SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Adapter Bolts to Transmission	50 N.m	37 lb ft
Adapter Studs	31 N.m	23 lb ft
Case Bolts	21 N.m	15 lb ft
Crossmember Bolts	95 N.m	70 lb ft
Drain Plug	25 N.m	18 lb ft
Encoder Motor Bolts	10 N.m	89 lb in
Encoder Motor Bracket Bolt	10 N.m	89 lb in
Fill Plug	25 N.m	18 lb ft
Transfer Case Mounting Nuts	50 N.m	37 lb ft
Transfer Case Shield Bolts	20 N.m	15 lb ft
Vehicle Speed Sensors	17 N.m	13 lb ft
Vent	6 N.m	53 lb in

CAPACITIES - APPROXIMATE FLUID

Capacities - Approximate Fluid

Application	Specification	
	Metric	English
DEXRON(R) lll Fluid GM P/N 12346143 (Canadian P/N 10952622)	1.4 liters	1.5 quarts

SEALERS, ADHESIVES, AND LUBRICANTS

Sealers, Adhesives, and Lubricants

Application	Type of Material	GM Part Number	
		United States	Canada
Drain Plug	Pipe Sealant	12346004	10953480
Fill Plug	Pipe Sealant	12346004	10953480
Front Output Shaft Cup Plug	Threadlocker	12345382	10953489
Rear Case Half to Front Case Half	RTV Sealant	12345739	10953541
Transfer Case Fluid	DEXRON(R)III	12346143	10952622
Vehicle Speed Sensor O-Ring	Transfer Case Fluid	12346143	10952622

Vent	Pipe Sealant	12346004	10953480

COMPONENT LOCATOR

TRANSFER CASE DISASSEMBLED VIEW

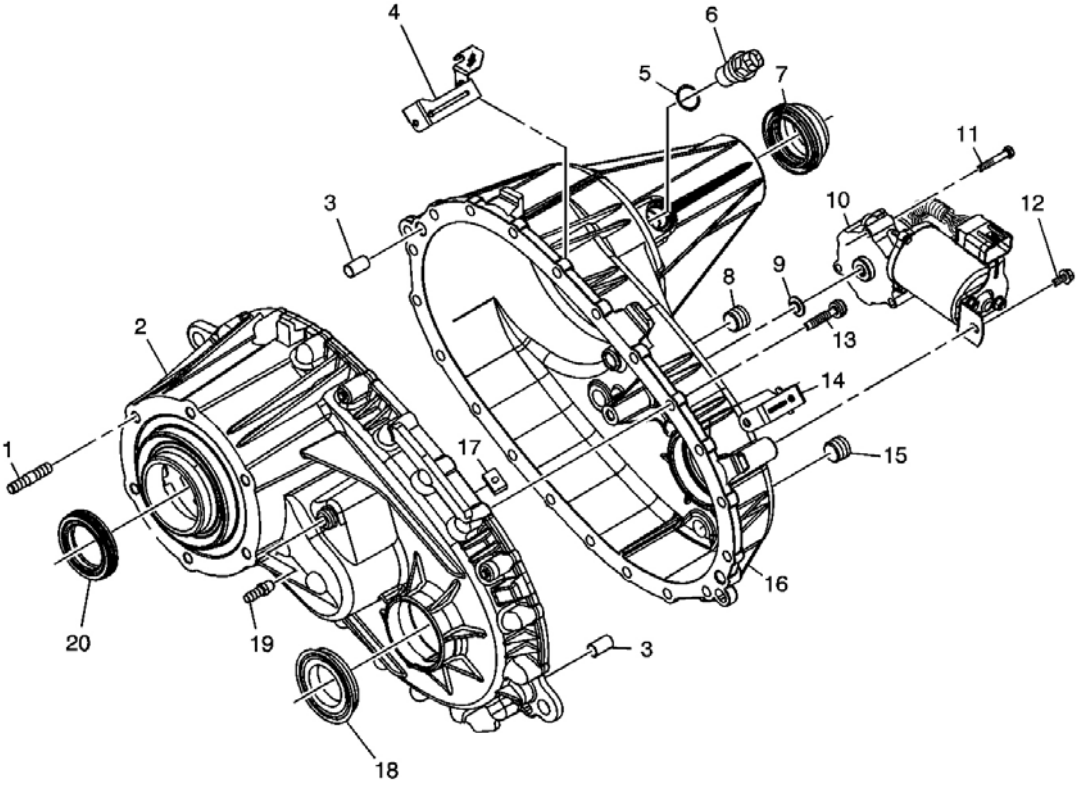


Fig. 1: Transfer Case Component Views
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 1

Callout	Component Name
1	Adapter Stud
2	Front Case Half
3	Location Pin
3	Location Pin
4	Fuel Line Bracket
5	Vehicle Speed Sensor O-Ring Seal
6	Vehicle Speed Sensor
7	Rear Output Shaft Seal
8	Fill Plug

9	Shift Detent Lever Seal
10	Encoder Motor
11	Encoder Motor Bolt
12	Encoder Motor Bracket Bolt
13	Case Half Bolt
14	Wiring Harness Bracket
15	Drain Plug
16	Rear Case Half
17	Magnet
18	Front Output Shaft Seal
19	Vent
20	Input Shaft Seal

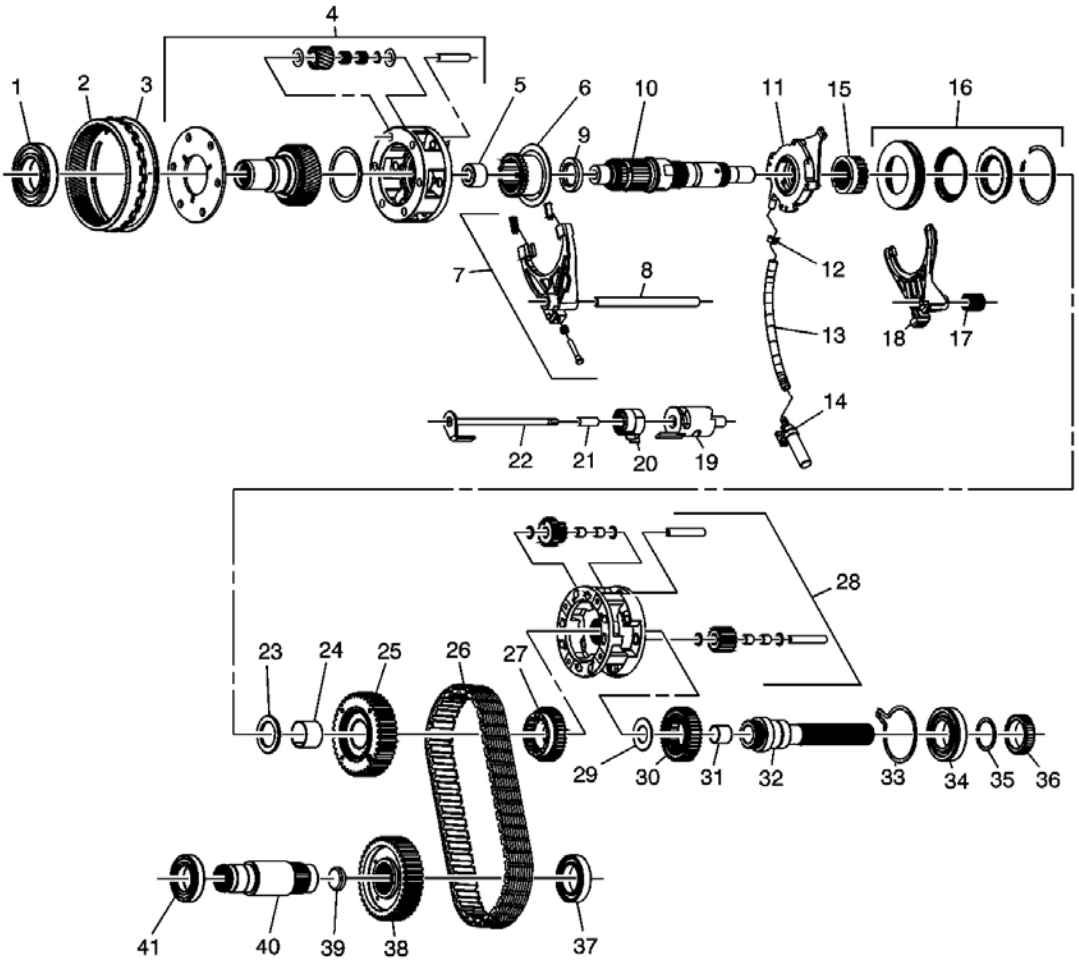


Fig. 2: Internal Component Views
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2

Callout	Component Name
1	Input Gear Bearing
2	Annulus Gear
3	Annulus Gear Retaining Ring
4	High/Low Planetary Carrier Assembly
5	Mainshaft Front Support Bearing
6	High/Low Range Sleeve
7	High/Low Range Shift Fork Assembly
8	Shift Fork Shaft
9	Input Gear Thrust Washer
10	Mainshaft
11	Oil Pump
12	Oil Pump Hose Clamp
13	Oil Pump Hose
14	Oil Pump Screen
15	Inner Lockup Hub
16	Lockup Shift Assembly
17	Shift Fork Shaft Spring
18	Lockup Shift Fork
19	Shift Detent Lever Cam
20	Shift Detent Lever Shaft Spring
21	Shift Detent Lever Shaft Sleeve
22	Shift Detent Lever Shaft
23	Drive Sprocket Thrust Washer
24	Drive Sprocket Bushing
25	Drive Sprocket
26	Drive Chain
27	Front Sun Gear
28	Planetary Differential Assembly
29	Rear Output Shaft Thrust Washer
30	Rear Sun Gear
31	Mainshaft Rear Support Bushing
32	Rear Output Shaft
33	Rear Output Shaft Bearing Outer Retaining Ring
34	Rear Output Shaft Bearing
35	Rear Output Shaft Bearing Retaining Ring
36	Speed Reluctor Wheel
37	Front Output Shaft Rear Bearing
38	Driven Gear
39	Front Output Shaft Cup Plug

40	Front Output Shaft
41	Front Output Shaft Front Bearing

SCHEMATIC AND ROUTING DIAGRAMS

TRANSFER CASE CONTROL SCHEMATICS

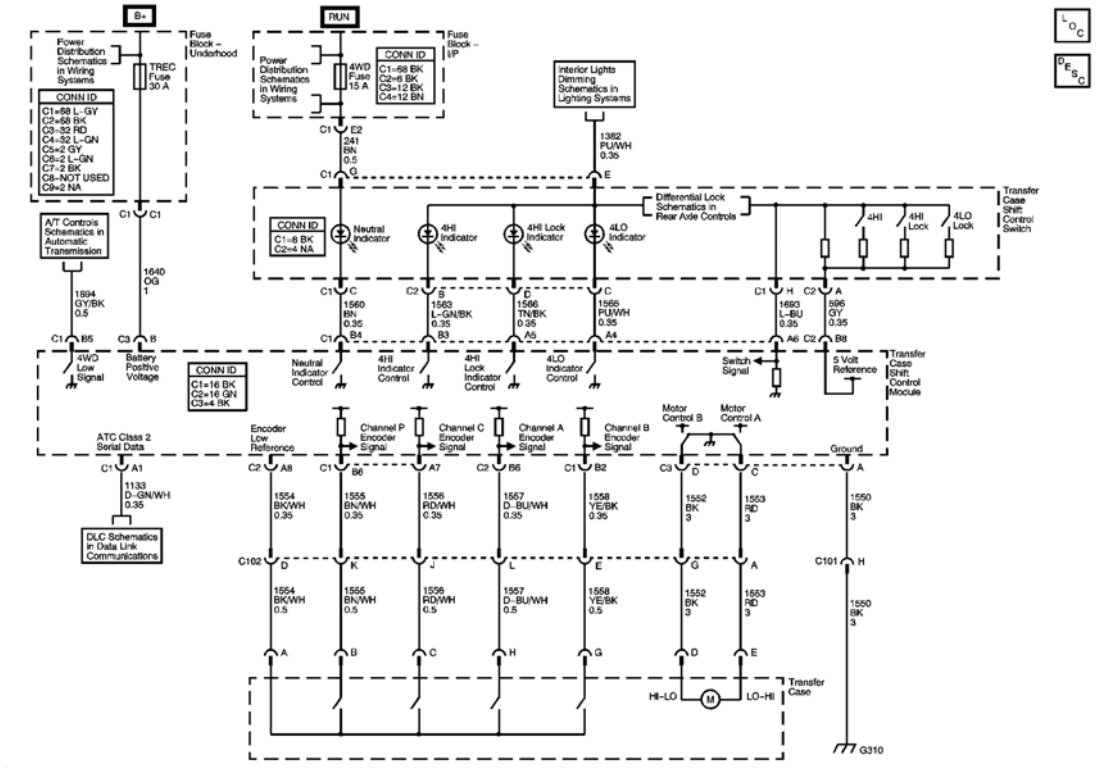


Fig. 3: Transfer Case Control
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

TRANSFER CASE CONTROL COMPONENT VIEWS

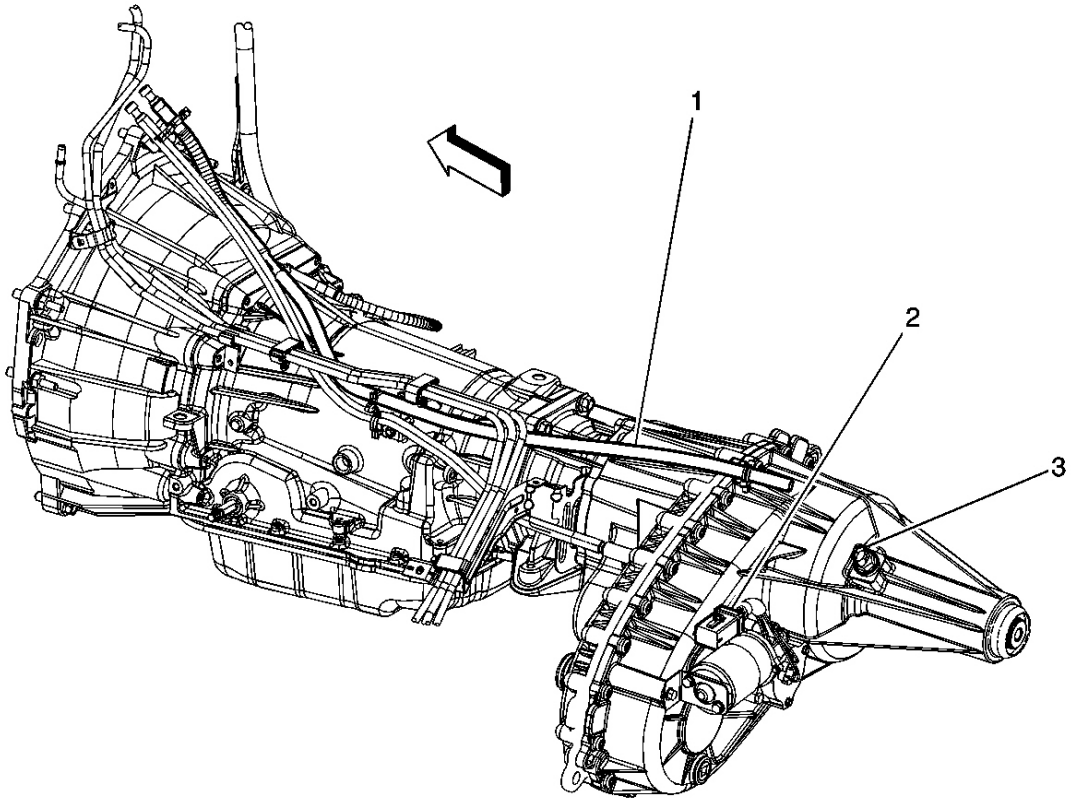


Fig. 4: Transfer Case Control Component Views
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 4

Callout	Component Name
1	Transfer Case
2	Transfer Case Encoder/Motor Connector
3	Vehicle Speed Sensor (VSS)

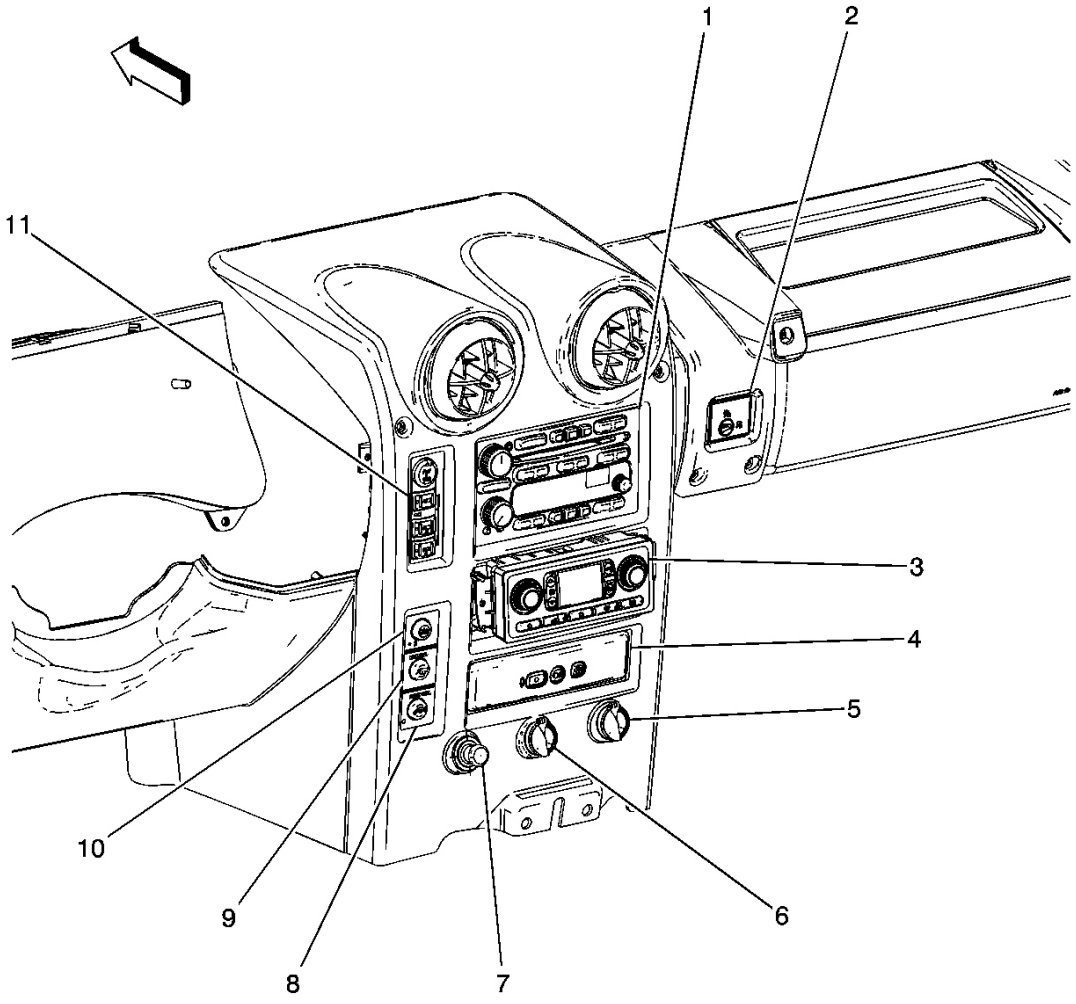


Fig. 5: Center Of I/P Component Views
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 5

Callout	Component Name
1	Radio
2	Inflatable Restraint I/P Module Disable Switch
3	HVAC Control Assembly
4	OnStar(R) Button Assembly
5	Auxiliary Power Outlet - Front 1
6	Auxiliary Power Outlet - Front 2
7	Cigar Lighter
8	Ride Height Switch
9	Tow/Haul Switch

10	Traction Control Switch
11	Transfer Case Shift Control Switch

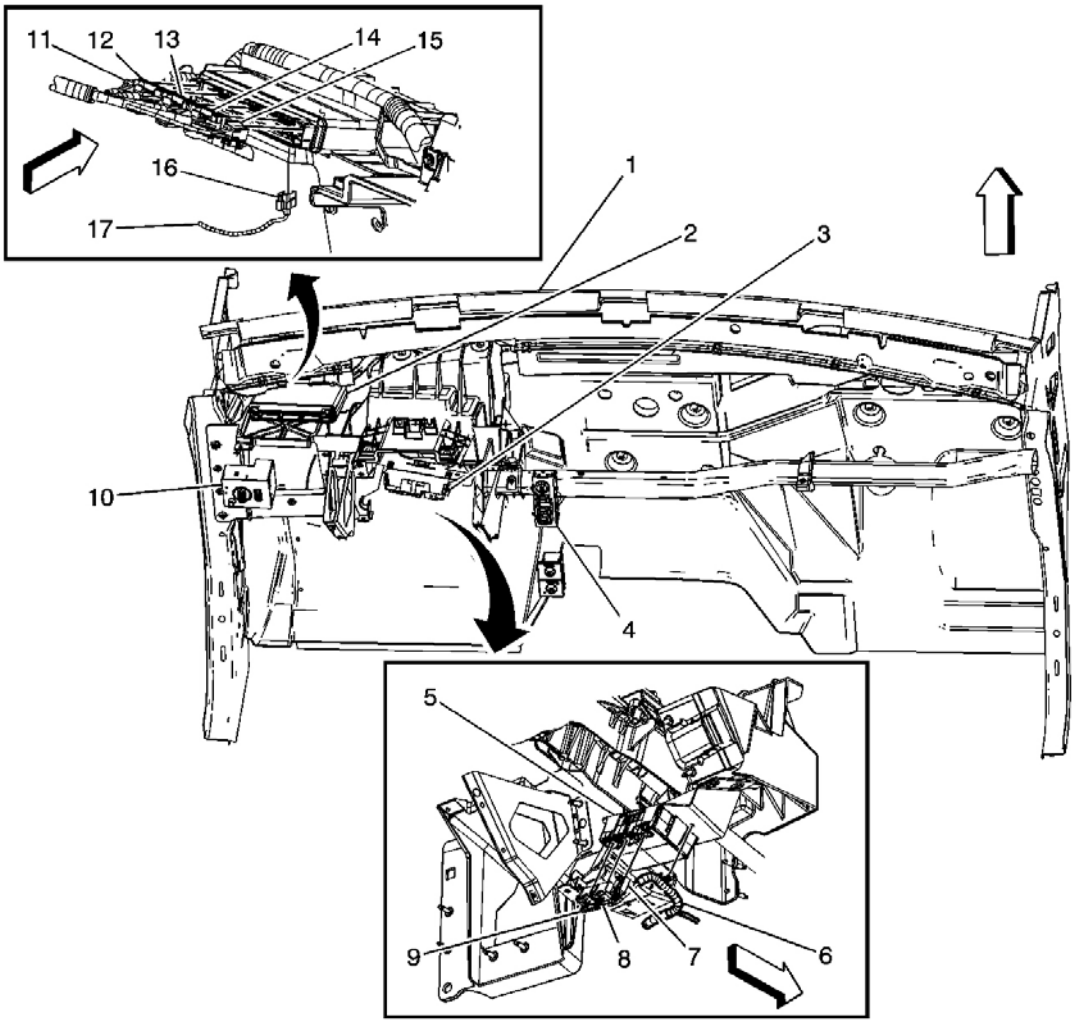


Fig. 6: Left Center Of I/P Component Views
Courtesy of GENERAL MOTORS CORP.

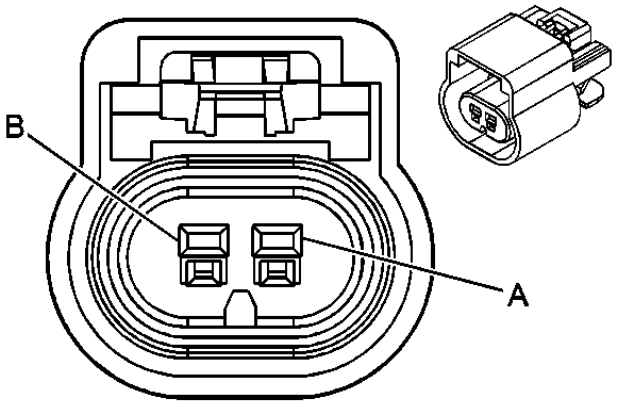
Callouts For Fig. 6

Callout	Component Name
1	Instrument Panel
2	Body Control Module (BCM)
3	Transfer Case Shift Control Module
4	Transfer Case Shift Control Switch
5	Transfer Case Shift Control Module

6	I/P Harness
7	Transfer Case Shift Control Module - C3
8	Transfer Case Shift Control Module - C2
9	Transfer Case Shift Control Module - C1
10	Headlamp and Panel Dimmer Switch
11	BCM - C1
12	BCM - C2
13	BCM - C3
14	BCM - C4
15	BCM - C5
16	BCM - C6
17	Body Harness

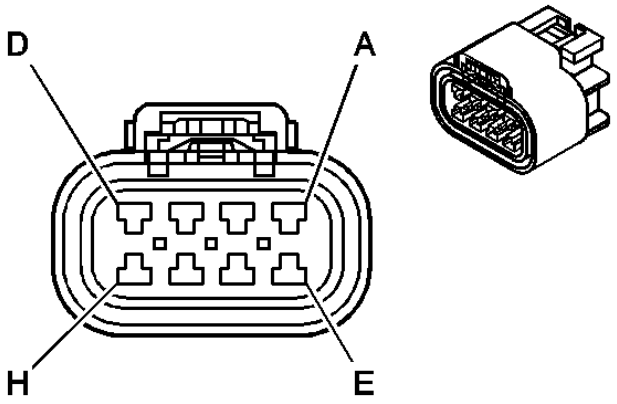
TRANSFER CASE CONTROL CONNECTOR END VIEWS

Rear Differential Lock Actuator Terminal Identification



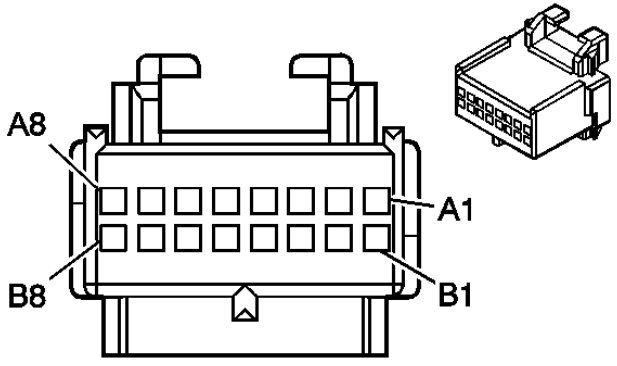
Connector Part Information		• **15326801** • **2-Way F GT 150 Series (BK)**	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	BK	1725	Rear Differential Lock - Low - Reference
B	L-GN	2659	Rear Differential Lock - High - Control

Transfer Case Encoder Motor Terminal Identification



Connector Part Information		• 15326906 • 8-Way F GT 280 SLD (BK)	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	BK/WH	1554	Encoder Low Reference
B	BN/WH	1555	Channel P Encoder - Signal
C	RD/WH	1556	Channel C Encoder - Signal
D	BK	1552	Motor Control B
E	RD	1553	Motor Control A
F	-	-	Not Used
G	YE/BK	1558	Channel B Encoder - Signal
H	D-BU/WH	1557	Channel A Encoder - Signal

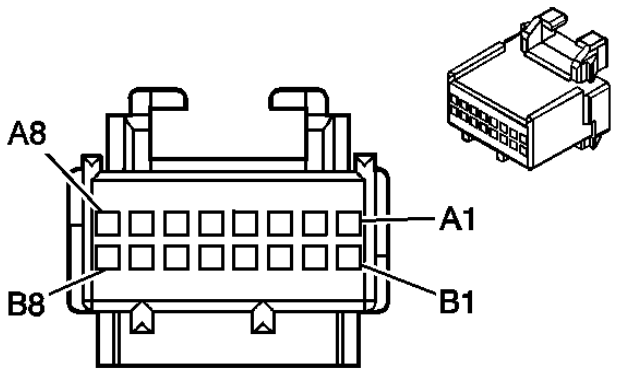
Transfer Case Shift Control Module - C1 Terminal Identification



	• 12084944

Connector Part Information		• 16-Way F Micro-Pack 100 Series (BK)	
Pin	**Wire Color**	**Circuit No.**	**Function**
A1	D-GN/WH	1133	ATC Class 2 Serial Data
A2	L-GN	2659	Rear Differential Lock - High - Control
A3	PK	1561	Rear Differential Lock Indicator Control
A4	PU/WH	1565	4 'LO' Indicator - Control
A5	TN/BK	1566	4 'HI' Indicator - Control
A6	L-BU	1693	Switch Signal
A7	RD/WH	1556	Channel C Encoder - Signal
A8	-	-	Not Used
B1	-	-	Not Used
B2	YE/BK	1558	Channel B Encoder - Signal
B3	L-GN/BK	1563	4 'HI' Indicator - Control
B4	BN	1560	Neutral Indicator Control
B5	GY/BK	1694	4WD Low Signal
B6	BN/WH	1555	Channel P Encoder - Signal
B7	-	-	Not Used
B8	BK	1725	Rear Differential Lock - Low - Reference

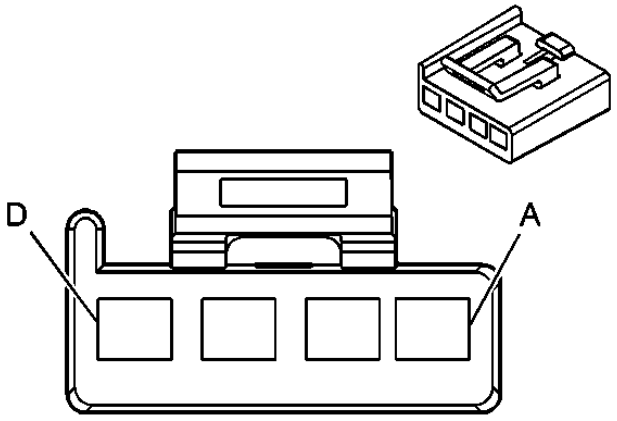
Transfer Case Shift Control Module - C2 Terminal Identification



Connector Part Information		• 12110259 • 16-Way F Micro-Pack 100 Series (GN)	
Pin	**Wire Color**	**Circuit No.**	**Function**
A1-A7	-	-	Not Used
A8	BK/WH	1554	Encoder Low Reference
B1-B5	-	-	Not Used
B6	D-BU/WH	1557	Channel A Encoder - Signal

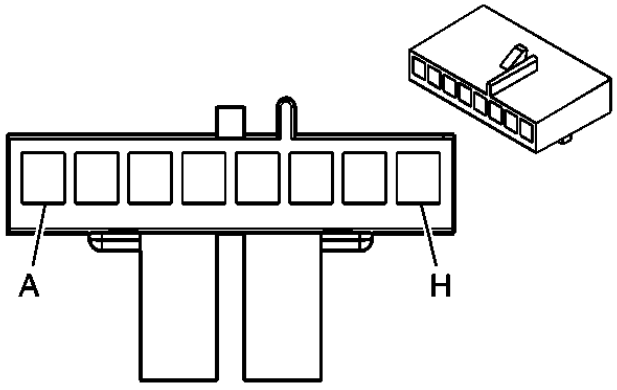
B7	-	-	Not Used
B8	GY	596	5-Volt Reference

Transfer Case Shift Control Module - C3 Terminal Identification



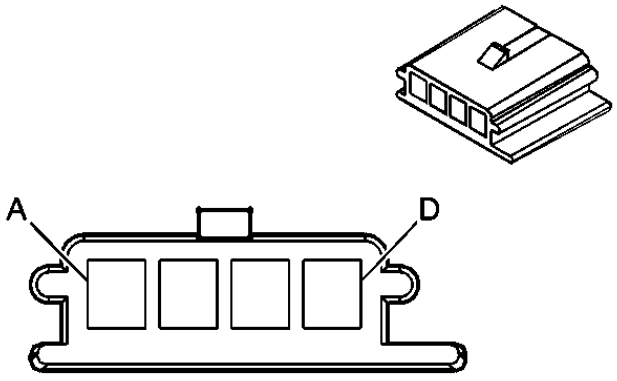
Connector Part Information		• **12052856** • **4-Way F Metri-Pack 280 Series (BK)**	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	BK	1550	Ground
B	OG	1640	Battery Positive Voltage
C	RD	1553	Motor Control A
D	BK	1552	Motor Control B

Transfer Case Shift Control Switch - C1 Terminal Identification



Connector Part Information		• 12064862 • 8-Way F Metri-Pack 150 Series (BK)	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	BK	1050	Ground
B	PK	1561	Differential Lock Indicator Control
C	BN	1560	Neutral Indicator Control
D	-	-	Not Used
E	PU/WH	1382	4LO LED Dimming Signal
F	BN/WH	230	Instrument Panel Lamps Dimming Control
G	BN	241	Ignition 3 Voltage
H	L-BU	1693	Switch Signal

Transfer Case Shift Control Switch - C2 Terminal Identification



Connector Part Information		• 12045813 • 4-Way F Metri-Pack 150 Series (WH)	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	GY	596	5-Volt Reference
B	L-GN/BK	1563	4 'HI' Indicator - Control
C	PU/WH	1565	4 'LO' Indicator - Control
D	TN/BK	1566	4 'HI' Indicator - Control

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - TRANSFER CASE

Begin the system diagnosis with the **Diagnostic System Check - Transfer Case** . The Diagnostic System Check will provide the following information:

- The identification of the control modules that command the system
- The ability of the control modules to communicate through the serial data circuit
- The identification of any stored DTCs and their status

The use of the Diagnostic System Check will identify the correct procedure for diagnosing the system and where the procedure is located.

DIAGNOSTIC SYSTEM CHECK - TRANSFER CASE

These diagnostic procedures will help you to find and repair full time 4WD transfer case (FT4WD) system malfunctions. This service category also contains information for repairing FT4WD system malfunctions. For best results, use the diagnostic tables, and follow the sequence listed below:

1. Perform the Transfer Case Diagnostic System Check. All FT4WD diagnostics must begin with the Transfer Case Diagnostic System Check. The Transfer Case Diagnostic System Check determines the following:
    - Proper SERVICE 4WD indicator operation.
    - Ability of the transfer case shift control module to communicate through the data link connector (DLC)
    - Existence of FT4WD DTCs
2. Refer to the diagnostic table as directed by the Transfer Case Diagnostic System Check. The diagnostic tables will help enable you to diagnose any FT4WD system malfunction. Bypassing these procedures may result in the following:
    - Extended Diagnostic Time
    - Incorrect Diagnosis
    - Incorrect Parts Replacement
3. Repeat the Transfer Case Diagnostic System Check after you perform any repair or diagnostic procedures. This will verify that you correctly performed the repair. This will also ensure that other malfunctions do not exist.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: Lack of communication may be due to a partial malfunction of the class 2 serial data circuit or due to a total malfunction of the class 2 serial data circuit. The specified procedure will determine the particular condition.

3: A fuse failure will cause no communication this step has you check for this condition.

4: This step determines if the fuse blows when the ignition is turned on.

5: This step determines if there is a short to ground in the battery positive circuit causing the fuse to blow.

6: This step refers to the table for DTC C0306 for further diagnosis if a transfer case mode change is causing the fuse to blow.

7: The presence of DTCs indicates that the transfer case shift control module has detected a fault. Go to

symptoms for other concerns.

8: The presence of DTCs which begin with "U" indicate some other module is not communicating. The specified procedure will compile all the available information before tests are performed.

9: Vehicle speed is provided to the transfer case shift control module via Class 2 and can effect the setting of DTC C0300. Perform the diagnostics for powertrain DTCs P0502 and P0503 first.

Diagnostic System Check - Transfer Case

Step	Action	Yes	No
1	Install a scan tool. Does the scan tool power up?	Go to **Step 2**	Go to **Scan Tool Does Not Power Up** in Data Link Communications
2	1. Turn ON the ignition, with the engine OFF. 2. Attempt to establish communication with the transfer case shift control module. Does the scan tool communicate with the transfer case shift control module?	Go to **Step 7**	Go to **Step 3**
3	1. Turn off the ignition. 2. Check the underhood TREC fuse. Did the TREC fuse blow?	Go to **Step 4**	Go to **Scan Tool Does Not Communicate with Class 2 Device** in Data Link Communications
4	Replace the TREC fuse. Does the ATC fuse blow immediately?	Go to **Step 5**	Go to **Step 6**
5	Check the battery positive circuit for a short to ground. Was the condition found and corrected?	Go to **Step 2**	Go to Transfer Case Shift Control Module Replacement.
6	1. Start the Engine 2. Attempt to shift the transfer case to different modes. 3. Check the underhood TREC fuse. Did the TREC fuse blow?	Go to **DTC C0306**	Go to **Step 2**
7	Select the transfer case shift control module display DTCs function on the scan tool.		

	Does the scan tool display any DTCs?	Go to **Step 8**	Go to **Symptoms - Transfer Case**
8	Does the scan tool display any DTCs which begin with a "U"?	Go to **Scan Tool Does Not Communicate with Class 2 Device** in Data Link Communications	Go to **Step 9**
9	Does the scan tool display DTC P0502 or P0503?	Go to Applicable Powertrain OBD Diagnostic System Check	Go to **Diagnostic Trouble Code (DTC) List**

SCAN TOOL OUTPUT CONTROLS

Scan Tool Output Controls

Scan Tool Output Control	Additional Menu Selections	Description
Refer to the scan tool manual for complete scan tool operating instructions.		
4WD High Indicator Light	-	This function allows the technician to command the 4WD high indicator light, within the transfer case shift control switch, on or off.
4WD High Lock Indicator Light	-	This function allows the technician to command the 4WD high lock indicator light, within the transfer case shift control switch, on or off.
4WD Low Lock Indicator Light	-	This function allows the technician to command the 4WD low lock indicator light, within the transfer case shift control switch, on or off.
Differential Lock Indicator Light	-	This function allows the technician to command the differential indicator light, within the transfer case shift control switch, on or off.
Motor A Driver - High	-	This function allows the technician to request the high side driver for the motor control A circuit, thus allowing the technician to test the circuit and the transfer case shift control module for their ability to provide battery voltage to the motor.
Motor A Driver - Low	-	This function allows the technician to request the low side driver for the motor control A circuit, thus allowing the technician to test the circuit and the transfer case shift control module for their ability to provide a ground path for the motor.
Motor B Driver - High	-	This function allows the technician to request the high side driver for the motor control B circuit, thus allowing the technician to test the circuit and the transfer case shift control module for their ability to provide battery voltage to the motor.
Motor B Driver - Low	-	This function allows the technician to request the low side driver for the motor control B circuit, thus allowing the technician to test the circuit and the transfer case shift control module for their ability to provide a ground path for the motor.
Neutral Indicator Light	-	This function allows the technician to command the neutral indicator light, within the transfer case shift control switch, on or off.

SCAN TOOL DATA LIST

Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Engine is at Idle, Upper Radiator Hose is Hot, Closed Throttle, Gear is in Park or Neutral, and Accessories are OFF.			
4WD High Indicator Light	Transfer Case Data	On/Off	Off
4WD High Lock Indicator Light	Transfer Case Data	On/Off	Off
4WD Low Active	Transfer Case Data	Yes/No	No
4WD Low Lock Indicator Light	Transfer Case Data	On/Off	Off
ATC Application	Transfer Case Data	Number	Number
Encoder Circuit A	Transfer Case Data	On/Off	On
Encoder Circuit B	Transfer Case Data	On/Off	On
Encoder Circuit C	Transfer Case Data	On/Off	On
Encoder Circuit P	Transfer Case Data	On/Off	On
Encoder Gear Position	Transfer Case Data	4WD High/4WD Low/AWD	4WD High
Encoder Supply Voltage	Transfer Case Data	Volts	2.55
Ign. Cycles Since Last Current DTC	Transfer Case Data	Count	Varies
Mode Switch Return Voltage	Transfer Case Data	Volts	0-5 V
Mode Switch Selected	Transfer Case Data	Transfer Case Mode	Inactive
Motor A High Side Driver Status	Transfer Case Data	On/Off	NO
Motor A Low Side Driver Status	Transfer Case Data	On/Off	NO
Motor B High Side Driver Status	Transfer Case Data	On/Off	NO
Motor B Low Side Driver Status	Transfer Case Data	On/Off	NO
Neutral Indicator Light	Transfer Case Data	On/Off	Off
	Transfer Case		

Rear Axle Lock	Data	On/Off	Off
Rear Axle Lock Indicator Lamp	Transfer Case Data	On/Off	Off
Rear Axle Lock Request	Transfer Case Data	On/Off	Off
Software ID	Transfer Case Data	Part Number	Part Number

SCAN TOOL DATA DEFINITIONS

4WD High Indicator Light

The scan tool displays On or Off. This parameter indicates On when the transfer case shift control module commands the rear 4WD high indicator light On.

4WD High Lock Indicator Light

The scan tool displays On or Off. This parameter indicates On when the transfer case shift control module commands the rear 4WD high lock indicator On.

4WD Low Active

The scan tool displays Yes or No. This parameter indicates Yes when the transfer case is currently in the 4WD low lock mode.

4WD Low Lock Indicator Light

The scan tool displays On or Off. This parameter indicates On when the transfer case shift control module commands the rear 4WD low lock indicator light On.

ATC Application

The scan tool displays a numeric value. This parameter indicates the model number assigned to the transfer case.

Encoder Circuits A, B, C, and P

The scan tool displays On or Off. If a high voltage is detected then the circuit is Off. If the encoder motor grounds the circuit and pulls the voltage low then the circuit is On. The encoder circuits allow the transfer case shift control module to determine what position the transfer case is in.

Encoder Gear Position

The scan tool displays the mode the transfer case is currently in.

Encoder Supply Voltage

The scan tool displays a range from 0-25 volts. This parameter indicates the voltage supplied to the encoder motor.

GM Part Number

The scan tool displays a numeric value. This parameter indicates the GM part number assigned to the module package (module, software, and calibrations).

Ign. Cycles Since Last Current DTC

The scan tool displays a numeric value. This parameter indicates how many ignition cycles have occurred since last current DTC was set.

Mode Switch Return Voltage

The scan tool displays a range of 0-5 volts. This parameter indicates the return voltage from the transfer case shift control switch.

Mode Switch Selected

The scan tool displays the current mode selected. This parameter indicates the transfer case shift control switch button currently depressed by the driver.

Motor A High Side Driver

The scan tool displays On or Off. This parameter indicates On when battery voltage is applied to the Motor A circuit.

Motor A Low Side Driver

The scan tool displays On or Off. This parameter indicates On when ground is applied to the Motor A circuit.

Motor B High Side Driver

The scan tool displays On or Off. This parameter indicates On when battery voltage is applied to the Motor B circuit.

Motor B Low side Driver

The scan tool displays On or Off. This parameter indicates On when ground is applied to the Motor B circuit.

Neutral Indicator Light

The scan tool displays On or Off. This parameter indicates On when the transfer case shift control module

commands the neutral indicator light On.

Rear Axle Lock

The scan tool displays On or Off. This parameter indicates On when the transfer case shift control module commands the rear axle lock solenoid to be applied.

Rear Axle Lock Indicator Light

The scan tool displays On or Off. On is displayed when the transfer case shift control module requests the rear axle lock indicator On.

Rear Axle Lock Request

The scan tool displays On or Off. On is displayed when the transfer case shift control module receives a rear axle lock request from the switch or a scan tool.

Software ID

The scan tool displays a numeric value. This parameter indicates which version of software is currently installed in the transfer case shift control module.

DIAGNOSTIC TROUBLE CODE (DTC) LIST

Diagnostic Trouble Code (DTC) List

Description	Module
DTC B0790	FT4WD
DTC B2725	FT4WD
DTC C0306	FT4WD
DTC C0327	FT4WD
DTC C0329	FT4WD
DTC C0359	FT4WD
DTC C0388	FT4WD
DTC C0550	FT4WD

DTC B0790

Circuit Description

The neutral indicator circuit consists of a ignition 3 voltage circuit and a neutral indicator control circuit. When the neutral mode has been selected by the driver, current is supplied to the neutral indicator by the ignition 3 voltage circuit, traveling through the neutral indicator LED at which time the transfer case shift control module supplies the ground through the neutral indicator control circuit. This DTC indicates an open, short to ground or a short to voltage.

Conditions for Running the DTC

- The ignition is ON.
- The system voltage is 9-18 volts.

Conditions for Setting the DTC

- The system monitors the voltage on the neutral indicator control circuit.
- If the system detects a voltage 3.5 volts or less when the neutral indicator is not commanded, the DTC is logged.
- If the system detects a voltage 3.5 volts or more when the neutral indicator is commanded, the DTC is logged.

Action Taken When the DTC Sets

The SERVICE 4WD indicator will remain illuminated for the remainder of the current ignition cycle.

Conditions for Clearing the DTC

- The transfer case shift control module will clear the DTC if the condition for setting the DTC is not currently present.
- A history DTC will clear after 33 consecutive ignition cycles without a fault present.
- History DTCs can be cleared using a scan tool.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: This step tests for voltage at the ignition 3 voltage side of the transfer case select switch.
3: This step tests the control circuit of the neutral indicator for a short to voltage or an open.
4: This step tests the control circuit of the neutral indicator for a short to ground.

DTC B0790

Step	Action	Yes	No
Schematic Reference: Transfer Case Control Schematics **Connector End View Reference: Transfer Case Control Connector End Views**			
1	Did you perform the Diagnostic System Check-Transfer Case?	Go to **Step 2**	Go to **Diagnostic System Check - Transfer Case**
2	1. Turn the ignition OFF. 2. Remove the transfer case select switch. 3. Disconnect the connector on the transfer case select switch. 4. Turn the ignition ON.		

	5. Probe the Ignition 3 voltage circuit with a DMM that is connected to a good ground. Does the DMM indicate battery voltage?	Go to **Step 3**	Go to **Step 6**
3	Test the neutral indicator control circuit for a short to voltage or an open. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 4**
4	Test the neutral indicator control circuit for a short to ground. Refer to **Testing for Short to Ground** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 5**
5	Inspect for poor connections at the harness connector of the transfer case shift control module, and the transfer case shift control switch. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 7**
6	Repair the ignition 3 voltage circuit of the transfer case select switch for an open, high resistance or short to ground. Did you complete the repair?	Go to **Step 9**	-
7	Replace the transfer case select switch, and clear all DTCs. Refer to **Transfer Case Shift Control Switch Replacement** . Does the DTC reset?	Go to **Step 8**	System OK
8	Replace the transfer case shift control module. Refer to **Transfer Case Shift Control Module Replacement** . Did you complete the repair?	Go to **Step 9**	-
9	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	Go to **Step 1**	System OK

DTC B2725

Circuit Description

The mode switch circuit consists of 5 modes. The transfer case shift control module supplies a regulated 5 volts, DC to the switch through the 5 volt regulator circuit. The current travels through the resistor of the currently pressed mode button. The current is then returned to the transfer case shift control module through the switch signal circuit.

The transfer case shift control module constantly monitors this signal voltage to determine the condition of the mode switch circuit.

When each of the modes are selected they will complete a circuit through their own specific resistor while the button is pressed. The transfer case shift control module continuously monitors the switch input to determine

whether the Neutral, Differential Lock, 4HI, 4HI Lock, or 4LO Lock mode was selected by the driver.

Conditions for Running the DTC

- The ignition is ON.
- The system voltage is 9-18 volts.

Conditions for Setting the DTC

- The system constantly monitors the voltage on switch signal circuit.
- If the system detects a voltage level under 0.3 volt or greater than 0.75 volts, the DTC is logged.

Action Taken When the DTC Sets

- All shifting will be disabled.
- The SERVICE 4WD indicator will remain illuminated for the remainder of the current ignition cycle.

Conditions for Clearing the DTC

- The transfer case shift control module will clear the current DTC if the condition for setting the DTC is not currently present.
- A history DTC will clear after 33 consecutive ignition cycles without a fault present.
- History DTCs can be cleared using a scan tool.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: This step tests for proper operation of the transfer case mode select switch.

3: This step tests the mode switch for proper resistance values in all mode switch states.

4: This step tests for proper voltage on the 5 volt reference circuit.

5: This step tests the 5 volt reference circuit for an open, high resistance, short to voltage, or short to ground.

6: This step tests the switch signal circuit for an open, high resistance, short to voltage, or short to ground.

DTC B2725

Step	Action	Values	Yes	No
Schematic Reference: Transfer Case Control Schematics **Connector End View Reference: Transfer Case Control Connector End Views**				
1	Did you perform the Diagnostic System Check-Transfer Case?	-	Go to **Step 2**	Go to **Diagnostic System Check - Transfer Case**
	1. Install a scan tool.			

2	2. Start the engine. 3. Set the Park brake. 4. Place the transmission into neutral. 5. With a scan tool, observe the 4WD indicator modes in the tech 2 transfer case data list. 6. Select each of the modes. Does the scan tool indicate that the 4WD indicators are in the correct state?	-	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
3	1. Disconnect and remove the mode switch. 2. Connect a DMM between the switch signal and 5 volt reference pins on the switch. 3. Measure the resistance through the mode switch while pressing and holding each of the mode buttons and comparing values. Does the DMM indicate all resistance values within the specified ranges?	4 HI 1.50-1.53K ohm 4 HI Lock 656.2-669.4 ohm 4 LO Lock 2.32-2.36K ohm Differential Lock 63.8-65.8 ohm Normal 9-9.18K ohm Neutral 1.010-1.031K ohm	Go to **Step 4**	Go to **Step 7**
4	Check the voltage on the 5 volt reference circuit. Was the voltage within the specified range?	4.8-5.1 V	Go to **Step 6**	Go to **Step 5**
5	Test the 5 volt reference circuit for an open, short to ground, short to voltage, or high resistance. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 9**	Go to **Step 8**
6	Test the switch signal circuit for a short to voltage, short to ground, open, or high resistance. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 9**	Go to **Step 8**
7	Replace the mode switch. Refer to **Transfer Case Shift Control Switch Replacement** .	-		-

	Did you complete the repair?		Go to **Step 9**	
8	Replace the transfer case shift control module. Refer to **Transfer Case Shift Control Module Replacement** Did you complete the repair?	-	Go to **Step 9**	-
9	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	-	Go to **Step 2**	System OK

DTC C0306

Circuit Description

The transfer case motor is a bi-directional, permanent magnet, D.C. motor. When energized, through motor control A or motor control B, the ground is provided by the opposing motor control circuit and then grounded through the transfer case shift control module ground circuit, the motor, through a series of gears, rotates a shaft which moves the mode and range forks to shift the transfer case between the following ranges:

- 4HI
- 4HI Lock
- 4LO Lock
- N

This DTC detects an open, short to voltage, or short to ground in the motor control A or motor control B circuits, or an open, or short to ground inside the motor.

Conditions for Running the DTC

- The ignition is ON.
- The system voltage is 9-18 volts.

Conditions for Setting the DTC

- The system will test the motor circuits by testing for unwanted voltage.
- Then, the system supplies voltage on each of the motor circuits and reads the voltage back on the other circuit.
- If the system detects a problem with the circuits, the DTC is logged. The transfer case shift control module senses a low voltage return in the motor control A or motor control B circuits when a high voltage is expected.
- The fault must remain current for 1.2 seconds to set the DTC.

Action Taken When the DTC Sets

- All shifting will be disabled.
- The SERVICE 4WD indicator will remain illuminated for the remainder of the current ignition cycle.

Conditions for Clearing the DTC

- The transfer case shift control module will clear the DTC if the condition for setting the DTC is not currently present.
- A history DTC will clear after 33 consecutive ignition cycles without a fault present.
- History DTCs can be cleared using a scan tool.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: This step tests motor A driver high for proper operation.
3: This step tests motor B driver high for proper operation.
4: This step tests motor A driver low for proper operation.
5: This step tests motor B driver low for proper operation.
6: This step tests motor control A and motor control B circuits for being shorted together.
7: This step tests motor control A for a short to ground, short to voltage, open, or high resistance.
8: This step tests motor control B for a short to ground, short to voltage, open, or high resistance.

DTC C0306

Step	Action	Value (s)	Yes	No
Schematic Reference: Transfer Case Control Schematics Connector End View Reference: Transfer Case Control Connector End Views				
1	Did you perform the Diagnostic System Check - Transfer Case?	-	Go to **Step 2**	Go to **Diagnostic System Check - Transfer Case**
2	1. Engage the parking brake. 2. Turn the ignition OFF and raise the vehicle on a hoist. 3. Disconnect the motor encoder connector at the transfer case. 4. Turn the ignition ON. 5. With a DMM, measure voltage by probing the motor control A circuit and take the other lead to a good ground. 6. With a scan tool, command motor A driver high	-		

	ON. Does the digital multimeter (DMM) indicate battery voltage?		Go to **Step 3**	Go to **Step 7**
3	1. With a DMM, measure voltage by probing the motor control B circuit and take the other lead to a good ground. 2. With a scan tool, command motor B driver high ON. Does the DMM indicate battery voltage?	-	Go to **Step 4**	Go to **Step 8**
4	1. With a DMM, measure voltage by probing the motor control A circuit and take the other lead to ground. 2. With a scan tool, command motor A driver low ON. Does the voltage on the DMM match the voltage indicated?	0 V	Go to **Step 5**	Go to **Step 7**
5	1. With a DMM, measure voltage by probing the motor control B circuit and use the other lead to probe one of the four encoder signal circuits. 2. With a scan tool, command motor B driver low ON. Does the DMM indicate voltage within the specified range?	4.3-4.7 V	Go to **Step 6**	Go to **Step 8**
6	With a DMM, check motor control A and motor control B circuits for being shorted together. Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 9**
7	With a DMM, check the motor control A circuit for a short to ground, short to voltage, open, or high resistance. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 10**
8	With a DMM, check the motor control B circuit for a short to ground, short to voltage, open, or high resistance. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 10**
9	Replace the encoder motor. Refer to **Transfer Case Motor/Encoder Replacement** . Did you complete the repair?	-	Go to **Step 11**	-
10	Replace the transfer case shift control module. Refer to **Transfer Case Shift Control Module Replacement** . Did you complete the repair?	-	Go to **Step 11**	-

11	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Setting the DTC as specified in the supporting text. Does the DTC reset?	-	Go to **Step 2**	System OK

DTC C0327

Circuit Description

The transfer case shift control module has four encoder channels, P, C, A, and B, which are supplied 5 volts each. The four encoder channels each run to a switch located inside the encoder/motor assembly. When a particular encoder channel is active the switch is closed and 5 volts flows through the encoder signal return circuit. If the module wants to request motor position a low side driver pulls the voltage low on the encoder signal return and the corresponding channel circuit indicating motor position.

The transfer case shift control module supplies 5 volts on all encoder channels, thus as these channels are pulled to ground, the module can interpret the location of the transfer case shift position.

This DTC detects an open, high resistance, or a short to voltage, in the encoder signal return circuit, or an open, high resistance, or short to voltage in the encoder channel circuits.

Conditions for Running the DTC

- The ignition is ON.
- The system voltage is 9-18 volts.

Conditions for Setting the DTC

The transfer case shift control module reads back a high voltage when a low voltage is expected, or low voltage when a high voltage is expected on the encoder channel circuits, or the encoder signal return circuit.

Action Taken When the DTC Sets

- All motor activity will stop.
- All the transfer case shift control switch mode indicators will be commanded OFF.
- The SERVICE 4WD indicator will be latched on for the remainder of the current ignition cycle.
- If a new mode is requested while the DTC is present either current or history, the indicator for the mode requested will flash for 15 seconds and then go out.

Conditions for Clearing the DTC

- The transfer case shift control module will clear the DTC if the condition for setting the DTC no longer exists.
- A history DTC will clear after 33 consecutive ignition cycles without a fault present.

- History DTCs can be cleared using a scan tool.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: This step determines if 2 or more of the 5 volts encoder signal circuits are shorted together.
3: This step tests for proper voltage on the 4 encoder signal circuits.
4: This step tests for a short to voltage, open, or high resistance on the encoder low reference circuit.
5: This step determines which encoder signal circuits are shorted together.
6: This step determines if any of the encoder signal circuits have an open, or high resistance condition.
7: This step determines if a binding shift detent lever shaft is causing the DTC.

DTC C0327

Step	Action	Value (s)	Yes	No
Schematic Reference: Transfer Case Control Schematics **Connector End View Reference: Transfer Case Control Connector End Views**				
1	Did you perform the Diagnostic System Check - Transfer Case?	-	Go to **Step 2**	Go to **Diagnostic System Check - Transfer Case**
2	1. Set the parking brake. 2. Raise the vehicle on a hoist. 3. Disconnect the connector at the transfer case. 4. Turn the ignition ON, with the engine OFF. 5. Install a scan tool. 6. While monitoring the encoder channels on the scan tool, short to ground each of the encoder channel circuits on the module side of the harness with a jumper wire. Do more than one of the four encoder channels indicate OFF when each encoder channel circuit is individually shorted to ground?	-	Go to **Step 5**	Go to **Step 3**
3	At the transfer case connector, using a digital multimeter (DMM), test the encoder signal circuits on the module side of the harness. Are the voltages within the specified range?	4.3-4.7 V	Go to **Step 4**	Go to **Step 6**
4	With the ignition in the OFF position, test the encoder low reference circuit for a short to ground, short to voltage, open, or high resistance. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 7**

5	1. Disconnect C1 and C2 from the transfer case shift control module. 2. Using a DMM, test for 2 or more encoder signal circuits being shorted together. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 10**
6	Test the suspect circuits for a short to ground, short to voltage, open, or high resistance. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 10**
7	1. Remove the encoder motor. 2. Inspect the shift detent lever shaft for a binding condition. Refer to **Transfer Case Motor/Encoder Replacement** . Did the shift detent lever shaft bind?	-	Go to **Step 8**	Go to **Step 9**
8	Remove the transfer case for disassembly and repair. Refer to **Transfer Case Disassemble** . Did you complete the repair?	-	Go to **Step 11**	-
9	Replace the encoder motor. Refer to **Transfer Case Motor/Encoder Replacement** . Did you complete the repair?	-	Go to **Step 11**	-
10	Replace the transfer case shift control module. Refer to **Transfer Case Shift Control Module Replacement** . Did you complete the repair?	-	Go to **Step 11**	-
11	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC set?	-	Go to **Step 1**	System OK

DTC C0329

Circuit Description

The transfer case shift control module has 4 encoder channels coming out of it which are all supplied 5 volts. These 4 channels are P, C, A, and B, each running to a switch located inside the encoder/motor assembly. When a particular encoder channel is active, the switch is closed and 5 volts flows through the encoder signal return circuit. If the module wants to request motor position, a low side driver pulls the voltage low on the encoder signal return and the corresponding channel circuit indicating motor position.

The transfer case shift control module supplies 5 volts on all the channels. As these channels are pulled to ground, the module can interpret the location of the transfer case shift position.

This DTC detects a short to ground in the encoder signal return circuit, or a short to ground in the encoder channel circuits.

Conditions for Running the DTC

- The ignition is ON.
- The system voltage is 9-18 volts.

Conditions for Setting the DTC

The transfer case shift control module can command the low side driver on the encoder signal return circuit not to pull the signal low. The module can then read the voltage on each of the encoder channel circuits. If the voltage is low a short to ground is indicated and the DTC is logged.

Action Taken When the DTC Sets

- All motor activity will stop.
- All the transfer case shift control switch mode indicators will be commanded OFF.
- The SERVICE 4WD indicator will be commanded ON, and an active DTC set, when a shift is requested.
- If a shift is not being requested the DTC will go to history.
- If a new mode is requested while the DTC is present either current or history, the indicator for the mode requested will flash for 15 seconds and then go out.

Conditions for Clearing the DTC

- The transfer case shift control module will clear the DTC if the condition for setting the DTC no longer exists.
- A history DTC will clear after 33 consecutive ignition cycles without a fault present.
- History DTCs can be cleared using a scan tool.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: This step determines if one or more of the encoder channel circuits are shorted to ground.

3: This step checks with a digital multimeter (DMM) for a short to ground on any of the 4 encoder channel circuits.

4: This step checks the encoder sign return circuit for a short to ground.

5: This step determines if a faulty transfer case shift control module is causing the DTC to set.

6: This step determines if the encoder motor is causing the DTC to set.

DTC C0329

Step	Action	Value (s)	Yes	No

Schematic Reference: Transfer Case Control Schematics
Connector End View Reference: Transfer Case Control Connector End Views

1	Did you perform the Diagnostic System Check - Transfer Case?	-	Go to **Step 2**	Go to **Diagnostic System Check - Transfer Case**
2	1. Set the parking brake. 2. Raise the vehicle on a hoist. 3. Disconnect the connector at the transfer case. 4. Turn the ignition ON, with the engine OFF. 5. Install a scan tool. 6. Monitor the encoder channels P, B, A, and C on the scan tool. Do any of the encoder channels indicate OFF?	-	Go to **Step 3**	Go to **Step 4**
3	Test the encoder channel circuit that is indicating OFF on the scan tool for a short to ground. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 9**	Go to **Step 8**
4	With the ignition in the OFF position, test the encoder low reference circuit for a short to ground. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 9**	Go to **Step 5**
5	1. Turn the ignition ON with the engine OFF. 2. With the transfer case connector still disconnected, use the scan tool to clear DTCs. Does DTC C0329 reset?	-	Go to **Step 8**	Go to **Step 6**
6	1. Turn the ignition OFF. 2. Connect the transfer case connector. 3. Turn the ignition ON, with the engine OFF. 4. With the transfer case shift control switch, command the transfer case through all of the modes. 5. Using a scan tool, check DTCs. Does DTC C0329 set?	-	Go to **Step 7**	Go to **Testing for Electrical Intermittents** in Wiring Systems
7	Replace the encoder motor. Refer to **Transfer Case Motor/Encoder Replacement** . Did you complete the repair?	-	Go to **Step 9**	-
8	Replace the transfer case shift control module. Refer to **Transfer Case Shift Control Module Replacement** . Did you complete the repair?	-	Go to **Step 9**	-

9	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC set?	-	Go to **Step 1**	System OK

DTC C0359

Circuit Description

The 4WD low signal circuit is used to notify the powertrain control module (PCM) that the vehicle is in 4WD low range. The PCM supplies 12 volts to this circuit. The transfer case shift control module grounds this circuit when the vehicle is in 4WD low range.

This DTC detects a short to ground, short to voltage, or an open in the 4WD low signal circuit.

Conditions for Running the DTC

- The ignition is ON.
- The system voltage is 9-18 volts.

Conditions for Setting the DTC

- After the transfer case shift control module grounds the output, the 4WD Low signal circuit, and reads back a high voltage, the DTC is set. The system will not attempt setting the DTC again during that ignition cycle.
- The transfer case shift control module reads back a high voltage when a low voltage is expected on the 4WD low signal circuit.

Action Taken When the DTC Sets

- Transmission shift points may be affected.
- The SERVICE 4WD indicator will be latched on for the remainder of the current ignition cycle.

Conditions for Clearing the DTC

- The transfer case shift control module will clear the DTC if the condition for setting the DTC is not currently present.
- A history DTC will clear after 33 consecutive ignition cycles without a fault present.
- History DTCs can be cleared using a scan tool.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: This step tests for proper reference voltage to the transfer case shift control module on the 4WD low signal circuit.

3: This step tests the 4WD low signal circuit for a short to voltage.

4: This step tests the 4WD low signal circuit for an open or high resistance.

5: This step repairs the 4WD low signal circuit for a short to voltage.

DTC C0359

Step	Action	Values	Yes	No
Schematic Reference:Transfer Case Control Schematics **Connector End View Reference: Transfer Case Control Connector End Views**				
1	Did you perform the Diagnostic System Check-Transfer Case?	-	Go to **Step 2**	Go to **Diagnostic System Check - Transfer Case**
2	1. Turn the ignition OFF. 2. Disconnect the transfer case shift control module. 3. Turn the ignition ON, with the engine OFF. 4. Measure the voltage between the 4WD low signal circuit harness and ground. Is the voltage reading within the specified values?	10-13.5 V	Go to **Step 3**	Go to **Step 4**
3	1. Disconnect the powertrain control module (PCM). 2. Measure the voltage between the 4WD low signal circuit harness and ground. Is the voltage reading within the specified value?	0 V	Go to **Step 7**	Go to **Step 5**
4	Test the 4WD low signal circuit for an open, high resistance, or short to ground. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 8**	Go to **Step 6**
5	Repair the 4WD low signal circuit for short to voltage. Refer to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 8**	-
6	Replace the PCM. Refer to **Powertrain Control Module (PCM) Replacement** in Engine Controls 6.0L (LQ4). Did you complete the repair?	-	Go to **Step 8**	-
7	Replace the transfer case shift control module. Refer to **Transfer Case Shift Control Module Replacement** . Did you complete the repair?	-	Go to **Step 8**	-
8	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text.	-		

	Does the DTC reset?		Go to **Step 2**	System OK

DTC C0550

Circuit Description

At each power-up the transfer case shift control module runs a self-test on the following functions:

- EEPROM Checksum
- ROM Checksum
- RAM Checksum
- RAM Malfunction

Conditions for Running the DTC

- The ignition is ON.
- The system voltage is 9-18 volts.

Conditions for Setting the DTC

- Critical operational parameters stored in EEPROM have failed Checksum test indicating invalid data.
- Masked ROM code has failed Checksum test indicating that masked ROM data is not currently valid.
- ROM code has failed Checksum test indicating that ROM data is not currently valid.
- One or more ROM locations have failed operational test indicating that some portions of RAM are not functional.

Action Taken When the DTC Sets

- The SERVICE 4WD indicator will be latched on and the system will be disabled.
- The transfer case control switch will display the current position LED while DTC C0550 is current, but further shifting will be disabled.

Conditions for Clearing the DTC

- Replace the transfer case shift control module.
- Perform the Transfer Case Diagnostic System Check.

Test Description

The number below refers to the step number on the diagnostic table.

2: This step replaces the transfer case shift control module.

DTC C0550

Step	Action	Yes	No
Schematic Reference: Transfer Case Control Schematics Connector End View Reference: Transfer Case Control Connector End Views			
1	Did you perform the Diagnostic System Check-Transfer Case?	Go to **Step 2**	Go to **Diagnostic System Check - Transfer Case**
2	Replace the transfer case shift control module. Refer to **Transfer Case Shift Control Module Replacement** . Is the repair complete?	System OK	-

SYMPTOMS - TRANSFER CASE

IMPORTANT:

1. **Perform the Transfer Case Diagnostic System Check before using the Symptom Tables in order to verify that the following statements are true:**
   - **DTCs are not set.**
   - **The control modules can communicate via the serial data link.**
2. **Review the system operation in order to familiarize yourself with the system functions. Refer to Transfer Case Description and Operation .**

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the automatic transfer case system. Refer to **Checking Aftermarket Accessories** in Wiring Systems.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Inspect the automatic transfer case for the proper fluid level.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Symptom List

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

- **Electronic Rear Differential Lock Will Not Engage**
- **Electronic Rear Differential Lock Will Not Disengage**
- **Transfer Case Shift Control Switch Inoperative**
- **Transfer Case Shift Control Switch Indicator Always On - Two or More**
- **Transfer Case Shift Control Switch Indicator Flashes, then Returns to Previous Mode**
- **Transfer Case Shift Control Switch Indicator Inoperative - One or More**
- **Service Indicator Always On**

- **Service Indicator Inoperative**
- **Transfer Case Popping Noise**
- **Transfer Case Whine or Rumble Noise**
- **Transfer Case Growl or Grinding Noise**
- **Transfer Case Clunk in 4HI Lock**
- **Transfer Case Clunk in 4LO Lock**
- **Transfer Case Clunk during Acceleration and Deceleration**
- **Transfer Case Shudder or Binding**
- **Transfer Case Will Not Shift**
- **Transfer Case Jumps Out of Gear**
- **Transfer Case Leak Diagnosis**

TRANSFER CASE SHIFT CONTROL SWITCH INOPERATIVE

Circuit Description

The range/mode switch circuit consists of the following 5 switches:

- 4HI
- 4HI Lock
- 4LO Lock
- Neutral
- Differential Lock

The transfer case shift control module supplies a regulated 5 volts, DC to the switch through the 5 volt regulator circuit. The current travel through the resistor of the currently active switch. The switch then returns current to the transfer case shift control module through the switch signal circuit.

The transfer case shift control module constantly monitors this signal voltage to determine the condition of the mode switch circuit.

When each switch is depressed, the switch will complete a circuit through the respective resistor. The transfer case shift control module continuously monitors the switch input to determine which of the following buttons were selected by the driver:

- 4HI
- 4HI Lock
- 4LO Lock
- Differential Lock

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: This step tests the functionality of the mode switch.

3: This step tests the modules ability to operate the transfer case modes.

Transfer Case Shift Control Switch Inoperative

Step	Action	Yes	No
Schematic Reference: Transfer Case Control Schematics **Connector End View Reference: Transfer Case Control Connector End Views**			
1	Did you perform the Diagnostic System Check-Transfer Case?	Go to **Step 2**	Go to **Diagnostic System Check - Transfer Case**
2	1. Install a scan tool. 2. Start the engine. 3. Place the transmission into neutral. 4. Set the park brake. 5. Observe the mode switch selected parameter on the scan tool while selecting each of the mode positions on the switch. Does the state change with the selection of each of the mode positions?	Go to **Step 5**	Go to **Step 3**
3	Test the switch signal and 5 volt reference circuits for an open, high resistance, short to ground, and short to voltage. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 6**	Go to **Step 4**
4	Replace the mode selection switch. Refer to **Transfer Case Shift Control Switch Replacement** . Did you complete the repair?	Go to **Step 6**	-
5	Replace the transfer case shift control module. Refer to **Transfer Case Shift Control Module Replacement** . Did you complete the repair?	Go to **Step 6**	-
6	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle in order to determine if the symptom has been corrected. Is the symptom still present?	Go to **Step 2**	System OK

TRANSFER CASE SHIFT CONTROL SWITCH INDICATOR ALWAYS ON - TWO OR MORE

Circuit Description

The indicator lamps circuit consist of the following 5 individual lamps contained inside the mode/range switch assembly:

- 4HI
- 4HI Lock
- 4LO Lock
- Neutral
- Differential Lock

The following lamps are contained inside their respective mode button:

- 4HI
- 4HI Lock
- 4LO Lock
- Neutral
- Differential Lock

When the ignition in ON, the transfer case shift control module illuminates the indicator that corresponds to the current gear position by providing a ground through a current limiting driver.

The transfer case shift control module flashes each indicator lamp after a shift has been requested and will continue to flash until the transfer case shift control module can complete the shift.

A solid state circuit located inside the switch supplies ignition voltage to the lamps. The solid state circuit also receives voltage whenever the headlamp switch is in the parklamp or headlamp position. When the solid state circuit receives voltage from the headlamp switch, the switch reduces the voltage supplied to the indicator lamps, dimming the lamps when the headlamps are ON.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: This step tests the transfer case electrical control of the lamp circuits.

3: This step tests the suspect lamp circuits for a short to ground.

Transfer Case Shift Control Switch Indicator Always On - Two or More

Step	Action	Yes	No
Schematic Reference: Transfer Case Control Schematics **Connector End View Reference: Transfer Case Control Connector End Views**			
1	Did you perform the Diagnostic System Check-Transfer Case?	Go to **Step 2**	Go to **Diagnostic System Check - Transfer Case**
2	1. Turn the ignition ON, with the engine OFF. 2. Install a scan tool. 3. Use the scan tool in order to command all the indicator lamps OFF.	Go to	

	Do all the lamps go OFF?	**Step 7**	Go to **Step 3**
3	1. Use the scan tool in order to determine the transfer case mode. 2. Use this information to determine which lamp circuits are at fault. 3. Disconnect the mode switch. 4. Test the suspect lamp circuits for a short to ground. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Is the suspect circuit shorted to ground?	Go to **Step 4**	Go to **Step 6**
4	1. Disconnect the transfer case shift control module. 2. Test the suspect lamp circuits for a short to ground. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Is the suspect circuit shorted to ground?	Go to **Step 5**	Go to **Step 7**
5	Repair short to ground in the suspect lamp circuit. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 8**	-
6	Replace the mode switch. Refer to **Transfer Case Shift Control Switch Replacement** . Is the repair complete?	Go to **Step 8**	-
7	Replace the transfer case shift control module. Refer to **Transfer Case Shift Control Module Replacement** . Is the repair complete?	Go to **Step 8**	-
8	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle in order to determine if the symptom has been corrected. Is the symptom still present?	Go to **Step 2**	System OK

TRANSFER CASE SHIFT CONTROL SWITCH INDICATOR FLASHES, THEN RETURNS TO PREVIOUS MODE

Circuit Description

The transfer case shift control module flashes each indicator lamp after a shift has been requested and continues to flash until the transfer case shift control module can complete the shift. If the transfer case is unable to make a shift, the requested mode indicator flashes and returns to the previous mode. If the requested mode indicator flashes for 15 seconds and returns to the previous mode, this indicates the loss of a necessary input from another module. The transfer case shift control module requires a vehicle speed sensor (VSS) signal, provided by the ABS module, and a PRNDL input provided by the transmission. These signals are provided to the transfer case shift control module via class 2, and if not received the transfer case will not shift.

If a new mode is requested and the requested mode indicator flashes less then 15 seconds and returns to the previous mode, this indicates a transfer case fault. This symptom is caused by an internal mechanical transfer case fault causing the shift detent lever shaft to bind, or a fault within the encoder motor.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: This step tests for the possibility of a missing system input or a system fault.

3: This step tests for a missing PRNDL input from the transmission.

4: This step tests for a missing VSS signal from the ABS system.

5: This step determines if the condition is caused by a faulty encoder motor or a mechanical internal fault to the transfer case.

Transfer Case Shift Control Switch Indicator Flashes, then Returns to Previous Mode

Step	Action	Yes	No
Schematic Reference: Transfer Case Control Schematics **Connector End View Reference: Transfer Case Control Connector End Views**			
1	Did you perform the Diagnostic System Check - Transfer Case?	Go to **Step 2**	Go to **Diagnostic System Check - Transfer Case**
2	1. Turn ON the ignition, with the engine OFF. 2. Place the vehicle in Neutral. 3. Select a different mode on the transfer case shift control switch. Does the switch flash the full 15 seconds?	Go to **Step 3**	Go to **Step 5**
3	1. Connect a scan tool to the vehicle. 2. Test for transmission DTCs indicating loss of the PRNDL signal. Is a DTC set?	Go to **Diagnostic Trouble Code (DTC) List/Type**	Go to **Step 4**
4	With the scan tool, test for ABS DTCs indicating a loss of VSS. Is a DTC set?	Go to **Diagnostic Trouble Code (DTC) List**	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems
5	1. Remove the transfer case encoder motor, while leaving the electrical harness connected. 2. Attempt to shift the transfer case to a different mode. Is the encoder motor able to make the shift?	Go to **Step 7**	Go to **Step 6**

6	Replace the transfer case encoder motor. Refer to **Transfer Case Motor/Encoder Replacement** . Is the repair complete?	Go to **Step 8**	-
7	Remove the transfer case and repair, for a shift detent lever shaft binding condition. Refer to **Transfer Case Disassemble** . Is the repair complete?	Go to **Step 8**	-
8	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle in order to determine if the symptom has been corrected. Is the symptom still present?	-	System OK

TRANSFER CASE SHIFT CONTROL SWITCH INDICATOR INOPERATIVE - ONE OR MORE

Circuit Description

The indicator lamps circuit consist of five individual lamps contained inside the mode switch assembly. They are 4HI, 4HI Lock, 4LO Lock, Neutral, and Differential Lock. The 4HI, 4HI Lock, 4LO Lock, and Differential Lock, are contained inside their respective mode button. When the ignition in ON, the transfer case shift control module illuminates the indicator lamp that corresponds to the current ATC gear position by providing a ground through a current limiting driver.

The transfer case shift control module flashes each indicator lamp after a shift has been requested and will continue to flash until the transfer case shift control module can complete the shift.

A solid state circuit located inside the switch supplies ignition voltage to the lamps. The solid state circuit also receives voltage whenever the headlamp switch is in the parklamp or headlamp position. When the solid state circuit receives voltage from the headlamp switch it will reduce the voltage that it supplies to the indicator lamps, dimming the lamps when the headlamps are ON.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

- **2:** This step determines if the module can command the indicators ON.
- **3:** This step determines if the indicator or wiring is at fault.
- **4:** This step tests the lamp feed circuit for an open or high resistance.
- **5:** This step tests the LED dimming circuit for an open or short to ground.

Transfer Case Shift Control Switch Indicator Inoperative - One or More

Step	Action	Yes	No

Schematic Reference: Transfer Case Control Schematics
Connector End View Reference: Transfer Case Control Connector End Views

1	Did you perform the Diagnostic System Check - Transfer Case?	Go to **Step 2**	Go to **Diagnostic System Check - Transfer Case**
2	1. Turn ON the ignition, with the engine OFF. 2. Install a scan tool. 3. Use the scan tool in order to command all the indicator lamps ON. Do all the lamps turn ON?	Go to **Testing for Intermittent Conditions and Poor Connections**	Go to **Step 3**
3	**IMPORTANT:** **Do not damage a connector or circuit when back probing.** 1. Access the back of the mode switch. 2. Using a fused jumper back probe the effected indicator control circuit to ground. Does the effected lamp turn ON?	Go to **Step 4**	Go to **Step 5**
4	Test the effected indicator control circuit for an open or high resistance. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Was the condition found and corrected?	Go to **Step 8**	Go to **Step 7**
5	Test the LED dimming circuit for an open or short to ground. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Was the condition found and corrected?	Go to **Step 8**	Go to **Step 6**
6	Replace the mode switch. Refer to **Transfer Case Shift Control Switch Replacement** . Is the repair complete?	Go to **Step 8**	-
7	Replace the transfer case shift control module. Refer to **Transfer Case Shift Control Module Replacement** . Is the repair complete?	Go to **Step 8**	-
8	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle in order to determine if the symptom has been corrected. Is the symptom still present?	Go to **Step 2**	System OK

SERVICE INDICATOR ALWAYS ON

Circuit Description

The Service 4WD indicator is located in the instrument panel cluster (IPC), and shares the common power and ground of the IPC. The transfer case shift control module controls the Service indicator by sending the IPC a Class 2 message. This indicator may be controlled with the scan tool using the IPC device controls.

Test Description

The number below refers to the step number on the diagnostic table.

2: This step determines whether the failure is the result of a malfunctioning transfer case shift control module or the IPC.

Service Indicator Always On

Step	Action	Yes	No
Schematic Reference: Transfer Case Control Schematics **Connector End View Reference: Transfer Case Control Connector End Views**			
1	Did you perform the Diagnostic System Check - Transfer Case?	Go to **Step 2**	Go to **Diagnostic System Check - Transfer Case**
2	In the IPC Data List, observe the Service 4WD input/output. Is the Service 4WD indicator commanded ON?	Go to **Step 3**	Go to **Step 4**
3	Replace the transfer case shift control module. Refer to **Transfer Case Shift Control Module Replacement** . Did you complete the repair?	Go to **Step 5**	-
4	Replace the instrument panel cluster. Refer to **Instrument Panel Cluster (IPC) Replacement** in Instrument Panel, Gauges, and Console. Did you complete the repair?	Go to **Step 5**	-
5	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle in order to determine if the symptom has been corrected. Is the symptom still present?	Go to **Step 1**	System OK

SERVICE INDICATOR INOPERATIVE

Circuit Description

The Service 4WD indicator is located in the instrument panel cluster (IPC), and shares the common power and ground of the IPC. The transfer case shift control module controls the Service indicator lamp by sending the IPC a Class 2 message. This lamp may be controlled with the scan tool using the IPC device controls.

Test Description

The number below refers to the step number on the diagnostic table.

2: This step determines whether the failure is the result of a faulty transfer case shift control module or the IPC.

Service Indicator Inoperative

Step	Action	Yes	No
Schematic Reference: Transfer Case Control Schematics **Connector End View Reference: Transfer Case Control Connector End Views**			
1	Did you perform the Diagnostic System Check - Transfer Case?	Go to **Step 2**	Go to **Diagnostic System Check - Transfer Case**
2	In the IPC Data List, observe the Service 4WD input/output. Is the Service 4WD indicator commanded ON?	Go to **Step 4**	Go to **Step 3**
3	Replace the transfer case shift control module. Refer to **Transfer Case Shift Control Module Replacement** . Did you complete the repair?	Go to **Step 5**	-
4	Replace the instrument panel cluster. Refer to **Instrument Panel Cluster (IPC) Replacement** in Instrument Panel, Gauges, and Console. Did you complete the repair?	Go to **Step 5**	-
5	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle in order to determine if the symptom has been corrected. Is the symptom still present?	Go to **Step 1**	System OK

TRANSFER CASE POPPING NOISE

Transfer Case Popping Noise

Cause	Correction
DEFINITION: A faulty internal transfer case component that causes a popping noise in the transfer case. Review the **Symptoms - Transfer Case** and perform the necessary inspections.	
Chain jump	• Replace the chain and sprockets. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** . • Replace the shaft bearings. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** . • Inspect for damaged components caused by metal debris. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

TRANSFER CASE WHINE OR RUMBLE NOISE

Transfer Case Whine or Rumble Noise

Cause	Correction

DEFINITION: A faulty internal transfer case component that causes a whine noise in the transfer case. Review the **Symptoms - Transfer Case** and perform the necessary inspections.	
Faulty bearings	1. Inspect all of the bearings and journals. Refer to **Cleaning and Inspection** . 2. Replace any faulty bearings and any components with faulty bearing journals. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

TRANSFER CASE GROWL OR GRINDING NOISE

Transfer Case Growl or Grinding Noise

Cause	Correction
DEFINITION: A faulty internal transfer case component that causes a growl or grinding noise in the transfer case while the vehicle is turning. Review the **Symptoms - Transfer Case** and perform the necessary inspections.	
High/low planetary carrier assembly	1. Inspect the high/low planetary carrier pinion gears for the following conditions: • Chipped, bent or deformed teeth • Pinion gear needle bearing worn • Pinion gear thrust washers missing • Seized or binding pinion gears Refer to **Cleaning and Inspection** . 2. Inspect the high/low planetary carrier input gear for excessive thrust end play. 3. Inspect the input gear teeth for excessive wear or damage. 4. Replace the high/low planetary carrier assembly if any of the above conditions exist. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Annulus gear	1. Inspect the annulus gear for teeth damage or wear. Refer to **Cleaning and Inspection** . 2. Replace the annulus gear if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Planetary differential	1. Inspect the planetary differential pinion gears for the following conditions: • Chipped, bent or deformed teeth • Pinion gear bushings worn • Pinion gear thrust washers missing • Seized or binding pinion gears Refer to **Cleaning and Inspection** . 2. Inspect the planetary differential for deformation. Refer to **Cleaning and**

	Inspection . 3. Replace the planetary differential assembly if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Sun gears	1. Inspect the sun gears for the following conditions: • Gear tooth failure • Worn or galled thrust surfaces Refer to **Cleaning and Inspection** . 2. Replace the sun gears if they are faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Thrust washers	1. Inspect the thrust washers for seizure to the planetary differential. 2. Inspect the thrust washers for galling. 3. Replace the thrust washers if they are faulty and the mating component if it is damaged. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Planetary differential not timed properly	1. Inspect the planetary differential for being timed properly. Refer to **Transfer Case Assemble** . 2. Properly time the planetary differential gears. Refer to **Transfer Case Assemble** .

TRANSFER CASE CLUNK IN 4HI LOCK

Transfer Case Clunk in 4HI Lock

Cause	Correction
DEFINITION: During acceleration or deceleration, a clunk is heard or felt in the transfer case while in the 4HI Lock range only. Review the **Symptoms - Transfer Case** and perform the necessary inspections.	
Incorrect fluid level or incorrect fluid	1. Inspect the transfer case for the correct fluid level. Refer to **Transfer Case Fluid Replacement** . 2. Inspect the transfer case for the correct type of fluid. 3. Flush the transfer case and fill with the correct fluid, if required. Refer to **Capacities - Approximate Fluid** .
Worn high speed teeth on the range sleeve	1. Inspect for worn high speed teeth on the range sleeve. Refer to **Cleaning and Inspection** . 2. Replace the range sleeve if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Worn or missing input gear thrust washer	Replace the worn or missing input gear thrust washer. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Worn or faulty planetary differential	1. Inspect the planetary differential for the following conditions: • Loose planetary differential splines to mainshaft splines

	• Loose or faulty pinion gears Refer to **Cleaning and Inspection** . 2. Replace the planetary differential assembly if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Worn or missing rear output shaft thrust washers	1. Inspect to ensure the thrust washers are installed. 2. Inspect the thrust washers and mating surface for excessive wear. 3. Replace the worn or missing thrust washer. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Worn or damaged rear sun gear	1. Inspect the sun gear external gear teeth for excessive wear. 2. Inspect the sun gear to rear output shaft for excessive looseness. 3. Replace the sun gear or rear output shaft if it is worn. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Rear output shaft bearing outer retaining ring	1. Inspect for the following conditions: • Properly installed rear output shaft bearing retaining ring • Excessive wear or damage to the retaining ring groove in the rear case half Refer to **Cleaning and Inspection** . 2. Repair or replace the following components if found faulty: 1. Replace the rear output shaft bearing outer retaining ring. 2. Replace the rear case half if the retaining ring groove is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Lockup shift assembly hub	1. Inspect the lockup shift assembly hub for the following conditions: • The hub internal teeth to inner lockup hub for excessive looseness caused by wear • The hub engagement teeth for wear Refer to **Cleaning and Inspection** . 2. Replace the lockup shift assembly if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

TRANSFER CASE CLUNK IN 4LO LOCK

Transfer Case Clunk in 4LO Lock

Cause	Correction

DEFINITION: During acceleration or deceleration, a clunk is heard or felt in the transfer case while in 4LO Lock range only. Review the **Symptoms - Transfer Case** and perform the necessary inspections.	
High/low planetary carrier assembly	1. Inspect for the following conditions: • Excessively worn planetary gears • The planetary gears loose in the planetary carrier • The input gear for missing thrust washers or excessive thrust end play in the carrier • Excessively worn range sleeve engagement teeth on the carrier Refer to **Cleaning and Inspection** . 2. Replace the high/low planetary if any of the above conditions are found. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Annulus gear	1. Inspect the annulus gear to front case fit for excessive looseness. 2. Inspect the front case for wear caused by excessive looseness. 3. Replace the front case half if it is worn.
Range sleeve	1. Inspect the range sleeve engagement teeth for excessive wear. 2. Inspect the range sleeve to mainshaft splines for excessive wear. 3. Replace the range sleeve if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

TRANSFER CASE CLUNK DURING ACCELERATION AND DECELERATION

Transfer Case Clunk during Acceleration and Deceleration

Cause	Correction
DEFINITION: During acceleration or deceleration, a clunk is heard or felt in the transfer case while in the 4HI mode. Review the **Symptoms - Transfer Case** and perform the necessary inspections.	
Incorrect fluid level or incorrect fluid	1. Inspect the transfer case for the correct fluid level. Refer to **Transfer Case Fluid Replacement** . 2. Inspect the transfer case for the correct type of fluid. 3. Flush the transfer case and fill with the correct fluid, if required. Refer to **Capacities - Approximate Fluid** .
Excessive clearance between the slip yoke and the rear output shaft	1. Inspect for the following conditions: • Worn slip yoke splines • Worn rear output shaft splines 2. Repair or replace the following components, if faulty. • Replace the slip yoke, if required. Refer to **Propeller Shaft Replacement - Rear** in Propeller Shaft.

	• Replace the rear output shaft, if required. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Excessive clearance between the slip yoke and the rear bushing	1. Inspect for the following conditions: • Worn rear bushing • Worn slip yoke bushing journal 2. Repair or replace the following components, if faulty. • Replace the slip yoke, if required. Refer to **Propeller Shaft Replacement - Rear** in Propeller Shaft. • Replace the rear case half if the rear bushing is worn. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Worn high speed teeth on the range sleeve	1. Inspect for the following conditions: • Worn high speed teeth on the range sleeve • Worn or missing input gear thrust washers Refer to **Cleaning and Inspection** . 2. Repair or replace the following components, if faulty. • Replace the range sleeve if it is worn. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** . • Replace the thrust washers, as required. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Worn or faulty planetary differential	1. Inspect the planetary differential for the following conditions: • Loose planetary differential splines to the mainshaft splines • Loose or faulty pinion gears Refer to **Cleaning and Inspection** . 2. Replace the planetary differential assembly if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Worn or missing rear output shaft thrust washers	1. Inspect to ensure the thrust washers are installed. 2. Inspect the thrust washers and mating surface for excessive wear. 3. Replace the worn or missing thrust washer. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Worn or damaged rear sun gear	1. Inspect the sun gear external gear teeth for excessive wear. 2. Inspect the sun gear to rear output shaft for excessive looseness.

	3. Replace the sun gear or rear output shaft if it is worn. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Worn or damaged front sun gear	1. Inspect the sun gear external gear teeth for excessive wear. 2. Inspect the sun gear to drive gear teeth for excessive wear. 3. Replace the sun gear or drive gear if it is worn. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Rear output shaft bearing outer retaining ring	1. Inspect for the following conditions: • Proper installation of the rear output shaft bearing retaining ring • Excessive wear or damaged retaining ring groove in the rear case half 2. Repair or replace the following components if found faulty: • Properly install a new rear output shaft bearing outer retaining ring. • Replace the rear case half if the retaining ring groove is excessively worn. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

TRANSFER CASE SHUDDER OR BINDING

Transfer Case Shudder or Binding

Cause	Correction
DEFINITION: A shudder, binding, or a crop-hop while turning, which may cause tire scuffing. Review the **Symptoms - Transfer Case** and perform the necessary inspections.	
Intermittent shift lock up engagement	1. Shift the vehicle into 4LO Lock or 4HI Lock. 2. Shift the vehicle from 4LO Lock or 4HI Lock to the 4HI mode. 3. Drive the vehicle and inspect for the shift lock up staying engaged after shifting from the 4LO Lock or 4HI Lock to the 4HI Mode. If the shift lock up stays engaged after shifting from 4LO Lock or 4HI Lock, it will give a symptom of both axles driving without any speed difference between the axles. It is noticed by tire scuffing on dry pavement when turning. 4. Drive the vehicle in reverse for a few feet. 5. Drive the vehicle forward and inspect for the shift lock up staying engaged. If the shift lock up disengaged after driving the vehicle in reverse this is normal and no further action is required. 6. Advise the customer to drive the vehicle in reverse for a few feet if the shift lock up does not disengage after shifting out of 4LO Lock or 4HI Lock.
Planetary differential	1. Inspect the planetary differential pinion gears for the following conditions: • Chipped, bent or deformed teeth

	• Pinion gear bushings worn • Pinion gear thrust washers missing • Seized or binding pinion gears Refer to **Cleaning and Inspection** . 2. Inspect the planetary differential for deformation. Refer to **Cleaning and Inspection** . 3. Replace the planetary differential assembly if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Thrust washers	1. Inspect the thrust washers for seizure to the planetary differential. 2. Replace the thrust washers if they are faulty and the mating component if it is damaged. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Planetary differential not timed properly	1. Inspect the planetary differential for being timed properly. Refer to **Transfer Case Assemble** . 2. Properly time the planetary differential gears. Refer to **Transfer Case Assemble** .

TRANSFER CASE WILL NOT SHIFT

Transfer Case Will Not Shift

Cause	Correction
DEFINITION: While shifting from HI range to LO range, there is gear clashing, no HI range, or the transfer case will not shift from 4HI to 4HI Lock. Review the **Symptoms - Transfer Case** and perform the necessary inspections.	
Shift detent lever	• Inspect for the following conditions: • The shift detent lever at the shift fork cams for being worn • The shift detent lever torsion spring for being faulty Refer to **Cleaning and Inspection** . • Replace the following components if found faulty: • The shift detent lever cam • The shift detent lever spring Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
High/low range shift fork	1. Inspect the high low shift fork for the following conditions: • Worn shift fork pads • The roller on the shift fork for wear or damage • Cracked or bent shift fork

	Refer to **Cleaning and Inspection** . 2. Replace the following components if found faulty: • The shift fork pads • The shift fork Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Range sleeve	1. Inspect the range sleeve for the following conditions: • Engagement teeth for burrs or damage • Sliding freely on the mainshaft • The range sleeve shift fork collar for excessive wear Refer to **Cleaning and Inspection** . 2. Replace the range sleeve if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
High/low planetary carrier	1. Inspect the high/low planetary engagement teeth for burrs or damage. Refer to **Cleaning and Inspection** . 2. Replace the high/low planetary carrier if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Mainshaft front support bearing	1. Inspect for the following conditions: • Failed front mainshaft support bearing in the input gear • Journal on the mainshaft for excessive wear or damage Refer to **Cleaning and Inspection** . 2. Replace the bearing if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** . 3. Replace the mainshaft if it is damaged. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Lockup shift assembly	1. Inspect the lockup shift assembly for the following conditions: • Shift assembly hub for binding • Shift assembly sleeve for damage • Burred or damaged engagement teeth Refer to **Cleaning and Inspection** . 2. Replace the shift assembly if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Drive sprocket	1. Inspect for the following conditions: • Engagement teeth on the drive sprocket for burrs or damage

	• Worn bushing in the drive sprocket • Journal on the mainshaft for excessive wear or damage Refer to **Cleaning and Inspection** . 2. Replace the drive gear if it is damaged. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** . 3. Replace the mainshaft if it is damaged. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

TRANSFER CASE JUMPS OUT OF GEAR

Transfer Case Jumps Out of Gear

Cause	Correction
DEFINITION: Loss of the transfer case drive torque during deceleration, acceleration, or under load. Review the **Symptoms - Transfer Case** and perform the necessary inspections.	
Shift detent cam worn	1. Inspect for excessive wear on the shift detent cam, not allowing full shift fork travel. Refer to **Cleaning and Inspection** . 2. Replace the faulty shift detent cam. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
High/low shift fork pads	1. Inspect the shift fork pads for wear. Refer to **Cleaning and Inspection** . 2. Replace the fork pads or other damaged components. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Faulty high speed teeth on range sleeve	1. Inspect for the following conditions: • The input gear high speed engagement teeth for wear or damage • The engagement teeth on the range sleeve for wear or damage Refer to **Cleaning and Inspection** . 2. Replace the range sleeve if the teeth are faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** . 3. Replace the high/low planetary carrier assembly if the input gear engagement teeth are faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
High/low planetary carrier	1. Inspect the high/low planetary carrier for the following conditions: • Low speed engagement teeth worn or damaged • Cracked carrier housing • Pinion gear bushings worn or out of position • Pinion gears broken or damaged teeth • Pinion gears seized

	Refer to **Cleaning and Inspection** . 2. Replace the high/low planetary carrier if any of the above conditions are found. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Faulty high/low range fork	1. Inspect the high/low range fork for damage or wear. Refer to **Cleaning and Inspection** . 2. Replace the high/low range fork if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Lockup shift assembly	1. Inspect the lockup shift assembly for the following conditions: • Worn or damaged sleeve • Lock up collar teeth worn or damaged Refer to **Cleaning and Inspection** . 2. Replace the lockup shift assembly if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Planetary differential	1. Inspect the planetary differential for the following conditions: • Cracked carrier housing • Pinion gear bushings worn or out of position • Pinion gears broken or damaged teeth • Pinion gears seized Refer to **Cleaning and Inspection** . 2. Replace the planetary differential if any of the above conditions are found. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Mainshaft front support bearing	1. Inspect the bearing in the input gear and the mainshaft journal for excessive wear. Refer to **Cleaning and Inspection** . 2. Replace the bearing and the mainshaft if they are faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Sun gears	1. Inspect the sun gears for broken or damaged teeth. Refer to **Cleaning and Inspection** . 2. Replace the sun gears if they are faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

TRANSFER CASE LEAK DIAGNOSIS

Transfer Case Leak Diagnosis

Cause	Correction
DEFINITION: A visible indication of an external fluid leak from the transfer case. Review the **Symptoms - Transfer Case** and perform the necessary inspections.	

Drain plug or fill plug leak	1. Inspect for the correct sealer and the correct amount of sealer on the plugs. 2. Install the plugs correctly. Refer to **Transfer Case Fluid Replacement** .
Vehicle speed sensor leaking	1. Remove the vehicle speed sensor (VSS) and inspect for the following conditions: • Cross threaded • Cut or damaged O-ring seal • VSS over tightened causing deformation in the VSS Refer to **Transfer Case Speed Sensor Replacement** . 2. Replace the VSS O-ring seal if it is faulty. Refer to **Transfer Case Speed Sensor Replacement** . 3. Replace the VSS if it is faulty. Refer to **Transfer Case Speed Sensor Replacement** .
Rear output shaft seal leaking	1. Inspect for the following conditions: • Overfilled or improper transfer case fluid • Blocked vent • Seal improperly installed, worn, or damaged • Seal bore damaged or cracked • Rear output shaft bushing for excessive wear • Slip yoke seal surface for wear or pitting 2. Repair or replace the following components if found faulty: • Adjust or replace the transfer case fluid. Refer to **Transfer Case Fluid Replacement** . • Clean, or properly route the vent hose. • Replace the slip yoke if the surface could cause leakage. Refer to **Propeller Shaft Replacement - Rear** in Propeller Shaft. • Replace the rear case half if the bushing is worn. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** . • Replace the rear case half if the seal bore is damaged. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** . • Replace the rear output shaft seal. Refer to **Transfer Case Output Shaft Seal Replacement - Rear** .
Front output shaft seal leaking	1. Inspect for the following conditions: • Overfilled or improper transfer case fluid • Blocked vent • Seal improperly installed, worn, or damaged • Seal bore damaged or cracked 2. Repair or replace the following components if found faulty:

	• Adjust or replace the transfer case fluid. Refer to **Transfer Case Fluid Replacement** . • Clean or properly route the vent hose. • Replace the front case half if the seal bore is damaged. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** . • Replace the front output shaft seal. Refer to **Transfer Case Output Shaft Seal Replacement - Front** .
Shift shaft detent seal leaking	1. Remove the encoder motor and inspect for the shift detent seal leaking. 2. Replace the shift shaft detent seal. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Leaking at the vent	• Transfer case overfilled 1. Inspect for the correct transfer case fluid level. Refer to **Transfer Case Fluid Replacement** . 2. Inspect the transmission fluid level. Refer to **Transmission Fluid Checking Procedure** in Automatic Transmission - 4L60-E. 3. If the transmission fluid level is low, and the transfer case fluid level is too high, replace the transfer case input shaft seal. Refer to **Transfer Case Input Shaft Seal Replacement** . 4. Inspect for the following conditions: • Seal improperly installed, worn, or damaged • Seal bore damaged or cracked • Input shaft seal surface worn, grooved, or damaged • Seal the vent with the correct sealer if it is leaking at the case. Refer to **Transfer Case Assemble** .
Transfer case to adapter leak	1. Inspect for the following conditions: • Loose mounting fasteners • Gasket or sealant faulty • The transfer case input shaft seal leaking 2. Repair or replace the following components if found faulty: • Replace the transfer case input shaft seal. Refer to **Transfer Case Input Shaft Seal Replacement** . • Inspect for the following conditions: ▪ Seal improperly installed, worn, or damaged ▪ Seal bore damaged or cracked ▪ Input shaft seal surface worn, grooved, or damaged • Repair or replace the loose fasteners. Refer to **Transfer Case Adapter Replacement** . • Replace the transfer case gasket or sealer. Refer to **Transfer Case Adapter Replacement** .

Front case half to rear case half seam leak	Disassemble and seal the case halves again. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
Case leaking	1. Inspect for a cracked case or case porosity. 2. Replace the faulty case half. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

REPAIR INSTRUCTIONS

TRANSFER CASE SHIFT CONTROL MODULE REPLACEMENT

Removal Procedure

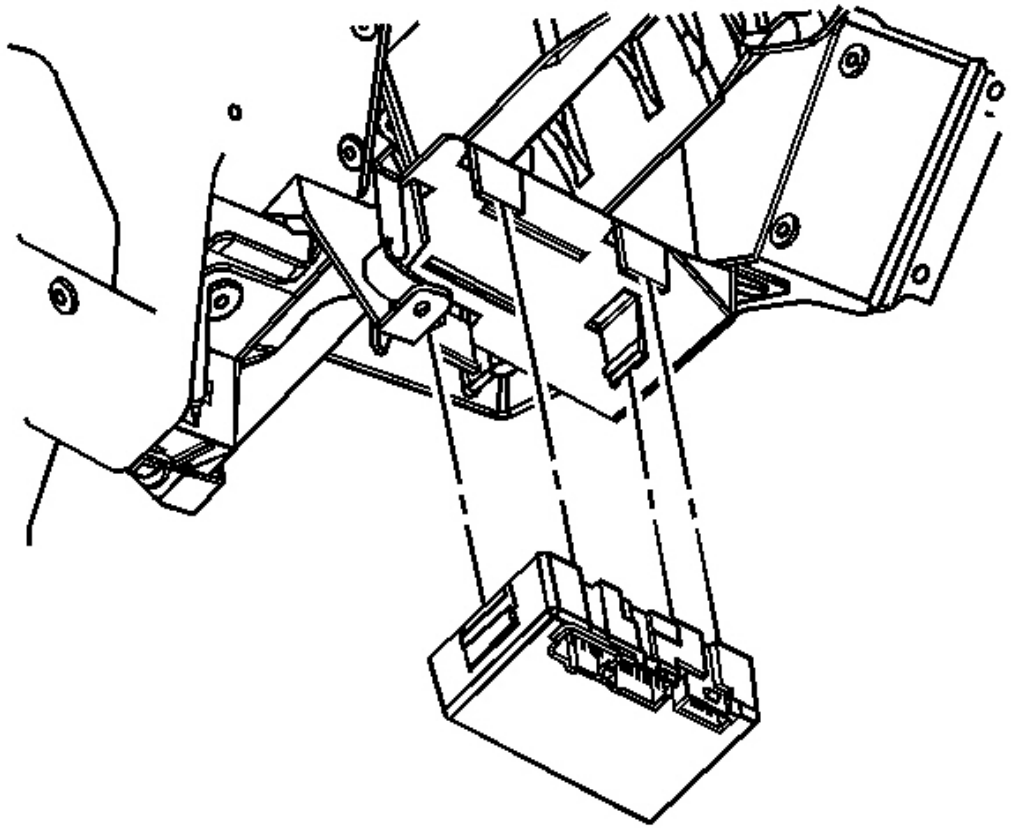


Fig. 7: Transfer Case Shift Control Module
Courtesy of GENERAL MOTORS CORP.

1. Remove the knee bolster. Refer to **Trim Panel Replacement - Knee Bolster** in Instrument Panel, Gauges, and Console.
2. Disconnect the shift control module electrical connectors.
3. Reposition the harness.
4. Remove the module from the vehicle.

Installation Procedure

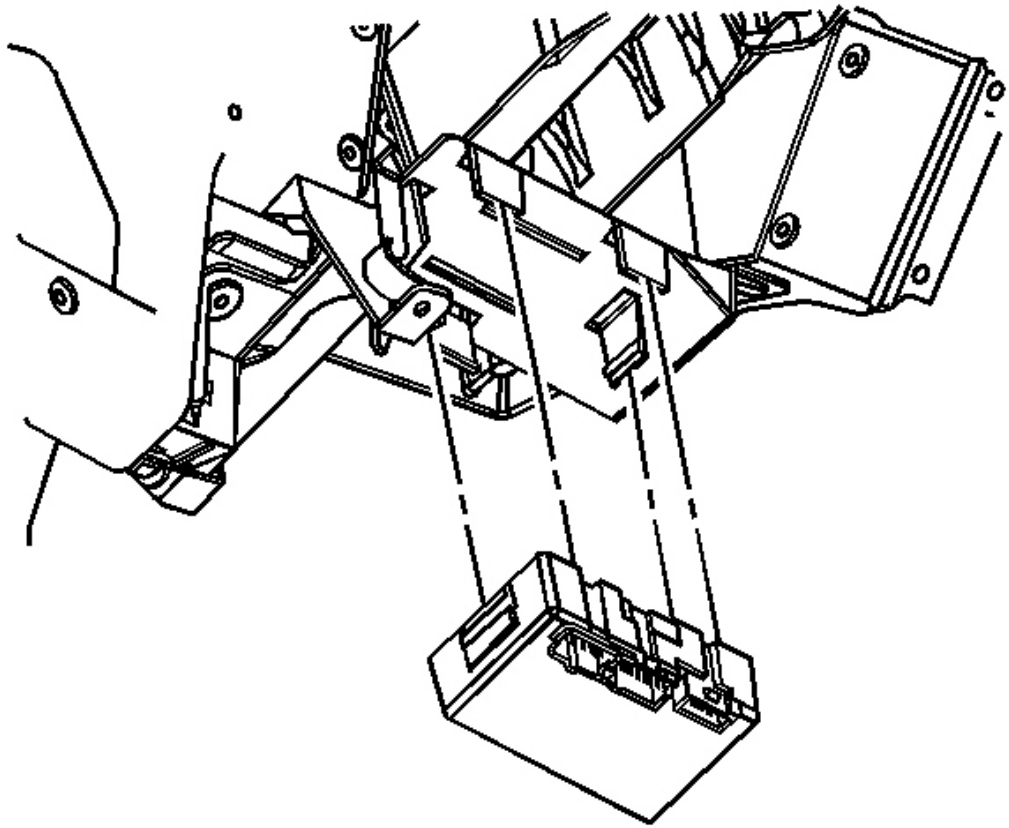


Fig. 8: Transfer Case Shift Control Module
Courtesy of GENERAL MOTORS CORP.

1. Install the shift control module to the vehicle.
2. Connect the shift control module electrical connectors.
3. Install the knee bolster. Refer to **Trim Panel Replacement - Knee Bolster** in Instrument Panel, Gauges, and Console.

4. Start the engine and test the automatic transfer case system for proper shift operation.

TRANSFER CASE CONTROL MODULE REPROGRAMMING

Set-up for Module Programming/Reprogramming

IMPORTANT: Ensure that the vehicle battery is fully charged and that a battery charger is no longer connected. If performing this procedure for module replacement, install new module before proceeding.

- **Turn OFF all accessories.**
- **Turn ON the ignition, with the engine OFF.**

Remote Programming Feature

1. Connect the scan tool to the vehicle.
2. Power-up the scan tool and select the Service Programming feature.
3. Select the appropriate vehicle.
4. Press the Request Info button on the scan tool.
5. Disconnect the scan tool from the vehicle and connect the scan tool to the computer station.
6. Follow the menu select items for reprogramming and provide information as to what type of device you are programming and whether you are reprogramming or replacing the electronic control unit (ECU).
7. Select "vehicle" from the selection menu.
8. Select the module you wish to Program.
9. Select "Normal" for Programming Type.
10. Select the applicable software calibrations.
11. Transfer data file to the scan tool.
12. Reconnect the scan tool to the vehicle.
13. Turn ON the ignition, with the engine OFF.
14. Select the Service Programming feature on the scan tool.
15. Press the Program button on the scan tool.

Programming Using Scan Tool Pass-Through Connection

1. Connect the scan tool to vehicle and power it up.
2. Connect the computer station to the scan tool.
3. Select "PC Using Scan Tool Connection" from the programming menu on the computer station.
4. Follow the menu select items for reprogramming and provide information as to what type of device you are programming and whether you are reprogramming or replacing the electronic control unit (ECU).
5. Select "vehicle" from the selection menu.
6. Select the module you wish to program.

7. Select "Normal" for Programming Type.
8. Select the applicable software calibrations.
9. Transfer data file to the scan tool.

TRANSFER CASE SHIELD REPLACEMENT

Removal Procedure

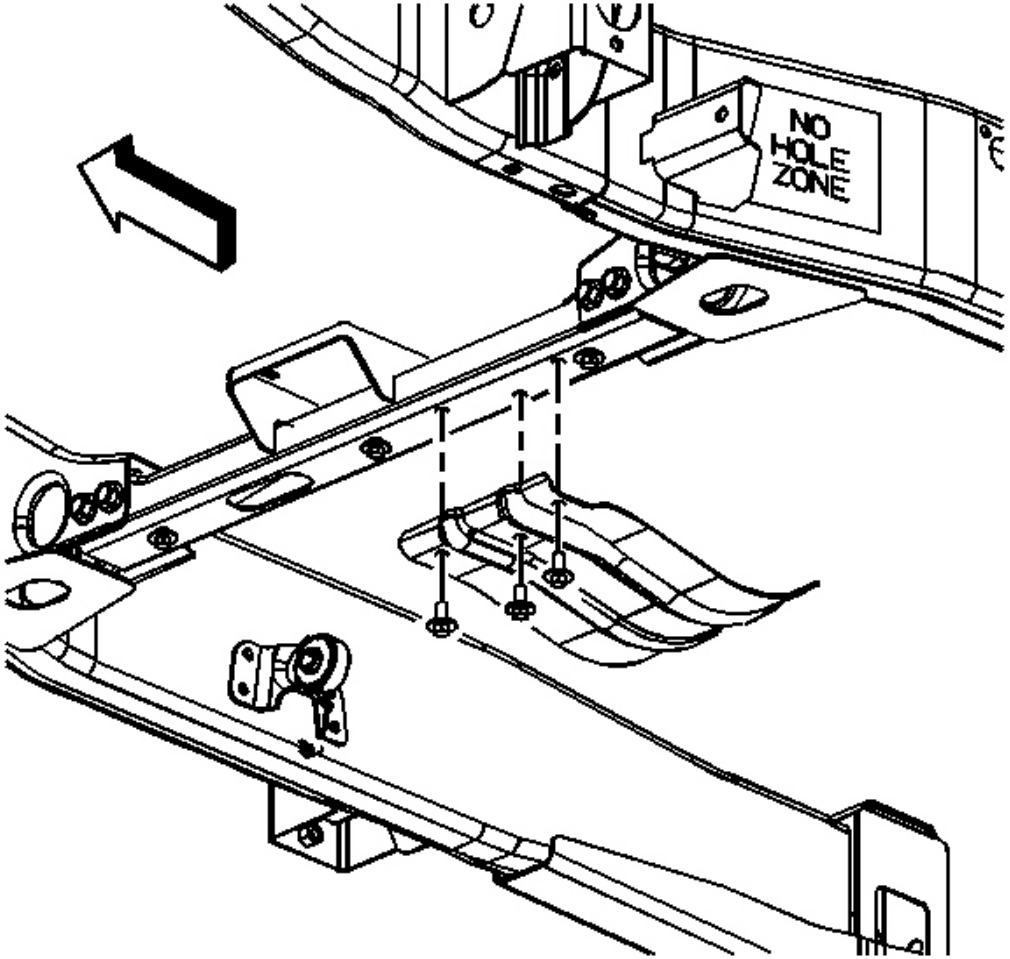


Fig. 9: Transfer Case Shield
Courtesy of GENERAL MOTORS CORP.

1. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.

2. Remove the transfer case shield mounting bolts from the cross member.
3. Remove the transfer case shield from cross member.

Installation Procedure

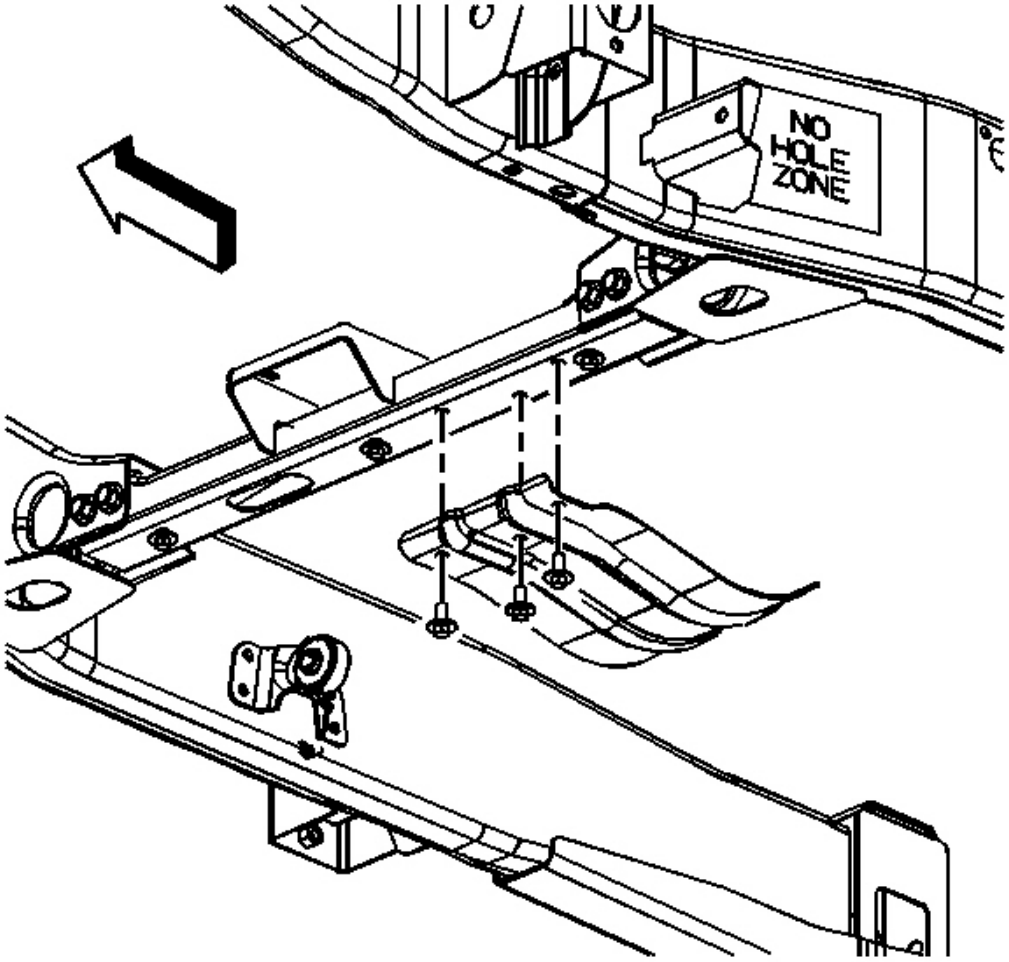


Fig. 10: Transfer Case Shield
Courtesy of GENERAL MOTORS CORP.

1. Install the transfer case shield to the cross member.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the transfer case shield mounting bolts the cross member.

   Tighten: Tighten the mounting bolts to 30 N.m (23 lb ft).

3. Lower the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.

TRANSFER CASE FLUID REPLACEMENT

Removal Procedure

IMPORTANT: When performing the following service procedures, use only hand tools to remove and install the fill or drain plugs.

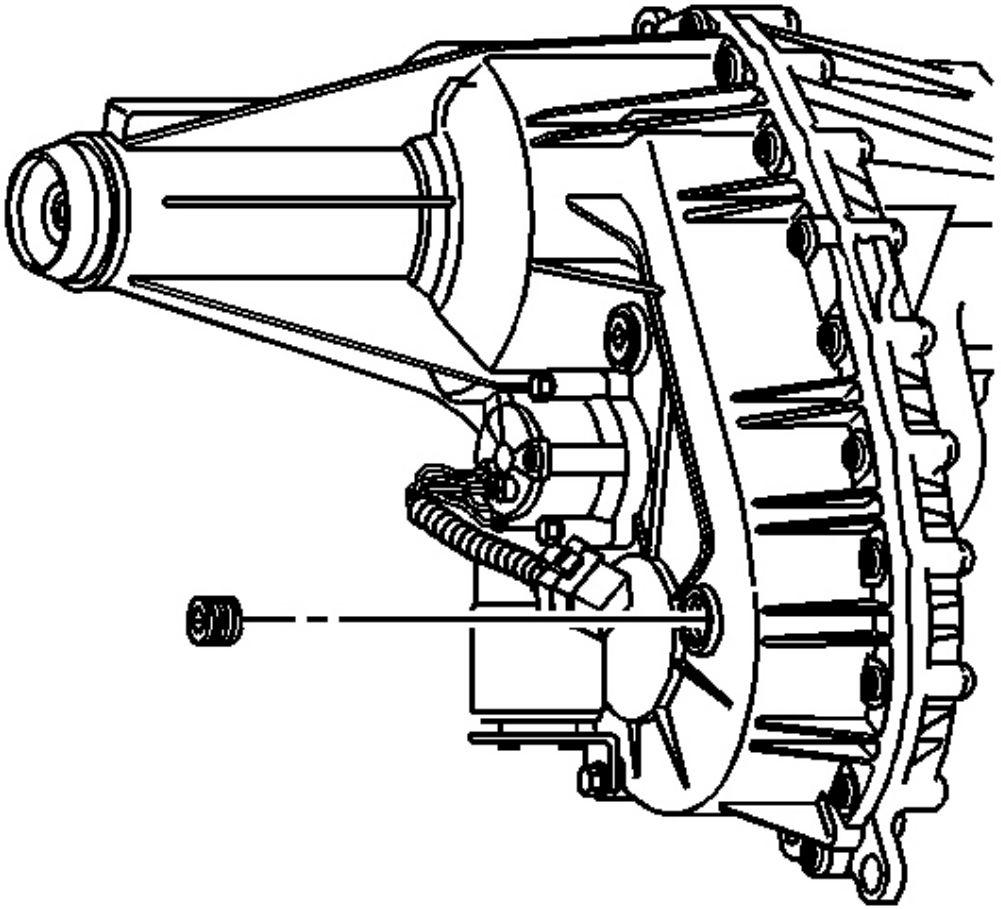


Fig. 11: Transfer Case Drain Plug
Courtesy of GENERAL MOTORS CORP.

1. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the fill plug from the transfer case.

IMPORTANT: When draining the transfer case, make sure that an approved drain pan is used.

3. Remove the drain plug from the transfer case.

Installation Procedure

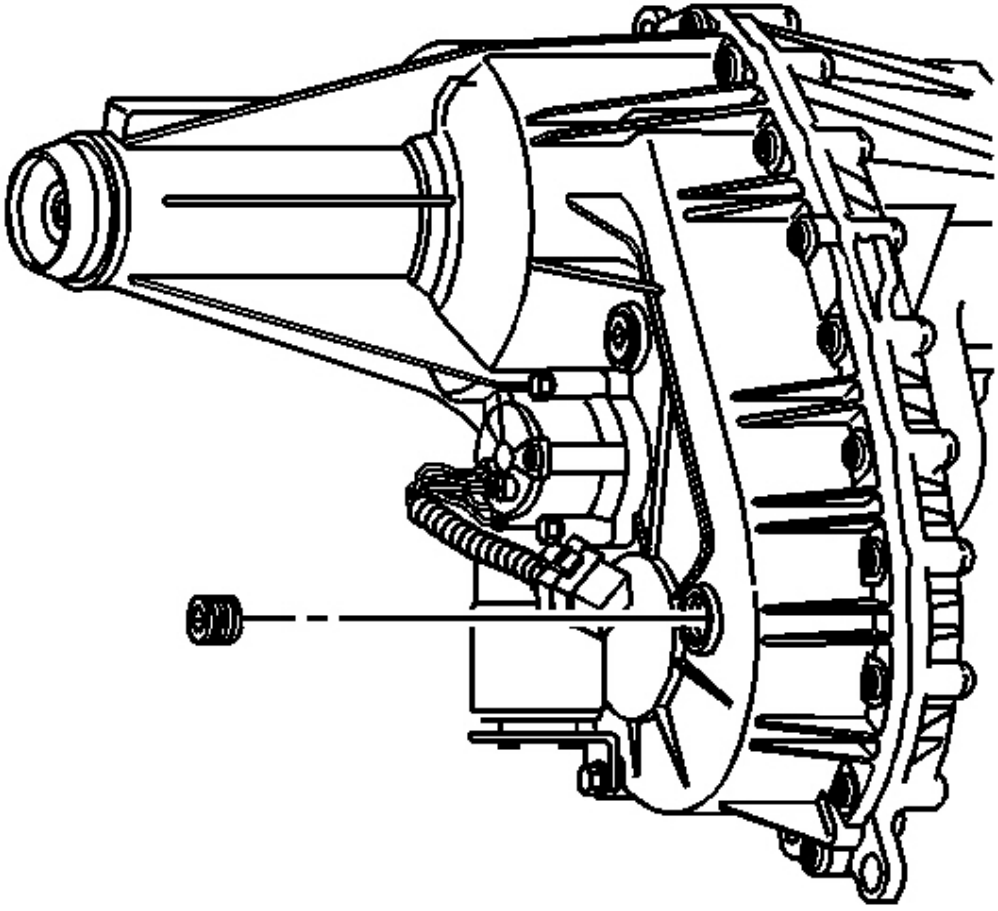


Fig. 12: Transfer Case Drain Plug
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

IMPORTANT: If the drain or fill plug have to be replaced, used only aluminum replacement drain plugs.

1. Apply pipe sealant GM P/N 12346004 (Canadian P/N 10953480) to the threads on the drain plug.
2. Install the drain plug in the transfer case.

   Tighten: Tighten the drain plug to 25 N.m (18 lb ft).

3. Fill the transfer case to the bottom of the fill hole with the proper fluid.
4. Apply pipe sealant GM P/N 12346004 (Canadian P/N 10953480) to the threads on the drain plug.
5. Install the fill plug.

   Tighten: Tighten the fill plug to 25 N.m (18 lb ft).

6. Lower the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.

TRANSFER CASE MOTOR/ENCODER REPLACEMENT

Removal Procedure

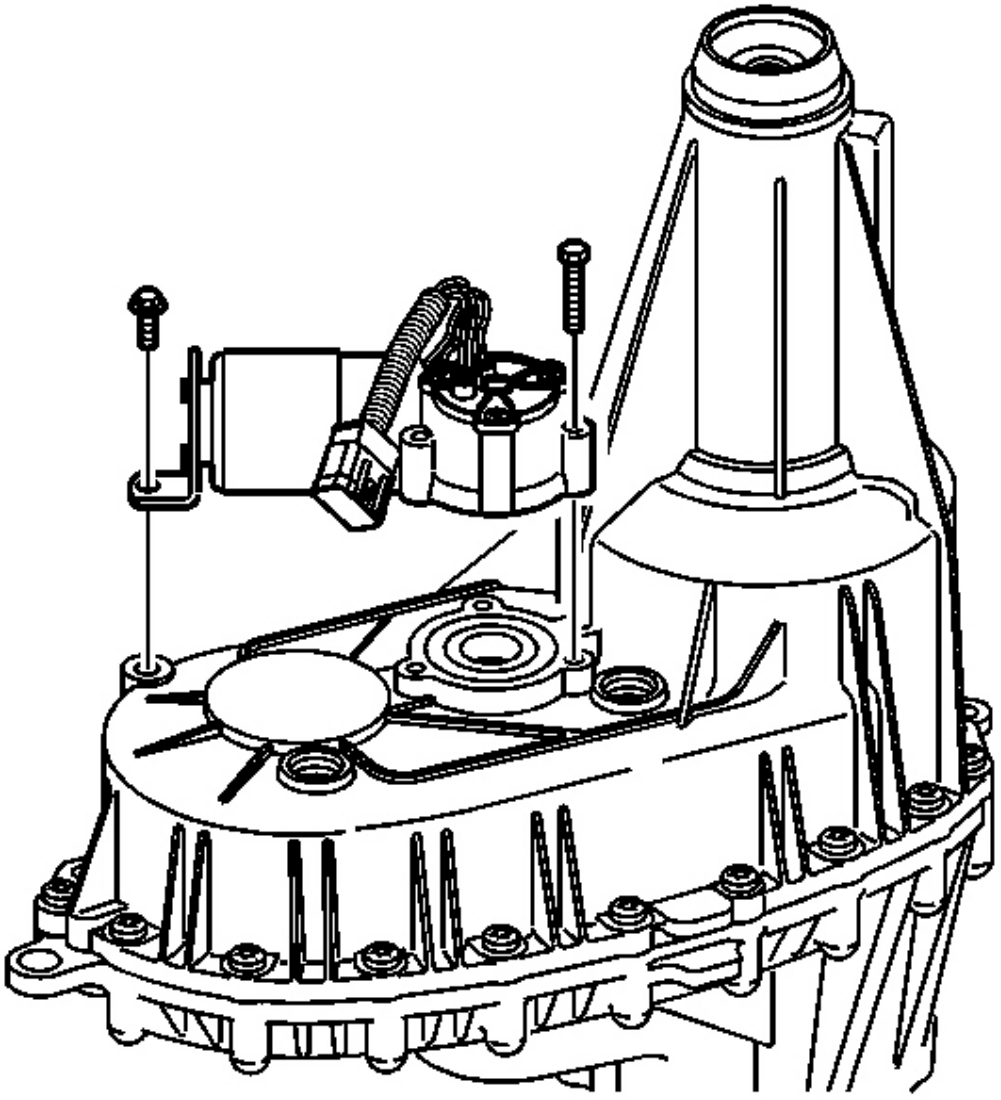


Fig. 13: Transfer Case Encoder/Motor Assembly
Courtesy of GENERAL MOTORS CORP.

1. Remove the transfer case shield. Refer to **Transfer Case Shield Replacement** .
2. Disconnect the encoder motor electrical connector.
3. Remove the encoder motor bolts.
4. Remove the encoder motor.
5. Remove the actuator insulator.

