

2018 DRIVELINE/AXLE

Rear Drive Axle - Equinox & Terrain

SPECIFICATIONS

FASTENER SPECIFICATIONS

Single Use Non-Threaded Fasteners/Components

NOTE: <i>All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.</i>
Application
Differential Carrier Bushing
Differential Drive Pinion Gear Seal
Rear Axle Shaft Seal
Torque Tube Gasket

Reusable Threaded Fastener Tightening Specifications

NOTE:
All fasteners listed in this table can be reused after removal.

Application	Specification
	Metric (English)
Clutch Control Module Bolts/Screws	10 N.m (89 lb in)
Differential-to-Cradle Mount Bolts/Nuts	100 N.m (74 lb ft)
Differential Clutch Oil Drain Plug	12 N.m (106 lb in)
Differential Clutch Oil Fill Plug	12 N.m (106 lb in)
Lubricant Drain Plug	35 N.m (26 lb ft)
Lubricant Fill Plug	35 N.m (26 lb ft)
Torque Tube Bracket-to-Body Bolt	160 N.m (118 lb ft)
Torque Tube-to-Differential Bolts	29 N.m (21 lb ft)

APPROXIMATE FLUID CAPACITIES

Application	Specification	
	Metric	English
Axle Ratio	2.73	
Differential Lubricant Fill Quantity	0.75 liters	0.79 quarts
Differential Clutch Oil Fill Quantity	0.4 liters	0.42 quarts

ADHESIVES, FLUIDS, LUBRICANTS AND SEALERS

Application	Type of Material	GM Part Number	
		United States	Canada
Differential Lubricant	Dexron LS Hypoid Fluid	88862624	88862625
Differential Clutch Oil	Pentosin CHF-11S	88901975	88901976

SCHEMATIC WIRING DIAGRAMS

REAR AXLE WIRING SCHEMATICS

Rear Differential Clutch Control Module (F48)

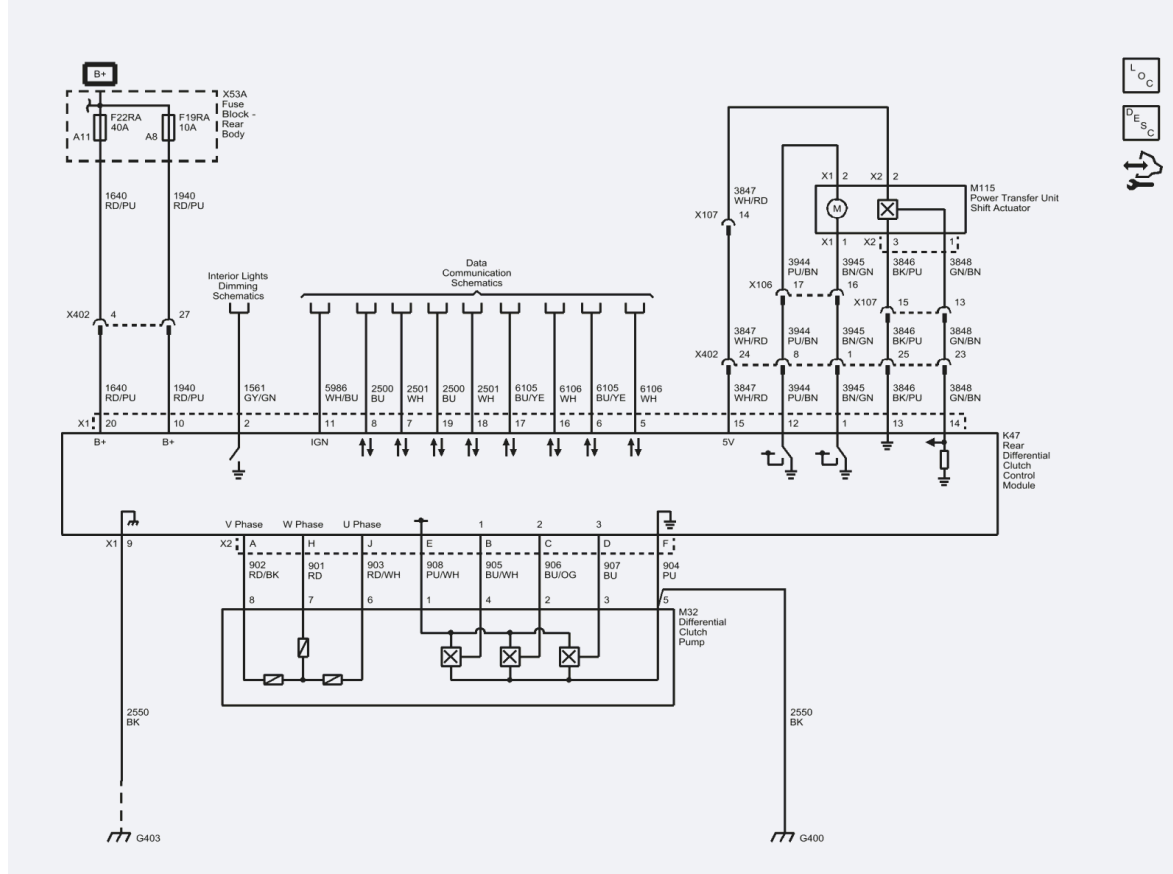


Fig. 1: Rear Differential Clutch Control Module (F48)
Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

DTC C0407: DIFFERENTIAL OIL PUMP MOTOR

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC C0407

Differential Oil Pump Motor

For symptom byte information, refer to [Symptom Byte List](#)

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Control Circuit Terminal 6	-	-	-	C0407 1B
Control Circuit Terminal 7	C0407 02	C0407 04	C0407 01	C0407 1B
Control Circuit Terminal 8	C0407 02	C0407 04	C0407 01	C0407 1B

Circuit/System Description

The pressure in the hydraulic circuit is controlled by the differential clutch pump. The differential clutch pump utilizes a brushless motor and a radial piston pump. The motor in the differential clutch pump is controlled utilizing a bi-directional control that applies power and ground to each control circuit. By reversing the polarity of the motor, the differential clutch pump is able to spin both clockwise and counter-clockwise as a means to increase and decrease pressure in the system. The differential clutch pump is constantly increasing or decreasing the pressure in the system according to the torque request signal as controlled by the rear differential clutch control module.

Conditions for Running the DTC

C0407 01, C0407 02, C0407 1B, C0407 5A

- The engine is running.
- Battery voltage is between 9-16 V.
- The engine speed is above 400 rpm.

C0407 04

- The engine is running.
- The starter motor commanded on is false.
- Battery voltage is between 9-16 V.
- The engine speed is above 400 rpm.

C0407 0B, C0407 61, C0407 64

- The engine is running.
- The engine speed is above 400 rpm.

Conditions for Setting the DTC

C0407 01

When voltage for motor phase U, V, and W is above 1.0 V.

C0407 02

When voltage for motor phase U, V, and W is below 7.0 V.

C0407 04

When voltage for motor phase U, V, and W is below 7.0 V.

C0407 0B

The bridge driver circuit detects shunt voltage above 0.16 V.

C0407 1B

A rear differential clutch control module has detected a short between U, V, and W phases.

C0407 5A

The rear differential clutch control module detects implausible voltage reading.

C0407 61

The rear differential clutch control module determines the differential clutch pump is stuck.

C0407 64

The rear differential clutch control module determines the differential clutch pump is slipping.

Action Taken When the DTC Sets

- Electronic limited slip is disabled for the duration of the key cycle.
- The AWD SERVICE message is displayed in the driver information center.

Conditions for Clearing the DTC

- The condition for the DTC is no longer present.
- The DTC is not detected in 40 consecutive ignition cycles.

Reference Information

[Rear Axle Wiring Schematics](#)

Connector End View Reference

[COMPONENT CONNECTOR END VIEWS - INDEX](#)

Description and Operation

[Rear Drive Axle Description and Operation](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

[Control Module References](#) for scan tool information

[Circuit/System Verification](#)

1. Verify that DTC C0407 with symptom byte 01, 02 or 04 is not set.
 - **If the DTC is set**

Refer to Circuit/System Testing.
 - **Go to next step: If the DTC is not set**
2. Verify the differential clutch oil level is correct. Refer to [Rear Axle Lubricant Level Inspection](#).
 - **If the differential clutch fluid level is below specifications**
 1. Verify the rear axle lubricant level is correct. Refer to [Rear Axle Lubricant Level Inspection](#).

NOTE: If the vehicle is unable to complete the rear differential hydraulic system service fill/bleed procedure, the M32 Differential Clutch Pump may have been damaged by the low differential clutch fluid level.

- If the rear axle lubricant level is above specifications, the differential clutch may be leaking differential clutch oil into the rear axle lubricant. Inspect for and correct any internal fluid leaks between the differential clutch oil and the rear axle lubricant. Refer to [Rear Differential Carrier Leak Diagnosis](#). After the repair has been completed, perform the [Rear Differential Hydraulic System Service Fill/Bleed](#).
 - If the rear axle lubricant level is below specifications, inspect for fluid leaks and fill as required.
 - If the rear axle lubricant level is correct.
2. Verify there are no external differential clutch oil leaks.
 - If any external differential clutch oil leaks are observed, repair as necessary and perform the [Rear Differential Hydraulic System Service Fill/Bleed](#).
 - If there are there are no external differential clutch oil leaks.
 3. Perform the [Rear Differential Hydraulic System Service Fill/Bleed](#) procedure.
 4. Verify the vehicle is able to complete the rear differential hydraulic system service fill/bleed procedure.
 - If the vehicle is unable to complete the rear differential hydraulic system service fill/bleed procedure, test or replace the M32 Differential Clutch Pump.
 - If the vehicle is able to complete the rear differential hydraulic system service fill/bleed procedure.
 5. Clear all DTCs.
 6. Verify the DTC does not set while operating the vehicle within the conditions for running the DTC.

- If the DTC sets, test or replace the M32 Differential Clutch Pump.
- If the DTC does not set.

7. All OK.

- **Go to next step: If the differential clutch fluid level is correct**

3. Perform the **Rear Differential Hydraulic System Service Fill/Bleed**.

4. Verify the vehicle is able to complete the rear differential hydraulic system service fill/bleed procedure.

- If the vehicle is unable to complete the rear differential hydraulic system service fill/bleed procedure, perform the **Rear Differential Hydraulic System Service Fill/Bleed** two additional times. If the vehicle is unable to complete the rear differential hydraulic system service fill/bleed procedure after three attempts, replace the M32 Differential Clutch Pump.
- If the vehicle is able to complete the rear differential hydraulic system service fill/bleed procedure.

5. All OK.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the M32 Differential Clutch Pump, Ignition ON/Vehicle in Service Mode.

2. Test for 3.3 - 5.3 V AC between the control circuit terminal 8 and ground.

- **If less than 3.3 V AC**

1. Ignition OFF, disconnect the X2 harness connector at the K47 Rear Differential Clutch Control Module.

2. Test for infinite resistance between the control circuit terminal 8 and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

3. Test for less than 2 Ω in the control circuit terminal 8 end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K47 Rear Differential Clutch Control Module.

- **If greater than 5.3 V AC**

1. Ignition OFF, disconnect the X2 harness connector at the K47 Rear Differential Clutch Control Module, Ignition ON/Vehicle in Service Mode.

2. Test for less than 1 V between the control circuit terminal 8 and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K47 Rear Differential Clutch Control Module.

- **Go to next step: If between 3.3 - 5.3 V AC**

3. Test for 1.2 - 3.7 V between the control circuit terminal 7 and ground.

- **If less than 1.2 V**

1. Ignition OFF, disconnect the X2 harness connector at the K47 Rear Differential Clutch Control Module.

2. Test for infinite resistance between the control circuit terminal 7 and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

3. Test for less than 2 Ω in the control circuit terminal 7 end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K47 Rear Differential Clutch Control Module.

- **If greater than 3.7 V**

1. Ignition OFF, disconnect the X2 harness connector at the K47 Rear Differential Clutch Control Module, Ignition ON/Vehicle in Service Mode.

2. Test for less than 1 V between the control circuit terminal 7 and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K47 Rear Differential Clutch Control Module.

- **Go to next step: If between 1.2 - 3.7 V**

4. Test for 6.4 - 6.8 V between the control circuit terminal 6 and ground.

- **If less than 6.4 V**

1. Ignition OFF, disconnect the X2 harness connector at the K47 Rear Differential Clutch Control Module.

2. Test for infinite resistance between the control circuit terminal 6 and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

3. Test for less than 2 Ω in the control circuit terminal 6 end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K47 Rear Differential Clutch Control Module.

• **If greater than 6.8 V**

1. Ignition OFF, disconnect the X2 harness connector at the K47 Rear Differential Clutch Control Module, Ignition ON/Vehicle in Service Mode.

2. Test for less than 1 V between the control circuit terminal 6 and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K47 Rear Differential Clutch Control Module.

• **Go to next step: If between 6.4 - 6.8 V**

5. Ignition OFF, disconnect the scan tool and disconnect the harness connector at the M32 Differential Clutch Pump.

6. Test for greater than 25 Ω between the following control circuit terminals listed below.

- Control Circuit Terminal 6
- Control Circuit Terminal 7
- Control Circuit Terminal 8

• **If 25 Ω or less**

1. Disconnect the X2 harness connector at the K47 Rear Differential Clutch Control Module.

2. Test for infinite resistance between the three control circuits.

- If less than infinite resistance, repair the short between the three circuits.
- If infinite resistance, replace the K47 Rear Differential Clutch Control Module.

• **Go to next step: If greater than 25 Ω**

7. Test or replace the M32 Differential Clutch Pump.

8. Operate the vehicle under the conditions for setting the DTC, the DTC should not set.

• **If the DTC sets**

Replace the K47 Rear Differential Clutch Control Module.

• **Go to next step: If the DTC does not set**

9. All OK.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair: [Diagnostic Repair Verification](#)

- [Differential Replacement](#) for M32 Differential Clutch Pump.
- For control module replacement, programming and setup, refer to [Control Module References](#)

DTC C122F: REAR DIFFERENTIAL CLUTCH SYSTEM PERFORMANCE

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provide an overview of each diagnostic category.

DTC Descriptors

DTC C122F

Rear Differential Clutch System Performance

For symptom byte information, refer to [Symptom Byte List](#) .

Circuit/System Description

The rear differential clutch control module detects a series of overheat events that have occurred in the rear differential clutch system.

Conditions for Running the DTC

- The engine is running.
- The engine speed is above 400 rpm.

Conditions for Setting the DTC

C122F 54

The rear differential clutch control module detects a series of overheat events on the clutch.

Action Taken When the DTC Sets

- The electronic limited slip control is disabled.
- The AWD SERVICE message is displayed in the driver information center.

Conditions for Clearing the DTC

- The condition for the DTC is no longer present.
- The DTC is not detected in 40 ignition cycles.

Diagnostic Aids

Excessive differentiation (wheel/tire slip) can cause high temperatures in the rear drive axle and DTC C122F may set.

Reference Information

Schematic Reference

Rear Axle Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Rear Drive Axle Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify DTC C122F is not set.
 - **If the DTC is set**
 1. Ignition OFF.
 2. Allow 30 min for the clutch to cool completely down.
 3. Perform key cycle, ignition OFF then ON.

4. Clear DTC.
5. Verify DTC C122F is not set.
 - If the DTC is set, replace K47 Rear Differential Clutch Control Module.
 - If the DTC is not set.
6. All OK.
 - **Go to next step: If the DTC is not set**
3. All OK.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair: [Diagnostic Repair Verification](#)

For control module replacement, programming and setup, refer to [Control Module References](#)

DTC C1244, C1245 OR C124B: AWD OIL PUMP MOTOR SPEED SENSOR SUPPLY CIRCUIT

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

DTC C1244

AWD Oil Pump Motor Speed Sensor Supply Circuit Low Voltage

DTC C1245

AWD Oil Pump Motor Speed Sensor Supply Circuit High Voltage

DTC C124B

AWD Oil Pump Motor Speed Sensor Signal Circuit Erratic

For symptom byte information, refer to [Symptom Byte List](#)

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Voltage	C1244 00	C0407 61	C1245 00	-
Signal Circuit Terminal 2	C0407 61	C0407 61	C124B 00	C124B 00
Signal Circuit Terminal 3	C0407 61	C0407 61	C0407 61	C124B 00
Signal Circuit Terminal 4	C0407 61	C0407 61	C0407 61	C124B 00
Low Reference	-	C124B 00	-	-

Circuit/System Description

The rear differential clutch control module monitors the speed of the AWD oil pump motor by using a hall effect sensor which is internal to the differential clutch pump. The sensor is a transducer that varies its output voltage in response to a magnetic field.

Conditions for Running the DTC

C1244 00, C1245 00, C124B 00

- The engine is running.
- Battery voltage is between 9-16 V.
- The engine speed is above 400 rpm.

Conditions for Setting the DTC

C1244 00

The AWD oil pump motor speed sensor supply circuit voltage is below 1.0 V.

C1245 00

The AWD oil pump motor speed sensor supply circuit voltage is above 6.0 V.

C124B 00

A plausibility error is detected on the AWD oil pump motor speed sensor signal circuit.

Action Taken When the DTC Sets

- Electronic limited slip is disabled for the duration of the key cycle.
- The AWD SERVICE message is displayed in the driver information center.

Conditions for Clearing the DTC

- The condition for the DTC is no longer present.
- The DTC is not detected in 40 consecutive ignition cycles.

Reference Information

Schematic Reference

Rear Axle Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Rear Drive Axle Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the M32 Differential Clutch Pump. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the low reference circuit terminal 5 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF, disconnect the X2 harness connector at the K47 Rear Differential Clutch Control Module.
 2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K47 Rear Differential Clutch Control Module.
 - **Go to next step: If less than 10 Ω**
3. Ignition ON/Vehicle in Service Mode.
4. Test for 4.8 - 5.2 V between the 5 V reference circuit terminal 1 and ground.
 - **If less than 4.8 V**
 1. Ignition OFF, disconnect the X2 harness connector at the K47 Rear Differential Clutch Control Module.

2. Test for infinite resistance between the 5 V reference circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

3. Test for less than 2 Ω in the 5 V reference circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K47 Rear Differential Clutch Control Module.

