2007 TRANSMISSION

Transfer Case - NVG 246-NP8 - Avalanche, Escalade, Suburban, Tahoe & Yukon

SPECIFICATIONS

CAPACITIES - APPROXIMATE FLUID

Capacities - Approximate Fluid

Application	Specification	
	Metric	English
Auto Trac® ll Fluid GM P/N 12378508 (Canadian P/N 10953626)	1.9 liters	2.0 quarts

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Actuator Encoder Motor Bolts	20 N.m	15 lb ft
Actuator Encoder Motor Cover Screw - Long Screw	3 N.m	26 lb in
Actuator Encoder Motor Cover Screw - Short Screw	2 N.m	18 lb in
Case Bolts	37 N.m	27 lb ft
Clutch Lever Pivot Pins	61 N.m	45 lb ft
Crossmember Bolts	70 N.m	52 lb ft
Drain Plug	20 N.m	15 lb ft
Fill Plug	20 N.m	15 lb ft
Transfer Case Adapter Bolt	50 N.m	37 lb ft
Transfer Case Adapter Nut	50 N.m	37 lb ft
Transfer Case Shield Bolt/Screw	20 N.m	15 lb ft
Transmission Mount Bolt	47 N.m	35 lb ft
Transmission Mount Nut	40 N.m	30 lb ft
Vehicle Speed Sensors	15 N.m	11 lb ft

SCHEMATIC AND ROUTING DIAGRAMS

TRANSFER CASE CONTROL SCHEMATICS

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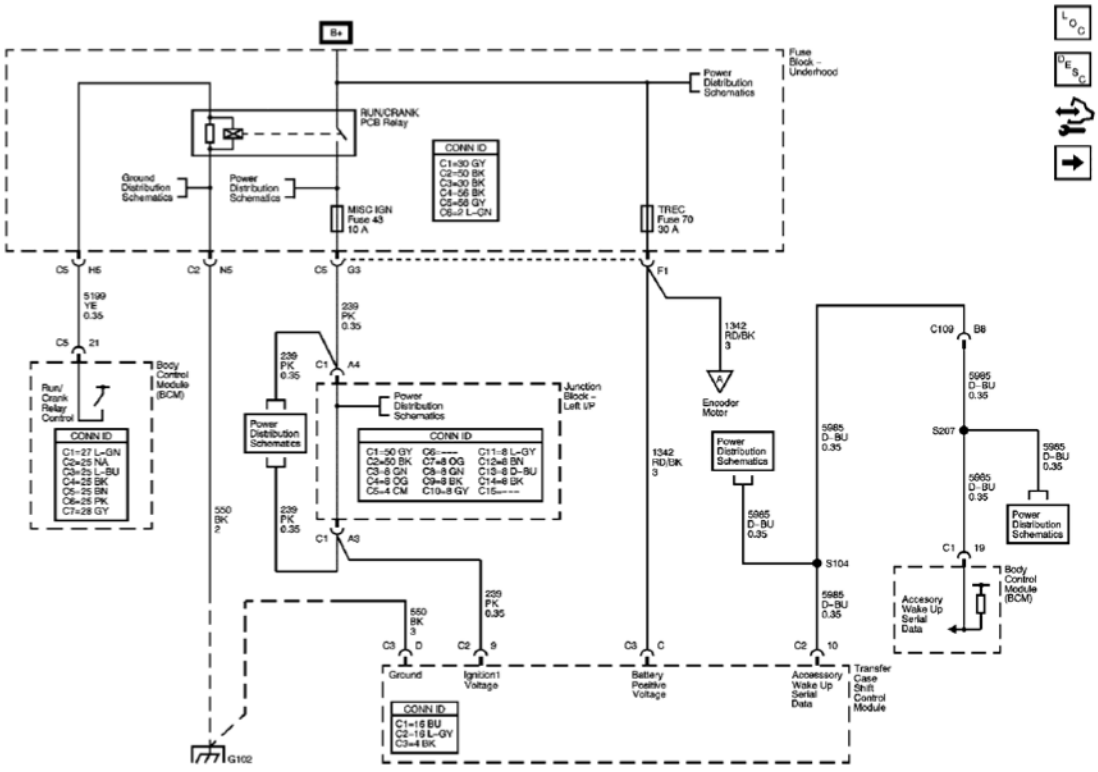


Fig. 1: Power & Ground Schematic
Courtesy of GENERAL MOTORS CORP.

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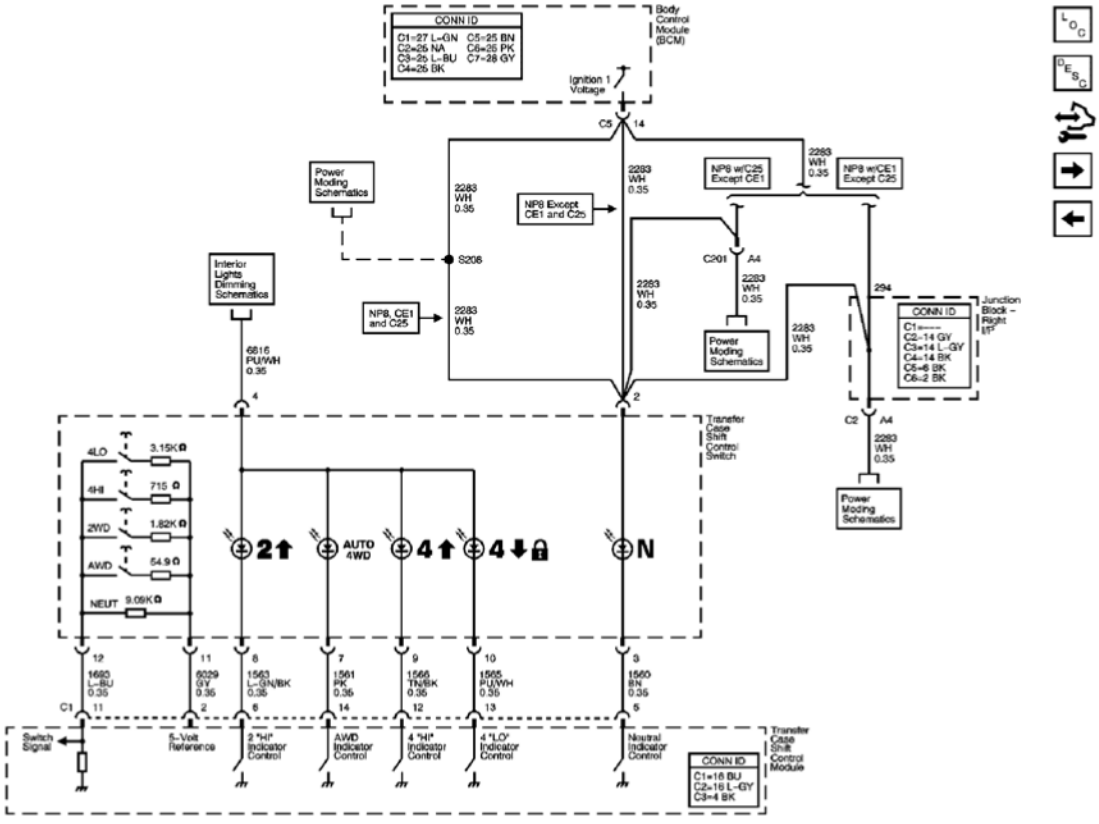


Fig. 2: Shift Control & Indicators Schematic
Courtesy of GENERAL MOTORS CORP.

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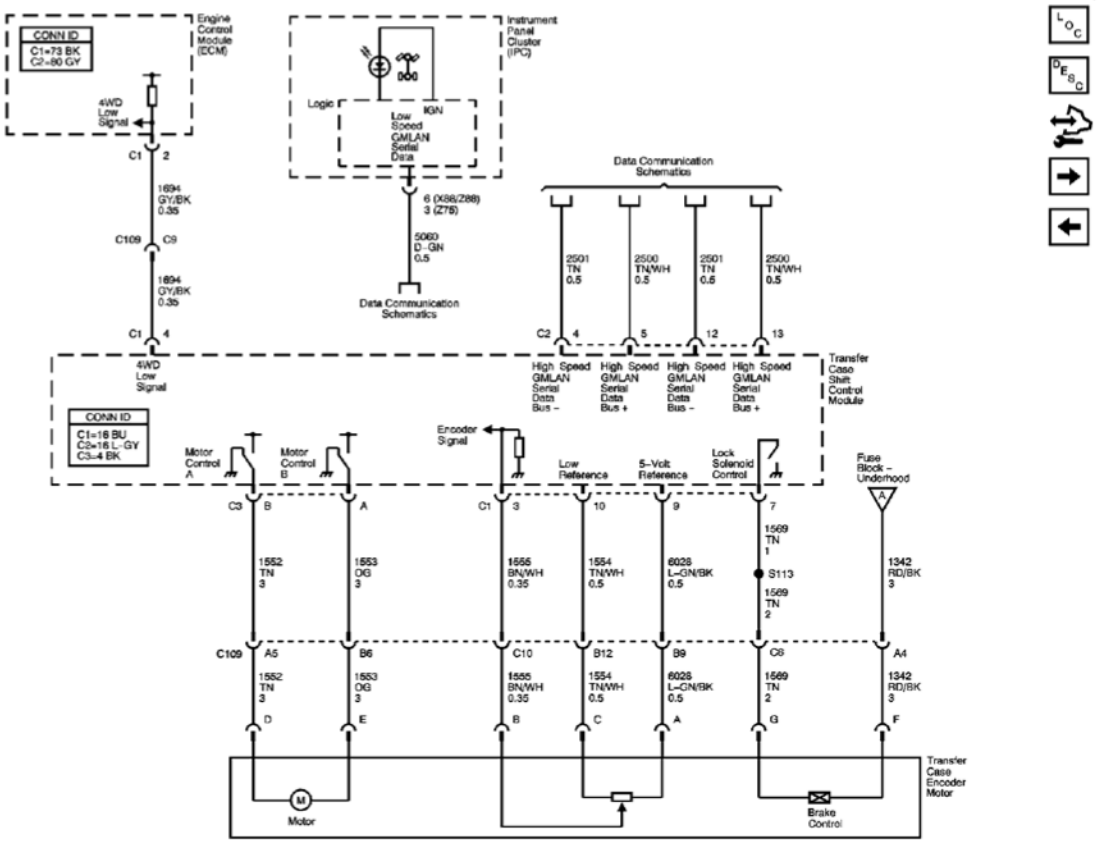


Fig. 3: Encoder Motor Control & Serial Data Schematic
Courtesy of GENERAL MOTORS CORP.

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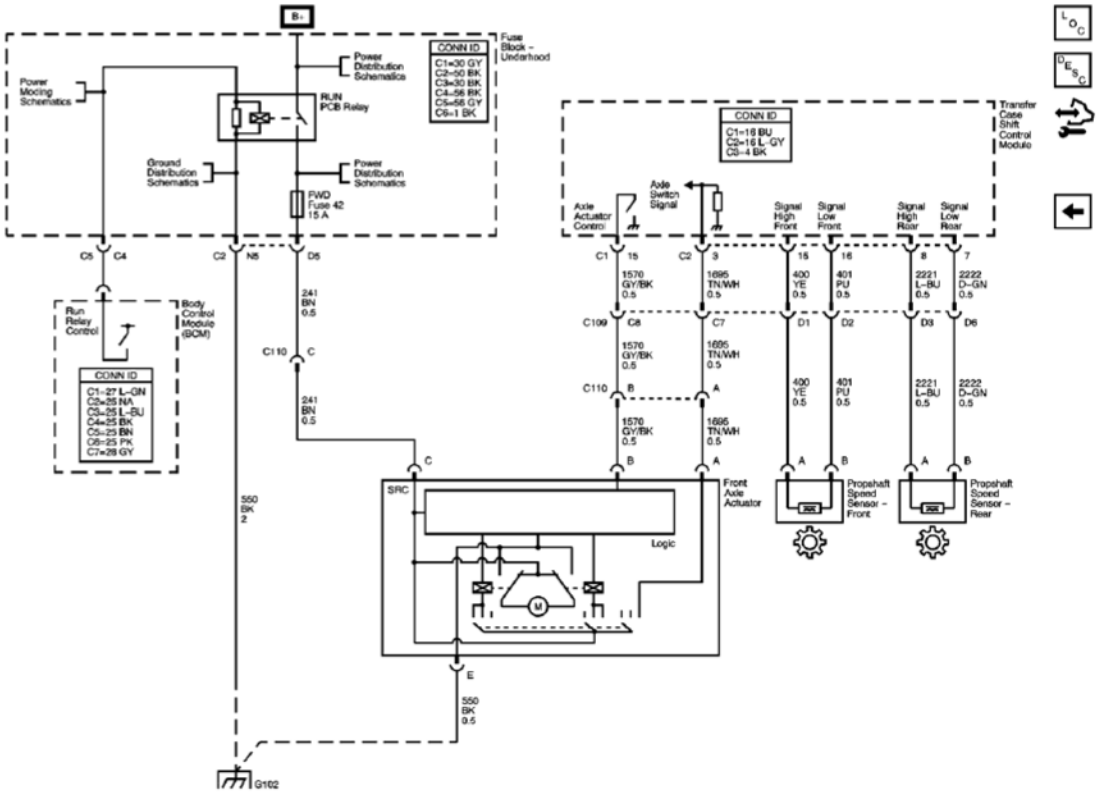


Fig. 4: Front Axle Actuator & Speed Sensors Schematic
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

TRANSFER CASE CONTROL COMPONENT VIEWS

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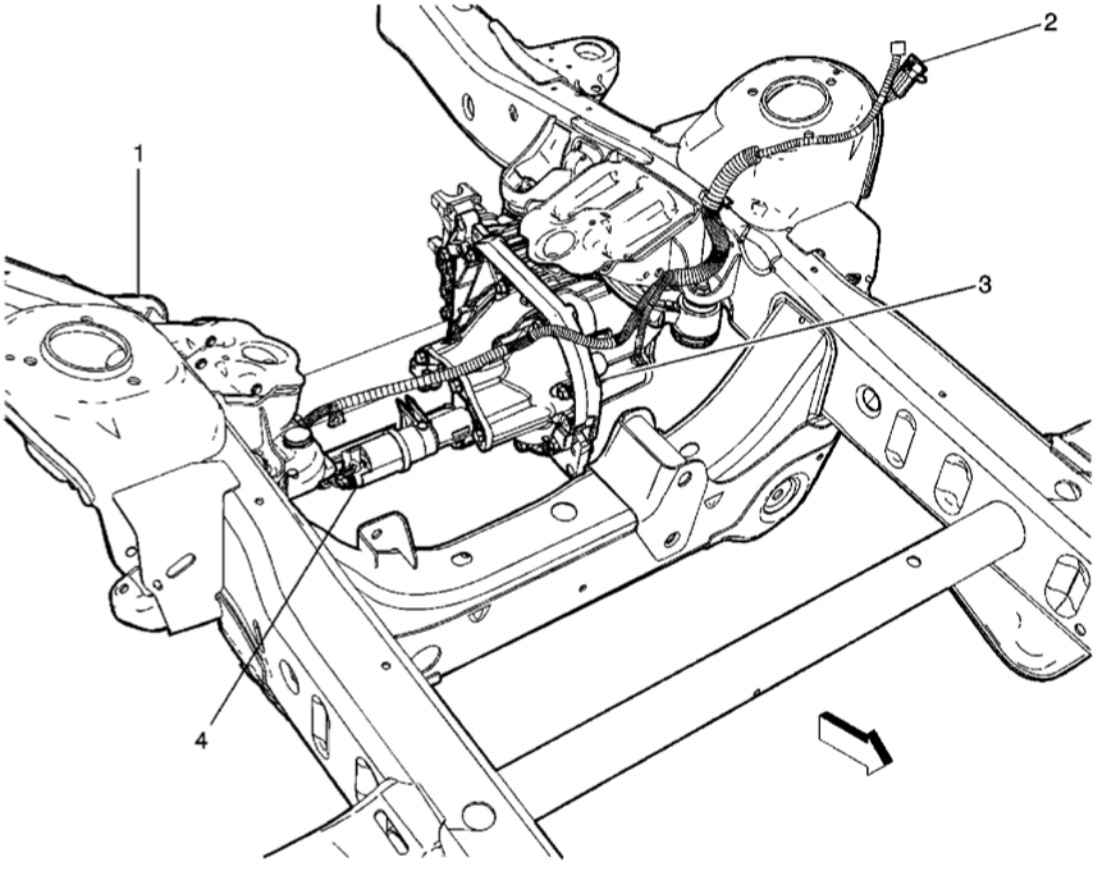


Fig. 5: Front Axle (NP8)
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 5

Callout	Component Name
1	Frame
2	C110
3	Front Axle Housing
4	Front Axle Actuator

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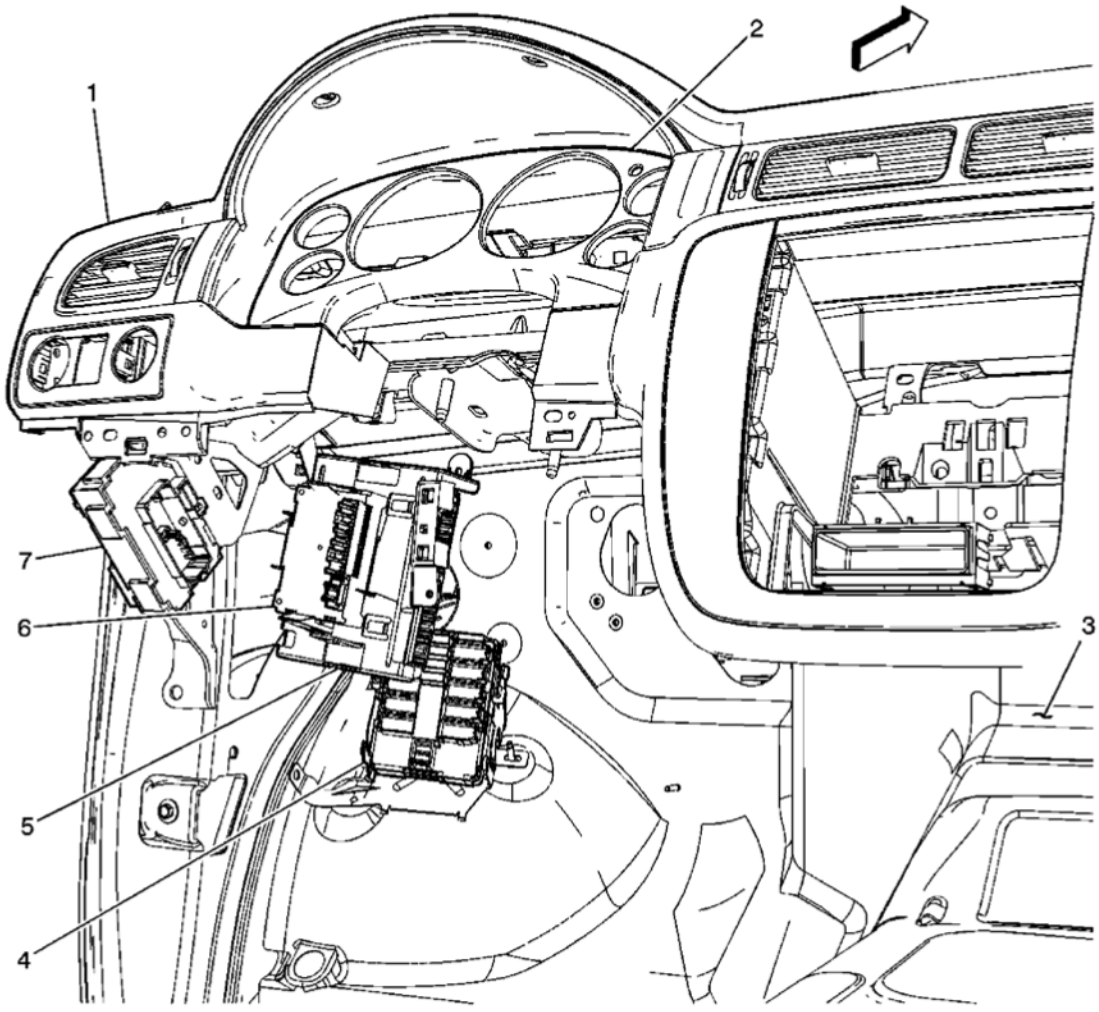


Fig. 6: Below the I/P
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 6

Callout	Component Name
1	I/P Trim
2	I/P Cluster Trim
3	Floor Panel
4	Junction Block - Left I/P
5	Body Control Module (BCM)
6	Transfer Case Shift Control Module
7	Fuse Block - I/P

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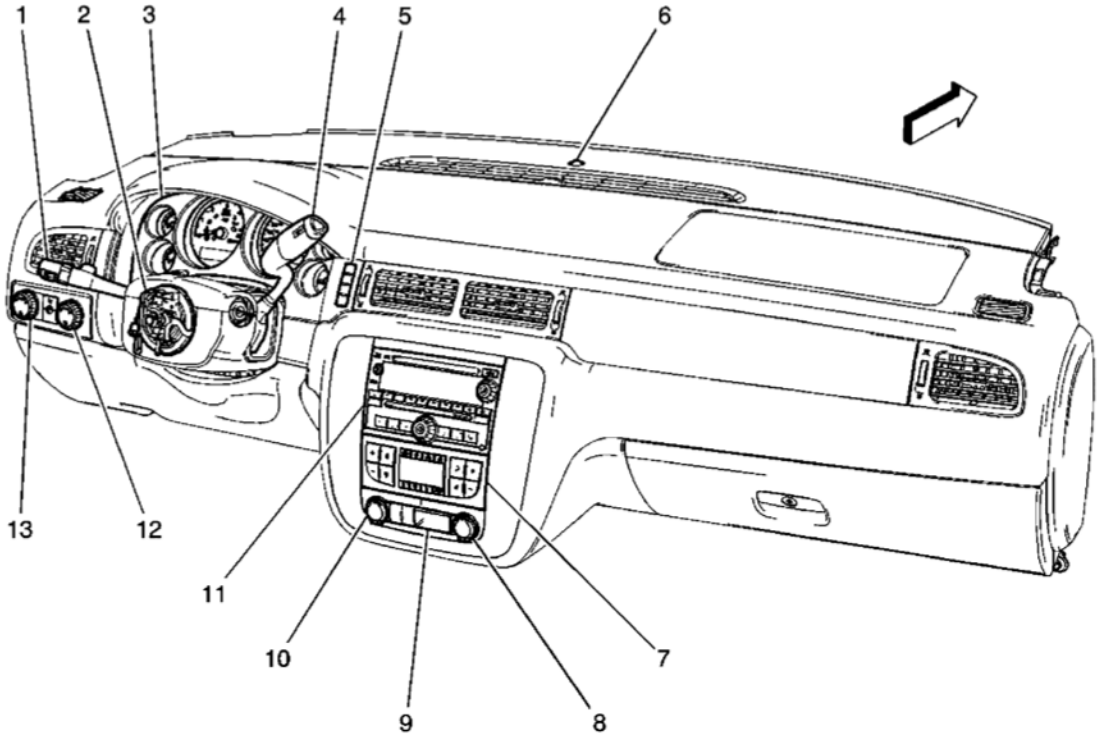


Fig. 7: Front of the I/P (Except Z75)
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 7

Callout	Component Name
1	Turn Signal Multifunction Switch
2	Inflatable Restraint Steering Wheel Module Coil
3	Instrument Panel Cluster (IPC)
4	Tow/Haul Switch
5	Driver Information Center (DIC) Switch
6	Ambient Light/Sunload Sensor Assembly (CJ2) or Ambient Light Sensor (CJ3)
7	HVAC Control Module
8	Auxiliary Power Outlet - Front 2
9	I/P Multifunction Switch Assembly
10	Auxiliary Power Outlet - Front 1
11	Radio
12	Transfer Case Shift Control Switch
13	Headlamp and Panel Dimmer Switch

TRANSFER CASE CONTROL CONNECTOR END VIEWS

Front Axle Actuator

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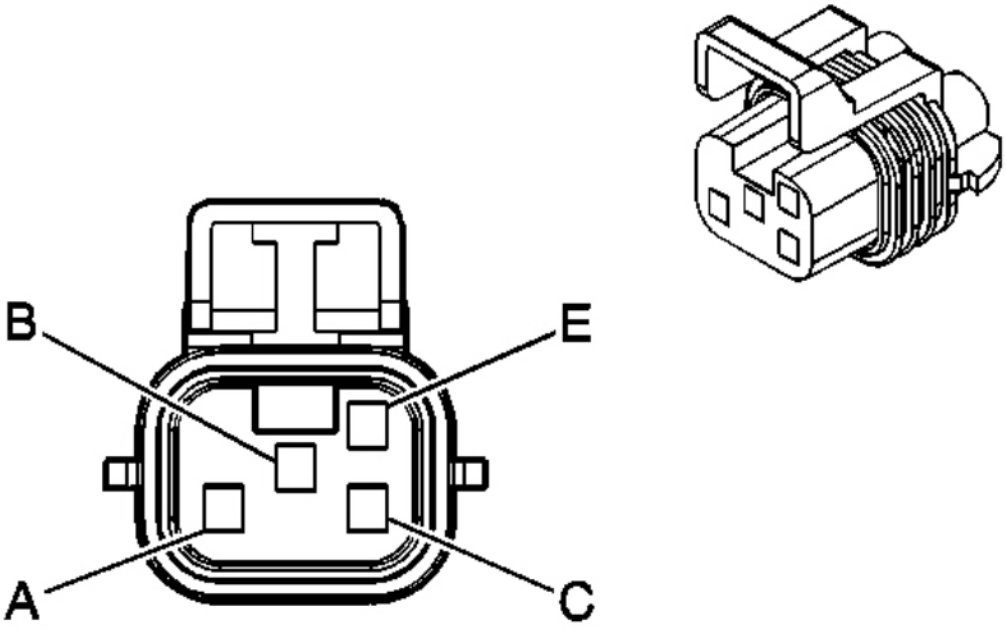


Fig. 8: Front Axle Actuator Connector End View
Courtesy of GENERAL MOTORS CORP.

Front Axle Actuator Connector Parts Information

Connector Part Information

- OEM: 15324541
- Service: 12117277
- Description: 4-Way F Metri-Pack 150 Series, Sealed (BU)

Terminal Part Information

- Terminal/Tray: 12048074/2
- Core/Insulation Crimp: E/1
- Release Tool/Test Probe: 12094429/J-35616-2A (GY)

Front Axle Actuator Connector Terminal Identification

Pin	Wire Color	Circuit No.	Function
A	TN/WH	1695	Axle Switch Signal
B	GY/BK	1570	Front Axle Actuator Control
C	BN	241	Ignition 3 Voltage

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D	-	-	Not Available
E	BK	550	Ground

Propshaft Speed Sensor - Front (NP8)

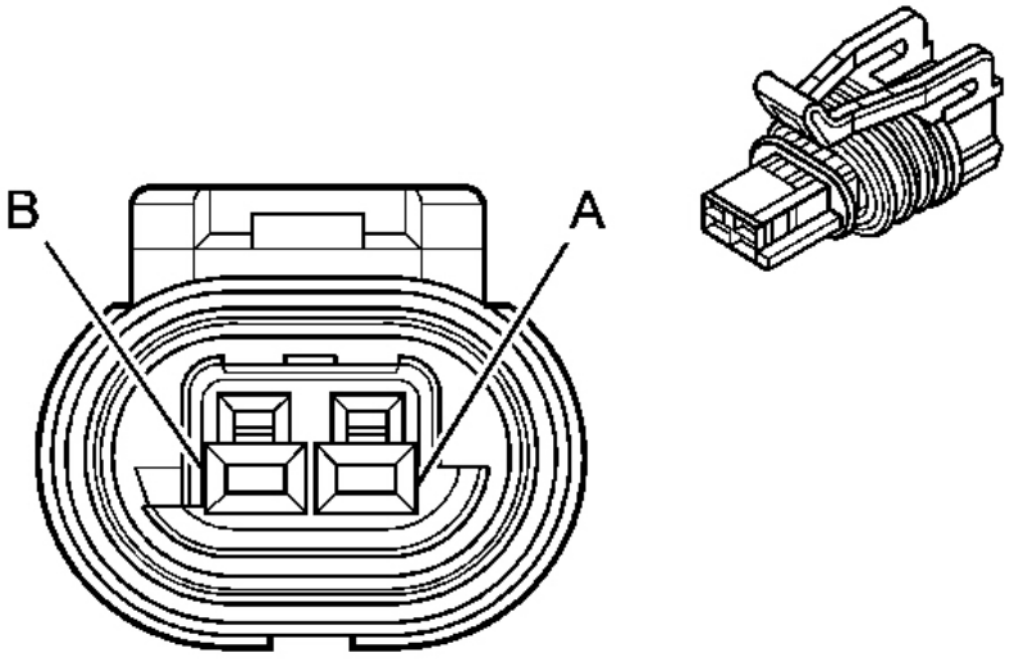


Fig. 9: Propshaft Speed Sensor - Front (NP8) Connector End View
Courtesy of GENERAL MOTORS CORP.

Propshaft Speed Sensor - Front (NP8) Connector Parts Information

Connector Part Information

- OEM: 15449028
- Service: 88987993
- Description: 2-Way F 150 GT Series Sealed (BK)

Terminal Part Information

- Terminal/Tray: 15326267/19
- Core/Insulation Crimp: E/4
- Release Tool/Test Probe: 15315247/J-35616-2A (GY)

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Propshaft Speed Sensor - Front (NP8) Connector Terminal Identification

Pin	Wire Color	Circuit No.	Function
A	YE	400	Signal High - Front/VSS High Signal/OSS High Signal
B	PU	401	Signal Low - Front/VSS Low Signal/OSS Low Signal

Propshaft Speed Sensor - Rear (NP8)

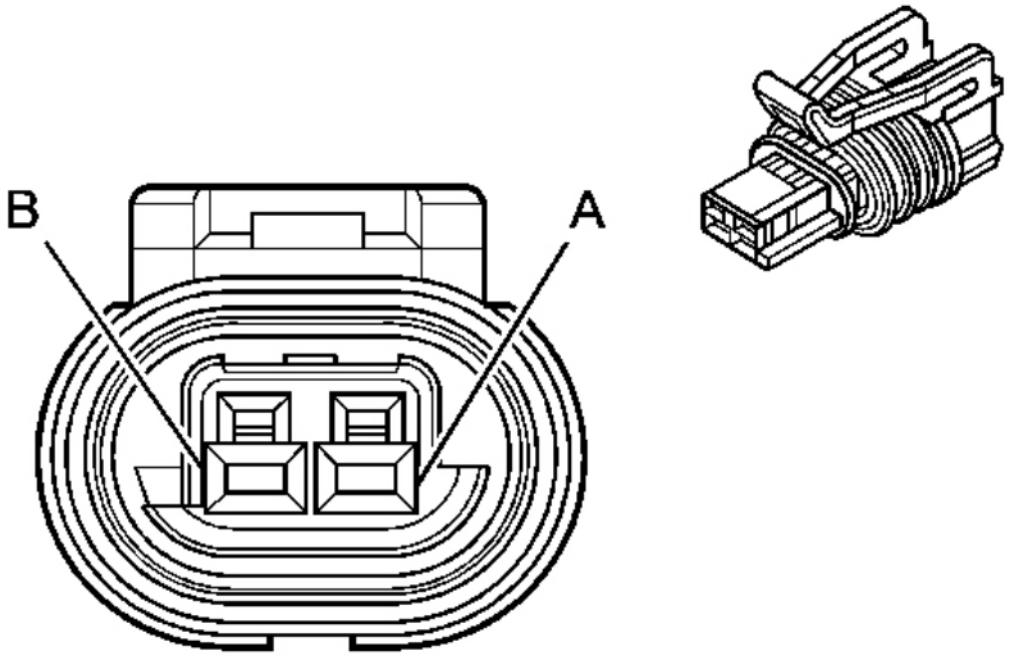


Fig. 10: Propshaft Speed Sensor - Rear (NP8) Connector End View
Courtesy of GENERAL MOTORS CORP.

Propshaft Speed Sensor - Rear (NP8) Connector Parts Information

Connector Part Information

- OEM: 15449028
- Service: 88987993
- Description: 2-Way F 150 GT Series Sealed (BK)

Terminal Part Information

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- Terminal/Tray: 15326267/19
- Core/Insulation Crimp: E/4
- Release Tool/Test Probe: 15315247/J-35616-2A (GY)

Propshaft Speed Sensor - Rear (NP8) Connector Terminal Identification

Pin	Wire Color	Circuit No.	Function
A	L-BU	2221	Signal High - Rear
B	D-GN	2222	Signal Low - Rear

Transfer Case Encoder Motor (NP8)

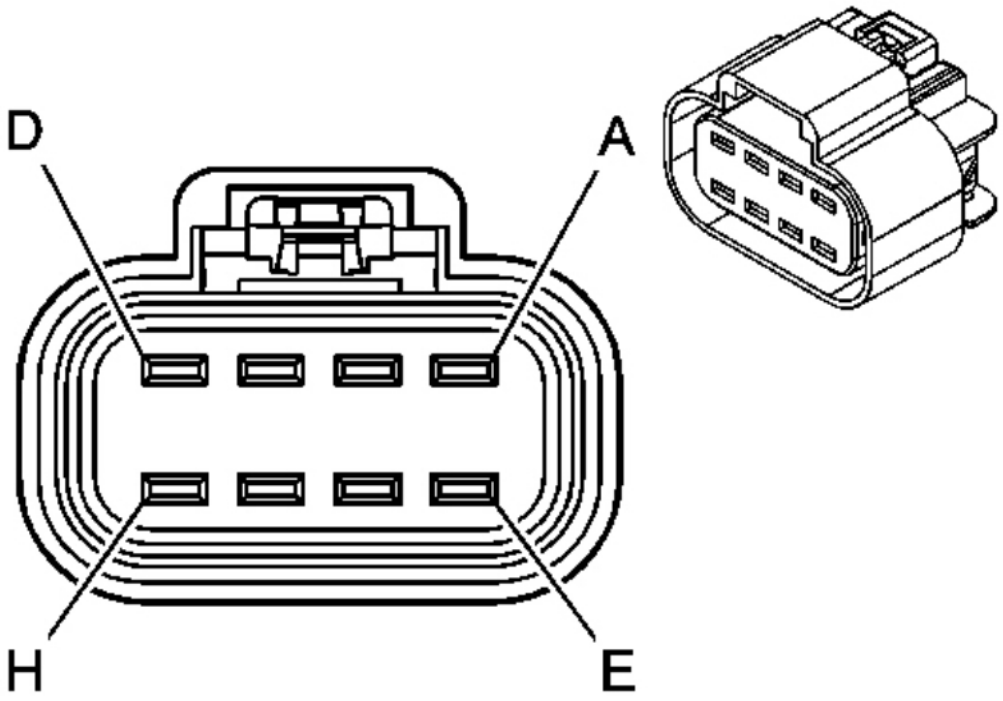


Fig. 11: Transfer Case Encoder Motor (NP8) Connector End View
Courtesy of GENERAL MOTORS CORP.

Transfer Case Encoder Motor (NP8) Connector Parts Information

Connector Part Information

- OEM: 15326654

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- Service: 88986254
- Description: 8-Way F GT 280 Series Sealed (BK)

Terminal Part Information

- Pins: A-C
- Terminal/Tray: 15304719/19
- Core/Insulation Crimp: E/5
- Release Tool/Test Probe: 15315247/J-35616-4A (PU)

- Pins: D-G
- Terminal/Tray: 15304720/19
- Core/Insulation Crimp: 4/5
- Release Tool/Test Probe: 15315247/J-35616-4A (PU)

Transfer Case Encoder Motor (NP8) Connector Terminal Identification

Pin	Wire Color	Circuit No.	Function
A	L-GN/BK	6028	Transfer Case Encoder 5-Volt Reference
B	BN/WH	1555	Channel P Encoder - Signal
C	TN/WH	1554	Encoder Low Reference
D	TN	1552	Motor Control A
E	OG	1553	Motor Control B
F	RD/BK	1342	Battery Positive Voltage
G	TN	1569	Lock Solenoid Control
H	-	-	Not Used

Transfer Case Shift Control Module C1

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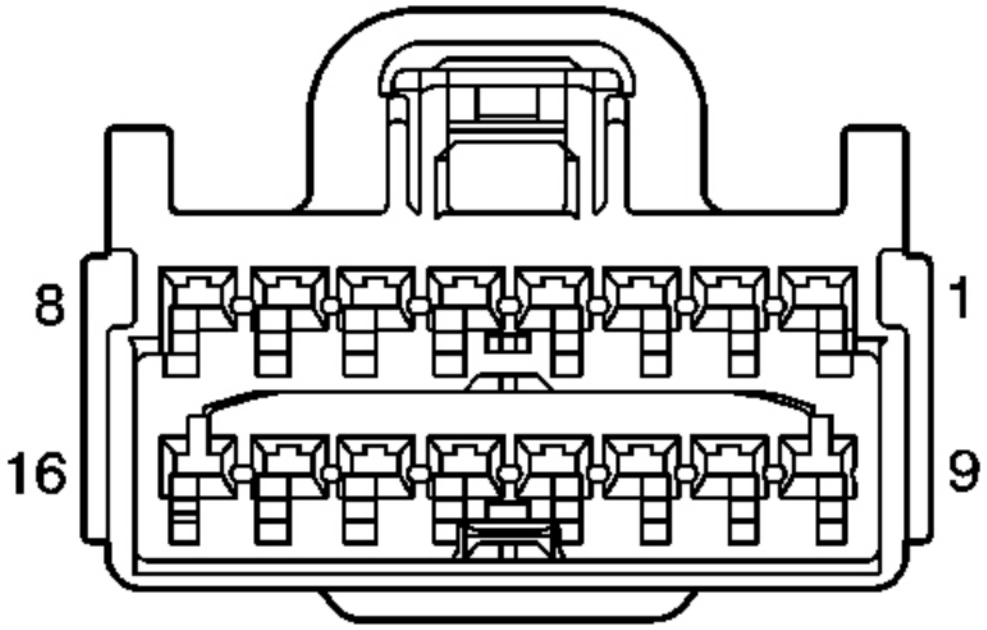


Fig. 12: Transfer Case Shift Control Module C1 Connector End View
Courtesy of GENERAL MOTORS CORP.

Transfer Case Shift Control Module C1 Connector Parts Information

Connector Part Information

- OEM: 13506916
- Service: 88988265
- Description: 16-Way F Kaizen 1.5 Series (BU)

Terminal Part Information

- Pins: 2-6, 9-15
- Terminal/Tray: 7116-4100-08/9
- Core/Insulation Crimp: E/C
- Release Tool/Test Probe: 12094430/J-35616-2A (GY)

- Pin: 7
- Terminal/Tray: 7116-4101-08/9
- Core/Insulation Crimp: E/A

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- Release Tool/Test Probe: 12094430/J-35616-2A (GY)

Transfer Case Shift Control Module C1 Connector Terminal Identification

Pin	Wire Color	Circuit No.	Function
1	-	-	Not Used
2	GY	6029	5-Volt Reference
3	BN/WH	1555	Channel P Encoder - Signal
4	GY/BK	1694	4WD Low Signal
5	BN	1560	Neutral Indicator Control
6	L-GN/BK	1563	2 'HI' Indicator - Control
7	TN	1569	Lock Solenoid Control
8	-	-	Not Used
9	L-GN/BK	6028	Transfer Case Encoder 5-Volt Reference
10	TN/WH	1554	Encoder Low Reference
11	L-BU	1693	Switch Signal
12	TN/BK	1566	4 'HI' Indicator - Control
13	PU/WH	1565	4 'LO' Indicator - Control
14	PK	1561	AWD Indicator Control
15	GY/BK	1570	Front Axle Actuator Control
16	-	-	Not Used

Transfer Case Shift Control Module C2

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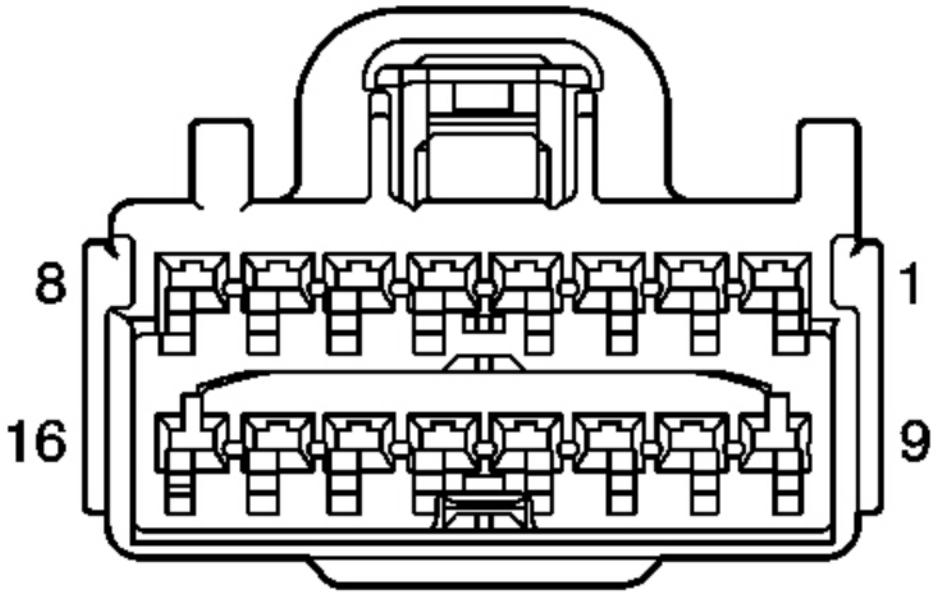


Fig. 13: Transfer Case Shift Control Module C2 Connector End View
Courtesy of GENERAL MOTORS CORP.

Transfer Case Shift Control Module C2 Connector Parts Information

Connector Part Information

- OEM: 13506917
- Service: 19115709
- Description: 16-Way F Kaizen 1.5 Series (L-GY)

Terminal Part Information

- Terminal/Tray: 7116-4100-08/9
- Core/Insulation Crimp: E/C
- Release Tool/Test Probe: 12094430/J-35616-2A (GY)

Transfer Case Shift Control Module C2 Connector Terminal Identification

Pin	Wire Color	Circuit No.	Function
1-2	-	-	Not Used
3	TN/WH	1695	Axle Switch Signal
4	TN	2501	High Speed GMLAN Serial Data Bus-

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5	TN/BK	2500	High Speed GMLAN Serial Data Bus+
6	-	-	Not Used
7	D-GN	2222	Signal Low - Rear
8	L-BU	2221	Signal High - Rear
9	PK	239	Ignition 1 Voltage
10	D-BU	5985	Accessory Wakeup Serial Data
11	-	-	Not Used
12	TN	2501	High Speed GMLAN Serial Data Bus-
13	TN/BK	2500	High Speed GMLAN Serial Data Bus+
14	-	-	Not Used
15	YE	400	Signal High - Front/VSS High Signal/OSS High Signal
16	PU	401	Signal Low - Front/VSS Low Signal/OSS Low Signal

Transfer Case Shift Control Module C3

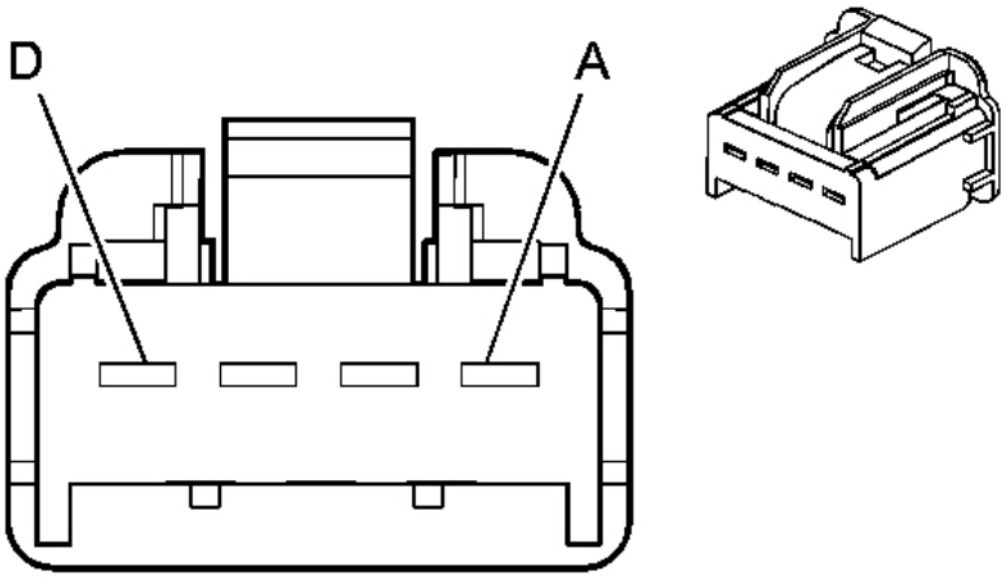


Fig. 14: Transfer Case Shift Control Module C3 Connector End View
Courtesy of GENERAL MOTORS CORP.

Transfer Case Shift Control Module C3 Connector Parts Information

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Connector Part Information

- OEM: 15466671
- Service: 19149301
- Description: 4-Way F GT 280 Series (L-GY)

Terminal Part Information

- Terminal/Tray: 15304713/19
- Core/Insulation Crimp: F/D
- Release Tool/Test Probe: 15315247/J-35616-4A (PU)

Transfer Case Shift Control Module C3 Connector Terminal Identification

Pin	Wire Color	Circuit No.	Function
A	OG	1553	Motor Control B
B	TN	1552	Motor Control A
C	RD/BK	1342	Battery Positive Voltage
D	BK	550	Ground

Transfer Case Shift Control Switch

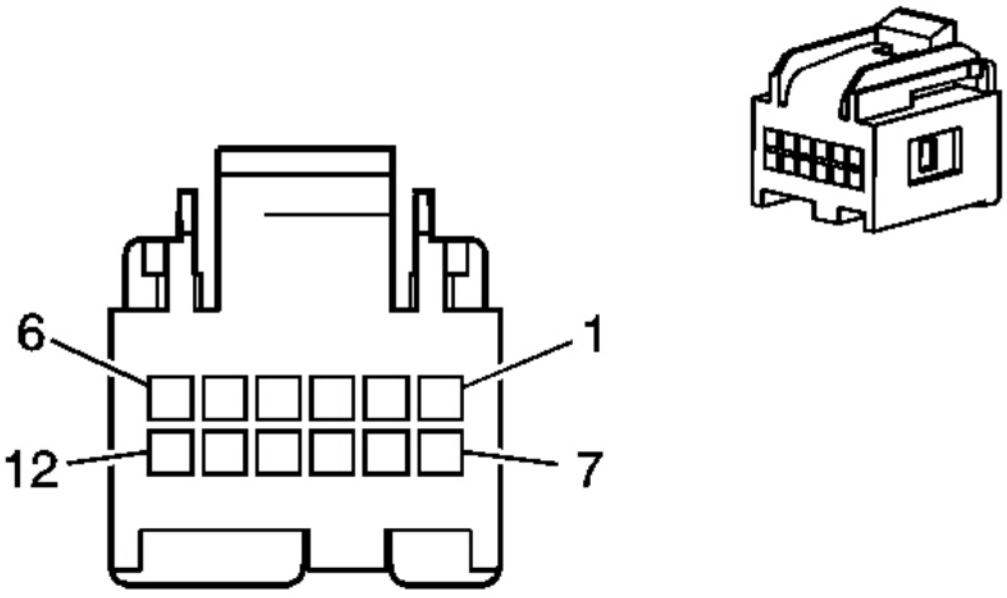


Fig. 15: Transfer Case Shift Control Switch Connector End View

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Courtesy of GENERAL MOTORS CORP.

Transfer Case Shift Control Switch Connector Parts Information

Connector Part Information

- OEM: 13551678
- Service: 89047364
- Description: 12-Way F Receptacle 0.64 Series (BK)

Terminal Part Information

- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Transfer Case Shift Control Switch Connector Terminal Identification

Pin	Wire Color	Circuit No.	Function
1	-	-	Not Used
2	WH	2283	Rear Wiper/Washer Switch Supply Voltage
3	BN	1560	Neutral Indicator Control
4	PU/WH	6816	Indicator Dimming Control
5	BN/WH	230	Instrument Panel Lamp Dimming Control
6	BK	1050	Ground
7	PK	1561	AWD Indicator Control
8	L-GN/BK	1563	2 'HI' Indicator - Control
9	TN/BK	1566	4 'HI' Indicator - Control
10	PU/WH	1565	4 'LO' Indicator - Control
11	GY	6029	Four Wheel Drive Mode Switch 5-Volt Reference
12	L-BU	1693	Switch Signal

TRANSFER CASE DISASSEMBLED VIEW

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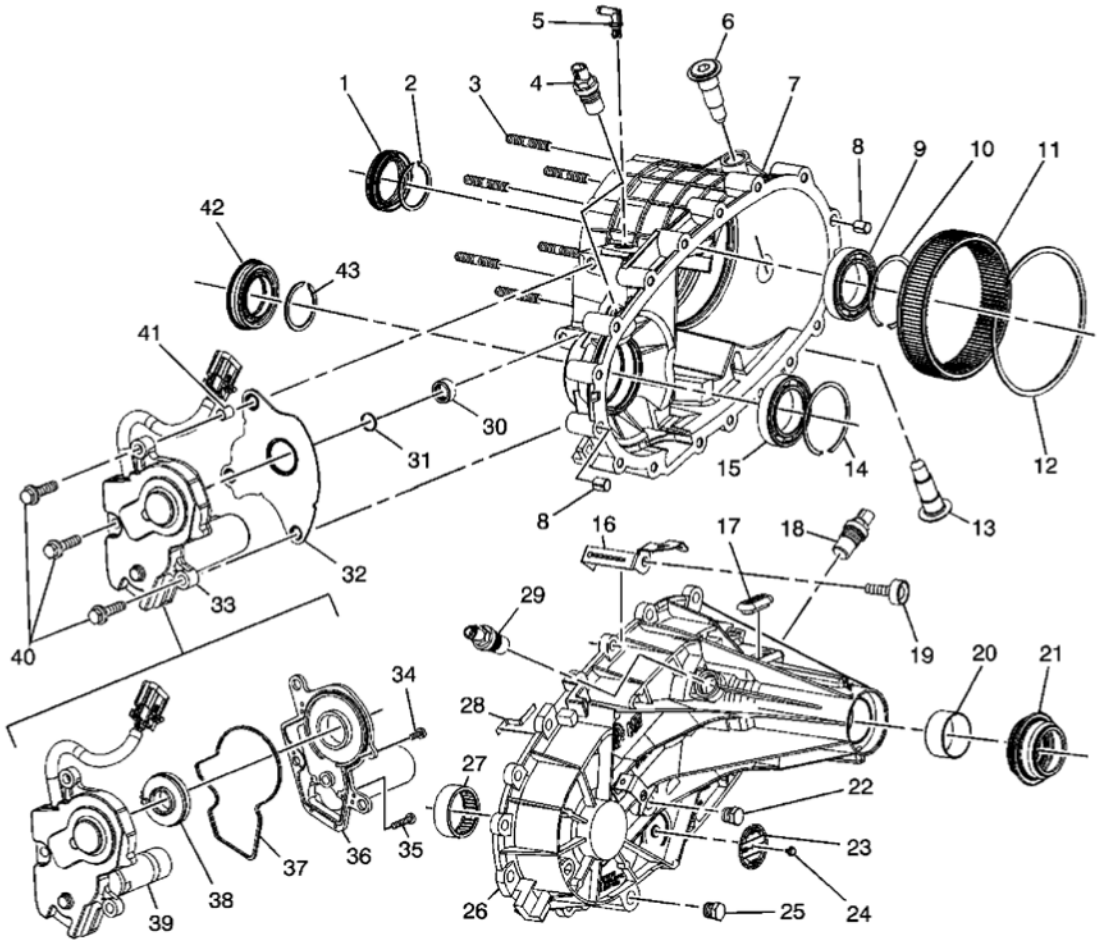


Fig. 16: Case Half Components Disassembled View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 16

Callout	Component Name
1	Input Shaft Seal
2	Input Gear Bearing Outer Retaining Ring
3	Adapter Stud
4	Front Vehicle Speed Sensor
5	Vent
6	Clutch Lever Pivot Pin
7	Front Case Half
8	Location Pin
8	Location Pin
9	Input Gear Bearing
10	Input Gear Bearing Retaining Ring

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11	Annulus Gear
12	Annulus Gear Retaining Ring
13	Clutch Lever Pivot Pin
14	Front Output Shaft Bearing Retaining Ring
15	Front Output Shaft Front Bearing
16	Bracket
17	Access Hole Plug
18	Right Vehicle Speed Sensor
19	Case Half Bolt
20	Rear Bushing
21	Rear Output Shaft Seal
22	Fill Plug
23	ID Tag
24	ID Tag Screw
25	Drain Plug
26	Rear Case Half
27	Front Output Shaft Rear Bearing
28	Wear Clip
29	Left Vehicle Speed Sensor
30	Control Actuator Lever Bearing
31	Control Actuator Lever Retaining Ring
32	Actuator Encoder Motor Insulating Spacer
33	Actuator Encoder Motor
34	Housing Screw
35	Motor Cover Screw
36	Actuator Cover Plate
37	Actuator Seal
38	Range Select Position Sensor
39	Actuator Housing
40	Actuator Encoder Motor Bolt
41	Actuator Encoder Motor Location Pin
42	Front Output Shaft Seal
43	Front Output Shaft Bearing Retaining Ring

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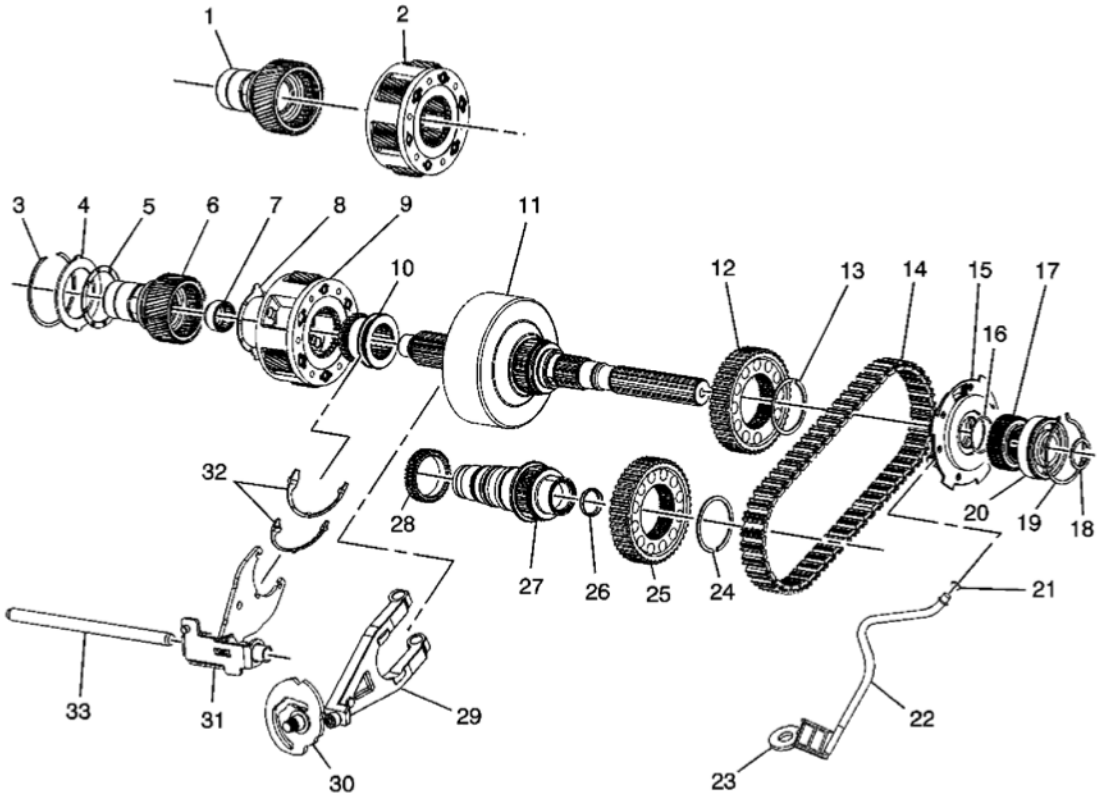


Fig. 17: Identifying Internal Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 17

Callout	Component Name
1	Input Gear 32 Teeth
2	High/Low Planetary Carrier 6 Pinion Gears
3	Planetary Gear Shaft Retaining Ring
4	Planetary Carrier Lock Ring
5	Input Gear Front Thrust Washer
6	Input Gear 27 Teeth
7	Input Gear Pilot Bearing
8	Input Gear Rear Thrust Washer
9	High/Low Planetary Carrier 3 Pinion Gears
10	High/Low Range Sleeve
11	Rear Output Shaft Assembly
12	Drive Sprocket
13	Drive Sprocket Retaining Ring
14	Drive Chain
15	Oil Pump

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16	Oil Pump Wave Spring
17	Rear Output Shaft Speed Reluctor Wheel
18	Rear Output Shaft Rear Bearing Retaining Ring
19	Rear Output Shaft Rear Bearing Outer Retaining Ring
20	Rear Output Shaft Rear Bearing
21	Oil Pump Suction Pipe O-Ring Seal
22	Oil Pump Screen and Suction Pipe
23	Magnet
24	Driven Sprocket Retaining Ring
25	Driven Sprocket
26	Front Output Shaft Cup Plug
27	Front Output Shaft
28	Front Output Shaft Speed Reluctor Wheel
29	Clutch Lever
30	Control Actuator Lever
31	Range Fork
32	Shift Fork Pads
33	Shift Fork Shaft

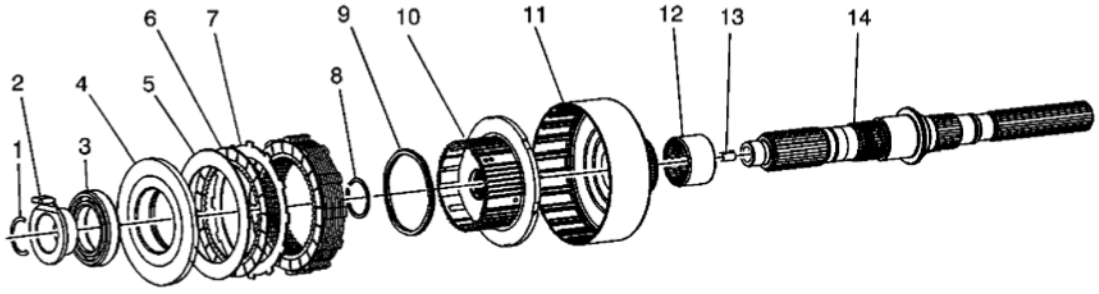


Fig. 18: Clutch Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 18

Callout	Component Name
1	Clutch Retaining Ring
2	Clutch Bearing Inner Support
3	Clutch Apply Plate Bearing
4	Clutch Apply Plate
5	Shims
6	Clutch Inner Plate Friction
7	Clutch Outer Plate Steel
8	Clutch Hub Retaining Ring

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9	Clutch Return Spring
10	Clutch Hub
11	Clutch Housing
12	Clutch Housing Bearing
13	Oil Restrictor
14	Rear Output Shaft

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B0770	All Wheel Drive (AWD) Indicator Circuit Malfunction
DTC B0775	Four Wheel Drive High Range (4HI) Indicator Circuit Malfunction
DTC B0780	Four Wheel Drive Low Range (4LO) Indicator Circuit Malfunction
DTC B0785	Two Wheel Drive High Range (2HI) Indicator Circuit Malfunction
DTC B0790	Transfer Case Neutral Indicator Circuit Malfunction
DTC B2725	ATC Mode Switch Circuit Malfunction
DTC C0300	Rear Speed Sensor Malfunction
DTC C0305	Front Speed Sensor Malfunction
DTC C0306	05: Motor A or B Circuit Short to Battery or Open
DTC C0321	01: Transfer Case Lock Short to Battery
DTC C0326	08: Transfer Case Lock System Performance Signal Invalid
DTC C0327	07: Encoder Circuit Voltage Above Threshold
DTC C0359	01: Four Wheel Drive Low Range (4LO) Discrete Output Circuit Short to Battery
DTC C0374	58: General System Malfunction Incorrect Reaction After Event
DTC C0378	08: Front Axle Switch Circuit Signal Invalid
DTC C0379	01: Four Wheel Drive Low Range (4LO) Discrete Output Circuit Short to Battery
DTC C0550	ECU Malfunction
DTC C0558	Calibration Data Not Performed

DIAGNOSTIC STARTING POINT - TRANSFER CASE

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

- The identification of the control module or modules that command the system.
- The ability of the control module or modules to communicate through the serial data circuit.
- The identification of any stored diagnostic trouble codes (DTCs) and the status of the codes.

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

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.		
2WD High Indicator Light	-	This function allows the technician to command the 2WD high indicator light, within the transfer case shift control switch, on or off.
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 Low Indicator Light	-	This function allows the technician to command the 4WD low indicator light, within the transfer case shift control switch, on or off.
ATC Motor A Control	-	This function allows the technician to energize the motor, causing it to shift the transfer case through all five modes. Motor control A moves in the opposite direction as motor control B.
ATC Motor B Control	-	This function allows the technician to energize the motor, causing it to shift the transfer case through all five modes. Motor control B moves in the opposite direction as motor control A.
Auto 4WD Indicator Light	-	This function allows the technician to command the auto 4WD indicator light, within the transfer case shift control switch, on or off.
Engage Front Axle	-	This function allows the technician to engage and disengage the front axle actuator. When the front axle actuator is engaged, the front axle becomes a live axle, causing the front propshaft to turn.
Neutral Indicator Light	-	This function allows the technician to command the neutral indicator light, within the transfer case shift control switch, on or off.
Transfer Case Lock	-	This function allows the technician to turn the transfer case lock on and off. With the transfer case lock on, the transfer case cannot be shifted.

SCAN TOOL DATA LIST

Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
DEFINITION: Engine is at idle, upper radiator hose is hot, closed throttle, gear is in Park or Neutral, and			

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accessories are OFF.			
2WD High Indicator Light	Transfer Case Data	On/Off	On
4WD High Indicator Light	Transfer Case Data	On/Off	Off
4WD Low Active	Transfer Case Data	Yes/No	No
4WD Low Indicator Light	Transfer Case Data	On/Off	Off
ATC Application	Transfer Case Data	Application	Varies
ATC Slip Speed	Transfer Case Data	RPM	0
Auto 4WD Indicator Light	Transfer Case Data	On/Off	On
Battery Voltage	Transfer Case Data	Volts	Battery Voltage
Current Slip Adapts	Transfer Case Data	Counts	Varies
Encoder Gear Position	Transfer Case Data	2WD/4WD High/4WD Low/Auto 4WD/Neutral	Varies
Encoder Return Voltage	Transfer Case Data	Volts	0-5 V
Encoder Supply Voltage	Transfer Case Data	Volts	0-5 V
Front Axle Requested	Transfer Case Data	Yes/No	No
Front Axle Switch	Transfer Case Data	Locked/Unlocked	Unlocked
Front Propshaft Speed	Transfer Case Data	RPM	0
Ign. Cycles Since Last Current DTC	Transfer Case Data	Number	Varies
Mode Switch Return Voltage	Transfer Case Data	Volts	0-5 V
Mode Switch Selected	Transfer Case Data	2WD/4WD High/4WD Low/Auto 4WD/Neutral	Varies
Neutral Indicator Light	Transfer Case Data	On/Off	Off
Rear Propshaft Speed	Transfer Case Data	RPM	0
Service 4WD Lamp	Transfer Case Data	On/Off	Off
Slip Adapt PWM	Transfer Case Data	%DC	0
Total Slippage	Transfer Case Data	RPM	0
Transfer Case Lock	Transfer Case Data	Enabled/Disabled	Disabled

SCAN TOOL DATA DEFINITIONS

2WD High Indicator Light

This parameter displays On when the transfer case shift control module commands the 2WD high indicator light On. The scan tool displays On or Off.

4WD High Indicator Light

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

4WD Low Active

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

4WD Low Indicator Light

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

ATC Application

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

ATC Slip Speed

This parameter displays the RPM difference between the front and rear propshafts. The scan tool displays a range of 0-8,192 RPM.

ATC Software ID

This parameter displays the numbers or characters assigned to the current version of software used in the transfer case shift control module. The scan tool displays an alphanumeric value.

Auto 4WD Indicator Light

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

Battery Voltage

This parameter displays the voltage measured by the transfer case shift control module at the transfer case shift control module battery feed. The scan tool displays a range of 0-25.5 volts.

Current Slip Adapts

This parameter displays corrective adjustments made by the transfer case shift control module for wheel slip events. The scan tool displays a numeric value.

Encoder Gear Position

This parameter displays the mode the transfer case is currently in.

Encoder Return Voltage

This parameter displays the voltage measured by the transfer case shift control module at the encoder signal return. The scan tool displays a range of 0-7.5 volts.

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Encoder Supply Voltage

This parameter displays the voltage measured by the transfer case shift control module at the 5 V reference circuit. The scan tool displays a range of 0-7.5 volts.

Front Axle Requested

This parameter displays Yes if the transfer case shift control module requests the front axle switch On. The scan tool displays Yes or No.

Front Axle Switch

This parameter displays the feedback states of the front propshaft. The scan tool displays Locked or Unlocked.

Front Propshaft Speed

This parameter displays the rotational speed of the front propshaft. The scan tool displays a range of 0-8,192 RPM.

Ing. Cycles Since Last Current DTC

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

Mode Switch Return Voltage

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

Mode Switch Selected

This parameter displays the transfer case shift control switch button currently depressed by the driver.

Neutral Indicator Light

This parameter displays On when the transfer case shift control module commands the neutral indicator light On. The scan tool displays On or Off.

Rear Propshaft Speed

This parameter displays the rotational speed of the rear propshaft. The scan tool displays a range of 0-8,192 RPM.

Service 4WD Lamp

This parameter displays On if the transfer case shift control module commands the Service 4WD lamp, or

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message, On. The scan tool displays On or Off.

Slip Adapt PWM

This parameter displays the duty cycle applied to the transfer case encoder motor. The scan tool displays a range of 0-100 percent.

Total Slippage

This parameter displays the total slippage of both the front and rear propshafts. The scan tool displays a range of 0-8,192 RPM.

Transfer Case Lock

This parameter displays Enabled if the transfer case shift control module commands the transfer case motor brake On. The scan tool displays Enabled or Disabled.

DIAGNOSTIC TROUBLE CODE (DTC) LIST

DTC List

Description	Module
DTC B0770	Electronic Transfer Case
DTC B0775	Electronic Transfer Case
DTC B0780	Electronic Transfer Case
DTC B0785	Electronic Transfer Case
DTC B0790	Electronic Transfer Case
DTC B2725	Electronic Transfer Case
DTC C0300	Electronic Transfer Case
DTC C0305	Electronic Transfer Case
DTC C0306	Electronic Transfer Case
DTC C0321	Electronic Transfer Case
DTC C0326	Electronic Transfer Case
DTC C0327	Electronic Transfer Case
DTC C0359	Electronic Transfer Case
DTC C0374	Electronic Transfer Case
DTC C0378	Electronic Transfer Case
DTC C0379	Electronic Transfer Case
DTC C0550	Electronic Transfer Case
DTC C0558	Electronic Transfer Case

DTC B0770

Circuit Description

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The All Wheel Drive (AWD) indicator circuit consists of an indicator lamp feed circuit and an AWD indicator lamp control circuit. When the AWD mode has been selected, current is supplied to the AWD indicator lamp by the indicator lamp feed circuit, traveling through the AWD indicator lamp LED, at which time the transfer case shift control module supplies the ground through the AWD indicator lamp control circuit.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B0770 All Wheel Drive (AWD) Indicator Circuit Malfunction

Conditions for Running the DTC

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

Conditions for Setting the DTC

- The system monitors the voltage on the AWD indicator control circuit.
- If the system detects a voltage of 2 volts or less for 1.5 seconds when the AWD indicator is not commanded, the DTC is logged.
- If the system detects a voltage of 4.5 volts or more when the AWD indicator is commanded, the DTC is logged.

Action Taken When the DTC Sets

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

Conditions for Clearing the DTC

- The transfer case shift control module clears the DTC if the condition for setting the DTC is not currently present.
- A history DTC clears after 100 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 looks for the visual operation of the AWD indicator. Command both the ON and OFF states.
3: This step helps determine if proper voltage is supplied to the transfer case select switch.
4: This step helps determine if there is a short to ground in the indicator control circuit.
5: This step helps determine if there is an open in the indicator control circuit.
6: This step tests the indicator feed circuit for an open or high resistance.
7: This step tests the AWD indicator control circuit for a short to ground.

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8: This step tests the AWD indicator control circuit for an open or high resistance.