Installation Procedure

IMPORTANT:

- **If the encoder motor is being replaced, ensure that the transfer case is in the neutral position. Manually shift the transfer case at the shift shaft, using a crescent wrench if necessary.**
- **When installing the encoder motor, ensure that the encoder motor is indexed correctly and the motor is flat against the transfer case before tightening the bolts.**

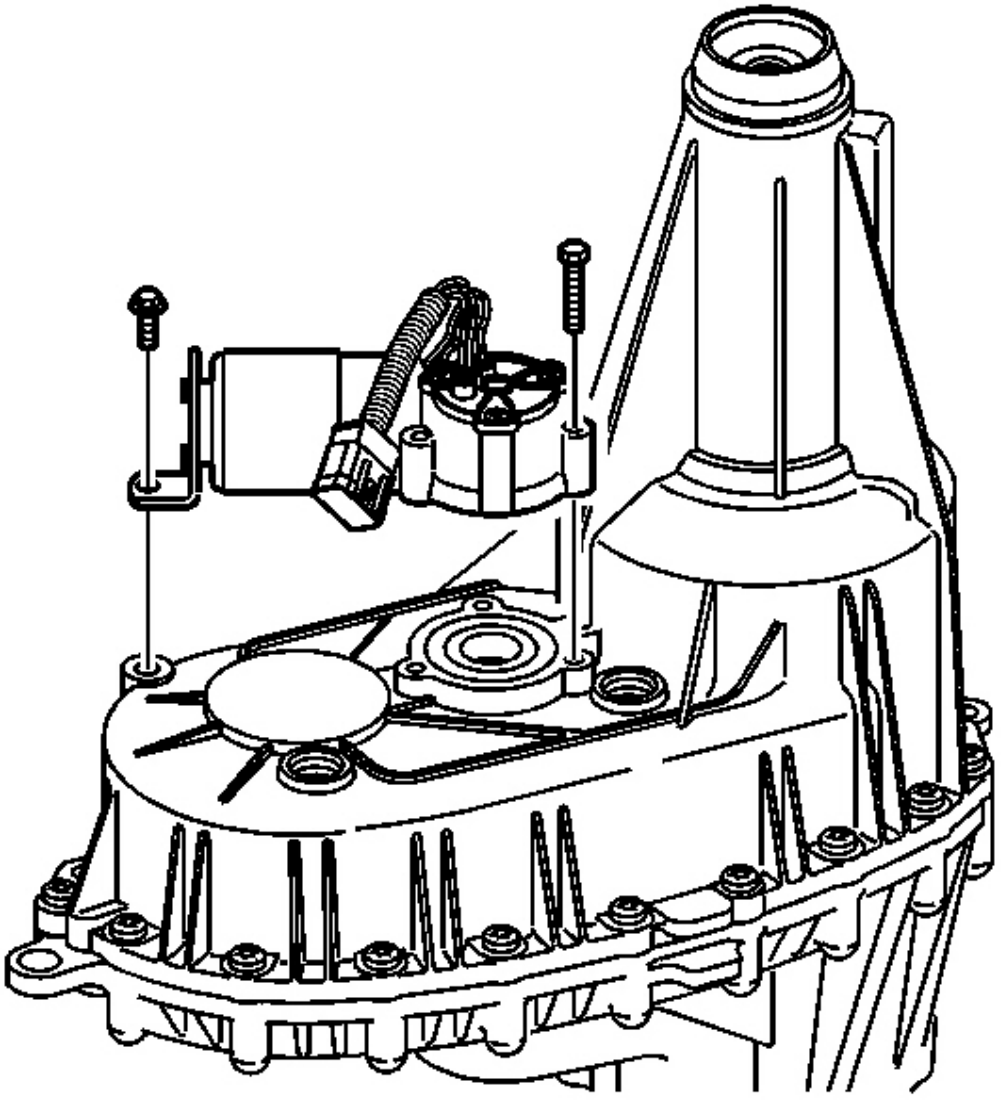


Fig. 14: Transfer Case Encoder/Motor Assembly
Courtesy of GENERAL MOTORS CORP.

1. Apply a 3.175 mm (1/8 in) bead of RTV sealant GM P/N 12345739 (Canadian P/N 10953541) or equivalent to the sealing surface of the encoder motor.
2. Rotate to align the shift detent lever with the encoder motor assembly and install the encoder motor.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Loosely install the encoder motor mounting bolts.
4. Loosely install the encoder motor bracket bolt.

   Tighten: Tighten the Encoder motor mounting bolts and the bracket bolt to 10 N.m (89 lb in).

5. Connect the encoder motor electrical connector.
6. Install the transfer case shield. Refer to **Transfer Case Shield Replacement** .

TRANSFER CASE SPEED SENSOR REPLACEMENT

Removal Procedure

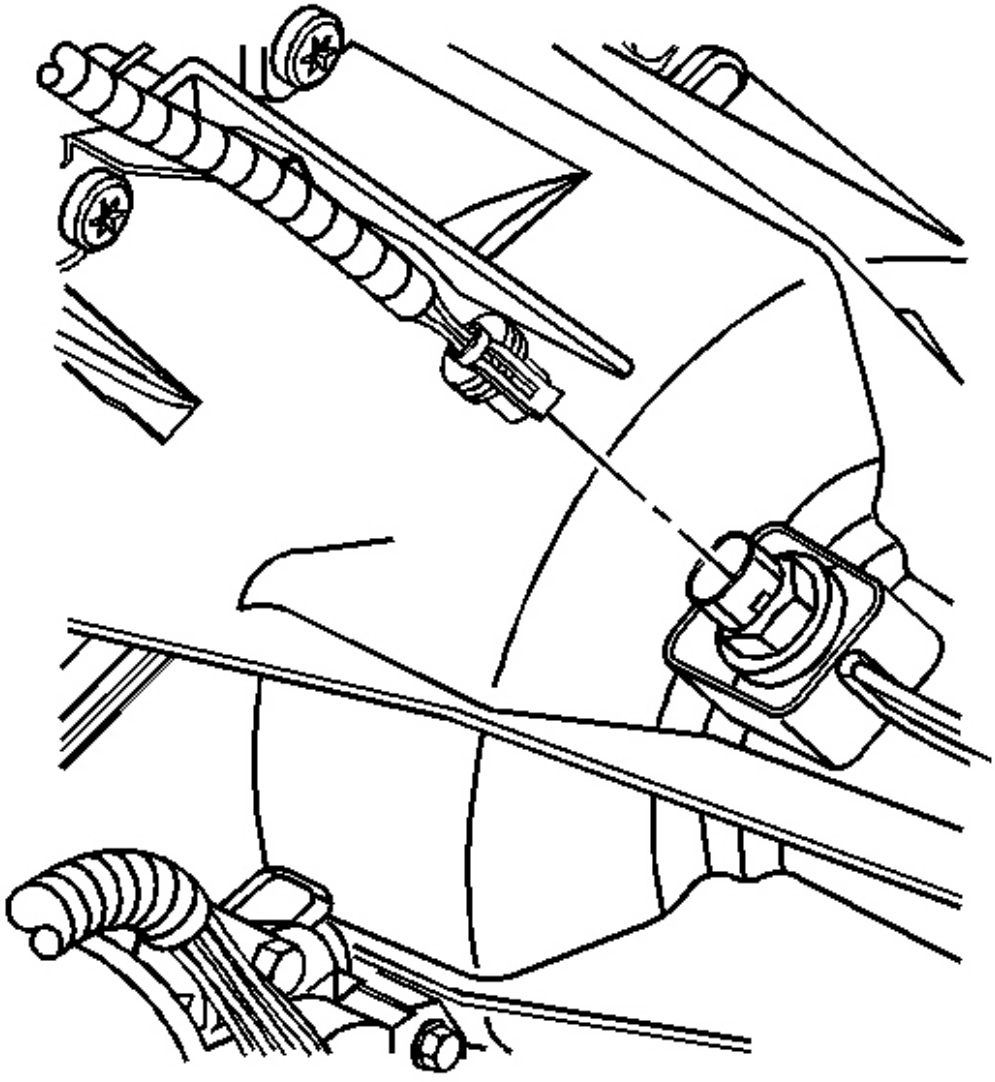


Fig. 15: Electrical Connector & Speed Sensor
Courtesy of GENERAL MOTORS CORP.

1. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the electrical connector from the speed sensor.

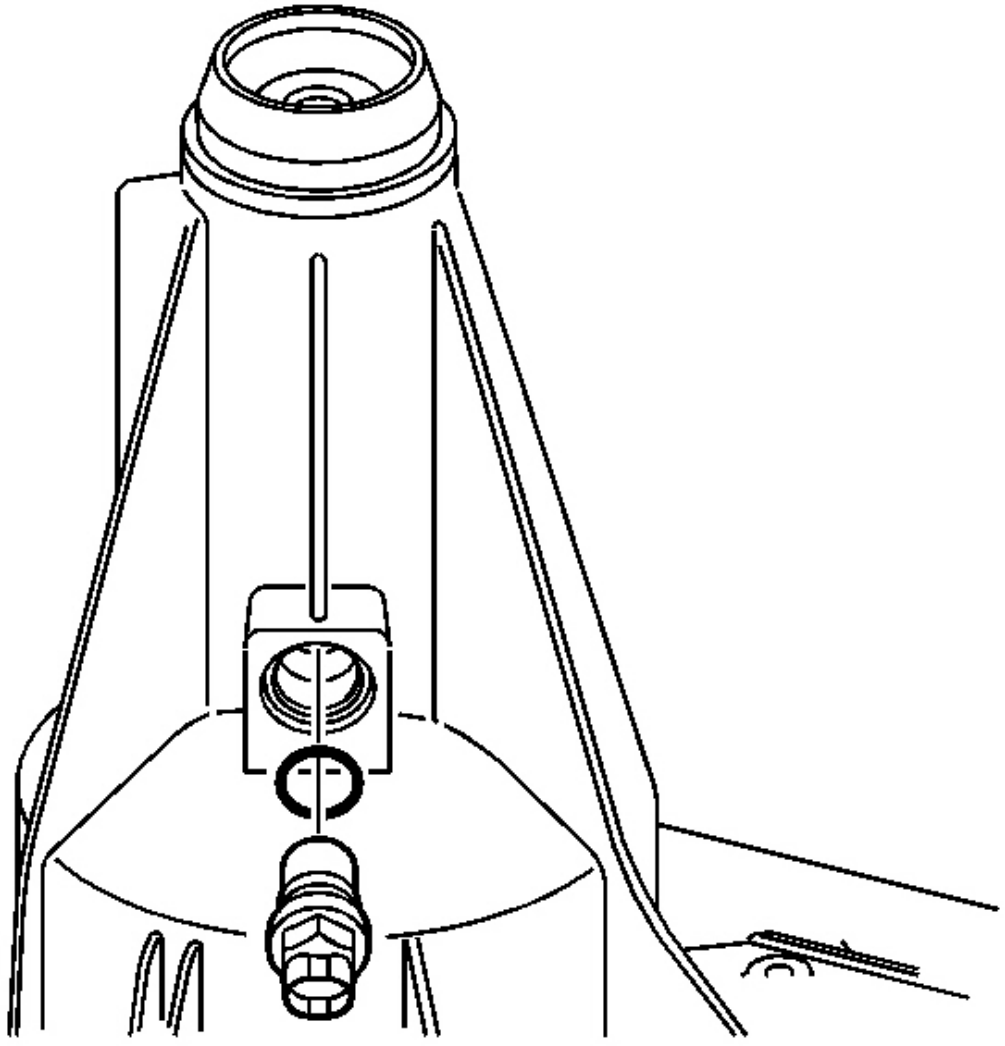


Fig. 16: Speed Sensor & O-Ring
Courtesy of GENERAL MOTORS CORP.

3. Remove the speed sensor and the O-ring from the transfer case.

Installation Procedure

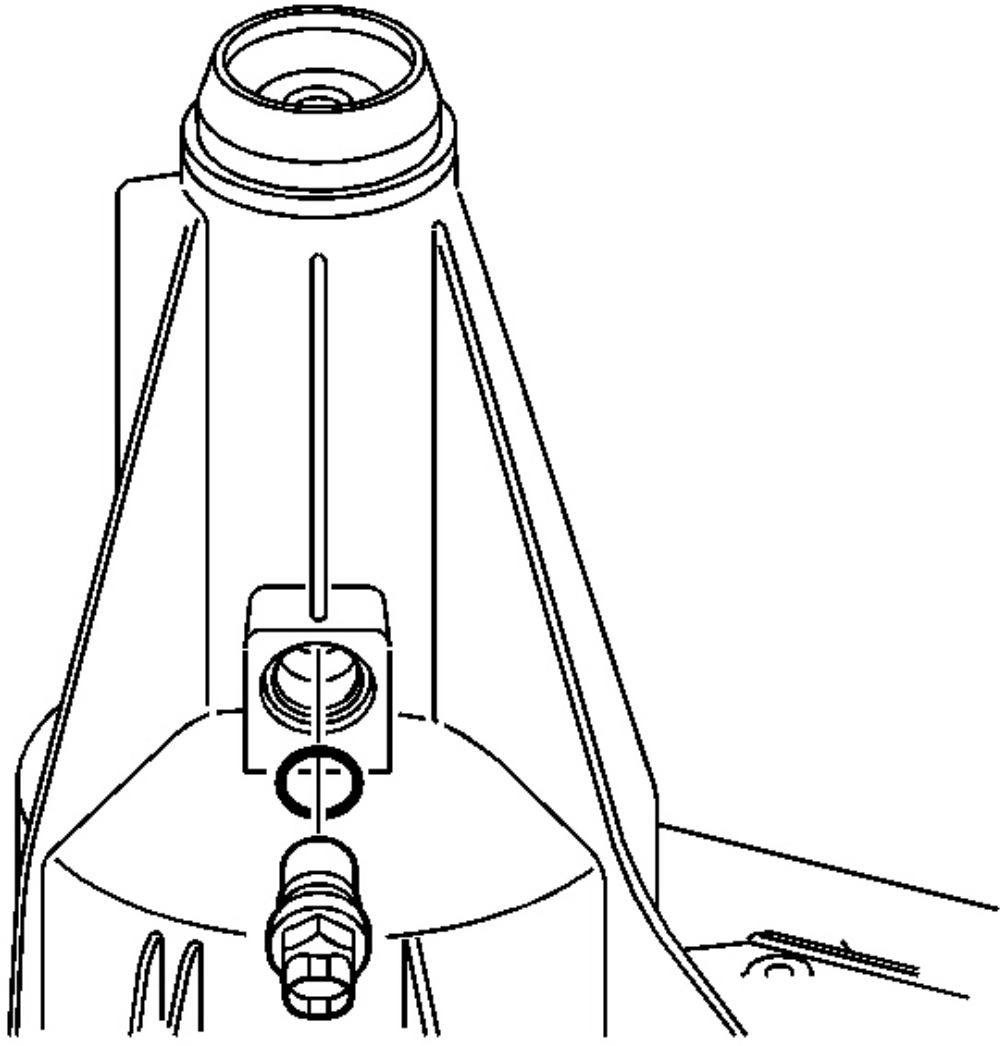


Fig. 17: Speed Sensor & O-Ring
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

1. Install the new rear speed sensor into the transfer case with a new O-ring seal.

   Tighten: Tighten the speed sensor to 17 N.m (13 lb ft).

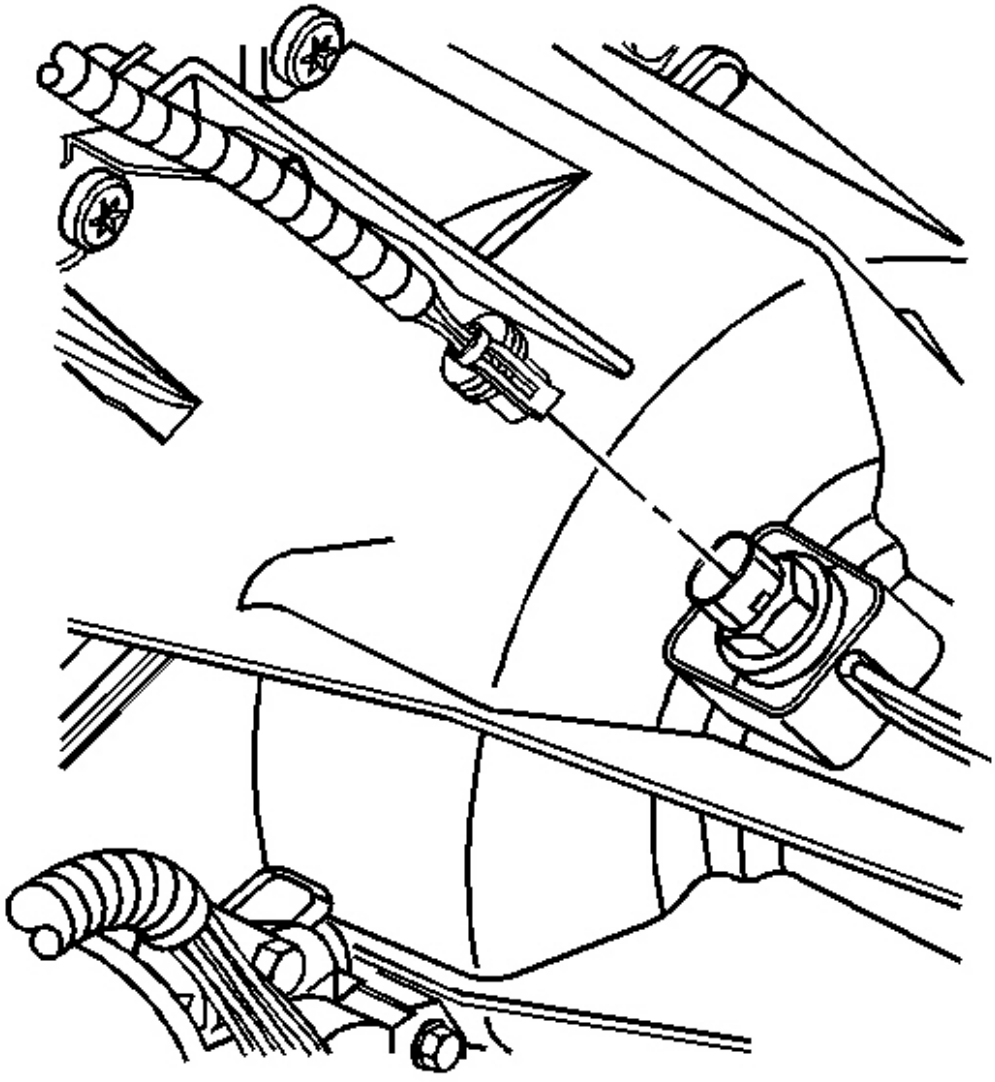


Fig. 18: Electrical Connector & Speed Sensor
Courtesy of GENERAL MOTORS CORP.

2. Install the electrical connector to the speed sensor.
3. Lower the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.

TRANSFER CASE OUTPUT SHAFT SEAL REPLACEMENT - FRONT

Tools Required

- **J 8092** Universal Handle
- **J 43484** Front Output Shaft Seal Installer. See **Special Tools and Equipment** .

Removal Procedure

NOTE: Refer to Transfer Case Seal Removal Notice in Cautions and Notices.

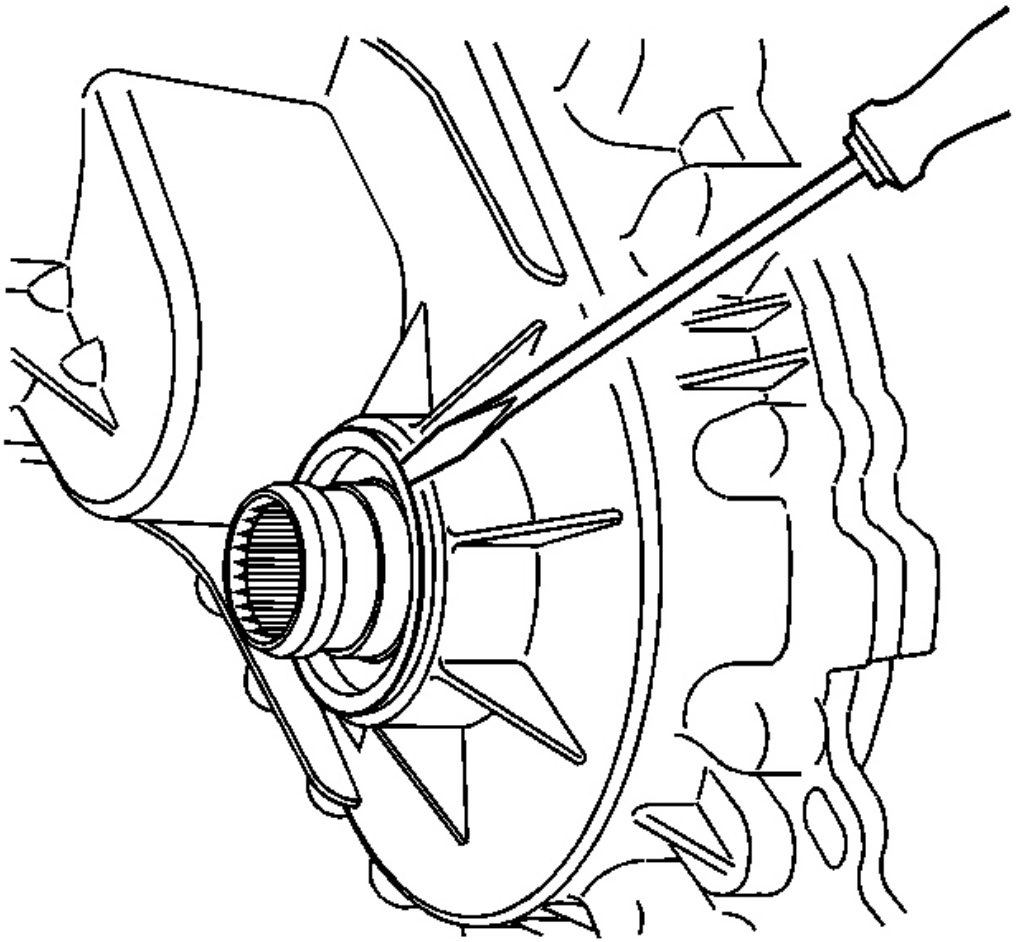


Fig. 19: Prying Inner Seal Race Forward
Courtesy of GENERAL MOTORS CORP.

1. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the front propeller shaft from the vehicle. Refer to **Propeller Shaft Replacement - Front** in Propeller Shaft.

3. Insert a flat-tipped screw driver in the inner race.
4. Pry the inner race forward.

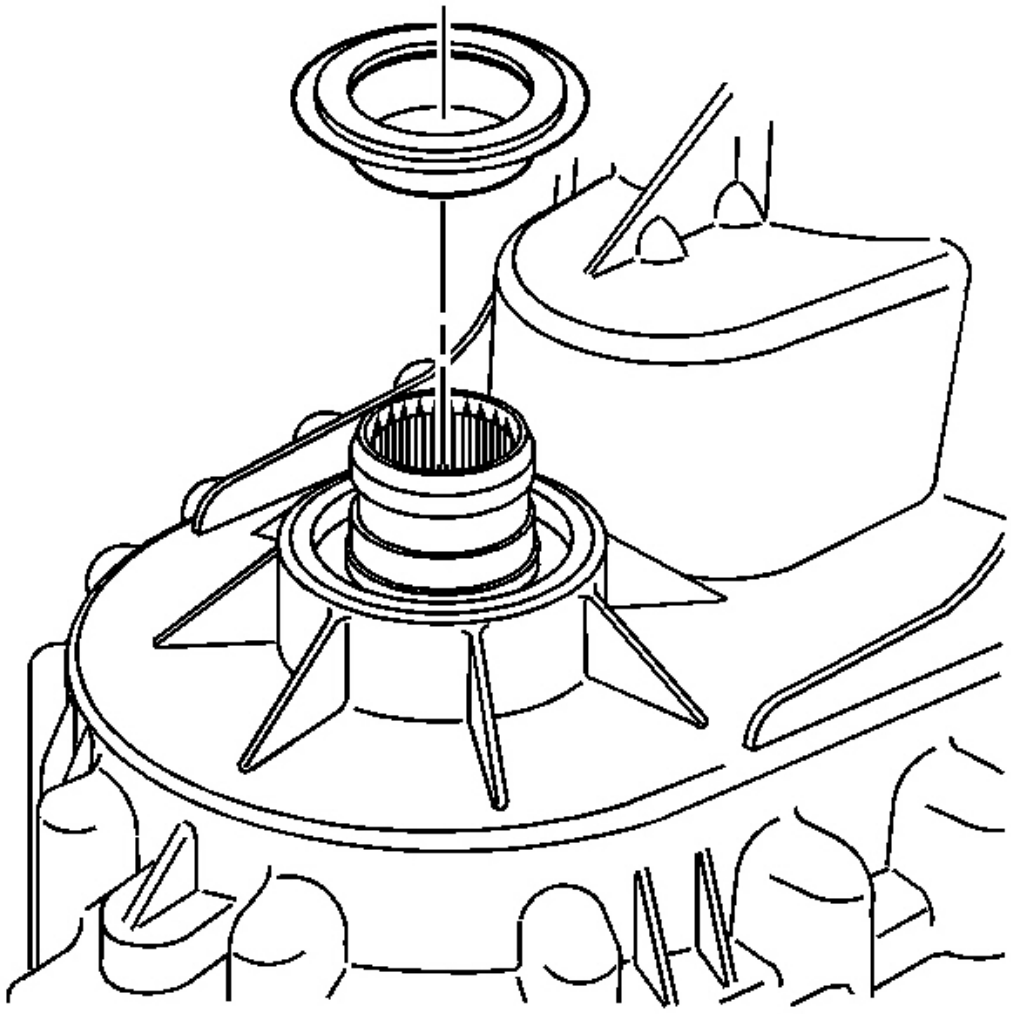


Fig. 20: Inner Seal Race
Courtesy of GENERAL MOTORS CORP.

5. Insert a small pry bar in the inner race.
6. Pry the inner part of the seal from the outer seal body.
7. Remove the inner part of the seal.

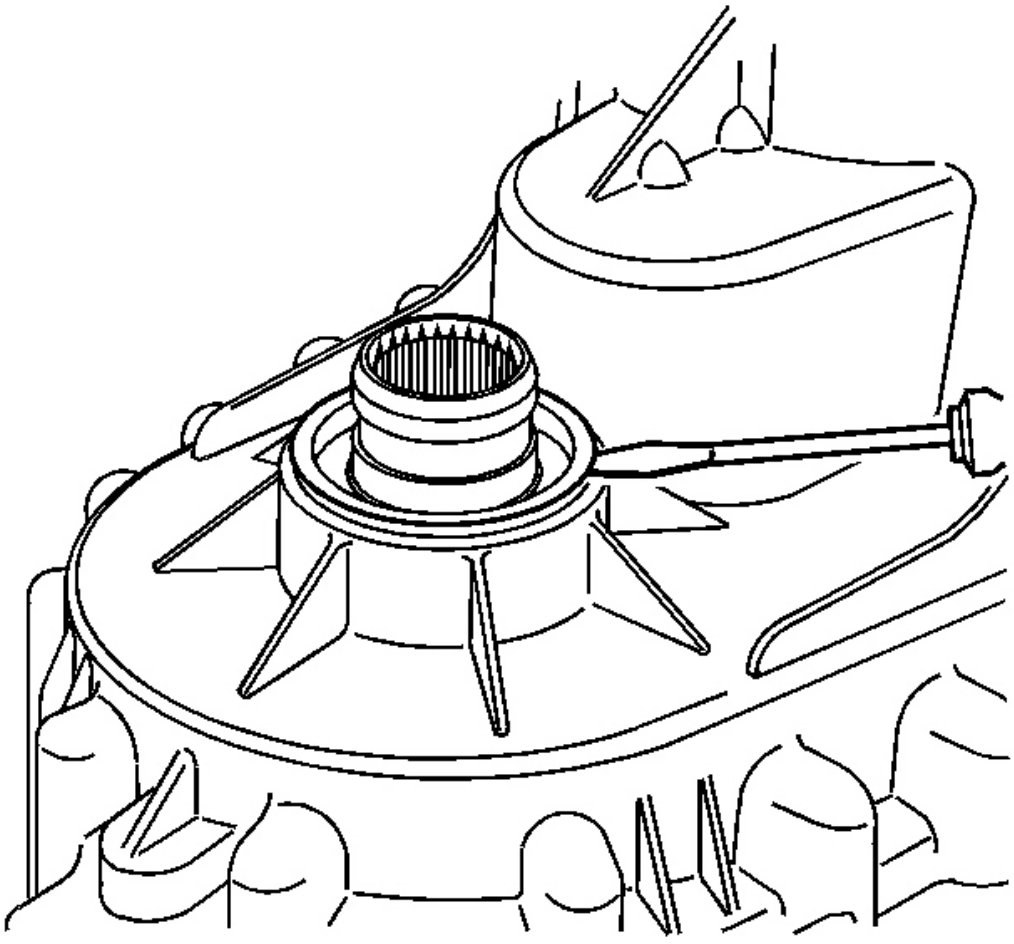


Fig. 21: Output Shaft Seal
Courtesy of GENERAL MOTORS CORP.

8. Insert a flat-tipped screw driver or small pry bar in the space between the outer race of the seal and the transfer case.
9. Pry the outer race out of the transfer case.
10. Remove the outer part of the seal.

Installation Procedure

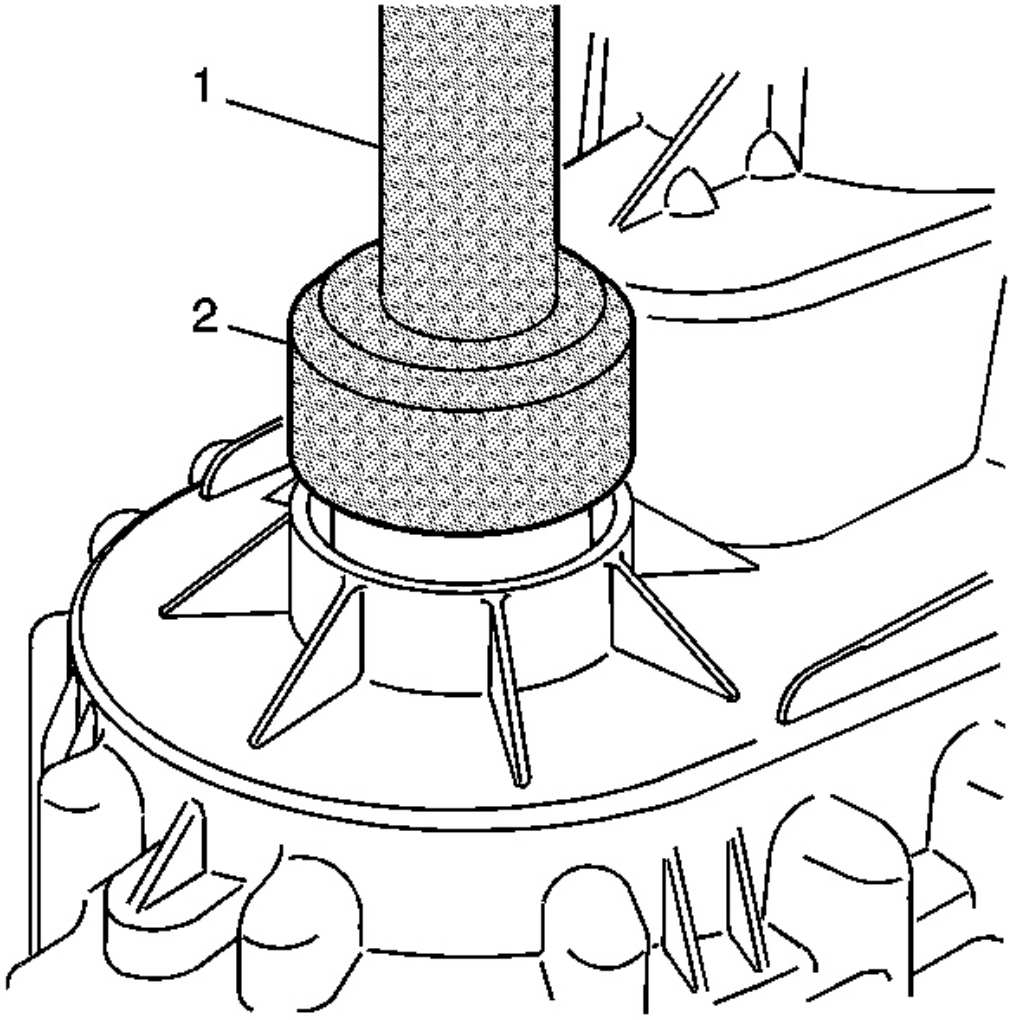


Fig. 22: Using J 43484 & J 8092 To Install Transfer Case Output Seal
Courtesy of GENERAL MOTORS CORP.

1. Using the **J 43484** (2) and the **J 8092** (1), install the transfer case output seal. See **Special Tools and Equipment** .
2. Install the front propeller shaft. Refer to **Propeller Shaft Replacement - Front** in Propeller Shaft.
3. Check the transfer case fluid level. Refer to **Transfer Case Fluid Replacement** .
4. Lower the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.

TRANSFER CASE OUTPUT SHAFT SEAL REPLACEMENT - REAR

Tools Required

J 45756 Rear Output Shaft Seal Installer. See **Special Tools and Equipment** .

Removal Procedure

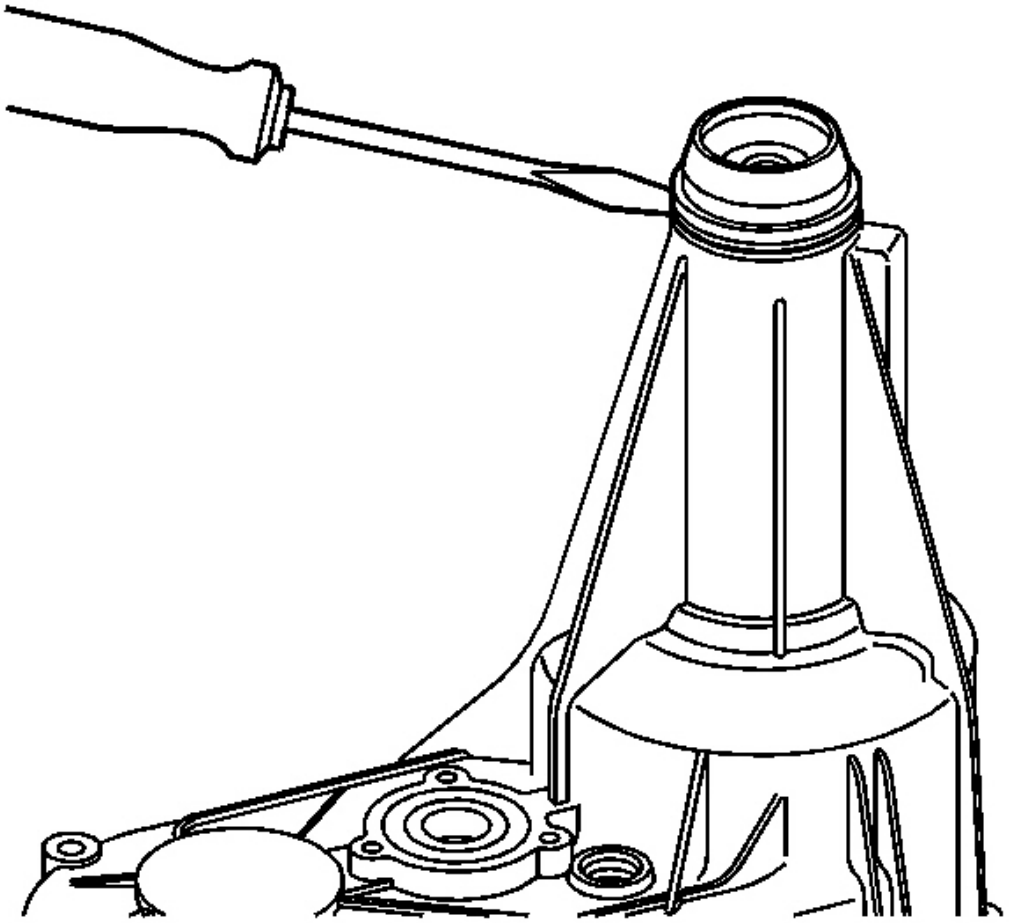


Fig. 23: Rear Output Shaft Seal
Courtesy of GENERAL MOTORS CORP.

1. Raise and suitably support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the rear propeller shaft. Refer to **Propeller Shaft Replacement - Rear** in Propeller Shaft.
3. Remove the rear output shaft seal by prying it out with a flat tipped screwdriver.

Installation Procedure

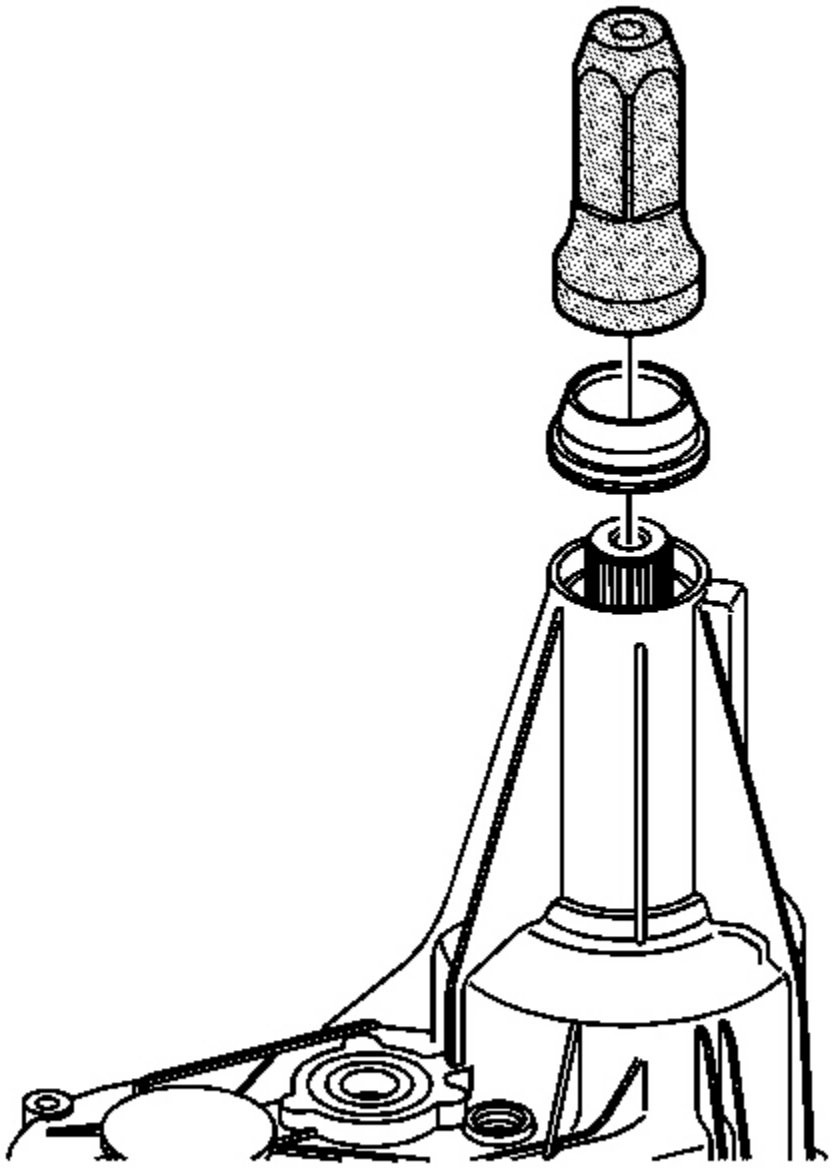


Fig. 24: Using J 45756 To Install NEW Front Output Shaft Seal
Courtesy of GENERAL MOTORS CORP.

1. Using **J 45756** , install a NEW front output shaft seal. See **Special Tools and Equipment** .
2. Install the rear propeller shaft. Refer to **Propeller Shaft Replacement - Rear** in Propeller Shaft.
3. Check the fluid level. Add fluid, if necessary.

4. Lower the vehicle.

TRANSFER CASE ASSEMBLY REPLACEMENT

Removal Procedure

1. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Drain the transfer case. Refer to **Transfer Case Fluid Replacement** .
3. Drain the transmission fluid. Refer to **Automatic Transmission Fluid/Filter Replacement** in Automatic Transmission - 4L60-E/4L65-E.
4. Remove the transmission support member. Refer to **Transmission Support Replacement** .
5. Remove the rear propeller shaft from the transfer case. Refer to **Propeller Shaft Replacement - Rear** in Propeller Shaft.
6. Remove the front propeller shaft from the transfer case. Refer to **Propeller Shaft Replacement - Front** in Propeller Shaft.

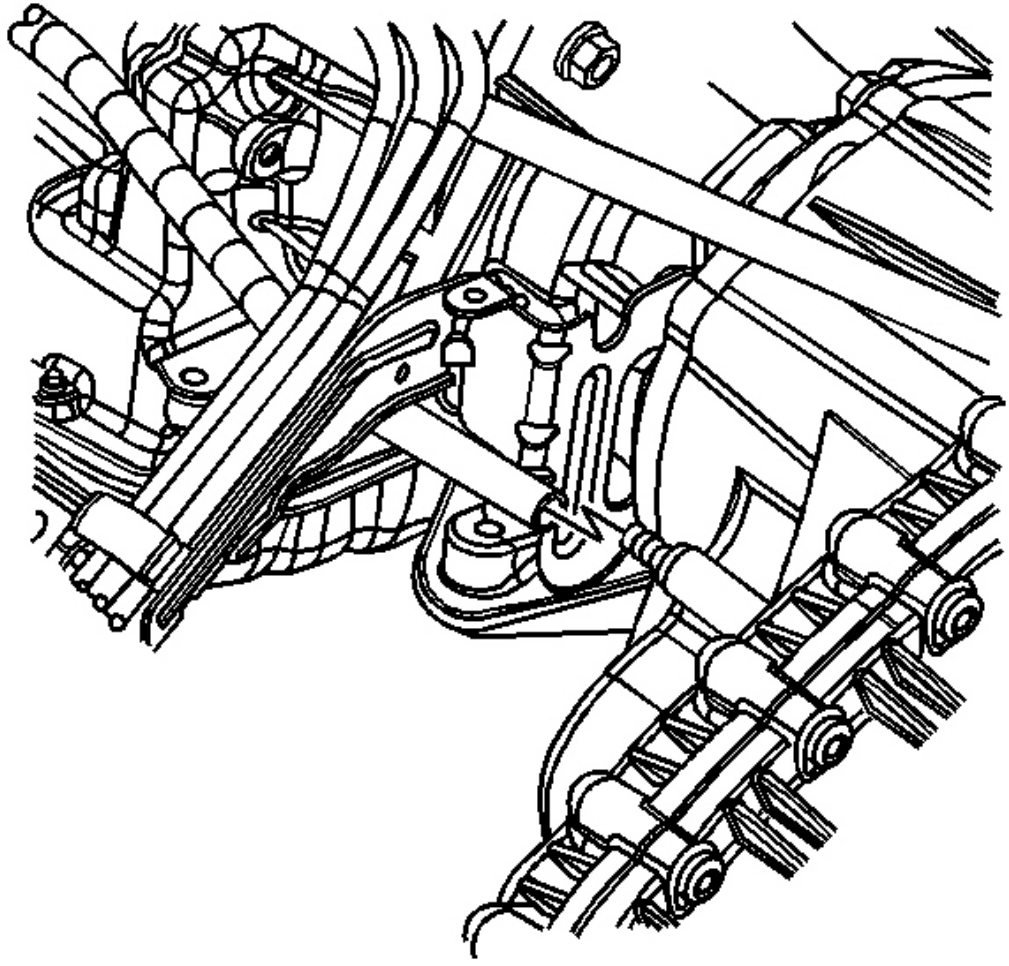


Fig. 25: Removing Vent Hoses From Transfer Case & Transmission
Courtesy of GENERAL MOTORS CORP.

7. Remove the vent hoses from the transfer case and transmission.

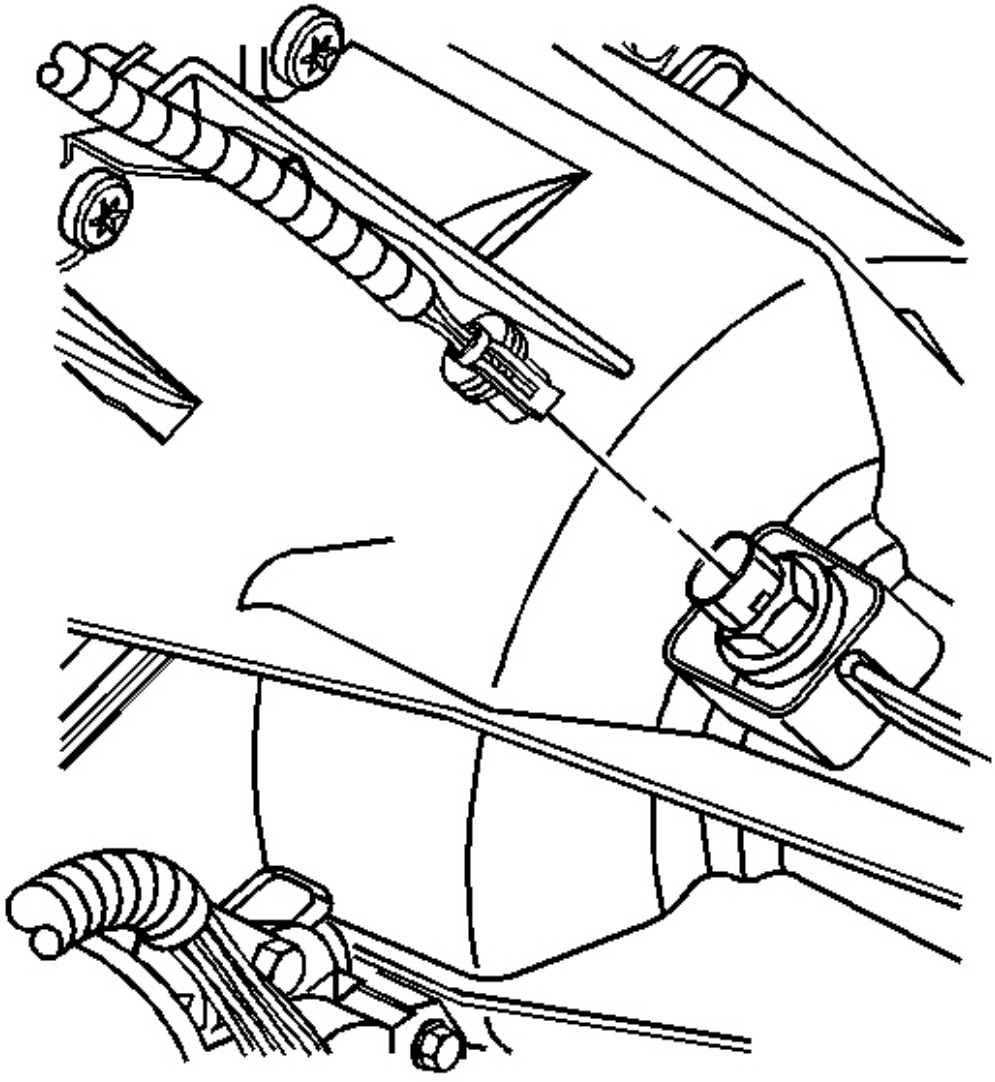


Fig. 26: Electrical Connector & Speed Sensor
Courtesy of GENERAL MOTORS CORP.

8. Disconnect the electrical connector from the speed sensor.
9. Disconnect the encoder motor from the electrical connector.
10. Remove the fuel lines from the retainer at the top of the transfer case.
11. Install a suitable transmission jack to the transfer case.
12. Remove the bolts from the transfer case to the adapter.

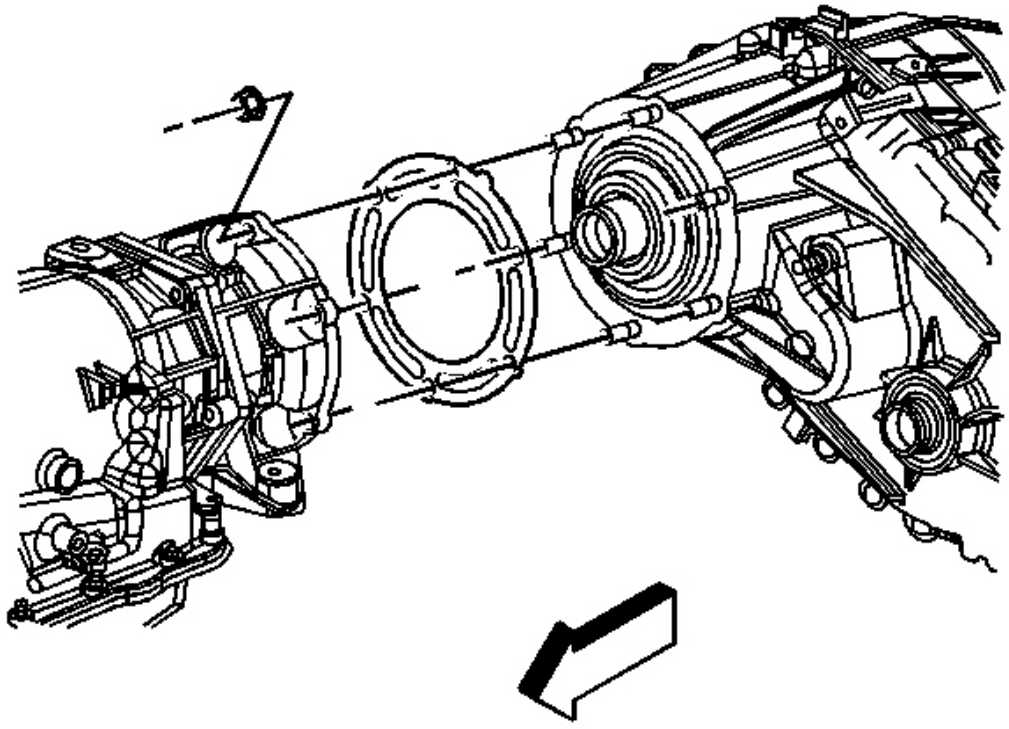


Fig. 27: Transfer Case Assembly
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Pull straight back on the transfer case in order to position the transfer case so that the transfer case can be turned parallel to the transmission.

13. Remove the transfer case from the transfer case adapter.
14. Rotate the transfer case so that the transfer case is perpendicular to the torsion bar mounting bracket.
15. Lower the transfer case.
16. Remove the gasket from the transfer case.
17. Remove the transfer case from the transmission jack.

Installation Procedure

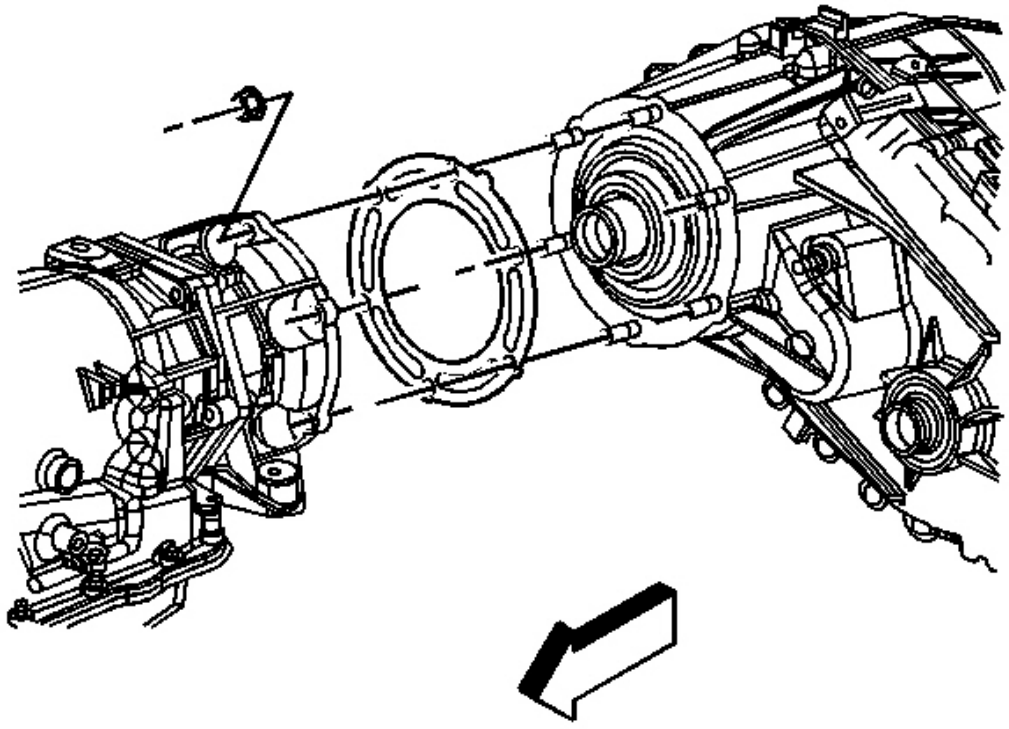


Fig. 28: Transfer Case Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the transfer case on a suitable transmission jack.

IMPORTANT: When installing a new transfer case gasket, ensure that the locator tab is facing up for proper installation. Install the gasket without the use of any type of sealant or lubricant.

2. Install a new transfer case gasket.
3. Rotate the transfer case so that the transfer case is parallel to the torsion bar mounting bracket.
4. Raise the transfer case into position.
5. Rotate the transfer case so that the transfer case is aligned with the adapter.
6. Install the transfer case on the adapter.

NOTE: Refer to Fastener Notice in Cautions and Notices.

7. Install the mounting nuts for the transfer case.

Tighten: Tighten the mounting nuts to 50 N.m (37 lb ft).

8. Connect the vent hoses to the transfer case and transmission.
9. Connect the vehicle speed sensor and encoder motor electrical connectors.
10. Install the fuel lines into the retainer at the top of the transfer case.

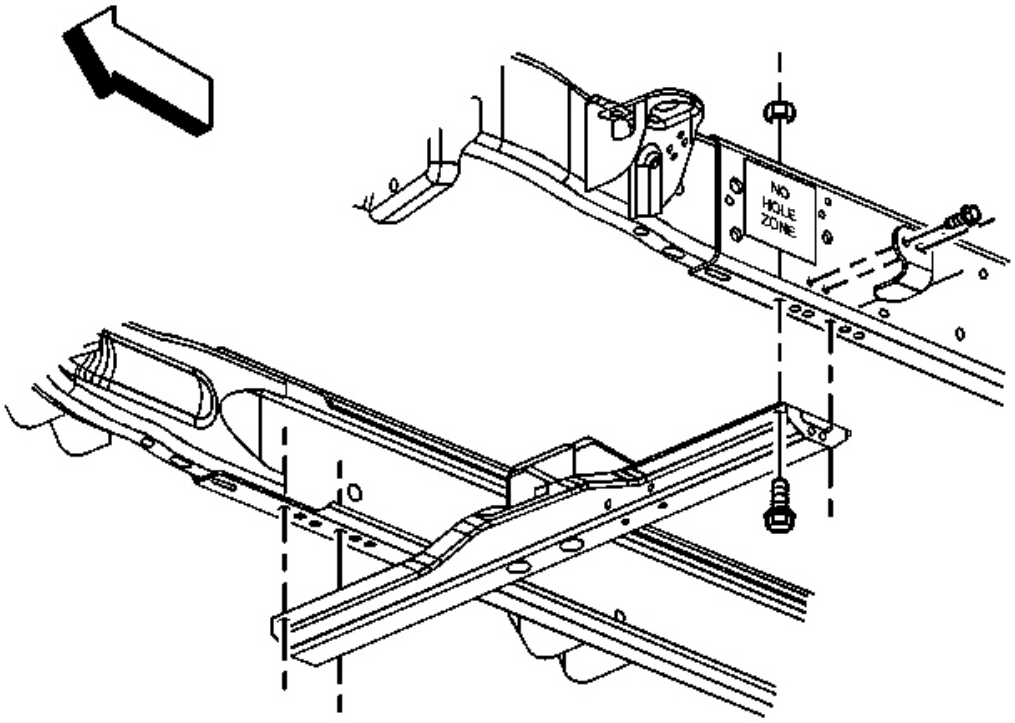


Fig. 29: Identifying Crossmember & Bolts
Courtesy of GENERAL MOTORS CORP.

11. Install the transmission support member. Refer to **Transmission Support Replacement** .
12. Remove the transmission jack.
13. Install the front propeller shaft. Refer to **Propeller Shaft Replacement - Front** in Propeller Shaft.
14. Install the rear propeller shaft. Refer to **Propeller Shaft Replacement - Rear** in Propeller Shaft.
15. Fill the transfer case with the proper transfer case fluid. Refer to **Transfer Case Fluid Replacement** .
16. Lower the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
17. Fill the transmission fluid with the proper fluid. Refer to **Automatic Transmission Fluid/Filter Replacement** in Automatic Transmission - 4L60-E/4L65-E.

TRANSFER CASE INPUT SHAFT SEAL REPLACEMENT

Tools Required

J 42738 Seal Installer. See **Special Tools and Equipment** .

J 36825 Output Shaft Oil Seal Remover. See **Special Tools and Equipment** .

Removal Procedure

1. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the transfer case from the adapter. Refer to **Transfer Case Assembly Replacement** .

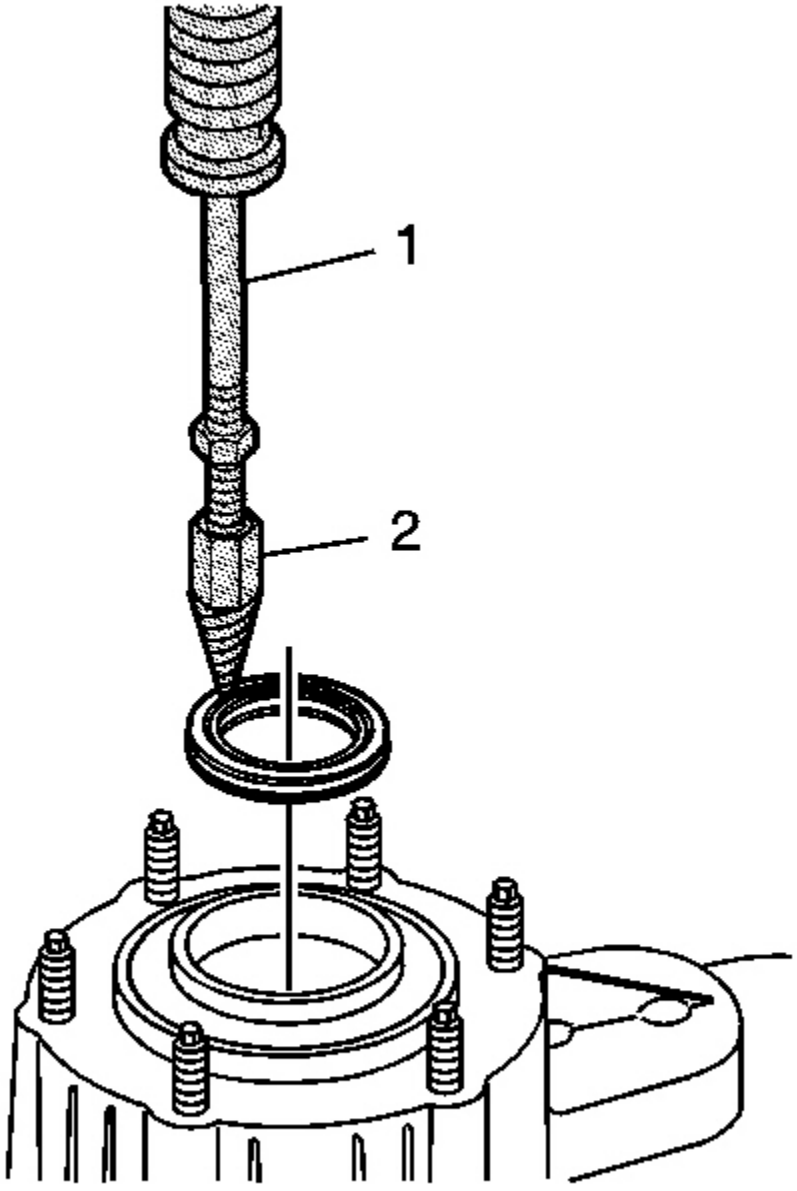


Fig. 30: Using J 36825 To Remove Input Shaft Seal From Transfer Case
Courtesy of GENERAL MOTORS CORP.

3. Using the **J 36825** remove the input shaft seal from the transfer case by threading the self tapping screw (2) into the seal. See **Special Tools and Equipment** .

Installation Procedure

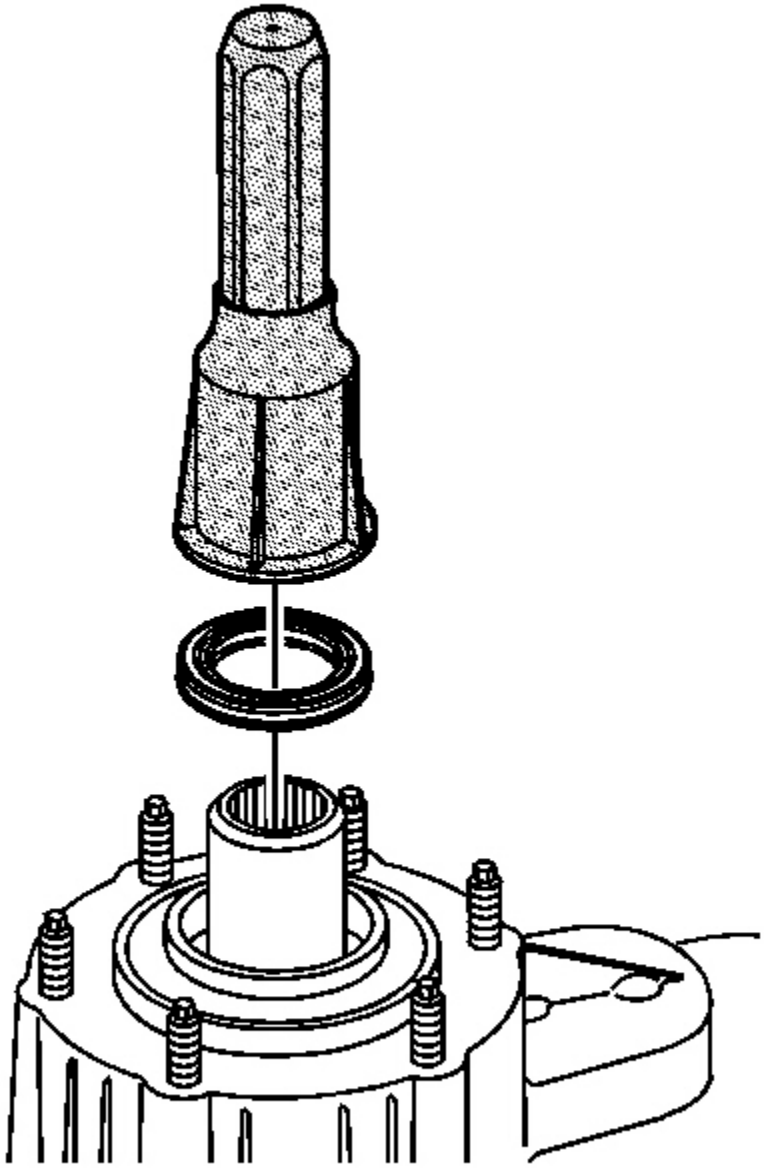


Fig. 31: Using J 42738 To Install Input Shaft Seal In Transfer Case
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: When installing the input shaft seal, make sure that the part numbers on

the seal are facing outward (toward the technician). The input shaft seal should be even with the surface of the transfer case after installation.

1. Position the seal on the input shaft.
2. Using the **J 42738** , install the input shaft seal in the transfer case. See **Special Tools and Equipment** .
3. Install the transfer case to the adapter. Refer to **Transfer Case Assembly Replacement** .
4. Lower the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.

TRANSFER CASE ADAPTER REPLACEMENT

Removal Procedure

1. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Support the transmission with a suitable jack stand.

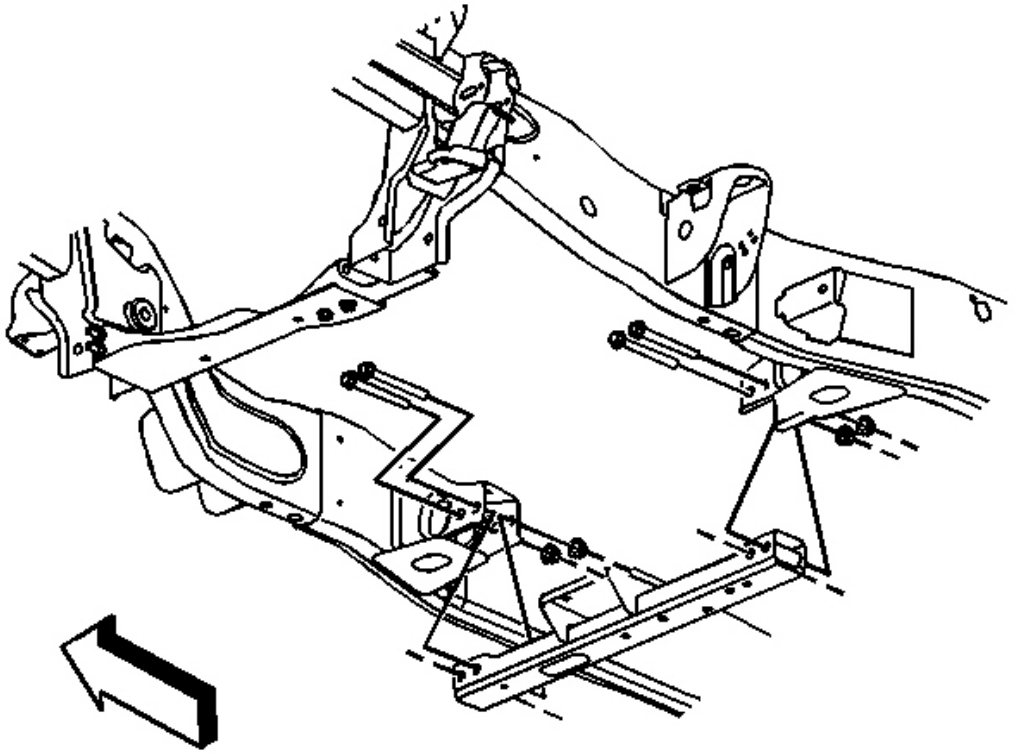


Fig. 32: Rear Crossmember
Courtesy of GENERAL MOTORS CORP.

3. Remove the rear crossmember from the frame.
4. Remove the transfer case from the vehicle. Refer to **Transfer Case Assembly Replacement** .

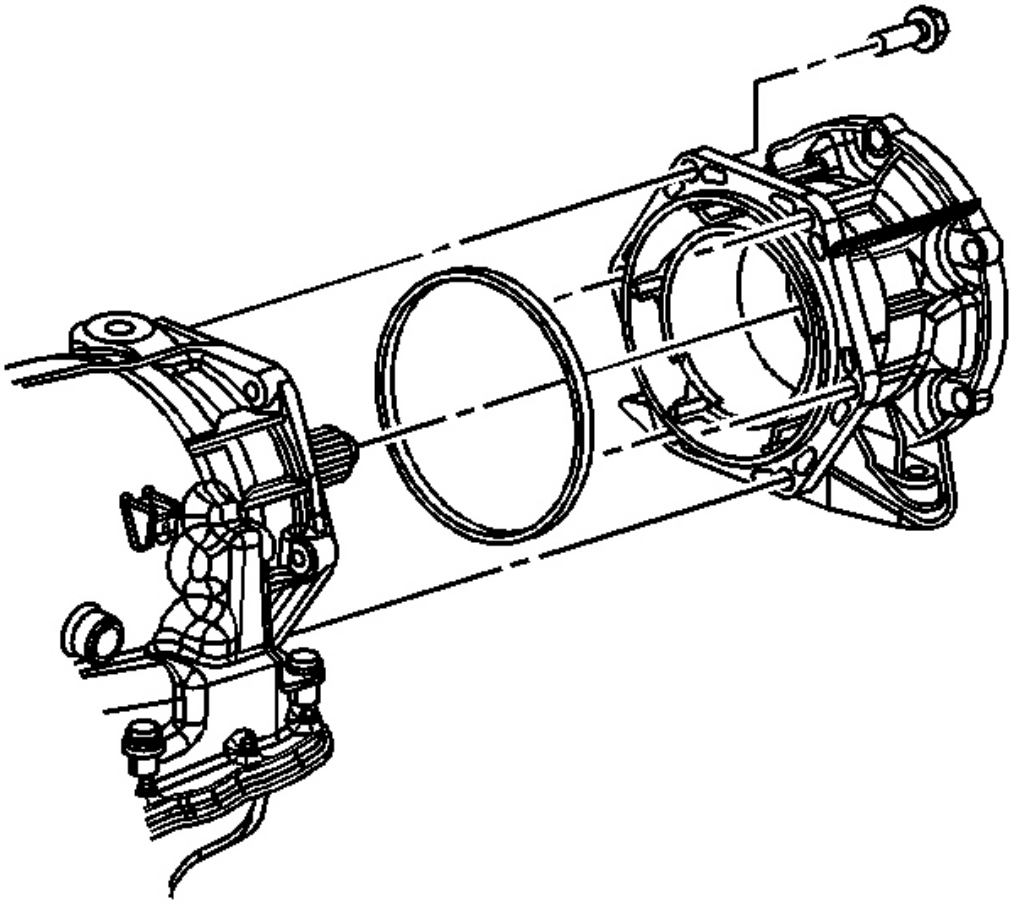


Fig. 33: Transfer Case & Adapter
Courtesy of GENERAL MOTORS CORP.

5. Remove the mounting bolts from the adapter to the transmission.
6. Remove the adapter from the transmission (automatic shown).
7. Remove the seal between the transfer case and the adapter.
8. Remove the gasket from the adapter.

Installation Procedure

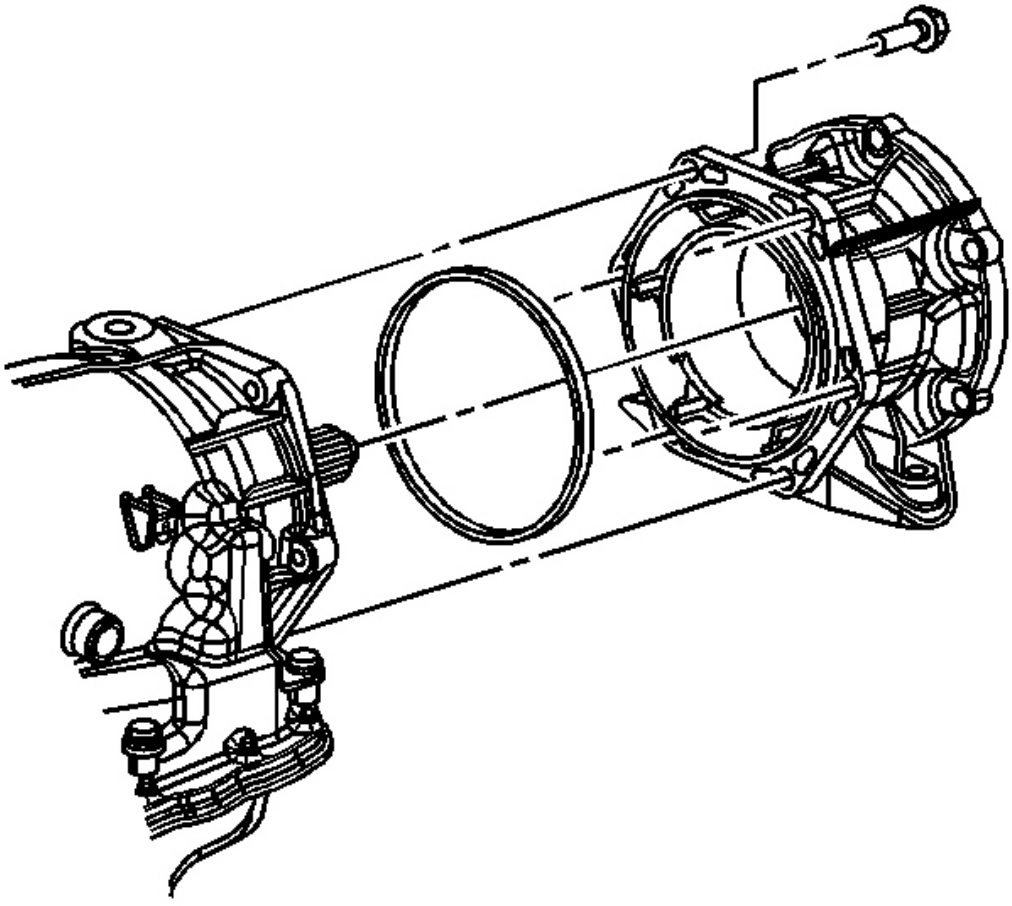


Fig. 34: Transfer Case & Adapter
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Always use a new gasket and seal for the adapter. Do not use any type of sealant or adhesive in place of or with the gasket or the seal.

1. Install the new seal onto the transfer case.

IMPORTANT: The transfer case adapter must be installed so that the adapter is evenly seated to the transmission before installing the retaining nuts.

2. Install the adapter to the transmission.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the adapter mounting bolts to the transmission.

   Tighten: Tighten the mounting bolts to 50 N.m (36 lb ft).

   IMPORTANT: When installing the gasket to the adapter, make sure that the yellow printing on the gasket is facing toward the transfer case (away from the transmission). The locating tab on the gasket should always be pointing up.

4. Install the new gasket to the adapter.
5. Install the transfer case to the adapter. Refer to **Transfer Case Assembly Replacement** .

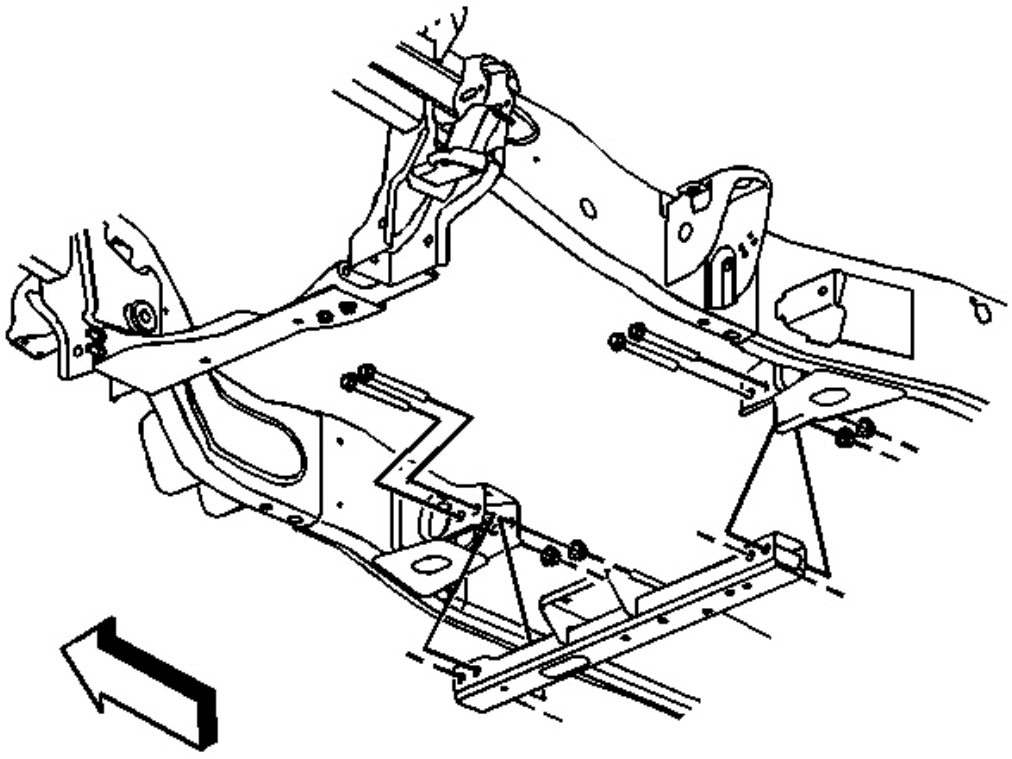


Fig. 35: Rear Crossmember
Courtesy of GENERAL MOTORS CORP.

6. Install the crossmember in the vehicle.

   Tighten: Tighten the mounting bolts to 95 N.m (70 lb ft).

7. Remove the transmission jack from the transmission.
8. Check the fluid level of the transfer case. Refer to **Transfer Case Fluid Replacement** .
9. Lower the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.

TRANSFER CASE SHIFT CONTROL SWITCH REPLACEMENT

Removal Procedure

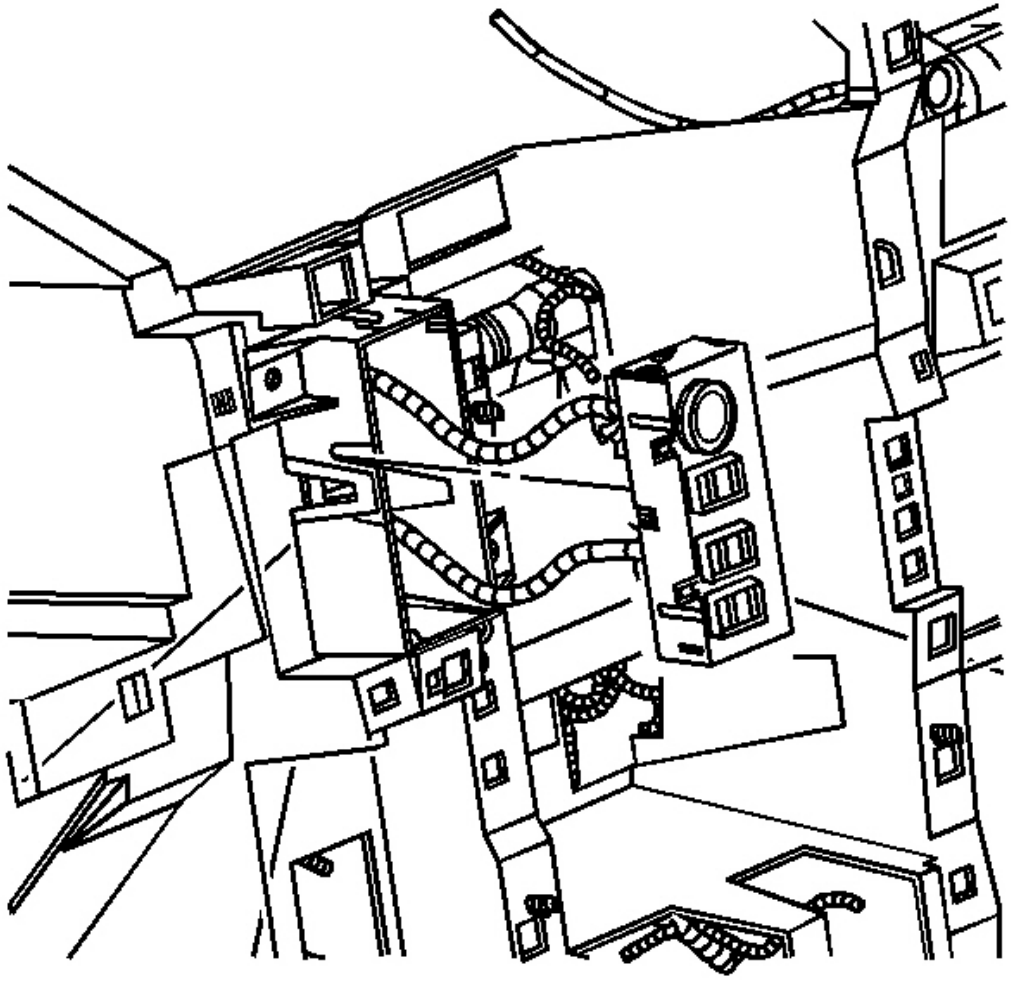


Fig. 36: Shift Control/Selector Switch
Courtesy of GENERAL MOTORS CORP.

1. Remove the instrument panel (I/P) cluster bezel. Refer to **Trim Panel Replacement - Instrument Panel**

(I/P) Center in Instrument Panel, Gauges, and Console.

2. Using a flat-tipped screwdriver, gently pry the retaining clips open on the housing.
3. Slide out the selector switch until the electrical connectors are accessible.
4. Disconnect the selector switch electrical connectors.
5. Remove the selector switch from the housing.

Installation Procedure

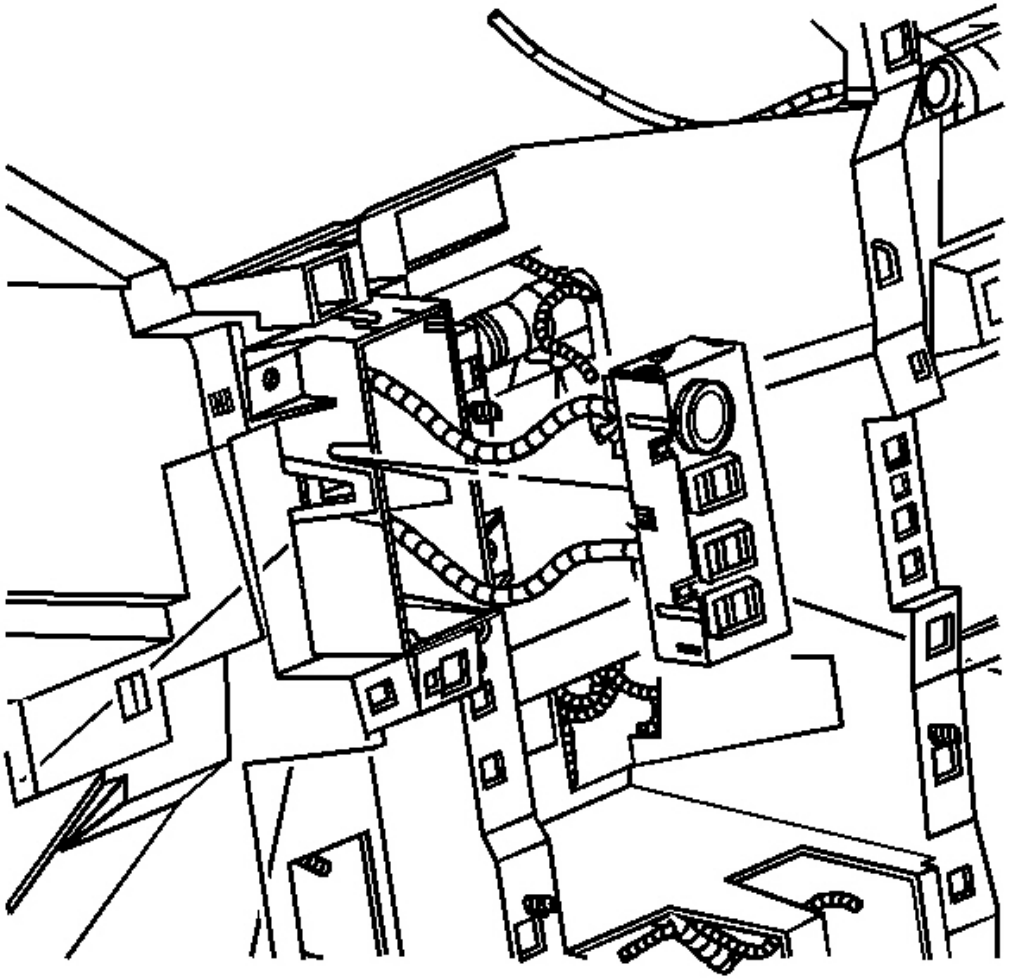


Fig. 37: Shift Control/Selector Switch
Courtesy of GENERAL MOTORS CORP.

1. Position the selector switch close to the housing so the electrical connectors can be connected.

2. Connect the selector switch electrical connectors.
3. Slide the selector switch into the housing until the switch snaps into place.

IMPORTANT: Make sure that the selector switch is seated properly in the housing before installing the I/P cluster bezel.

4. Install the I/P cluster bezel. Refer to **Trim Panel Replacement - Instrument Panel (I/P) Center** in Instrument Panel, Gauges, and Console.

TRANSFER CASE DISASSEMBLE

Tools Required

- **J 2619-01** Slide Hammer
- **J 3289-20** Holding Fixture. See **Special Tools and Equipment** .
- **J 22912-01** Split Plate Bearing Puller
- **J 23907** Slide Hammer with Bearing Adapter. See **Special Tools and Equipment** .
- **J 26941** Bushing and Bearing Remover - 3-4 inch. See **Special Tools and Equipment** .
- **J 45358** Case Spreader. See **Special Tools and Equipment** .
- **J 45548** Mainshaft Support Bushing/Bearing Remover. See **Special Tools and Equipment** .
- **J 45759** Assembly Fixture. See **Special Tools and Equipment** .

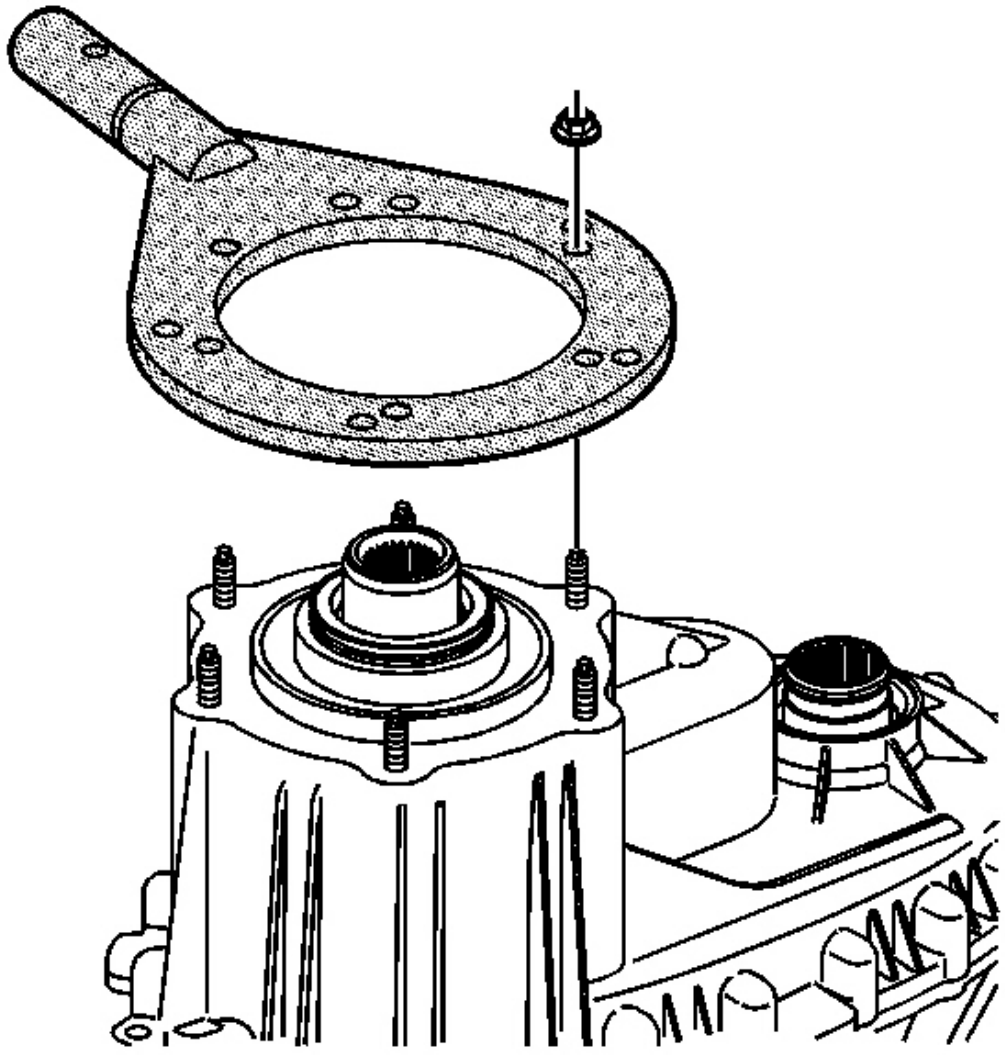


Fig. 38: Attaching J 45759 To Transfer Case
Courtesy of GENERAL MOTORS CORP.

1. Using the adapter studs, attach the **J 45759** to the transfer case. All of the transfer case disassembly procedures can be performed with the case mounted to the **J 45759** . See **Special Tools and Equipment** .

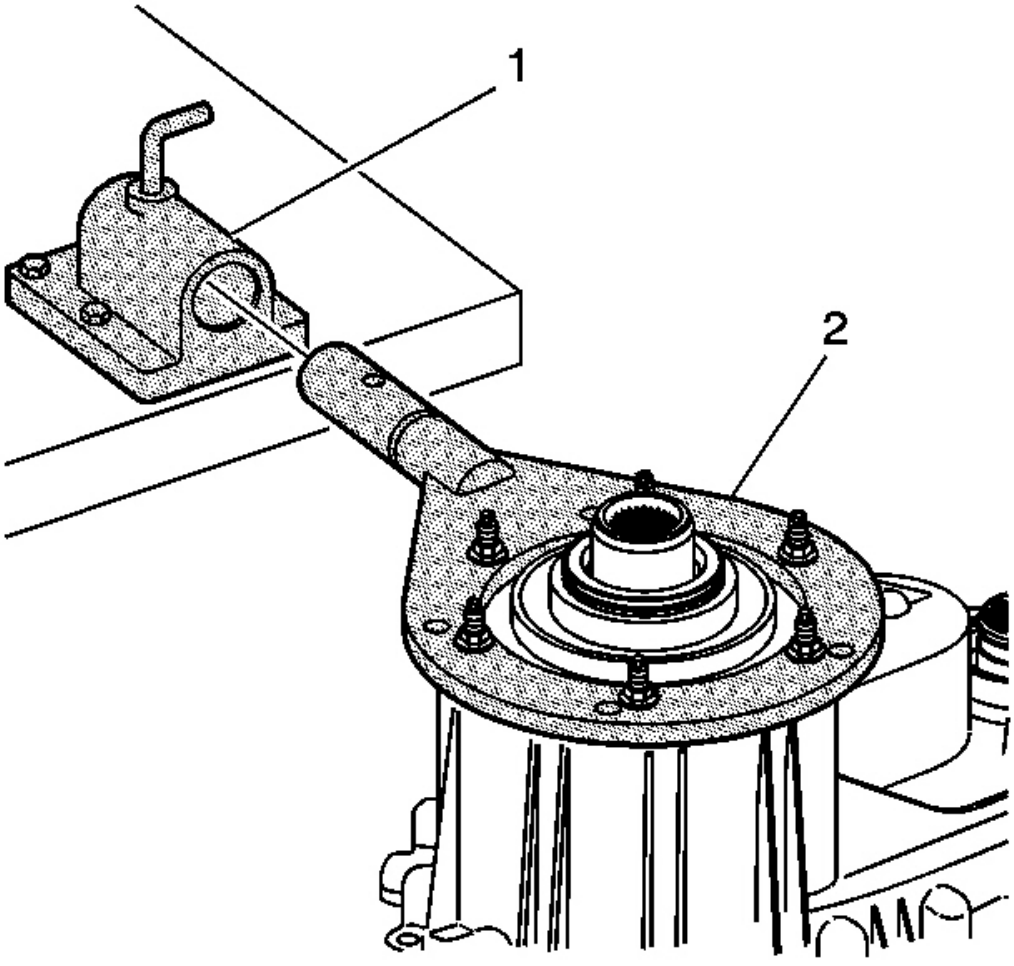


Fig. 39: View Of J 45759 & J 3289-20
Courtesy of GENERAL MOTORS CORP.

2. Mount the **J 3289-20** (1) to a sturdy workbench. See **Special Tools and Equipment** .
3. Install the **J 45759** (2) into **J 3289-20** (1) and secure with pivot pin. See **Special Tools and Equipment** .

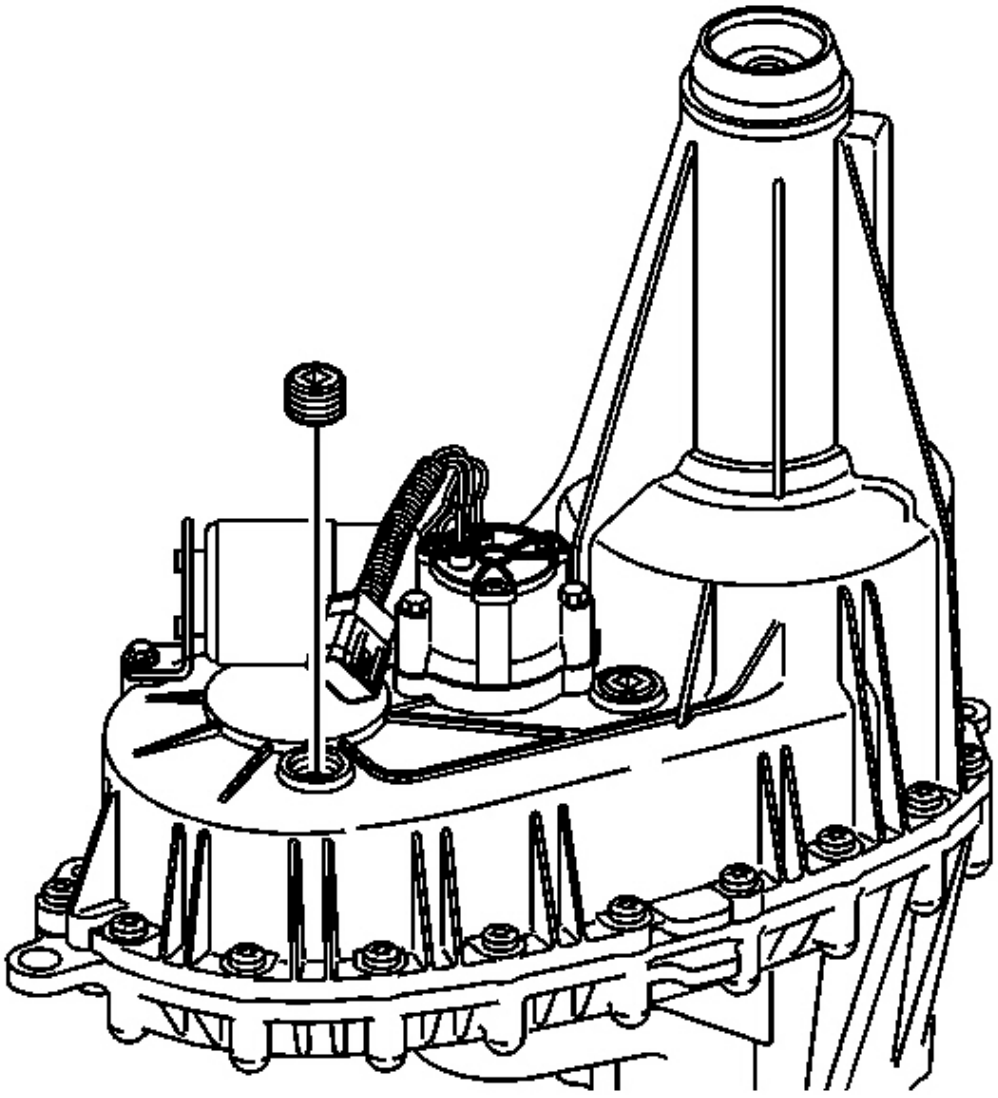


Fig. 40: Drain Plug & Fill Plug
Courtesy of GENERAL MOTORS CORP.

4. Remove the drain plug and the fill plug. Ensure all of the transfer case fluid is drained out of the transfer case.

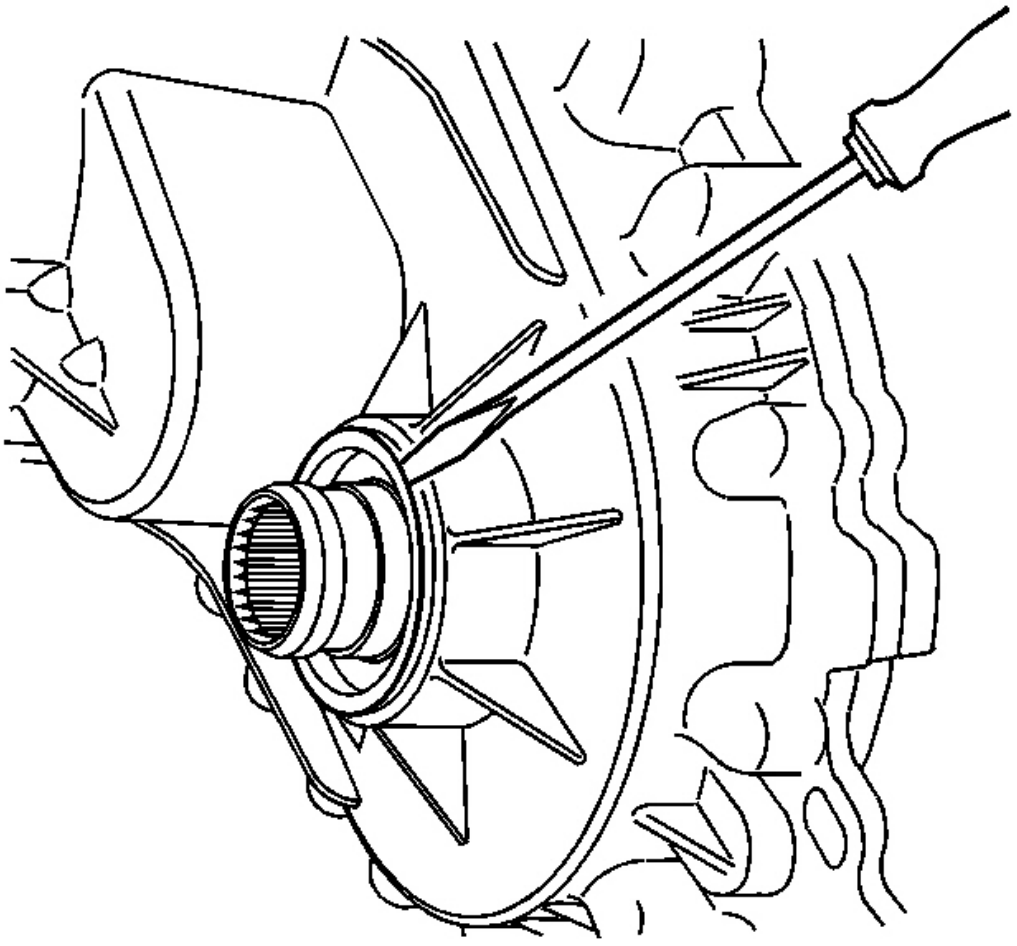


Fig. 41: Prying Inner Seal Race Forward
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Transfer Case Seal Removal Notice in Cautions and Notices.

IMPORTANT: The front output shaft seal is a two piece internal seal. The inner seal race is a force fit on the front output shaft.

5. Remove the front output shaft seal by inserting a flat-tipped screwdriver behind the inner race of the seal.
6. Pry the inner seal race forward.

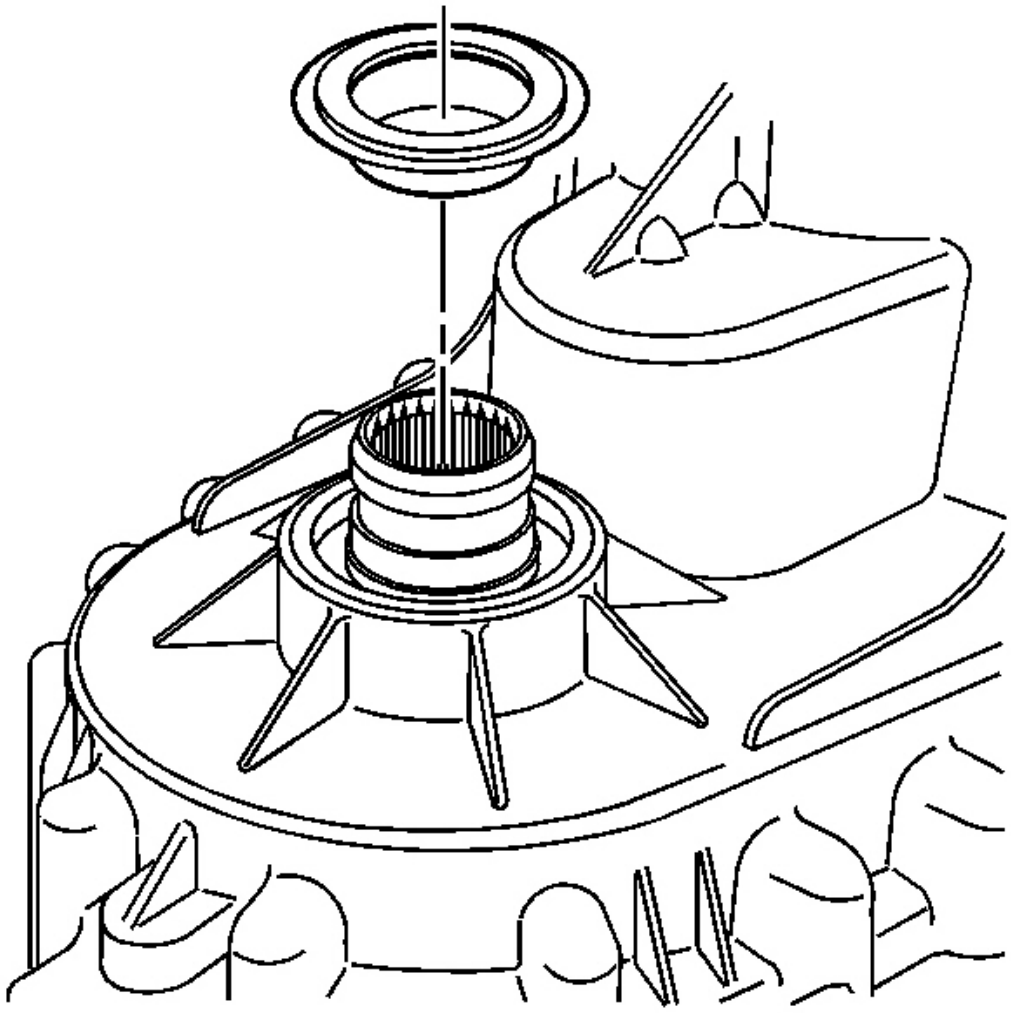


Fig. 42: Inner Seal Race
Courtesy of GENERAL MOTORS CORP.

7. Using a small pry bar, move the inner seal race forward on the front output shaft.
8. Remove the inner seal race from the front output shaft.

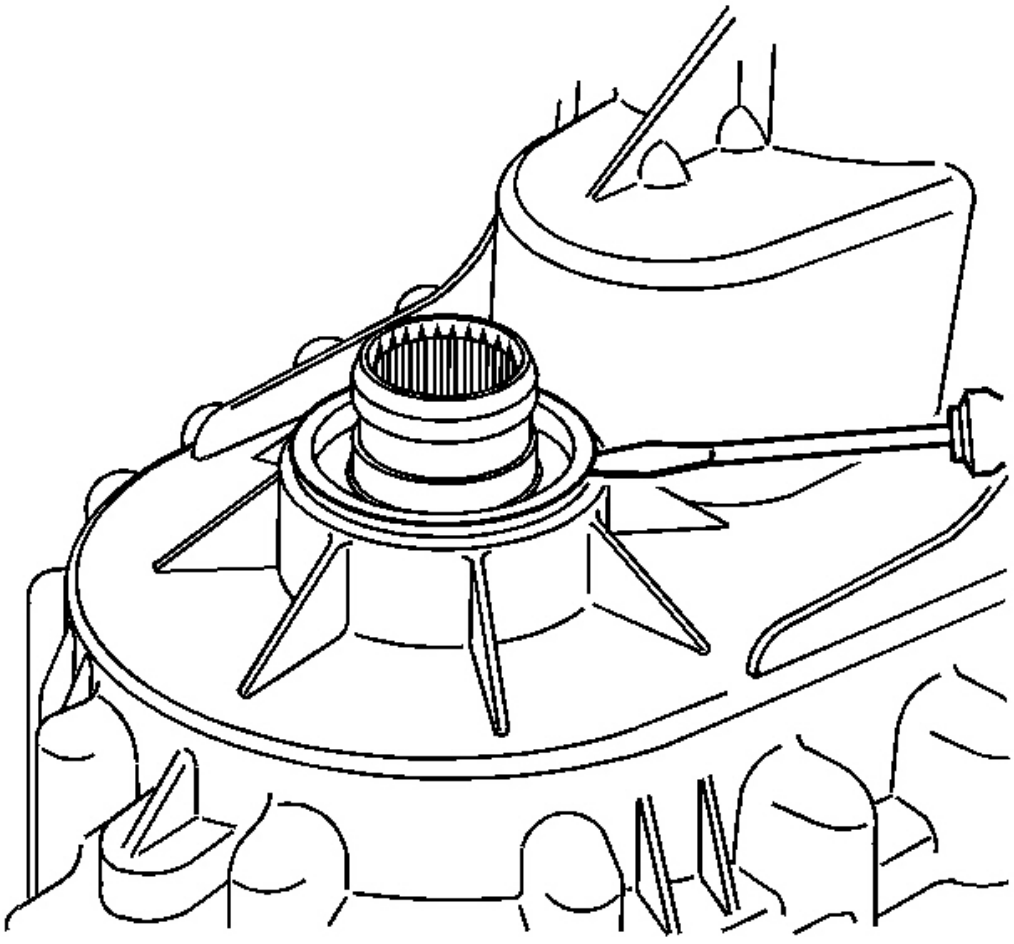


Fig. 43: Output Shaft Seal
Courtesy of GENERAL MOTORS CORP.

9. Insert a flat-tipped screwdriver or a small pry bar between the outer lip of the front output shaft seal and the transfer case.
10. Remove the remaining part of the front output shaft seal from the transfer case.

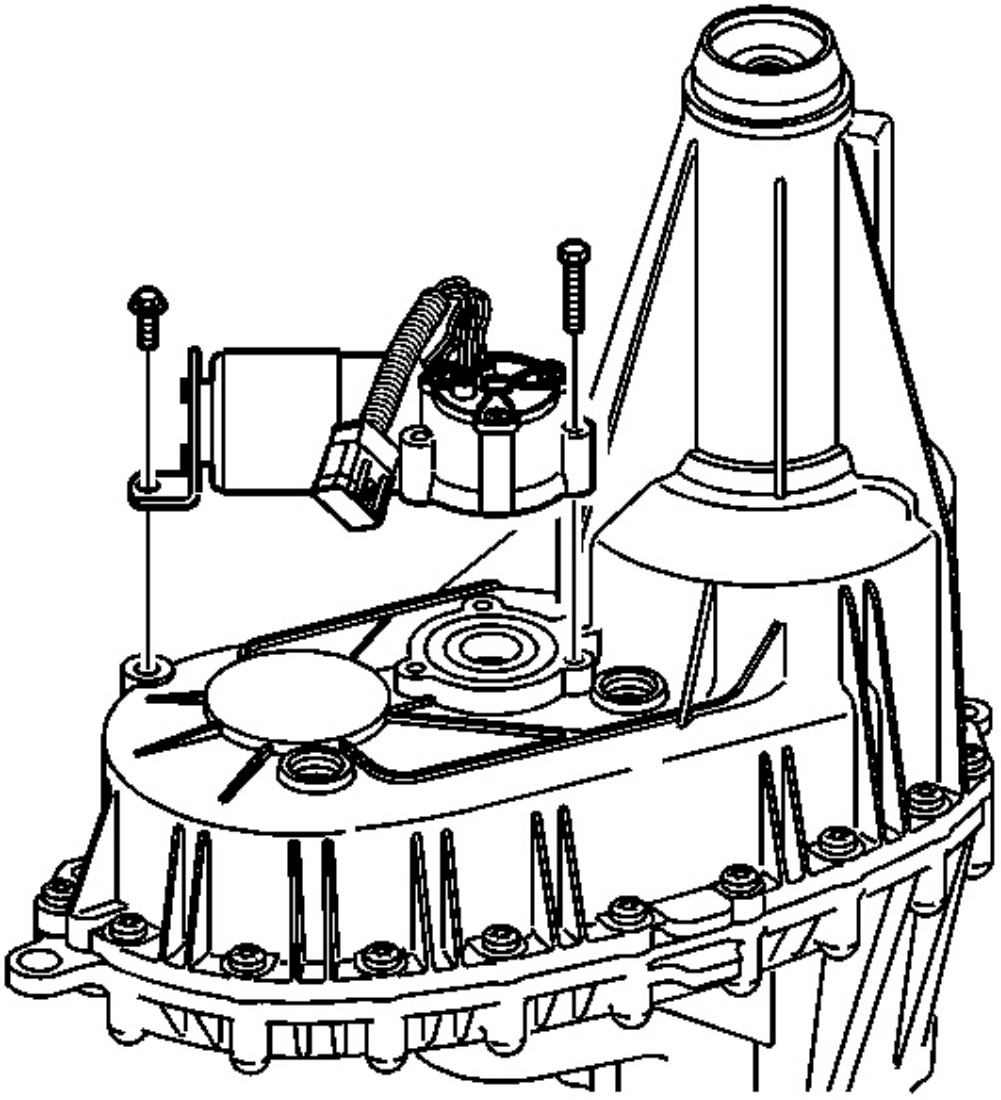


Fig. 44: Transfer Case Encoder/Motor Assembly
Courtesy of GENERAL MOTORS CORP.

11. Remove the encoder motor bracket bolt.
12. Remove the encoder motor mounting bolts.
13. Remove the encoder motor assembly.

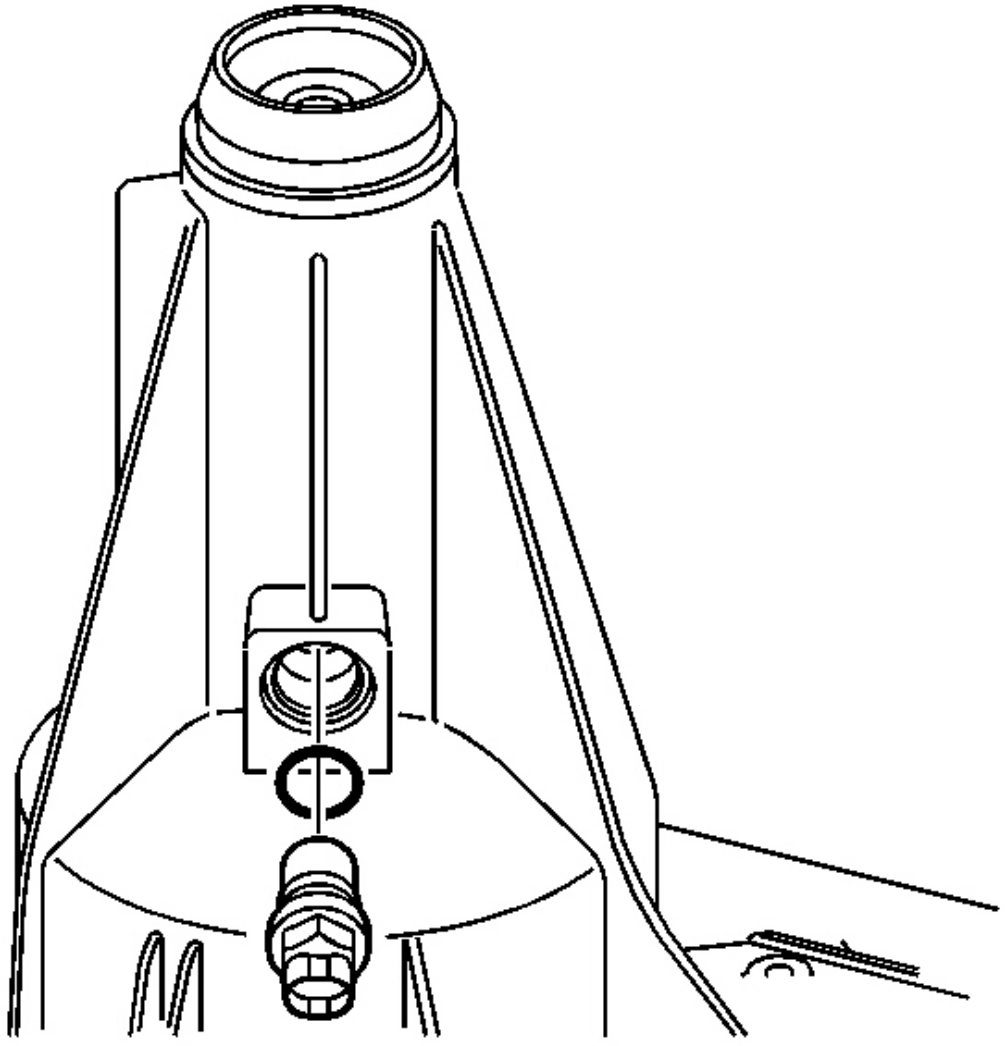


Fig. 45: Speed Sensor & O-Ring
Courtesy of GENERAL MOTORS CORP.

14. Remove the rear vehicle speed sensor (VSS) and the O-ring seal.

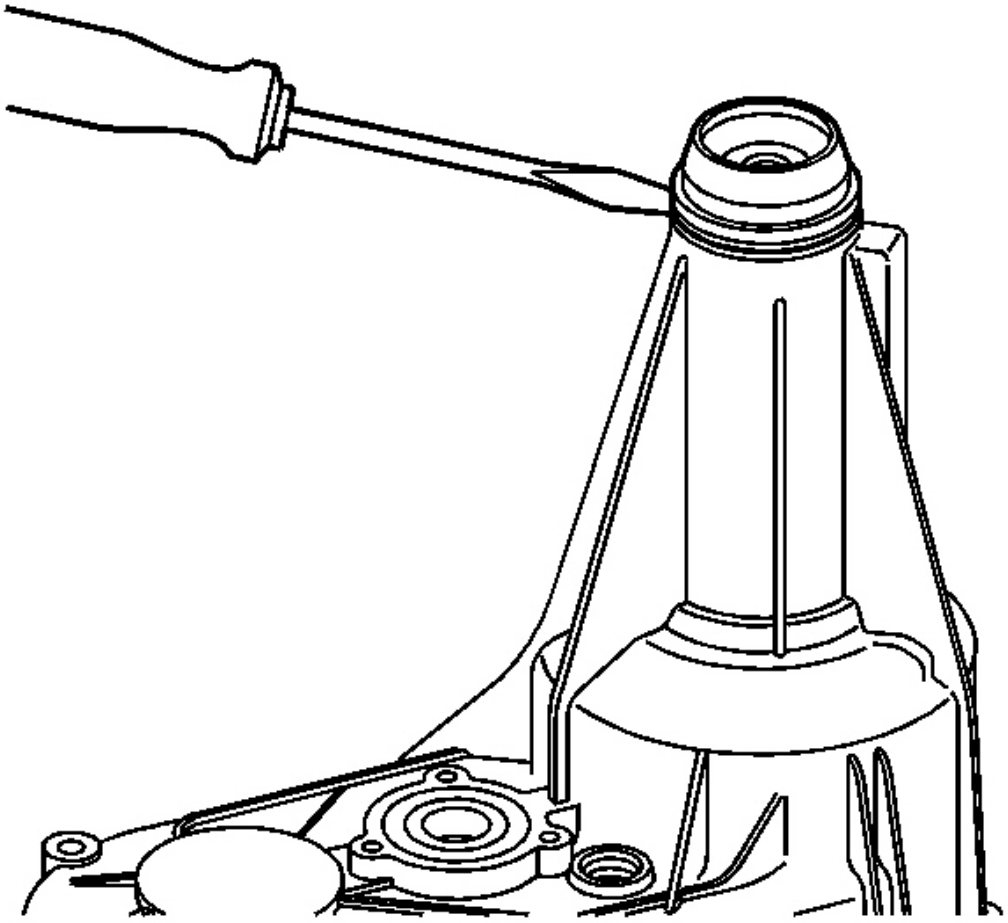


Fig. 46: Rear Output Shaft Seal
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Transfer Case Seal Removal Notice in Cautions and Notices.

15. Remove the rear output shaft seal by prying it out with a flat-blade screwdriver.
16. Remove the shipping seal from the rear output shaft, if equipped.

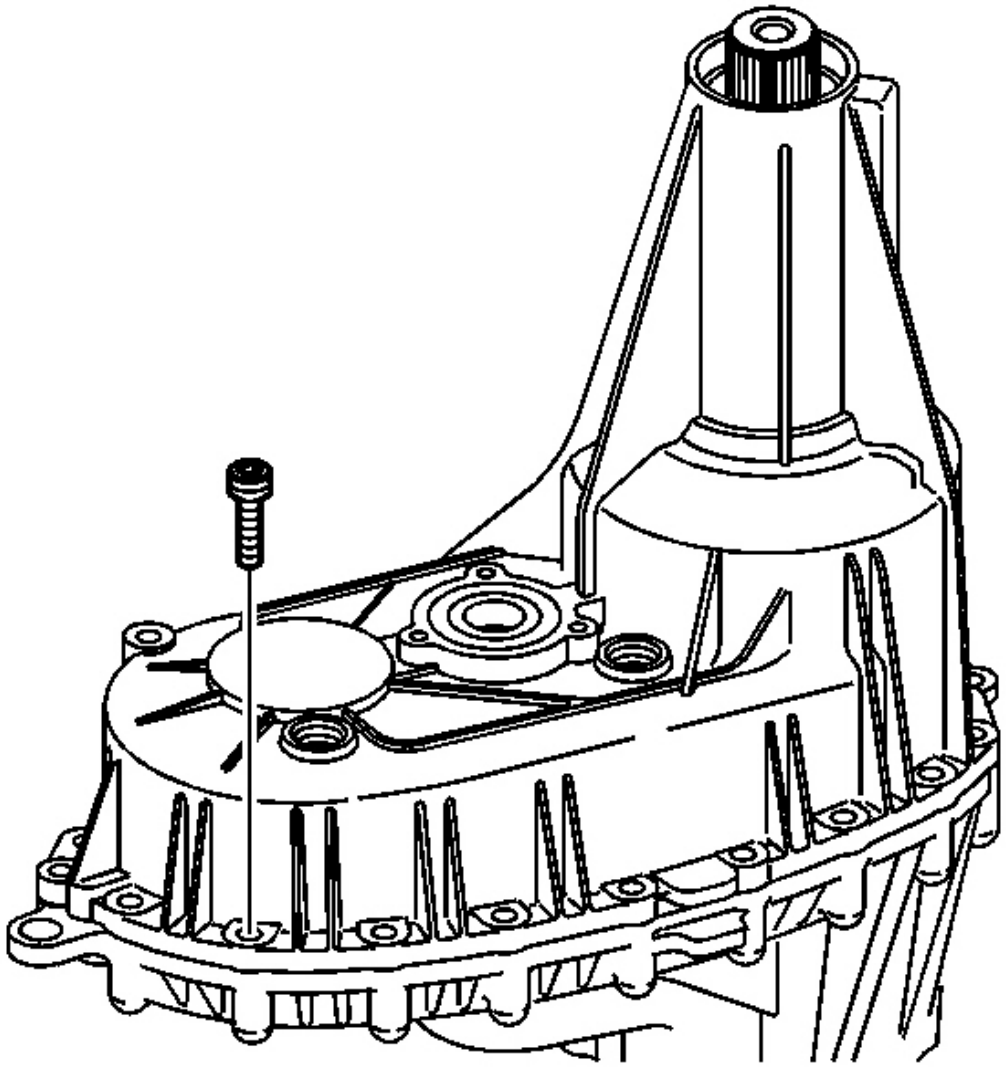


Fig. 47: Transfer Case Retaining Bolts & Washers
Courtesy of GENERAL MOTORS CORP.

17. Remove the transfer case retaining bolts and washers.

    Mark the location of the brackets.

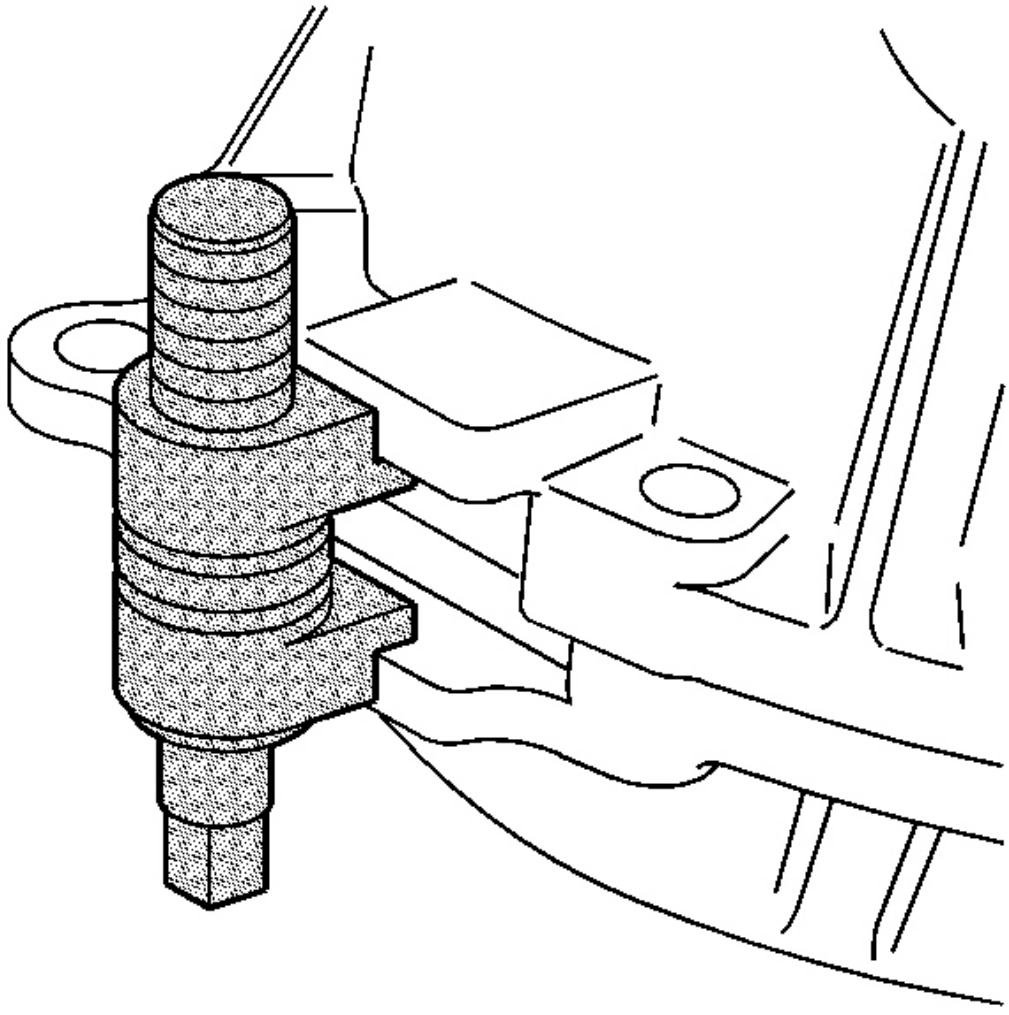


Fig. 48: Identifying J 45358
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Machined Surface Damage Notice in Cautions and Notices.

18. Using the **J 45358** between the tabs on the case halves, shear the sealer that is holding the case halves together. See **Special Tools and Equipment** .
19. Using pry bars at each side of the case, remove the case from the locating pins.

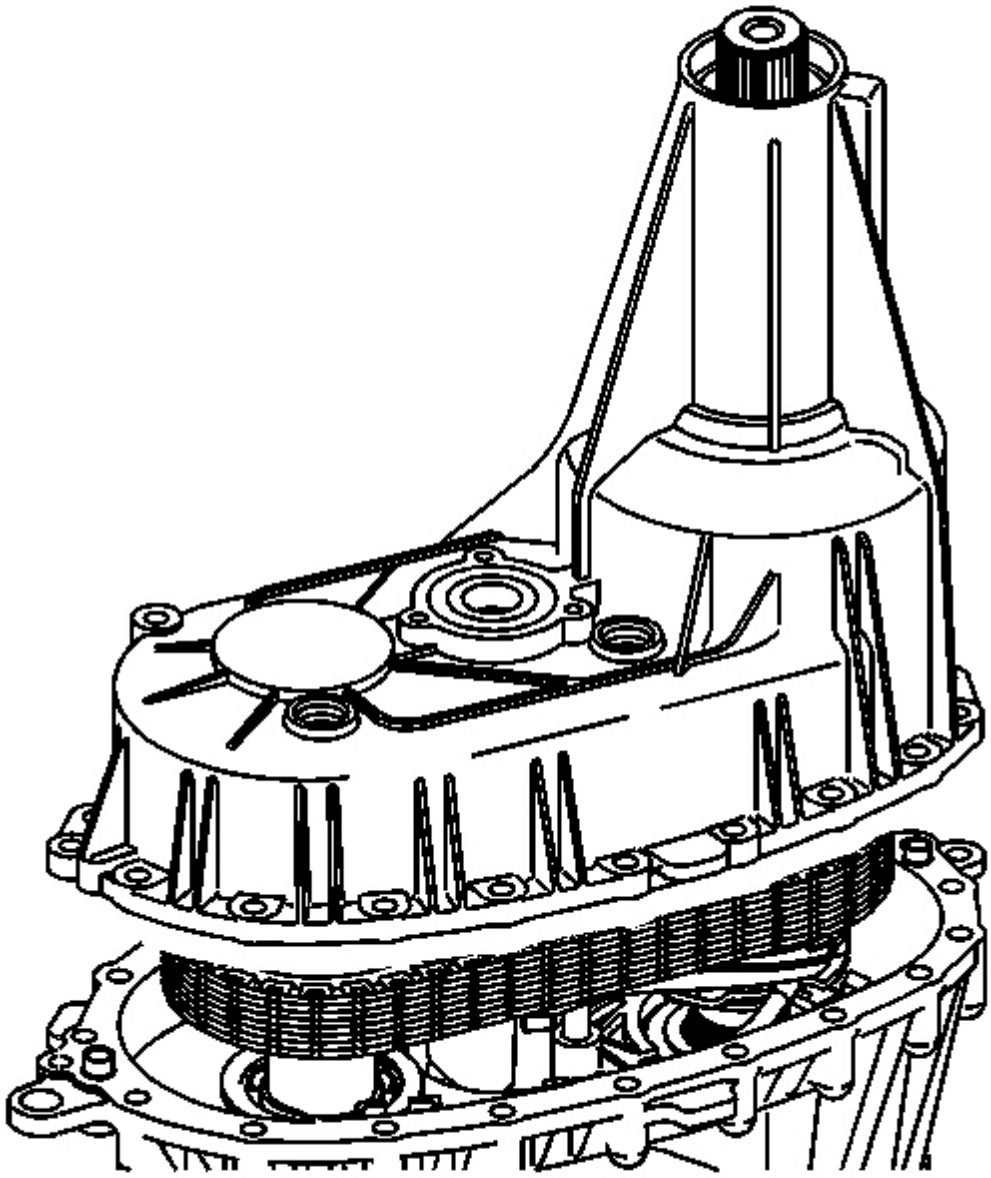


Fig. 49: Rear Case Half
Courtesy of GENERAL MOTORS CORP.