• **If greater than 5.2 V**

1. Ignition OFF, disconnect the X2 harness connector at the K47 Rear Differential Clutch Control Module, Ignition ON/Vehicle in Service Mode.

2. Test for less than 1 V between the 5 V reference circuit and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K47 Rear Differential Clutch Control Module.

• **Go to next step: If between 4.8 - 5.2 V**

5. Test for 4.4 - 4.8 V between the signal circuit terminals listed below and ground.

- Signal Circuit Terminal 2
- Signal Circuit Terminal 3
- Signal Circuit Terminal 4

• **If less than 4.4 V**

1. Ignition OFF, disconnect the X2 harness connector at the K47 Rear Differential Clutch Control Module.

2. Test for infinite resistance between the appropriate signal circuit terminal and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

3. Test for less than 2 Ω in the appropriate signal circuit terminal end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K47 Rear Differential Clutch Control Module.

• **If greater than 4.8 V**

1. Ignition OFF, disconnect the X2 harness connector at the K47 Rear Differential Clutch Control Module, Ignition ON/Vehicle in Service Mode.

2. Test for less than 1 V between the appropriate signal circuit terminal and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K47 Rear Differential Clutch Control Module.

• **Go to next step: If between 4.4 - 4.8 V**

6. Test or replace the M32 Differential Clutch Pump.

7. Operate the vehicle under the conditions for setting the DTC, the DTC should not set.

• **If the DTC sets**

Replace the K47 Rear Differential Clutch Control Module.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Differential Replacement](#) for M32 Differential Clutch Pump.
- [Control Module References](#) for control module replacement, programming and setup.

DTC C1260, C1261, C1262, C1263, C1264, C1265, C1266, C1267: POWER TRANSFER UNIT CLUTCH POSITION SENSOR

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

DTC C1260 00

Power Transfer Unit Clutch Position Sensor Circuit High Voltage

DTC C1261 00

Power Transfer Unit Clutch Position Sensor Circuit Low Voltage

DTC C1262 00

Power Transfer Unit Clutch Position Sensor Circuit

DTC C1263 00

Power Transfer Unit Clutch Position Sensor Signal Circuit High

DTC C1264 00

Power Transfer Unit Clutch Position Sensor Signal Circuit Low

DTC C1265 00

Power Transfer Unit Clutch Position Sensor Signal Circuit

DTC C1266 00

Power Transfer Unit Clutch Position Sensor Signal Circuit Incorrect

DTC C1267 00

Power Transfer Unit Clutch Position Sensor Signal Out Of Range

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
5 V Reference	C1261 00	C1262 00	C1260 00	-
Signal	C1264 00	C1265 00	C1263 00	C1266 00 C1267 00
Low Reference	-	C1262 00	-	-

Circuit/System Description

The power transfer unit shift actuator sensor is to monitor the position of the power transfer unit actuator. The sensor is a three wire circuit that consists of a 5 V reference, low reference, and signal low circuit.

Conditions for Running the DTC

The engine is running.

Conditions for Setting the DTC**C1260 00**

The rear differential clutch control module detects a short to battery on the power transfer unit shift actuator position sensor circuit.

C1261 00

The rear differential clutch control module detects a short to ground on the power transfer unit shift actuator position sensor circuit.

C1262 00

The rear differential clutch control module detects a open on the power transfer unit shift actuator position sensor circuit.

C1263 00

The rear differential clutch control module detects a short to battery on the power transfer unit shift actuator position sensor circuit.

C1264 00

The rear differential clutch control module detects a short to ground on the power transfer unit shift actuator position sensor circuit.

C1265 00

The rear differential clutch control module detects a open on the power transfer unit shift actuator position sensor circuit.

C1266 00

The rear differential clutch control module detects that the power transfer unit shift actuator position sensor signal has incorrect frequency.

C1267 00

The rear differential clutch control module detects that the power transfer unit shift actuator position sensor signal is out of range.

Action Taken When the DTC Sets

One or more of the following actions may occur:

- The electronic limited slip system is disabled for the duration of the key cycle.
- The AWD SERVICE message is displayed in the driver information center.

Conditions for Clearing the DTC

- The condition for the DTC is no longer present.
- The DTC is not detected in 40 consecutive drive cycles.

Reference Information

Schematic Reference

Rear Axle Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Rear Drive Axle Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the X2 harness connector at the M115 Power Transfer Unit Shift Actuator. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the low reference circuit terminal 3 and ground.
 - **If 10 Ω or greater**

1. Ignition OFF, disconnect the X1 harness connector at the K47 Rear Differential Clutch Control Module.
2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K47 Rear Differential Clutch Control Module.
 - **Go to next step: If less than 10 Ω**
3. Ignition ON/Vehicle In Service Mode.
4. Test for 4.8 - 5.2 V between the 5 V reference circuit terminal 2 and ground.
 - **If less than 4.8 V**
 1. Ignition OFF, disconnect the X1 harness connector at the K47 Rear Differential Clutch Control Module.
 2. Test for infinite resistance between the 5 V reference circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the 5 V reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K47 Rear Differential Clutch Control Module.
 - **If greater than 5.2 V**
 1. Ignition OFF, disconnect the X1 harness connector at the K47 Rear Differential Clutch Control Module, ignition ON/Vehicle In Service Mode.
 2. Test for less than 1 V between the 5 V reference circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K47 Rear Differential Clutch Control Module.
 - **Go to next step: If between 4.8 - 5.2 V**
5. Ignition ON/Vehicle In Service Mode.
6. Test for 4.6 - 5.6 V between the signal circuit terminal 1 and ground.
 - **If less than 4.6 V**
 1. Ignition OFF, disconnect the X1 harness connector at the K47 Rear Differential Clutch Control Module.
 2. Test for infinite resistance between the signal circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K47 Rear Differential Clutch Control Module.
 - **If greater than 5.6 V**
 1. Ignition OFF, disconnect the X1 harness connector at the K47 Rear Differential Clutch Control Module, ignition ON/Vehicle In Service Mode.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K47 Rear Differential Clutch Control Module.
 - **Go to next step: If between 4.6 - 5.6 V**
7. Test or replace the M115 Power Transfer Unit Shift Actuator.
8. Operate the vehicle under the conditions for setting the DTC, the DTC should not set.
 - **If the DTC sets**

Replace the K47 Rear Differential Clutch Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Power Transfer Unit Case Replacement (MNH Transmission with LYX Engine) Power Transfer Unit Case Replacement (M3D Transmission with LTG Engine) Power Transfer Unit Case Replacement (MHG Transmission with LH7 Engine)** for M115 Power Transfer Unit Shift Actuator
- **Control Module References** for control module replacement, programming and setup.

DTC C1282: REAR DRIVE CLUTCH CLASSIFICATION NOT PROGRAMMED

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provide an overview of each diagnostic category.

DTC Descriptors

DTC C1282

Rear Drive Clutch Classification Not Programmed

For symptom byte information, refer to [Symptom Byte List](#).

Circuit/System Description

The rear differential clutch control module detects if the initial clutch classification calibration procedure has not been performed or has not been performed incorrectly. No external circuit diagnosis is involved.

Conditions for Running the DTC

- The engine is running.
- The engine speed is above 400 rpm.

Conditions for Setting the DTC

C1282 00

The rear differential clutch control module detects that the clutch classification has not been programmed.

Action Taken When the DTC Sets

- The electronic limited slip control is disabled.
- The AWD SERVICE message is displayed in the driver information center.

Conditions for Clearing the DTC

- The condition for the DTC is no longer present.
- The DTC is not detected in 40 consecutive ignition cycles.

Diagnostic Aids

- The clutch service calibration will be the alphanumeric characters of the supplier assigned unique serial number found etched/stamped on the clutch pack housing. The characters must be entered exactly how it appears etched/stamped on the clutch pack housing. The calibration procedure is done through SPS programming and setup.

NOTE: When entering the alphanumeric characters into the scan tool, be sure to enter the characters as seen.

-
- For the single clutch system (RPO F46), there is only one clutch calibration alphanumeric code.
- For the twin clutch system (RPO G99), there are two clutch calibration alphanumeric code. Both codes must be entered during the calibration procedure for the right and left clutch respectively.

Reference Information

Schematic Reference

[Rear Axle Wiring Schematics](#)

Connector End View Reference

Description and Operation

Rear Drive Axle Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify DTC C1282 is not set.
 - **If the DTC is set**
 1. Perform the rear differential clutch classification calibration procedure. Refer to **K47 Rear Differential Clutch Control Module: Programming and Setup** .
 2. Verify the Rear Differential Clutch Factory Calibration parameter has stored the value used during the rear differential clutch classification calibration procedure.
 3. Perform key cycle, ignition OFF then ON.
 - If the Rear Differential Clutch Factory Calibration parameter has not stored the value used during the rear differential clutch classification calibration procedure, replace the K47 Rear Differential Clutch Control Module.
 - If the Rear Differential Clutch Factory Calibration parameter has stored the value used during the rear differential clutch classification calibration procedure.
 - 4. Verify DTC C1282 is not set.
 - If the DTC is set, replace the K47 Rear Differential Clutch Control Module.
 - If the DTC is not set
 - 5. All OK.
 - **Go to next step: If the DTC is not set**
3. All OK.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for control module replacement, programming, and setup.

DTC C1290, C1291, C1292, C1293, C1295: POWER TRANSFER UNIT CLUTCH MOTOR CIRCUIT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC C1290 00

Power Transfer Unit Clutch Motor Circuit High Voltage

DTC C1291 00

DTC C1292 00

Power Transfer Unit Clutch Motor Circuit

DTC C1293 00

Power Transfer Unit Clutch Motor Circuit High Current

DTC C1295 00

Power Transfer Unit Clutch Motor Circuit Erratic

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Control	C1291 00	C1292 00	C1290 00	C1295 00
Low Reference	C1291 00	C1292 00	C1290 00	C1295 00

Circuit/System Description

Rear differential clutch control module is supplying voltage to the power transfer unit shift actuator motor and is grounded through the control module.

Conditions for Running the DTC

The engine is running.

Conditions for Setting the DTC**C1290 00**

The rear differential clutch control module detects a short to battery on the power transfer unit clutch motor circuit.

C1291 00

The rear differential clutch control module detects a short to ground on the power transfer unit clutch motor circuit.

C1292 00

The rear differential clutch control module detects an open on the power transfer unit clutch motor circuit.

C1293 00

The rear differential clutch control module detects high current at the power transfer unit clutch motor circuit.

C1295 00

The rear differential clutch control module detects plausibility error at the power transfer unit clutch motor circuit.

Action Taken When the DTC Sets

One or more of the following actions may occur:

- The electronic limited slip system is disabled for the duration of the key cycle.
- The AWD SERVICE message is displayed in the driver information center.

Conditions for Clearing the DTC

- The condition for the DTC is no longer present.
- The DTC is not detected in 40 consecutive drive cycles.

Reference Information

Rear Axle Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Rear Drive Axle Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector at the K47 Rear Differential Clutch Control Module, ignition ON/Vehicle in Service Mode.
2. Test for less than 1 V between the K47 Rear Differential Clutch Control Module harness connector terminals listed below and ground.
 - Terminal 1
 - Terminal 12
 - **If 1 V or greater**

Repair the short to voltage on the circuit.
 - **Go to next step: If less than 1 V**
3. Ignition OFF.
4. Test for infinite resistance between K47 Rear Differential Clutch Control Module harness connector terminals listed below and ground.
 - Terminal 1
 - Terminal 12
 - **If less than infinite resistance**

Repair the short to ground on the circuit.
 - **Go to next step: If Infinite resistance**
5. Disconnect the X1 harness connector at the M115 Power Transfer Unit Shift Actuator.
6. Test for less than 2 Ω between M115 Power Transfer Unit Shift Actuator harness connector terminal 1 and K47 Rear Differential Clutch Control Module harness connector terminal 1 end to end.
 - **If 2 Ω or greater**

Repair the open/high resistance in the circuit.
 - **Go to next step: If less than 2 Ω**
7. Test for less than 2 Ω between M115 Power Transfer Unit Shift Actuator harness connector terminal 2 and K47 Rear Differential Clutch Control Module harness connector terminal 12 end to end.
 - **If 2 Ω or greater**

Repair the open/high resistance in the circuit.
 - **Go to next step: If less than 2 Ω**

NOTE:

DTC C1295 may set due to a mechanical issue within the power transfer unit in which the unit is not physically engaging, despite being commanded to do so.

8. Visually inspect the power transfer unit for any signs of mechanical damage or other conditions which may prevent the unit from physically engaging. This may require disassembly of the power transfer unit. Refer to [**Power Transfer Unit Case Disassemble**](#)
 - **If damage is found**

Repair as necessary.
 - **Go to next step: If no damage is found**
9. Test or replace the M115 Power Transfer Unit Shift Actuator.
10. Operate the vehicle under the conditions for setting the DTC, the DTC should not set.
 - **If the DTC sets**

Replace the K47 Rear Differential Clutch Control Module.
 - **Go to next step: If no DTC sets**
11. All OK

Component Testing

1. Ignition OFF, disconnect the harness X1 connector at the M115 Power Transfer Unit Shift Actuator.
2. Install a 20 A fused jumper wire between the control terminal 2 and 12 V. Install a jumper wire between the low reference terminal 1 and ground.
3. Verify the power transfer unit clutch motor turns ON and OFF
 - **If the power transfer unit clutch motor does not turn ON and OFF**

Replace the M115 Power Transfer Unit Shift Actuator.
 - **Go to next step: If the power transfer unit clutch motor does turn ON and OFF**
4. All OK

Repair Instructions

Perform the [**Diagnostic Repair Verification**](#) after completing the repair.

- [**Power Transfer Unit Case Replacement \(MNH Transmission with LYX Engine\)**](#) [**Power Transfer Unit Case Replacement \(M3D Transmission with LTG Engine\)**](#) [**Power Transfer Unit Case Replacement \(MHG Transmission with LH7 Engine\)**](#) for M115 Power Transfer Unit Shift Actuator.
- [**Control Module References**](#) for control module replacement, programming and setup.

DTC C1296: POWER TRANSFER UNIT CLUTCH MOTOR PERFORMANCE**Diagnostic Instructions**

- Perform the [**Diagnostic System Check - Vehicle**](#) prior to using this diagnostic procedure.
- Review [**Strategy Based Diagnosis**](#) for an overview of the diagnostic approach.
- [**Diagnostic Procedure Instructions**](#) provide an overview of each diagnostic category.

DTC Descriptors**DTC C1296 61**

Power Transfer Unit Clutch Motor Performance

Circuit/System Description

When the rear differential clutch control module receives a request to engage the rear differential, it will command the power transfer unit clutch motor to activate providing the operator with all wheel drive

Conditions for Running the DTC

The engine is running.

Conditions for Setting the DTC

C1296 61

The rear differential clutch control module has detected that the power transfer unit clutch motor does not activate when commanded.

Action Taken When the DTC Sets

- The electronic limited slip control is disabled.
- The AWD SERVICE message is displayed in the driver information center.

Conditions for Clearing the DTC

- The condition for the DTC is no longer present.
- The DTC is not detected in 40 consecutive ignition cycles.

Reference Information

Schematic Reference

Rear Axle Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Rear Drive Axle Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness X1 connector at the M115 Power Transfer Unit Shift Actuator. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 2.2 K Ω between the low reference circuit terminal 1 and ground.
 - **If 2.2 K Ω or greater**
 1. Ignition OFF, disconnect the X1 harness connector at the K47 Rear Differential Clutch Control Module.
 2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K47 Rear Differential Clutch Control Module.
 - **Go to next step: If less than 2.2 K Ω**
3. Ignition ON/Vehicle In Service Mode.
4. Test for 6.1 - 7.1 V between the control circuit terminal 2 and ground.
 - **If less than 6.1 V**
 1. Ignition OFF, disconnect the X1 harness connector at the K47 Rear Differential Clutch Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.

- If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K47 Rear Differential Clutch Control Module.
 - **If greater than 7.1 V**
 1. Ignition OFF, disconnect the X1 harness connector at the K47 Rear Differential Clutch Control Module, ignition ON/Vehicle In Service Mode.
 2. Test for less than 1 V between the control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K47 Rear Differential Clutch Control Module.
 - **Go to next step: If between 6.1 - 7.1 V**
 5. Test or replace the M115 Power Transfer Unit Shift Actuator.
 6. Operate the vehicle under the conditions for setting the DTC, the DTC should not set.

- **If the DTC sets**

Replace the K47 Rear Differential Clutch Control Module.

Component Testing

1. Ignition OFF, disconnect the X1 harness connector at the M115 Power Transfer Unit Shift Actuator.
2. Install a 20 A fused jumper wire between the control terminal 2 and 12 V. Install a jumper wire between the low reference terminal 1 and ground.
3. Verify the power transfer unit clutch motor turns ON and OFF
 - **If the power transfer unit clutch motor does not turn ON and OFF**
Replace the M115 Power Transfer Unit Shift Actuator.
 - **Go to next step: If the power transfer unit clutch motor does turn ON and OFF**
4. All OK

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Power Transfer Unit Case Replacement \(MNH Transmission with LYX Engine\)](#) [Power Transfer Unit Case Replacement \(M3D Transmission with LTG Engine\)](#) [Power Transfer Unit Case Replacement \(MHG Transmission with LH7 Engine\)](#) for M115 Power Transfer Unit Shift Actuator.
- [Control Module References](#) for rear differential clutch control module replacement, programming and setup.

SYMPTOMS - REAR DIFFERENTIAL CARRIER

Strategy Based Diagnostics

Review the system operations in order to familiarize yourself with the system functions. Refer to [Rear Drive Axle Description and Operation](#) and [Power Transfer Unit Case Description and Operation](#). All diagnosis on a vehicle should follow a logical process. Strategy based diagnostics is a uniform approach for repairing all systems. The diagnostic flow may always be used in order to resolve a system condition. The diagnostic flow is the place to start when repairs are necessary. For a detailed explanation, refer to [Strategy Based Diagnosis](#).

Visual/Physical Inspection

- Inspect for aftermarket devices, which could affect the operation of the vehicle. Refer to [Checking Aftermarket Accessories](#).
- Inspect the easily accessible or visible system components for obvious damage or conditions, which could cause the symptom.
- Check for the correct lubricant level and the proper viscosity.
- Verify the exact operating conditions under which the concern exists. Note factors such as vehicle speed, road conditions, ambient temperature, and other specifics.