DTC B0770

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 - Vehicle?	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With the scan tool, command the AWD Indicator control ON and OFF. Does the AWD Indicator turn ON and OFF with each command?	Go to **Testing for Intermittent Conditions and Poor Connections**	Go to **Step 3**
3	With a scan tool, command the 4HI, 4LO, and 2HI indicators ON and OFF. Do all the indicators turn ON and OFF?	Go to **Step 4**	Go to **Step 6**
4	Does the AWD Indicator stay ON?	Go to **Step 7**	Go to **Step 5**
5	1. Remove the transfer case select switch. 2. While the transfer case select switch is still connected to the harness, backprobe the AWD indicator control circuit with a wire to a good ground. Does the AWD Indicator illuminate?	Go to **Step 8**	Go to **Step 9**
6	Test the LED dimming supply circuit for an open or high resistance. Refer to **Testing for Continuity** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 11**	Go to **Step 9**
7	Test the AWD indicator control circuit for a short to ground. Refer to **Testing for Short to Ground** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 11**	Go to **Step 10**
8	Test the AWD indicator control circuit for an open or high resistance. Refer to **Testing for Continuity** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 11**	Go to **Step 10**
9	Replace the transfer case select switch. Refer to **Transfer Case Shift Control Switch Replacement**. Did you complete the repair?	Go to **Step 11**	-
	IMPORTANT:		

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10	**After transfer case shift control module replacement and reprogramming, ensure all doors are closed and the key is out of the ignition, then open and close the doors again and wait 2 minutes to avoid incomplete programming or false communication DTCs.** Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**.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 reset?	Go to **Step 2**	System OK

DTC B0775

Circuit Description

The 4HI indicator circuit consists of an LED dimming supply circuit and a 4HI indicator control circuit. When the 4HI mode is selected, current is supplied to the 4HI indicator by the LED dimming supply circuit, traveling through the 4HI indicator LEDs, at which time the transfer case shift control module supplies the ground through the 4HI indicator control circuit.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B0775 Four Wheel Drive High Range (4HI) Indicator Circuit Malfunction

Conditions for Running the DTC

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

Conditions for Setting the DTC

- The system monitors the voltage on the 4HI indicator control circuit.
- If the system detects a voltage of 3 volts or less for 1.5 seconds when the 4HI indicator is not commanded, the DTC is logged.
- If the system detects a voltage of 4.5 volts or greater when the 4HI indicator is commanded, the DTC is logged.

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Action Taken When the DTC Sets

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

Conditions for Clearing the DTC

- The transfer case shift control module clears the DTC if the condition for setting the DTC is not currently present.
- A history DTC clears after 100 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 looks for the visual operation of the 4HI indicator. Command both the ON and OFF states.
3: This step helps determine if proper voltage is supplied to the transfer case select switch.
4: This step helps determine if there is a short to ground in the indicator control circuit.
5: This step helps determine if there is an open in the indicator control circuit.
6: This step tests the indicator feed circuit for an open or high resistance.
7: This step tests the 4HI neutral control circuit for a short to ground.
8: This step tests the 4HI neutral control circuit for an open or high resistance.

DTC B0775

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 - Vehicle?	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With the scan tool, command the 4HI indicator control ON and OFF. Does the 4HI neutral turn ON and OFF with each command?	Go to **Testing for Intermittent Conditions and Poor Connections**	Go to **Step 3**
3	With a scan tool, command the 4HI, 4LO, and 2HI indicators ON and OFF. Do all the indicators turn ON and OFF?	Go to **Step 4**	Go to **Step 6**
4	Does the 4HI indicator stay ON?	Go to **Step 7**	Go to **Step 5**
	1. Remove the transfer case select switch. 2. While the transfer case select switch is still		

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5	connected to the harness, backprobe the 4HI neutral control circuit with a wire to a good ground. Does the 4HI indicator illuminate?	Go to **Step 8**	Go to **Step 9**
6	Test the LED dimming supply circuit for an open or high resistance. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 11**	Go to **Step 9**
7	Test the 4HI indicator control circuit for a short to ground. Refer to **Testing for Short to Ground** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 11**	Go to **Step 10**
8	Test the 4HI indicator control circuit for an open or high resistance. Refer to **Testing for Continuity** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 11**	Go to **Step 10**
9	Replace the transfer case select switch. Refer to **Transfer Case Shift Control Switch Replacement**. Did you complete the repair?	Go to **Step 11**	-
10	**IMPORTANT:** **After transfer case shift control module replacement and reprogramming, ensure all doors are closed and the key is out of the ignition, then open and close the doors again and wait 2 minutes to avoid incomplete programming or false communication DTCs.** Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**.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 reset?	Go to **Step 2**	System OK

DTC B0780

Circuit Description

The 4LO indicator circuit consists of an LED dimming supply circuit and a 4LO indicator control circuit. When the 4LO mode is selected, current is supplied to the 4LO indicator by the LED dimming supply circuit, traveling

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through the 4LO indicator LEDs, at which time the transfer case shift control module supplies the ground through the 4LO indicator control circuit.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B0780 Four Wheel Drive Low Range (4LO) Indicator Circuit Malfunction

Conditions for Running the DTC

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

Conditions for Setting the DTC

- The system monitors the voltage on the 4LO indicator control circuit.
- If the system detects a voltage of 3 volts or less for 1.5 seconds when the 4LO indicator is not commanded, the DTC is logged.
- If the system detects a voltage of 4.5 volts or greater when the 4LO indicator is commanded, the DTC is logged.

Action Taken When the DTC Sets

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

Conditions for Clearing the DTC

- The transfer case shift control module clears the DTC if the condition for setting the DTC is not currently present.
- A history DTC clears after 100 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 looks for the visual operation of the 4LO indicator. Command both the ON and OFF states.
3: This step helps determine if proper voltage is supplied to the transfer case select switch.
4: This step helps determine if there is a short to ground in the indicator control circuit.
5: This step helps determine if there is an open in the indicator control circuit.
6: This step tests the indicator feed circuit for an open or high resistance.
7: This step tests the 4LO neutral control circuit for a short to ground.
8: This step tests the 4LO neutral control circuit for an open or high resistance.

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DTC B0780

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 - Vehicle?	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With the scan tool, command the 4LO indicator control ON and OFF. Does the 4LO neutral turn ON and OFF with each command?	Go to **Testing for Intermittent Conditions and Poor Connections**	Go to **Step 3**
3	With a scan tool, command the AWD, 4HI, and 2HI indicators ON and OFF. Do all the indicators turn ON and OFF?	Go to **Step 4**	Go to **Step 6**
4	Does the 4LO indicator stay ON?	Go to **Step 7**	Go to **Step 5**
5	1. Remove the transfer case select switch. 2. While the transfer case select switch is still connected to the harness, backprobe the 4LO indicator control circuit with a wire to a good ground. Does the 4LO neutral illuminate?	Go to **Step 8**	Go to **Step 9**
6	Test the LED dimming supply circuit for an open or high resistance. Refer to **Testing for Continuity** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 11**	Go to **Step 9**
7	Test the 4LO indicator control circuit for a short to ground. Refer to **Testing for Short to Ground** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 11**	Go to **Step 10**
8	Test the 4LO indicator control circuit for an open or high resistance. Refer to **Testing for Continuity** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 11**	Go to **Step 10**
9	Replace the transfer case select switch. Refer to **Transfer Case Shift Control Switch Replacement**. Did you complete the repair?	Go to **Step 11**	-
	IMPORTANT: **After transfer case shift control module replacement and reprogramming, ensure all doors are closed and the key is out of the ignition, then open and**		

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	close the doors again and wait 2 minutes to avoid incomplete programming or false communication DTCs.		
10	Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**.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 reset?	Go to **Step 2**	System OK

DTC B0785

Circuit Description

The 2HI indicator circuit consists of an LED dimming supply circuit and a 2HI indicator control circuit. When the 2HI mode is selected, current is supplied to the 2HI indicator by the LED dimming supply circuit, traveling through the 2HI LED indicator, at which time the transfer case shift control module supplies the ground through the 2HI indicator control circuit.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B0785 Two Wheel Drive High Range (2HI) Indicator Circuit Malfunction

Conditions for Running the DTC

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

Conditions for Setting the DTC

- The system monitors the voltage on the 2HI indicator control circuit.
- If the system detects a voltage of 3 volts or less for 1.5 seconds when the 2HI indicator is not commanded, the DTC is logged.
- If the system detects a voltage of 4.5 volts or greater when the 2HI indicator is commanded, the DTC is logged.

Action Taken When the DTC Sets

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

Conditions for Clearing the DTC

- The transfer case shift control module clears the DTC if the condition for setting the DTC is not currently present.
- A history DTC clears after 100 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 looks for the visual operation of the 2HI indicator. Command both the ON and OFF states.
3: This step helps determine if proper voltage is supplied to the transfer case select switch.
4: This step helps determine if there is a short to ground in the indicator control circuit.
5: This step helps determine if there is an open in the indicator control circuit.
6: This step tests the indicator feed circuit for an open or high resistance.
7: This step tests the 2HI neutral control circuit for a short to ground.
8: This step tests the 2HI neutral control circuit for an open or high resistance.

DTC B0785

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 - Vehicle?	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With the scan tool, command the 2HI neutral control ON and OFF. Does the 2HI indicator turn ON and OFF with each command?	Go to **Testing for Intermittent Conditions and Poor Connections**	Go to **Step 3**
3	With a scan tool, command the AWD, 4HI, and 4LO indicators ON and OFF. Do all the indicators turn ON and OFF?	Go to **Step 4**	Go to **Step 6**
4	Does the 2HI indicator stay ON?	Go to **Step 7**	Go to **Step 5**
5	1. Remove the transfer case select switch. 2. While the transfer case select switch is still connected to the harness, backprobe the 2HI neutral control circuit with a wire to a good		

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	ground. Does the 2HI neutral illuminate?	Go to **Step 8**	Go to **Step 9**
6	Test the LED dimming supply circuit for an open or high resistance. Refer to **Testing for Continuity** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 11**	Go to **Step 9**
7	Test the 2HI indicator control circuit for a short to ground. Refer to **Testing for Short to Ground** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 11**	Go to **Step 10**
8	Test the 2HI indicator control circuit for an open or high resistance. Refer to **Testing for Continuity** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 11**	Go to **Step 10**
9	Replace the transfer case select switch. Refer to **Transfer Case Shift Control Switch Replacement**. Did you complete the repair?	Go to **Step 11**	-
10	**IMPORTANT:** **After transfer case shift control module replacement and reprogramming, ensure all doors are closed and the key is out of the ignition, then open and close the doors again and wait 2 minutes to avoid incomplete programming or false communication DTCs.** Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**.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 reset?	Go to **Step 2**	System OK

DTC B0790

Circuit Description

The Neutral indicator circuit consists of an 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 detects an open,

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short to ground, or a short to voltage.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B0790 Transfer Case Neutral Indicator Circuit Malfunction

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 of 3 volts or less for 1.5 seconds when the Neutral indicator is not commanded, the DTC is logged.
- If the system detects a voltage of 4.5 volts or more when the Neutral indicator is commanded, the DTC is logged.

Action Taken When the DTC Sets

The SERVICE 4WD indicator remains 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 100 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 inspects for the visual operation of the neutral indicator light. Command both the ON and OFF states.

3: This step tests for voltage at the Neutral indicator feed side of the transfer case select switch.

4: This step verifies that the transfer case shift control module is providing ground to the neutral indicator.

5: This step tests if ground is constantly being applied to the neutral indicator.

6: This step tests the control circuit of the Neutral indicator for a short to voltage or an open.

7: This step tests the control circuit of the neutral indicator for a short to ground.

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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 - Vehicle?	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With the scan tool, command the Neutral Indicator Light ON and OFF. Does the Neutral Indicator Light turn ON and OFF with each command?	Go to **Testing for Intermittent Conditions and Poor Connections**	Go to **Step 3**
3	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 test lamp that is connected to a good ground. Does the test lamp illuminate?	Go to **Step 4**	Go to **Step 10**
4	1. Connect a test lamp between the harness connector of the neutral indicator control circuit and the neutral indicator feed circuit. 2. With the scan tool, command the Neutral indicator ON and OFF. Does the test lamp turn ON and OFF with each command?	Go to **Step 8**	Go to **Step 5**
5	Does the test lamp remain illuminated with each command?	Go to **Step 7**	Go to **Step 6**
6	Test the neutral indicator control circuit for a short to voltage or an open. Refer to **Testing for Continuity** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 13**	Go to **Step 9**
7	Test the control circuit of the neutral indicator for a short to ground. Refer to **Testing for Short to Ground** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 13**	Go to **Step 9**
	Inspect for poor connections at the transfer case shift control switch. Refer to **Testing for Intermittent**		

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8	**Conditions and Poor Connections** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 13**	Go to **Step 11**
9	Inspect for poor connections at the harness connector of the transfer case shift control module. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** . Did you find and correct the condition?	Go to **Step 13**	Go to **Step 12**
10	Repair the ignition 3 voltage circuit of the transfer case select switch for an open, a high resistance, or a short to ground. Refer to **Circuit Testing** and **Wiring Repairs** . Did you complete the repair?	Go to **Step 13**	-
11	Replace the transfer case select switch. Refer to **Transfer Case Shift Control Switch Replacement**. Did you complete the repair?	Go to **Step 13**	-
12	**IMPORTANT:** **After transfer case shift control module replacement and reprogramming, ensure all doors are closed and the key is out of the ignition, then open and close the doors again and wait 2 minutes to avoid incomplete programming or false communication DTCs.** Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**.Did you complete the repair?	Go to **Step 13**	-
13	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 2**	System OK

DTC B2725

Circuit Description

The range/mode switch circuit consists of 5 modes. The transfer case shift control module supplies 5 volts to the switch through the 5-volt reference circuit. The current travel through the resistor of the currently active mode. 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.

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When each of the modes are selected they complete a circuit through their own specific resistor. The transfer case shift control module continuously monitors the switch input to determine whether the Neutral, AWD, 2HI, 4HI, or 4LO mode was selected by the driver.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B2725 ATC Mode Switch Circuit Malfunction

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 0.35 volt or greater than 0.70 volt for 60 seconds, the DTC is logged.

Action Taken When the DTC Sets

- All shifting is disabled.
- The SERVICE 4WD indicator remains 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 100 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 the switch signal wire for a short to ground, short to voltage, or high resistance.

DTC B2725

Step	Action	Values	Yes	No
Schematic Reference: Transfer Case Control Schematics **Connector End View Reference: Transfer Case Control Connector End Views**				

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1	Did you perform the Diagnostic System Check - Vehicle?	-	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Install a scan tool. 2. Start the engine. 3. Set the parking 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**	Go to **Step 3**
3	1. Connect a DMM between the selector mode switch signal and voltage from the 5-volt reference circuit at the switch. 2. Measure the resistance through the mode switch while selecting the modes and comparing values. Does the DMM indicate all resistance values within the specified ranges?	2 HI: 230-245 ohms AWD: 526-580 ohms 4 HI: 1,042-1,107 ohms 4 LO: 2,039-2,165 ohms Neutral: 4,467-4,743 ohms	Go to **Step 4**	Go to **Step 5**
4	1. Disconnect the transfer case shift control module connectors C1 and C2. 2. Test the switch signal for a short to voltage, a short to ground, or a high resistance. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 7**	Go to **Step 6**
5	Replace the selector mode switch. Refer to **Transfer Case Shift Control Switch Replacement**. Did you complete the repair?	-	Go to **Step 7**	-
	IMPORTANT: **After transfer case shift control module replacement and reprogramming, ensure all doors are closed and the key is out of the ignition, then open and close the doors again and wait 2 minutes to avoid incomplete**			

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	programming or false communication DTCs.			
6	Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**.Did you complete the repair?	-	Go to **Step 7**	-
7	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 2**	System OK

DTC C0300

Circuit Description

The rear propshaft speed sensor is a permanent magnet generator. The permanent magnet generator produces a pulsing AC voltage. The AC voltage level and number of pulses increases as speed increases. The module converts the pulsating AC voltage to a propshaft RPM which is used for calculations. The propshaft RPM can be displayed with a scan tool.

This DTC detects an open, short to ground, short to voltage or faulty sensor.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC C0300 Rear Speed Sensor Malfunction

Conditions for Running the DTC

- The ignition is ON.
- The system voltage is 9-18 volts.
- The vehicle speed exceeds 16 km/h (10 mph).

Conditions for Setting the DTC

The system logs the DTC if the rear propshaft input indicates a speed of less than 16 RPM for 30 seconds while all of the following are true:

- The transmission is not in Park/Neutral.

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- The engine is running.
- The front axle is engaged.
- The vehicle speed on Class 2 data bus exceeds 16 km/h (10 mph).

Action Taken When the DTC Sets

- All shifts to AUTO, or the Adapt mode is disabled. If the current mode is AUTO, the system does not allow any further adaptive events, such as correcting slip.
- The SERVICE 4WD indicator remains 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 100 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 to see if the malfunction is intermittent.

3: This step tests the internal resistance of the propshaft speed sensor.

4: This step tests to see if the propshaft speed sensor can generate a sufficient amount of AC voltage.

5: This step tests the rear propshaft speed sensor low circuit for a short to ground, a high resistance, or an open.

6: This step tests the rear propshaft speed sensor high circuit for a short to ground, a high resistance or an open.

7: This step tests the rear propshaft speed sensor low circuit for a short to voltage.

8: This step tests the rear propshaft speed sensor high circuit for a short to voltage.

9: This step tests the rear propshaft speed sensor low circuit for a short to the rear speed sensor high circuit.

DTC C0300

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 - Vehicle?	-	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
	1. Drive the vehicle for a short test drive. 2. With the scan tool, observe the value of		Go to **Testing**	

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2	the Rear Propshaft Speed Data parameter in the transfer case data list, while driving. Does the RPM value vary, or become intermittent while driving at a steady speed?	-	**for Intermittent Conditions and Poor Connections**	Go to **Step 3**
3	1. Turn the ignition OFF. 2. Disconnect the transfer case rear propshaft speed sensor. 3. Measure the resistance of the transfer case rear propshaft speed sensor. Is the resistance reading within the specified values?	1,300-2,700 ohms	Go to **Step 4**	Go to **Step 10**
4	1. Connect a DMM to the transfer case rear propshaft speed sensor. 2. Block the front wheels. 3. Place the transmission in NEUTRAL. 4. Raise and support the rear axle so that the wheels turn freely. 5. Hold one rear wheel while rotating the other rear wheel. 6. Observe the AC voltage reading on the DMM. Is the voltage reading greater than the specified value?	0.5 V AC	Go to **Step 5**	Go to **Step 10**
5	1. Disconnect the transfer case shift control module. 2. Test the rear propshaft speed sensor low signal circuit for a short to ground, a high resistance, or an open. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 6**
6	Test the rear propshaft speed sensor high signal circuit for a short to ground, a high resistance, or an open. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 7**
7	Test the rear propshaft speed sensor low signal circuit for a short to voltage. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 8**

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8	Test the rear propshaft speed sensor high signal circuit for a short to voltage. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 9**
9	Test the rear propshaft speed sensor high signal circuit for a short to the rear propshaft speed sensor low signal circuit. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 11**
10	Replace the transfer case rear propshaft speed sensor. Refer to **Transfer Case Speed Sensor Replacement - Right Rear**. Did you complete the repair?	-	Go to **Step 12**	-
11	**IMPORTANT:** **After transfer case shift control module replacement and reprogramming, ensure all doors are closed and the key is out of the ignition, then open and close the doors again and wait 2 minutes to avoid incomplete programming or false communication DTCs.** Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**.Did you complete the repair?	-	Go to **Step 12**	-
12	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 2**	System OK

DTC C0305

Circuit Description

The front propshaft speed sensor is a permanent magnet generator. The permanent magnet generator produces a pulsing AC voltage. The AC voltage level and number of pulses increases as speed increases. The transfer case shift control module converts the pulsating AC voltage to a propshaft RPM which is used for the following functions:

- Calculations
- To monitor the difference between the front and rear propshaft speed

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- To determine the amount of slip and the percent of torque to apply to the front axle in the AUTO 4WD mode.

The module accesses this input when the vehicle is in AUTO 4WD mode, 4HI, and 4LO ranges. The propshaft RPM can be displayed with a scan tool.

This DTC detects an open, short to ground, short to voltage or faulty sensor.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC C0305 Front Speed Sensor Malfunction

Conditions for Running the DTC

- The ignition is ON.
- The system voltage is 9-18 volts.
- The vehicle speed exceeds 16 km/h (10 mph).

Conditions for Setting the DTC

The system logs the DTC if the front propshaft input indicates a speed of less than 16 RPM for 30 seconds while all of the following are true:

- The transmission is not in Park/Neutral.
- The engine is running.
- The front axle is engaged.
- The rear propshaft speed exceeds 512 RPM.
- The vehicle speed on Class 2 Data bus exceeds 16 km/h (10 mph).

Action Taken When the DTC Sets

- All shifts to AUTO 4WD mode are disabled. If the current mode is AUTO 4WD, the system does not allow any further adaptive events, such as correcting the slip.
- The SERVICE 4WD indicator remains 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 100 consecutive ignition cycles without a fault present.
- History DTCs can be cleared using a scan tool.

Test Description

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

2: This step tests to see if the malfunction is intermittent.

3: This step tests the internal resistance of the propshaft speed sensor.

4: This step tests to see if the propshaft speed sensor can generate a sufficient amount of AC voltage.

5: This step tests the front propshaft speed sensor low signal circuit for a short to ground, a high resistance, or an open.

6: This step tests the front propshaft speed sensor high signal circuit for a short to ground, a high resistance or an open.

7: This step tests the front propshaft speed sensor low signal circuit for a short to voltage.

8: This step tests the front propshaft speed sensor high signal circuit for a short to voltage.

9: This step tests the front propshaft speed sensor low signal circuit for a short to the front propshaft speed sensor high circuit.

DTC C0305

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 - Vehicle?	-	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Drive the vehicle for a short test drive. 2. With a scan tool, observe the value of the Front Propshaft Speed Data parameter in the transfer case data list, while driving. Does the RPM value vary or become intermittent while driving at a steady speed?	-	Go to **Testing for Intermittent Conditions and Poor Connections**	Go to **Step 3**
3	1. Turn the ignition OFF. 2. Disconnect the transfer case front propshaft speed sensor. 3. Measure the resistance of the transfer case front propshaft speed sensor. Is the resistance reading within the specified values?	1,300-2,700 ohms	Go to **Step 4**	Go to **Step 10**
	1. Connect a DMM to the transfer case front propshaft speed sensor. 2. Block the front wheels. 3. Place the transmission in NEUTRAL. 4. Raise and support the front axle, so that			

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4	the wheels turn freely. 5. Hold one front wheel while rotating the other front wheel. 6. Observe the AC voltage reading on the DMM. Is the voltage reading greater than the specified value?	0.5 V AC	Go to **Step 5**	Go to **Step 10**
5	1. Disconnect the transfer case shift control module. 2. Test the front propshaft speed sensor low signal circuit for a short to ground, a high resistance, or an open. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 6**
6	Test the front propshaft speed sensor high signal circuit for a short to ground, a high resistance, or an open. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 7**
7	Test the front propshaft speed sensor low signal circuit for a short to voltage. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 8**
8	Test the front propshaft speed sensor high signal circuit for a short to voltage. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 9**
9	Test the front propshaft speed sensor low signal circuit for a short to the front propshaft speed sensor high signal circuit. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 11**
10	Replace the transfer case front propshaft speed sensor. Refer to **Transfer Case Speed Sensor Replacement - Front**. Did you complete the repair?	-	Go to **Step 12**	-
11	**IMPORTANT:** **After transfer case shift control module replacement and reprogramming, ensure all doors are closed and the key is out of the ignition, then open and close the doors again and wait 2 minutes to avoid incomplete programming or false communication DTCs.**	-		-

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	Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**.Did you complete the repair?		Go to **Step 12**	
12	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 2**	System OK

DTC C0306

Circuit Description

The transfer case motor is a bi-directional, permanent magnet, DC 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:

- 2HI
- 4HI
- 4LO
- AUTO 4WD
- Neutral

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.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC C0306 05: Motor A or B Circuit Short to Battery or Open

DTC C0306 02: Motor A or B Circuit Short to Ground

Diagnostic Fault Information

Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

DTC C0306

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Motor A or B Circuit	C0306 02	C0306 05	C0306 05	-

Conditions for Running the DTC

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

Conditions for Setting the DTC

- The system tests the motor circuits by checking 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 condition 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 30 seconds to set the DTC.

Action Taken When the DTC Sets

- All shifting is disabled.
- The SERVICE 4WD indicator remains illuminated for the remainder of the current ignition cycle.
- The transfer case shift control module provides a reference voltage of 4.5 volts on the motor A/B line for diagnostic purposes.

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 100 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 the battery positive and ground circuits for poor connections.

3: This step tests the encoder motor for an internal short to ground.

4: This step helps isolate motor malfunctions from the transfer case shift control module and wiring.

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

DTC C0306

Step	Action	Values	Yes	No

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

1	Did you perform the Diagnostic System Check - Vehicle?	-	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	Check the battery positive and ground circuits at the transfer case shift control module for poor connections. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 8**	Go to **Step 3**
3	**IMPORTANT:** **Use test leads designed for this connector and make firm contact with the leads.** 1. Turn off the ignition. 2. Disconnect the encoder motor. 3. With a DMM at the encoder motor pigtail connector, test motor control A and motor control B for a short to ground within the encoder motor. Is motor control A or motor control B shorted to ground?	-	Go to **Step 6**	Go to **Step 4**
4	**IMPORTANT:** **Use test leads designed for this connector and make firm contact with the leads.** 1. Turn OFF the ignition. 2. Disconnect the encoder motor connector. 3. Zero the DMM with ohms selected by touching the 2 leads. 4. Connect the DMM between motor control A terminal and motor control B terminal and test the resistance in the encoder motor. Is the motor/encoder within the specified values?	0.3-35 ohms	Go to **Step 5**	Go to **Step 6**
5	1. Disconnect the transfer case shift control module connectors C1 and C2. 2. Test the motor A and motor B control circuits for a short to ground, a short to voltage, an open, or a high resistance.	-		

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	Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?		Go to **Step 8**	Go to **Step 7**
6	Replace the encoder motor. Refer to **Transfer Case Encoder Motor Replacement**. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**. Did you complete the repair?	-	Go to **Step 8**	-
7	**IMPORTANT:** **After transfer case shift control module replacement and reprogramming, ensure all doors are closed and the key is out of the ignition, then open and close the doors again and wait 2 minutes to avoid incomplete programming or false communication DTCs.** Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**.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 set?	-	Go to **Step 2**	System OK

DTC C0321

Circuit Description

The transfer case shift control module controls the transfer case lock solenoid.

The transfer case lock solenoid is released by being energized. This is accomplished by grounding the lock solenoid control circuit during gears shifts, and in the AUTO 4WD mode. Locking action is applied when power or ground are taken away from the lock solenoid, the transfer case motor is prevented from moving. The system is capable of providing a 2HI, 4HI and 4LO lock-up without the need of additional vehicle power to hold the transfer case in these positions.

This DTC detects an open lock solenoid coil, open motor lock control circuit, or an open motor lock feed circuit.

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DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC C0321 01: Transfer Case Lock Short to Battery

DTC C0321 06: Transfer Case Lock Short to Ground or Open

Diagnostic Fault Information

Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

DTC C0321

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Transfer Case Lock	C0321 06	C0321 06	C0321 01	-

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 tries to unapply, turn OFF the lock solenoid by grounding the motor control circuit.
- If the module does not sense the battery voltage at the motor lock control circuit prior to applying the motor lock, the DTC sets.
- Transfer Case Lock output reads back as a high voltage when a low voltage is expected.

Action Taken When the DTC Sets

- All shifting is disabled.
- The SERVICE 4WD indicator remains 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 100 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.

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2: Listen for an audible click when the encoder motor brake operates. Command both the ON and OFF states. Repeat the commands as necessary.

3: This step tests for voltage at the lock solenoid feed side of the encoder motor lock solenoid.

4: This step verifies that the lock solenoid battery positive circuit is not shorted to power, shorted to ground, or have high resistance.

5: This step determines if the encoder motor lock solenoid is faulty by checking the internal resistance.

6: This step tests the encoder motor brake solenoid for an internal short to ground.

7: This step tests the control circuit of the encoder motor brake for a short to voltage or an open.

8: This step determines if a corroded or damaged connector in the encoder motor harness is the cause.

DTC C0321

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 - Vehicle?	-	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. Apply the Park brake and put the transmission in Neutral. 4. With the scan tool, command the transfer case lock control ON and OFF. Do you hear the encoder motor lock click when turned ON and OFF with each command?	-	Go to **Testing for Intermittent Conditions and Poor Connections**	Go to **Step 3**
3	1. Turn the ignition ON with the engine OFF. 2. Using a DMM, measure the battery positive voltage circuit of the transfer case lock solenoid. Is the voltage within the specified range?	12.5-14.5 V	Go to **Step 5**	Go to **Step 4**
4	Inspect the lock solenoid battery positive circuit for an open, a short to ground, or a high resistance. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 5**
	1. Disconnect the transfer case encoder motor connector.			

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5	2. Check the internal resistance of the lock solenoid. Is the resistance within the specified values?	15-25 ohms	Go to **Step 6**	Go to **Step 9**
6	At the encoder motor pigtail check the 8 lock solenoid windings for an internal short to ground, by probing the lock solenoid control with a DMM and taking the other lead to ground. Did the DMM indicate a short to ground?	-	Go to **Step 9**	Go to **Step 7**
7	1. Disconnect the transfer case shift control module. 2. With a DMM, test the lock solenoid control circuit for a short to ground, a short to voltage or a high resistance. Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 8**
8	Check all connectors for corrosion or damage. Refer to **Connector Repairs** . Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 10**
9	Replace the encoder motor. Refer to **Transfer Case Encoder Motor Replacement**. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset** Did you complete the repair?	-	Go to **Step 11**	-
10	Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**. 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 2**	System OK

DTC C0326

Circuit Description

The transfer case shift control module controls the transfer case lock solenoid. The transfer case lock solenoid is released by being energized. This is accomplished by grounding the lock solenoid control circuit during gears

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shifts, and in the AUTO 4WD mode. Locking action is applied when power or ground are taken away from the lock solenoid, the transfer case motor is prevented from moving. The system is capable of providing a 2HI, 4HI and 4LO lock-up without the need of additional vehicle power to hold the transfer case in these positions. This DTC detects a lock solenoid that is mechanically unable to hold when in the locked state.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC C0326 08: Transfer Case Lock System Performance Signal Invalid

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 tries to apply the lock by removing the ground to the lock control circuit, if the transfer case shift control module indicates any movement while locked this DTC will set.

Action Taken When the DTC Sets

- All shifting is disabled.
- The SERVICE 4WD indicator remains illuminated for the remainder of the current ignition cycle.
- The transfer case shift control module will command a default shift to 2 high and disable all further shift requests.

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 100 consecutive ignition cycles without a fault present.
- History DTCs can be cleared using a scan tool.

Test Description

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

2: This step advises to replace the encoder motor assembly.

DTC C0326

Step	Action	Yes	No
Schematic Reference: Transfer Case Control Schematics **Connector End View Reference: Transfer Case Control Connector End Views**			
	Did you perform the Diagnostic System Check -		Go to **Diagnostic**

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1	Vehicle?	Go to **Step 2**	**System Check - Vehicle**
2	**IMPORTANT:** **If DTC C0321 is set diagnose this DTC before proceeding with DTC C0326 as DTC C0321 may cause this DTC to set falsely.** Replace the transfer case encoder motor. Refer to **Transfer Case Encoder Motor Replacement**. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**.Did you complete the repair?	Go to **Step 3**	-
3	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 2**	System OK

DTC C0327

Circuit Description

The transfer case encoder is an analog sensor that returns a signal that represents the physical position of the transfer case sector shaft. This signal represents the mode or range position that the transfer case is currently in. This sensor is made up of the following 3 circuits:

- 5-volt reference circuit
- Encoder signal circuit
- Encoder low reference circuit

This DTC detects an out of range reading from the encoder signal, a short to voltage on the 5 volt reference circuit.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC C0327 07: Encoder Circuit Voltage Above Threshold

DTC C0327 06: Encoder Circuit Short to Ground or Open

DTC C0327 08: Encoder Circuit Signal Invalid

Diagnostic Fault Information

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Perform the **Diagnostic System Check - Vehicle**

DTC C0327

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Transfer Case Lock	DTC C0327 06	DTC C0327 06	DTC C0327 07	DTC C0327 08

Conditions for Setting the DTC

The transfer case shift control module has a predefined range, 0.5-4.5 volts, in which the encoder feed back should stay within. The DTC sets if the encoder signal feed back falls out of this range for 100 milliseconds.

Action Taken When the DTC Sets

- All motor activity stops and the transfer case lock engages.
- The SERVICE 4WD indicator remains 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 100 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 checks for a voltage reading on the scan tool.

3: This step tests the encoder circuit for a current malfunction.

4: This step tests for an internal encoder malfunction which is present only in certain areas of the encoder sensor.

5: This step tests for proper reference voltage at the encoder.

6: This step tests the 5-volt regulator encoder circuit for a short to voltage, short to ground, an open or high resistance.

7: After determining if the reference voltage measured in Step 4 is correct, Step 6 reviews the reading originally measured in Step 3 to see if it is higher or lower than what is expected. This step helps determine whether the encoder signal circuit is being pulled high or low.

8: This step tests the encoder signal circuit and the encoder low reference circuit for a short to voltage.

9: This step helps determine a faulty encoder.

10: This step tests the encoder signal circuit and the encoder low reference circuit for an open or a short to ground.

DTC C0327

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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 - Vehicle?	-	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Install a scan tool. 2. Turn the ignition ON with the engine OFF. 3. With a scan tool, observe the Encoder supply and return voltage parameters. Are the voltage parameters displayed?	-	Go to **Step 3**	Go to **Step 5**
3	1. Install a scan tool. 2. Start the engine. 3. Set the park brake. 4. Place the transmission in Neutral. 5. With a scan tool, observe the Encoder Return Voltage parameter. 6. Select each of the mode positions. Does the voltage reading stay within the specified values?	0.5-4.5 V	Go to **Testing for Intermittent Conditions and Poor Connections**	Go to **Step 4**
4	Does the voltage reading stay within the specified values at any position?	0.5-4.5 V	Go to **Step 11**	Go to **Step 5**
5	1. Turn the ignition OFF. 2. Disconnect the encoder motor. 3. Turn the ignition ON with the engine OFF. 4. Measure the voltage from the 5-volt reference encoder circuit to ground at the transfer case shift control module side of the harness. Does the voltage measure within the specified values?	4.8-5.2 V	Go to **Step 7**	Go to **Step 6**
6	Test the 5-volt reference encoder circuit for a short to voltage, a short to ground, an open, or a high resistance. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 13**	Go to **Step 12**

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7	Was the voltage reading measured in Step 4 greater than 5.2 volts?	-	Go to **Step 8**	Go to **Step 9**
8	Test the encoder signal circuit and the encoder low reference circuit for a short to voltage. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 13**	Go to **Step 12**
9	1. Install a scan tool. 2. Turn the ignition ON with the engine OFF. 3. Using a fused jumper, back probe between the 5-volt reference encoder circuit and encoder signal circuit at the transfer case shift control module side of the harness. 4. With a scan tool, observe the Encoder Return Voltage parameter. Is the encoder return voltage display within the specified values?	4.8-5.2 V	Go to **Step 11**	Go to **Step 10**
10	Test the encoder signal circuit and the encoder low reference circuit for an open or a short to ground. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 13**	Go to **Step 12**
11	Replace the encoder sensor. Refer to **Encoder Motor Sensor Replacement**. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**. Did you complete the repair?	-	Go to **Step 13**	-
12	Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**. Did you complete the repair?	-	Go to **Step 13**	-
13	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 2**	System OK

DTC C0359

Circuit Description

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The 4WD low 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 circuit.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC C0359 01: Four Wheel Drive Low Range (4LO) Discrete Output Circuit Short to Battery

DTC C0359 06: Four Wheel Drive Low Range (4LO) Discrete Output Circuit Short to Ground or Open

Diagnostic Fault Information

Perform the **Diagnostic System Check - Vehicle**

DTC C0359

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Transfer Case Lock	C0359 06	C0359 06	C0359 01	-

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 circuit, and reads back a high voltage, the DTC is set. The system will not attempt setting the DTC again for 5 seconds.
- The transfer case shift control module reads back a high voltage when a low voltage is expected on the 4WD low circuit.

Action Taken When the DTC Sets

- Transmission shift points may be affected.
- The SERVICE 4WD indicator remains 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 100 consecutive ignition cycles without a fault present.
- History DTCs can be cleared using a scan tool.

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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 circuit.

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

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

5: This step repairs the 4WD low 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 - Vehicle?	-	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
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 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 PCM. 2. Measure the voltage between the 4WD low circuit harness and ground. Is the voltage reading at the specified value?	0 V	Go to **Step 7**	Go to **Step 5**
4	Test the 4WD low circuit for an open, a high resistance, or a short to ground. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 8**	Go to **Step 6**
5	Repair the 4WD low circuit for short to voltage. Refer to **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 8**	-
6	Replace the PCM. Refer to **Control Module References** for replacement, setup, and programming. Did you complete the repair?	-	Go to **Step 8**	-

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7	Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**. 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 set?	-	Go to **Step 2**	System OK

DTC C0374

Circuit Description

The transfer case shift control module senses rear slip. After several attempts of applying torque to the front wheels, by activating the encoder motor, the transfer case still sees a difference in speed between the front propshaft speed sensor and rear propshaft speed sensor.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC C0374 58: General System Malfunction Incorrect Reaction After Event

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 is unable to correct sensed wheel slip for 10 consecutive seconds.

Action Taken When the DTC Sets

- All shifts to AUTO 4WD Mode are disabled. If the current mode is AUTO 4WD, the system will not allow any further adaptive events, such as correcting slip.
- The SERVICE 4WD indicator remains illuminated for the remainder of the current ignition cycle.

Conditions for Clearing the DTC

- A history DTC will clear after 100 consecutive ignition cycles without a fault present.

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- Use a scan tool in order to clear history and current DTCs.

Diagnostic Aids

If DTCs C0300 or C0305 have set, diagnose these DTCs first as they may cause DTC C0374 to set falsely. Refer to **DTC C0300** or **DTC C0305**.

Test Description

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

2: This step determines if the rear propshaft speed sensor and wiring are operating properly.

3: This step determines if the front propshaft speed sensor and wiring are operating properly.

4: This step determines if the motor control A or motor control B circuits are shorted to ground within the encoder motor.

5: This step tests the integrity of the motor windings.

6: This step tests the motor control A and motor control B circuits for an open, short to ground, or high resistance between the encoder motor and the transfer case shift control module.

7: This step determines whether the transfer case is mechanically functioning properly.

DTC C0374

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 - Vehicle?	-	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Take the vehicle for a short test drive in auto mode. 2. While driving, use a scan tool in order to observe the Rear Propshaft Speed parameter. Does the RPM value vary or become intermittent while driving at a steady speed?	-	Go to **DTC C0300**	Go to **Step 3**
3	1. Take the vehicle for a short test drive in auto mode. 2. While driving, Use a scan tool in order to observe the Front Propshaft Speed parameter. Does the RPM value vary or become intermittent while driving at a steady speed?	-	Go to **DTC C0305**	Go to **Step 4**

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4	1. Turn OFF the ignition. 2. Disconnect the encoder motor connector. 3. With a DMM at the encoder motor pigtail connector, test motor control A and motor control B for a short to ground within the encoder motor. Is motor control A or motor control B shorted to ground?	-	Go to **Step 9**	Go to **Step 5**
5	**IMPORTANT:** **Use test leads designed for this connector and make firm contact with the leads.** 1. Turn OFF the ignition. 2. Zero the DMM, with ohms selected, by touching the two leads. 3. Connect the DMM between motor control A terminal and motor control B terminal and test the resistance of the encoder motor. Is the encoder motor within the specified values?	0.3-35 ohms	Go to **Step 6**	Go to **Step 9**
6	Test the motor A and motor B control circuits for a short to ground, a short to voltage, an open, or a high resistance. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 7**
7	1. Remove the encoder motor assembly. Refer to **Transfer Case Encoder Motor Replacement**. 2. Connect a wrench to the transfer case sector shaft. 3. Turn the shift lever detent shaft to apply the clutch pack. 4. While the clutch pack is applied, attempt to turn the front propshaft by hand. Does the clutch hold the propshaft and prevent it from being turned?	-	Go to **Step 9**	Go to **Step 8**
8	Remove the transfer case and overhaul. Refer to **Transfer Case Disassemble**. Did you complete the repair?	-	Go to **Step 11**	-
	Replace the transfer case encoder motor. Refer to **Transfer Case Encoder Motor Replacement**.			

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9	Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**. Did you complete the repair?	-	Go to **Step 11**	-
10	Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**. Did you complete the repair?	-	Go to **Step 2**	-
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 10**	System OK

DTC C0378

Circuit Description

The front axle control circuit consists of an electric motor actuator which engages and disengages the front axle. The front axle actuator motor consists of a permanent magnetic motor, a worm gear controlled plunger, a front axle switch and an electronic control circuit within the actuator assembly. The axle switch signal circuit will have 12 volts when in any 4WD mode or AWD mode and 0 volts when in 2 high or neutral. The front axle actuator consists of the following circuits:

- The front axle control circuit, which is also connected to the transfer case shift control module
- The front axle switch circuit, which is also connected to the transfer case shift control module
- An ignition 3 voltage circuit
- A ground circuit

When a shift to AUTO 4WD, 4HI, or 4LO is requested, the transfer case shift control module engages the front axle by grounding the front axle control circuit through a current limiting driver. This DTC detects a short to ground, short to voltage or an open circuit on the switch signal circuit.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC C0378 08: Front Axle Switch Circuit Signal Invalid

Diagnostic Fault Information

Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

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DTC C0378

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Front Axle Switch Circuit	C0378 08	C0378 08	C0378 08	C0378 08

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 monitors the state of the front axle switch. The transfer case shift control module reads back the front axle switch circuit for a high and low voltage. The DTC sets if this circuit is high when a low voltage is present or when the circuit is low when a high voltage is present for 10 seconds.
- The DTC sets if this circuit is high when a low voltage is present or when the circuit is low when a high voltage is present for 10 seconds.

Action Taken When the DTC Sets

The SERVICE 4WD indicator remains 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 100 consecutive ignition cycle 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 the front axle circuit for a current malfunction.

3: This step helps determine if the failure is the result of a short to voltage or ground.

4: This step helps determine if the front axle control circuit is shorted to ground.

5: This step tests the integrity of the front axle switch and the ignition 3 voltage circuits.

6: This step tests the front axle control circuit for short to ground.

7: This step tests the front axle control circuit for short to voltage or ground.

8: This step tests the front axle switch signal circuit for a short to voltage.

9: This step tests the front axle ignition 3 voltage circuit and the front axle switch circuit for an open or short to ground.

10: This step tests the front axle control circuit and the front axle ground circuit for an open or high

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resistance.

DTC C0378

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 - Vehicle?	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. Place the transfer case into 2WD mode and change to 4WD. 4. With a scan tool, observe the Front Axle Switch parameter. Does the Front Axle Switch parameter change from Unlocked to Locked?	Go to **Testing for Intermittent Conditions and Poor Connections**	Go to **Step 3**
3	Place the transfer case into 2WD mode. Does the scan tool parameter continue to display Locked?	Go to **Step 4**	Go to **Step 5**
4	Disconnect the front axle switch/actuator. Does the parameter display Unlocked?	Go to **Step 6**	Go to **Step 8**
5	1. Turn the ignition OFF. 2. Disconnect the front axle switch/actuator. 3. Turn the ignition ON, with the engine OFF. 4. Connect a fused jumper across the ignition 3 voltage and the axle switch signal circuits. 5. With a scan tool, observe the Front Axle Switch parameter. Does the Front Axle Switch parameter change from Unlocked to Locked?	Go to **Step 11**	Go to **Step 10**
6	1. Turn the ignition OFF and disconnect the transfer case control module connectors C1 and C2. 2. Test the front axle actuator control circuit for short to ground. Refer to **Testing for Short to Ground** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 13**	Go to **Step 7**
	1. With the transfer case shift control module		

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7	connected, turn the ignition ON, with the engine OFF. 2. Place the transfer case into 2WD. 3. Use a DMM to probe the front axle control circuit and check for a short to ground or voltage. Refer to **Circuit Testing** and **Wiring Repairs** . Did the DMM indicate continuity to ground?	Go to **Step 12**	Go to **Step 9**
8	1. Turn the ignition OFF. 2. Disconnect the transfer case shift control module. 3. Test the front axle switch signal circuit at the front axle actuator connector for a short to voltage. Refer to **Testing for a Short to Voltage** . Did you find and correct the condition?	Go to **Step 13**	Go to **Step 12**
9	1. 1. Connect the transfer case control module connectors C1 and C2. 2. 2. Test the front axle switch signal circuit for short to voltage. Refer to **Testing for a Short to Voltage** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 12**	Go to **Step 10**
10	Test the front axle ignition 3 circuit, front axle switch circuit, and the front axle control actuator ground circuit for an open or high resistance. Refer to **Testing for Continuity** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 13**	Go to **Step 12**
11	Replace the front axle switch/actuator. Did you complete the repair?	Go to **Step 13**	-
12	Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**. Did you complete the repair?	Go to **Step 13**	-
13	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

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DTC C0379

Circuit Description

The front axle control circuit consists of an electric motor actuator which engages and disengages the front axle. The front axle actuator motor consists of a permanent magnetic motor, a worm gear controlled plunger, a front axle switch and an electronic control circuit within the actuator assembly.

The front axle actuator consists of the following circuits:

- The front axle control circuit, which is also connected to the transfer case shift control module
- The front axle switch circuit, which is also connected to the transfer case shift control module
- An ignition 3 voltage circuit
- A ground circuit

When a shift to AUTO 4WD, 4HI, or 4LO is requested, the transfer case shift control module engages the front axle by grounding the front axle control circuit through a current limiting driver.

This DTC detects a short to ground, short to voltage or an open circuit.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC C0379 01: Four Wheel Drive Low Range (4LO) Discrete Output Circuit Short to Battery

DTC C0379 06: Four Wheel Drive Low Range (4LO) Discrete Output Circuit Short to Ground or Open

Diagnostic Fault Information

Perform the **Diagnostic System Check - Vehicle**

DTC C0379

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Transfer Case Lock	DTC C0379 06	DTC C0379 06	DTC C0379 01	-

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 monitors the state of the front axle switch. The transfer case shift control module reads back the front axle switch circuit for a high and low voltage. The DTC sets if this

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circuit is high when a low voltage is present or when the circuit is low when a high voltage is present for 10 seconds.

- The DTC sets if this circuit is high when a low voltage is present or when the circuit is low when a high voltage is present for 10 seconds.

Action Taken When the DTC Sets

The SERVICE 4WD indicator remains 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 100 consecutive ignition cycle 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 the front axle circuit for a current malfunction.

3: This step helps determine if the failure is the result of a short to voltage or ground.

4: This step helps determine if the front axle control circuit is shorted to ground.

5: This step tests the integrity of the front axle switch and the ignition 3 voltage circuits.

6: This step tests the front axle control circuit for short to ground.

7: This step tests the front axle control circuit for short to voltage or ground.

8: This step tests the front axle switch signal circuit for a short to voltage.

9: This step tests the front axle ignition 3 voltage circuit and the front axle switch circuit for an open or short to ground.

10: This step tests the front axle control circuit and the front axle ground circuit for an open or high resistance.

DTC C0379

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 - Vehicle?	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. Place the transfer case into 2WD mode and change to 4WD.		

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2	4. With a scan tool, observe the Front Axle Switch parameter. Does the Front Axle Switch parameter change from Unlocked to Locked?	Go to **Testing for Intermittent Conditions and Poor Connections**	Go to **Step 3**
3	Place the transfer case into 2WD mode. Does the scan tool parameter continue to display Locked?	Go to **Step 4**	Go to **Step 5**
4	Disconnect the front axle switch/actuator. Does the parameter display Unlocked?	Go to **Step 6**	Go to **Step 8**
5	1. Turn the ignition OFF. 2. Disconnect the front axle switch/actuator. 3. Turn the ignition ON, with the engine OFF. 4. Connect a fused jumper across the ignition 3 voltage and the axle switch signal circuits. 5. With a scan tool, observe the Front Axle Switch parameter. Does the Front Axle Switch parameter change from Unlocked to Locked?	Go to **Step 11**	Go to **Step 10**
6	1. Turn the ignition OFF and disconnect the transfer case control module connectors C1 and C2. 2. Test the front axle actuator control circuit for short to ground. Refer to **Testing for Short to Ground** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 13**	Go to **Step 7**
7	1. With the transfer case shift control module connected, turn the ignition ON, with the engine OFF. 2. Place the transfer case into 2WD. 3. Use a DMM to probe the front axle control circuit and check for a short to ground or voltage. Refer to **Circuit Testing** and **Wiring Repairs** . Did the DMM indicate continuity to ground?	Go to **Step 12**	Go to **Step 9**
8	1. Turn the ignition OFF. 2. Disconnect the transfer case shift control module. 3. Test the front axle switch signal circuit at the front axle actuator connector for a short to voltage. Refer to **Testing for a Short to Voltage** .		

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	Did you find and correct the condition?	Go to **Step 13**	Go to **Step 12**
9	1. Connect the transfer case control module connectors C1 and C2. 2. Test the front axle switch signal circuit for short to voltage. Refer to **Testing for a Short to Voltage** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 12**	Go to **Step 10**
10	Test the front axle ignition 3 circuit, front axle switch circuit, and the front axle control actuator ground circuit for an open or high resistance. Refer to **Testing for Continuity** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 13**	Go to **Step 12**
11	Replace the front axle switch/actuator. Refer to **Actuator Replacement - Front Drive Axle** . Did you complete the repair?	Go to **Step 13**	-
12	Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**. Did you complete the repair?	Go to **Step 13**	-
13	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 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:

- Electronically erasable programmable read only memory (EEPROM) Checksum
- Read only memory (ROM) Checksum
- Random access memory (RAM) Checksum
- RAM Malfunction

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC C0550 ECU Malfunction

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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 RAM locations have failed operational test indicating that some portions of RAM are not functional.

Action Taken When the DTC Sets

- The SERVICE 4WD indicator remains illuminated for the remainder of the current ignition cycle.
- The transfer case control switch does not display the current position LED while DTC C0550 is current.

Conditions for Clearing the DTC

- Replace the transfer case shift control module.
- Perform the **Diagnostic System Check - Vehicle** .

Diagnostic Aids

Extremely low system voltage can cause this DTC to set falsely. Refer to **Battery Charging** .

Test Description

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

2: This step has the technician attempt to reprogram the transfer case shift control module.
3: This step has the technician replace and reprogram 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 - Vehicle?	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	Attempt to reprogram the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Does the DTC set after programming?	Go to **Step 3**	System OK

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3	Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**. Did you complete the repair?	System OK	-

DTC C0558

Circuit Description

At each power-up, the transfer case shift control module will check the boot loader for a valid calibration. If no calibration is found the DTC will be set, this DTC will be erased upon programming.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC C0558 Calibration Data Not Performed

Conditions for Running the DTC

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

Conditions for Setting the DTC

Calibration has not been programmed into the transfer case shift control module.

Action Taken When the DTC Sets

- The SERVICE 4WD indicator remains illuminated for the remainder of the current ignition cycle.
- The transfer case control switch does not display the current position LED while DTC C0558 is current.

Conditions for Clearing the DTC

- Program the transfer case shift control module.
- Perform the Diagnostic System Check - Vehicle.

Test Description

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

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

DTC C0558

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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 - Vehicle?	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	Program the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**. Did you complete the repair?	System OK	-

SYMPTOMS - TRANSFER CASE

IMPORTANT:

- **Perform the Diagnostic System Check - Vehicle before using the symptom tables in order to verify that the following statements are true:**
  - **There are no diagnostic trouble codes (DTCs) set.**
  - **The control module or modules can communicate via the serial data link.**
- **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** .
- 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** .

Symptom List

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

- **Front Axle Will Not Engage**
- **Front Axle Will Not Disengage**
- **Transfer Case Shift Control Switch Inoperative**
- **No Correction for Slip in AWD Mode**

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- **Service Indicator Always On**
- **Service Indicator 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 Indicators Flash Continuously 15 Seconds or More**
- **Transfer Case Shift Control Switch Indicator Inoperative - One or More**
- **Transfer Case Popping Noise**
- **Transfer Case Whine or Rumble Noise**
- **Transfer Case Growl or Grinding Noise**
- **Transfer Case Grating Noise**
- **Transfer Case Clunk in 2HI Only**
- **Transfer Case Clunk in 4HI**
- **Transfer Case Clunk in 4LO**
- **Transfer Case Clunk during Acceleration and Deceleration**
- **Transfer Case Shudder or Binding**
- **Transfer Case Will Not Shift**
- **Transfer Case Jumps Out of Gear**

FRONT AXLE WILL NOT ENGAGE

Circuit Description

The front axle control circuit consists of an electric motor actuator which engages and disengages the front axle. The front axle actuator motor consists of a permanent magnetic motor, a worm gear controlled plunger, a front axle switch and an electronic control circuit all within the actuator assembly.

The front axle actuator consists of the following circuits:

- The front axle control circuit, which is also connected to the transfer case shift control module
- The front axle switch circuit, which is also connected to the transfer case shift control module
- A battery feed circuit
- A ground circuit

When a shift to AUTO 4WD, 4HI, or 4LO is requested, the transfer case shift control module engages the front axle by grounding the front axle control circuit through a current limiting driver.

Diagnostic Aids

A mechanical condition inside the front axle could prevent the shift fork from moving causing the motor to be stuck in one position. Refer to **Symptoms - Front Drive Axle** .

Test Description

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

2: This step tests the electrical function of the front axle actuator and helps determine mechanical and electrical malfunctions.

3: This step tests for proper power and ground at the front axle actuator.

4: This step tests the operation of the front axle control circuit.

5: This step helps determine if the transfer case shift control module is able to monitor the front axle switch.

6: This step tests the front axle switch circuit for an open or high resistance.

7: This step measures the voltage between the front axle feed circuit and ground.

8: This step tests the front axle control circuit for an open or high resistance.

9: This step inspects the front axle for a mechanical malfunction.

10: This step tests for open fuse in the front axle feed circuit.

Front Axle Will Not Engage

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 - Vehicle?	-	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With a scan tool, command the Front Axle Switch parameter Unlocked and Locked. Does the scan tool display Unlocked and Locked with each command?	-	Go to **Step 9**	Go to **Step 3**
3	1. Turn the ignition OFF. 2. Disconnect the front axle actuator. 3. Turn the ignition ON, with the engine OFF. 4. Measure the voltage between the ignition 3 voltage circuit and the front axle ground circuit at the front axle actuator. Is the voltage reading within the specified value?	11-13 V	Go to **Step 4**	Go to **Step 7**
	1. Connect a test lamp between the ignition 3 voltage circuit and the front axle actuator control circuit at the front axle actuator.			

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4	2. Observe the test lamp while using the scan tool in order to engage the front axle. Does the test lamp illuminate?	-	Go to **Step 5**	Go to **Step 8**
5	1. Connect a fused jumper wire between the ignition 3 voltage circuit and the front axle actuator signal circuit. 2. Use the scan tool in order to observe the Front Axle Switch parameter. Does the scan tool display the Front Axle Switch status Locked?	-	Go to **Step 13**	Go to **Step 6**
6	Test the front axle actuator signal circuit for an open or high resistance. Refer to **Testing for Continuity** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 15**	Go to **Step 14**
7	Measure the voltage between the ignition 3 voltage circuit and ground. Is the voltage reading within the specified range?	9-14 V	Go to **Step 12**	Go to **Step 10**
8	Test the front axle control circuit for an open or high resistance. Refer to **Testing for Continuity** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 15**	Go to **Step 14**
9	Inspect the front axle for a mechanical malfunction. Did you find and correct the condition?	-	Go to **Step 15**	Go to **Step 13**
10	Test for open fuse in the front axle feed circuit. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 15**	Go to **Step 11**
11	Repair an open in the front axle feed circuit. Refer to **Wiring Repairs** . Did you complete the repair?	-	Go to **Step 15**	-
12	Repair an open in the front axle ground circuit. Refer to **Wiring Repairs** . Did you complete the repair?	-	Go to **Step 15**	-
13	Replace the front axle switch/actuator. Refer to **Actuator Replacement - Front Drive Axle** . Did you complete the repair?	-	Go to **Step 15**	-
14	Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the clutch reset procedure. Refer to **Transfer Case High/Low Clutch Reset**. Did you complete the repair?	-	Go to **Step 15**	-

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15	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

FRONT AXLE WILL NOT DISENGAGE

Circuit Description

The front axle control circuit consists of an electric motor actuator which engages and disengages the front axle. The front axle actuator motor consists of a permanent magnetic motor, a worm gear controlled plunger, a front axle switch and an electronic control circuit all within the actuator assembly.

The front axle actuator consists of the following circuits:

- The front axle control circuit, which is also connected to the transfer case shift control module
- The front axle switch circuit, which is also connected to the transfer case shift control module
- A battery feed circuit
- A ground circuit

When a shift to AUTO 4WD, 4HI or 4LO is requested, the transfer case shift control module engages the front axle by grounding the front axle control circuit through a current limiting driver.

Diagnostic Aids

A mechanical condition inside the front axle could prevent the shift fork from moving causing the motor to be stuck in one position. Refer to **Symptoms - Front Drive Axle** .

Test Description

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

2: This step tests the electrical function of the front axle actuator and helps determine mechanical and electrical malfunctions.
3: This step tests for proper voltage and ground at the front axle actuator.
4: This step tests the operation of the front axle actuator control circuit.
5: This step tests the electrical function of the front axle actuator control circuit.
6: This step tests for proper supply voltage to the front axle actuator.
7: This step tests for open fuse in the ignition 3 voltage circuit.
8: This step tests the front axle actuator control circuit for an open or high resistance.
9: This step tests the front axle actuator signal circuit for an open or high resistance.

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10: This step helps determine if the front axle actuator has a mechanical malfunction.

11: This step tests the front axle switch circuit for a short to voltage.

12: This step inspects the front axle for a mechanical malfunction.

Front Axle Will Not Disengage

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 - Vehicle?	-	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Turn the ignition ON, with the engine OFF. 2. Ensure that the vehicle is in 2WD mode 3. Install a scan tool. 4. Using the scan tool, observe the Front Axle Switch parameter. Does the scan tool display the Front Axle Switch status as Locked?	-	Go to **Step 10**	Go to **Step 3**
3	1. Turn the ignition OFF. 2. Disconnect the front axle actuator. 3. Turn the ignition ON, with the engine OFF. 4. Measure the voltage between the ignition 3 voltage circuit and the front axle ground circuit at the front axle actuator. Is the voltage reading within the specified values?	11-13 V	Go to **Step 4**	Go to **Step 6**
4	1. Connect a DMM between the ignition 3 voltage circuit and the front axle control circuit at the front axle actuator. 2. Observe the DMM, while using the scan tool in order to engage the front axle. Does the test lamp illuminate?	-	Go to **Step 5**	Go to **Step 8**
5	1. Connect a fused jumper wire between the ignition 3 circuit and the front axle switch circuit. 2. Using the scan tool, observe the Front	-		

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	Axle Switch parameter. Does the scan tool display the Front Axle Switch status Locked?		Go to **Step 15**	Go to **Step 9**
6	Measure the voltage between the ignition 3 voltage circuit and ground. Is the voltage reading within the specified values?	11-13 V	Go to **Step 13**	Go to **Step 7**
7	Test for an open fuse in the front axle feed circuit. Refer to **Testing for Continuity** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 17**	Go to **Step 14**
8	Test the front axle control circuit for an open or high resistance. Refer to **Testing for Continuity** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 17**	Go to **Step 16**
9	Test the front axle actuator signal circuit for an open or high resistance. Refer to **Testing for Continuity** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 17**	Go to **Step 16**
10	1. Disconnect the front axle actuator. 2. Use the scan tool in order to observe the Front Axle Switch parameter. Does the scan tool display the Front Axle Switch status Locked?	-	Go to **Step 11**	Go to **Step 12**
11	Test the front axle actuator signal circuit for a short to voltage. Refer to **Testing for a Short to Voltage** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 17**	Go to **Step 16**
12	Inspect the front axle for a mechanical malfunction. Did you find and correct the condition?	-	Go to **Step 17**	Go to **Step 16**
13	Repair an open in the front axle actuator ground circuit. Refer to **Wiring Repairs** . Did you complete the repair?	-	Go to **Step 17**	-
14	Repair an open in the ignition 3 voltage circuit. Refer to **Wiring Repairs** . Did you complete the repair?	-	Go to **Step 17**	-
15	Replace the front axle switch/actuator. Refer to **Actuator Replacement - Front Drive Axle** . Did you complete the repair?	-	Go to **Step 17**	-
	Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform			

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16	the clutch reset procedure. Refer to **Transfer Case High/Low Clutch Reset**. Did you complete the repair?	-	Go to **Step 17**	-
17	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 INOPERATIVE

Circuit Description

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

- 2HI
- 4HI
- 4LO
- AUTO 4WD
- Neutral

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 completes 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:

- 2HI
- 4HI
- 4LO
- AUTO 4WD

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.

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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	**IMPORTANT:** **If the transfer case shift control switch is left between the 4HI and 4LO mode detents, the transfer case defaults to AWD mode. This is considered a characteristic of the system. Ensure the switch is within the proper detents.** Did you perform the Diagnostic System Check - Vehicle?	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Install a scan tool. 2. Start the engine. 3. Place the transmission into Neutral. 4. Set the park brake. 5. Use a scan tool in order to observe the Commanded Mode Indicator parameter while selecting each of the Mode positions. Does the state change with the selection of any of the mode positions?	Go to **Step 5**	Go to **Step 3**
3	Replace the transfer case shift control switch. Refer to **Transfer Case Shift Control Switch Replacement**. Did you complete the repair?	Go to **Step 5**	-
4	**IMPORTANT:** **After transfer case shift control module replacement and reprogramming, ensure all doors are closed and the key is out of the ignition, then open and close the doors again and wait 2 minutes to avoid incomplete programming or false communication DTCs.** Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**.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 2**	System OK

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NO CORRECTION FOR SLIP IN AWD MODE

Test Description

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

2: This step helps determine whether the front axle switch is functioning properly.
3: This step helps determine whether the front axle switch is locking and unlocking.
4: This step tests transfer case clutch performance.

No Correction for Slip in AWD 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 - Vehicle?	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Turn the ignition ON, with the engine OFF. 2. Ensure that the vehicle is in 4WD mode. 3. Install a scan tool. 4. Using the scan tool, observe the Front Axle Switch parameter. Does the scan tool display the Front Axle Switch status as Locked?	Go to **Step 3**	Go to **Front Axle Will Not Engage**
3	1. Change the transfer case mode from 4WD to AWD mode. 2. Use the scan tool in order to observe the Front Axle Switch parameter. Does the scan tool display the Front Axle Switch status as Locked?	Go to **Step 4**	Go to **Step 6**
4	1. Change the transfer case mode back to 4WD mode. 2. Drive the vehicle for a short test drive while observing the Front and Rear Propshaft Speed parameters. 3. Note the values of the Front and Rear Propshaft Speed parameters at a set speed. 4. Compare the Front and Rear Propshaft Speed parameter values previously noted at the same speeds.		

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	Are the RPM values approximately equal at the same speeds?	Go to **Step 6**	Go to **Step 5**
5	Inspect the front axle and transfer case for a mechanical malfunction. Repair or replace components as needed. Did you complete the repair?	Go to **Step 7**	-
6	Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**. Did you complete the repair?	Go to **Step 7**	-
7	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 - Vehicle?	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Turn the ignition ON, with the engine OFF. 2. Install a scan tool. 3. Using the scan tool, command the SERVICE 4WD lamp OFF. Does the SERVICE 4WD Lamp turn OFF?	Go to **Step 3**	Go to **Diagnostic System Check - Vehicle**

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3	Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**. Did you complete the repair?	Go to **Step 4**	-
4	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 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 - Vehicle?	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Turn the ignition ON, with the engine OFF. 2. Install a scan tool. 3. Using the scan tool, command the SERVICE 4WD Lamp ON. Does the SERVICE 4WD Lamp turn ON?	Go to **Step 3**	Go to **Diagnostic System Check - Vehicle**
3	Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**. Did you complete the repair?	Go to **Step 4**	-

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4	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:

- 2HI
- 4HI
- 4LO
- AUTO 4WD
- Neutral

The following lamps are contained inside their respective range button:

- 2HI
- 4HI
- 4LO
- AUTO 4WD

When the ignition in ON, the transfer case shift control module illuminates the indicator that corresponds to the current automatic transfer case (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 continues 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 when 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 helps determine if there is a short to ground in the suspect lamp circuits.

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

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5: This step repairs a short to ground in the suspect lamp circuit.

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 - Vehicle?	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Turn the ignition ON, with the engine OFF. 2. Install a scan tool. 3. Using the scan tool, command all the indicator lamps OFF. Do all the lamps go OFF?	Go to **Testing for Intermittent Conditions and Poor Connections**	Go to **Step 3**
3	1. With a scan tool, determine the transfer case mode. 2. Use this information to determine which lamp circuits are at fault. 3. Disconnect the transfer case shift control switch. 4. Test the suspect lamp circuits for a short to ground. Refer to **Circuit Testing** and **Wiring Repairs** . Are the suspect circuits 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 **Testing for Short to Ground** and **Wiring Repairs** . Is the suspect circuits shorted to ground?	Go to **Step 5**	Go to **Step 7**
5	Repair the short to ground in the suspect lamp circuit. Refer to **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 8**	-
6	Replace the mode switch. Refer to **Transfer Case Shift Control Switch Replacement**. Did you complete the repair?	Go to **Step 8**	-
7	Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**.		-

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	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 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 controls the transfer case lock solenoid. The transfer case lock solenoid is released by being energized. This is accomplished by grounding the lock solenoid control circuit during gear shifts, and in the AUTO 4WD mode. Locking action is applied when power or ground are taken away from the lock solenoid, the transfer case motor is prevented from moving. The system is capable of providing a 2HI, 4HI and 4LO lock-up without the need of additional vehicle power to hold the transfer case in these positions.

The transfer case motor is a bi-directional, permanent magnet, DC 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, AUTO 4WD, 2HI, Neutral, and 4LO.

If there is a fault in the brake control circuit, motor control A and B circuits are shorted together, or a motor control driver is damaged in the transfer case shift control module, the transfer case shift control module goes into a shift block mode. The transfer case module will also go into shift block mode if there is a mechanical concern causing the shift lever detent shaft to bind, or the transfer case shift control module is not seeing a signal from the Park/Neutral position (PNP) switch. The shift block mode causes the mode indicator to flash for a period of time when another mode is selected. After that period of time has ended, the indicator reverts back to the previous mode selection.

Test Description

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

2: This step determines if the battery positive or ground circuits have an open or high resistance.

3: This step helps to determine if the transfer case shift control module has the ability to command the encoder motor.

4: This step determines if motor control A and motor control B circuits being shorted together is causing a shift block.

5: This step determines if the motor control A and motor control B circuits are shorted together within the module.

6: This step determines if a binding shift lever detent shaft is causing a shift block.

7: This step has the transfer case removed and repaired.

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8: This step determines if the PNP switch is sending the correct range signal.

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

10: This step determines if a short to ground, short to voltage, open, or high resistance on the transfer case lock circuit is causing a shift block.

11: This step replaced the encoder motor assembly.

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

Step	Action	Value	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 - Vehicle?	-	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	Test the battery positive voltage circuit and the ground circuit at the transfer case shift control module for an open or high resistance. Refer to **Testing for Continuity** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 3**
3	1. Turn the ignition ON, with the engine OFF. 2. Install a scan tool. 3. Use the scan tool in order to observe the Slip Adapt PWM parameter. 4. Using the mode switch in the instrument panel, select the different modes. Does the scan tool indicate a duty cycle from the motor?	-	Go to **Step 4**	Go to **Step 8**
4	1. Turn the ignition OFF and disconnect the transfer case shift control module and the encoder motor. 2. With a DMM, check to see if motor control A and motor control B are shorted together. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 5**
5	1. Connect the transfer case shift control module. 2. With a DMM, check motor control A and motor control B circuits for being shorted together on the module side of the harness.	100 ohms		

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	Refer to **Circuit Testing** . Does the DMM indicate a resistance less than the specified value?		Go to **Step 9**	Go to **Step 6**
6	Remove the encoder motor and check to see if the shift lever detent shaft is binding. Refer to **Transfer Case Encoder Motor Replacement**. Is the shift lever detent shaft binding?	-	Go to **Step 7**	Go to **Step 10**
7	Remove the transfer case and repair. Refer to **Transfer Case Assembly Replacement**. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**. Did you complete the repair?	-	Go to **Step 12**	-
8	Check the instrument panel to see if the correct transmission range is being displayed. Is the correct range being displayed?	-	Go to **Step 9**	Go to **Diagnostic System Check - Vehicle**
9	Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**. Did you complete the repair?	-	Go to **Step 12**	-
10	1. Disconnect the transfer case shift control module and the encoder motor. 2. Test the transfer case lock circuit for a short to ground, a short to voltage, an open, or a high resistance. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 11**
11	Replace the encoder motor. Refer to **Transfer Case Encoder Motor Replacement**. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**. Did you complete the repair?	-	Go to **Step 12**	-
12	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 INDICATORS FLASH CONTINUOUSLY 15 SECONDS OR MORE

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Circuit Description

This symptom is usually the result of actions expected to take place during the transition of a transfer case mode change, which has not happened. When the transfer case changes from 2WD to 4WD, for example, the front axle is Locked by the transfer case shift control module. If the transfer case shift control module does not sense that the front axle is applied, the module waits for the action to take place before the gear change is made. While waiting, the mode switch lamp continues to flash for a period of time, at which time all other mode requests are ignored for the duration of the ignition cycle.

