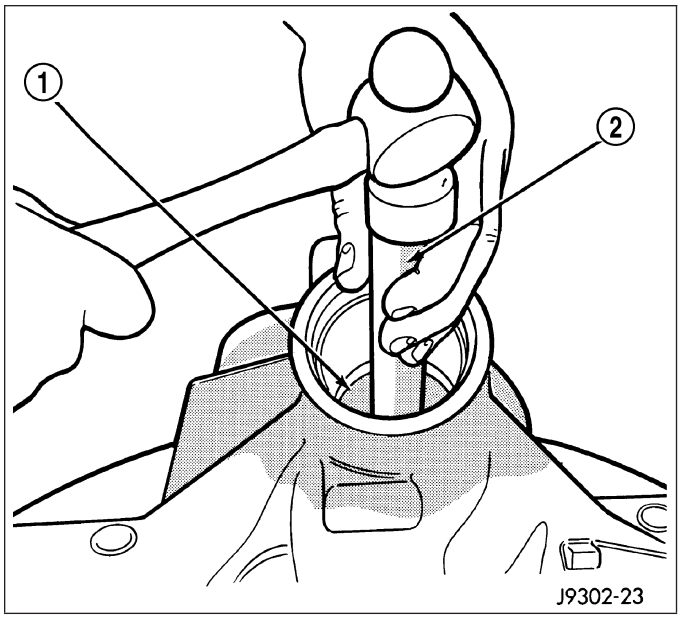
9. Remove pinion seal with a slide hammer or suitable pry bar.
10. Remove oil slinger (1) and front pinion bearing from housing (2).



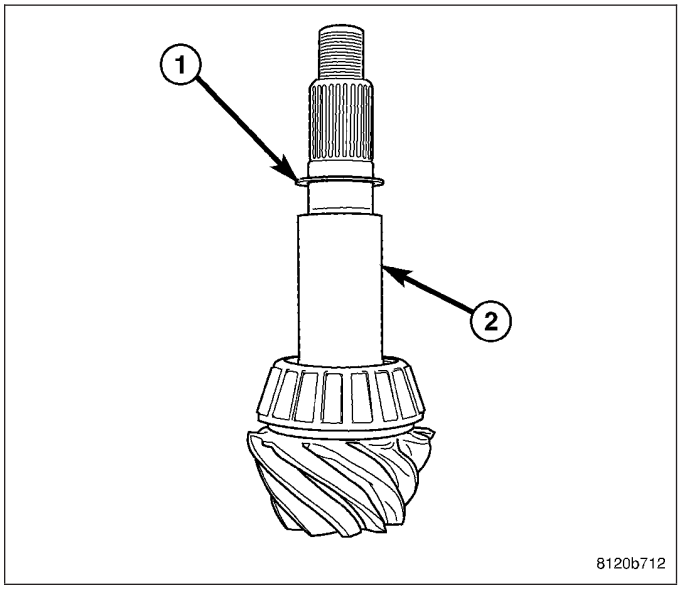
11. Remove front pinion bearing cup with Remover D-158 (1) and Handle C-4171(2).



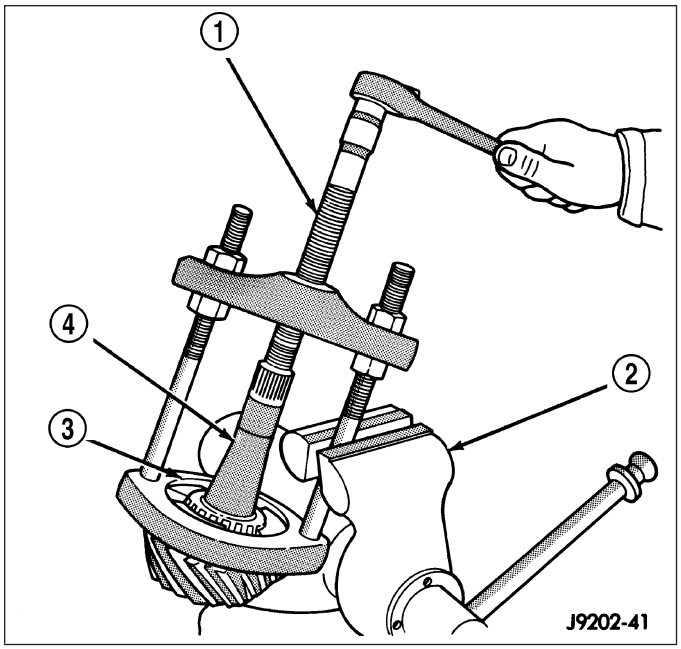
12. Remove rear bearing cup with Remover D-162 (1) and Handle C-4171 (2).