- Compare the driving characteristics or sounds, if applicable, to a known good vehicle and make sure you are not trying to correct a normal condition.
- Inspect for all-wheel drive activation and operation. Refer to [All-Wheel Drive \(AWD\) System Functional Inspection](#).
- Factors that may contribute to an inoperative rear differential include:
 - Low gear oil levels
 - Differential inoperative due to antilock brake system (ABS) function
 - Inoperative powertrain control module (PCM) and/or wiring system
 - A mini-spare or different size tire installed
 - A fluid over-temperature condition
 - An inoperative or "stuck" clutch pump check valve
 - A defective rear differential assembly
 - An inoperative transfer case assembly

Intermittent

Test the vehicle under the same conditions that the customer reported in order to verify the system is operating properly.

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- [Symptoms - Vehicle](#)
- [All-Wheel Drive \(AWD\) System Functional Inspection](#)
- [Noisy in Drive](#)
- [Noisy When Coasting](#)
- [Intermittent Noise](#)
- [Constant Noise](#)
- [Noisy on Turns](#)
- [Rear Differential Carrier Leak Diagnosis](#)

ALL-WHEEL DRIVE (AWD) SYSTEM FUNCTIONAL INSPECTION

Functional Test

Rear axle activation and operation may be checked by positioning the four wheels off the ground, starting the vehicle, fully applying the parking brake, and selecting the drive position.

CAUTION: Avoid rear differential damage. Do not exceed 20 percent accelerator pedal application or apply throttle for more than 5 seconds while the parking brake is applied.

Lightly depress the accelerator pedal while watching the rear wheels. They will rotate slightly as the drive line winds-up. This indicates the all wheel drive (AWD) is functioning.

ALL WHEEL DRIVE INDICATOR MALFUNCTION

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+ Terminal 20	C0800 03	C0800 03	-	-

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+ Terminal 10	2	2	-	-
Control	1	2	2	-
1. AWD indicator always ON. 2. AWD indicator always OFF.				

Circuit/System Description

The body control module provides voltage to the AWD indicator and other vehicle indicators. The rear differential clutch control module monitors the input received by the drive mode switch, when the driver selects the All Wheel Drive mode, the rear differential clutch control module will provide a ground for the AWD indicator control circuit causing the AWD indicator to illuminate.

Reference Information

Schematic Reference

Rear Axle Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Rear Drive Axle Description and Operation

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Circuit/System Verification

1. Engine running/Vehicle ON.
2. Using the drive mode switch, press the All Wheel Drive switch, verify the AWD indicator turns ON.
 - **If the AWD indicator does not turn ON**
Refer to Circuit/System Testing.
 - **Go to next step: If the AWD indicator does turn ON**
3. Using the drive mode switch, press again the All Wheel Drive switch, verify the AWD indicator turns OFF.
 - **If the indicator does not turn OFF**
Refer to Circuit/System Testing.
 - **Go to next step: If the indicator turns OFF**
4. All OK.

Circuit/System Testing

1. Ignition OFF/Vehicle OFF, disconnect the X1 harness connector at the K47 Rear Differential Clutch Control Module.
2. Ignition ON/Vehicle In Service Mode.
3. Verify a test lamp illuminates between B+ circuit terminal 10 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF/Vehicle OFF.

2. Test for less than 2 Ω in the B+ circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , verify the fuse is not open and there is voltage at the fuse.
- **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF/Vehicle OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the appropriate control module.
 - **Go to next step: If the test lamp illuminates**
4. Verify the AWD indicator is not illuminated.
 - **If illuminated**
 1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the appropriate component listed below.
 - S48E Multifunction Switch - Center Console
 - S126 Drive Mode Select Switch
 2. Test for infinite resistance between the control circuit terminal 2 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, test or replace the appropriate component.
 - **Go to next step: If not illuminated**
5. Ignition ON/Vehicle In Service Mode, connect a 3 A fused jumper wire between the control circuit terminal 2 and the ground.
6. Verify the AWD indicator is illuminated.
 - **If not illuminated**
 1. Ignition OFF/Vehicle OFF, remove the jumper wire, disconnect the harness connector at the appropriate component listed below, ignition ON / Vehicle In Service Mode.
 - S48E Multifunction Switch - Center Console
 - S126 Drive Mode Select Switch
 2. Test for less than 1 V between the control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , test or replace the appropriate component.
 - **Go to next step: If illuminated**
7. Replace the K47 Rear Differential Clutch Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Floor Console Accessory Function Switch Replacement (Equinox)**, **Floor Console Accessory Function Switch Replacement (Terrain)**
- **Control Module References** for rear differential clutch control module replacement, programming and setup

NOISY IN DRIVE

Cause	Correction
Inspect for the proper gear oil levels prior to performing system diagnosis. Refer to <u>Axle Lubricant Change</u> .	
Incorrect type fluid Installation of the incorrect type gear oil may create a "moan" type noise within 7, 770 - 25, 900 km (3 - 10, 000 miles). Fluid that is "black" in color is to be considered normal and is darkened by the carbon material in the clutch plates.	Replace the rear differential assembly as required. Fluid replacement will not correct a "moan" condition caused by the use of incorrect oil. Refer to <u>Differential Replacement</u> .

Cause	Correction
Water or contamination within the transmission oil Water or contamination within the transmission fluid, causing excessive torque converter clutch slip rate, may create a "grind, growl, or moan" in the rear differential or torque tube under light or steady load conditions.	Replace the transmission fluid and flush the transfer case of the contaminated fluid.
Loose propeller shaft mounting bolts	Tighten the bolts as required. Refer to Two-Piece Propeller Shaft Replacement .
Worn propeller shaft constant velocity joints	Replace propeller shaft assembly. Refer to Two-Piece Propeller Shaft Replacement .
Worn axle shaft constant velocity joints	Replace the constant velocity joints as required.
Worn, loose, or missing differential mounts	Repair or replace the differential mounts as required.
Loose torque tube bracket or a worn bracket bushing	Tighten the bracket bolts or replace the bracket as required.
Worn bearing in the torque tube assembly	Replace the torque tube assembly
Torque tube dampner loose or missing A "moan" or "exhaust leak" type noise at higher engine speeds, approximately 2, 000 - 2, 500 RPM, may indicate a loose or missing dampner.	Tighten the dampner retaining bolt or replace the torque tube assembly as required.
Bearing noise within the differential assembly A "grinding" or "roar" type noise will increase or decrease relative to the vehicle speed.	1. Check for the proper fluid level. Fill as required. 2. If the noise continues, replace unit as required.
Gear set "whine" noise within the differential assembly A "whine" type noise will increase or decrease relative to the vehicle speed approximately 80 - 97 km/h (50 - 60 mph).	1. Check for the proper fluid level. Fill as required. 2. Replace unit as required.

NOISY WHEN COASTING

Cause	Correction
Inspect for the proper gear oil levels prior to performing system diagnosis. Refer to Axle Lubricant Change . A light "clunk" type noise during a downshift is to be considered a normal condition.	
Loose propeller shaft mounting bolts	Tighten the bolts as required. Refer to Two-Piece Propeller Shaft Replacement .
Worn propeller shaft constant velocity joints	Replace the propeller shaft assembly. Refer to Two-Piece Propeller Shaft Replacement .
Worn axle shaft constant velocity joints	Replace the constant velocity joints as required.
Worn, loose, or missing differential mounts	Repair or replace the differential mounts as required.
Loose torque tube bracket or a damaged bracket bushing	Tighten the bracket bolts or replace the bracket as required.
Worn bearing in the torque tube assembly	Replace the torque tube assembly.
Bearing noise within the differential assembly A "grinding" or "roar" type noise will increase or decrease relative to the vehicle speed.	1. Check for the proper fluid level. Fill as required. 2. If the noise continues, replace unit as required.
Gear set "whine" noise within the differential assembly A "whine" type noise will increase or decrease relative to the vehicle speed, approximately 80 - 97 km/h (50 - 60 mph).	1. Check for the proper fluid level. Fill as required. 2. Replace unit as required.

INTERMITTENT NOISE

Cause	Correction
Inspect for the proper gear oil levels prior to performing system diagnosis. Refer to Axle Lubricant Change .	

Cause	Correction
Loose propeller shaft mounting bolts	Tighten the bolts as required. Refer to Two-Piece Propeller Shaft Replacement .
Worn, loose, or missing differential mounts	Repair or replace the differential mounts as required.
Loose torque tube bracket or a damaged bracket bushing	Tighten the bracket bolts or replace the bracket as required.
Incorrect type fluid Installation of the incorrect type gear oil may create a "moan" type noise within 7, 770 - 25, 900 km (3 - 10, 000 miles). Fluid that is "black" in color is to be considered normal and is darkened by the carbon material in the clutch plates.	Replace the rear differential assembly as required. Fluid replacement will not correct a "moan" condition caused by the use of incorrect oil. Refer to Differential Replacement .

CONSTANT NOISE

Cause	Correction
Inspect for the proper gear oil levels prior to performing system diagnosis. Refer to Axle Lubricant Change .	
Low gear oil levels	Faulty oil seal or other type external leaks may contribute to lower than required fluid levels. Refer to Rear Differential Carrier Leak Diagnosis . Fill to proper level with gear oil GM P/N 12378514 (Canadian P/N 88901045).
Worn, loose, or missing differential mounts	Repair or replace the differential mounts as required.
Worn propeller shaft constant velocity joints	Replace the propeller shaft assembly. Refer to Two-Piece Propeller Shaft Replacement .
Worn bearing in the torque tube assembly	Replace the torque tube assembly.
Bearing noise within the differential assembly A "grinding" or "roar" type noise will increase or decrease relative to the vehicle speed.	1. Check for the proper fluid level. Fill as required. 2. If the noise continues, replace unit as required.
Gear set "whine" noise within the differential assembly A "whine" type noise will increase or decrease relative to the vehicle speed, approximately 80 - 97 km/h (50 - 60 mph).	1. Check for the proper fluid level. Fill as required. 2. Replace unit as required.

NOISY ON TURNS

Cause	Correction
Inspect for the proper gear oil levels prior to performing system diagnosis. Refer to Axle Lubricant Change . Operate the vehicle turning in tight circles in both left and right directions. A moan, groan, chatter, or a pulsing type concern may indicate a pump, valve, or clutch pack malfunction within the differential assembly.	
Worn or loose rear differential mounts	Repair or replace as required.
Loose torque tube bracket or a damaged bracket bushing	Tighten the bracket bolts or replace the bracket as required.
Worn axle shaft constant velocity joints	Replace the constant velocity joints as required.
Worn wheel bearings	Replace the wheel bearings as required.
Incorrect type fluid Installation of the incorrect type gear oil may create a "moan" type noise within 7, 770 - 25, 900 km (3 - 10, 000 miles). Fluid that is "black" in color is to be considered normal and is darkened by the carbon material in the clutch plates.	Replace the rear differential assembly as required. Fluid replacement will not correct a "moan" condition caused by the use of incorrect oil. Refer to Differential Replacement .
Worn clutch pack friction discs	Replace the differential assembly.

REAR DIFFERENTIAL CARRIER LEAK DIAGNOSIS

Cause	Correction

Cause	Correction
GM P/N 12378514 Hypoid Gear Oil has ultraviolet dye already included within the oil. Drain and fill the unit with new oil before using the J 28428-E high-intensity black light kit, when inspecting for leaks. J 28431-6 Fluorescent oil dye - 6 1-oz is not approved for use.	
Restricted or damaged ventilation tube assembly	Replace the ventilation tube as required.
Worn, scored, or missing drain and/or fill plug sealing washers	Install new sealing washers and tighten the plugs per specifications.
Worn or damaged drive pinion oil seal	1. Inspect the torque tube propeller shaft oil seal surface for excessive wear or damage. 2. Inspect the torque tube propeller shaft bearings for wear or damage. A worn bearing may allow excessive movement of the propeller shaft within the torque tube. 3. Replace the components as required.
Cut or damaged drive pinion housing O-ring seal	Replace the O-ring seal as required.
Worn or damaged axle shaft oil seals	Replace the axle shaft oil seals as required.
Cut or damaged clutch pump check valve O-ring seals	Replace the O-ring seals as required.
Leaking clutch pump check valve	Replace the clutch pump check valve assembly.
Carrier housing porosity or a leaking side cover seal surface	Replace the differential assembly.

REPAIR INSTRUCTIONS

REAR DIFFERENTIAL CLUTCH CONTROL MODULE REPLACEMENT

Removal Procedure

1. Prepare the control module for removal using the SPS programming support tool. [K47 Rear Differential Clutch Control Module: Programming and Setup](#)

NOTE: The rear differential clutch control module can now be removed and replaced.

2. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#)

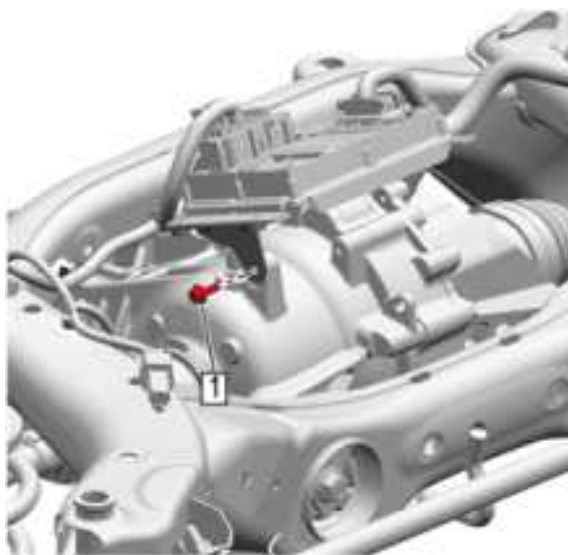


Fig. 2: Control Module Bracket Bolt

Courtesy of GENERAL MOTORS COMPANY

3. Remove the control module bracket bolt (1).

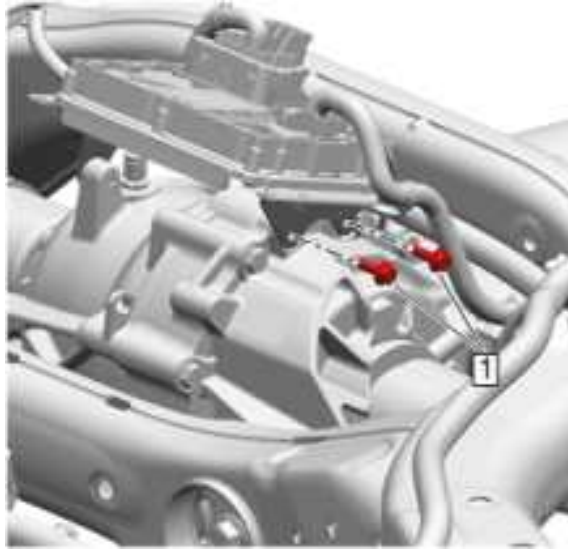


Fig. 3: Control Module Bracket Bolts

Courtesy of GENERAL MOTORS COMPANY

4. Remove the control module bracket bolts (1).



Fig. 4: Four Control Module Bolts

Courtesy of GENERAL MOTORS COMPANY

5. Remove the four control module bolts (1).

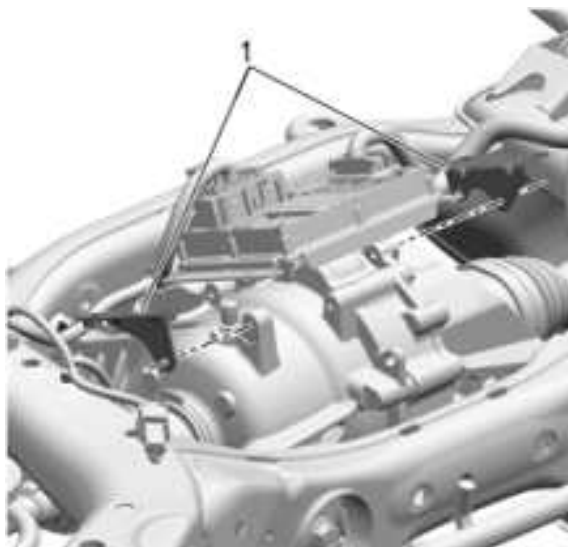


Fig. 5: Control Module Brackets

Courtesy of GENERAL MOTORS COMPANY

6. Remove the control module brackets (1).

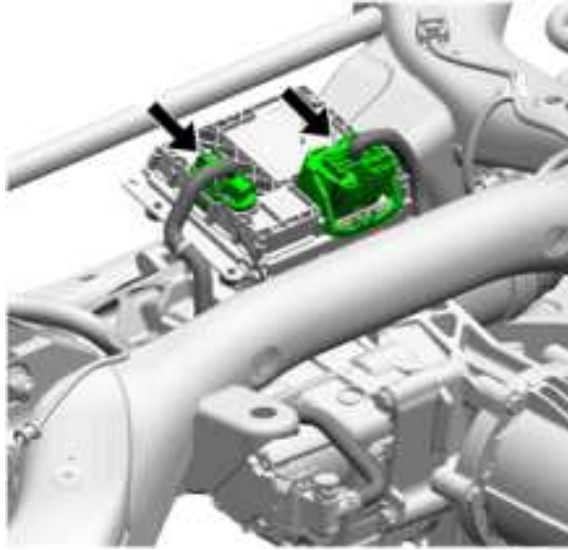


Fig. 6: Connectors And Control Module

Courtesy of GENERAL MOTORS COMPANY

7. Disconnect the connectors from the control module.
8. Remove Wiring Harness Retainer from Clutch Control Module.



Fig. 7: Clutch Control Module

Courtesy of GENERAL MOTORS COMPANY

9. Remove the clutch control module (1) by rotating it 180 degrees and sliding it out of the passenger side area above the axle shaft.