The front axle control circuit consists of an electric motor actuator which engages and disengages the front axle. The front axle actuator motor consists of a permanent magnetic motor, a worm gear controlled plunger, a front axle switch and an electronic control circuit all within the actuator assembly.

The front axle actuator consists of the following circuits:

- The front axle control circuit, which is also connected to the transfer case shift control module
- The front axle switch circuit, which is also connected to the transfer case shift control module
- A battery feed circuit
- A ground circuit

When a shift to AUTO 4WD, 4HI, or 4LO is requested, the transfer case shift control module engages the front axle by grounding the front axle control circuit through a current limiting driver.

Test Description

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

2: This step determines the position of the front axle switch.
3: This step helps determine if the front axle will not engage.
4: This step helps determine if the front axle will not disengage.

Transfer Case Shift Control Switch Indicators Flash Continuously 15 Seconds 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 - Vehicle?	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Turn the ignition ON, with the engine OFF. 2. Install a scan tool. 3. Using a scan tool, observe the Front Axle Switch parameter. Does the scan tool display the Front Axle Switch status		

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	as Locked?	Go to **Step 4**	Go to **Step 3**
3	Using a scan tool, observe the Encoder Gear Position parameter. Is the transfer case in AUTO 4WD, 4WD HI or 4WD Low mode?	Go to **Front Axle Will Not Engage**	Go to **Step 5**
4	Using a scan tool, observe the Encoder Gear Position parameter. Is the transfer case in 2WD mode?	Go to **Front Axle Will Not Disengage**	Go to **Step 5**
5	Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**. 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 INOPERATIVE - ONE OR MORE

Circuit Description

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

- 2HI
- 4HI
- 4LO
- AUTO 4WD
- Neutral

The following lamps are contained inside the respective range button:

- 2HI
- 4HI
- 4LO
- AUTO 4WD

Each time the ignition is cycled, all 5 mode indicators light simultaneously as an indicator check, to ensure proper operation of the indicators. When the ignition is ON, the transfer case shift control module illuminates the indicator lamp that corresponds to the current automatic transfer case (ATC) gear position by providing a ground through a current limiting driver.

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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 completes the shift.

A solid state circuit located inside the switch supplies ignition voltage to the lamps. The solid state circuit also receives voltage when the headlamp switch is in the parklamp or headlamp position. When the solid state circuit receives voltage from the headlamp switch, the circuit reduces the voltage that is 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 helps determine module failures.
- **4:** This step tests the affected lamp circuit for an open or high resistance.
- **5:** This step tests the lamp feed 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 - Vehicle?	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Turn the ignition ON, with the engine OFF. 2. Install a scan tool. 3. Using the scan tool, command all the indicators ON. Do all the indicators illuminate?	Go to **Testing for Intermittent Conditions and Poor Connections**	Go to **Step 3**
3	1. Access the back of the mode switch. 2. Backprobe the indicator control circuit of the affected indicator to ground. Does the affected indicator go ON?	Go to **Step 7**	Go to **Step 4**
4	Test the affected indicator control circuit for an open or high resistance. Refer to **Testing for Continuity** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 8**	Go to **Step 5**
5	Test the LED dimming supply circuit for an open or short to ground. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 8**	Go to **Step 6**
	Replace the transfer case shift control switch. Refer to		

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6	**Transfer Case Shift Control Switch Replacement**. Did you complete the repair?	Go to **Step 8**	-
7	Replace the transfer case shift control module. Refer to **Control Module References** for replacement, setup, and programming. Perform the Clutch Reset Procedure. Refer to **Transfer Case High/Low Clutch Reset**. 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 in order to determine if the symptom has been corrected. Is the symptom still present?	Go to **Step 2**	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 **Cleaning and Inspection**.

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 or rumble 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

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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 or in a four wheel drive mode. 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 bearings worn • Pinion gear thrust washers missing • Seized or binding pinion gears Refer to **Cleaning and Inspection** . 2. 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 front case half if the annulus gear is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.
Input gear	1. Inspect the input gear in the planetary carrier assembly for excessive thrust end play. Refer to **Cleaning and Inspection**. 2. Inspect the input gear teeth for the following conditions: • Gear tooth failure • Worn or galled thrust surfaces Refer to **Cleaning and Inspection** . 3. Replace the input gear if faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.
Thrust washers	1. Inspect the thrust washers for being broken or missing. 2. Inspect the thrust washers for galling. 3. Replace the thrust washers if faulty and the mating component if damaged. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.

TRANSFER CASE GRATING NOISE

Transfer Case Grating Noise

Cause	Correction
DEFINITION: A faulty internal transfer case component that causes a grating noise in the transfer case while in the AWD, 4HI, or 4LO mode.	

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Review the **Symptoms - Transfer Case** and perform the necessary inspections.	
Broken clutch apply plate	1. Inspect for a broken clutch apply plate. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**. 2. Replace the apply plate and the transfer case components that are damaged from debris. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.
Faulty clutch pressure plate bearing	1. Inspect for a faulty clutch pressure plate bearing. Refer to **Cleaning and Inspection**. 2. Recondition the transfer case components that are damaged from debris. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.

TRANSFER CASE CLUNK IN 2HI ONLY

Transfer Case Clunk in 2HI Only

Cause	Correction
DEFINITION: During acceleration or deceleration, a clunk is heard or felt in the transfer case while in the 2HI 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 **Transfer Case Fluid Replacement**.
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 **Rear Propeller Shaft Replacement** . • 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 **Rear Propeller Shaft Replacement** . • Replace the rear bushing if it is worn. Refer to **Transfer Case Output Shaft Seal Replacement - Rear** .

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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 collar 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** .
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 damage to the 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 CLUNK IN 4HI

Transfer Case Clunk in 4HI

Cause	Action
DEFINITION: During acceleration or deceleration, a clunk is heard or felt in the transfer case while in the 4HI range only. Review the **Symptoms - Transfer Case** and perform the necessary inspections.	
Incorrect fluid level or incorrect fluid	• Inspect the transfer case for the correct fluid level. Refer to **Transfer Case Fluid Replacement**. • Inspect the transfer case for the correct type of fluid. • Flush the transfer case and fill with the correct fluid, if required. Refer to **Transfer Case Fluid Replacement**.
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 collar if faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.

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Worn or missing input gear thrust washers	Inspect for worn or missing input gear thrust washers. Refer to **Cleaning and Inspection**.
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** .

TRANSFER CASE CLUNK IN 4LO

Transfer Case Clunk in 4LO

Cause	Correction
DEFINITION: During acceleration or deceleration, a clunk is heard or felt in the transfer case while in the 4LO 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 pinion gears loose in the planetary carrier • The input gear for missing thrust washers or excessive thrust end play in the carrier • Excessively worn range collar 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 any looseness. Refer to **Cleaning and Inspection**. 2. Replace the front case half if the annulus gear is loose. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.
Range sleeve	1. Inspect the range sleeve engagement teeth for excessive wear.

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	2. Inspect the range sleeve to mainshaft splines for excessive wear. 3. Replace the range sleeve if 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 when it is in AWD 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 **Transfer Case Fluid Replacement**.
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 **Rear Propeller Shaft Replacement** . • 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 **Rear Propeller Shaft Replacement** . • Replace the rear bushing if it is worn. Refer to **Transfer Case Output Shaft Seal Replacement - Rear** .

TRANSFER CASE HIGH/LOW CLUTCH RESET

Using a Scan Tool

1. Go to the special functions heading in the scan tool.
2. Select Clutch Reset Procedure.
3. When the Clutch Reset Procedure is initiated you should hear the motor engage, at the same time view the Clutch Motor Learned Position Voltage on the scan tool it should go to 0.6 volts and back to 0 volts

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indicating a successful learn procedure.

Using the transfer case shift control switch

1. Place the switch into the AWD mode.
2. Turn the switch clockwise past 4 low into the neutral request mode and hold for 30 seconds.
3. After 30 seconds immediately turn the switch back into the AWD mode, an audible noise from the motor should occur indicating a successful learn procedure.

TRANSFER CASE SHUDDER OR BINDING

Transfer Case Shudder or Binding

Cause	Correction
DEFINITION: When in the AWD mode, a shudder is felt during acceleration or a crow-hop or binding while turning, which may cause tire scuffing. Review the **Symptoms - Transfer Case** and perform the necessary inspections.	
Oil breakdown or contamination	Flush the transfer case and fill with the correct fluid. Refer to **Transfer Case Fluid Replacement**.
Incorrect transfer case fluid	Flush the transfer case and fill with the correct fluid. The active transfer case uses a blue fluid. Refer to **Transfer Case Fluid Replacement**.
Burrs on the clutch hub slots	1. Inspect the clutch disc tab slots in the clutch hub for burrs or notches. Refer to **Cleaning and Inspection**. 2. De-burr the hub slots. If the hub slots are excessively notched, replace the clutch hub. Refer to **Transfer Case Disassemble** and **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 or the gear range cannot be selected. Review the **Symptoms - Transfer Case** and perform the necessary inspections.	
Actuator lever	1. Inspect the actuator lever at the shift fork cam for being worn. Refer to **Cleaning and Inspection**. 2. Replace the actuator lever if found faulty. 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 • Shift fork springs and brackets for damage

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	Refer to **Cleaning and Inspection** . 2. Replace the following components if found faulty: • Shift fork pads • 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 rear output shaft • The range sleeve shift fork collar for excessive wear Refer to **Cleaning and Inspection** . 2. Replace the range sleeve if faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.
High/low planetary carrier	1. Inspect the engagement teeth for burrs or damage. Refer to **Cleaning and Inspection**. 2. Replace the high/low planetary if faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.
Front input shaft pilot bearing	1. Inspect for the following conditions: • Failed front input shaft pilot bearing • Journal on the rear output shaft for excessive wear or damage Refer to **Cleaning and Inspection** . 2. Replace the bearing if faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**. 3. Replace the rear output shaft if 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.	
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

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	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 faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.
Actuator lever worn	1. Inspect for excessive wear on the actuator lever - for not allowing full shift fork travel. Refer to **Cleaning and Inspection**. 2. Replace the faulty actuator lever. 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 input gear if the engagement teeth are faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.
High/low planetary carrier	1. Inspect for the following conditions of the high/low planetary carrier: • 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**.
Input shaft pilot bearing	1. Inspect the bearing in the input gear and the rear output shaft journal for excessive wear. Refer to **Cleaning and Inspection**. 2. Replace the bearing and the rear output shaft if faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.
Input gear	1. Inspect the input gear for broken or damaged teeth. Refer to **Cleaning and Inspection**. 2. Replace the input gear if faulty. Refer to **Transfer Case**

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	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 amount of sealer on the plugs. 2. Correctly install the plugs. Refer to **Transfer Case Fluid Replacement**.
Vehicle speed sensor (VSS) leaking	1. Remove the 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 - Front** or **Transfer Case Speed Sensor Replacement - Left Rear** or **Transfer Case Speed Sensor Replacement - Right Rear** . 2. Replace the VSS O-ring seal if it is faulty. Refer to **Transfer Case Speed Sensor Replacement - Front** or **Transfer Case Speed Sensor Replacement - Left Rear** or **Transfer Case Speed Sensor Replacement - Right Rear**. 3. Replace the VSS if it is faulty. Refer to **Transfer Case Speed Sensor Replacement - Front** or **Transfer Case Speed Sensor Replacement - Left Rear** or **Transfer Case Speed Sensor Replacement - Right Rear**.
Encoder motor area leak	1. Remove the encoder motor and inspect for the following conditions: • Inspect the encoder motor insulator for cracks. • Inspect for a faulty control actuator lever shaft bearing. • Inspect the actuator lever shaft for wear or damage. Refer to **Transfer Case Encoder Motor Replacement** . 2. Repair or replace the following components if found faulty: • Replace the encoder motor insulator if it is cracked. Refer to **Transfer Case Encoder Motor Replacement** . • Replace the control actuator lever shaft bearing if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer**

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	Case Assemble . • Replace the control actuator lever shaft if the bearing or seal surface is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble** .
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 **Rear Propeller Shaft Replacement** . • Replace the rear bushing if it is worn. Refer to **Transfer Case Output Shaft Seal Replacement - Rear** . • 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** .
Leaking at the vent	• Transfer case overfilled

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	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** in Automatic Transmission - 4L60-E or **Transmission Fluid Checking** in Automatic Transmission - 6L80-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 • Replace the vent with the correct sealer, if it is leaking at the case. Refer to **Transfer Case Disassemble** and **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: o Seal improperly installed, worn or damaged o Seal bore damaged or cracked o 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. Refer to **Transfer Case Adapter Replacement** .
Front case half to rear case half seam leak	Disassemble and seal the case halves. 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

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TRANSFER CASE SHIELD REPLACEMENT

Removal Procedure

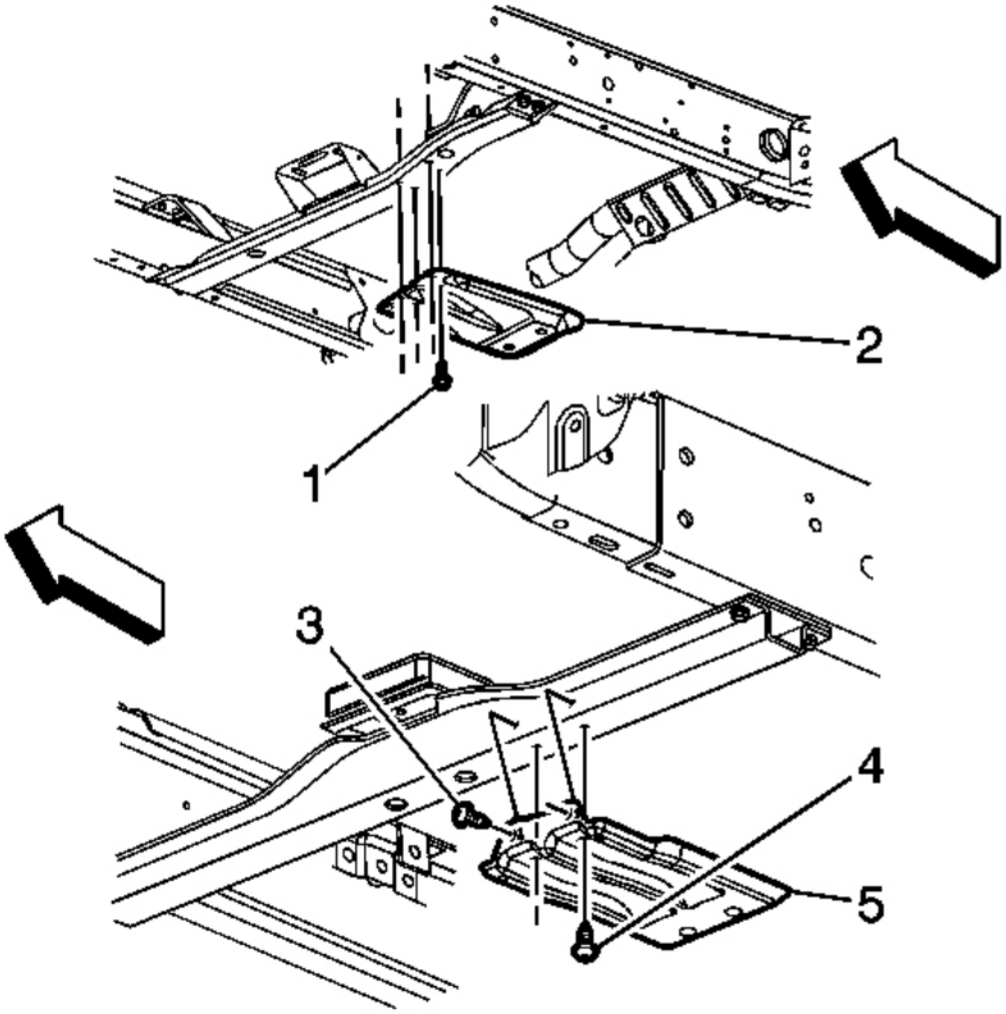


Fig. 19: View Of Transfer Case Shield & Bolts
Courtesy of GENERAL MOTORS CORP.

1. Raise and suitably support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the transfer case shield bolts (1, 3, and 4).
3. Remove the transfer case shield (2 or 5).

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Installation Procedure

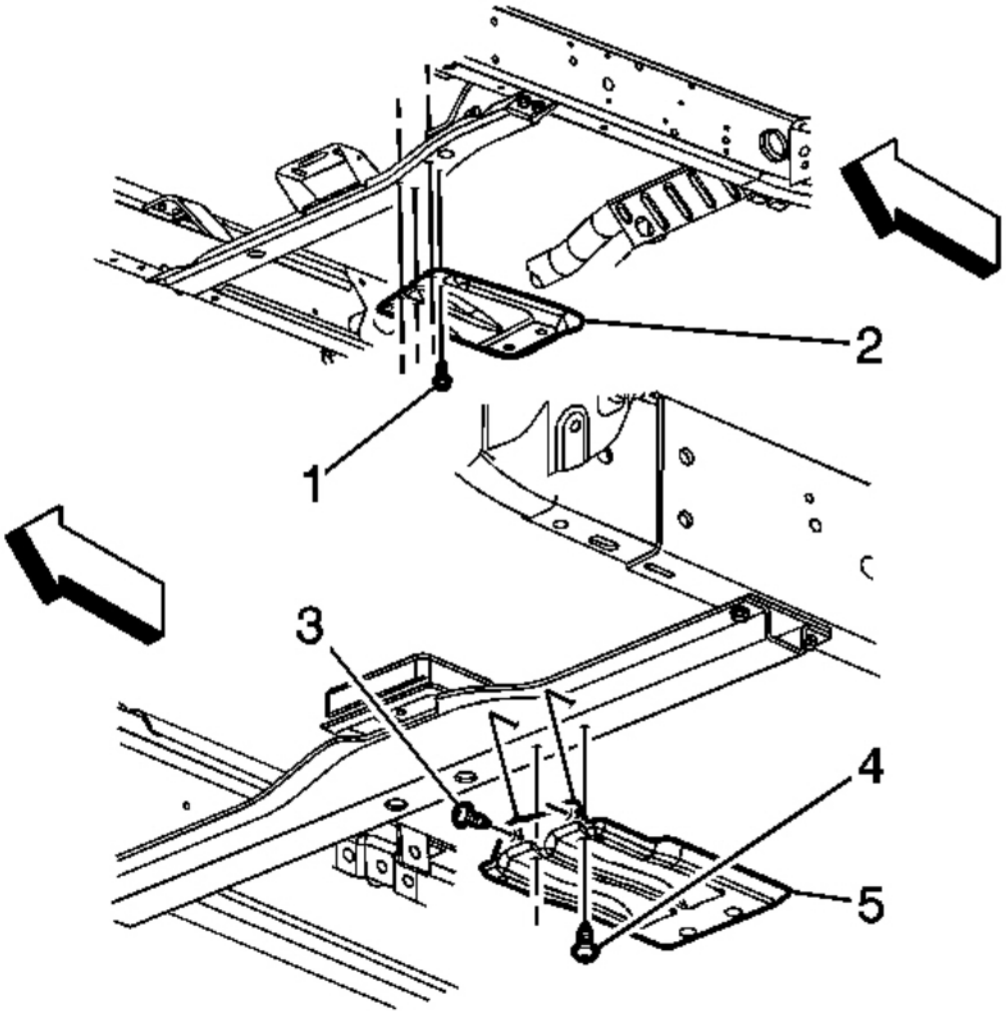


Fig. 20: View Of Transfer Case Shield & Bolts
Courtesy of GENERAL MOTORS CORP.

1. Position the transfer case shield (1, 3, and 4).

NOTE: **Refer to Fastener Notice .**

2. Install the transfer case shield bolts (2 or 5).

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Tighten: Tighten the bolts to 20 N.m (15 lb ft).

3. Lower the vehicle.

TRANSFER CASE FLUID REPLACEMENT

Removal Procedure

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

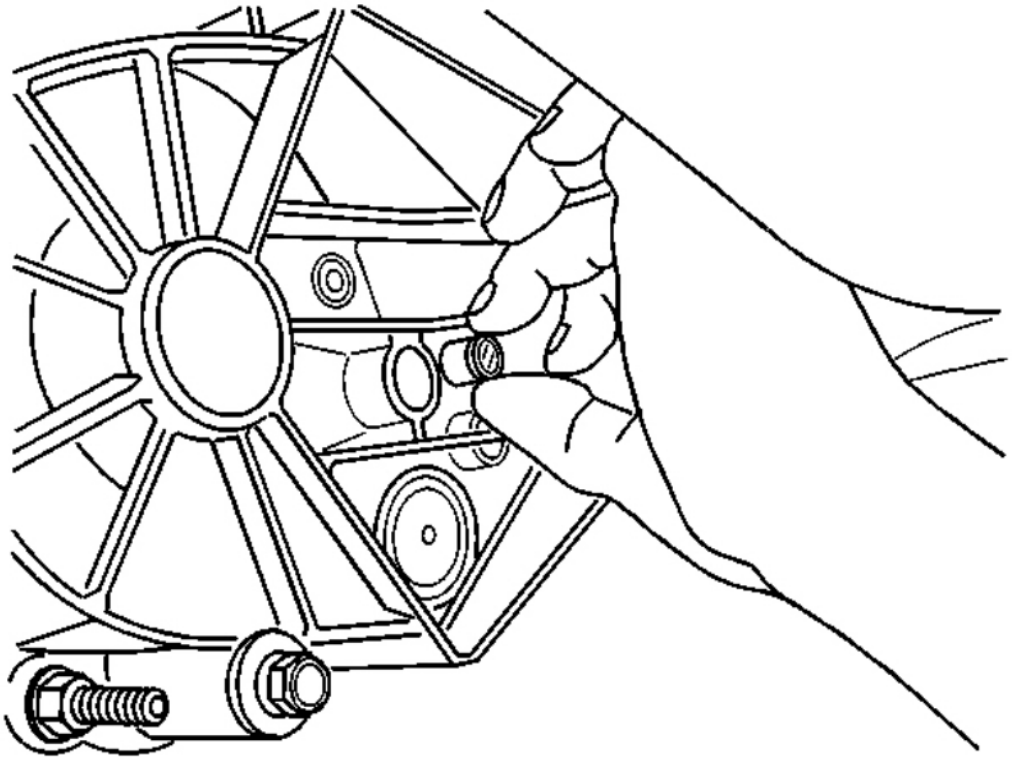


Fig. 21: View Of Transfer Case Fill Plug
Courtesy of GENERAL MOTORS CORP.

1. Raise and suitably support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the transfer case shield, if equipped. Refer to **Transfer Case Shield Replacement** .
3. Remove the fill plug.

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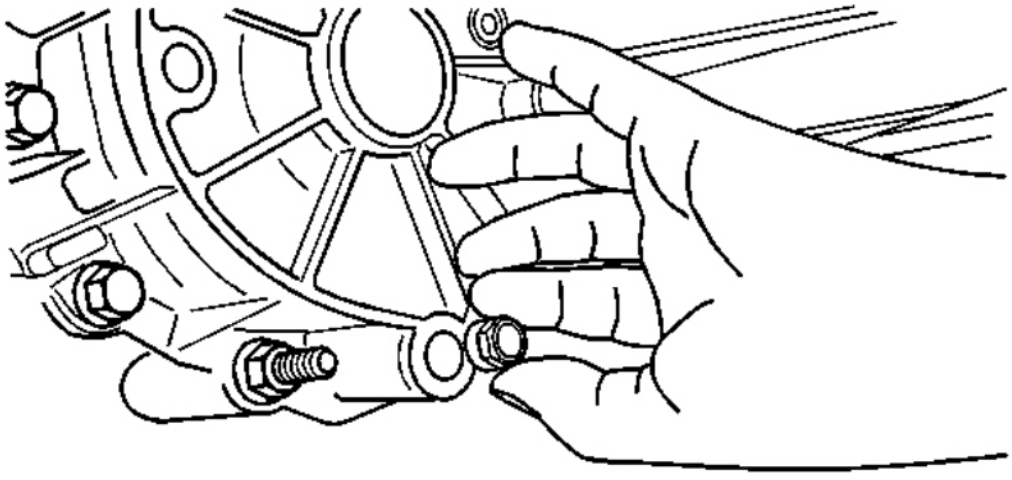
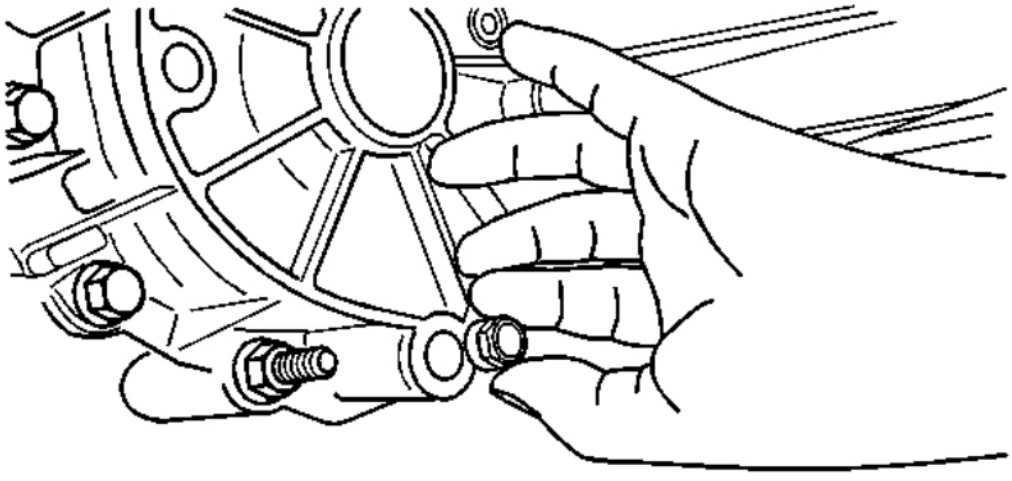


Fig. 22: View Of Transfer Case Drain Plug
Courtesy of GENERAL MOTORS CORP.

4. Remove the drain plug.

Installation Procedure



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Fig. 23: View Of Transfer Case Drain Plug
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

IMPORTANT: Use only drain and fill plugs that are made from aluminum. Steel or brass plugs are not compatible with the magnesium case.

1. Install the drain plug.

   Tighten: Tighten the plug to 20 N.m (15 lb ft).

2. Fill the transfer case to the bottom of the fill plug hole with Auto-Trak II, transfer case fluid, GM P/N 12378508 (Canadian P/N 10953626).

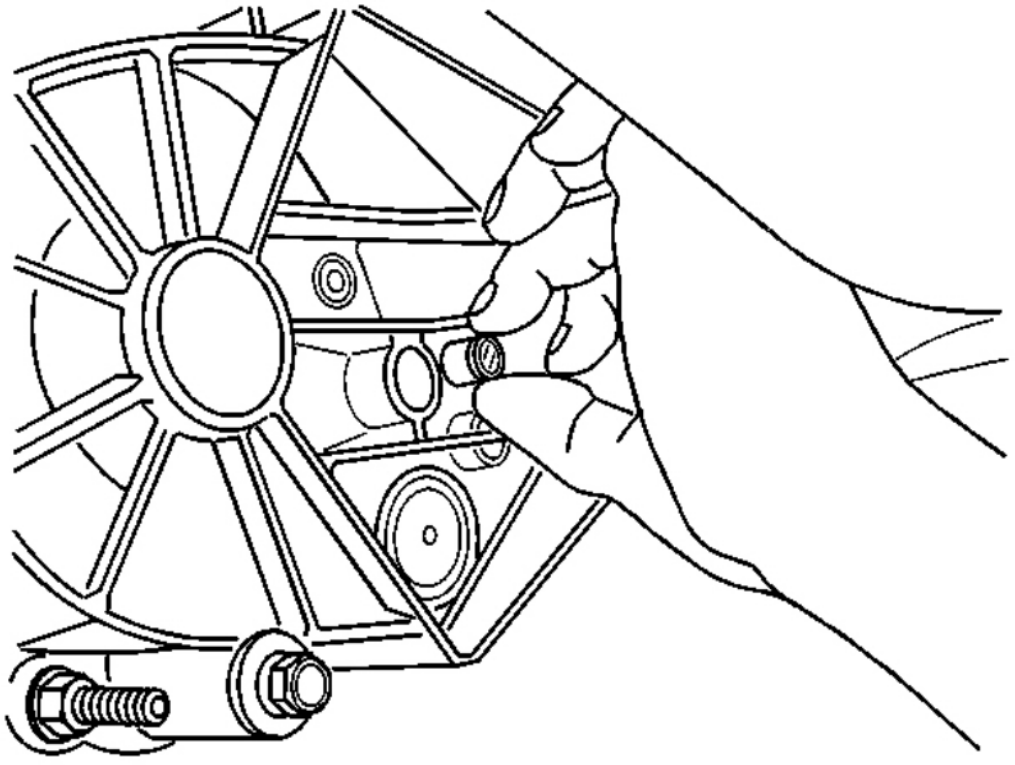


Fig. 24: View Of Transfer Case Fill Plug
Courtesy of GENERAL MOTORS CORP.

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3. Install the fill plug.

   Tighten: Tighten the plug to 20 N.m (15 lb ft).

4. Install the transfer case shield, if equipped. Refer to **Transfer Case Shield Replacement** .
5. Lower the vehicle.

TRANSFER CASE ENCODER MOTOR REPLACEMENT

Removal Procedure

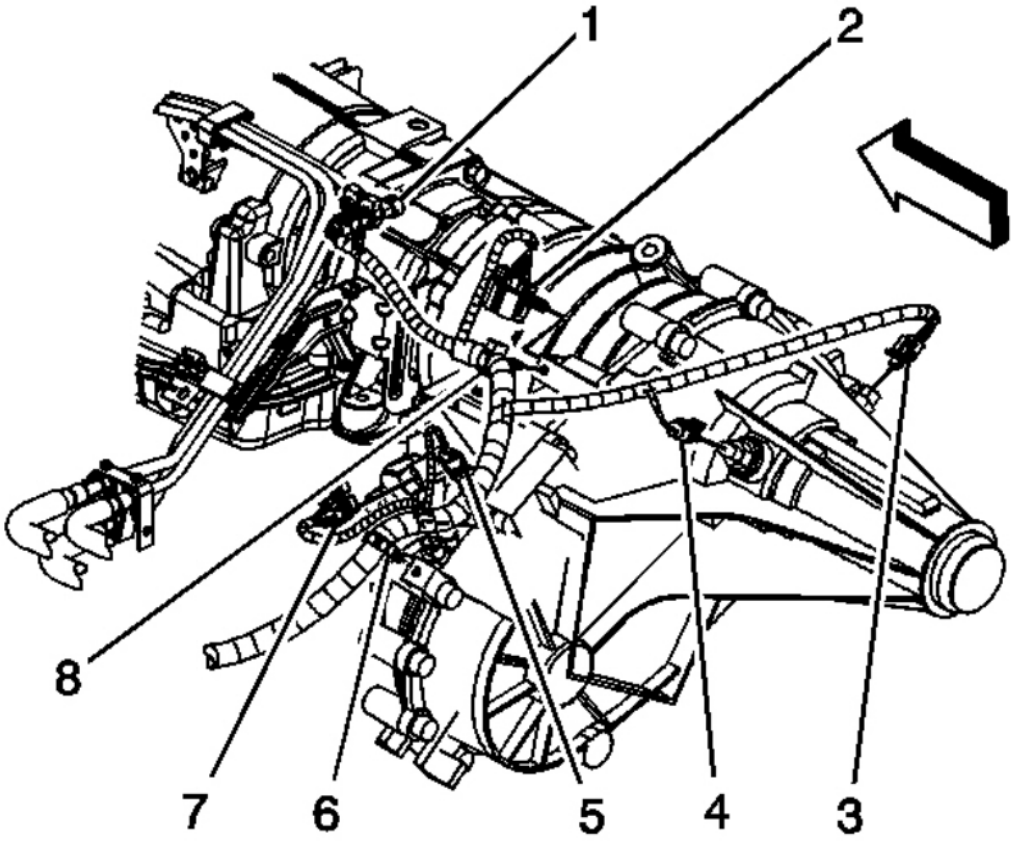


Fig. 25: Identifying External Transfer Case Components
Courtesy of GENERAL MOTORS CORP.

1. Remove the transfer case shield, if equipped. Refer to **Transfer Case Shield Replacement** .
2. Remove the front propeller shaft. Refer to **Front Propeller Shaft Replacement** in Propeller Shaft.

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3. Disconnect the transfer case switch electrical connector (2).
4. Disconnect the encoder motor electrical connector (7).

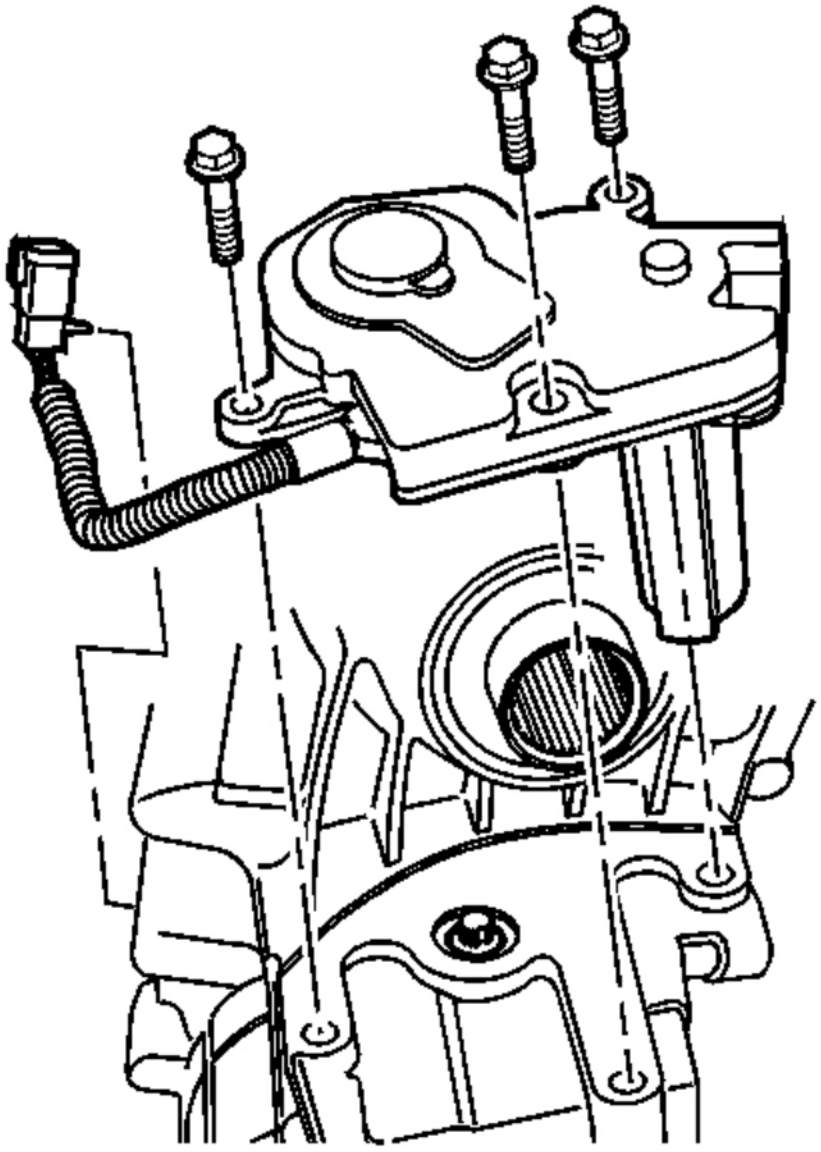


Fig. 26: View Of Actuator Encoder Motor Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

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5. Remove the encoder motor bolts.
6. Remove the encoder motor.
7. Remove the actuator insulator gasket.
8. If replacing the encoder motor, remove the locating pins from the old motor.

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.**
- **A NEW encoder motor does NOT come with locating pins.**

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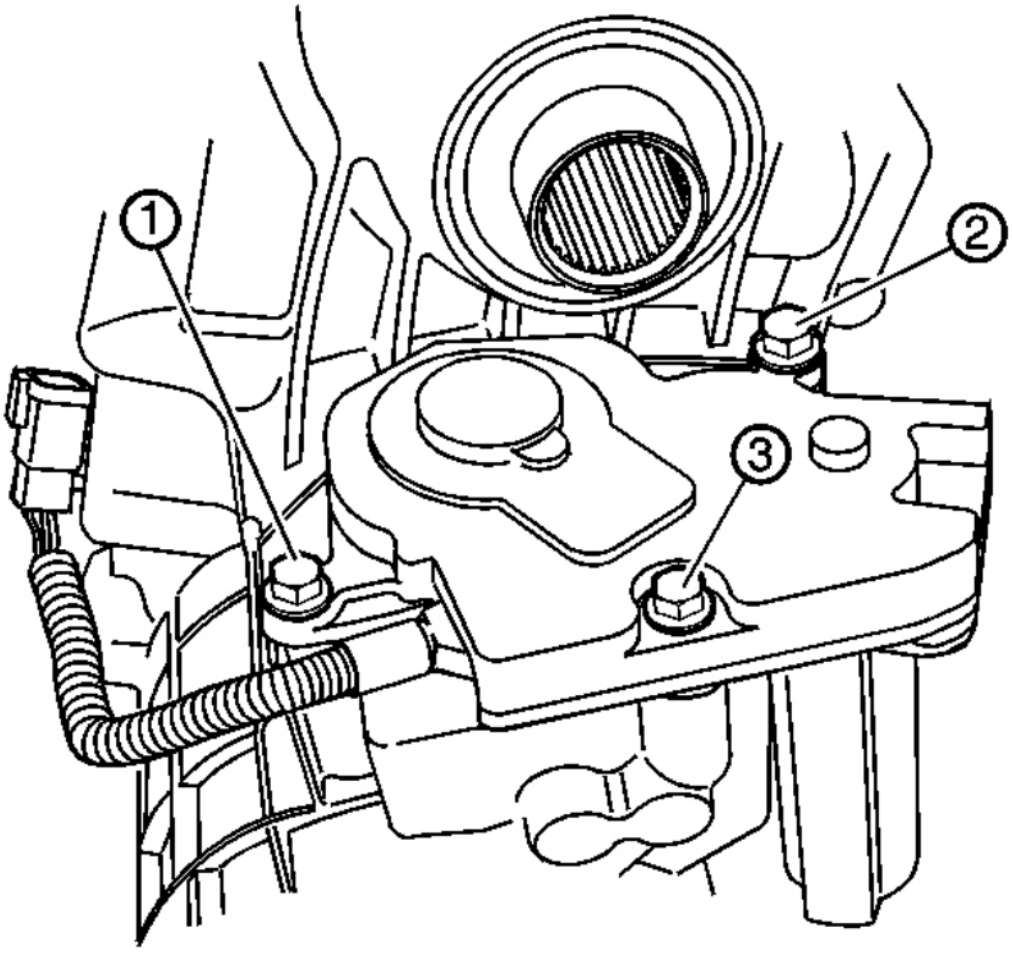


Fig. 27: View Of Encoder Motor Bolts Tightening Sequence
Courtesy of GENERAL MOTORS CORP.

1. Install the locating pins to the NEW encoder motor.
2. Position a NEW actuator insulator gasket to the transfer case.
3. Install the encoder motor.

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install encoder motor bolts.

Tighten: Tighten the bolts, in the sequence shown, to 20 N.m (15 lb ft).

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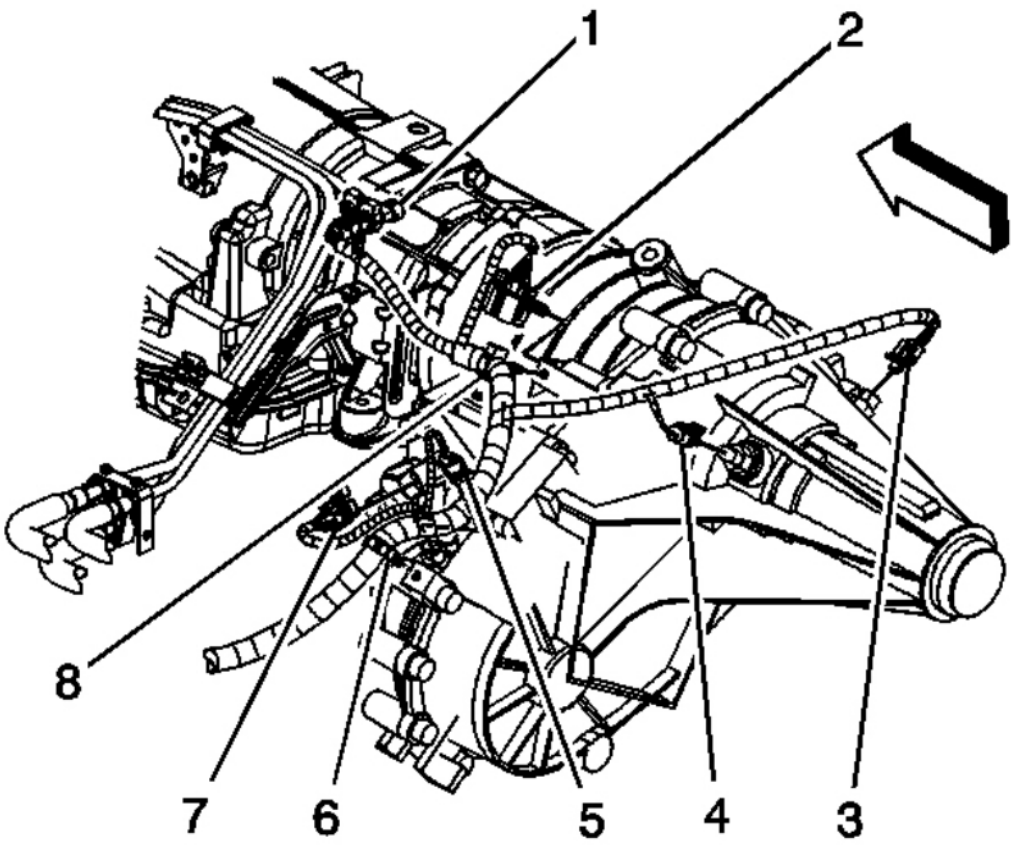


Fig. 28: Identifying External Transfer Case Components
Courtesy of GENERAL MOTORS CORP.

5. Connect the encoder motor electrical connector (7).
6. Connect the transfer case switch electrical connector (2).
7. Install the front propeller shaft. Refer to **Front Propeller Shaft Replacement** in Propeller Shaft.
8. Install the transfer case shield, if equipped. Refer to **Transfer Case Shield Replacement** .

ENCODER MOTOR SENSOR REPLACEMENT

Removal Procedure

IMPORTANT: For ease of reassembly, shift the transfer case to Neutral prior to removing any components.

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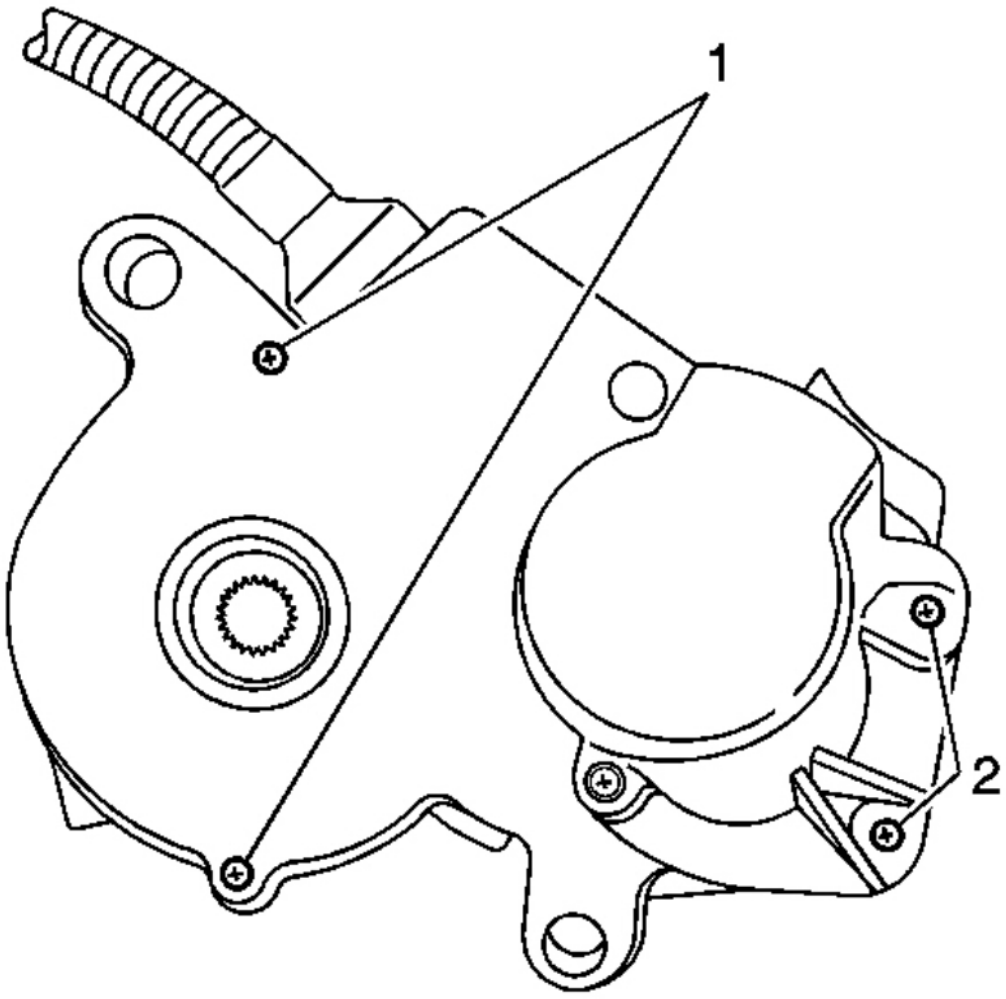


Fig. 29: Motor Cover & Casting Screws
Courtesy of GENERAL MOTORS CORP.

1. Remove the encoder motor. Refer to **Transfer Case Encoder Motor Replacement**.
2. Place the encoder motor on a clean work bench.
3. Remove and discard 2 screws (2) from the motor cover.
4. Remove and discard 2 screws (1) from the casting.
5. Remove the cover.
6. Remove and save the shim on the output gear.
7. Remove and discard the orange rubber seal from the cover.

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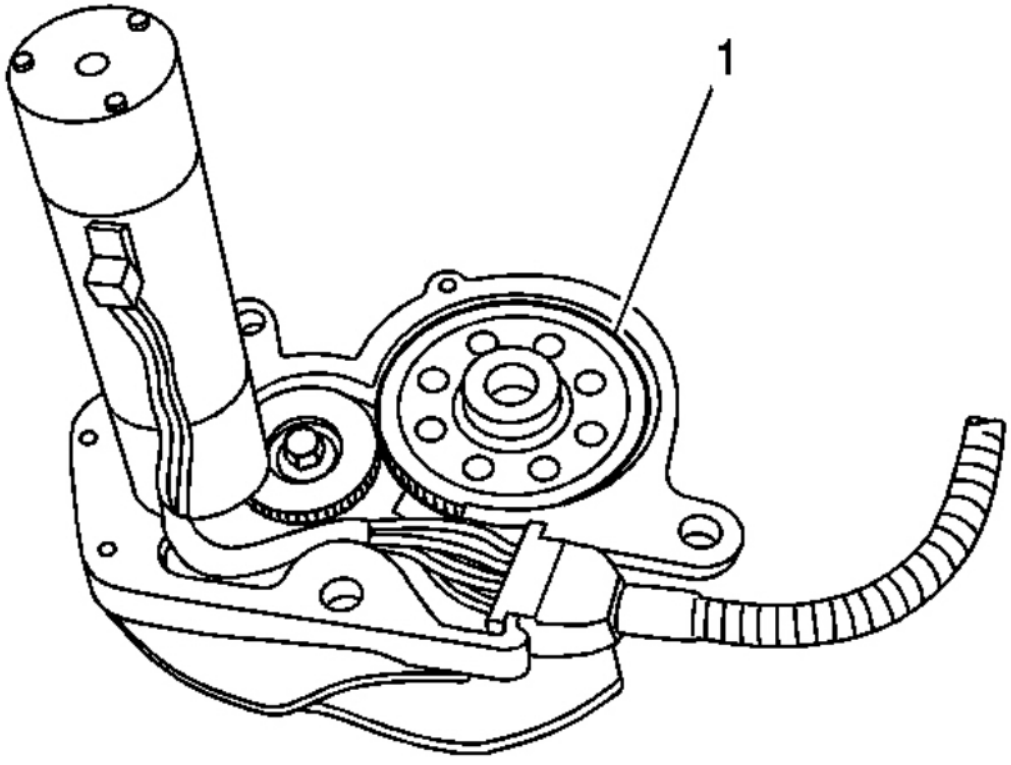


Fig. 30: Output Gear
Courtesy of GENERAL MOTORS CORP.

8. Remove the output gear (1).

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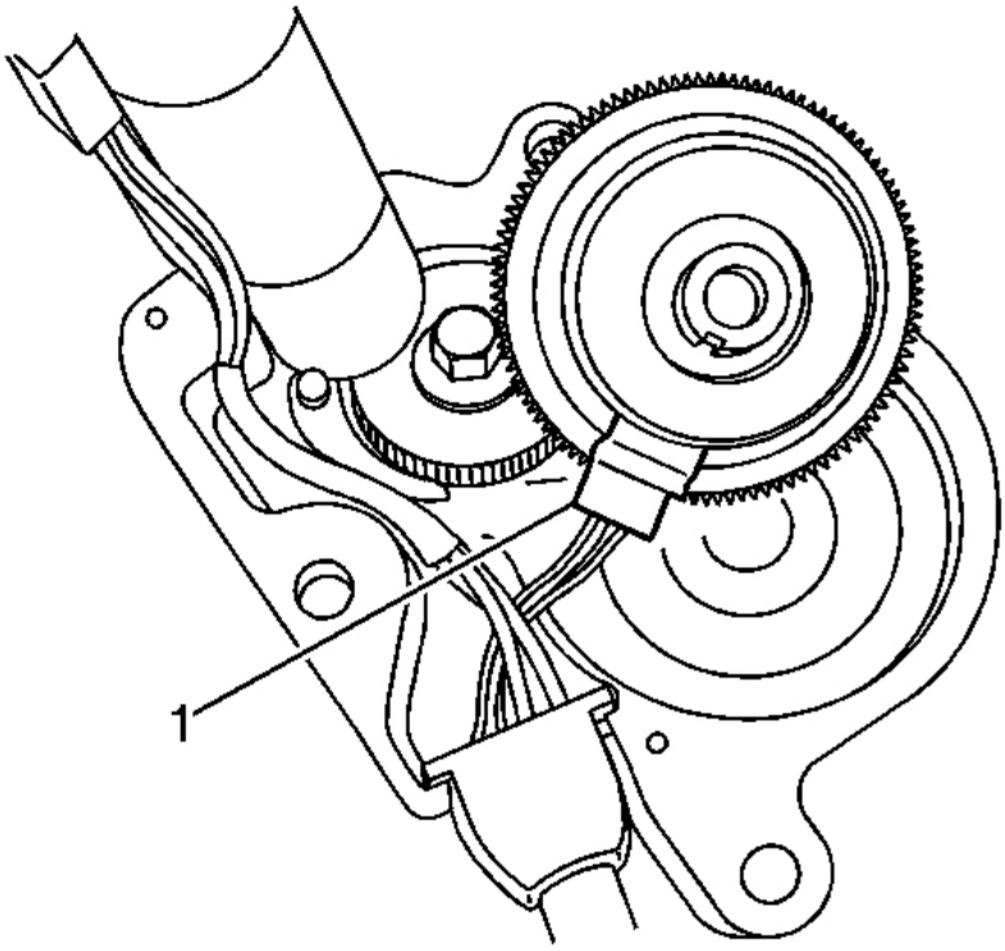


Fig. 31: Encoder Harness Connector
Courtesy of GENERAL MOTORS CORP.

9. Disassemble the harness connector (1) from the encoder.
10. Remove the encoder from the output shaft using a flat-tipped screwdriver.

Installation Procedure

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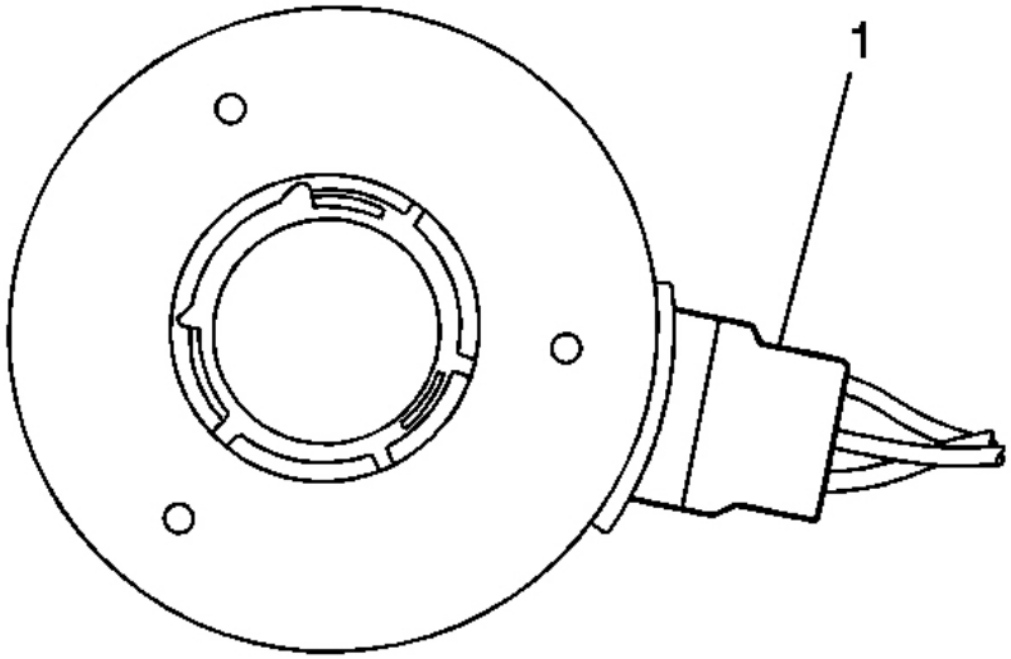


Fig. 32: Encoder Harness Connector
Courtesy of GENERAL MOTORS CORP.

1. Assemble the harness to the NEW encoder with the connector legend "TOP" (1) and the encoder part number facing up.
2. Assemble the output shaft into the encoder being sure to align the encoder tab with the groove on the shaft.
3. Ensure the encoder is seating properly on the output gear.
4. Place the output shaft/encoder on the casting.
5. Place the grommet harness on the casting slot, the flat area on the grommet will be facing up.

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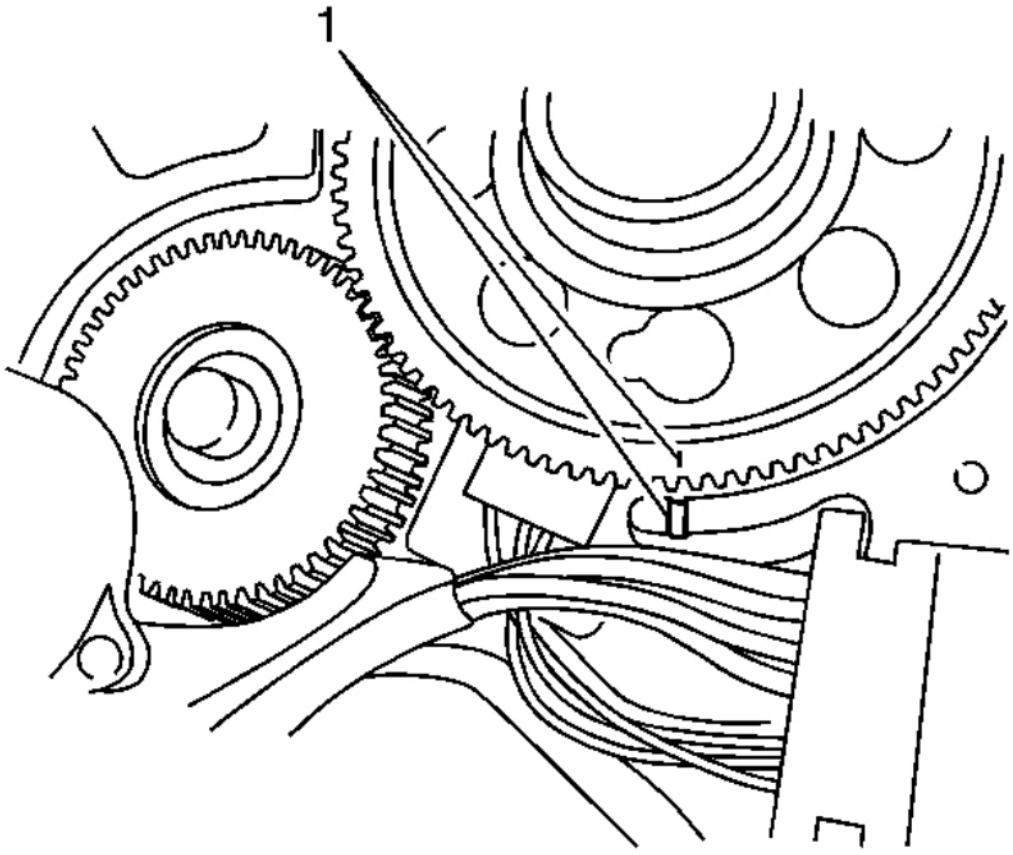


Fig. 33: Casting & Output Gear Timing Marks
Courtesy of GENERAL MOTORS CORP.

6. With the output gear/encoder assembly in hand, carefully align the casting and output gear timing marks (1).

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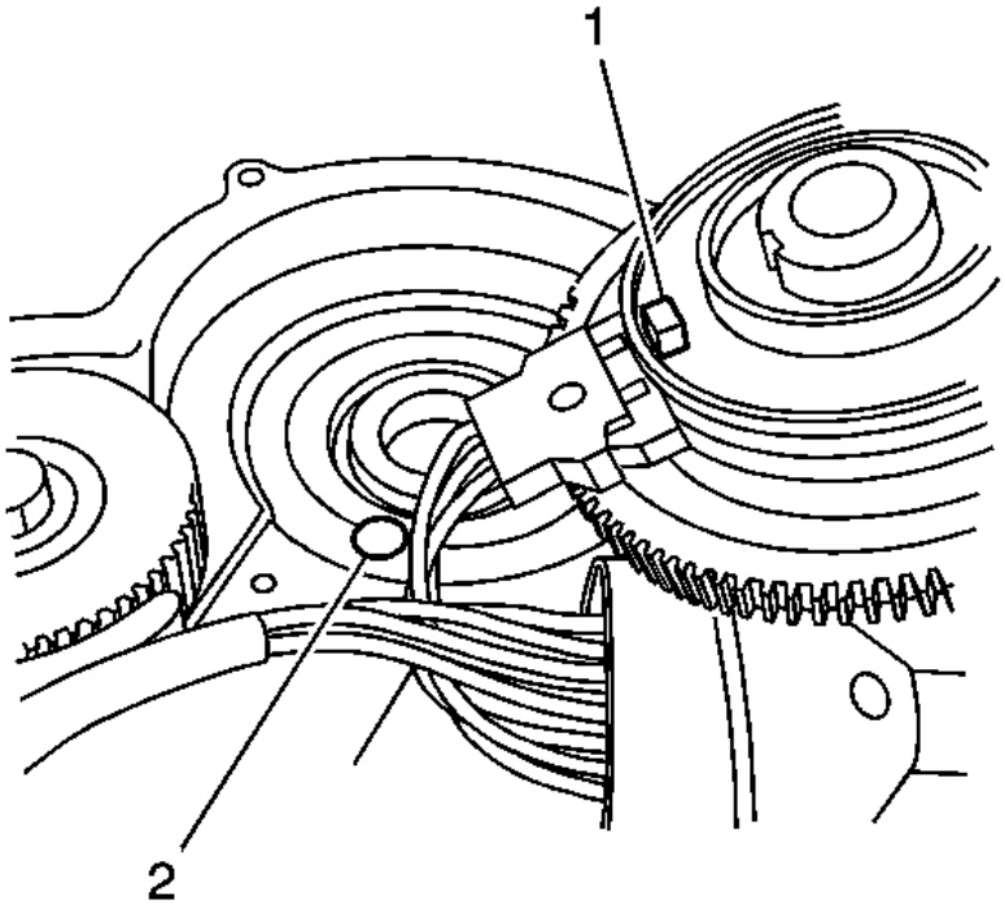


Fig. 34: Encoder Phasing Post & Phasing Slot
Courtesy of GENERAL MOTORS CORP.

7. At the same time be sure to align the encoder phasing post (1) with the phasing slot (2) in the casting and insert the shaft into the bushing.
8. Verify that the output gear and idler gear are engaged properly.
9. Seat the harness wires on the casting channel.
10. Place the shim on the output shaft gear.
11. Press a NEW seal into the cover.

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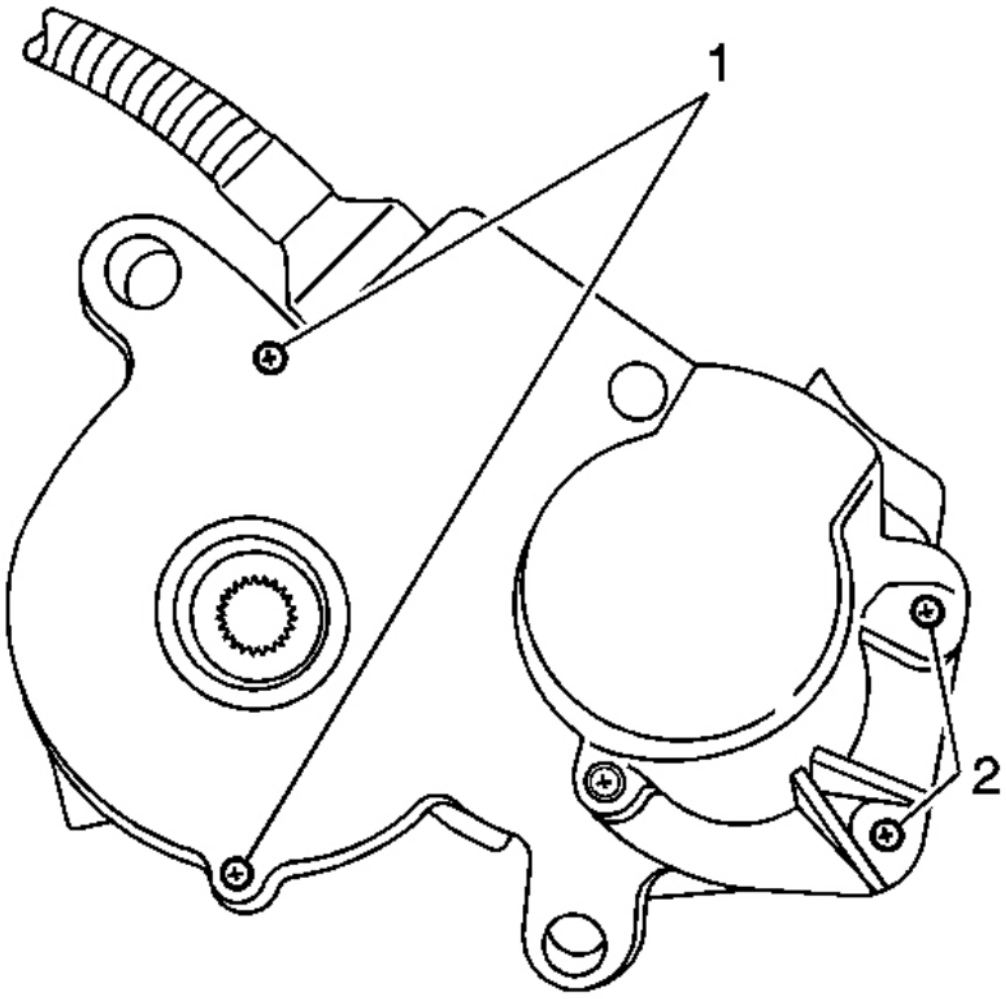


Fig. 35: Motor Cover & Casting Screws
Courtesy of GENERAL MOTORS CORP.

NOTE: **Refer to Fastener Notice in Cautions and Notices.**

12. Install the cover.
13. Install 2 NEW screws (1) to the casting.

    Tighten: Tighten the screws to 2 N.m (18 lb in).

14. Install 2 NEW longer screws (2) to the motor cover.

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Tighten: Tighten the screws to 3 N.m (26 lb in).

15. Install the encoder motor. Refer to **Transfer Case Encoder Motor Replacement**.

TRANSFER CASE SPEED SENSOR REPLACEMENT - FRONT

Removal Procedure

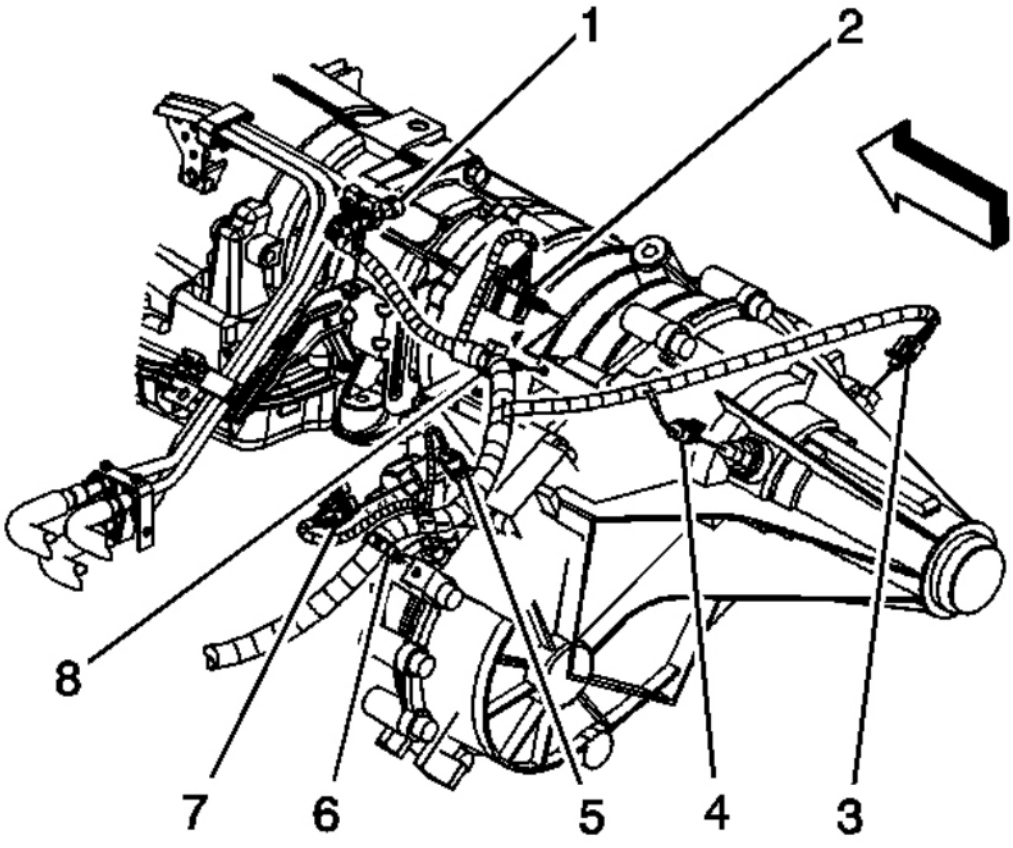


Fig. 36: Identifying External Transfer Case Components
Courtesy of GENERAL MOTORS CORP.

1. Remove the transfer case shield, if equipped. Refer to **Transfer Case Shield Replacement** .
2. Disconnect the front speed sensor electrical connector (5).