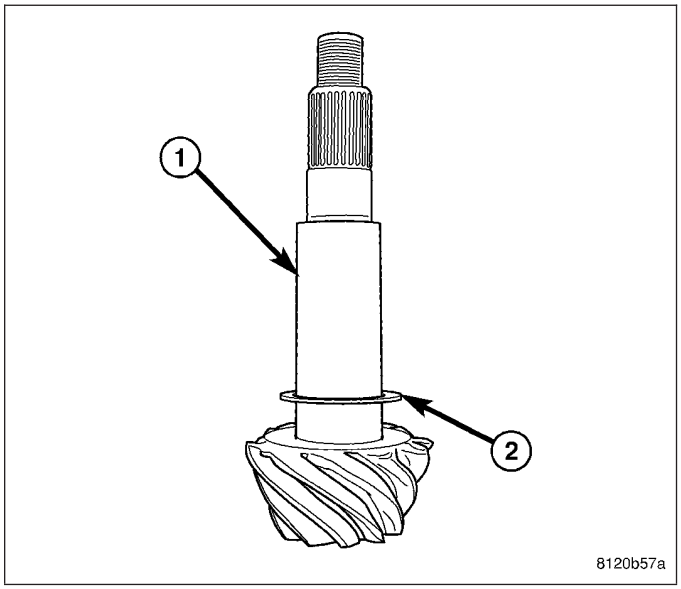
13. Remove pinion preload shims (1) from pinion shaft (2).