20. Remove the rear case half from the front case half. The rear output shaft will come with the rear case half.

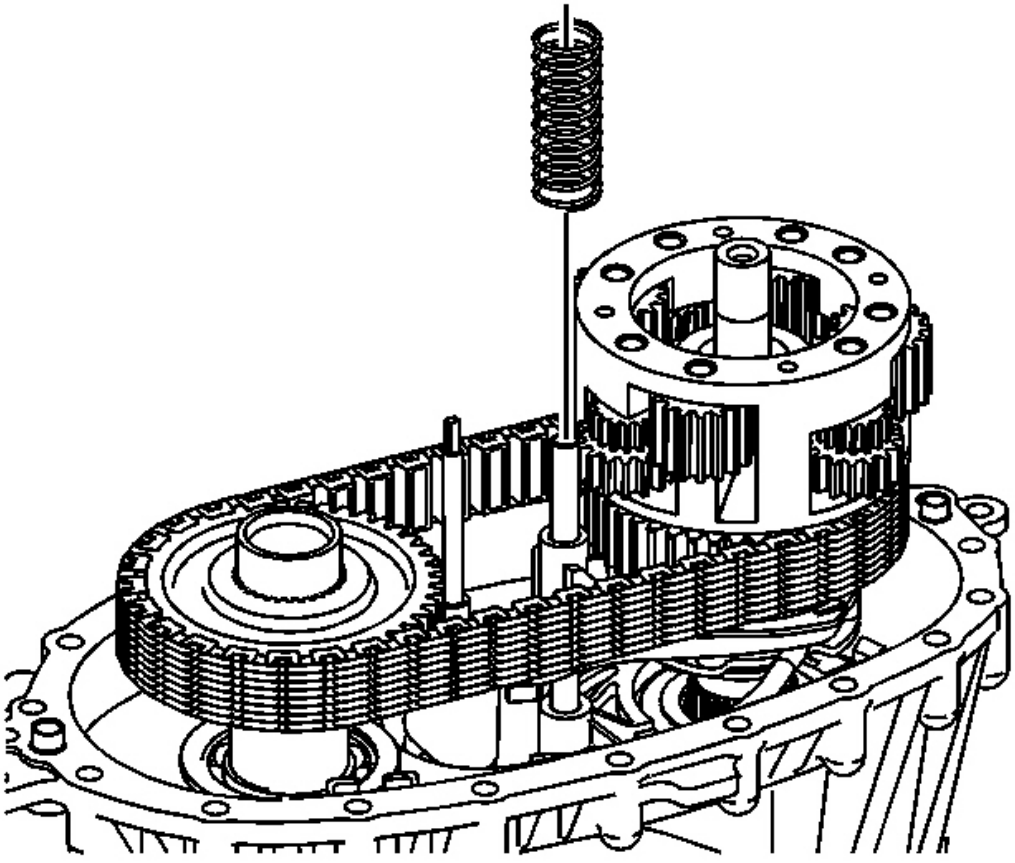


Fig. 50: Shift Fork Shaft Spring
Courtesy of GENERAL MOTORS CORP.

21. Remove the shift fork shaft spring.

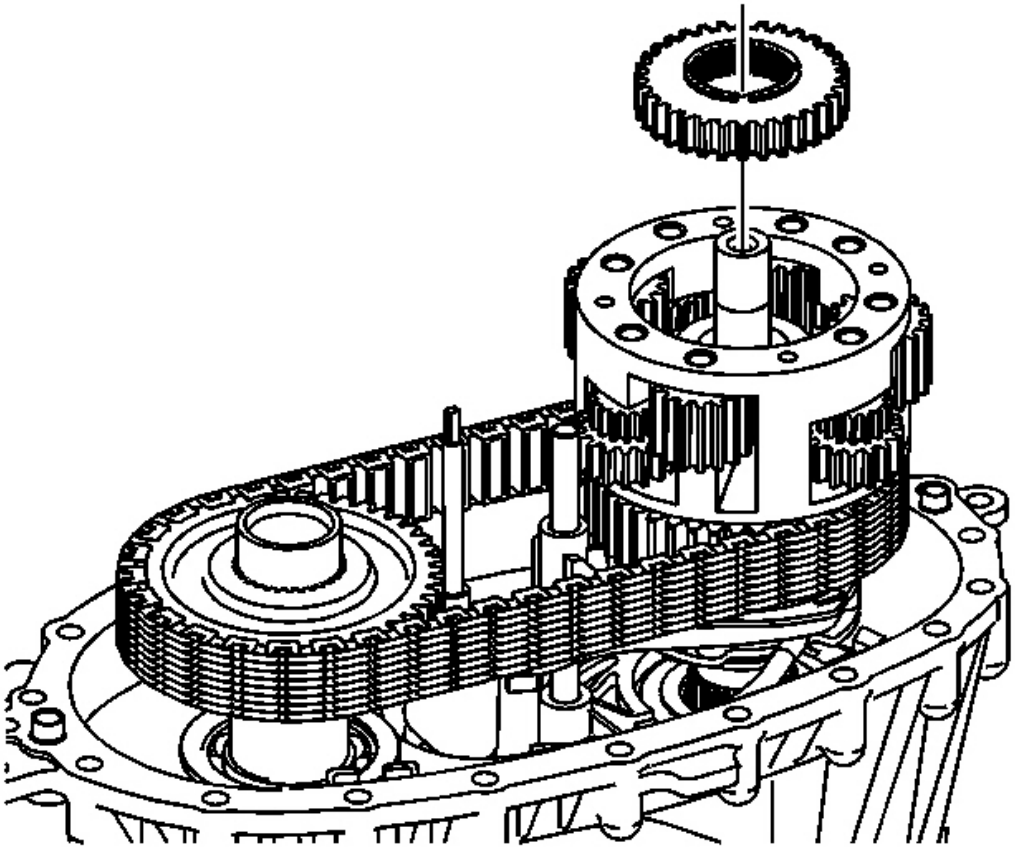


Fig. 51: Rear Sun Gear
Courtesy of GENERAL MOTORS CORP.

22. Remove the rear sun gear.

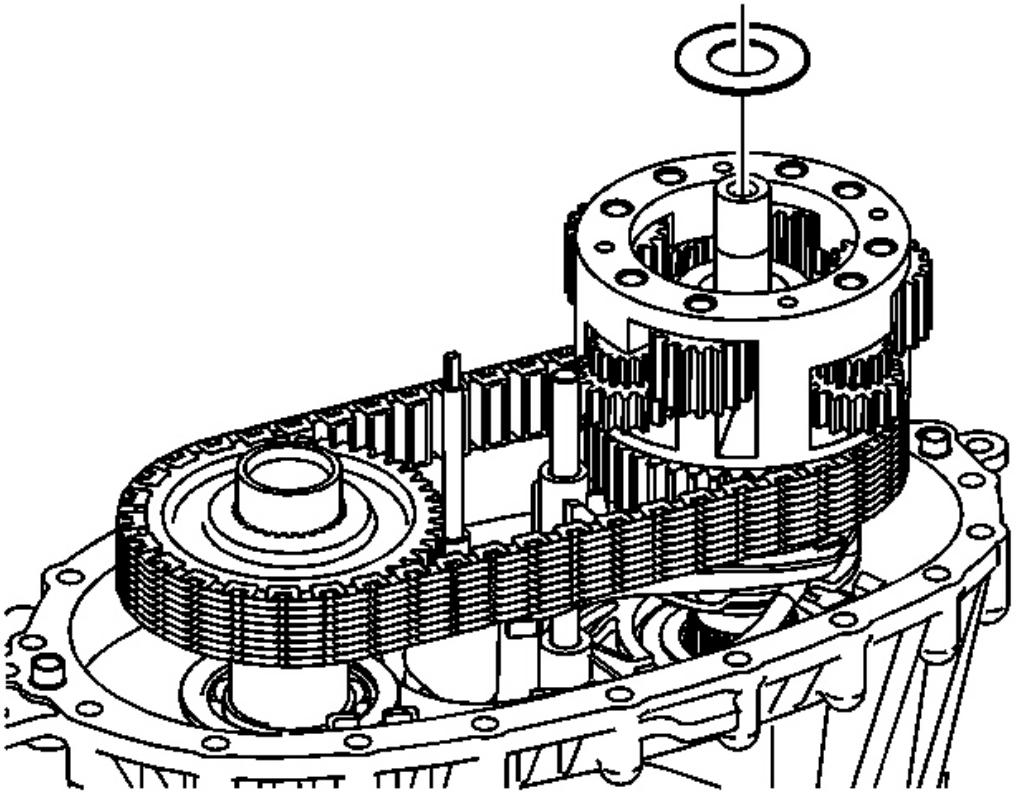


Fig. 52: Rear Output Shaft Thrust Washer
Courtesy of GENERAL MOTORS CORP.

23. Remove the rear output shaft thrust washer.

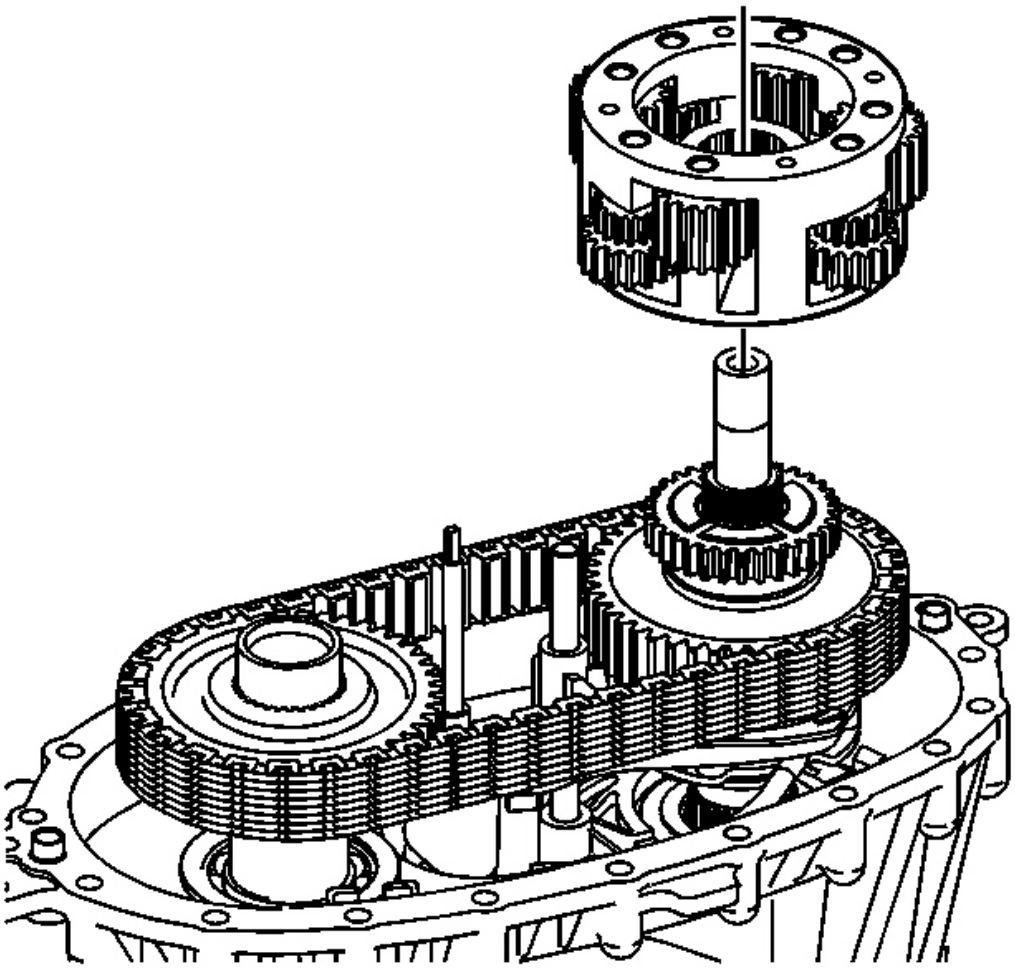


Fig. 53: Planetary Differential Assembly
Courtesy of GENERAL MOTORS CORP.

24. Remove the planetary differential assembly.

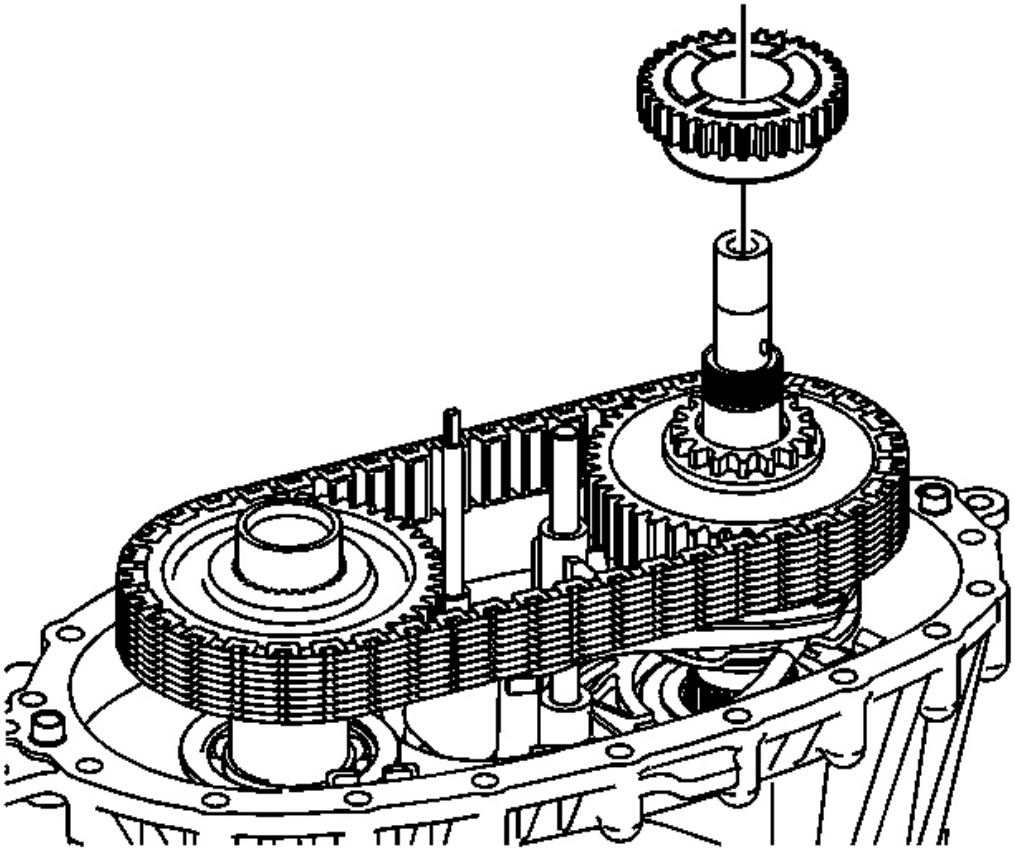


Fig. 54: Front Sun Gear
Courtesy of GENERAL MOTORS CORP.

25. Remove the front sun gear.

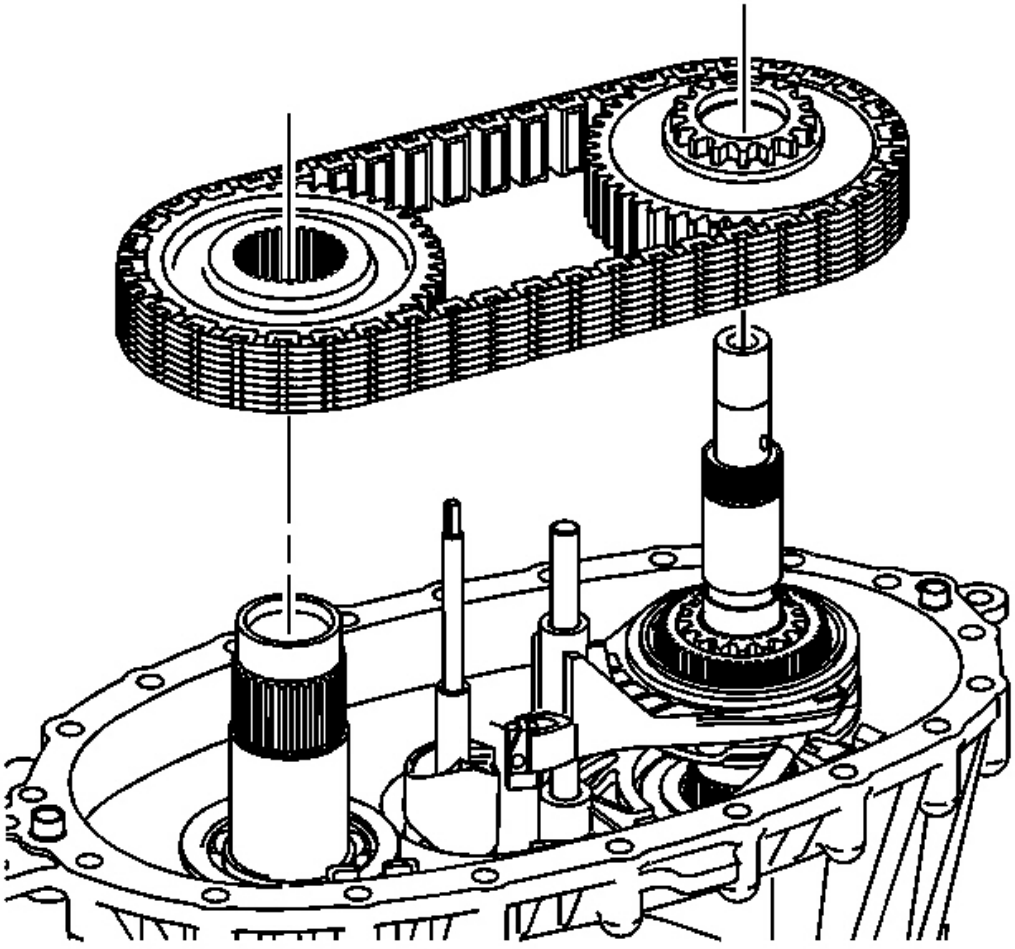


Fig. 55: Drive Chain & Sprockets
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: If the chain and sprockets are to be used again, mark the relationship of the chain to the sprockets in order to mark the wear patterns.

26. Remove the chain with the drive sprocket and driven sprocket.

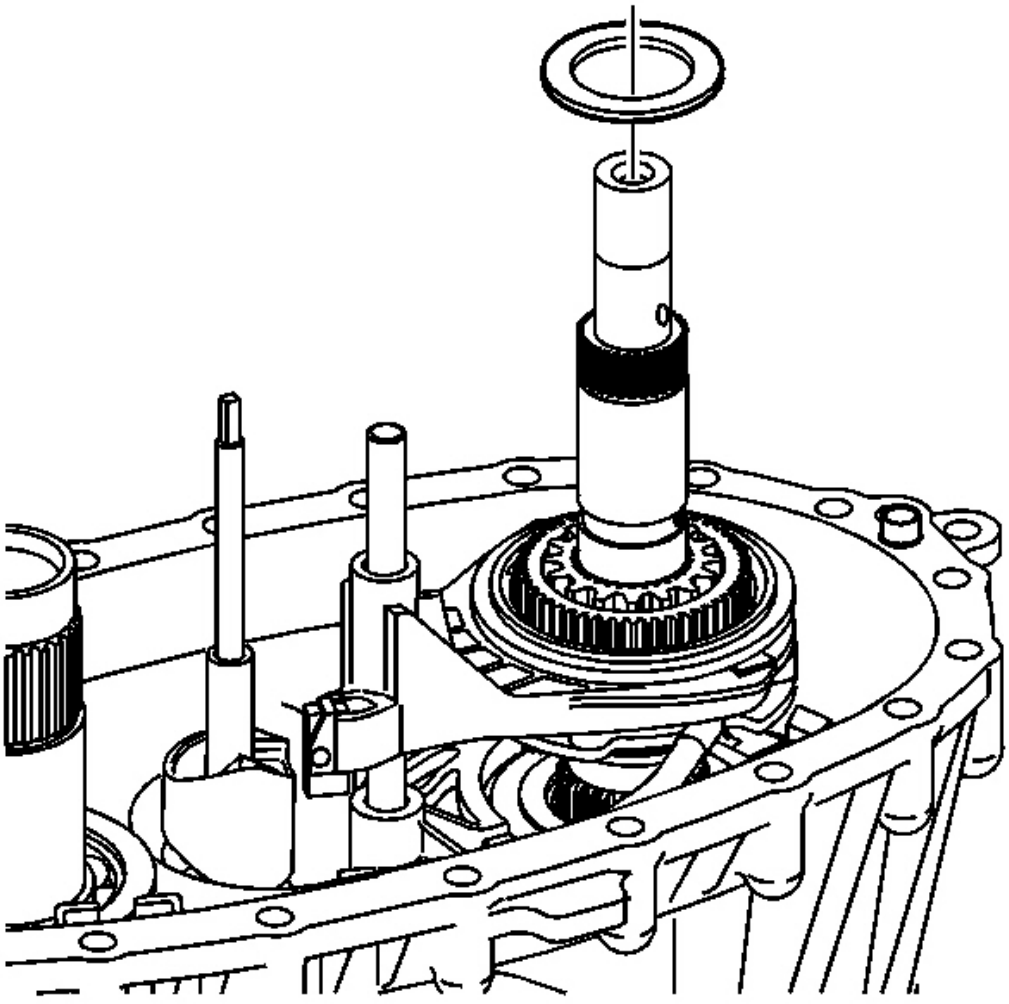


Fig. 56: Drive Sprocket Thrust Washer
Courtesy of GENERAL MOTORS CORP.

27. Remove the drive sprocket thrust washer.

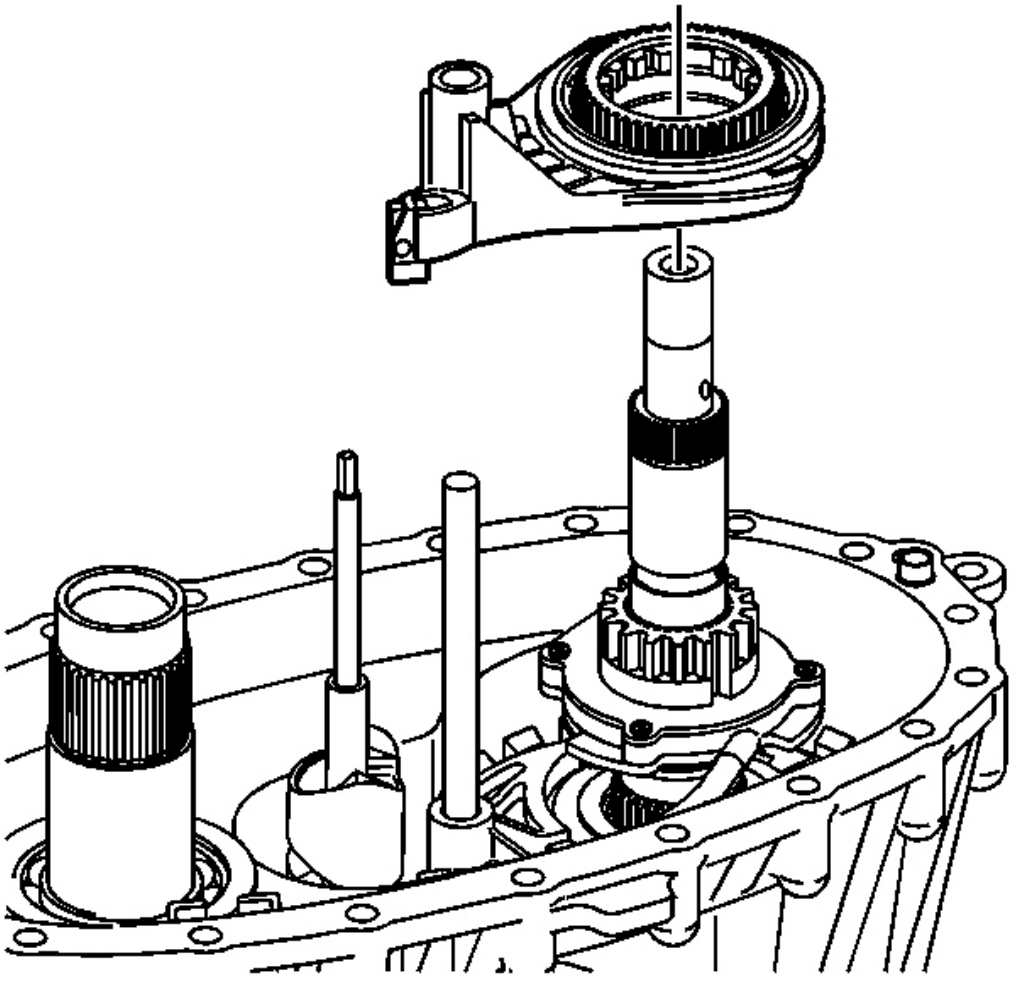


Fig. 57: Lockup Shift Assembly & Lockup Mode Shift Fork
Courtesy of GENERAL MOTORS CORP.

28. Remove the lockup shift assembly and lockup mode shift fork.

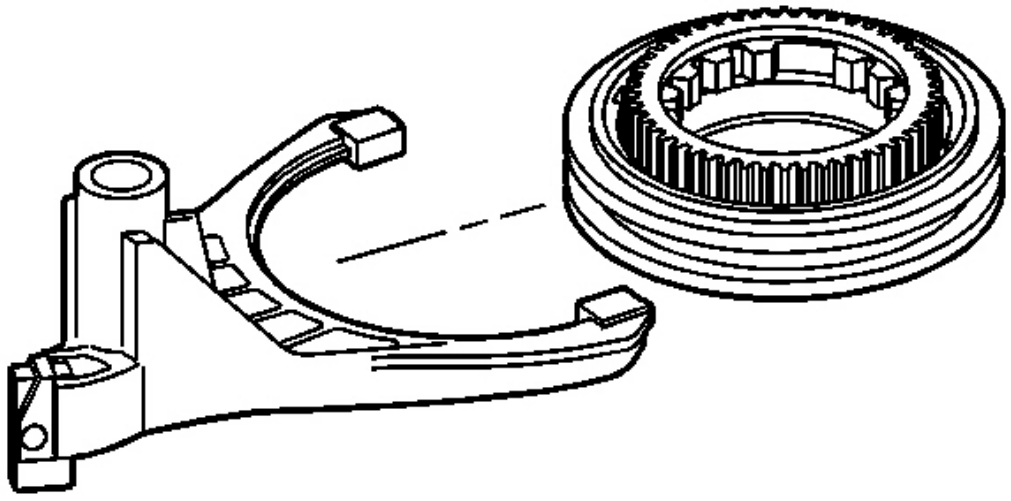


Fig. 58: Lockup Mode Shift Fork & Lockup Shift Assembly
Courtesy of GENERAL MOTORS CORP.

29. Remove the lockup mode shift fork from the lockup shift assembly.

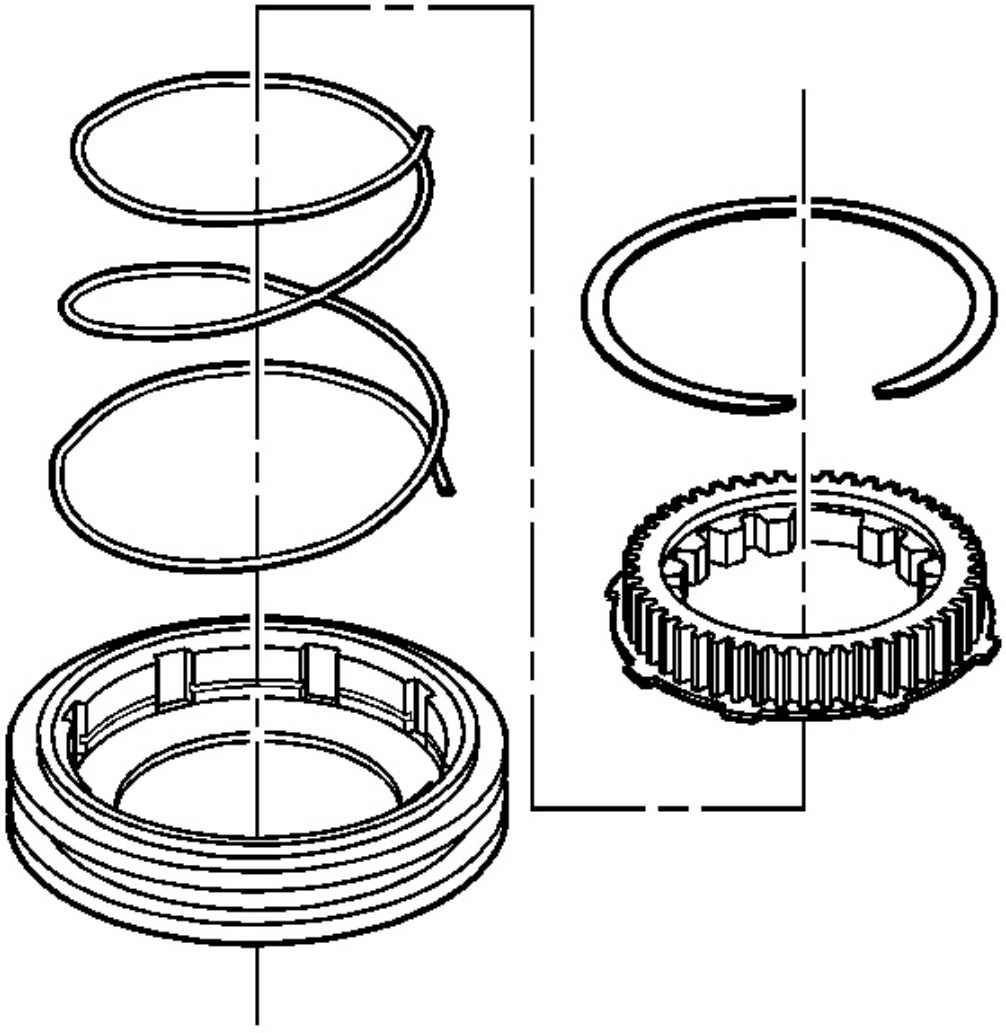


Fig. 59: Lockup Shift Assembly
Courtesy of GENERAL MOTORS CORP.

30. If necessary, disassemble the lockup shift assembly.
    1. Remove the retainer ring from the sleeve.
    2. Remove the hub.
    3. Remove the spring.

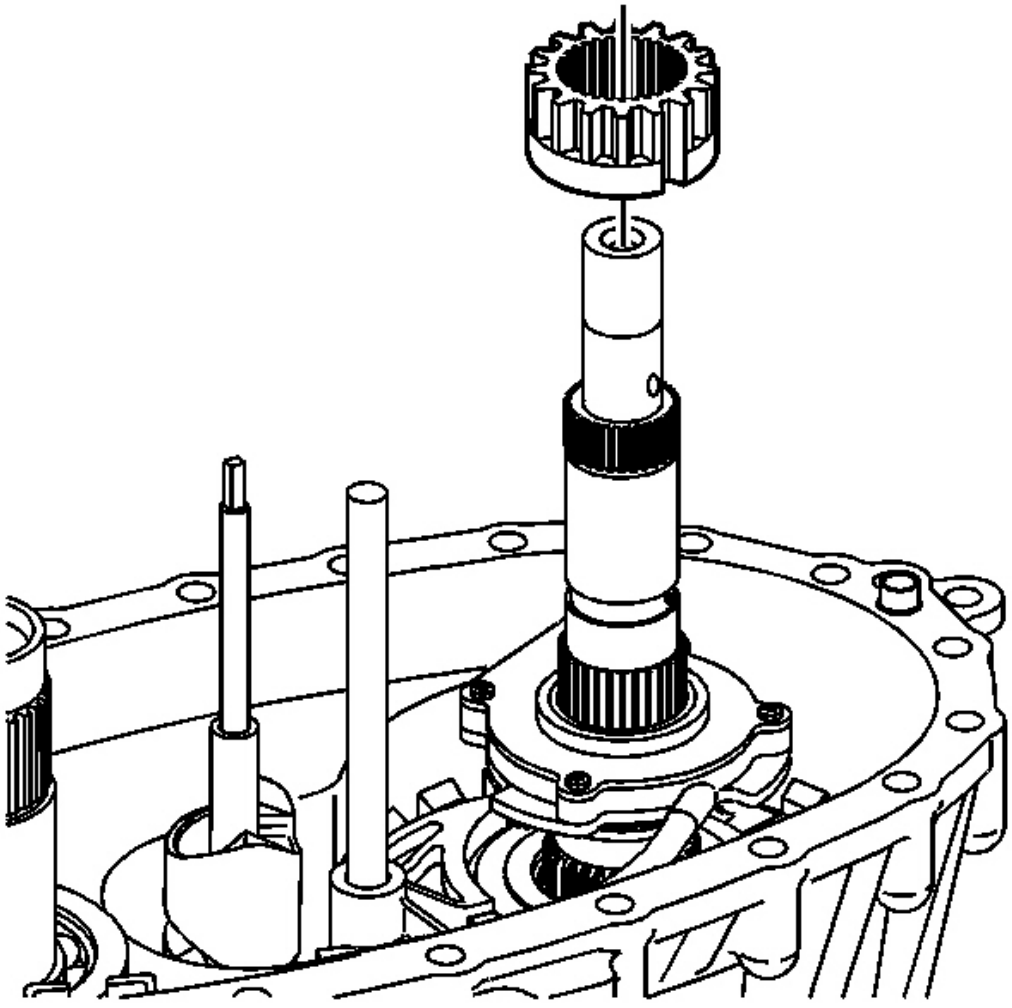


Fig. 60: Inner Lockup Hub
Courtesy of GENERAL MOTORS CORP.

31. Remove the inner lockup hub.

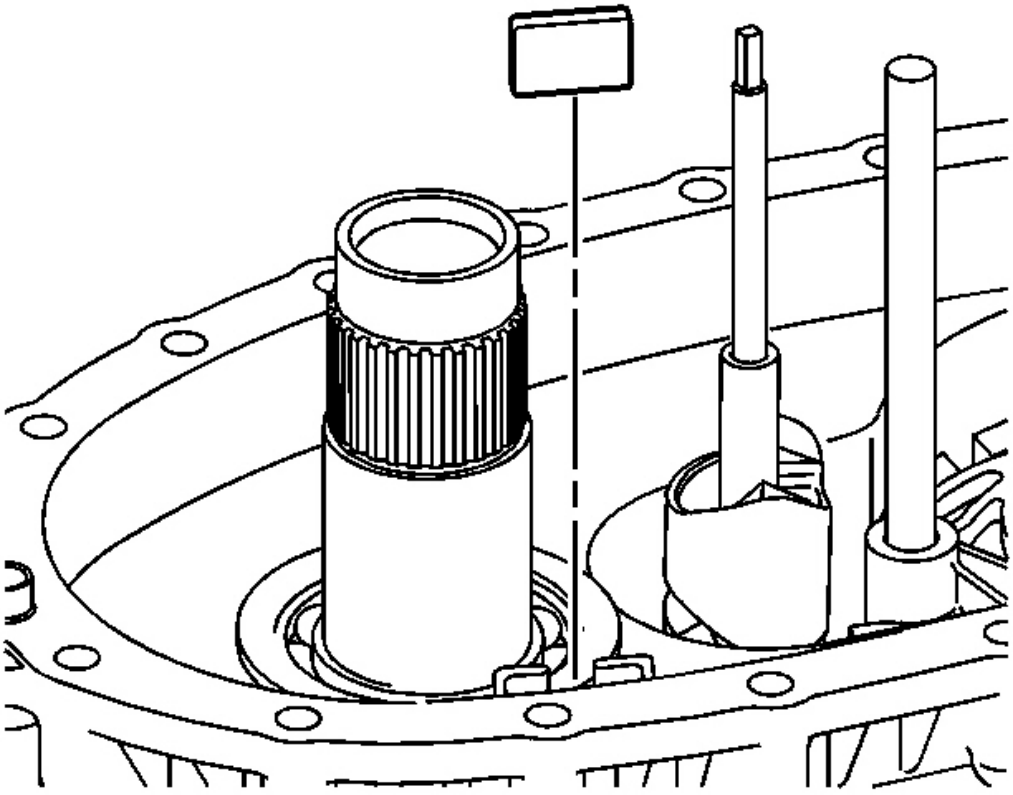


Fig. 61: View Of Magnet
Courtesy of GENERAL MOTORS CORP.

32. Remove the magnet.

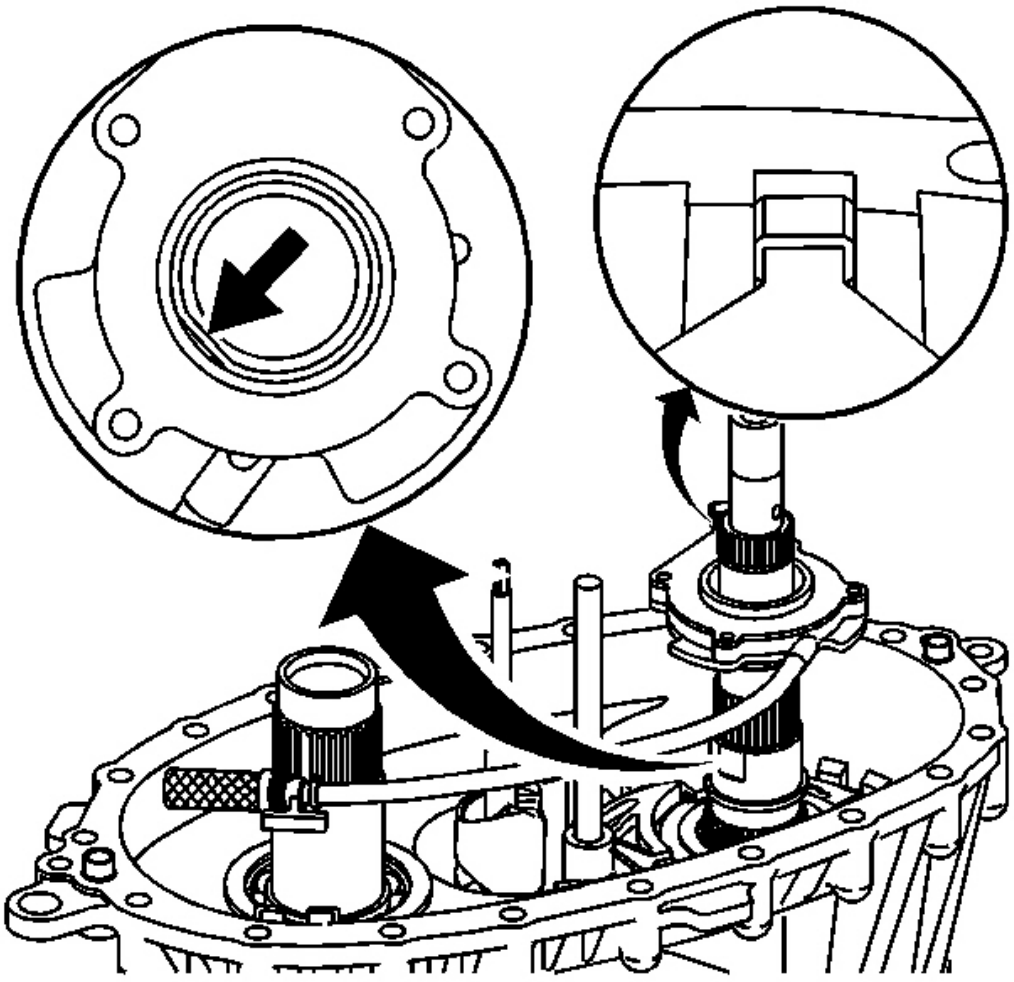


Fig. 62: Oil Pump Assembly With Hose & Screen
Courtesy of GENERAL MOTORS CORP.

33. Remove the oil pump assembly with the hose and screen.

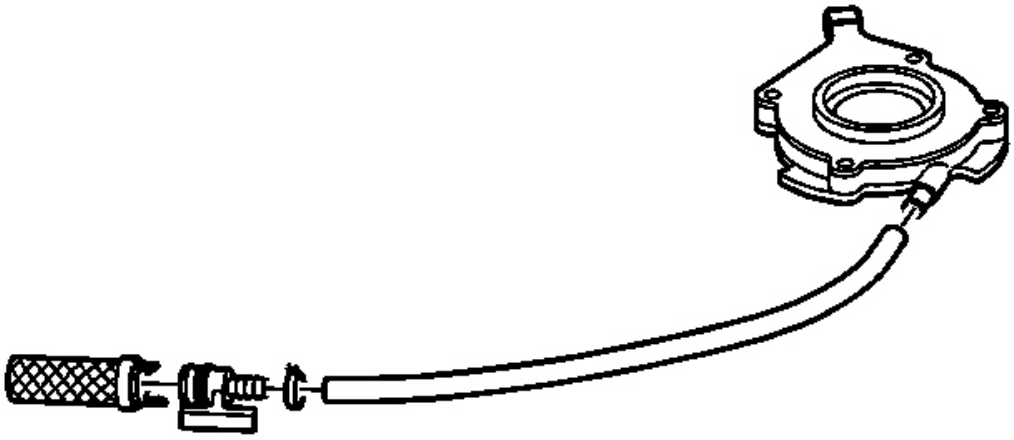


Fig. 63: Oil Pump Hose & Oil Pump Screen
Courtesy of GENERAL MOTORS CORP.

34. Disconnect the oil pump hose from the oil pump screen.
35. Disconnect the oil pump hose from the oil pump.

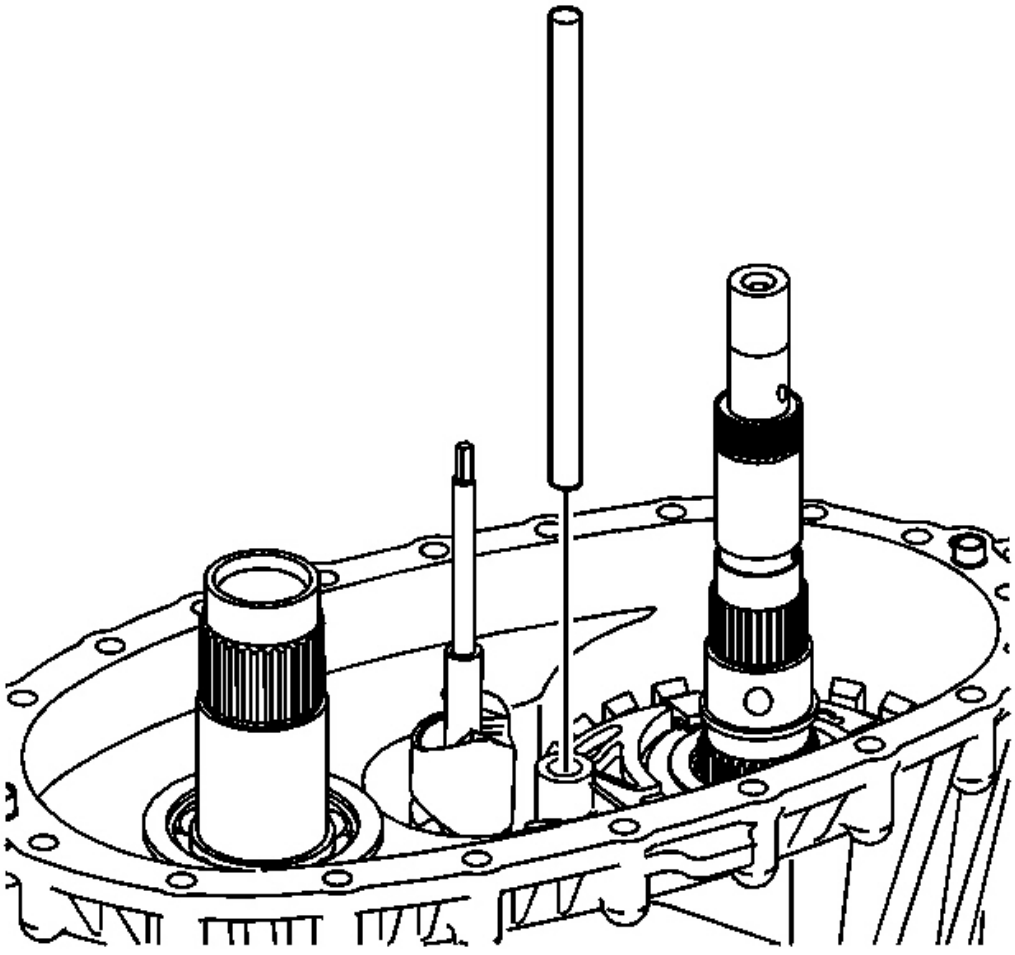


Fig. 64: Shift Fork Shaft
Courtesy of GENERAL MOTORS CORP.

36. Remove the shift fork shaft.

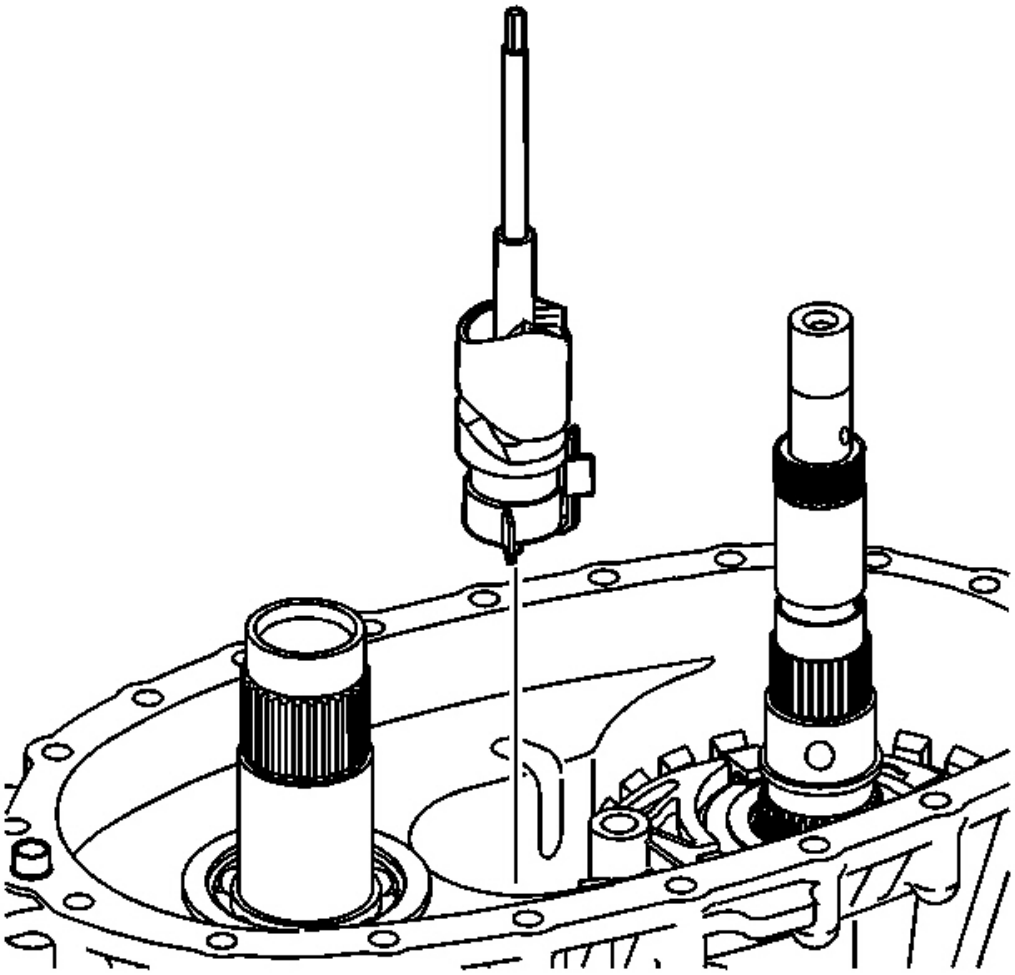


Fig. 65: Shift Detent Lever Assembly
Courtesy of GENERAL MOTORS CORP.

NOTE: In order to prevent component damage, properly remove and install the shift detent lever shaft assembly. When removing or installing the shift detent lever shaft assembly, keep the shaft straight and do not tilt. Tilting the shift detent lever shaft assembly in the transfer case housing will break the tip on the end of the shaft.

37. Remove the shift detent lever assembly.
    - Rotate the high/low shift fork roller from the shift detent lever assembly.
    - Lift straight up on the shift detent lever assembly.

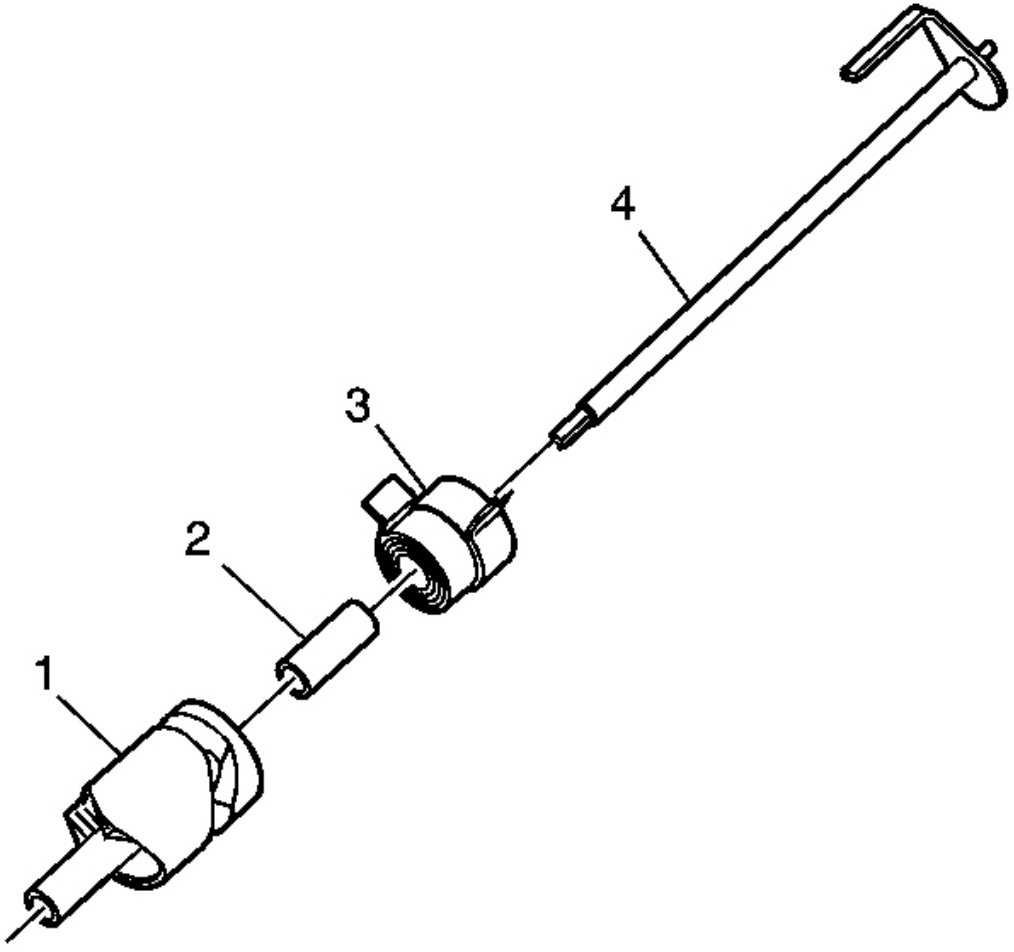


Fig. 66: Shift Detent Lever Assembly Components
Courtesy of GENERAL MOTORS CORP.

38. If necessary, disassemble the shift detent lever assembly.
    1. Hold the shift detent lever assembly by one tab of the spring (3), in a vise.
    2. Rotate the other spring tab and slide the detent lever cam (1) off the shaft.
    3. Remove the sleeve (2).
    4. Push the shaft (4) out of the spring (3).

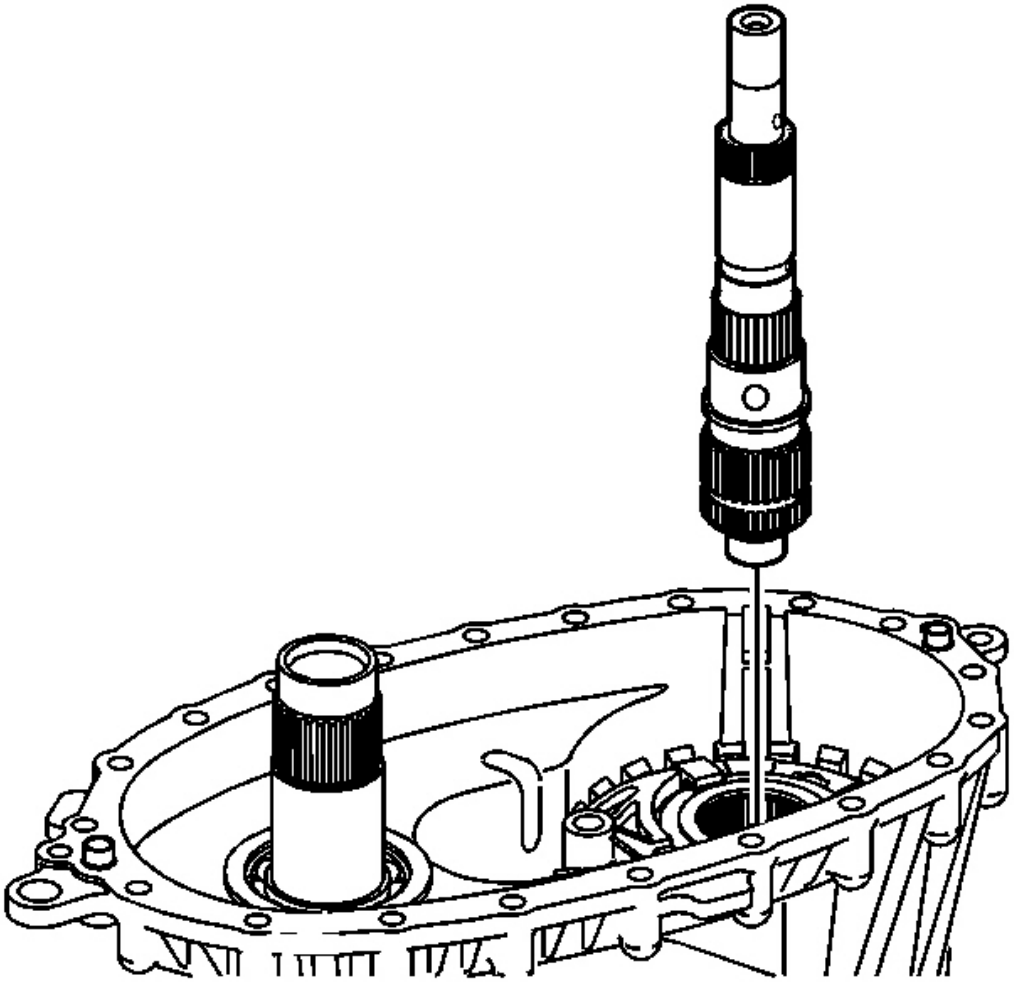


Fig. 67: Identifying Mainshaft
Courtesy of GENERAL MOTORS CORP.

39. Remove the mainshaft.

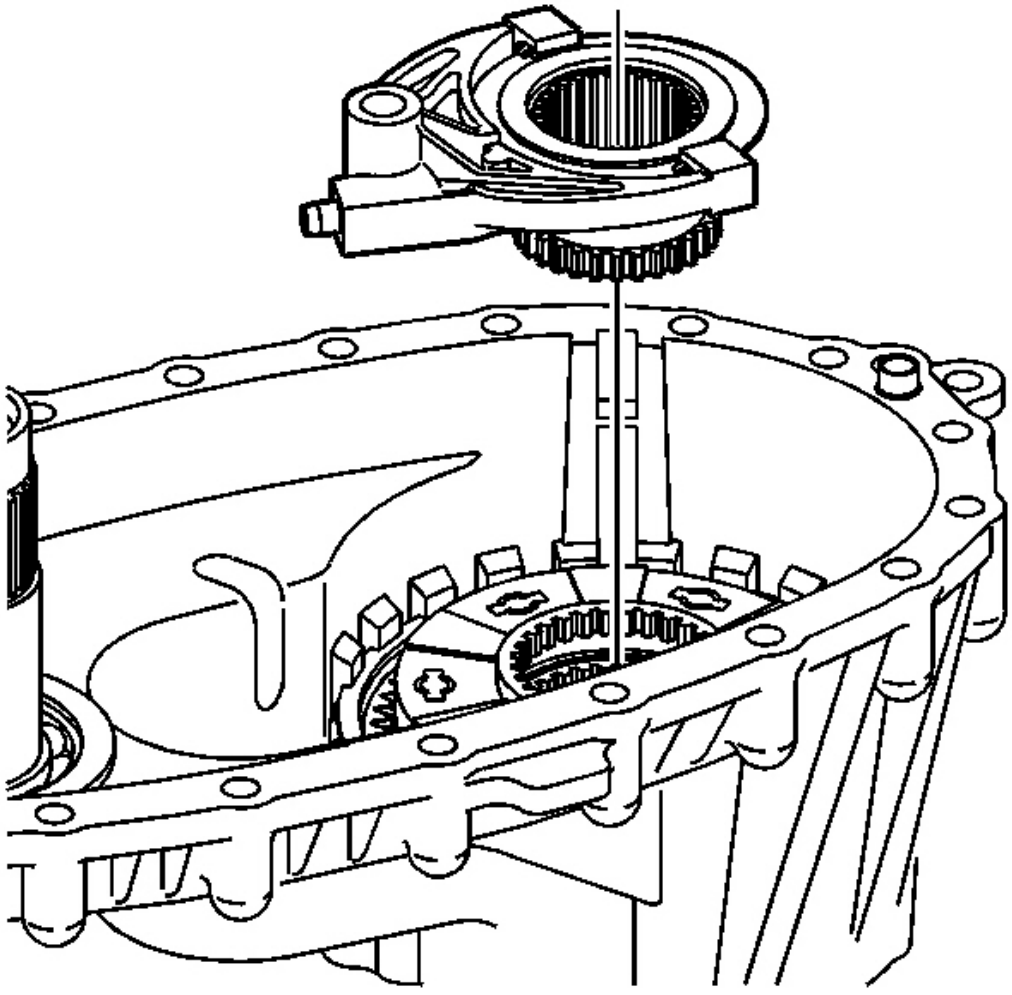


Fig. 68: High/Low Range Sleeve & High/Low Range Shift Fork
Courtesy of GENERAL MOTORS CORP.

40. Remove the high/low range sleeve with the high/low range shift fork.

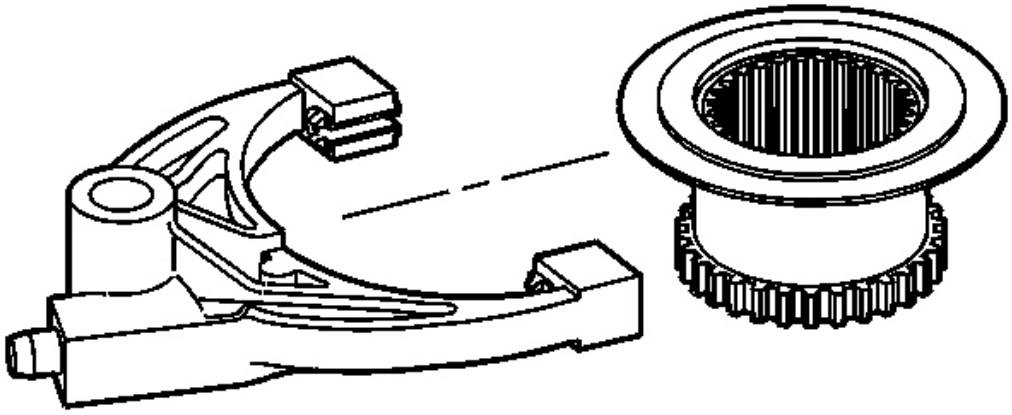


Fig. 69: Range Shift Fork Range Shift Sleeve
Courtesy of GENERAL MOTORS CORP.

41. Remove the range shift fork from the range shift sleeve.

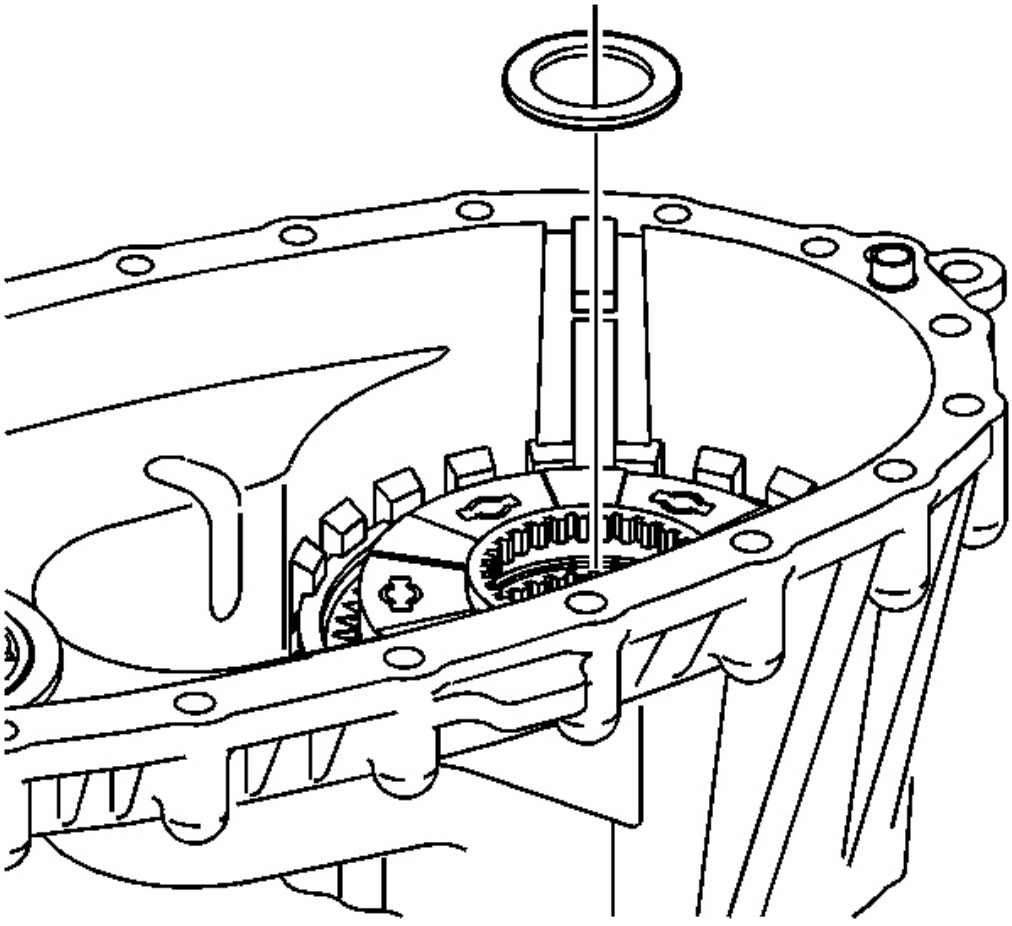


Fig. 70: Input Shaft Thrust Washer
Courtesy of GENERAL MOTORS CORP.

42. Remove the input shaft thrust washer.

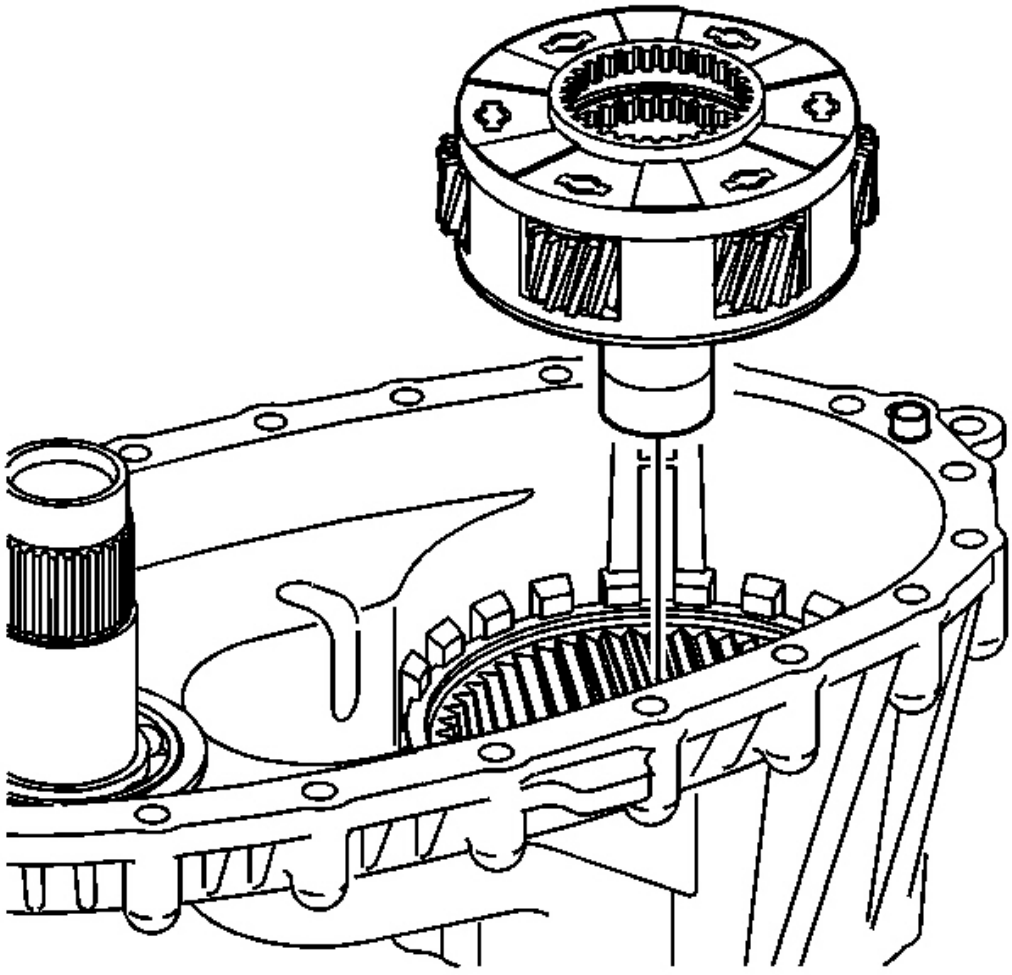


Fig. 71: High/Low Planetary Carrier
Courtesy of GENERAL MOTORS CORP.

43. Remove the high/low planetary carrier.

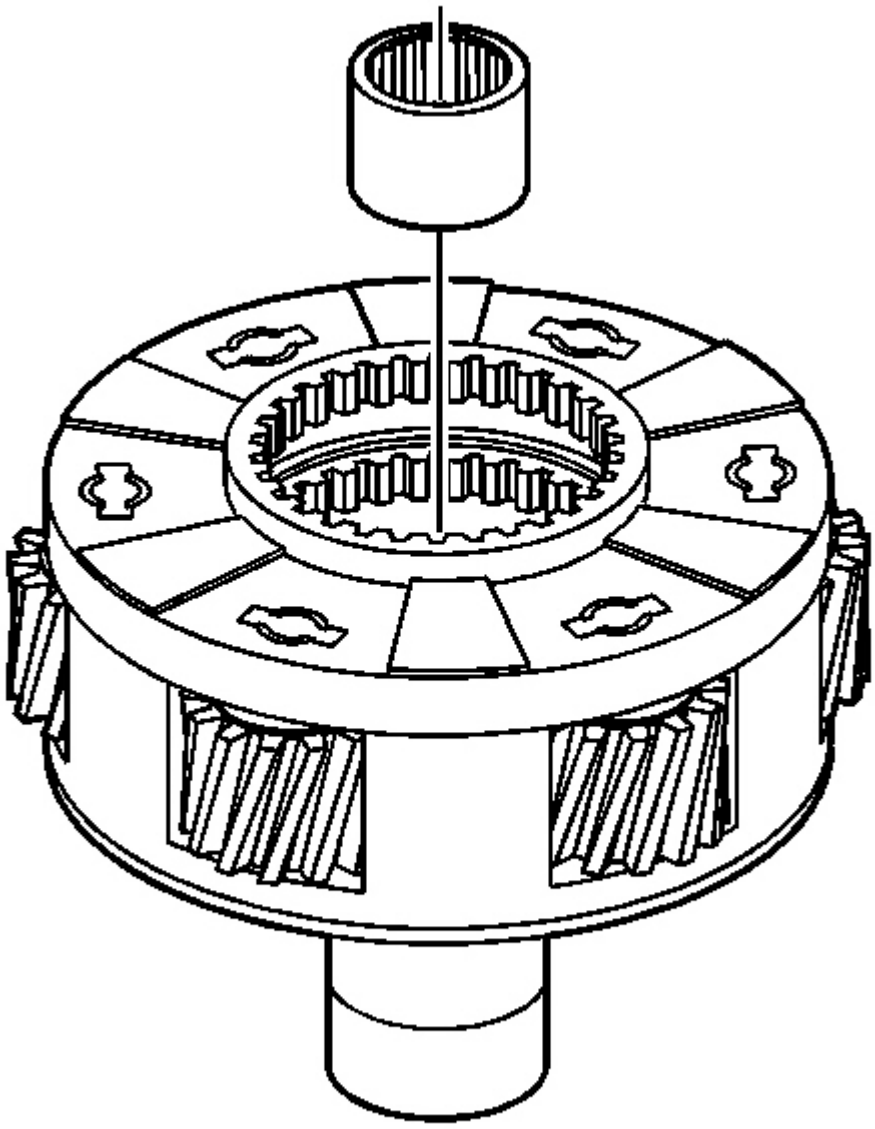


Fig. 72: Inspecting Mainshaft Front Support Bearing
Courtesy of GENERAL MOTORS CORP.

44. Inspect the mainshaft front support bearing for being faulty. Refer to **Cleaning and Inspection** .
45. Using a brass drift and a hammer, remove the mainshaft front support bearing from the planetary carrier assembly.

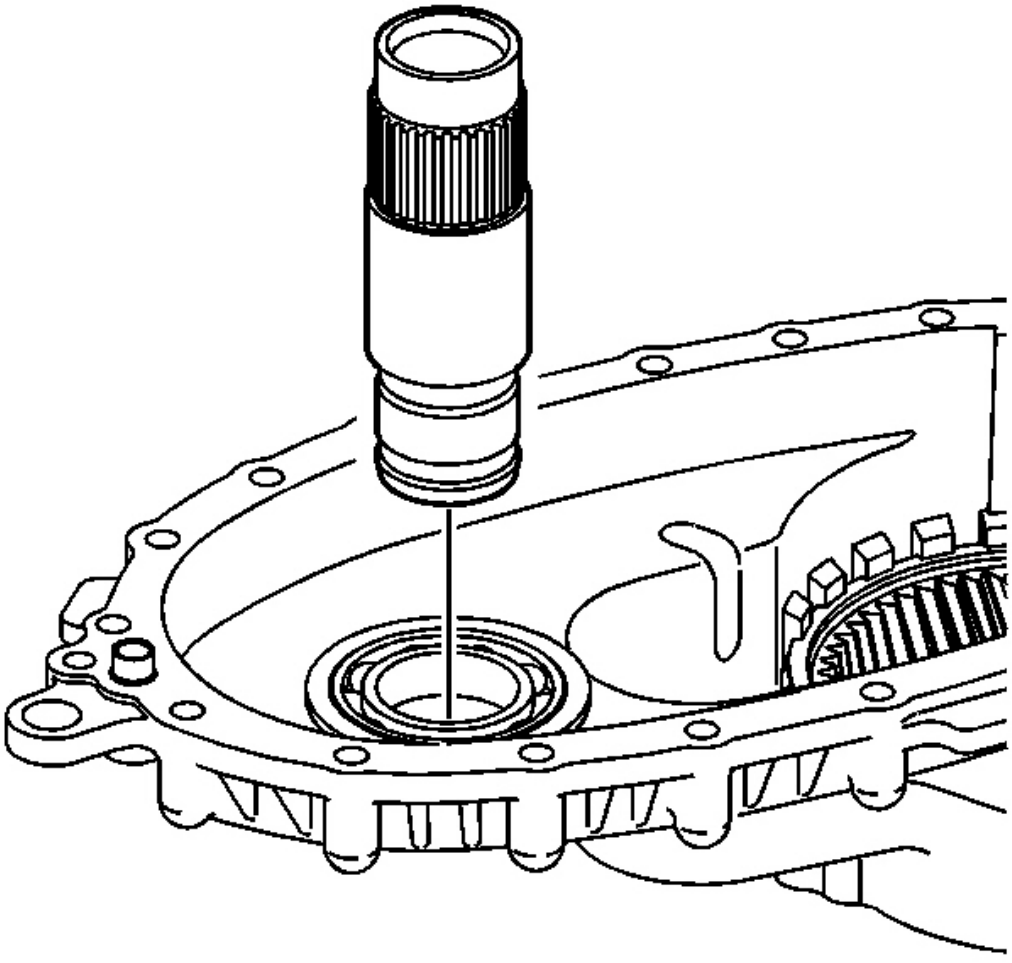


Fig. 73: Front Output Shaft Assembly
Courtesy of GENERAL MOTORS CORP.

46. Remove the front output shaft assembly.

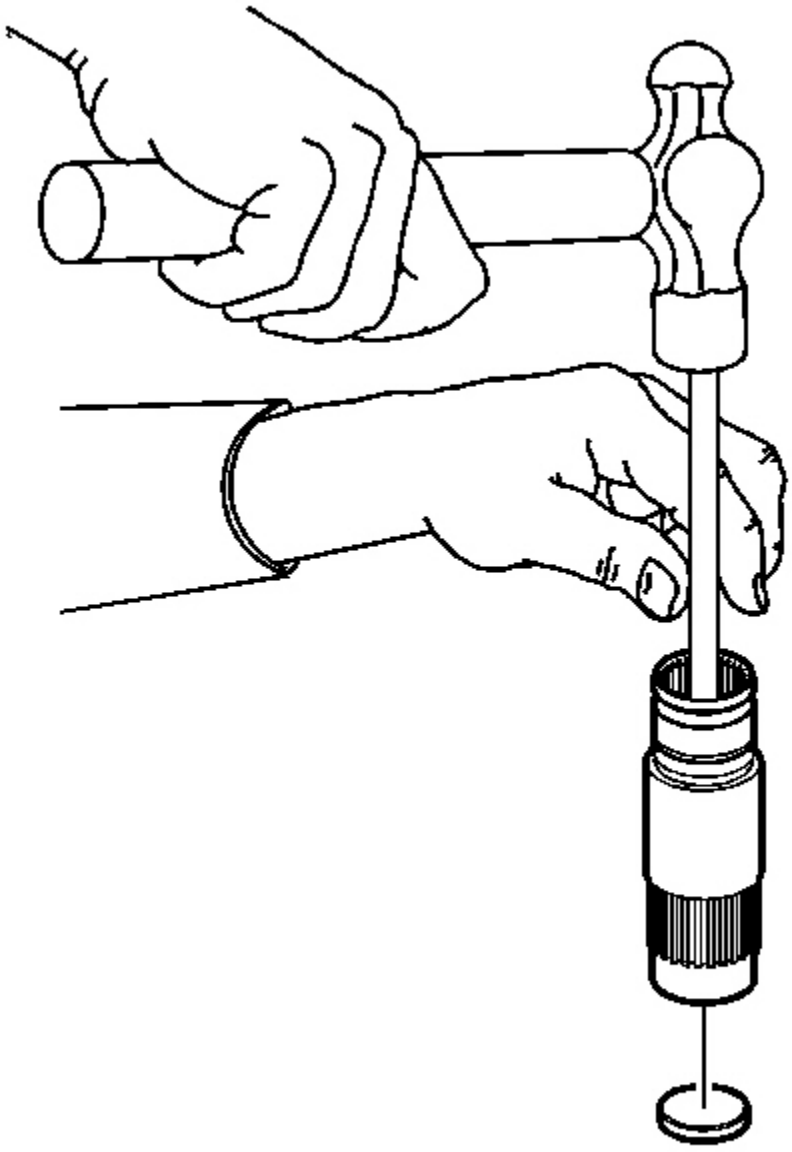


Fig. 74: Removing Cup Plug In Front Output Shaft (If Leaking)
Courtesy of GENERAL MOTORS CORP.

47. If the cup plug in the front output shaft is leaking, remove the plug using a brass drift.

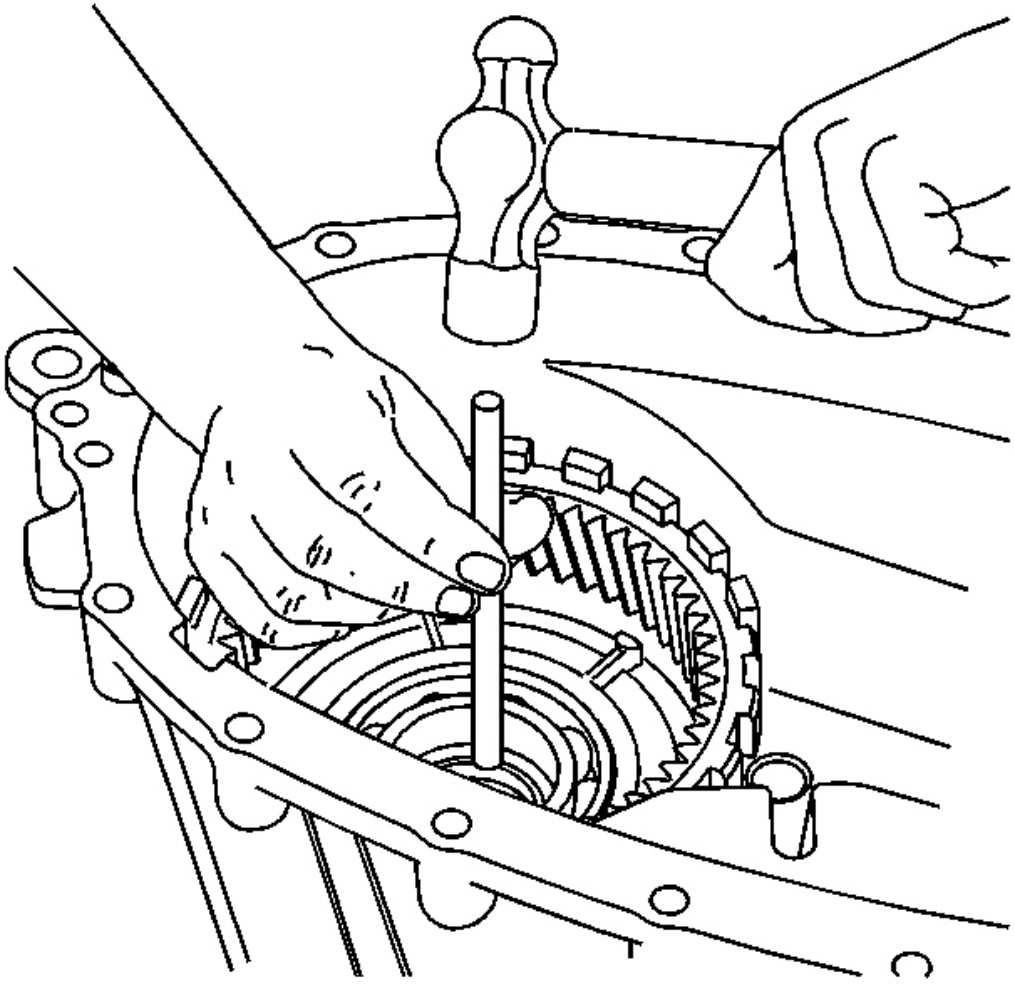


Fig. 75: Removing Input Seal By Using Hammer & Punch
Courtesy of GENERAL MOTORS CORP.

48. Using a hammer and a suitable punch, remove the input seal.

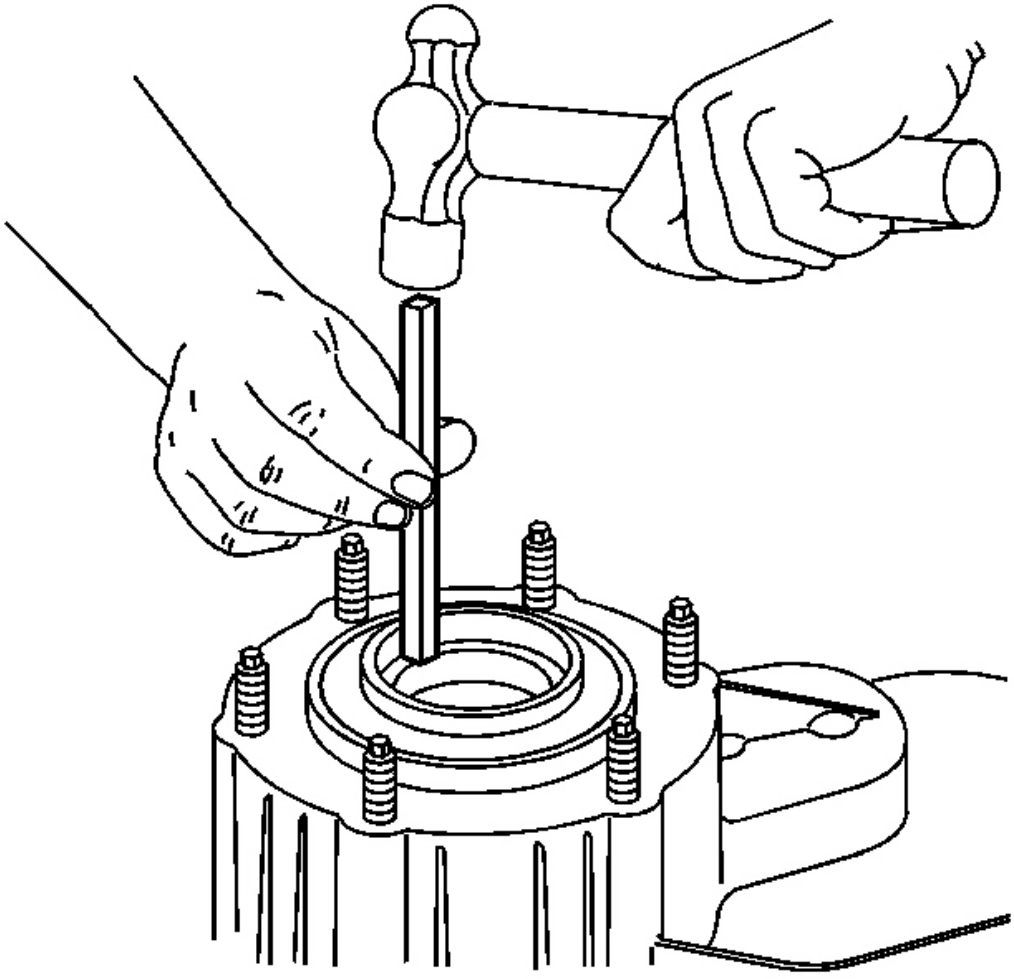


Fig. 76: Removing Input Shaft Bearing From Front Case Half Using Hammer & Brass Drift
Courtesy of GENERAL MOTORS CORP.

49. Using a hammer and a brass drift, remove the input shaft bearing from the front case half.

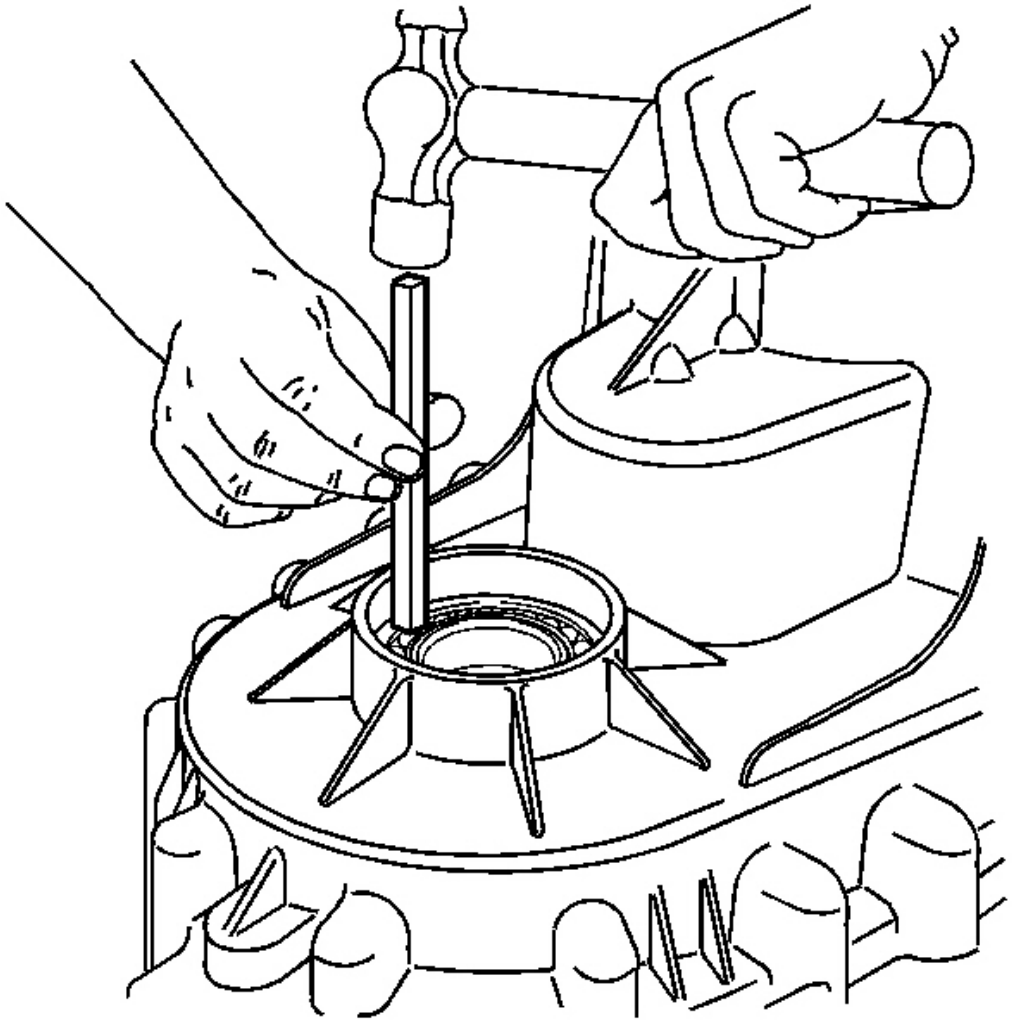


Fig. 77: Removing Front Output Shaft Bearing From Front Case Half By Using Brass Drift
Courtesy of GENERAL MOTORS CORP.

50. Using a brass drift, remove the front output shaft bearing from the front case half.

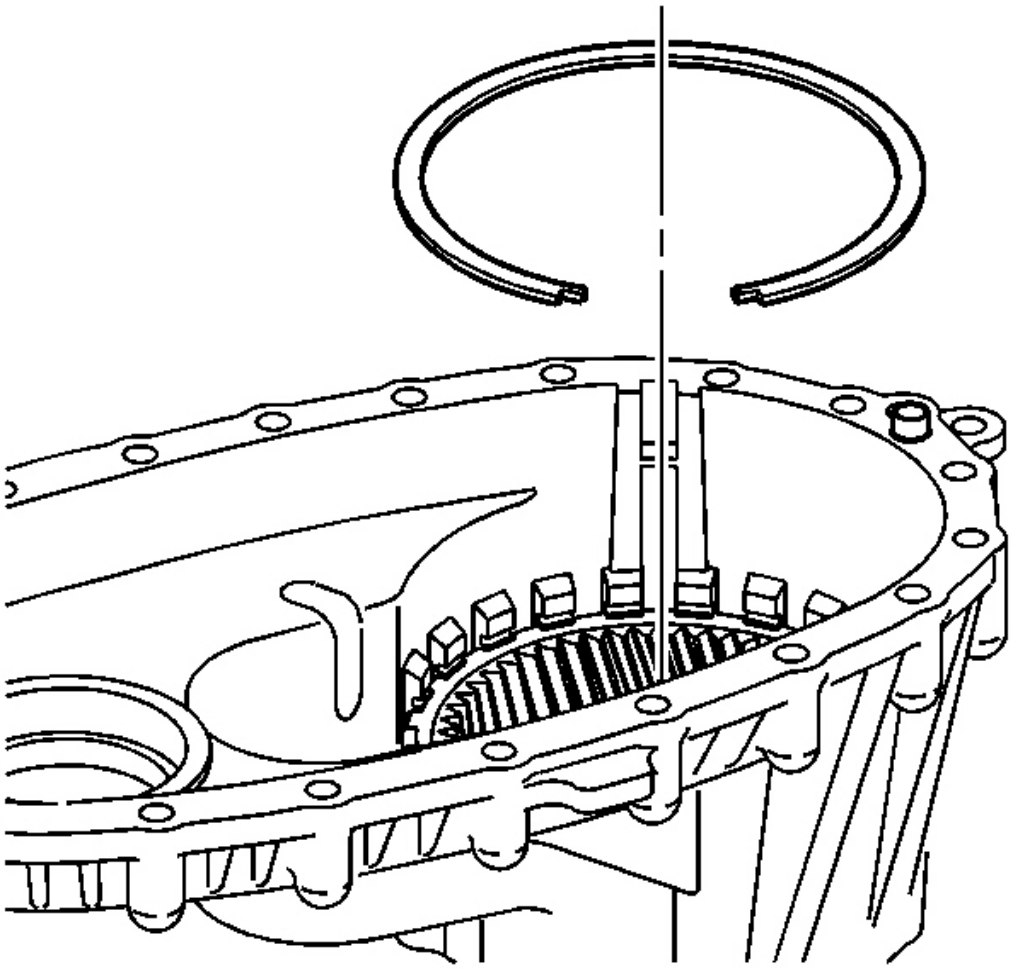


Fig. 78: Retaining Ring & Annulus Gear
Courtesy of GENERAL MOTORS CORP.

51. Remove the retaining ring for the annulus gear.

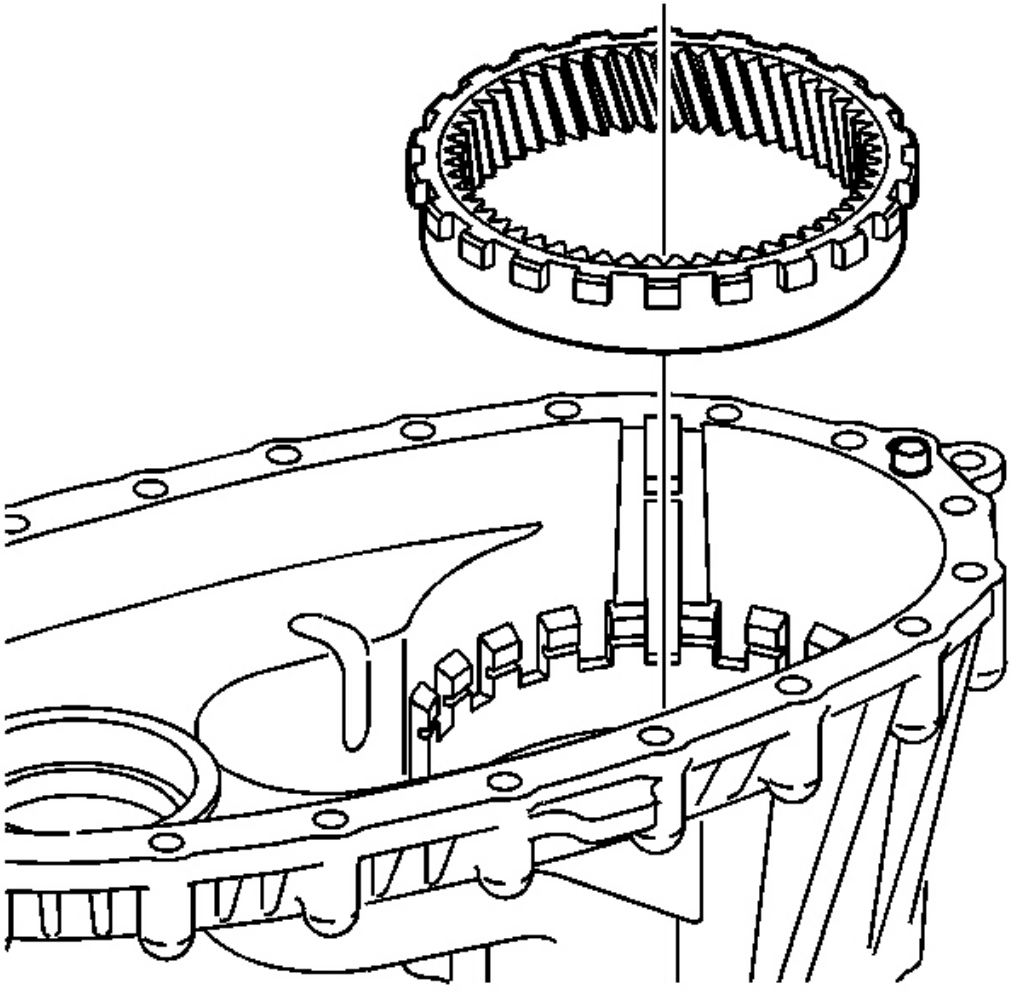


Fig. 79: Annulus Gear & Front Case Half
Courtesy of GENERAL MOTORS CORP.

52. Remove the annulus gear from the front case half.

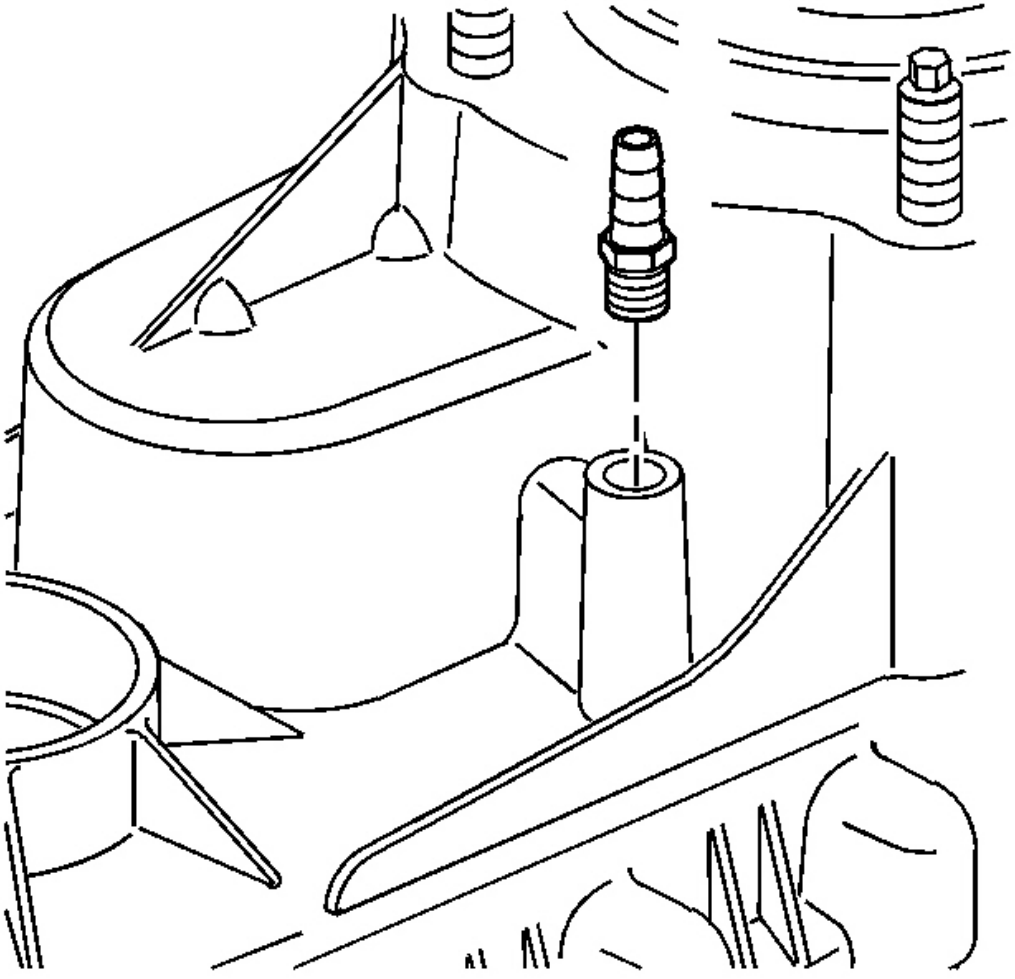


Fig. 80: Vent & Front Case Half
Courtesy of GENERAL MOTORS CORP.

53. If necessary, remove the vent from the front case half.

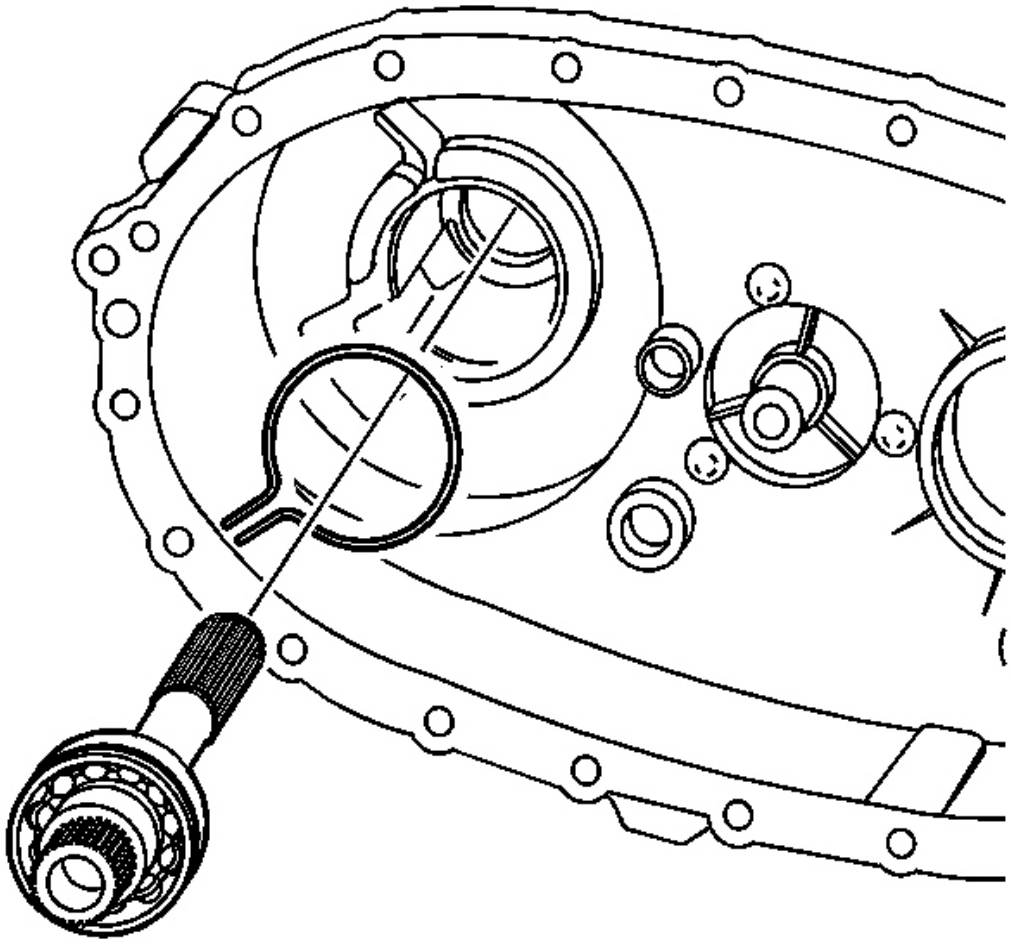


Fig. 81: Rear Output Shaft & Rear Case Half
Courtesy of GENERAL MOTORS CORP.

54. Remove the rear output shaft from the rear case half.
    1. Spread the rear output shaft rear bearing outer retaining ring.
    2. Using a soft-face hammer, tap on the end of the rear output shaft.

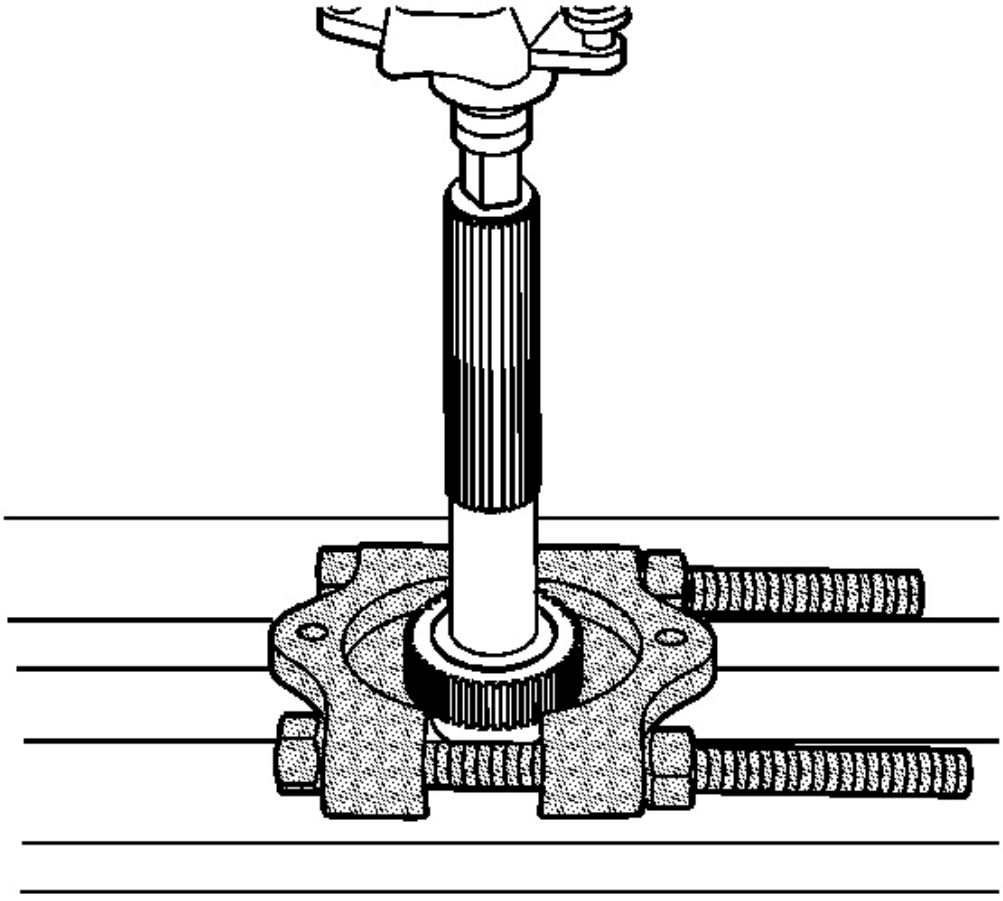


Fig. 82: Removing Speed Reluctor Wheel By Using Hydraulic Press & J 22912-01
Courtesy of GENERAL MOTORS CORP.

55. Using a hydraulic press and the **J 22912-01** , remove the speed reluctor wheel.

    Do not use the speed reluctor wheel again.

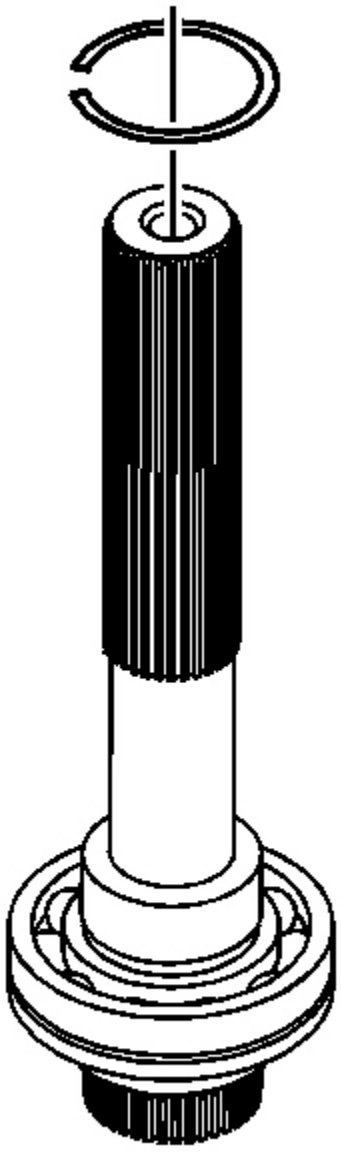


Fig. 83: Retaining Ring & Rear Output Shaft Bearing
Courtesy of GENERAL MOTORS CORP.

56. Remove the retaining ring for the rear output shaft bearing.

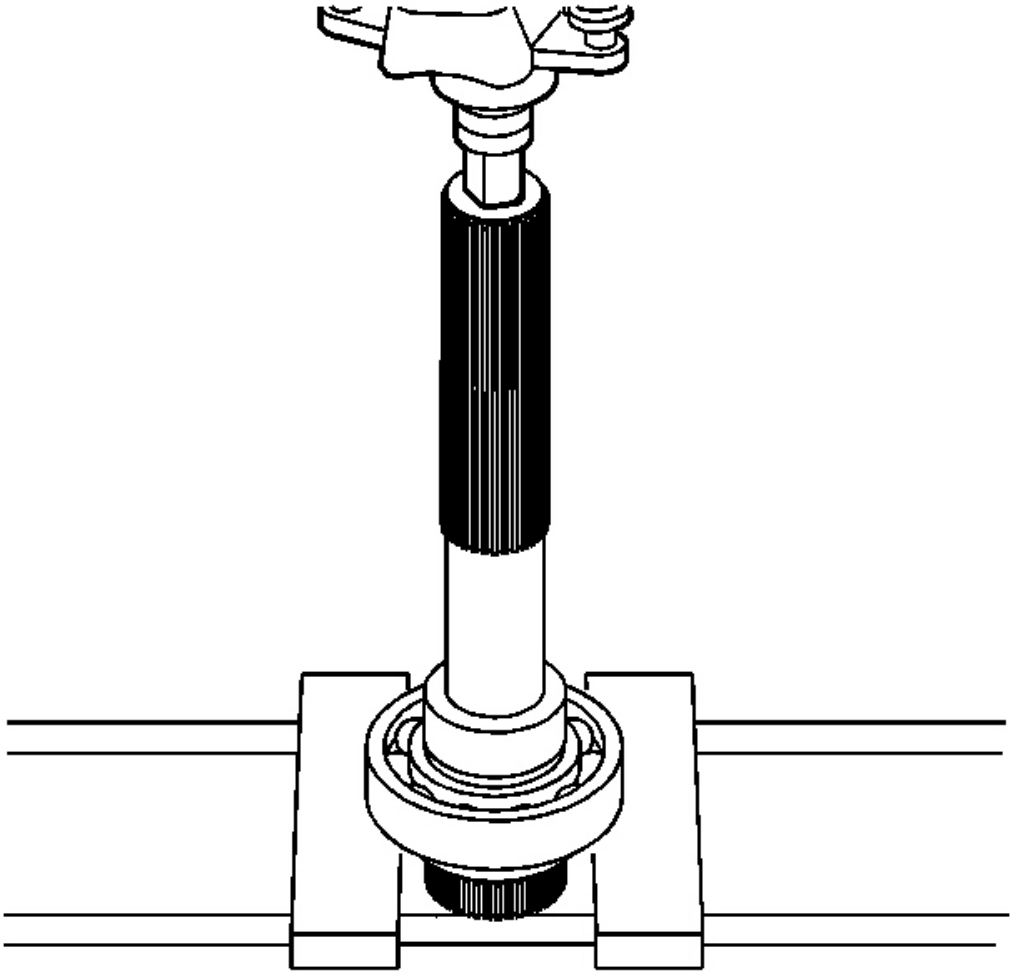


Fig. 84: Removing Rear Output Shaft Bearing By Using Hydraulic Press
Courtesy of GENERAL MOTORS CORP.

57. Using a hydraulic press, remove the rear output shaft bearing.

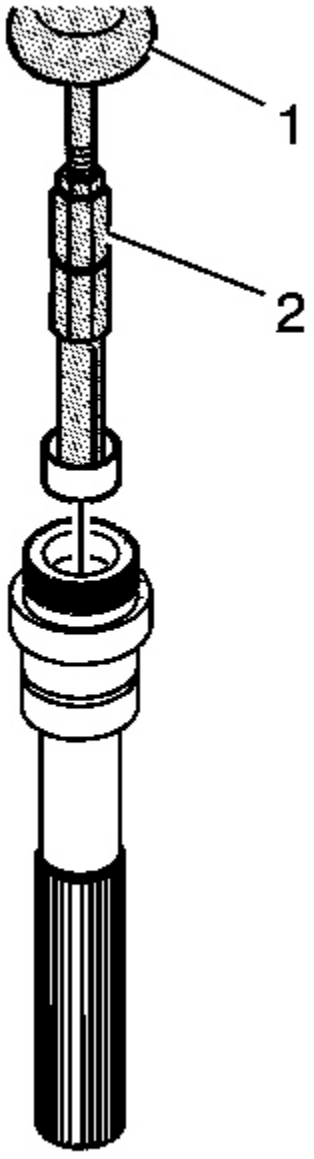


Fig. 85: Removing Mainshaft Rear Support Bushing From Rear Output Shaft Using J 2619-01 & J 45548
Courtesy of GENERAL MOTORS CORP.

58. Inspect the mainshaft rear support bushing in the rear output shaft for being faulty. Refer to **Cleaning and Inspection** .

59. Using the **J 2619-01** (1) and the **J 45548** (2), remove the mainshaft rear support bushing from the rear output shaft. See **Special Tools and Equipment** .

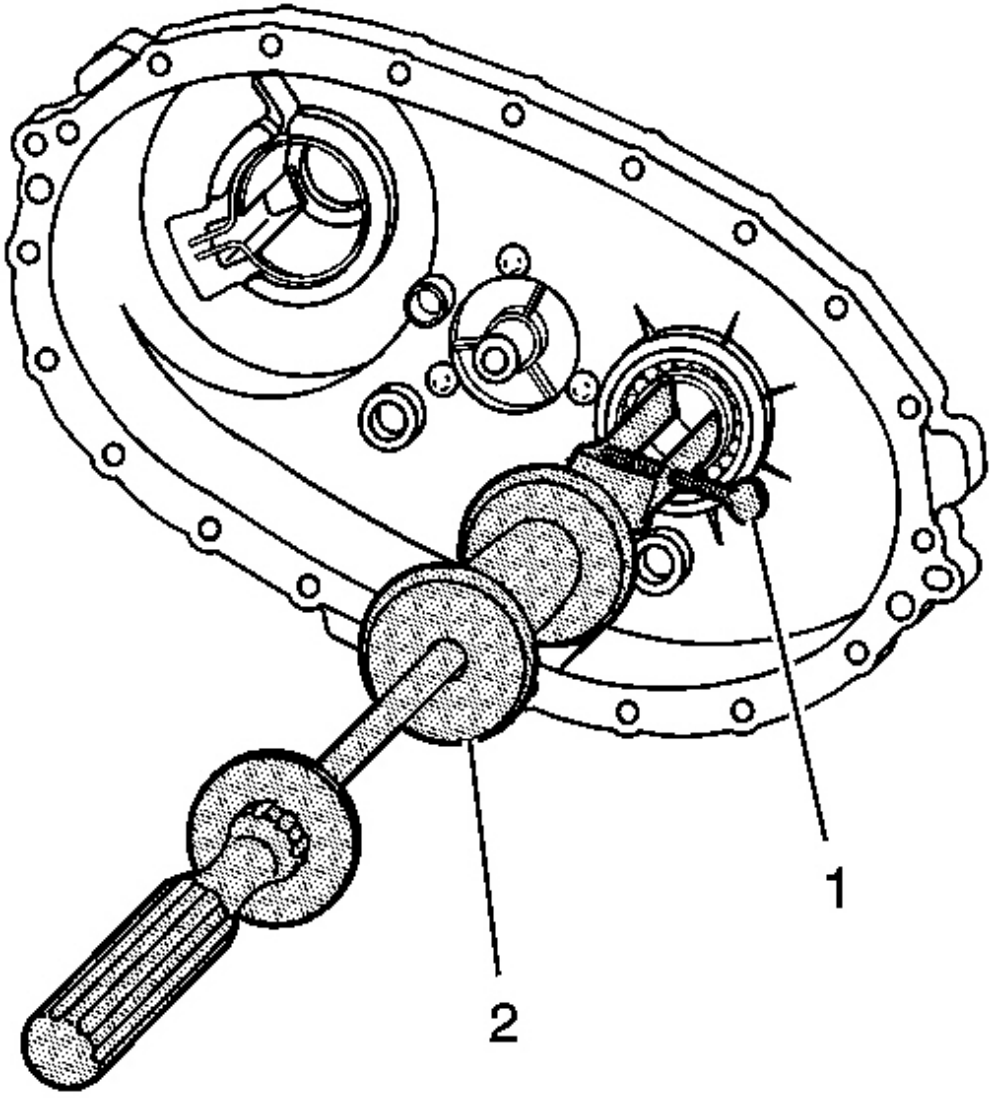


Fig. 86: Using J 26941 & J 23907 To Remove Rear Bearing For Front Output Shaft From Rear Case
Courtesy of GENERAL MOTORS CORP.

60. Using the **J 26941** (1) and the **J 23907** (2), remove the rear bearing for the front output shaft from the rear

case. See **Special Tools and Equipment** .

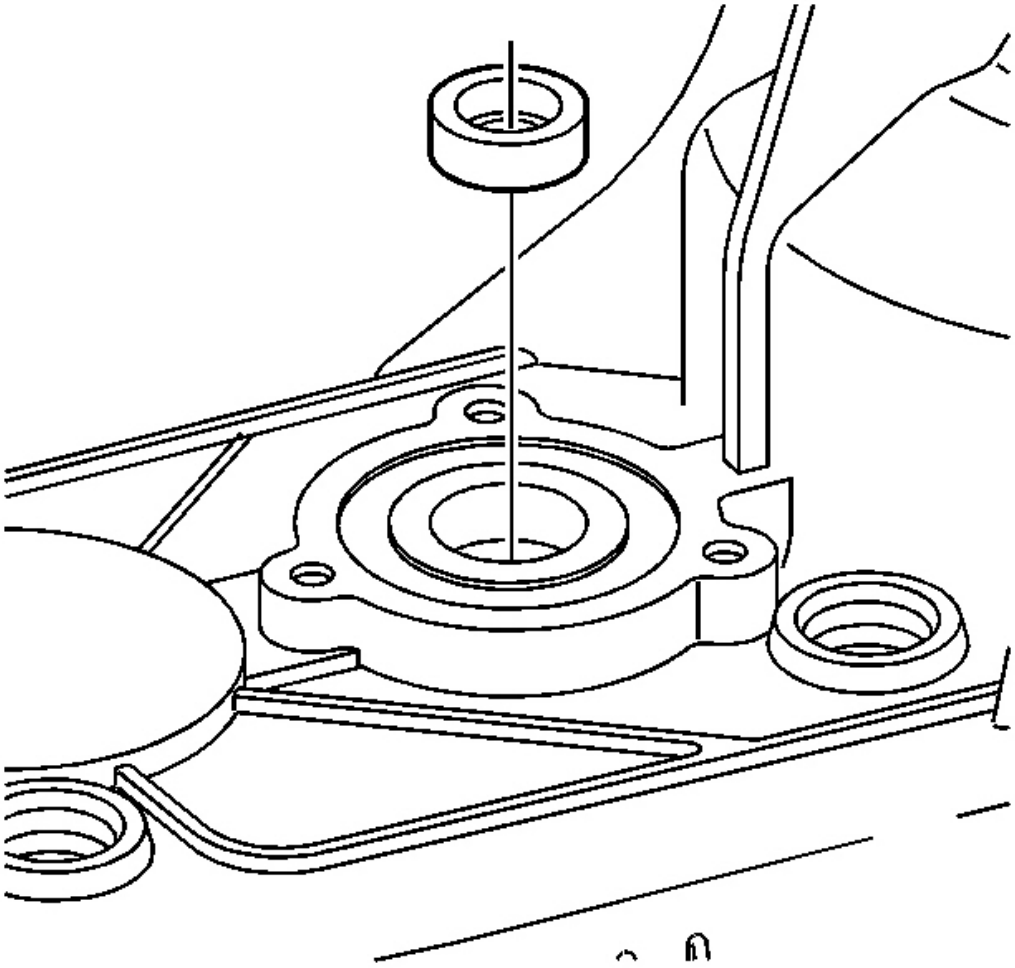


Fig. 87: Seal For Shift Detent Lever Shaft
Courtesy of GENERAL MOTORS CORP.

61. Remove the seal for the shift detent lever shaft by prying it out from the case.

CLEANING AND INSPECTION

Front Case Half

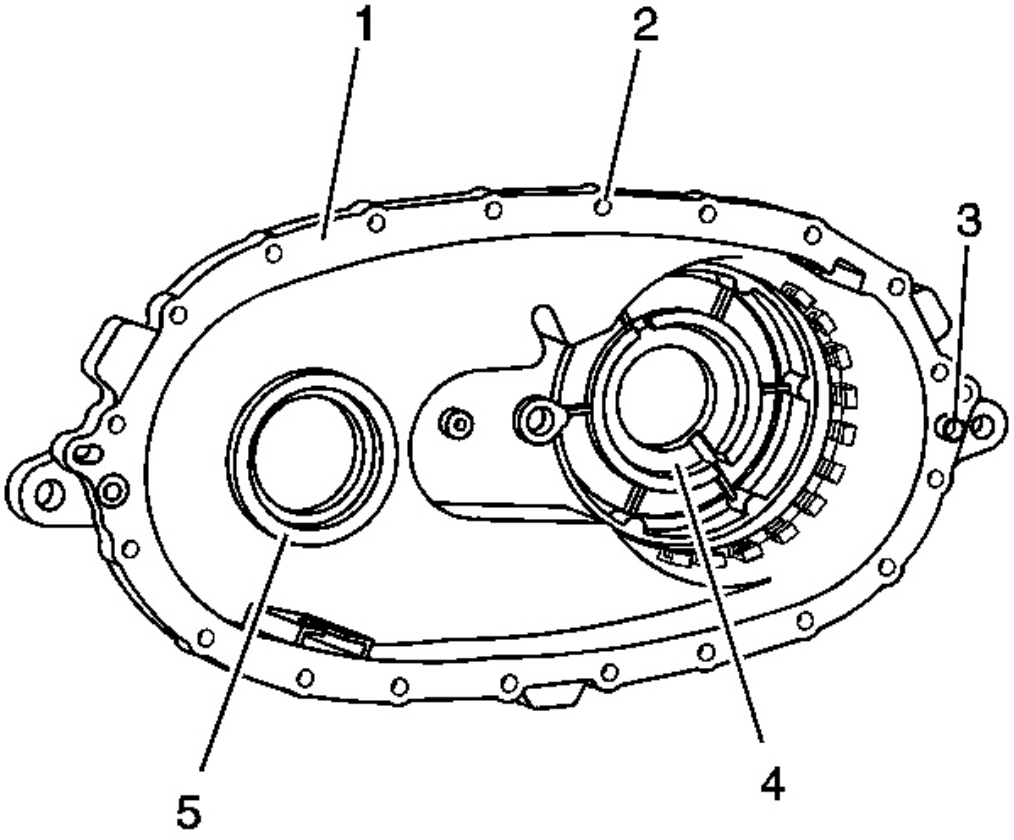


Fig. 88: Front Case Half Components
Courtesy of GENERAL MOTORS CORP.

1. Clean the front case half in cleaning solvent, and air dry.
2. Remove the shavings from the case half bolt holes.

NOTE: Refer to Machined Surface Damage Notice in Cautions and Notices.

3. Remove the sealer from the case sealing surfaces.
4. Inspect the case for being broken or cracked.
5. Inspect the front output shaft front bearing bore (5) for the following conditions:
   - A spun bearing
   - Cracks
6. Inspect the input shaft bearing bore (4) for the following conditions:
   - A spun bearing

- Cracks

7. Replace the front case half if any of the above conditions are found.
8. Inspect the sealing surfaces (1) for damage.
9. Repair small scratches or nicks with a soft stone.
10. Inspect the front case to transmission case mounting surface for damage.
11. Inspect the case threaded bolt holes (2) for damage.
12. Repair any damaged threads.
13. Inspect the transmission to transfer case studs for damage.
14. Replace any damaged studs. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
15. Inspect the location pins (3) for being loose or missing.
16. Repair or replace any damaged location pins.
17. Inspect the front output shaft front bearing and the input shaft bearing for the following conditions:
    - Roughness
    - Brinelling
    - Pitting
18. Replace the bearings if any of the above conditions are found. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

Rear Case Half

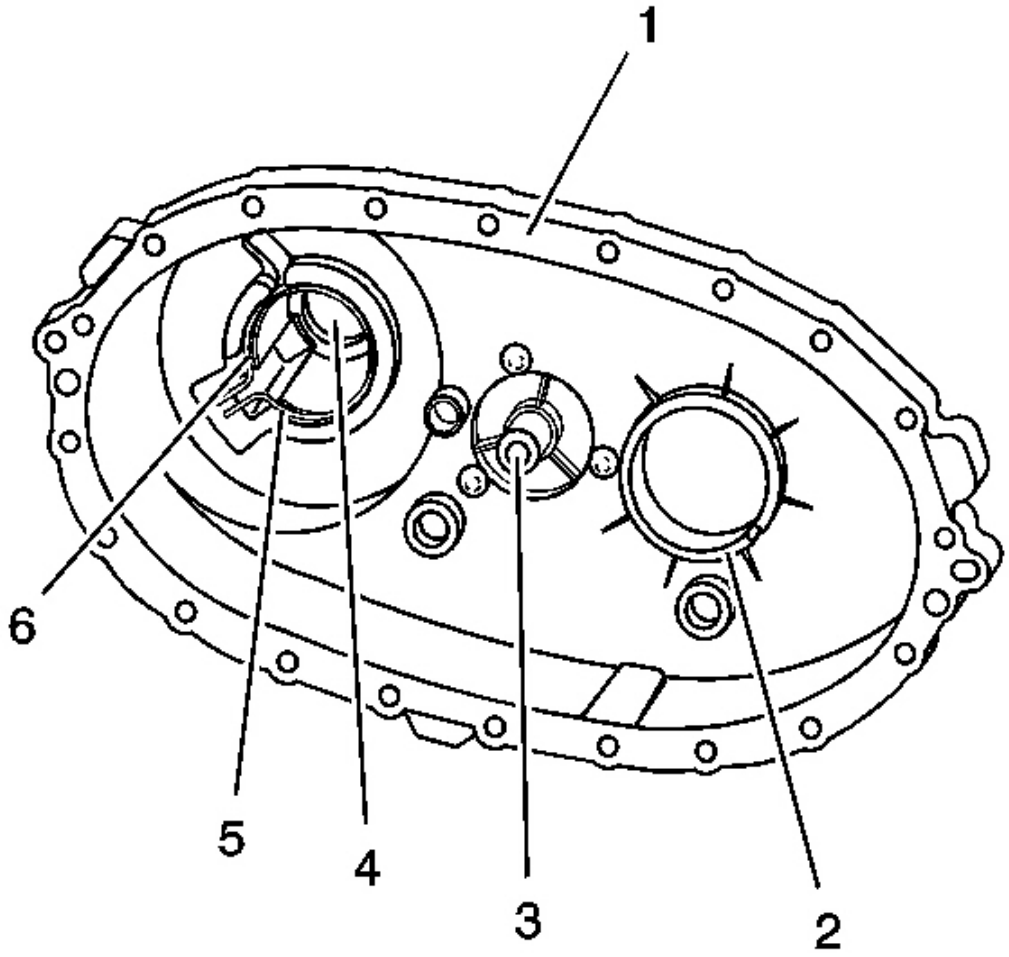


Fig. 89: Rear Case Half Components
Courtesy of GENERAL MOTORS CORP.

1. Clean the rear case half in cleaning solvent, and air dry.

NOTE: Refer to Machined Surface Damage Notice in Cautions and Notices.

2. Remove the sealer from the case sealing surfaces.
3. Inspect the case for being broken or cracked.
4. Replace the case if it is broken or cracked.
5. Inspect the sealing surfaces (1) for damage.
6. Repair small scratches or nicks with a soft stone.