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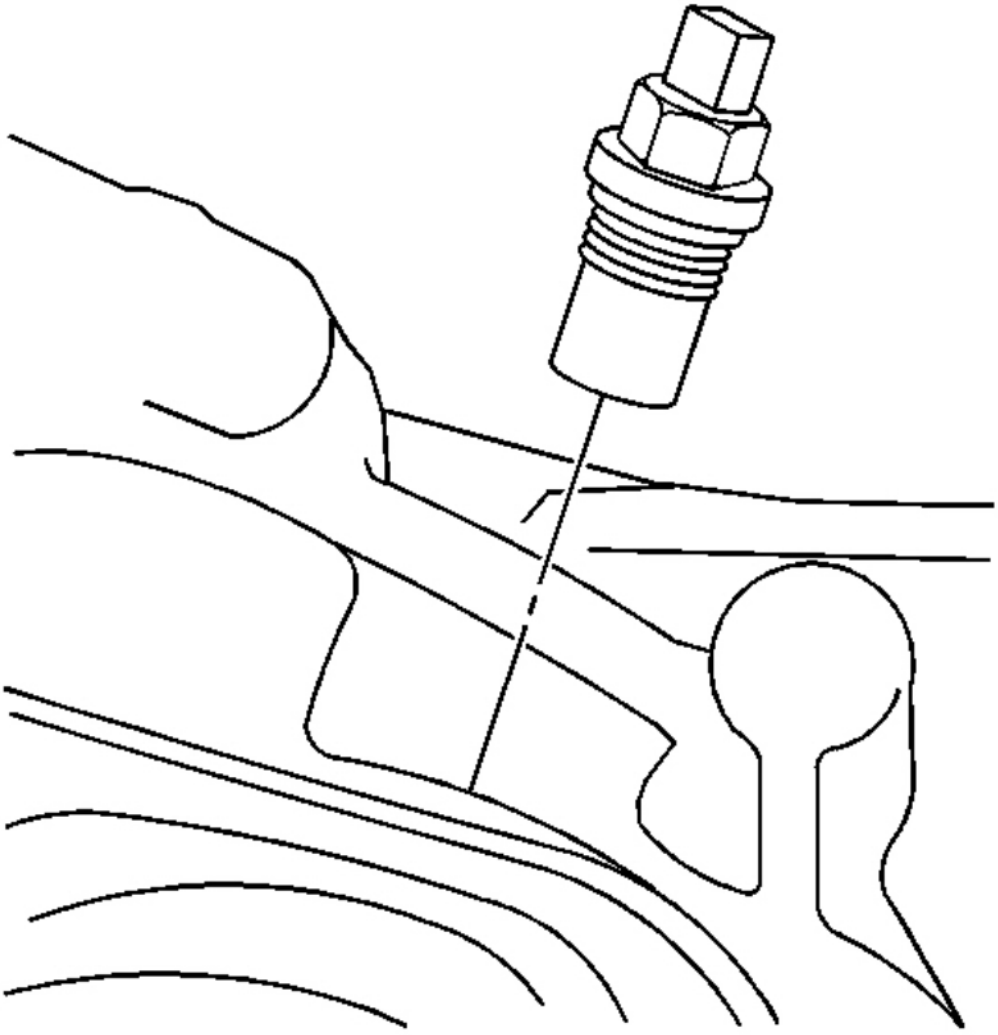


Fig. 37: View Of Vehicle Speed Sensor
Courtesy of GENERAL MOTORS CORP.

3. Remove the front speed sensor.

Installation Procedure

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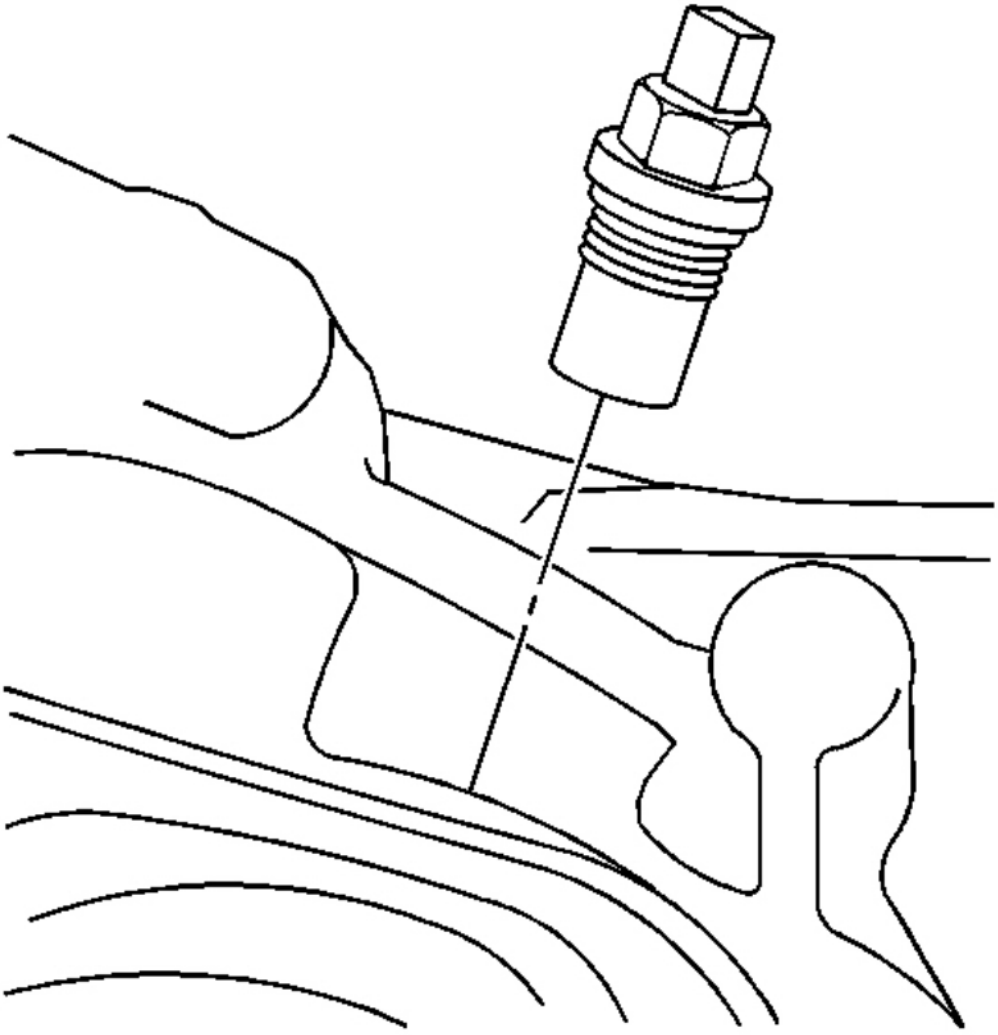


Fig. 38: View Of Vehicle Speed Sensor
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

1. Install the front speed sensor.

   Tighten: Tighten the speed sensor to 15 N.m (11 lb ft).

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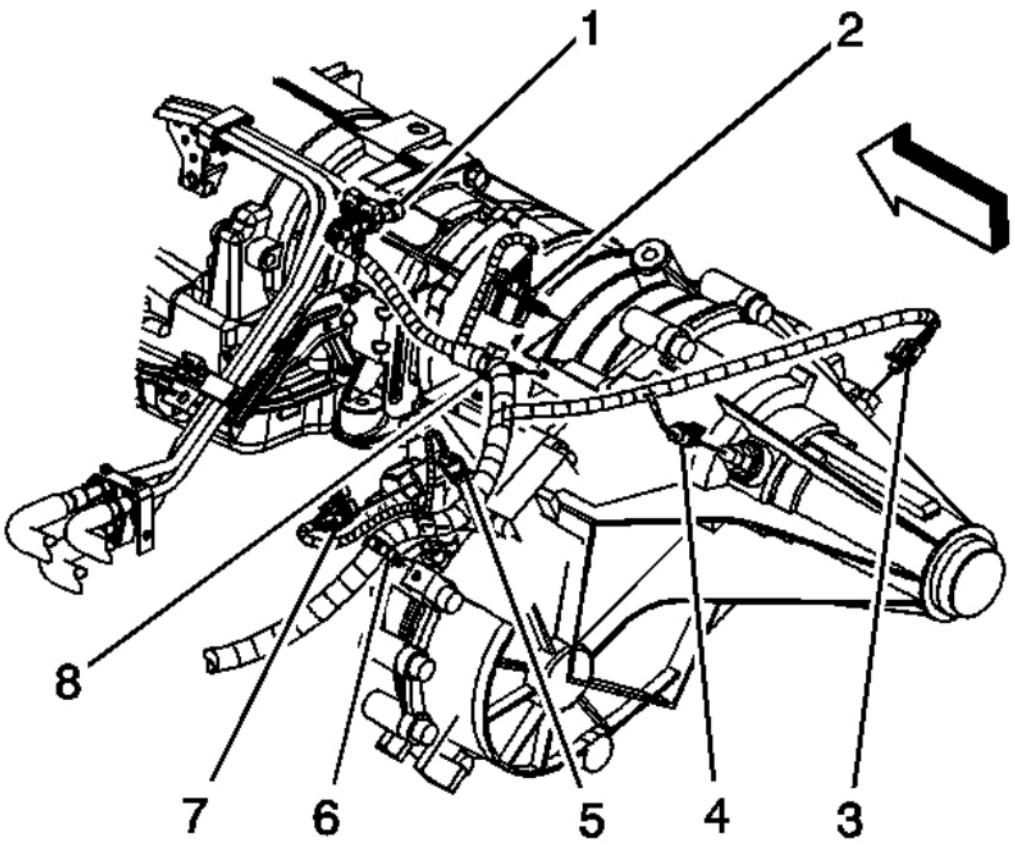


Fig. 39: Identifying External Transfer Case Components
Courtesy of GENERAL MOTORS CORP.

2. Connect the front speed sensor electrical connector (5).
3. Install the transfer case shield, if equipped. Refer to **Transfer Case Shield Replacement** .

TRANSFER CASE SPEED SENSOR REPLACEMENT - LEFT REAR

Removal Procedure

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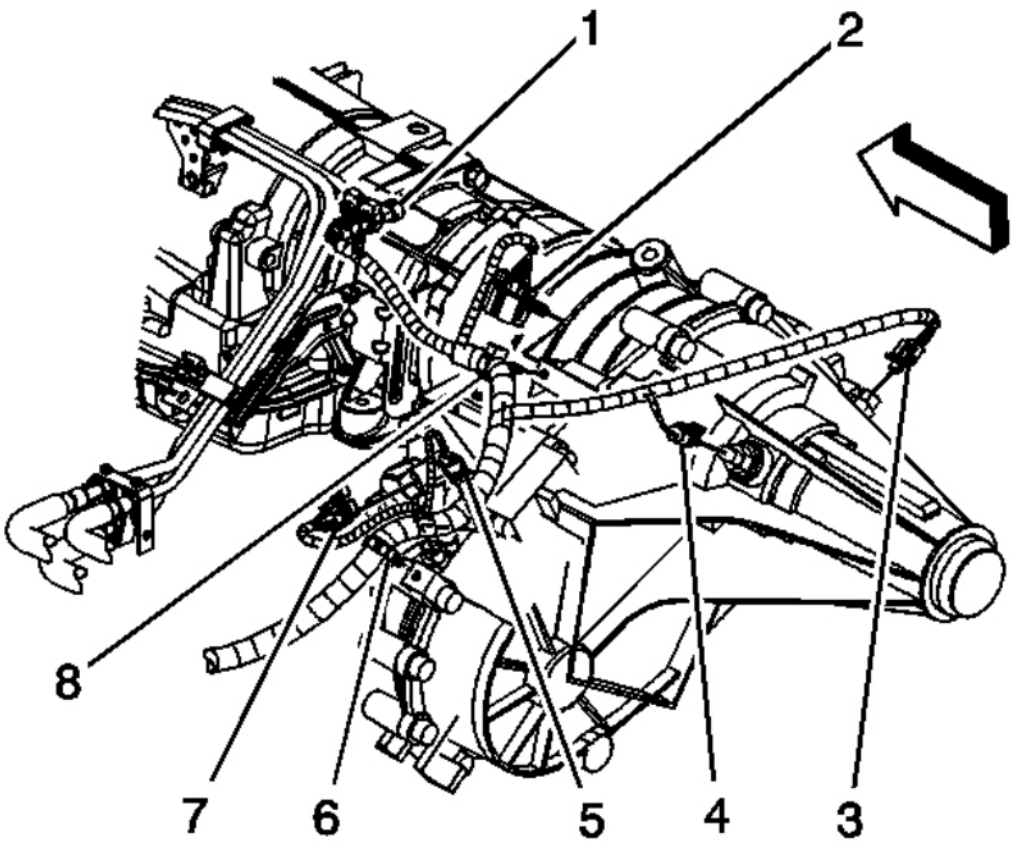


Fig. 40: Identifying External Transfer Case Components
Courtesy of GENERAL MOTORS CORP.

1. Raise and suitably support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Disconnect the left rear speed sensor electrical connector (4).

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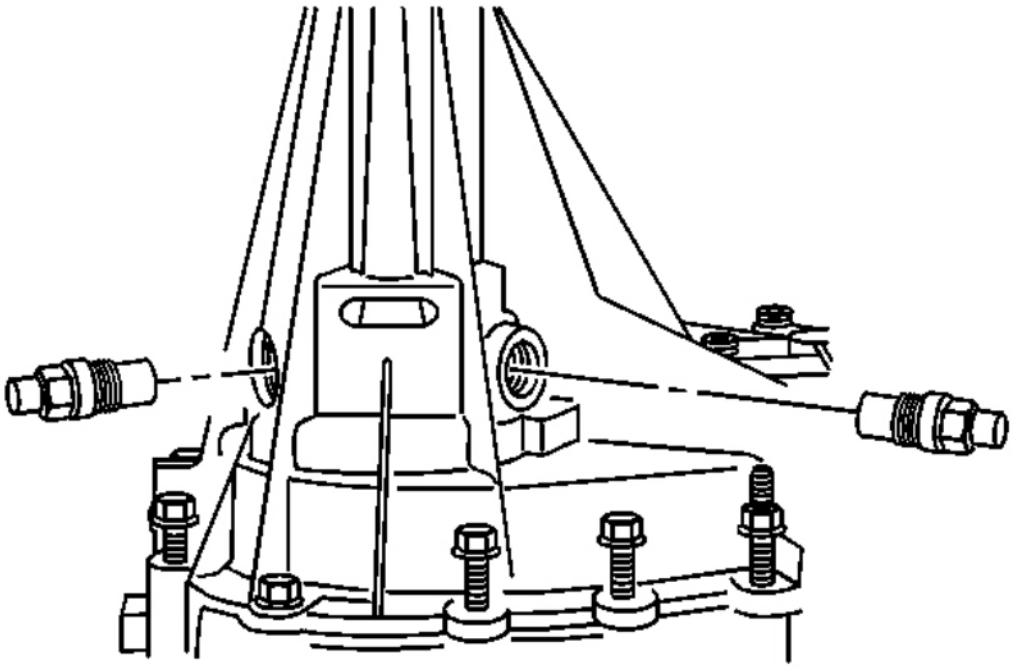


Fig. 41: Locating Rear Speed Sensor
Courtesy of GENERAL MOTORS CORP.

3. Remove the left rear speed sensor.

Installation Procedure

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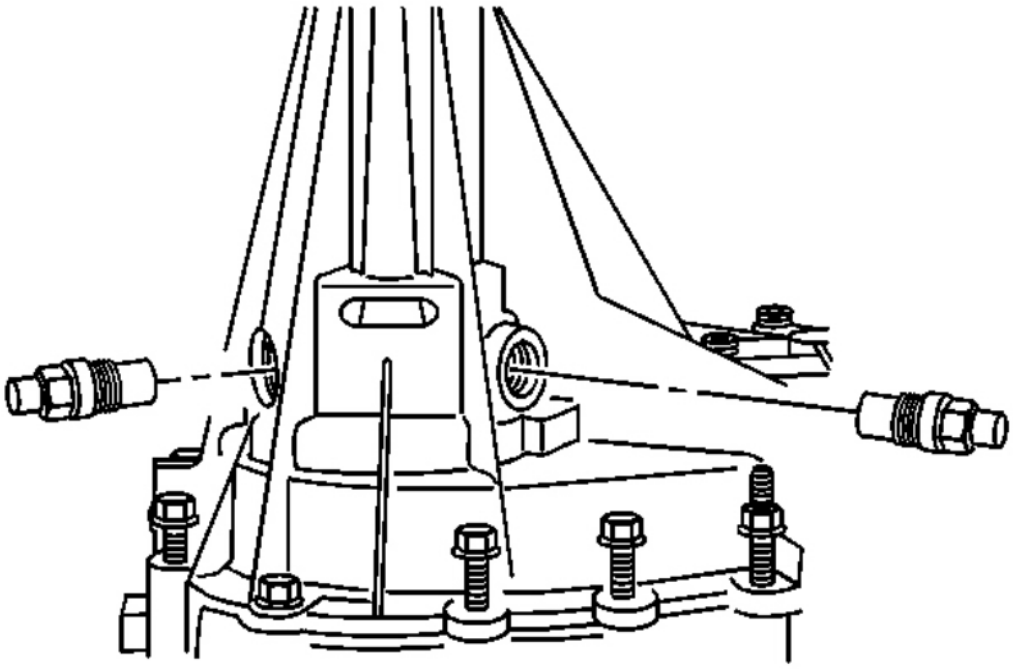


Fig. 42: Locating Rear Speed Sensor
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

1. Install the left rear speed sensor.

   Tighten: Tighten the speed sensor to 15 N.m (11 lb ft).

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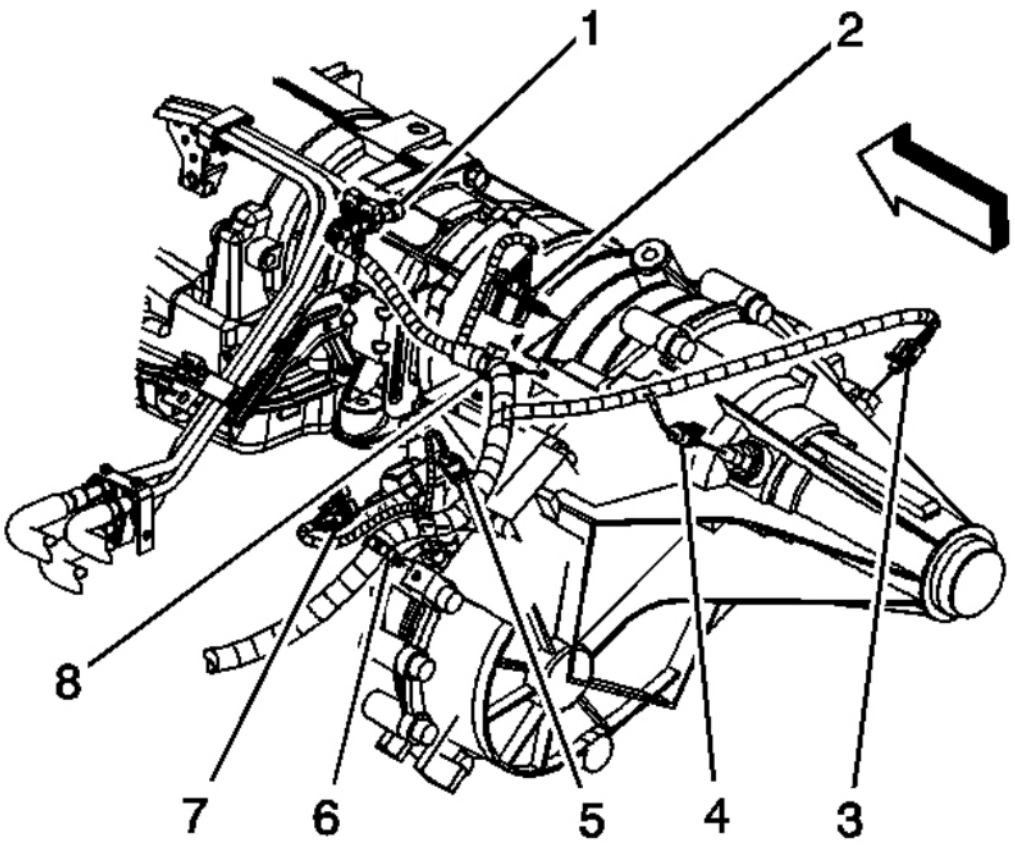


Fig. 43: Identifying External Transfer Case Components
Courtesy of GENERAL MOTORS CORP.

2. Connect the left rear speed sensor electrical connector (4).
3. Lower the vehicle.

TRANSFER CASE SPEED SENSOR REPLACEMENT - RIGHT REAR

Removal Procedure

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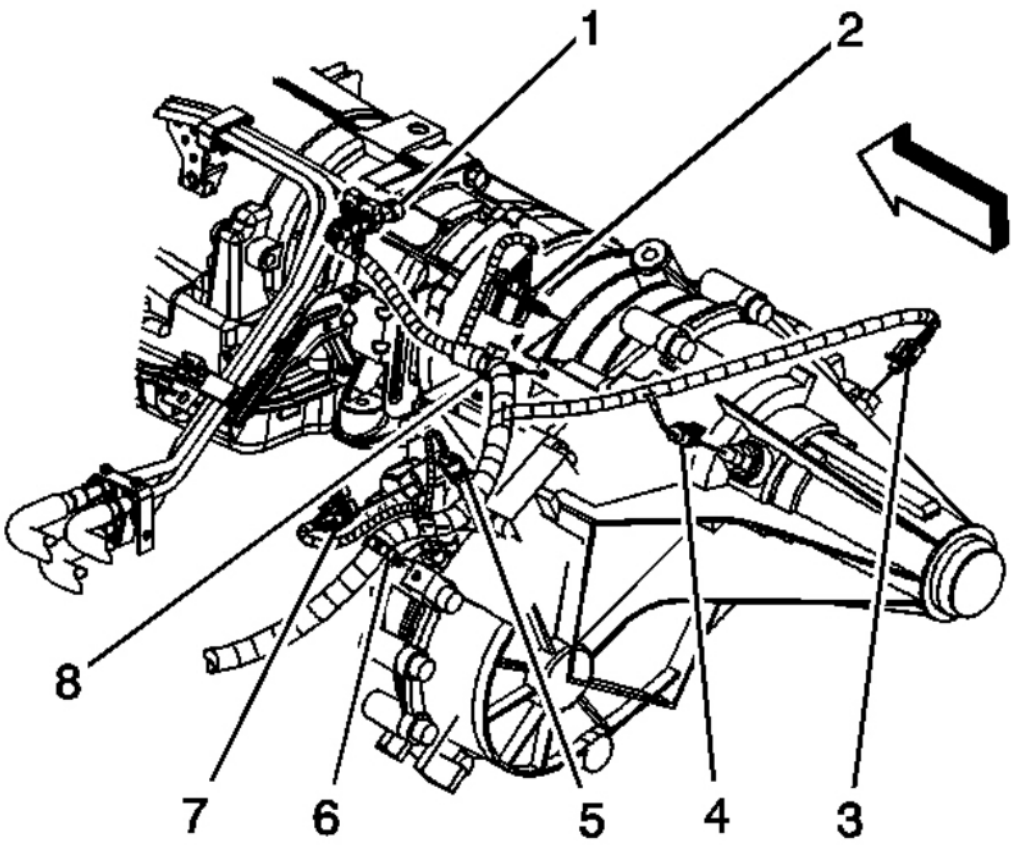


Fig. 44: Identifying External Transfer Case Components
Courtesy of GENERAL MOTORS CORP.

1. Raise and suitably support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Disconnect the right rear speed sensor electrical connector (3).

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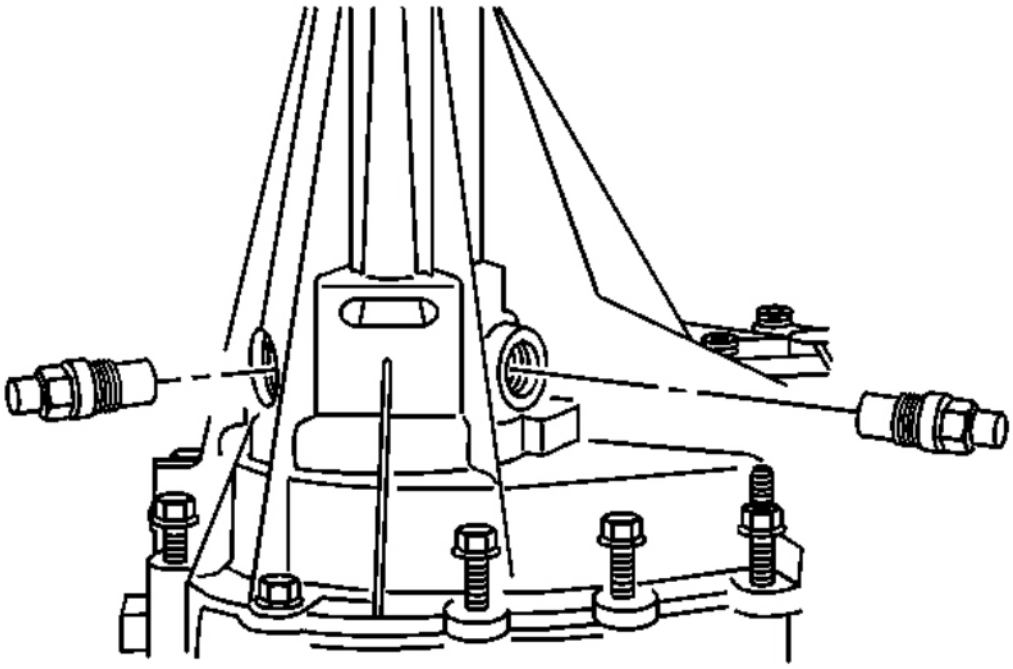


Fig. 45: Locating Rear Speed Sensor
Courtesy of GENERAL MOTORS CORP.

3. Remove the right rear speed sensor.

Installation Procedure

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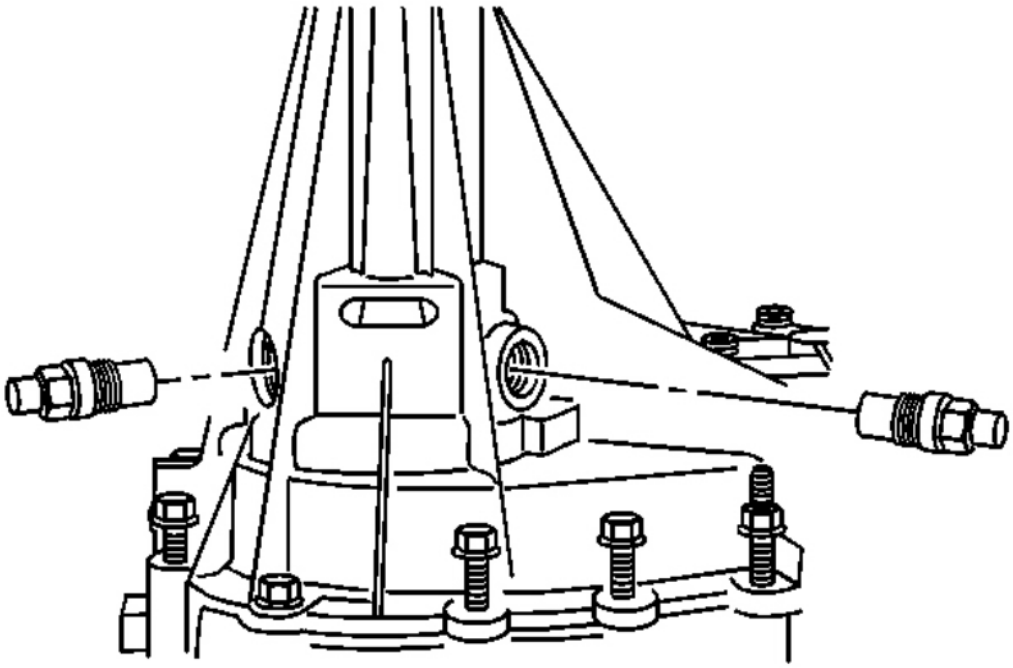


Fig. 46: Locating Rear Speed Sensor
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

1. Install the right rear speed sensor.

   Tighten: Tighten the speed sensor to 15 N.m (11 lb ft).

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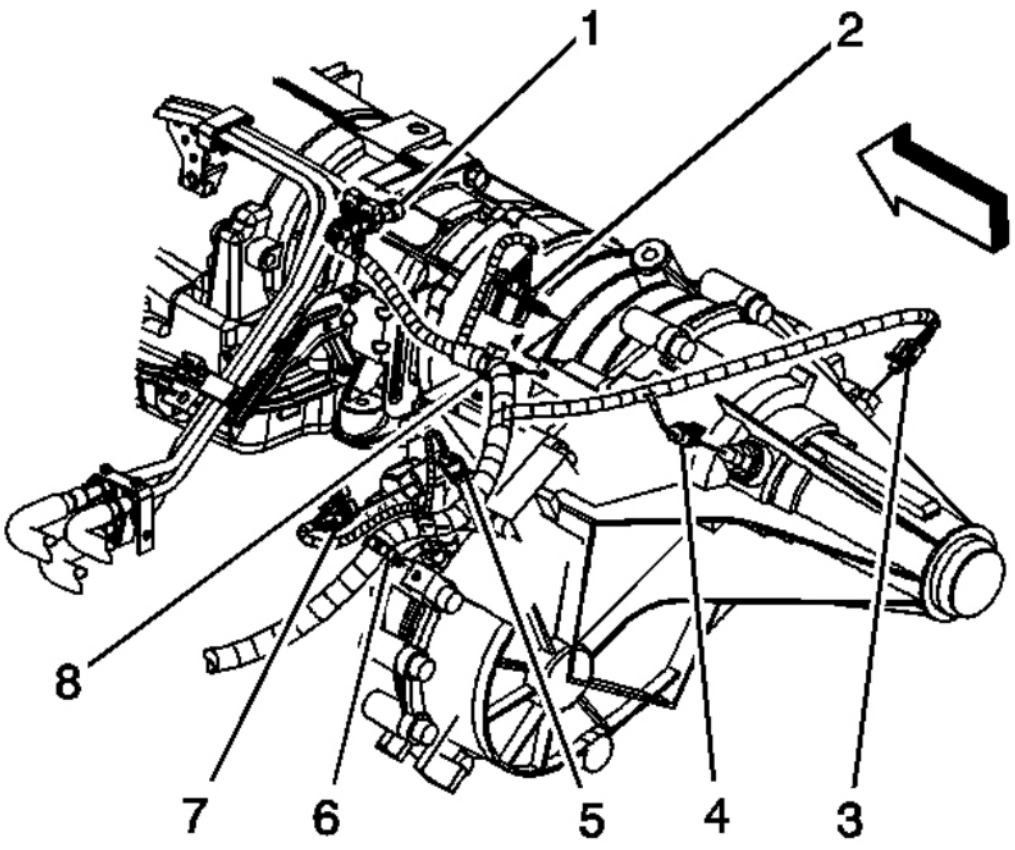


Fig. 47: Identifying External Transfer Case Components
Courtesy of GENERAL MOTORS CORP.

2. Connect the right rear speed sensor electrical connector (3).
3. Lower the vehicle.

TRANSFER CASE OUTPUT SHAFT SEAL REPLACEMENT - FRONT

Tools Required

- **J 8092** Driver Handle
- **J 43484** Output Shaft Seal Installer

Removal Procedure

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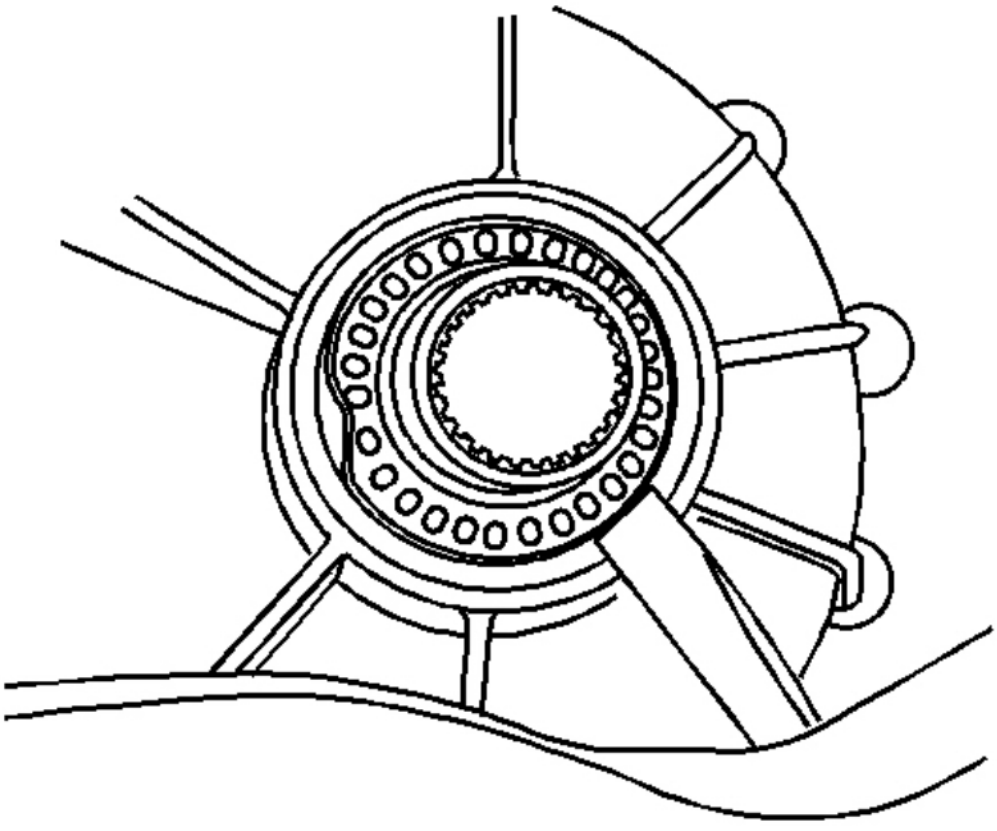


Fig. 48: Prying Inner Race
Courtesy of GENERAL MOTORS CORP.

1. Remove the transfer case shield, if equipped. Refer to **Transfer Case Shield Replacement** .
2. Remove the front propeller shaft. Refer to **Front Propeller Shaft Replacement** in Propeller Shaft.
3. Insert a flat-tipped screwdriver into the inner race.
4. Pry the inner race back.

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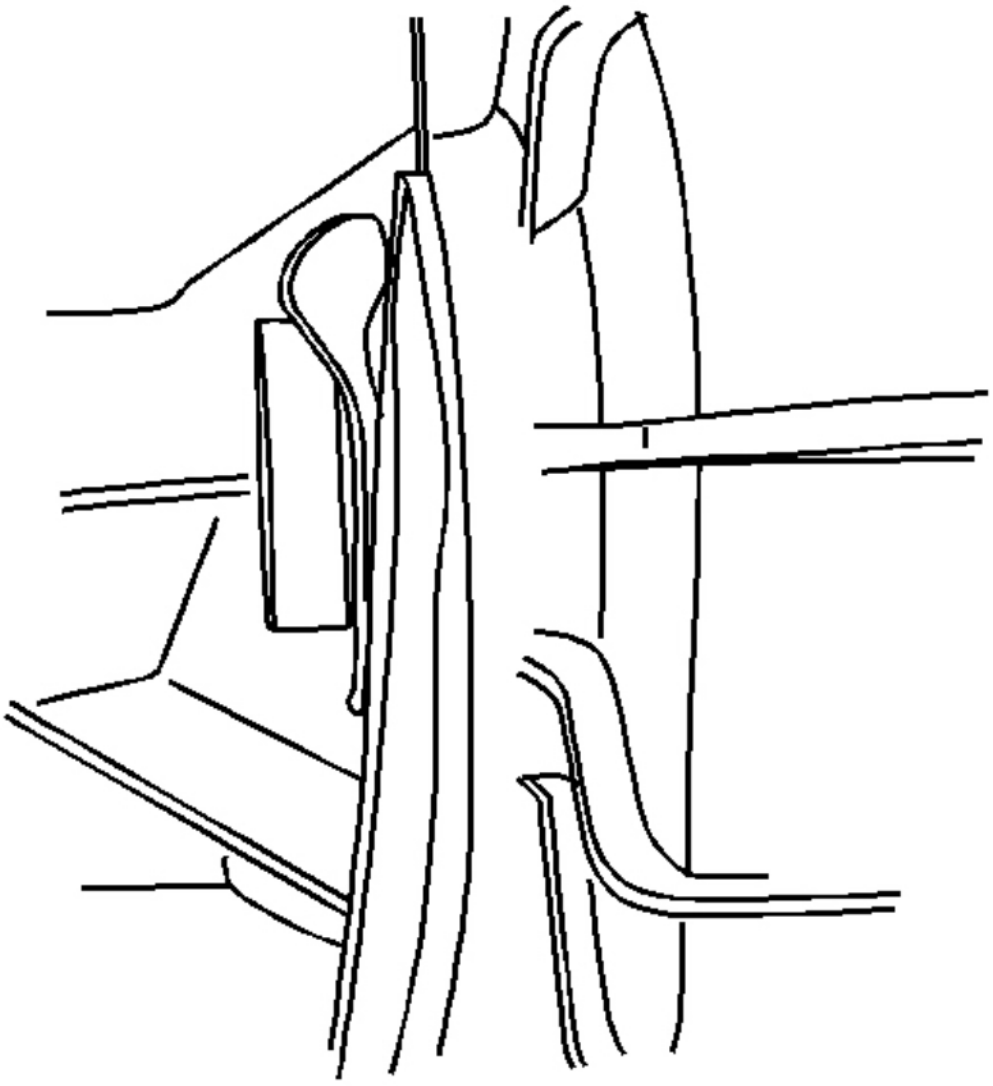


Fig. 49: Prying Seal Inner Part From Outer Seal Body
Courtesy of GENERAL MOTORS CORP.

5. Insert a small pry bar into the inner race.

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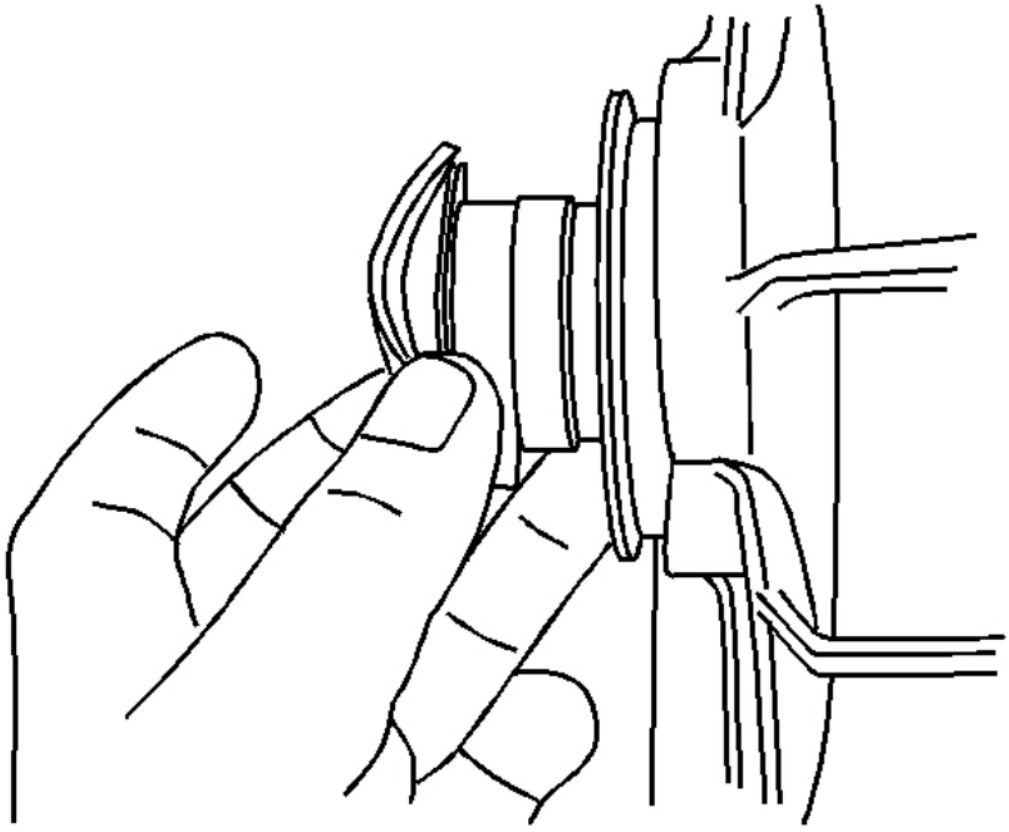


Fig. 50: Removing Inner Part Of Seal
Courtesy of GENERAL MOTORS CORP.

6. Remove the inner race from the seal.

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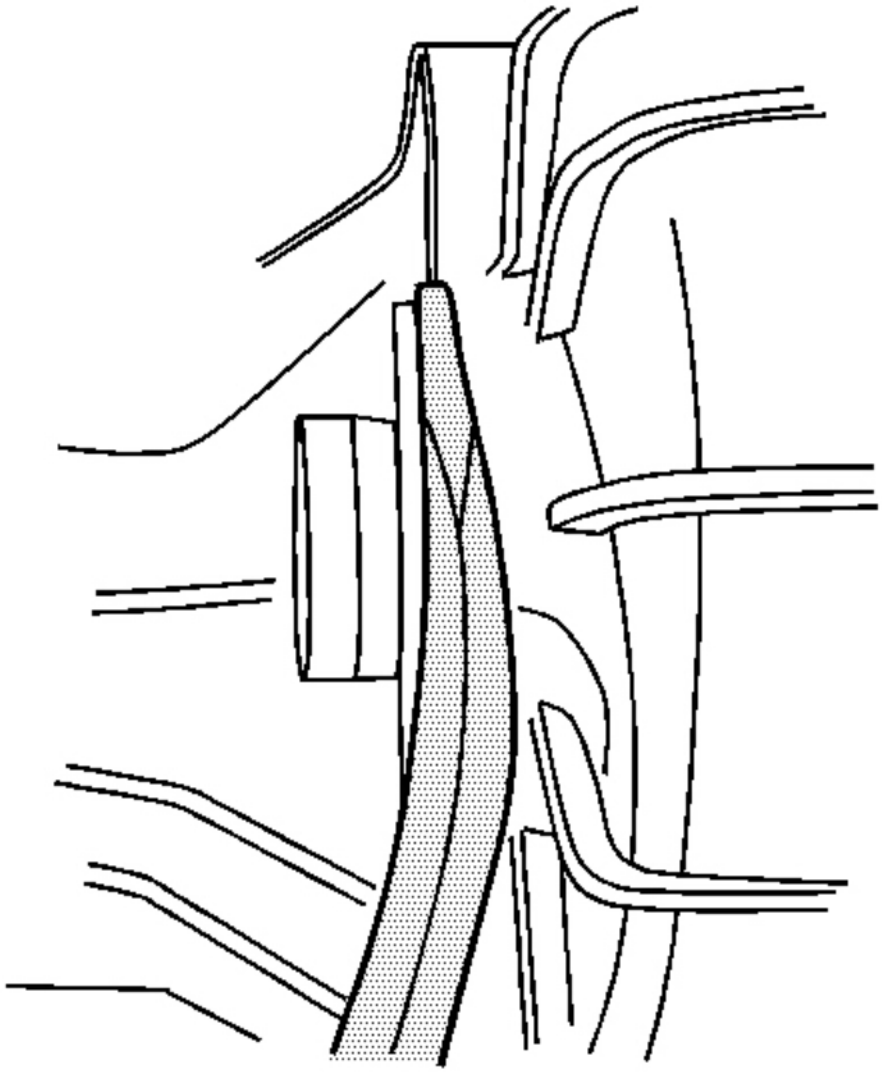


Fig. 51: Inserting Screwdriver Between Front Output Shaft Seal Outer Lip & Transfer Case
Courtesy of GENERAL MOTORS CORP.

7. Insert a flat-tipped screwdriver or a small pry bar in the space between the outer race of the seal and transfer case.

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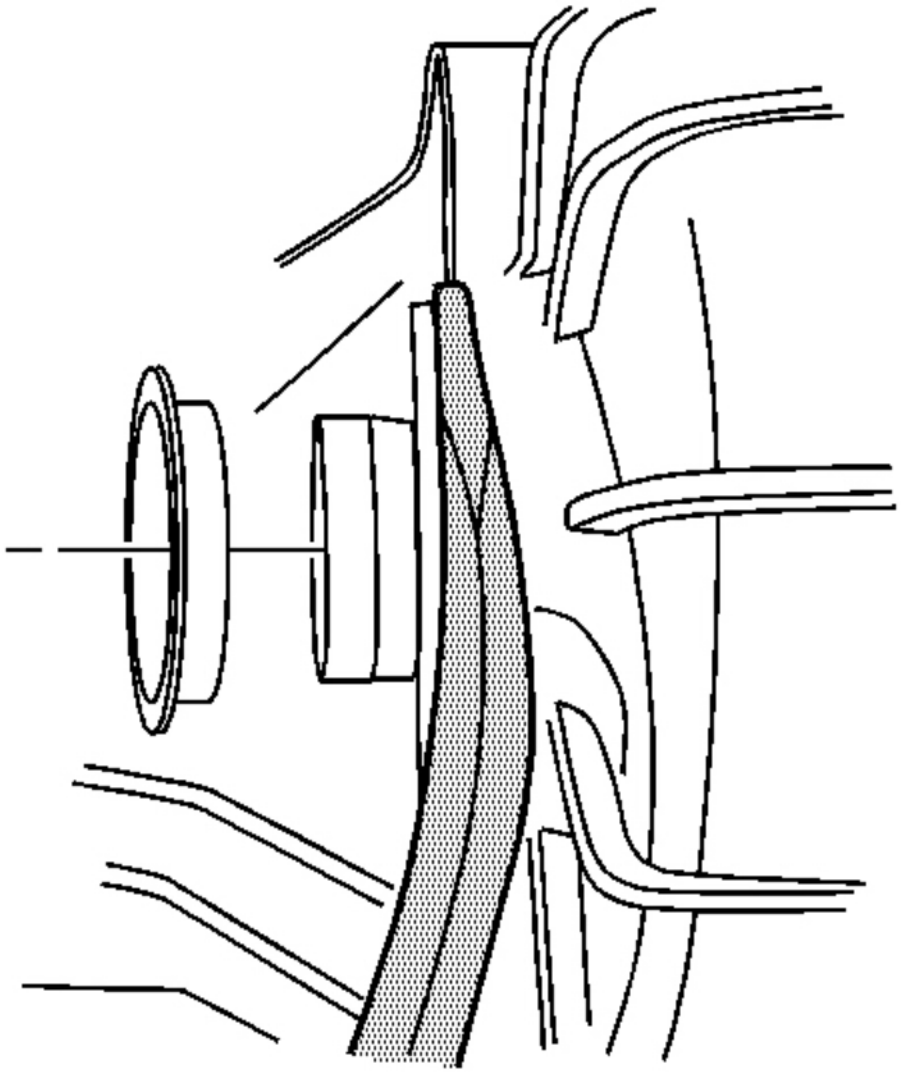


Fig. 52: Removing Outer Part Of Seal
Courtesy of GENERAL MOTORS CORP.

8. Remove the outer part of the seal.

Installation Procedure

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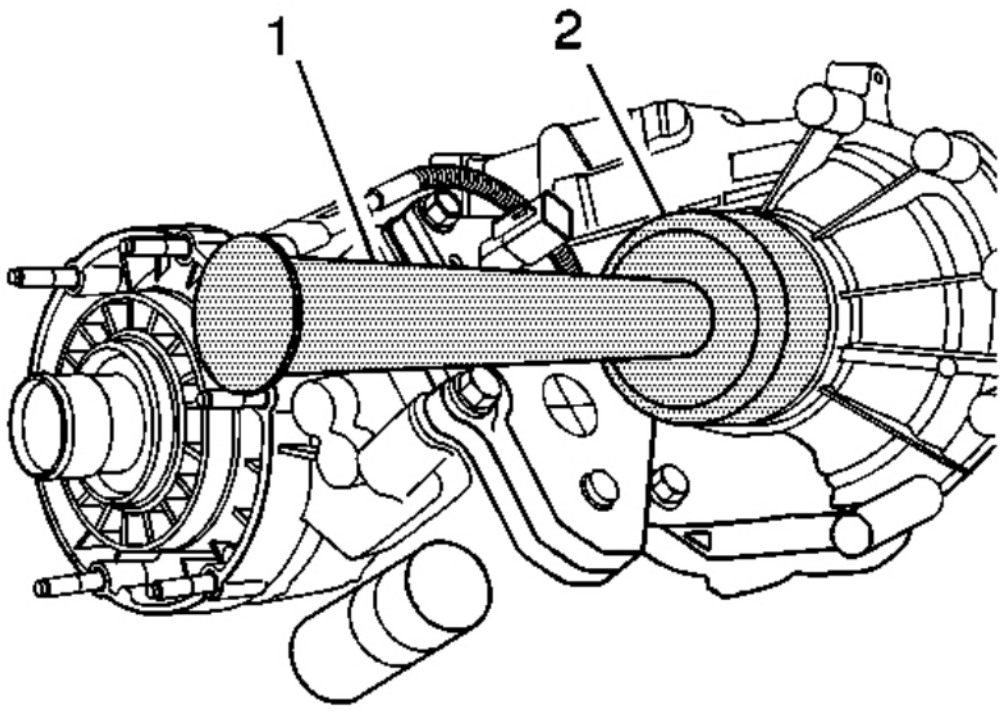


Fig. 53: J 8092 & J 43484
Courtesy of GENERAL MOTORS CORP.

1. Install the **J 43484** (2) to the **J 8092** (1).
2. Install the seal onto the **J 43484** .
3. Using the **J 43484** (2) and the **J 8092** (1), install the seal.
4. Install the front propeller shaft. Refer to **Front Propeller Shaft Replacement** in Propeller Shaft.
5. Check the fluid level. Add fluid if necessary.
6. Install the transfer case shield, if equipped. Refer to **Transfer Case Shield Replacement** .

TRANSFER CASE OUTPUT SHAFT SEAL REPLACEMENT - REAR

Tools Required

- **J 37668-A** Seal Installer. See **Special Tools**.
- **J 45380** Transfer Case Rear Bushing Remover and Installer. See **Special Tools**.

Removal Procedure

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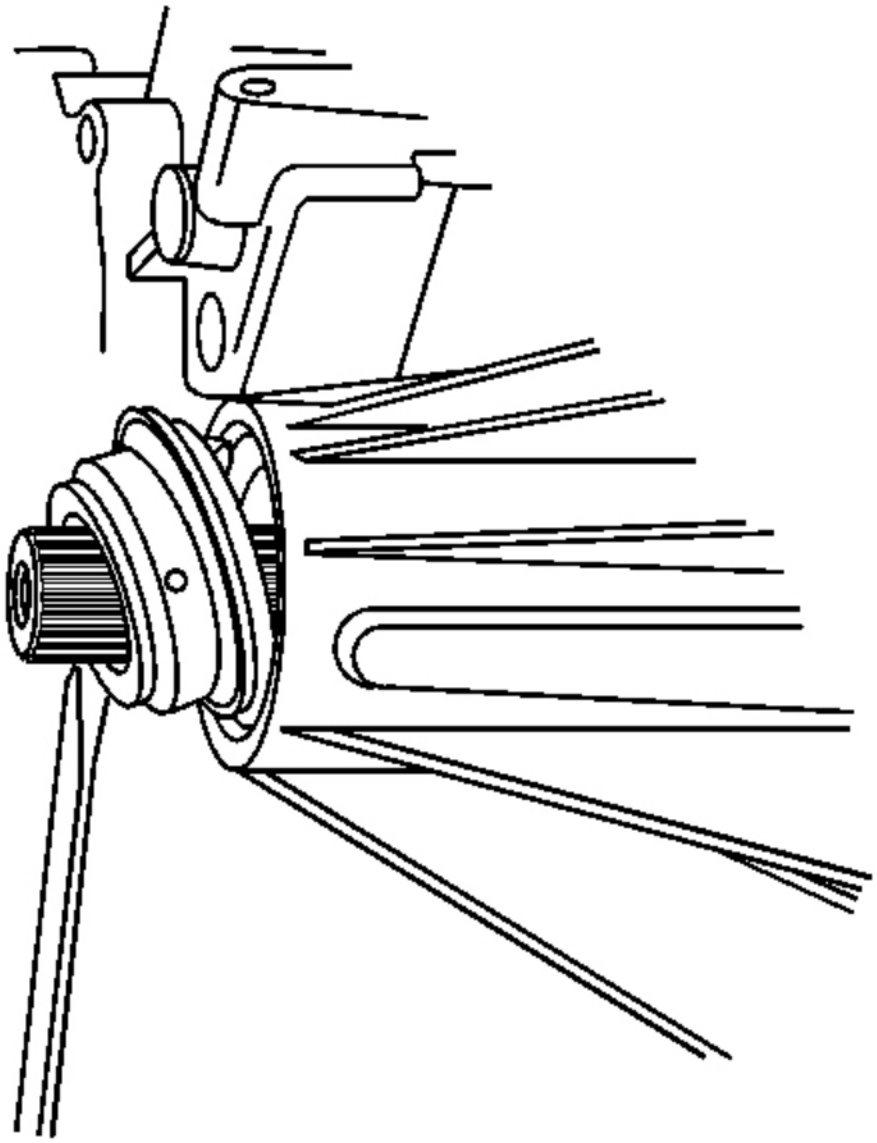


Fig. 54: Removing Rear Output Shaft Seal
Courtesy of GENERAL MOTORS CORP.

1. Remove the transfer case shield, if equipped. Refer to **Transfer Case Shield Replacement** .
2. Remove the rear propeller shaft. Refer to **Rear Propeller Shaft Replacement** in Propeller Shaft.
3. Remove the rear output shaft seal.

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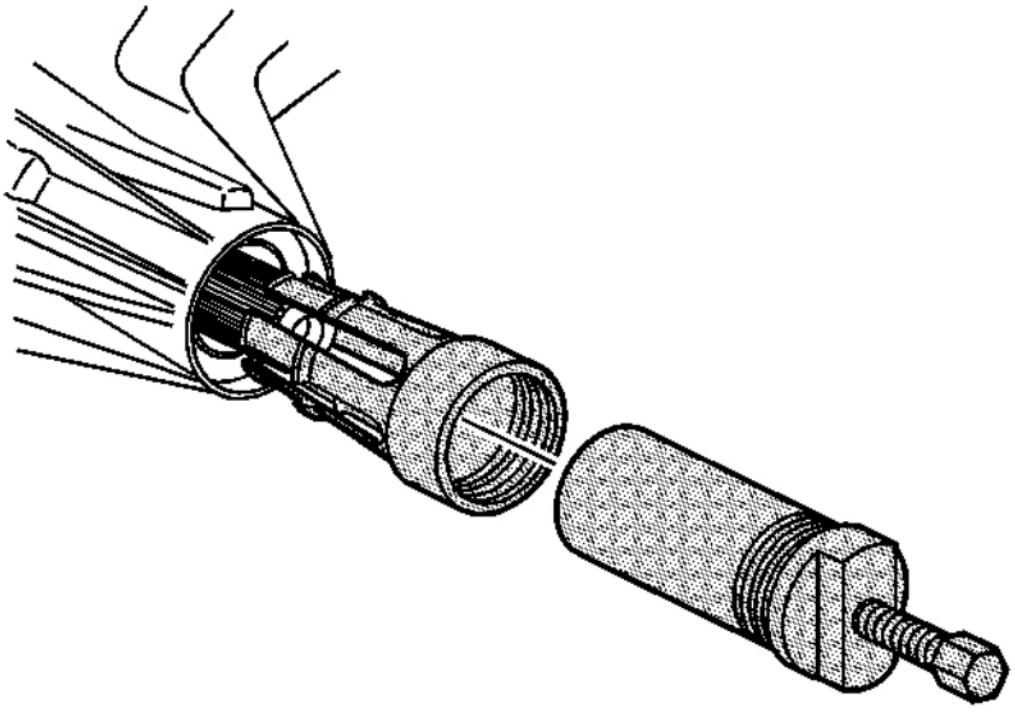


Fig. 55: Removing Rear Output Shaft Bushing
Courtesy of GENERAL MOTORS CORP.

4. Inspect the rear output shaft bushing for scoring or wear.
5. Remove the rear output shaft bushing if required, using the **J 45380** . See **Special Tools**.
    - Install the finger section of the **J 45380** in front of the bushing. See **Special Tools**.
    - Install the tube and forcing screw to the finger section. Ensure the forcing screw is backed out.
    - Using a wrench on the forcing screw, remove the rear output shaft bushing.

Installation Procedure

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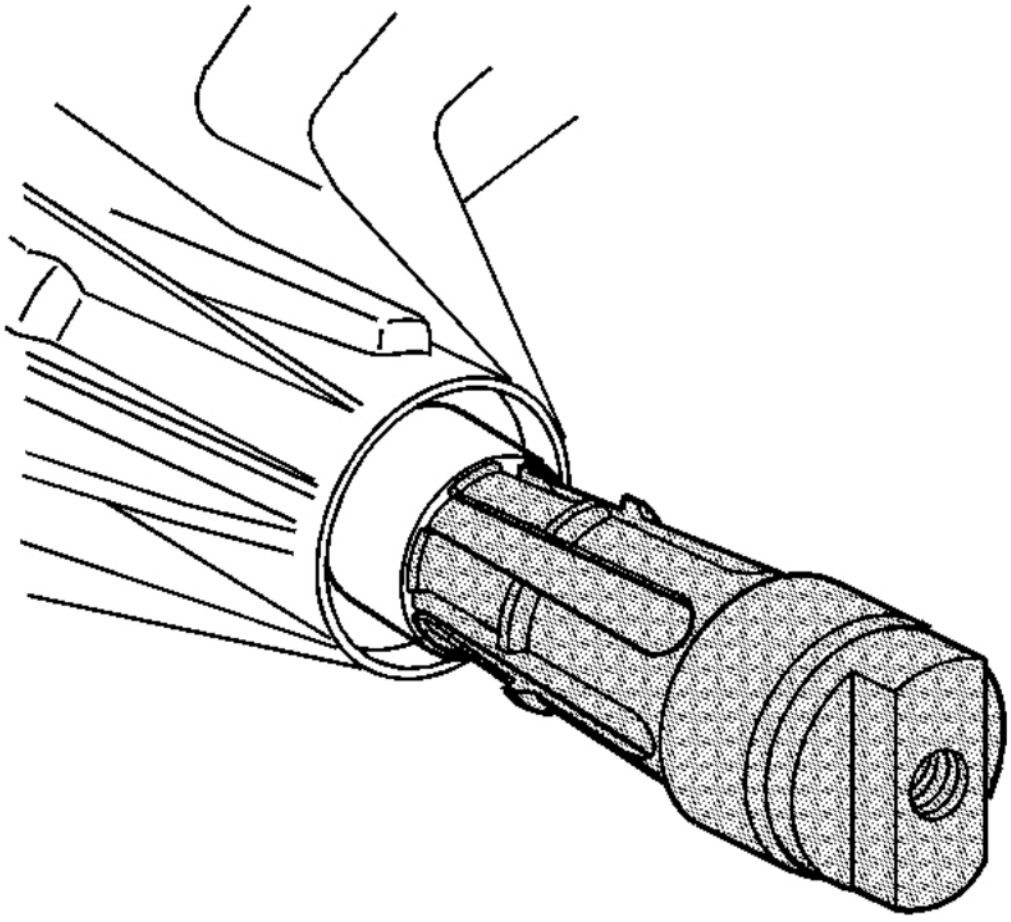


Fig. 56: Installing Rear Output Shaft Bushing
Courtesy of GENERAL MOTORS CORP.

1. Using the **J 45380** , install a NEW output shaft bushing. See **Special Tools**.
    1. Install the bushing or the finger section of the **J 45380** . See **Special Tools**.
    2. Install the finger section to the main body of the **J 45380** . See **Special Tools**.
    3. Position the bushing and tool to the case.
    4. Using a hammer and the **J 45380** , install the bushing. See **Special Tools**.

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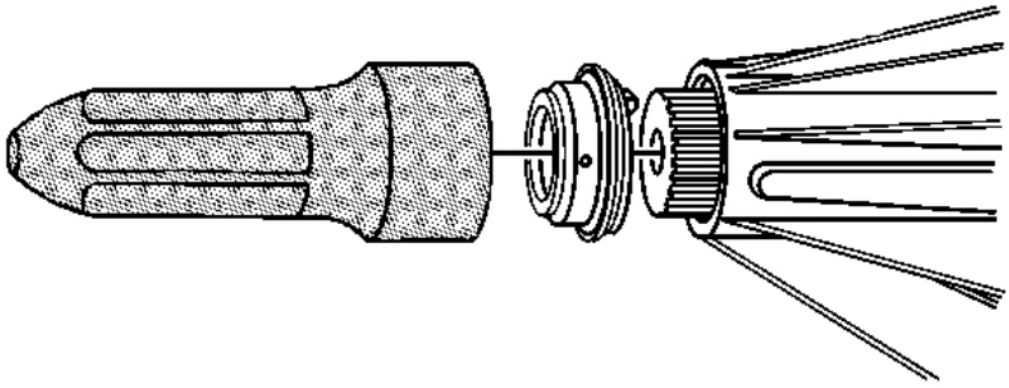


Fig. 57: Installing Output Shaft Seal
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Ensure the drain hole on the boot of the rear output shaft seal is facing down toward the ground.

2. Using the **J 37668-A** , install a NEW front output shaft seal. See **Special Tools**.
3. Install the rear propeller shaft. Refer to **Rear Propeller Shaft Replacement** in Propeller Shaft.
4. Check the fluid level. Add fluid if necessary.
5. Install the transfer case shield, if equipped. Refer to **Transfer Case Shield Replacement** .

TRANSFER CASE ASSEMBLY REPLACEMENT

Removal Procedure

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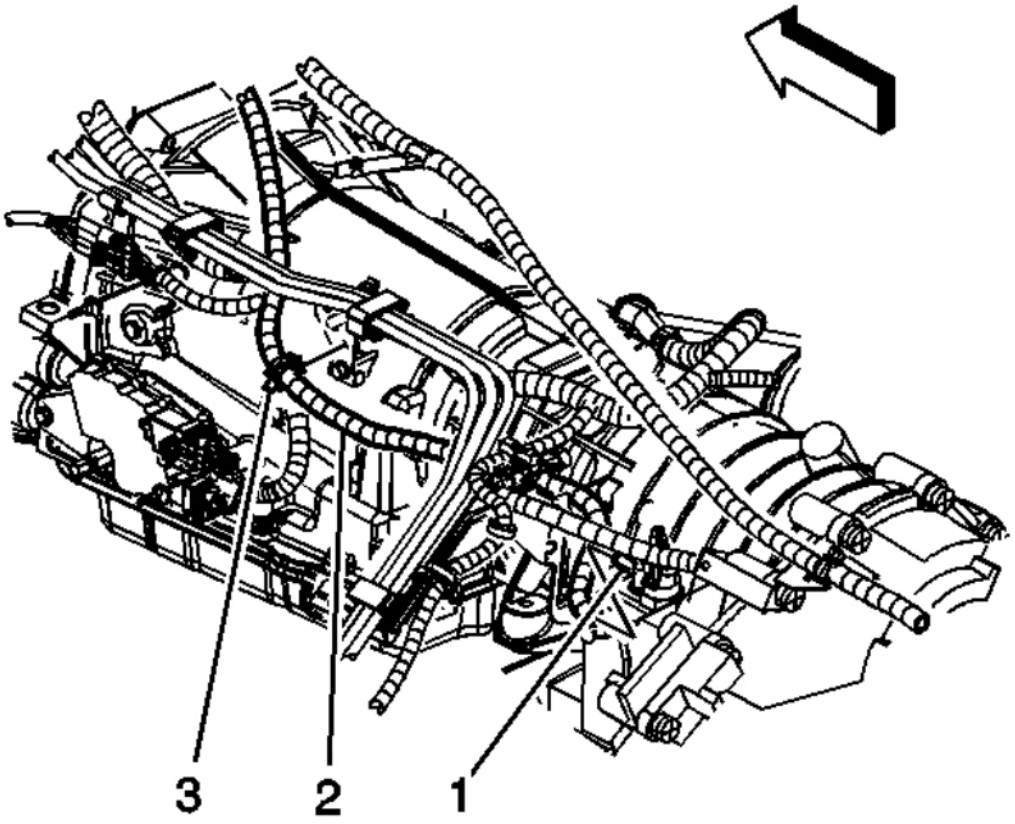


Fig. 58: Vent Hose & Transfer Case Fitting
Courtesy of GENERAL MOTORS CORP.

1. Remove the transfer case shield, if equipped. Refer to **Transfer Case Shield Replacement** .
2. Remove the front propeller shaft. Refer to **Front Propeller Shaft Replacement** in Propeller Shaft.
3. Remove the rear propeller shaft. Refer to **Rear Propeller Shaft Replacement** in Propeller Shaft.
4. Remove the vent hose (2) from the transfer case fitting (1).
5. Reposition the vent hose out of the way.

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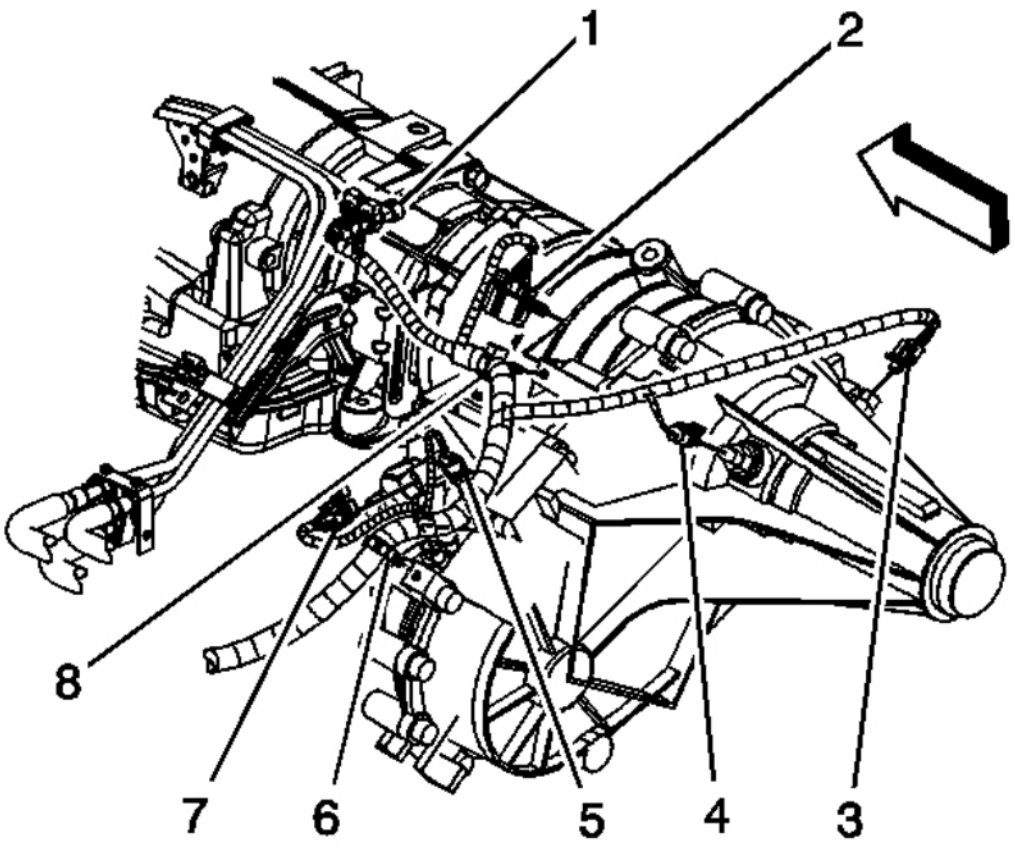


Fig. 59: Identifying External Transfer Case Components
Courtesy of GENERAL MOTORS CORP.

6. Remove the harness inline to engine harness connector (1) clip from the fuel feed and return pipe bracket.
7. Disconnect the encoder motor electrical connector (7).
8. Disconnect the speed sensor electrical connectors (3, 4, and 5).
9. Remove the harness clips (6, 8) from the transfer case.
10. Reposition the harness out of the way.

IMPORTANT: Ensure that the transfer case is correctly secured to the transmission jack.