14. Remove rear pinion bearing with Puller/Press C-293-PA (1) and Adapters C-293-37 (3).

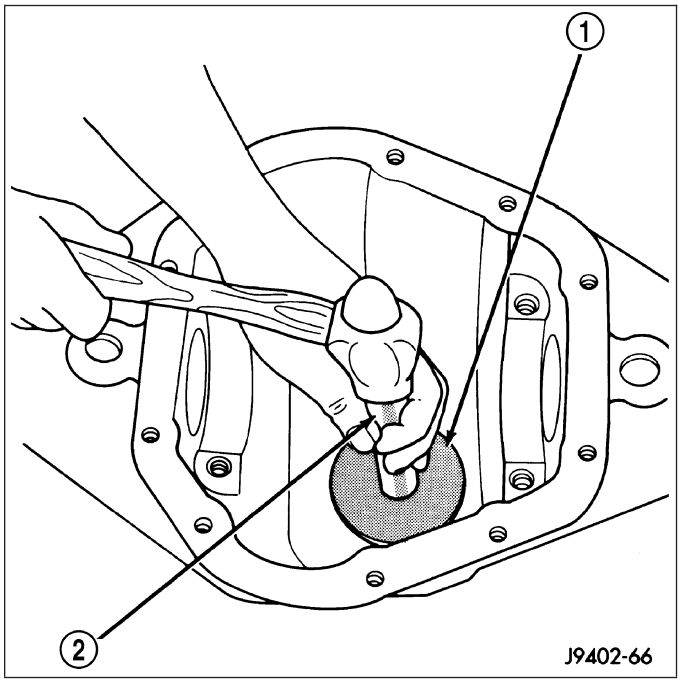


15. Remove pinion depth shims (2) from pinion shaft (1) and record shim thickness.

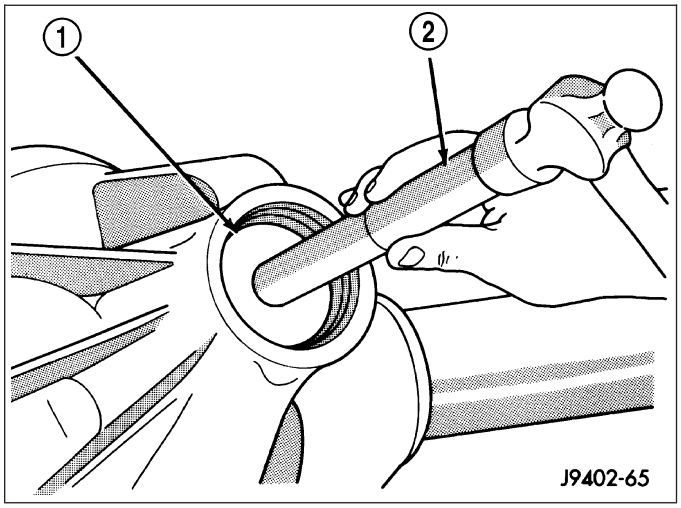


INSTALLATION

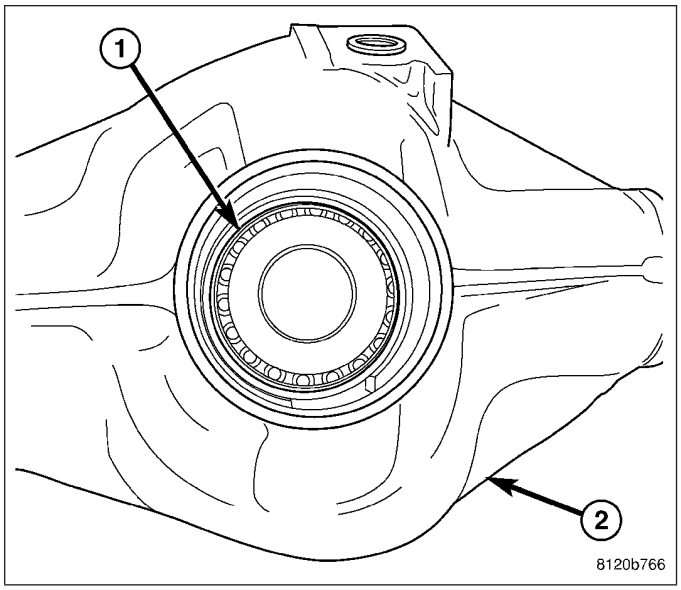
1. Install rear pinion bearing cup with Installer D-111 (1) and Handle C-4171 (2).



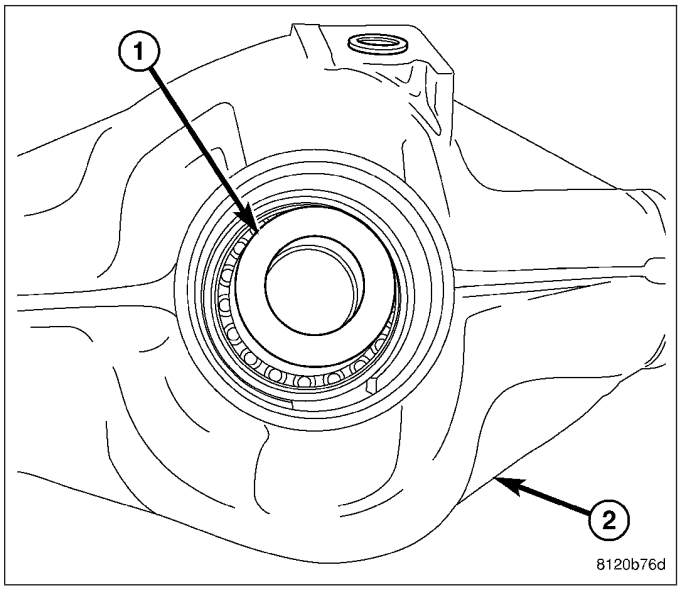
2. Install front pinion bearing cup with Installer D-146 (1) and Handle C-4171 (2).