7. Inspect the case threaded bolt holes for damage.
8. Repair any damaged threads.
9. Inspect the front output shaft rear bearing bore (2) for the following conditions:
    - Spun bearing
    - Cracks
10. Inspect the rear output shaft rear bearing bore (5) for the following conditions:
    - Spun bearing
    - Cracks
11. Replace the case if the bearing has spun. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
12. Inspect the retaining ring (6) for the rear output shaft rear bearing for being bent or twisted.
13. Replace a faulty retaining ring.
14. Inspect the rear output shaft bushing (4) for scoring or wear.
15. Replace the case if the rear output shaft bushing is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
16. Inspect the shift detent lever shaft bore (3) for the following conditions:
    - Out of round
    - Excessive wear
17. Replace the case if the shift detent lever shaft bore is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

Oil Pump

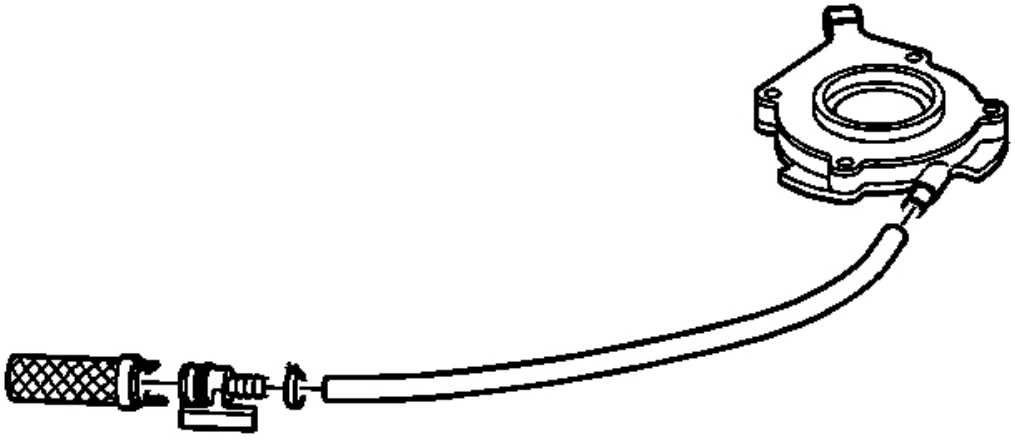


Fig. 90: Oil Pump Hose & Oil Pump Screen
Courtesy of GENERAL MOTORS CORP.

1. Remove the oil pump suction hose from the oil pump screen.
2. Clean the hose and screen in cleaning solvent and air dry.
3. If the screen is embedded with debris, replace the screen.
4. Inspect the hose for cracking or tears.
5. Replace the hose if it is faulty.
6. Inspect the oil pump for free movement.
7. Replace the oil pump if there is any binding. Do not disassemble the oil pump. The oil pump is serviced as a unit.
8. Inspect the wear clip on the oil pump.
9. Replace the oil pump if the wear clip is missing or faulty.

High/Low Range Components

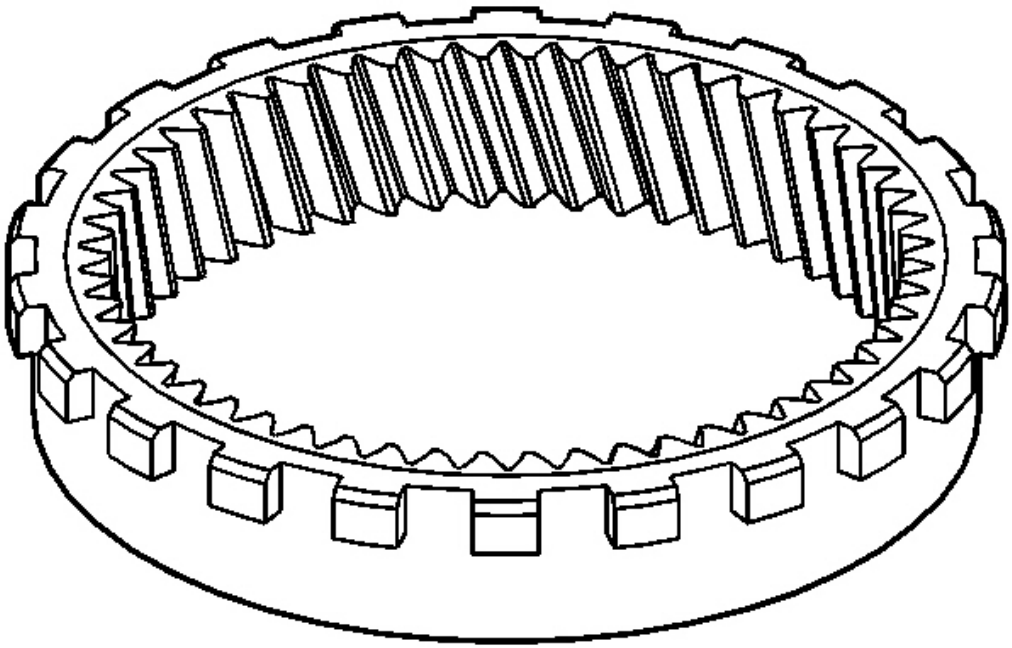


Fig. 91: Inspecting Annulus Gear Teeth
Courtesy of GENERAL MOTORS CORP.

1. Clean the annulus gear in cleaning solvent and air dry.

2. Inspect the annulus gear teeth for the following conditions:
    - Damage or excessive wear
    - Chipped
    - Debris embedded in the root of the teeth
3. Replace the annulus gear if it is faulty.

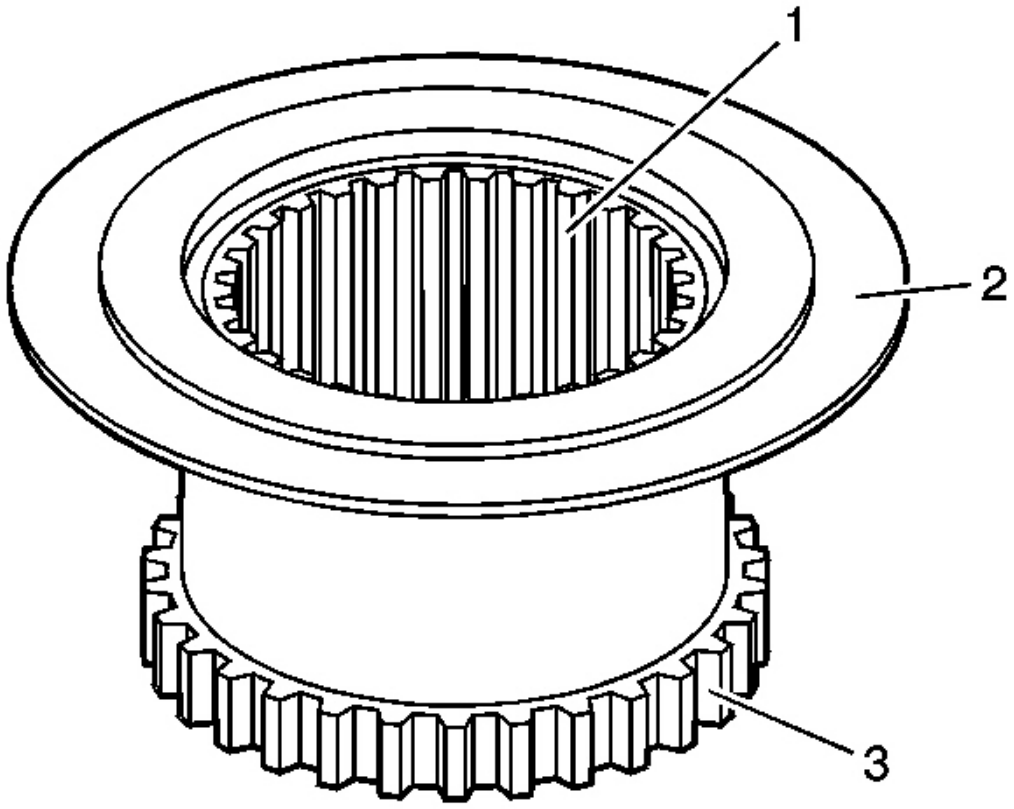


Fig. 92: Inspecting High/Low Range Shift Sleeve
Courtesy of GENERAL MOTORS CORP.

1. Clean the high/low range shift sleeve in cleaning solvent and air dry.
2. Inspect the high/low range shift sleeve for the following conditions:
    - Excessive wear or roughness on the shift fork pad surface (2)
    - Damaged, chipped or excessive wear on the engagement teeth (3)
    - Excessive looseness or gouging on the mainshaft splines (1)

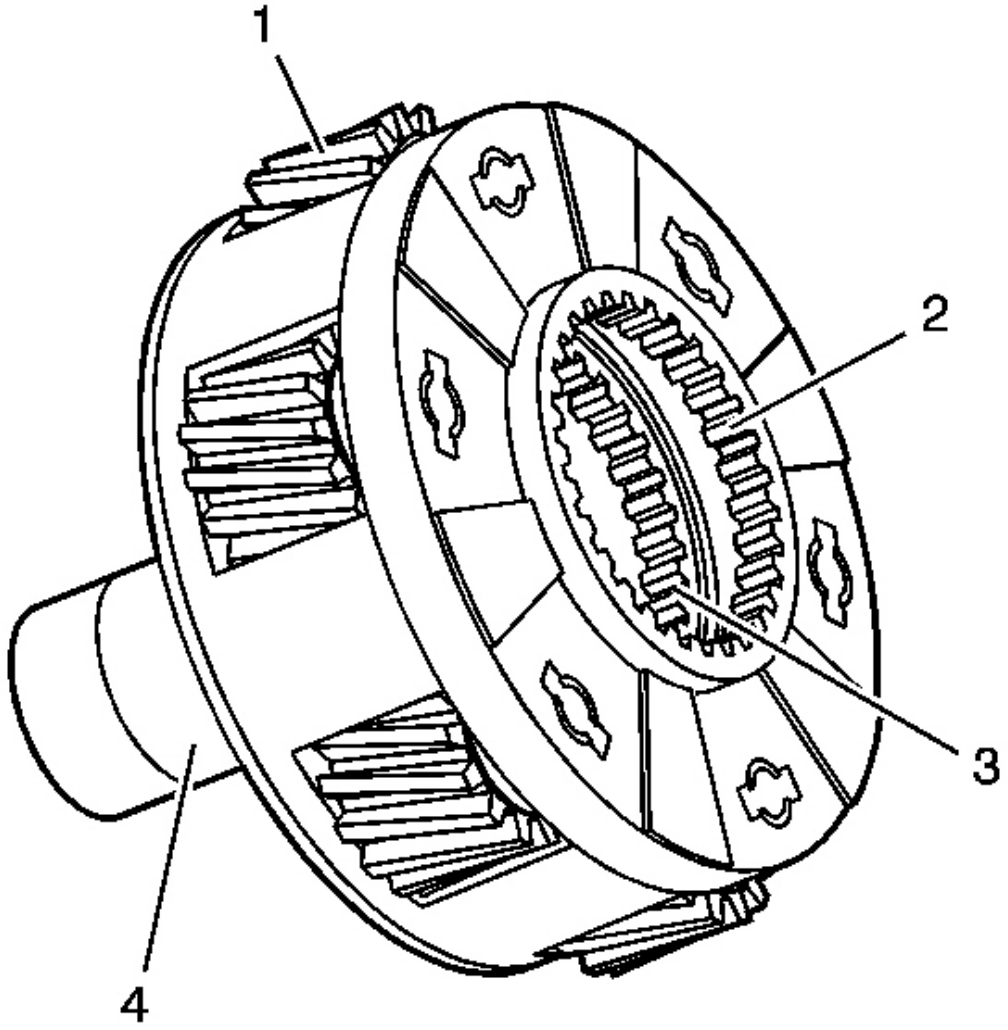


Fig. 93: Inspecting High/Low Planetary Carrier
Courtesy of GENERAL MOTORS CORP.

1. Clean the high/low planetary carrier in cleaning solvent. Do not disassemble the planetary carrier.
2. Air dry, and ensure all cleaning solvent is removed from the bearings in the planetary gears (1). Do not spin the planetary gears with compressed air.
3. Inspect the planetary gears for chipped teeth.
4. Inspect the planetary gears for debris embedded in the root of the teeth.
5. Inspect the planetary gears for excessive side movement from worn bearings or shafts.

6. Inspect the low range teeth (2) for damage or excessive wear.
7. Inspect the high range teeth (3) for damage or excessive wear.
8. Inspect the input seal surface (4) for scoring or excessive wear.
9. Inspect the thrust washer surface for scoring or excessive wear.
10. Replace the high/low planetary carrier if any of the above conditions are found.
11. Inspect the mainshaft front support bearing for the following conditions:
    - Scoring
    - Pitting
    - Brinelling
    - Excessive wear
12. Replace the mainshaft front support bearing if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
13. Inspect the high/low planetary thrust washer for excessive wear or scoring.
14. Replace the thrust washer if it is faulty.

Differential Components

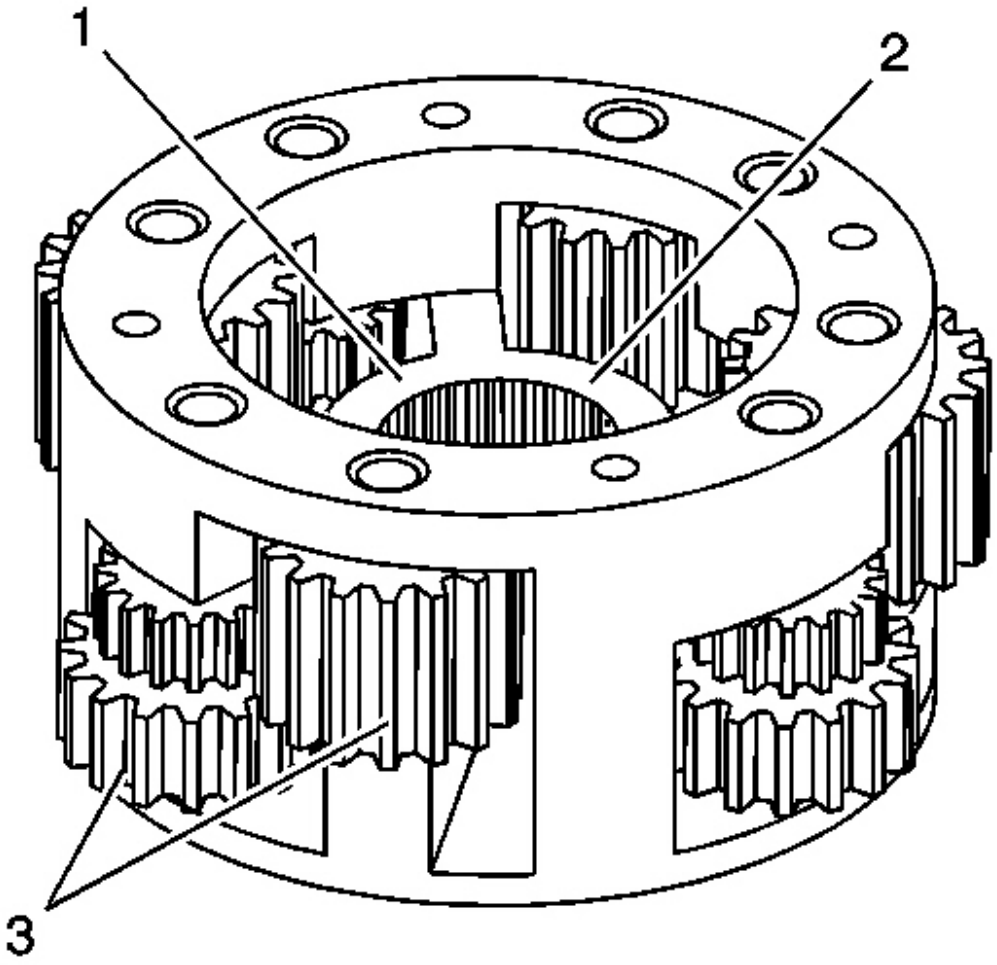


Fig. 94: Inspecting Planetary Differential
Courtesy of GENERAL MOTORS CORP.

1. Clean the planetary differential in cleaning solvent. Do not disassemble the planetary differential.
2. Air dry, and ensure all cleaning solvent is removed from the bushings in the pinion gears (3). Do not spin the pinion gears with compressed air.
3. Inspect the pinion gears for chipped teeth.
4. Inspect the pinion gears for debris embedded in the root of the teeth.
5. Inspect the pinion gears for excessive side movement from worn bushings or shafts.
6. Inspect the planetary differential assembly for cracks at the web (1) of the housing.
7. Inspect the thrust washer surface (2) for scoring or excessive wear.

8. Inspect the planetary differential for distortion.
9. Inspect the planetary differential to mainshaft splines for excessive wear.
10. Replace the planetary differential if any of the above conditions are found.
11. Inspect the thrust washers for excessive wear or scoring.
12. Replace the thrust washers if they are faulty.

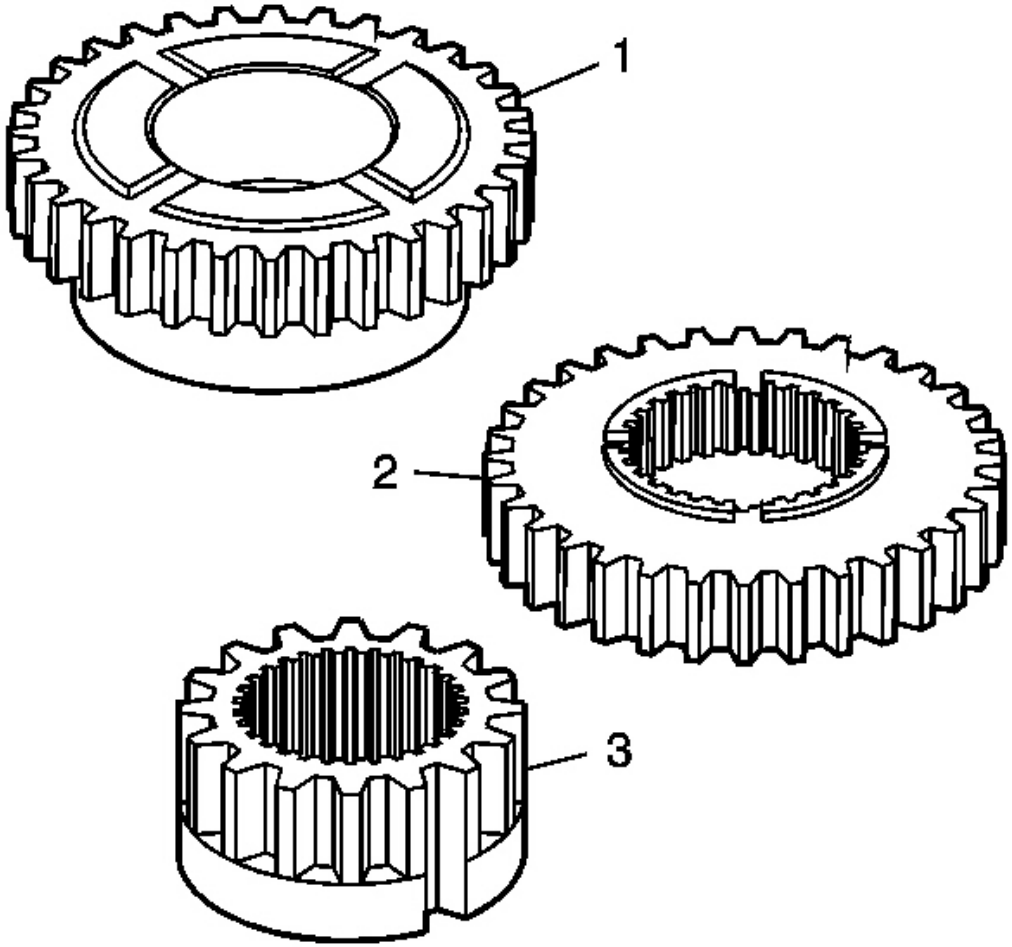


Fig. 95: Inspecting Teeth On Front Sun Gear, Rear Sun Gear & Inner Lockup Hub
Courtesy of GENERAL MOTORS CORP.

1. Clean the front sun gear (1), the rear sun gear (2), and the inner lockup hub (3) in cleaning solvent and air dry.
2. Inspect the teeth on the front sun gear (1), the rear sun gear (2), and the inner lockup hub (3) for the

following conditions:

- Chipped teeth
- Excessively worn gear surfaces

  Slight wear marks are normal.

- Debris embedded in the root of the teeth

3. Inspect the thrust washer surfaces for excessive wear or scoring.
4. Replace the front sun gear (1), the rear sun gear (2), and the inner lockup hub (3) if they are faulty.

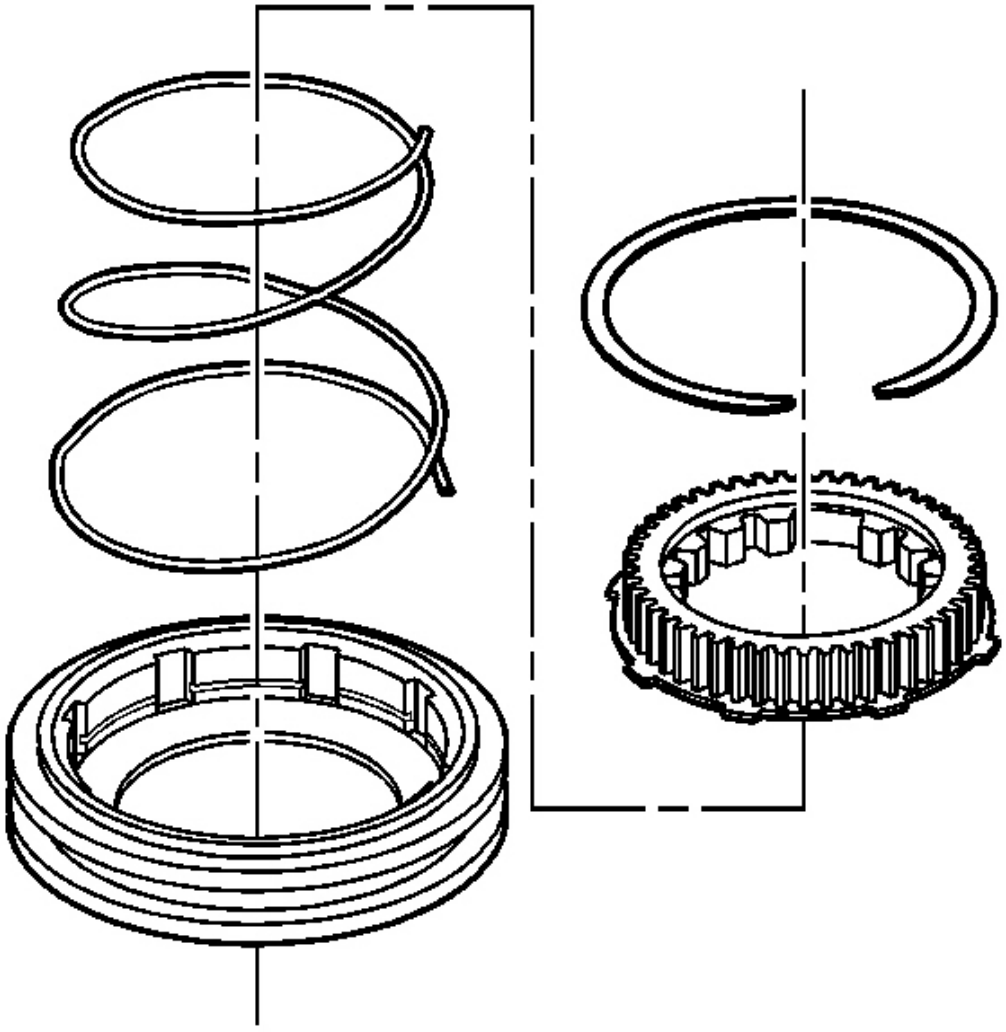


Fig. 96: Lockup Shift Assembly
Courtesy of GENERAL MOTORS CORP.

1. If necessary, disassemble the lockup shift assembly. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
2. Clean the lockup shift assembly components in cleaning solvent and air dry.
3. Inspect the lockup shift hub engagement teeth for the following conditions:
   - Chipped teeth
   - Excessively worn gear surfaces

     Slight wear marks are normal.

   - Debris embedded in the root of the teeth
4. Replace the lockup shift assembly if it is faulty. The lockup shift assembly components are not serviced separately.

Drive Chain and Sprockets

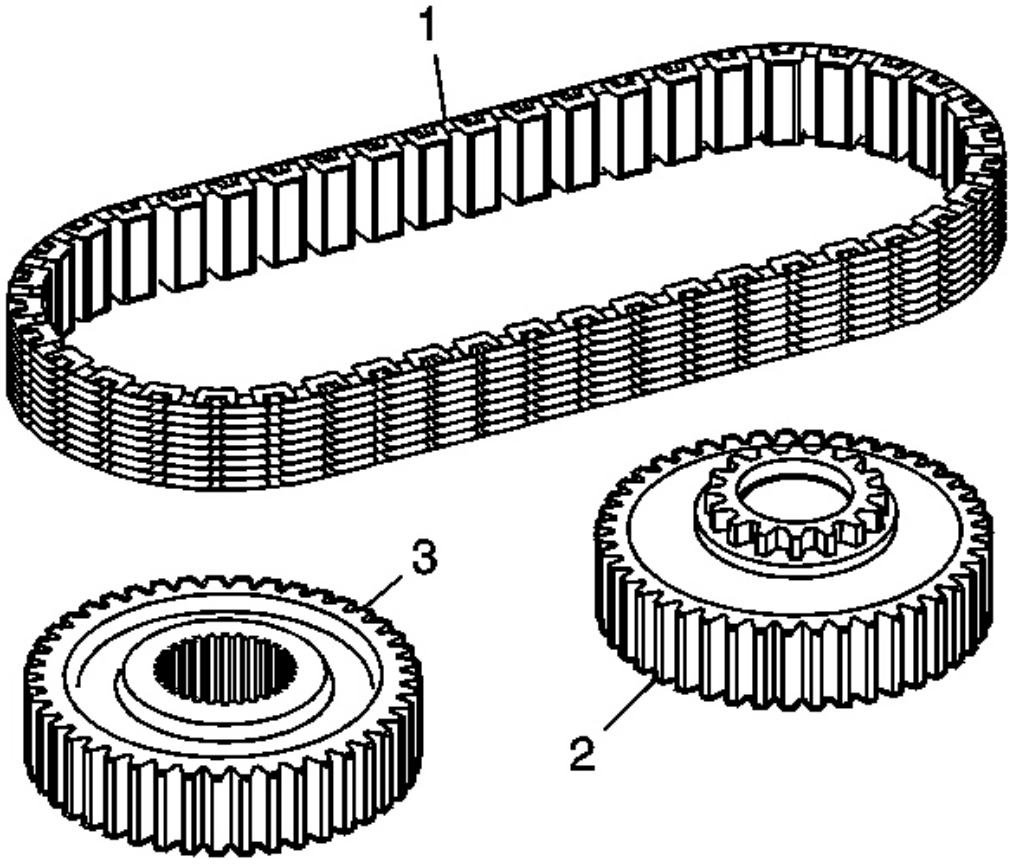


Fig. 97: Drive Chain, Drive Sprocket & Driven Sprocket
Courtesy of GENERAL MOTORS CORP.

1. Clean the drive chain (1), drive sprocket (2), and driven sprocket (3) in cleaning solvent and air dry.
2. Inspect the drive chain (1) for the following conditions:
    - Loose link pins
    - Binding or stiff links
    - Debris embedded in the links
    - Worn teeth surfaces
3. Replace the chain if any of the above conditions are found.
4. Inspect the driven sprocket (3) and the drive sprocket (2) for the following conditions:
    - Chipped teeth
    - Excessively worn gear surfaces

Slight wear marks are normal.

- Debris embedded in the root of the teeth

5. Inspect the drive sprocket (2) for the following conditions:
   - Lockup shift engagement teeth for chipping
   - Lockup shift engagement teeth for excessive wear
6. Inspect the drive sprocket bushing for the following conditions:
   - Excessive wear
   - Scoring
7. Replace the sprockets if any of the above conditions are found. The chain and sprockets may be replaced separately.

Mainshaft

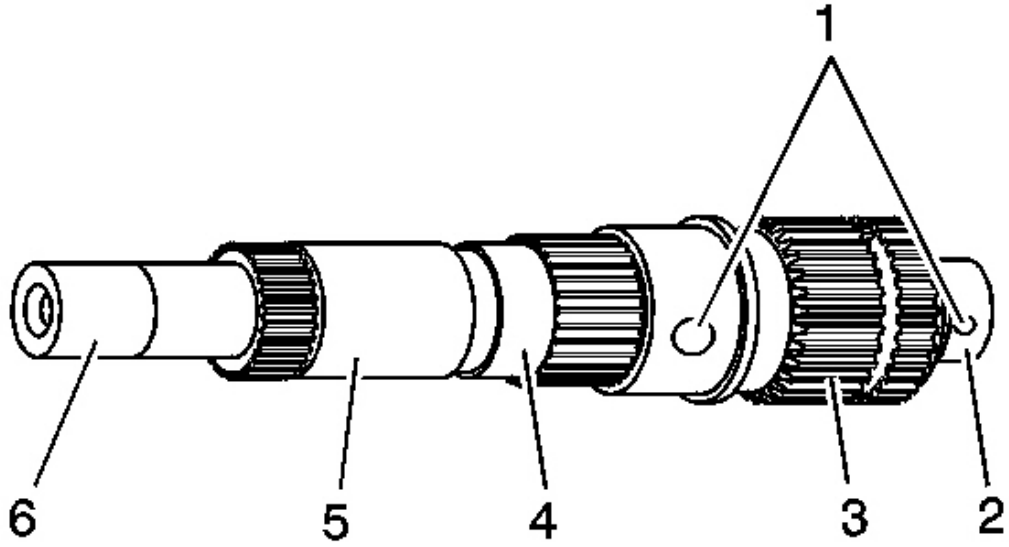


Fig. 98: Front Support Bearing, Drive Gear Bushing, Front Sun Gear & Rear Support Bushing
Courtesy of GENERAL MOTORS CORP.

1. Clean the mainshaft in cleaning solvent.
2. Clean the mainshaft oil galleries (1) and air dry.

IMPORTANT: Do not attempt to smooth any roughness in the bearing journals.

3. Inspect the bearing journals on the mainshaft for the following conditions:
    - The front support bearing (2)
    - The drive gear bushing (4)
    - The front sun gear (5)
    - The rear support bushing (6)
        - Scoring
        - Pitting
        - Brinelling
        - Excessive wear
4. Inspect the mainshaft range collar splines (3) for damage or excessive wear. Witness marks at the location of the gear is normal.
5. Replace the mainshaft if any of the above conditions are found.

Front Output Shaft

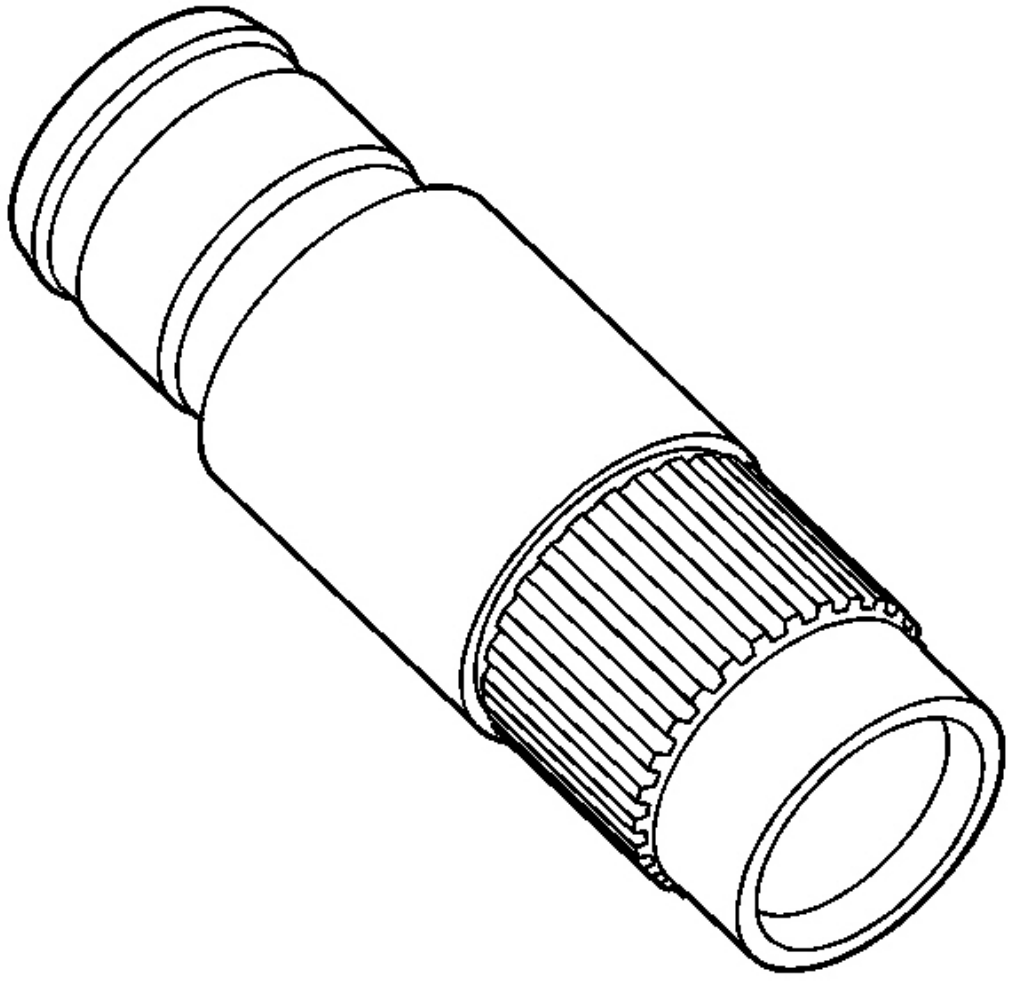


Fig. 99: Front Output Shaft
Courtesy of GENERAL MOTORS CORP.

1. Clean the front output shaft in cleaning solvent and air dry.
2. Inspect for spun bearings at the front output shaft bearing areas.
3. Inspect the front output internal splines and driven gear splines for damage or excessive wear.
4. Replace the front output shaft if it is damaged.
5. Inspect the cup plug in the front output shaft for leaking.
6. Replace the cup plug if it is leaking. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

Rear Output Shaft

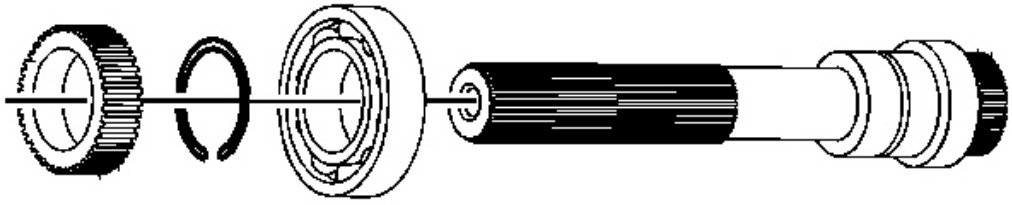


Fig. 100: Rear Output Shaft
Courtesy of GENERAL MOTORS CORP.

1. Clean the rear output shaft with rear output shaft bearing in cleaning solvent.
2. Air dry, and ensure all solvent is removed from the bearing.
3. Inspect the speed reluctor wheel for damage.
4. Replace the speed reluctor wheel if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
5. Inspect the rear output shaft bearing for the following conditions:
   - Scoring
   - Pitting
   - Brinelling
   - Excessive wear
6. Replace the rear output shaft bearing if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
7. Inspect the mainshaft rear support bushing for the following conditions:
   - Pitted
   - Wear
   - Corrosion
8. Replace the mainshaft rear support bushing if any of the above conditions are found. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
9. Inspect the rear output shaft splines for wear or damage.
10. Inspect the rear output shaft bearing area for a spun bearing.
11. Replace the rear output shaft if any of the above conditions are found.

Shift System Components

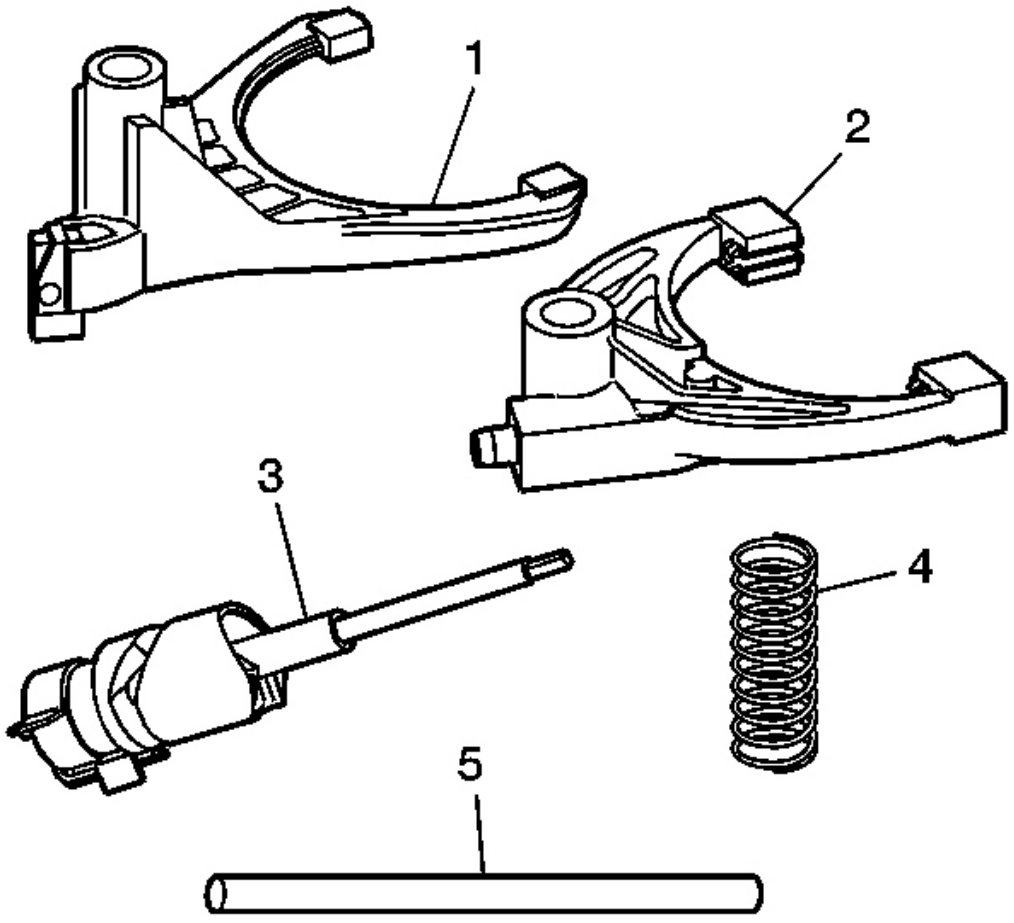


Fig. 101: Cleaning Shift System Components
Courtesy of GENERAL MOTORS CORP.

1. Clean the following shift system components in cleaning solvent and air dry.
    - The lockup mode shift fork (1)
    - The high/low range shift fork (2)
    - The shift detent lever shaft assembly (3)
    - The shift fork spring (4)
    - The shift fork shaft (5)
2. Inspect the shift fork shaft (5) for straightness and excessive wear at the shift fork locations.
3. Replace the shift fork shaft if it is not straight or if it is worn excessively.

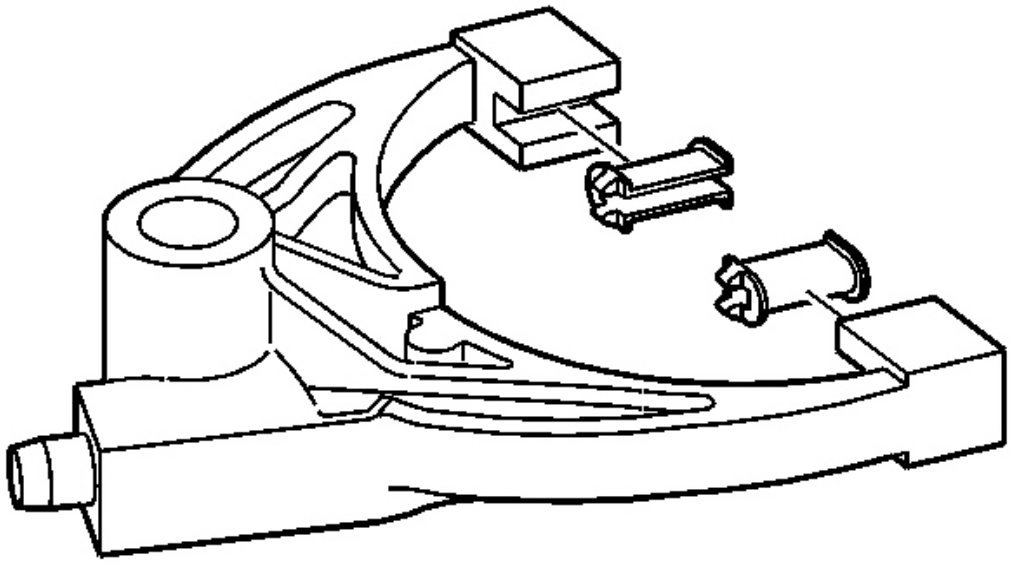


Fig. 102: Inspecting Pads On High/Low Range Shift Fork For Wear
Courtesy of GENERAL MOTORS CORP.

1. Inspect the pads on the high/low range shift fork for wear.
2. Replace the worn pads.
3. Inspect the roller on the shift fork for wear.
4. Inspect the bore for the shift fork shaft for excessive wear.
5. Replace the shift fork if the above conditions are found.

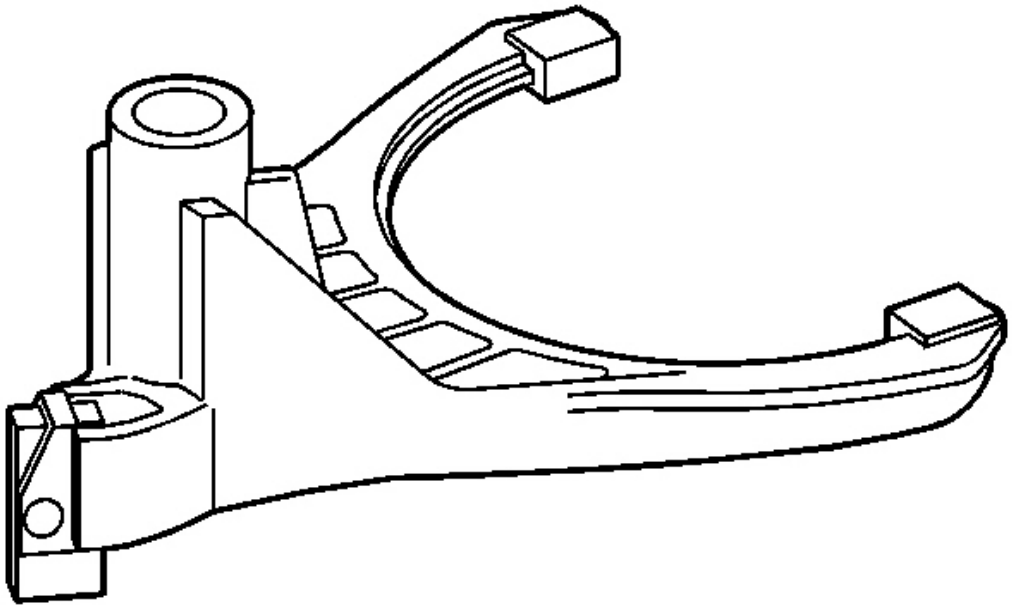


Fig. 103: Inspecting Lockup Mode Shift Fork
Courtesy of GENERAL MOTORS CORP.

1. Inspect the lockup mode shift fork for excessive wear at the lockup collar pads.
2. Inspect the lockup mode shift fork for wear at the shift detent cam follower.
3. Inspect the lockup mode shift fork for cracks.
4. Replace the lockup mode shift fork if any of the above conditions are found.

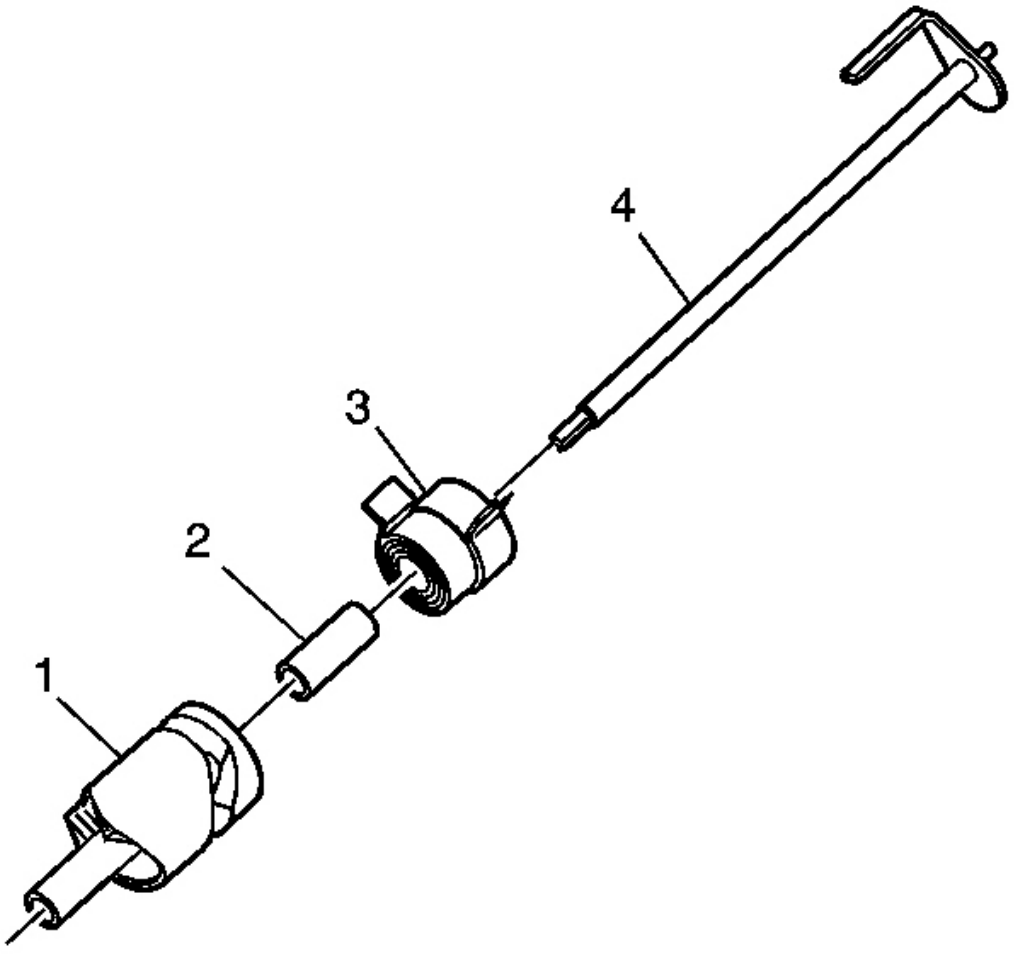


Fig. 104: Shift Detent Lever Assembly Components
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Only disassemble the shift detent lever shaft assembly if replacing a faulty component. The tip on the end of the shift detent lever shaft is used for assembly. If the tip is broken off, the shaft can still be used, but may cause problems aligning with the rear case half during the assembly procedure.

1. Inspect the shift detent lever (1) at the cam surfaces for the following conditions:
   - Roughness
   - Grooved

    - Excessive wear
2. Inspect the shift detent lever shaft (4) for the following conditions:
    - Encoder motor drive end excessively worn
    - Straightness
3. Inspect the sleeve (2) for excessive wear or for being grooved from the spring (3).
4. Inspect the spring (3) for being weak or the tabs bent.
5. Replace any of the above components if they are found to be faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

TRANSFER CASE ASSEMBLE

Tools Required

- **J 3289-20** Holding Fixture. See **Special Tools and Equipment** .
- **J 8092** Universal Driver Handle
- **J 22912-01** Split Plate Bearing Puller
- **J 36850** Transjel Lubricant. See **Special Tools and Equipment** .
- **J 42176** Universal Driver Handle - Non-Threaded. See **Special Tools and Equipment** .
- **J 42738** Seal Installer. See **Special Tools and Equipment** .
- **J 43484** Front Output Shaft Seal Installer. See **Special Tools and Equipment** .
- **J 45756** Rear Output Shaft Seal Installer. See **Special Tools and Equipment** .
- **J 45757** Mainshaft Support Bushing and Bearing Installer. See **Special Tools and Equipment** .
- **J 45759** Assembly Fixture. See **Special Tools and Equipment** .

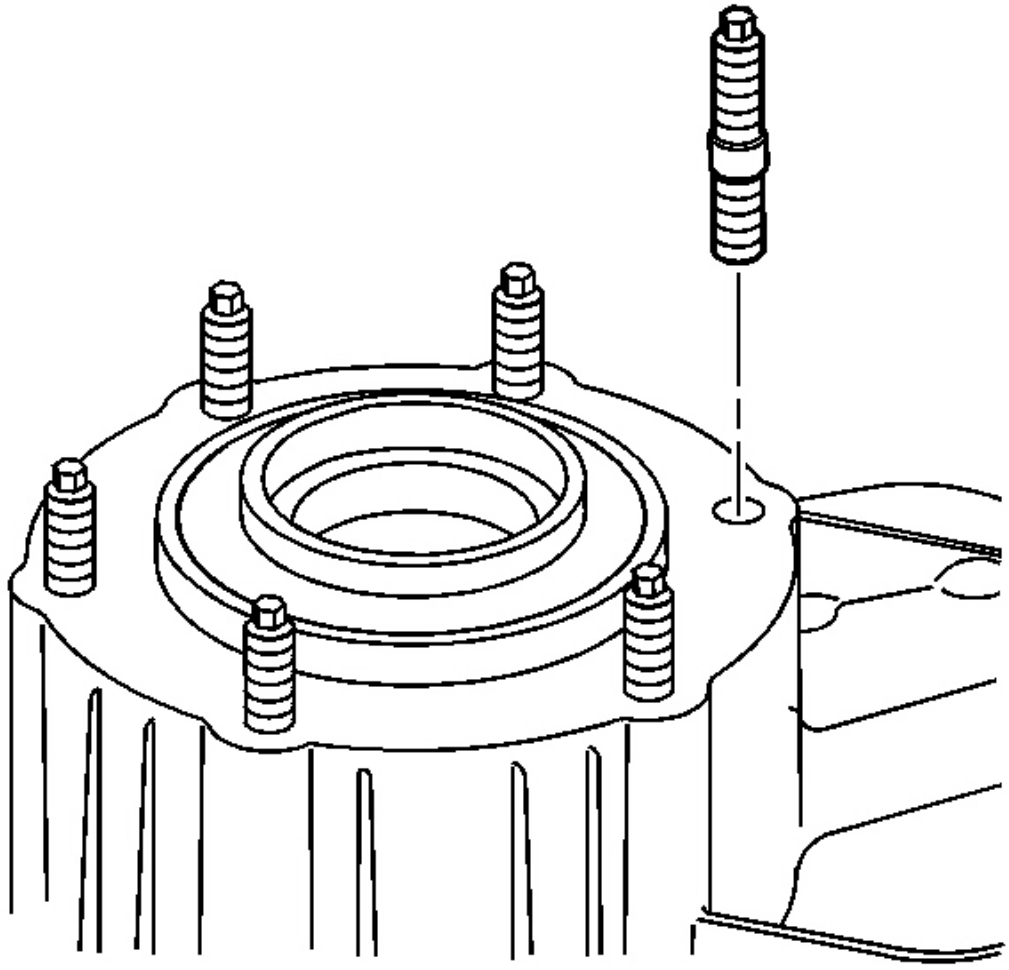


Fig. 105: Installing Transfer Case Mounting Studs (If Removed)
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

1. If removed, install the transfer case mounting studs.

   Tighten: Tighten the mounting studs to 31 N.m (23 lb ft).

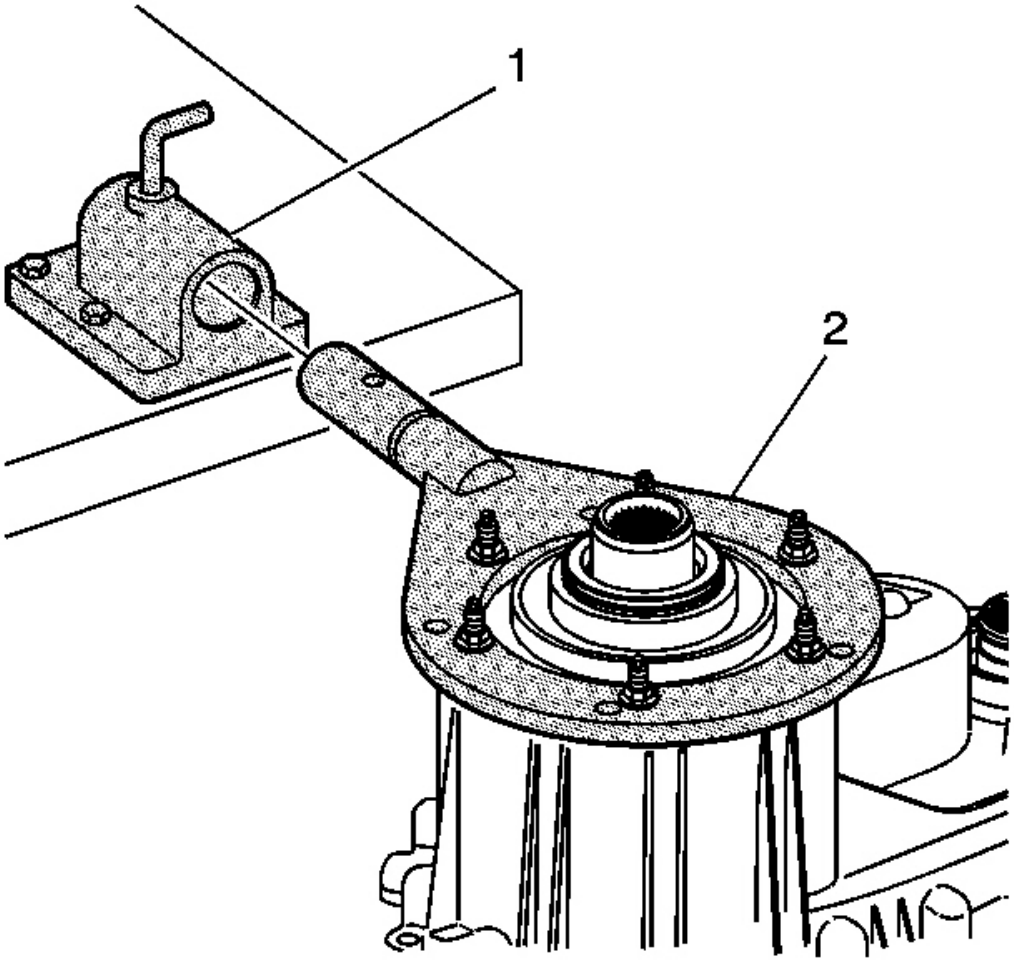


Fig. 106: View Of J 45759 & J 3289-20
Courtesy of GENERAL MOTORS CORP.

2. Using the adapter studs, attach the **J 45759** to the front transfer case. All of the assembly procedures can be performed with the case mounted to the **J 45759** . See **Special Tools and Equipment** .
3. Install the **J 45759** (2) into the **J 3289-20** (1) and secure with the pivot pin. See **Special Tools and Equipment** .

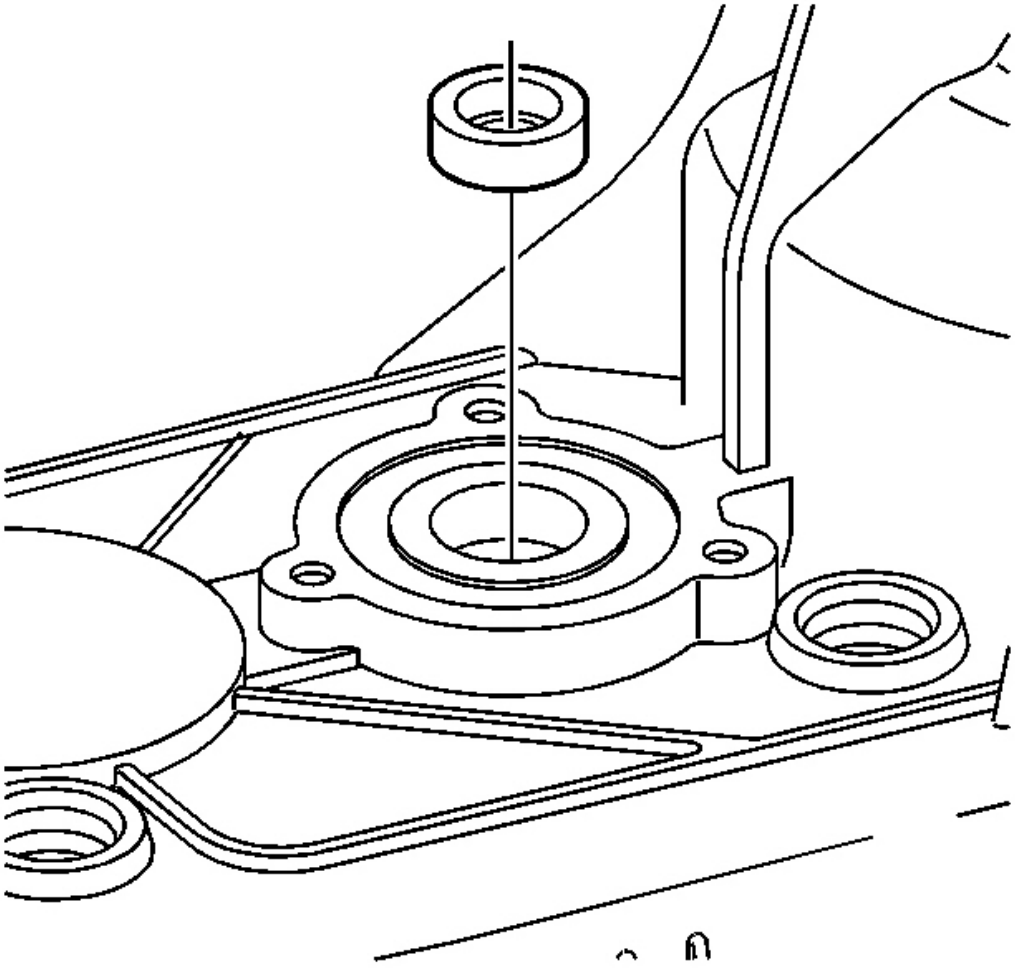


Fig. 107: Seal For Shift Detent Lever Shaft
Courtesy of GENERAL MOTORS CORP.

4. Install the seal for the shift detent lever shaft. The seal will install using hand pressure. The spring side, or opened side, of the seal faces outward.

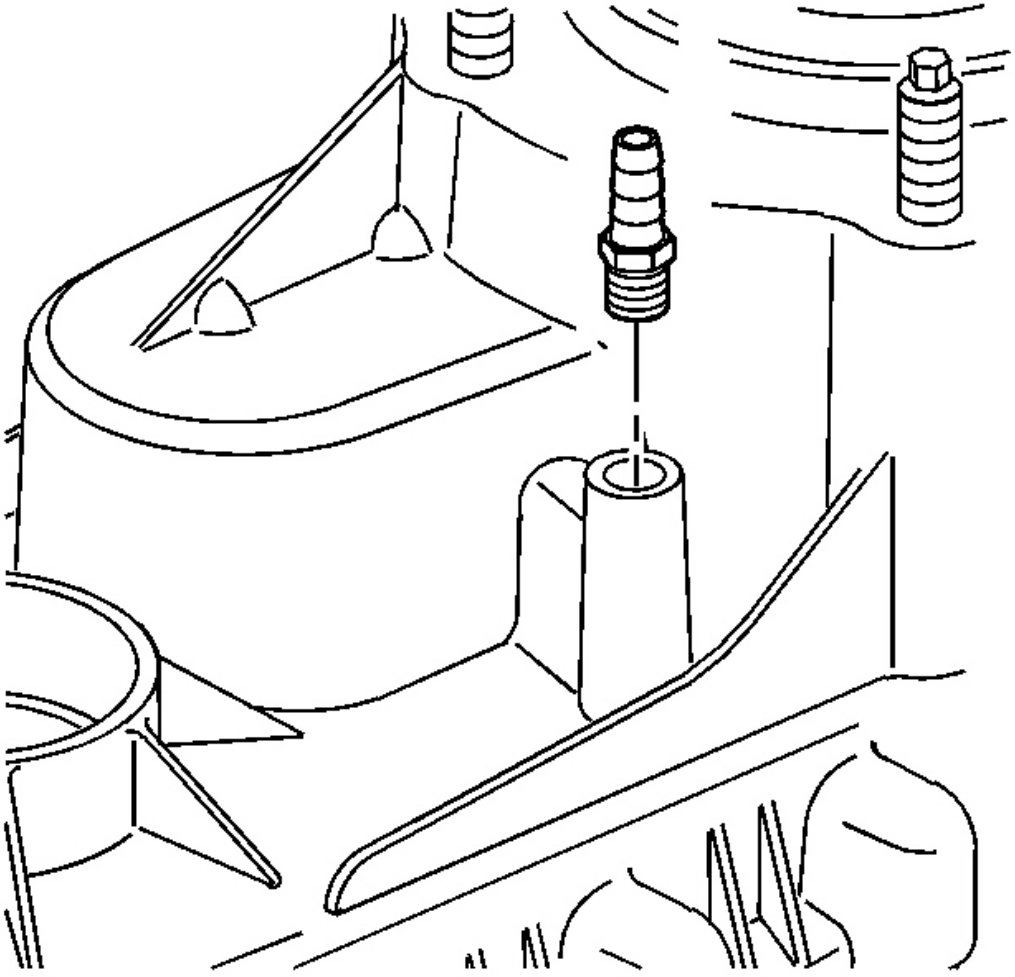


Fig. 108: Vent & Front Case Half
Courtesy of GENERAL MOTORS CORP.

5. If the vent is removed, apply pipe sealant GM P/N 12346004 (Canadian P/N 10953480) to the threads on the vent.
6. Install the vent.

Tighten: Tighten the vent to 6 N.m (53 lb in).

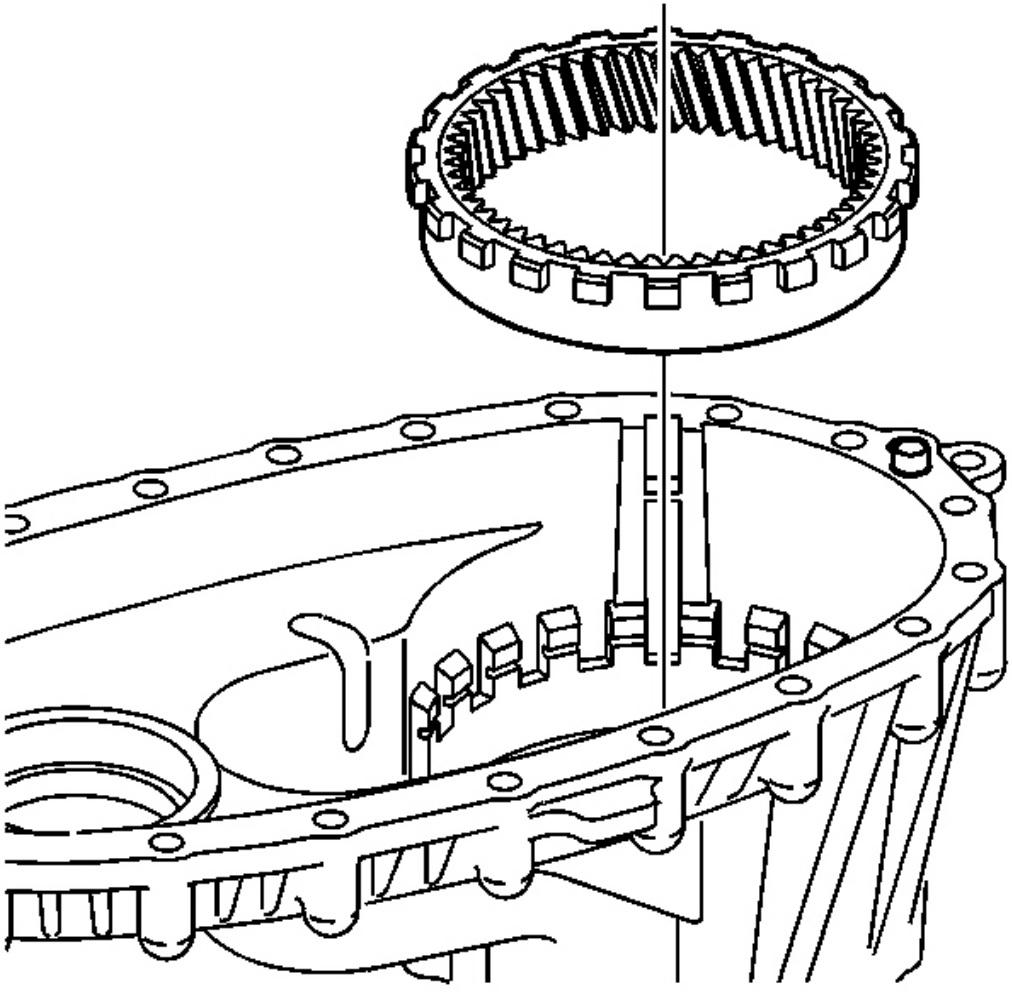


Fig. 109: Annulus Gear & Front Case Half
Courtesy of GENERAL MOTORS CORP.

7. Install the annulus gear in the front case half.

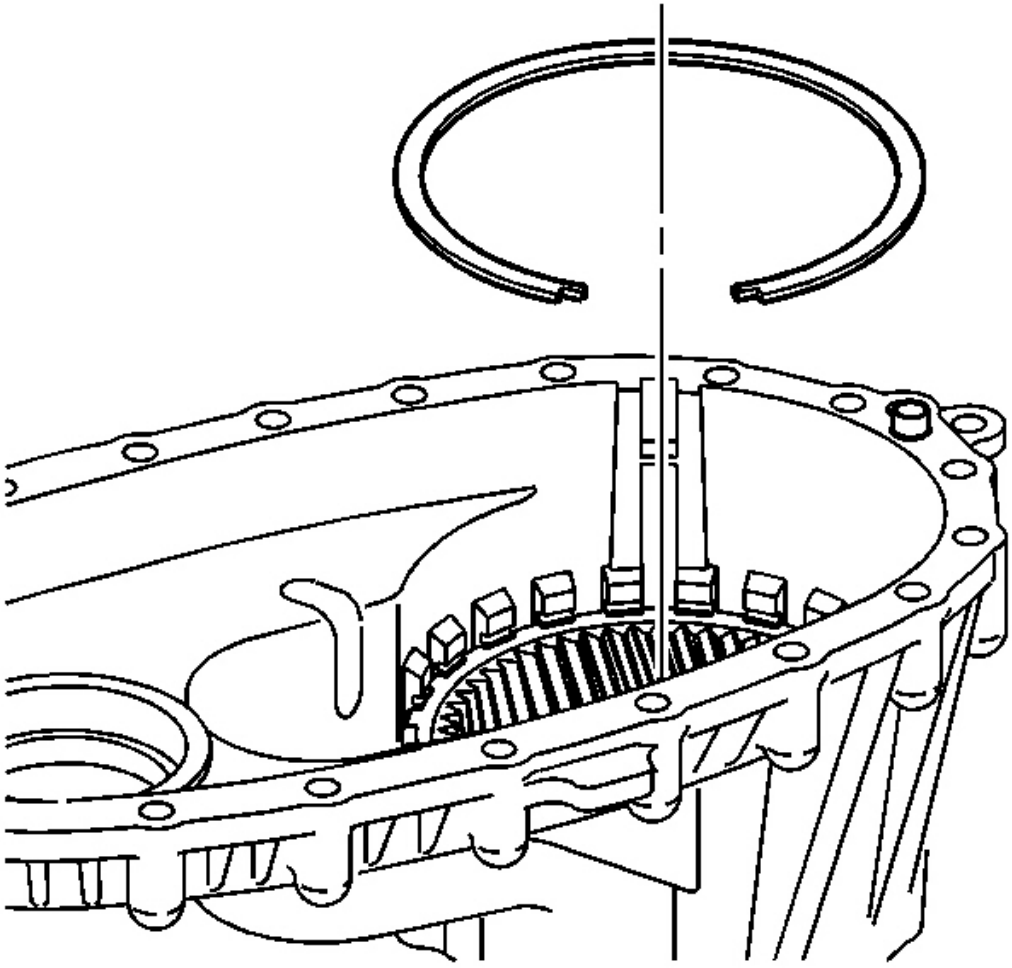


Fig. 110: Retaining Ring & Annulus Gear
Courtesy of GENERAL MOTORS CORP.

8. Install a NEW retaining ring for the annulus gear.

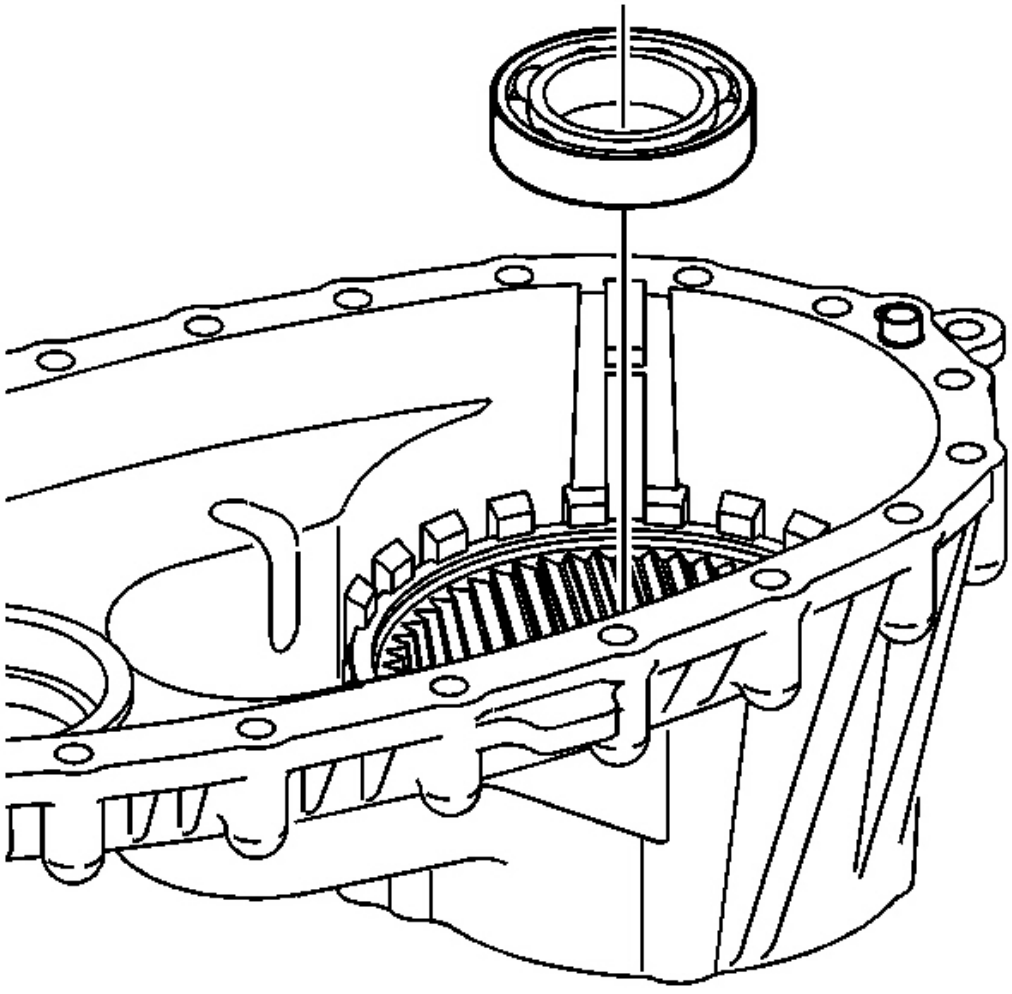


Fig. 111: Installing Input Shaft Bearing
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Lubricate all of the bearings and bearing journals with transfer case fluid during installation.

9. Install the input shaft bearing in the front case half.
    - Use a hammer and a brass drift only on the outer bearing race.
    - Ensure the bearing is kept square to the bore while installing.

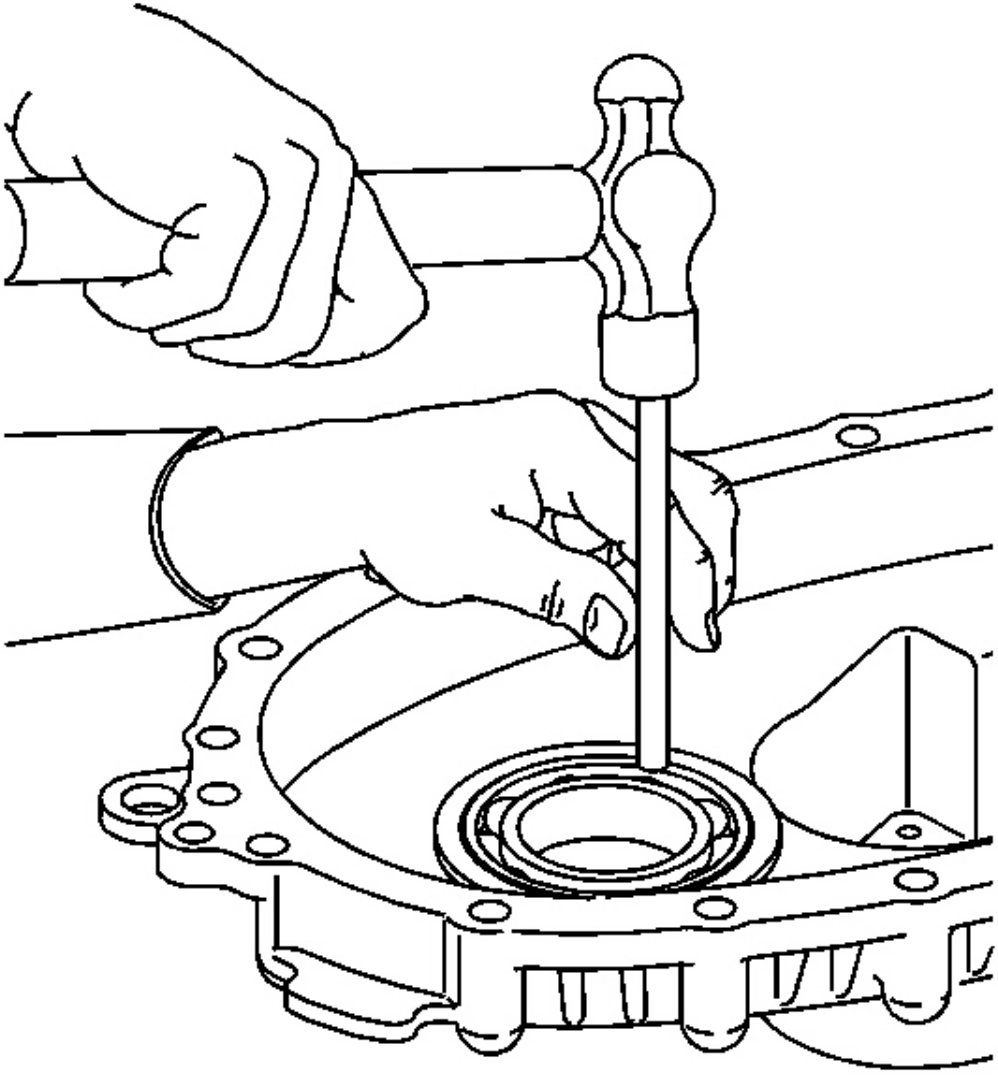


Fig. 112: Installing Front Bearing
Courtesy of GENERAL MOTORS CORP.

10. Install the front bearing for the front output shaft in the front case half.
    - Use a hammer and a brass drift only on the outer bearing race.
    - Ensure the bearing is kept square to the bore while installing.

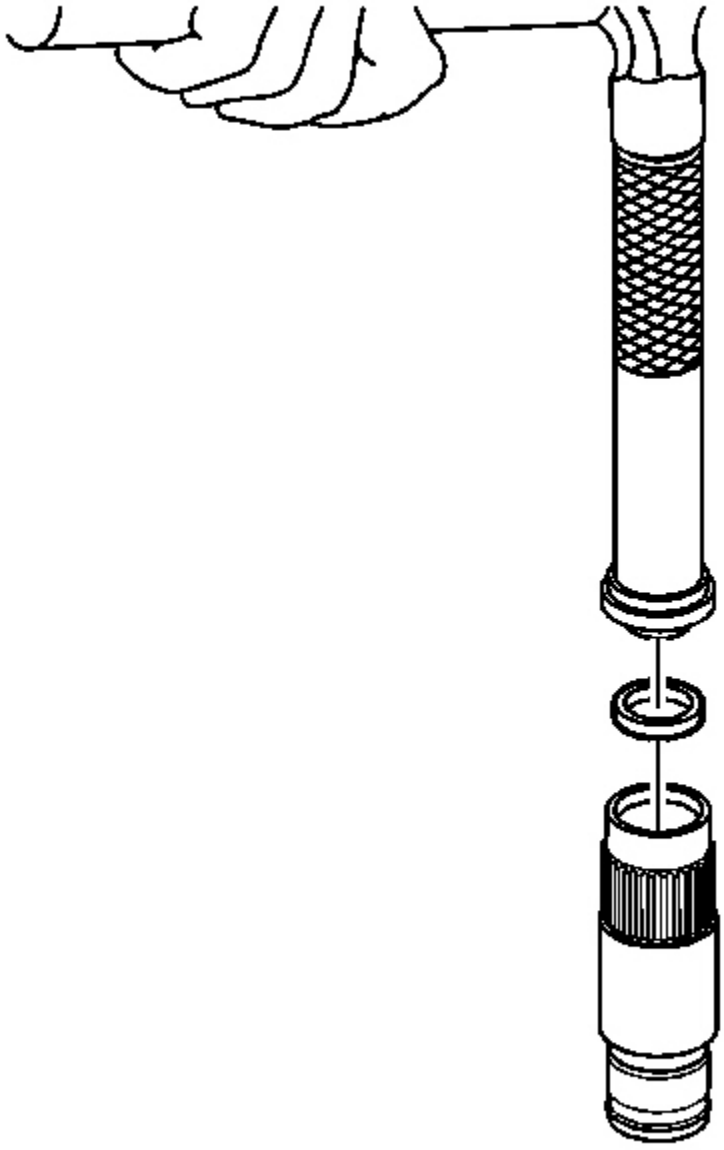


Fig. 113: Installing Cup Plug In Front Output Shaft
Courtesy of GENERAL MOTORS CORP.

11. If it is a new shaft, or if the cup plug was removed, apply threadlocker GM P/N 12345382 (Canadian P/N 10953489) to the cup plug.
12. Using a suitable driver, install the cup plug in the front output shaft. Install the cup plug 1 mm (0.039 in) from flush with the end of the shaft.

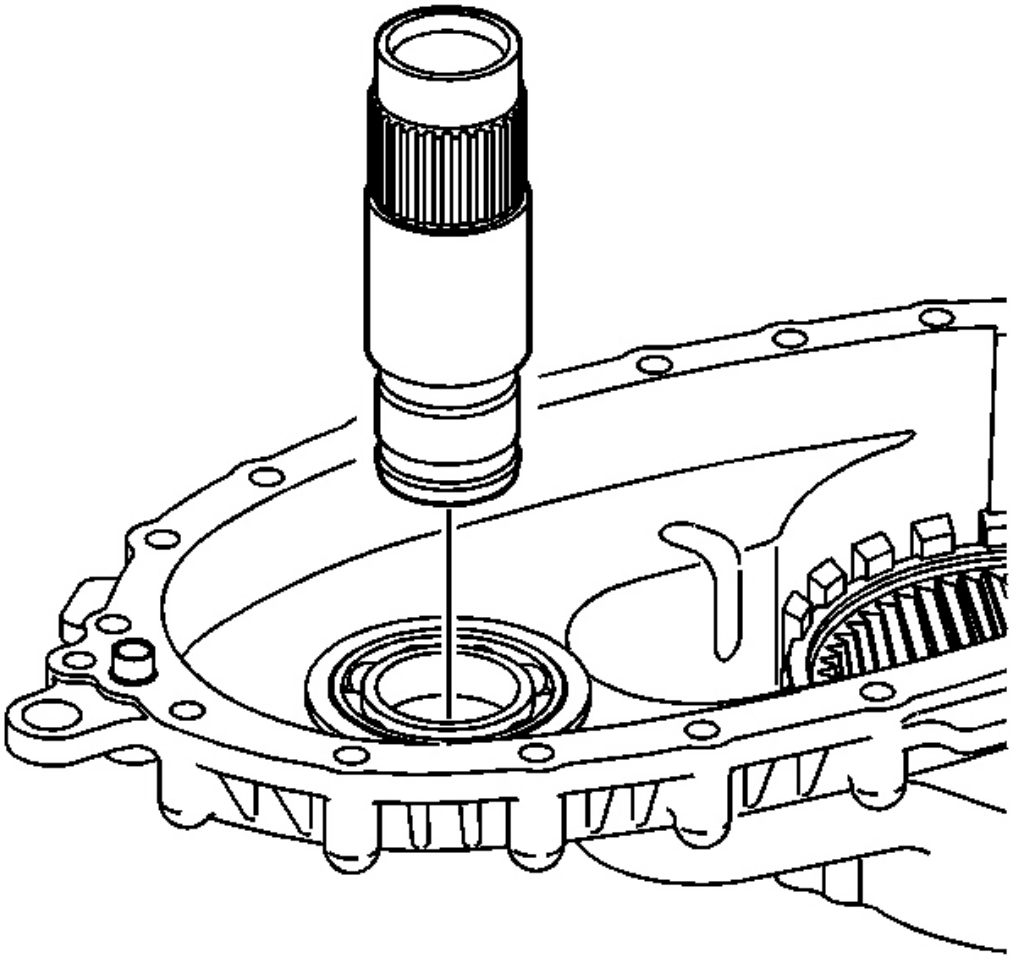


Fig. 114: Front Output Shaft Assembly
Courtesy of GENERAL MOTORS CORP.

13. Install the front output shaft assembly.

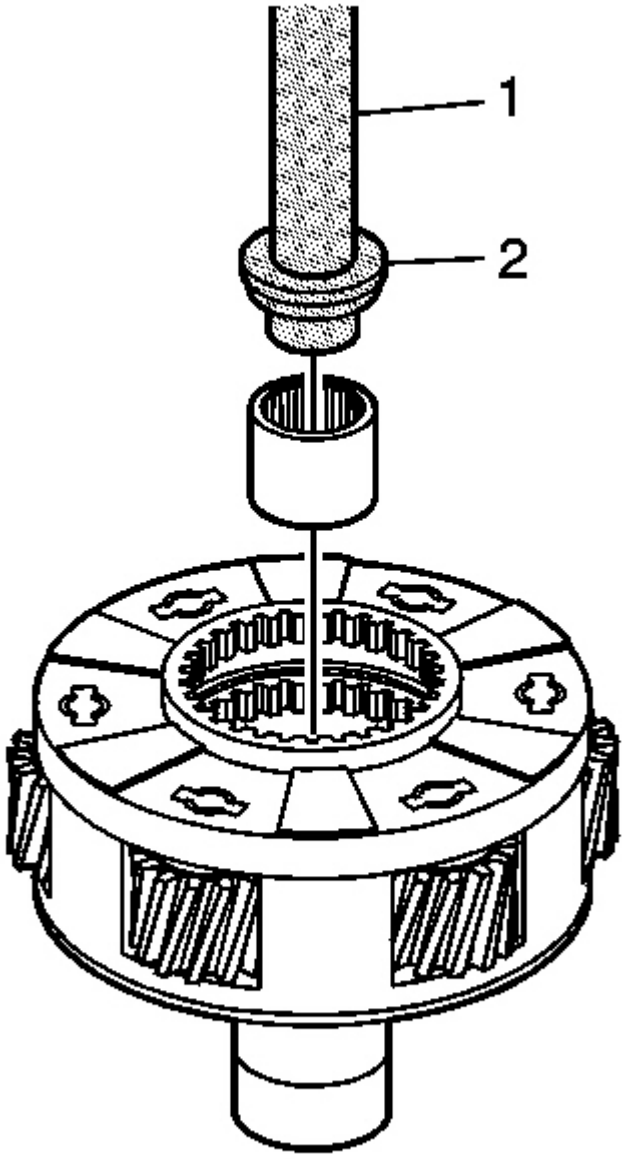


Fig. 115: Installing Mainshaft Front Support Bearing Using J 42176 & J 45757
Courtesy of GENERAL MOTORS CORP.

14. Using the **J 42176** (1) and the **J 45757** (2), install the mainshaft front support bearing in the high/low planetary carrier assembly. See **Special Tools and Equipment** .

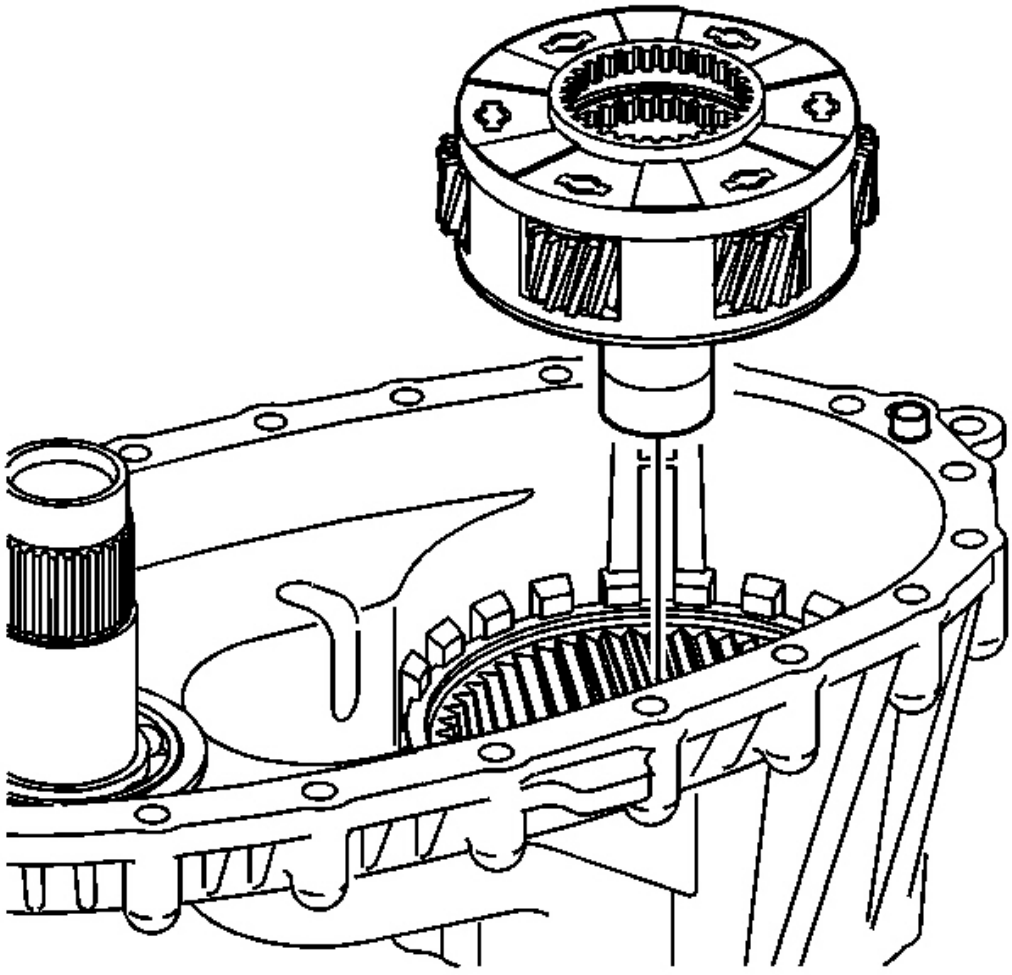


Fig. 116: High/Low Planetary Carrier
Courtesy of GENERAL MOTORS CORP.

15. Install the high/low planetary carrier.

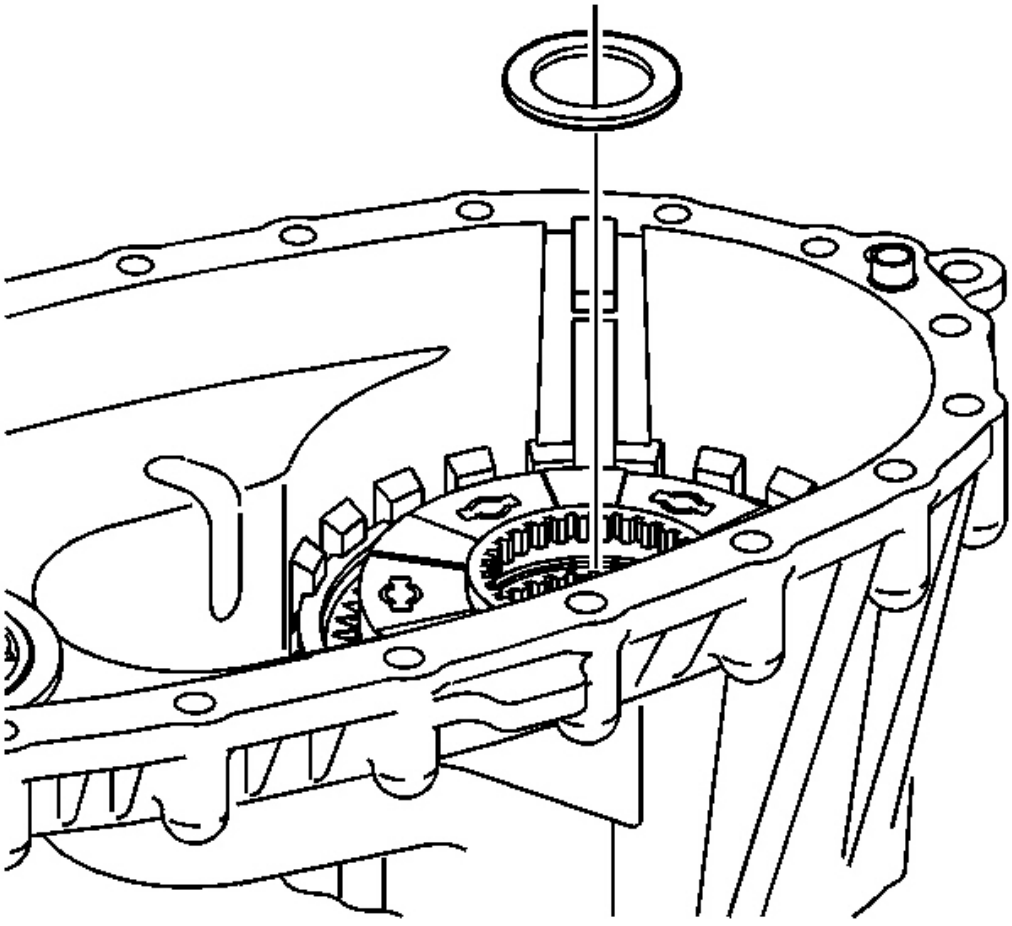


Fig. 117: Input Shaft Thrust Washer
Courtesy of GENERAL MOTORS CORP.

16. Lubricate the input shaft thrust washer with **J 36850** or equivalent. See **Special Tools and Equipment** .
17. Install the input shaft thrust washer.

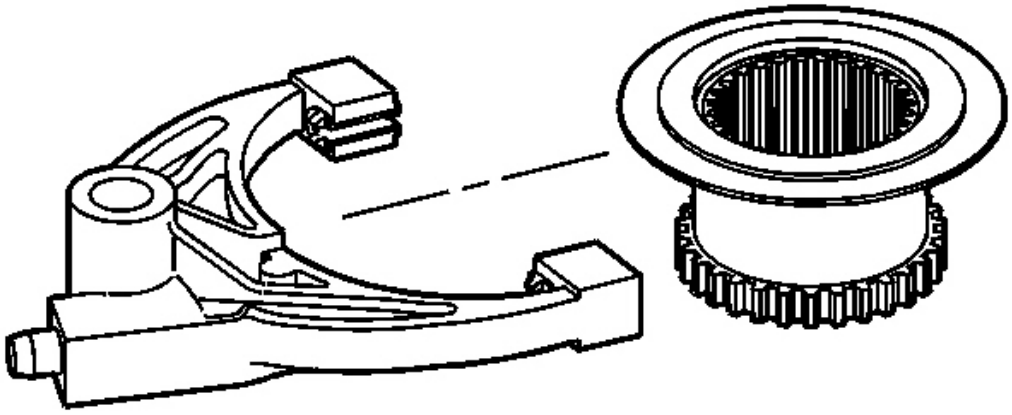


Fig. 118: Range Shift Fork Range Shift Sleeve
Courtesy of GENERAL MOTORS CORP.

18. Install new shift fork pads, if removed.
19. Install the range shift sleeve in the range fork.

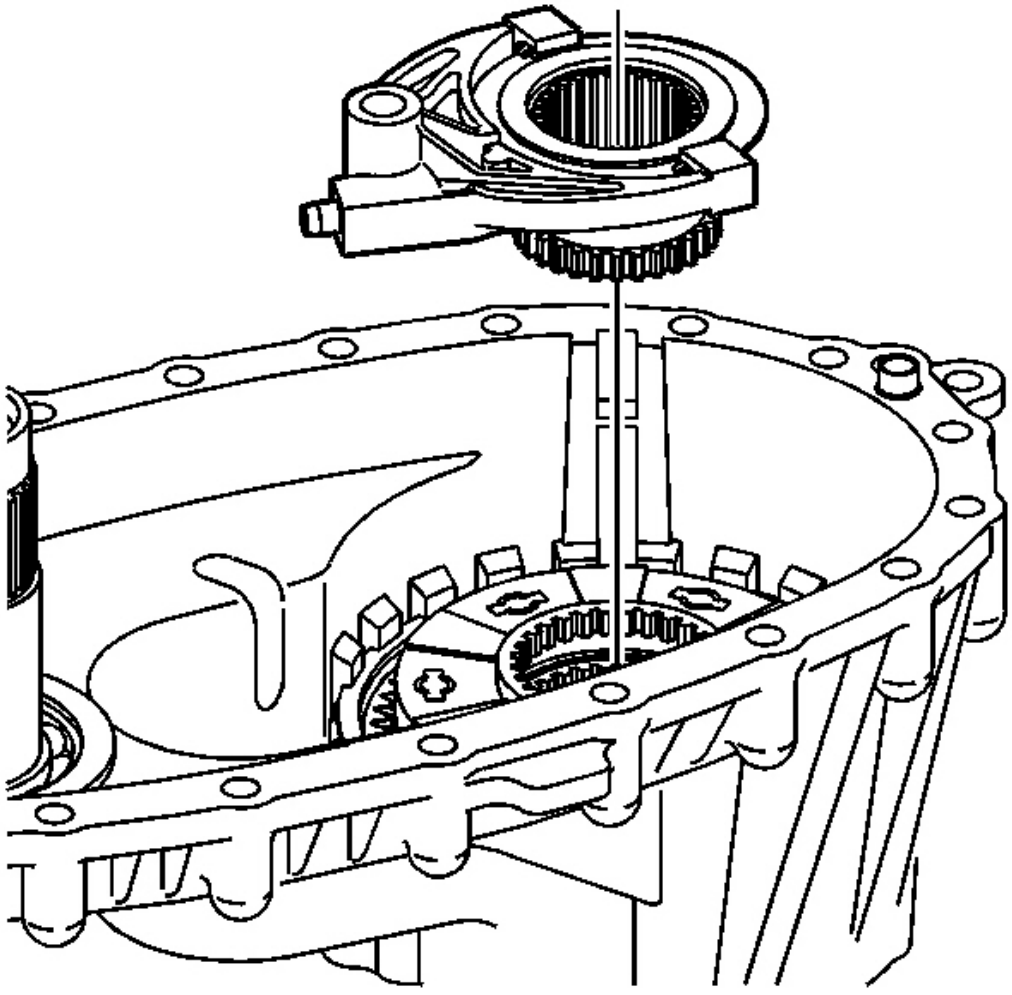


Fig. 119: High/Low Range Sleeve & High/Low Range Shift Fork
Courtesy of GENERAL MOTORS CORP.

20. Align the gear teeth on the range shift sleeve to the planetary carrier.
21. Install the range shift fork and the range shift sleeve.

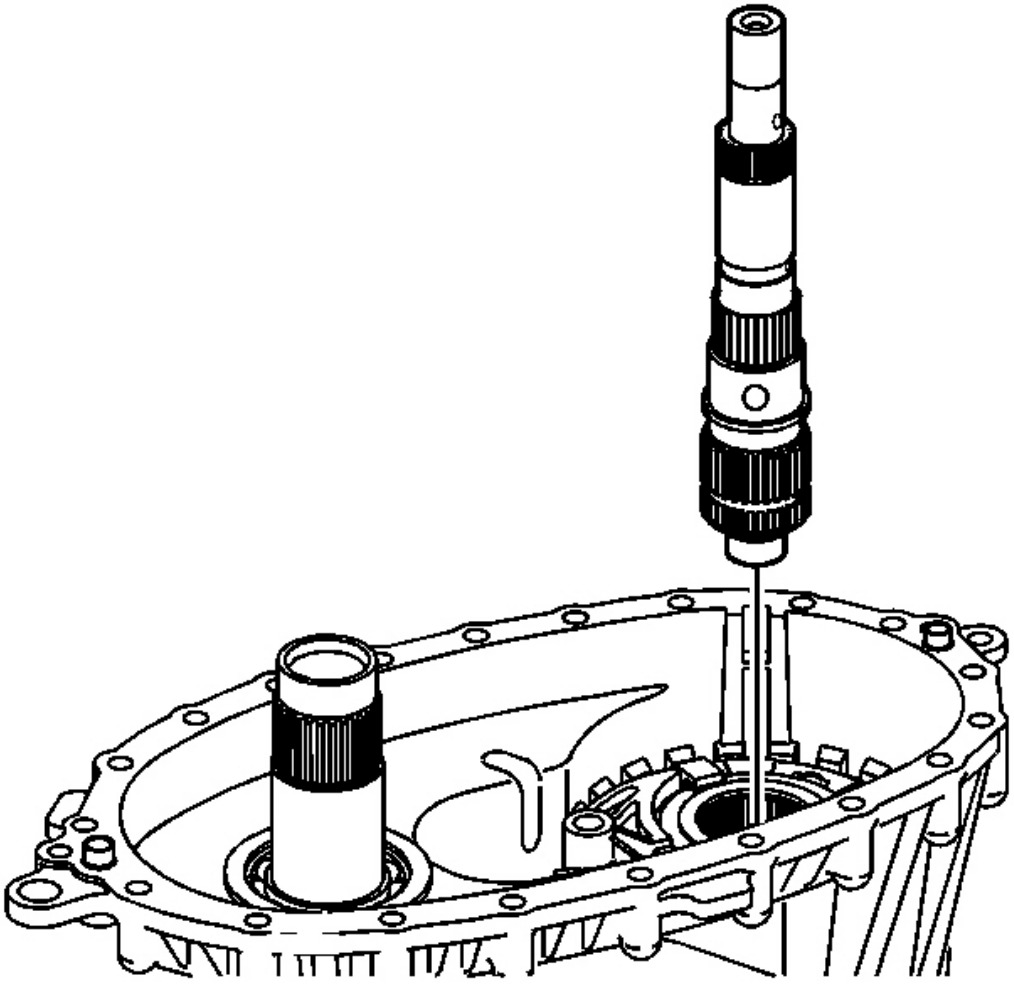


Fig. 120: Identifying Mainshaft
Courtesy of GENERAL MOTORS CORP.

22. Install the mainshaft.

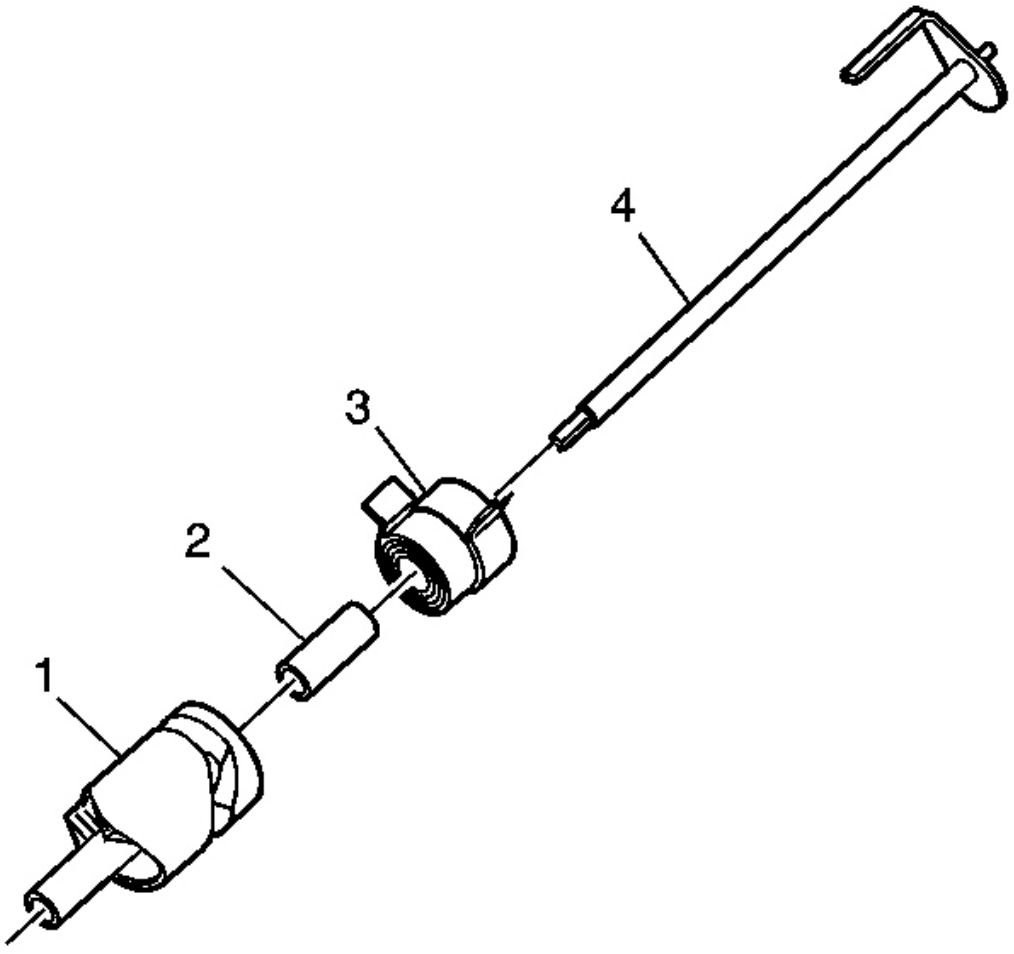


Fig. 121: Shift Detent Lever Assembly Components
Courtesy of GENERAL MOTORS CORP.

23. Assemble the shift detent lever assembly.
    1. Mount the spring (3), by one tab, in a vise.
    2. Install the sleeve (2) in the spring (3).
    3. Install the shaft (4) partially in the spring (3).
    4. Install the shift detent lever cam (1) on the shaft (4).
    5. Rotate the spring (3) and install the tab on the shift detent lever cam between the spring tabs.
    6. Finish installing the shaft, aligning the lever on the shaft between the spring tabs.

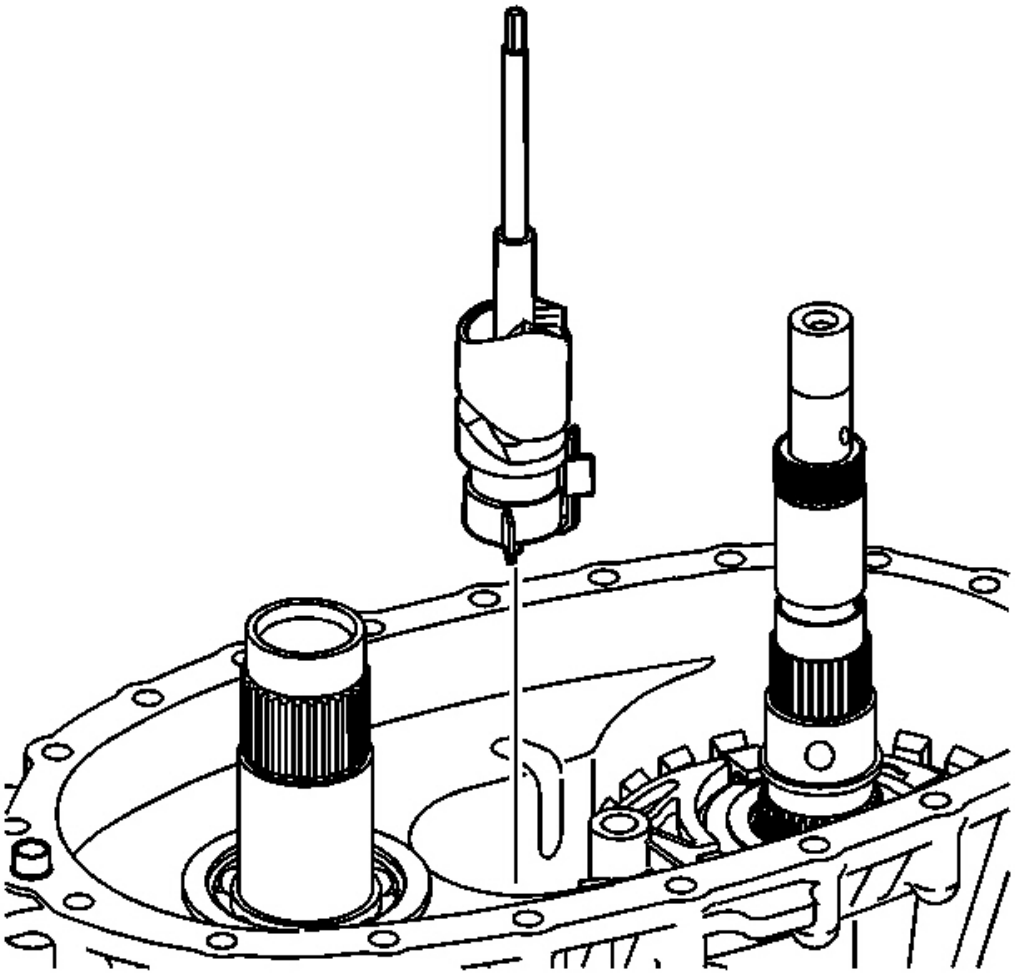


Fig. 122: Shift Detent Lever Assembly
Courtesy of GENERAL MOTORS CORP.

NOTE: In order to prevent component damage, properly remove and install the shift detent lever shaft assembly. When removing or installing the shift detent lever shaft assembly, keep the shaft straight and do not tilt. Tilting the shift detent lever shaft assembly in the transfer case housing will break the tip on the end of the shaft.

24. Install the shift detent lever assembly.
    1. Install the shift detent lever assembly straight, with the tip into the hole in the case.
    2. Rotate the high/low shift fork to position the shift fork roller in the shift detent lever slot.

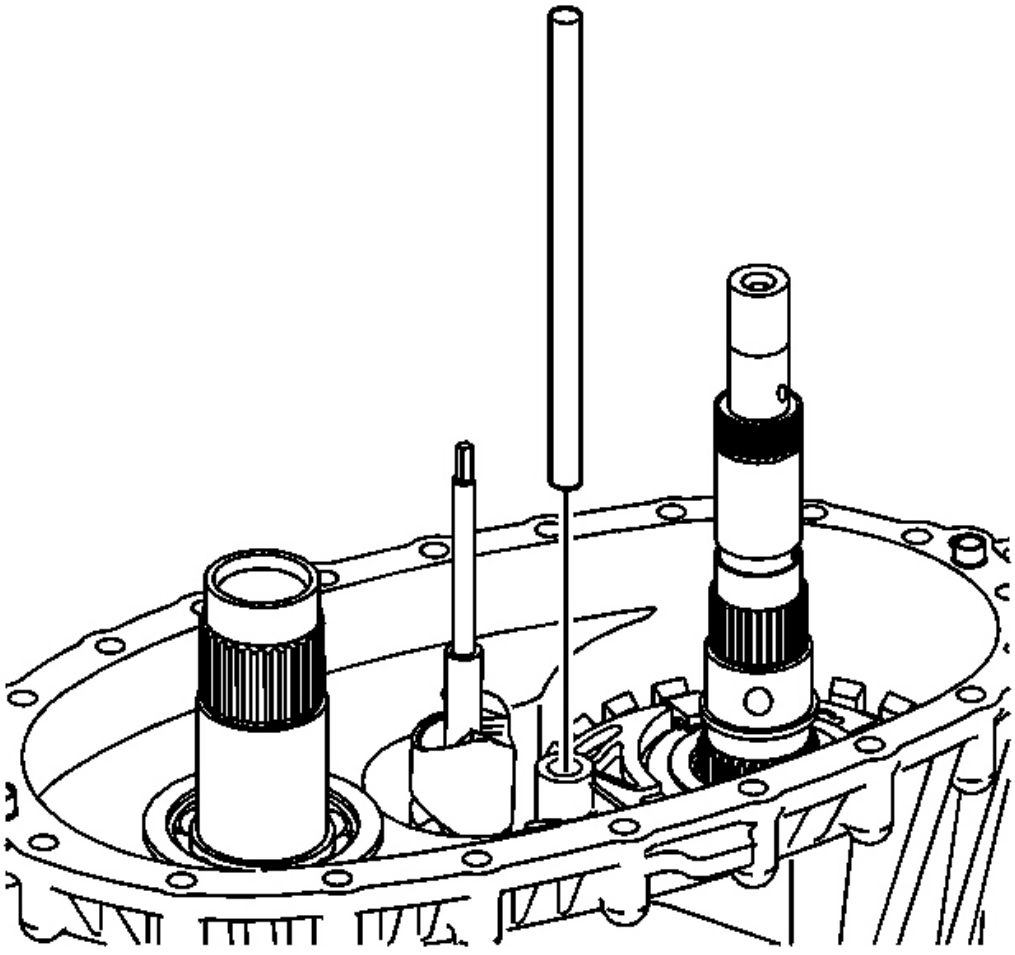


Fig. 123: Shift Fork Shaft
Courtesy of GENERAL MOTORS CORP.

25. Install the shift fork shaft.

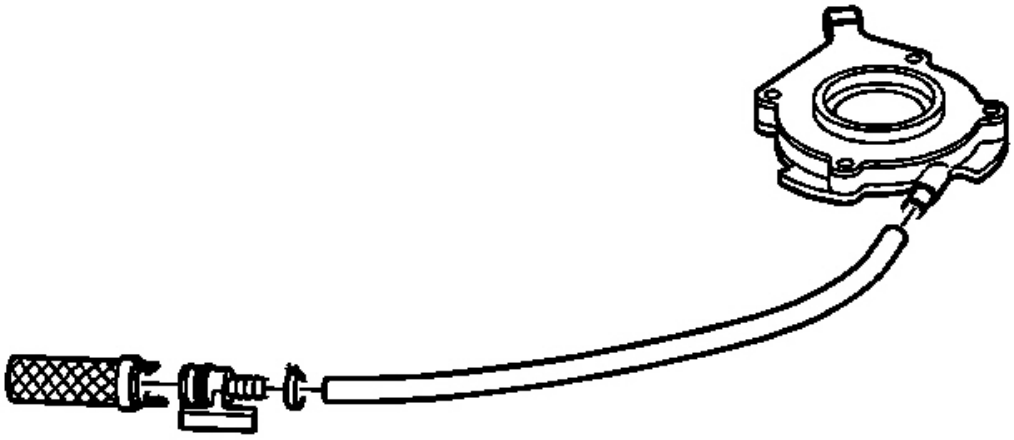


Fig. 124: Oil Pump Hose & Oil Pump Screen
Courtesy of GENERAL MOTORS CORP.

26. Connect the oil pump hose to the oil pump screen.
27. Connect the oil pump hose to the oil pump.

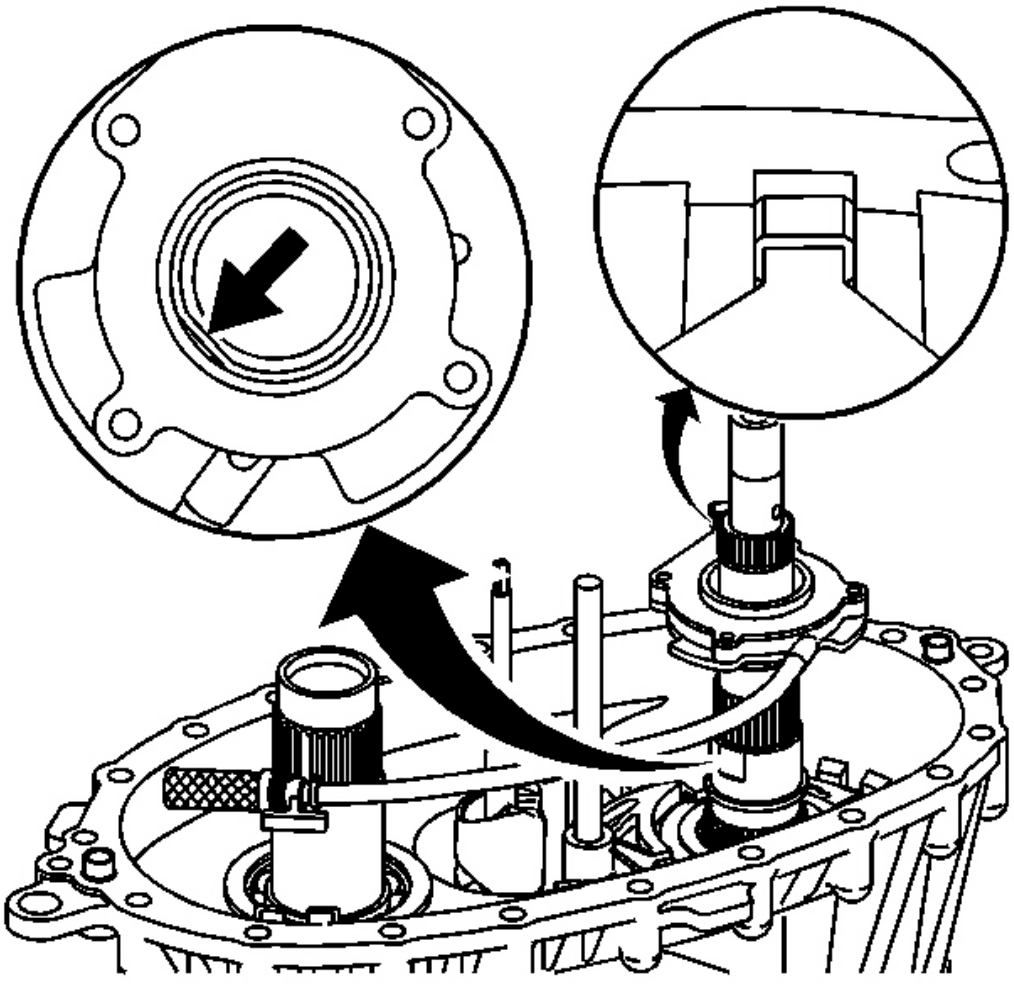


Fig. 125: Oil Pump Assembly With Hose & Screen
Courtesy of GENERAL MOTORS CORP.

28. Install the oil pump assembly with the hose and screen.
    1. Align the square boss of the oil pump gear with the flat area on the mainshaft.
    2. Install the oil pump in the slot of the front case half. Ensure the wear clip is on the oil pump.
    3. Install the oil pump screen in the front case half.

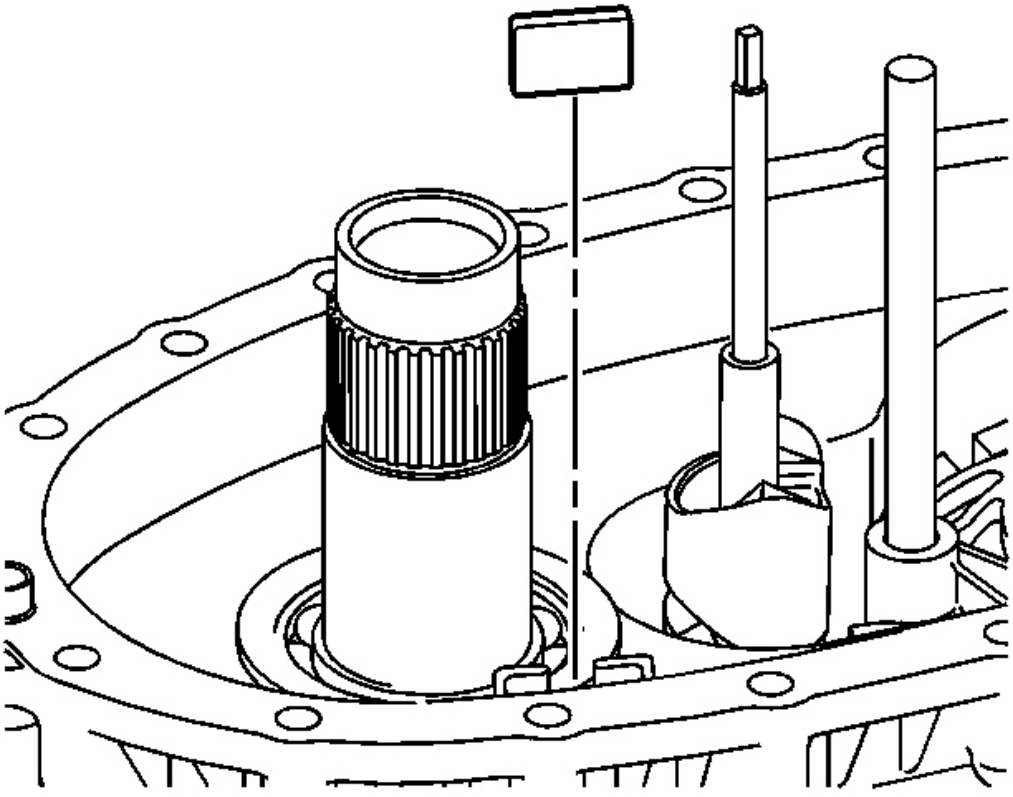


Fig. 126: View Of Magnet
Courtesy of GENERAL MOTORS CORP.

29. Install the magnet.

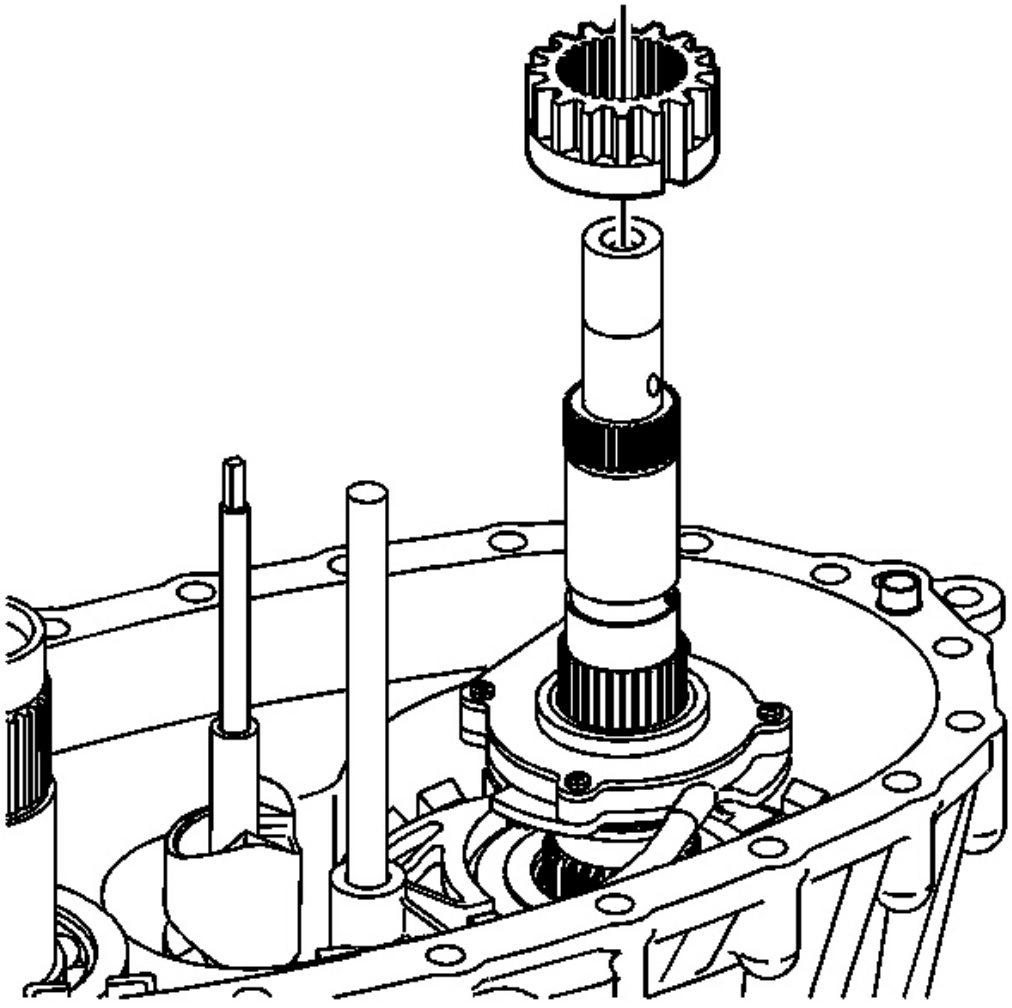


Fig. 127: Inner Lockup Hub
Courtesy of GENERAL MOTORS CORP.

30. Install the inner lockup hub.

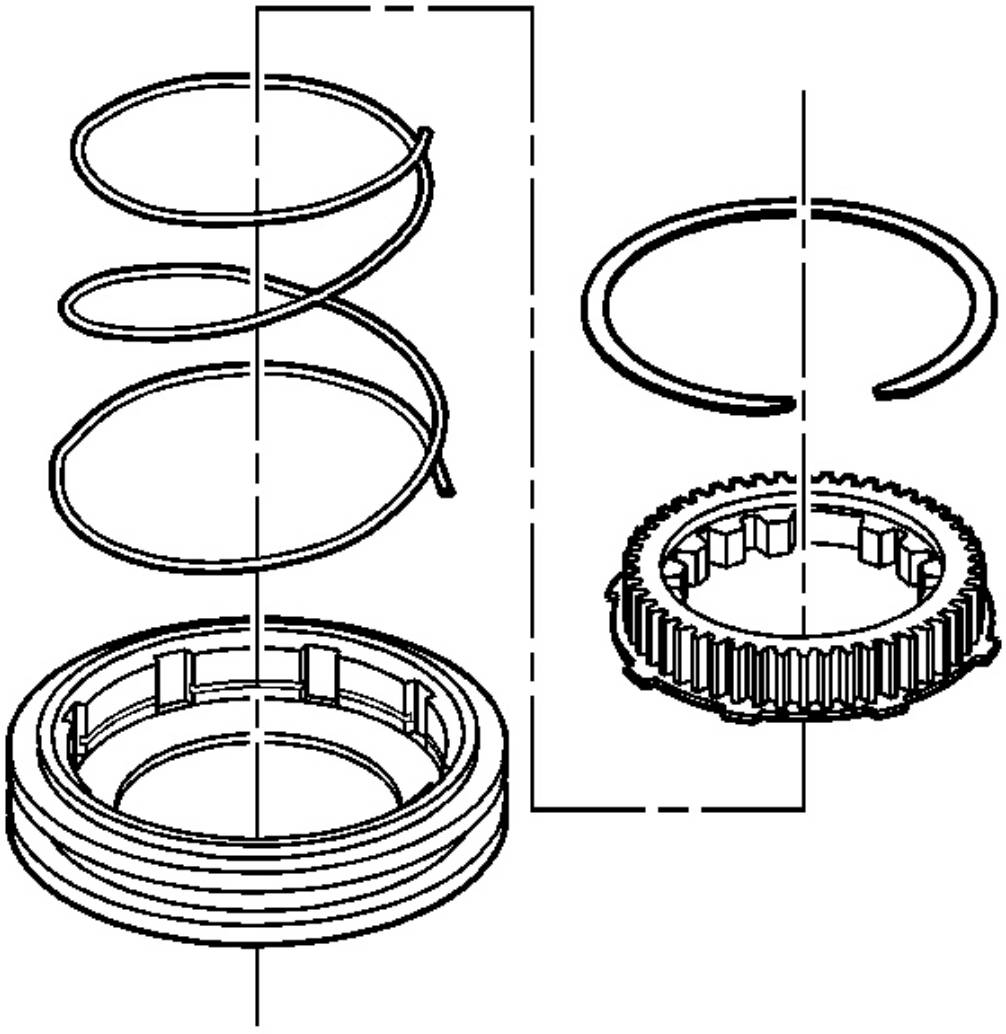


Fig. 128: Lockup Shift Assembly
Courtesy of GENERAL MOTORS CORP.

31. If necessary, assemble the lockup shift assembly.
    1. Install the spring in the sleeve.
    2. Install the hub, with the external tabs, towards the spring.
    3. Install the retainer ring in the sleeve.

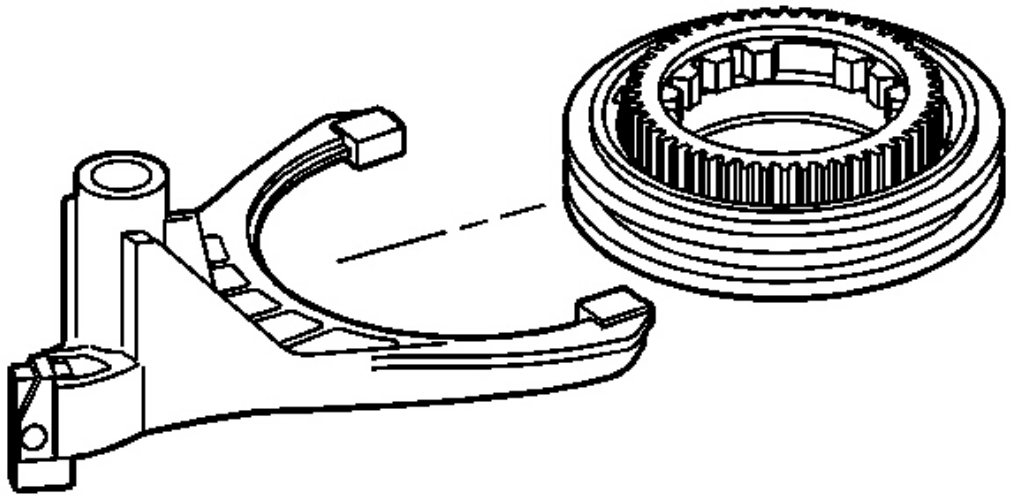


Fig. 129: Lockup Mode Shift Fork & Lockup Shift Assembly
Courtesy of GENERAL MOTORS CORP.