Installation Procedure



Fig. 8: Clutch Control Module

Courtesy of GENERAL MOTORS COMPANY

1. Position the clutch control module (1) onto the rear axle.

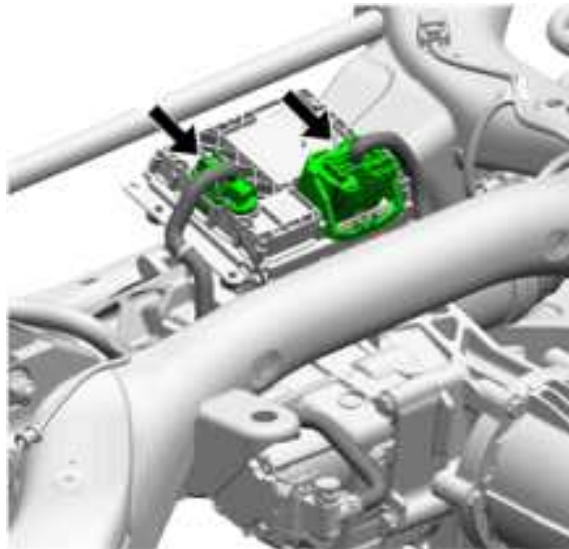


Fig. 9: Connectors And Control Module

Courtesy of GENERAL MOTORS COMPANY

2. Reconnect the electrical connectors to the clutch control module.

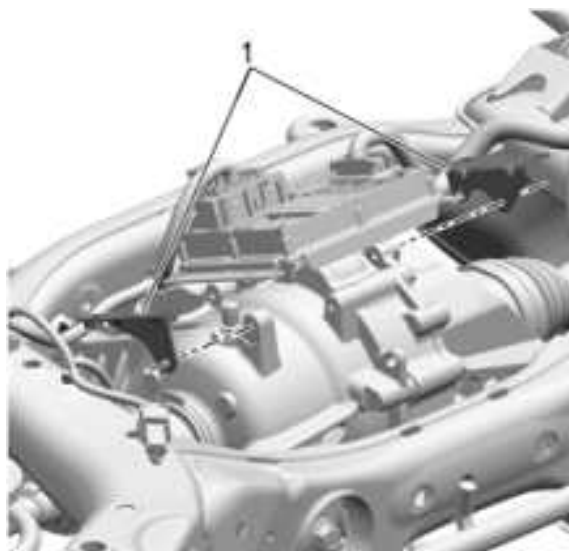


Fig. 10: Control Module Brackets

Courtesy of GENERAL MOTORS COMPANY

3. Install the control module brackets (1).



CAUTION: Refer to [Fastener Caution](#) .

NOTE: Apply loctite before installing bolts.

4. Install the clutch control module bolts (1). Tighten to 10 N.m (89 lb in).

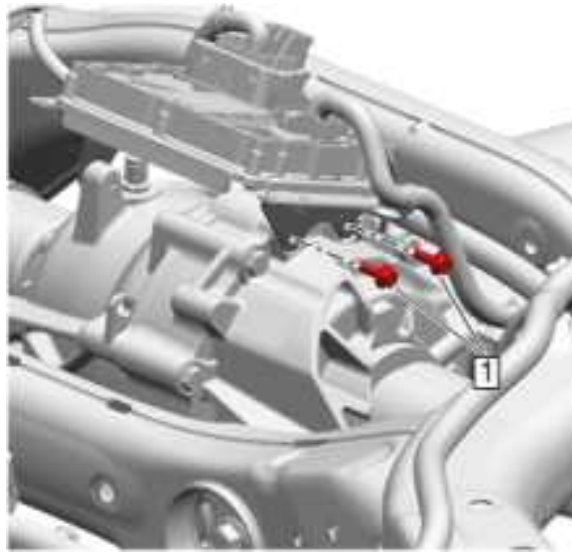


Fig. 12: Control Module Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

5. Install the control module bracket bolts (1). Tighten to 10 N.m (89 lb in).

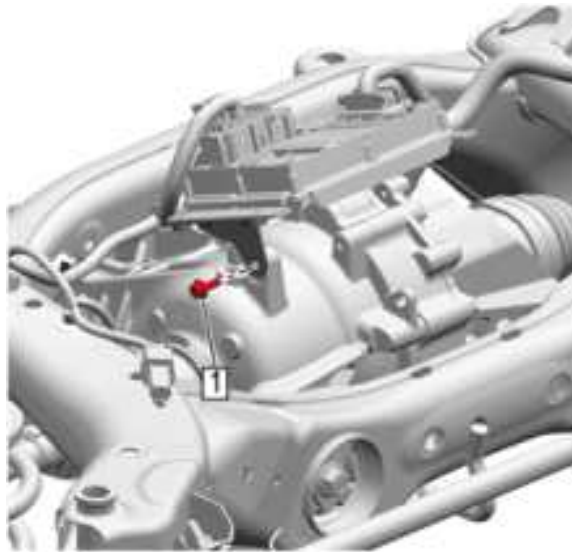


Fig. 13: Control Module Bracket Bolt
Courtesy of GENERAL MOTORS COMPANY

6. Install the control module bracket bolt (1). Tighten to 10 N.m (89 lb in).
7. Remove the support and lower the vehicle.
8. Reprogram the K47 Rear Differential Clutch Control Module. [Control Module References](#)

REAR AXLE LUBRICANT LEVEL INSPECTION

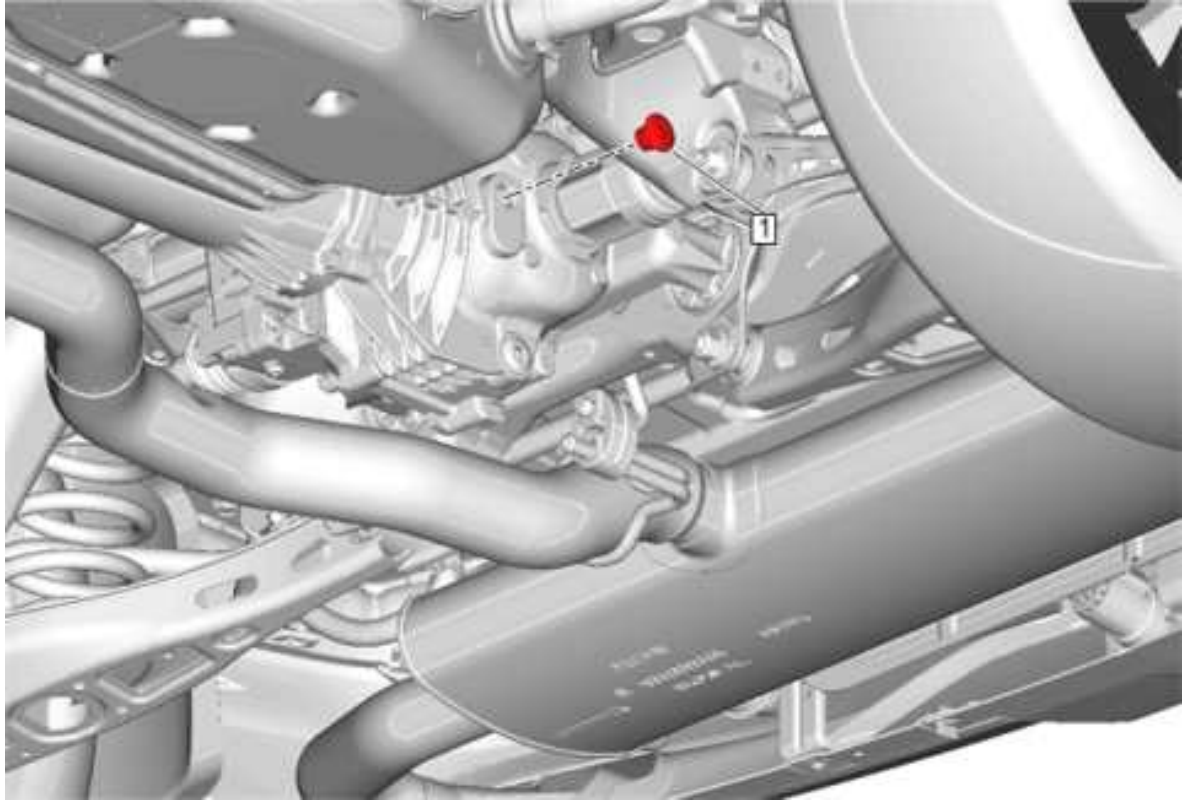


Fig. 14: Rear Axle Lubricant Level

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Raise the vehicle. Refer to Lifting and Jacking the Vehicle .	
1	Rear Differential Fill Plug CAUTION: Refer to Fastener Caution . Procedure The fluid level should be even with the bottom of the threads of the fill hole. Tighten 35 N.m (26 lb ft)

AXLE LUBRICANT CHANGE

Removal Procedure

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .

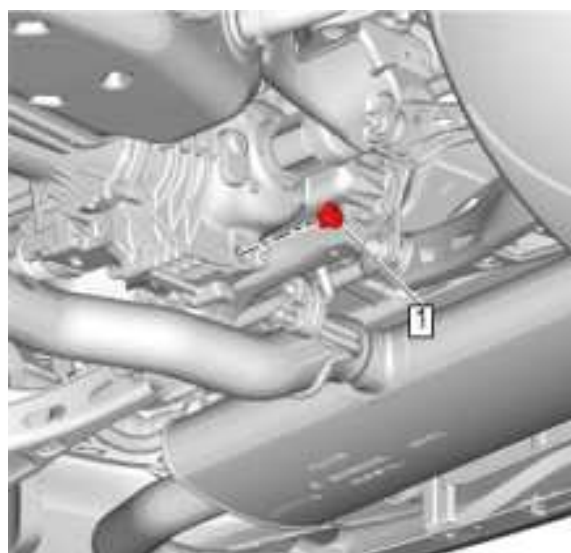


Fig. 15: Drain Plug

Courtesy of GENERAL MOTORS COMPANY

2. Remove the drain plug (1) from the rear differential housing.

Installation Procedure

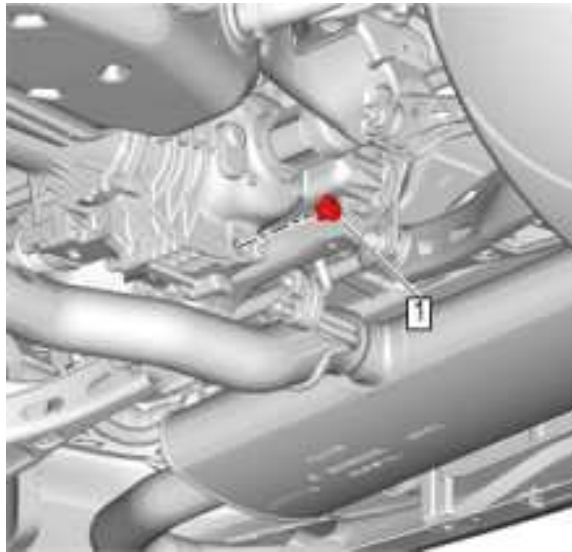


Fig. 16: Drain Plug

Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to [Fastener Caution](#) .

1. Install the drain plug (1), then tighten to 35 N.m (26 lb ft).



Fig. 17: Fill Plug

Courtesy of GENERAL MOTORS COMPANY

2. Remove the fill plug (1) from the rear differential housing.
3. Fill the rear differential with the proper synthetic gear lubricant. Refer to [Adhesives, Fluids, Lubricants, and Sealers](#).
4. Inspect the gear oil level to ensure it is even with the bottom of the fill plug.

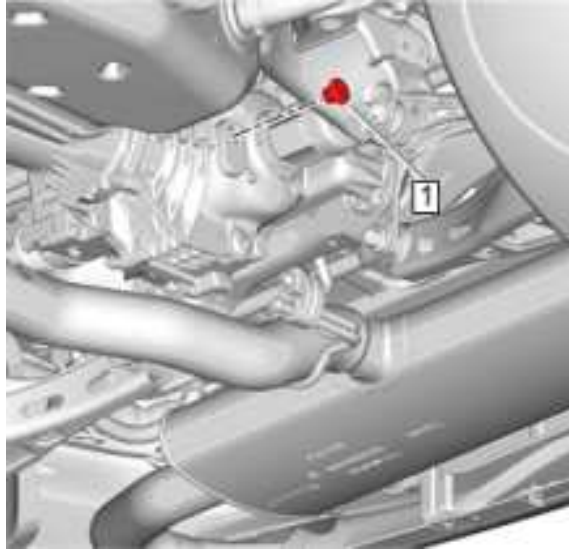


Fig. 18: Fill Plug

Courtesy of GENERAL MOTORS COMPANY

5. Install the fill plug (1) into the rear differential housing and tighten to 35 N.m (26 lb ft).
6. Remove the support and lower the vehicle.

DIFFERENTIAL CLUTCH OIL REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .

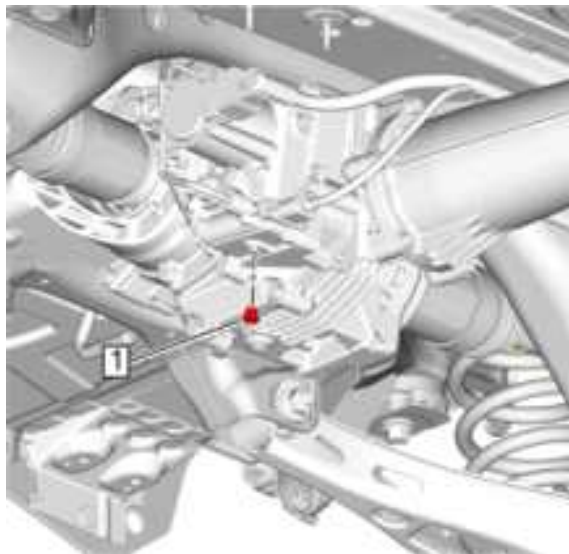


Fig. 19: Rear Differential Clutch Housing Drain Plug

Courtesy of GENERAL MOTORS COMPANY

2. Remove the drain plug (1) from the rear differential clutch housing.

Installation Procedure

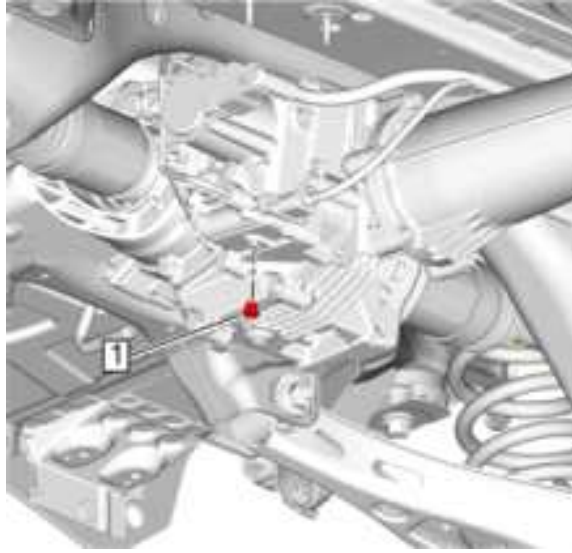


Fig. 20: Rear Differential Clutch Housing Drain Plug
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to [Fastener Caution](#) .

1. Install the drain plug (1), then tighten to 12 N.m (106 lb in).

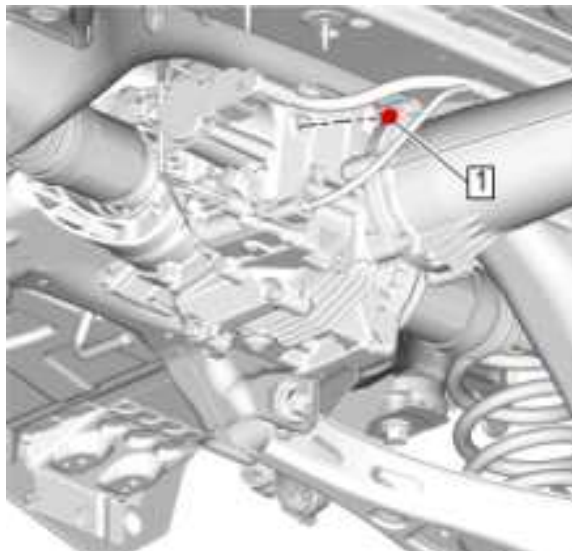


Fig. 21: Rear Differential Clutch Housing Fill Plug
Courtesy of GENERAL MOTORS COMPANY

2. Remove the fill plug (1) from the rear differential clutch housing.
3. Fill the rear differential clutch with the proper synthetic gear lubricant. Refer to [Adhesives, Fluids, Lubricants, and Sealers](#), and [Approximate Fluid Capacities](#).
4. Inspect the oil level to ensure it is even with the bottom of the fill plug.

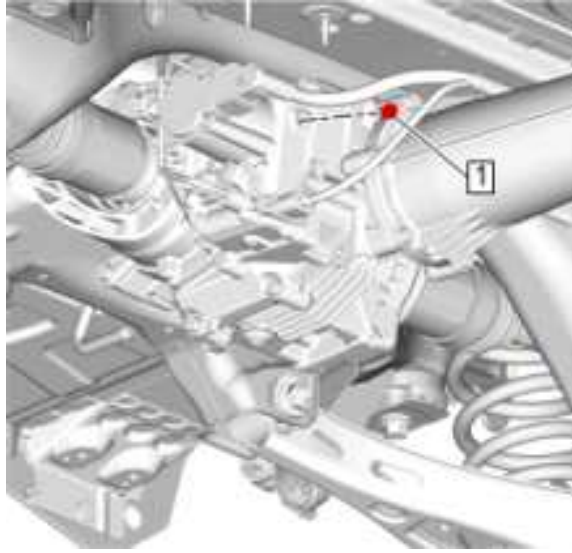


Fig. 22: Rear Differential Clutch Housing Fill Plug

Courtesy of GENERAL MOTORS COMPANY

5. Install the fill plug (1) in the rear differential clutch housing and tighten to 12 N.m (106 lb in).
6. Perform the Rear Differential Hydraulic System Service Fill/Bleed. Refer to [Rear Differential Hydraulic System Service Fill/Bleed](#).
7. Remove the support and lower the vehicle.

DIFFERENTIAL CARRIER BUSHING REPLACEMENT - REAR

Tools Required

J-45725 Cradle Bushing Replacer

Removal Procedure

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Remove the rear differential assembly. Refer to [Differential Replacement](#).