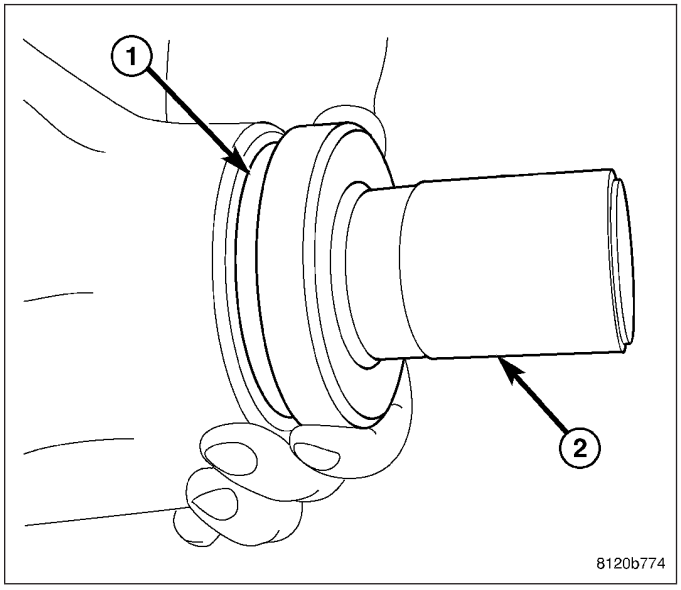
3. Install front pinion bearing (1) into housing (2).



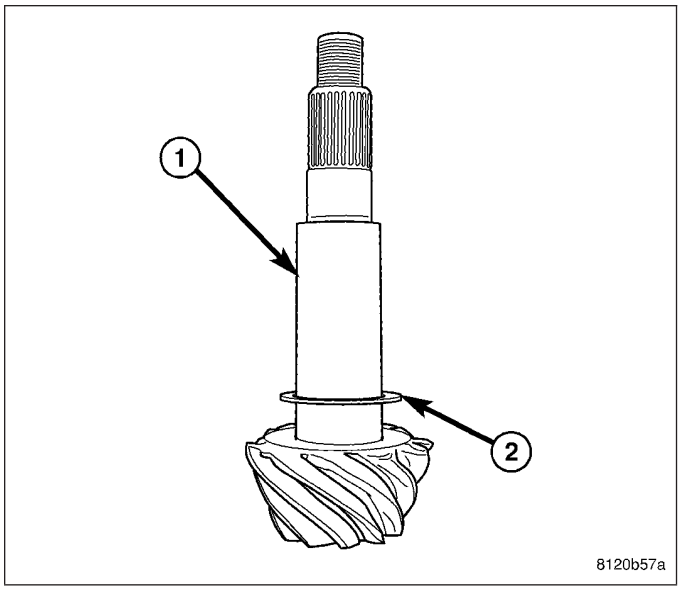
4. Install oil slinger (1) into housing (2).



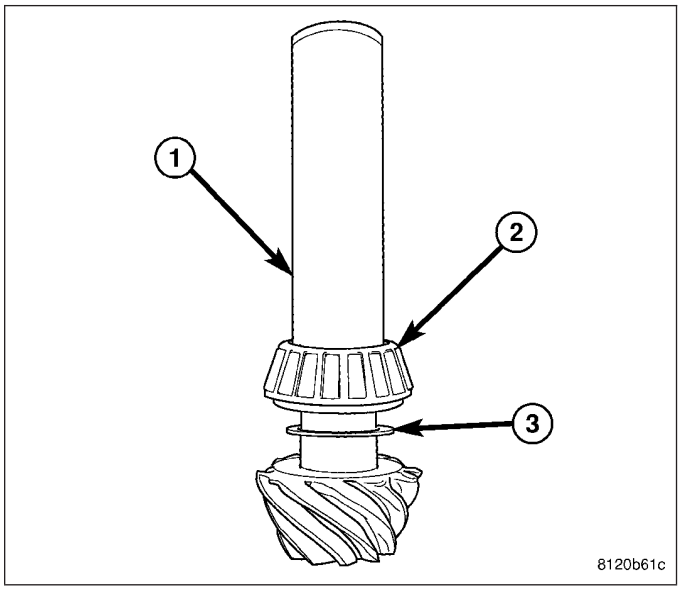
5. Apply a light coating of gear lubricant on the lip of pinion seal. Install **new** pinion seal (1) with Installer 9348 (2).