32. Install the lockup mode shift fork to the lockup shift assembly.

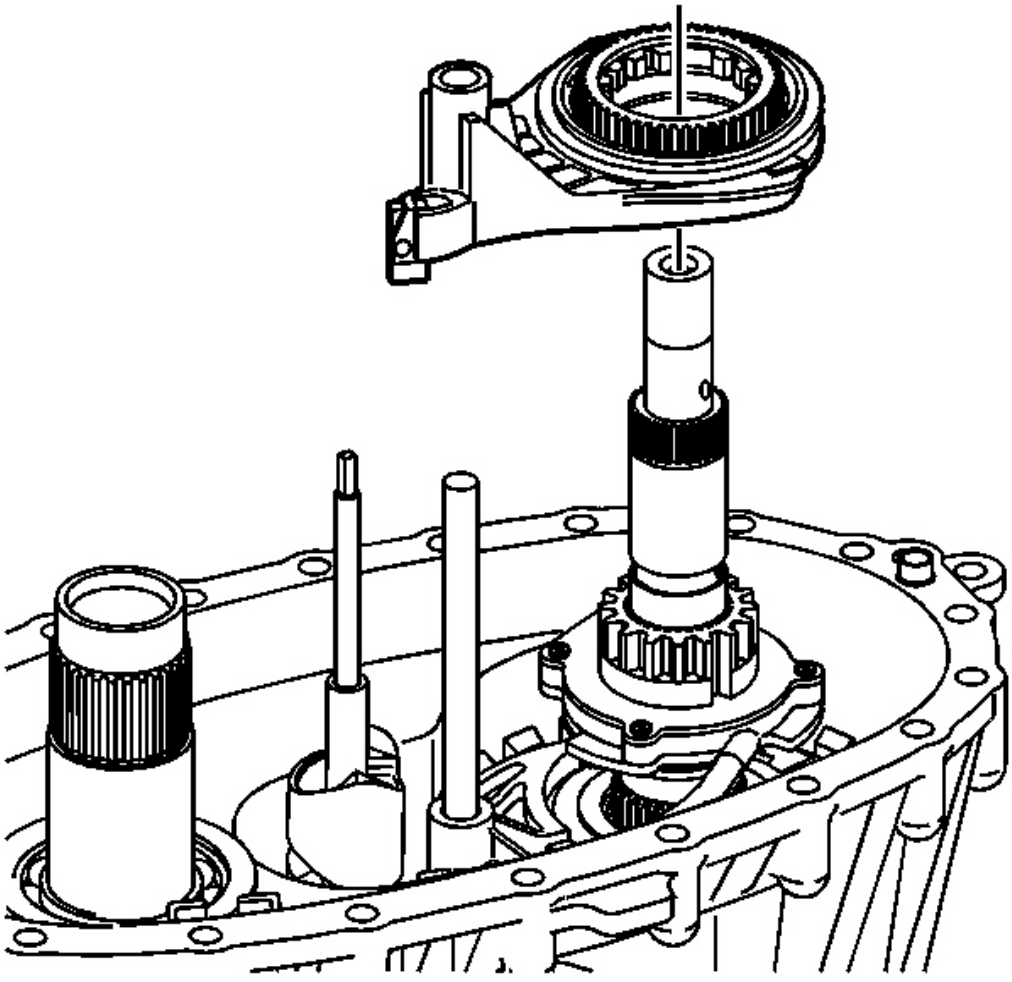


Fig. 130: Lockup Shift Assembly & Lockup Mode Shift Fork
Courtesy of GENERAL MOTORS CORP.

33. Install the lockup shift assembly and lockup mode shift fork.
    - Slide the shift fork over the shift fork shaft.
    - Turn the mainshaft to align the slot on the inner lockup hub with the large tooth area on the lockup shift assembly hub.

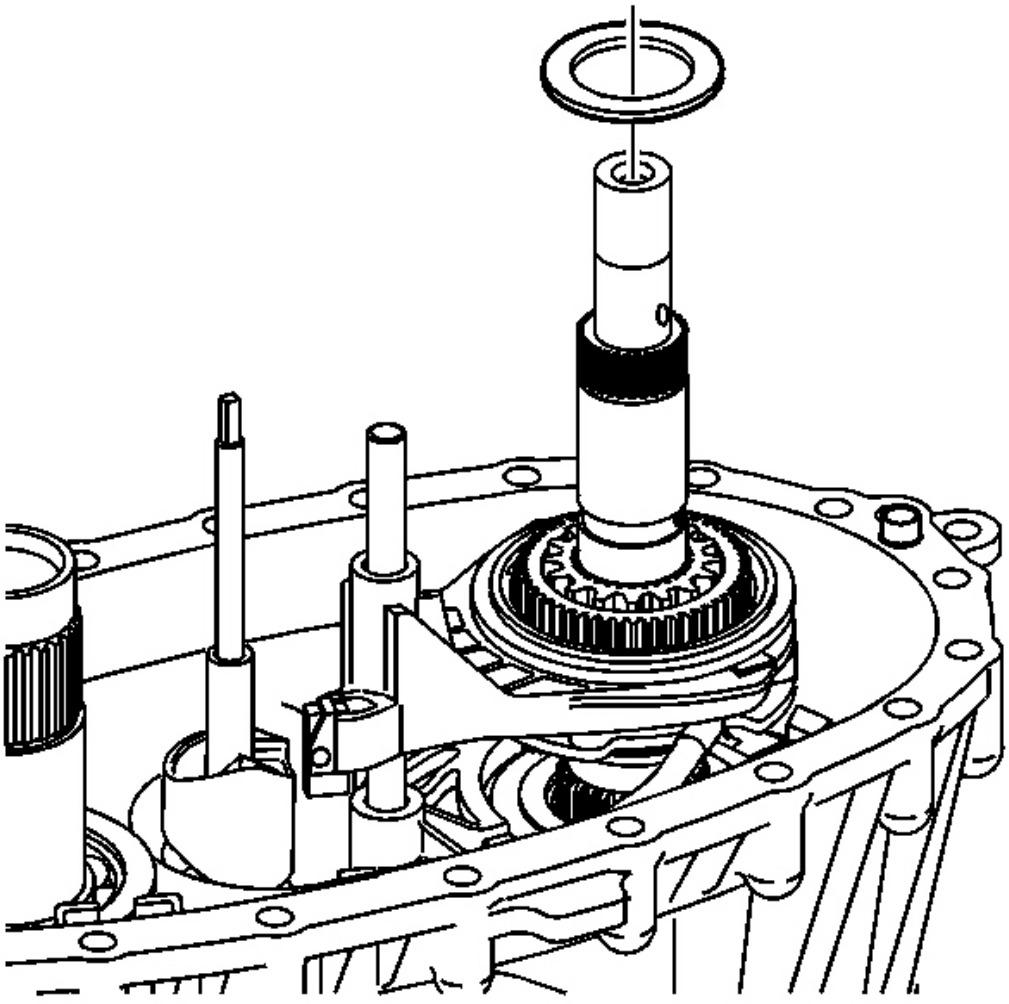


Fig. 131: Drive Sprocket Thrust Washer
Courtesy of GENERAL MOTORS CORP.

34. Lubricate the drive sprocket thrust washer with **J 36850** or equivalent. See **Special Tools and Equipment** .
35. Install the drive sprocket thrust washer.

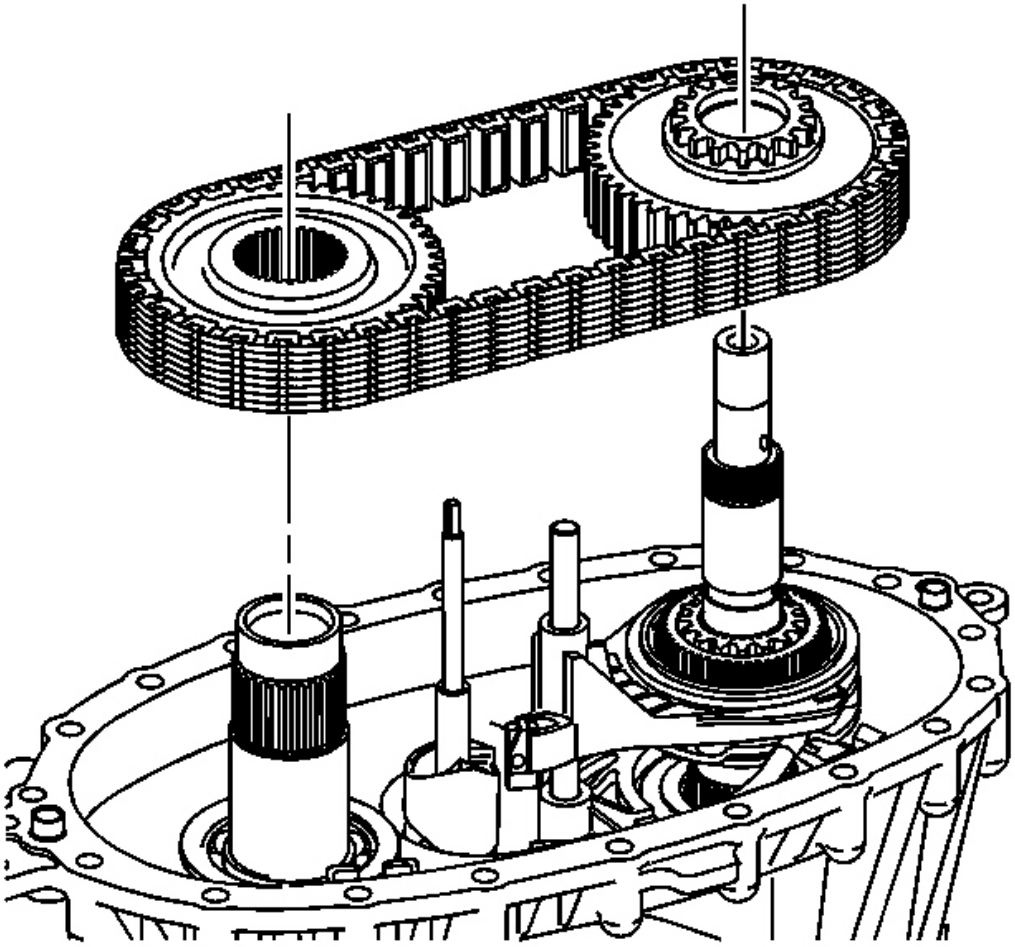


Fig. 132: Drive Chain & Sprockets
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: If using the chain and sprockets again, ensure to align the marks of the drive chain and sprockets.

36. Install the drive chain and sprockets.
    - The blue link on the chain faces up.
    - Align the drive sprocket engagement teeth with the lockup shift assembly hub teeth.

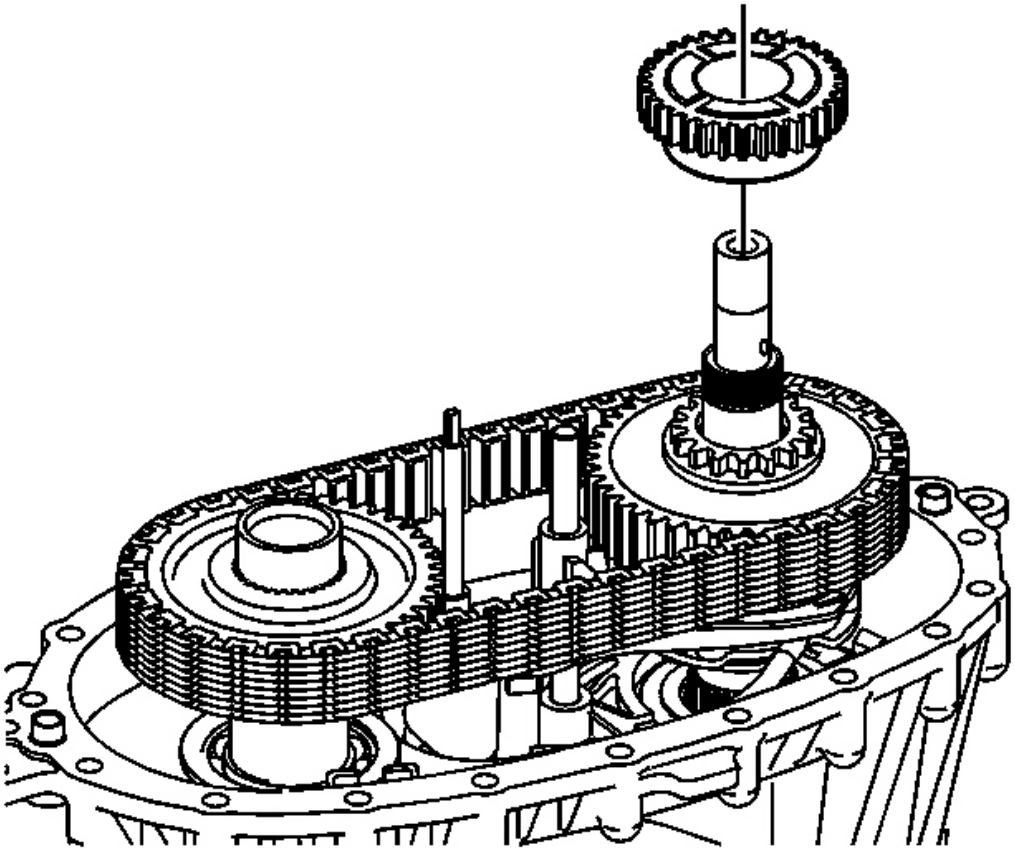


Fig. 133: Front Sun Gear
Courtesy of GENERAL MOTORS CORP.

37. Install the front sun gear.

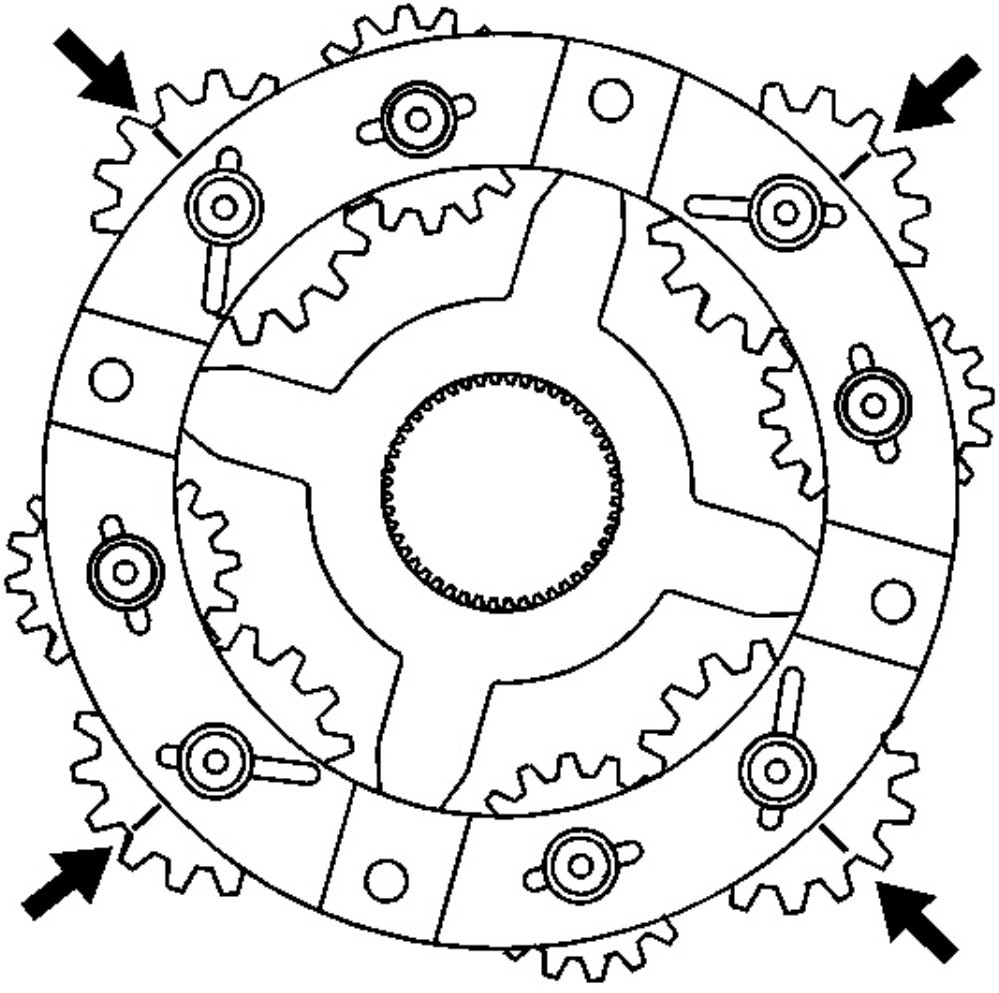


Fig. 134: Aligning Marks On Pinion Gears
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: or
The planetary differential gears are timed to the sun gears. If the gears are not timed properly, the differential will not rotate without binding.

38. With the rear side of the planetary differential facing up, align the marks on the pinion gears. Position the alignment marks with an area on the planetary differential that can be reference for all gears.

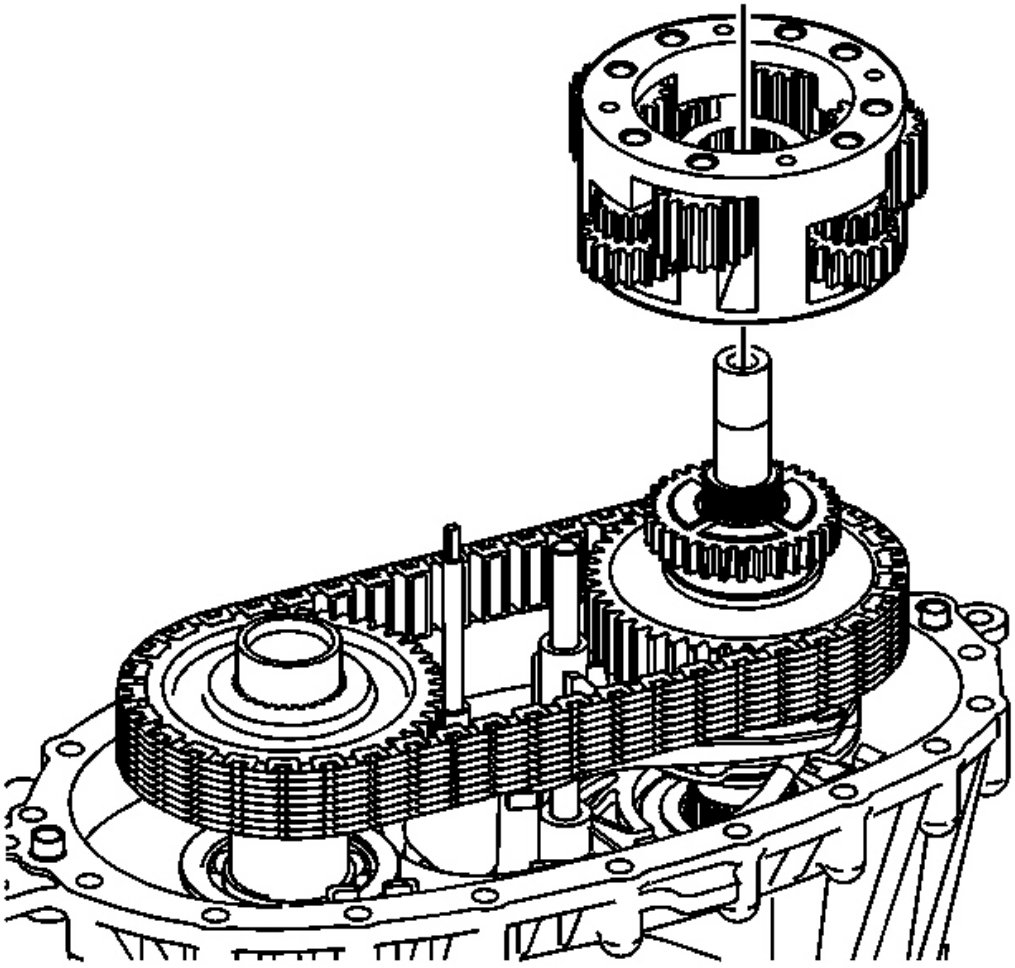


Fig. 135: Planetary Differential Assembly
Courtesy of GENERAL MOTORS CORP.

39. Install the planetary differential assembly.
    - Do not rotate the planetary differential pinion gears when installing.
    - Ensure the alignment marks are still in position.
    - The single row pinion gears face rearward, or up. The double row pinion gears face forward, or down.

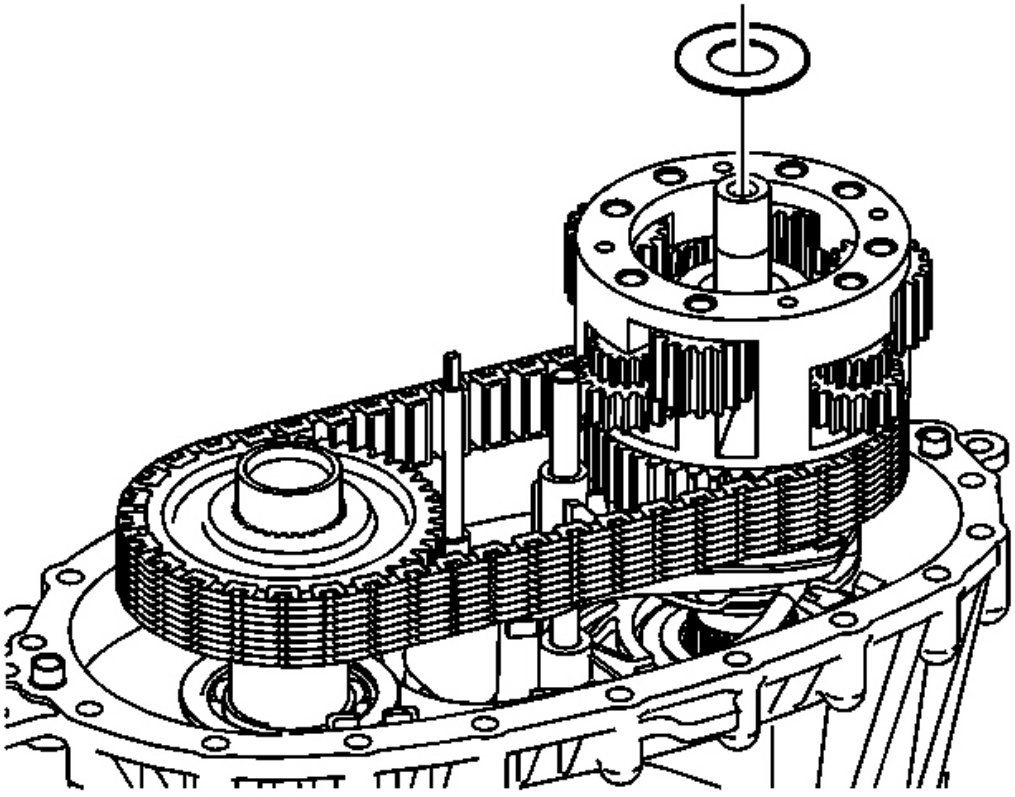


Fig. 136: Rear Output Shaft Thrust Washer
Courtesy of GENERAL MOTORS CORP.

40. Lubricate the rear output shaft thrust washer with **J 36850** or equivalent. See **Special Tools and Equipment** .
41. Install the thrust washer.

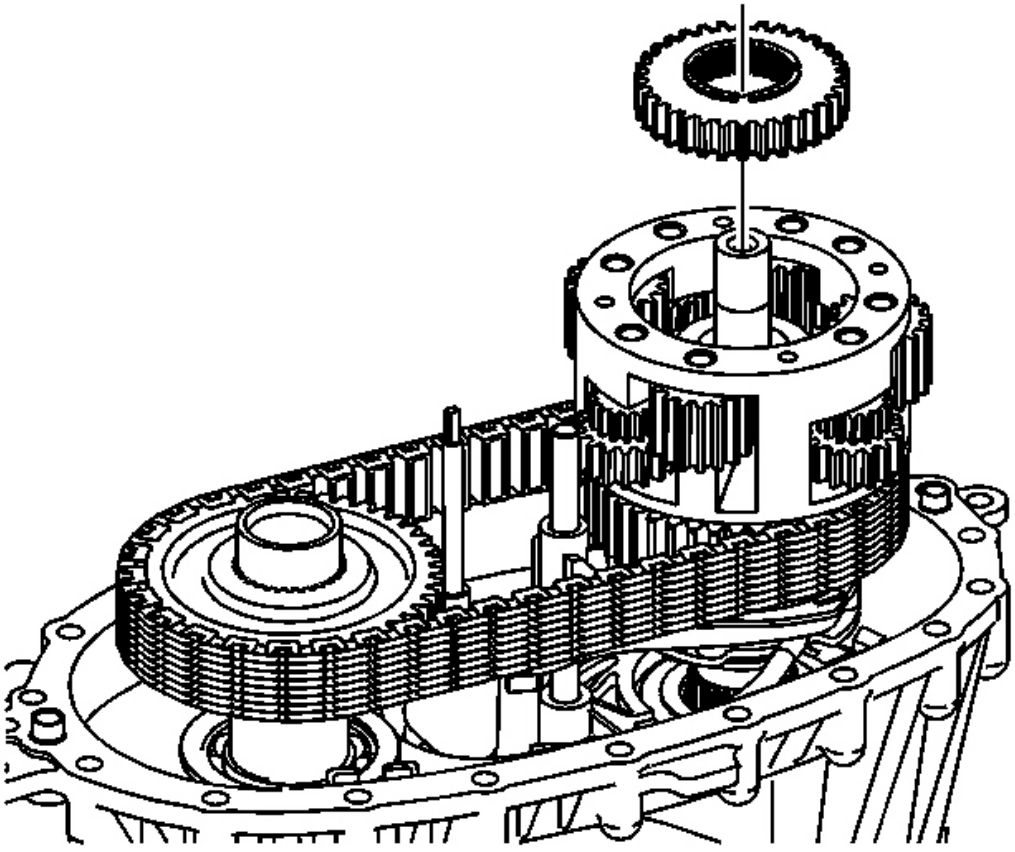


Fig. 137: Rear Sun Gear
Courtesy of GENERAL MOTORS CORP.

42. Install the rear sun gear.
    - The shoulder side of the gear faces up.
    - Do not rotate the differential pinion gears.

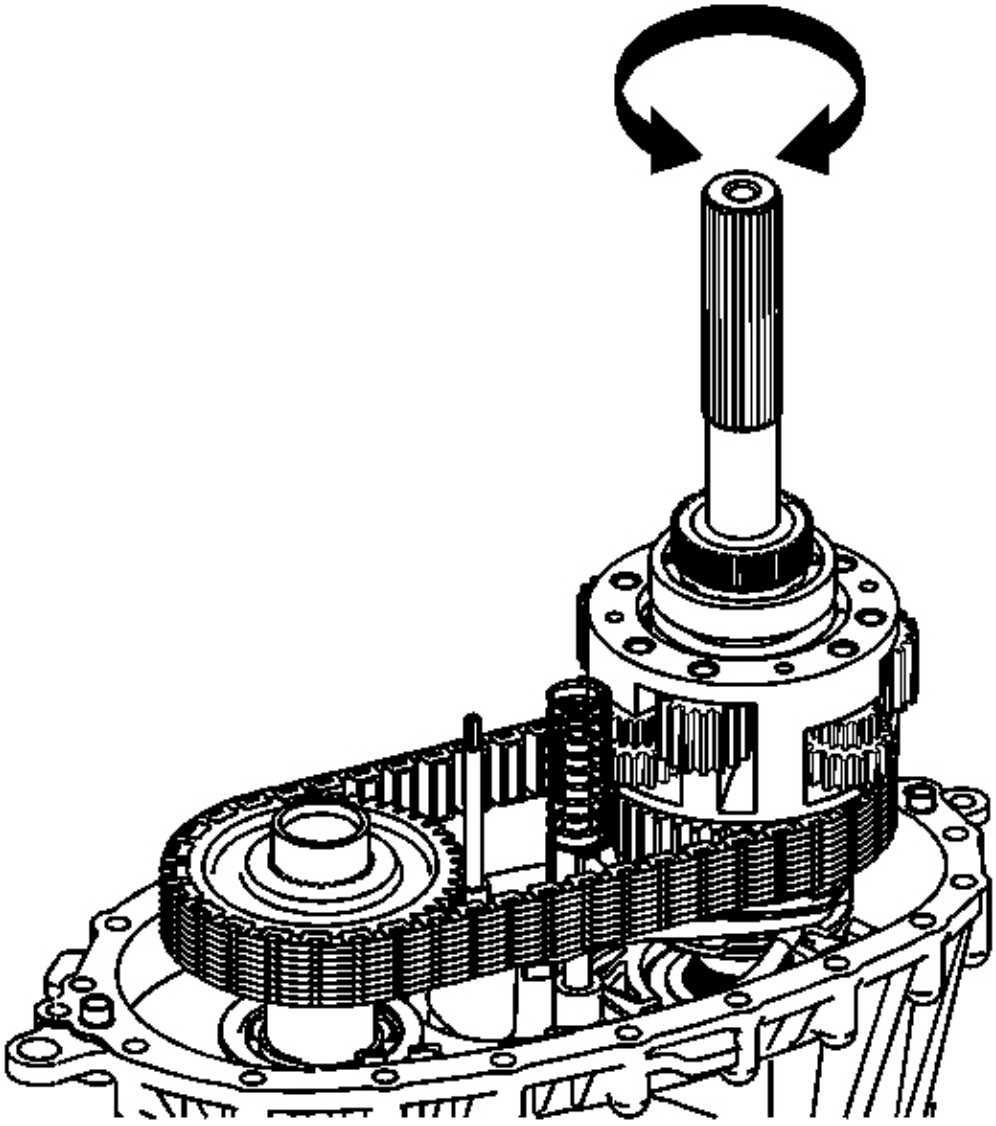


Fig. 138: Rotating Rear Output Shaft
Courtesy of GENERAL MOTORS CORP.

43. Temporarily install the rear output shaft to the planetary differential and the rear sun gear.
44. Rotate the rear output shaft three or four revolutions to rotate the planetary differential pinion gears. If properly aligned, the pinion gears will rotate freely, there will be no binding.
45. Remove the rear output shaft without disturbing the rear sun gear.

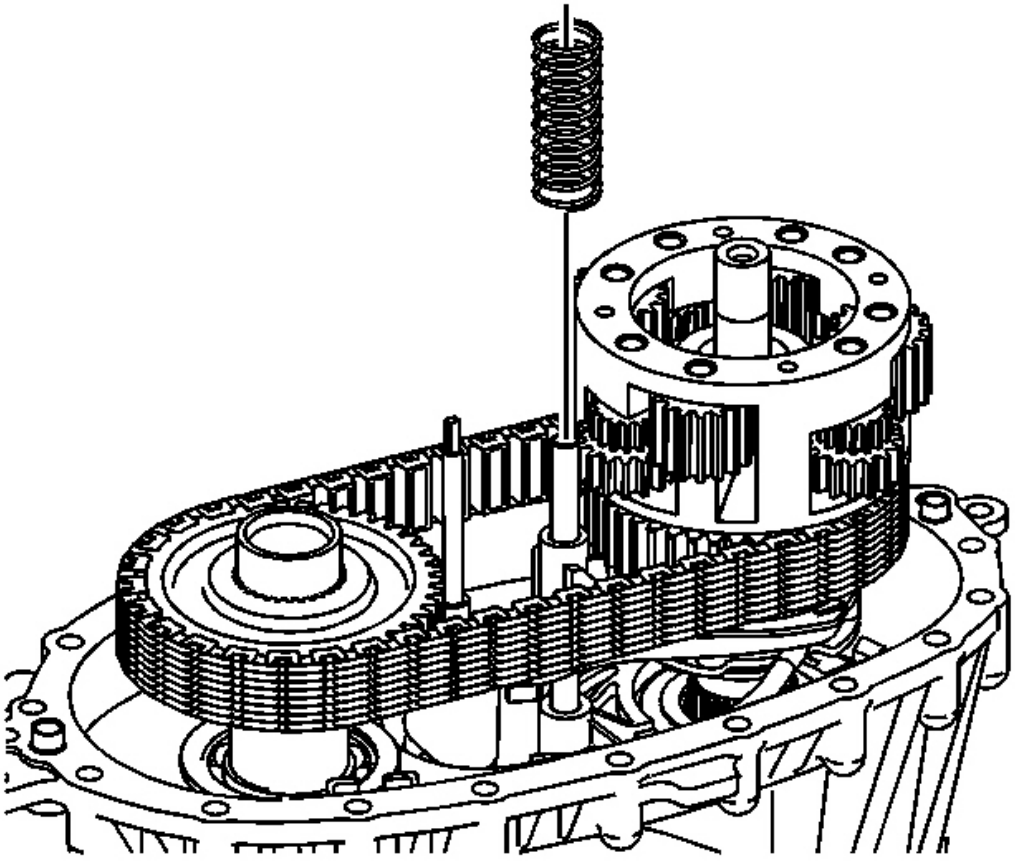


Fig. 139: Shift Fork Shaft Spring
Courtesy of GENERAL MOTORS CORP.

46. Install the shift fork shaft spring.

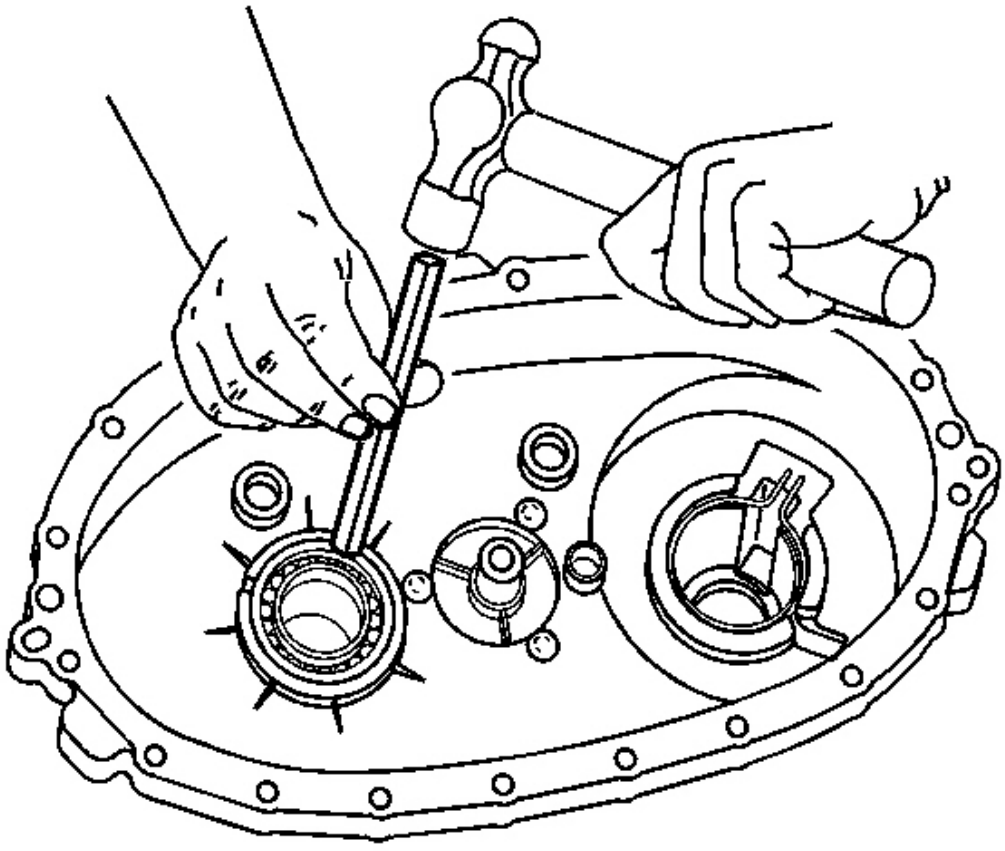


Fig. 140: Installing Front Output Shaft Rear Bearing In Rear Case Half
Courtesy of GENERAL MOTORS CORP.

47. Install the front output shaft rear bearing in the rear case half.
    - Use a hammer and a brass drift only on the outer bearing race.
    - Ensure the bearing is kept square to the bore while installing.

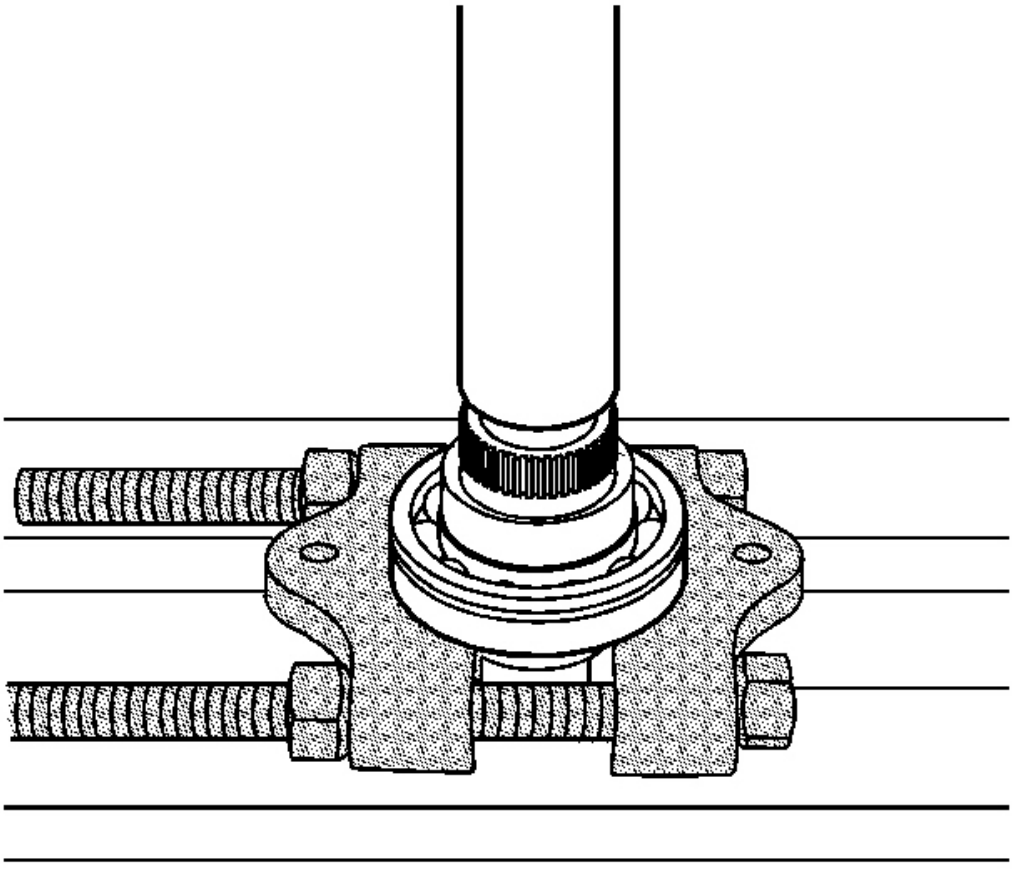


Fig. 141: Installing Rear Output Shaft Bearing Using Hydraulic Press & J 22912-01
Courtesy of GENERAL MOTORS CORP.

48. Using a hydraulic press and the **J 22912-01** , install the rear output shaft bearing.
    - The retaining ring groove on the bearing goes toward the input end or forward.
    - Use a suitable press plate on the end of the rear output shaft.
    - Ensure the bearing is supported on the inner race.

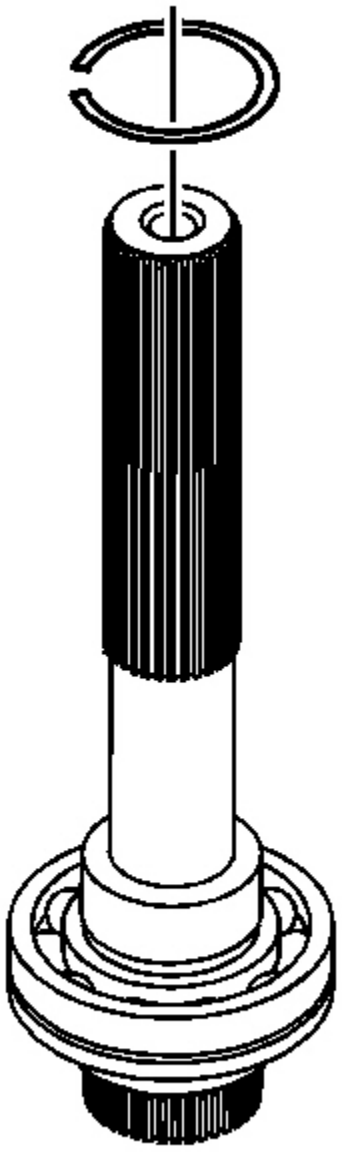


Fig. 142: Retaining Ring & Rear Output Shaft Bearing
Courtesy of GENERAL MOTORS CORP.

49. Install a NEW retaining ring for the rear output shaft bearing.

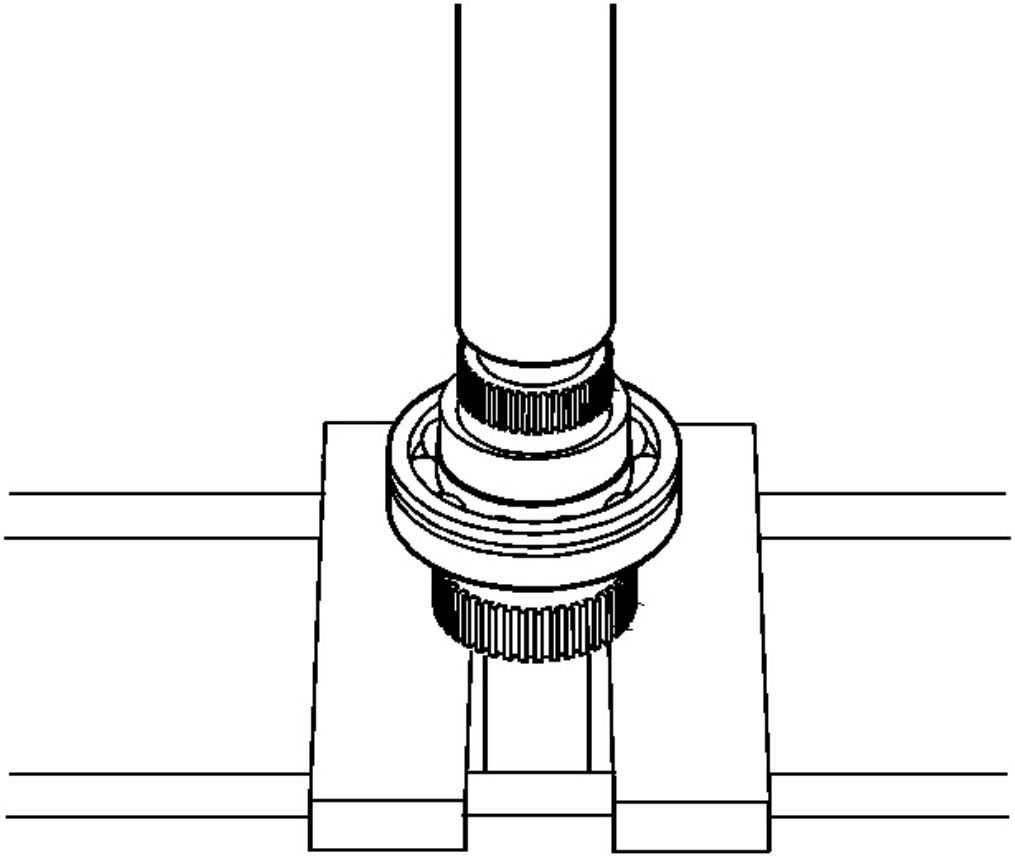


Fig. 143: Installing NEW Speed Reluctor Wheel Using Hydraulic Press
Courtesy of GENERAL MOTORS CORP.

50. Using a hydraulic press, install a NEW speed reluctor wheel.

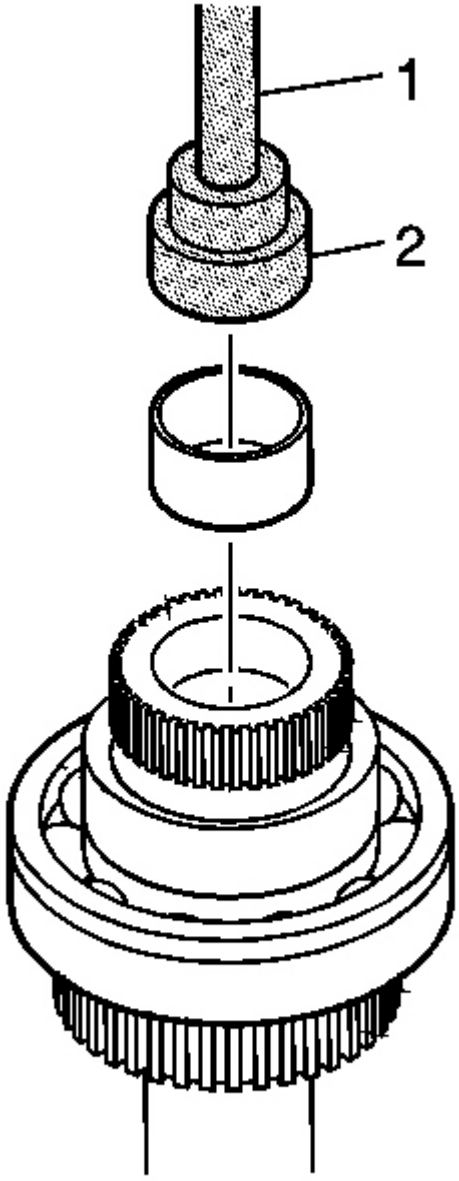


Fig. 144: Installing Mainshaft Rear Support Bushing Using J 42176 & J 45757
Courtesy of GENERAL MOTORS CORP.

51. Using **J 42176** (1) and **J 45757** (2), install the mainshaft rear support bushing in the rear output shaft. See **Special Tools and Equipment** .

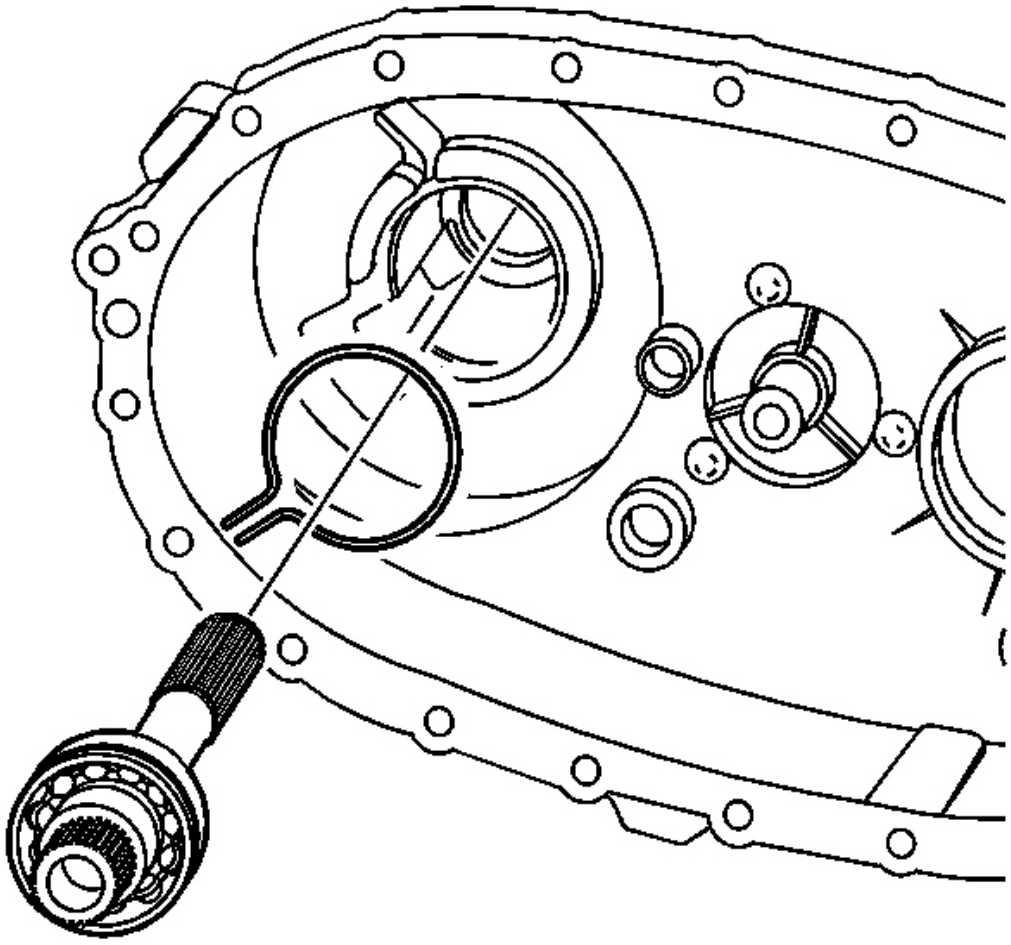


Fig. 145: Rear Output Shaft & Rear Case Half
Courtesy of GENERAL MOTORS CORP.

52. Install the rear output shaft in the rear case half.
    1. Spread the rear output shaft rear bearing outer retaining ring.
    2. Install the rear output shaft bearing outer retaining ring until it is seated in the bearing groove.

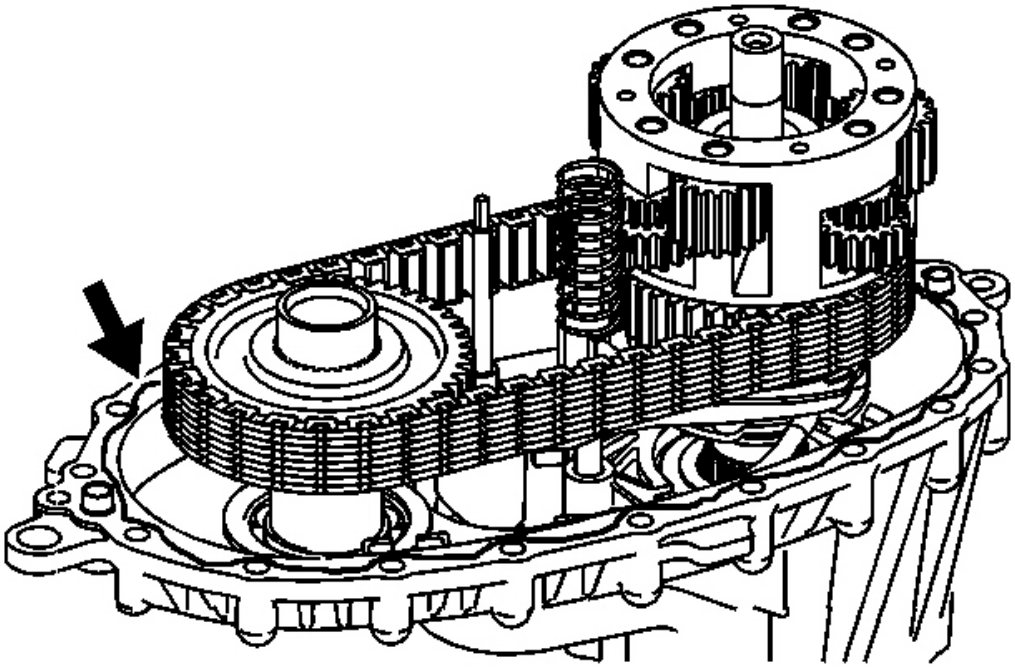


Fig. 146: Applying RTV Sealant GM P/N 12345739 To Mating Surfaces Of Front Case Half
Courtesy of GENERAL MOTORS CORP.

IMPORTANT:

- **Excessive amounts of sealer may plug the oil pump screen.**
- **Ensure that both the sealing surfaces on the front and rear case halves are free of dirt, oil, and cleaning solvent.**
- **Ensure the locating pins are installed in the case halves.**

53. Install the locating pins in the front case and rear case half, if necessary.
54. Apply a 3.175 mm (1/8 in) bead of RTV Sealant GM P/N 12345739 (Canadian P/N 10953541) or equivalent to the mating surfaces of the front case half.

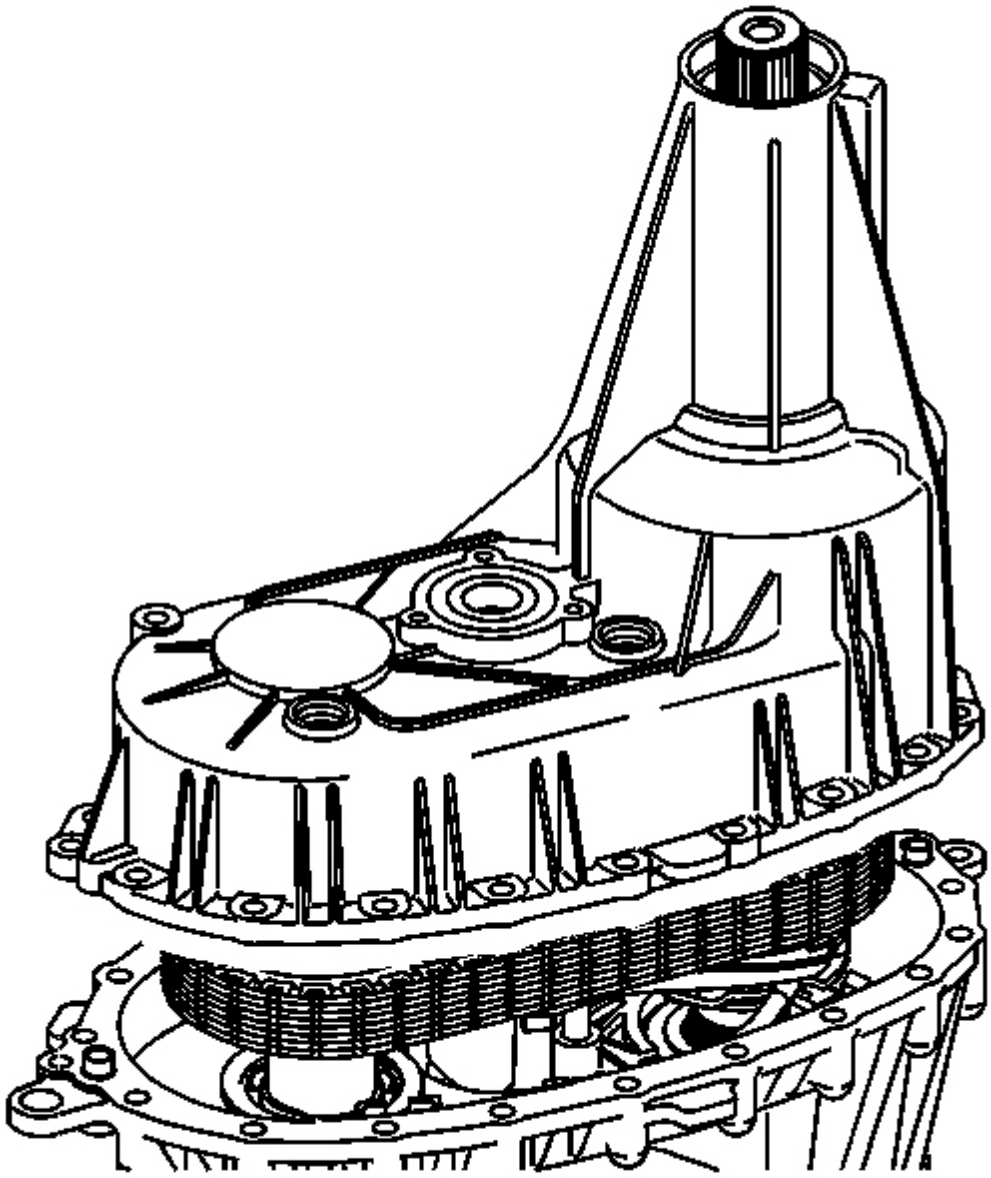


Fig. 147: Rear Case Half
Courtesy of GENERAL MOTORS CORP.

55. Lower the rear case half into place.

    The rear output may require rotating to align the teeth with the planetary differential.

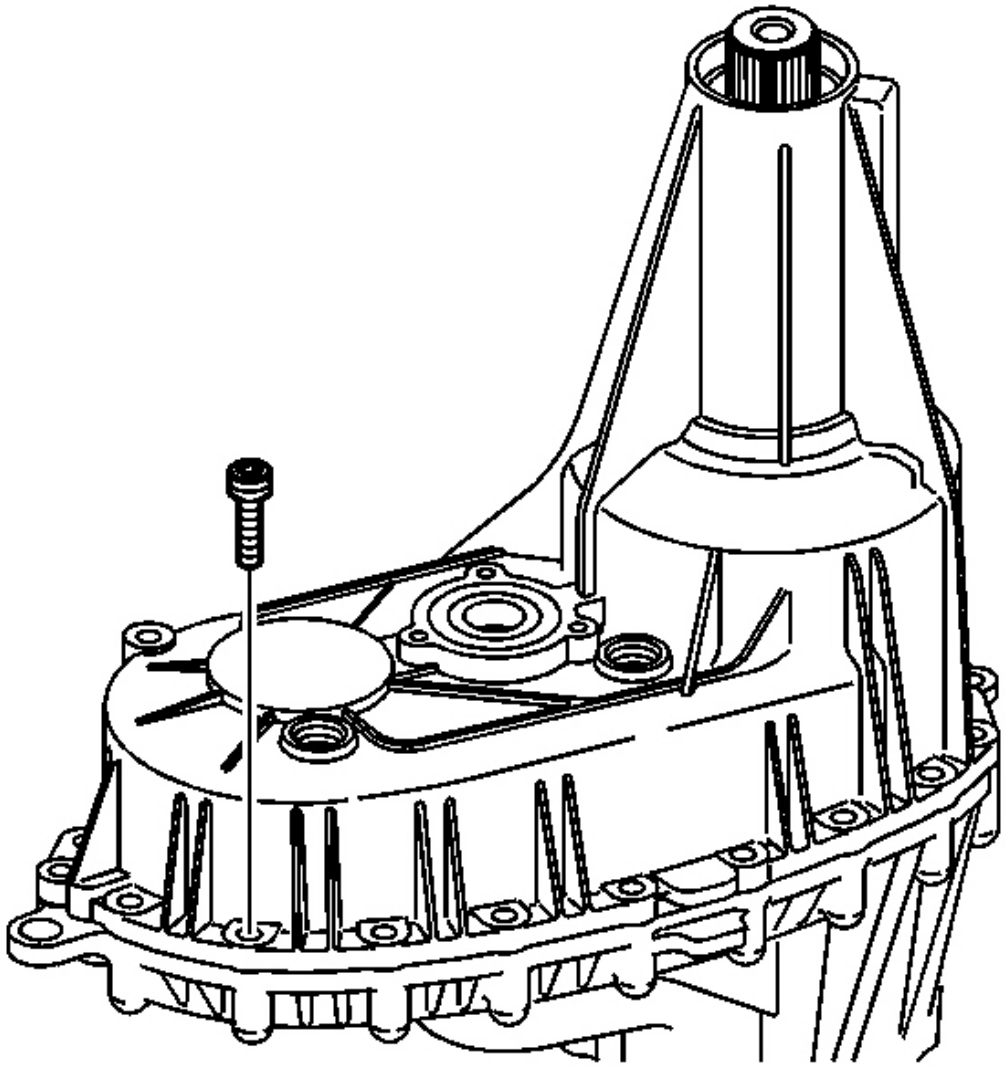


Fig. 148: Transfer Case Retaining Bolts & Washers
Courtesy of GENERAL MOTORS CORP.

NOTE: **This component is made of magnesium. Proper assembly is required to prevent damage. Ensure the magnesium transfer case housings are properly insulated from all external steel components, or galvanic corrosion will occur. New nylon coated case bolts and aluminum washers must be used. Use only aluminum fill and drain plugs. Use only aluminum brackets under the case bolts. Ensure new seals are installed that have a**

rubber insulated outside diameter and have no tears or cuts. Extensive damage will occur if there is galvanic corrosion between the magnesium and steel components.

56. Inspect the nylon coating on the case bolts for cuts or tears.
57. Replace the case bolts if there is any damage to the nylon coating.

IMPORTANT: The case bolts are self-tapping. They must be hand started. Do not use power assisted tools to install the bolts.

58. Install the case bolts with washers, and the brackets.

    Tighten: Tighten the case bolts to 21 N.m (15 lb ft).

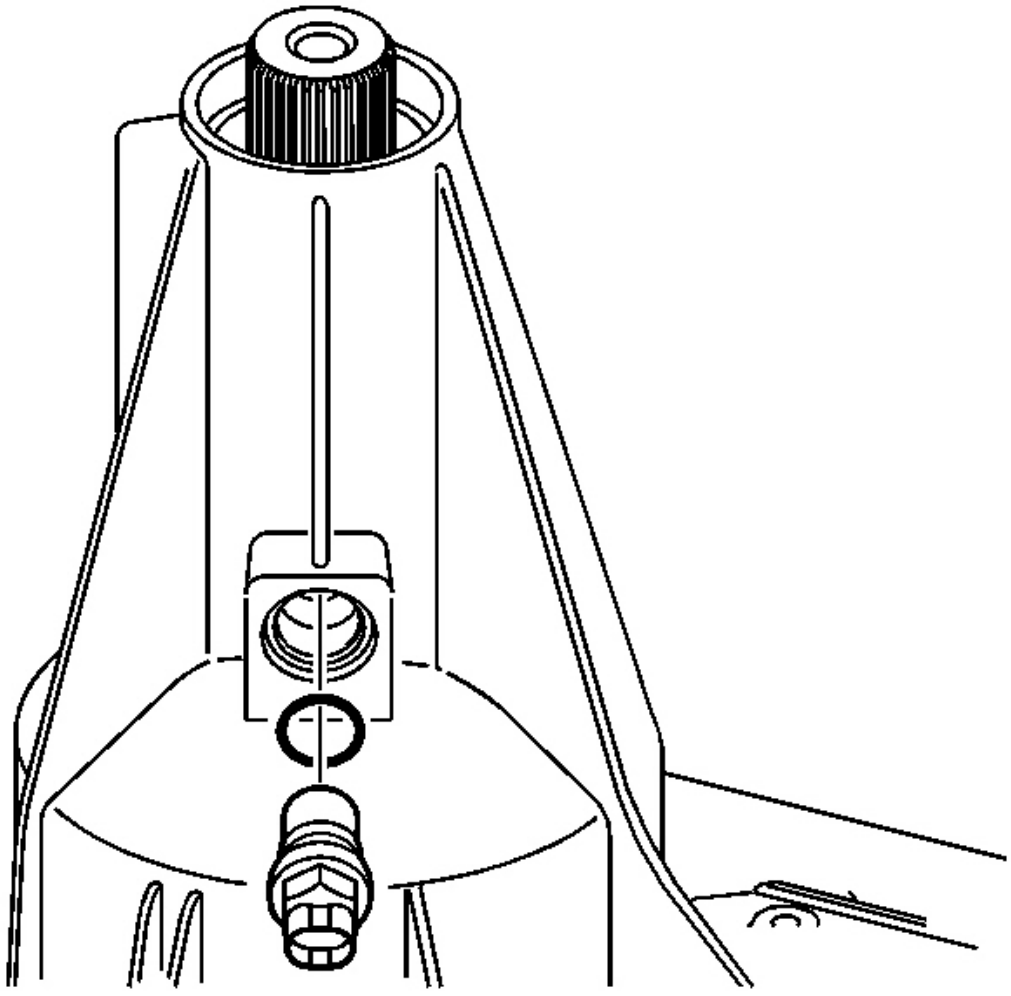


Fig. 149: Installing Vehicle Speed Sensor With New O-Ring Seal
Courtesy of GENERAL MOTORS CORP.

59. Install the vehicle speed sensor with a new O-ring seal.

    Tighten: Tighten the speed sensor to 17 N.m (13 lb ft).

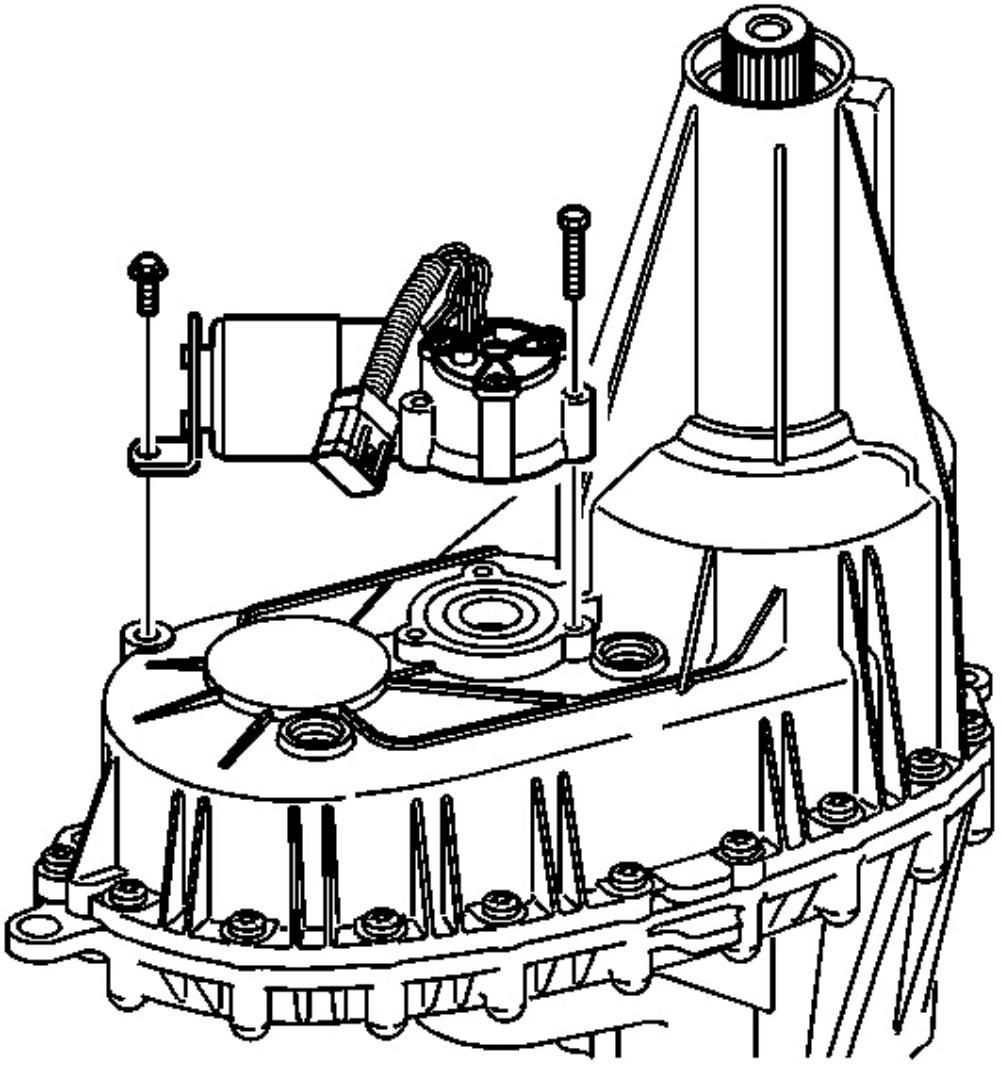


Fig. 150: Applying RTV Sealant GM P/N 12345739 To Sealing Surface Of Encoder Motor Assembly
Courtesy of GENERAL MOTORS CORP.

60. Apply a 3.175 mm (1/8 in) bead of RTV Sealant GM P/N 12345739 (Canadian P/N 10953541) or equivalent to the sealing surface of the encoder motor assembly.
61. Install the encoder motor assembly. Rotate the shift detent lever to align to the encoder motor.
62. Loosely install the encoder motor mounting bolts.
63. Loosely install the encoder motor bracket bolt.

Tighten:

- Tighten the encoder motor mounting bolts to 10 N.m (89 lb in).
- Tighten the encoder motor bracket bolt to 10 N.m (89 lb in).

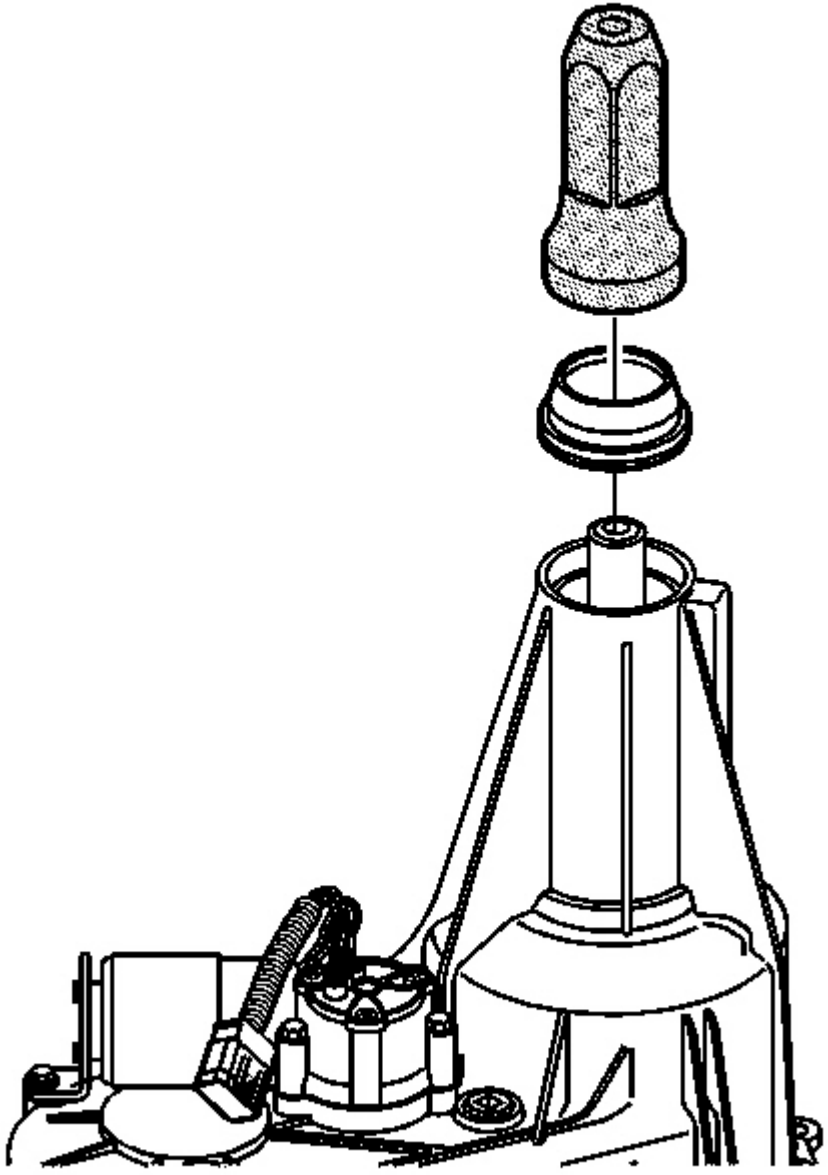


Fig. 151: Installing Rear Output Shaft Seal By Using J 45756
Courtesy of GENERAL MOTORS CORP.

64. Using **J 45756** , install the rear output shaft seal. See **Special Tools and Equipment** .

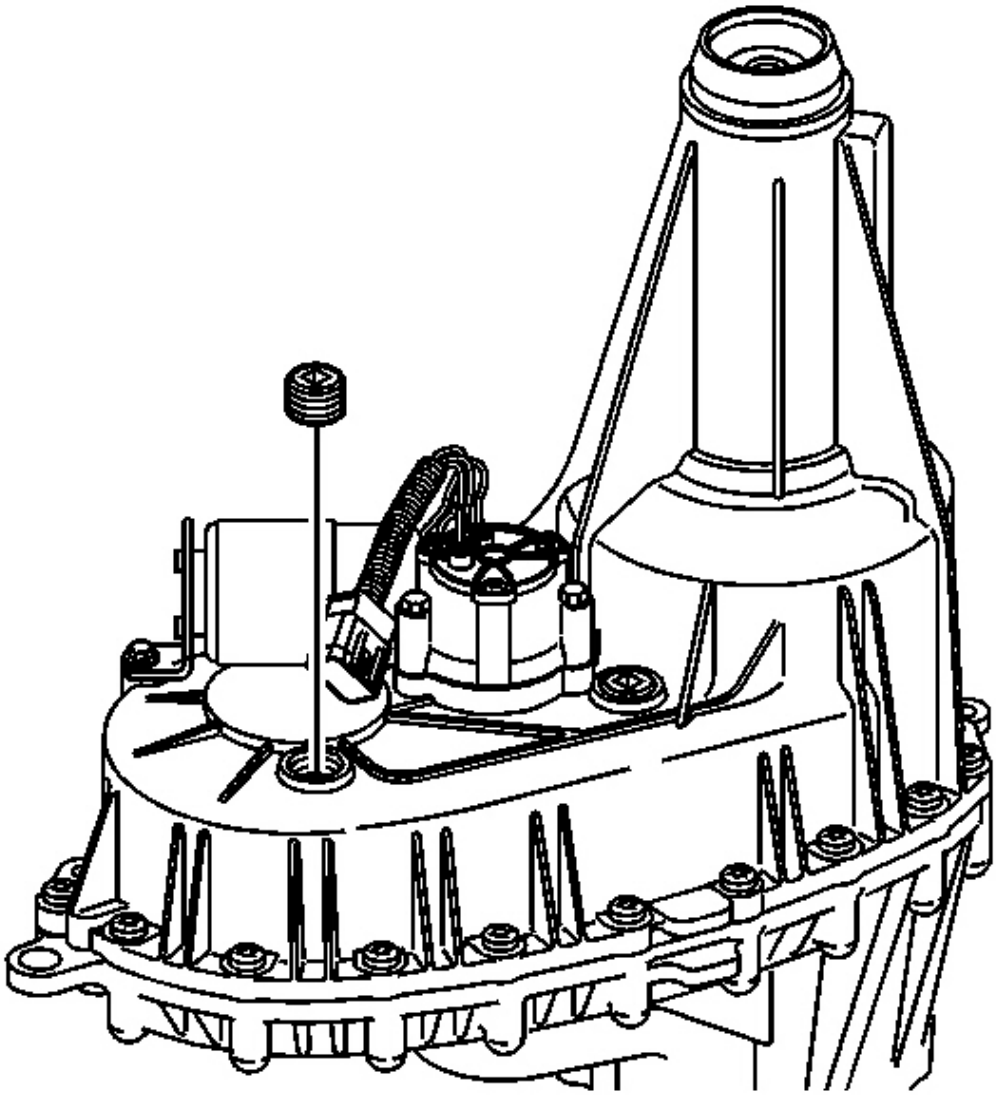


Fig. 152: Drain Plug & Fill Plug
Courtesy of GENERAL MOTORS CORP.

65. Apply pipe sealant GM P/N 12346004 (Canadian P/N 10953480) to the threads on the drain plug and fill plug.
66. Install the drain plug and the fill plug.

Tighten: Tighten the drain plug and fill plug to 25 N.m (18 lb ft).

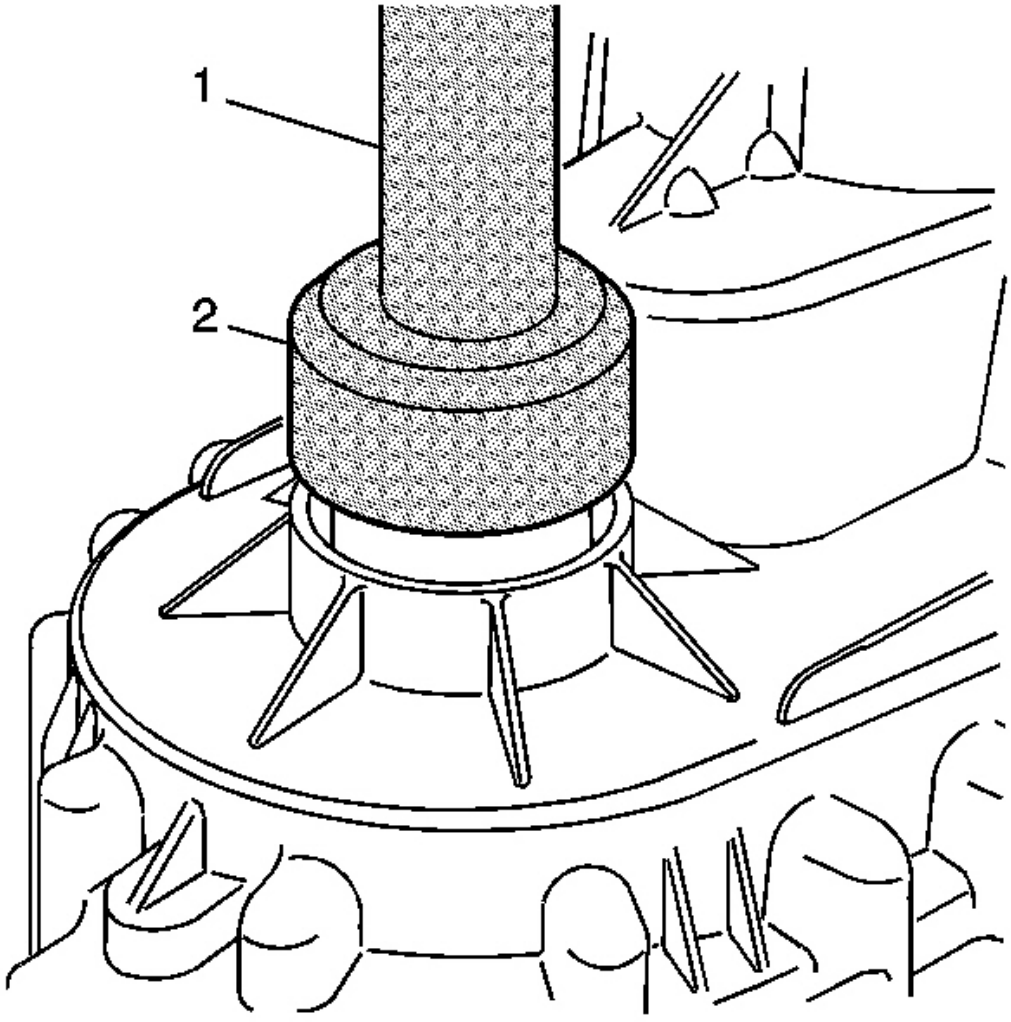


Fig. 153: Using J 43484 & J 8092 To Install Transfer Case Output Seal
Courtesy of GENERAL MOTORS CORP.

67. Using the **J 43484** (2) and the **J 8092** (1), install the front output shaft seal. See **Special Tools and Equipment** .

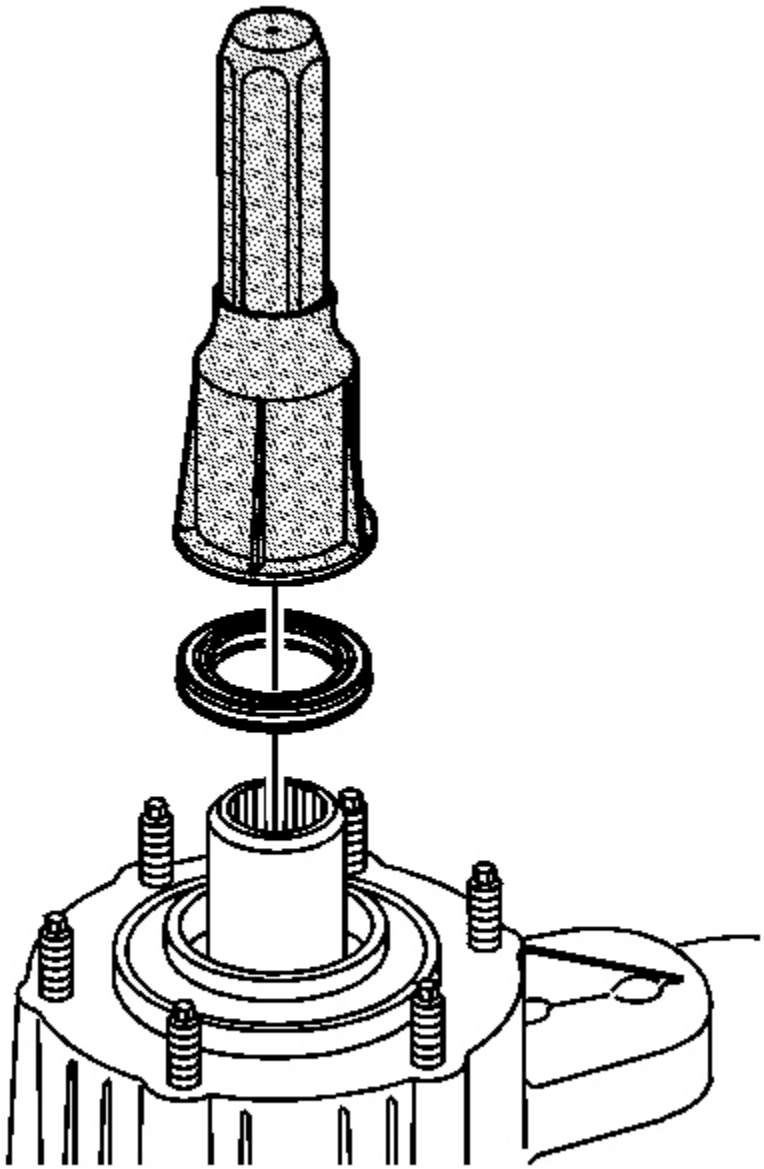


Fig. 154: Installing Front Input Shaft Seal By Using J 42738
Courtesy of GENERAL MOTORS CORP.

68. Using the **J 42738** , install the front input shaft seal. See **Special Tools and Equipment** .
69. Remove the transfer case from the **J 45759** . See **Special Tools and Equipment** .

DESCRIPTION AND OPERATION

TRANSFER CASE DESCRIPTION AND OPERATION

The Borg Warner (BW) model 4484 NR4 transfer case is a two-speed, full time 4WD, transfer case. The transfer case has an external planetary type differential, which has two different sets of pinion gears. The planetary differential provides a 40/60 torque split front/rear full time. This means the front and rear propeller shafts are constantly being driven for maximum traction in all conditions. A high/low planetary carrier assembly provides the high and low ranges, which is a 6-pinion gear, sun gear, and annulus gear arrangement giving a 2.64 low range reduction ratio.

The BW 4484 case halves are high-pressure die-cast magnesium. Ball bearings support the input shaft, the front output shaft, and the rear output shaft. A needle roller bearing is located inside of the input shaft gear to support the front of the mainshaft. The rear of the mainshaft is supported by a bronze bearing inside the rear output shaft. The transfer case requires DEXRON III ATF Fluid GM P/N 12346143 (Canadian P/N 10952622), which is red in color. An oil pump pumps the fluid through the mainshaft oil gallery to the gears and bearings.

Transfer Case Shift Control Switch

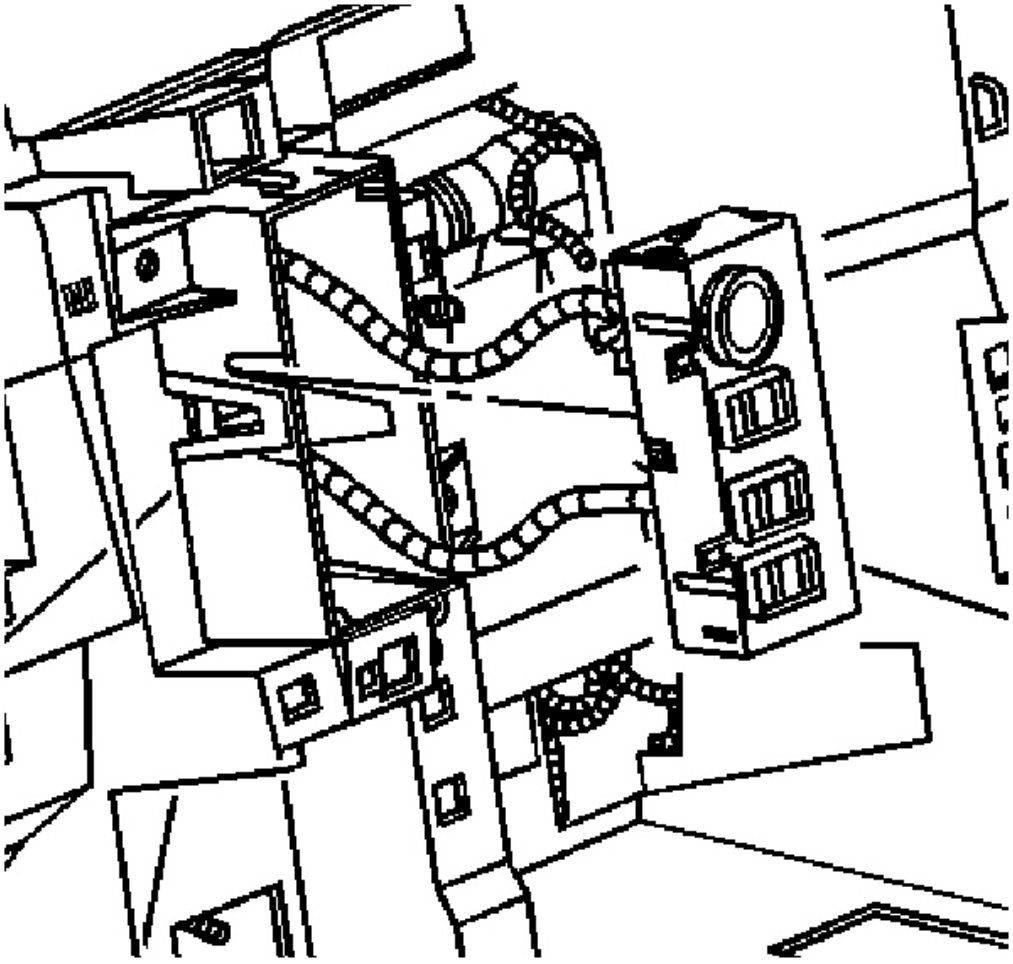


Fig. 155: Transfer Case Shift Control Switch
Courtesy of GENERAL MOTORS CORP.

The BW 4484 transfer case features a 4-button shift control switch located on the instrument panel. When the vehicle has the ignition key in the RUN position, the transfer case shift control module starts monitoring the transfer case shift control switch to determine if the driver desires a new mode/gear position. At a single press of the transfer case shift control switch, the lamp of the new desired position begins flashing to inform the driver that the transfer case shift control module has received the request for a new mode/gear position. The lamp continues to flash until all shifting criteria have been met and the new mode/gear position has been reached, or has been engaged. Once the new mode/gear position is fully active, the switch indicator lamp for the new position remains ON constantly.

During normal driving situations, the transfer case operates in the 4HI mode. When the 4HI mode is selected,

the transfer case shift control module sends 12 volts to an electrical motor, which is the transfer case encoder motor. This motor rotates the transfer case shift detent lever shaft which moves the shift forks and range sleeve to obtain different modes/ranges.

The BW 4484 transfer case has the added feature of also providing the driver with 3 manual mode/range positions:

- 4HI - 4 Wheel Drive High Open
- 4HI Lock - 4 Wheel Drive High Locked
- 4LO Lock - 4 Wheel Drive Low Locked

The driver may choose to select any of these mode/range positions while driving the vehicle. However, the transfer case will not allow a shift into or out of 4LO Lock unless the following criteria has been met:

- The engine is running.
- The automatic transmission is in Neutral.
- The vehicle speed is below 5 km/h (3 mph).

This transfer case also has a Neutral position. A shift to the Neutral position allows the vehicle to be towed without the transmission output shaft rotating. Refer to the Owners Manual for instructions for proper towing of the vehicle.

Neutral position may be obtained only if the following criteria have been met:

- The engine is running or the ignition is ON.
- The automatic transmission is in Neutral.
- The vehicle speed is below 5 km/h (3 mph).
- The transfer case is in the 4HI mode.

Once these conditions have been met, press and hold both the 4HI and 4LO Lock buttons for 10 seconds. When the system completes the shift to Neutral, the red Neutral indicator illuminates.

The BW 4484 transfer case has one other additional feature along with the 3 modes. The Electronic Rear Differential Lock can only be used in the 4LO Lock mode with a vehicle speed at or below 32 km/h (20 mph).

4HI Mode Power Flow

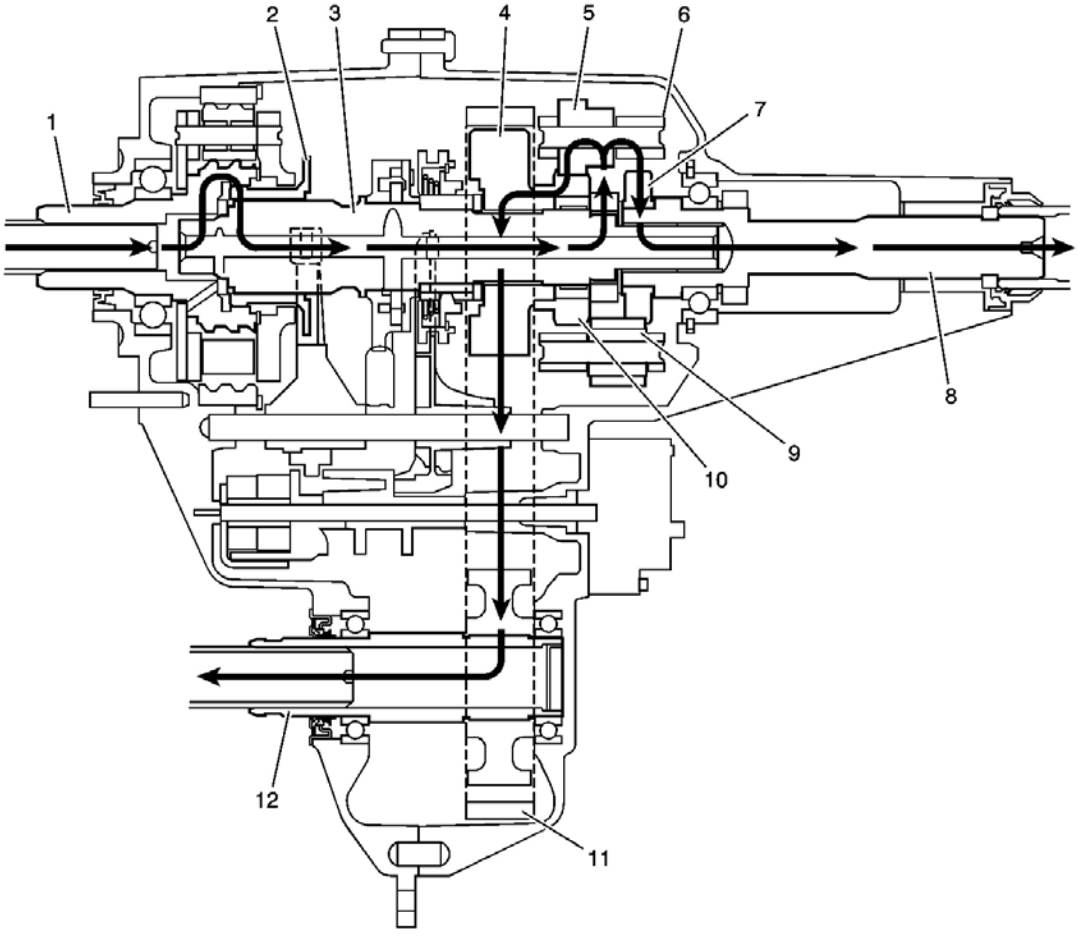


Fig. 156: 4HI Mode Power Flow
Courtesy of GENERAL MOTORS CORP.

When the BW 4484 is in 4HI mode, the engine power flows from the transmission to the input shaft (1). The input shaft (1) is connected to the mainshaft (3) by the high/low range sleeve (2). The high/low range sleeve (2) outer teeth are engaged with the input shaft (1) high-speed teeth. The range collar is slip splined to the mainshaft (3). The mainshaft (3) delivers the power flow to the planetary differential (6), which splits the torque 40 percent through the front differential pinion gears (5) to the front sun gear (10). The torque to the front axle then goes through the drive sprocket (4), via the chain (11) to the front output shaft (12) and to the front axle. The differential planetary splits the torque 60 percent to differential rear pinion gears (9) and rear sun gear (7). The rear sun gear is connected to the rear output shaft (8) and the torque flows to the rear axle. In the 4HI mode, if traction is lost to one axle and the tires spin, the Traction Assist System (TAS) applies braking to the spinning tires and the engine power is delivered to the other tires.

4HI Lock Mode Power Flow

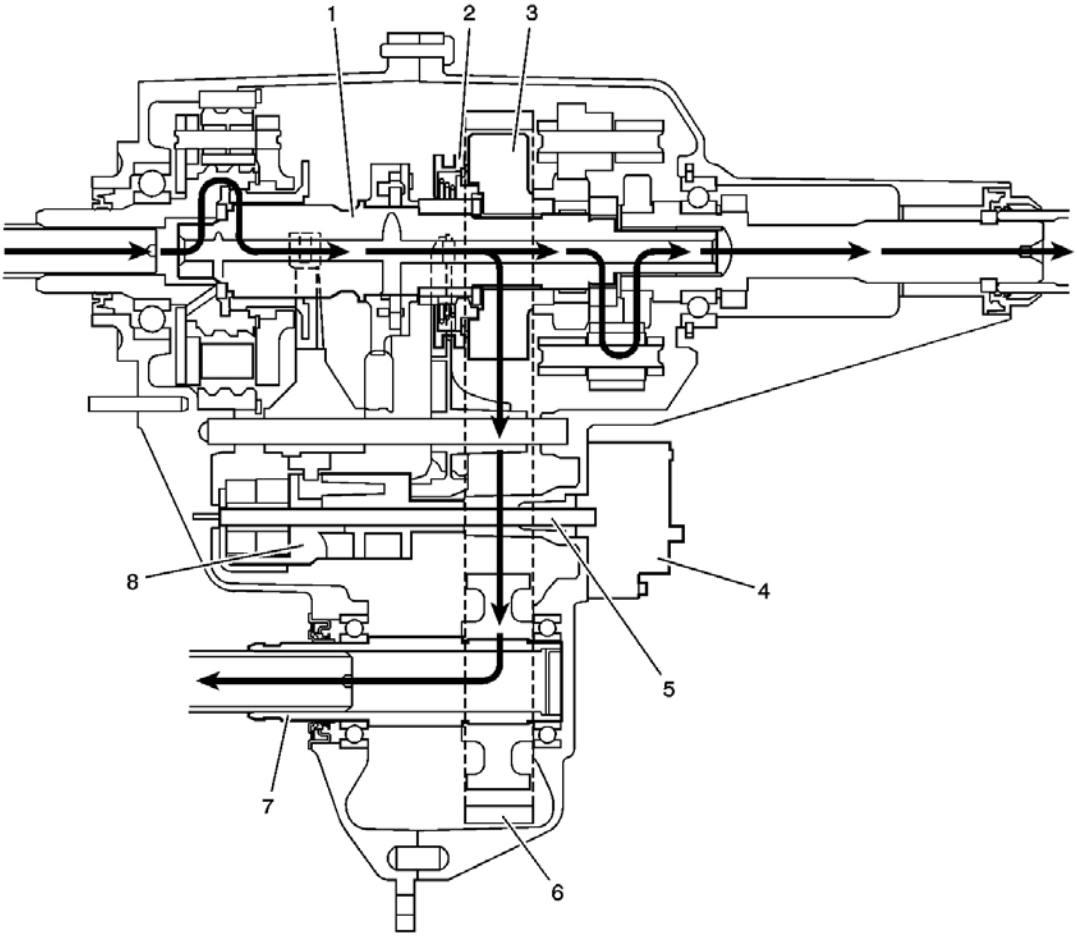


Fig. 157: 4HI Lock Mode Power Flow
Courtesy of GENERAL MOTORS CORP.

When shifting to the 4HI Lock mode, the encoder motor (4) turns the shift detent lever shaft (5), to rotate the shift detent lever cam (8). The cam action of the shift detent lever cam (8) moves the lockup mode shift fork rearward along with the lockup shift assembly sleeve (2). The lockup shift assembly sleeve (2) locks the mainshaft (1) to the drive sprocket (3). Torque is sent by the chain (6) to the front output shaft (7) and to the front axle. The torque distribution in this mode is now determined by vehicle dynamic conditions and weight distribution. The planetary differential is not operating, and both the front and rear propeller shafts are being driven at equal RPMs, therefore giving a 4 high lock mode. This mode should only be used for extra traction during off road use. Using this mode on dry pavement causes tire scuffing.

4LO Lock Mode Power Flow

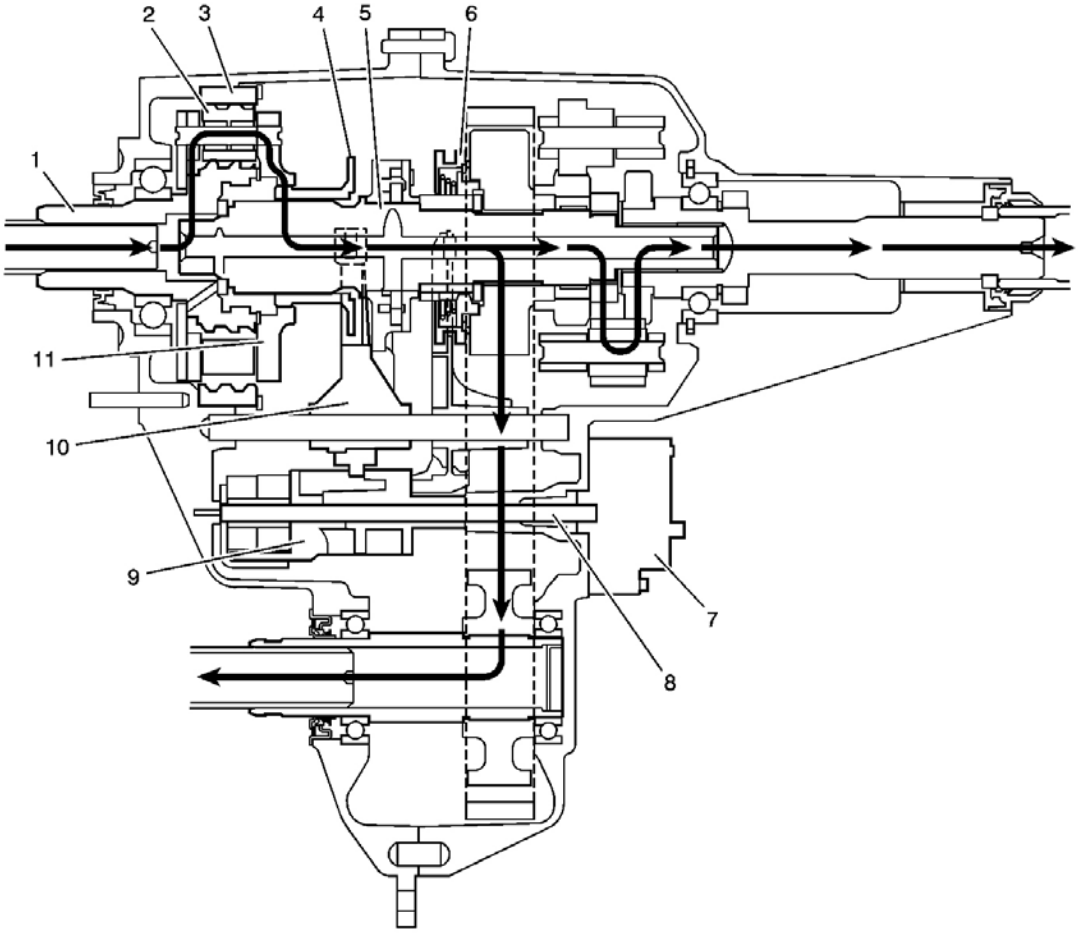


Fig. 158: 4LO Lock Mode Power Flow
Courtesy of GENERAL MOTORS CORP.

When shifting the transfer case to the 4LO Lock mode, it commands the encoder motor (7) to turn the shift detent lever shaft (8), to rotate the shift detent lever cam (9). The range cam profile on the shift detent lever cam (9) moves the high/range shift fork (10) and the high/low range sleeve (4) rearward to the 4LO Lock range position. The high/low range sleeve (4) outer teeth disengage from the input shaft (1) high-speed teeth. The high/low range sleeve (4) outer teeth then engage in the high/low planetary carrier teeth (11). The power flow is now from planetary teeth on the input shaft (1) to the planetary gears (2) in the carrier. Rotating the planetary gears, which are engaged in the annulus gear (3), rotates the planetary carrier. The planetary carrier delivers the power to the high/low range sleeve (4). The high/low range sleeve (4) then drives the mainshaft (5), providing a 2.64:1 reduction to the speed of the mainshaft (5). When in the 4LO Lock position, the lockup mode shift fork and lockup shift assembly (6) engages in the same way as in the 4HI Lock mode.

Neutral Mode Power Flow

Shifting to the neutral position, the high/low range sleeve is centered between the input shaft and the high/low planetary carrier. The high/low range sleeve is not engaged with either the input shaft or the high/low planetary

carrier teeth. The planetary differential is in the AWD mode.

Transfer Case Electrical Components

View the list of major electrical components that make up the full time four wheel drive transfer case (FT4WD) system below.

Service 4WD Message

The SERVICE 4WD message is displayed on the driver information center, which is an integral part of the cluster and cannot be serviced separately. This message is used to inform the driver of malfunctions within the FT4WD transfer case system. The SERVICE 4WD message is controlled by the transfer case shift control module via a Class 2 message.

Transfer Case Encoder

The encoder is mounted to the transfer case encoder motor assembly and is replaced only as an assembly. The encoder converts the shift detent lever shaft position, representing a mode/range into electrical signal inputs to the transfer case shift control module. The module detects what position the transfer case is in by monitoring the 4 encoder channels, P, B, A, and C. These inputs translate into 4HI, 4HI Lock, 4LO Lock, and Neutral, or whether the motor is still in transition between gears.

The transfer case encoder channel circuits may be monitored using a scan tool.

Transfer Case Encoder Motor

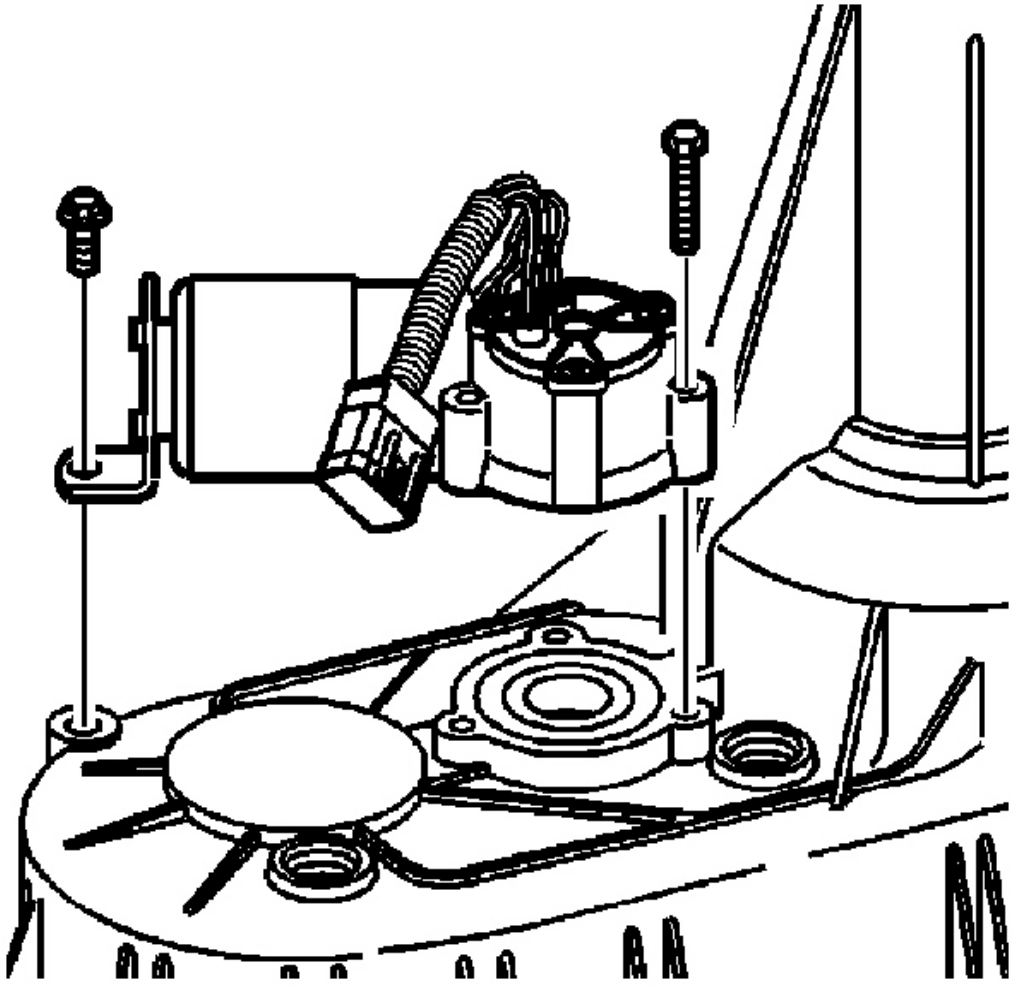


Fig. 159: Transfer Case Encoder Motor
Courtesy of GENERAL MOTORS CORP.

The transfer case encoder motor consists of a permanent magnet (PM) DC motor and gear reduction assembly. It is located on the left hand side of the transfer case. When activated, it turns the shift detent lever shaft of the transfer case clockwise or counterclockwise, to shift the transfer case by moving the shift forks and collar assemblies inside the transfer case. The encoder motor is controlled through a 12 volt circuit provided by the transfer case shift control module. This circuit consists of a driver on both the Motor Control A and Motor Control B circuits. The encoder motor is bi-directional to allow the motor to shift the transfer case from 4HI or 4HI Lock to NEUTRAL and 4LO Lock positions.

Both the motor control drivers and motor control return drivers can be turned on using a scan tool. You may also monitor Motor Control A and B circuits using a scan tool.

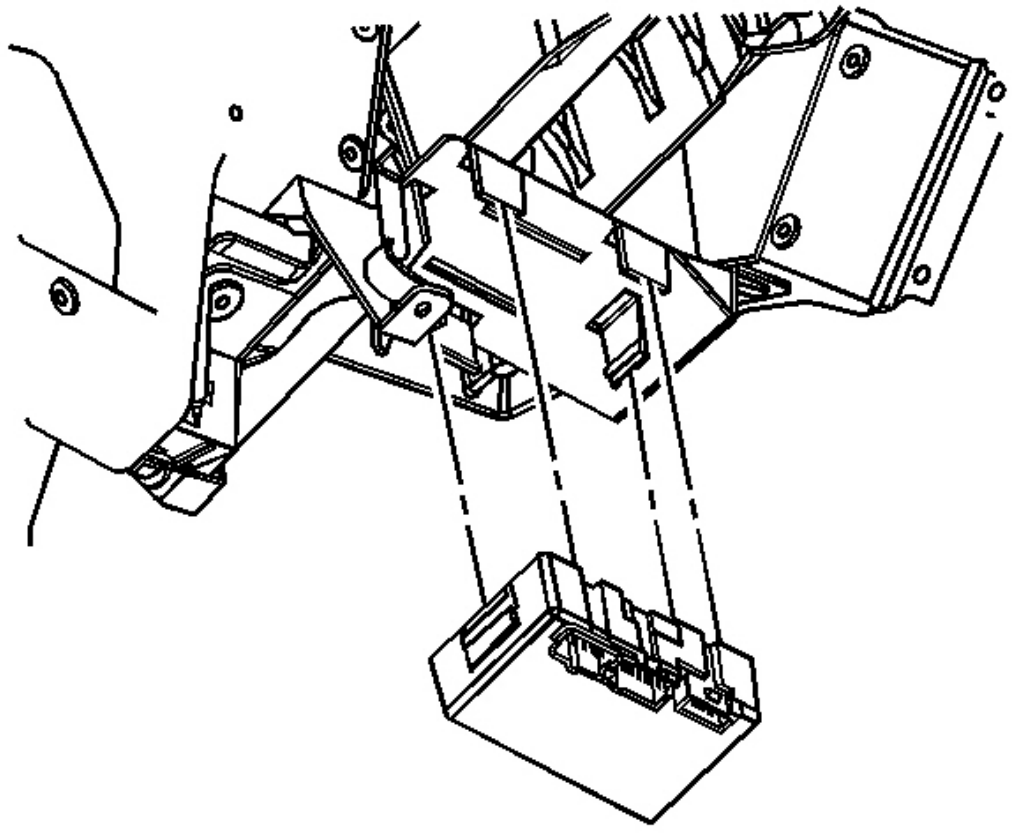


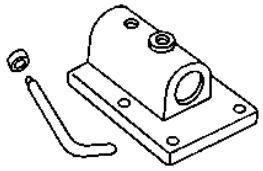
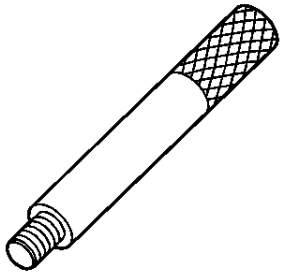
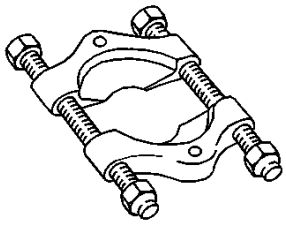
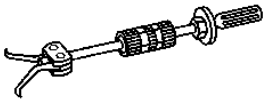
Fig. 160: Transfer Case Shift Control Module
Courtesy of GENERAL MOTORS CORP.

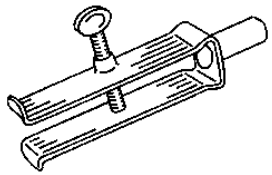
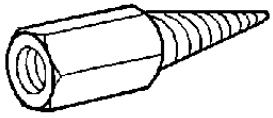
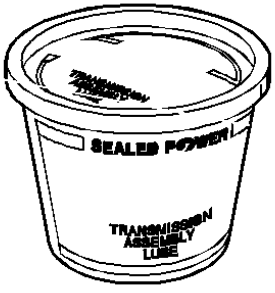
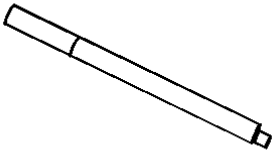
The transfer case shift control module uses the VIN information for calculations that are required for the different calibrations used base on axle ratio, transmission, tire size, and engine. The system does not know which calibration to use without this information. This information is provided to the transfer case shift control module via Class 2 data bus from the powertrain control module (PCM). The transfer case shift control module monitors vehicle speed via the Class 2 data bus from the PCM as well as controlling the operation of the transfer case encoder motor assembly.

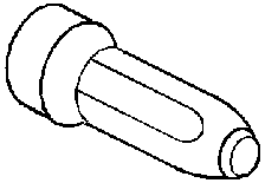
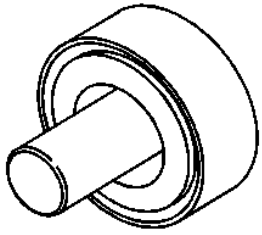
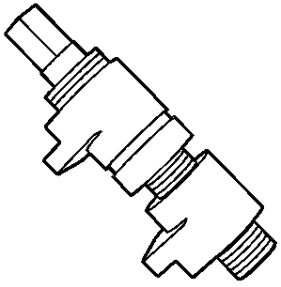
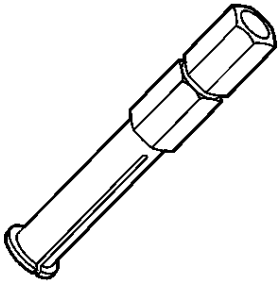
SPECIAL TOOLS AND EQUIPMENT

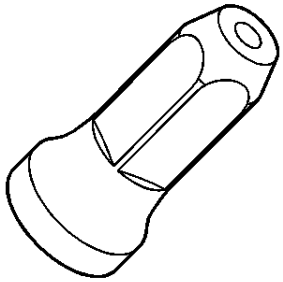
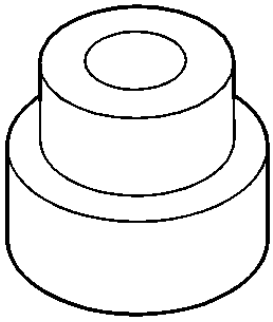
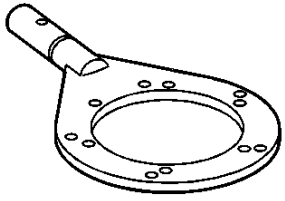
SPECIAL TOOLS

Special Tools

Illustration	Tool Number/Description
	J 2619-01 Slide Hammer
	J 3289-20 Holding Fixture
	J 8092 Universal Driver Handle
	J 22912-01 Split Plate Bearing Puller
	J 23907 Slide Hammer with Bearing Adapter

	J 26941 Bushing and Bearing Remover - 3-4 inch
	J 36825 Output Shaft Oil Seal Remover - 4WD Models Only
	J 36850 Transjel Lubricant
	J 42176 Universal Driver Handle - Non-Threaded
	J 42738 Seal Installer

	
	J 43484 Front Output Shaft Seal Installer
	J 45358 Case Spreader
	J 45548 Mainshaft Support Bushing/Bearing Remover

	J 45756 Rear Output Shaft Seal Installer
	J 45757 Mainshaft Support Bushing and Bearing Installer
	J 45759 Assembly Fixture

Transfer Case - Overhaul - BW 4482-NR4

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Adapter Studs	31 N.m	23 lb ft
Case Bolts	21 N.m	15 lb ft
Drain Plug	25 N.m	18 lb ft
Encoder Motor Bolts	10 N.m	89 lb in
Encoder Motor Bracket Bolt	10 N.m	89 lb in
Fill Plug	25 N.m	18 lb ft
Vehicle Speed Sensors	17 N.m	13 lb ft
Vent	6 N.m	53 lb in

SEALERS, ADHESIVES, AND LUBRICANTS

Sealers, Adhesives, and Lubricants

Application	Type of Material	GM Part Number	
		United States	Canada
Drain Plug	Pipe Sealant	12346004	10953480
Fill Plug	Pipe Sealant	12346004	10953480
Front Output Shaft Cup Plug	Threadlocker	12345382	10953489
Rear Case Half to Front Case Half	RTV Sealant	12345739	10953541
Transfer Case Fluid	DEXRON(R)III	12346143	10952622
Vehicle Speed Sensor O-Ring	Transfer Case Fluid	12346143	10952622
Vent	Pipe Sealant	12346004	10953480

CAPACITIES - APPROXIMATE FLUID

Capacities - Approximate Fluid

Application	Specification	
	Metric	English
DEXRON(R)III Fluid GM P/N 12346143 (Canadian P/N 10952622)	1.4 liters	1.5 quarts

VISUAL IDENTIFICATION

TRANSFER CASE DISASSEMBLED VIEW

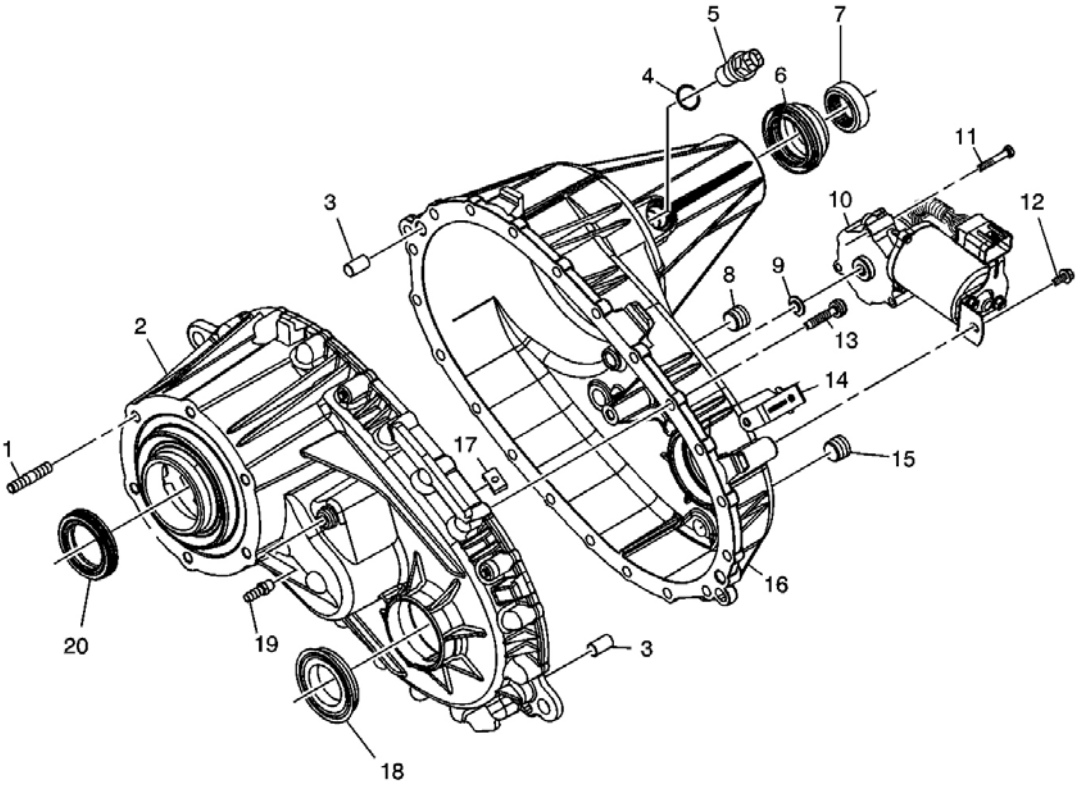


Fig. 1: Case Components Disassembled View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 1

Callout	Component Name
1	Adapter Stud
2	Front Case Half
3	Location Pin
3	Location Pin
4	Vehicle Speed Sensor O-Ring Seal
5	Vehicle Speed Sensor
6	Rear Output Shaft Seal
7	Shipping Seal
8	Fill Plug
9	Shift Detent Lever Seal
10	Encoder Motor
11	Encoder Motor Bolt
12	Encoder Motor Bracket Bolt

13	Case Half Bolt
14	Wiring Harness Bracket
15	Drain Plug
16	Rear Case Half
17	Magnet
18	Front Output Shaft Seal
19	Vent
20	Input Shaft Seal

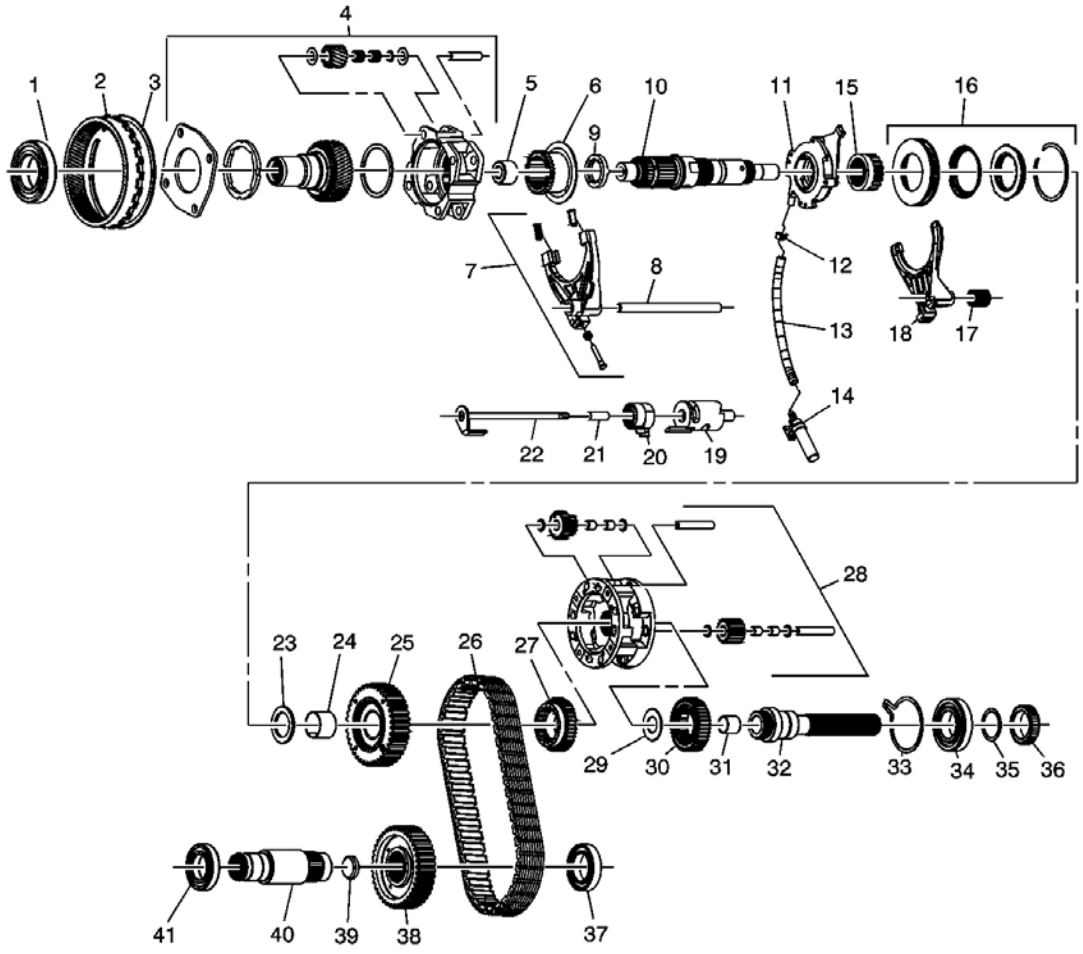


Fig. 2: Transfer Case Internal Components Disassembled View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2

Callout	Component Name
1	Input Gear Bearing

2	Annulus Gear
3	Annulus Gear Retaining Ring
4	High/Low Planetary Carrier Assembly
5	Mainshaft Front Support Bearing
6	High/Low Range Sleeve
7	High/Low Range Shift Fork Assembly
8	Shift Fork Shaft
9	Input Gear Thrust Washer
10	Mainshaft
11	Oil Pump
12	Oil Pump Hose Clamp
13	Oil Pump Hose
14	Oil Pump Screen
15	Inner Lockup Hub
16	Lockup Shift Assembly
17	Shift Fork Shaft Spring
18	Lockup Shift Fork
19	Shift Detent Lever Cam
20	Shift Detent Lever Shaft Spring
21	Shift Detent Lever Shaft Sleeve
22	Shift Detent Lever Shaft
23	Drive Sprocket Thrust Washer
24	Drive Sprocket Bushing
25	Drive Sprocket
26	Drive Chain
27	Front Sun Gear
28	Planetary Differential Assembly
29	Rear Output Shaft Thrust Washer
30	Rear Sun Gear
31	Mainshaft Rear Support Bushing
32	Rear Output Shaft
33	Rear Output Shaft Bearing Outer Retaining Ring
34	Rear Output Shaft Bearing
35	Rear Output Shaft Bearing Retaining Ring
36	Speed Reluctor Wheel
37	Front Output Shaft Rear Bearing
38	Driven Gear
39	Front Output Shaft Cup Plug
40	Front Output Shaft
41	Front Output Shaft Front Bearing

REPAIR INSTRUCTIONS

TRANSFER CASE DISASSEMBLE

Tools Required

- **J 2619-01** Slide Hammer. See **Special Tools and Equipment** .
- **J 3289-20** Holding Fixture. See **Special Tools and Equipment** .
- **J 22912-01** Rear Pinion and Axle Bearing Remover. See **Special Tools and Equipment** .
- **J 23907** Slide Hammer with Bearing Adapter. See **Special Tools and Equipment** .
- **J 26941** Bushing and Bearing Remover - 3-4 inch. See **Special Tools and Equipment** .
- **J 45358** Case Spreader. See **Special Tools and Equipment** .
- **J 45548** Mainshaft Support Bushing/Bearing Remover. See **Special Tools and Equipment** .
- **J 45759** Assembly Fixture. See **Special Tools and Equipment** .