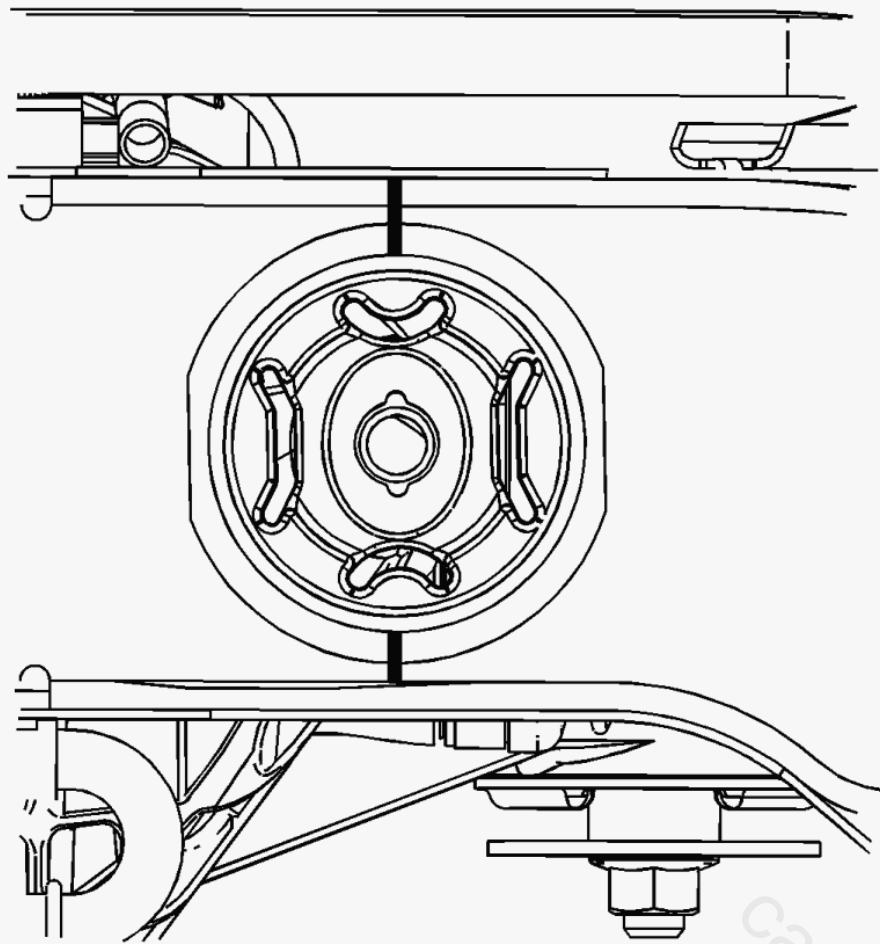


Fig. 23: Identifying Reference Point On Frame
Courtesy of GENERAL MOTORS COMPANY

3. Mark a reference point on the frame and old bushing at the 12 and 6 o'clock position to use to align the new bushing.

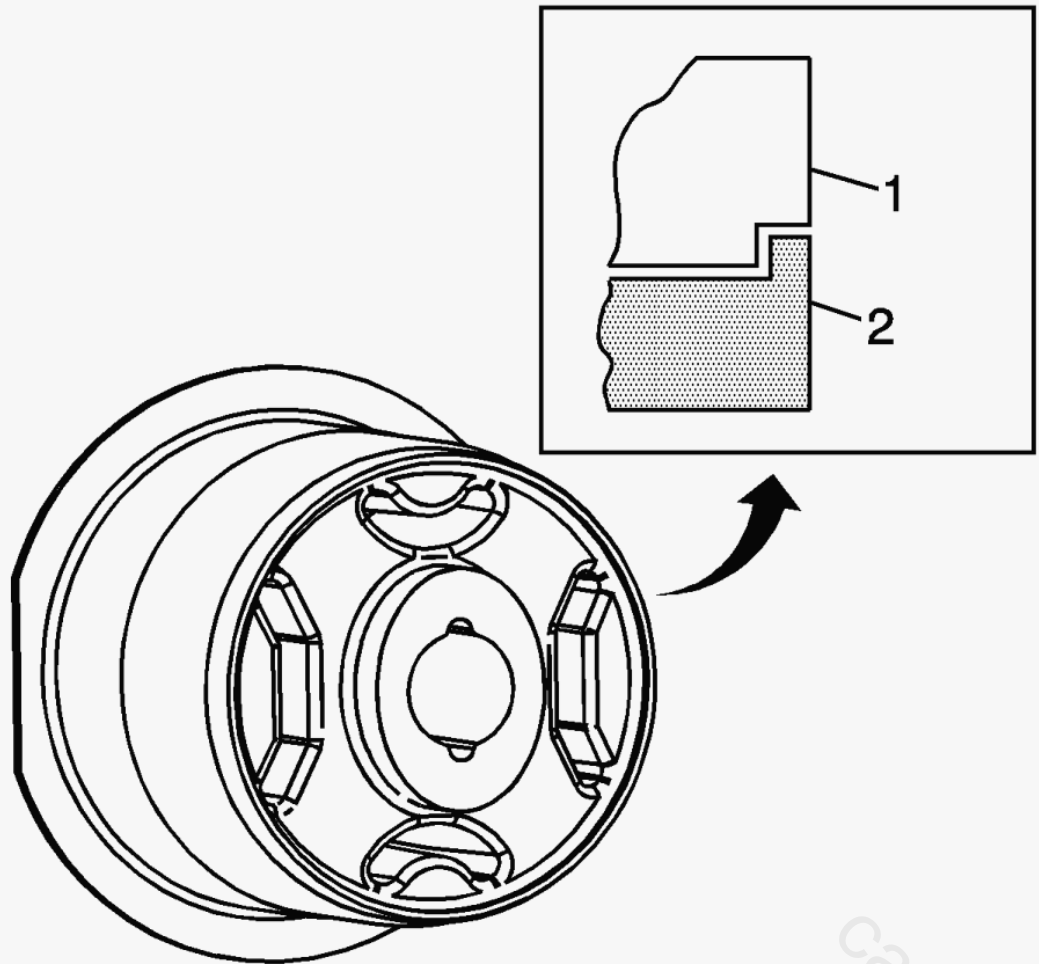


Fig. 24: View Of J-45725-2A & Bushing

Courtesy of GENERAL MOTORS COMPANY

4. Position the J-45725-1A (1) on the bushing (2).
5. Position the J-45725-2A (1) on the frame.

IMPORTANT: Apply a small amount of grease on the threaded to lubricate the nuts when turning the nuts.

6. Install the threaded rod, bearing and washers.

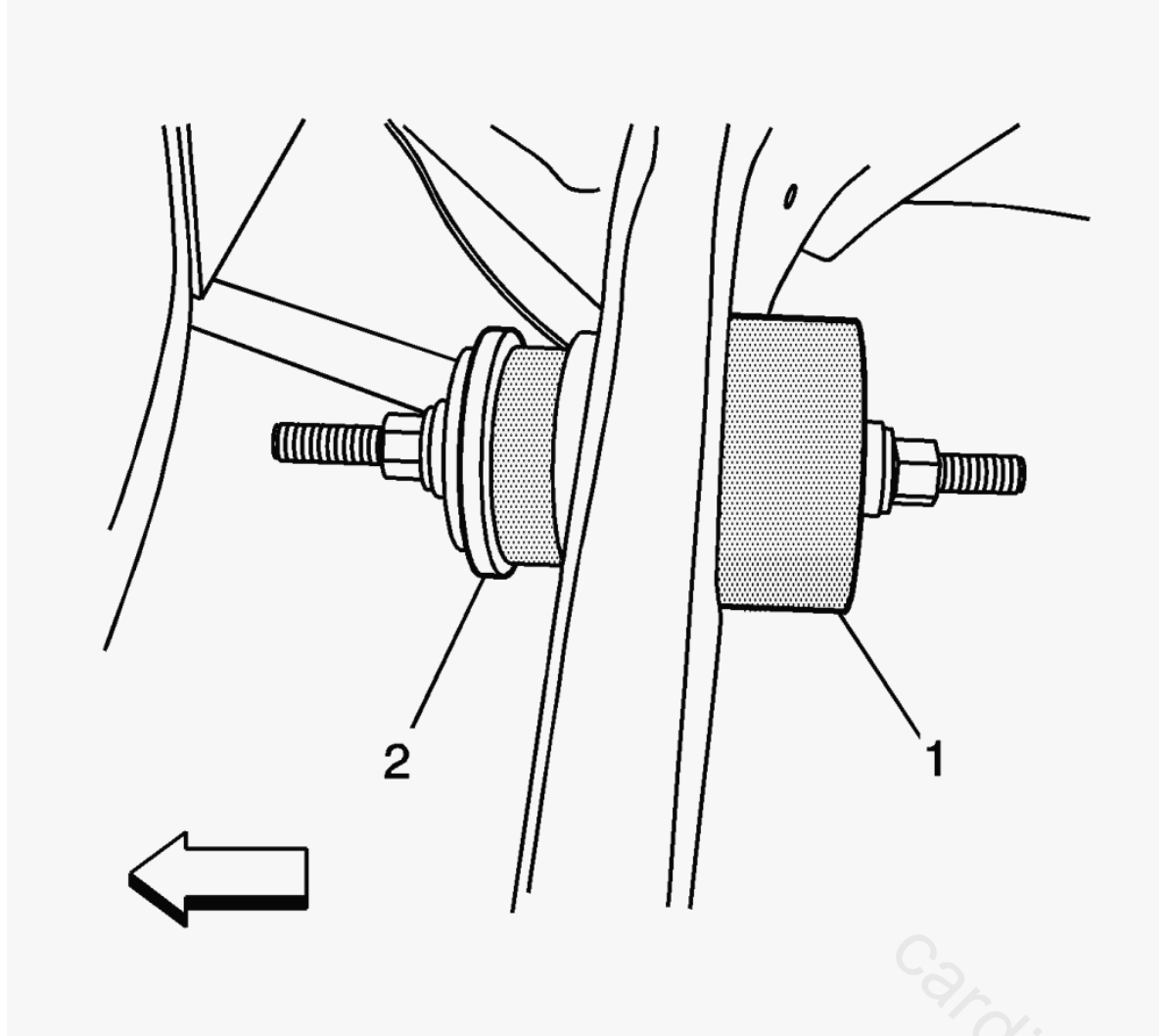


Fig. 25: Cradle Bushing Replacer

Courtesy of GENERAL MOTORS COMPANY

7. Adjust the nuts so that they are touching the J-45725-1A (2) and the J-45725-2A (1).
8. Install the proper size wrenches on the nuts.

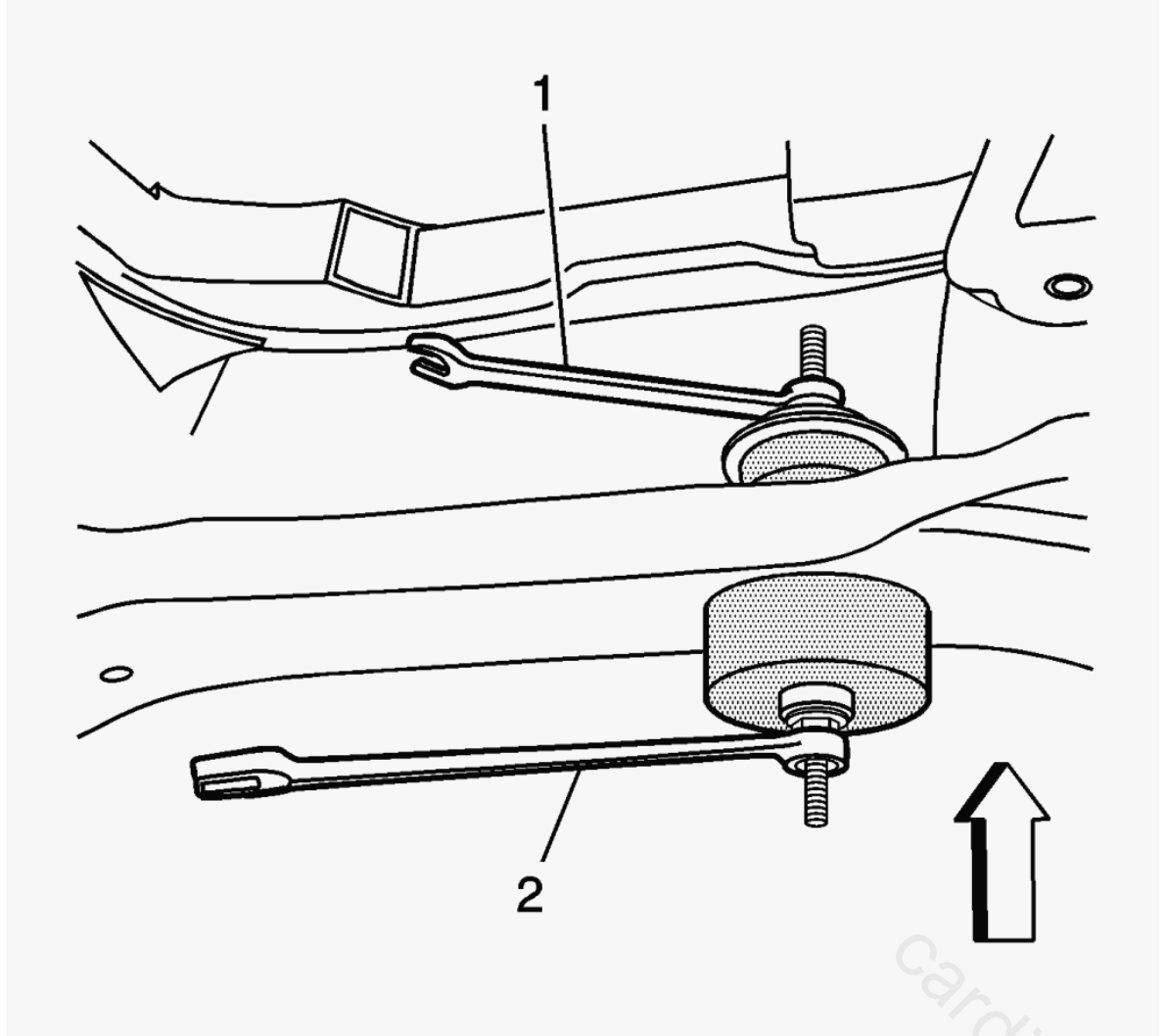


Fig. 26: View Of Attaching Nuts

Courtesy of GENERAL MOTORS COMPANY

IMPORTANT: In the following service procedure, use only HAND TOOLS when using the **J-45725** Cradle Bushing Replacer.

9. While holding the front wrench (1) rotate the rear wrench (2) to remove the bushing.
10. Remove the special tools.

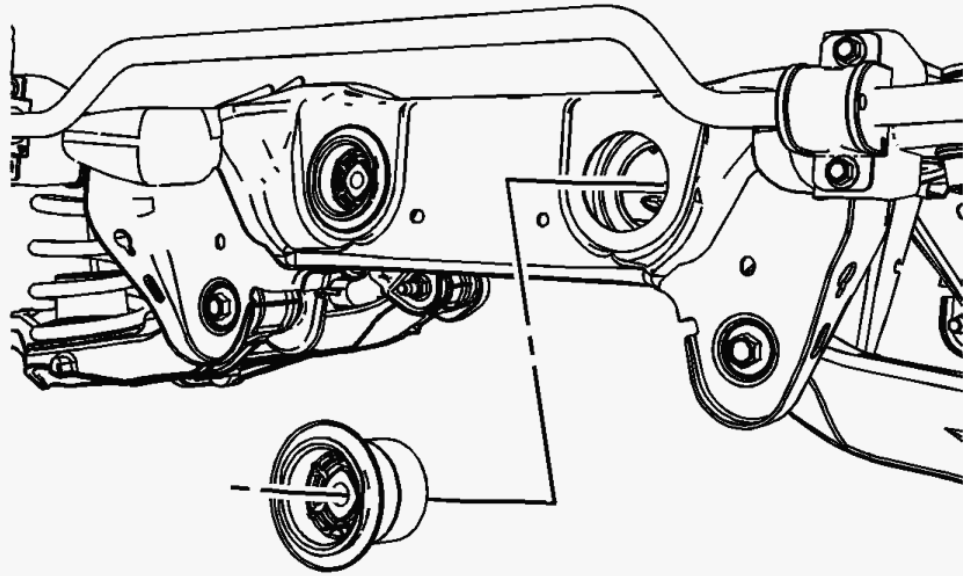


Fig. 27: View Of Frame Bushing
Courtesy of GENERAL MOTORS COMPANY

11. Remove the bushing from the frame.

Installation Procedure

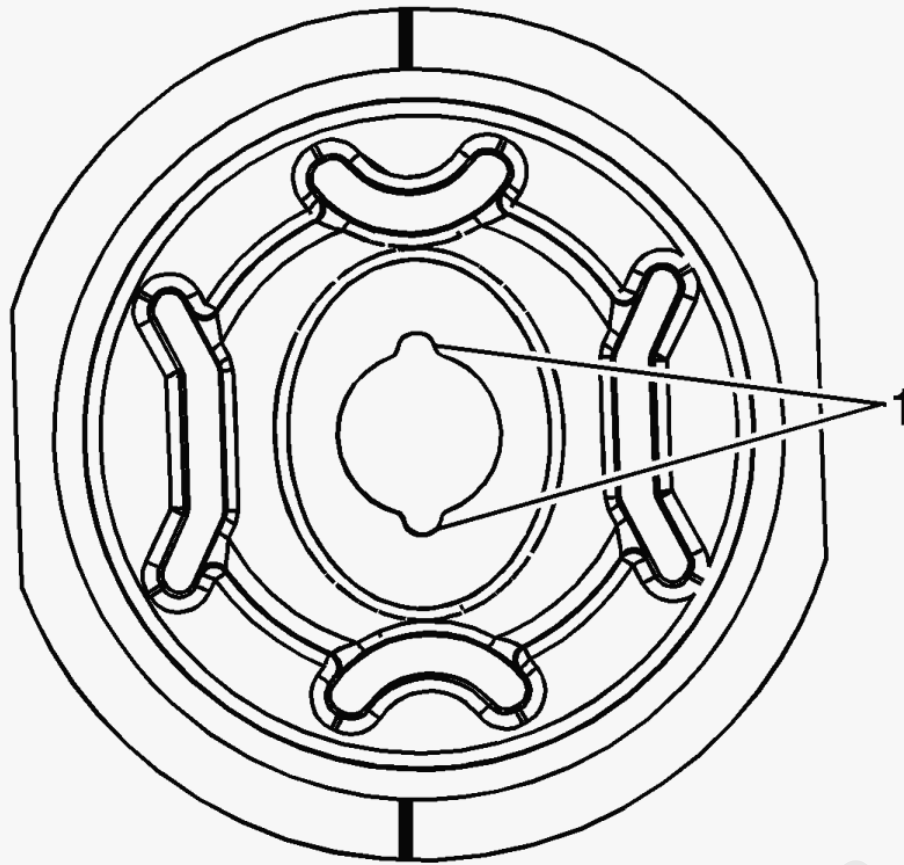


Fig. 28: Identifying Proper Bushing Alignment
Courtesy of GENERAL MOTORS COMPANY

IMPORTANT: Failure to perform the following service procedure prior to the installation of the new bushing, could cause premature failure of the bushing.