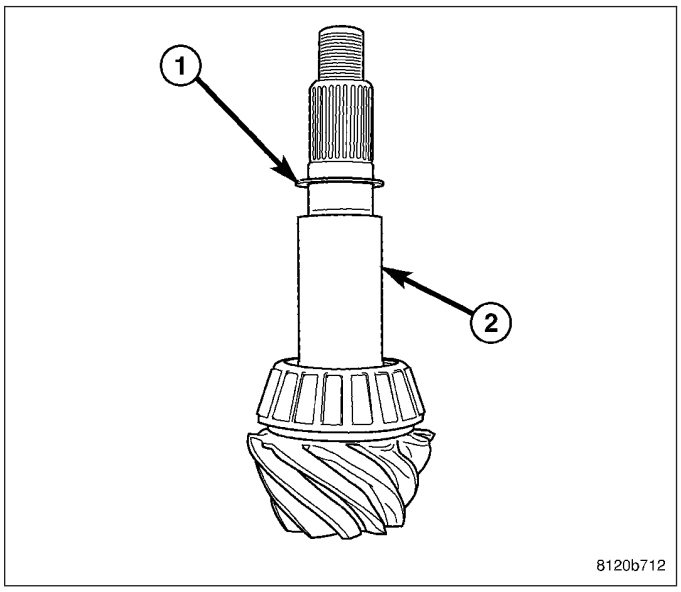
6. Install pinion depth shim (2) on pinion gear shaft (1).



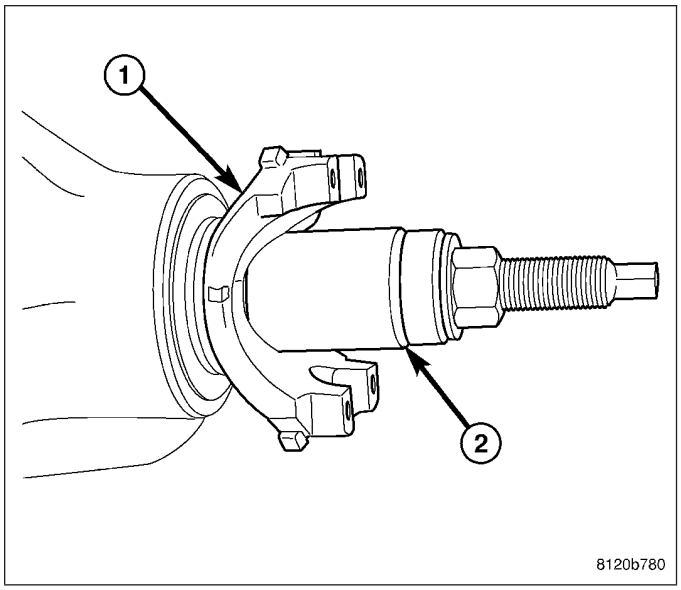
7. Install rear pinion bearing (2) on pinion gear with Installer 9347 (1) and a press.



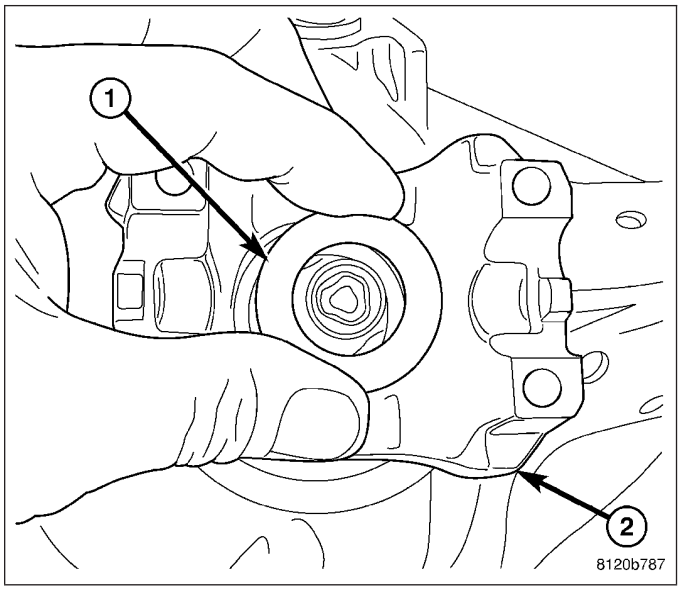
8. Install pinion preload shims (1) on pinion shaft (2).