11. Support the transfer case with a suitable transmission jack.

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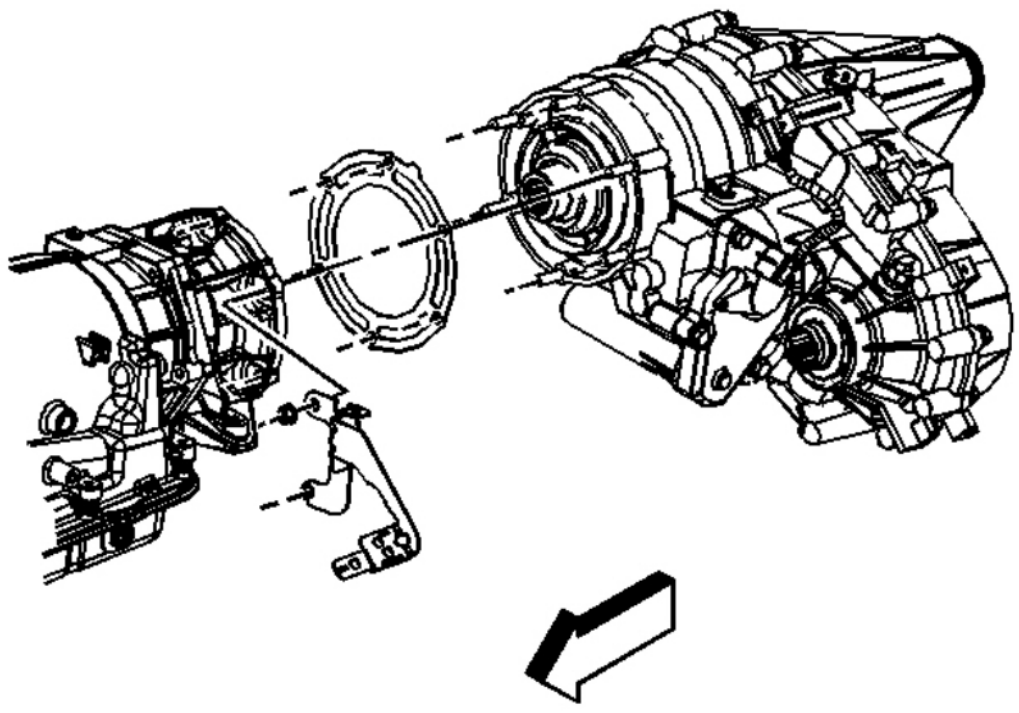


Fig. 60: View Of Transfer Case & Transmission
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: When removing the transfer case from the transmission, do not remove the transmission mount or the transfer case adapter.

12. Remove the transfer case adapter nuts.
13. Remove the fuel feed and return pipe bracket.
14. Separate the transfer case from the transmission by moving the transfer case straight back toward the rear of the vehicle.
15. Rotate the transfer case so that the transfer case is perpendicular to the transmission.
16. Lower the transfer case.

Installation Procedure

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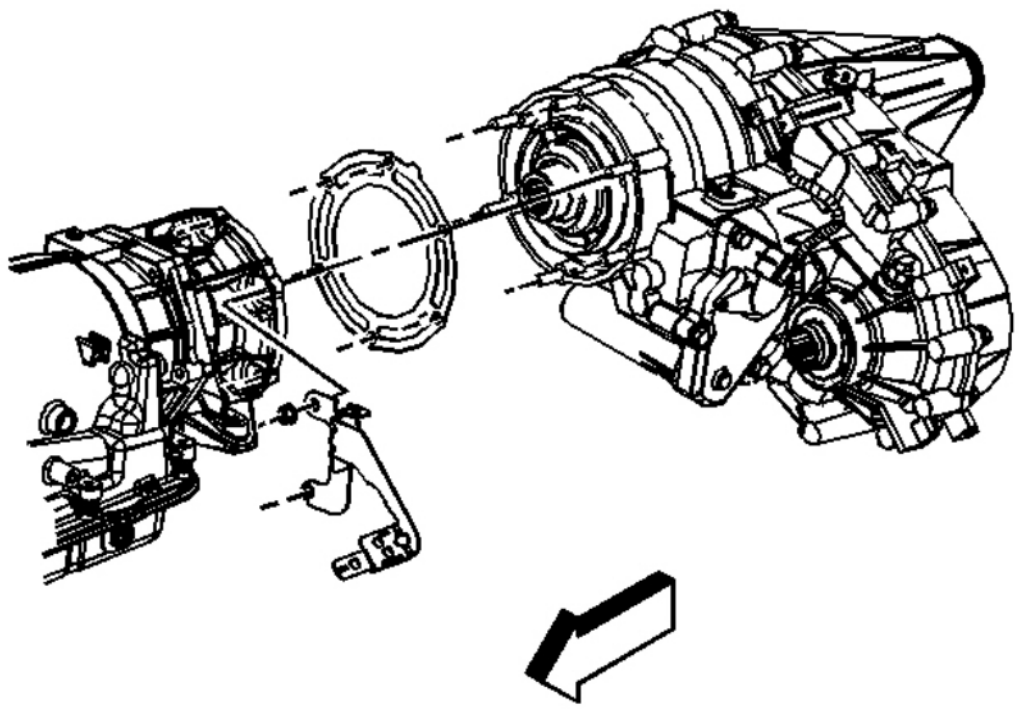


Fig. 61: View Of Transfer Case & Transmission
Courtesy of GENERAL MOTORS CORP.

1. Rotate the transfer case so that the transfer case is perpendicular to the transmission.
2. Raise the transfer case into position.
3. Rotate the transfer case so that the transfer case aligns with the transfer case adapter.
4. Install the transfer case.
5. Install the fuel feed and return pipe bracket.

NOTE: Refer to Fastener Notice in Cautions and Notices.

6. Install the transfer case adapter nuts.

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

7. Remove the transmission jack from the transfer case.

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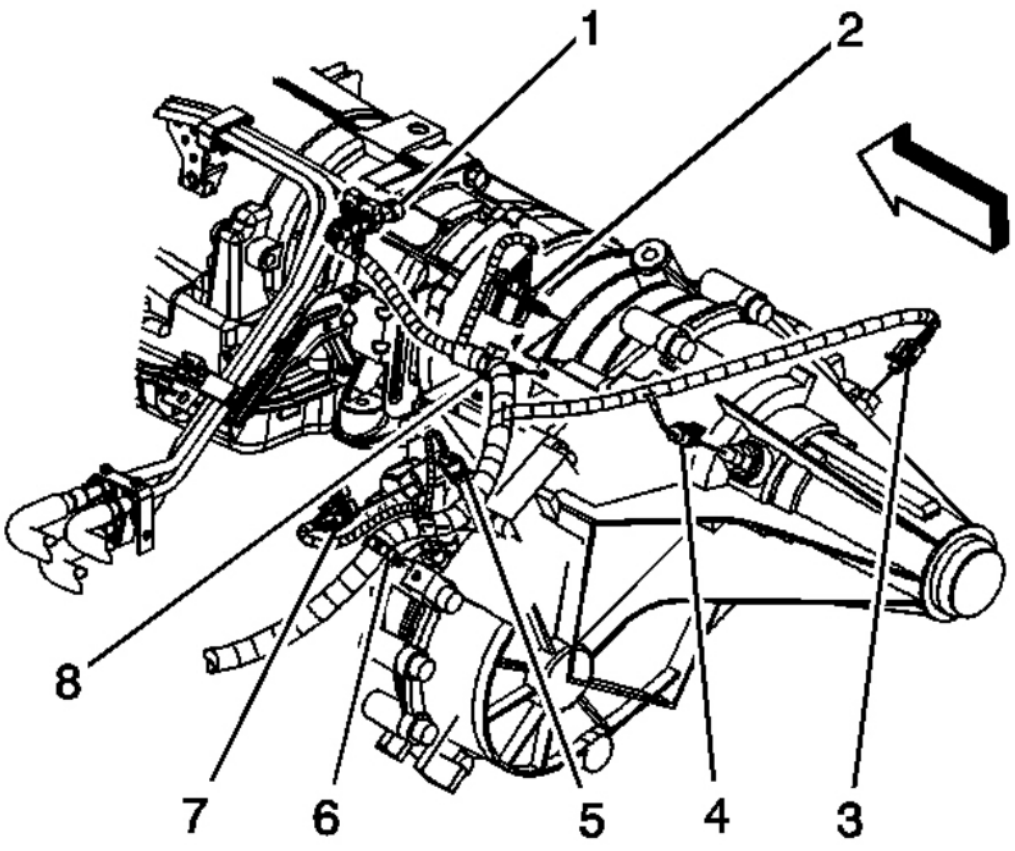


Fig. 62: Identifying External Transfer Case Components
Courtesy of GENERAL MOTORS CORP.

8. Position the harness to the transfer case.
9. Install the harness clips (6, 8) to the transfer case.
10. Connect the speed sensor electrical connectors (3, 4, and 5).
11. Connect the encoder motor electrical connector (7).
12. Install the harness inline to engine harness connector (1) clip to the fuel feed and return pipe bracket.

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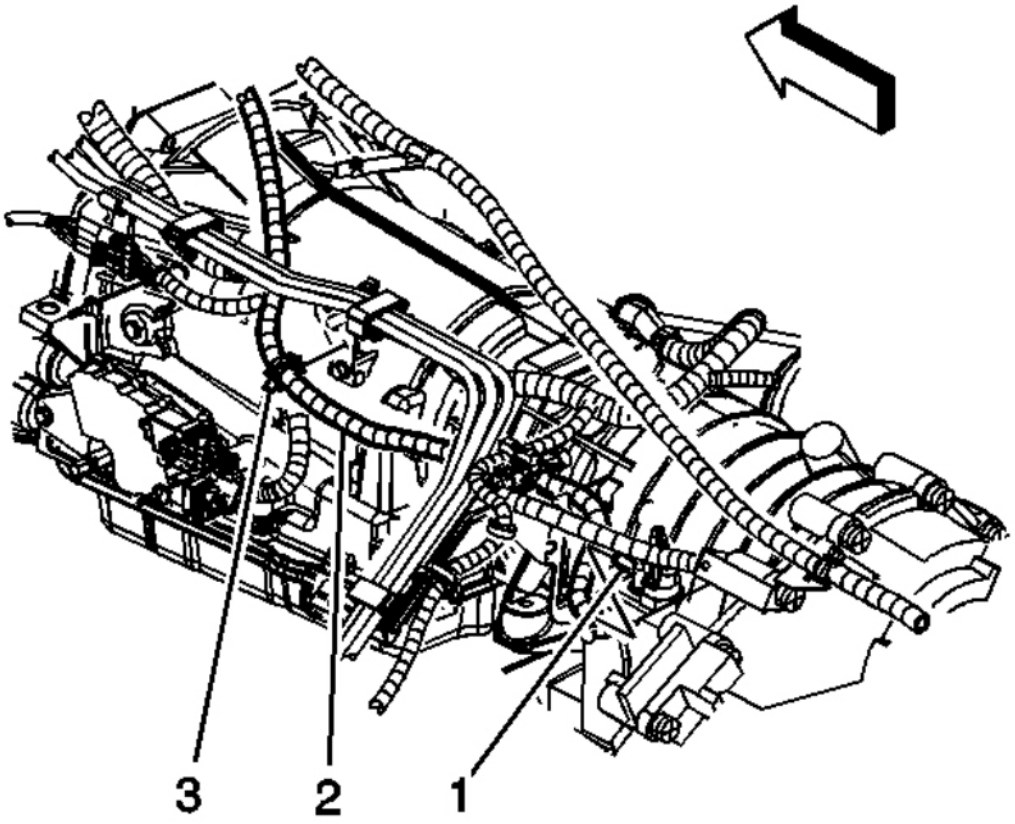


Fig. 63: Vent Hose & Transfer Case Fitting
Courtesy of GENERAL MOTORS CORP.

13. Position the vent hose to the transfer case.
14. Install the vent hose (2) to the transfer case fitting (1).
15. Install the rear propeller shaft. Refer to **Rear Propeller Shaft Replacement** in Propeller Shaft.
16. Install the front propeller shaft. Refer to **Front Propeller Shaft Replacement** in Propeller Shaft.
17. Install the transfer case shield, if equipped. Refer to **Transfer Case Shield Replacement** .

TRANSFER CASE ADAPTER REPLACEMENT

Removal Procedure

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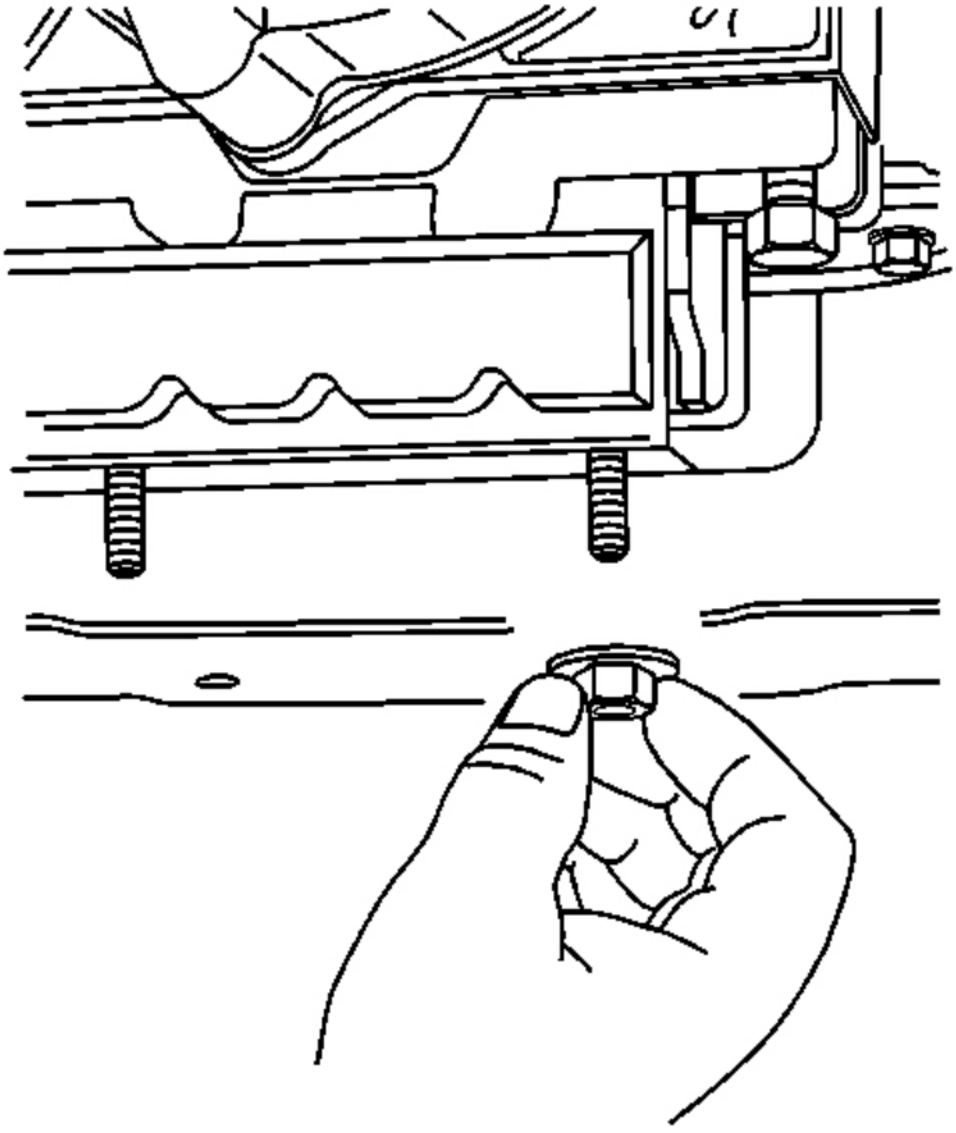


Fig. 64: Identifying Transmission Mount Nuts
Courtesy of GENERAL MOTORS CORP.

1. Remove the transfer case. Refer to **Transfer Case Assembly Replacement**.
2. Support the transmission with a suitable jack stand.
3. Remove the transmission mount nuts.

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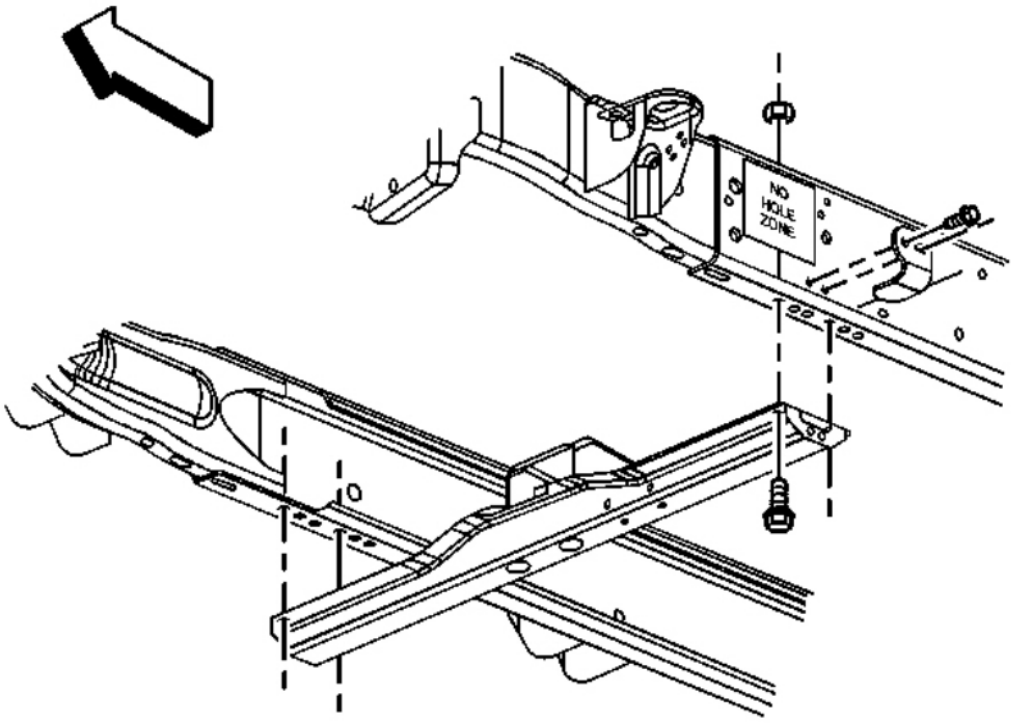


Fig. 65: Identifying Crossmember & Bolts
Courtesy of GENERAL MOTORS CORP.

4. Remove the crossmember bolts.
5. Remove the crossmember.

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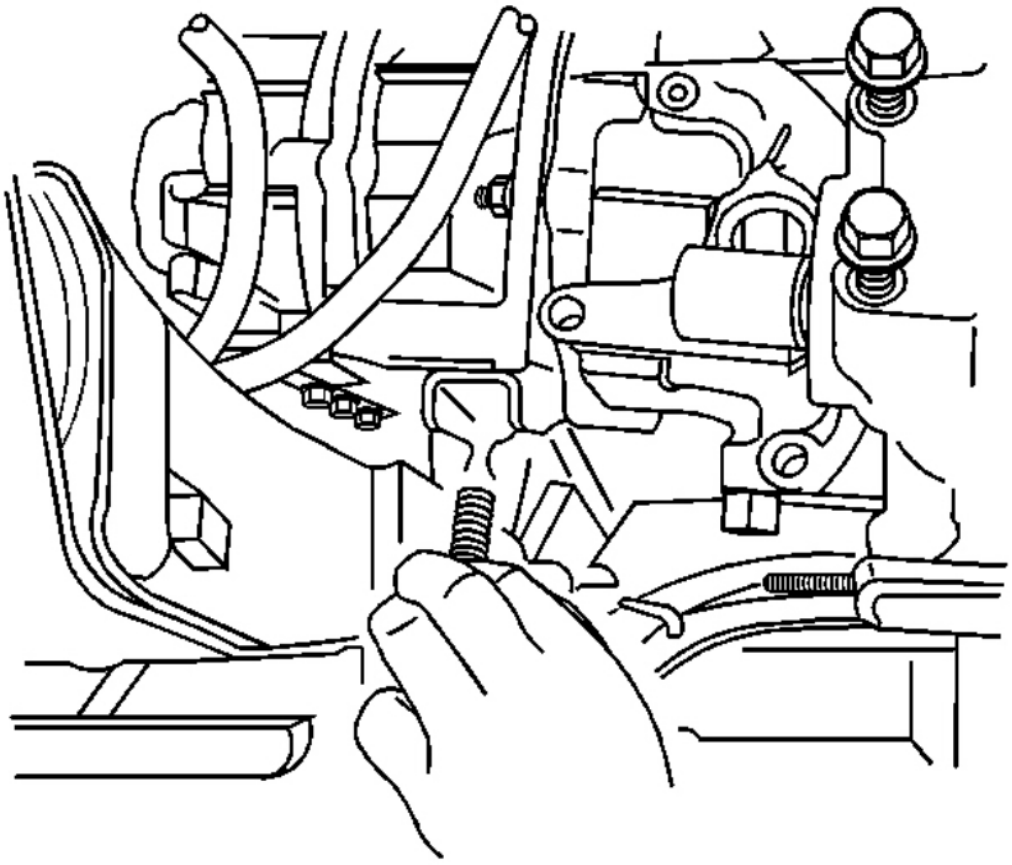


Fig. 66: Removing Transmission Mount Bolts
Courtesy of GENERAL MOTORS CORP.

6. Remove the transmission mount bolts.

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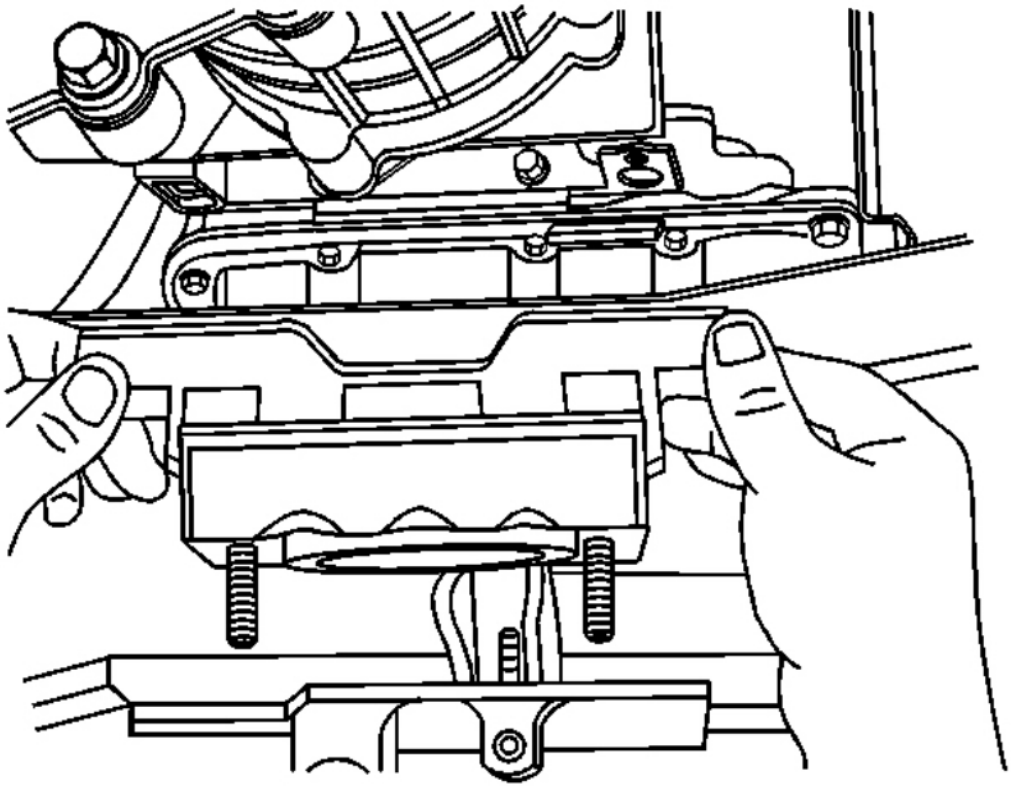


Fig. 67: View Of Transmission Mount
Courtesy of GENERAL MOTORS CORP.

7. Remove the transmission mount.

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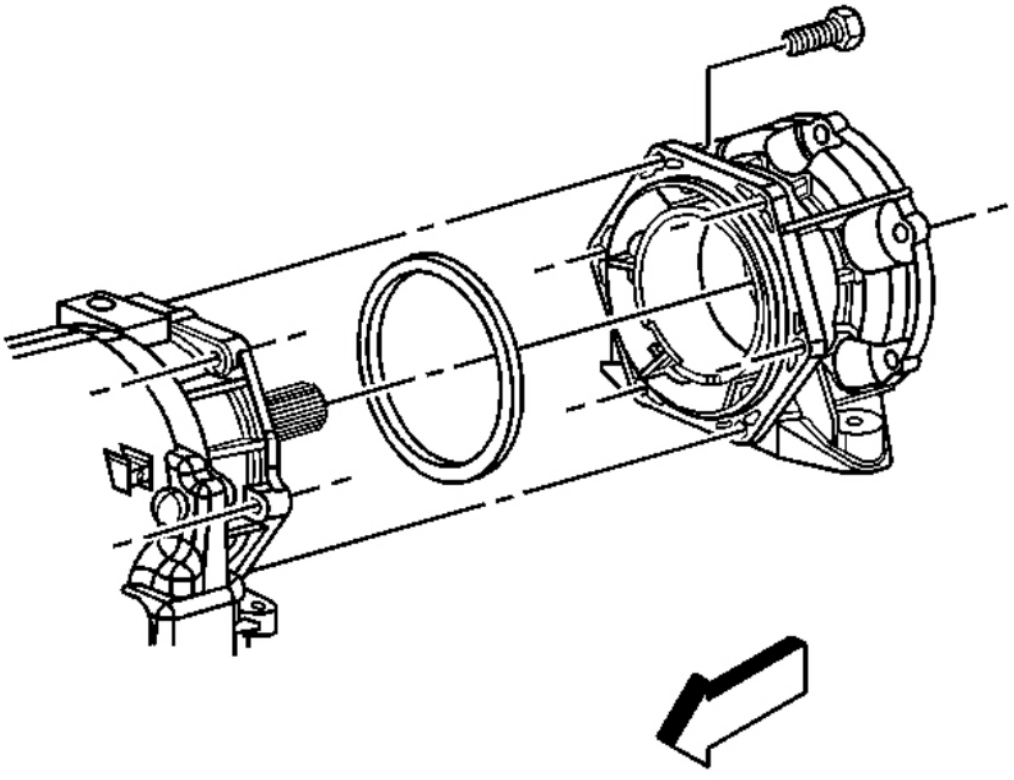


Fig. 68: View Of Transfer Case Adapter, Bolts & Seal
Courtesy of GENERAL MOTORS CORP.

8. Remove the transfer case adapter bolts.
9. Remove the transfer case adapter.
10. Remove the transfer case seal.

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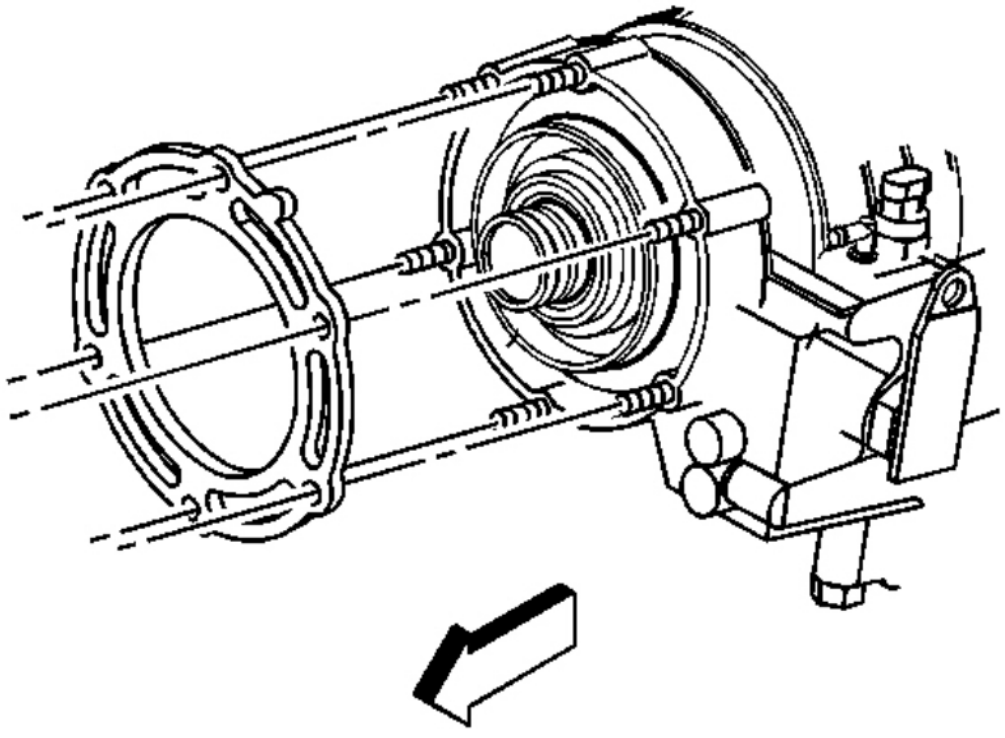


Fig. 69: View Of Transfer Case Gasket
Courtesy of GENERAL MOTORS CORP.

11. Remove the transfer case gasket, if necessary.

Installation Procedure

IMPORTANT: If the gasket or the seal becomes damaged, replace it. DO NOT use any type of silicone sealer or liquid gasket maker in place of the seal or gasket.

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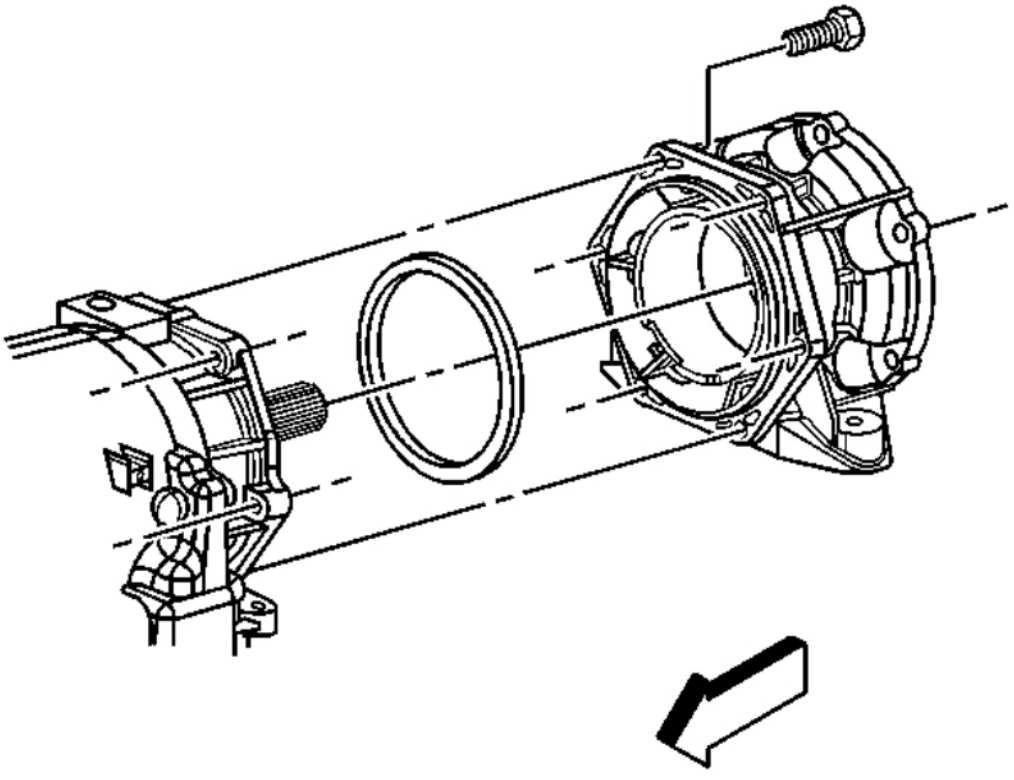


Fig. 70: View Of Transfer Case Adapter, Bolts & Seal
Courtesy of GENERAL MOTORS CORP.

1. Install a NEW transfer case adapter seal.
2. Install the transfer case adapter.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the transfer case adapter bolts.

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

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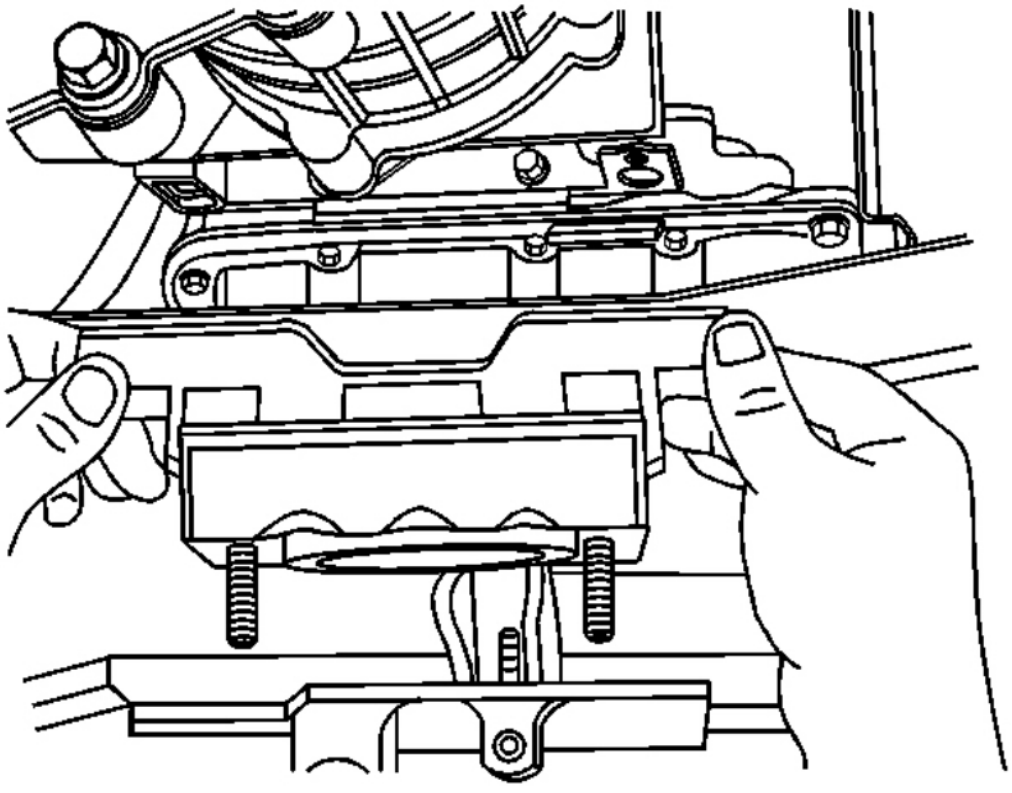


Fig. 71: View Of Transmission Mount
Courtesy of GENERAL MOTORS CORP.

4. Install the transmission mount.

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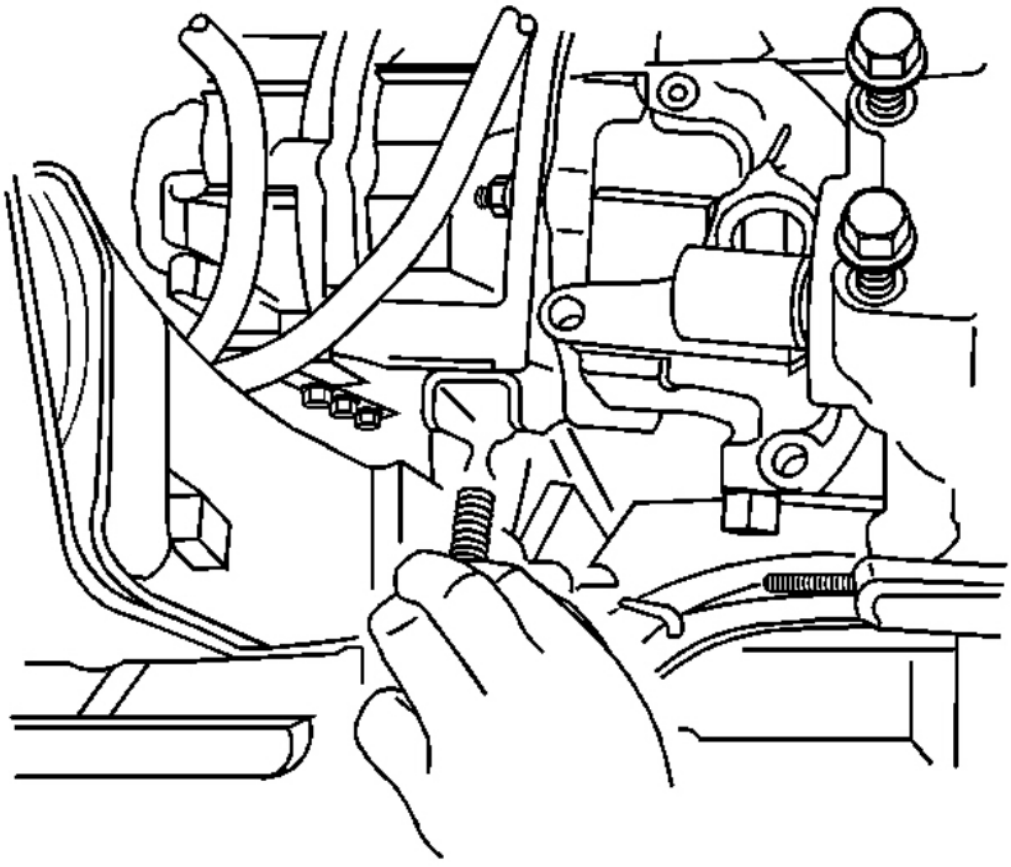


Fig. 72: Installing Transmission Mount Bolts
Courtesy of GENERAL MOTORS CORP.

5. Install the transmission mount bolts.

   Tighten: Tighten the bolts to 47 N.m (35 lb ft).

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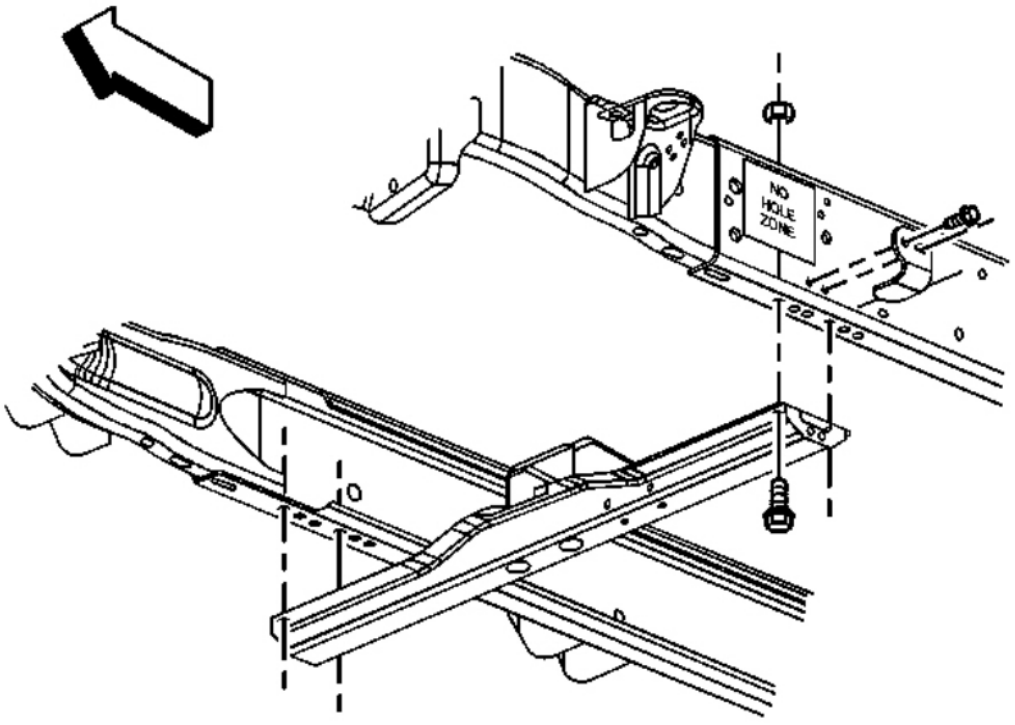


Fig. 73: Identifying Crossmember & Bolts
Courtesy of GENERAL MOTORS CORP.

6. Install the crossmember.
7. Install the crossmember bolts.

Tighten: Tighten the bolts to 70 N.m (52 lb ft).

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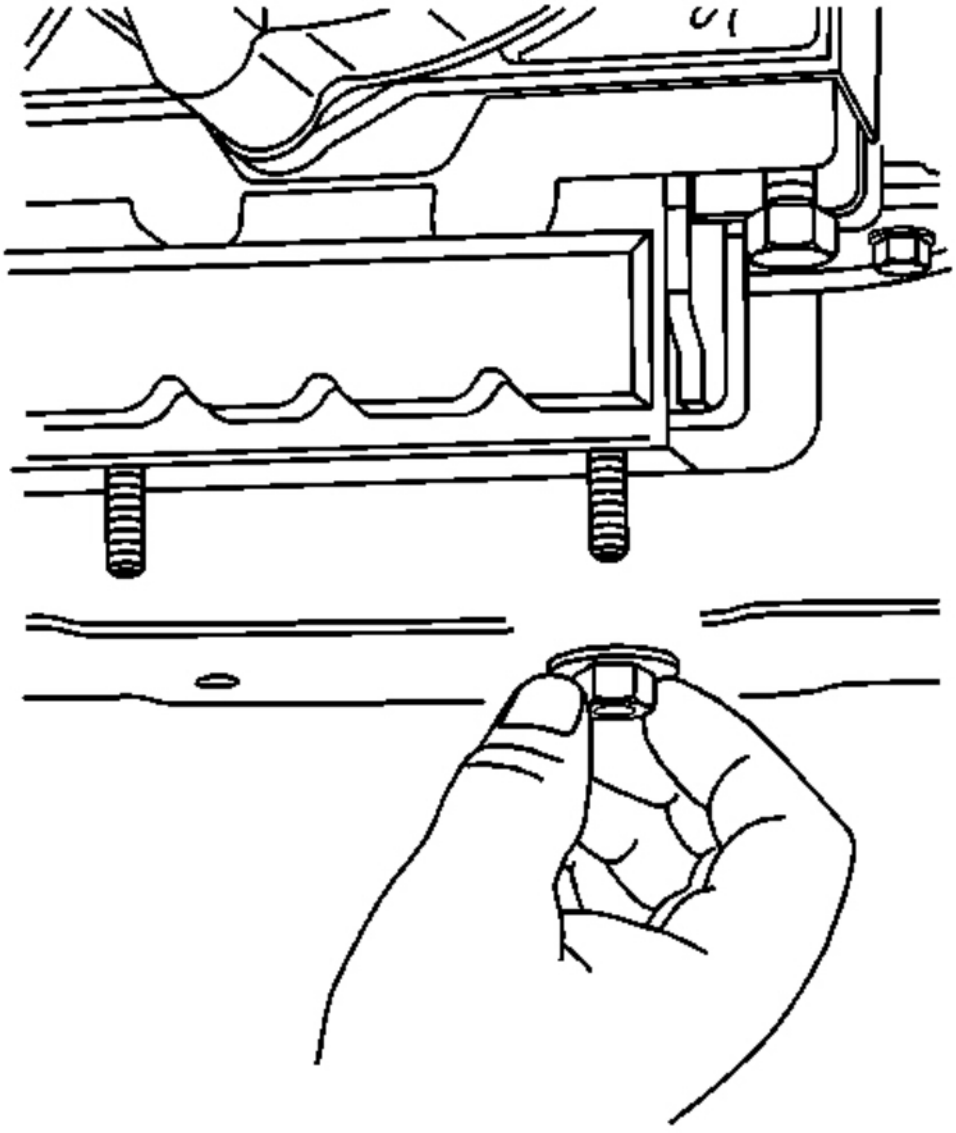


Fig. 74: Identifying Transmission Mount Nuts
Courtesy of GENERAL MOTORS CORP.

8. Install the transmission mount nuts.

   Tighten: Tighten the nuts to 40 N.m (30 lb ft).

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9. Remove the transmission jack.

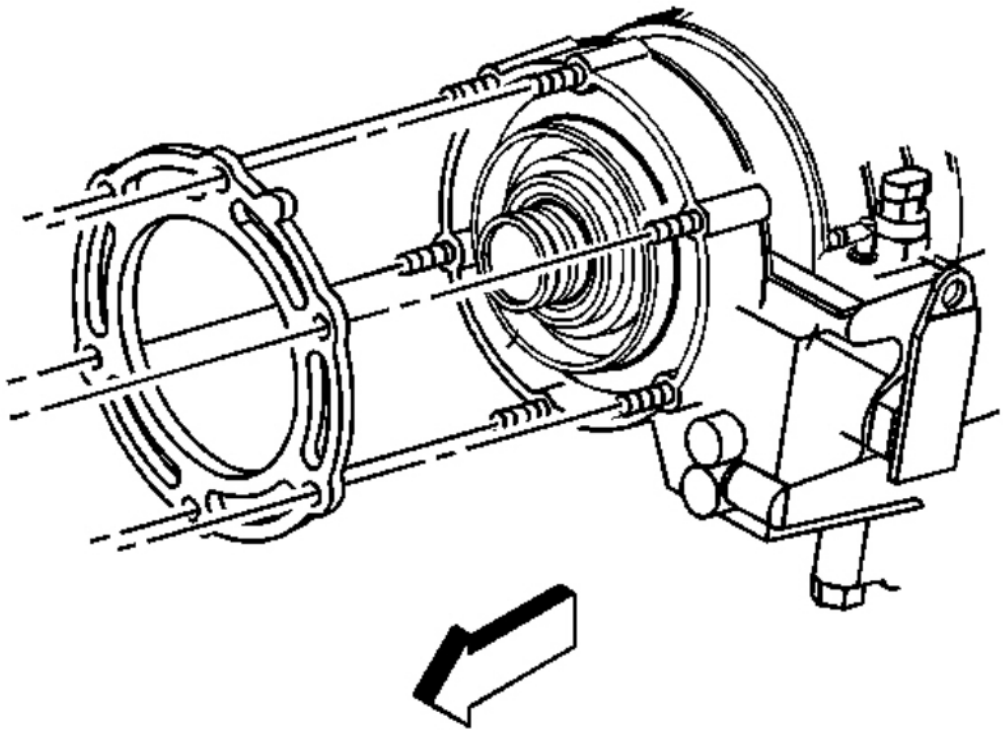


Fig. 75: View Of Transfer Case Gasket
Courtesy of GENERAL MOTORS CORP.

10. Install a NEW transfer case gasket, if necessary.
11. Install the transfer case. Refer to **Transfer Case Assembly Replacement**.
12. Check the fluid level. Add fluid if necessary.

TRANSFER CASE INPUT SHAFT SEAL REPLACEMENT

Tools Required

J 42738 Seal Installer

Removal Procedure

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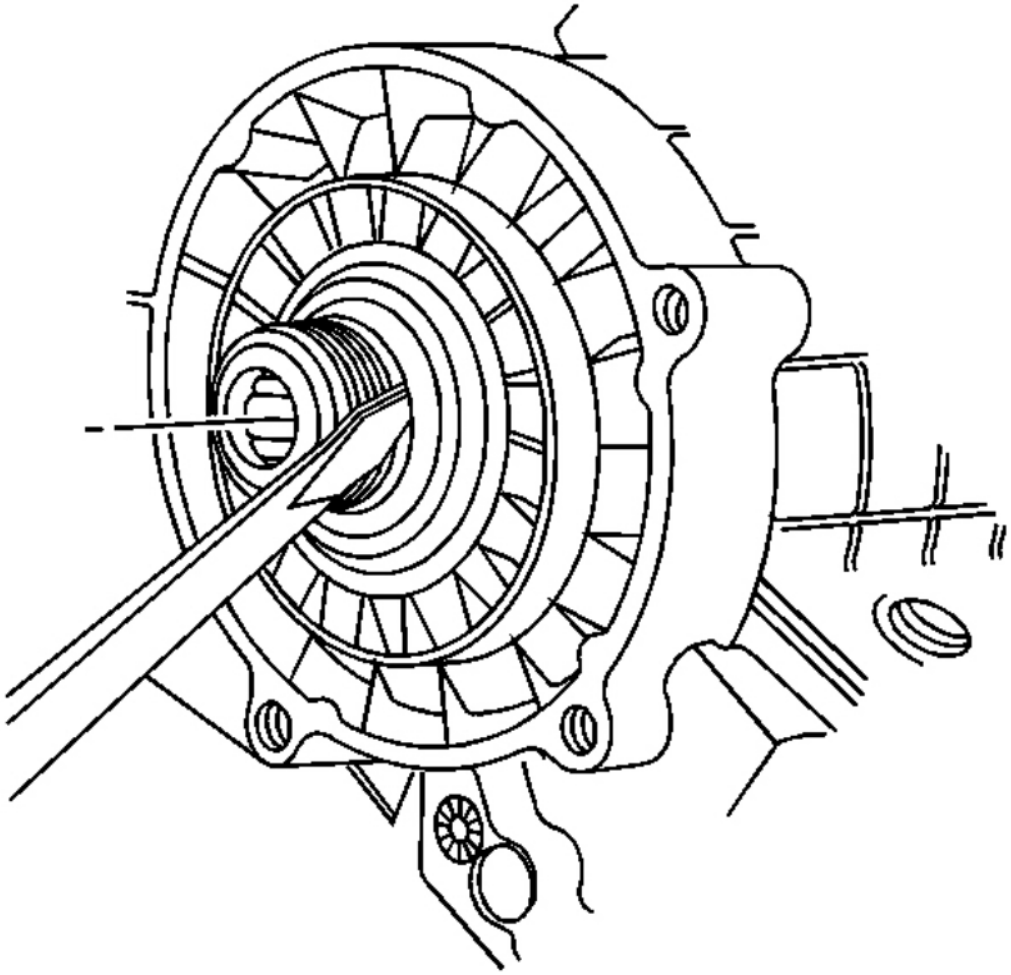


Fig. 76: Removing Input Shaft Seal
Courtesy of GENERAL MOTORS CORP.

1. Remove the transfer case. Refer to **Transfer Case Assembly Replacement**.
2. Using a flat-tipped screwdriver, remove the input shaft seal.

Installation Procedure

IMPORTANT: When installing the input shaft seal, make sure that the part numbers on the seal are facing outward (away from the body of the transfer case).

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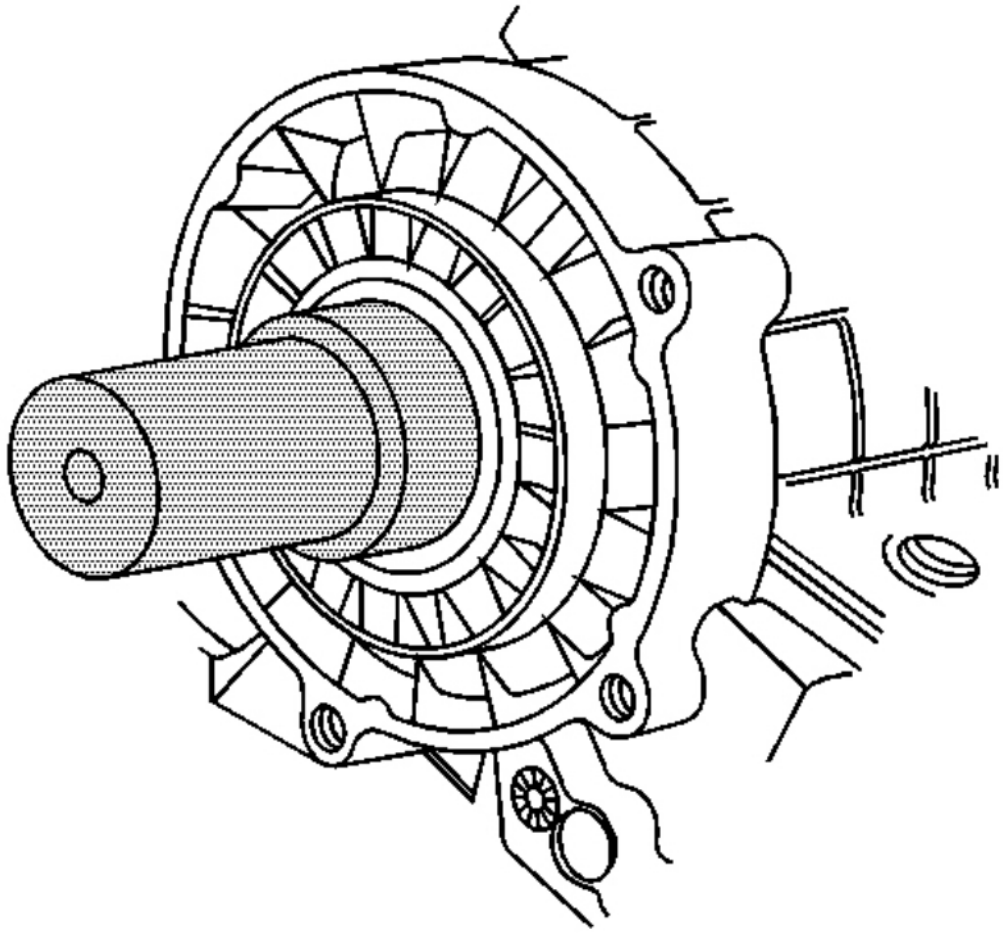


Fig. 77: Installing Transfer Case Input Shaft Seal
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The input shaft seal should be even with the surface of the transfer case after installation.

1. Align the transfer case input shaft seal evenly on the input shaft.
2. Using the **J 42738** , install the transfer case input shaft seal.
3. Install the transfer case. Refer to **Transfer Case Assembly Replacement**.
4. Check the fluid level. Add fluid if necessary.

TRANSFER CASE SHIFT CONTROL SWITCH REPLACEMENT

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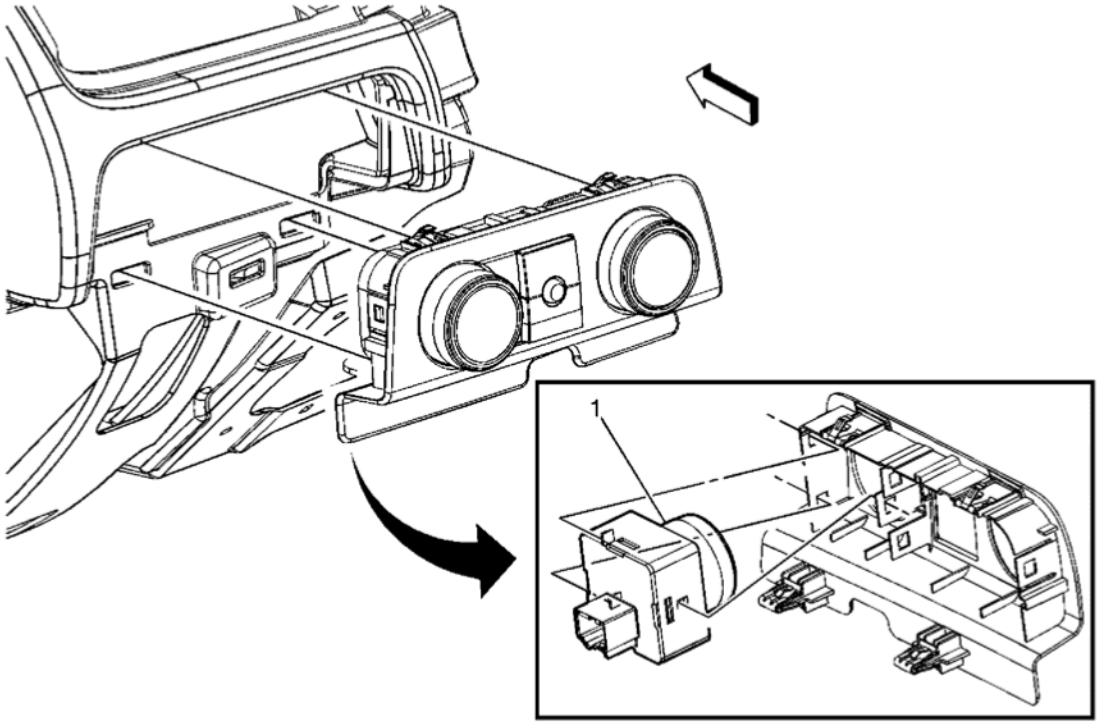


Fig. 78: View Of Transfer Case Control Switch
Courtesy of GENERAL MOTORS CORP.

Transfer Case Shift Control Switch Replacement

Callout	Component Name
Preliminary Procedure: Remove the headlight bezel. Refer to **Headlamp Switch Bezel Replacement** .	
1	Switch, Transfer Case Control **Tip:** • Disconnect the electrical connectors from the headlight and control switches. • It may be necessary to use a small flat bladed screw driver to depress the locking tabs to remove the control switch.

TRANSFER CASE SHIFT CONTROL MODULE REPLACEMENT

Removal Procedure

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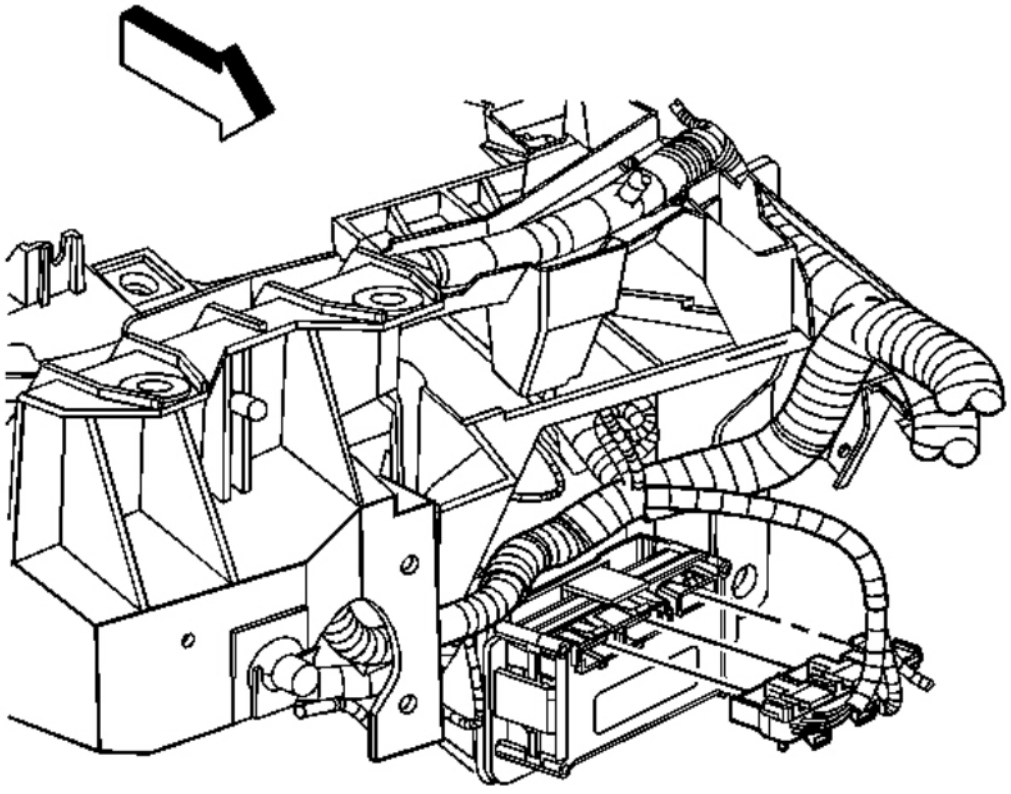


Fig. 79: View Of Shift Control Module Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

1. Disconnect the shift control module electrical connectors.

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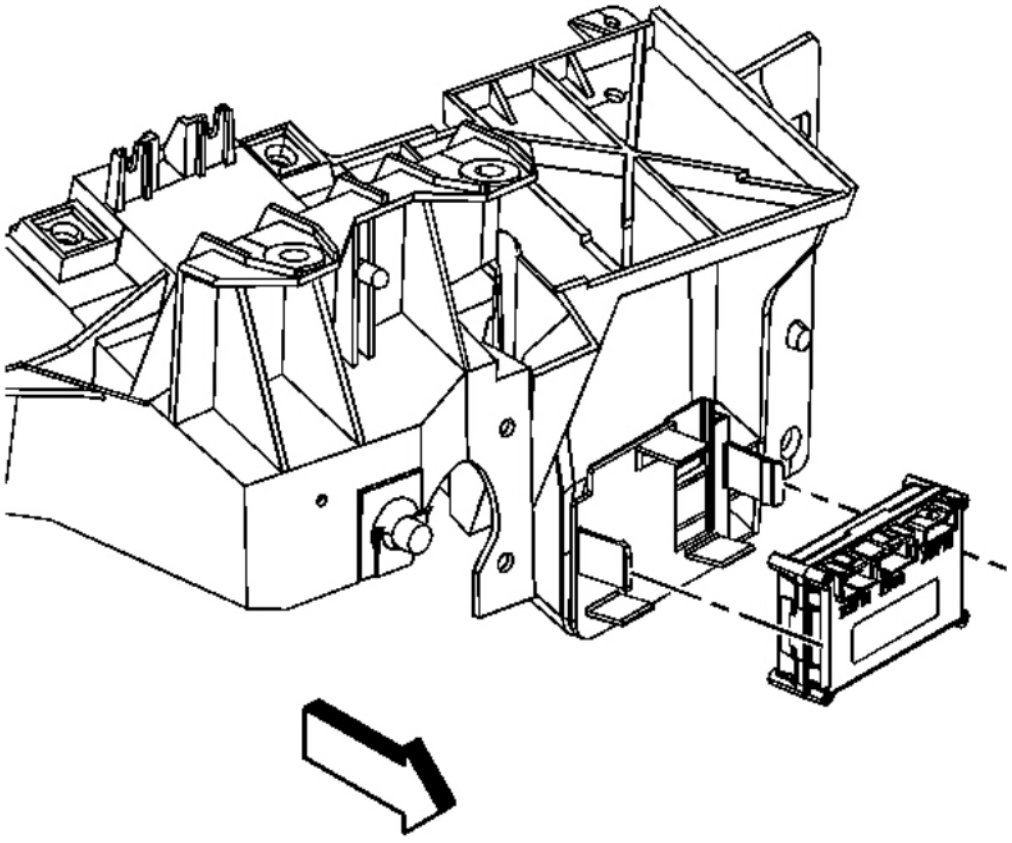


Fig. 80: View Of Shift Control Module
Courtesy of GENERAL MOTORS CORP.

2. Unsnap and remove the shift control module from the bracket.

Installation Procedure

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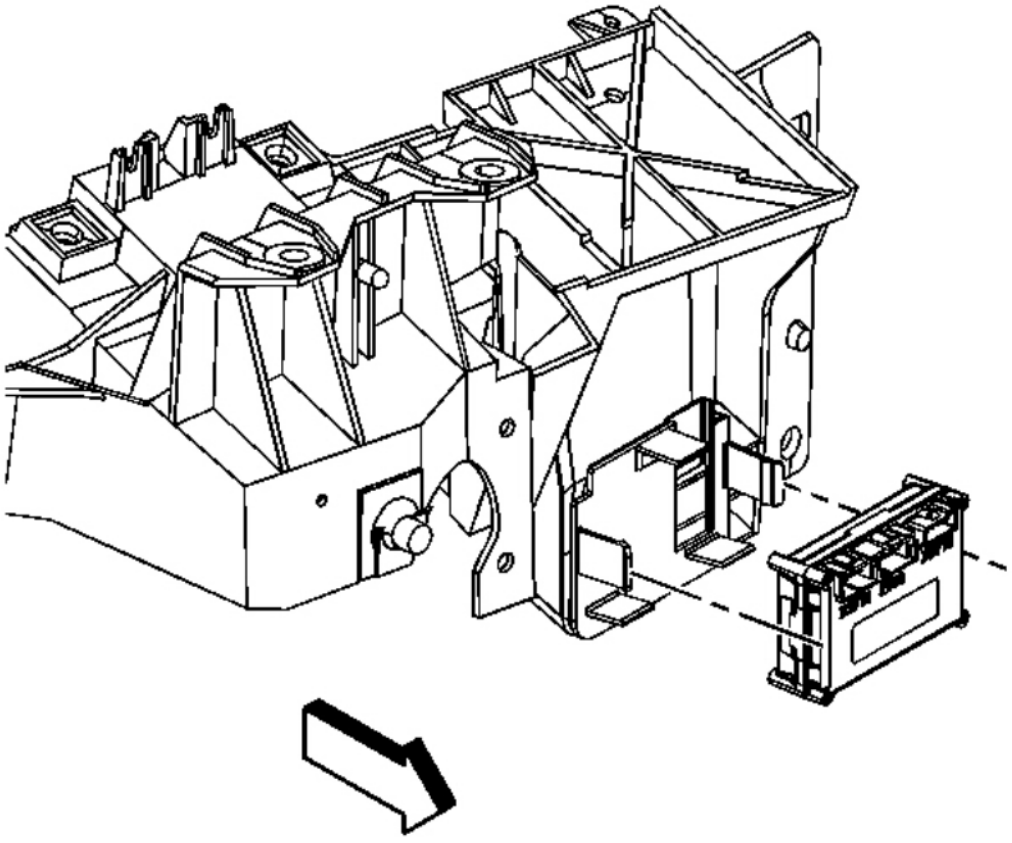


Fig. 81: View Of Shift Control Module
Courtesy of GENERAL MOTORS CORP.

1. If a NEW control module is being installed, program the new module. Refer to **Control Module References** .
2. Install the shift control module to the bracket.

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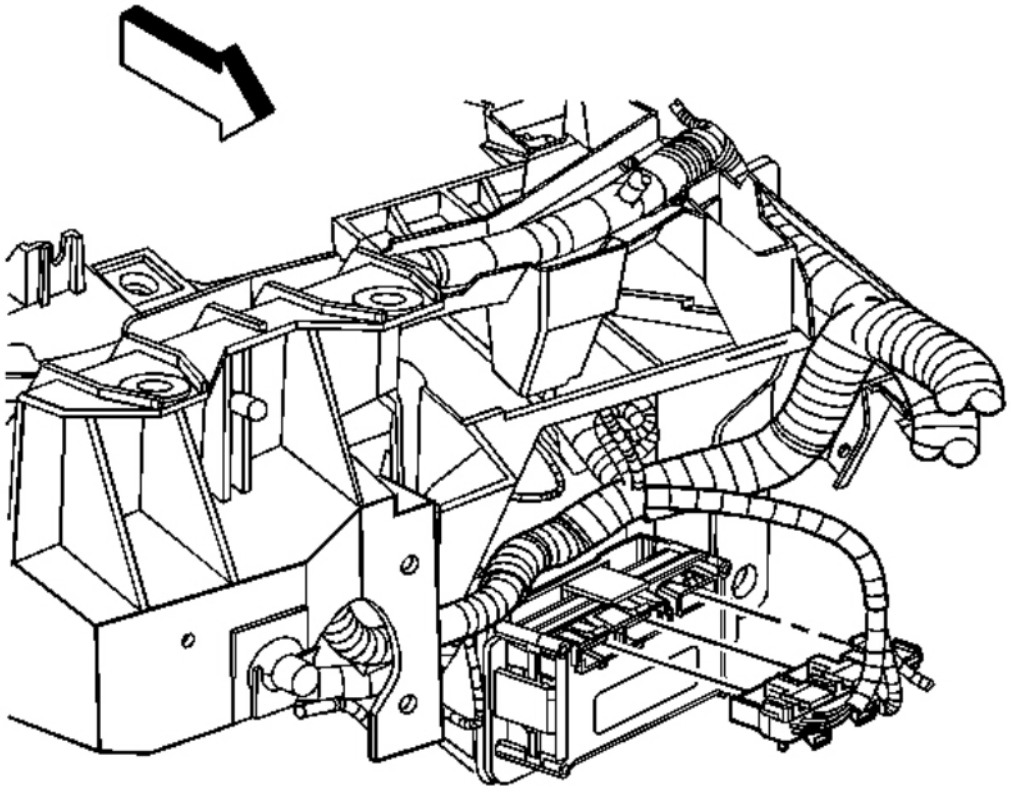


Fig. 82: View Of Shift Control Module Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

3. Connect the shift control module electrical connectors.
4. Start the engine and test the automatic transfer case system for proper shift operation.