1. Before the installation of the new bushing, use a straight edge draw a line on the new bushing at the 12 and 6 o'clock positions. Ensure that the grooves (1) are at the 12 and 6 o'clock positions.
2. Position the new bushing so that the reference marks on the frame and the bushing are in alignment. This will ensure that the new bushing will be within the 5 degree specification required for the proper alignment of the bushing.

IMPORTANT: The following procedure is to temporarily hold the new bushing in place so that the special tools can be installed for the proper installation. This is NOT to be used to install the bushing.

3. Using a block of wood and a hammer, slightly tap the bushing into the frame.
4. Assemble the threaded rod, bearings and washers as indicated in step 7 in the removal procedure.

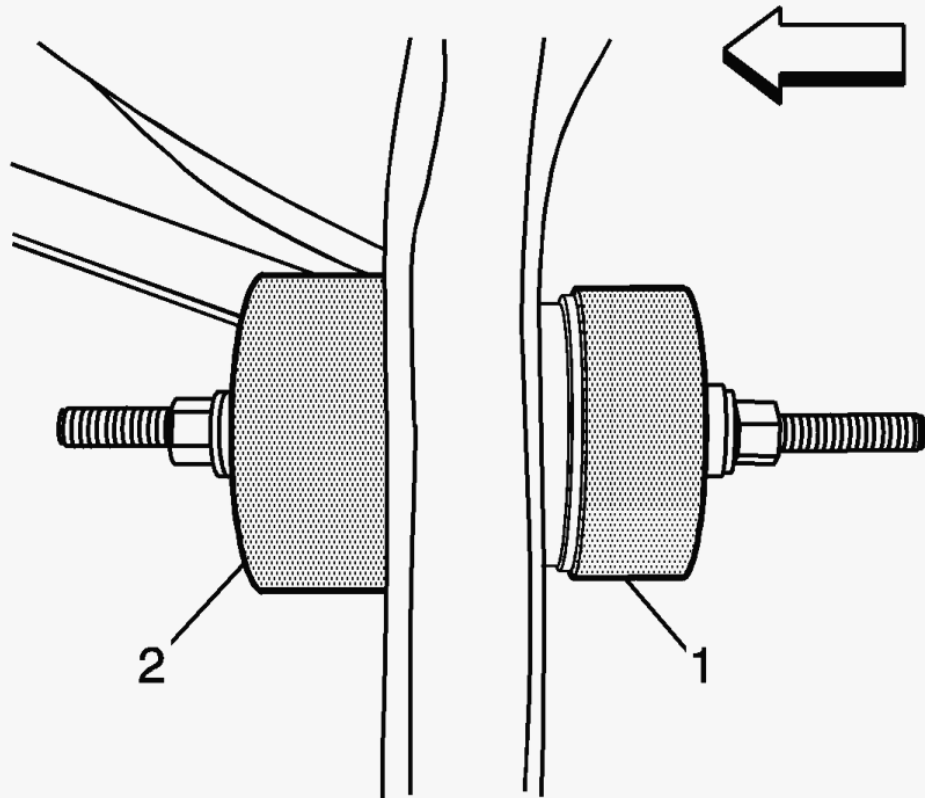


Fig. 29: Cradle Bushing Replacer

Courtesy of GENERAL MOTORS COMPANY

5. Position the J-45725-2 (2) on the inside of the frame.
6. Position J-45725-2A (1) on the outside of the frame.
7. Adjust the nuts so that they are touching the J-45725-2 (1) and the J-45725-2A (2).

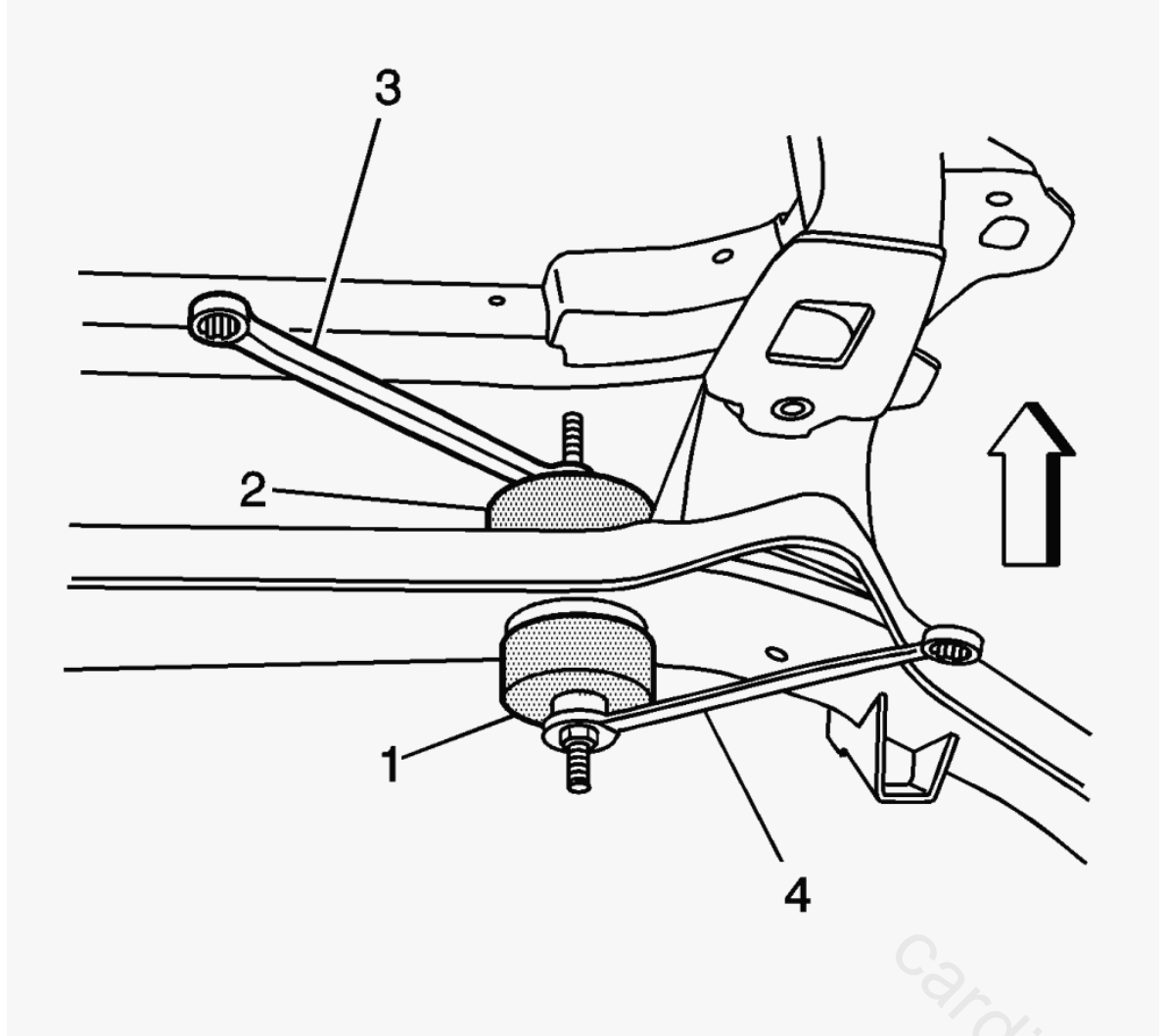


Fig. 30: Tightening Bushing Nuts

Courtesy of GENERAL MOTORS COMPANY

8. While holding the front wrench (2) rotate the rear wrench (1) to install the bushing.
9. Remove the special tools.
10. Install the rear differential assembly. Refer to [Differential Replacement](#).
11. Lower the vehicle.

DRIVELINE TORQUE TUBE REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).

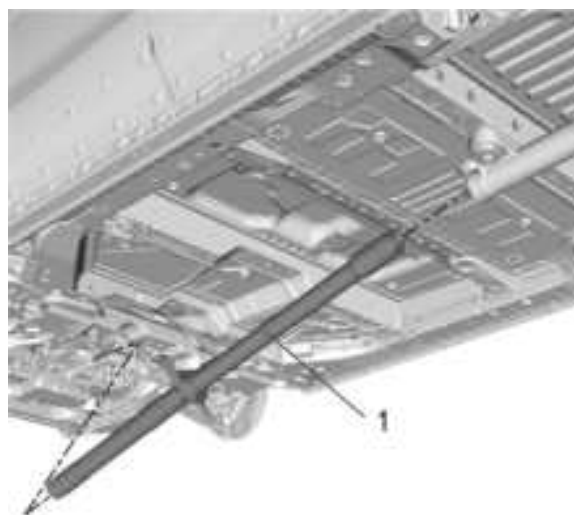


Fig. 31: Propeller Shaft

Courtesy of GENERAL MOTORS COMPANY

2. Remove the propeller shaft assembly (1). Refer to [Two-Piece Propeller Shaft Replacement](#).

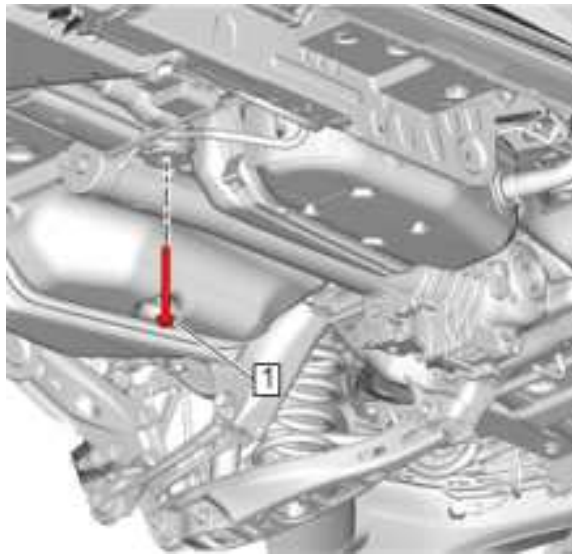


Fig. 32: Torque Tube Mounting Bolt
Courtesy of GENERAL MOTORS COMPANY

3. Remove the torque tube mounting bolt (1).

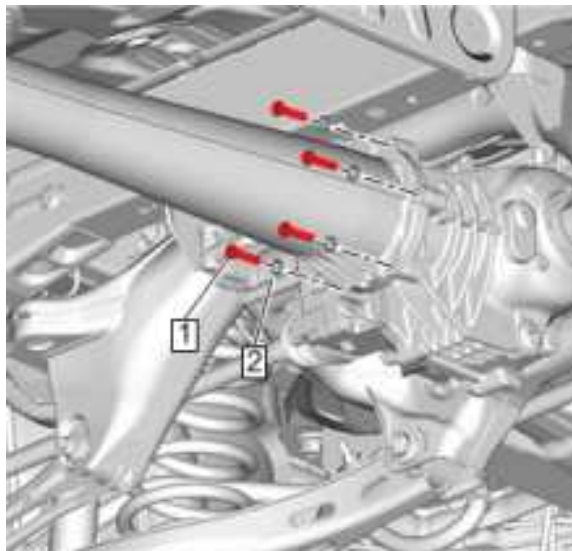


Fig. 33: Six Torque Tube Mounting Bolts And Washers
Courtesy of GENERAL MOTORS COMPANY

4. Remove the six torque tube mounting bolts (1) and washers (2) from the rear differential.

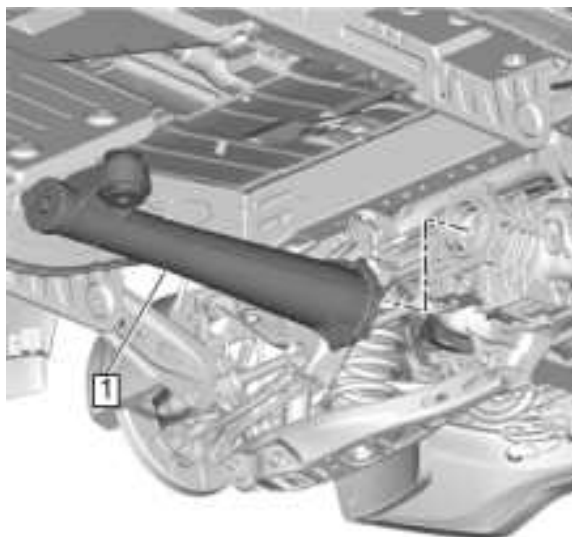


Fig. 34: Torque Tube Assembly
Courtesy of GENERAL MOTORS COMPANY

NOTE:

- DO NOT re-use the old gasket, discard and use NEW only.
- If any fluid is found in the torque tube, check the condition of pinion oil seal.

5. Remove the torque tube assembly (1) from the rear differential assembly.

Installation Procedure

1. Install the NEW torque tube gasket to the rear differential assembly.
2. Using a suitable jack stand support the torque tube assembly.

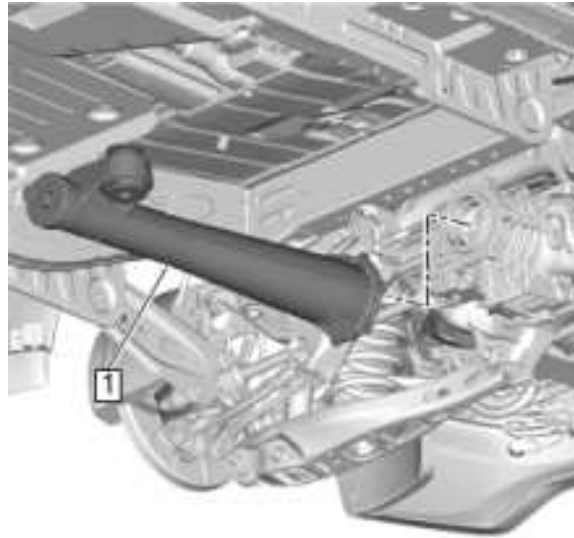


Fig. 35: Torque Tube Assembly

Courtesy of GENERAL MOTORS COMPANY

3. Install the torque tube assembly (1) to the rear differential assembly.

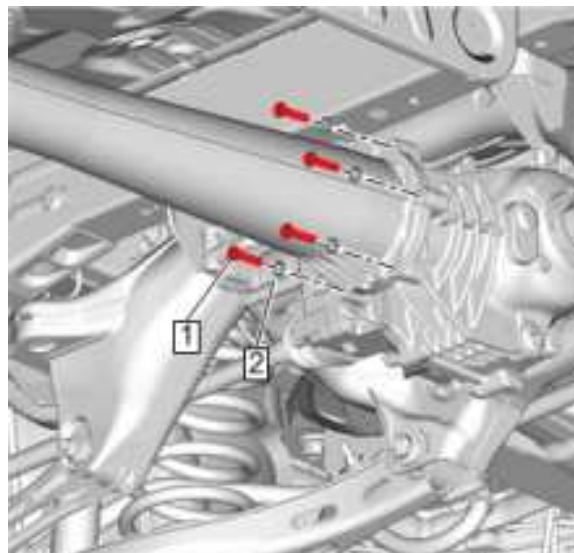


Fig. 36: Six Torque Tube Mounting Bolts And Washers

Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to **Fastener Caution** .

NOTE: Apply loctite before installing bolts.

4. Install and hand tighten the torque tube to differential bolts (1) before torquing to specifications.
5. Torque the mounting bolts (1) to specifications.

Tighten

Tighten the bolts to 29 N.m (21 lb ft).

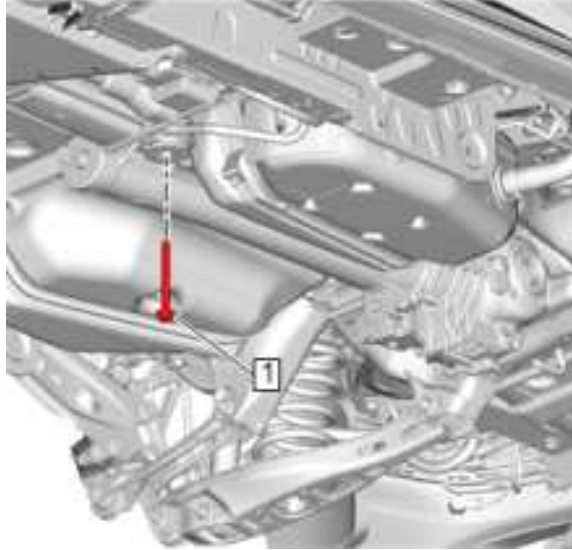


Fig. 37: Torque Tube Mounting Bolt

Courtesy of GENERAL MOTORS COMPANY

6. Install the front torque tube mounting bolt (1).

Tighten

Tighten the bolt to 160 N.m (118 lb ft).

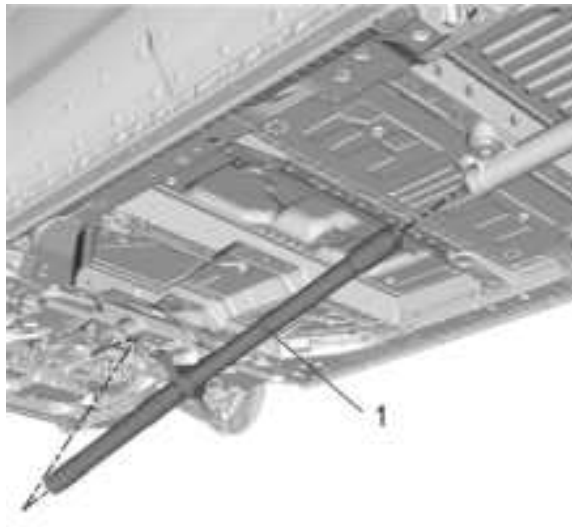


Fig. 38: Propeller Shaft

Courtesy of GENERAL MOTORS COMPANY

7. Install the propeller shaft assembly (1). Refer to [Two-Piece Propeller Shaft Replacement](#) .
8. Remove the support and lower the vehicle.