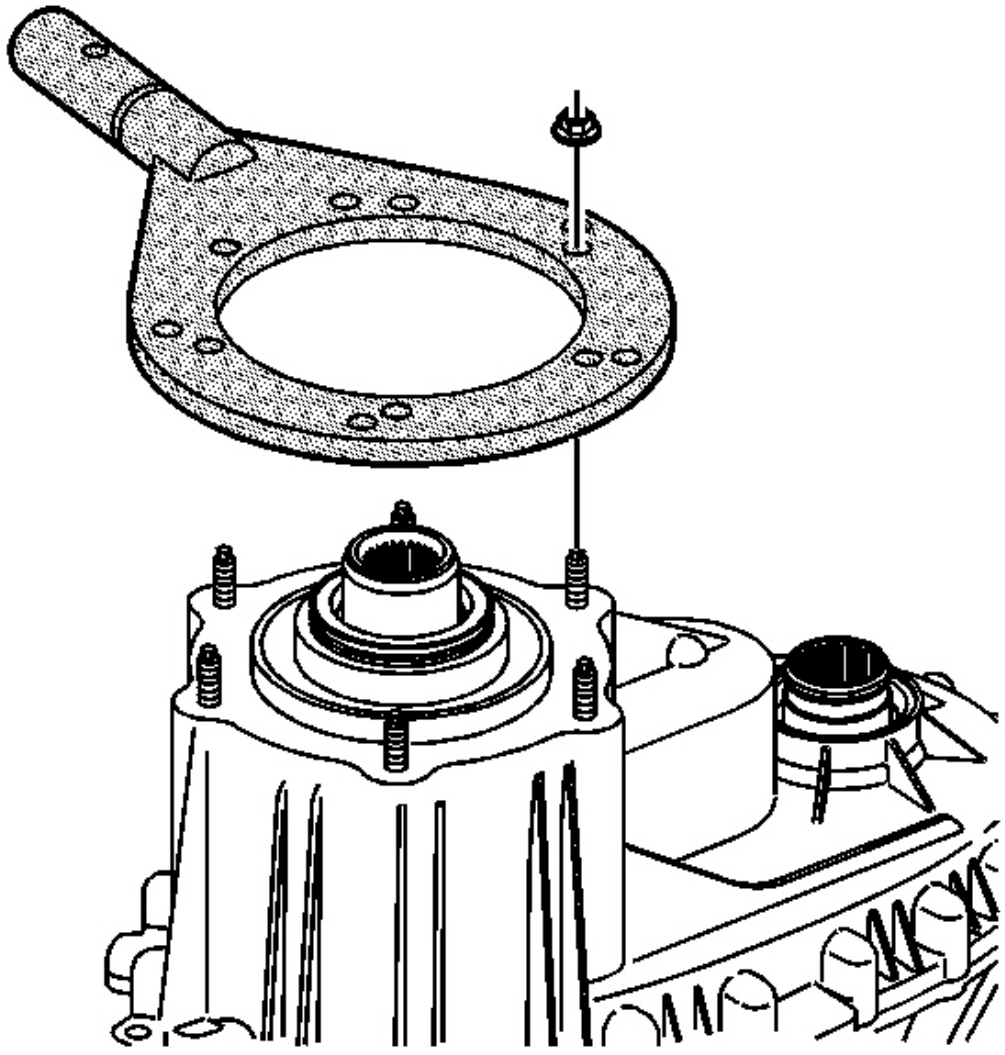


Fig. 3: Mounting Transfer Case To J 45759
Courtesy of GENERAL MOTORS CORP.

1. Using the adapter studs, attach the **J 45759** to the transfer case. All of the transfer case disassembly procedures can be performed with the case mounted to the **J 45759** .

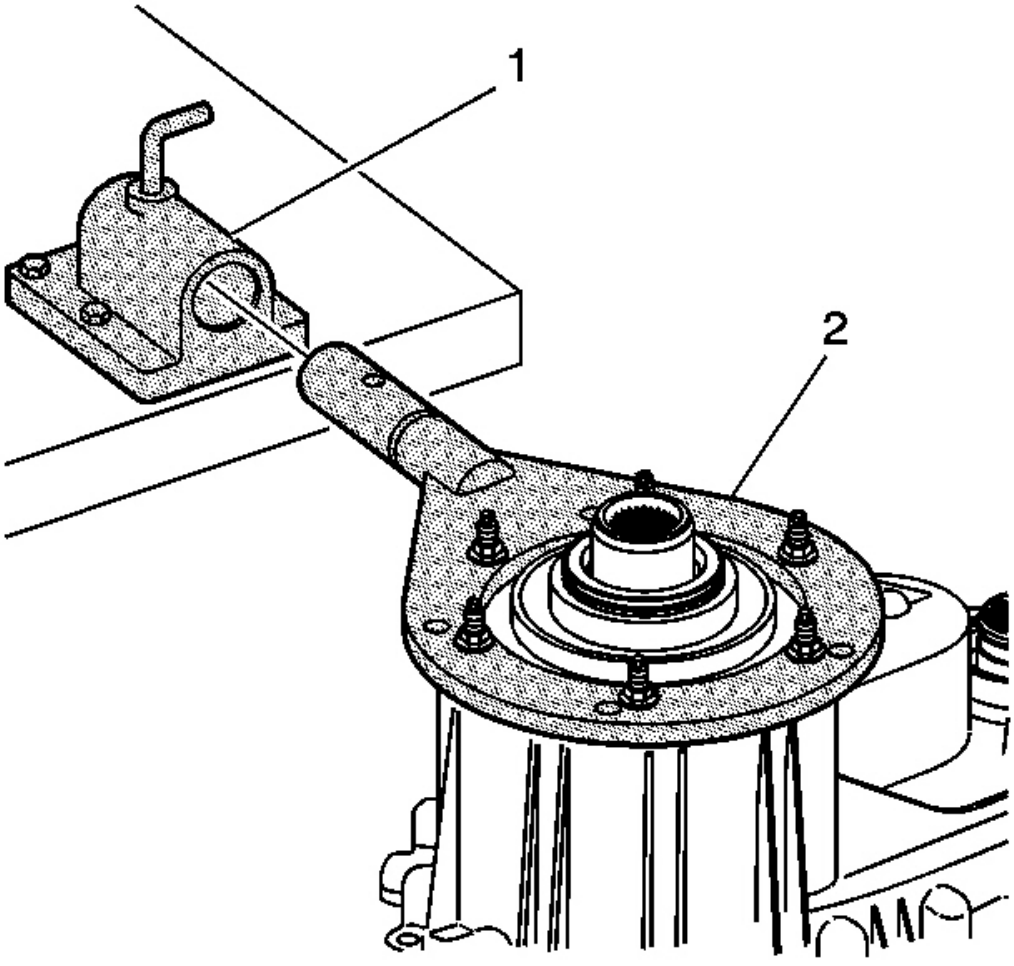


Fig. 4: Installing J 45759 Into J 3289-20
Courtesy of GENERAL MOTORS CORP.

2. Mount the **J 3289-20** (1) to a sturdy work bench.
3. Install the **J 45759** (2) into **J 3289-20** (1) and secure with pivot pin.

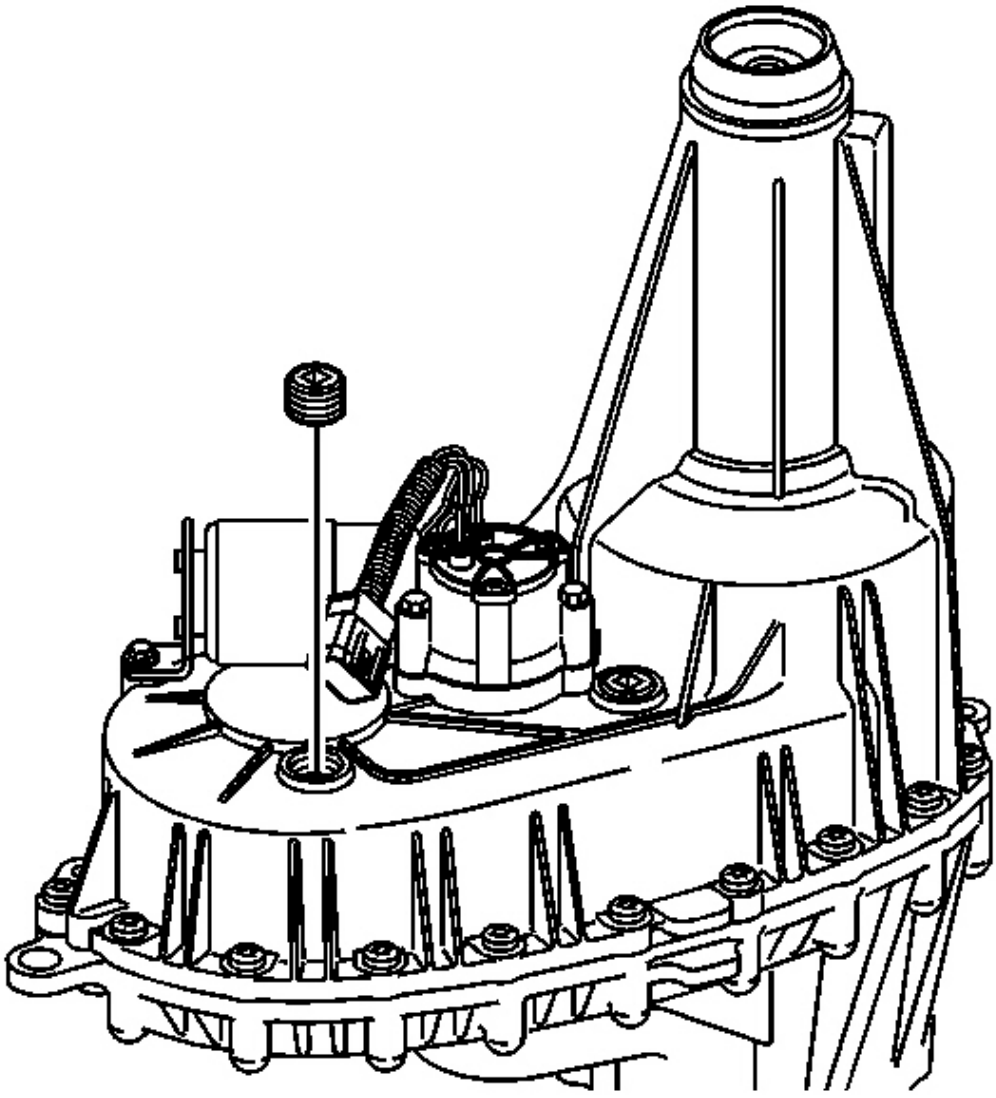


Fig. 5: View Of Drain & Fill Plug
Courtesy of GENERAL MOTORS CORP.

4. Remove the drain plug and the fill plug. Ensure all of the transfer case fluid is drained out of the transfer case.

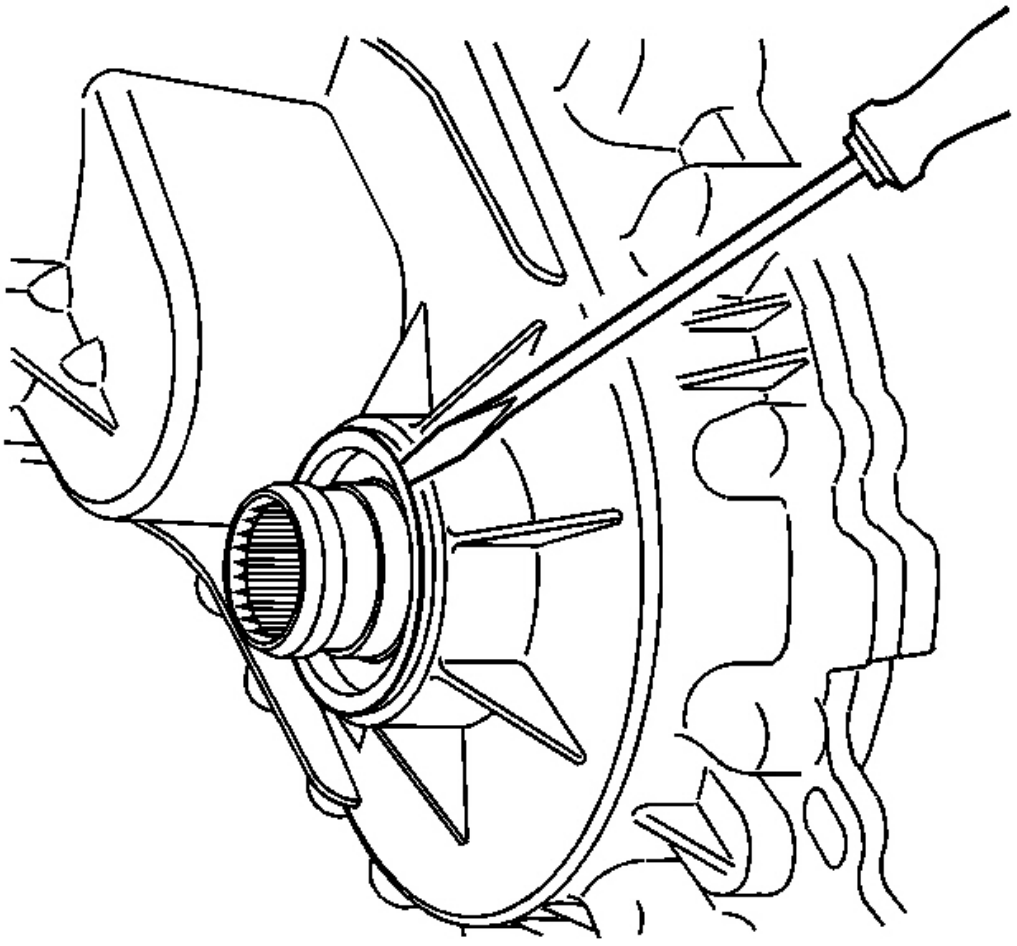


Fig. 6: Inserting Screwdriver Behind Inner Race Of Seal
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Transfer Case Seal Removal Notice in Cautions and Notices.

IMPORTANT: The front output shaft seal is a two piece internal seal. The inner seal race is a force fit on the front output shaft.

5. Remove the front output shaft seal by inserting a flat-tipped screwdriver behind the inner race of the seal.
6. Pry the inner seal race forward.

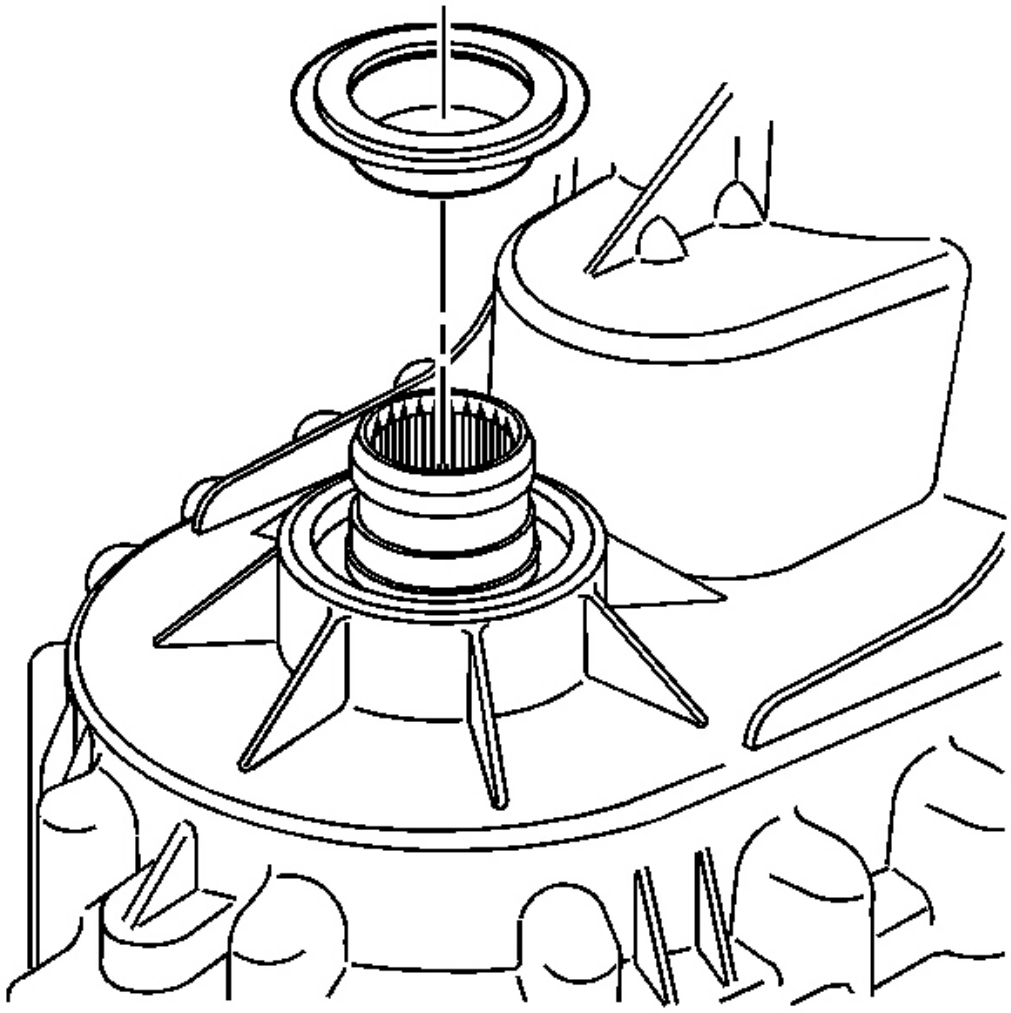


Fig. 7: View Of Inner Seal Race From The Front Output Shaft
Courtesy of GENERAL MOTORS CORP.

7. Using a small pry bar, move the inner seal race forward on the front output shaft.
8. Remove the inner seal race from the front output shaft.

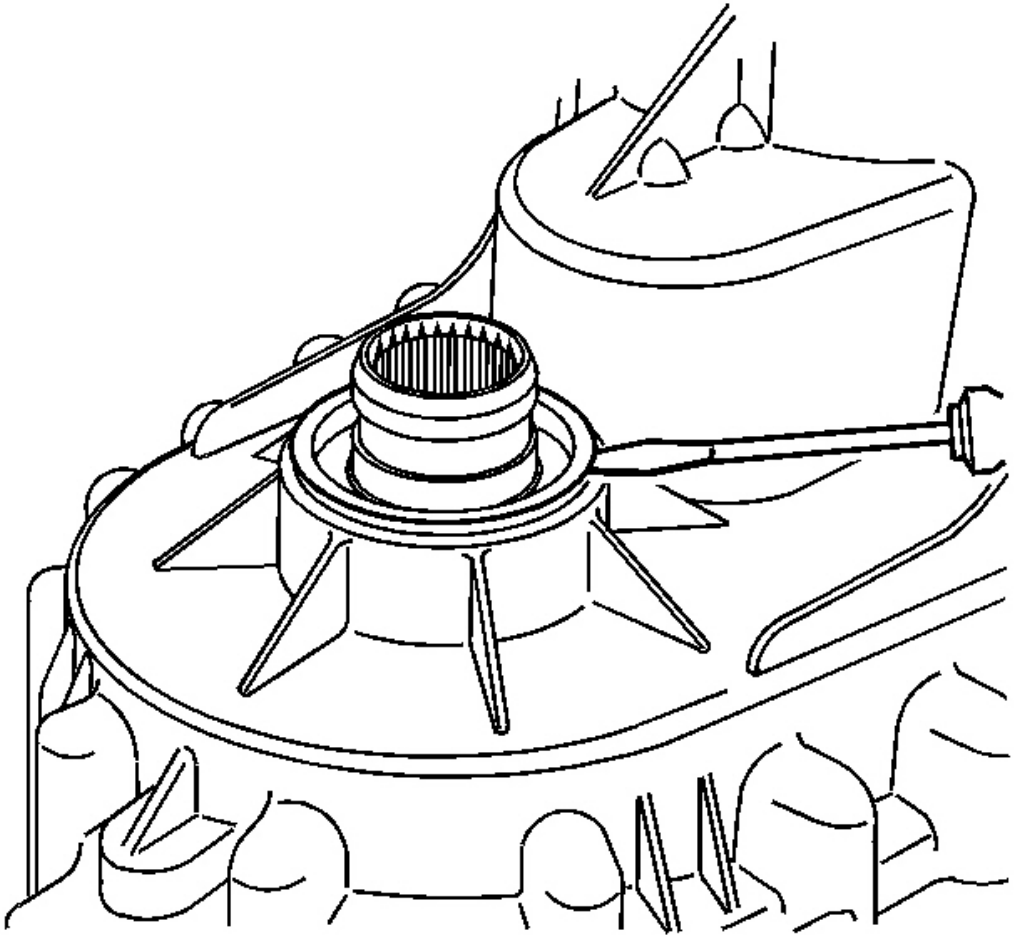


Fig. 8: Locating Outer Lip Of The Front Output Shaft Seal
Courtesy of GENERAL MOTORS CORP.

9. Insert a flat-tipped screwdriver or a small pry bar between the outer lip of the front output shaft seal and the transfer case.
10. Remove the remaining part of the front output shaft seal from the transfer case.

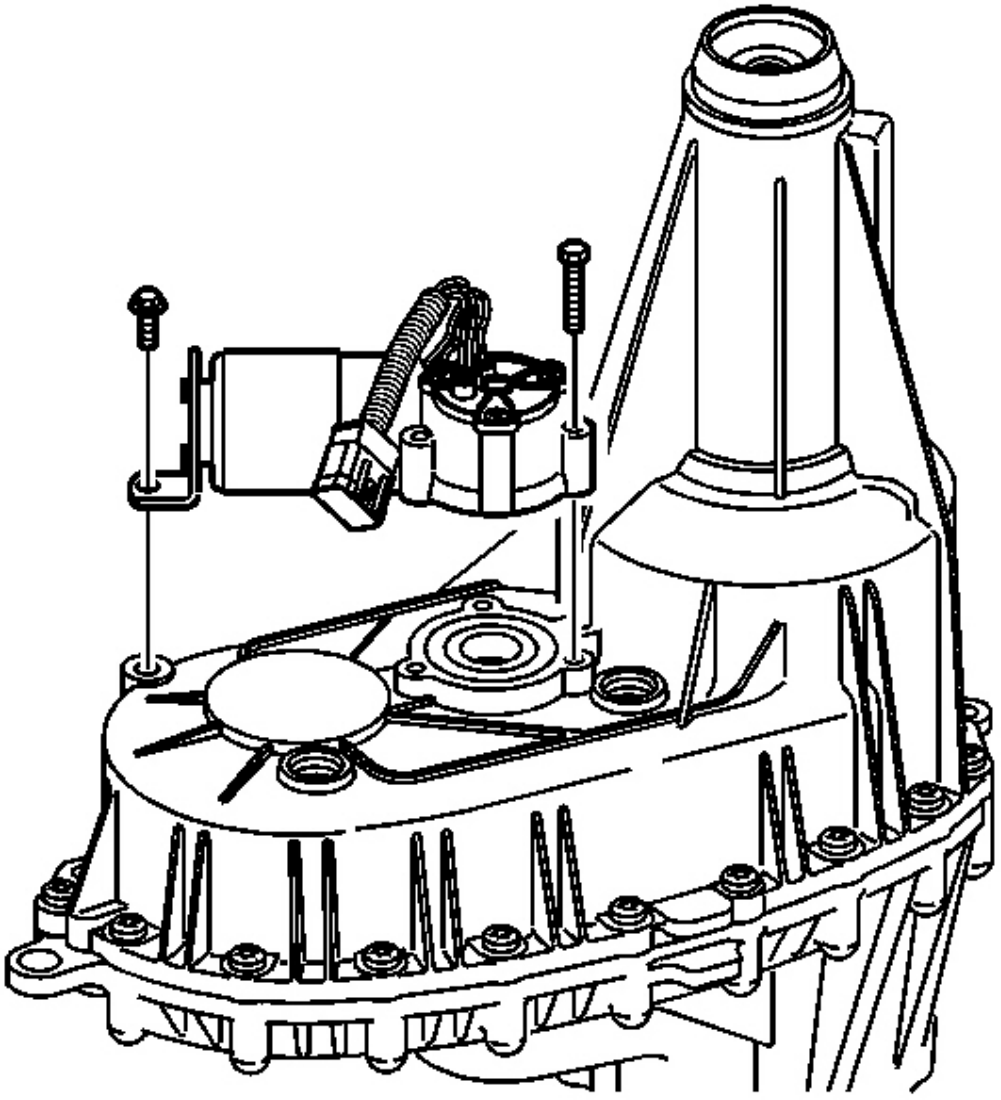


Fig. 9: Locating Encoder Motor Assembly
Courtesy of GENERAL MOTORS CORP.

11. Remove the encoder motor bracket bolt.
12. Remove the encoder motor mounting bolts.
13. Remove the encoder motor assembly.

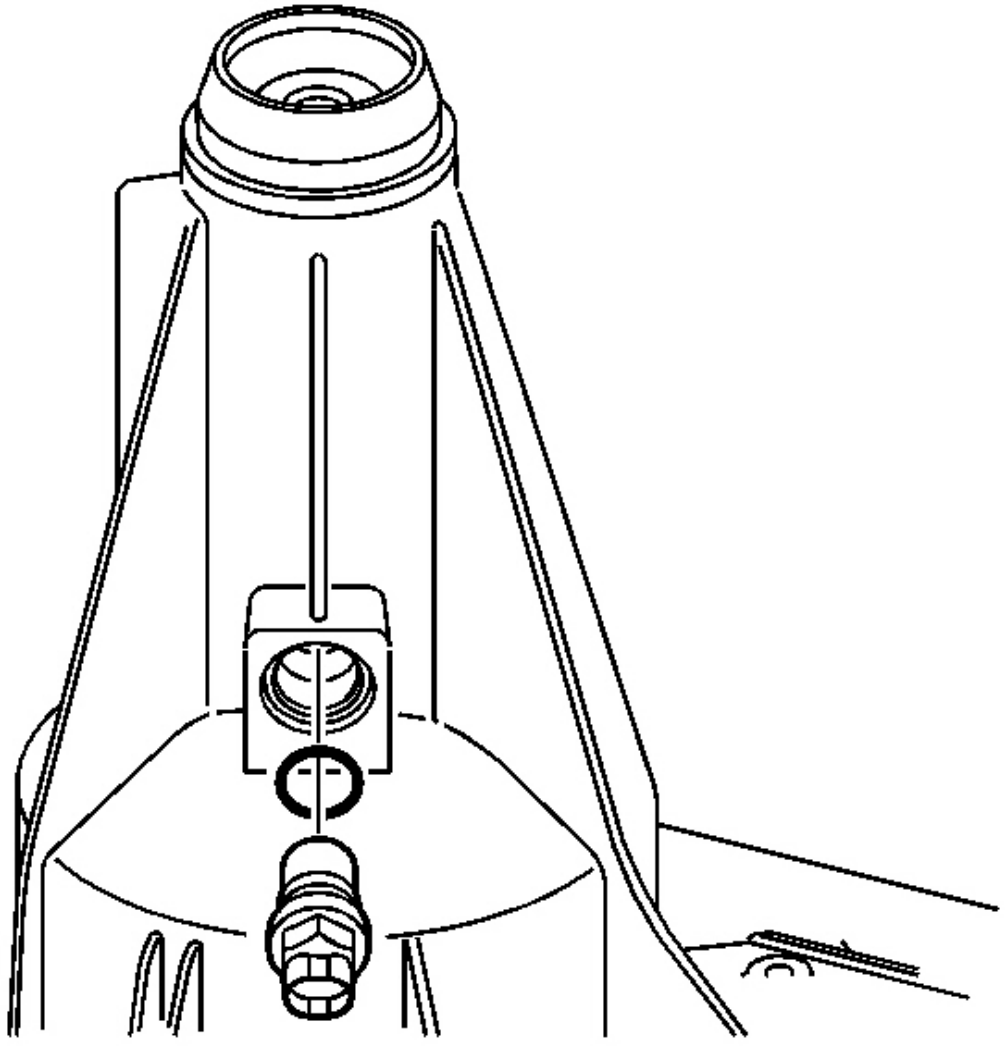


Fig. 10: Identifying Vehicle Speed Sensor (VSS) & O-Ring Seal
Courtesy of GENERAL MOTORS CORP.

14. Remove the vehicle speed sensor (VSS) and the O-ring seal.

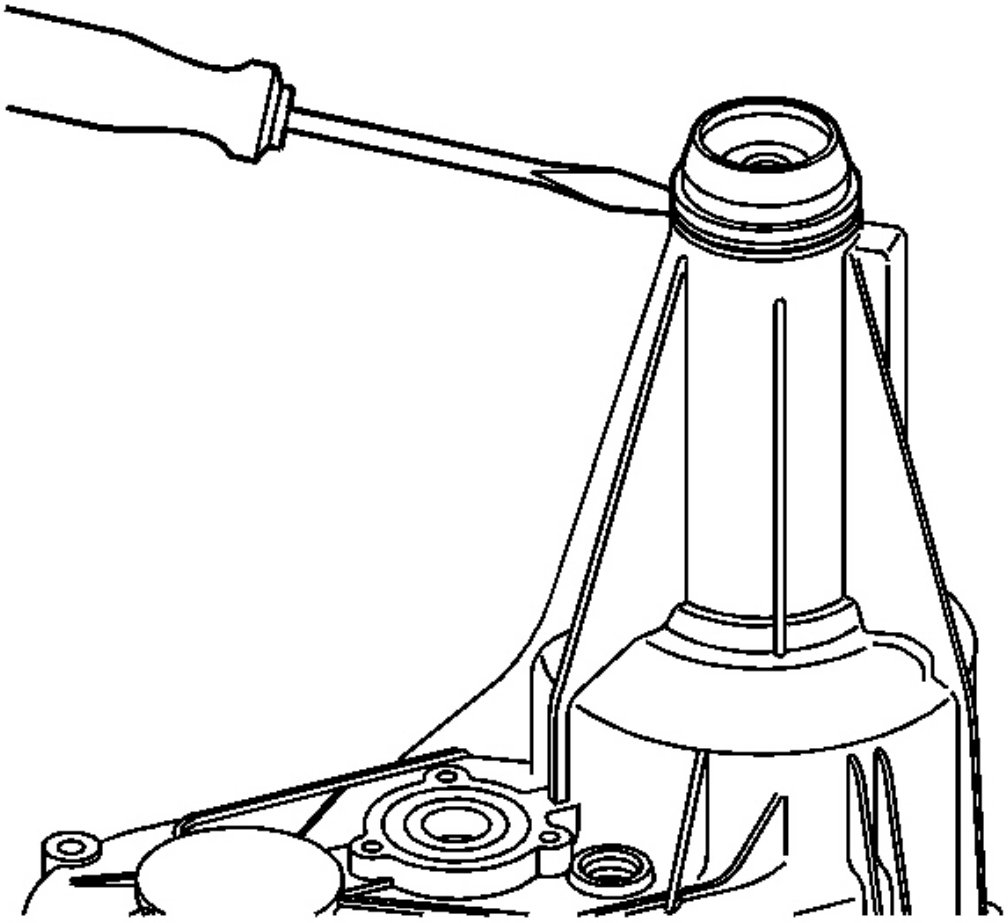


Fig. 11: Removing Rear Output Shaft Seal
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Transfer Case Seal Removal Notice in Cautions and Notices.

15. Remove the rear output shaft seal by prying it out with a flat-blade screwdriver.
16. Remove the shipping seal from the rear output shaft, if equipped.

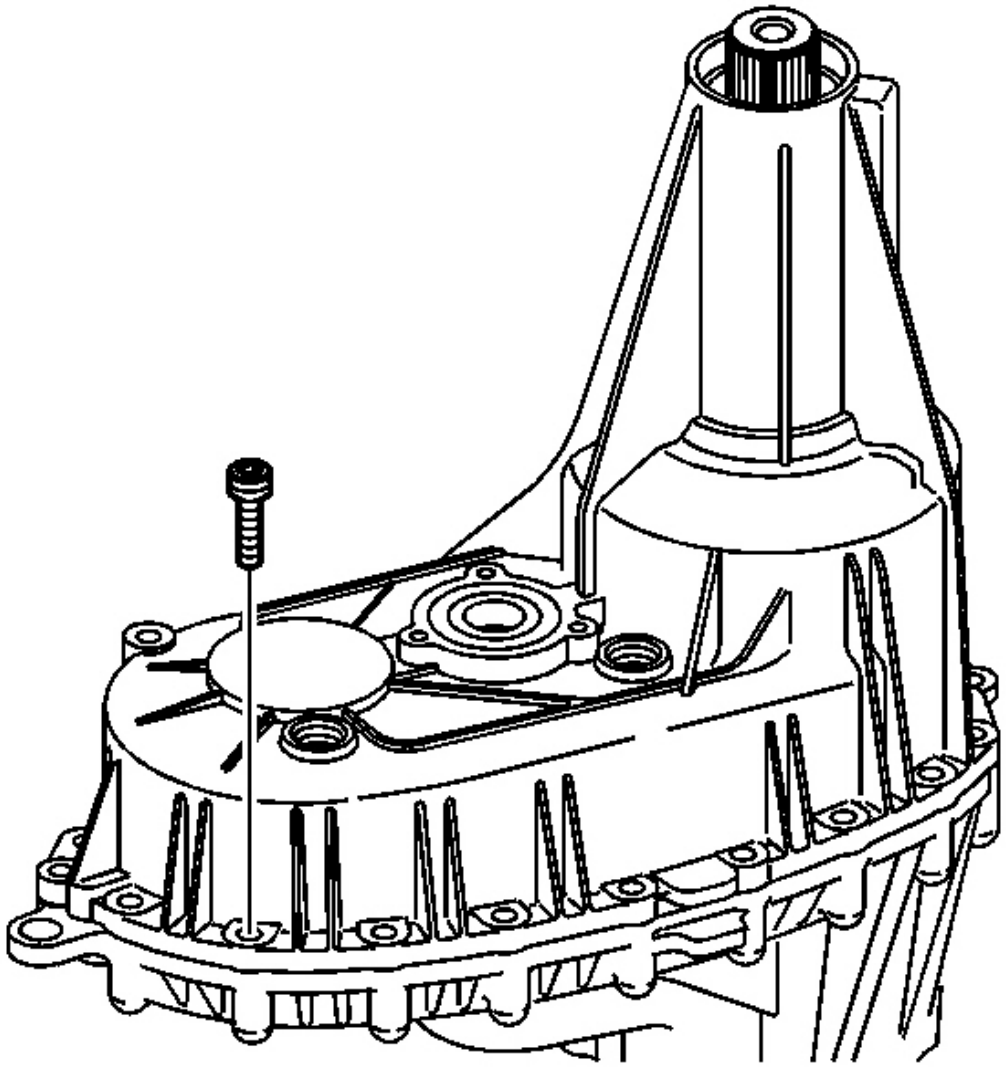


Fig. 12: Identifying Transfer Case Retaining Bolts
Courtesy of GENERAL MOTORS CORP.

17. Remove the transfer case retaining bolts and washers.

    Mark the location of the brackets.

NOTE: **Refer to Machined Surface Damage Notice in Cautions and Notices.**

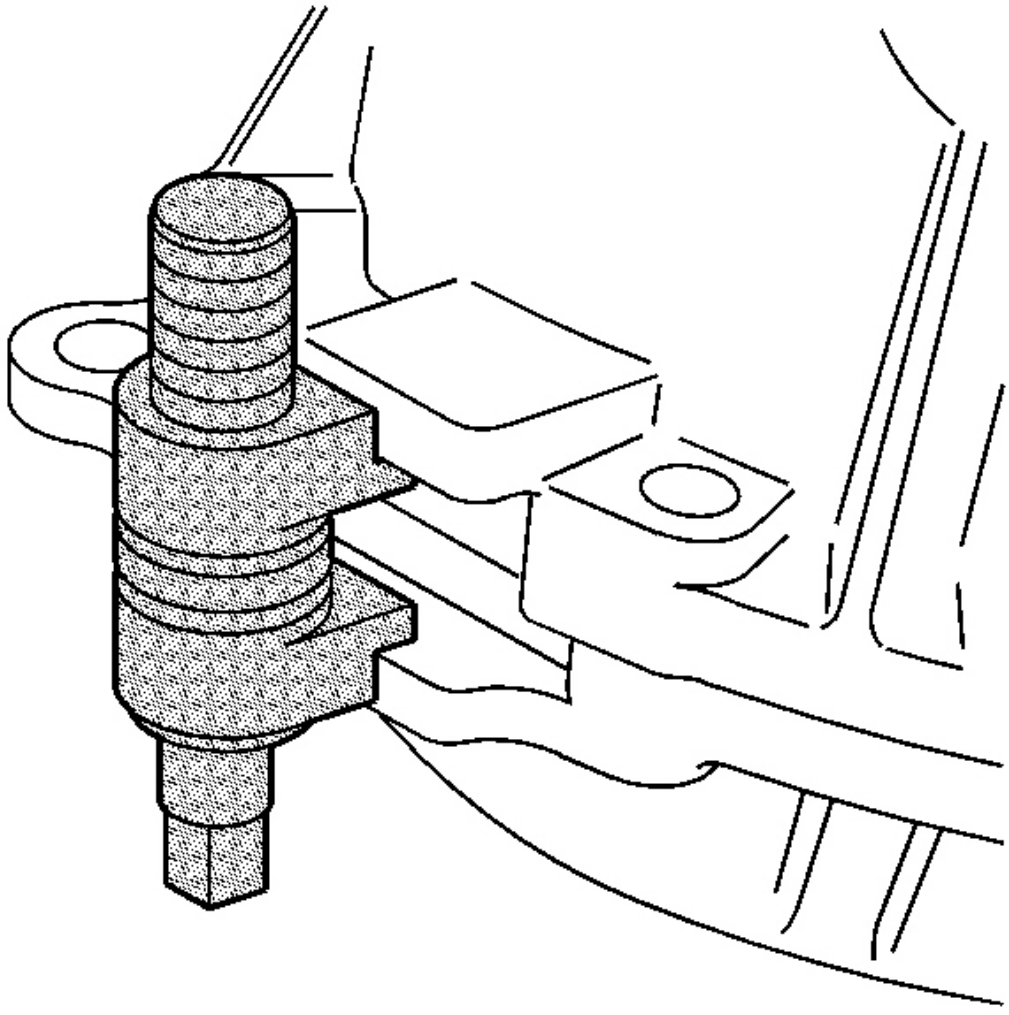


Fig. 13: View Of J 45358 Installed Between The Tabs On The Case Halves
Courtesy of GENERAL MOTORS CORP.

18. Using the **J 45358** between the tabs on the case halves, shear the sealer that is holding the case halves together.
19. Using pry bars at each side of the case, remove the case from the locating pins.

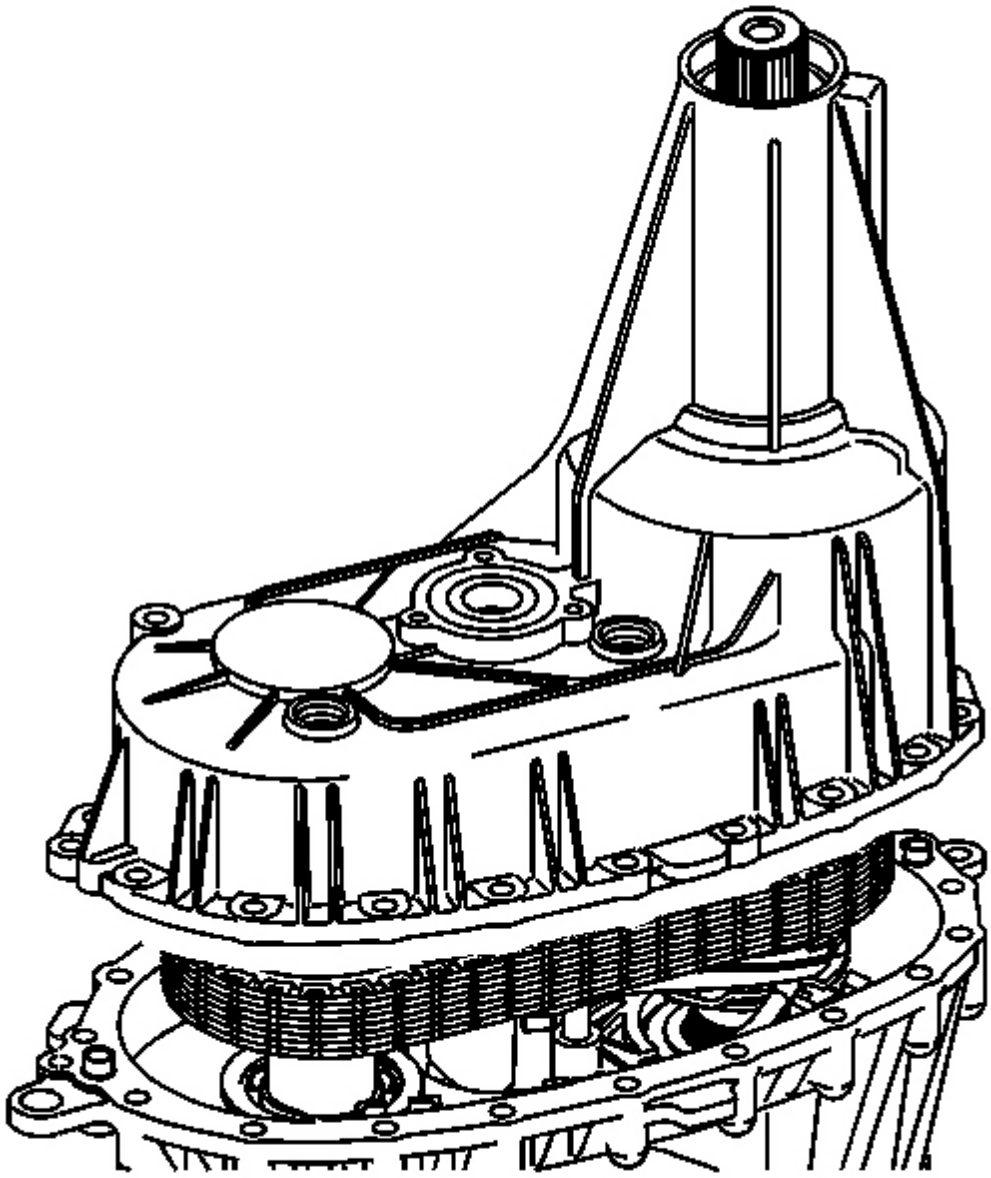


Fig. 14: View Of Rear Case & Front Case Half
Courtesy of GENERAL MOTORS CORP.

20. Remove the rear case half from the front case half. The rear output shaft will come with the rear case half.

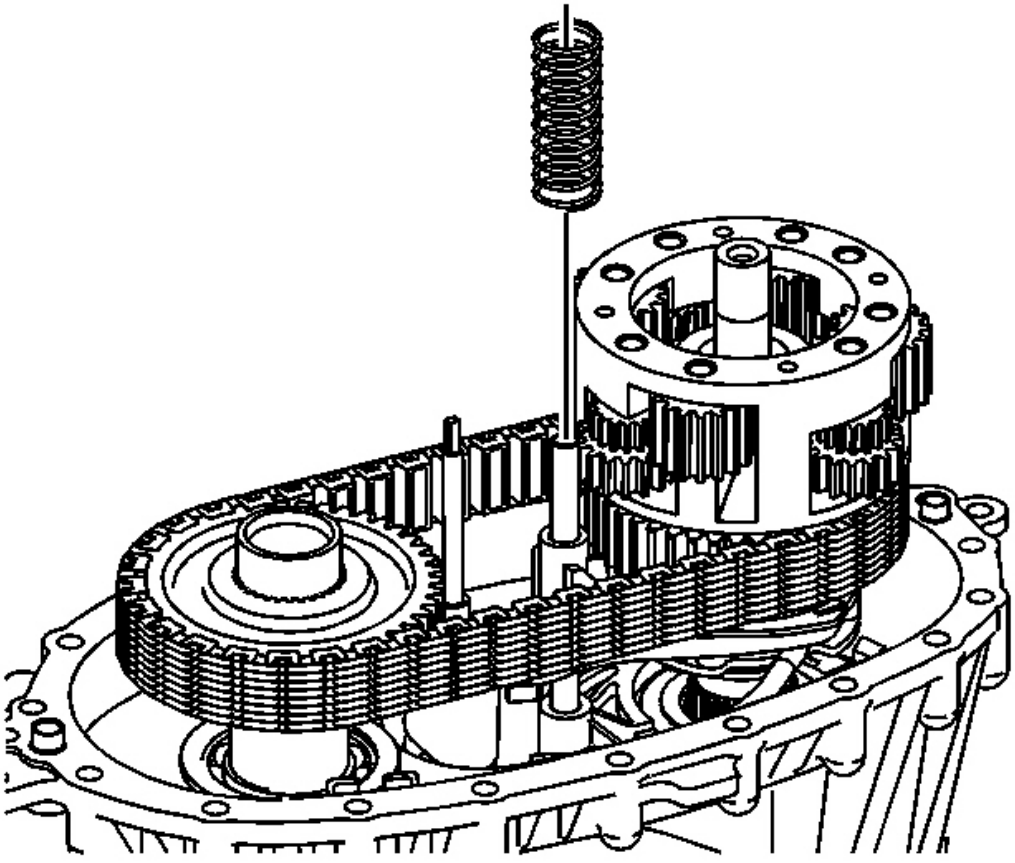


Fig. 15: Identifying Shift Fork Shaft Spring
Courtesy of GENERAL MOTORS CORP.

21. Remove the shift fork shaft spring.

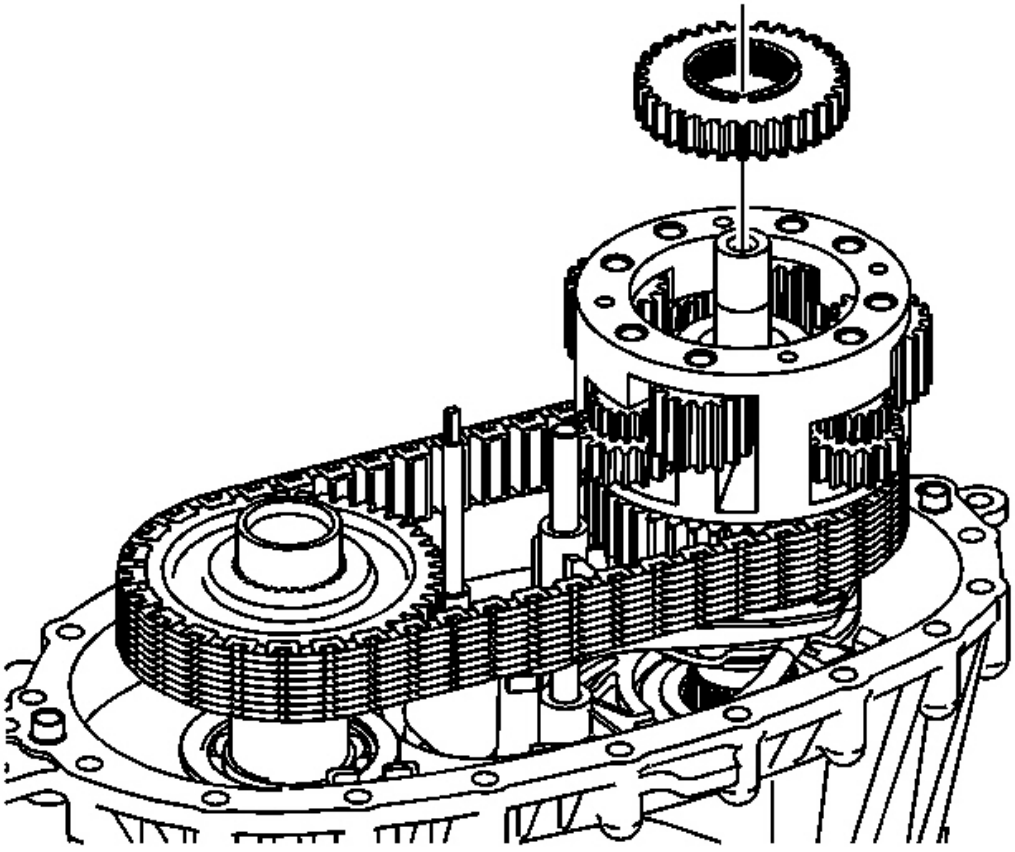


Fig. 16: View Of Rear Sun Gear
Courtesy of GENERAL MOTORS CORP.

22. Remove the rear sun gear.

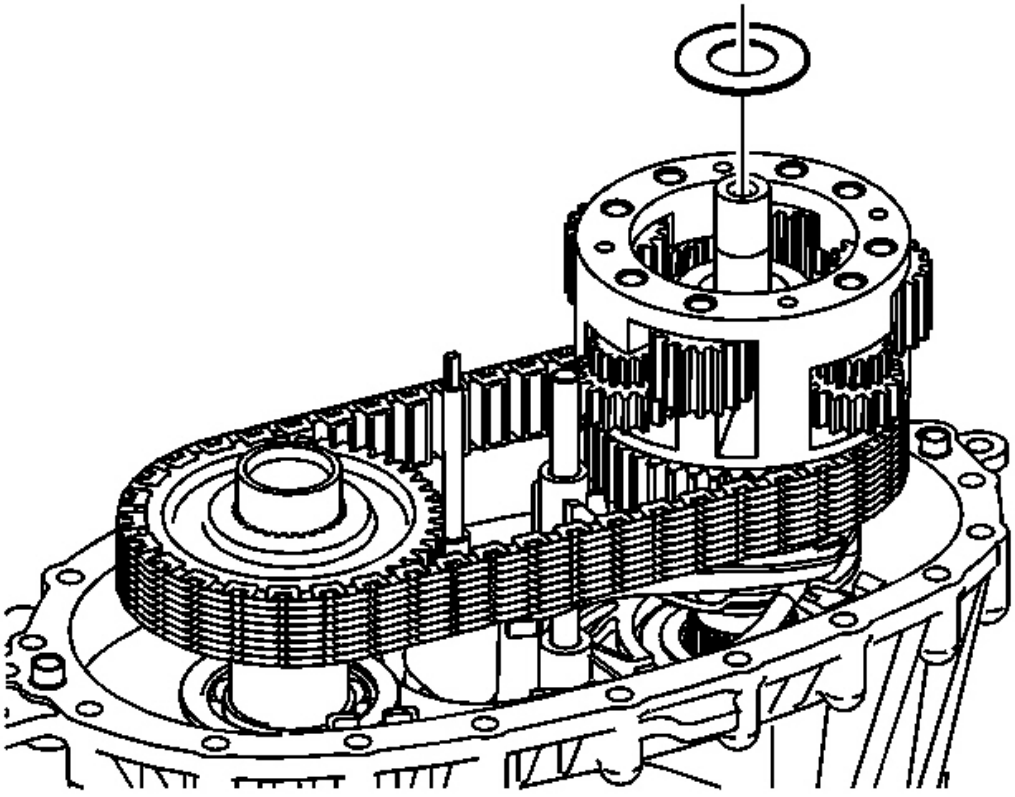


Fig. 17: Locating Rear Output Shaft Thrust Washer
Courtesy of GENERAL MOTORS CORP.

23. Remove the rear output shaft thrust washer.

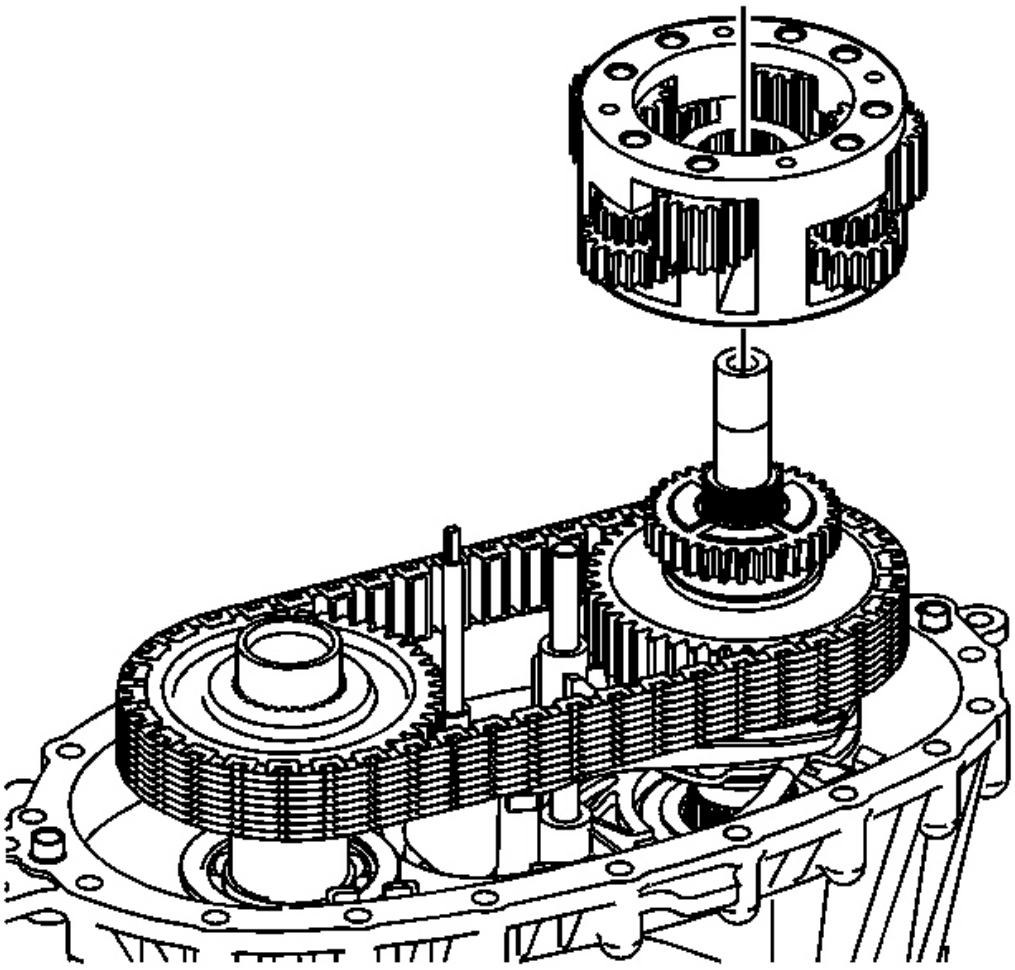


Fig. 18: View Of Planetary Differential Assembly
Courtesy of GENERAL MOTORS CORP.

24. Remove the planetary differential assembly.

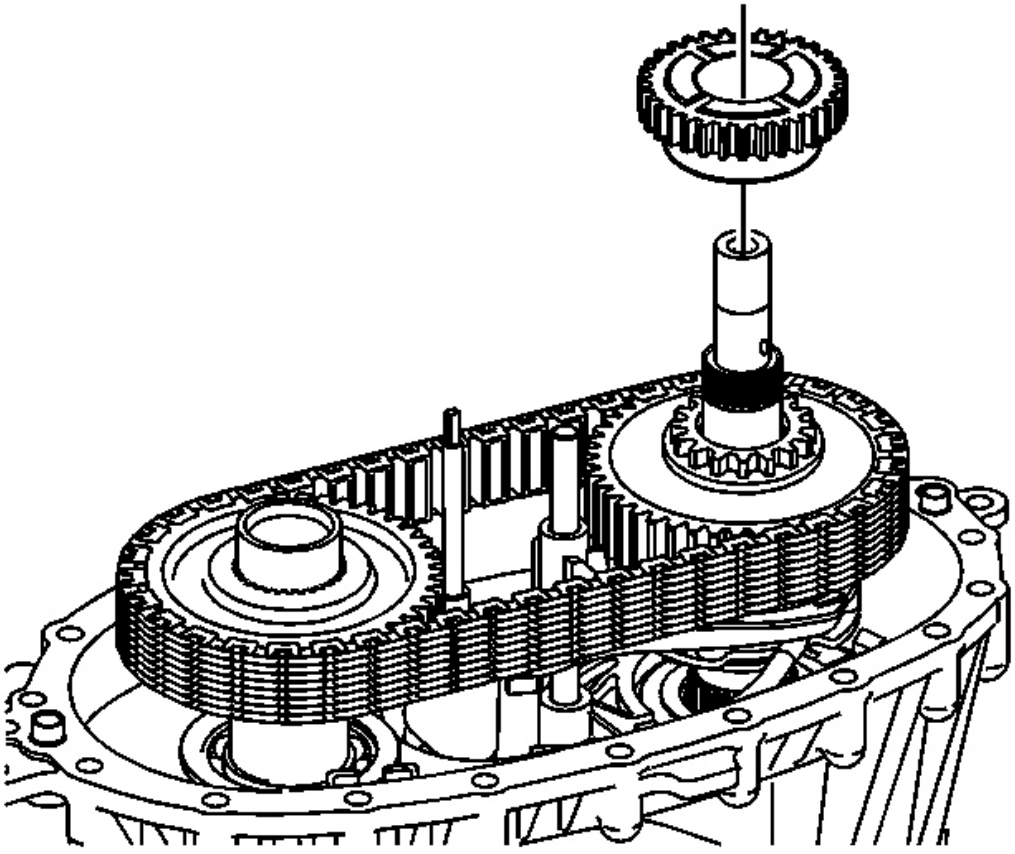


Fig. 19: Identifying Front Sun Gear
Courtesy of GENERAL MOTORS CORP.

25. Remove the front sun gear.

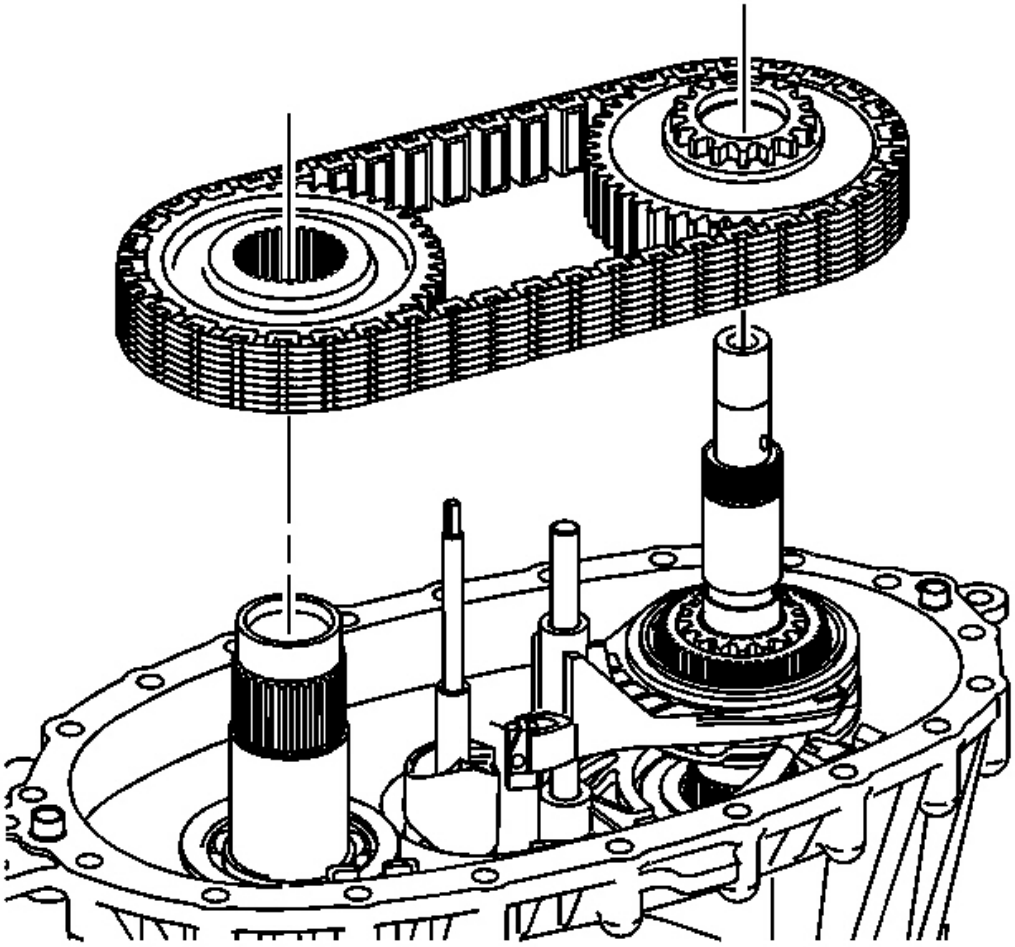


Fig. 20: View Of Drive Chain & Sprockets
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: If the chain and sprockets are to be used again, mark the relationship of the chain to the sprockets in order to mark the wear patterns.

26. Remove the chain with the drive sprocket and driven sprocket.

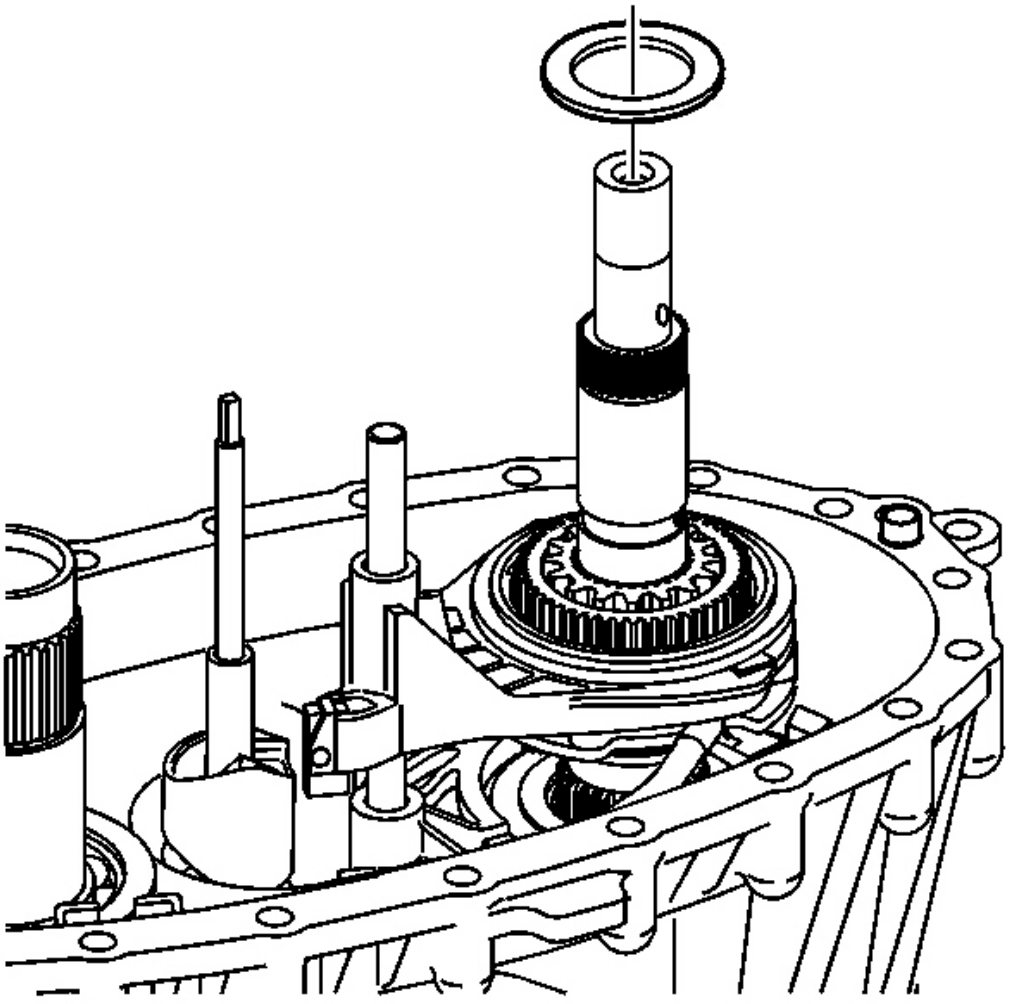


Fig. 21: Identifying Drive Sprocket Thrust Washer
Courtesy of GENERAL MOTORS CORP.

27. Remove the drive sprocket thrust washer.

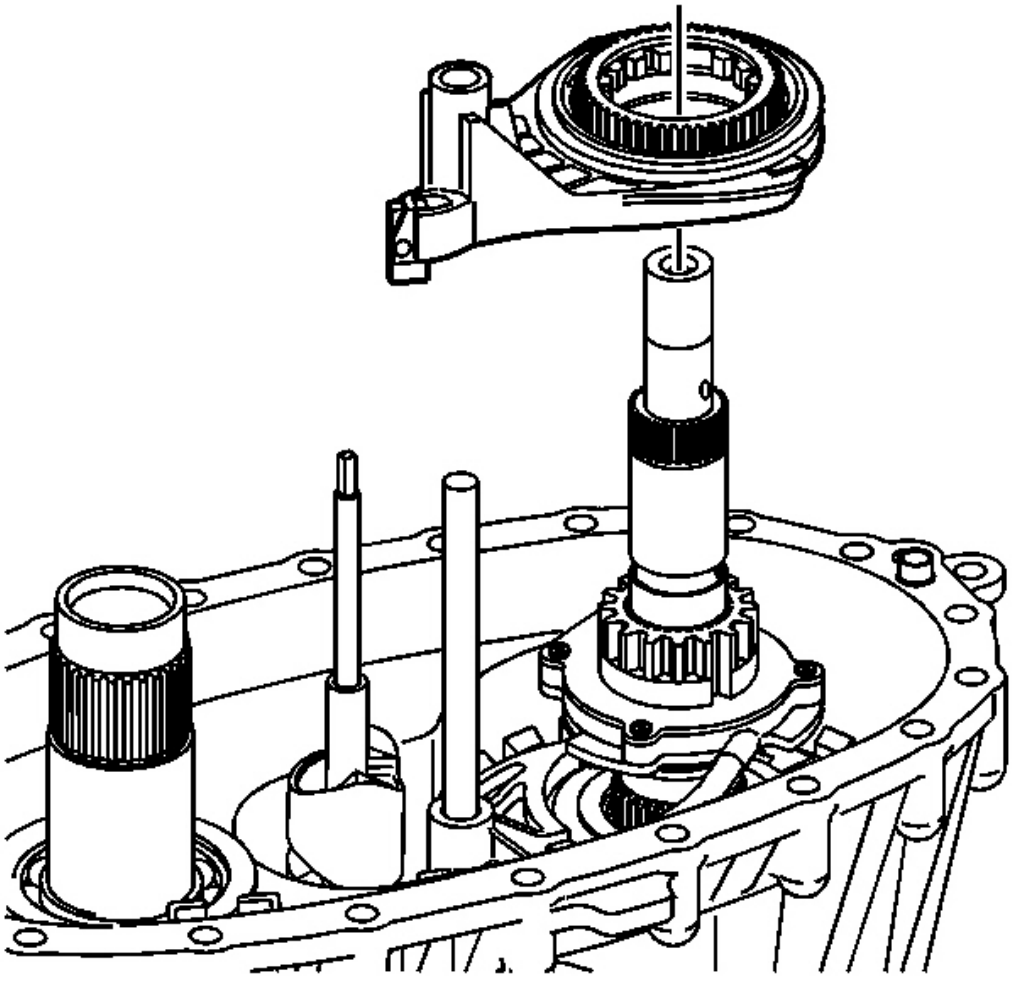


Fig. 22: Identifying Lockup Shift Assembly & Lockup Mode Shift Fork
Courtesy of GENERAL MOTORS CORP.

28. Remove the lockup shift assembly and lockup mode shift fork.

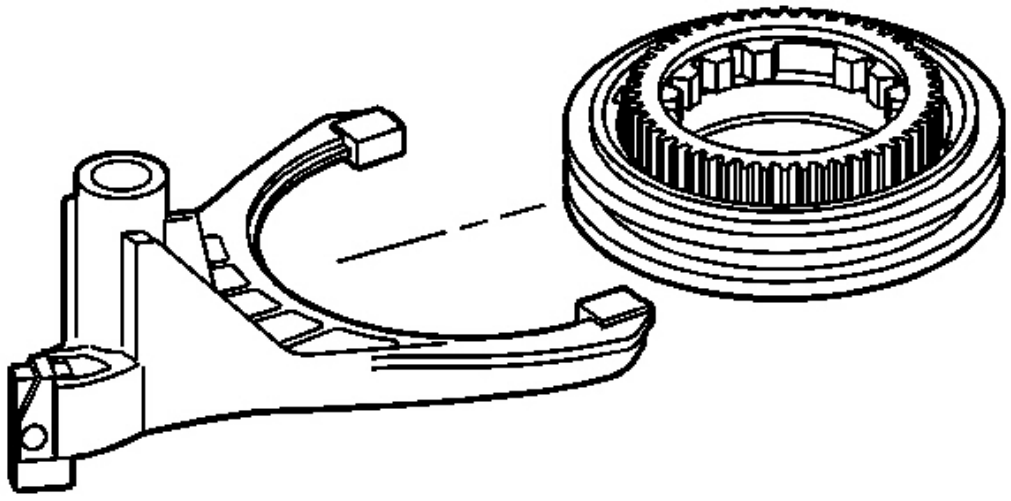


Fig. 23: View Of Lockup Shift Assembly & Lockup Mode Shift Fork
Courtesy of GENERAL MOTORS CORP.

29. Remove the lockup mode shift fork from the lockup shift assembly.

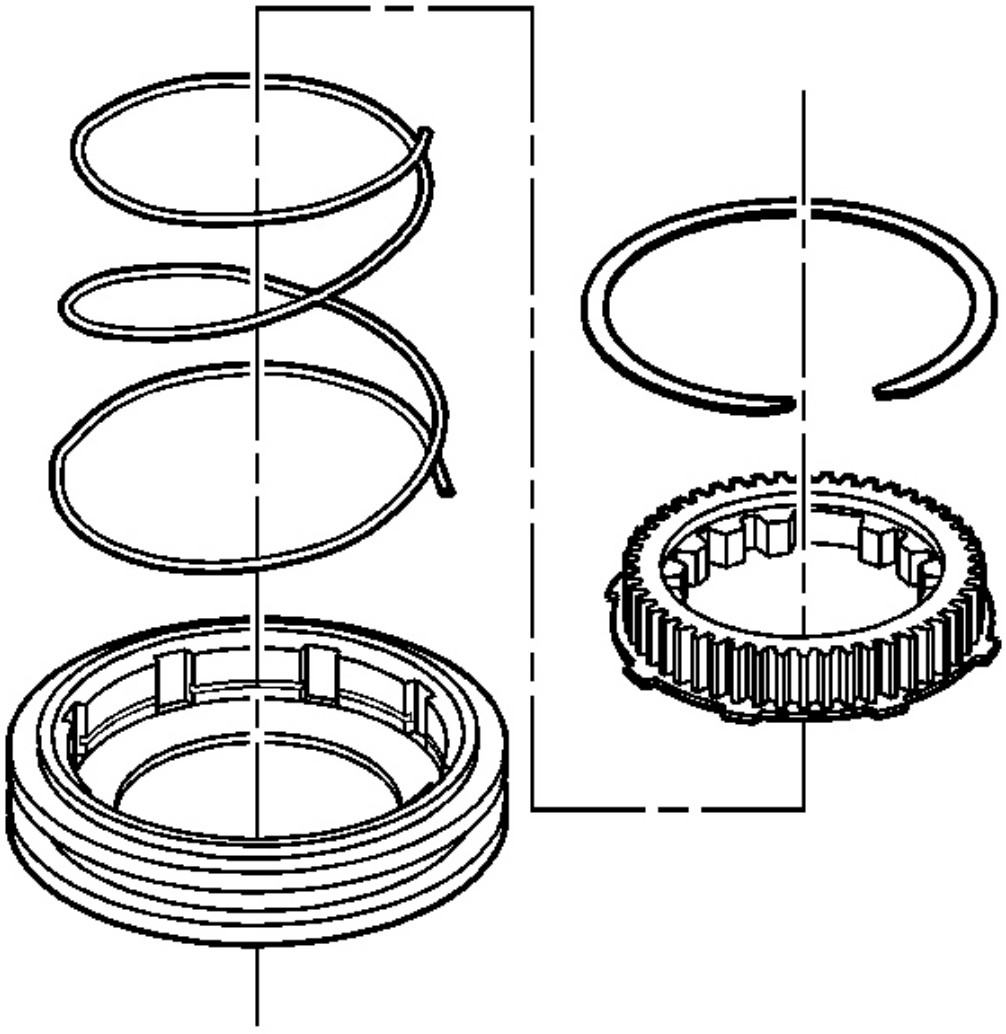


Fig. 24: Illustrating Lockup Shift Assembly Components
Courtesy of GENERAL MOTORS CORP.

30. If necessary, disassemble the lockup shift assembly.
    1. Remove the retainer ring from the sleeve.
    2. Remove the hub.
    3. Remove the spring.

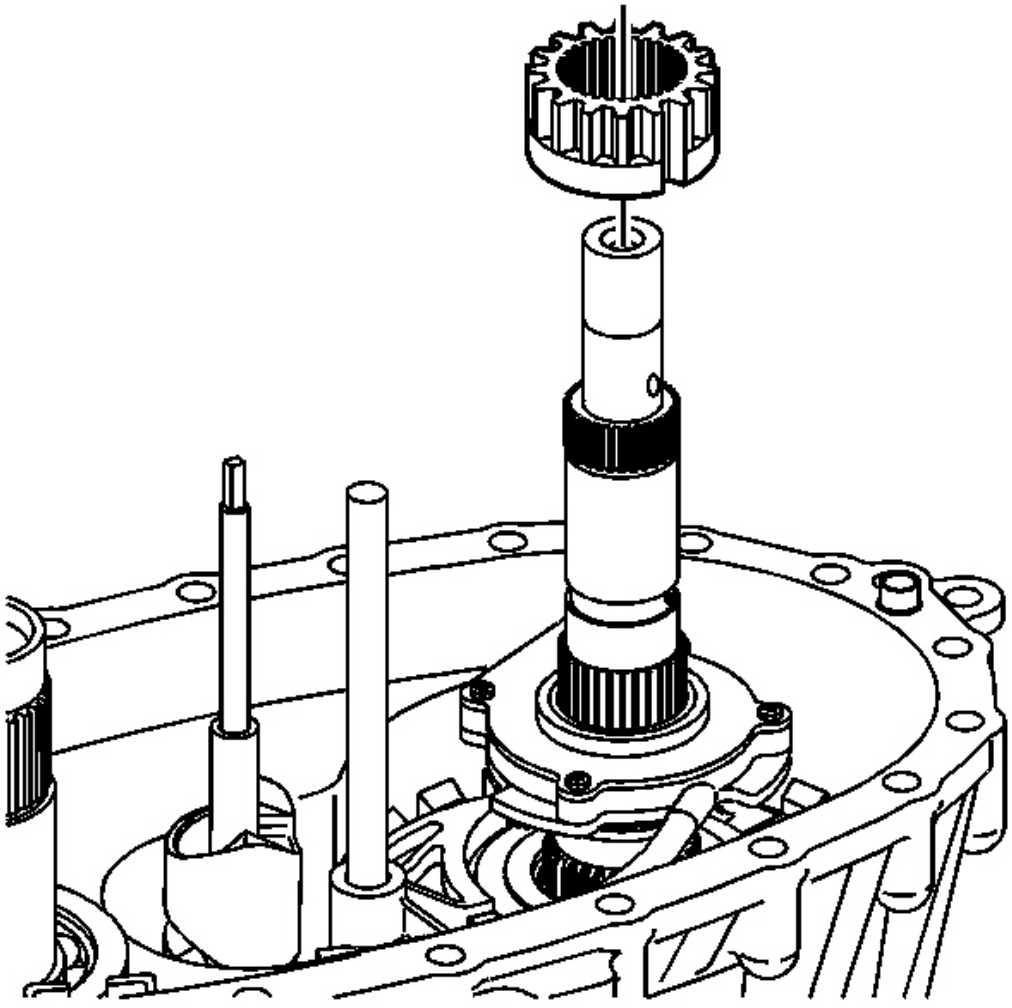


Fig. 25: View Of Inner Lockup Hub
Courtesy of GENERAL MOTORS CORP.

31. Remove the inner lockup hub.

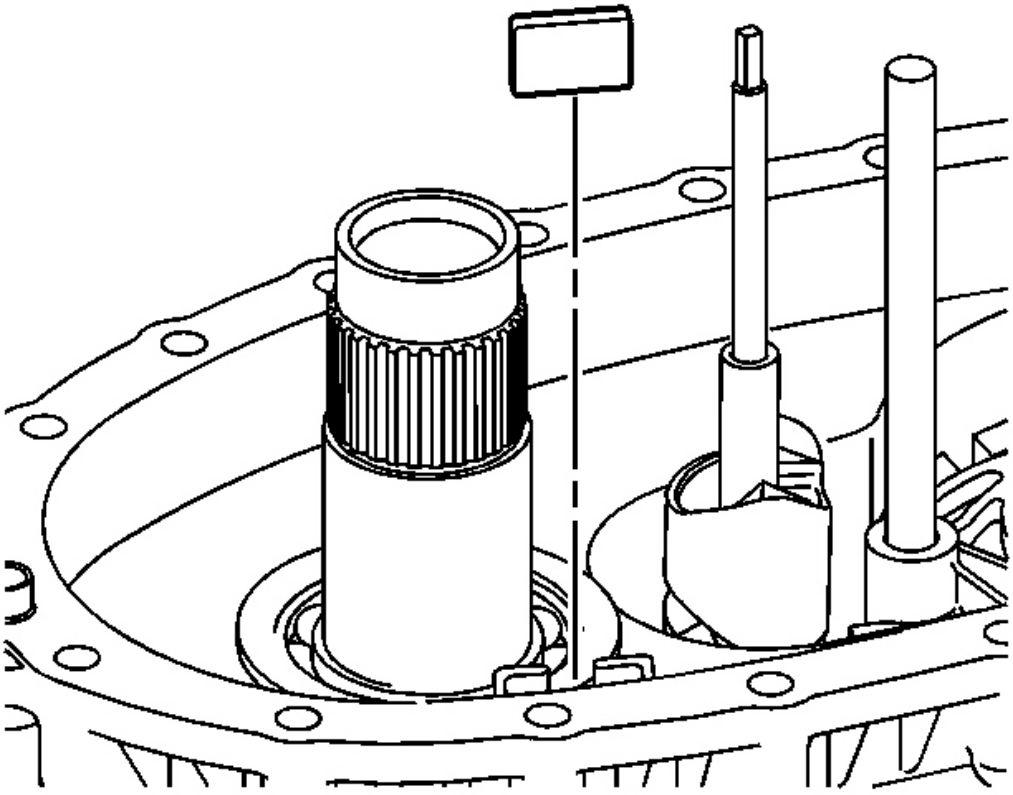


Fig. 26: Identifying Magnet
Courtesy of GENERAL MOTORS CORP.

32. Remove the magnet.

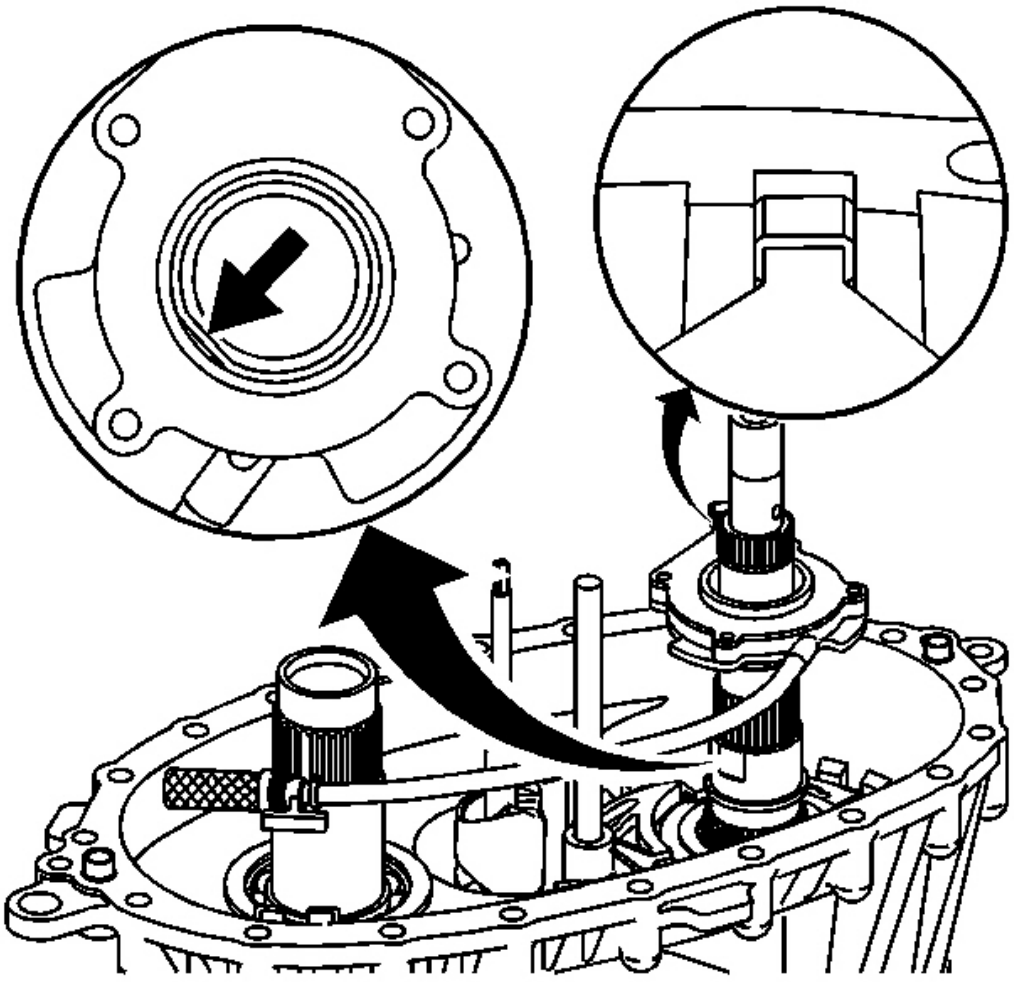


Fig. 27: Expanded View Of Oil Pump Assembly
Courtesy of GENERAL MOTORS CORP.

33. Remove the oil pump assembly with the hose and screen.

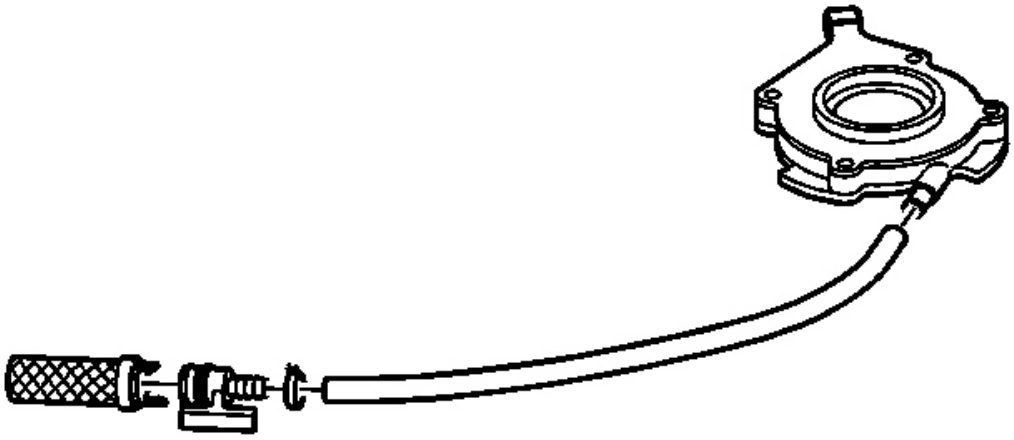


Fig. 28: Locating Oil Pump Hose & Screen
Courtesy of GENERAL MOTORS CORP.

34. Disconnect the oil pump hose from the oil pump screen.
35. Disconnect the oil pump hose from the oil pump.

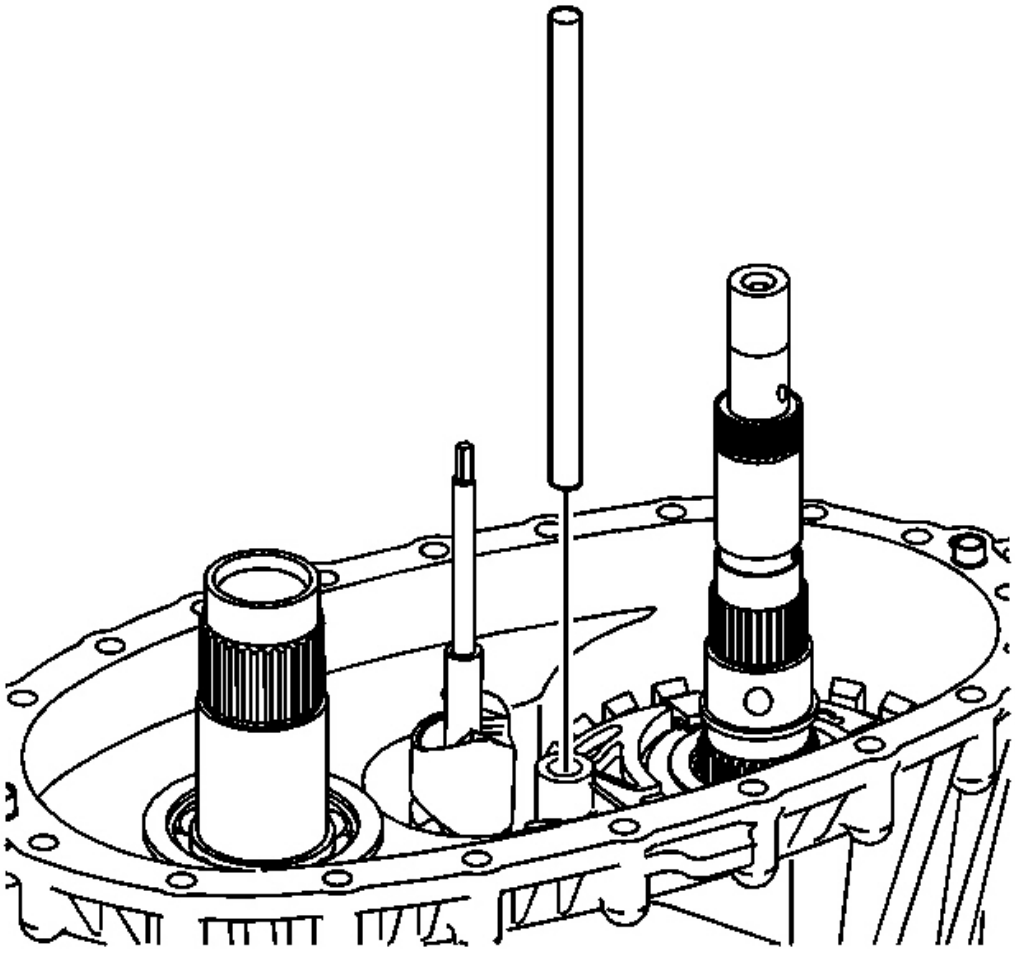


Fig. 29: View Of Shift Fork Shaft
Courtesy of GENERAL MOTORS CORP.

36. Remove the shift fork shaft.

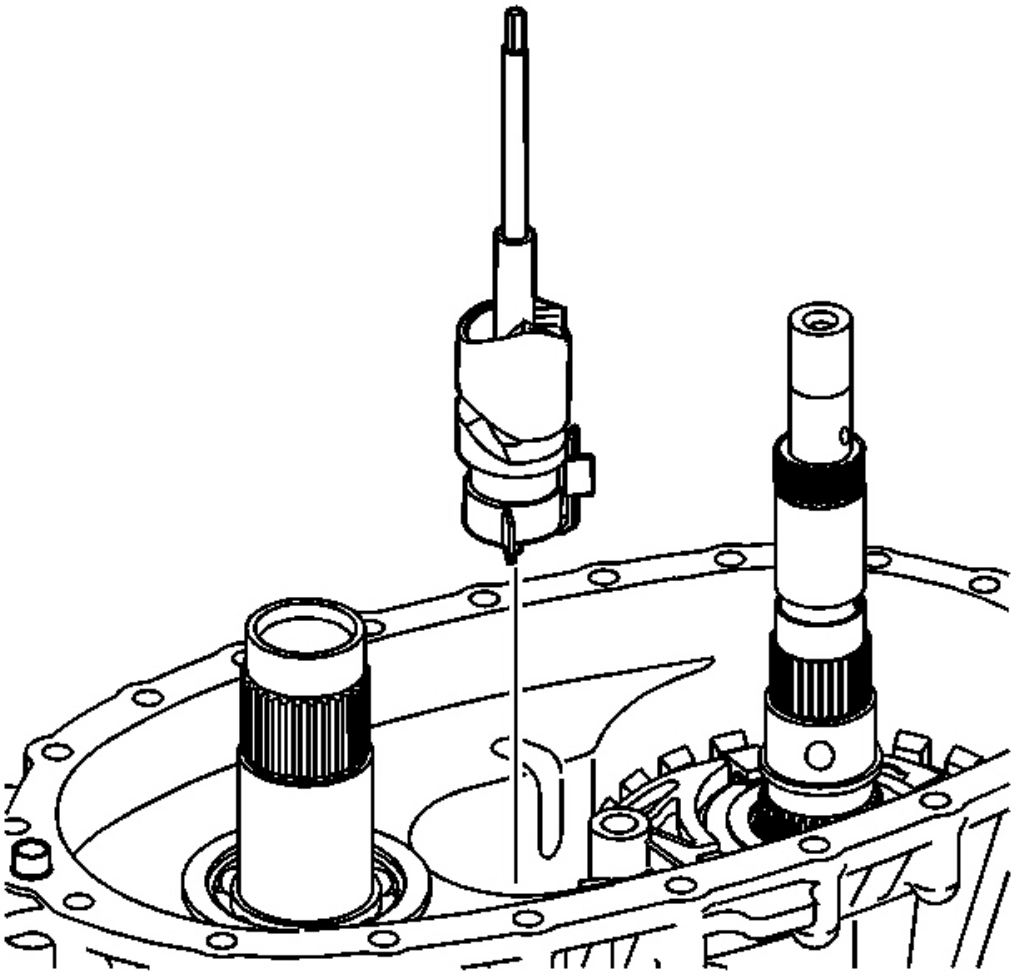


Fig. 30: Shift Detent Lever Assembly
Courtesy of GENERAL MOTORS CORP.

NOTE: In order to prevent component damage, properly remove and install the shift detent lever shaft assembly. When removing or installing the shift detent lever shaft assembly, keep the shaft straight and do not tilt. Tilting the shift detent lever shaft assembly in the transfer case housing will break the tip on the end of the shaft.

37. Remove the shift detent lever assembly.
    - Rotate the high/low shift fork roller from the shift detent lever assembly.
    - Lift straight up on the shift detent lever assembly.

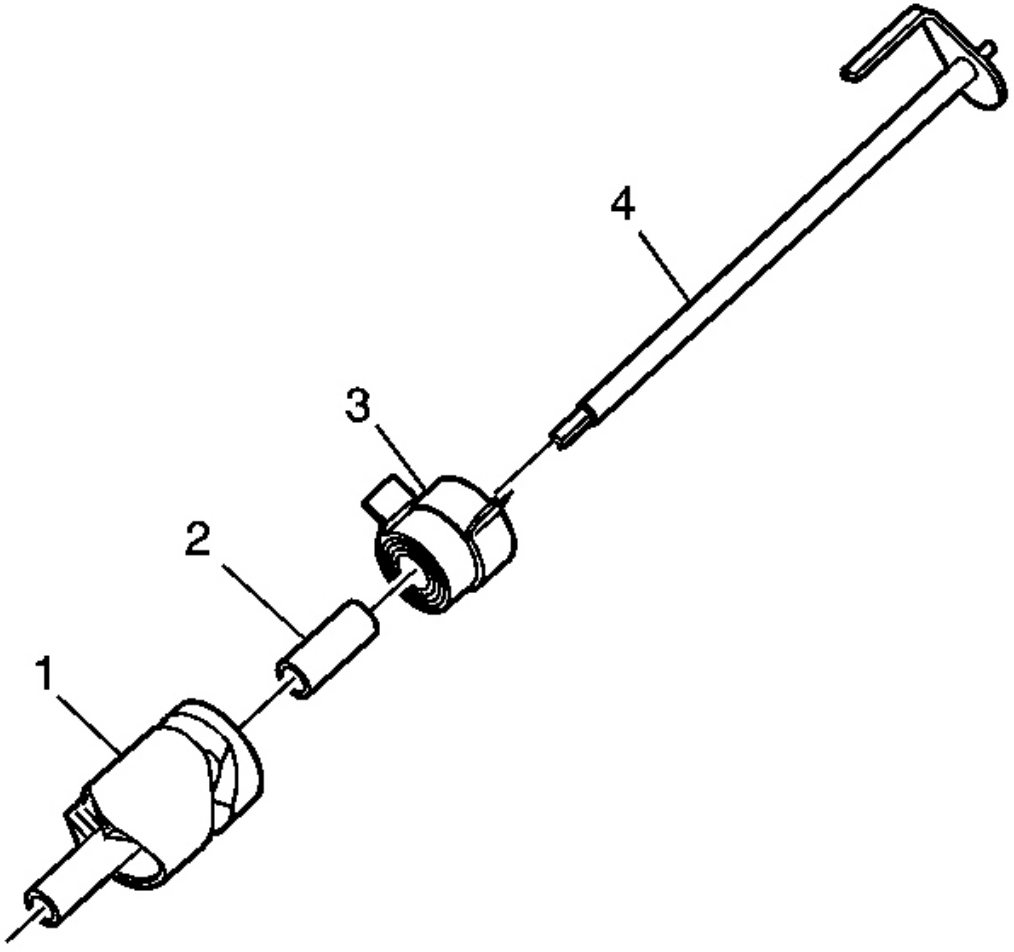


Fig. 31: Expanded View Of Shift Detent Lever Assembly
Courtesy of GENERAL MOTORS CORP.

38. If necessary, disassemble the shift detent lever assembly.
    1. Hold the shift detent lever assembly by one tab of the spring (3), in a vise.
    2. Rotate the other spring tab and slide the detent lever cam (1) off the shaft.
    3. Remove the sleeve (2).
    4. Push the shaft (4) out of the spring (3).

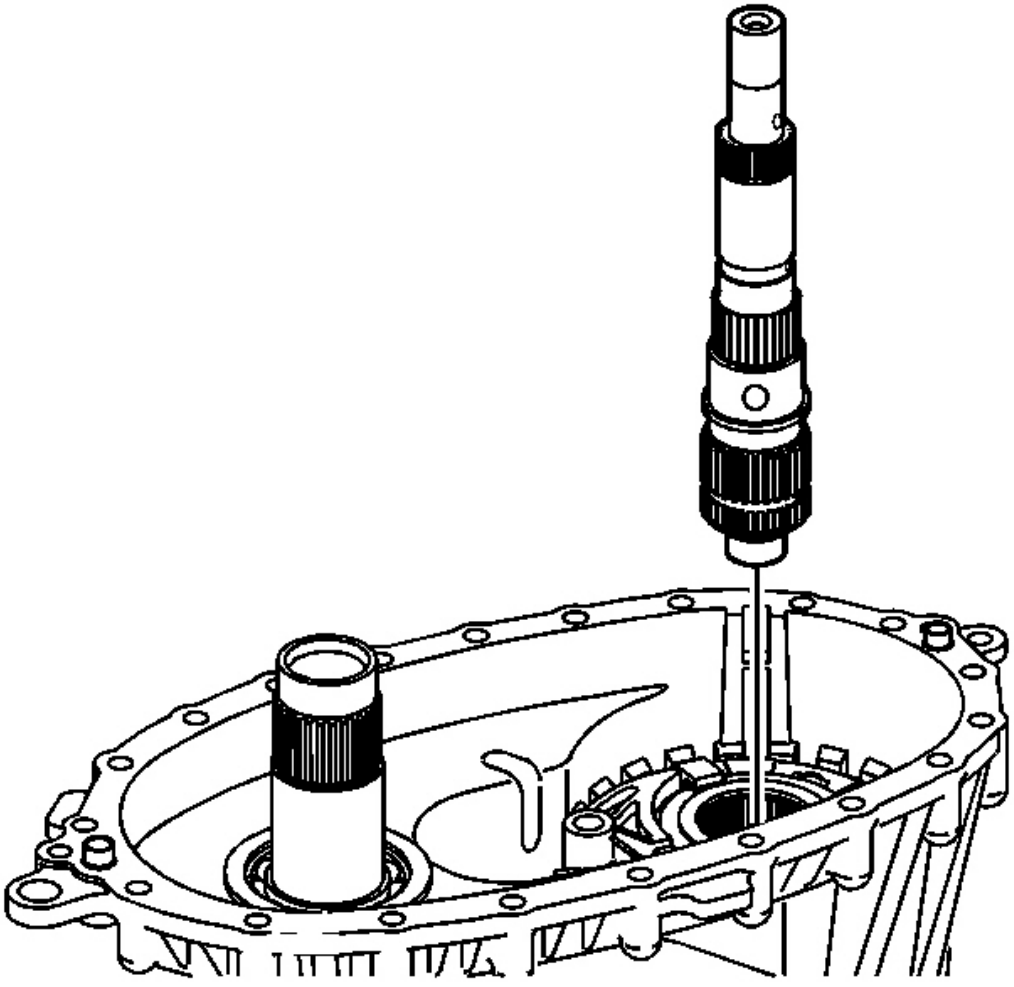


Fig. 32: View Of Mainshaft
Courtesy of GENERAL MOTORS CORP.

39. Remove the mainshaft.

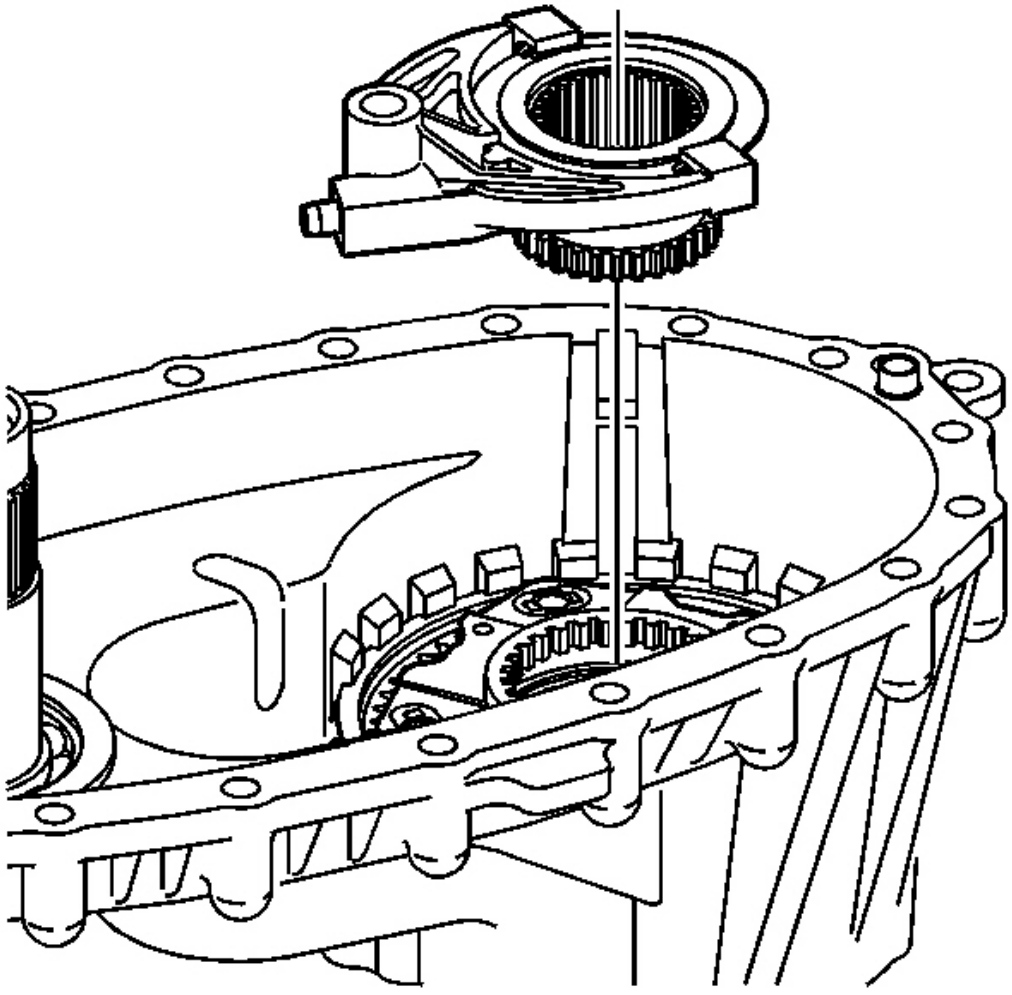


Fig. 33: Identifying High/Low Range Sleeve With The High/Low Range Shift Fork
Courtesy of GENERAL MOTORS CORP.

40. Remove the high/low range sleeve with the high/low range shift fork.

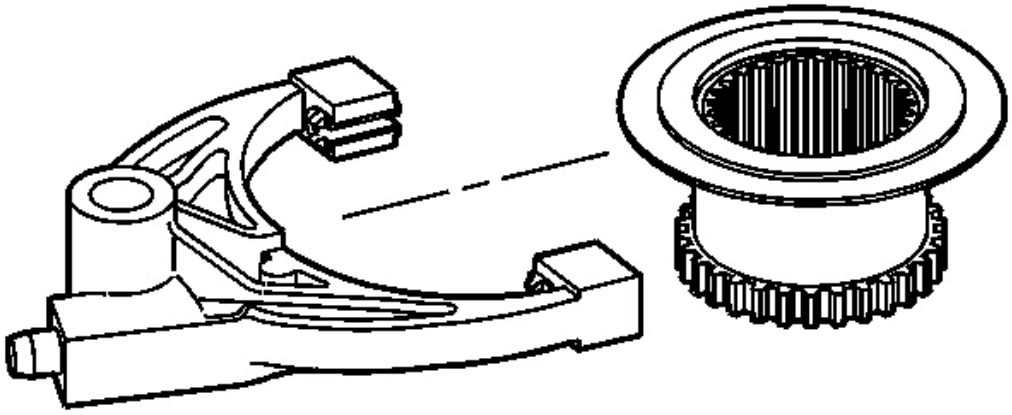


Fig. 34: View Of Range Shift Fork & Range Shift Sleeve
Courtesy of GENERAL MOTORS CORP.

41. Remove the range shift fork from the range shift sleeve.

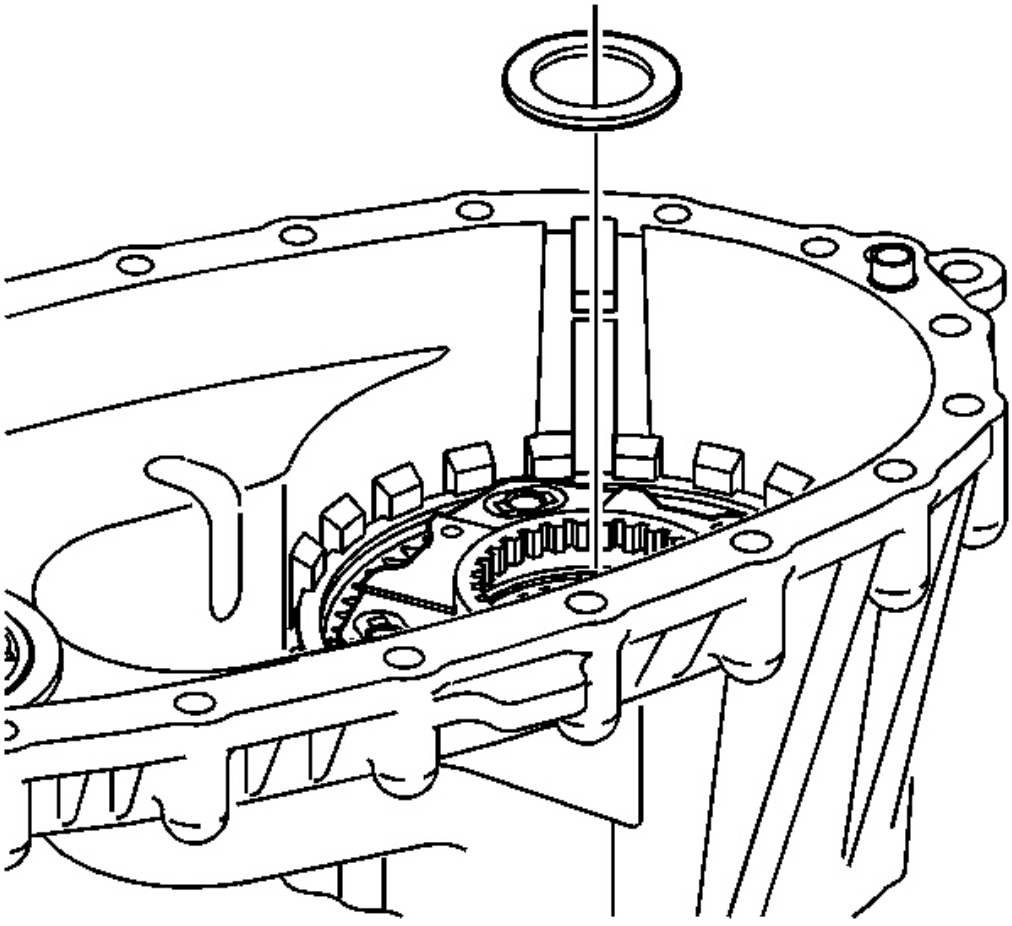


Fig. 35: Locating Input Shaft Thrust Washer
Courtesy of GENERAL MOTORS CORP.

42. Remove the input shaft thrust washer.

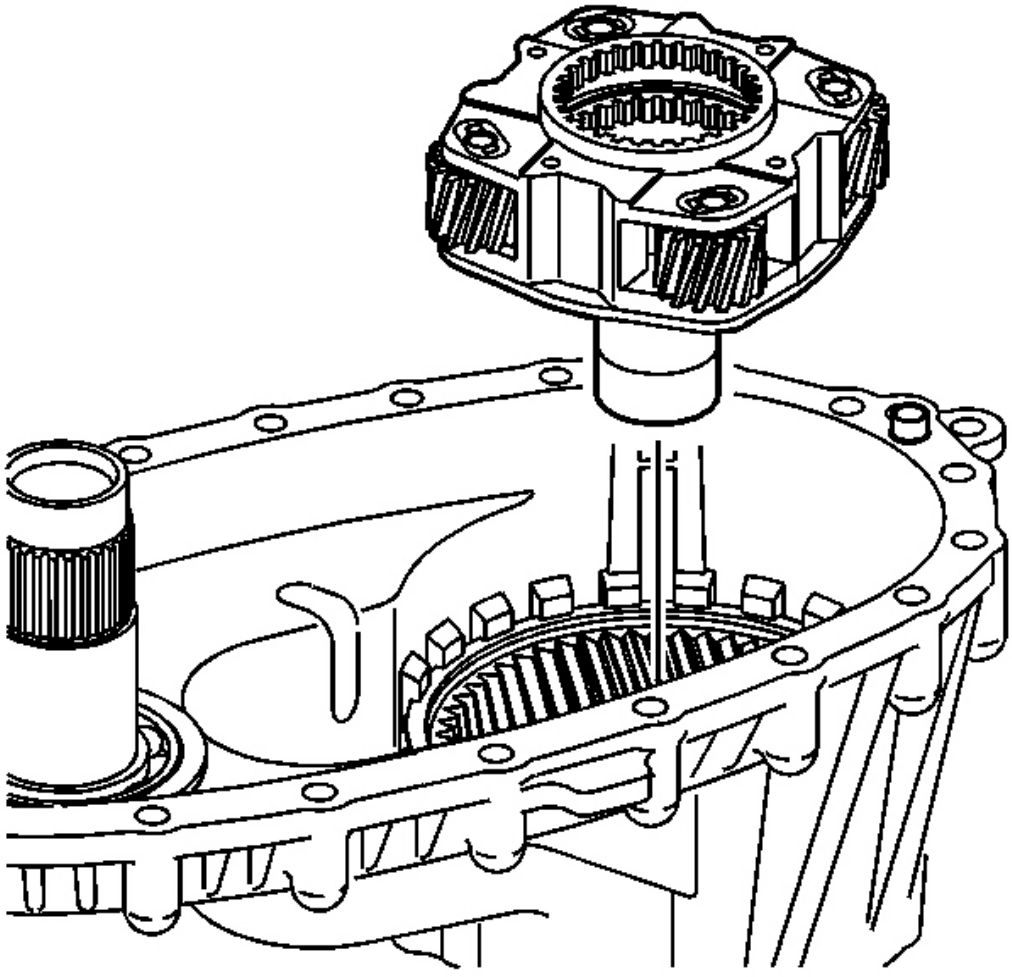


Fig. 36: Identifying High/Low Planetary Carrier
Courtesy of GENERAL MOTORS CORP.

43. Remove the high/low planetary carrier.

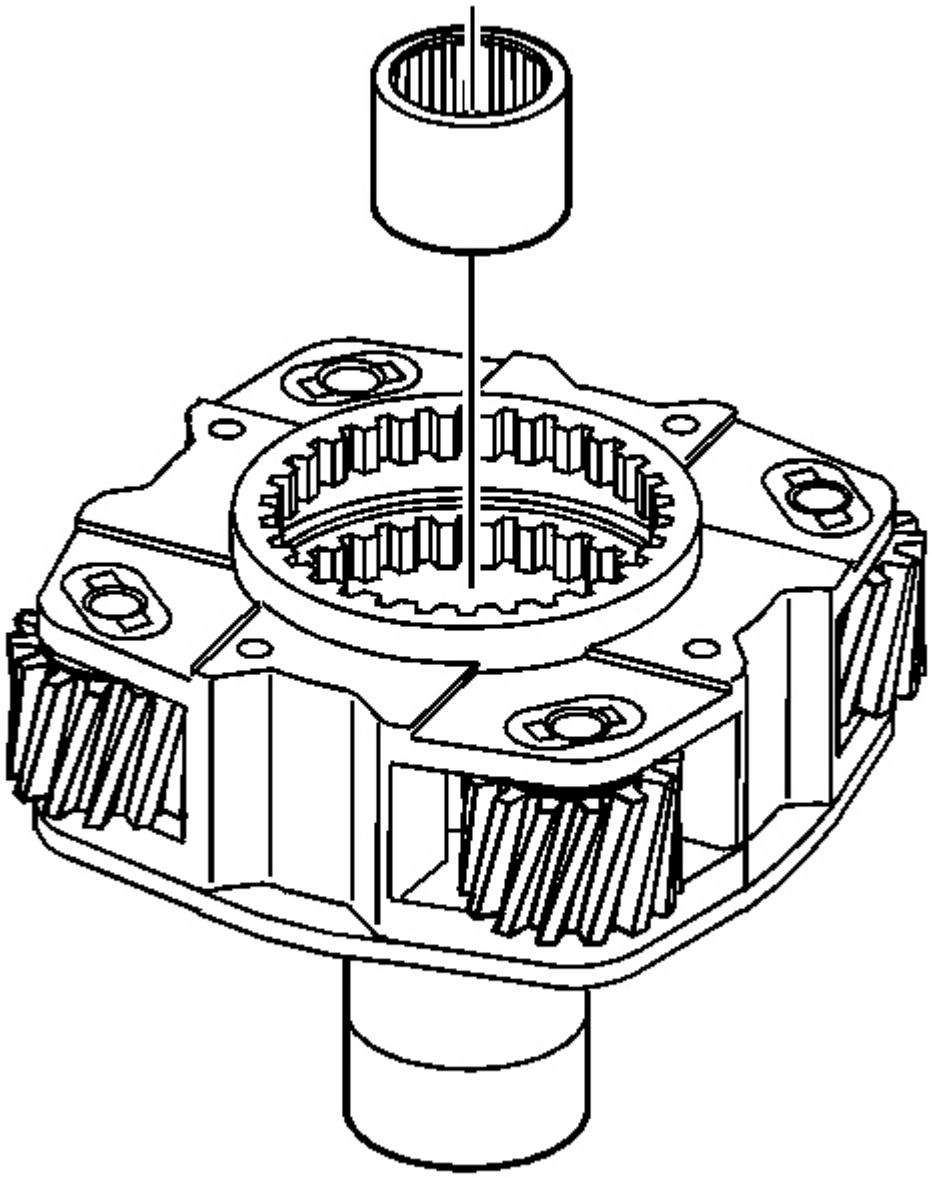


Fig. 37: View Of Mainshaft Front Support Bearing
Courtesy of GENERAL MOTORS CORP.

44. Inspect the mainshaft front support bearing for being faulty. Refer to **Cleaning and Inspection** .
45. Using a brass drift and a hammer, remove the mainshaft front support bearing from the planetary carrier assembly.

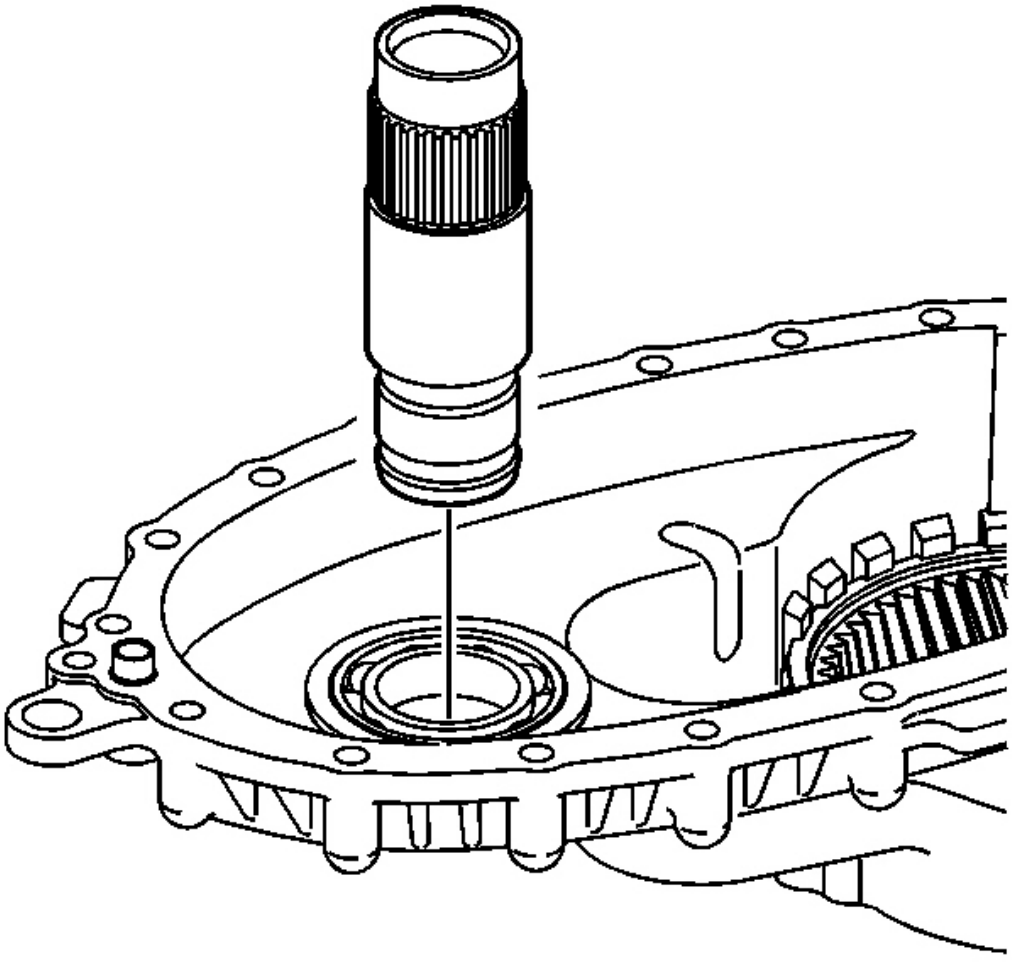


Fig. 38: Front Output Shaft Assembly
Courtesy of GENERAL MOTORS CORP.

46. Remove the front output shaft assembly.

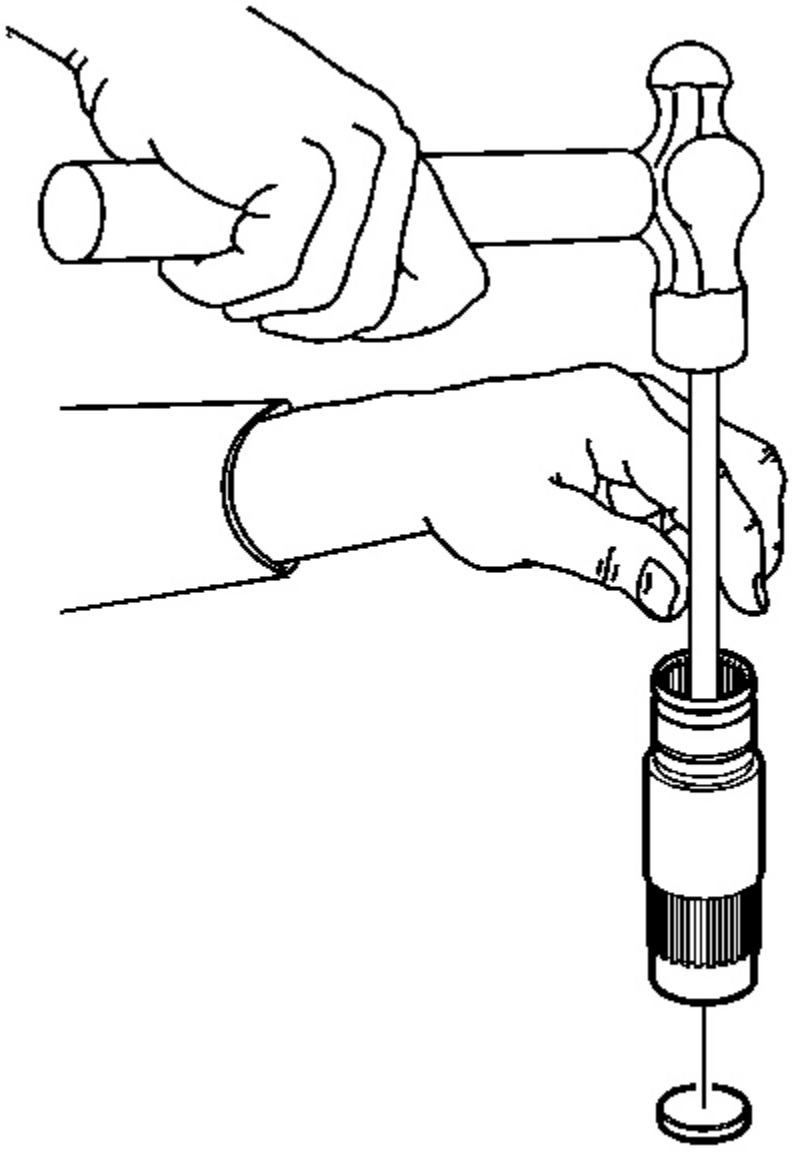


Fig. 39: Removing Cup Plug
Courtesy of GENERAL MOTORS CORP.

47. If the cup plug in the front output shaft is leaking, remove the plug using a brass drift.

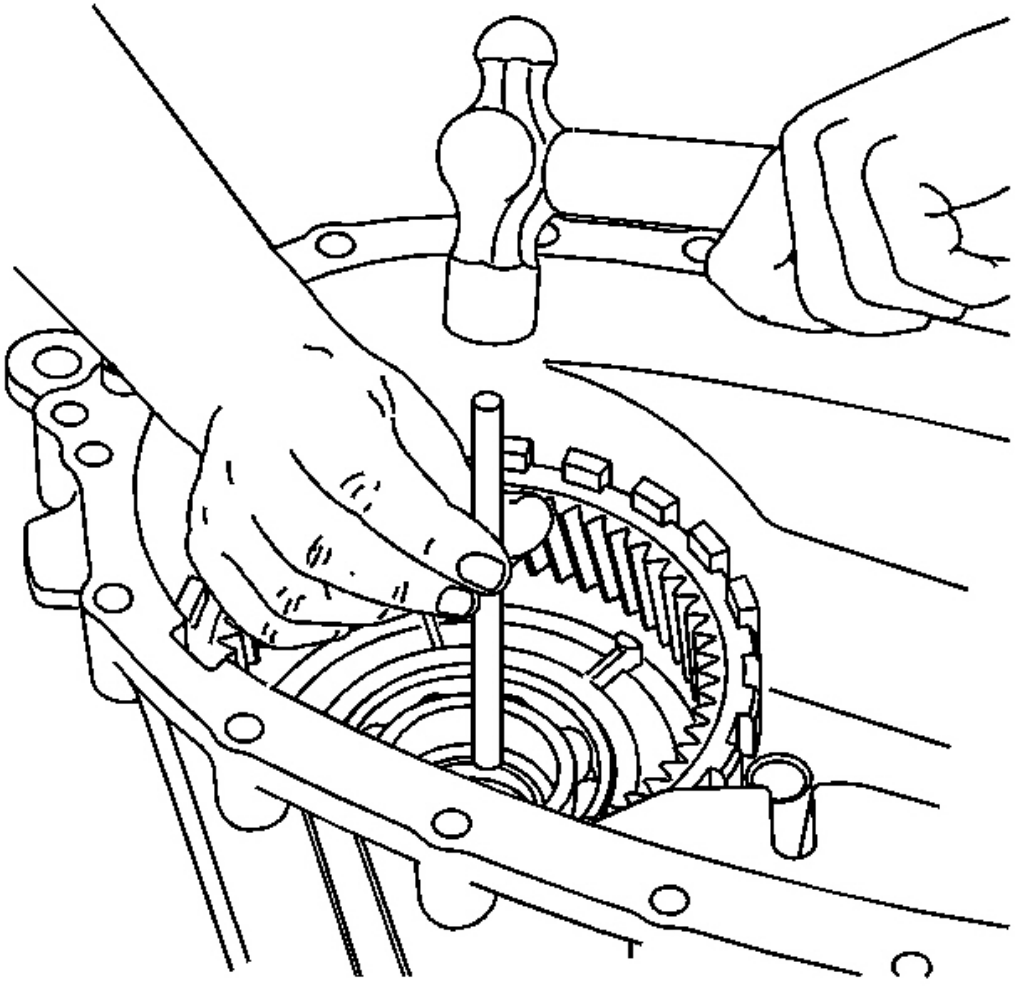


Fig. 40: Identifying Input Seal
Courtesy of GENERAL MOTORS CORP.

48. Using a hammer and a suitable punch, remove the input seal.

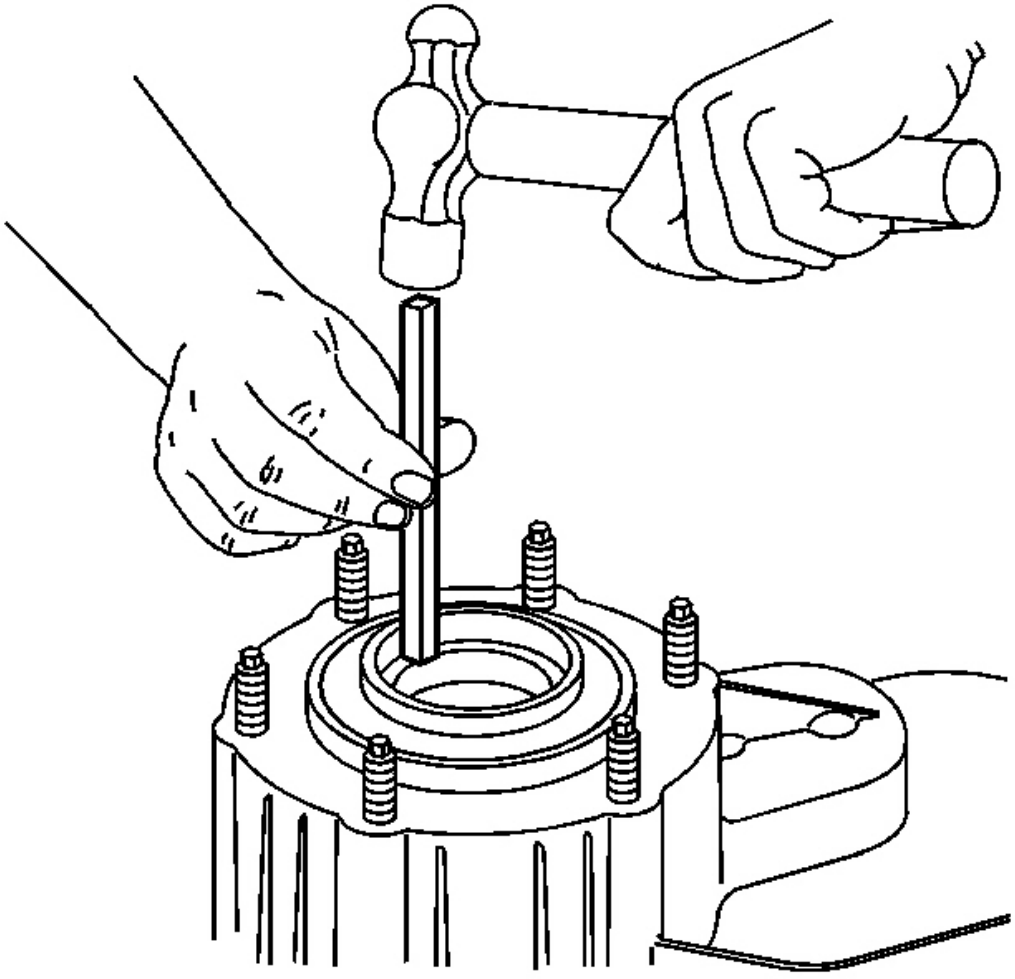


Fig. 41: Tapping Out Input Shaft Bearing With Brass Drift
Courtesy of GENERAL MOTORS CORP.