TRANSFER CASE DISASSEMBLE

Tools Required

- **J 3289-20** Holding Fixture
- **J 23907** Slide Hammer with Bearing Adapter. See **Special Tools**.
- **J 26941** Bushing and Bearing Remover - 3-4 inch
- **J 45380** Transfer Case Rear Bushing Remover and Installer. See **Special Tools**.
- **J 45759** Assembly Fixture

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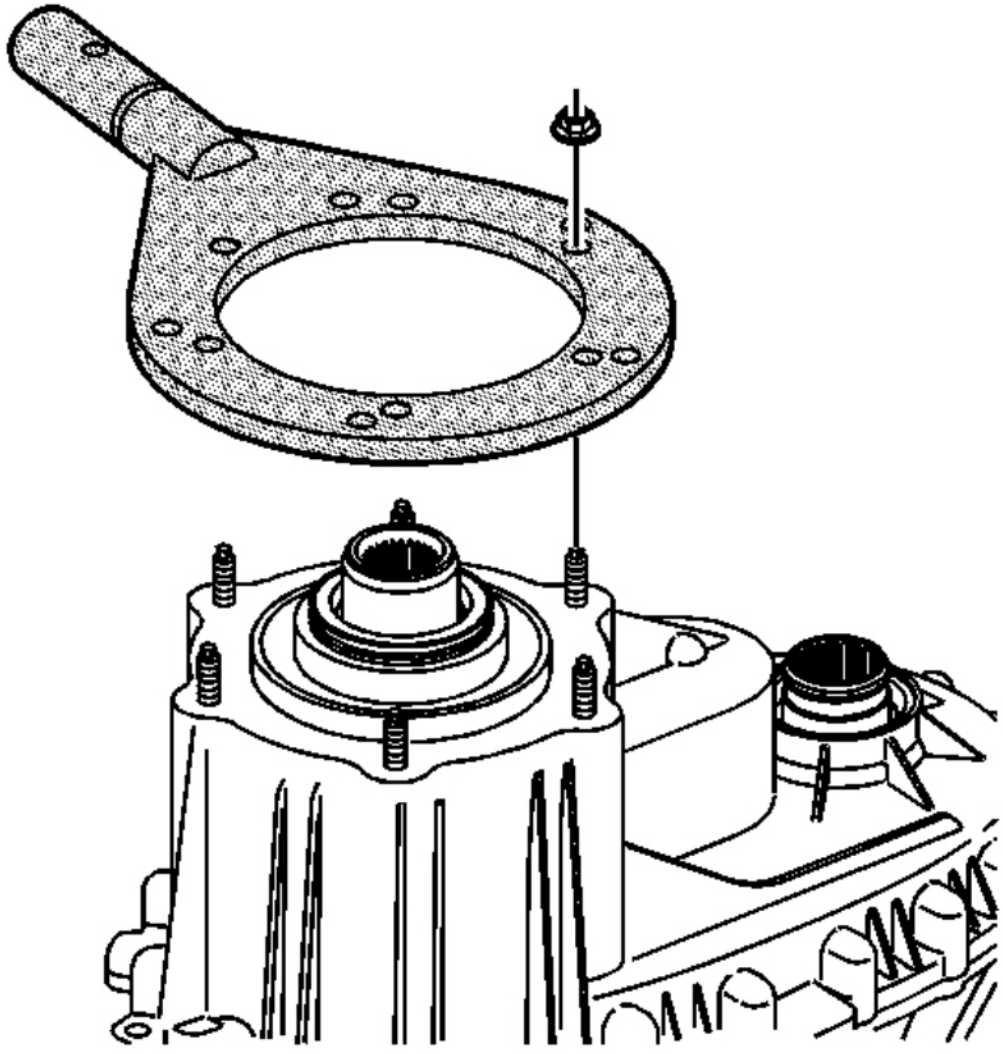


Fig. 83: Identifying J 45759
Courtesy of GENERAL MOTORS CORP.

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

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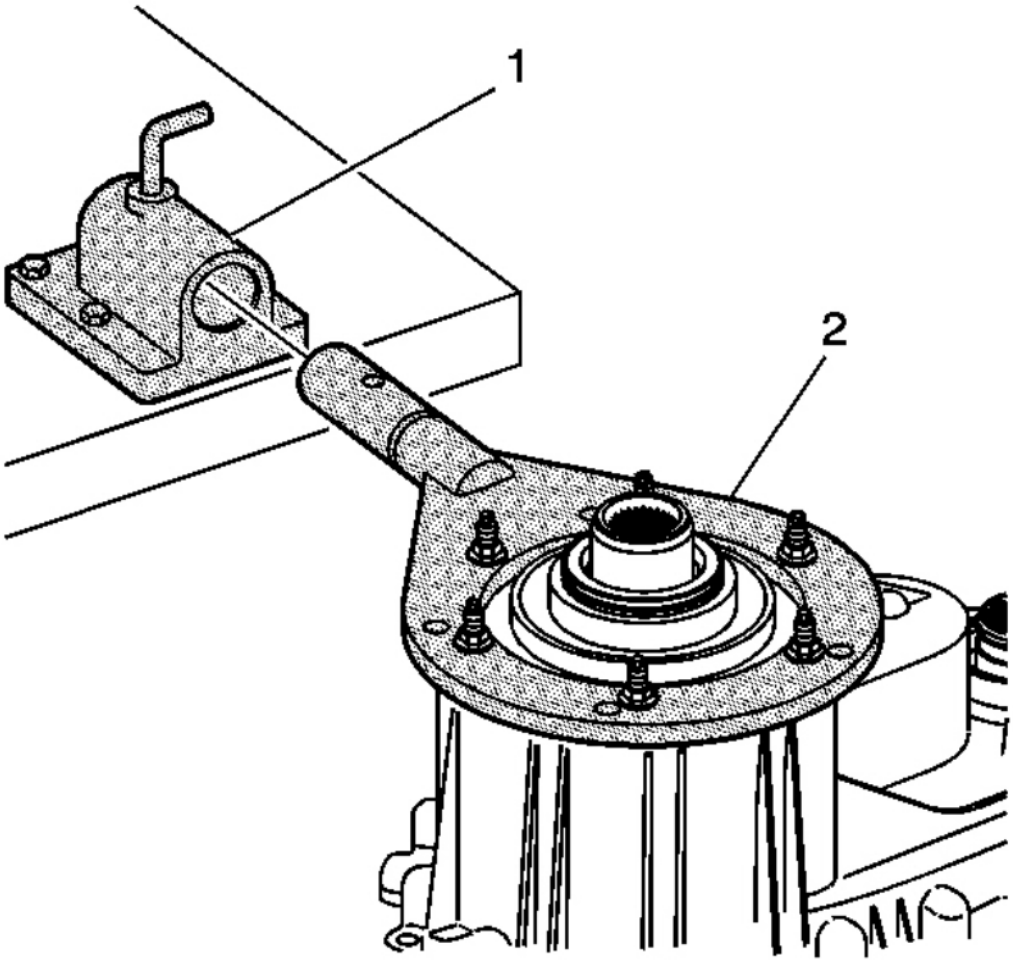


Fig. 84: View Of Front Transfer Case Bench Mount
Courtesy of GENERAL MOTORS CORP.

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

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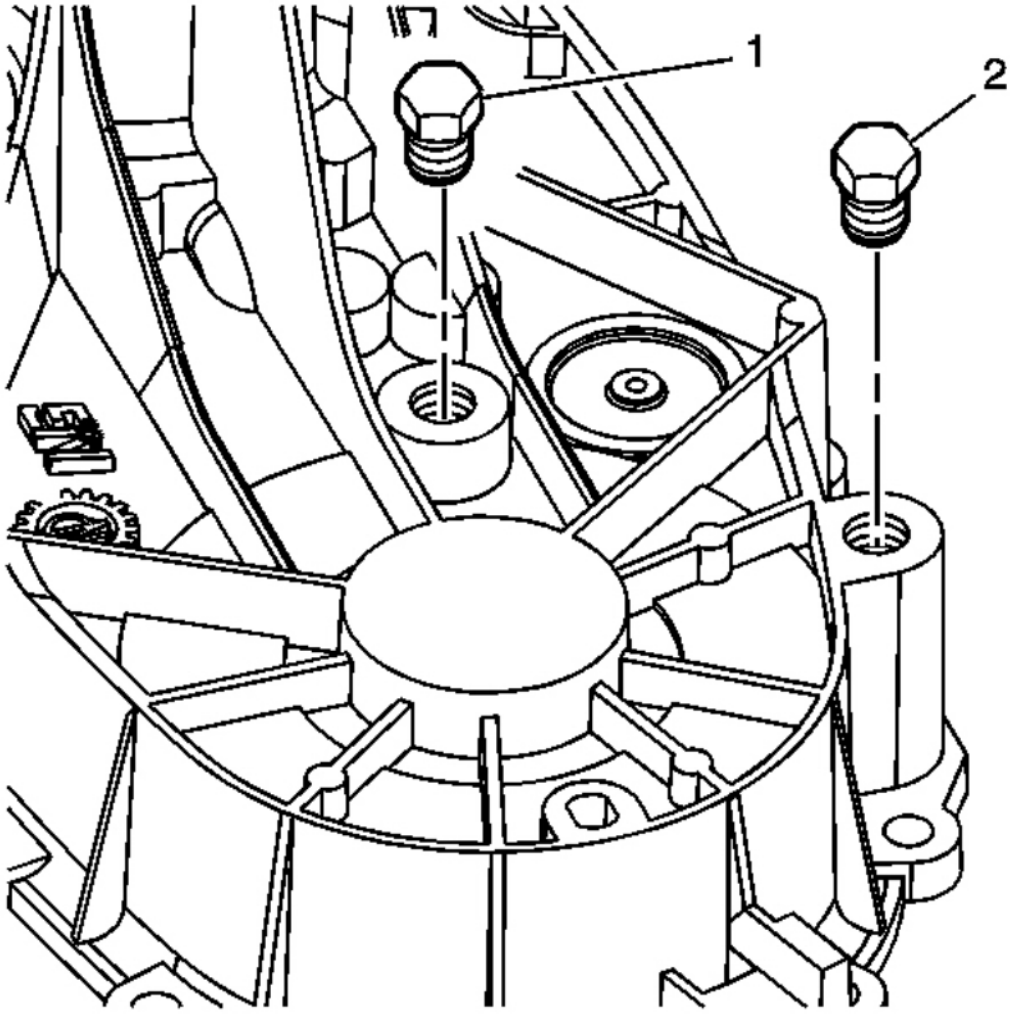


Fig. 85: Locating Drain & Fill Plugs
Courtesy of GENERAL MOTORS CORP.

4. Remove the fill plug (1) and the drain plug (2) and drain the transfer case fluid.

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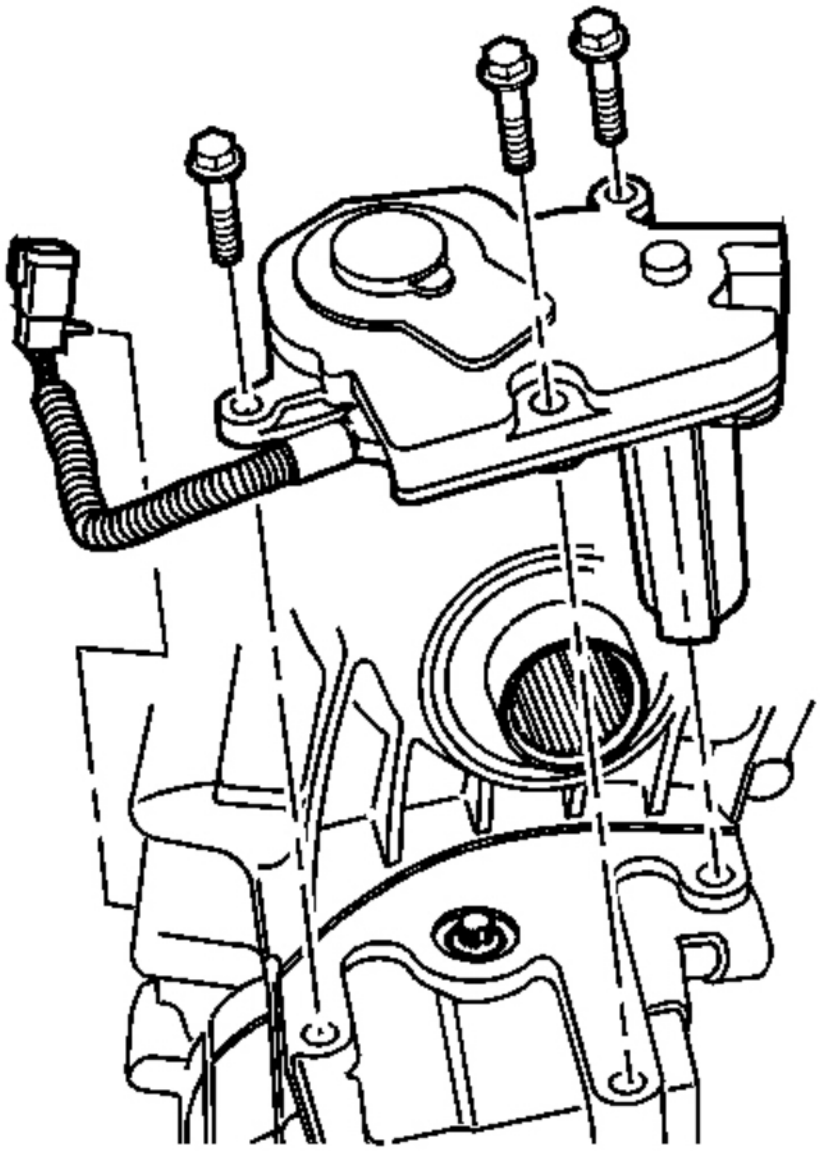


Fig. 86: View Of Actuator Encoder Motor Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

5. Remove the connector, for the actuator encoder motor wiring harness, from the bracket.
6. Remove the actuator encoder motor mounting bolts.
7. Remove the actuator encoder motor assembly.

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8. Remove the actuator insulator gasket.

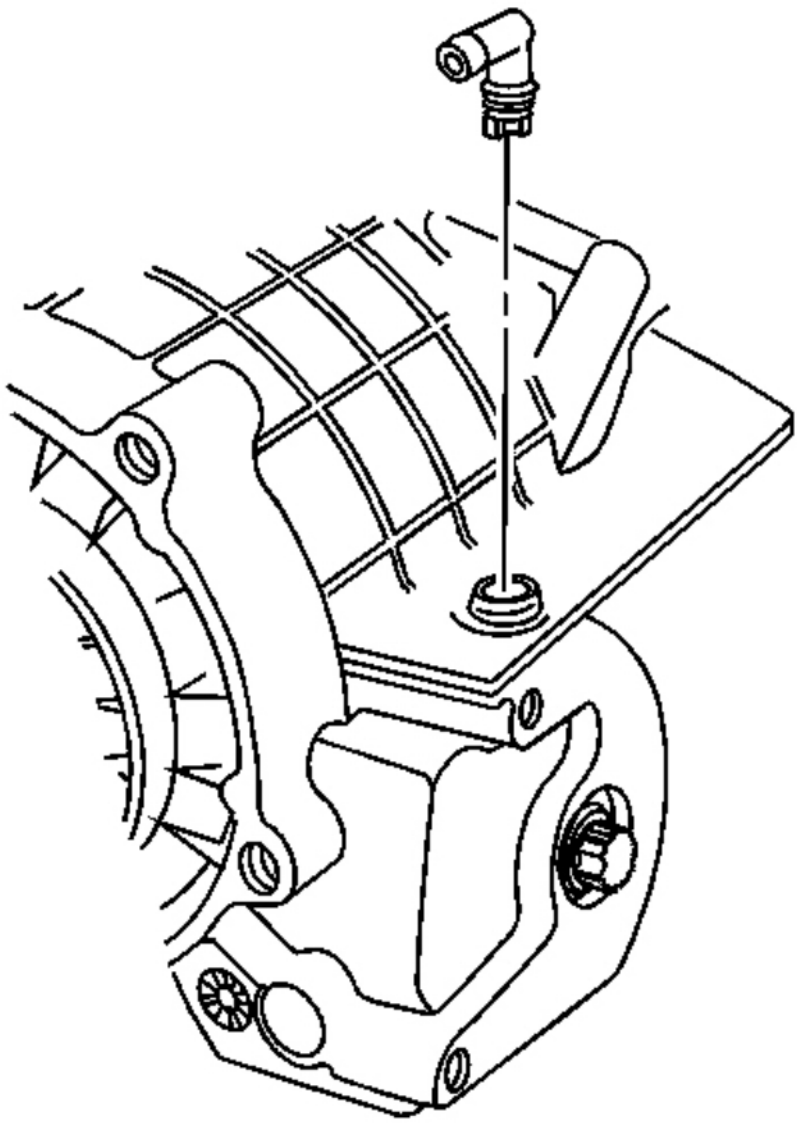


Fig. 87: Identifying Case Vent & Seal
Courtesy of GENERAL MOTORS CORP.

9. Remove the vent and the seal, only if damaged.

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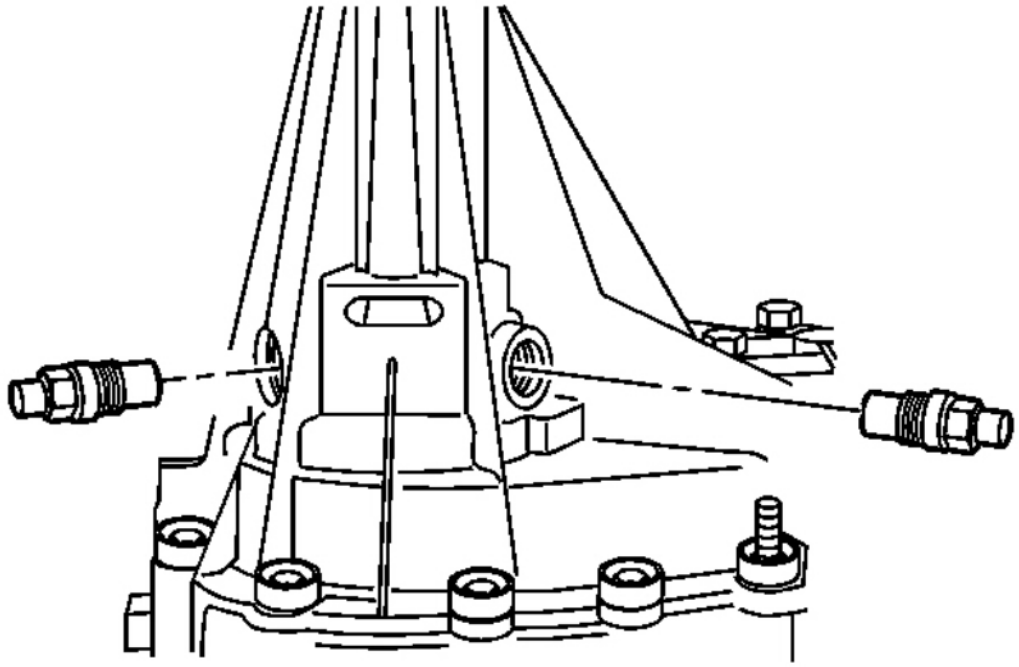


Fig. 88: View Of Left Rear & Right Rear Speed Sensor
Courtesy of GENERAL MOTORS CORP.

10. Remove the rear vehicle speed sensors (VSS).

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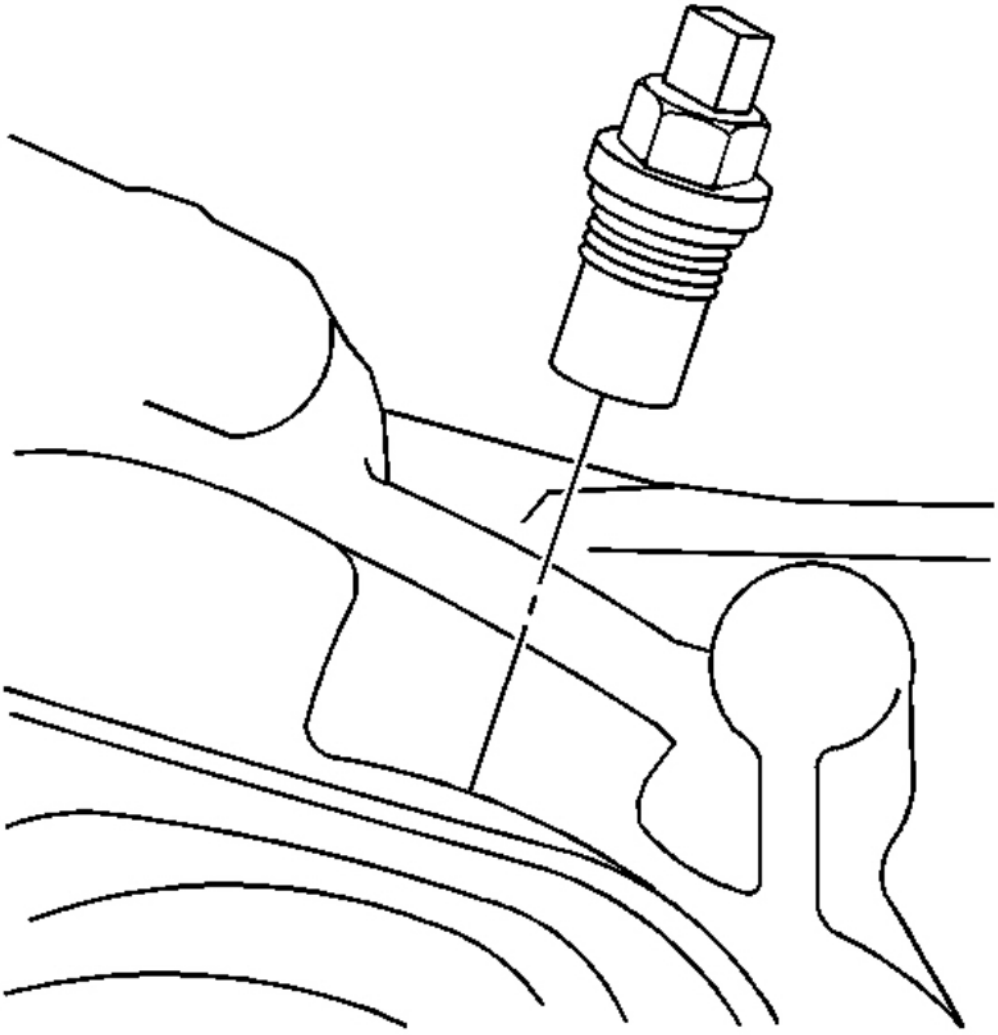


Fig. 89: View Of Vehicle Speed Sensor
Courtesy of GENERAL MOTORS CORP.

11. Remove the front VSS.

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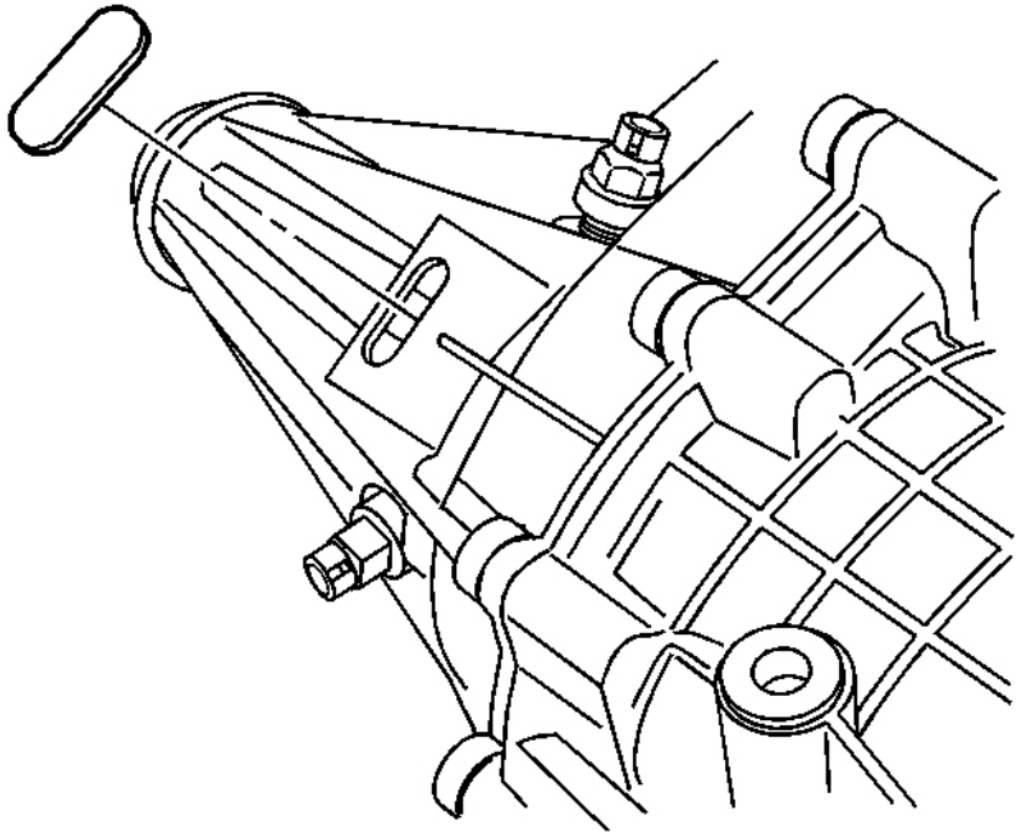


Fig. 90: Identifying Rubber Plug
Courtesy of GENERAL MOTORS CORP.

12. Remove the access hole plug.

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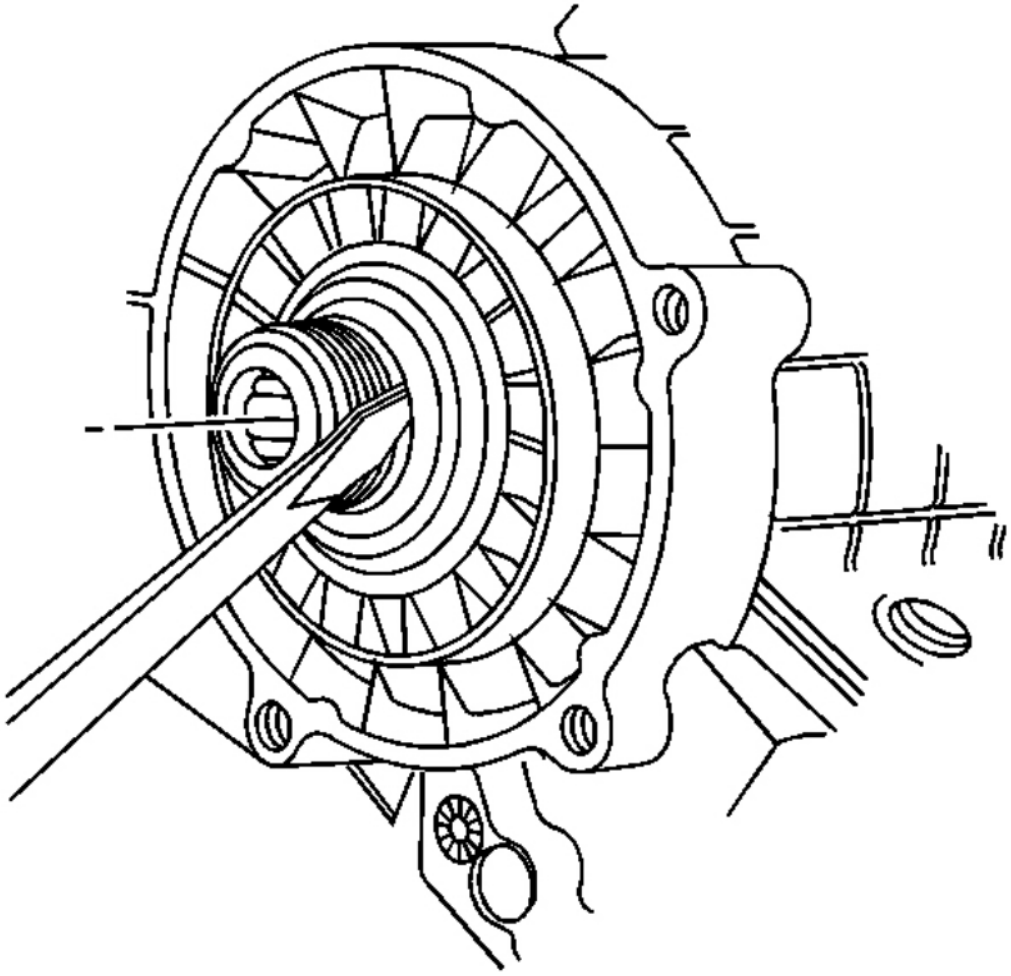


Fig. 91: Removing Input Shaft Seal
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not damage the sealing surfaces of the transfer cases or the shafts when prying the seals for removal. Damaging the sealing surface may cause leakage or require replacement of the damaged component.

13. Remove the input shaft seal by prying it out of the front case.

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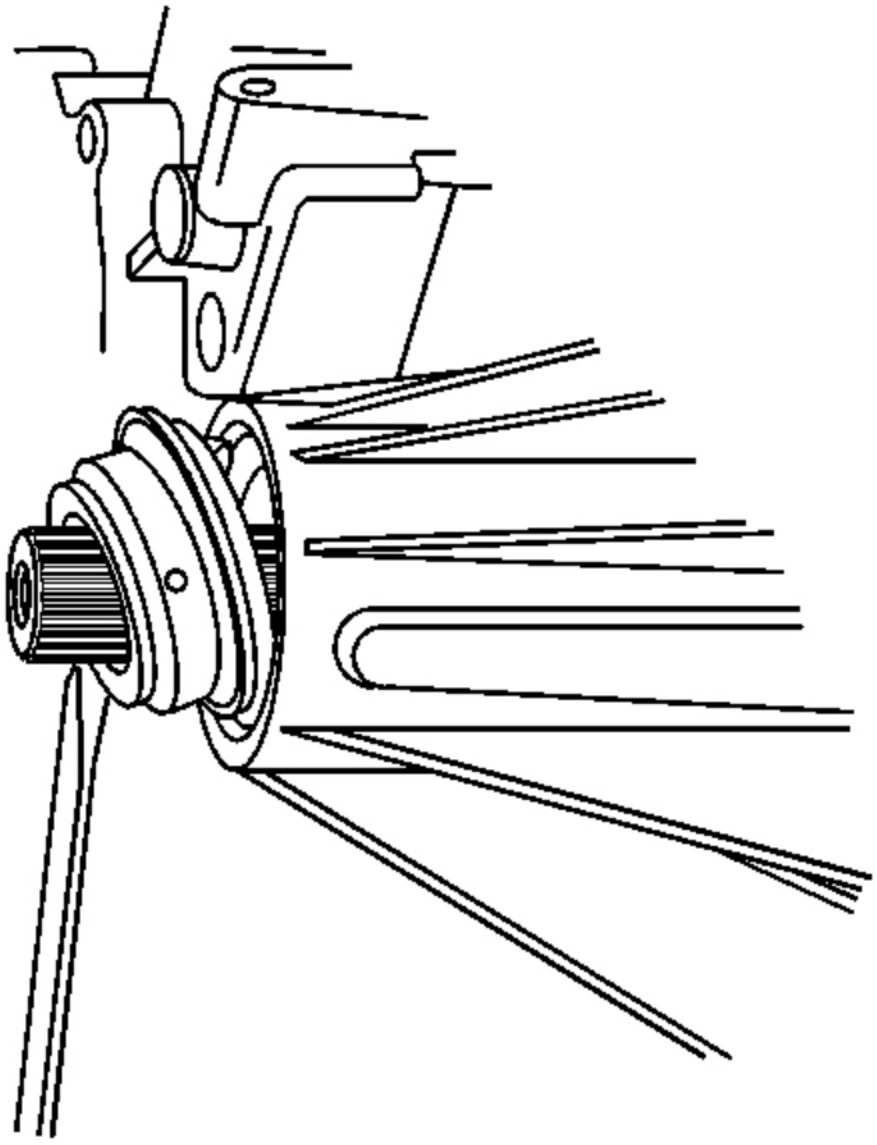


Fig. 92: Removing Rear Output Shaft Seal
Courtesy of GENERAL MOTORS CORP.

14. Remove the rear output shaft seal.

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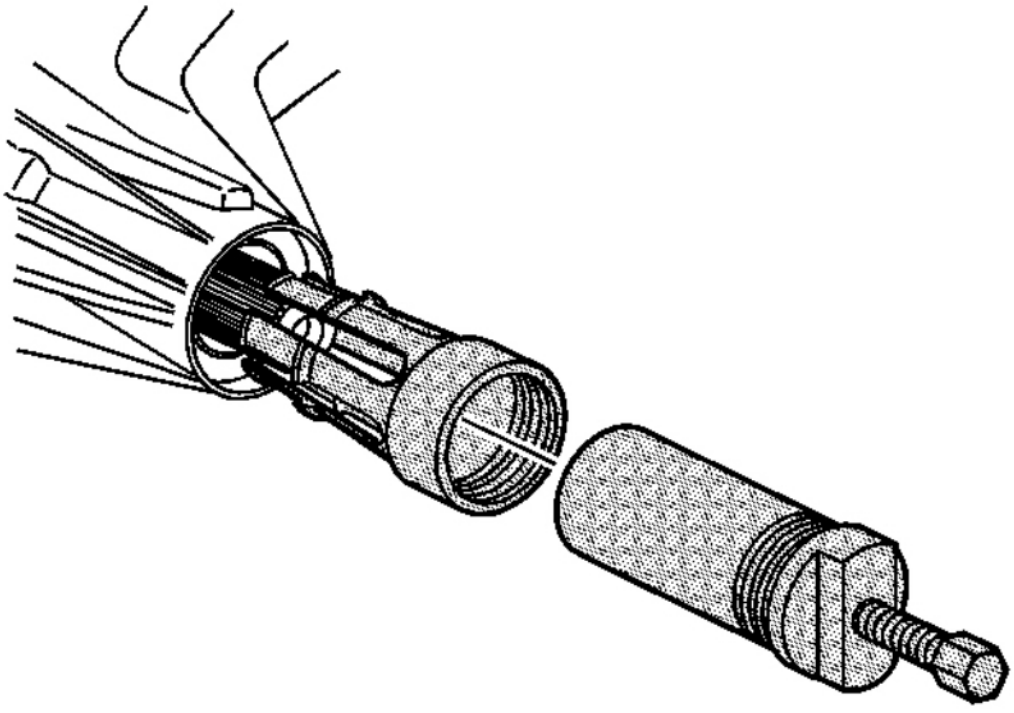


Fig. 93: Removing Rear Output Shaft Bushing
Courtesy of GENERAL MOTORS CORP.

15. Inspect the rear output shaft bushing for scoring or wear.
16. Remove the rear output shaft bushing using the **J 45380** . See **Special Tools**.
    1. Install the finger section of the **J 45380** in front of the bushing. See **Special Tools**.
    2. Install the tube and forcing screw assembly to the finger section. Ensure the forcing screw is backed out.
    3. Using a wrench on the forcing screw, remove the rear output shaft bushing.

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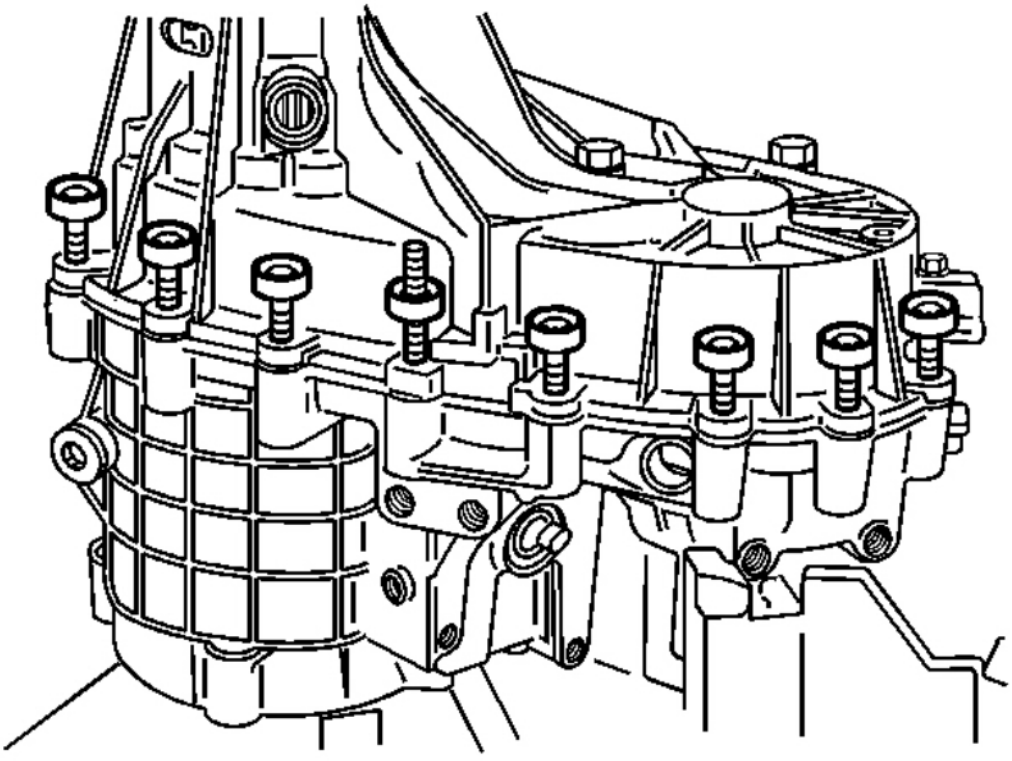


Fig. 94: View Of Case Half Bolts/Studs With Cup Washers
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The magnesium transfer cases are using new style bolts that have a cup style washer. The cup washer is only available with the bolt. If the cup washer is not damaged, the bolt can be used again.

17. Remove the transfer case retaining bolts and washers.

    Mark the location of any brackets.

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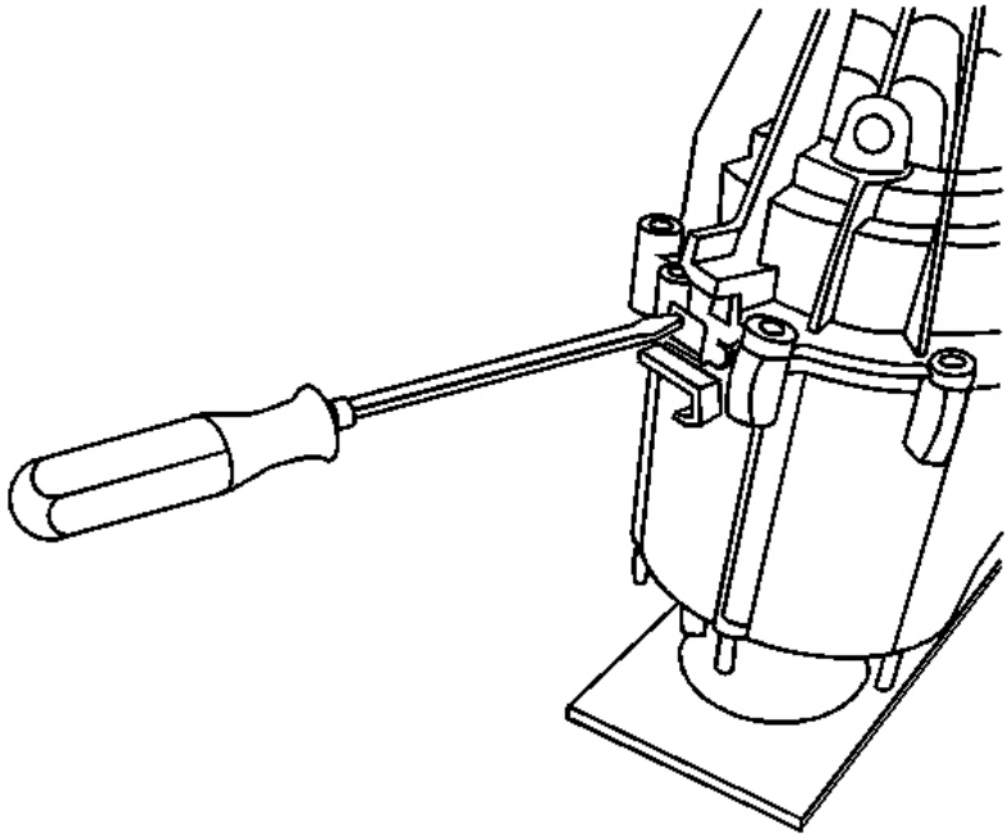


Fig. 95: Identifying Slot On Right Side Of Transfer Case
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not nick, scratch or damage the sealing surface. The sealing surface is a machined surface. Damage to the machined surface can cause leakage.

18. Insert a flat-blade screwdriver into the slot on the left side of the transfer case.

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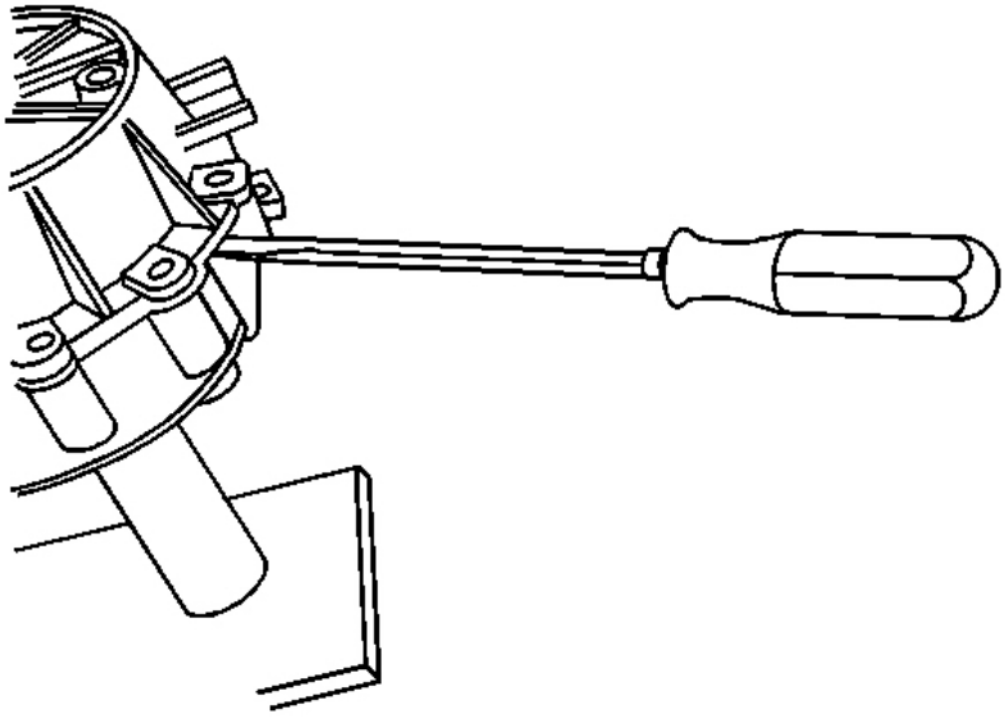


Fig. 96: Locating Slot On Right Side On Transfer Case
Courtesy of GENERAL MOTORS CORP.

19. Insert a flat-blade screwdriver into the slot on the right side of the transfer case.
20. With equal pressure, press down on the screwdrivers in order to separate the front case half and the rear case half.

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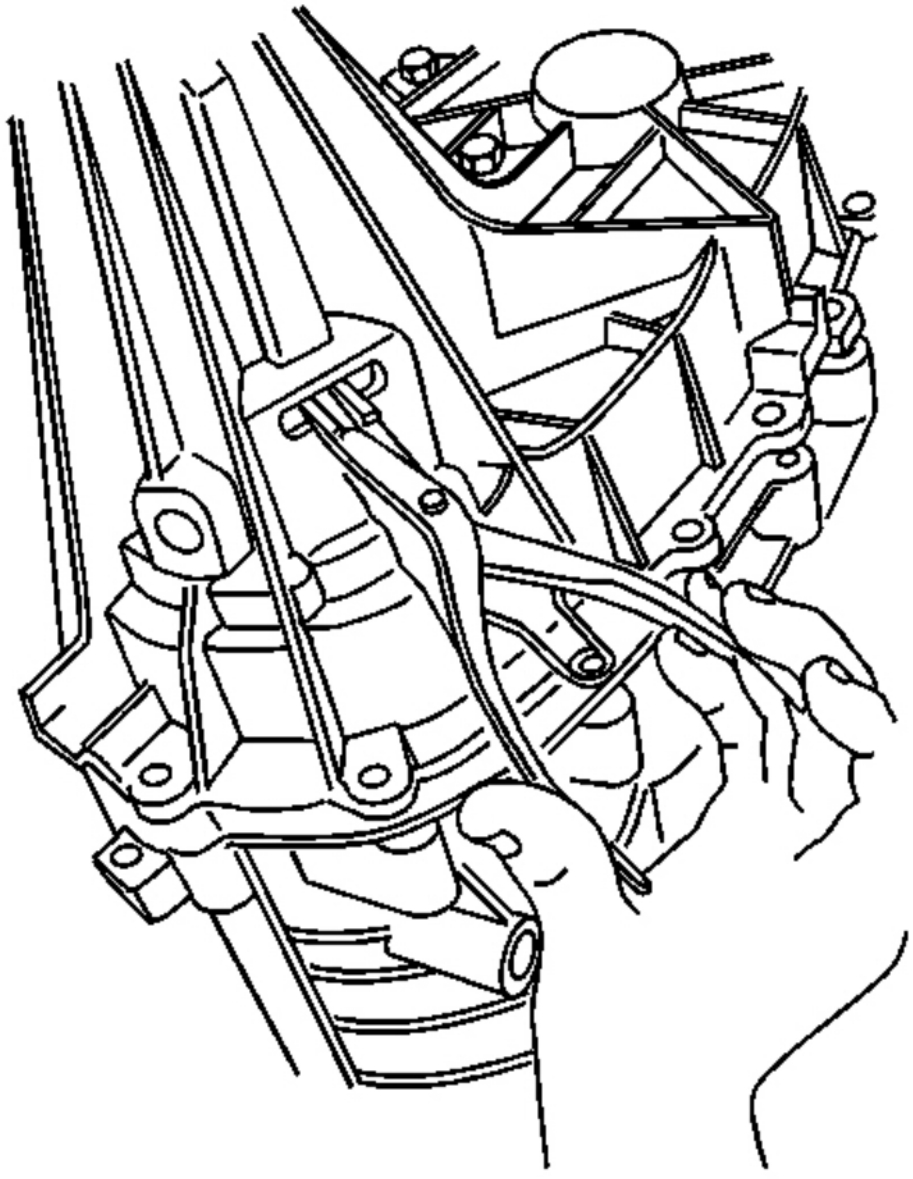


Fig. 97: Positioning Snap Ring Pliers In Access Opening
Courtesy of GENERAL MOTORS CORP.

21. Insert a pair of snap ring pliers and release the outer retaining ring for the rear output shaft bearing.

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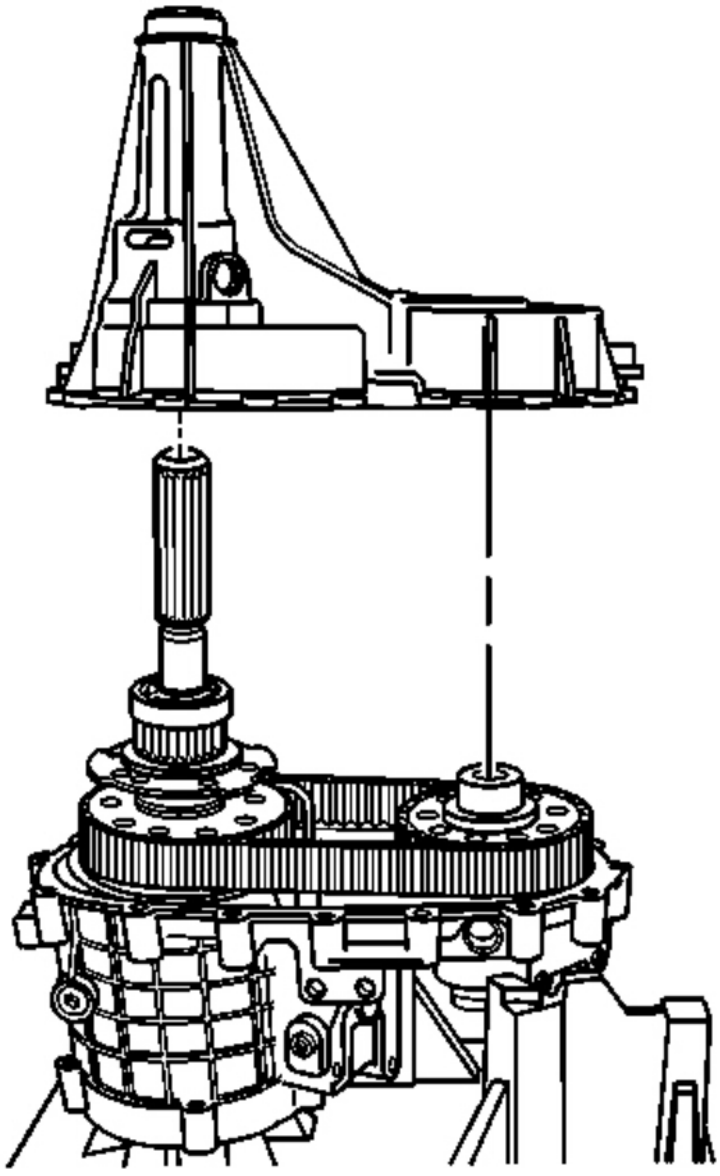


Fig. 98: Front Case & Rear Case Half Assembly
Courtesy of GENERAL MOTORS CORP.

22. Remove the rear case half from the front case half.

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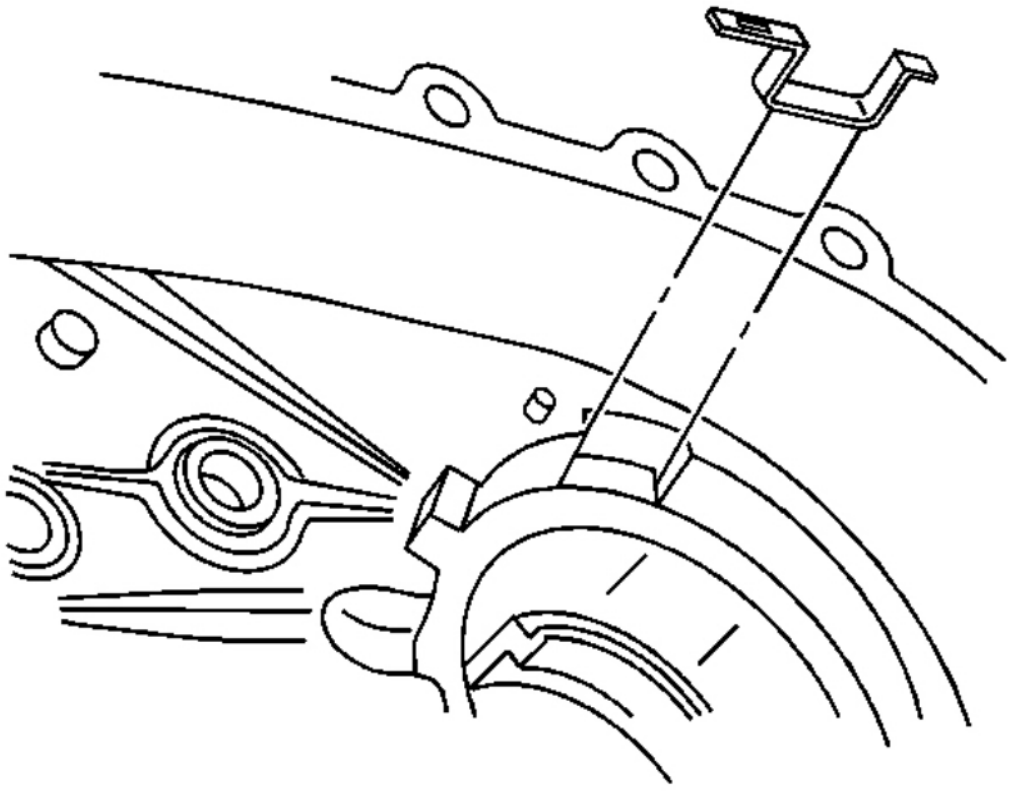


Fig. 99: View Of Oil Pump Wear Sleeve
Courtesy of GENERAL MOTORS CORP.

23. Remove the oil pump wear sleeve, only if worn or damaged.

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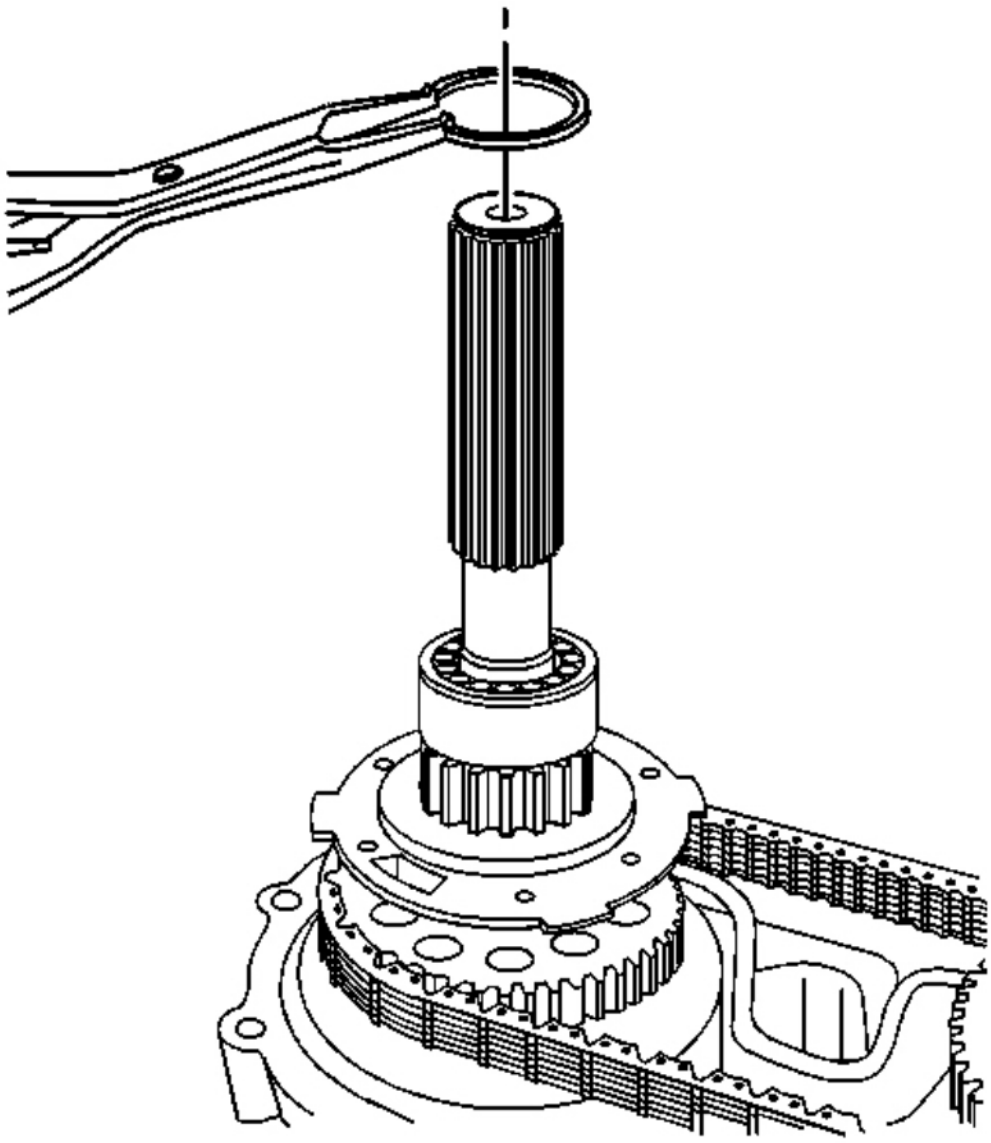


Fig. 100: Locating Rear Output Shaft Bearing Retaining Ring
Courtesy of GENERAL MOTORS CORP.

24. Remove the rear output shaft rear bearing retaining ring.

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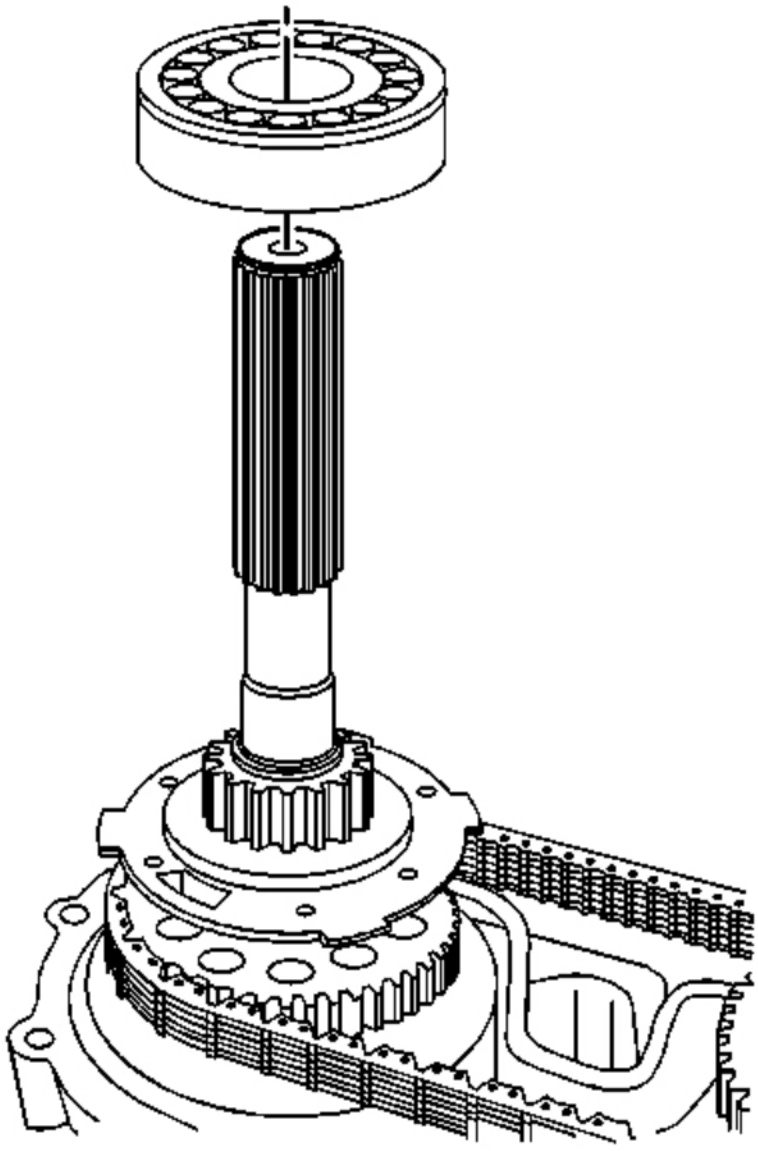


Fig. 101: View Of Rear Output Shaft Bearing
Courtesy of GENERAL MOTORS CORP.

25. Remove the rear output shaft rear bearing.

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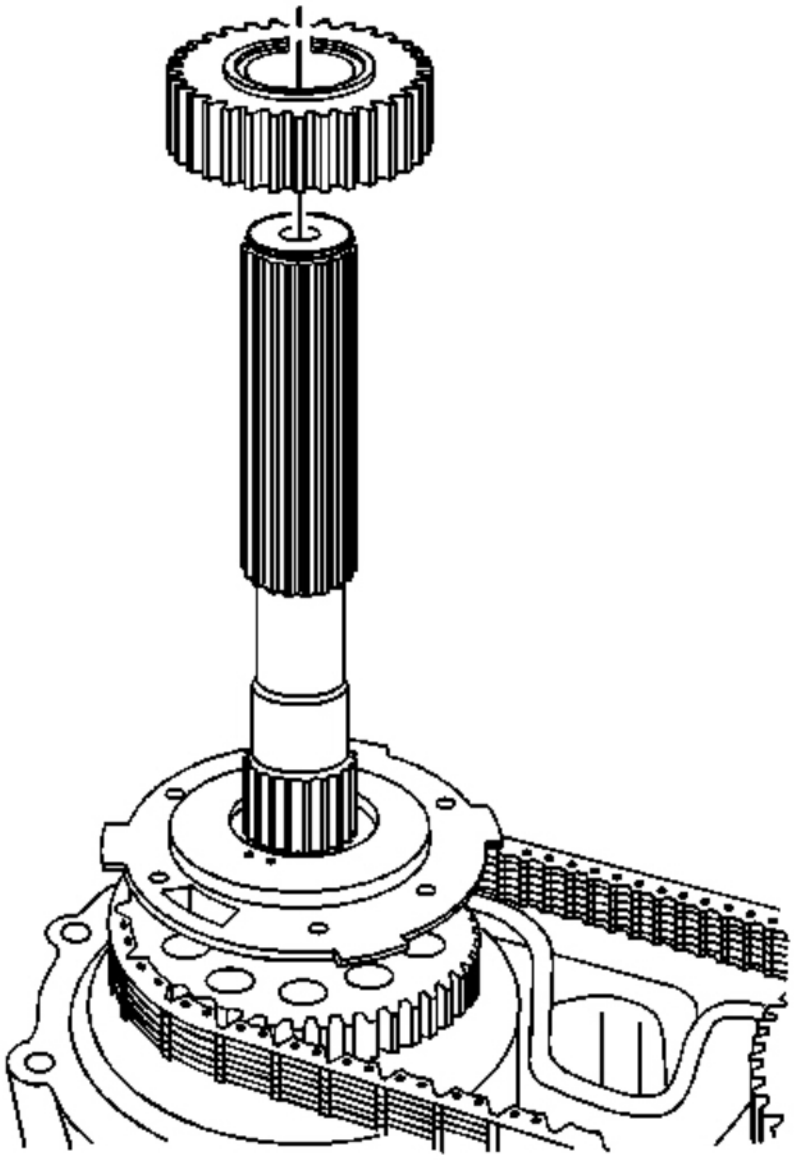


Fig. 102: Identifying Rear Output Shaft Speed Sensor Reluctor Wheel
Courtesy of GENERAL MOTORS CORP.

26. Remove the rear output shaft speed sensor reluctor wheel.

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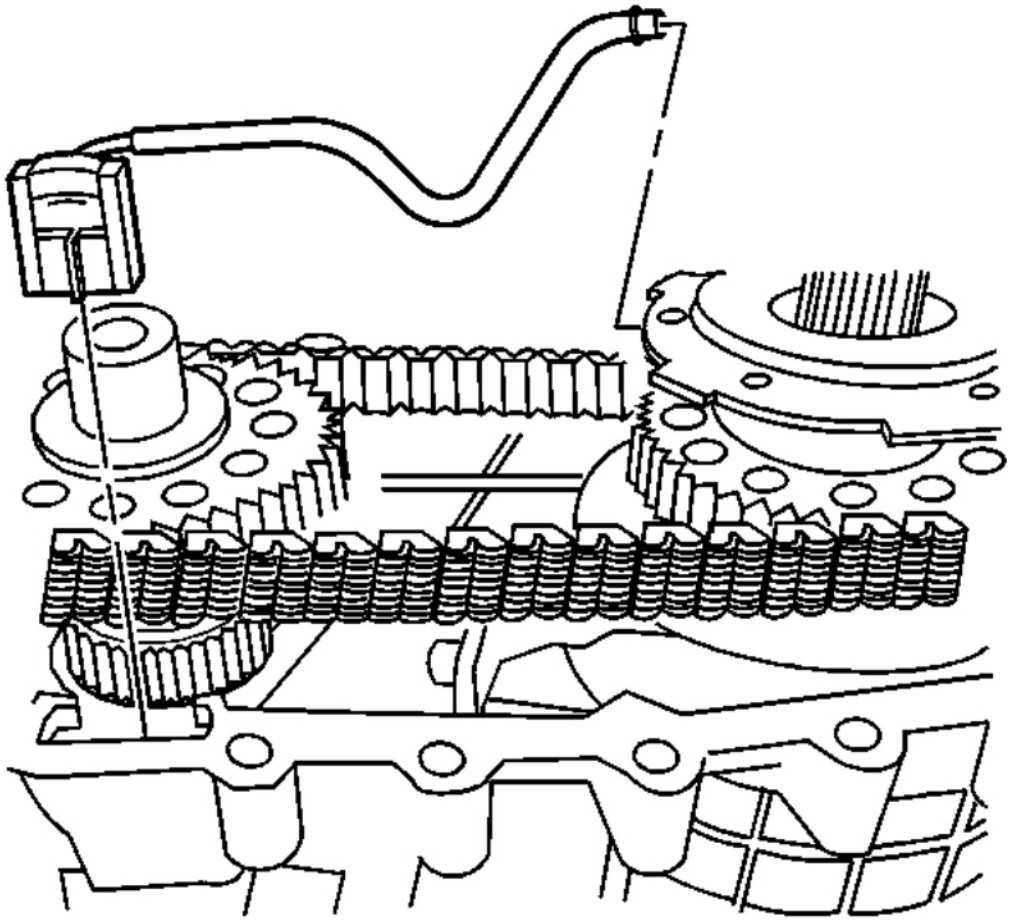


Fig. 103: Locating Oil Pump Suction Pipe Assembly
Courtesy of GENERAL MOTORS CORP.

27. Remove the oil pump suction pipe assembly. Do not remove the screen from the pipe.

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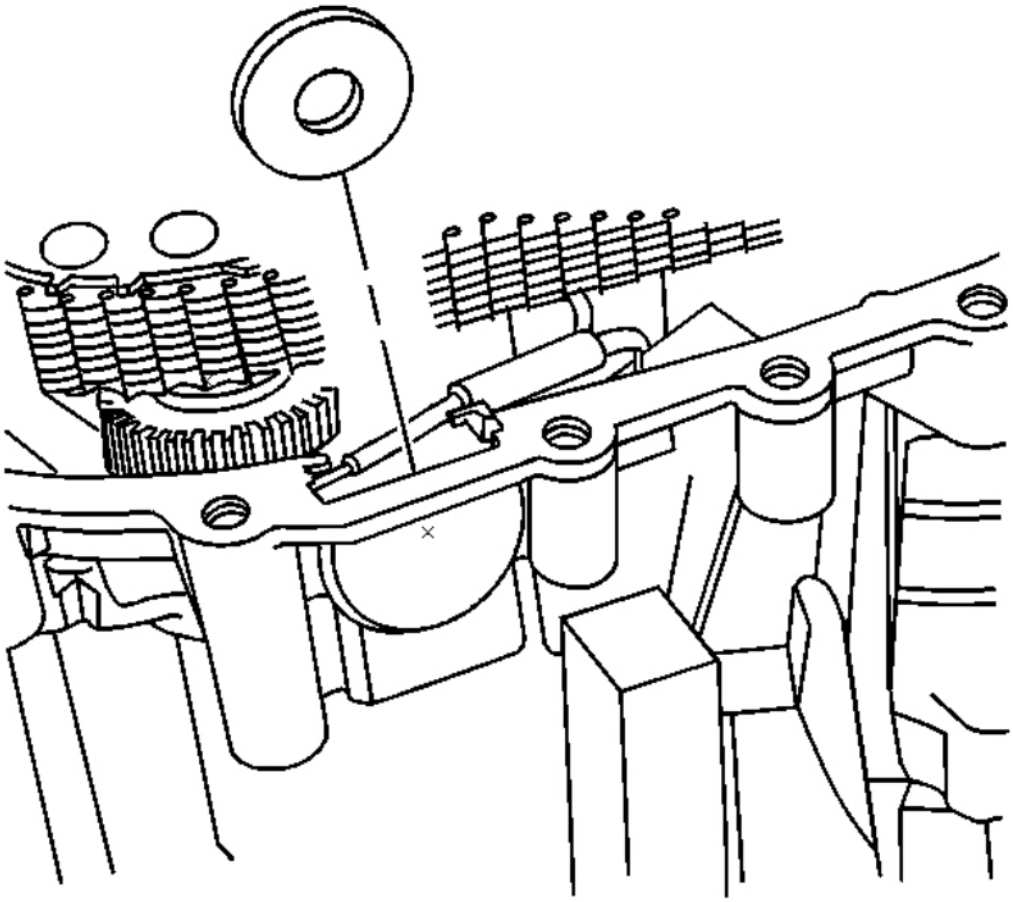


Fig. 104: Locating Magnet
Courtesy of GENERAL MOTORS CORP.