REAR AXLE SHAFT SEAL REPLACEMENT

Special Tools

EN-45000 Seal Remover

Equivalent regional tools: [Special Tools](#)

Removal Procedure

1. Raise and support the vehicle. [Lifting and Jacking the Vehicle](#)
2. Remove the rear axle shaft. [Rear Wheel Drive Shaft Replacement - Left Side](#) , [Rear Wheel Drive Shaft Replacement - Right Side](#)

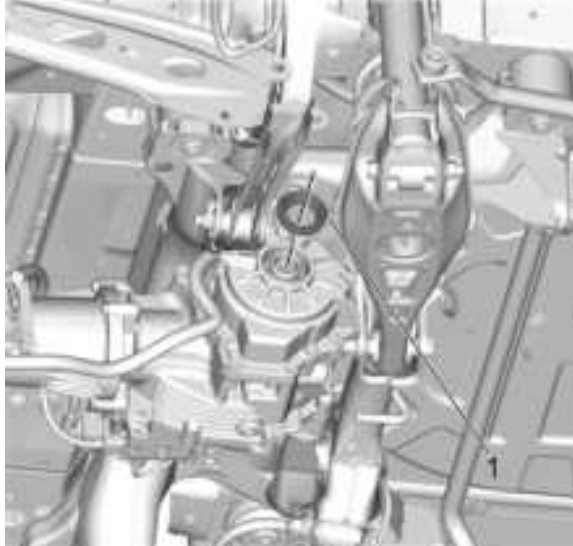


Fig. 39: Rear Axle Shaft Seal

Courtesy of GENERAL MOTORS COMPANY

3. Using the **EN-45000** seal remover, remove the rear axle shaft seal (1).

Installation Procedure

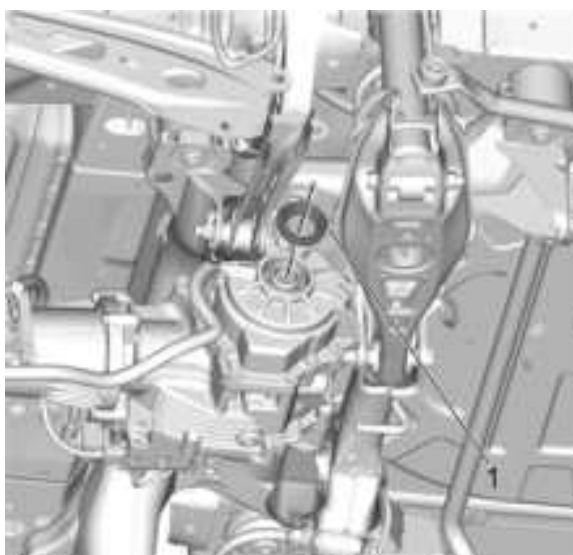


Fig. 40: Rear Axle Shaft Seal

Courtesy of GENERAL MOTORS COMPANY

1. Position the rear axle seal (1) in the rear differential carrier.
2. Using a suitable seal driver, install the rear axle seal (1).
3. Install the rear axle shaft. [Rear Wheel Drive Shaft Replacement - Left Side](#) , [Rear Wheel Drive Shaft Replacement - Right Side](#)
4. Remove the support and lower the vehicle.

DIFFERENTIAL REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. [Lifting and Jacking the Vehicle](#)
2. Remove the underbody rear air deflector. [Underbody Rear Air Deflector Replacement \(Front Wheel Drive\)](#), [Underbody Rear Air Deflector Replacement \(All Wheel Drive\)](#), [Underbody Rear Air Deflector Replacement \(Diesel\)](#)
3. Remove the tires and wheels. [Tire and Wheel Removal and Installation](#)
4. Drain the rear differential assembly. [Axle Lubricant Change](#)
5. Remove the rear wheel drive shafts. [Rear Wheel Drive Shaft Replacement - Left Side](#) , [Rear Wheel Drive Shaft Replacement - Right Side](#)
6. Remove the propeller shaft assembly. [Two-Piece Propeller Shaft Replacement](#)

7. Support the torque tube with a jack stand.

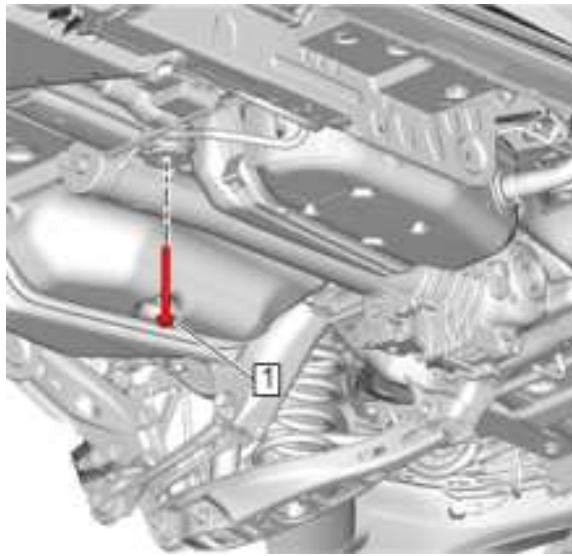


Fig. 41: Torque Tube Mounting Bolt
Courtesy of GENERAL MOTORS COMPANY

8. Remove the front torque tube mounting bracket bolt (1).
9. Support the rear differential assembly with a transmission jack.

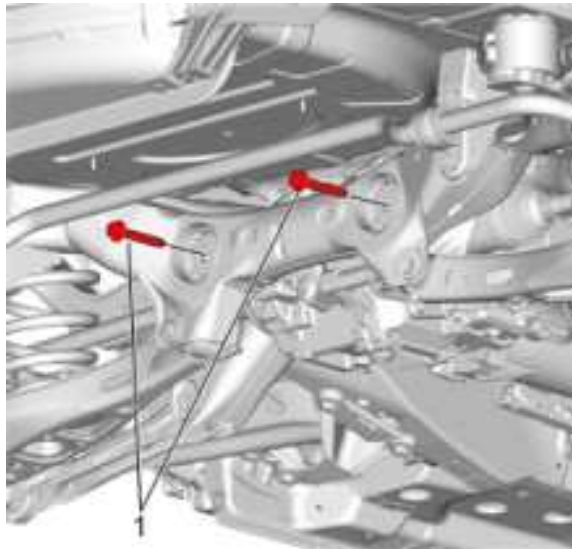
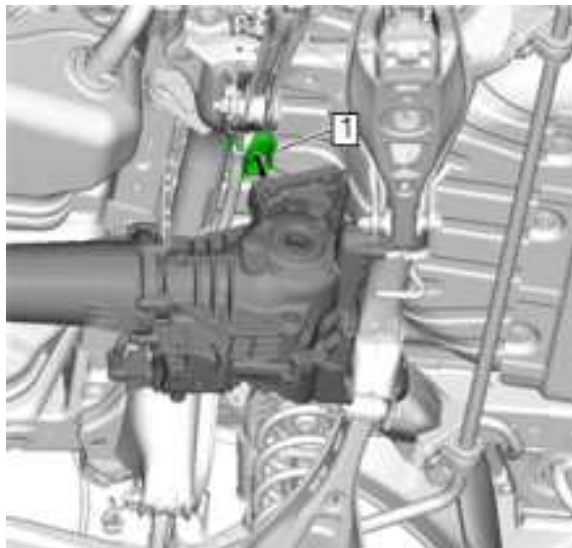


Fig. 42: Rear Differential Drive Mounting Bolts
Courtesy of GENERAL MOTORS COMPANY

10. Remove the rear differential drive mounting bolts (1).



11. Disconnect the electrical connector (1) from the electronic clutch control module.

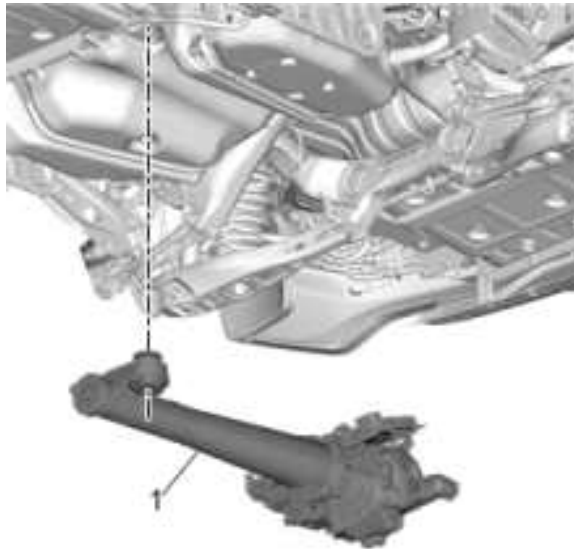


Fig. 44: Rear Differential Assembly

Courtesy of GENERAL MOTORS COMPANY

12. With the aide of an assistant, remove the rear differential assembly (1) from the vehicle.
13. Remove the torque tube assembly mounting bolts from the rear differential assembly. [Driveline Torque Tube Replacement](#)

Installation Procedure

1. Install the torque tube assembly to the rear differential assembly. [Driveline Torque Tube Replacement](#)

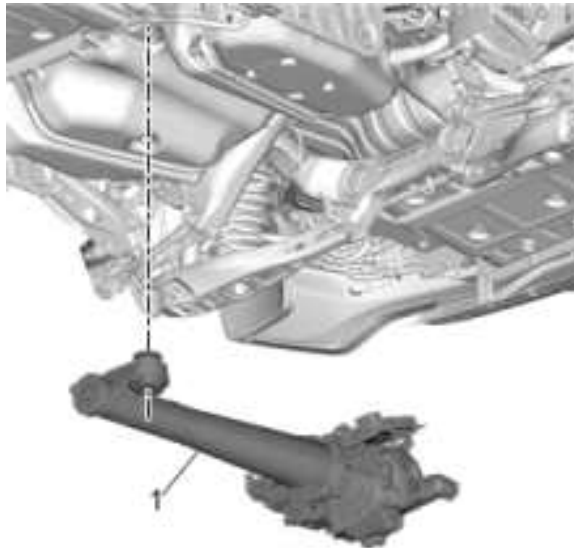


Fig. 45: Rear Differential Assembly

Courtesy of GENERAL MOTORS COMPANY

2. Position the rear differential (1) in the vehicle.

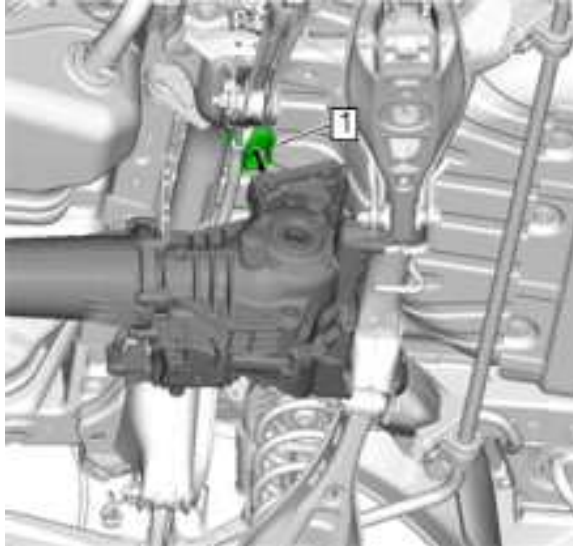


Fig. 46: Electrical Connector

Courtesy of GENERAL MOTORS COMPANY

3. Connect the electrical connector (1) to the electronic clutch control module.

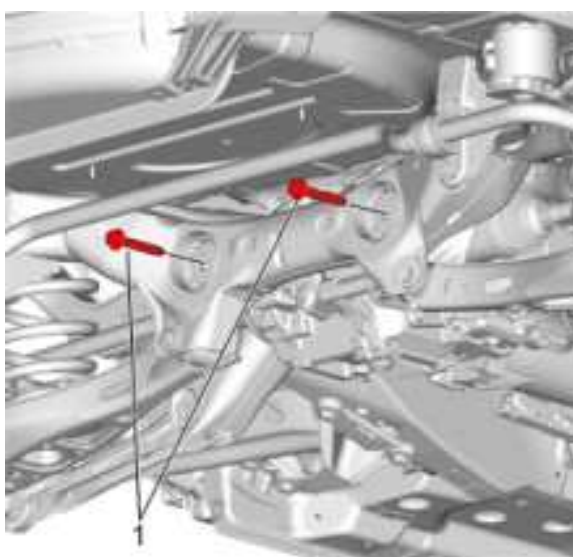


Fig. 47: Rear Differential Drive Mounting Bolts

Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to **Fastener Caution** .

4. Install the rear differential mounting bolts (1).

Tighten

Tighten the bolts to 100 N.m (74 lb ft).

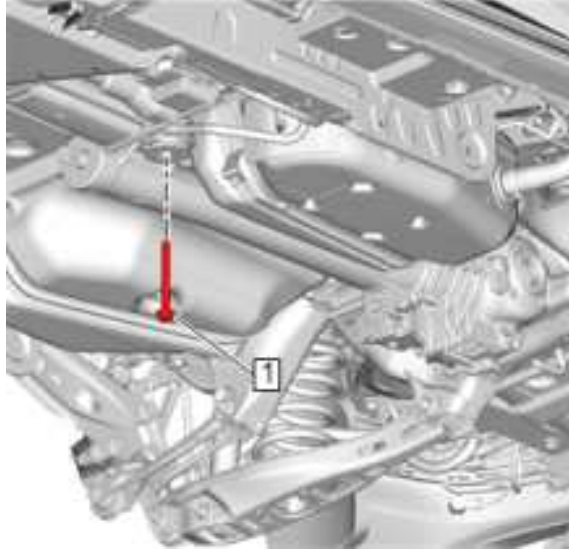


Fig. 48: Torque Tube Mounting Bolt

Courtesy of GENERAL MOTORS COMPANY

5. Install the torque tube bolt (1).

Tighten

Tighten the bolt to 160 N.m (118 lb ft).

6. Install the propeller shaft assembly. [Two-Piece Propeller Shaft Replacement](#)
7. Refill the rear differential assembly. [Axle Lubricant Change](#)
8. Install the rear wheel drive shaft. [Rear Wheel Drive Shaft Replacement - Left Side](#) , [Rear Wheel Drive Shaft Replacement - Right Side](#)
9. Install the tires and wheels. [Tire and Wheel Removal and Installation](#)
10. Install the underbody rear air deflector. [Underbody Rear Air Deflector Replacement \(Front Wheel Drive\)](#), [Underbody Rear Air Deflector Replacement \(All Wheel Drive\)](#), [Underbody Rear Air Deflector Replacement \(Diesel\)](#)
11. Remove the support and lower the vehicle.
12. Program the K47 Rear Differential Clutch Control Module. [Control Module References](#)

TORQUE TUBE ASSEMBLY CLEANING AND INSPECTION



Fig. 49: Torque Tube Assembly

Courtesy of GENERAL MOTORS COMPANY

IMPORTANT: The internal components of the torque tube assembly are not serviced separately. Replace the tube and internal components as an assembly.

1. Check the torque tube for the following conditions:

- Damage to the driver flange
- Cracks or dents on the exterior of the torque tube
- Operation of all bearings
- Machine surfaces for abnormal wear

2. If any of the above conditions are found to be present, replace the torque tube assembly.

REAR DIFFERENTIAL HYDRAULIC SYSTEM SERVICE FILL/BLEED

Rear Differential Hydraulic System Service Fill/Bleed Procedure

The rear differential hydraulic system service bleed is used to remove air from the system, check for proper system and solenoid function, and determine if full pressure can be achieved at the apply piston. Any time a rear differential hydraulic line is disconnected or any repairs are made, this procedure must be performed.

1. Connect scan tool and check the rear differential clutch control module for any DTCs and perform repairs as necessary. The scan tool may not allow the hydraulic system service bleed if certain DTCs are present.
2. Raise vehicle. Refer to [Lifting and Jacking the Vehicle](#) .
3. Remove the fill plug. Fill the Rear Drive Clutch fill hole to the appropriate level with the appropriate fluid. Refer to [Differential Clutch Oil Replacement](#), [Approximate Fluid Capacities](#), and [Adhesives, Fluids, Lubricants, and Sealers](#).
4. Install fill plug. Lower vehicle.
5. Ignition ON.
6. From the scan tool menu, select Rear Differential Clutch Control Module, then select Control Functions, then Rear Differential Hydraulic System Service Bleed.

NOTE: The Rear Differential Clutch Control Module can run this procedure. If this step does not pass, repeat procedure from step 2.

NOTE: Status will change to "Complete" when done.

7.