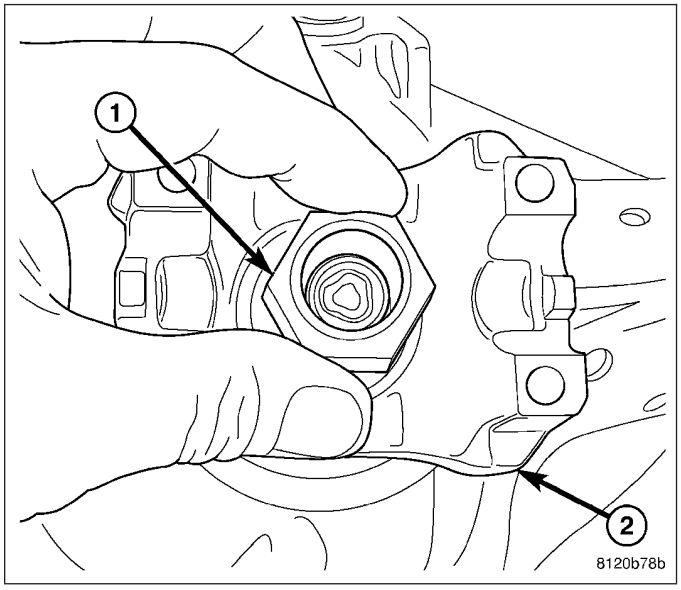
9. Install pinion gear in housing.
10. Install yoke (1) with Installer C-3718 (2).



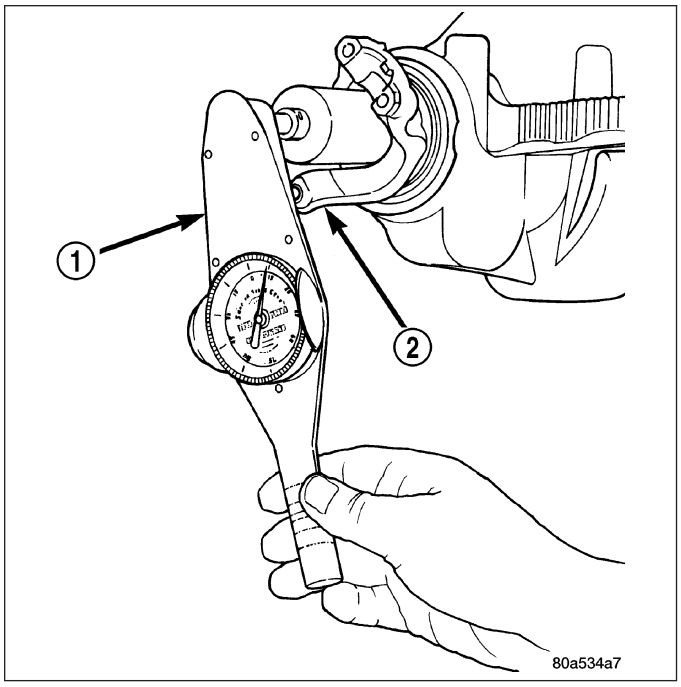
11. Install yoke (2) washer (1) on pinion.



12. Install **new** pinion nut (1).



13. Tighten pinion nut with Holder 6719A to 292 N·m (215 ft. lbs.) minimum. **Do not over-tighten.** Maximum torque is 447 N·m (330 ft. lbs.).
14. Tighten pinion nut with Holder 6719A and a torque wrench set at 447 N·m (330 ft. lbs.). Slowly tighten the nut in 6.8 N·m (5 ft. lbs.) increments until the pinion Torque To Rotate is achieved. Measure pinion Torque To Rotate with an inch pound torque wrench (1) frequently.
15. Pinion Torque To Rotate is:
    - Original Bearings - 1 to 3 N·m (10 to 20 in. lbs.)
    - New Bearings - 1.7 to 3.9 N·m (15 to 35 in. lbs.)
16. Invert differential case in the vise.



17. Position exciter ring on differential case slowly and evenly tap the exciter ring into position with a brass drift.
18. Install ring gear (3) and start two ring gear bolts (2) to provide case-to-ring gear bolt hole alignment.
19. Invert differential case in the vise.
20. Install **new** ring gear bolts and alternately tighten to 177 N·m (130 ft. lbs.).

CAUTION: Never reuse ring gear bolts. Failure to follow these instructions can fracture bolts causing damage.

21. Install differential into housing and verify backlash and gear contact pattern.
22. Measure Total Torque to Rotate with an inch pound torque wrench. This measurement is pinion Torque To Rotate plus 0.33 to 0.56 N·m (3 to 5 in. lbs.).