28. Remove the magnet.

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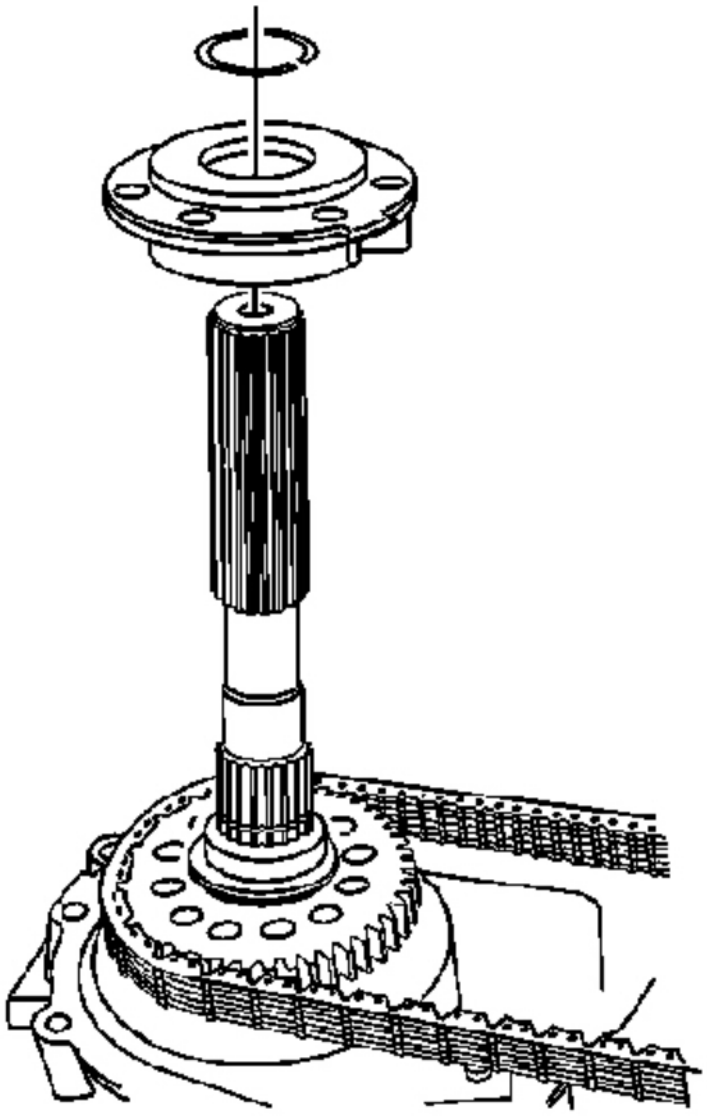


Fig. 105: Oil Pump Assembly
Courtesy of GENERAL MOTORS CORP.

29. Remove the oil pump wave spring.
30. Remove the oil pump assembly.

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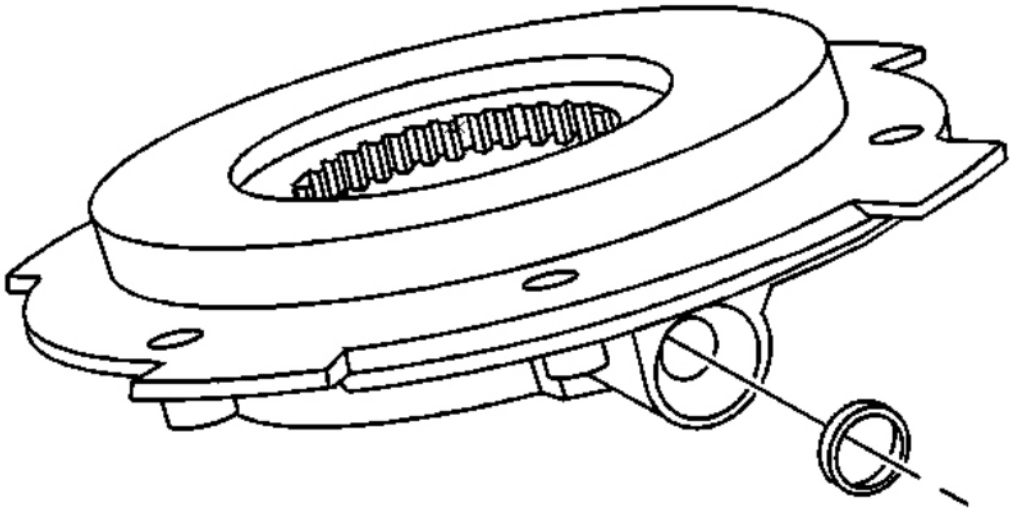


Fig. 106: Identifying Oil Pump Suction Pipe O-Ring
Courtesy of GENERAL MOTORS CORP.

31. Remove the oil pump suction pipe O-ring from the oil pump.

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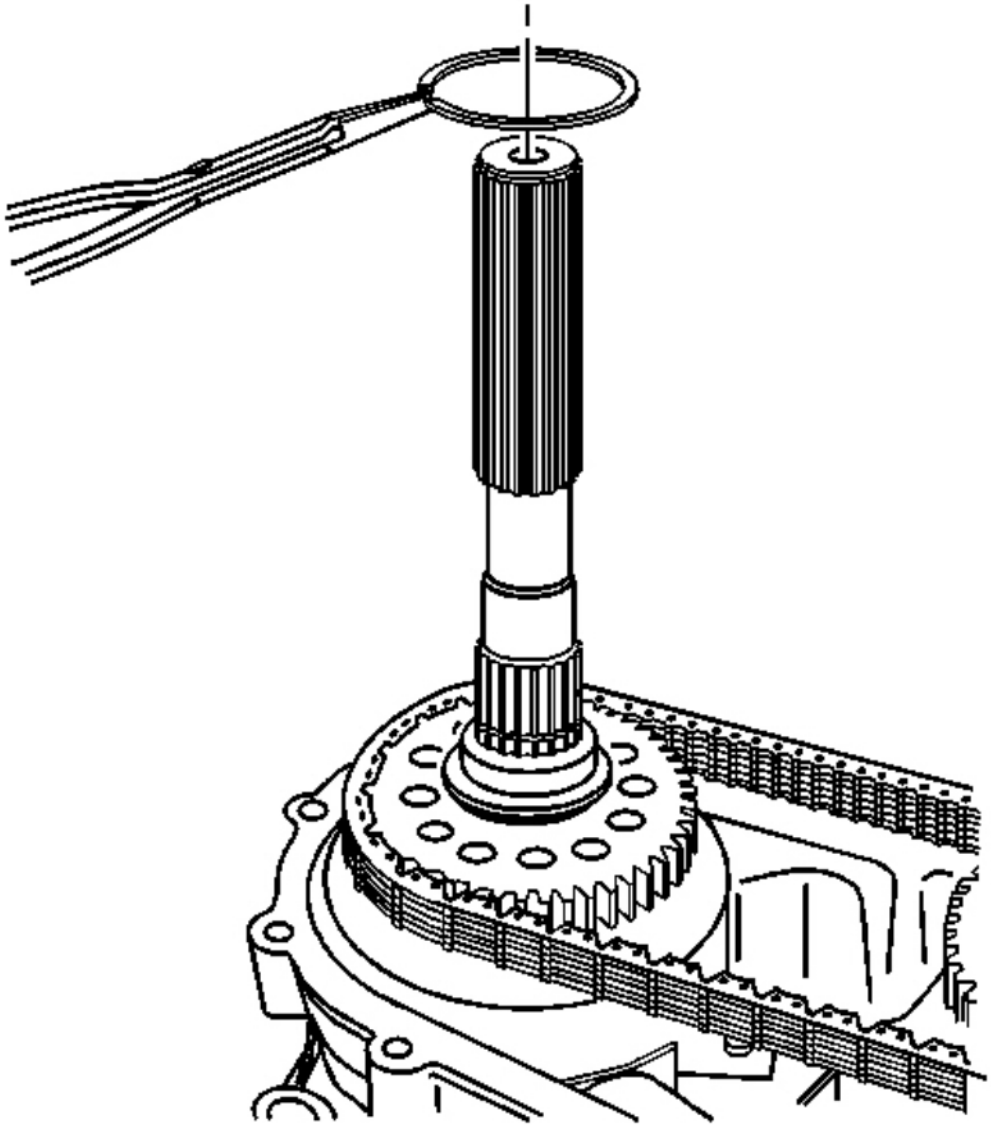


Fig. 107: View Of Drive Sprocket Retaining Ring
Courtesy of GENERAL MOTORS CORP.

32. Remove the drive sprocket retaining ring.

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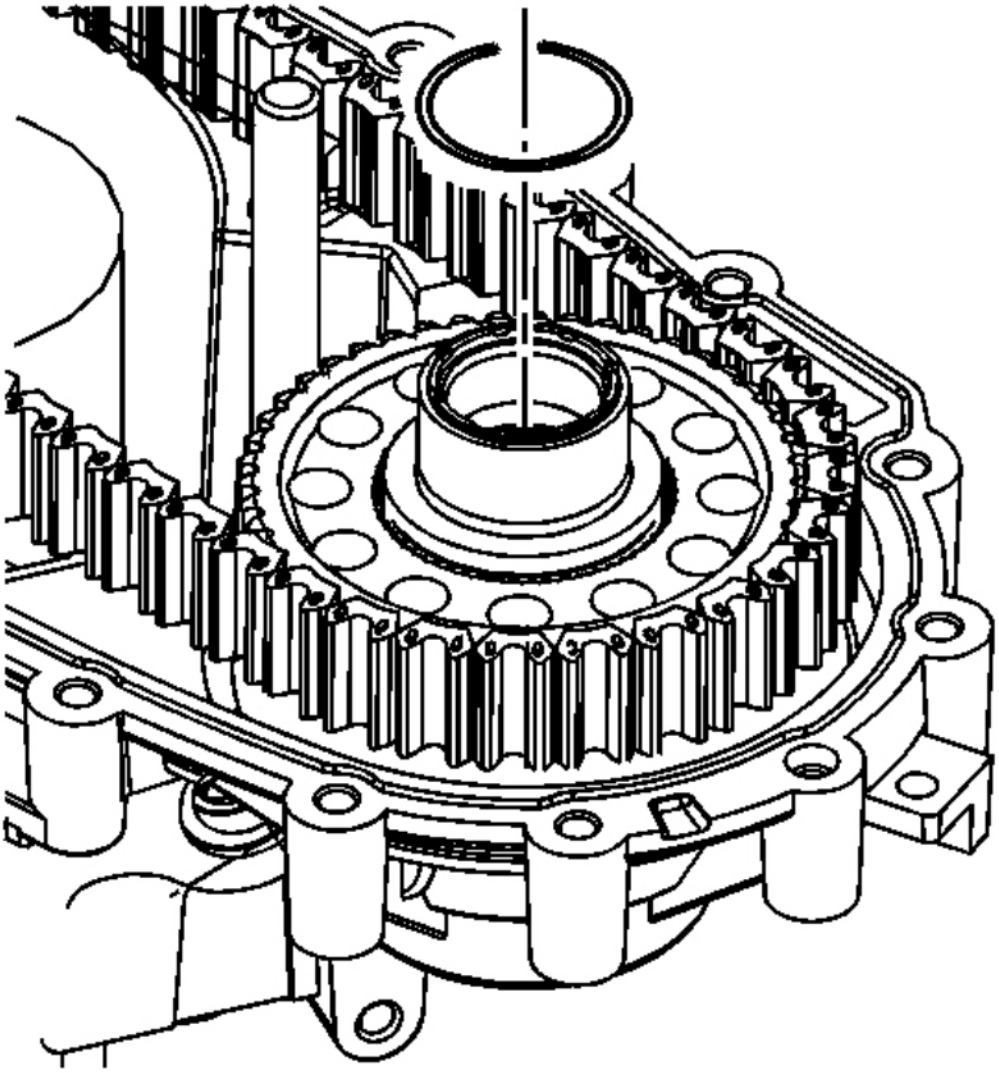


Fig. 108: Locating Driven Sprocket Retaining Ring
Courtesy of GENERAL MOTORS CORP.

33. Remove the driven sprocket retaining ring.

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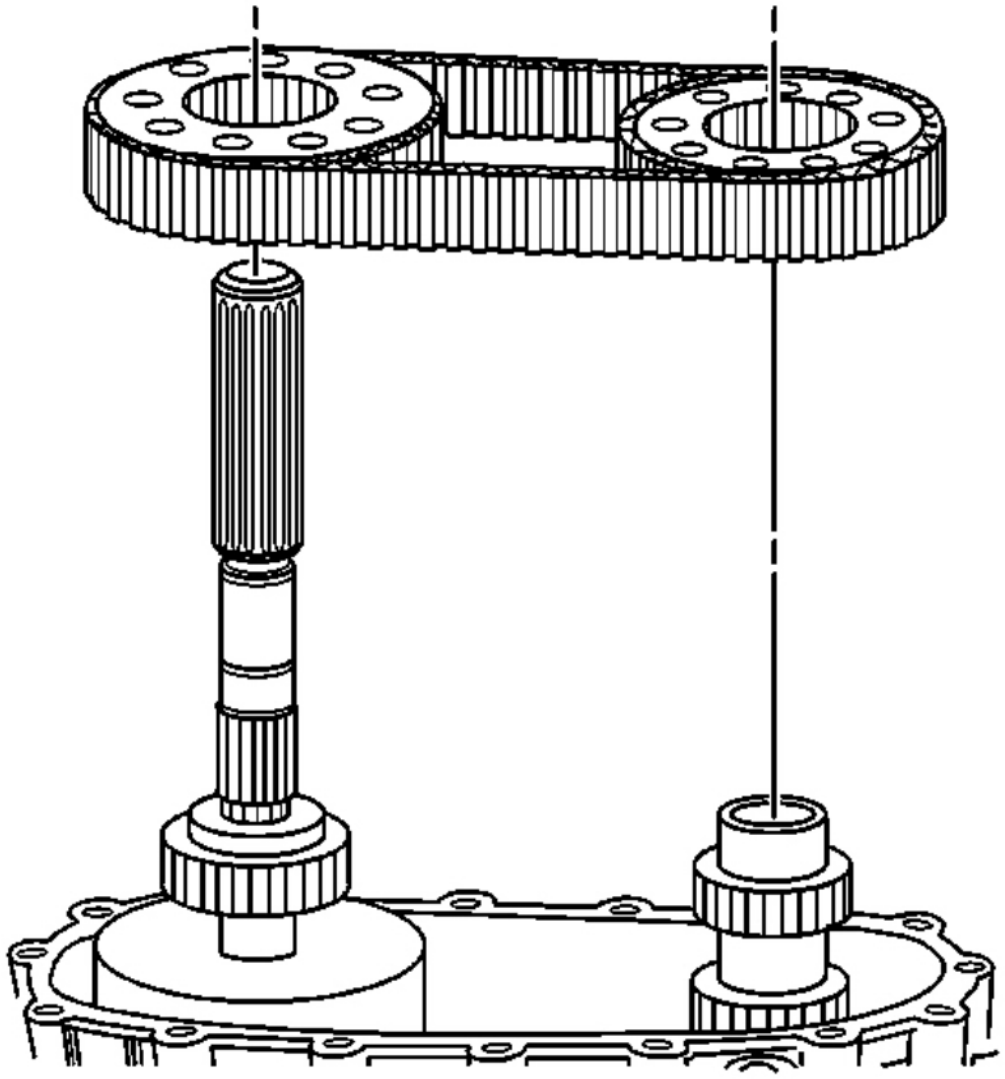


Fig. 109: Identifying Drive Chains & Sprockets
Courtesy of GENERAL MOTORS CORP.

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.

34. Remove the chain and sprockets.
35. Remove the chain from the drive sprocket and driven sprocket.

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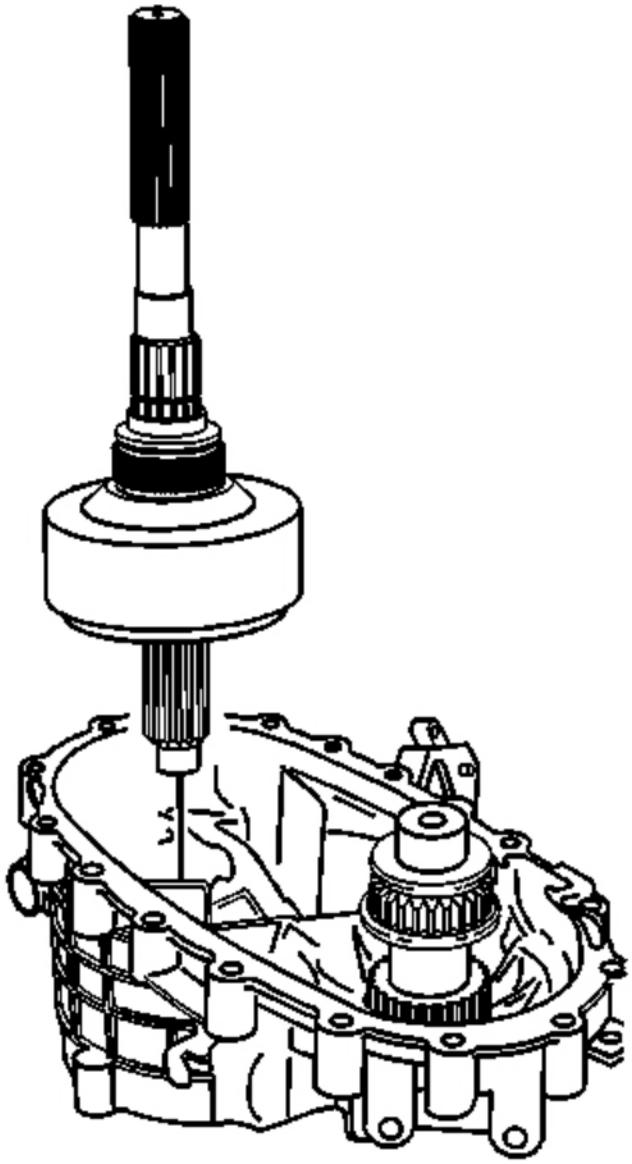


Fig. 110: Locating Rear Output Shaft Assembly
Courtesy of GENERAL MOTORS CORP.

36. Remove the rear output shaft assembly.
37. Mount the rear output shaft assembly, with the input end up, in a soft-jaw vise.

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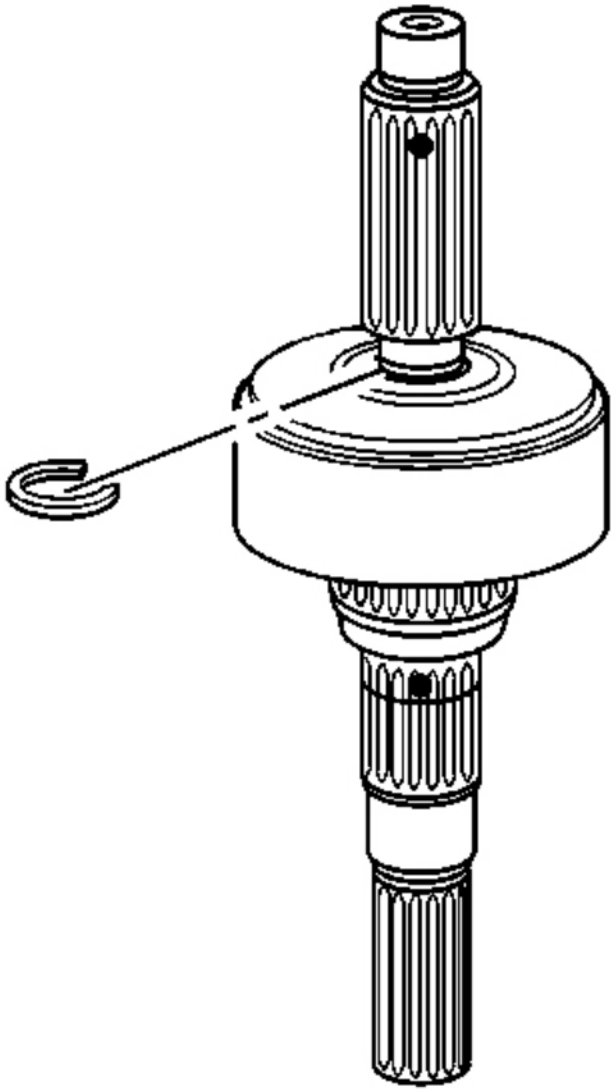


Fig. 111: View Of Clutch Pressure Plate Retaining Ring
Courtesy of GENERAL MOTORS CORP.

38. Remove the clutch assembly retaining ring. Push down on the clutch apply plate to access the retaining ring.

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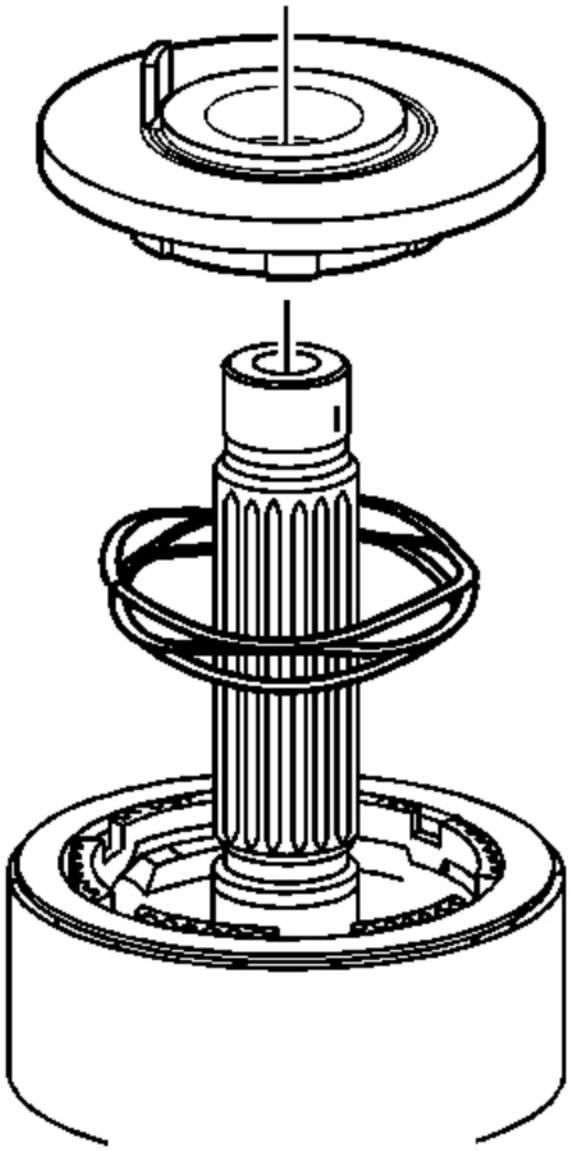


Fig. 112: View Of Clutch Return Spring
Courtesy of GENERAL MOTORS CORP.

39. Remove the clutch apply plate assembly.
40. Remove the clutch return spring.

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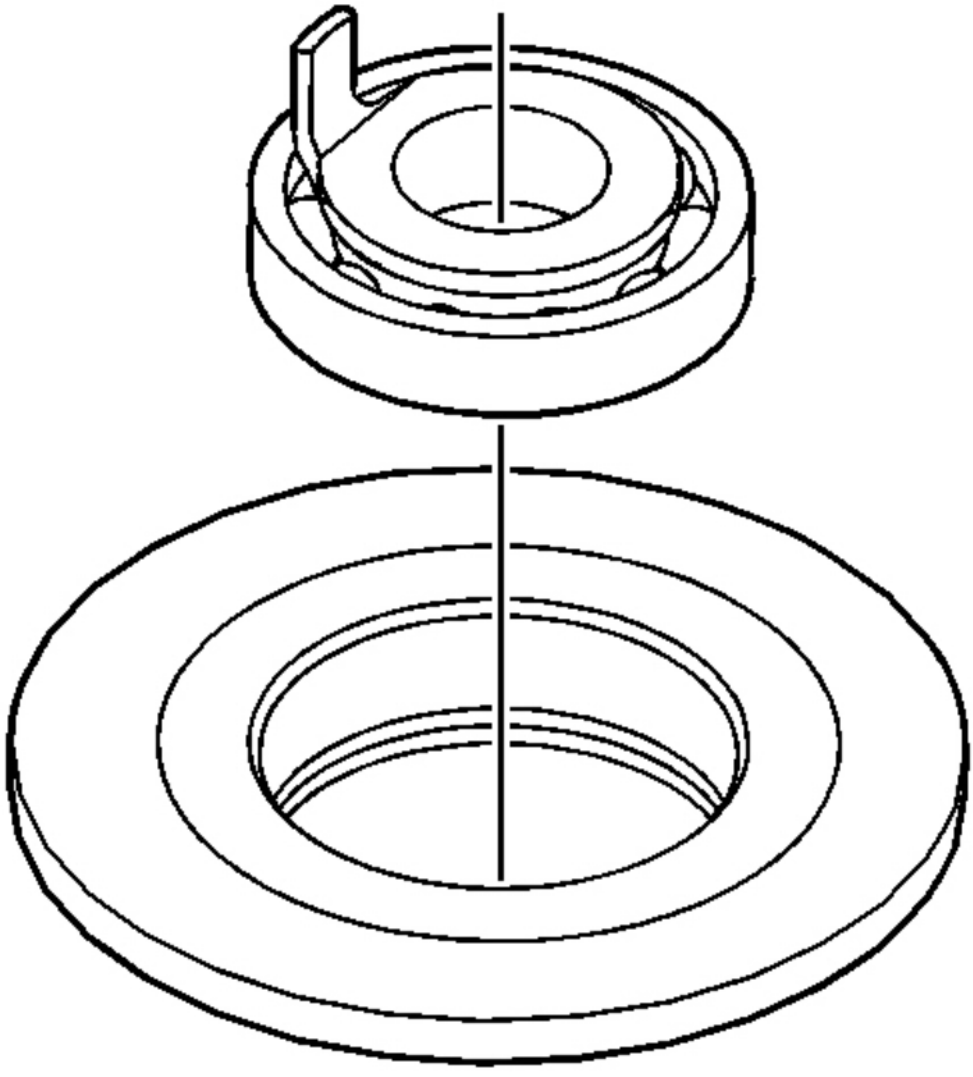


Fig. 113: View Of Clutch Pressure Plate Bearing With The Inner Support
Courtesy of GENERAL MOTORS CORP.

41. Remove the clutch apply plate bearing and inner support from the clutch apply plate.

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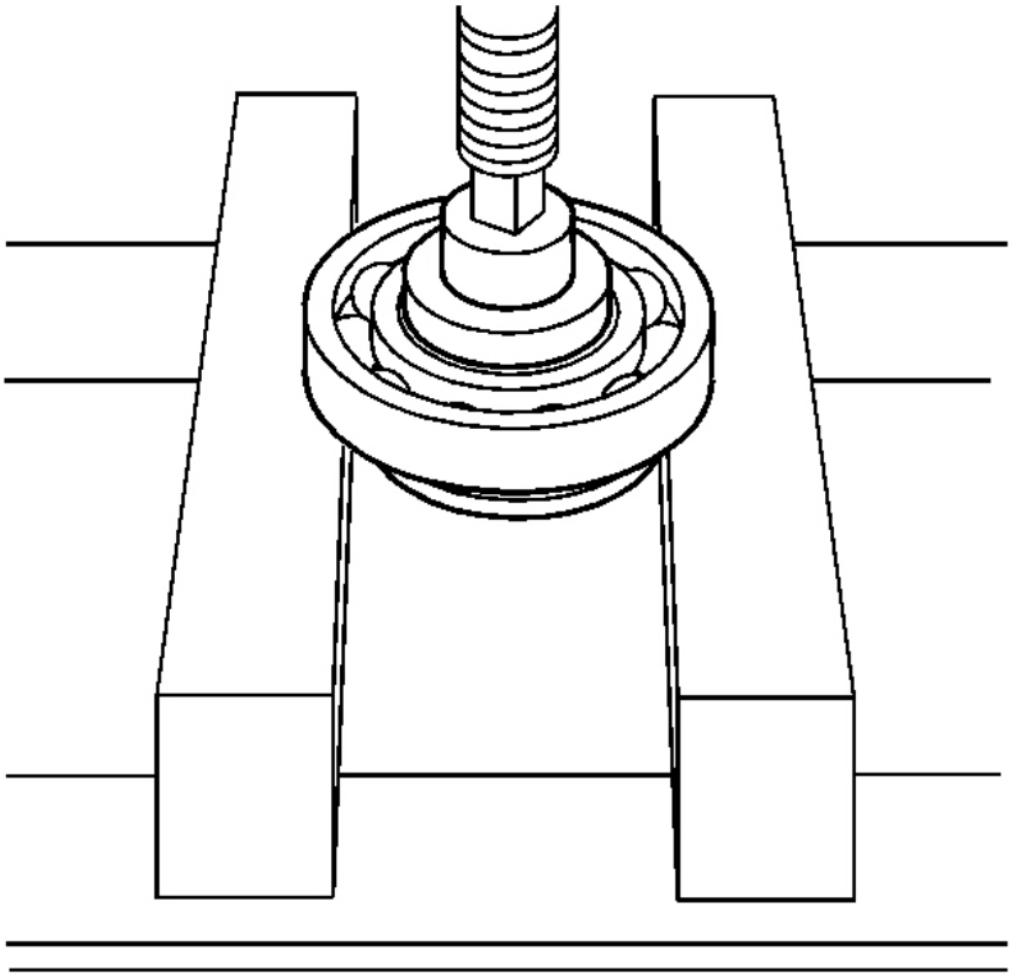


Fig. 114: Removing Clutch Pressure Plate Bearing From Clutch Bearing Inner Support
Courtesy of GENERAL MOTORS CORP.

42. Inspect the bearing for being faulty. Refer to **Cleaning and Inspection**.
43. If the bearing is faulty, using a hydraulic press and a suitable adapter, remove the clutch apply plate bearing from the clutch bearing inner support.
44. Discard the bearing after removal.

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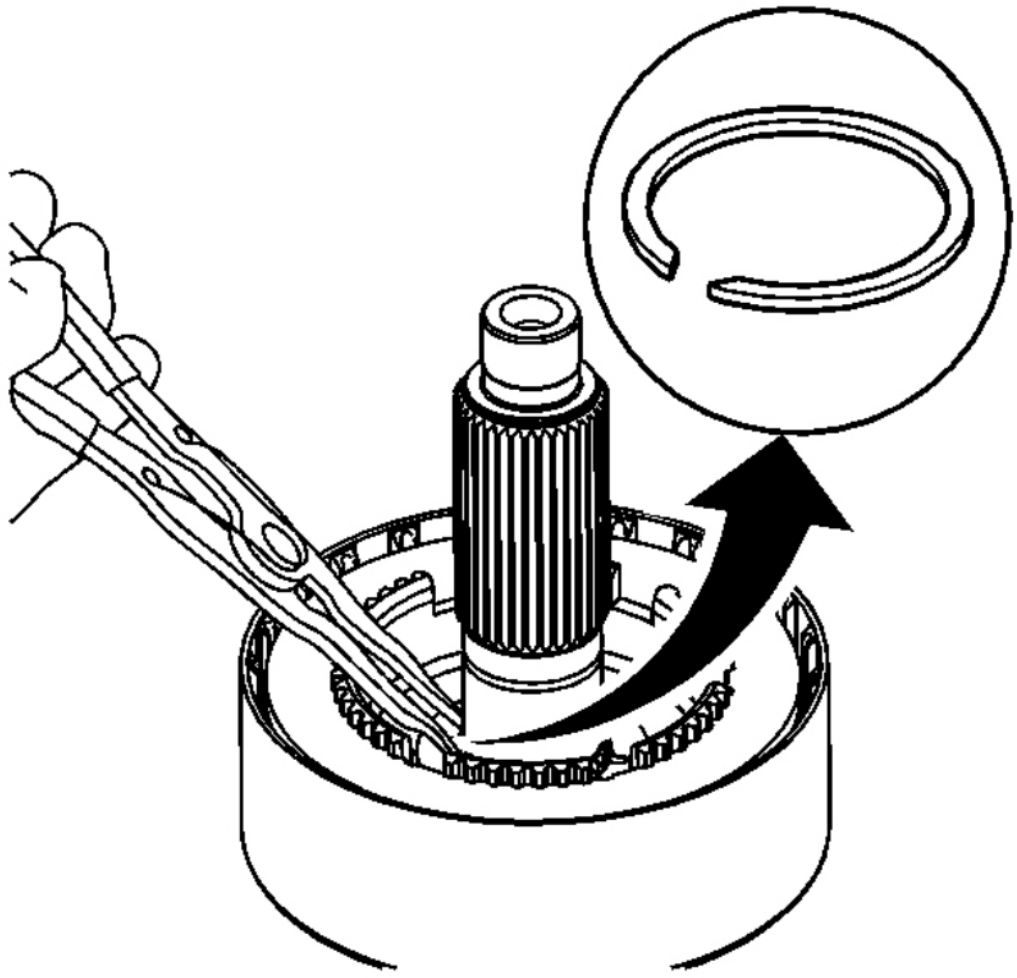


Fig. 115: Removing Clutch Hub Retaining Ring
Courtesy of GENERAL MOTORS CORP.

45. Remove the clutch hub retaining ring.

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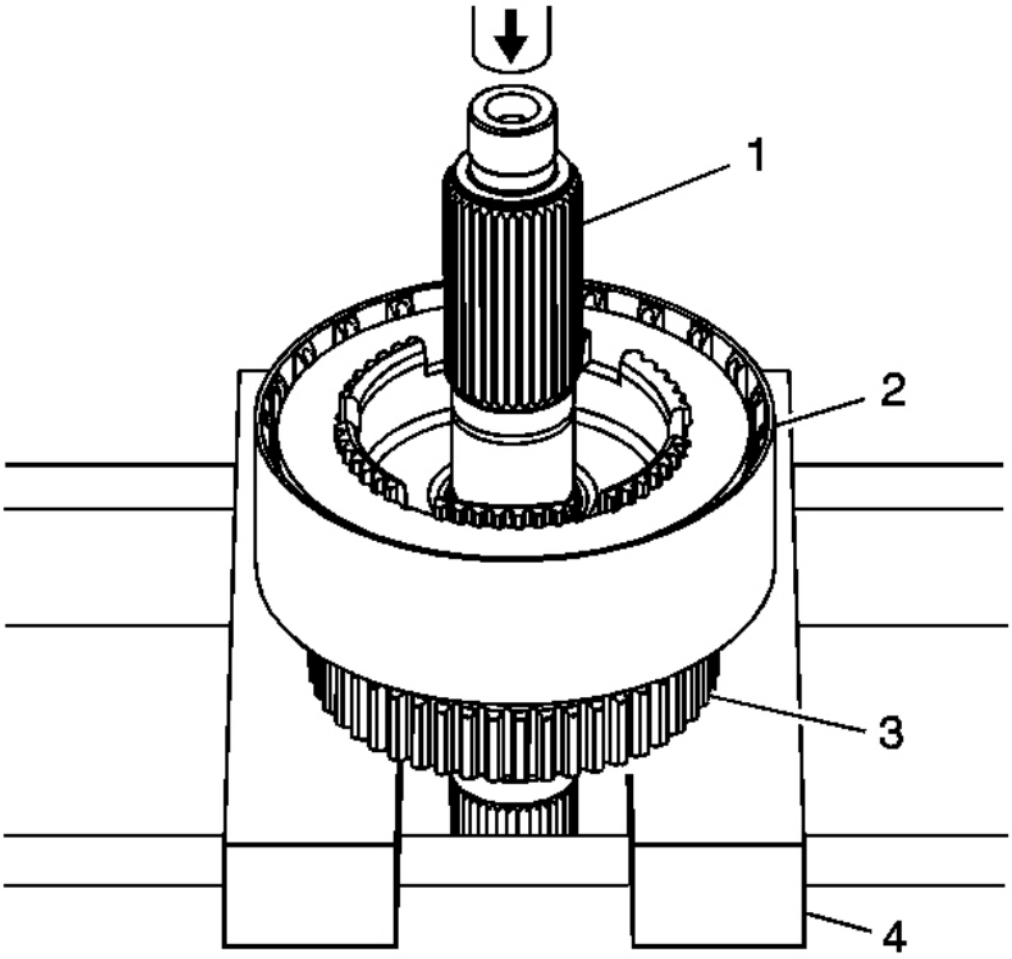


Fig. 116: View Of Clutch Housing & Hub Assembly Components
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not press against the outer portion of the clutch housing (2).

46. Reinstall the drive sprocket (3) to the clutch housing (2). The drive sprocket (3) will be used to press against.
47. Place the rear output shaft assembly into a hydraulic press with the input end facing up and the drive sprocket (3) supporting the assembly against the hydraulic press blocks (4).

IMPORTANT: A maximum of 3 200 kg (7,055 lbs) may be necessary to remove the rear output shaft (1) from the clutch hub.

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48. Press the rear output shaft (1) from the clutch hub.

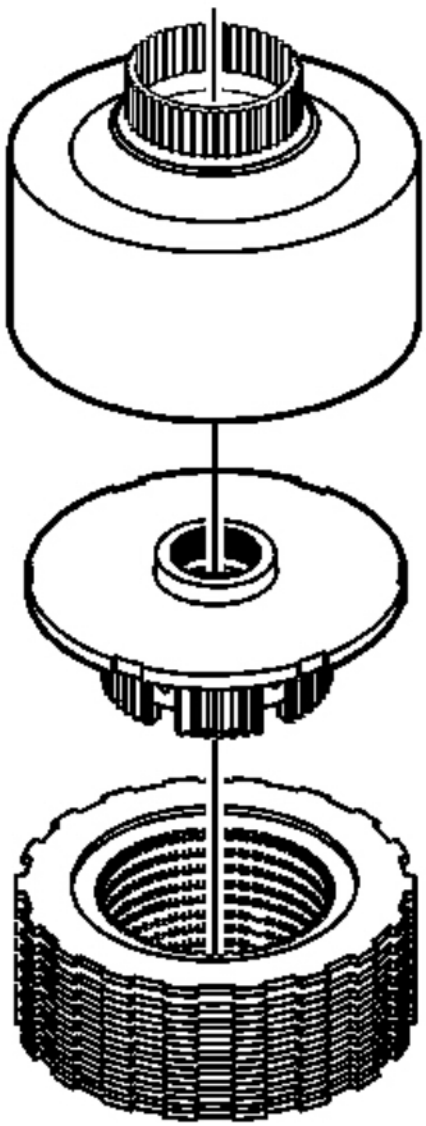


Fig. 117: View Of Clutch Assembly Components, 2nd Design
Courtesy of GENERAL MOTORS CORP.

49. Turn the clutch assembly over on a workbench.
50. Remove the clutch housing.

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IMPORTANT: Do not remove the oil restrictor plate. The oil restrictor plate is only serviced with the clutch hub.

51. Remove the clutch hub.

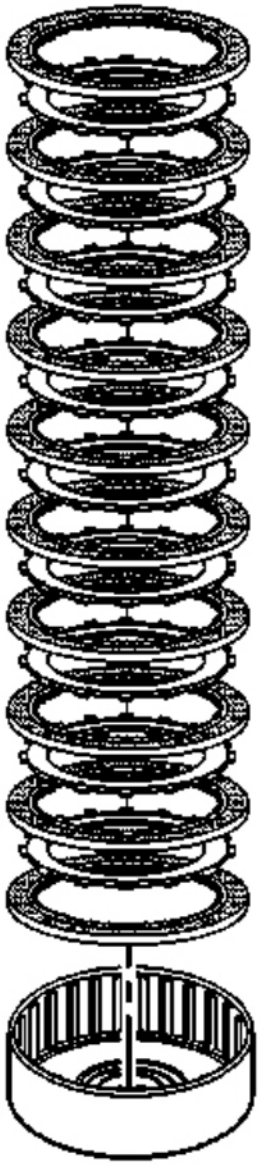


Fig. 118: Identifying Clutch Plates

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Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not wash the clutch inner friction plates in cleaning solvent.

52. Separate the clutch plates for inspection.
53. Remove and discard the shim or shims.

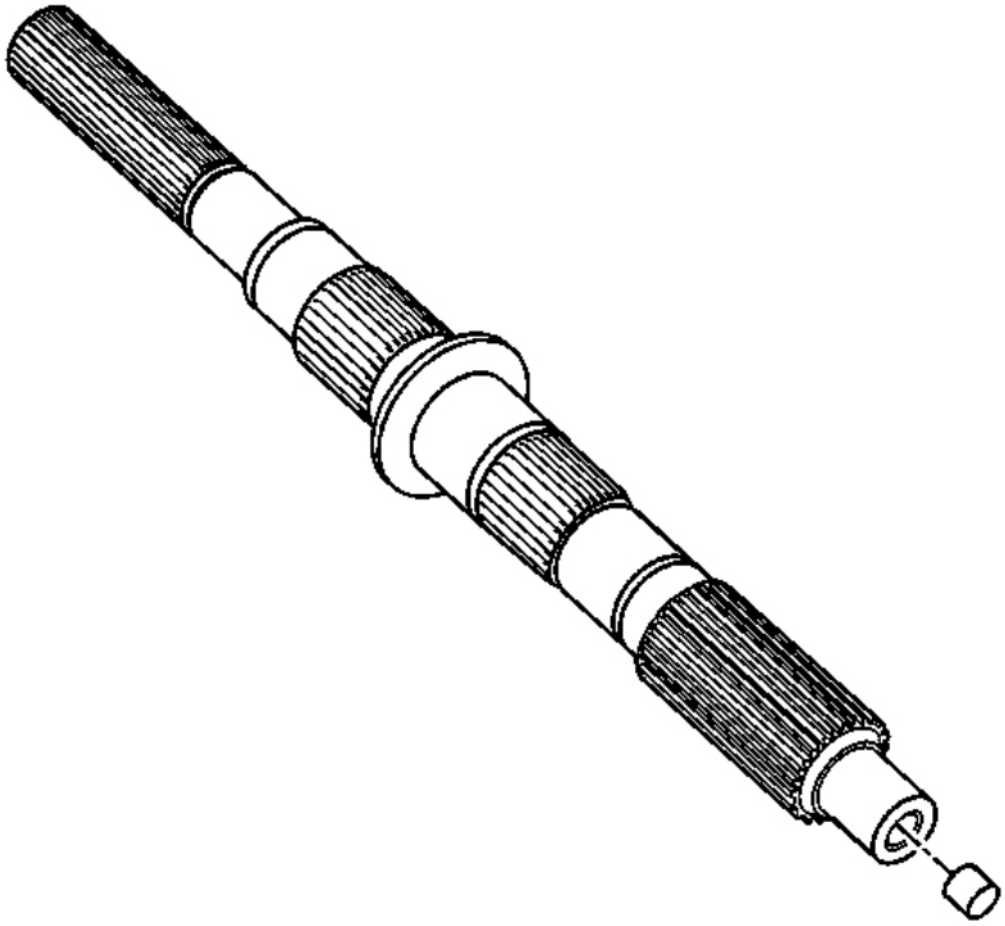


Fig. 119: View Of Rear Output Shaft Oil Restrictor
Courtesy of GENERAL MOTORS CORP.

54. Remove the oil restrictor from the rear output shaft, if replacing the shaft.

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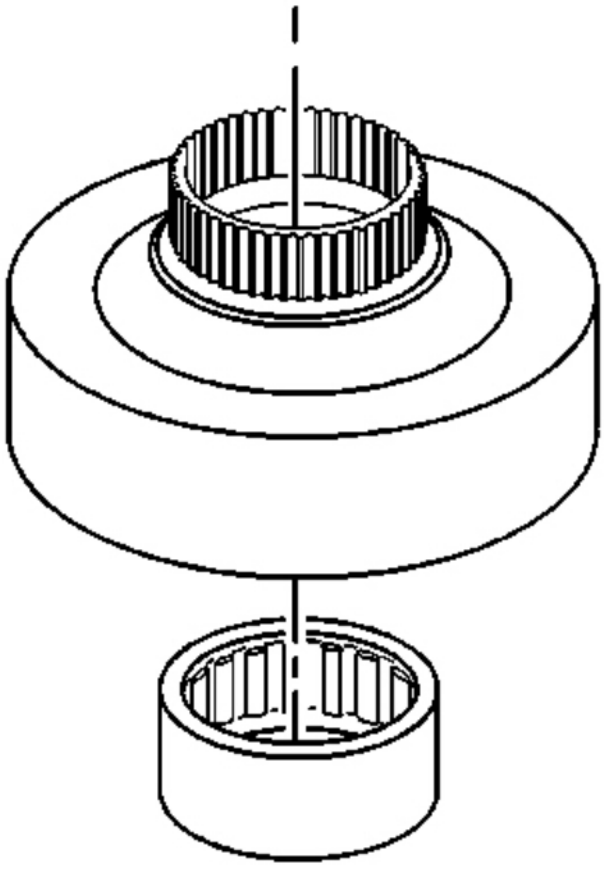


Fig. 120: Locating Bearing In The Clutch Housing
Courtesy of GENERAL MOTORS CORP.

55. Inspect the bearing in the clutch housing for being faulty. Refer to **Cleaning and Inspection**.
56. If the bearing is faulty, use a brass drift and a hammer to remove the bearing.

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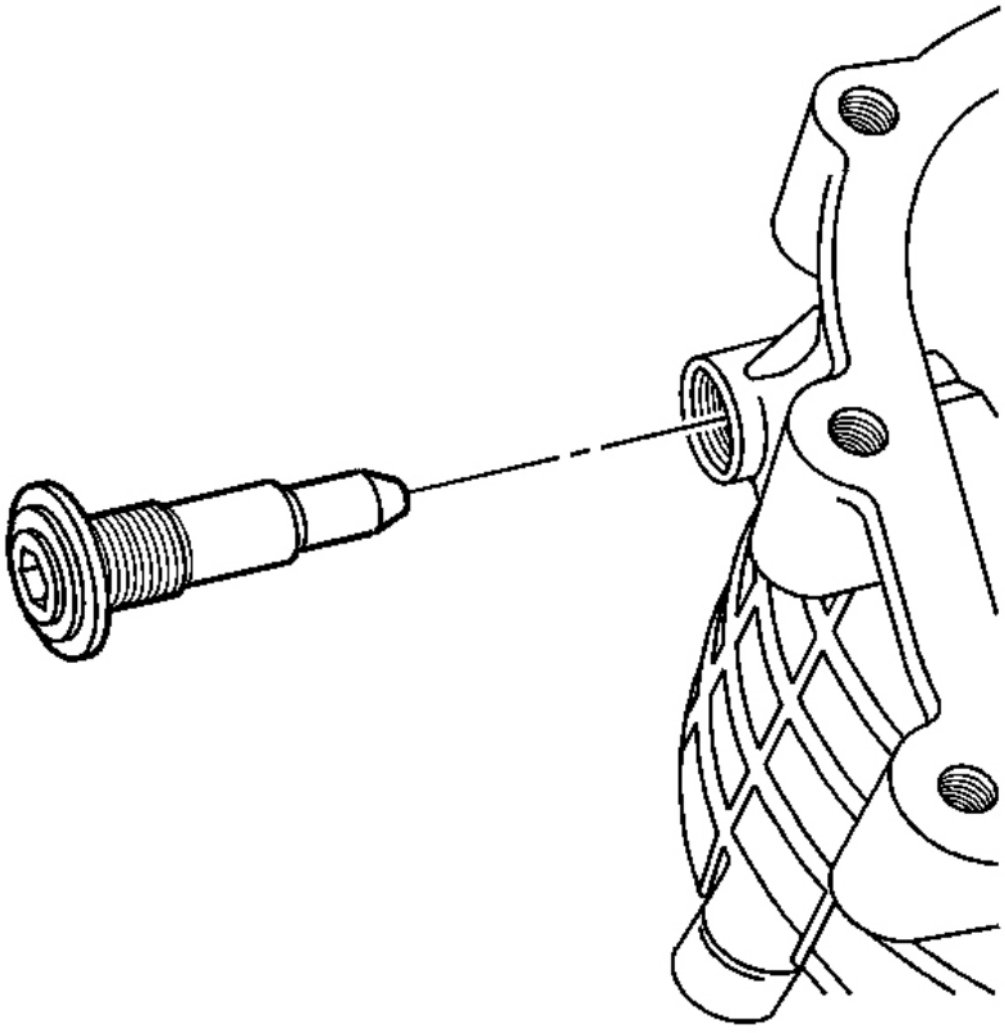


Fig. 121: Identifying Clutch Lever Pivot Pins O-Ring Seals
Courtesy of GENERAL MOTORS CORP.

57. Remove both of the clutch lever pivot pins with the aluminum washers and the O-ring seals.

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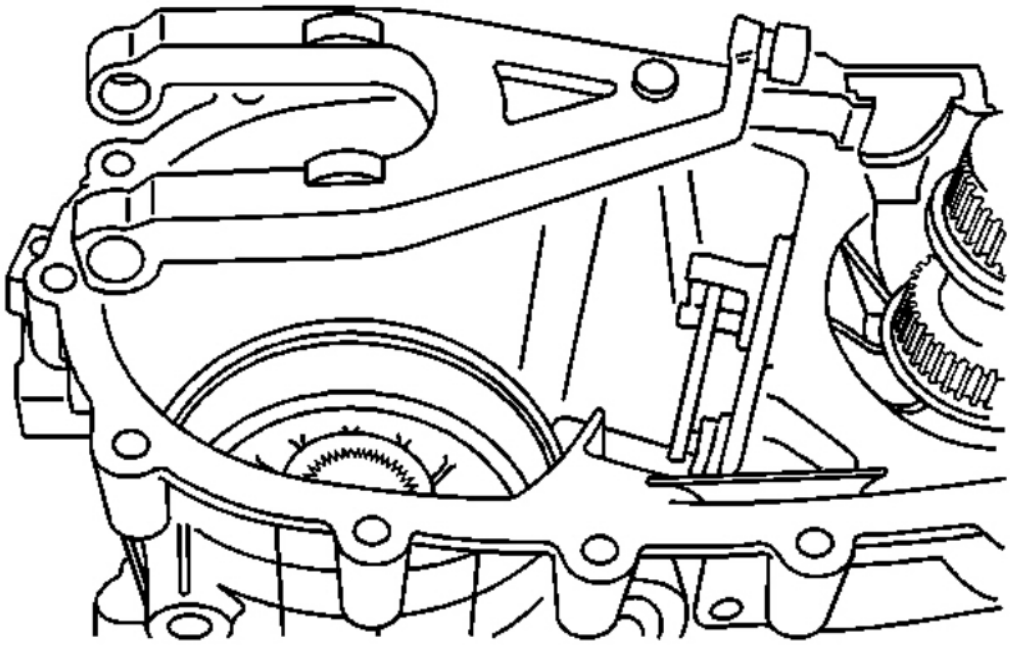


Fig. 122: View Of Clutch Lever Assembly
Courtesy of GENERAL MOTORS CORP.

58. Remove the clutch lever assembly from the control actuator lever.

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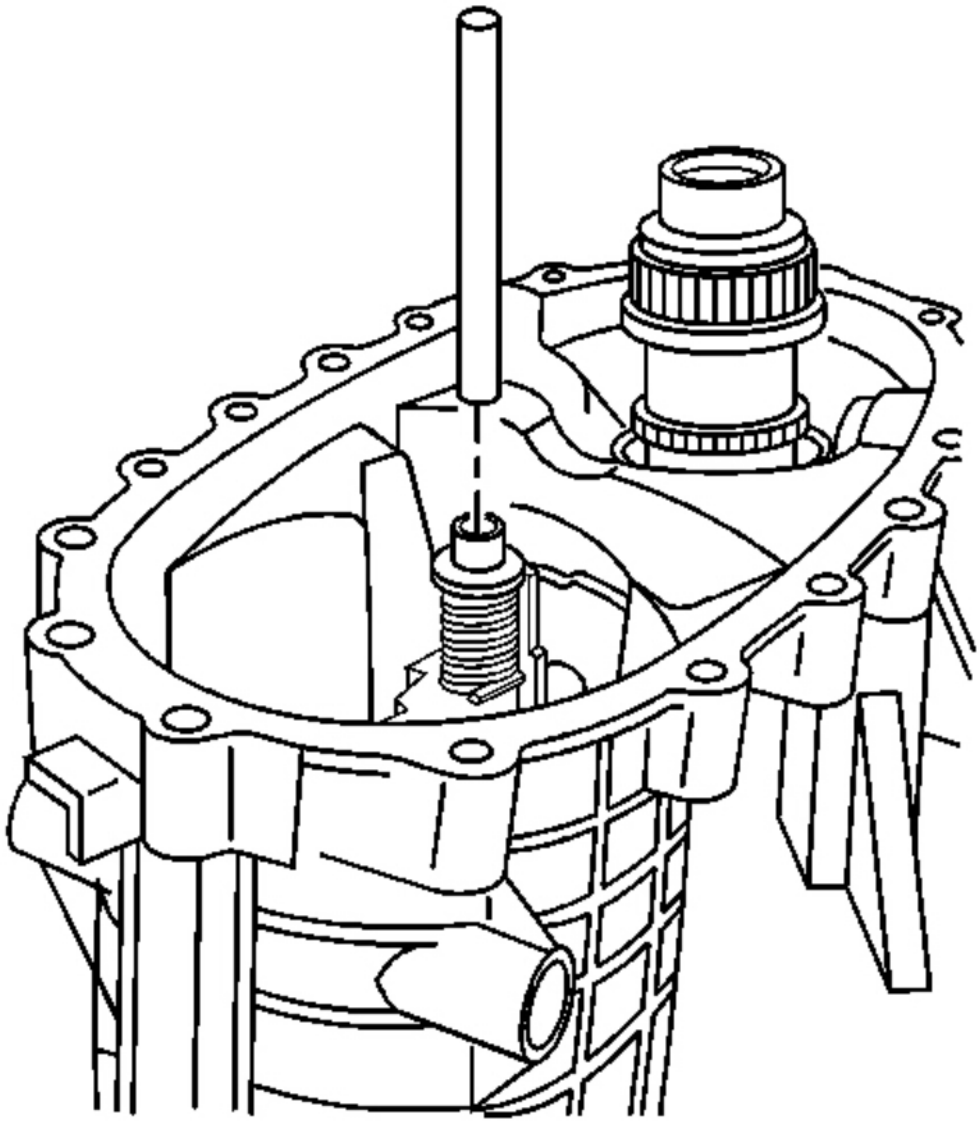


Fig. 123: Locating Shift Fork Shaft
Courtesy of GENERAL MOTORS CORP.

59. Remove the shift fork shaft.

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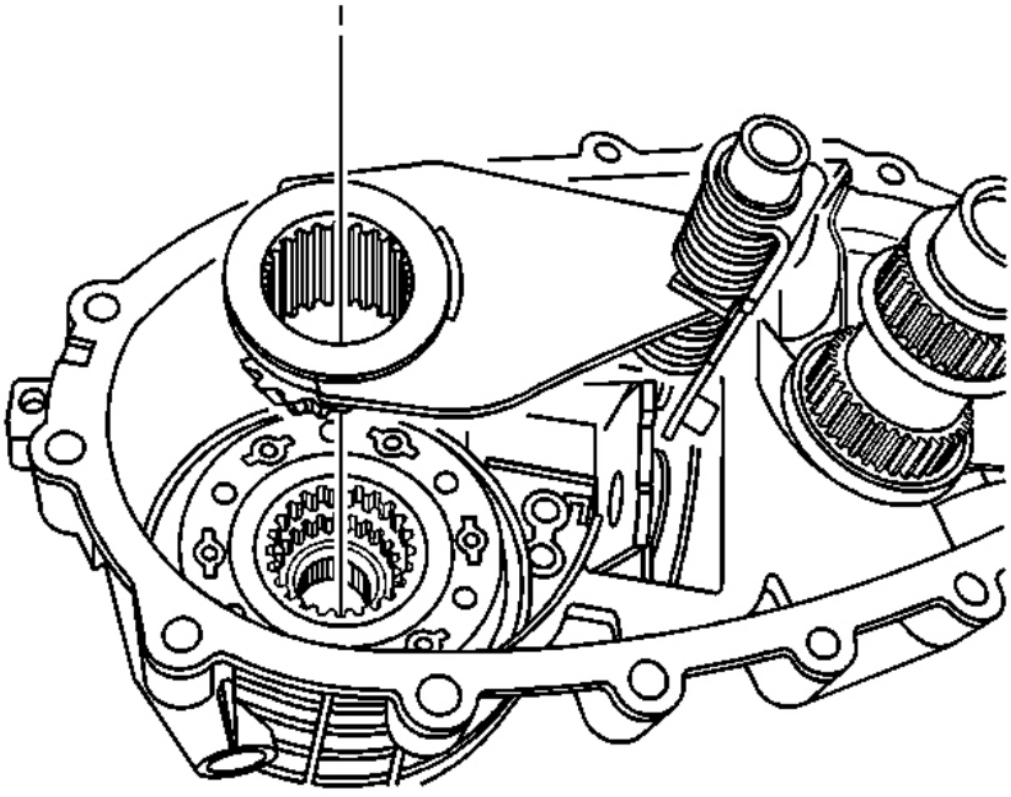


Fig. 124: View Of Range Shift Fork & Range Shift Sleeve Assembly
Courtesy of GENERAL MOTORS CORP.

60. Remove the range shift fork and the range shift sleeve as an assembly.

    It may be necessary to lightly pry the roller on the shift fork from the control actuator lever.

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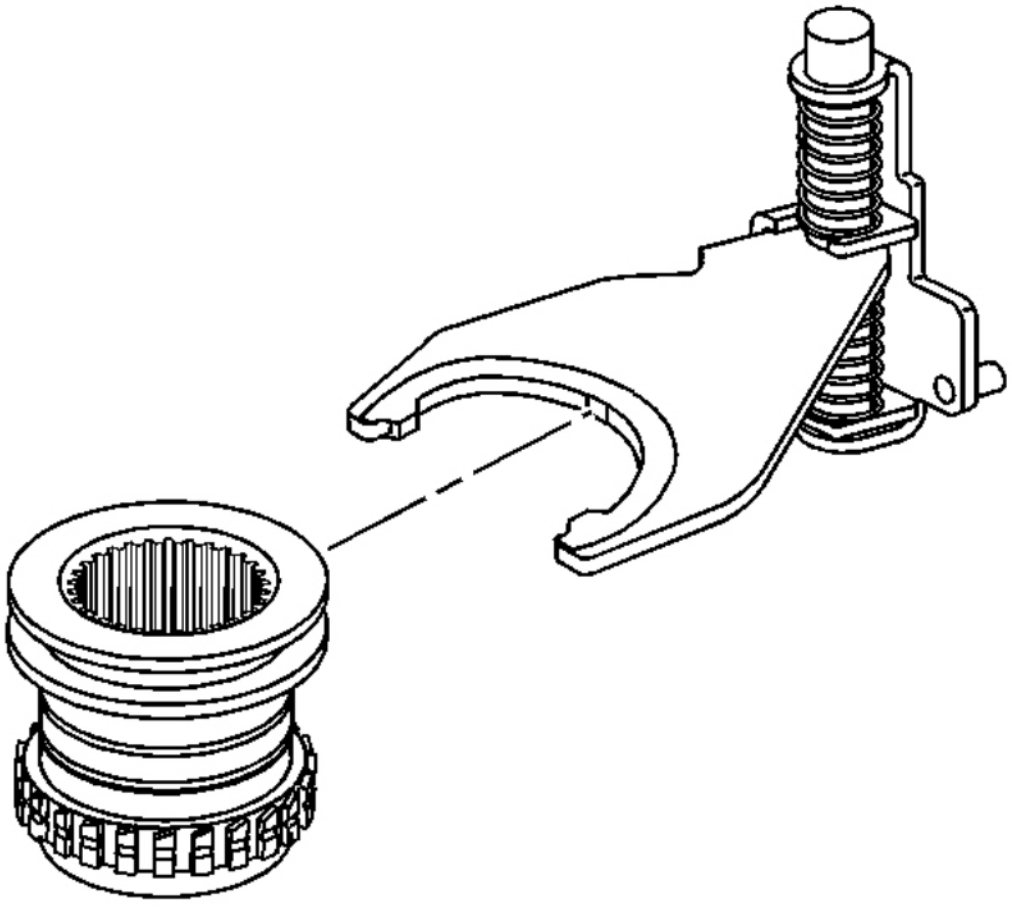


Fig. 125: View Of Range Shift Sleeve & Range Shift Fork
Courtesy of GENERAL MOTORS CORP.

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

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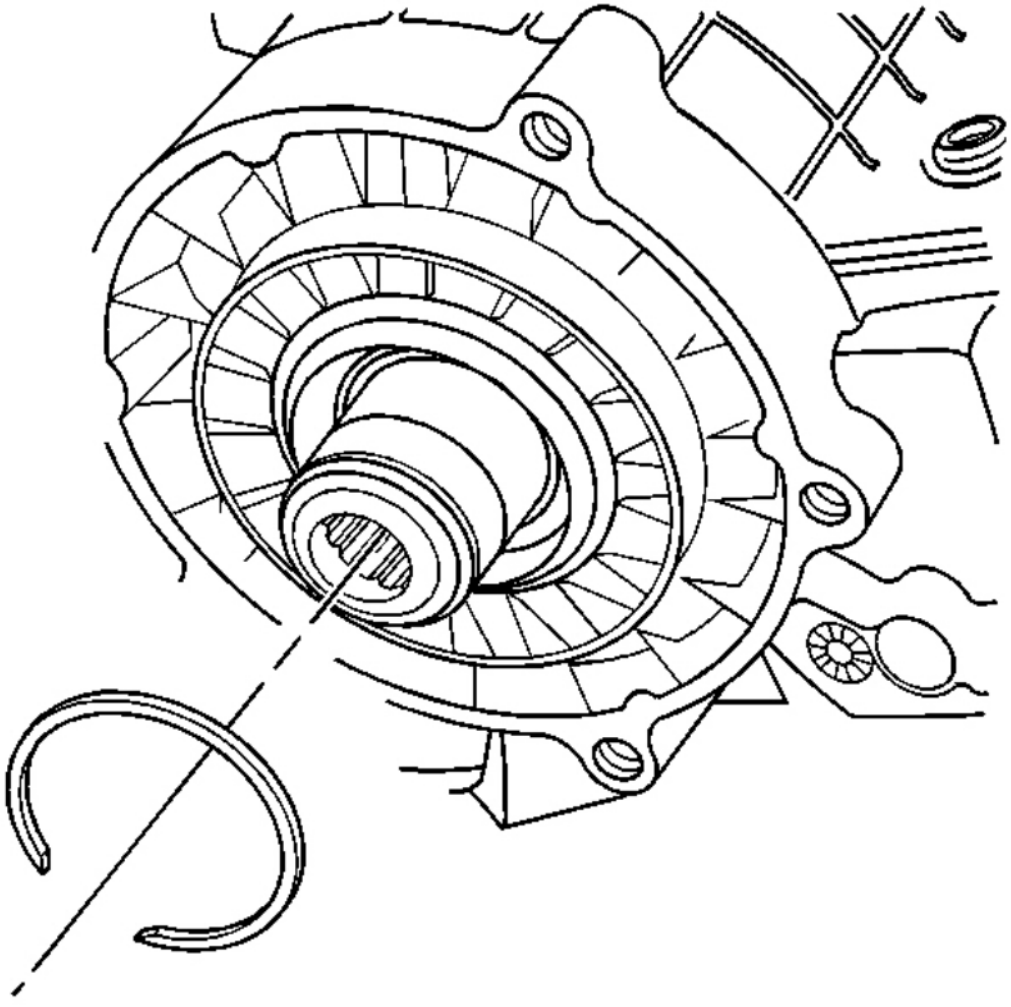


Fig. 126: View Of Outer Retaining Ring For The Input Gear Bearing
Courtesy of GENERAL MOTORS CORP.

62. Remove the input gear bearing outer retaining ring.

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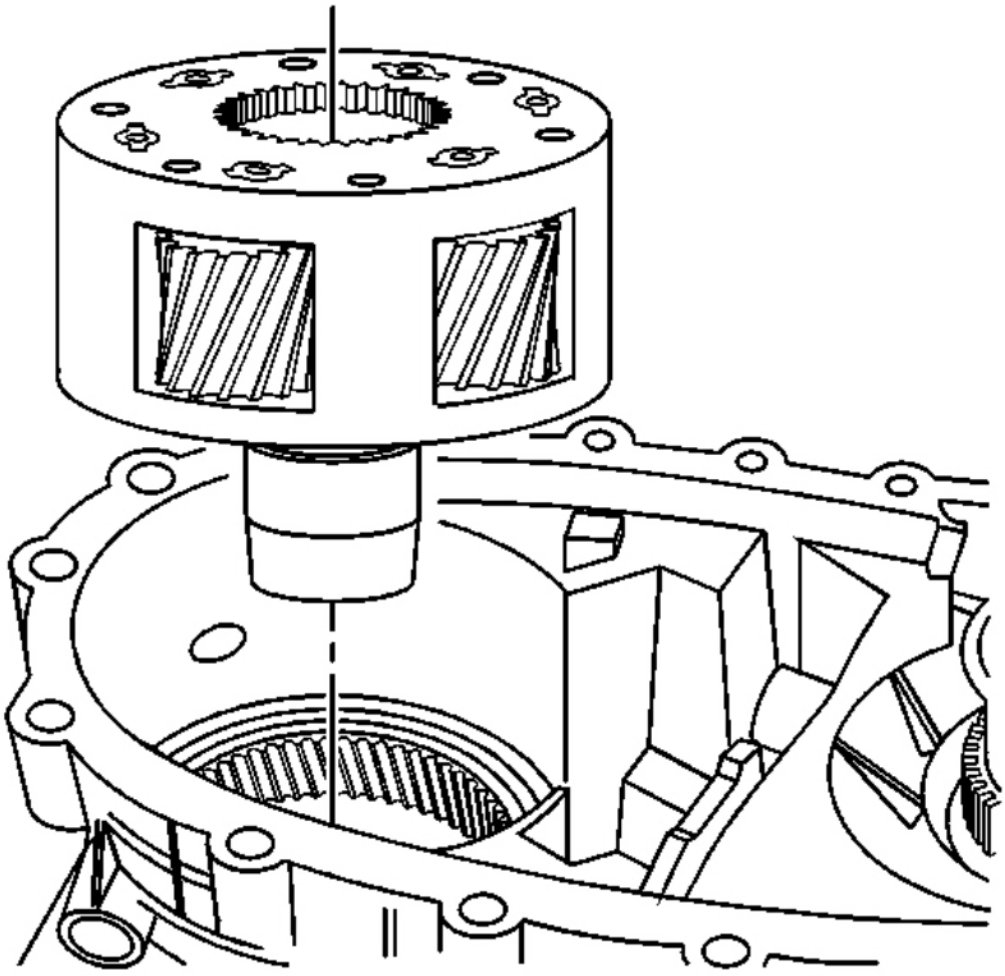


Fig. 127: View Of High/Low Planetary Carrier
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Depending on the version of the transfer case, it may have either a 3 pinion gear or 6 pinion gear planetary carrier assembly. The 3 pinion gear planetary carrier is used with transmission RPO M30 and the input gear splines are 27 teeth. The 6 pinion gear planetary carrier is used with transmission RPO MT1 and MN8 and the input gear splines are 32 teeth. The repair procedures are the same for both planetary carriers.

63. Remove the high/low planetary carrier.

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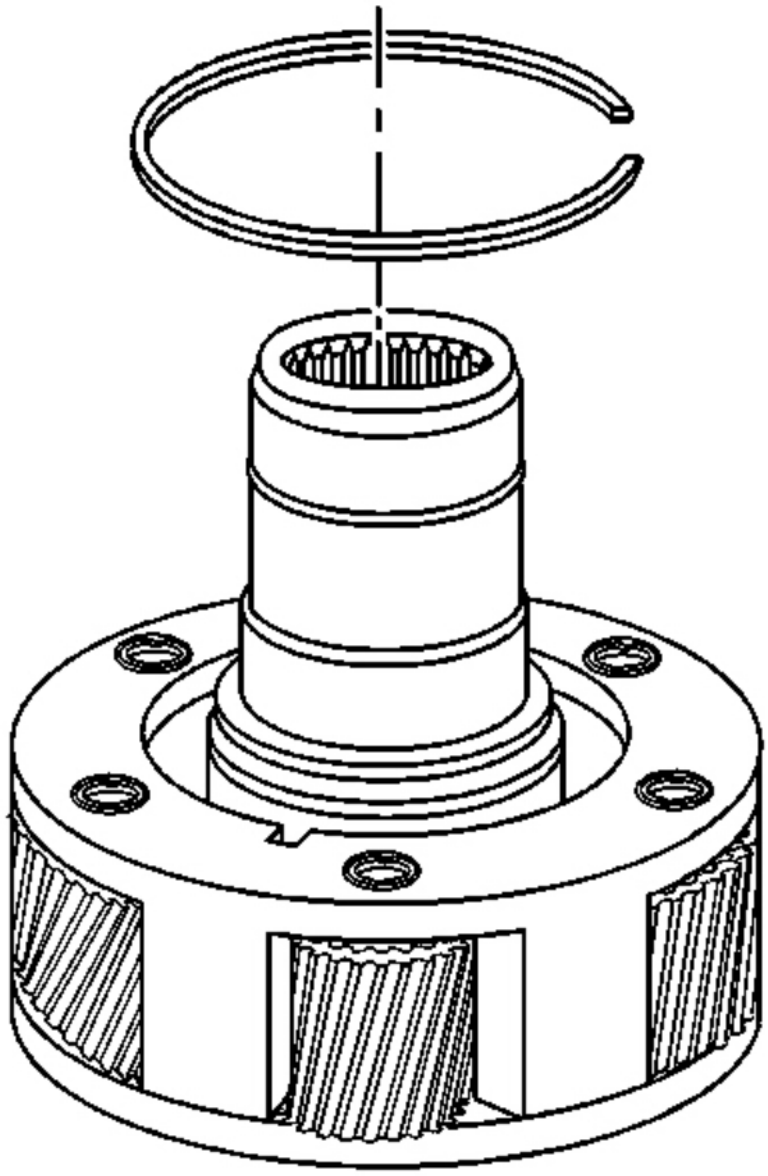


Fig. 128: View Of Input Gear Retaining Ring
Courtesy of GENERAL MOTORS CORP.