49. Using a hammer and a brass drift, remove the input shaft bearing from the front case half.

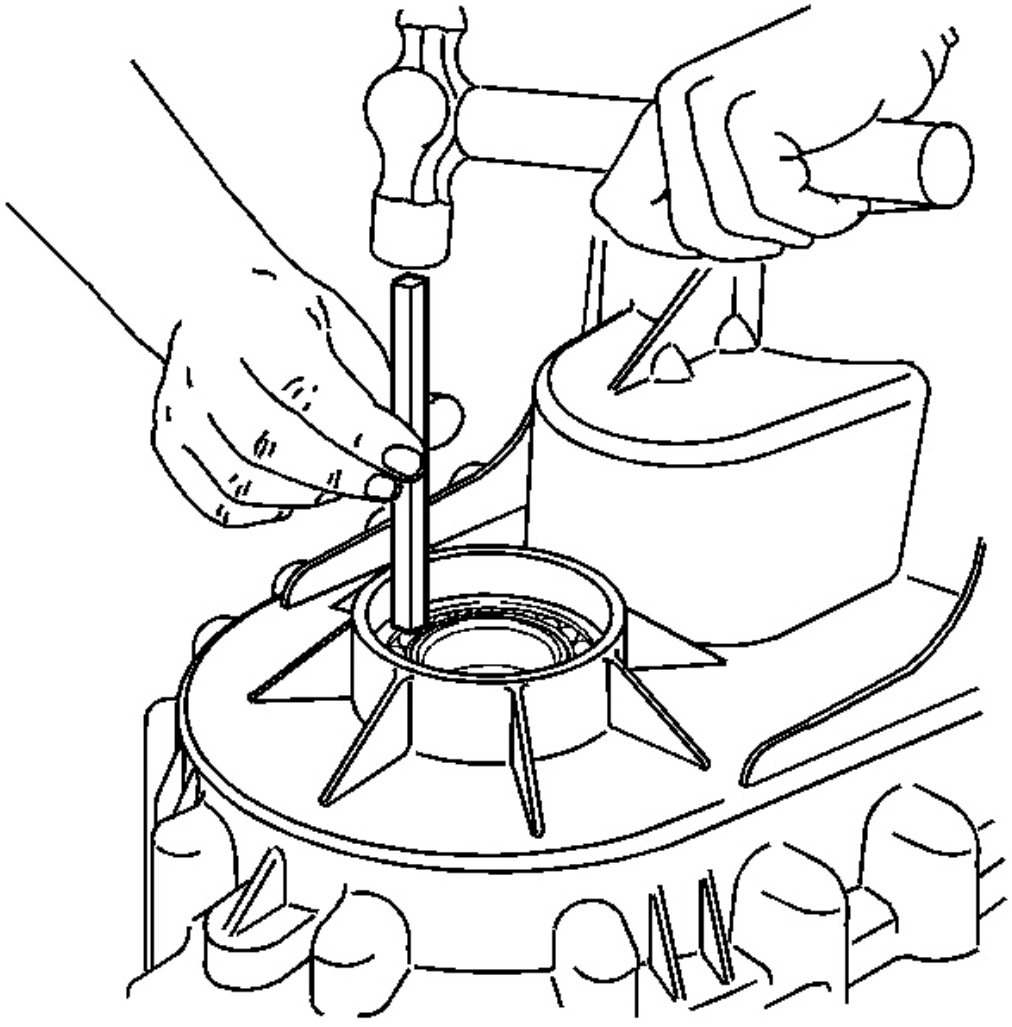


Fig. 42: Removing Front Output Shaft Bearing
Courtesy of GENERAL MOTORS CORP.

50. Using a brass drift, remove the front output shaft bearing from the front case half.

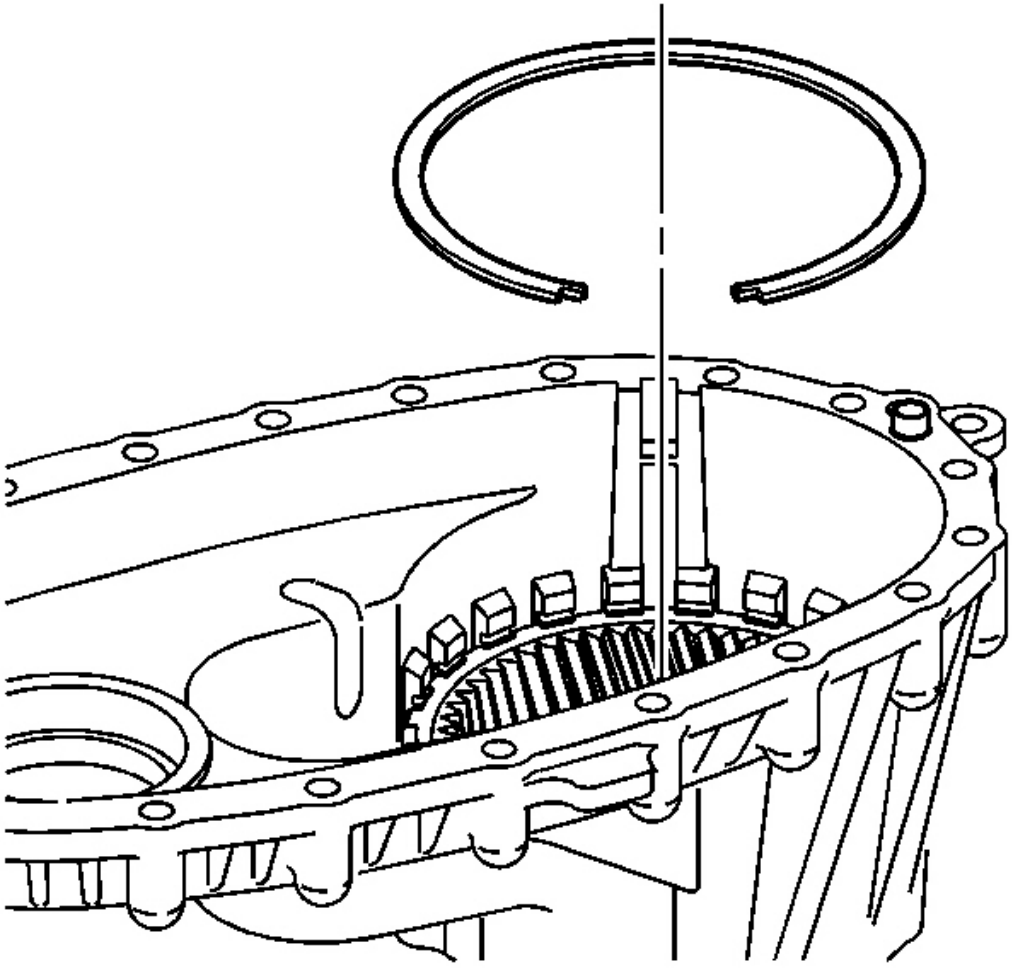


Fig. 43: Locating Retaining Ring For Annulus Gear
Courtesy of GENERAL MOTORS CORP.

51. Remove the retaining ring for the annulus gear.

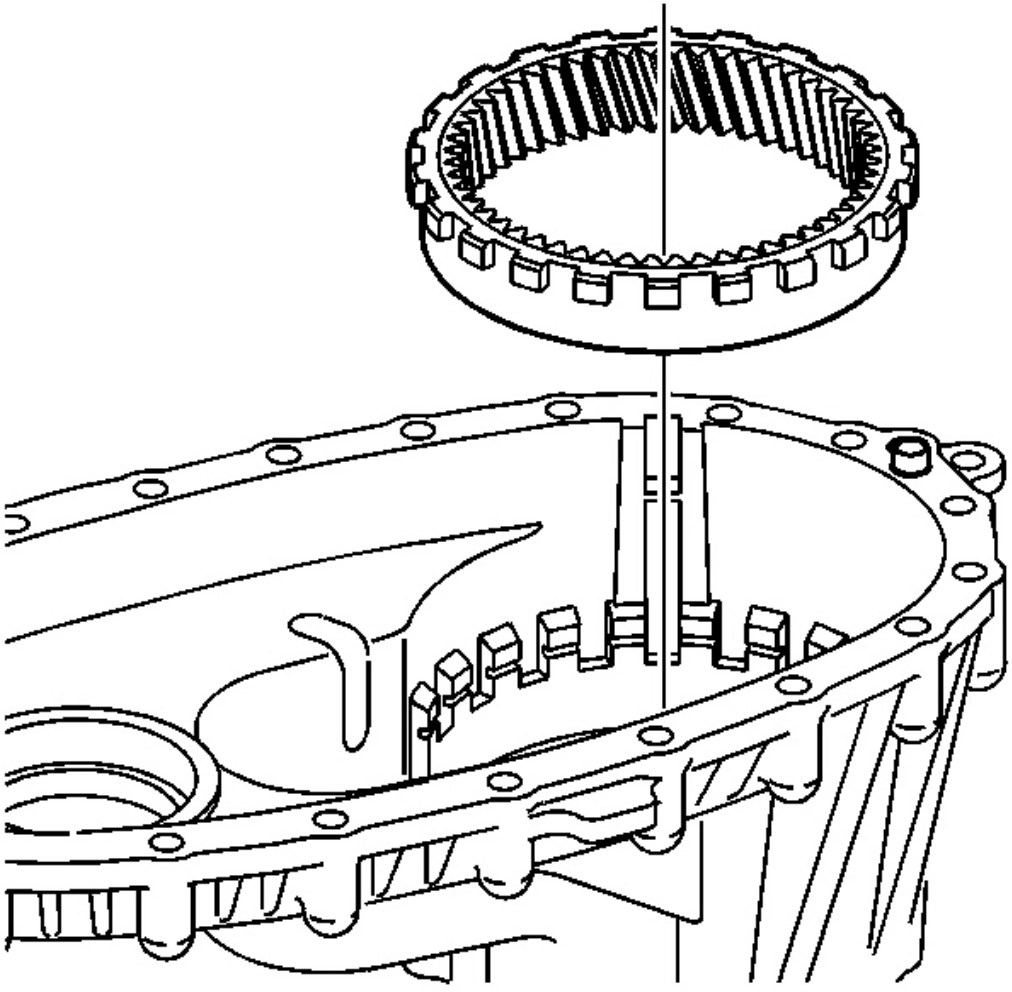


Fig. 44: Identifying Annulus Gear
Courtesy of GENERAL MOTORS CORP.

52. Remove the annulus gear from the front case half.

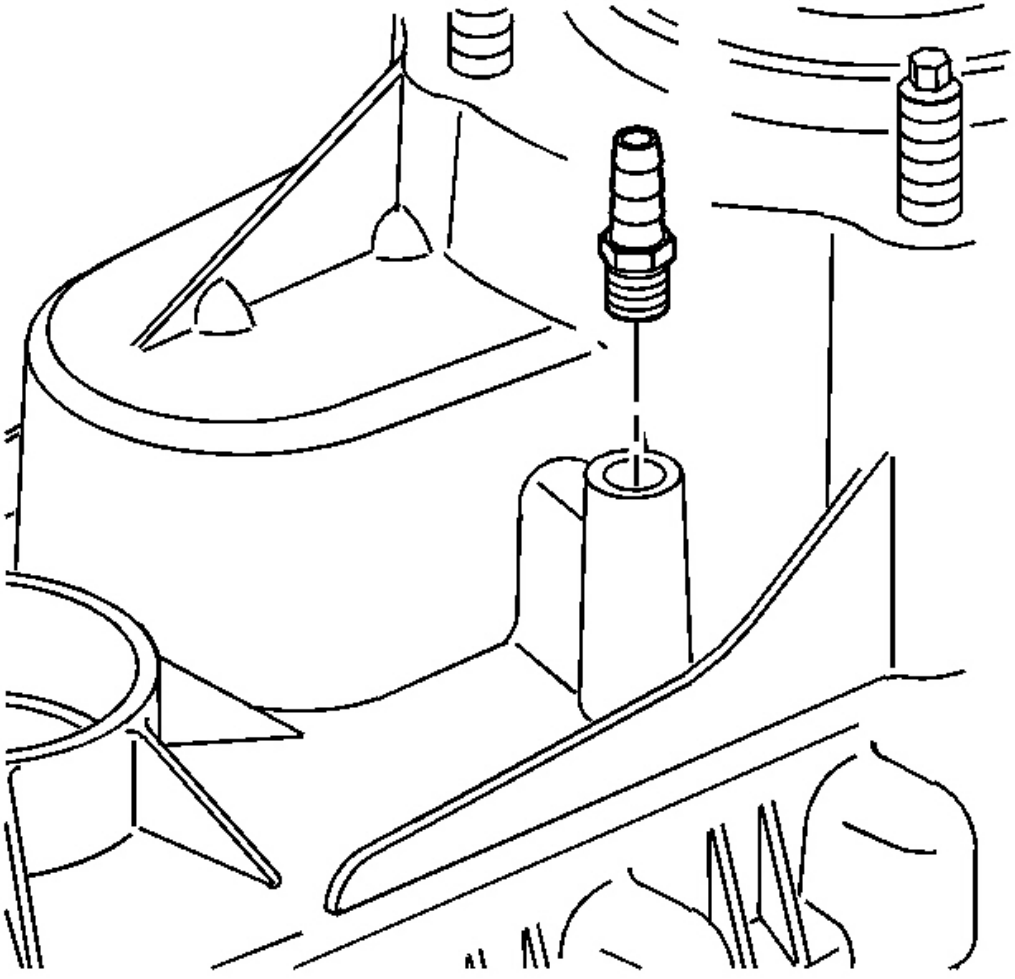


Fig. 45: View Of Front Case Vent
Courtesy of GENERAL MOTORS CORP.

53. If necessary, remove the vent from the front case half.

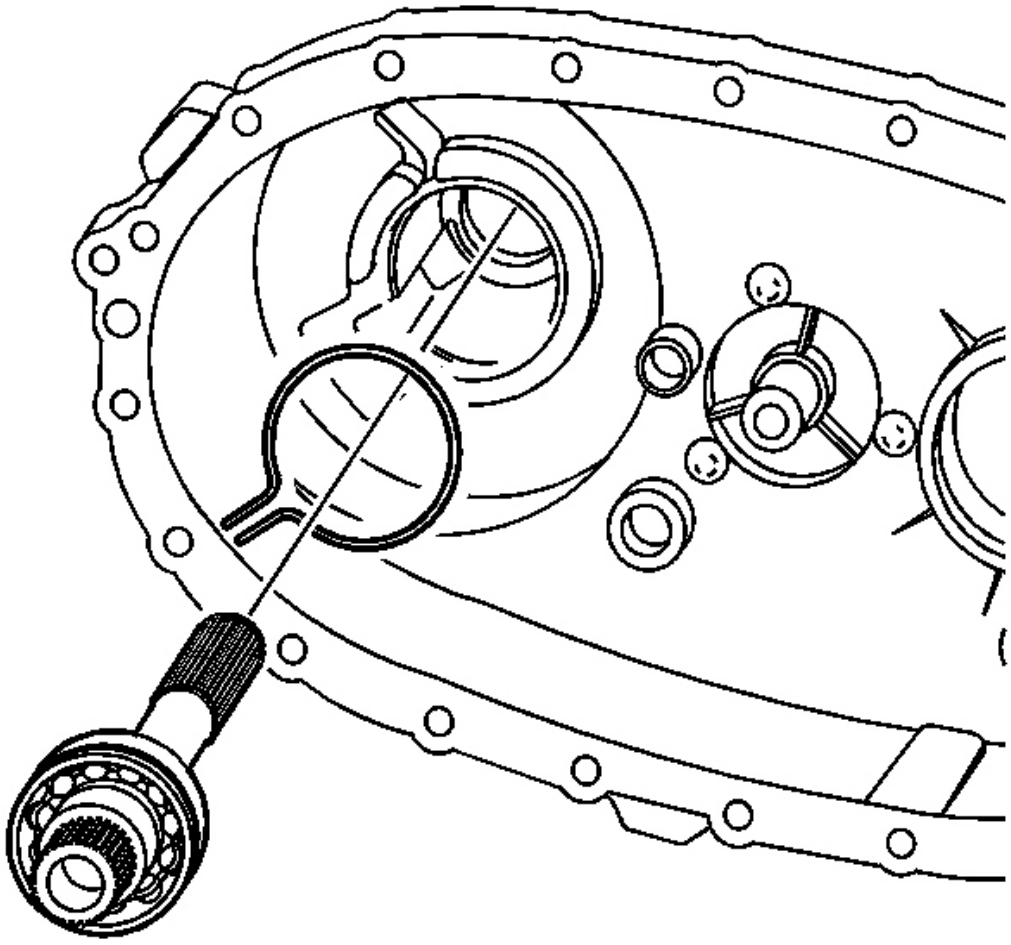


Fig. 46: Identifying Rear Output Shaft & Outer Retaining Ring
Courtesy of GENERAL MOTORS CORP.

54. Remove the rear output shaft from the rear case half.
    1. Spread the rear output shaft rear bearing outer retaining ring.
    2. Using a soft-face hammer, tap on the end of the rear output shaft.

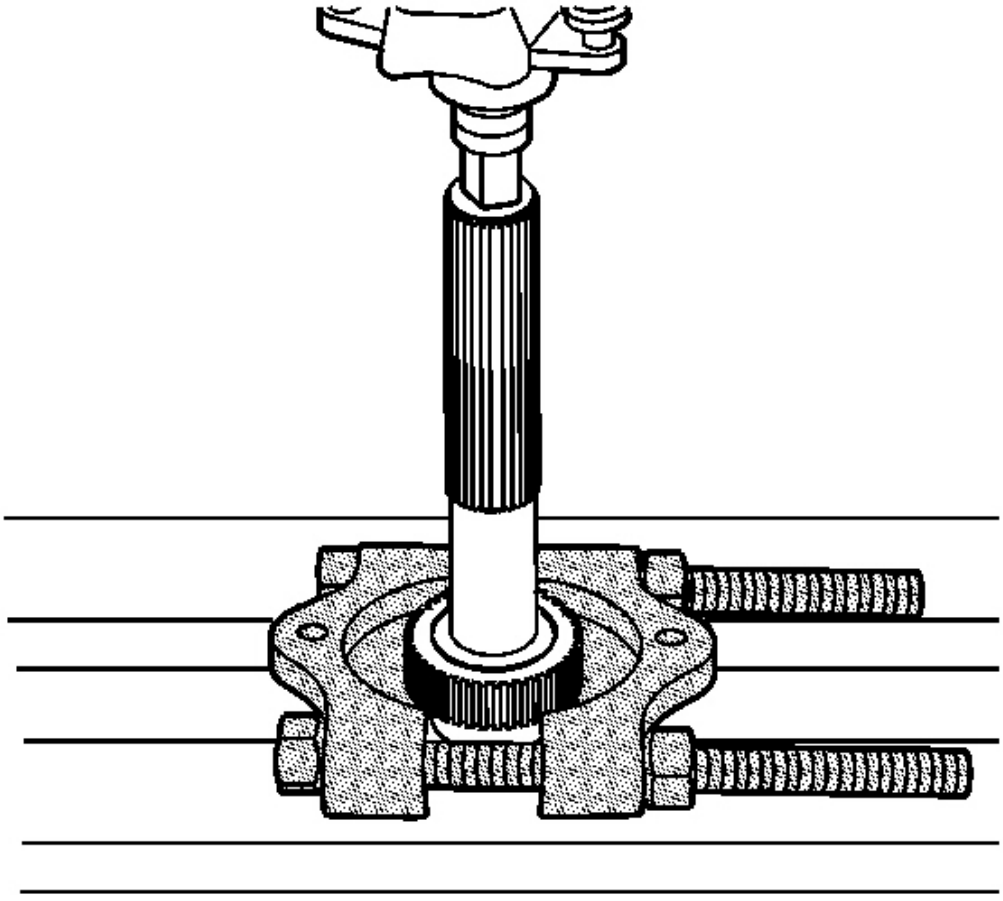


Fig. 47: Removing Speed Reluctor Wheel With J 22912-01
Courtesy of GENERAL MOTORS CORP.

55. Using a hydraulic press and the **J 22912-01** , remove the speed reluctor wheel.

    Do not use the speed reluctor wheel again.

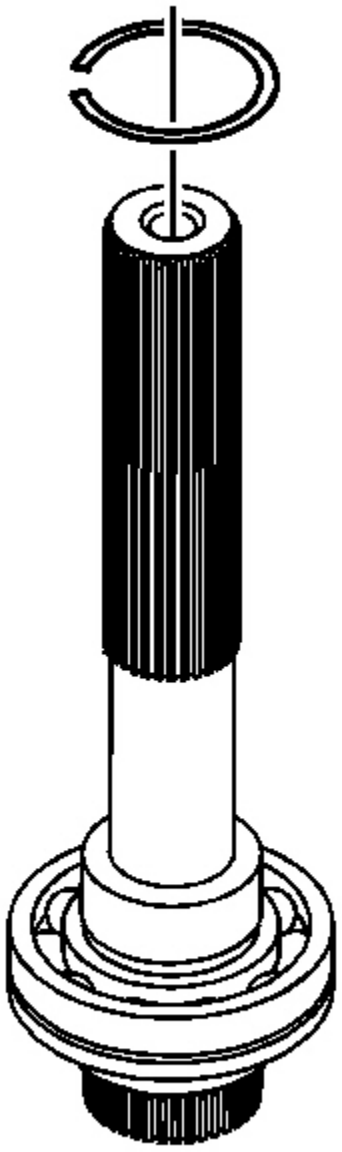


Fig. 48: View Of Rear Output Shaft Bearing Retaining Ring
Courtesy of GENERAL MOTORS CORP.

56. Remove the retaining ring for the rear output shaft bearing.

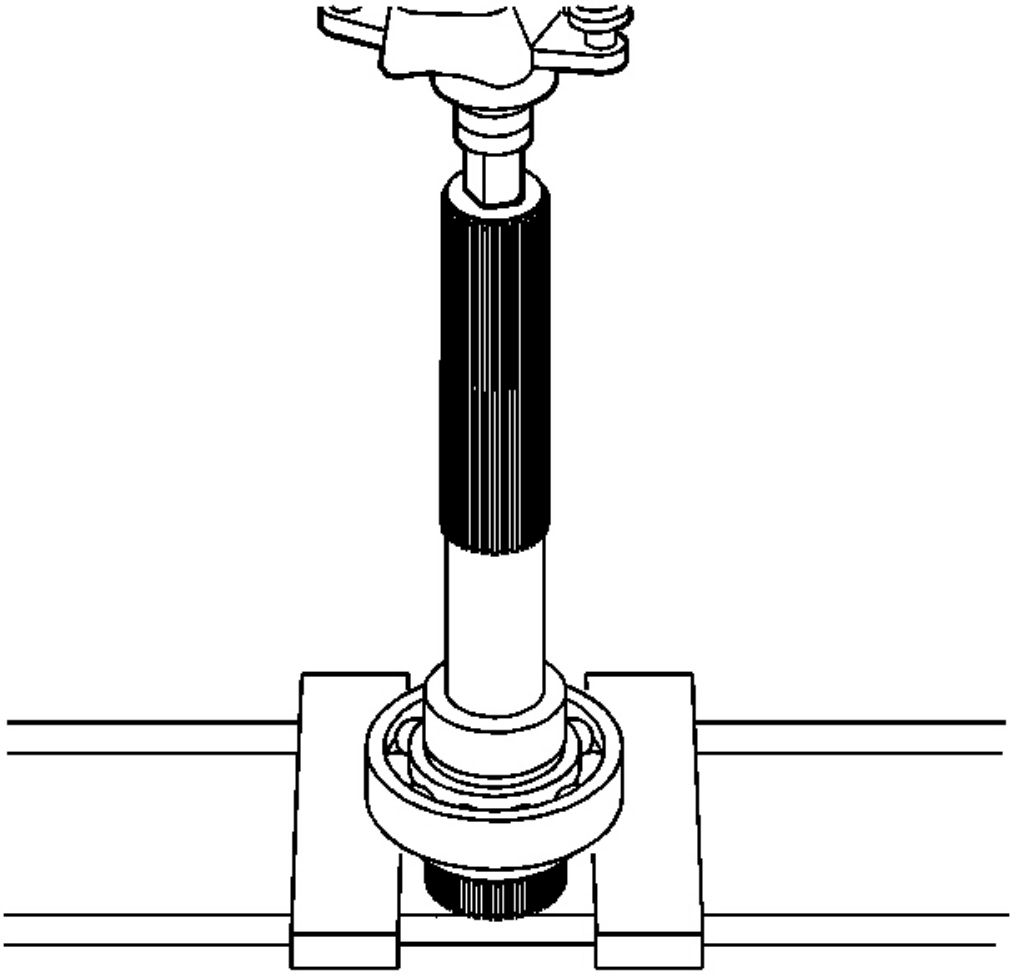


Fig. 49: Pressing Out Rear Output Shaft Bearing
Courtesy of GENERAL MOTORS CORP.

57. Using a hydraulic press, remove the rear output shaft bearing.

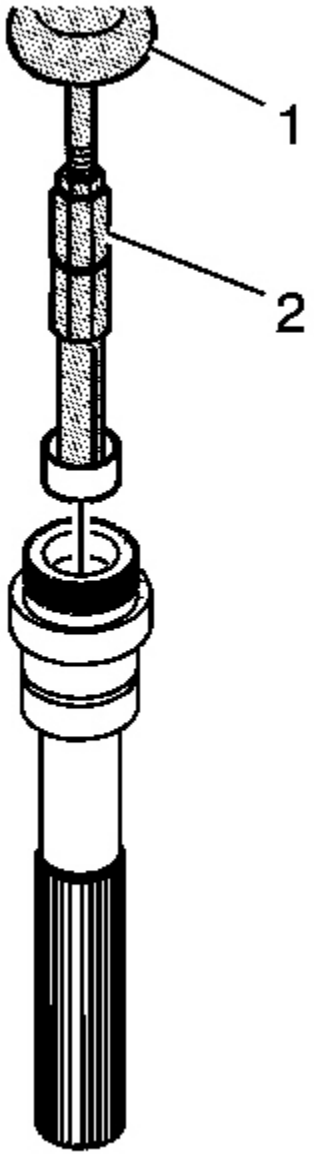


Fig. 50: Using J 2619-01 & J 45548 To Remove Mainshaft Rear Support Bushing
Courtesy of GENERAL MOTORS CORP.

58. Inspect the mainshaft rear support bushing in the rear output shaft for being faulty. Refer to **Cleaning and Inspection** .
59. Using the **J 2619-01** (1) and the **J 45548** (2), remove the mainshaft rear support bushing from the rear

output shaft.

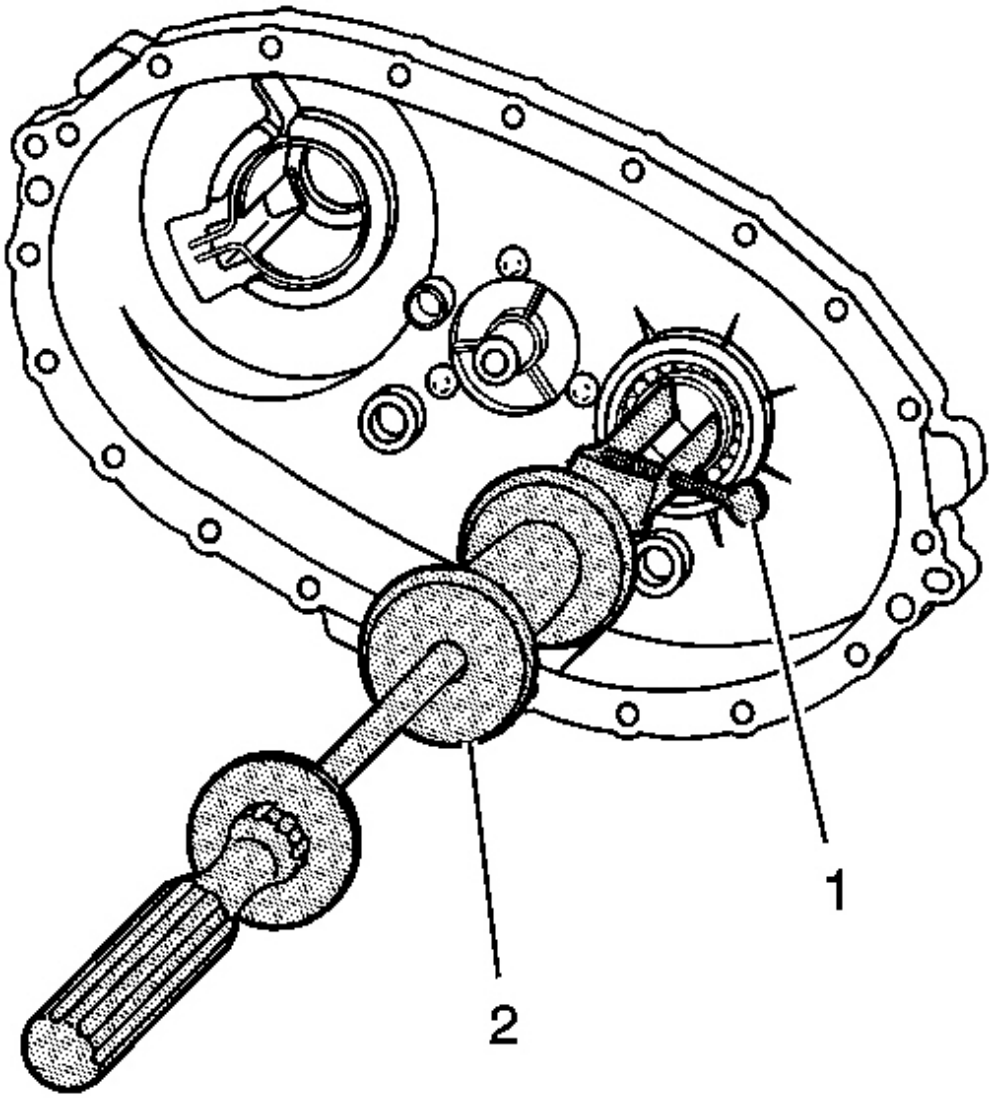


Fig. 51: Identifying J 26941 & J 23907
Courtesy of GENERAL MOTORS CORP.

60. Using the **J 26941** (1) and the **J 23907** (2), remove the rear bearing for the front output shaft from the rear case.

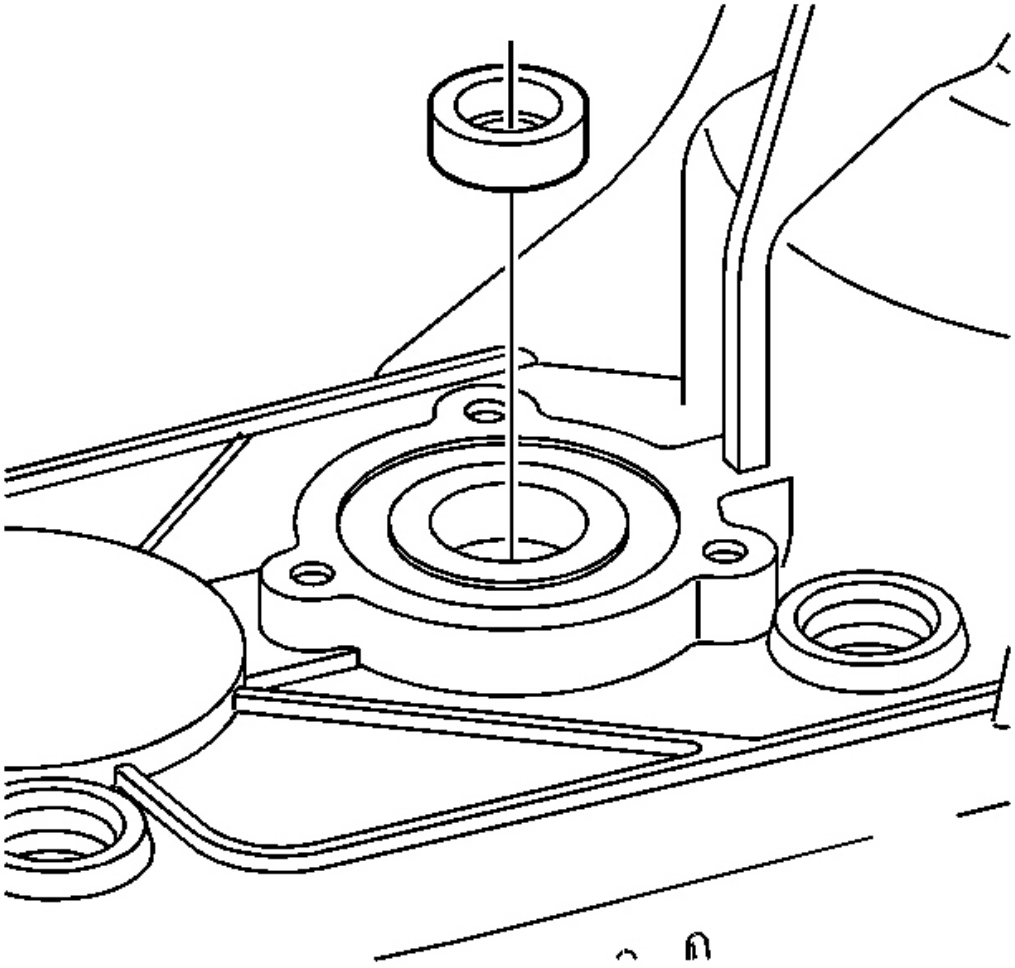


Fig. 52: View Of Shift Detent Lever Shaft Seal
Courtesy of GENERAL MOTORS CORP.

61. Remove the seal for the shift detent lever shaft by prying it out from the case.

CLEANING AND INSPECTION

Front Case Half

1. Clean the front case half in cleaning solvent and air dry.

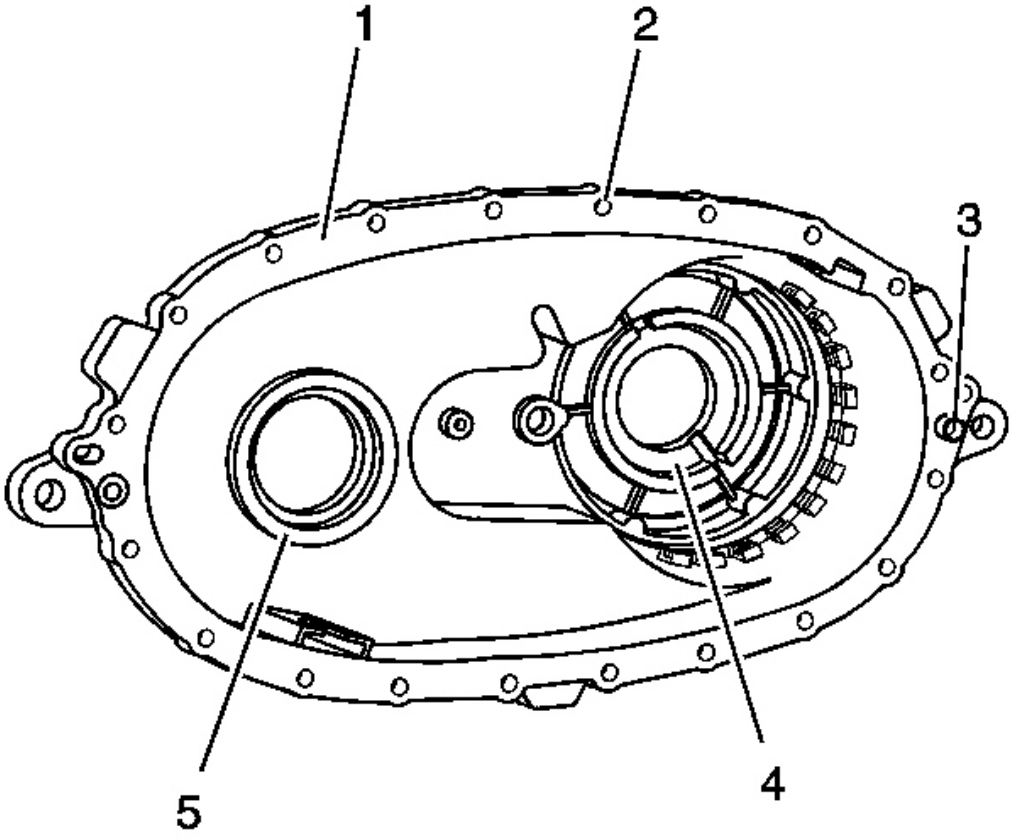


Fig. 53: View Of Front Case Inspection Areas
Courtesy of GENERAL MOTORS CORP.

2. Remove the shavings from the case half bolt holes.

NOTE: Refer to Machined Surface Damage Notice in Cautions and Notices.

3. Remove the sealer from the case sealing surfaces.
4. Inspect the case for being broken or cracked.
5. Inspect the front output shaft front bearing bore (5) for the following conditions:
   - A spun bearing
   - Cracks
6. Inspect the input shaft bearing bore (4) for the following conditions:
   - A spun bearing
   - Cracks

7. Replace the front case half if any of the above conditions are found.
8. Inspect the sealing surfaces (1) for damage.
9. Repair small scratches or nicks with a soft stone.
10. Inspect the front case to transmission case mounting surface for damage.
11. Inspect the case threaded bolt holes (2) for damage.
12. Repair any damaged threads.
13. Inspect the transmission to transfer case studs for damage.
14. Replace any damaged studs. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
15. Inspect the location pins (3) for being loose or missing.
16. Repair or replace any damaged location pins.
17. Inspect the front output shaft front bearing and the input shaft bearing for the following conditions:
    - Roughness
    - Brinelling
    - Pitting
18. Replace the bearings if any of the above conditions are found. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

Rear Case Half

1. Clean the rear case half in cleaning solvent and air dry.

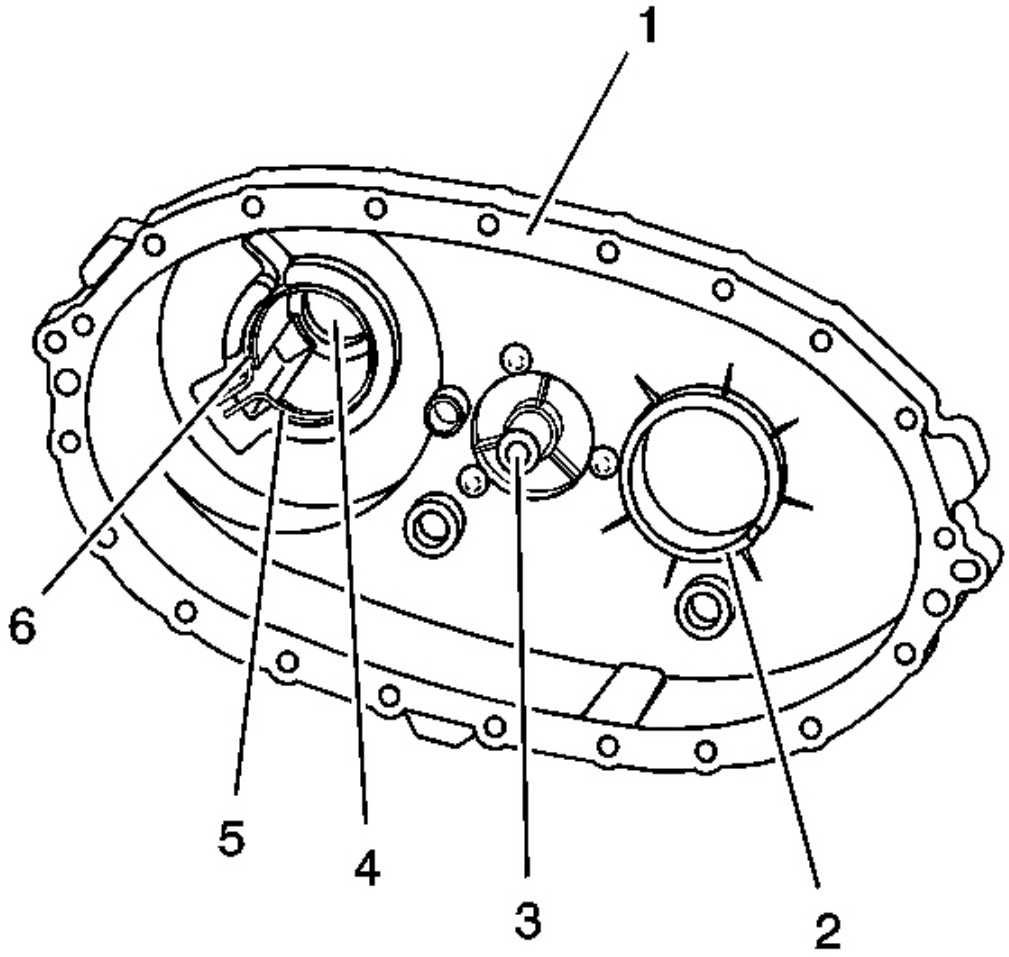


Fig. 54: Locating Rear Case Half Inspection Points
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Machined Surface Damage Notice in Cautions and Notices.

2. Remove the sealer from the case sealing surfaces.
3. Inspect the case for being broken or cracked.
4. Replace the case if it is broken or cracked.
5. Inspect the sealing surfaces (1) for damage.
6. Repair small scratches or nicks with a soft stone.
7. Inspect the case threaded bolt holes for damage.

8. Repair any damaged threads.
9. Inspect the front output shaft rear bearing bore (2) for the following conditions:
    - Spun bearing
    - Cracks
10. Inspect the rear output shaft rear bearing bore (5) for the following conditions:
    - Spun bearing
    - Cracks
11. Replace the case if the bearing has spun. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
12. Inspect the retaining ring (6) for the rear output shaft rear bearing for being bent or twisted.
13. Replace a faulty retaining ring.
14. Inspect the rear output shaft bushing (4) for scoring or wear.
15. Replace the case if the rear output shaft bushing is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
16. Inspect the shift detent lever shaft bore (3) for the following conditions:
    - Out of round
    - Excessive wear
17. Replace the case if the shift detent lever shaft bore is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

Oil Pump

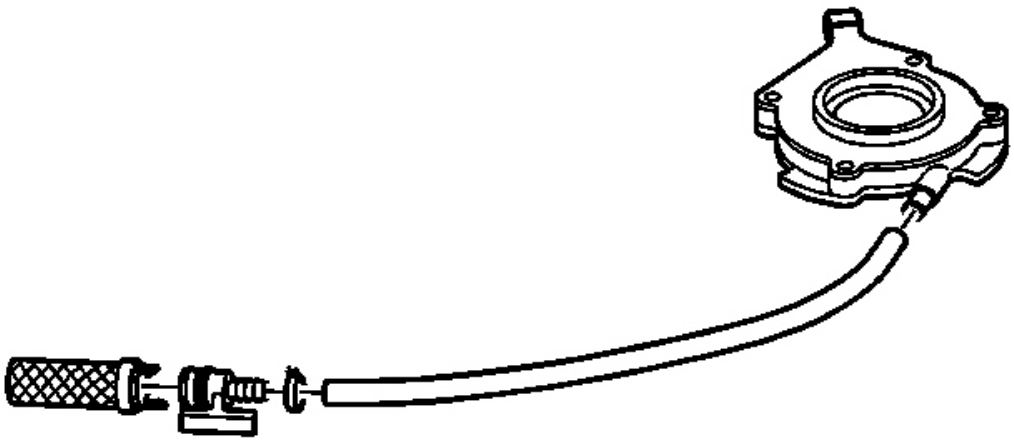


Fig. 55: Locating Oil Pump Hose & Screen
Courtesy of GENERAL MOTORS CORP.

1. Remove the oil pump suction hose from the oil pump screen.
2. Clean the hose and screen in cleaning solvent and air dry.
3. If the screen is embedded with debris, replace the screen.
4. Inspect the hose for cracking or tears.
5. Replace the hose if it is faulty.
6. Inspect the oil pump for free movement.
7. Replace the oil pump if there is any binding. Do not disassemble the oil pump. The oil pump is serviced as a unit.
8. Inspect the wear clip on the oil pump.
9. Replace the oil pump if the wear clip is missing or faulty.

High/Low Range Components

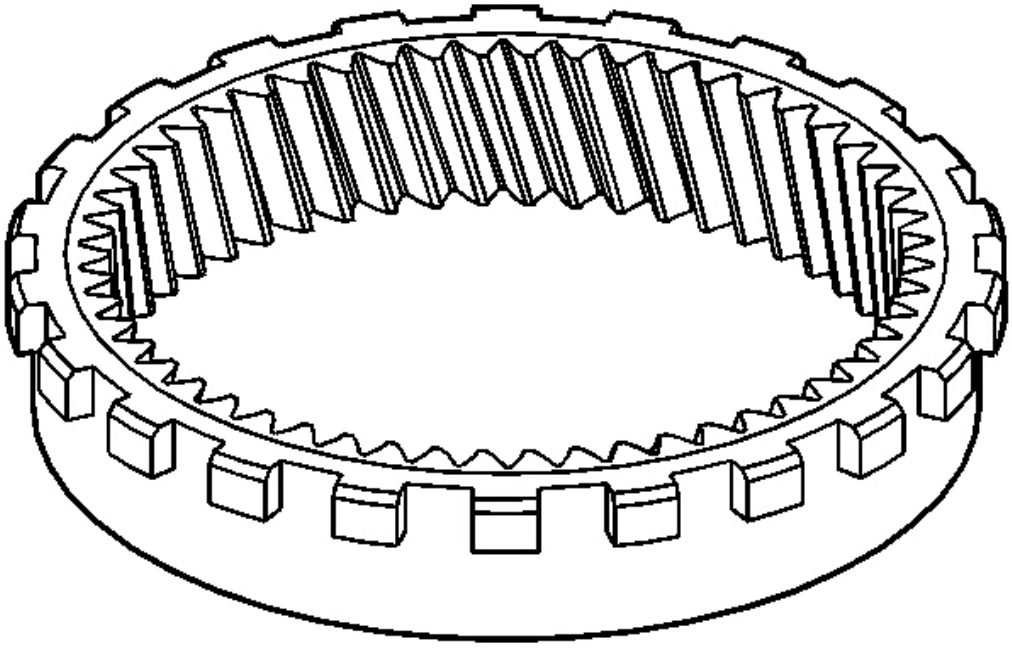


Fig. 56: Annulus Gear
Courtesy of GENERAL MOTORS CORP.

1. Clean the annulus gear in cleaning solvent and air dry.
2. Inspect the annulus gear teeth for the following conditions:
   - Damage or excessive wear

- Chipped
- Debris embedded in the root of the teeth

3. Replace the annulus gear if it is faulty.

1. Clean the high/low range shift sleeve in cleaning solvent and air dry.
2. Inspect the high/low range shift sleeve for the following conditions:
    - Excessive wear or roughness on the shift fork pad surface (2)
    - Damaged, chipped or excessive wear on the engagement teeth (3)
    - Excessive looseness or gouging on the mainshaft splines (1)

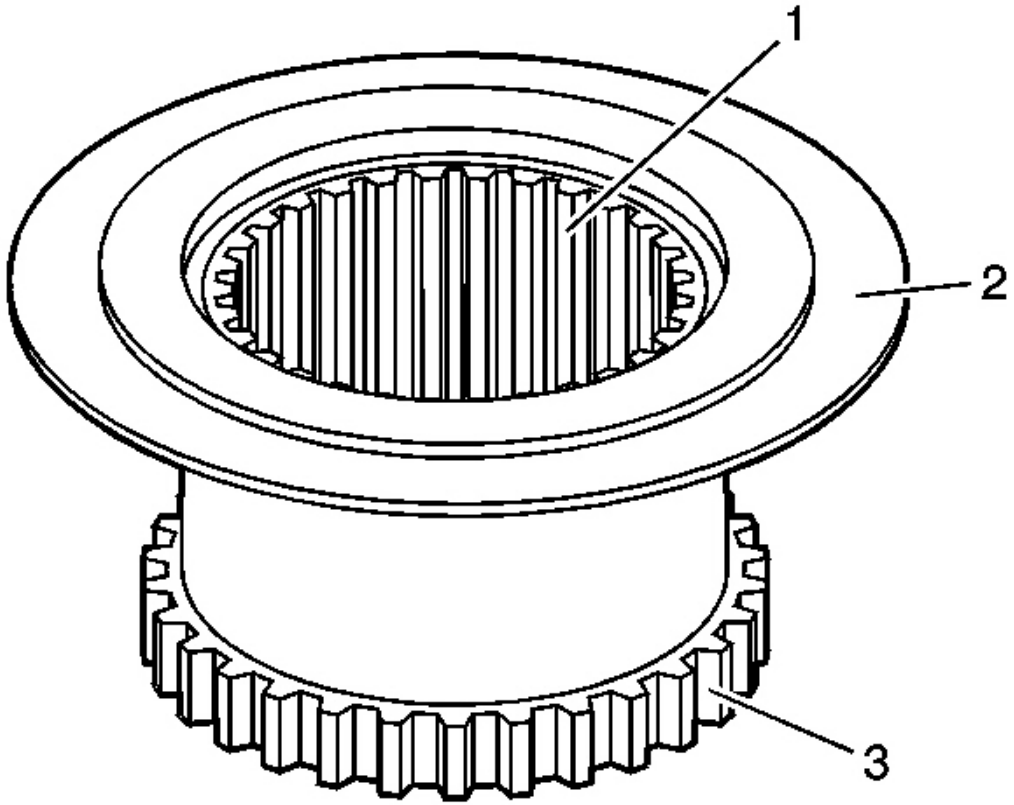


Fig. 57: Identifying High/Low Range Shift Sleeve Inspection Areas
Courtesy of GENERAL MOTORS CORP.

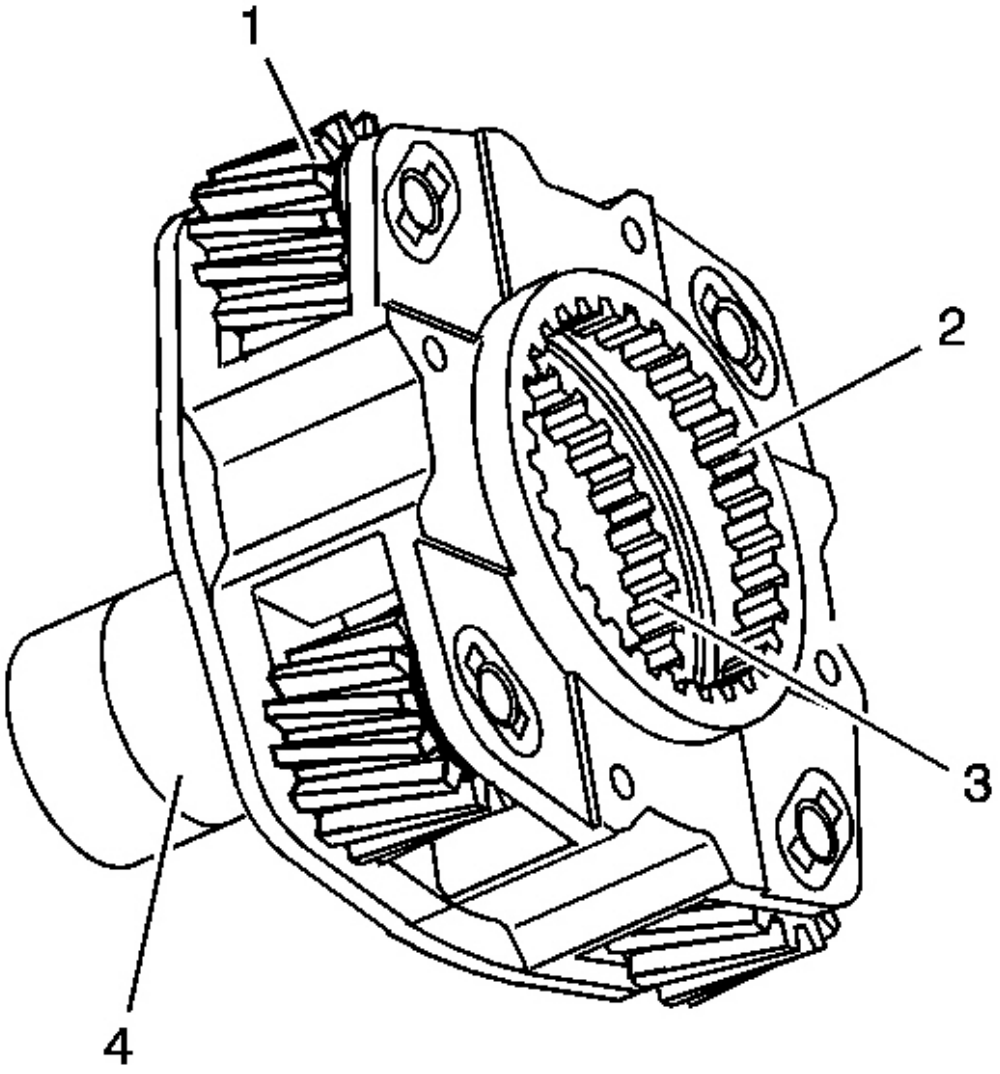


Fig. 58: View Of High/Low Planetary Carrier Inspection Areas
Courtesy of GENERAL MOTORS CORP.

1. Clean the high/low planetary carrier in cleaning solvent. Do not disassemble the planetary carrier.
2. Air dry and ensure all cleaning solvent is removed from the bearings in the planetary gears (1). Do not spin the planetary gears with compressed air.
3. Inspect the planetary gears for chipped teeth.
4. Inspect the planetary gears for debris embedded in the root of the teeth.

5. Inspect the planetary gears for excessive side movement from worn bearings or shafts.
6. Inspect the low range teeth (2) for damage or excessive wear.
7. Inspect the high range teeth (3) for damage or excessive wear.
8. Inspect the input seal surface (4) for scoring or excessive wear.
9. Inspect the thrust washer surface for scoring or excessive wear.
10. Replace the high/low planetary carrier if any of the above conditions are found.
11. Inspect the mainshaft front support bearing for the following conditions:
    - Scoring
    - Pitting
    - Brinelling
    - Excessive wear
12. Replace the mainshaft front support bearing if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
13. Inspect the high/low planetary thrust washer for excessive wear or scoring.
14. Replace the thrust washer if it is faulty.

Differential Components

1. Clean the planetary differential in cleaning solvent. Do not disassemble the planetary differential.
2. Air dry and ensure all cleaning solvent is removed from the bushings in the pinion gears (3). Do not spin the pinion gears with compressed air.

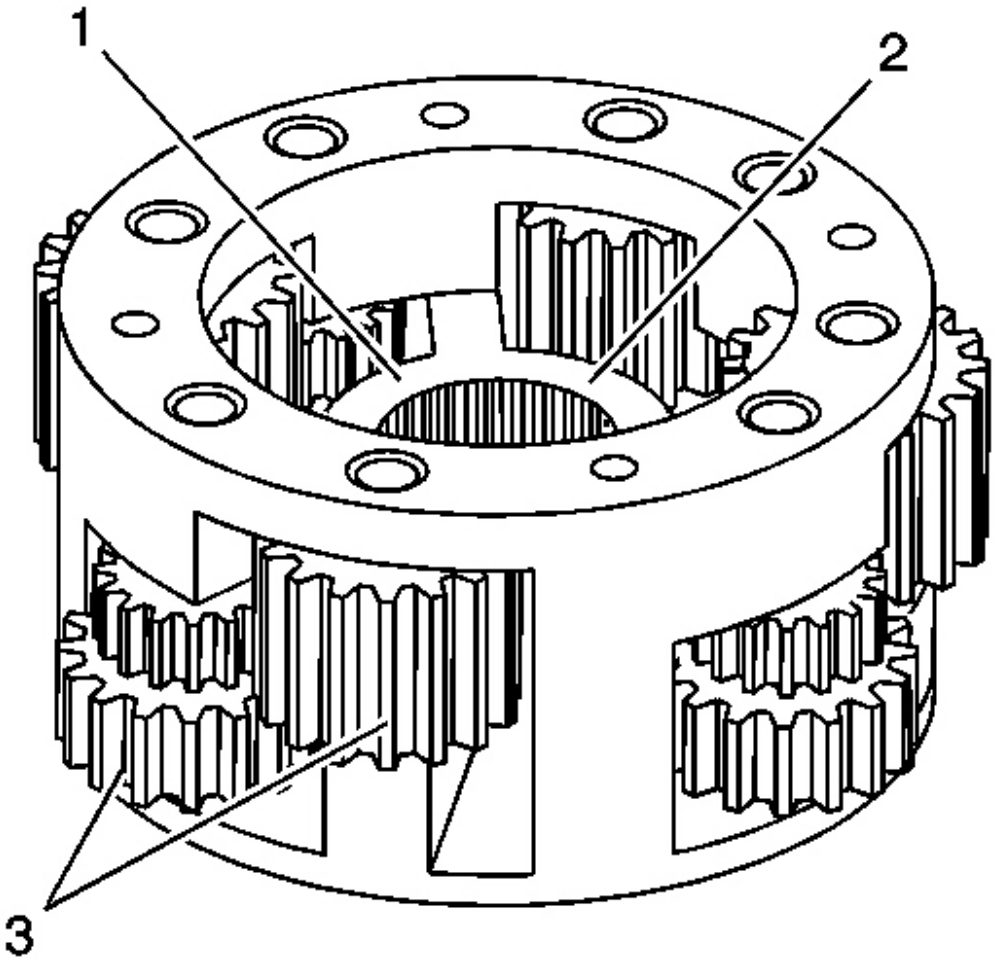


Fig. 59: Locating Planetary Differential Inspection Points
Courtesy of GENERAL MOTORS CORP.

3. Inspect the pinion gears for chipped teeth.
4. Inspect the pinion gears for debris embedded in the root of the teeth.
5. Inspect the pinion gears for excessive side movement from worn bushings or shafts.
6. Inspect the planetary differential assembly for cracks at the web (1) of the housing.
7. Inspect the thrust washer surface (2) for scoring or excessive wear.
8. Inspect the planetary differential for distortion.
9. Inspect the planetary differential to mainshaft splines for excessive wear.

10. Replace the planetary differential if any of the above conditions are found.
11. Inspect the thrust washers for excessive wear or scoring.
12. Replace the thrust washers if they are faulty.

Sun Gears and Lock-Up Hub

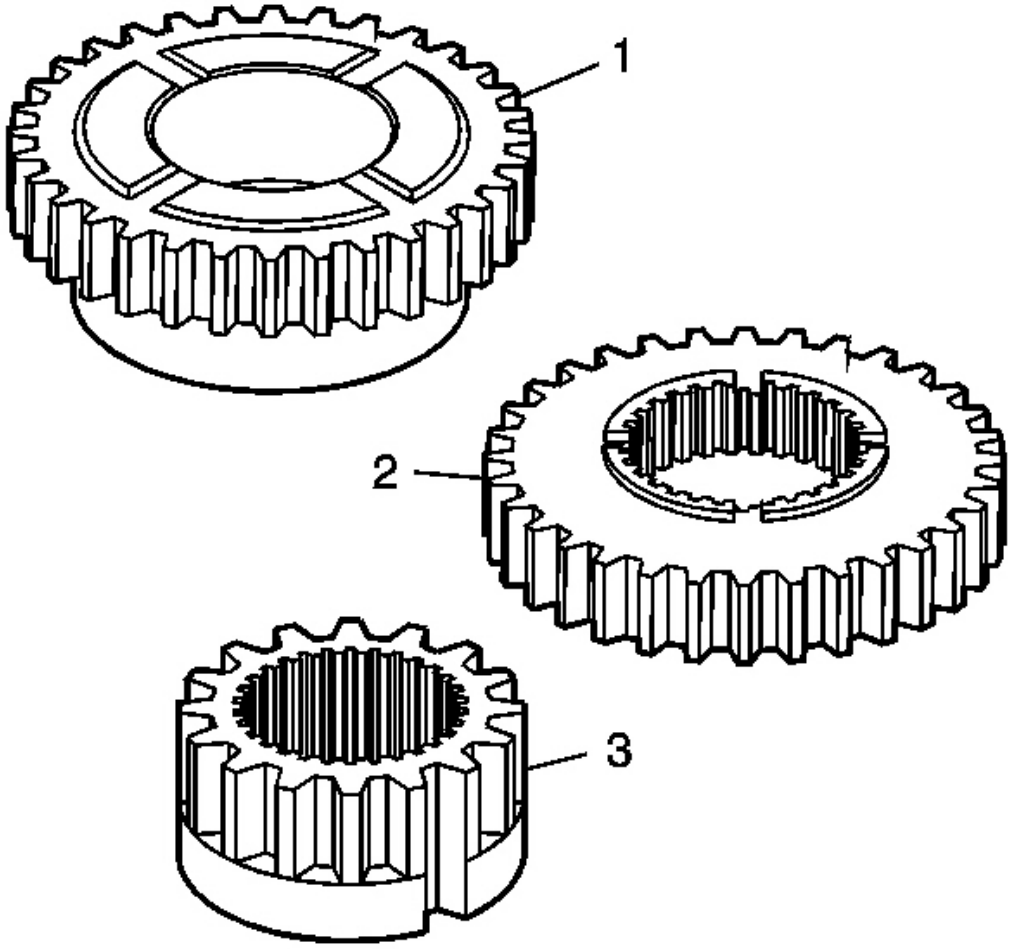


Fig. 60: Identifying Front Sun Gear, Rear Sun Gear & Inner Lockup Hub
Courtesy of GENERAL MOTORS CORP.

1. Clean the front sun gear (1), the rear sun gear (2), and the inner lockup hub (3) in cleaning solvent and air dry.
2. Inspect the teeth on the front sun gear (1), the rear sun gear (2), and the inner lockup hub (3) for the

following conditions:

- Chipped teeth
- Excessively worn gear surfaces

  Slight wear marks are normal.

- Debris embedded in the root of the teeth

3. Inspect the thrust washer surfaces for excessive wear or scoring.
4. Replace the front sun gear (1), the rear sun gear (2), and the inner lockup hub (3) if they are faulty.

Lock-Up Shift Assembly

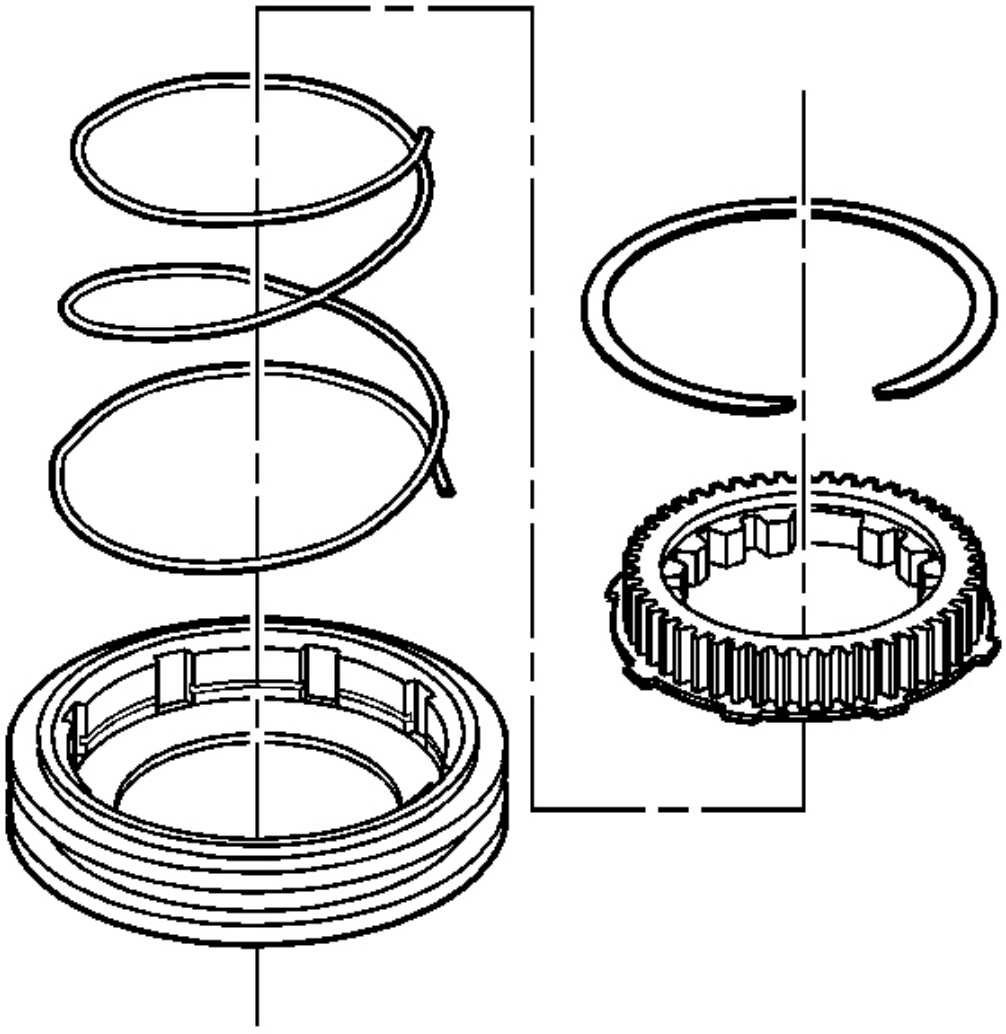


Fig. 61: Illustrating Lockup Shift Assembly Components
Courtesy of GENERAL MOTORS CORP.

1. If necessary, disassemble the lockup shift assembly. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
2. Clean the lockup shift assembly components in cleaning solvent and air dry.
3. Inspect the lockup shift hub engagement teeth for the following conditions:
    - Chipped teeth
    - Excessively worn gear surfaces

Slight wear marks are normal.

- Debris embedded in the root of the teeth

4. Replace the lockup shift assembly if it is faulty. The lockup shift assembly components are not serviced separately.

Drive Chain and Sprockets

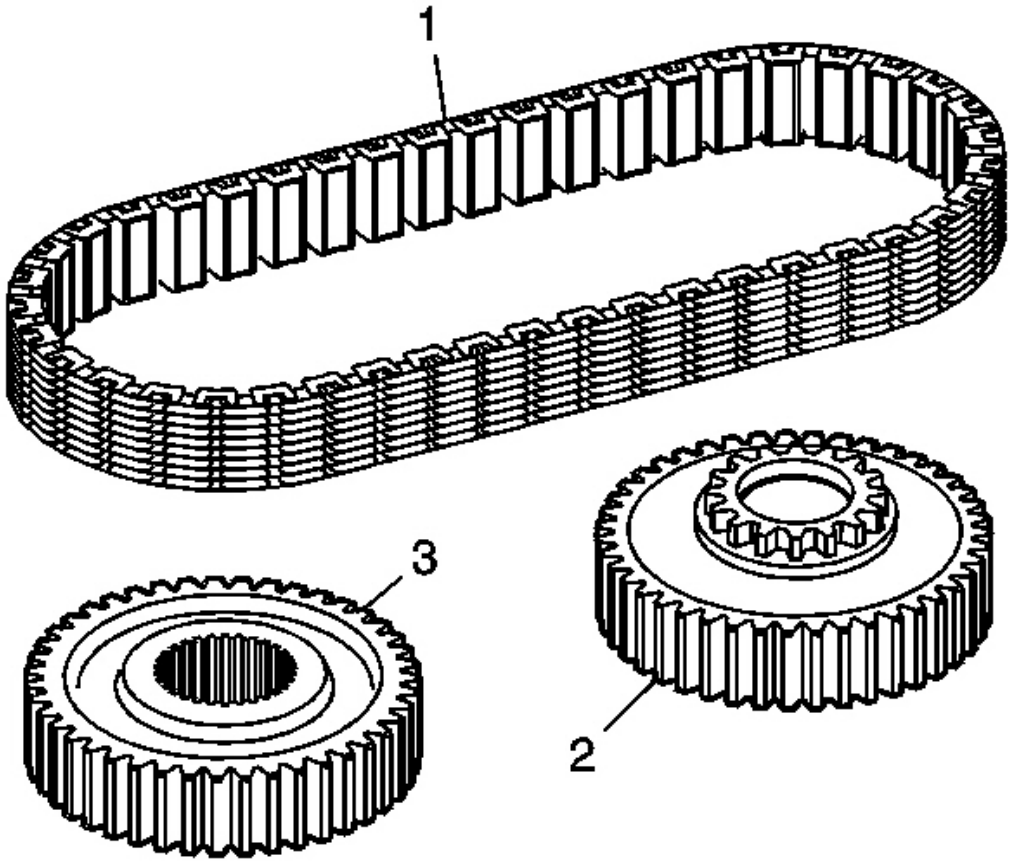


Fig. 62: View Of Drive Chain, Drive Sprocket & Driven Sprocket
Courtesy of GENERAL MOTORS CORP.

1. Clean the drive chain (1), drive sprocket (2), and driven sprocket (3) in cleaning solvent and air dry.
2. Inspect the drive chain (1) for the following conditions:
   - Loose link pins
   - Binding or stiff links

- Debris embedded in the links
- Worn teeth surfaces

3. Replace the chain if any of the above conditions are found.
4. Inspect the driven sprocket (3) and the drive sprocket (2) for the following conditions:
    - Chipped teeth
    - Excessively worn gear surfaces

      Slight wear marks are normal.

    - Debris embedded in the root of the teeth
5. Inspect the drive sprocket (2) for the following conditions:
    - Lockup shift engagement teeth for chipping
    - Lockup shift engagement teeth for excessive wear
6. Inspect the drive sprocket bushing for the following conditions:
    - Excessive wear
    - Scoring
7. Replace the sprockets if any of the above conditions are found. The chain and sprockets may be replaced separately.

Mainshaft

1. Clean the mainshaft in cleaning solvent.
2. Clean the mainshaft oil galleries (1) and air dry.

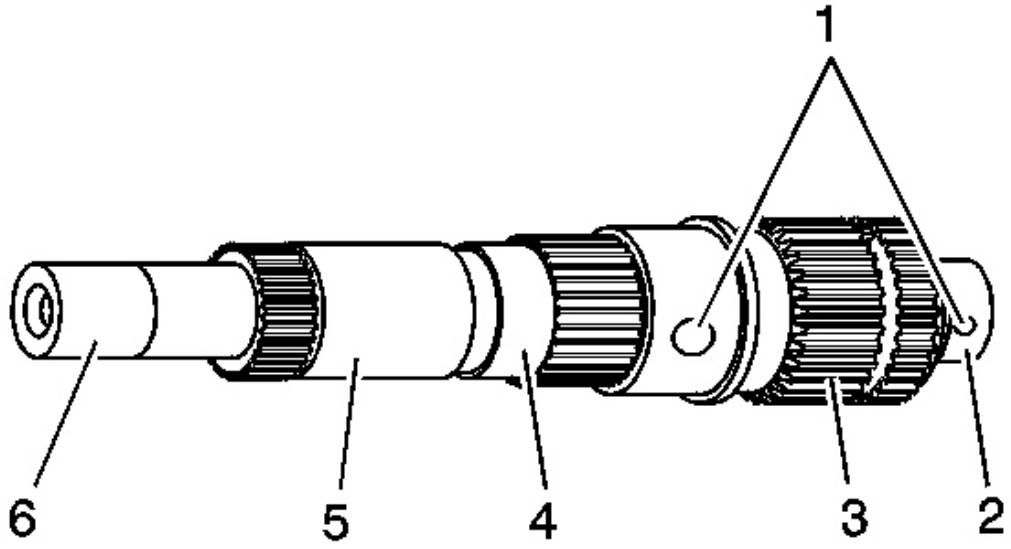


Fig. 63: Identifying Mainshaft Inspection Areas
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not attempt to smooth any roughness in the bearing journals.

3. Inspect the bearing journals on the mainshaft for the following conditions:
    - The front support bearing (2)
    - The drive gear bushing (4)
    - The front sun gear (5)
    - The rear support bushing (6)
        - Scoring
        - Pitting
        - Brinelling
        - Excessive wear
4. Inspect the mainshaft range collar splines (3) for damage or excessive wear. Witness marks at the location of the gear is normal.
5. Replace the mainshaft if any of the above conditions are found.

Front Output Shaft

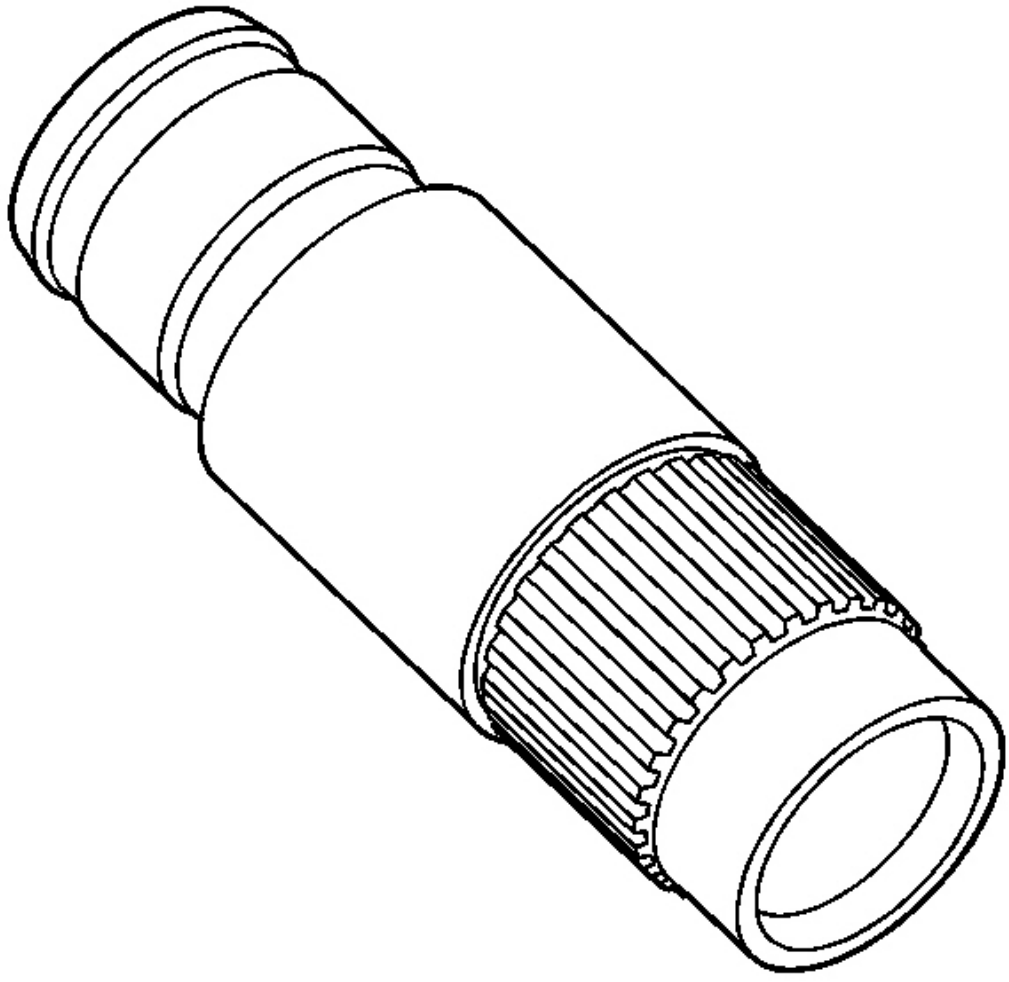


Fig. 64: Front Output Shaft
Courtesy of GENERAL MOTORS CORP.

1. Clean the front output shaft in cleaning solvent and air dry.
2. Inspect for spun bearings at the front output shaft bearing areas.
3. Inspect the front output internal splines and driven gear splines for damage or excessive wear.
4. Replace the front output shaft if it is damaged.
5. Inspect the cup plug in the front output shaft for leaking.
6. Replace the cup plug if it is leaking. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

Rear Output Shaft

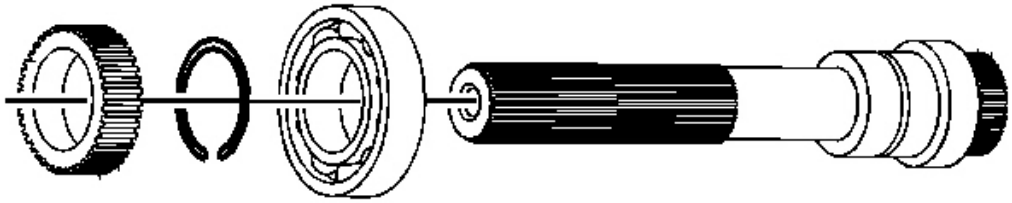


Fig. 65: View Of Rear Output Shaft Components
Courtesy of GENERAL MOTORS CORP.

1. Clean the rear output shaft with rear output shaft bearing in cleaning solvent.
2. Air dry and ensure all solvent is removed from the bearing.
3. Inspect the speed reluctor wheel for damage.
4. Replace the speed reluctor wheel if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
5. Inspect the rear output shaft bearing for the following conditions:
   - Scoring
   - Pitting
   - Brinelling
   - Excessive wear
6. Replace the rear output shaft bearing if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
7. Inspect the mainshaft rear support bushing for the following conditions:
   - Pitted
   - Wear
   - Corrosion
8. Replace the mainshaft rear support bushing if any of the above conditions are found. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
9. Inspect the rear output shaft splines for wear or damage.
10. Inspect the rear output shaft bearing area for a spun bearing.
11. Replace the rear output shaft if any of the above conditions are found.

Shift System Components

1. Clean the following shift system components in cleaning solvent and air dry.

- The lockup mode shift fork (1)
- The high/low range shift fork (2)
- The shift detent lever shaft assembly (3)
- The shift fork spring (4)
- The shift fork shaft (5)

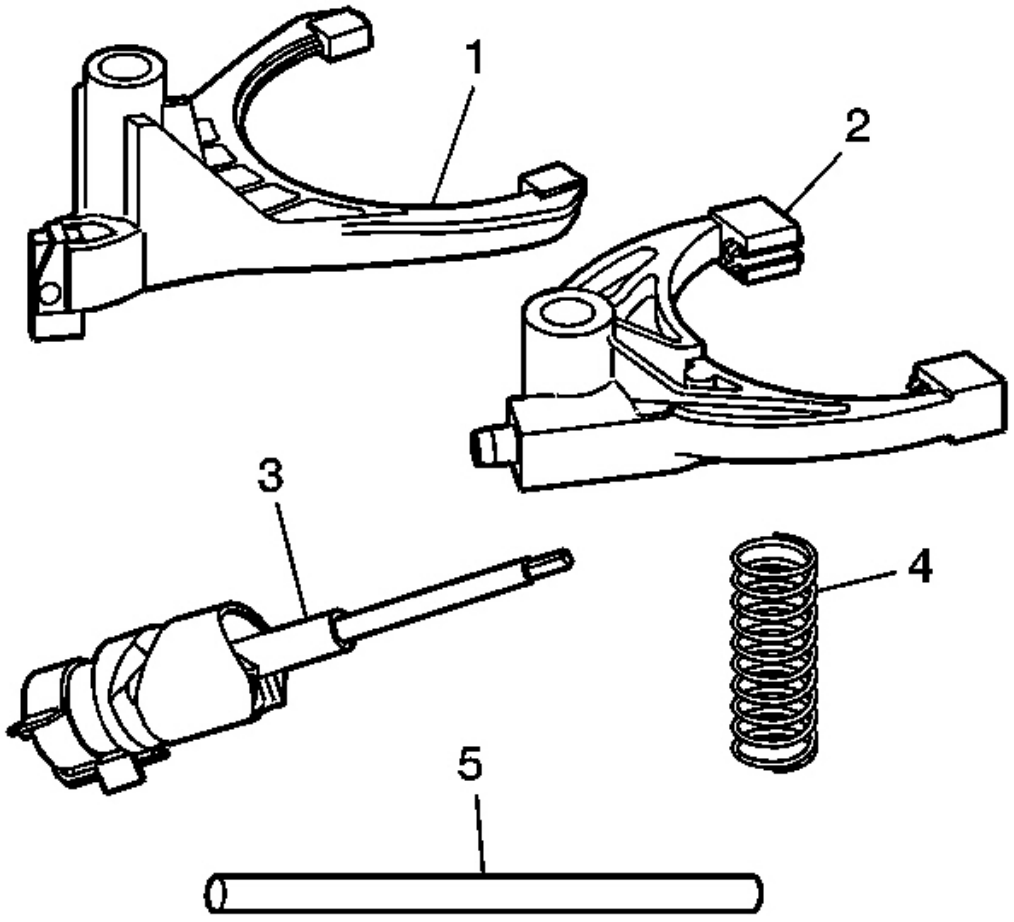


Fig. 66: Identifying Shift System Components
Courtesy of GENERAL MOTORS CORP.

2. Inspect the shift fork shaft (5) for straightness and excessive wear at the shift fork locations.
3. Replace the shift fork shaft if it is not straight or if it is worn excessively.

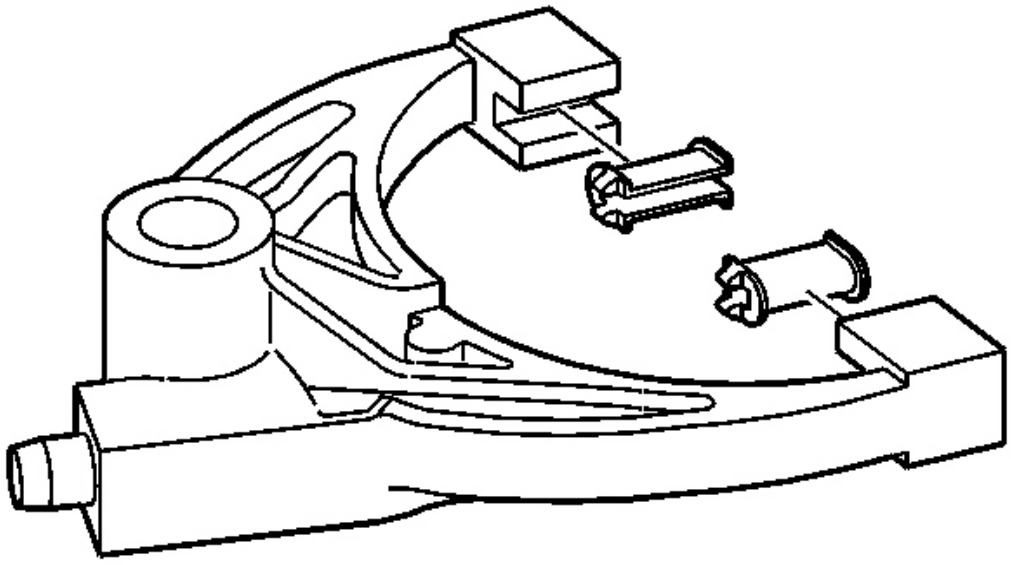


Fig. 67: Identifying Shift Fork Pads
Courtesy of GENERAL MOTORS CORP.

1. Inspect the pads on the high/low range shift fork for wear.
2. Replace the worn pads.
3. Inspect the roller on the shift fork for wear.
4. Inspect the bore for the shift fork shaft for excessive wear.
5. Replace the shift fork if the above conditions are found.

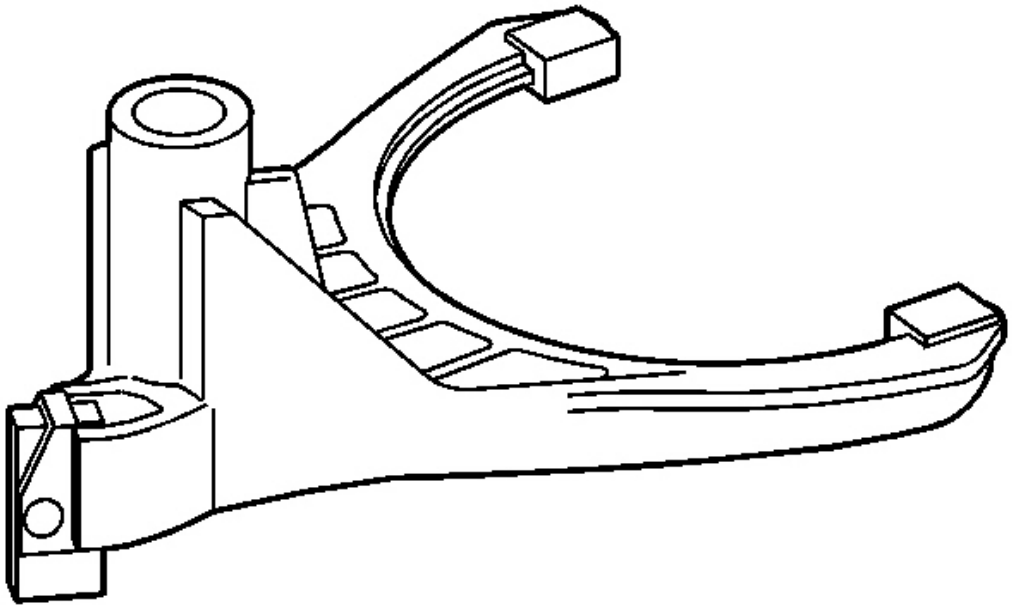


Fig. 68: Lockup Mode Shift Fork
Courtesy of GENERAL MOTORS CORP.

1. Inspect the lockup mode shift fork for excessive wear at the lockup collar pads.
2. Inspect the lockup mode shift fork for wear at the shift detent cam follower.
3. Inspect the lockup mode shift fork for cracks.
4. Replace the lockup mode shift fork if any of the above conditions are found.

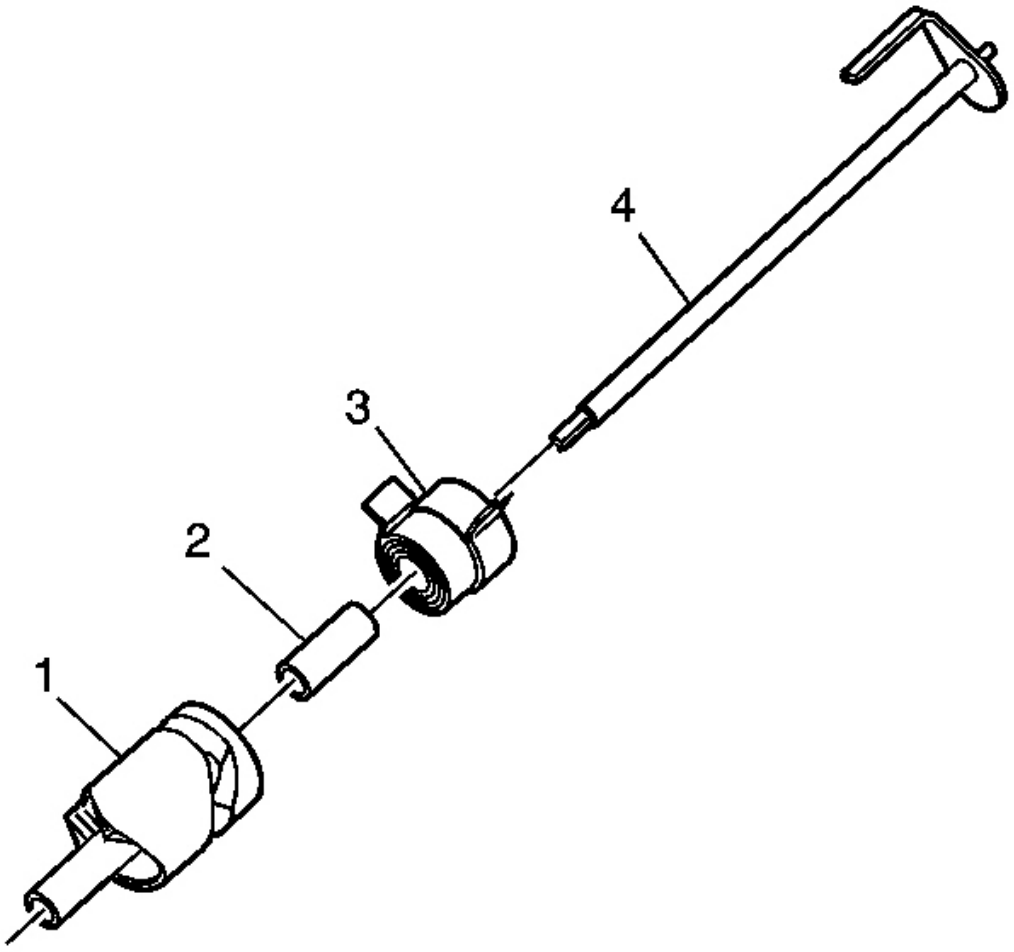


Fig. 69: Expanded View Of Shift Detent Lever Assembly
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Only disassemble the shift detent lever shaft assembly if replacing a faulty component. The tip on the end of the shift detent lever shaft is used for assembly. If the tip is broken off, the shaft can still be used, but may cause problems aligning with the rear case half during the assembly procedure.

1. Inspect the shift detent lever (1) at the cam surfaces for the following conditions:
   - Roughness
   - Grooved

    - Excessive wear
2. Inspect the shift detent lever shaft (4) for the following conditions:
    - Encoder motor drive end excessively worn
    - Straightness
3. Inspect the sleeve (2) for excessive wear or for being grooved from the spring (3).
4. Inspect the spring (3) for being weak or for the tabs being bent.
5. Replace any of the above components if they are found to be faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .

TRANSFER CASE ASSEMBLE

Tools Required

- **J 3289-20** Holding Fixture
- **J 8092** Universal Driver Handle
- **J 22912-01** Rear Pinion and Axle Bearing Remover
- **J 36850** Transjel Lubricant
- **J 42176** Universal Driver Handle - Non-Threaded
- **J 42738** Seal Installer
- **J 43484** Front Output Shaft Seal Installer
- **J 45756** Rear Output Shaft Seal Installer
- **J 45757** Mainshaft Support Bushing and Bearing Installer
- **J 45759** Assembly Fixture

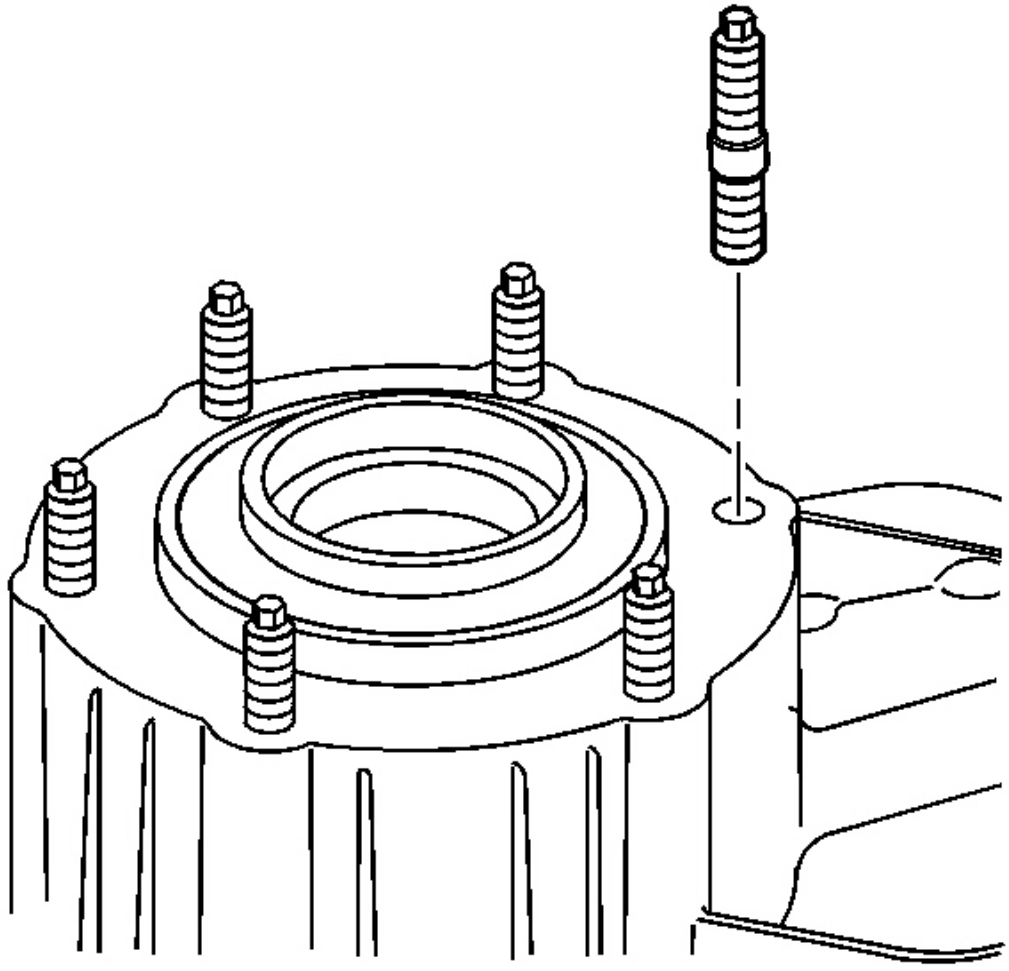


Fig. 70: View Of Transfer Case Mounting Stud
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

1. If removed, install the transfer case mounting studs.

   Tighten: Tighten the mounting studs to 31 N.m (23 lb ft).

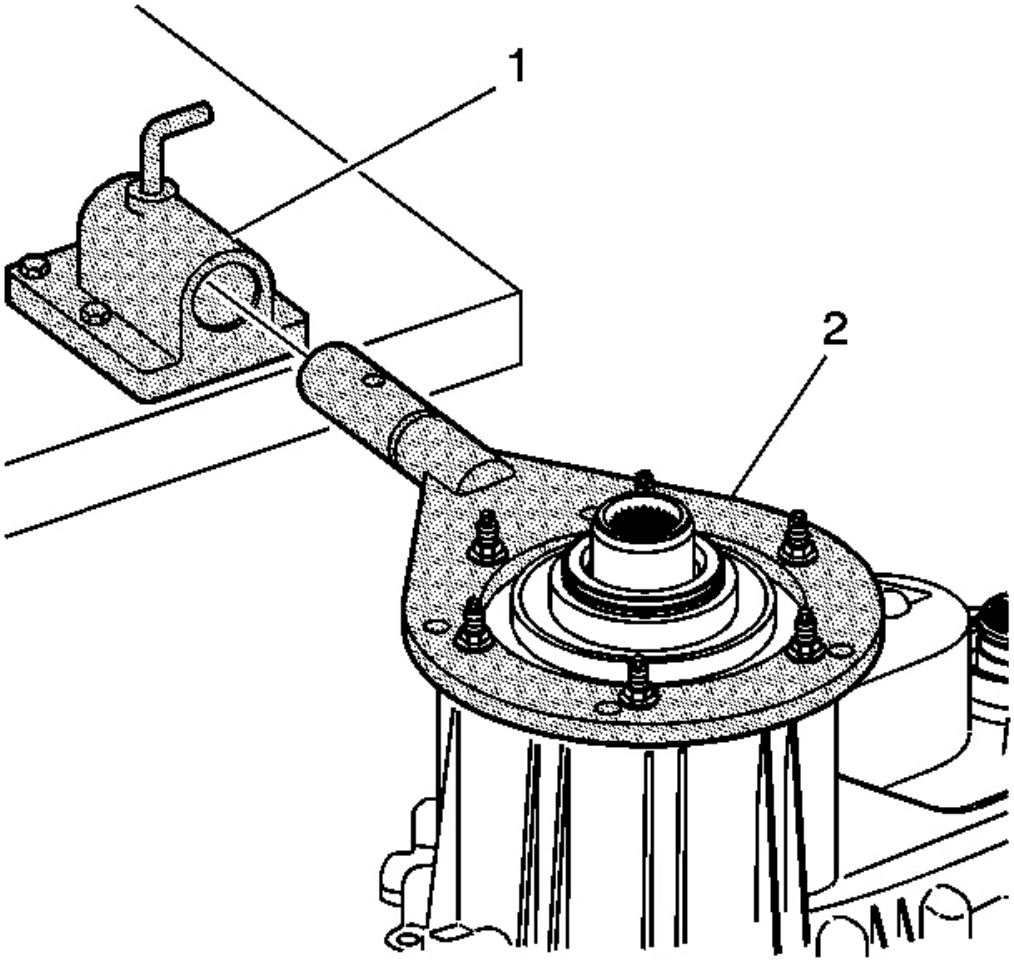


Fig. 71: Installing J 45759 Into J 3289-20
Courtesy of GENERAL MOTORS CORP.

2. Using the adapter studs, attach the **J 45759** to the front transfer case. All of the assembly procedures can be performed with the case mounted to the **J 45759** .
3. Install the **J 45759** (2) into the **J 3289-20** (1) and secure with the pivot pin.

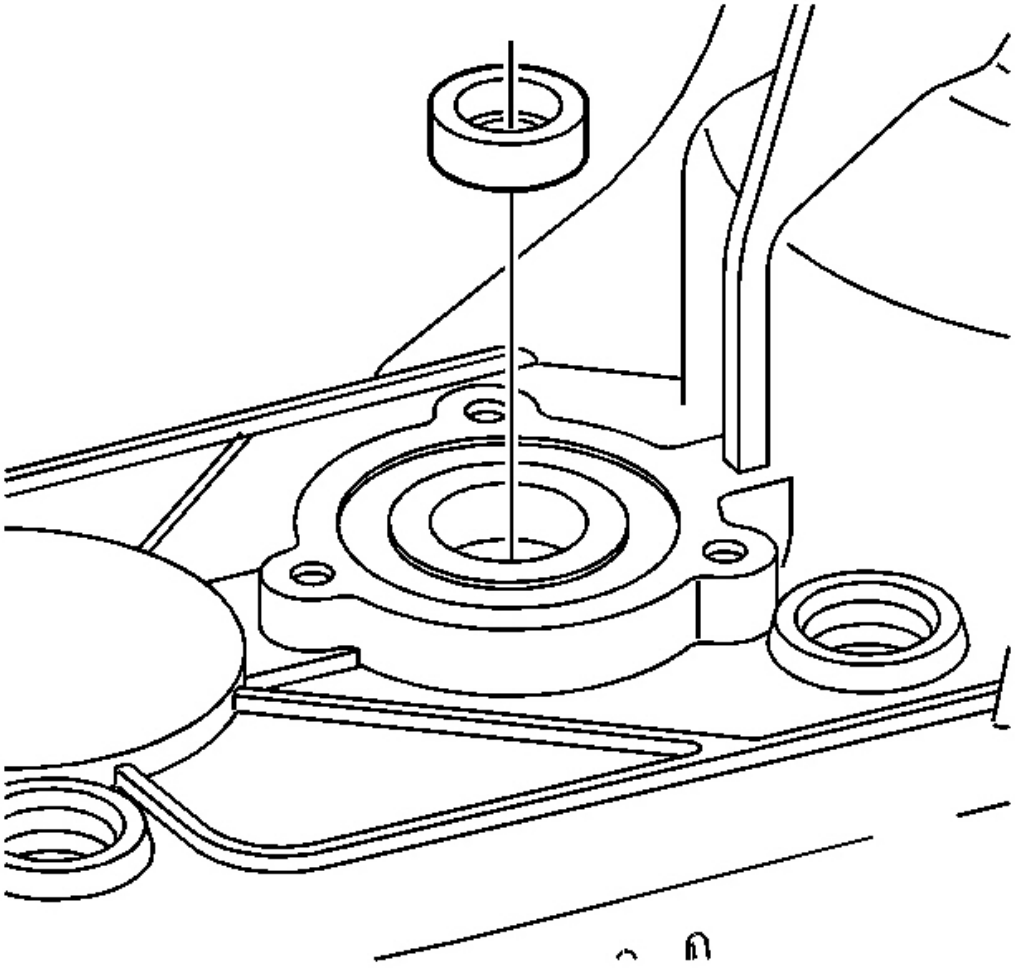


Fig. 72: View Of Shift Detent Lever Shaft Seal
Courtesy of GENERAL MOTORS CORP.

4. Install the seal for the shift detent lever shaft. The seal will install using hand pressure. The spring side, or opened side, of the seal faces outward.

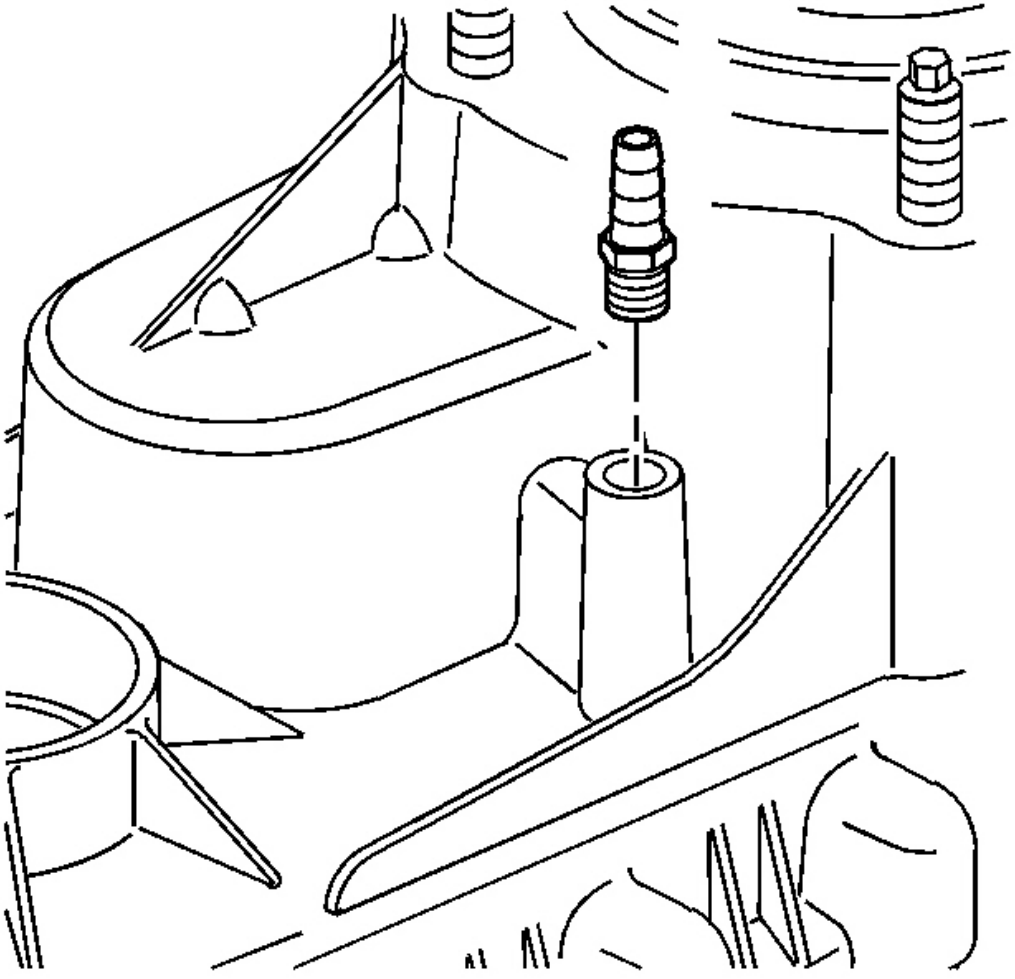


Fig. 73: View Of Front Case Vent
Courtesy of GENERAL MOTORS CORP.

5. If the vent is removed, apply pipe sealant GM P/N 12346004 (Canadian P/N 10953480) to the threads on the vent.
6. Install the vent.

Tighten: Tighten the vent to 6 N.m (53 lb in).

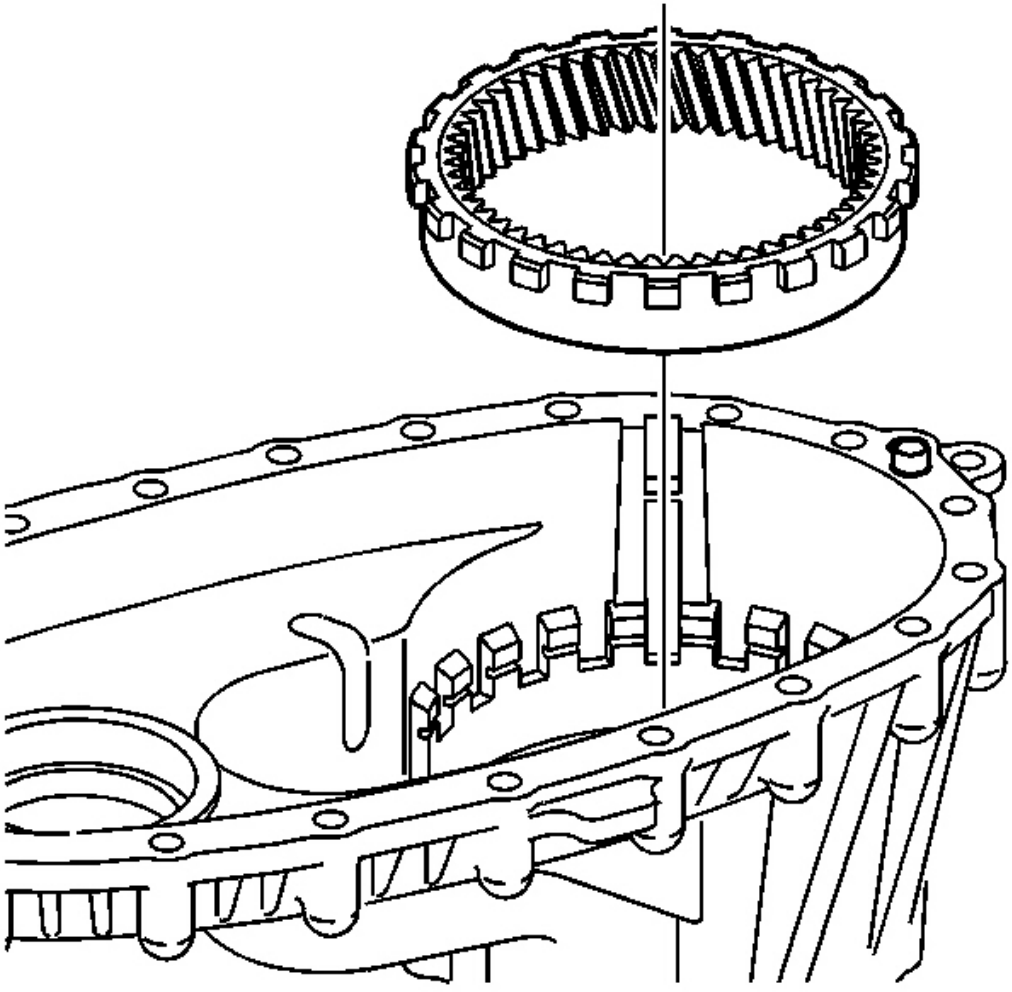


Fig. 74: Identifying Annulus Gear
Courtesy of GENERAL MOTORS CORP.

7. Install the annulus gear in the front case half.

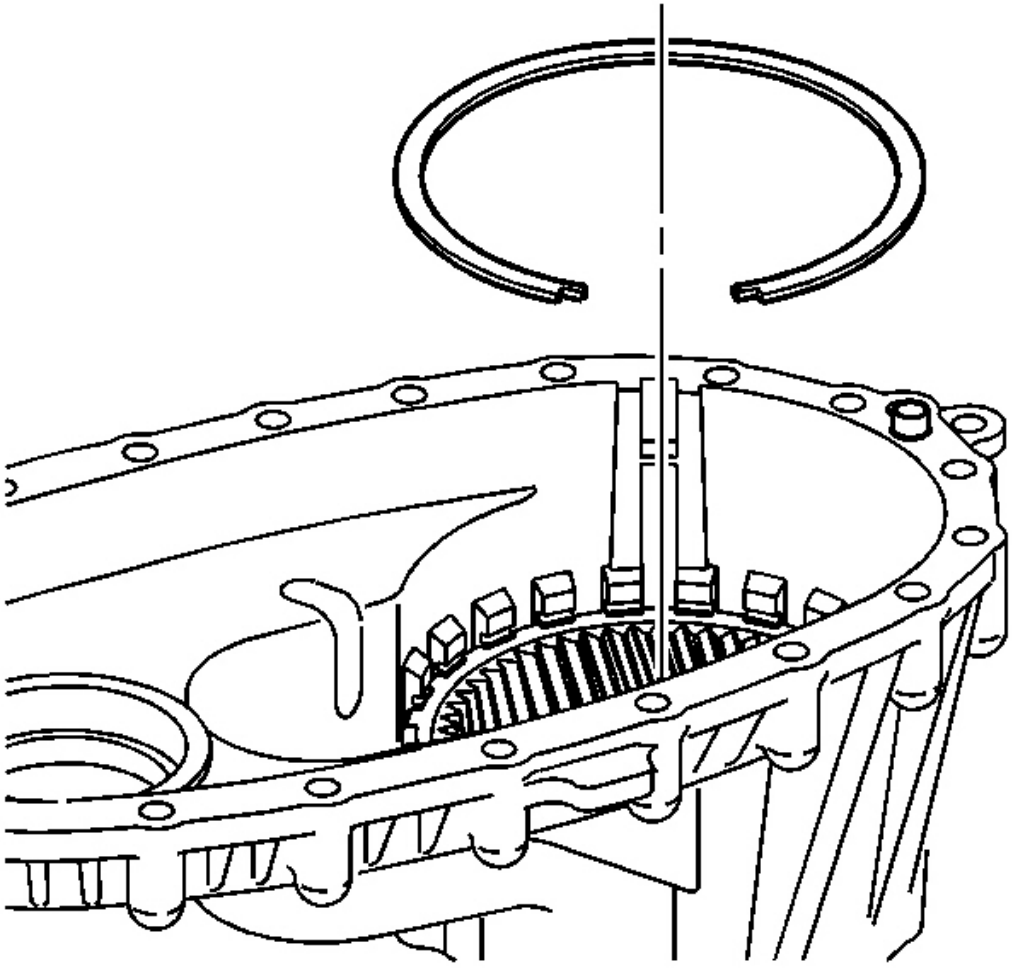


Fig. 75: Locating Retaining Ring For Annulus Gear
Courtesy of GENERAL MOTORS CORP.

8. Install a NEW retaining ring for the annulus gear.

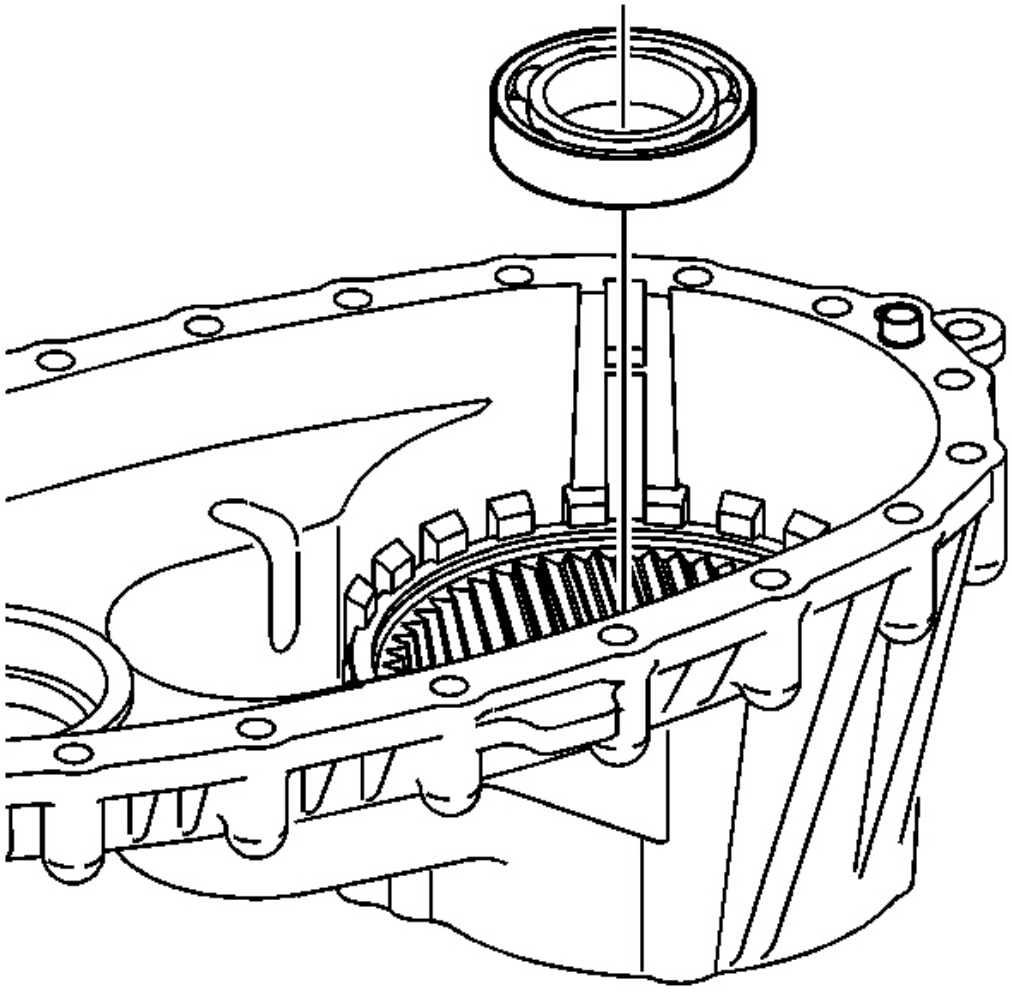


Fig. 76: Installing Input Shaft Bearing
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Lubricate all of the bearings and bearing journals with transfer case fluid during installation.

9. Install the input shaft bearing in the front case half.
    - Use a hammer and a brass drift only on the outer bearing race.
    - Ensure the bearing is kept square to the bore while installing.

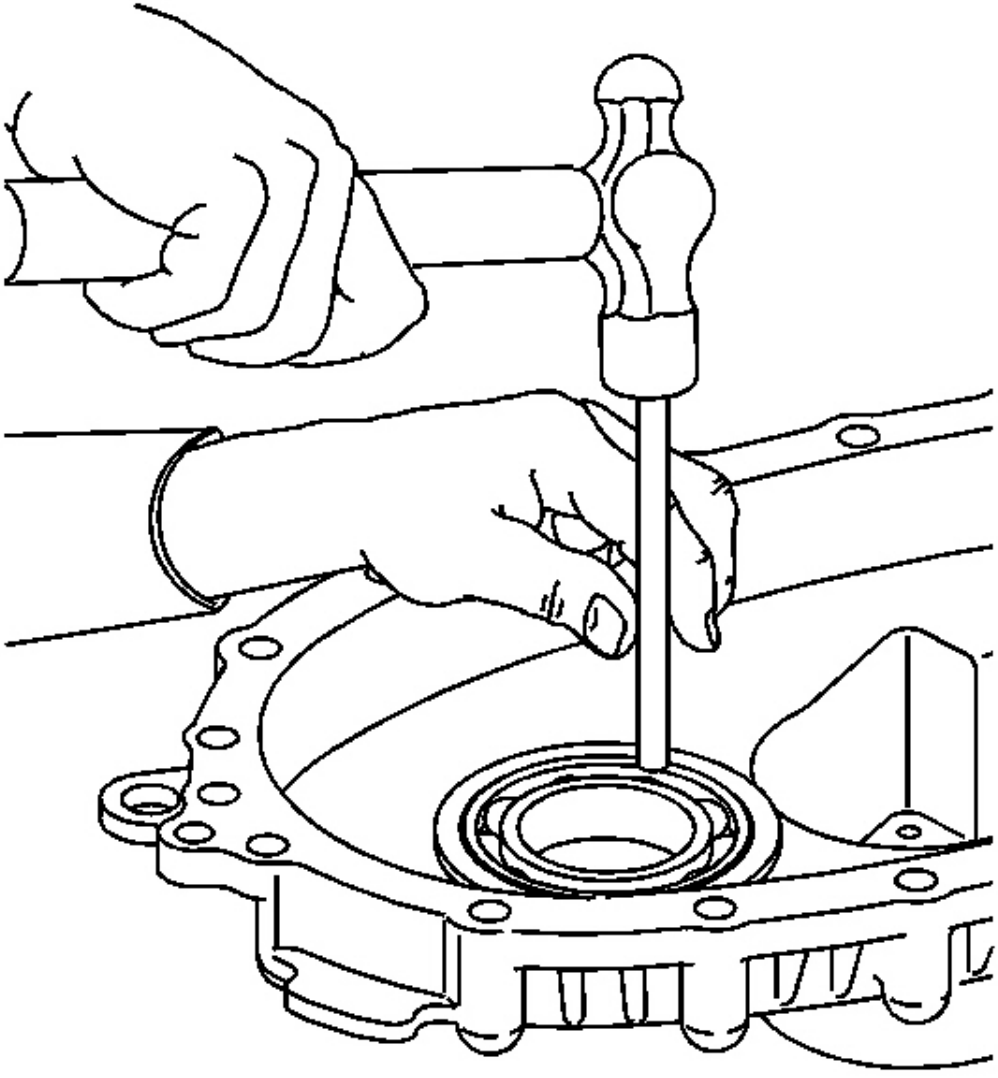


Fig. 77: Installing Front Bearing For Front Output Shaft
Courtesy of GENERAL MOTORS CORP.

10. Install the front bearing for the front output shaft in the front case half.
    - Use a hammer and a brass drift only on the outer bearing race.
    - Ensure the bearing is kept square to the bore while installing.

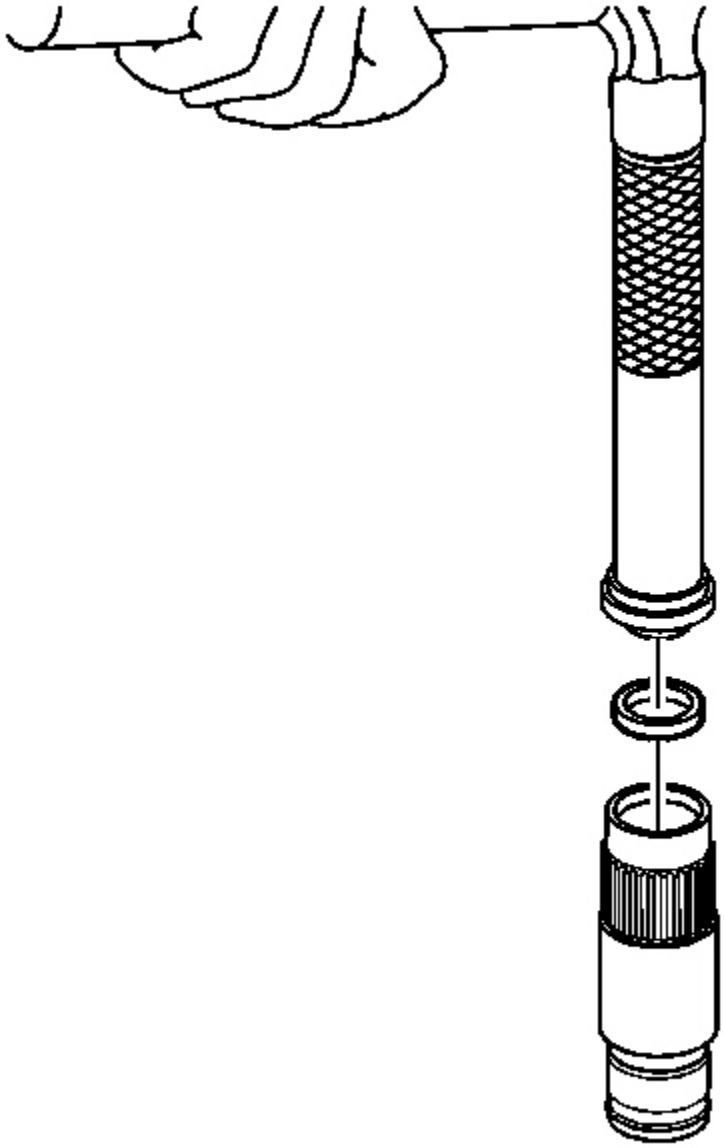


Fig. 78: Installing Cup Plug
Courtesy of GENERAL MOTORS CORP.

11. If it is a new shaft or if the cup plug was removed, apply threadlocker GM P/N 12345382 (Canadian P/N 10953489) to the cup plug.
12. Using a suitable driver, install the cup plug in the front output shaft. Install the cup plug 1 mm (0.039 in) from flush with the end of the shaft.

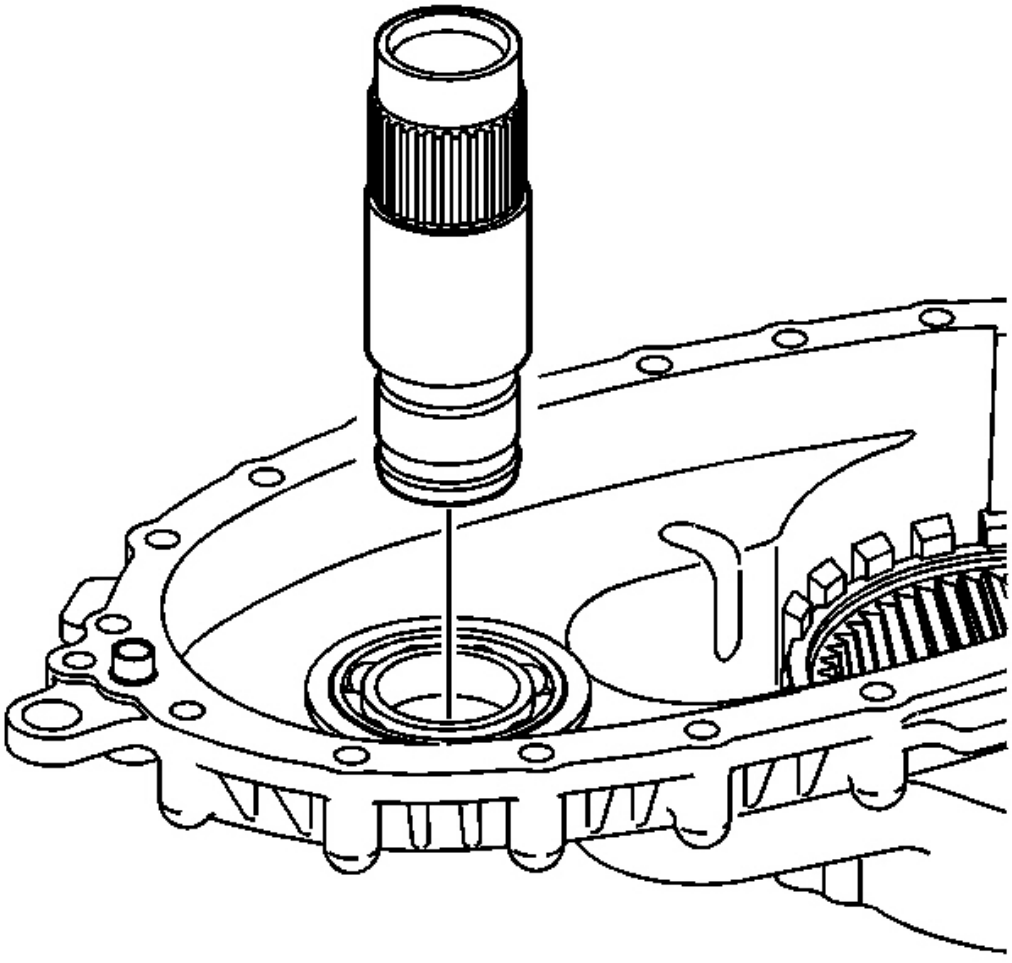


Fig. 79: Front Output Shaft Assembly
Courtesy of GENERAL MOTORS CORP.

13. Install the front output shaft assembly.

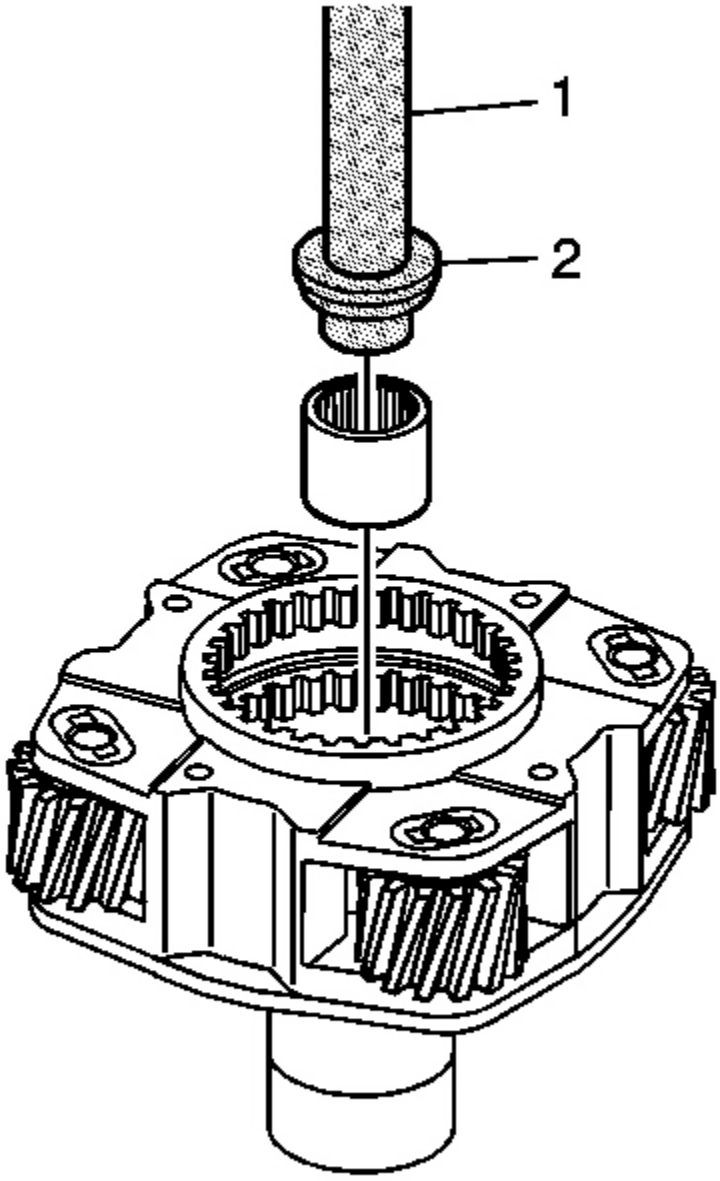


Fig. 80: Identifying J 42176 & J 45757
Courtesy of GENERAL MOTORS CORP.

14. Using the **J 42176** (1) and the **J 45757** (2), install the mainshaft front support bearing in the high/low planetary carrier assembly.