DESCRIPTION AND OPERATION

REAR DRIVE AXLE DESCRIPTION AND OPERATION

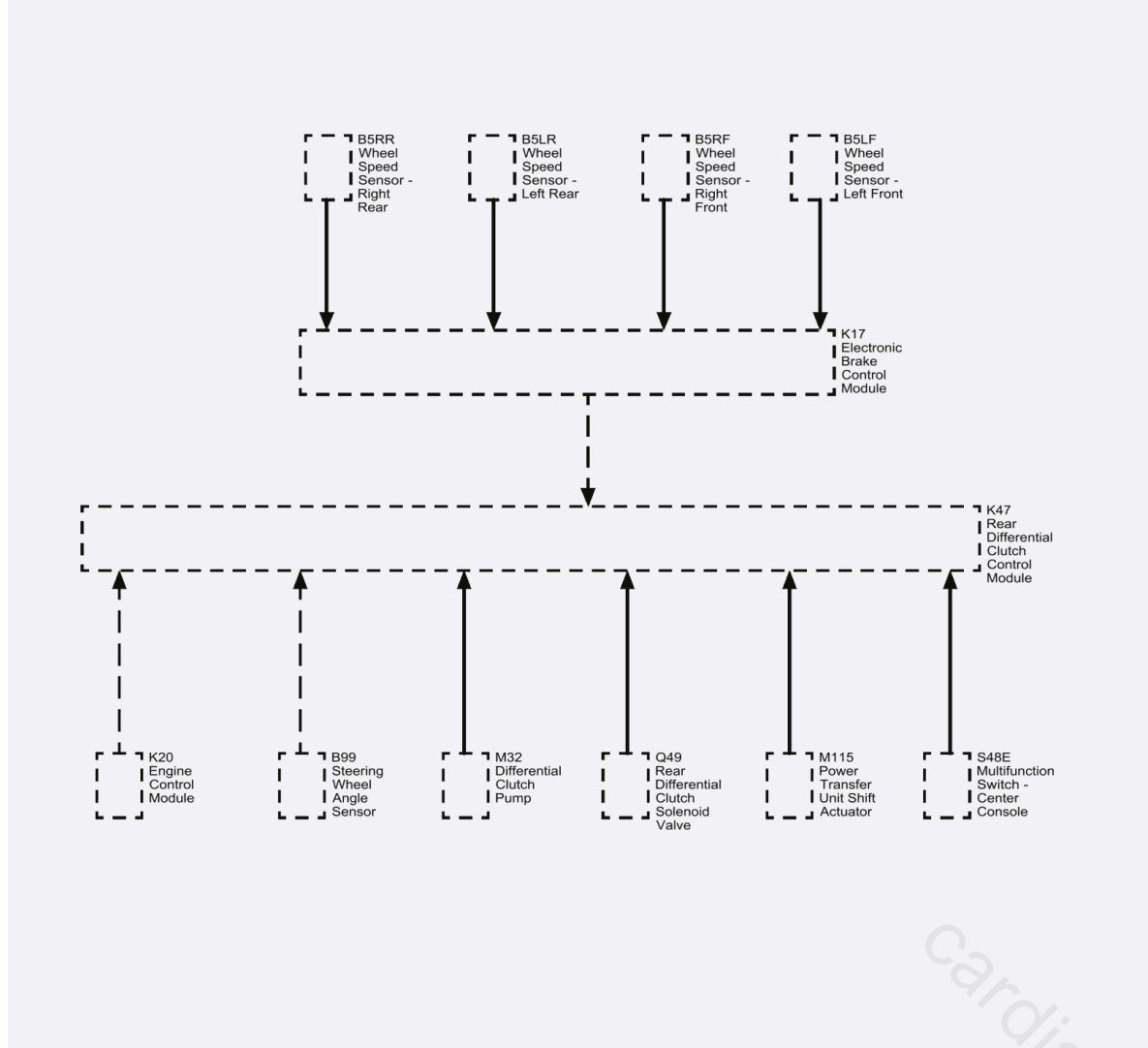


Fig. 50: Rear Drive Axle System Block Diagram
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
B5RR	B5RR Wheel Speed Sensor - Right Rear
B5LR	B5LR Wheel Speed Sensor - Left Rear
B5RF	B5RF Wheel Speed Sensor - Right Front
B5LF	B5LF Wheel Speed Sensor - Left Front
K17	K17 Electronic Brake Control Module
K47	K47 Rear Differential Clutch Control Module
K20	K20 Engine Control Module
B99	B99 Steering Wheel Angle Sensor
M32	M32 Differential Clutch Pump
Q49	Q49 Rear Differential Clutch Solenoid Valve
S48E	S48E Multifunction Switch - Center Console
M115	M115 Power Transfer Unit Shift Actuator

The rear differential clutch control modules function is to control the electronic open differential. The rear differential control module receives a torque command signal from the chassis control module (CCM) according to the driving situation to achieve vehicle dynamics and traction.

The electronic differential system contains the following main components:

- The rear differential clutch control module
- The rear differential clutch motor
- The rear differential multi-disc wet clutches

When the torque signal is received, the rear differential control module actuates the following components:

- The rear differential clutch motor

The hydraulic piston engages the clutch to allow torque to the open differential.

The rear differential clutch control module monitors voltage levels, clutch temperatures, over-current, and circuit failures.

Whenever the hydraulic control system within the electronic differential system is opened, a service bleed procedure with a scan tool needs to be performed to remove any air from the system.

If replacing the rear drive clutch control module, the module needs to be programmed/configured with a rear differential clutch correction factors. The clutch correction factor value is an alphanumeric value that is stored in the rear differential clutch control module and stamped on the rear differential clutch pack housing. The clutch correction factors is based on the valve current-to-torque performance of the individual clutch pack. The clutch correction factor helps to improve vehicle performance by adjusting software parameters to suit the mechanical hardware.

Configuring the rear differential clutch control module with the clutch classification value might be required after certain service procedures are performed. An eight digit values will be used during the programming of the rear differential clutch control module using the scan tool.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/Description
	J-44636-1 Pinion Seal Installer

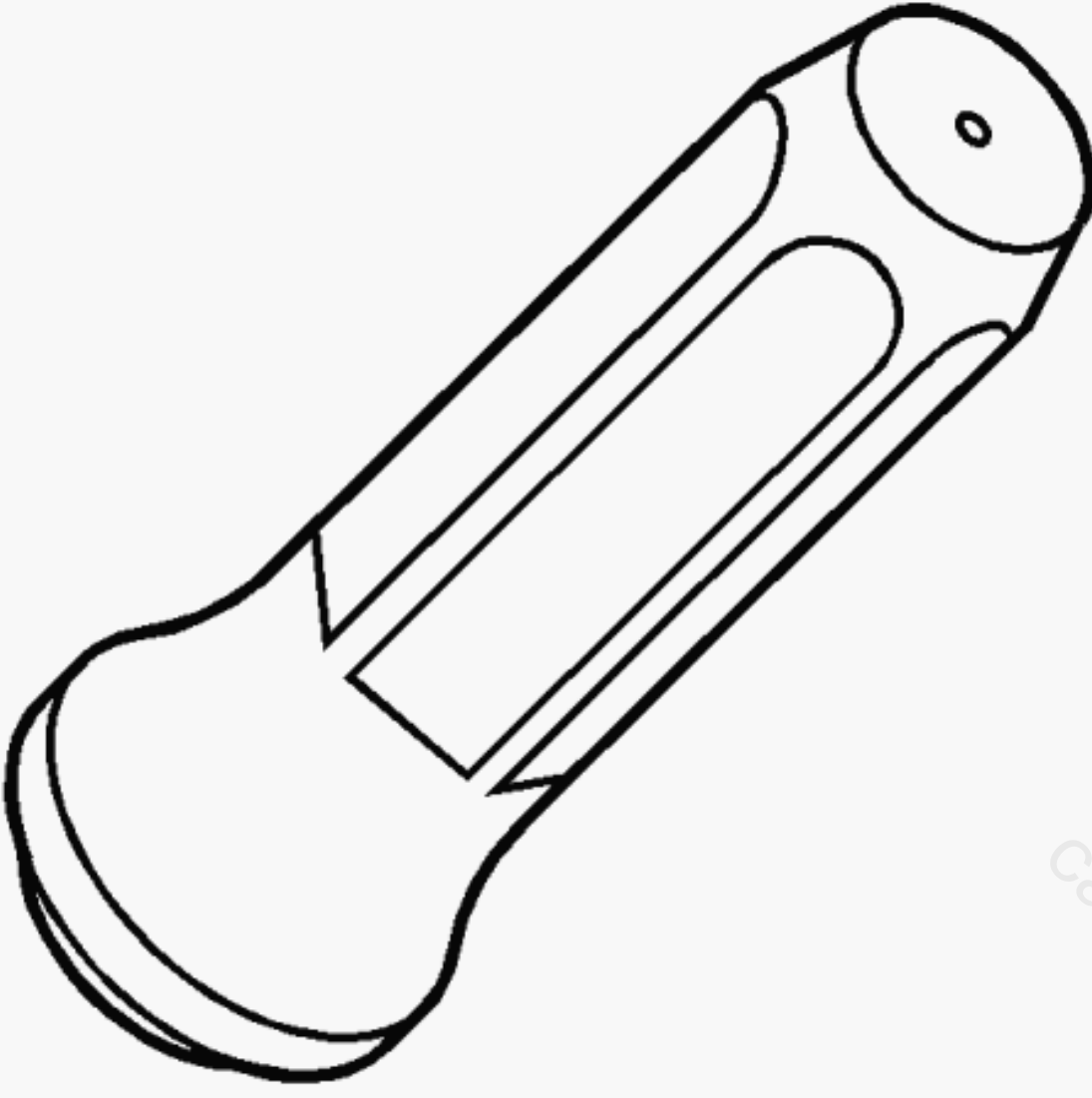
Illustration	Tool Number/Description
	J-44809 Seal Installer



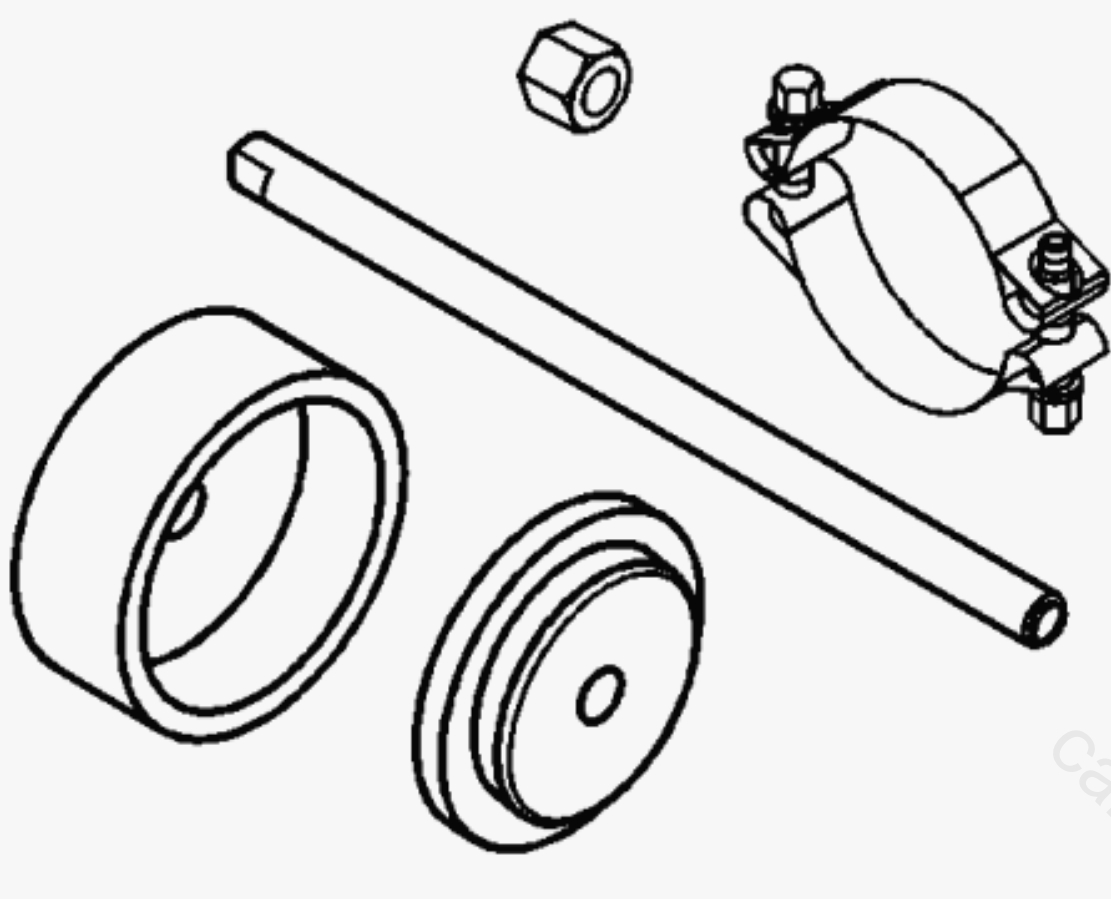
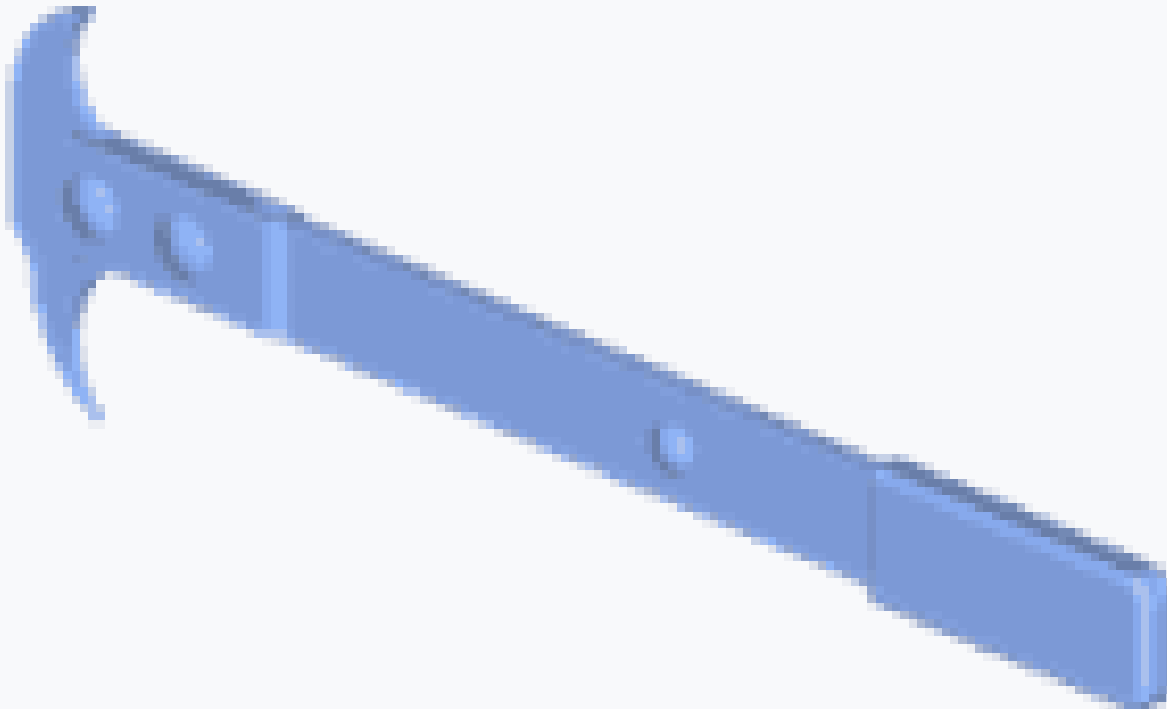
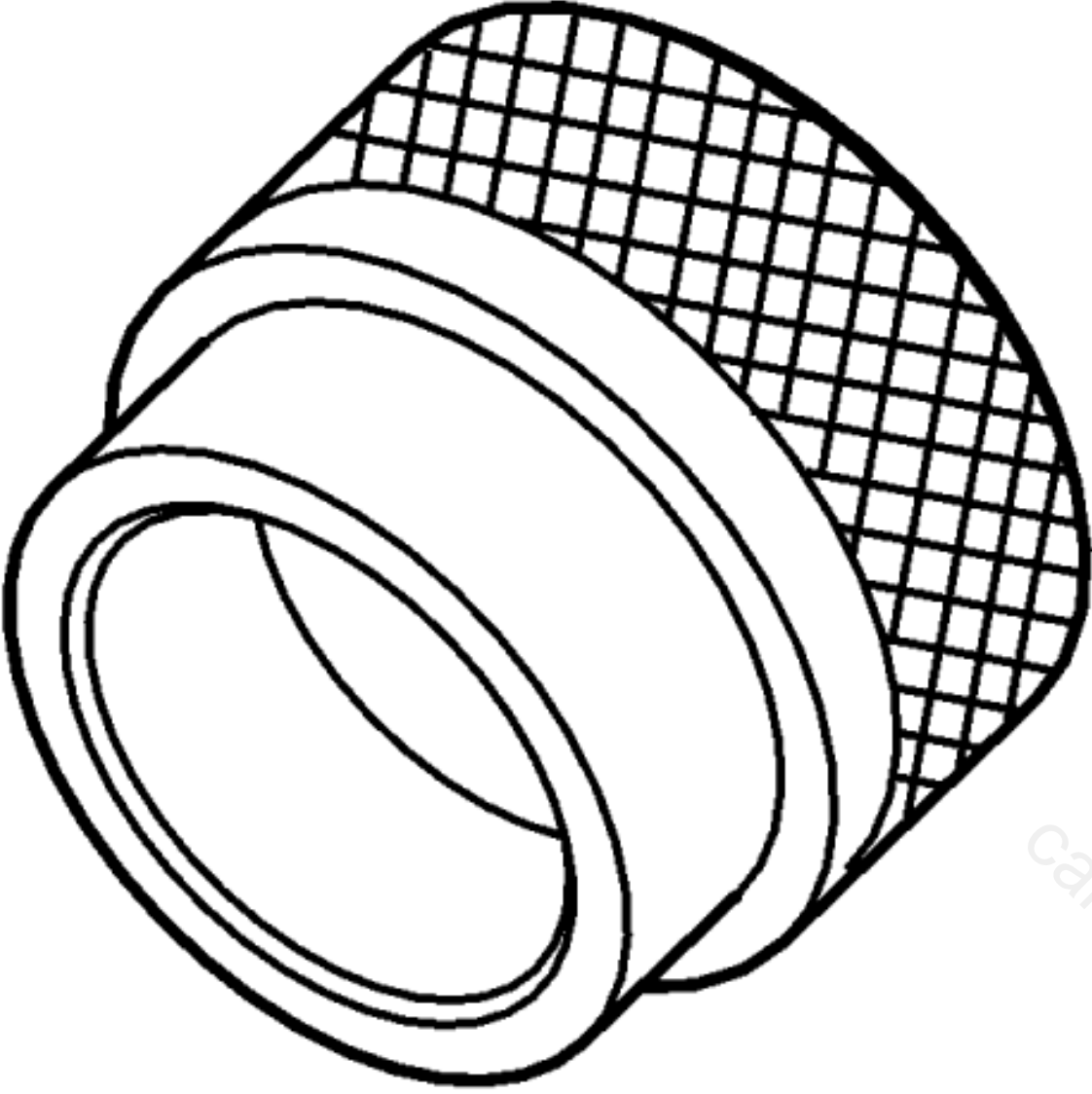
Illustration	Tool Number/Description
	J-45725-A Frame Bushing Installer

Illustration	Tool Number/Description
 The image shows a blue metal tool, identified as a seal remover. It has a long, straight handle with a few small circular indentations. The handle is attached to a curved, hook-like head. The tool is shown against a light gray background.	EN-45000 Seal Remover

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Illustration	Tool Number/Description
	DT-51061 Seal Installer