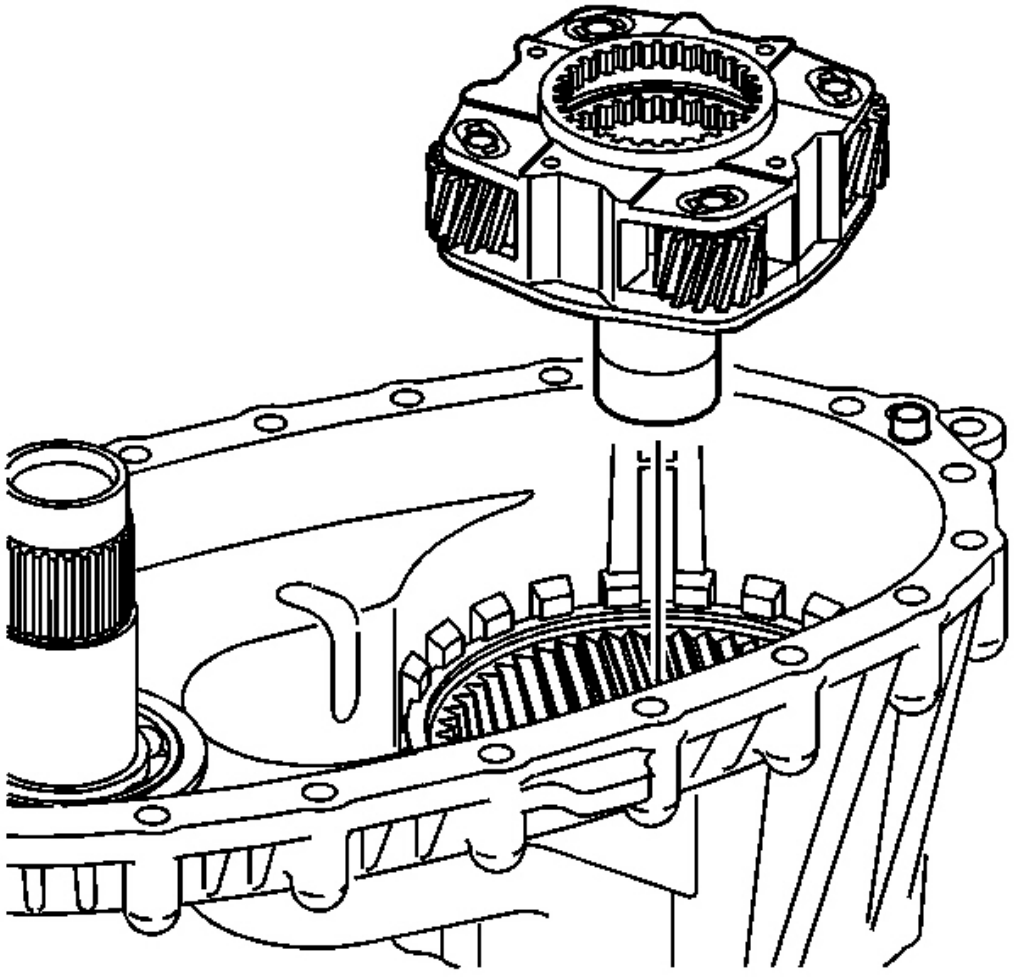


Fig. 81: Identifying High/Low Planetary Carrier
Courtesy of GENERAL MOTORS CORP.

15. Install the high/low planetary carrier.

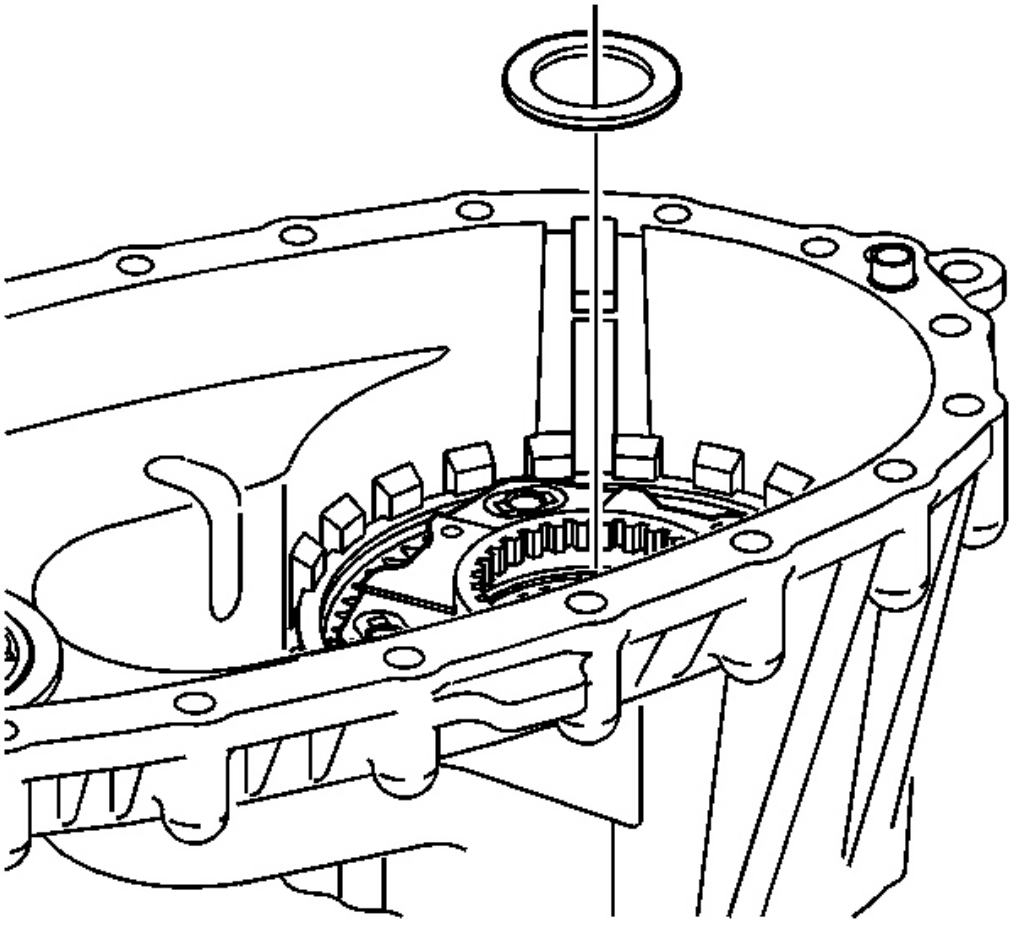


Fig. 82: Locating Input Shaft Thrust Washer
Courtesy of GENERAL MOTORS CORP.

16. Lubricate the input shaft thrust washer with **J 36850** or equivalent.
17. Install the input shaft thrust washer.

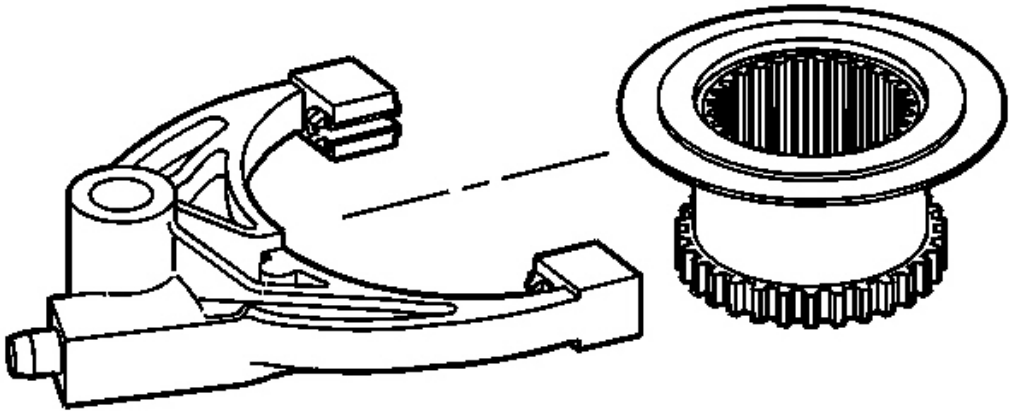


Fig. 83: View Of Range Shift Fork & Range Shift Sleeve
Courtesy of GENERAL MOTORS CORP.

18. Install new shift fork pads, if removed.
19. Install the range shift sleeve in the range fork.

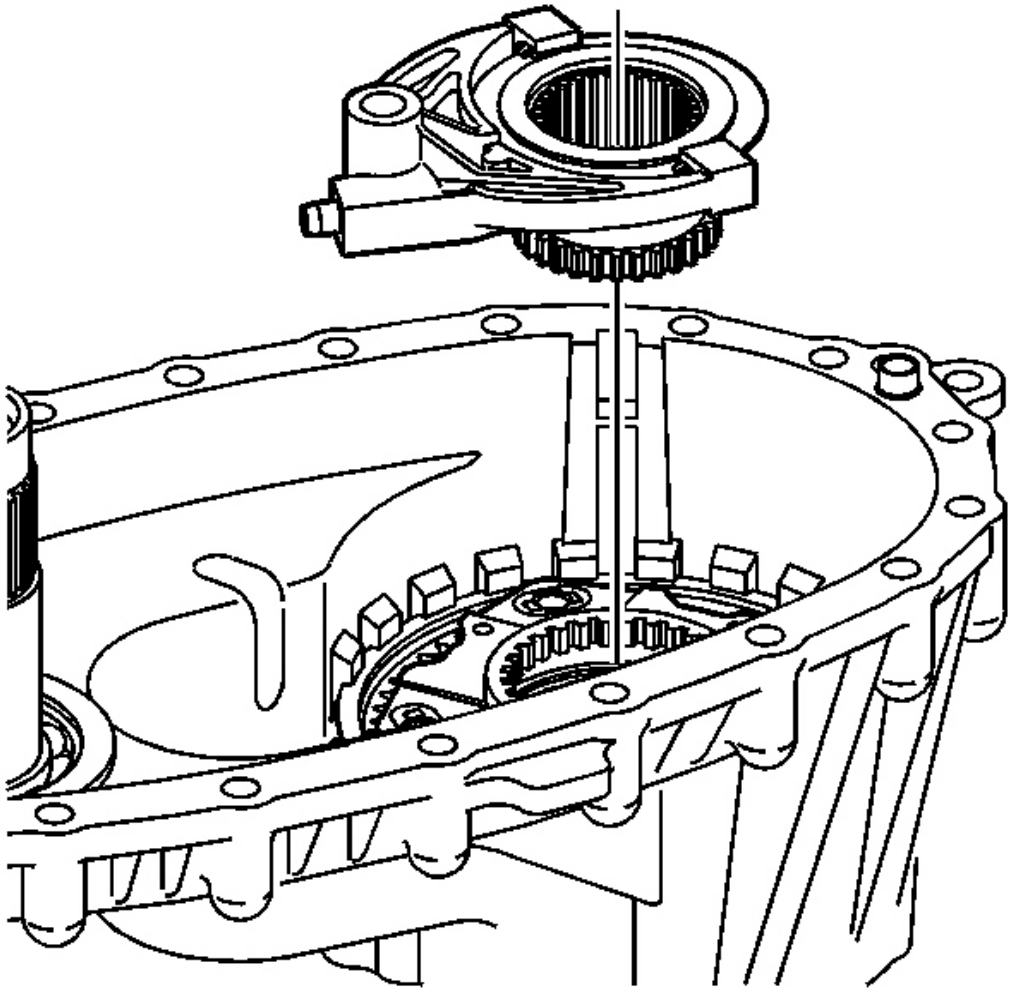


Fig. 84: Identifying High/Low Range Sleeve With The High/Low Range Shift Fork
Courtesy of GENERAL MOTORS CORP.

20. Align the gear teeth on the range shift sleeve to the planetary carrier.
21. Install the range shift fork and the range shift sleeve.

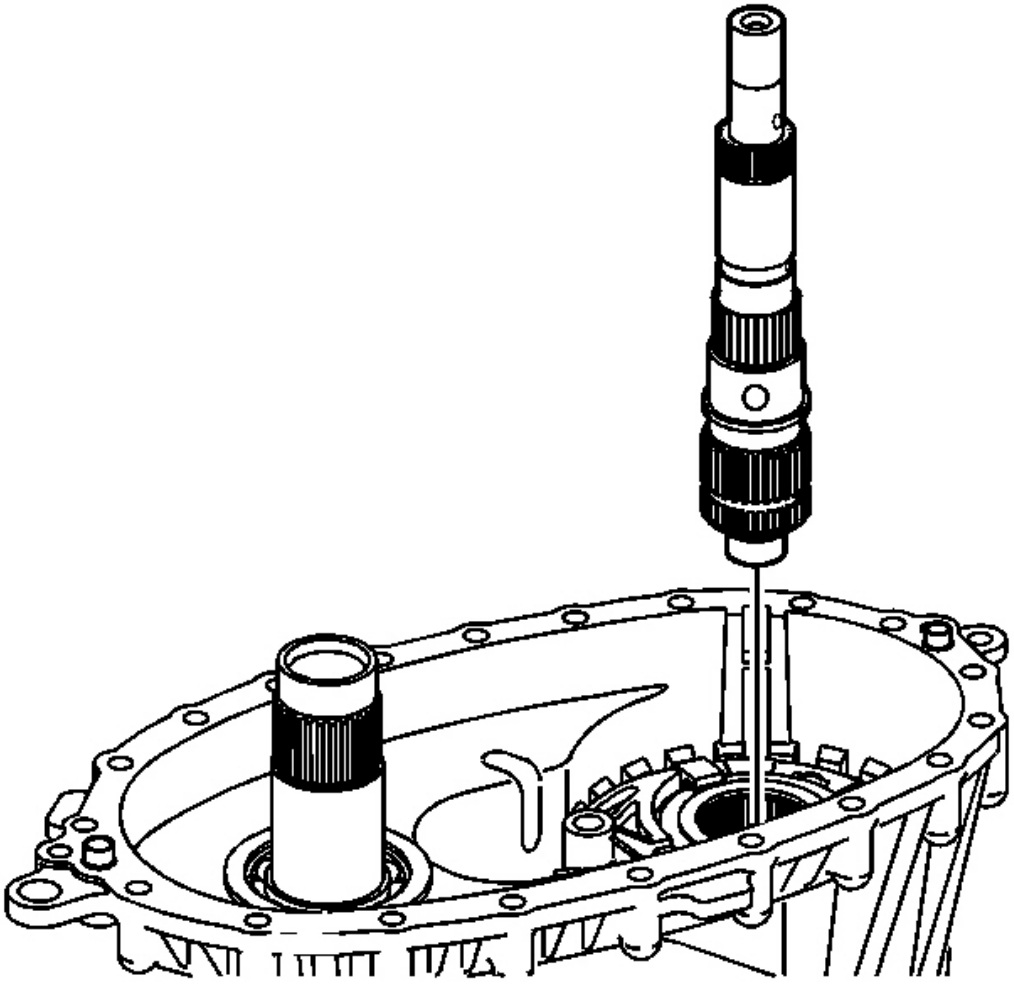


Fig. 85: View Of Mainshaft
Courtesy of GENERAL MOTORS CORP.

22. Install the mainshaft.

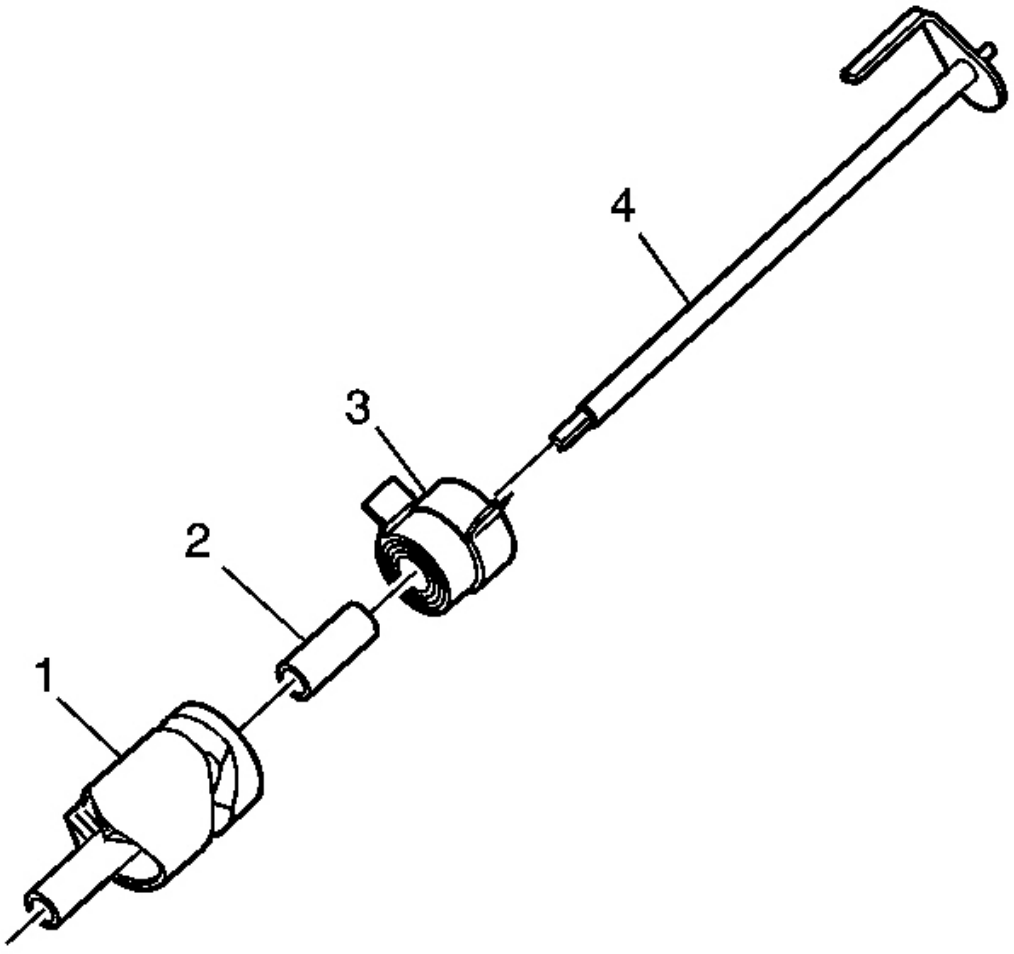


Fig. 86: Expanded View Of Shift Detent Lever Assembly
Courtesy of GENERAL MOTORS CORP.

23. Assemble the shift detent lever assembly.
    1. Mount the spring (3), by one tab, in a vise.
    2. Install the sleeve (2) in the spring (3).
    3. Install the shaft (4) partially in the spring (3).
    4. Install the shift detent lever cam (1) on the shaft (4).
    5. Rotate the spring (3) and install the tab on the shift detent lever cam between the spring tabs.
    6. Finish installing the shaft, aligning the lever on the shaft between the spring tabs.

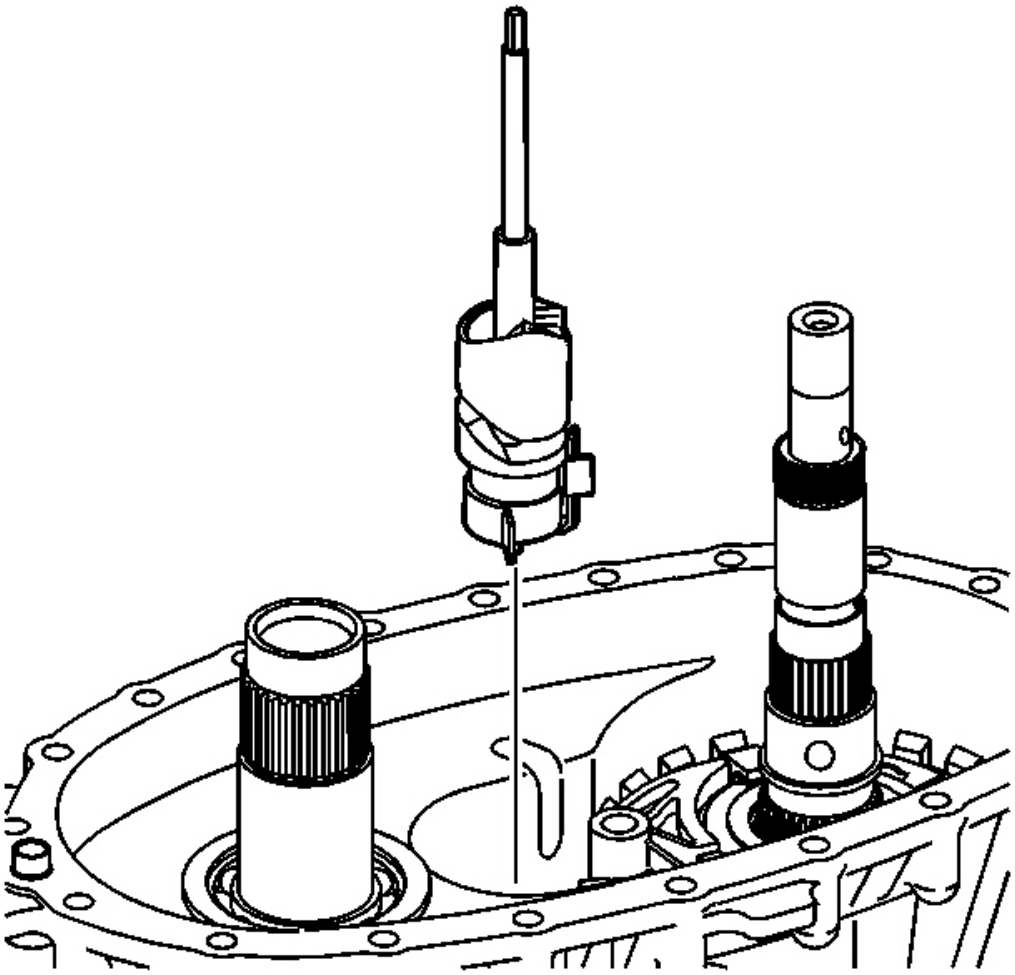


Fig. 87: Shift Detent Lever Assembly
Courtesy of GENERAL MOTORS CORP.

NOTE: In order to prevent component damage, properly remove and install the shift detent lever shaft assembly. When removing or installing the shift detent lever shaft assembly, keep the shaft straight and do not tilt. Tilting the shift detent lever shaft assembly in the transfer case housing will break the tip on the end of the shaft.

24. Install the shift detent lever assembly.
    1. Install the shift detent lever assembly straight, with the tip into the hole in the case.
    2. Rotate the high/low shift fork to position the shift fork roller in the shift detent lever slot.

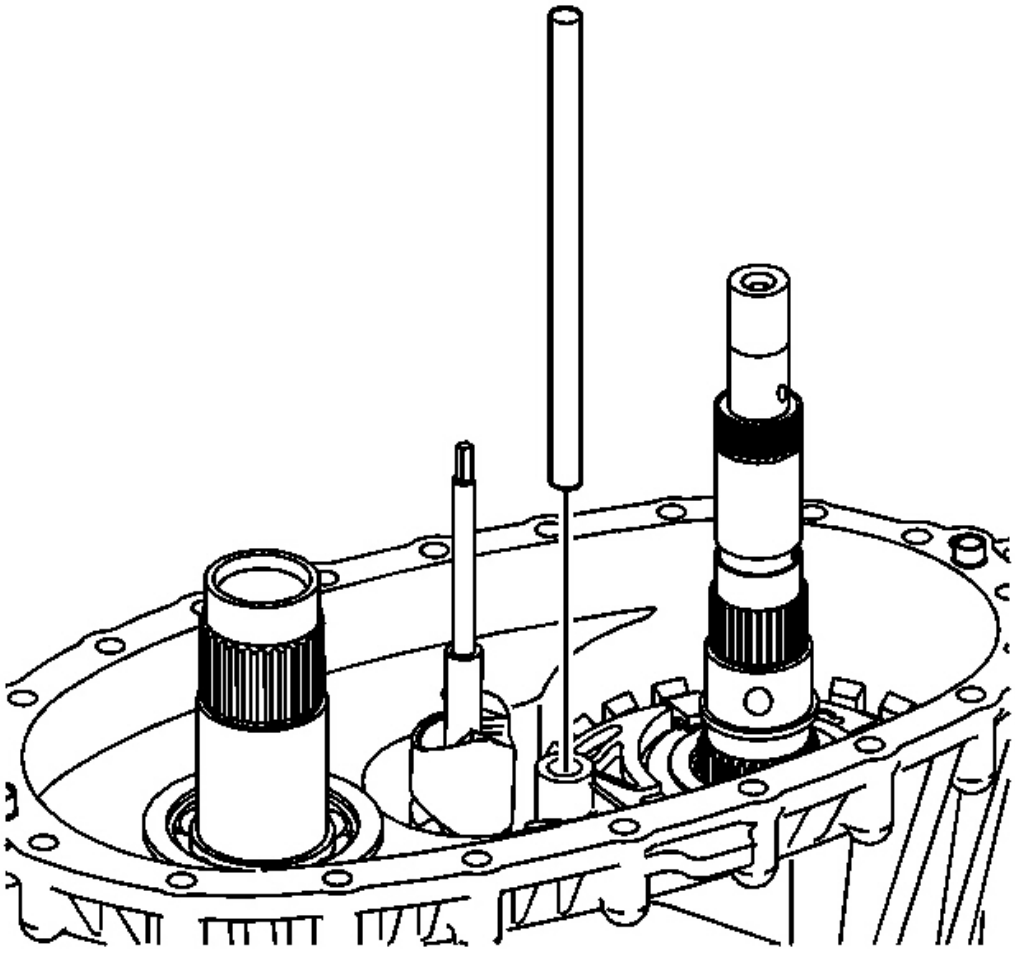


Fig. 88: View Of Shift Fork Shaft
Courtesy of GENERAL MOTORS CORP.

25. Install the shift fork shaft.

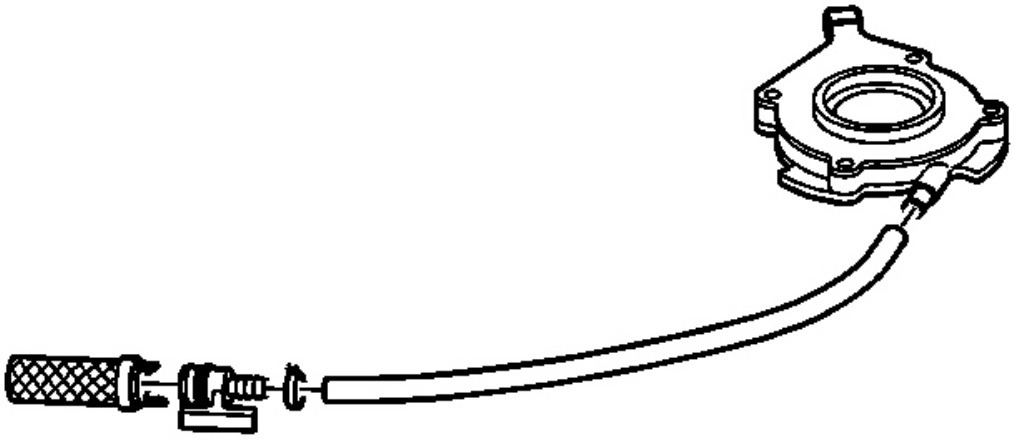


Fig. 89: Locating Oil Pump Hose & Screen
Courtesy of GENERAL MOTORS CORP.

26. Connect the oil pump hose to the oil pump screen.
27. Connect the oil pump hose to the oil pump.

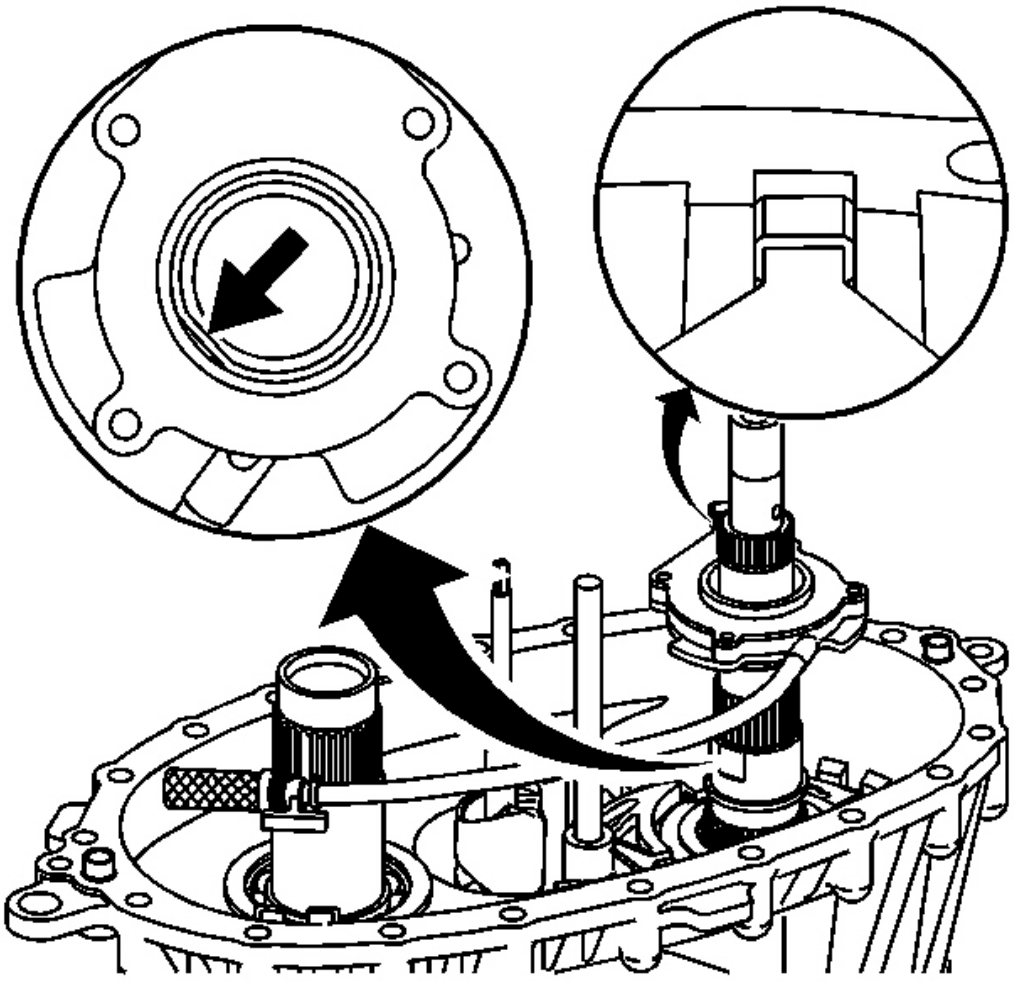


Fig. 90: Expanded View Of Oil Pump Assembly
Courtesy of GENERAL MOTORS CORP.

28. Install the oil pump assembly with the hose and screen.
    1. Align the square boss of the oil pump gear with the flat area on the mainshaft.
    2. Install the oil pump in the slot of the front case half. Ensure the wear clip is on the oil pump.
    3. Install the oil pump screen in the front case half.

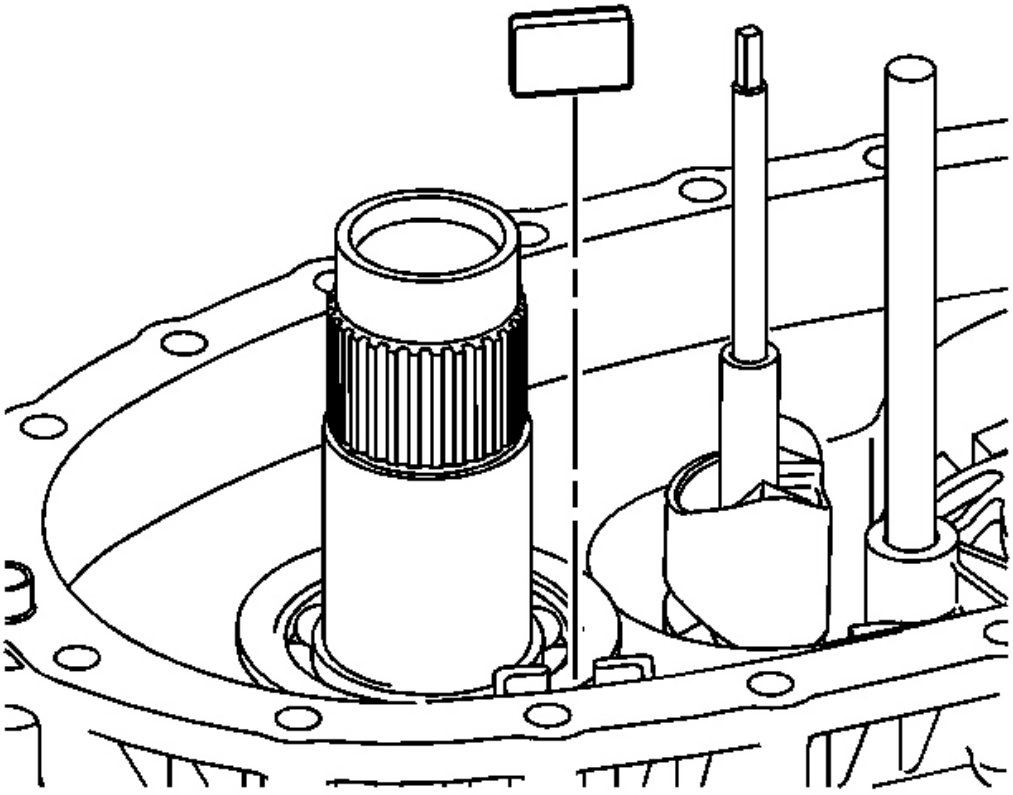


Fig. 91: Identifying Magnet
Courtesy of GENERAL MOTORS CORP.

29. Install the magnet.

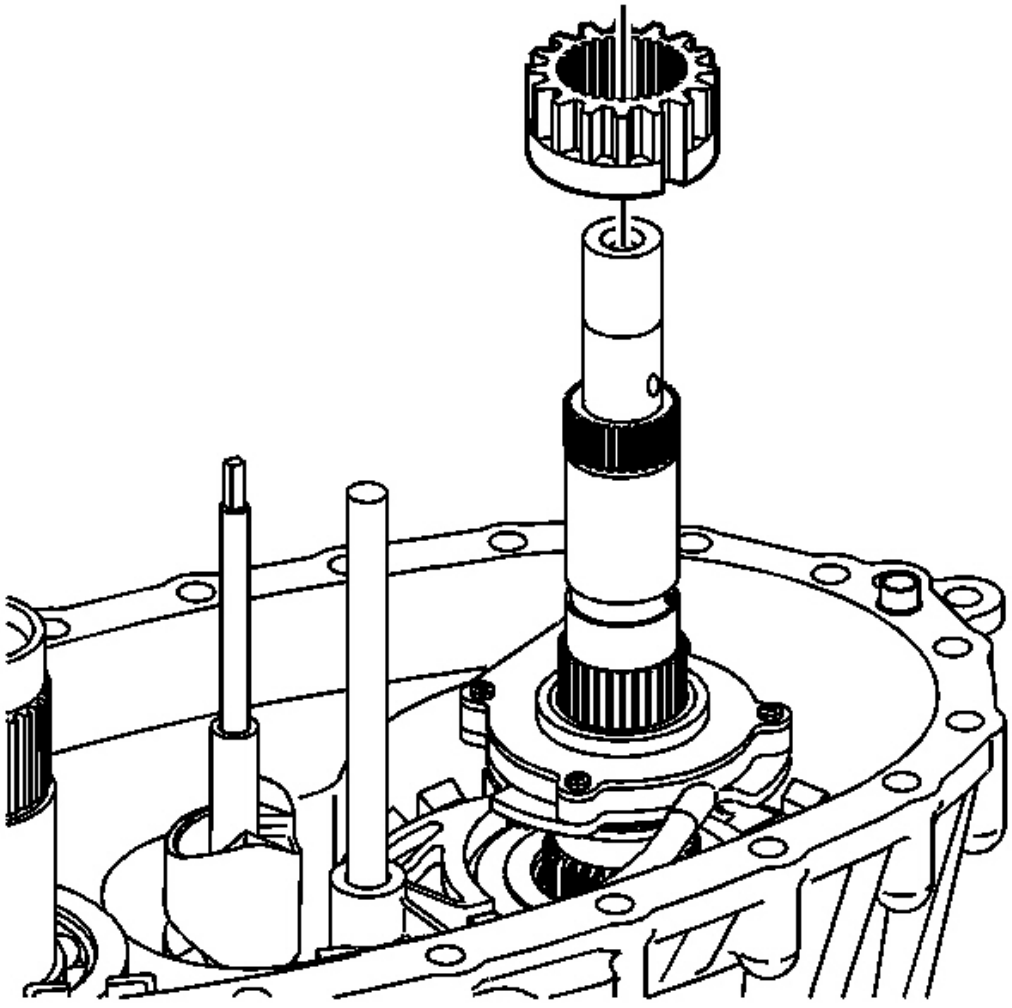


Fig. 92: View Of Inner Lockup Hub
Courtesy of GENERAL MOTORS CORP.

30. Install the inner lockup hub.

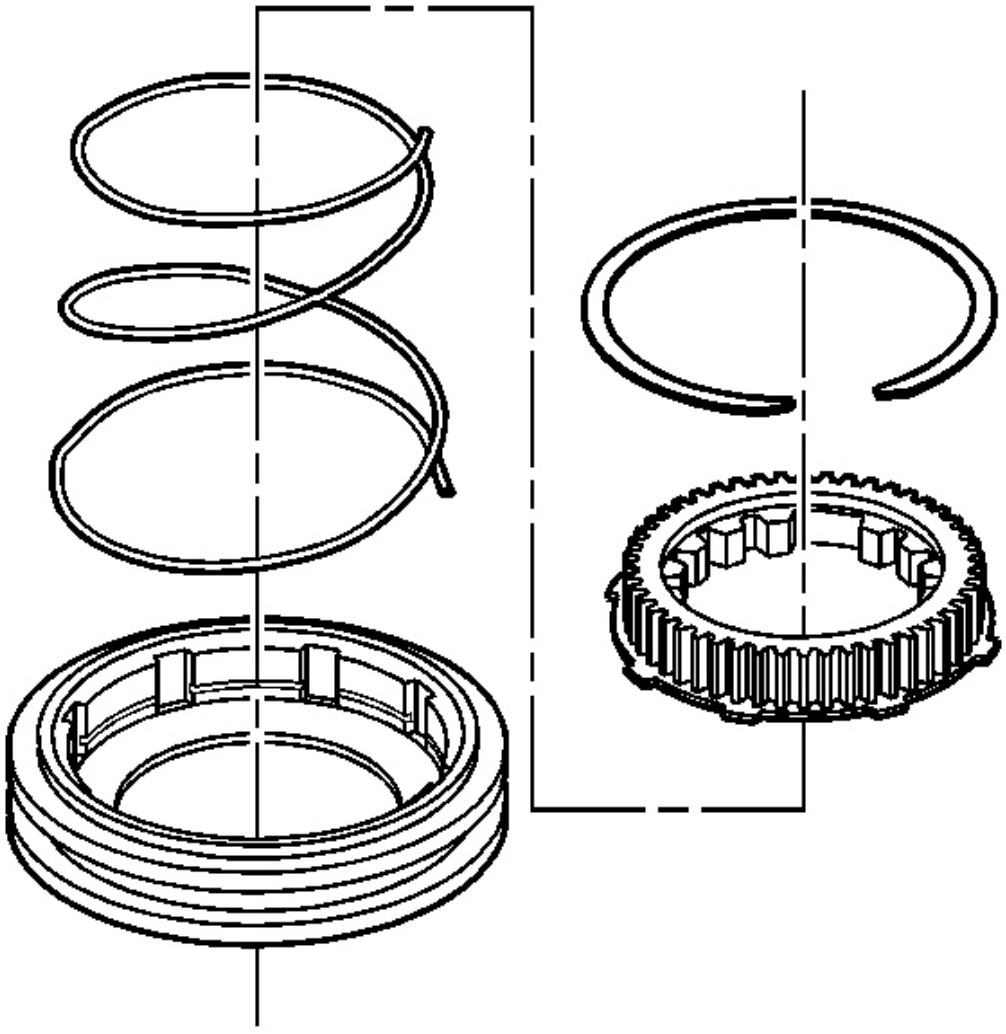


Fig. 93: Illustrating Lockup Shift Assembly Components
Courtesy of GENERAL MOTORS CORP.

31. If necessary, assemble the lockup shift assembly.
    1. Install the spring in the sleeve.
    2. Install the hub, with the external tabs, towards the spring.
    3. Install the retainer ring in the sleeve.

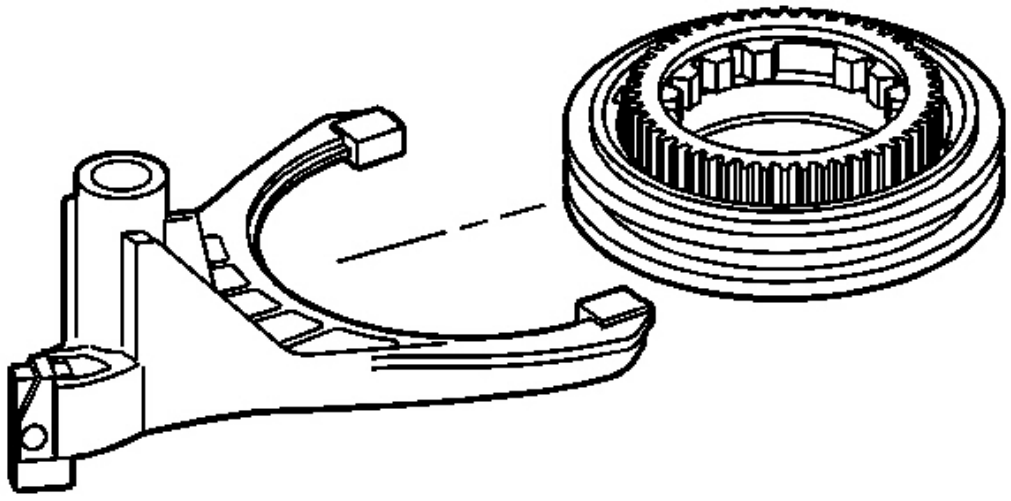


Fig. 94: View Of Lockup Shift Assembly & Lockup Mode Shift Fork
Courtesy of GENERAL MOTORS CORP.

32. Install the lockup mode shift fork to the lockup shift assembly.

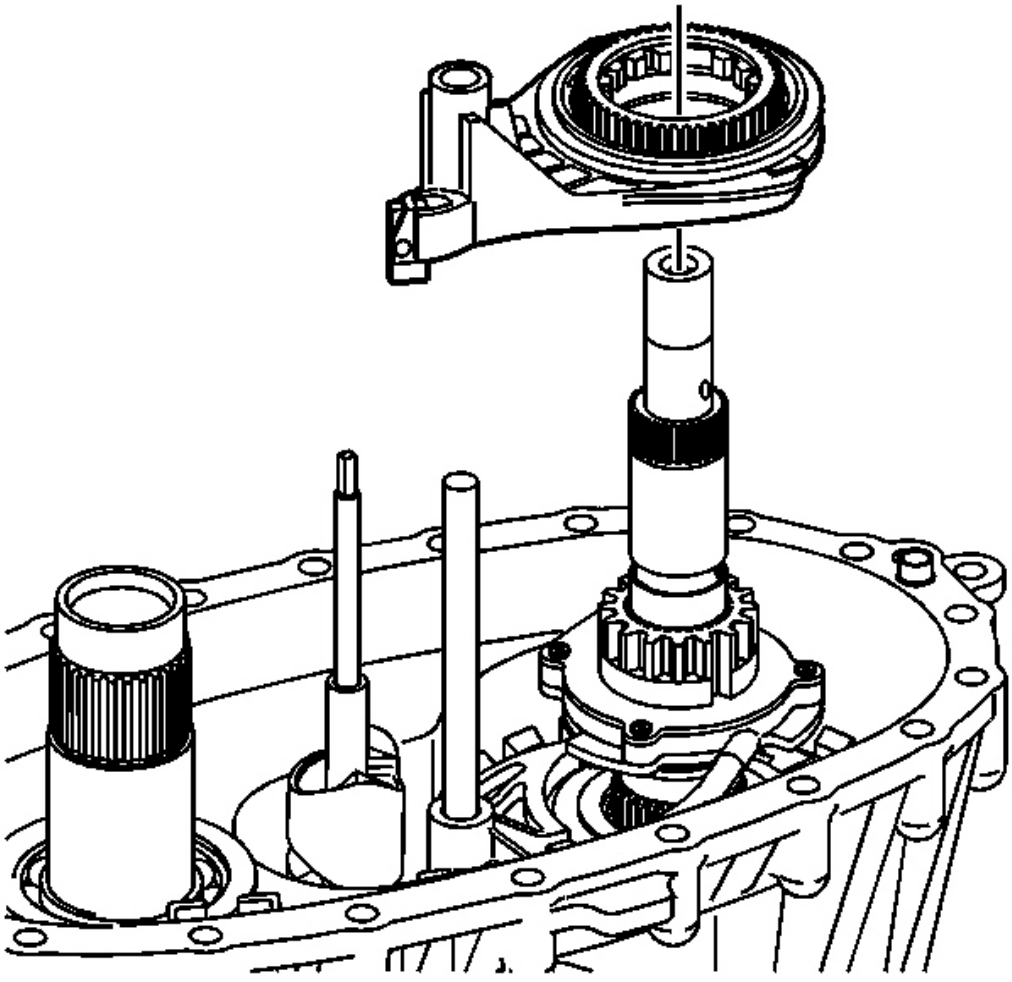


Fig. 95: Identifying Lockup Shift Assembly & Lockup Mode Shift Fork
Courtesy of GENERAL MOTORS CORP.

33. Install the lockup shift assembly and lockup mode shift fork.
    - Slide the shift fork over the shift fork shaft.
    - Turn the mainshaft to align the slot on the inner lockup hub with the large tooth area on the lockup shift assembly hub.

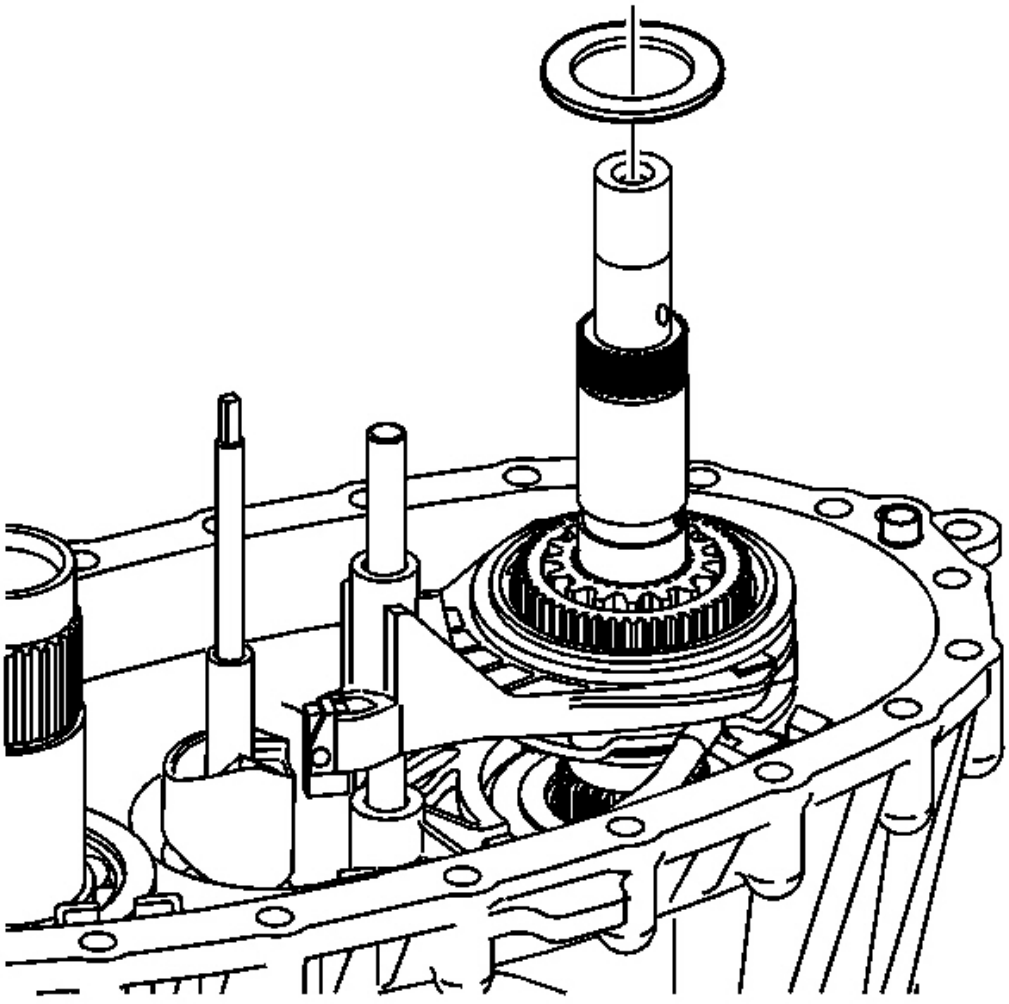


Fig. 96: Identifying Drive Sprocket Thrust Washer
Courtesy of GENERAL MOTORS CORP.

34. Lubricate the drive sprocket thrust washer with **J 36850** or equivalent.
35. Install the drive sprocket thrust washer.

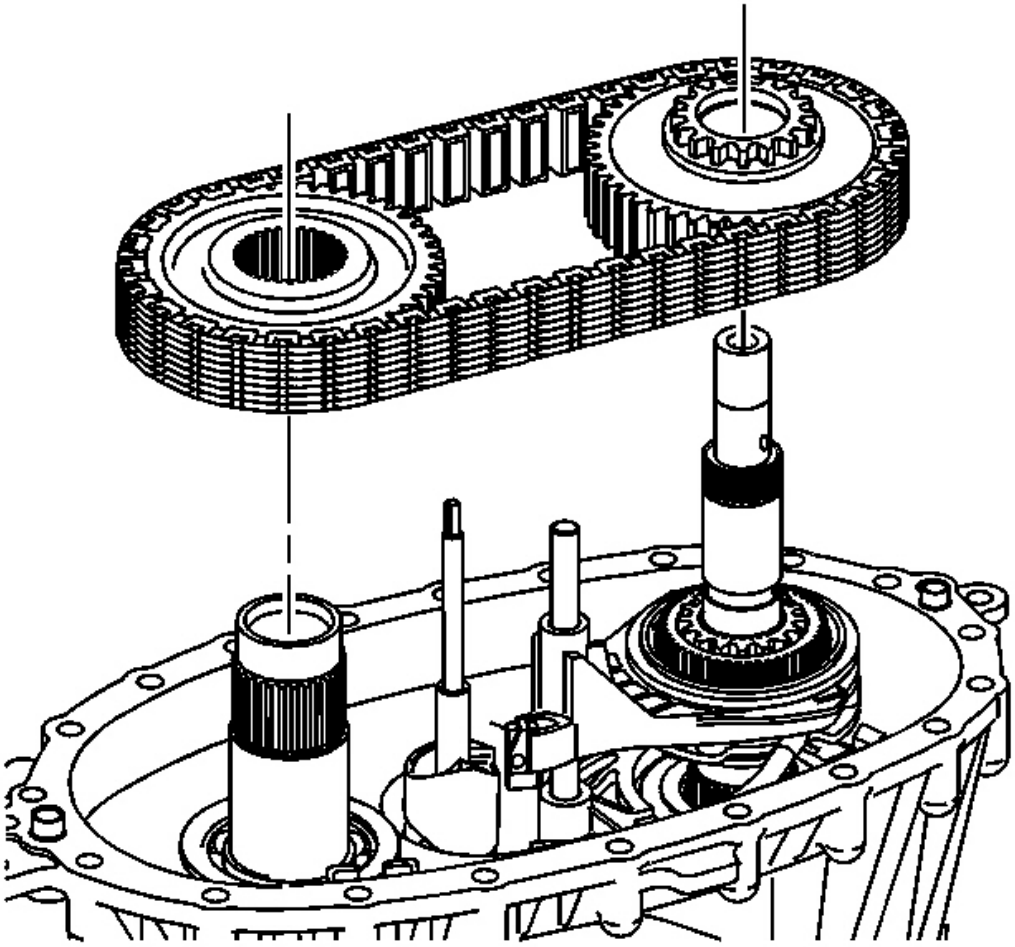


Fig. 97: View Of Drive Chain & Sprockets
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: If using the chain and sprockets again, ensure to align the marks of the drive chain and sprockets.

36. Install the drive chain and sprockets.
    - The blue link on the chain faces up.
    - Align the drive sprocket engagement teeth with the lockup shift assembly hub teeth.

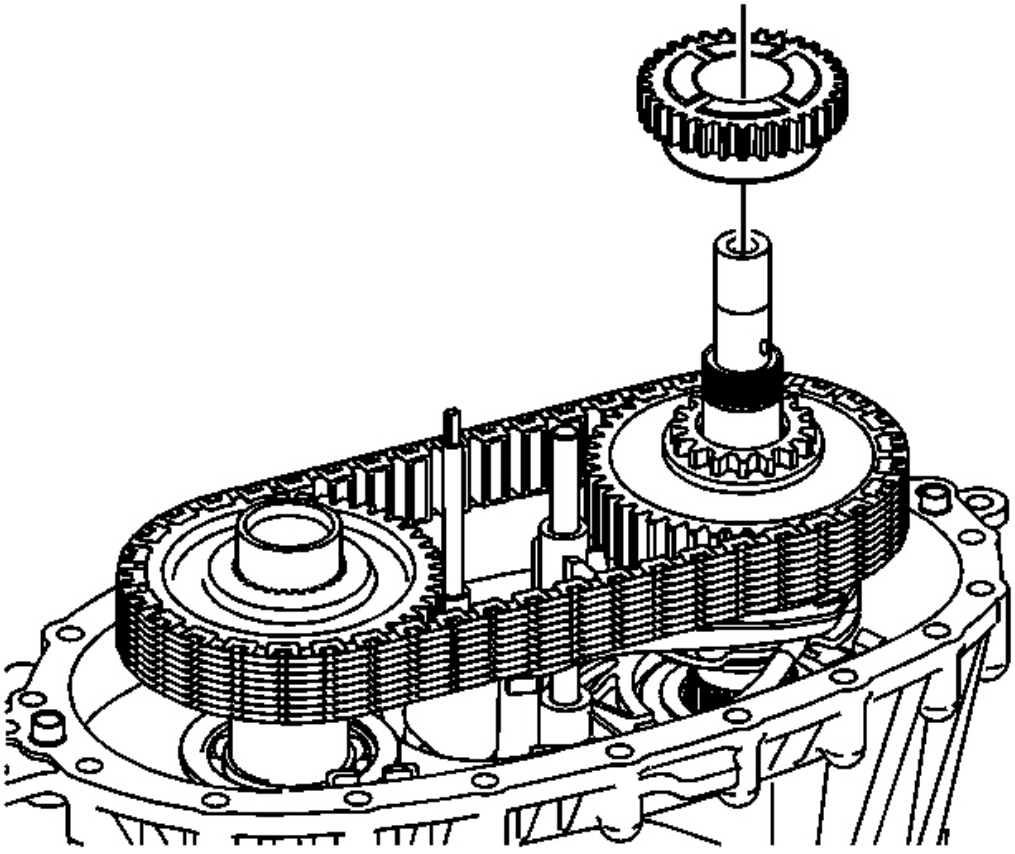


Fig. 98: Identifying Front Sun Gear
Courtesy of GENERAL MOTORS CORP.

37. Install the front sun gear.

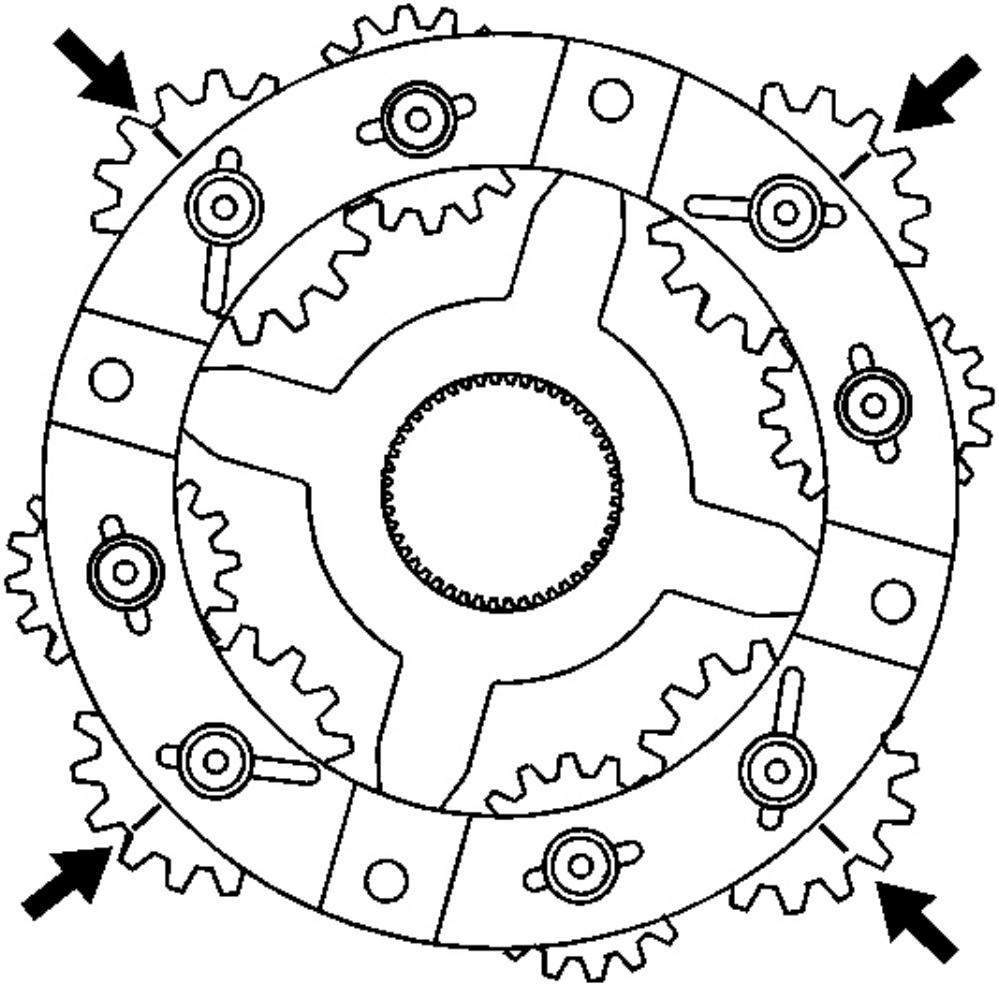


Fig. 99: Aligning Marks On The Pinion Gears
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The planetary differential gears are timed to the sun gears. If the gears are not timed properly, the differential will not rotate without binding.

38. With the rear side of the planetary differential facing up, align the marks on the pinion gears. Position the alignment marks with an area on the planetary differential that can be reference for all gears.

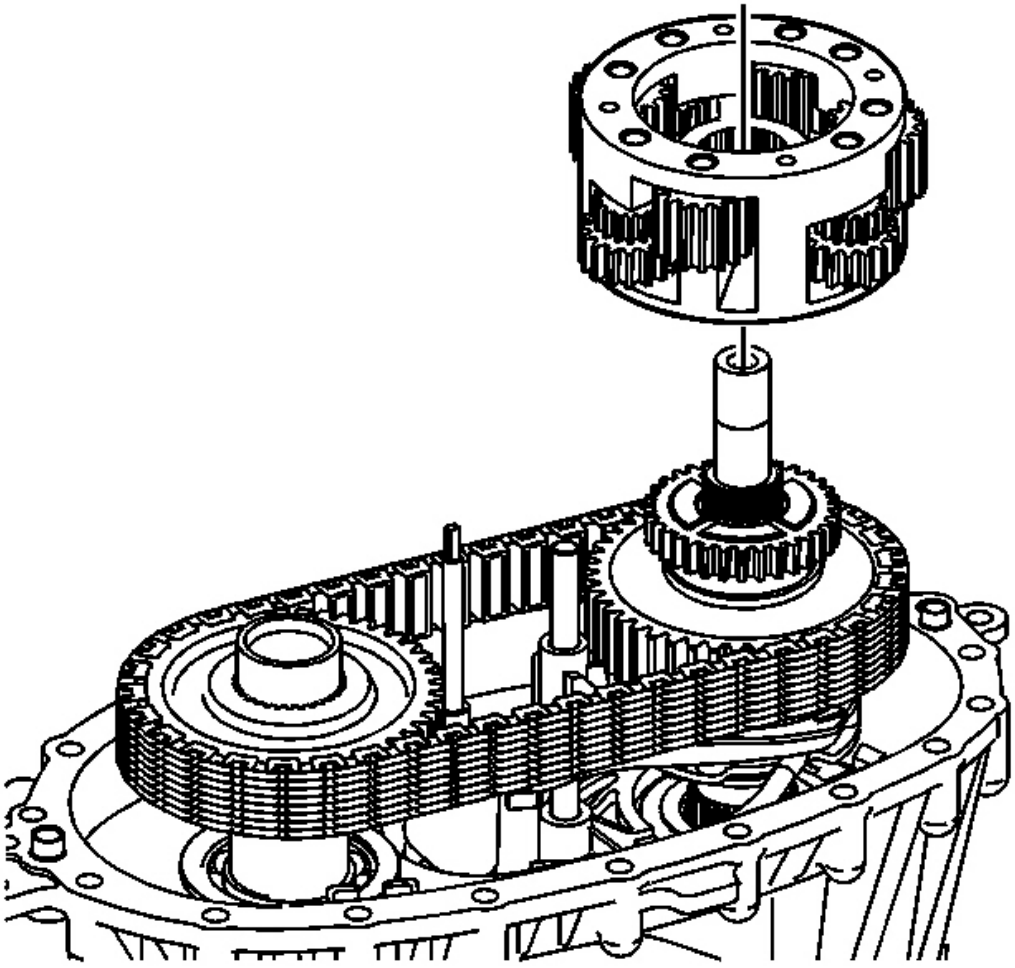


Fig. 100: View Of Planetary Differential Assembly
Courtesy of GENERAL MOTORS CORP.

39. Install the planetary differential assembly.
    - Do not rotate the planetary differential pinion gears when installing.
    - Ensure the alignment marks are still in position.
    - The single row pinion gears face rearward, or up. The double row pinion gears face forward, or down.

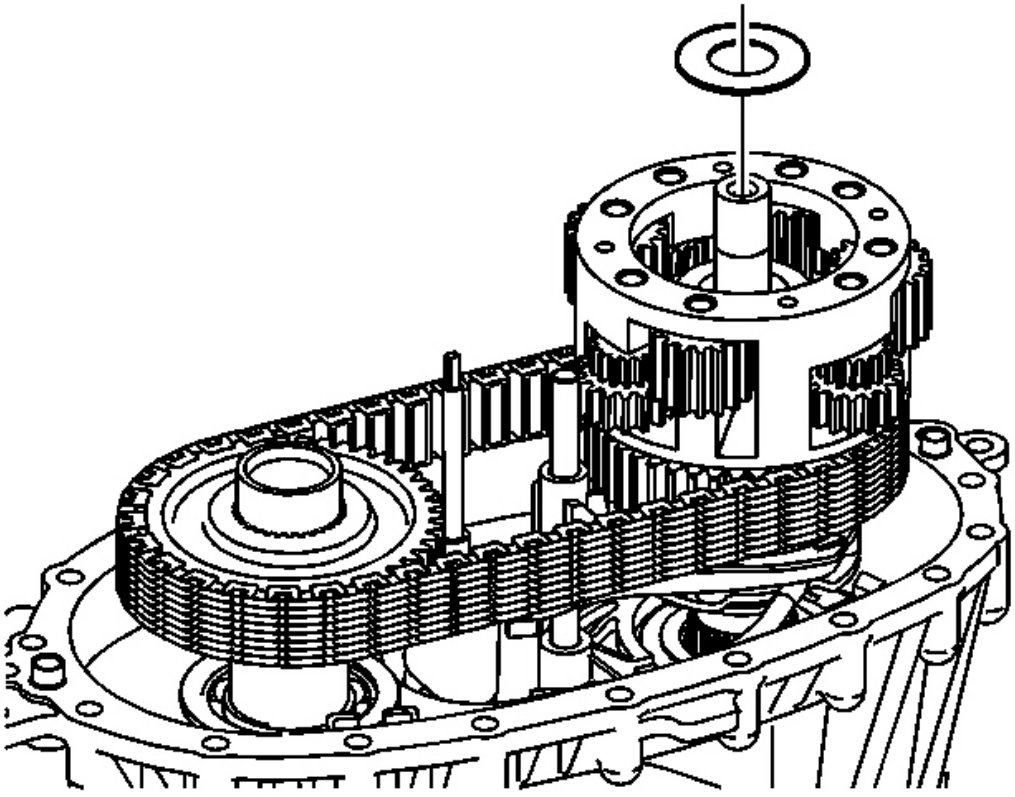


Fig. 101: Locating Rear Output Shaft Thrust Washer
Courtesy of GENERAL MOTORS CORP.

40. Lubricate the rear output shaft thrust washer with **J 36850** or equivalent.
41. Install the thrust washer.

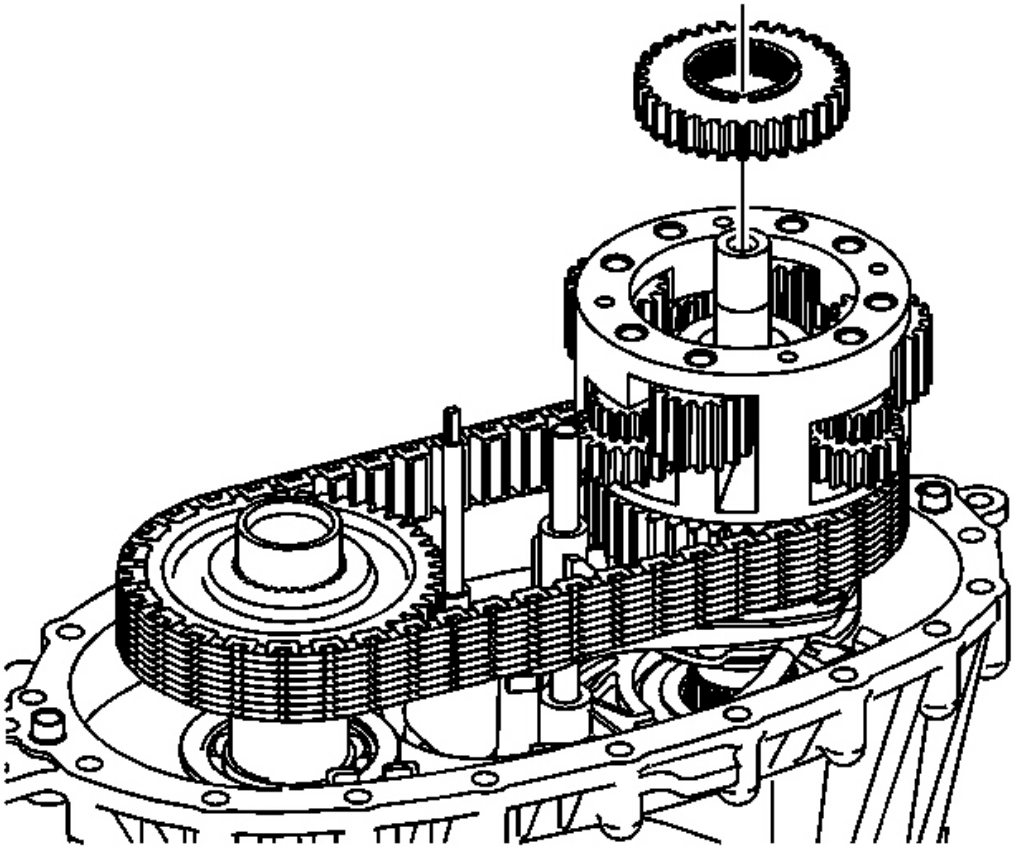


Fig. 102: View Of Rear Sun Gear
Courtesy of GENERAL MOTORS CORP.

42. Install the rear sun gear.
    - The shoulder side of the gear faces up.
    - Do not rotate the differential pinion gears.

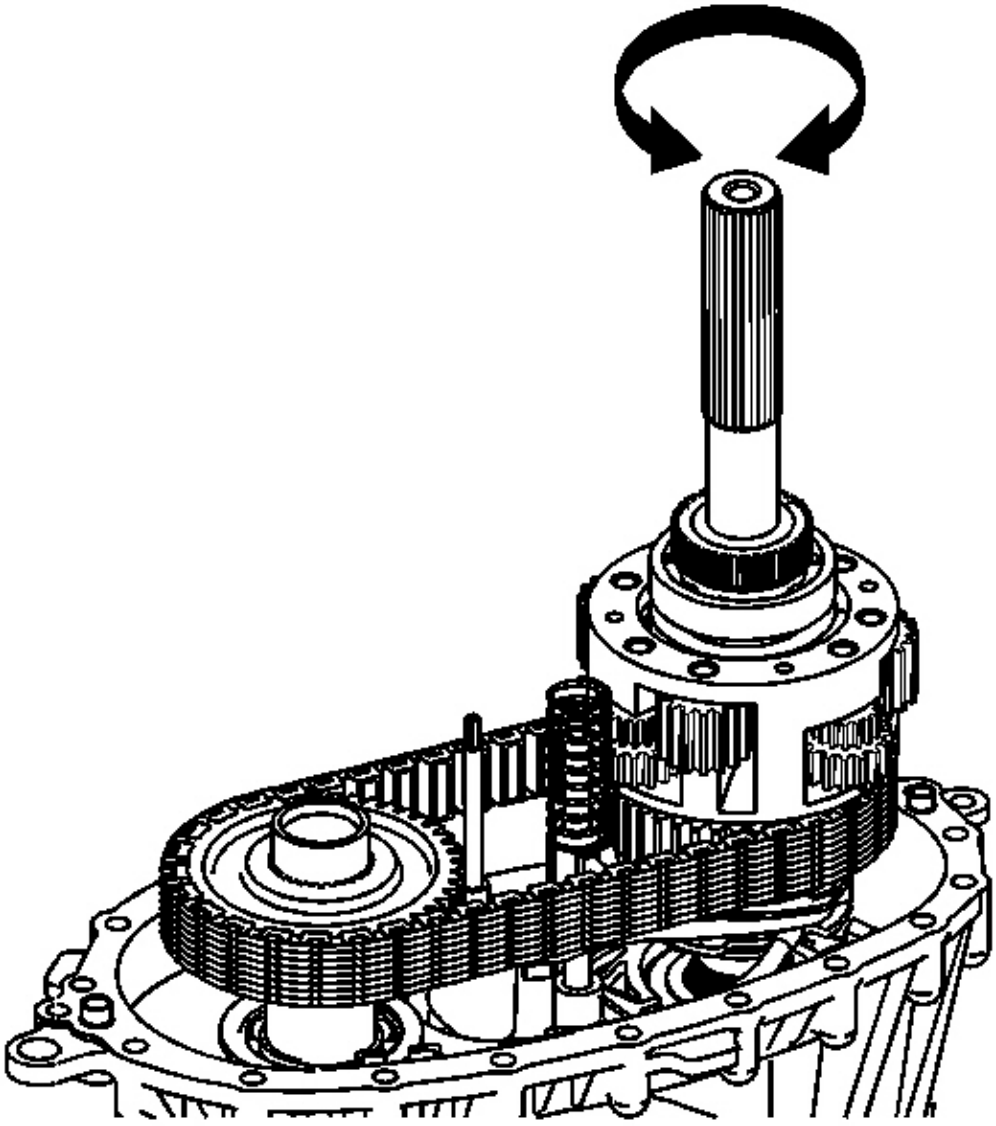


Fig. 103: Checking Planetary Differential Pinion Gear Rotation With Rear Output Shaft
Courtesy of GENERAL MOTORS CORP.

43. Temporarily install the rear output shaft to the planetary differential and the rear sun gear.
44. Rotate the rear output shaft three or four revolutions to rotate the planetary differential pinion gears. If properly aligned, the pinion gears will rotate freely, there will be no binding.
45. Remove the rear output shaft without disturbing the rear sun gear.

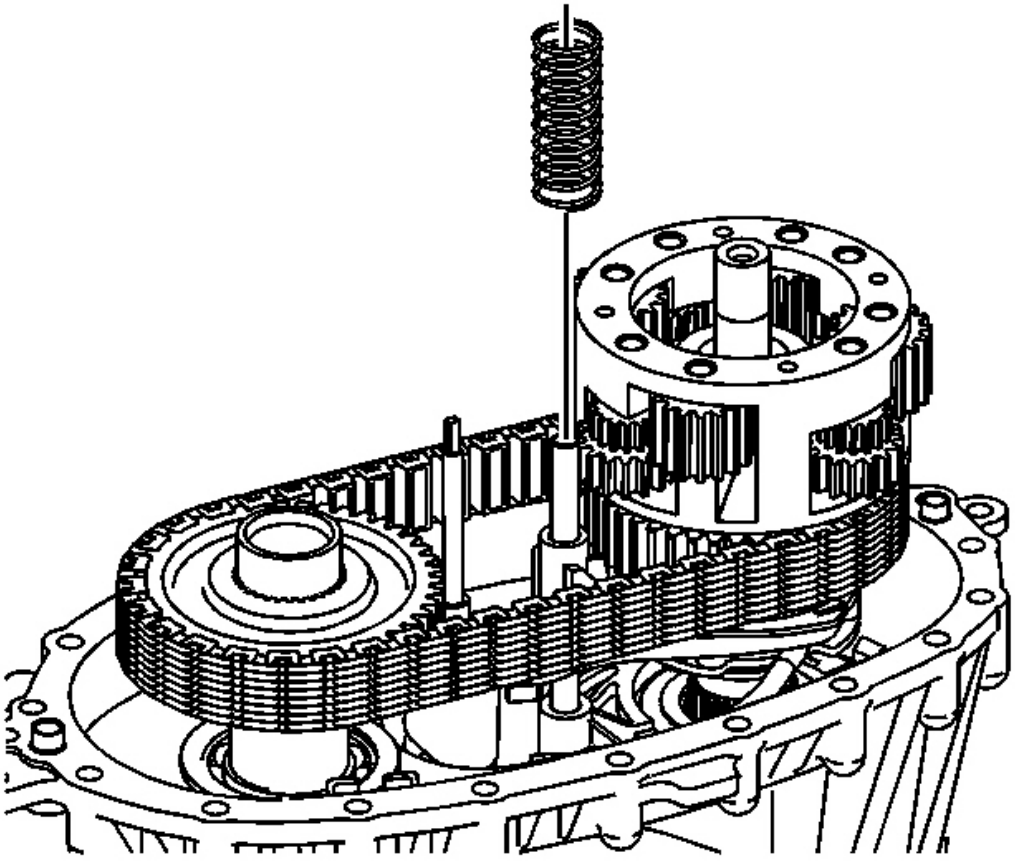


Fig. 104: Identifying Shift Fork Shaft Spring
Courtesy of GENERAL MOTORS CORP.

46. Install the shift fork shaft spring.

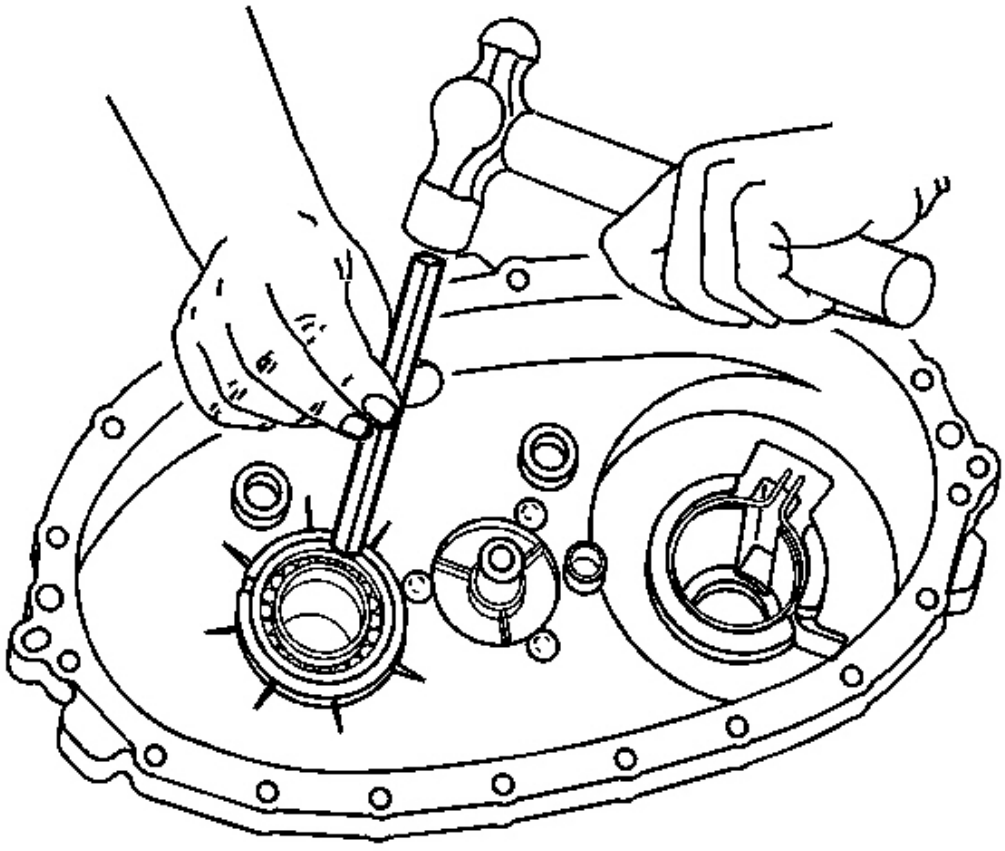


Fig. 105: Installing Front Output Shaft Rear Bearing
Courtesy of GENERAL MOTORS CORP.

47. Install the front output shaft rear bearing in the rear case half.
    - Use a hammer and a brass drift only on the outer bearing race.
    - Ensure the bearing is kept square to the bore while installing.

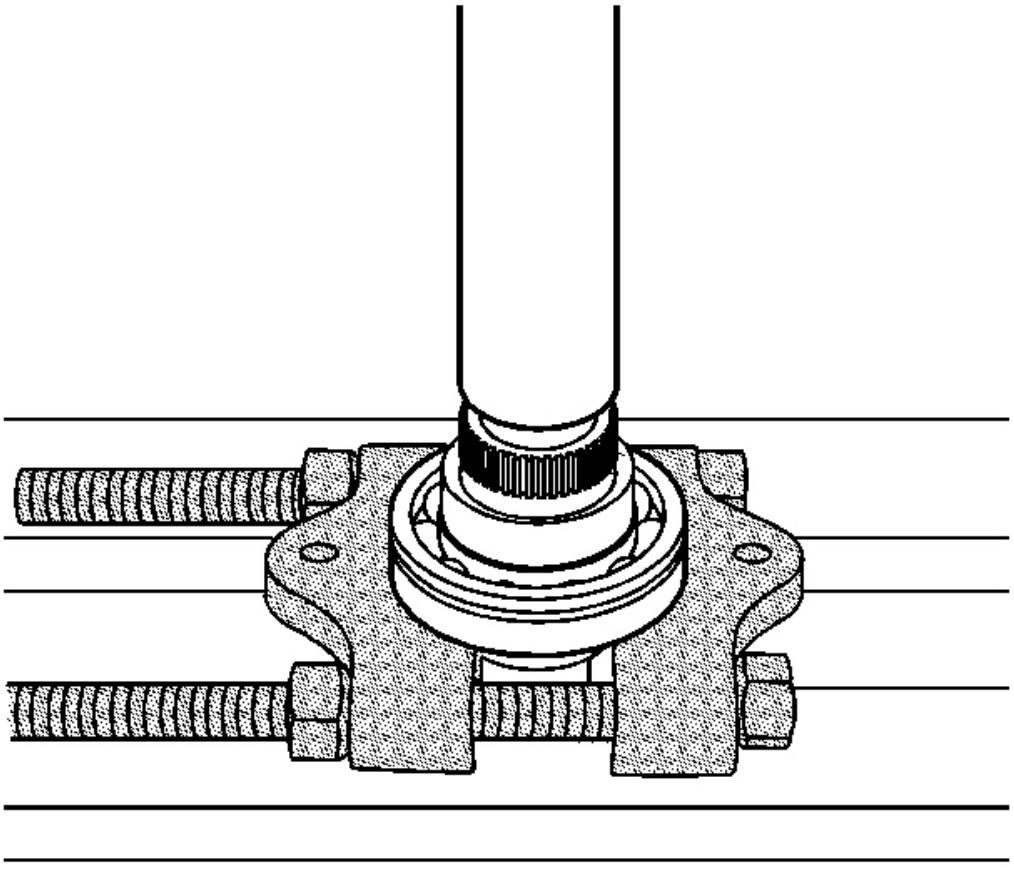


Fig. 106: View Of J 22912-01
Courtesy of GENERAL MOTORS CORP.

48. Using a hydraulic press and the **J 22912-01** , install the rear output shaft bearing.
    - The retaining ring groove on the bearing goes toward the input end or forward.
    - Use a suitable press plate on the end of the rear output shaft.
    - Ensure the bearing is supported on the inner race.

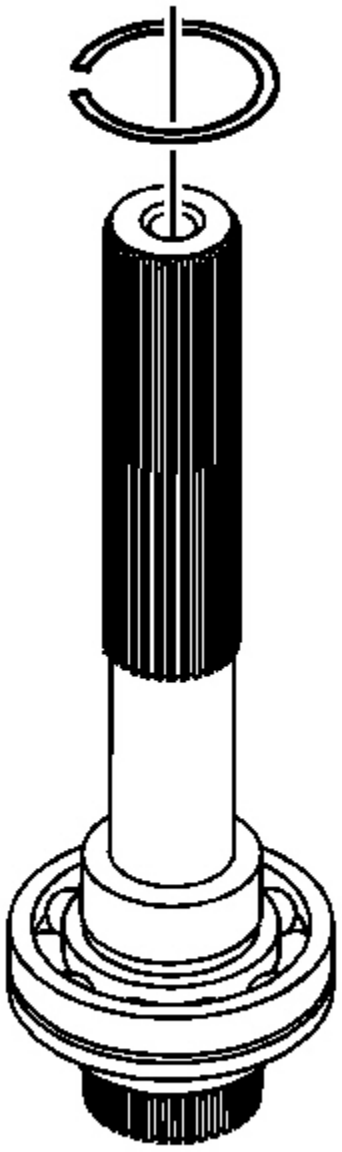


Fig. 107: View Of Rear Output Shaft Bearing Retaining Ring
Courtesy of GENERAL MOTORS CORP.

49. Install a NEW retaining ring for the rear output shaft bearing.

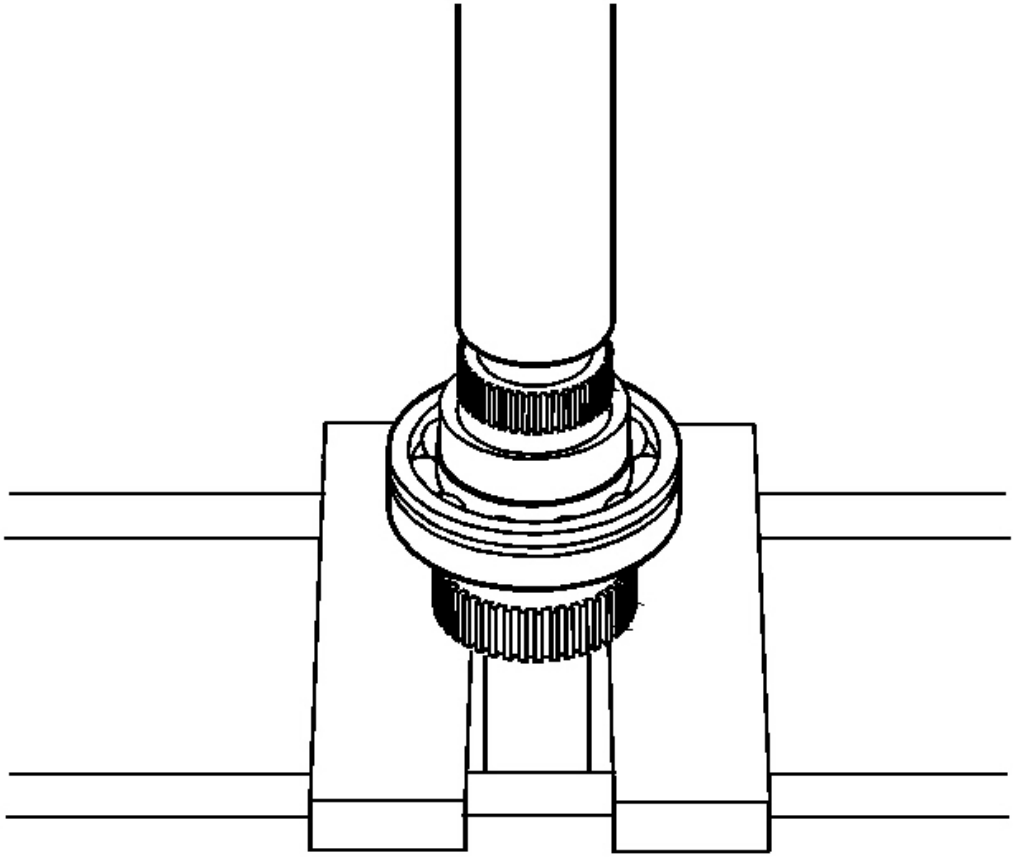


Fig. 108: Pressing In Speed Reluctor Wheel
Courtesy of GENERAL MOTORS CORP.

50. Using a hydraulic press, install a NEW speed reluctor wheel.

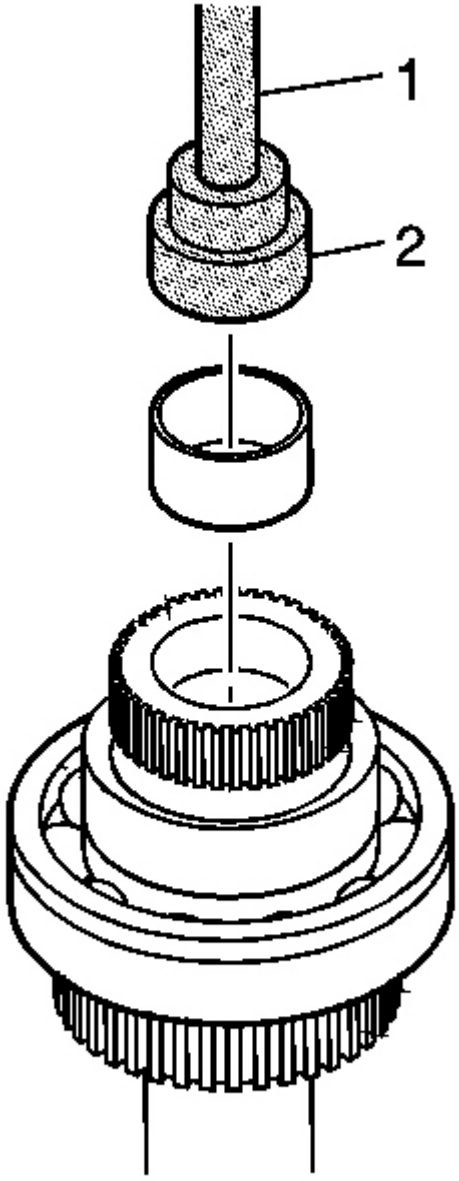


Fig. 109: Installing Mainshaft Rear Support Bushing In Rear Output Shaft
Courtesy of GENERAL MOTORS CORP.

51. Using **J 42176** (1) and **J 45757** (2), install the mainshaft rear support bushing in the rear output shaft.

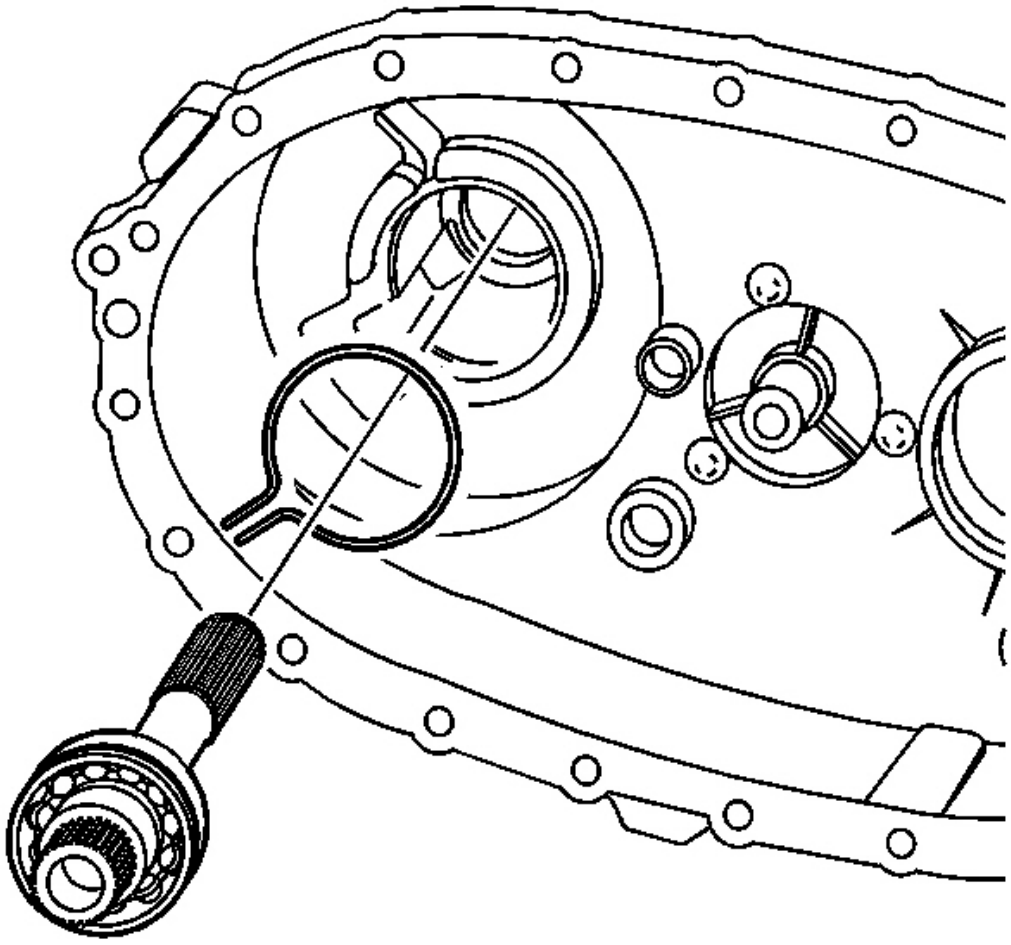


Fig. 110: Identifying Rear Output Shaft & Outer Retaining Ring
Courtesy of GENERAL MOTORS CORP.

52. Install the rear output shaft in the rear case half.
    1. Spread the rear output shaft rear bearing outer retaining ring.
    2. Install the rear output shaft bearing outer retaining ring until it is seated in the bearing groove.

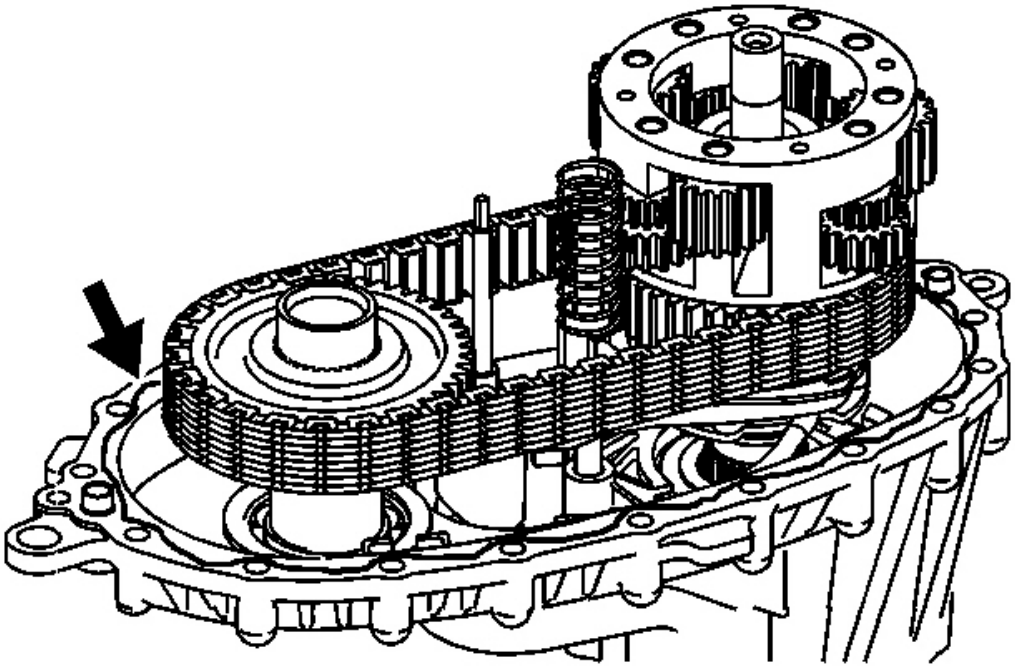


Fig. 111: Identifying Sealing Surfaces
Courtesy of GENERAL MOTORS CORP.

IMPORTANT:

- **Ensure that both the sealing surfaces on the front and rear case halves are free of dirt, oil, and cleaning solvent.**
- **Ensure the locating pins are installed in the case halves.**

53. Install the locating pins in the front case and rear case half, if necessary.
54. Apply a 3.175 mm (1/8 in) bead of RTV sealant GM P/N 12345739 (Canadian P/N 10953541) or equivalent to the mating surfaces of the front case half.

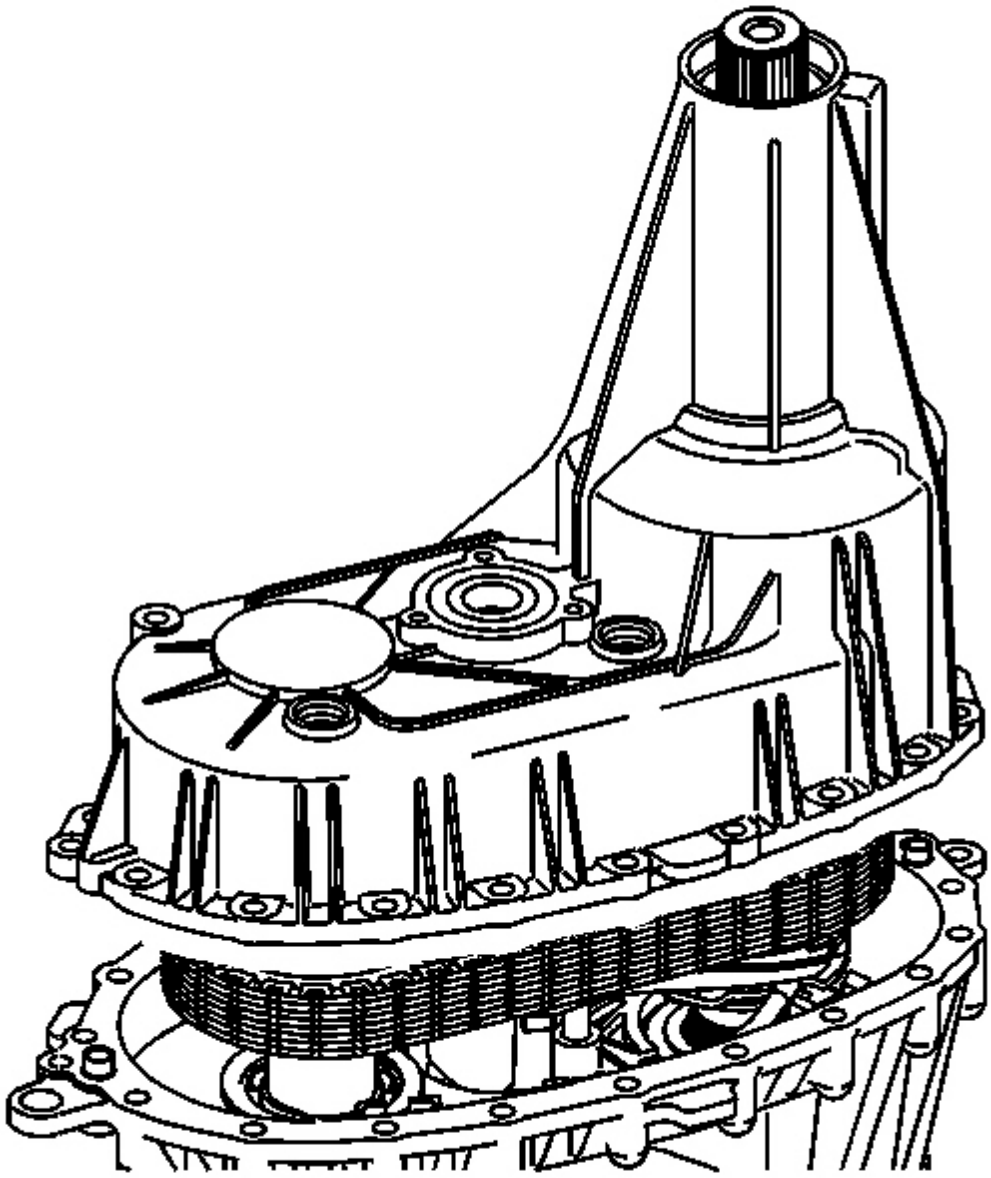


Fig. 112: View Of Rear Case & Front Case Half
Courtesy of GENERAL MOTORS CORP.

55. Lower the rear case half into place.

    The rear output shaft may require rotating to align the teeth with the planetary differential.

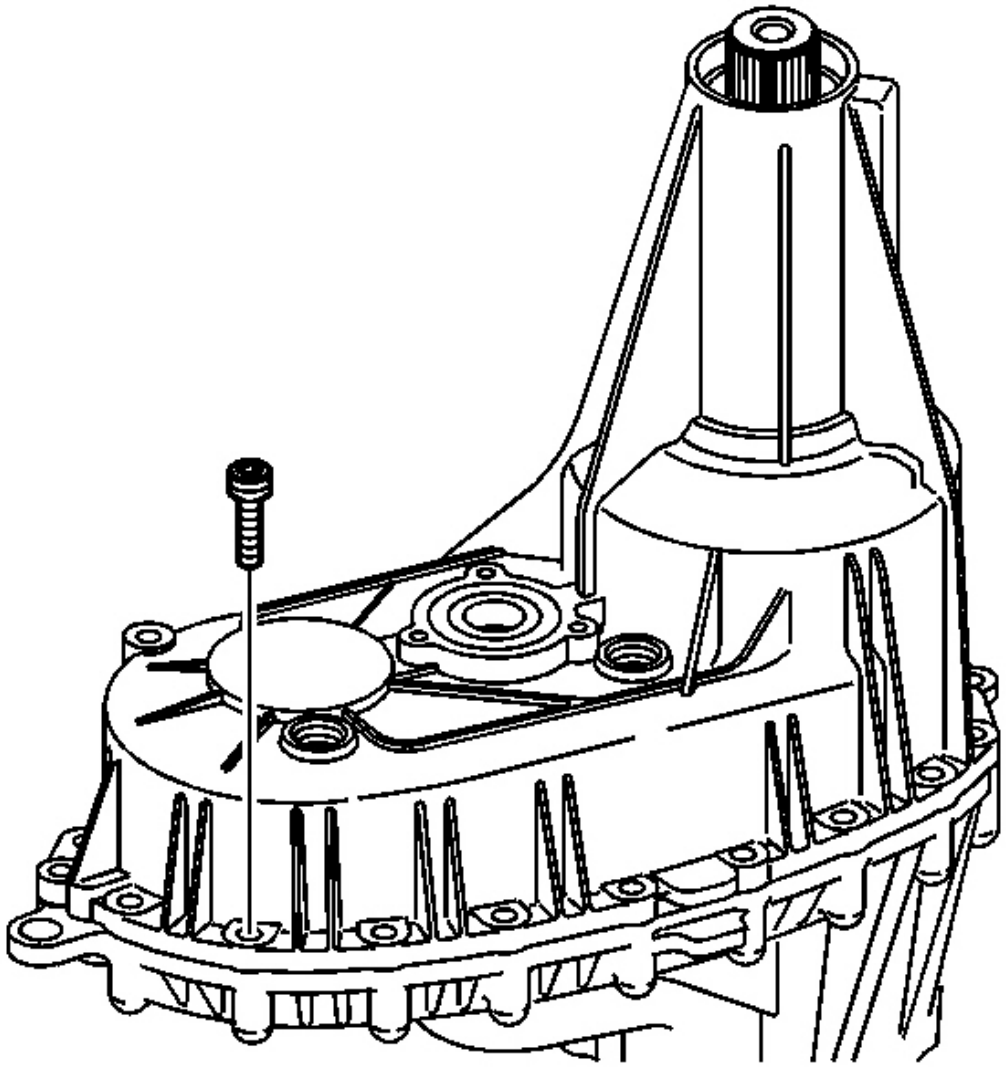


Fig. 113: Identifying Transfer Case Retaining Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: **This component is made of magnesium. Proper assembly is required to prevent damage. Ensure the magnesium transfer case housings are properly insulated from all external steel components, or galvanic corrosion will occur. New nylon coated case bolts and aluminum washers must be used. Use only aluminum fill and drain plugs. Use only aluminum brackets under the case bolts. Ensure new seals are installed that have a**

rubber insulated outside diameter and have no tears or cuts. Extensive damage will occur if there is galvanic corrosion between the magnesium and steel components.

56. Inspect the nylon coating on the case bolts for cuts or tears.
57. Replace the case bolts if there is any damage to the nylon coating.

IMPORTANT: The case bolts are self-tapping; they must be hand started. Do not use power assisted tools to install the bolts.

58. Install the case bolts with washers, and the brackets.

    Tighten: Tighten the case bolts to 21 N.m (15 lb ft).

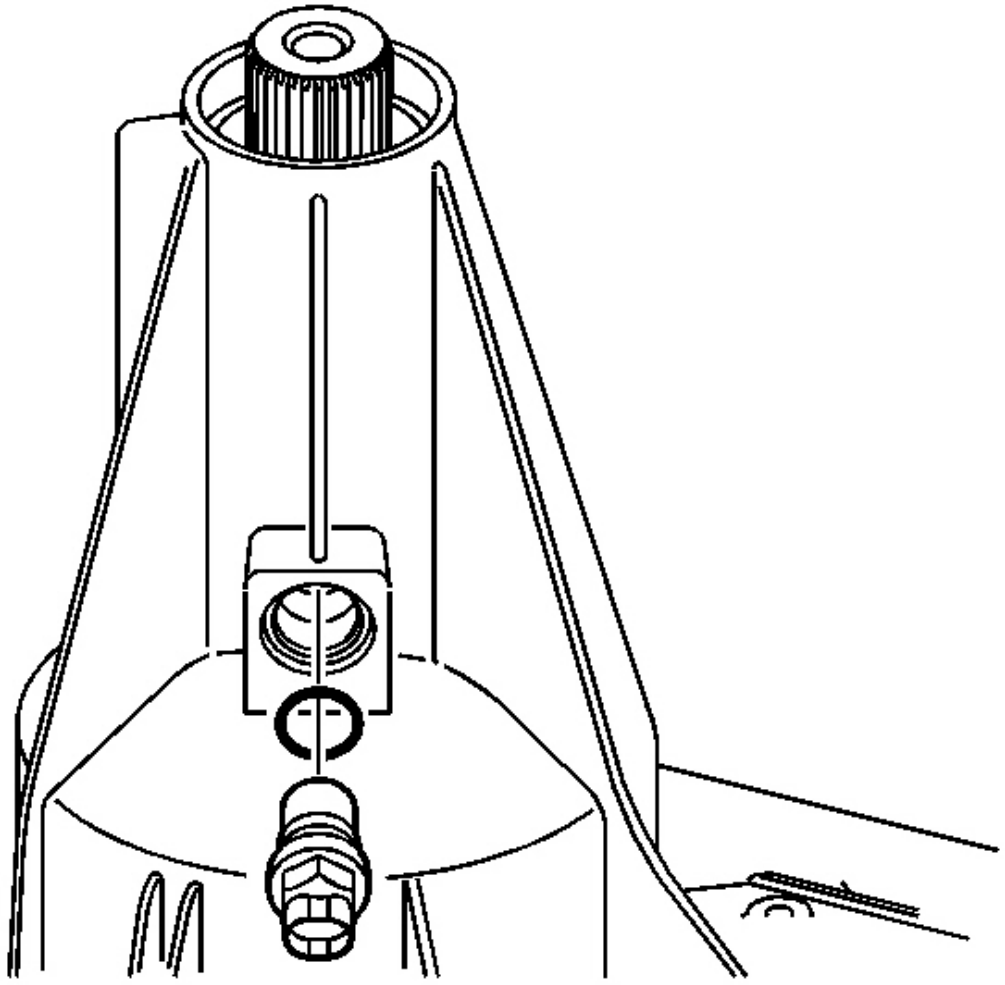


Fig. 114: Locating Vehicle Speed Sensor (VSS)
Courtesy of GENERAL MOTORS CORP.

59. Install the vehicle speed sensor (VSS) with a new O-ring seal.

    Tighten: Tighten the speed sensor to 17 N.m (13 lb ft).

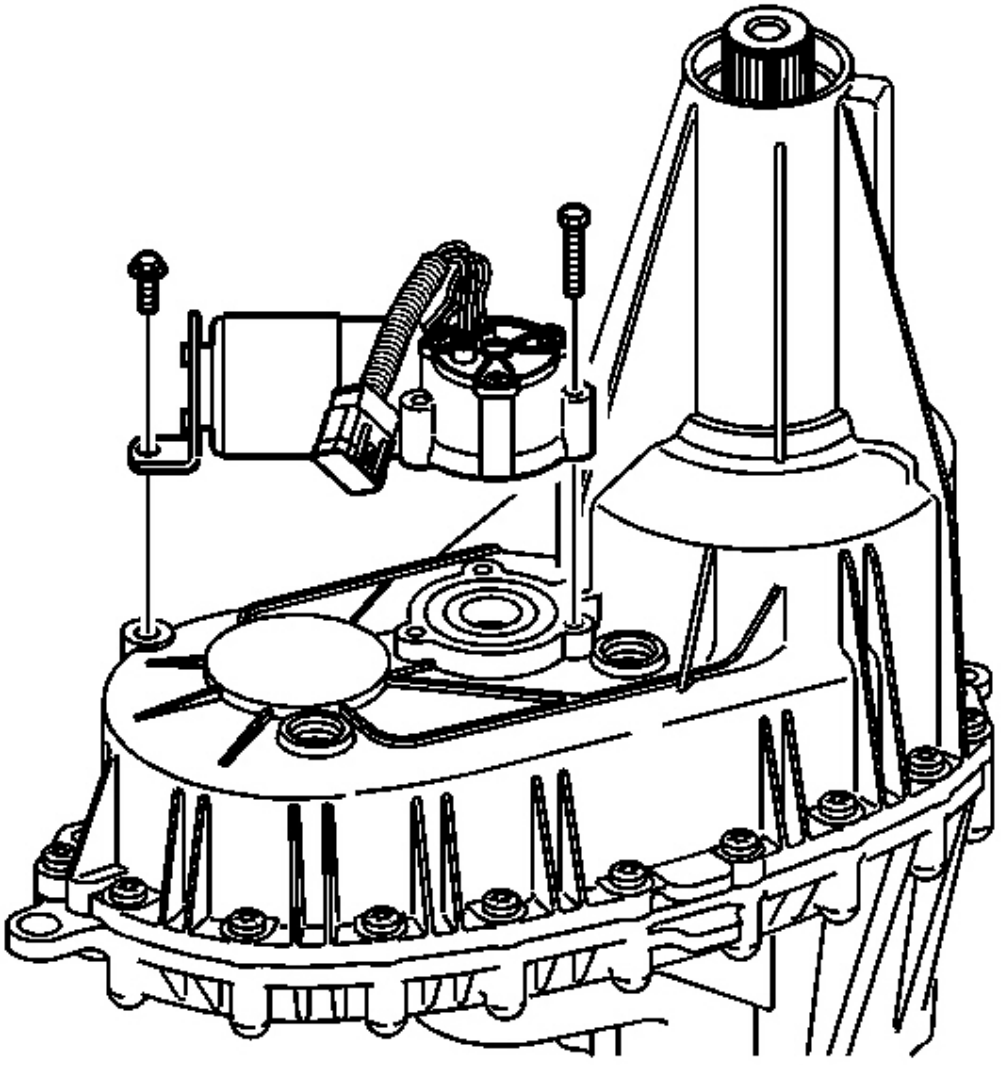


Fig. 115: Identifying Encoder Motor Assembly
Courtesy of GENERAL MOTORS CORP.

60. Apply a 3.175 mm (1/8 in) bead of RTV sealant GM P/N 12345739 (Canadian P/N 10953541), or equivalent, to the sealing surface of the encoder motor assembly.
61. Install the encoder motor assembly. Rotate the shift detent lever to align to the encoder motor.
62. Loosely install the encoder motor mounting bolts.
63. Loosely install the encoder motor bracket bolt.

Tighten:

- Tighten the encoder motor mounting bolts to 10 N.m (89 lb in).
- Tighten the encoder motor bracket bolt to 10 N.m (89 lb in).

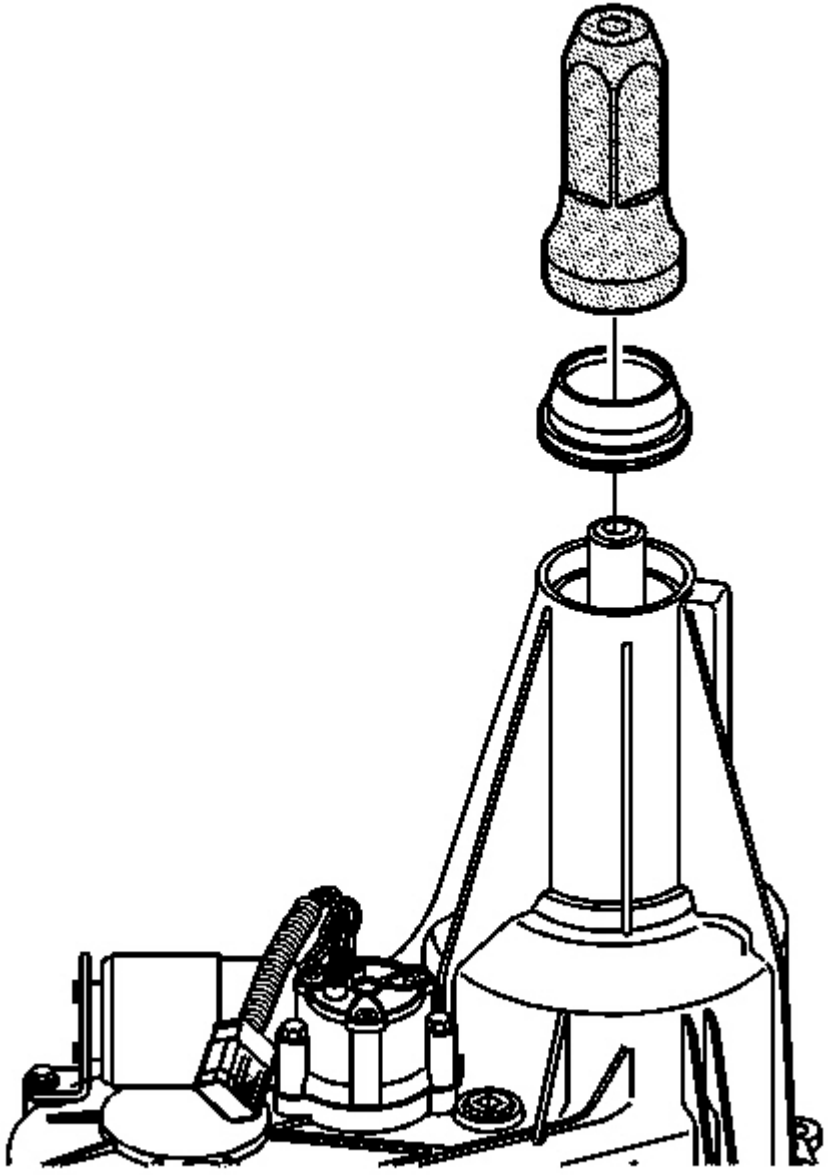


Fig. 116: Installing Rear Output Shaft Seal
Courtesy of GENERAL MOTORS CORP.

64. Using **J 45756** , install the rear output shaft seal.

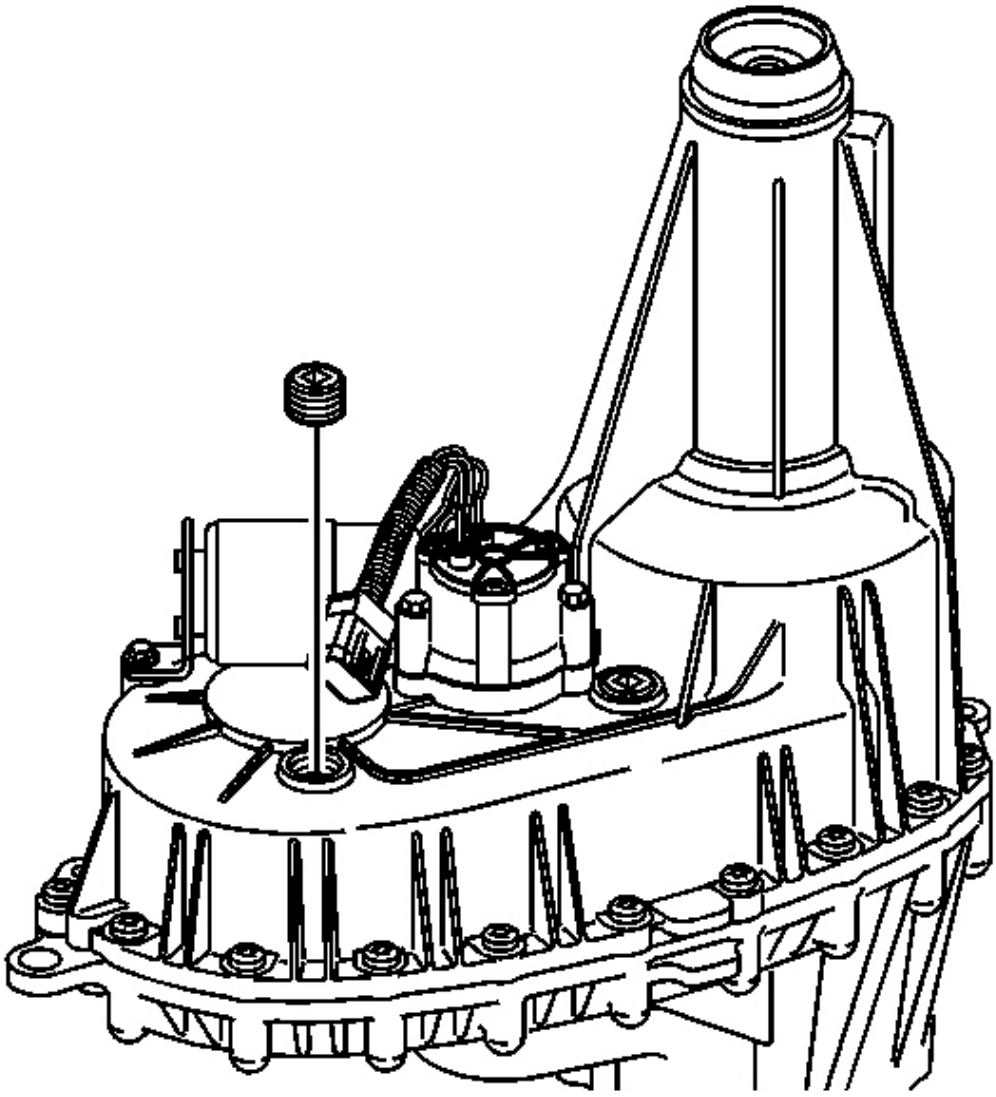


Fig. 117: View Of Drain & Fill Plug
Courtesy of GENERAL MOTORS CORP.

65. Apply pipe sealant GM P/N 12346004 (Canadian P/N 10953480) to the threads on the drain plug and fill plug.
66. Install the drain plug and the fill plug.

Tighten: Tighten the drain plug and fill plug to 25 N.m (18 lb ft).

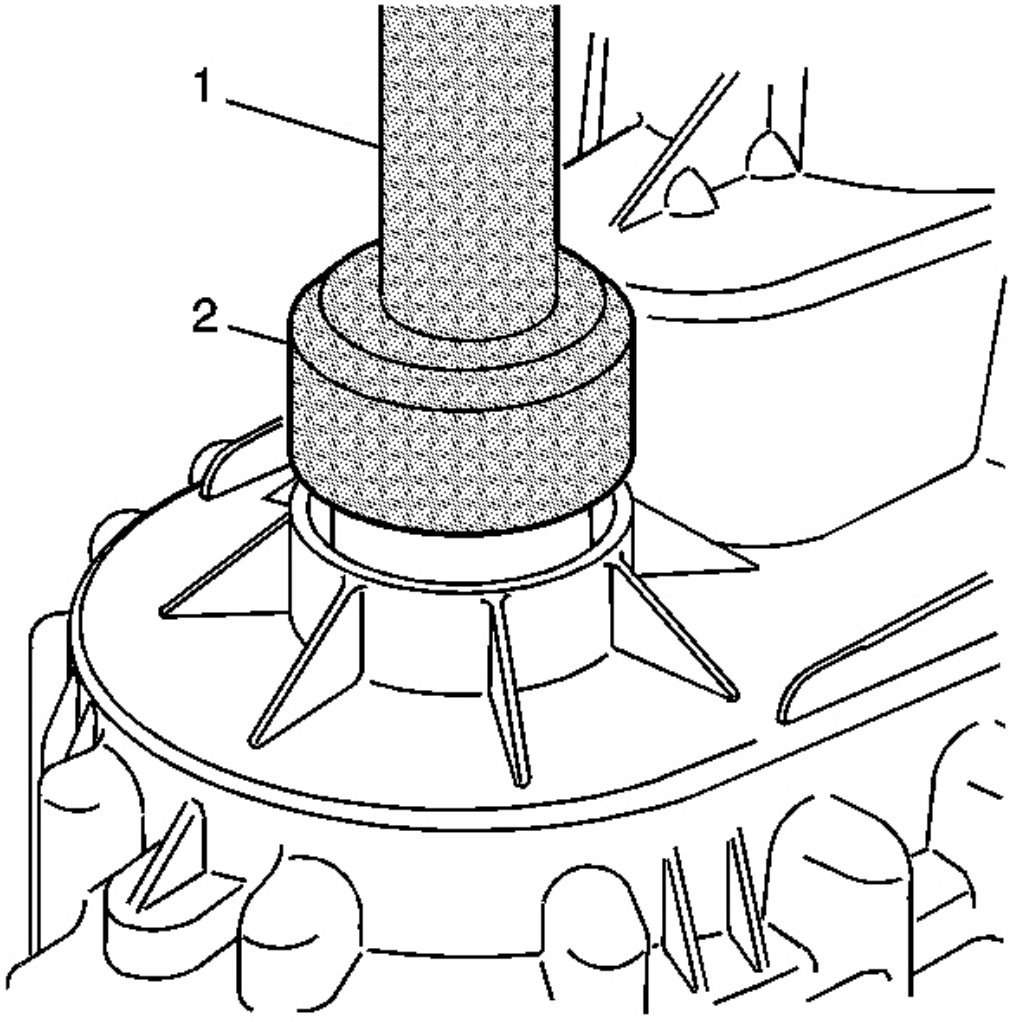


Fig. 118: Installing Front Output Shaft Seal With J 43484 & J 8092
Courtesy of GENERAL MOTORS CORP.

67. Using the **J 43484** (2) and the **J 8092** (1), install the front output shaft seal.

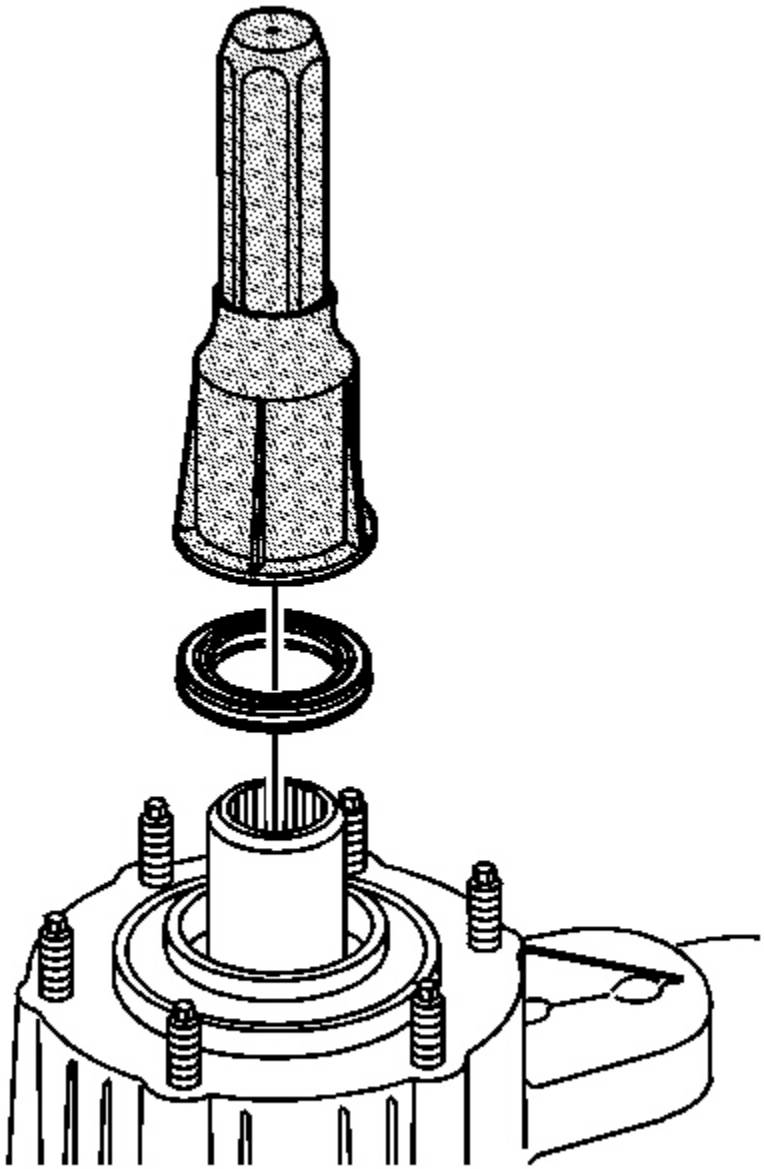


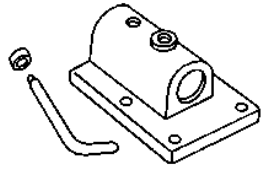
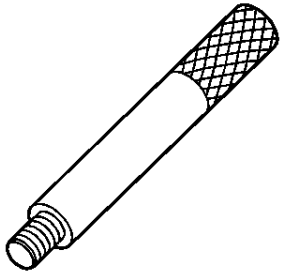
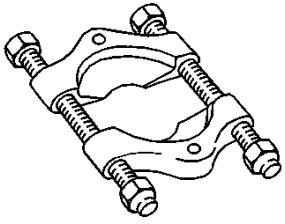
Fig. 119: Installing The Front Input Shaft Seal J 42738
Courtesy of GENERAL MOTORS CORP.

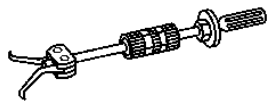
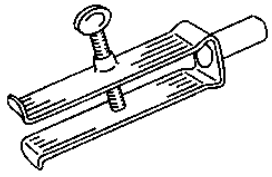
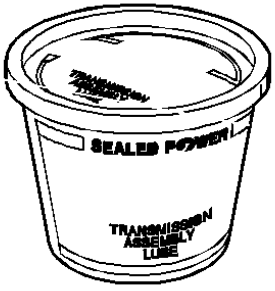
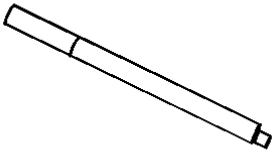
68. Using the **J 42738** , install the front input shaft seal.
69. Remove the transfer case from the **J 45759** .

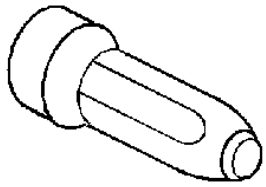
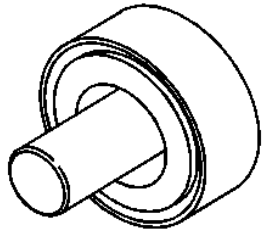
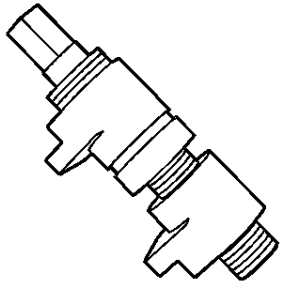
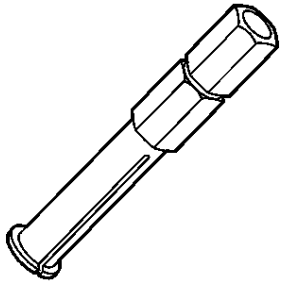
SPECIAL TOOLS AND EQUIPMENT

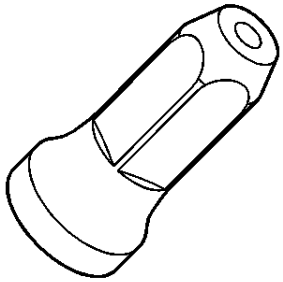
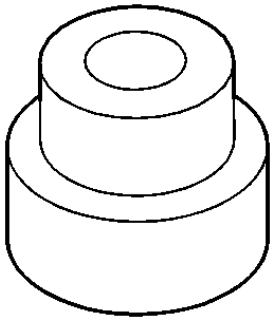
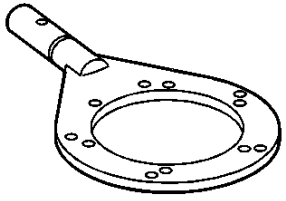
SPECIAL TOOLS

Special Tools

Illustration	Tool Number/Description
	J 2619-01 Slide Hammer
	J 3289-20 Holding Fixture
	J 8092 Universal Driver Handle
	J 22912-01 Rear Pinion and Axle Bearing Remover

	J 23907 Slide Hammer with Bearing Adapter
	J 26941 Bushing and Bearing Remover - 3-4 inch
	J 36850 Transjel Lubricant
	J 42176 Universal Driver Handle - Non-Threaded
	J 42738 Seal Installer

	
	J 43484 Front Output Shaft Seal Installer
	J 45358 Case Spreader
	J 45548 Mainshaft Support Bushing/Bearing Remover

	J 45756 Rear Output Shaft Seal Installer
	J 45757 Mainshaft Support Bushing and Bearing Installer
	J 45759 Assembly Fixture