64. Remove the planetary gear shaft retaining ring.

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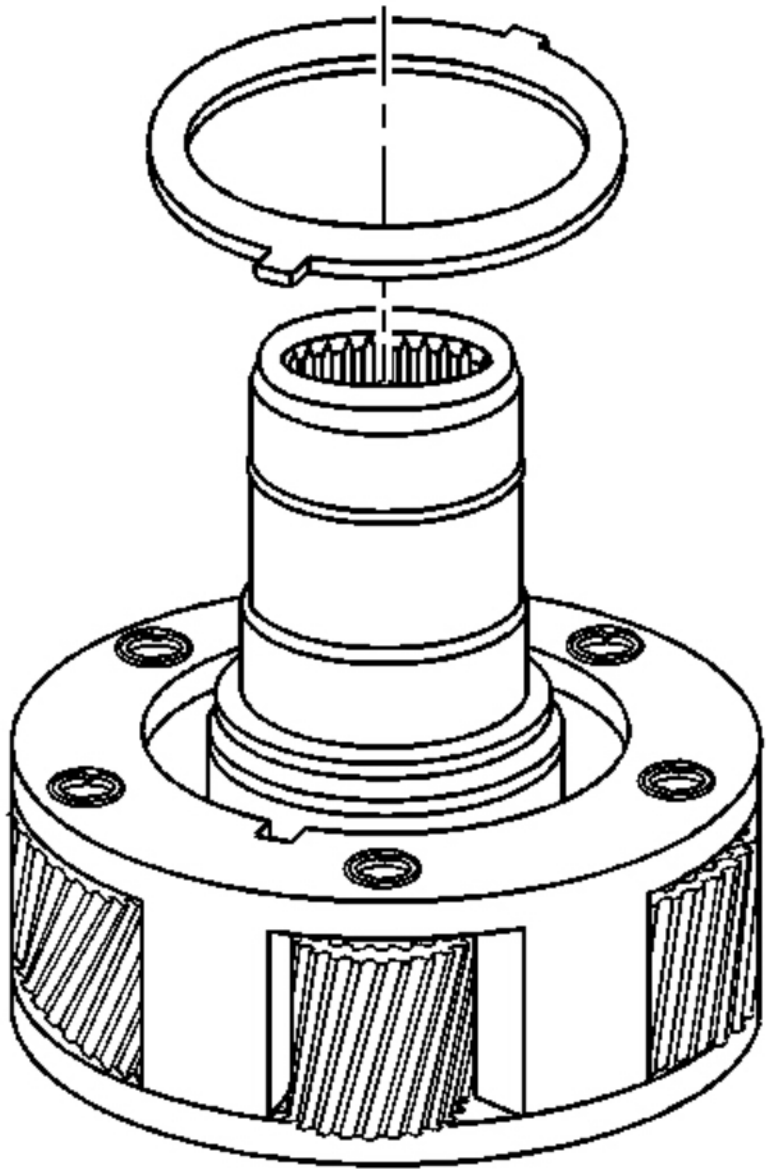


Fig. 129: Locating Input Gear Thrust Plate
Courtesy of GENERAL MOTORS CORP.

65. Remove the planetary carrier lock ring.

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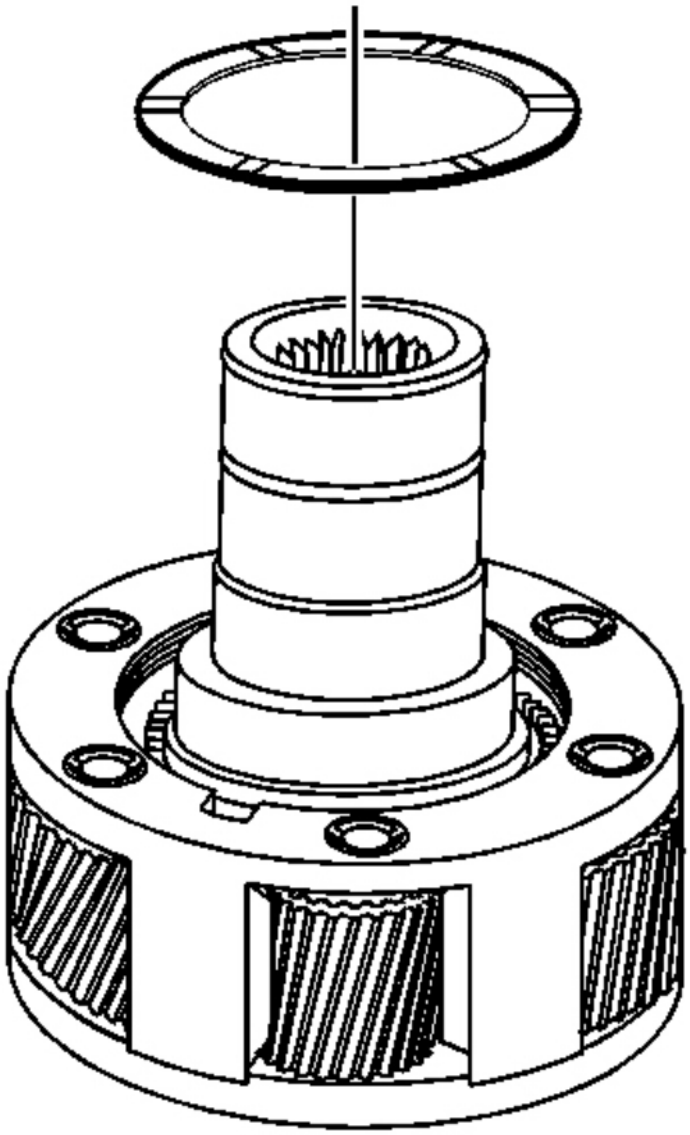


Fig. 130: Identifying Input Shaft Thrust Washer
Courtesy of GENERAL MOTORS CORP.

66. Remove the input gear front thrust washer.

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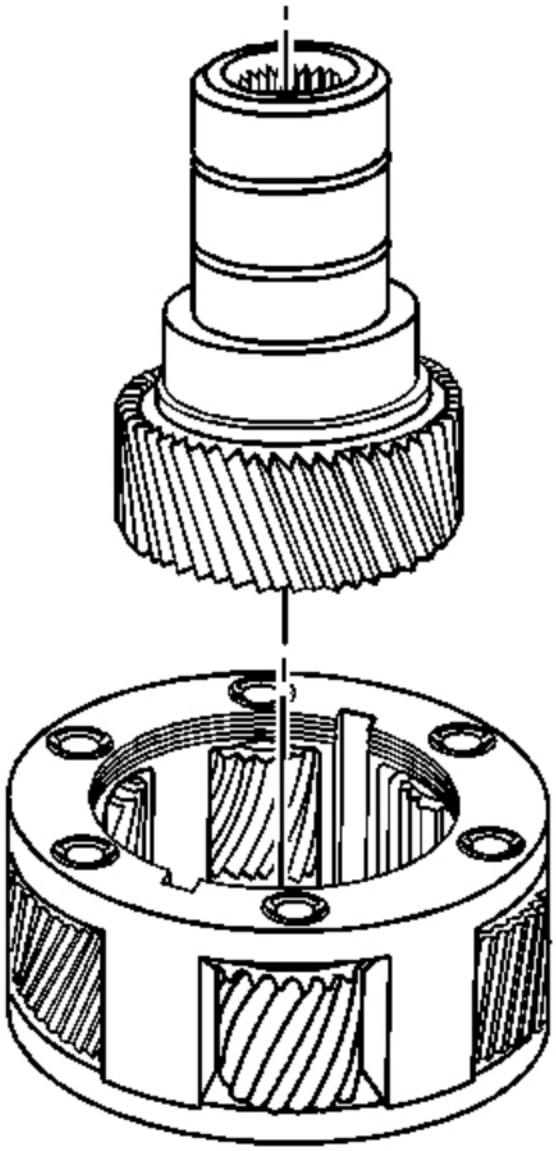


Fig. 131: View Of Input Gear
Courtesy of GENERAL MOTORS CORP.

67. Remove the input gear from the planetary carrier.

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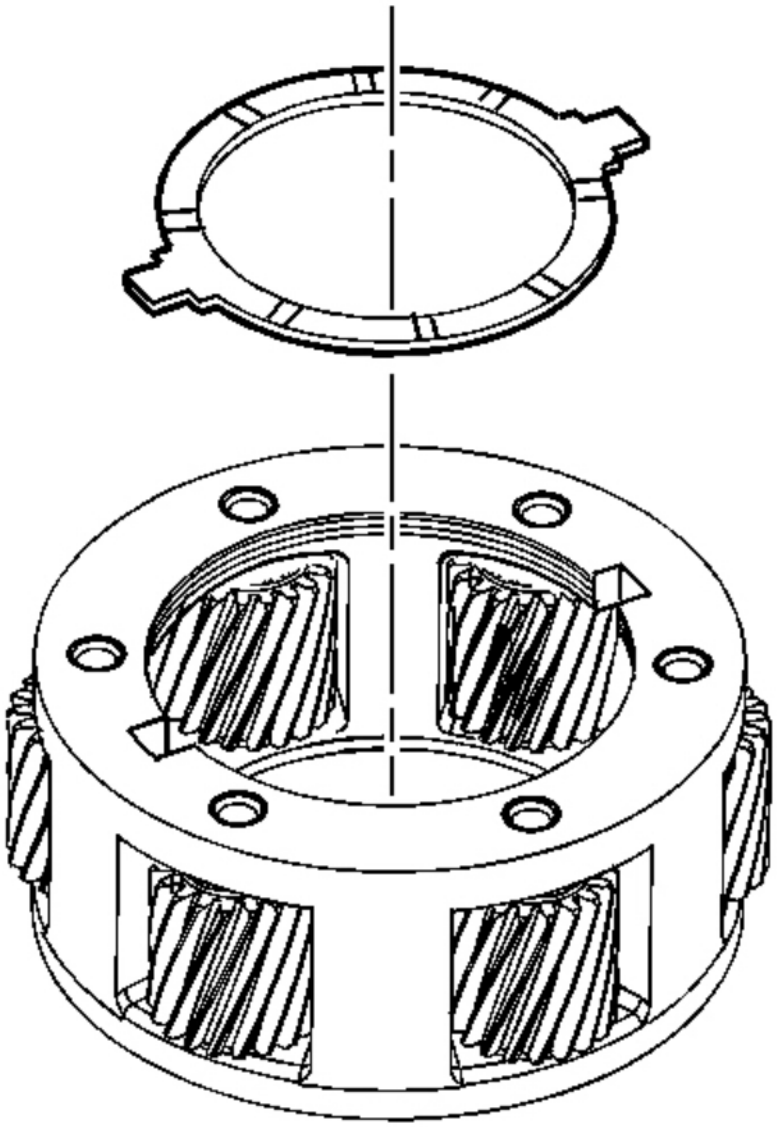


Fig. 132: View Of Input Shaft Thrust Washer
Courtesy of GENERAL MOTORS CORP.

68. Remove the input gear rear thrust washer.

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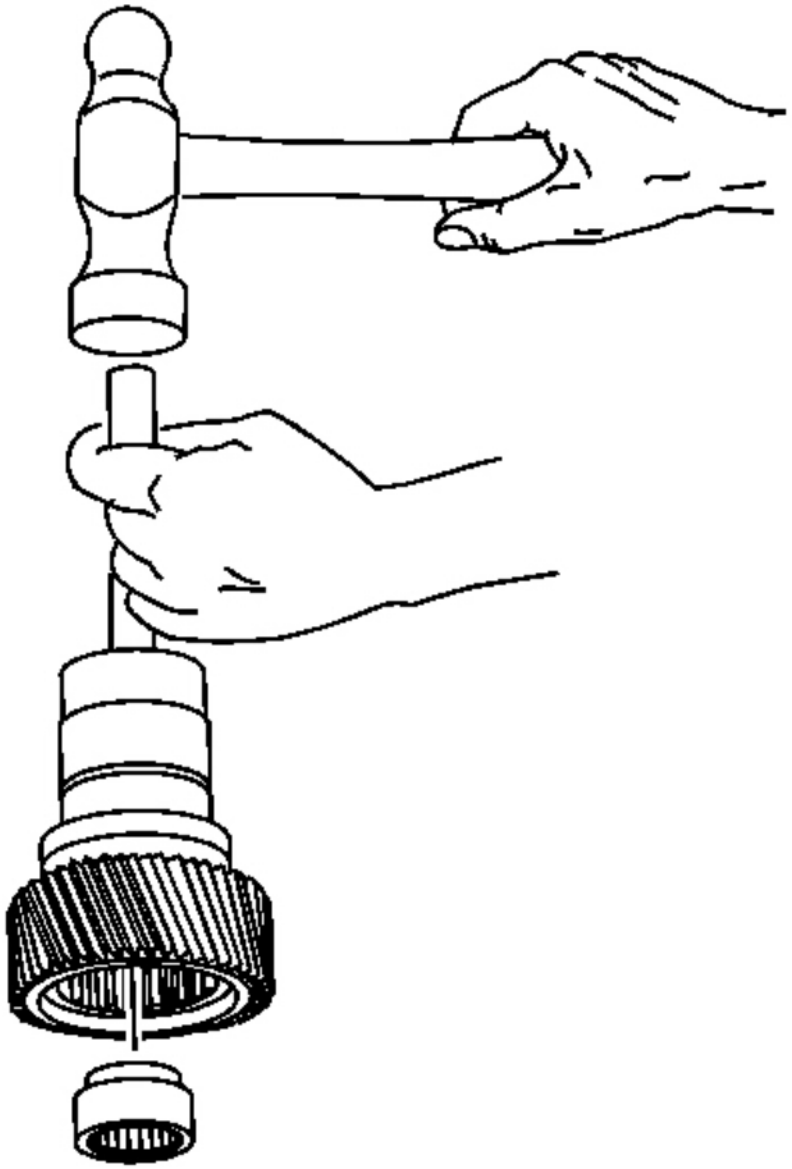


Fig. 133: Removing Pilot Bearing From Input Gear
Courtesy of GENERAL MOTORS CORP.

69. Inspect the pilot bearing in the input gear for being faulty. Refer to **Cleaning and Inspection**.
70. Remove the pilot bearing from the input gear using a brass drift and a hammer.

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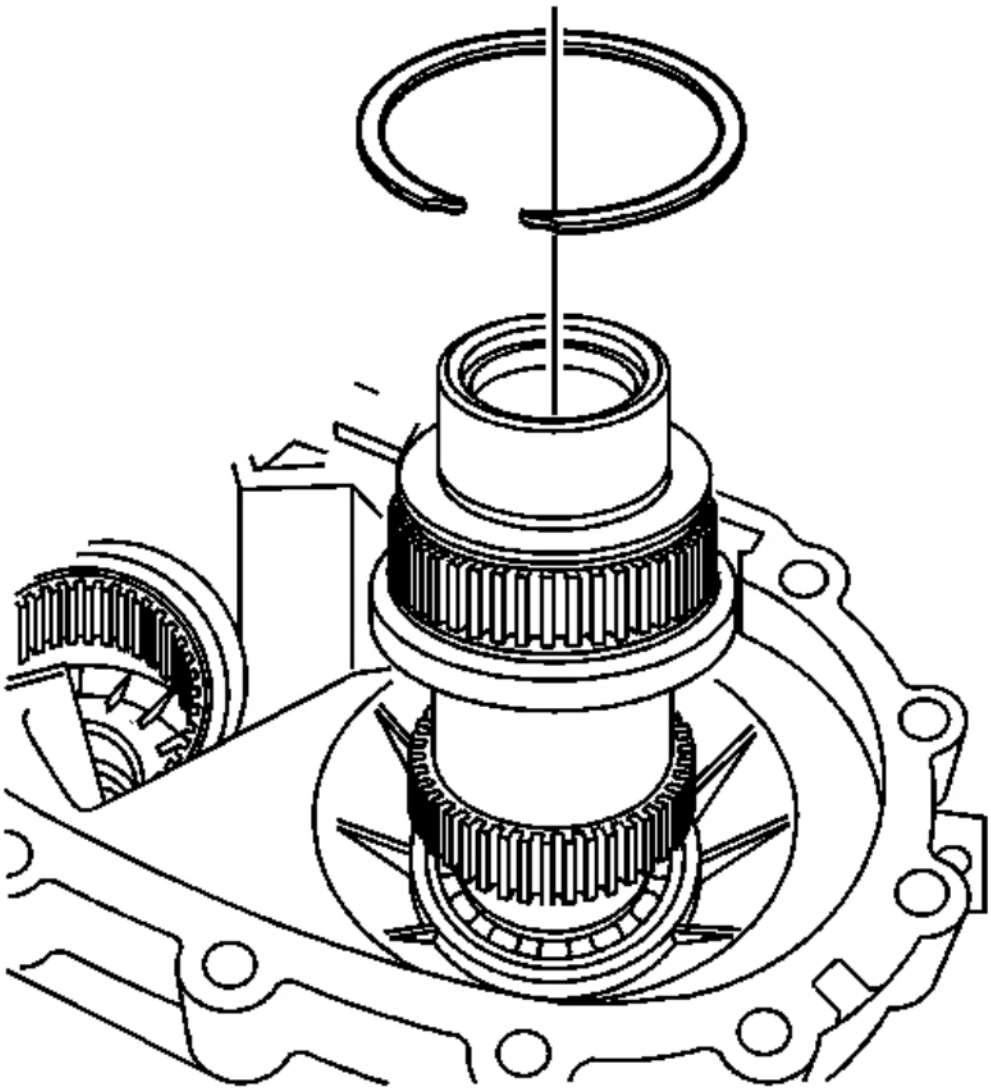


Fig. 134: Identifying Front Output Shaft Bearing Inner Retaining Ring
Courtesy of GENERAL MOTORS CORP.

71. Remove the inner retaining ring for the front output shaft bearing.

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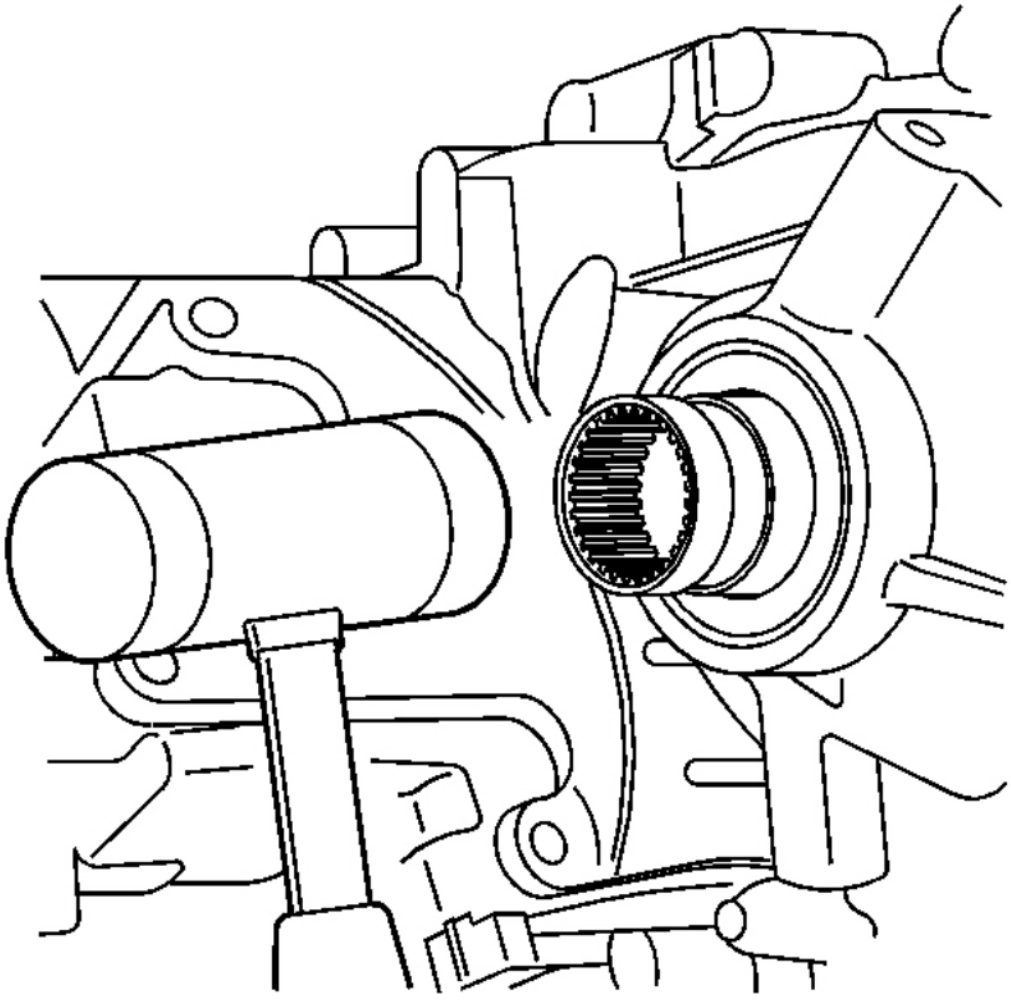


Fig. 135: Removing Front Output Shaft With Bearing
Courtesy of GENERAL MOTORS CORP.

72. Using a soft-face hammer, remove the front output shaft, with the bearing, from the front case half.

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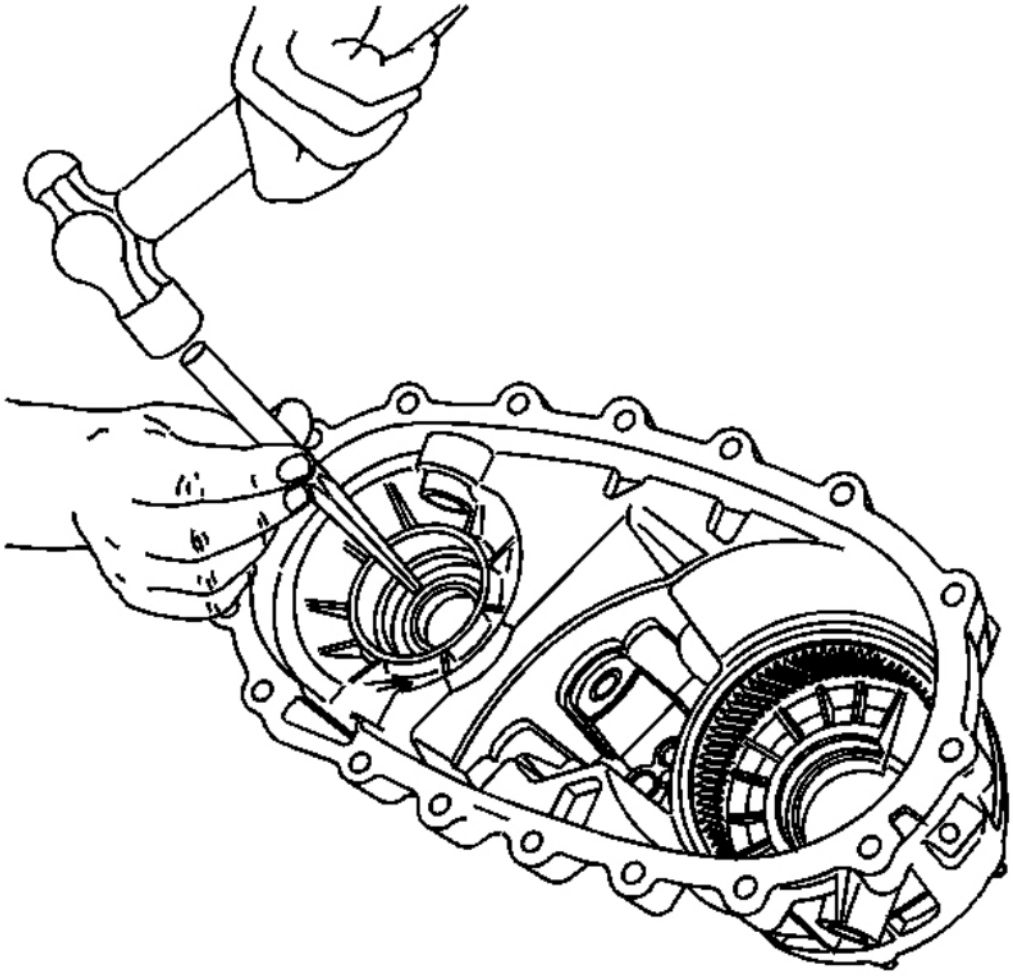


Fig. 136: Locating Front Output Shaft Seal
Courtesy of GENERAL MOTORS CORP.

73. Using a suitable punch, remove the front output shaft seal from the front case half.

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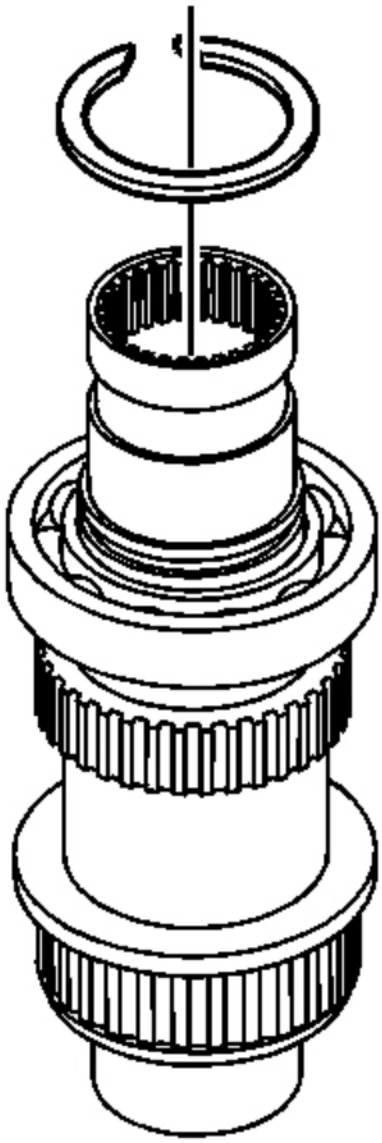


Fig. 137: View Of Front Output Shaft Bearing Outer Retaining Ring
Courtesy of GENERAL MOTORS CORP.

74. Remove the outer retaining ring for the front output shaft bearing.

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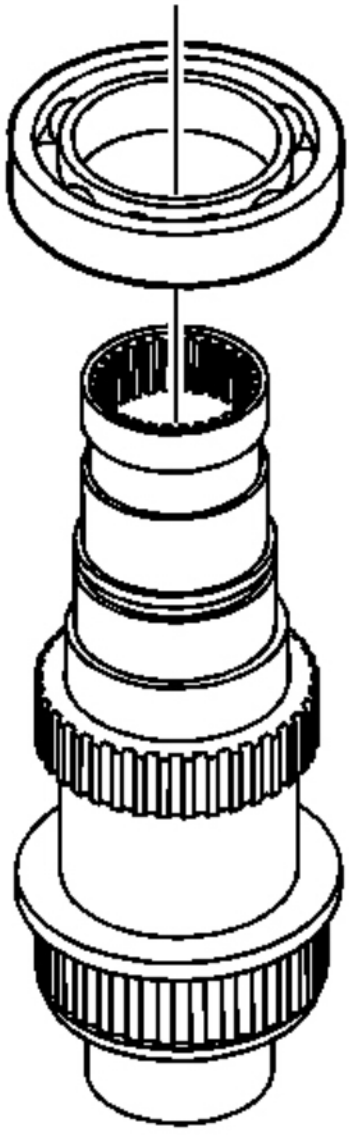


Fig. 138: Identifying Front Output Shaft Bearing
Courtesy of GENERAL MOTORS CORP.

75. Inspect the front output shaft bearing for being faulty. Refer to **Cleaning and Inspection**.
76. Remove the bearing from the front output shaft. Do not use the bearing again after removal.

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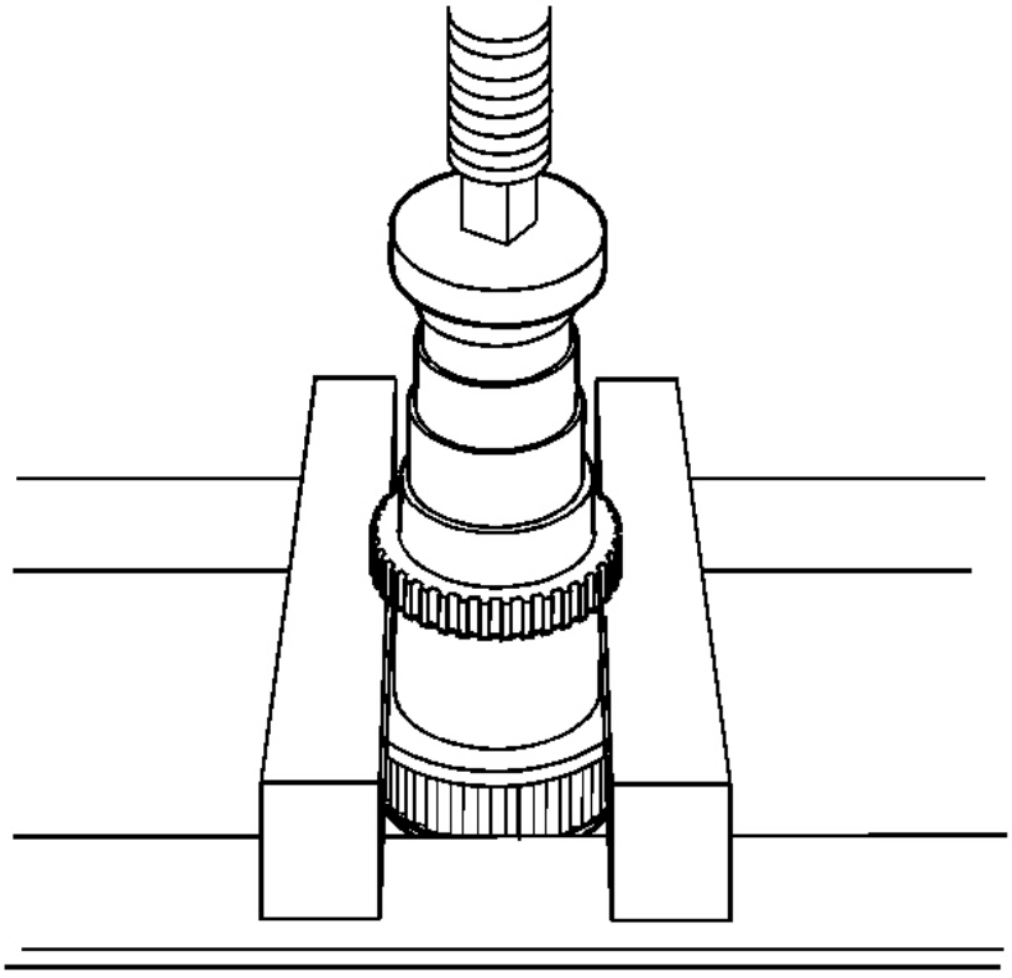


Fig. 139: Locating Speed Sensor Reluctor Wheel
Courtesy of GENERAL MOTORS CORP.

77. If damaged, remove the speed sensor reluctor wheel from the front output shaft, using a hydraulic press. Do not use the speed sensor reluctor wheel again after removal.

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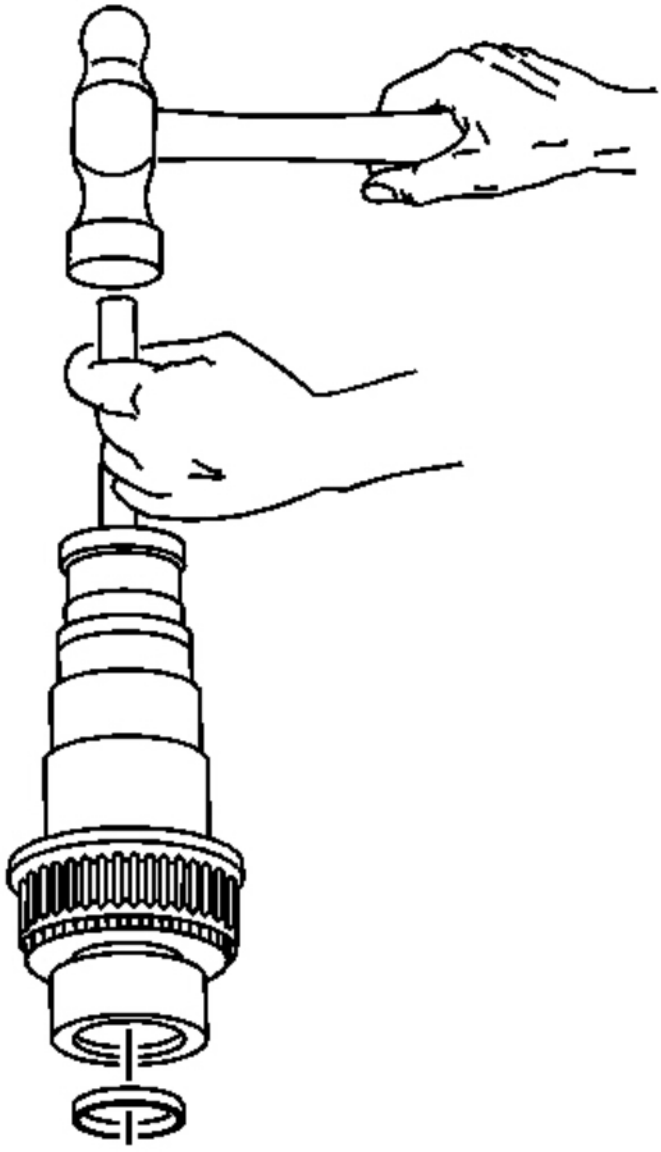


Fig. 140: Removing Cup Plug
Courtesy of GENERAL MOTORS CORP.

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

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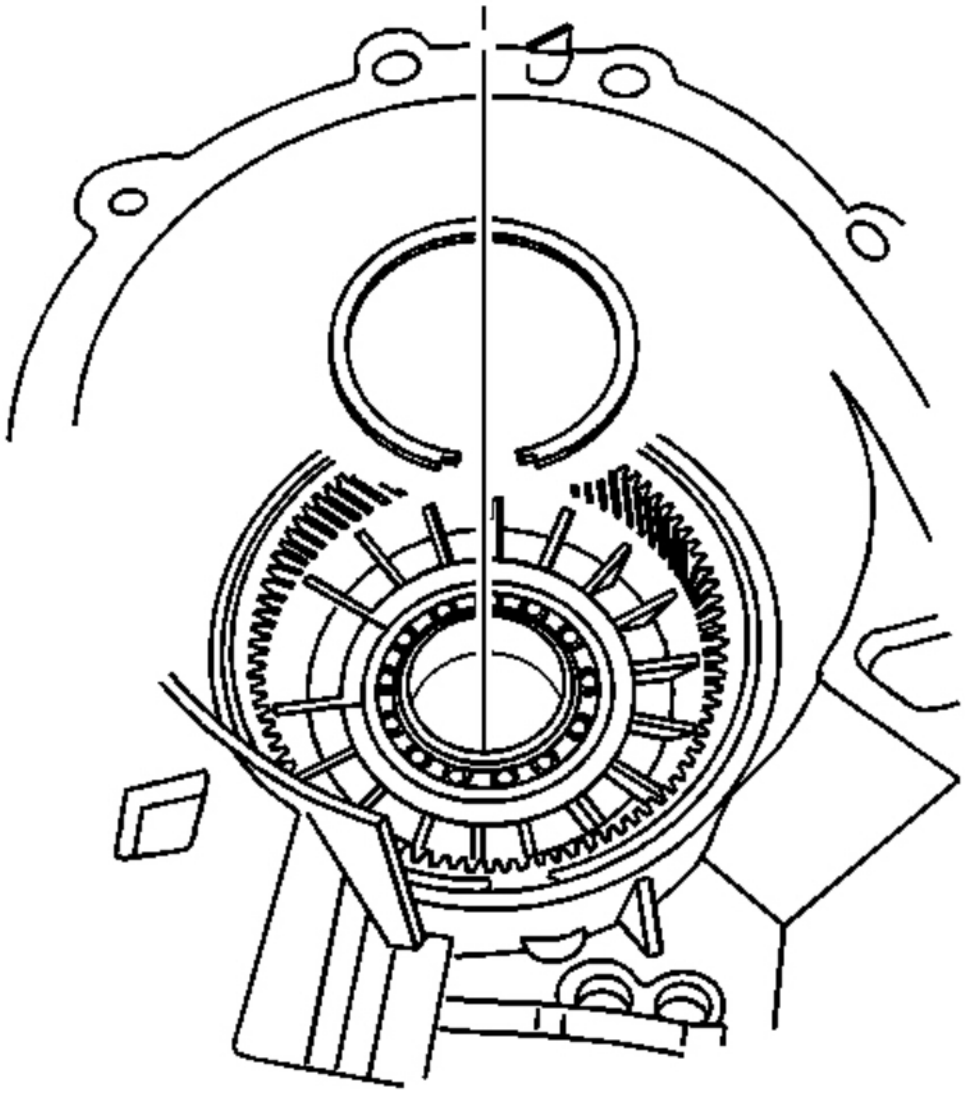


Fig. 141: Locating Input Bearing Retaining Ring
Courtesy of GENERAL MOTORS CORP.

79. Remove the input bearing retaining ring.

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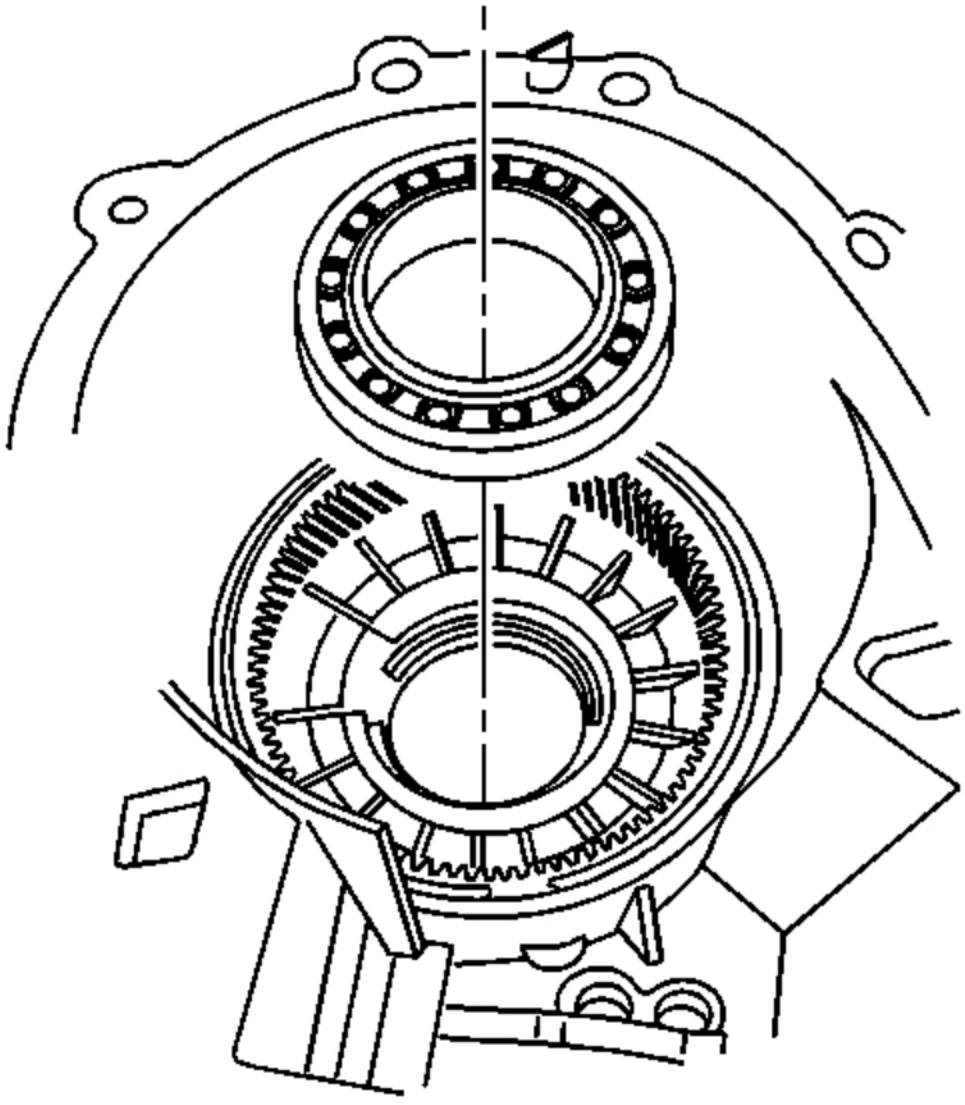


Fig. 142: Identifying Input Bearing
Courtesy of GENERAL MOTORS CORP.

80. Remove the input bearing.

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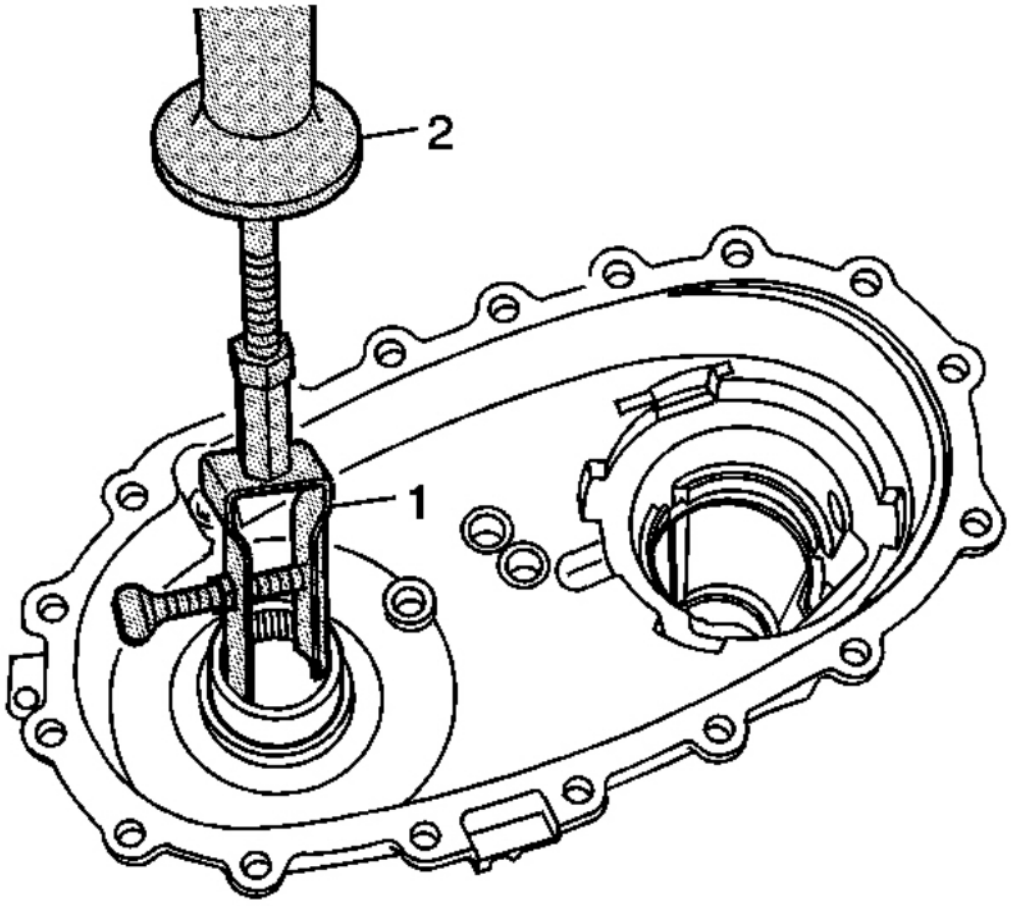


Fig. 143: Removing Front Output Shaft Rear Bearing With J 23907 & J 26941
Courtesy of GENERAL MOTORS CORP.

81. Inspect the front output shaft rear bearing for being faulty. Refer to **Cleaning and Inspection**.
82. If the bearing is faulty, remove the bearing using the **J 23907** (2) and the **J 26941** (1). See **Special Tools**.

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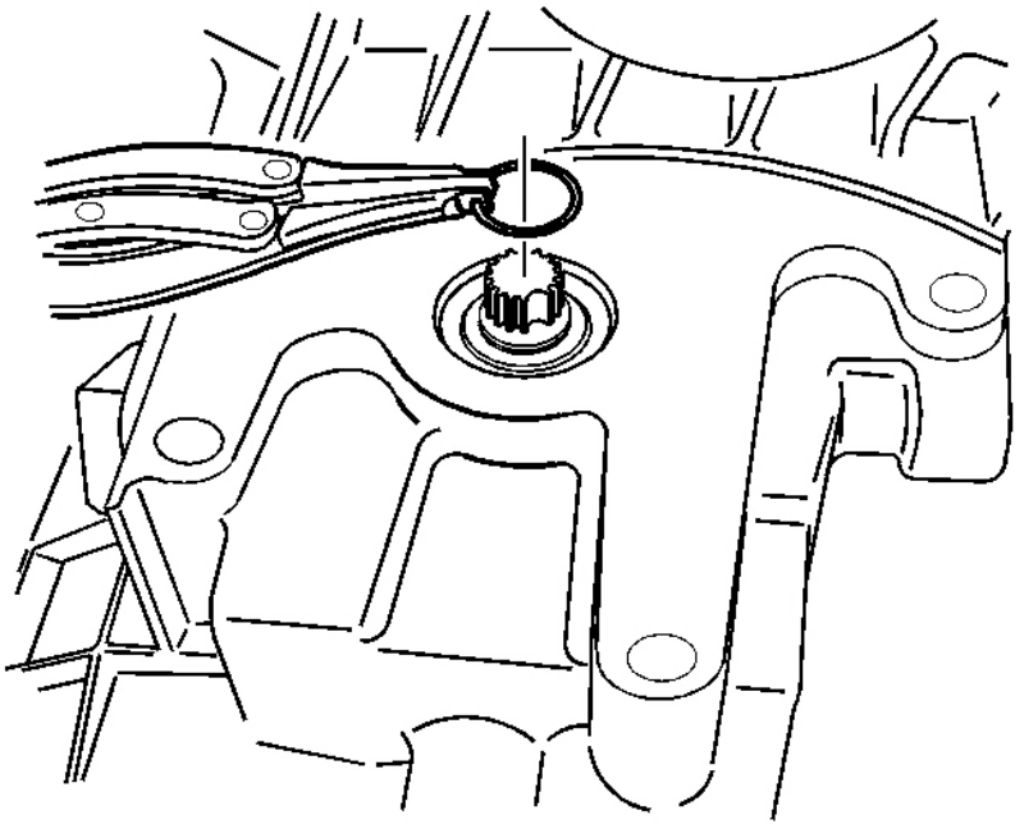


Fig. 144: Locating Control Actuator Lever Shaft Retaining Ring
Courtesy of GENERAL MOTORS CORP.

83. Remove the control actuator lever shaft retaining ring.

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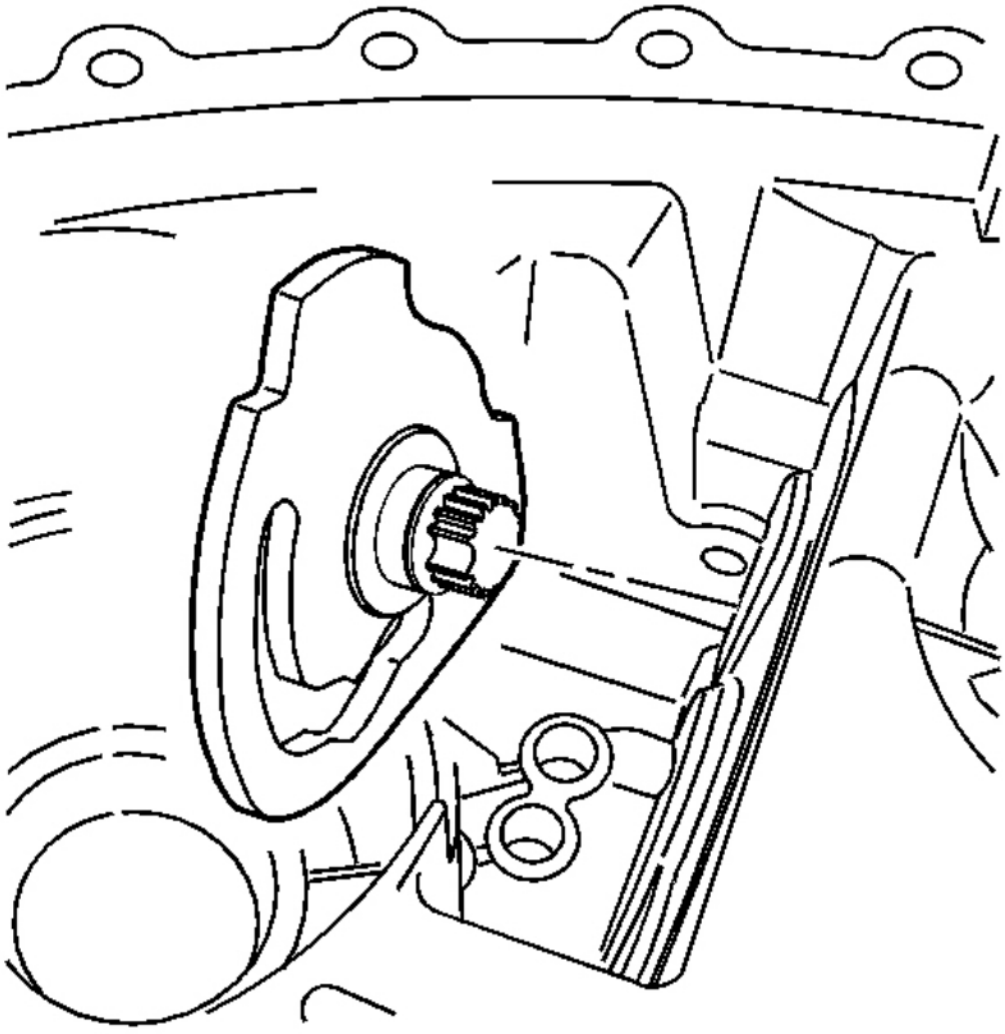


Fig. 145: Identifying Control Actuator Lever Shaft
Courtesy of GENERAL MOTORS CORP.

84. Remove the control actuator lever shaft.
85. Inspect the control actuator lever bearing and seal for being faulty. Refer to **Cleaning and Inspection**.
86. If the bearing is leaking or faulty, remove the bearing from the case.

CLEANING AND INSPECTION

Front Case Half

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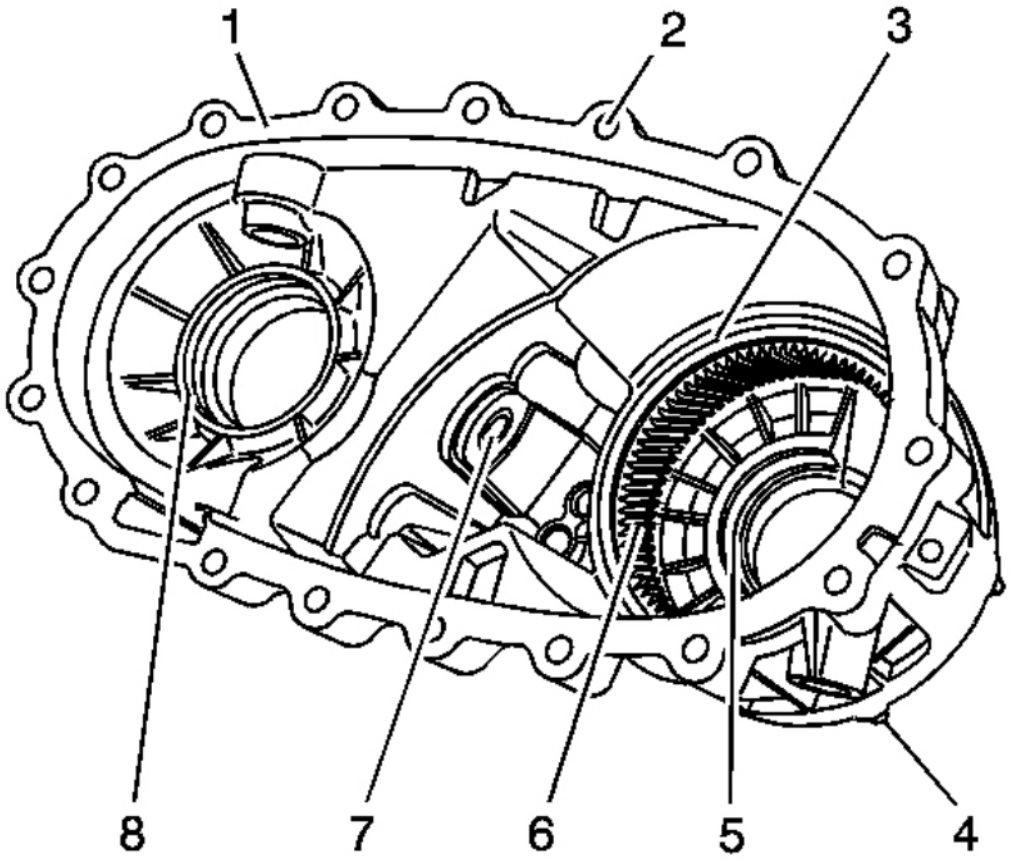


Fig. 146: View Of Inspection Areas On Front Case Half
Courtesy of GENERAL MOTORS CORP.

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

NOTE: **Refer to Machined Surface Damage Notice .**

2. Remove the sealer from the case sealing surfaces.
3. Inspect the case for being broken or cracked.
4. Inspect the front output shaft front bearing bore (8) for the following conditions:
   - Spun bearing
   - Cracks
5. Inspect the input shaft bearing bore (5) for the following conditions:
   - Spun bearing

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- Cracks

6. Replace the front case half if any of the above conditions are found.
7. Inspect the sealing surfaces (1) for damage.
8. Repair small scratches or nicks with a soft stone.
9. Inspect the front case to transmission case mounting surface for damage.
10. Inspect the case threaded bolt holes (2) for damage.
11. Repair any damaged threads.
12. Inspect the transmission to transfer case studs (4) for damage.
13. Replace any damaged studs. Refer to **Transfer Case Assemble**.
14. Inspect the retaining ring (3) of the annulus gear to ensure it is properly seated.
15. Inspect the annulus gear (6) for the following conditions:
    - Damage or wear
    - Chipped gear teeth
    - Debris embedded in the root of the teeth
16. Replace the front case half if the annulus gear is damaged. The annulus gear is serviced only with the front case half.
17. Inspect the control actuator lever shaft bearing and seal (7) for the following conditions:
    - Roughness
    - Pitted rollers
    - Seal torn or damaged
    - Missing rollers
18. Replace the control actuator lever shaft bearing if it is faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.
19. Inspect the location pins for being loose or missing.
20. Repair or replace any damaged location pins.
21. Inspect the front output shaft front bearing and the input shaft bearing for the following conditions:
    - Roughness
    - Brinelling
    - Pitting
22. Replace the bearings if any of the above conditions are found. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.

Rear Case Half

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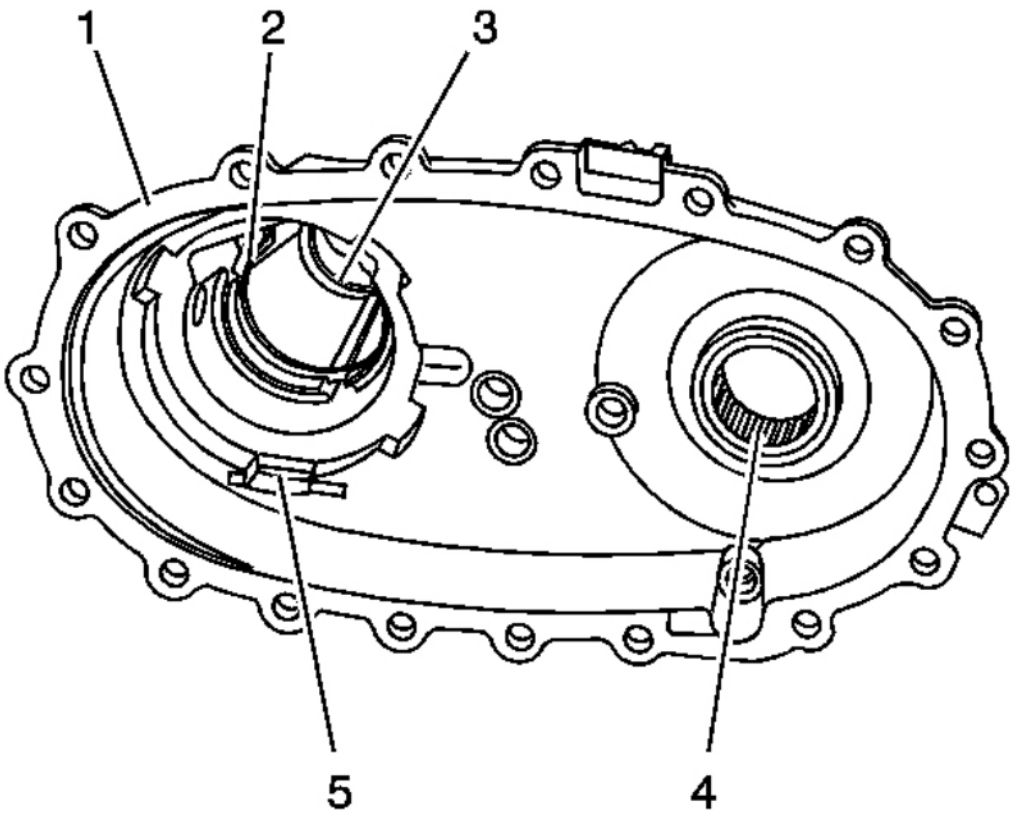


Fig. 147: View Of Rear Case Half Inspection Areas
Courtesy of GENERAL MOTORS CORP.

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

NOTE: **Refer to Machined Surface Damage Notice .**

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 oil pump wear sleeve (5) for wear or damage.

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10. Replace the oil pump wear sleeve if faulty.
11. Inspect the front output shaft rear bearing (4) for the following conditions:
    - Roughness
    - Brinelling
    - Pitting
12. Replace the front output shaft rear bearing if any of the above conditions are found. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.
13. Inspect the rear output shaft bearing for the following conditions:
    - Roughness
    - Brinelling
    - Pitting
14. Inspect the rear output shaft rear bearing for a spun bearing bore.
15. Replace the case if a bearing has spun.
16. Inspect the rear output shaft rear bearing retaining ring (2) for being bent or twisted.
17. Replace a faulty retaining ring.
18. Inspect the rear output shaft bushing (3) for scoring or wear.
19. Replace a faulty rear output shaft bushing. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.

Oil Pump

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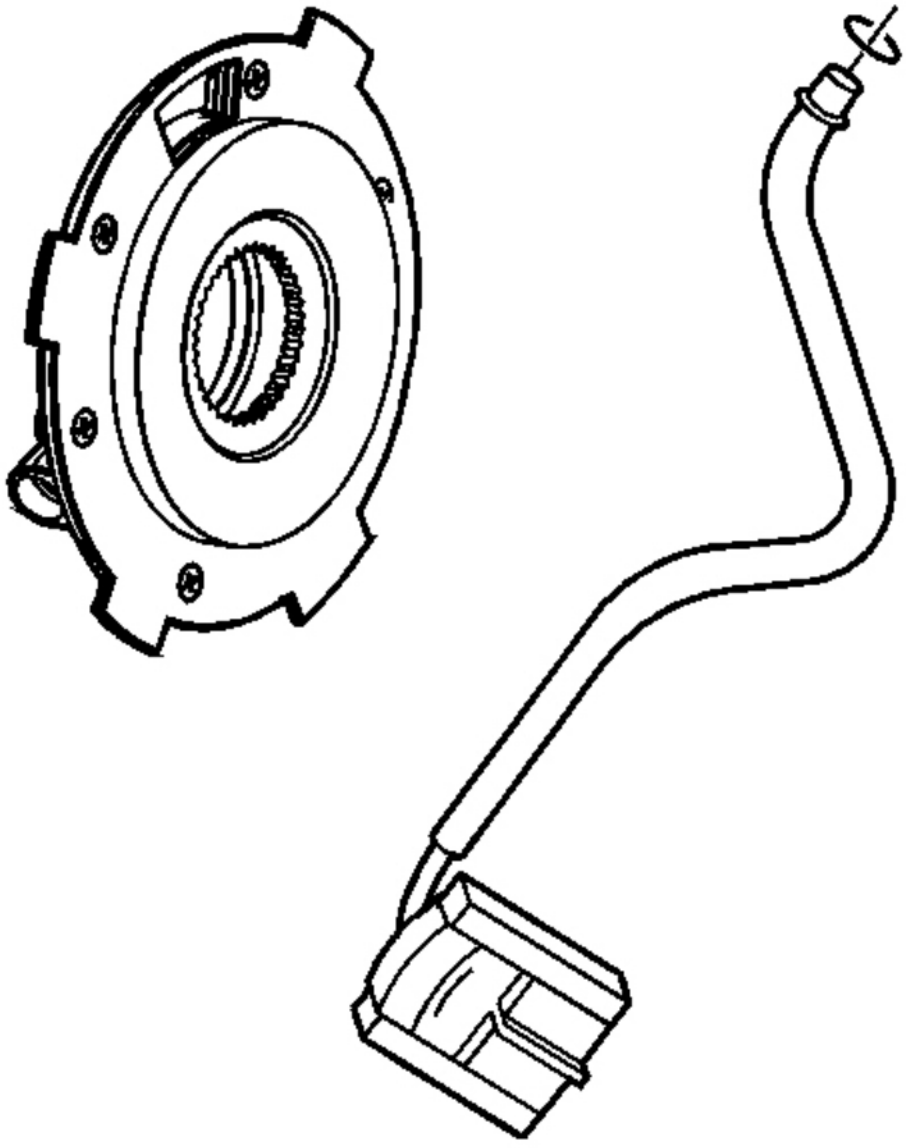


Fig. 148: Oil Pump, 2nd Design
Courtesy of GENERAL MOTORS CORP.

1. Clean the oil pump suction pipe, with the screen, in cleaning solvent and air dry. Do not remove the screen from the pipe.
2. If the screen is embedded with debris, replace the suction pipe assembly.

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3. Inspect the oil pump for free movement.
4. Replace the oil pump if there is any binding. Do not disassemble the oil pump. The oil pump is serviced as a unit.

Rear Output Shaft

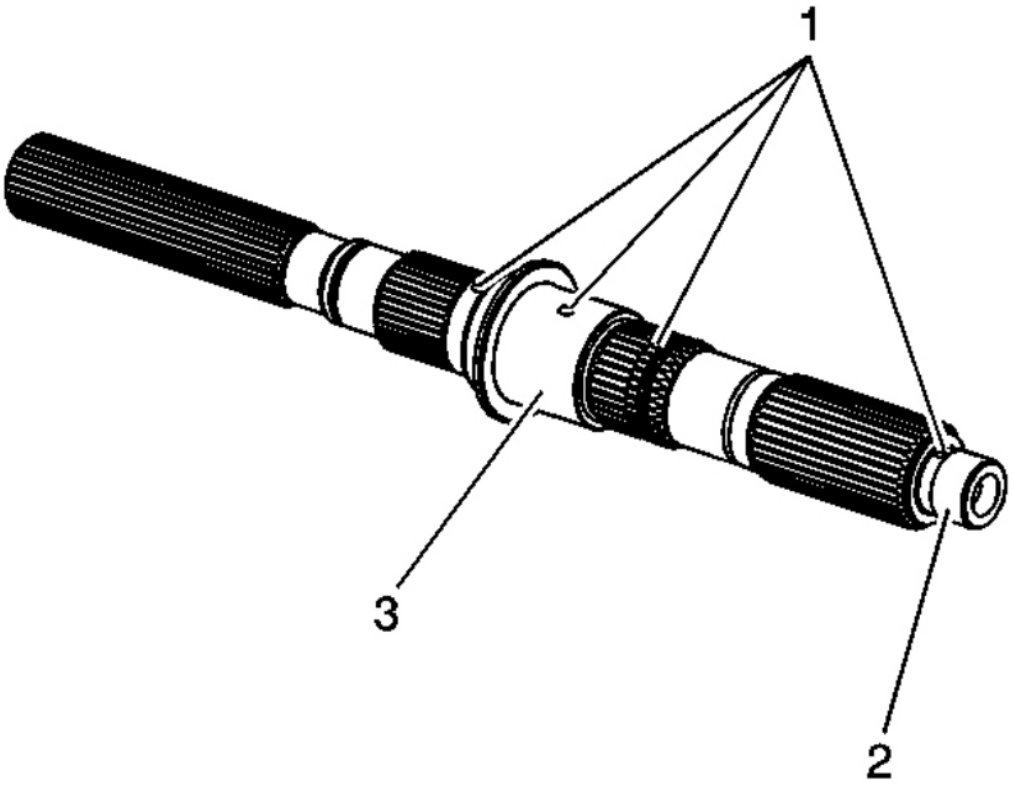


Fig. 149: Rear Output Shaft
Courtesy of GENERAL MOTORS CORP.

1. Clean the rear output shaft in cleaning solvent.
2. Clean the rear output shaft oil galleries (1) and air dry.

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

3. Inspect the input gear pilot bearing surface (2) and the clutch housing bearing surface (3) for the following conditions:
   - Scoring

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- Pitting
- Brinelling
- Excessive wear

4. Inspect the splines on the rear output shaft for damage or excessive wear. Witness marks at the location of the gears are normal.
5. Replace the rear output shaft if any of the above conditions are found.

Clutch Components

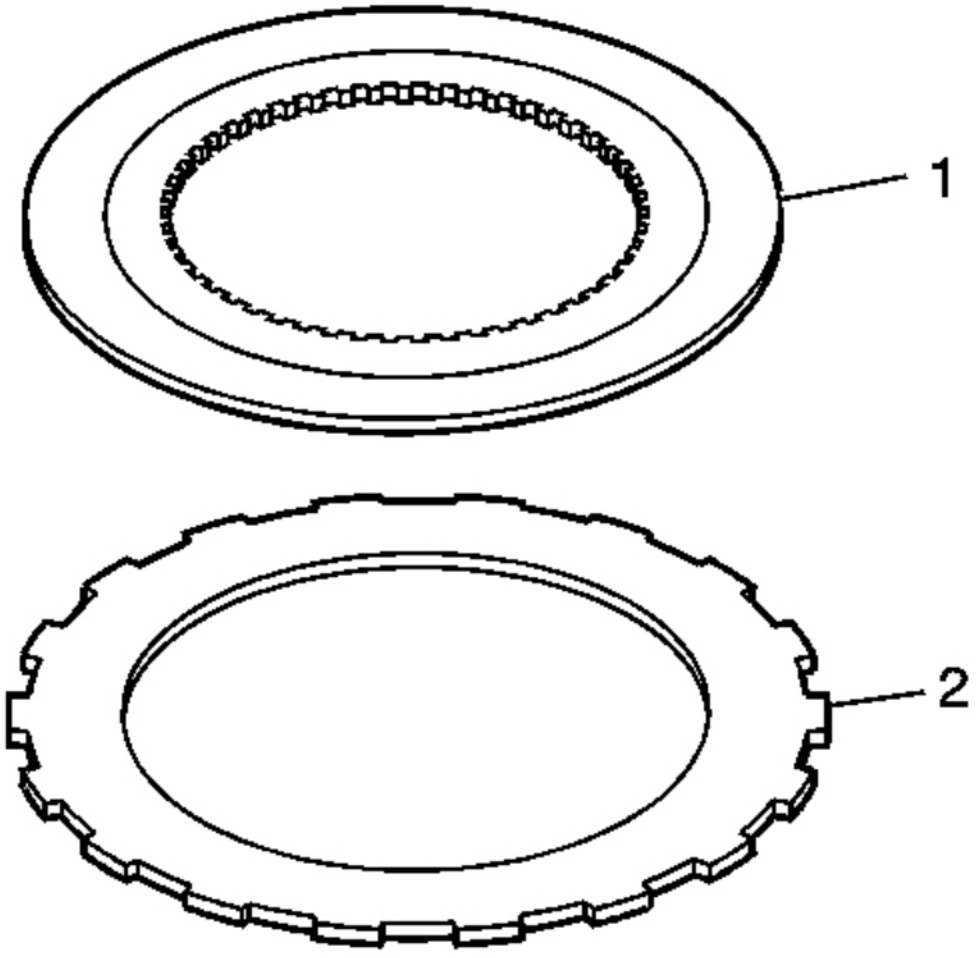


Fig. 150: View Of Inner & Outer Clutch Discs
Courtesy of GENERAL MOTORS CORP.

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1. Do not clean the inner clutch discs (1) in cleaning solvent.
2. Inspect the inner clutch discs (1) with the friction material for the following conditions:
   - Worn friction material
   - Grooved or scored friction material
   - Warped
   - Burnt
3. Inspect the outer clutch discs (2) steel plates for being worn or warped. If the discs show wavey wear marks, the discs are faulty.
4. Replace the clutch discs if any of the above conditions are found.

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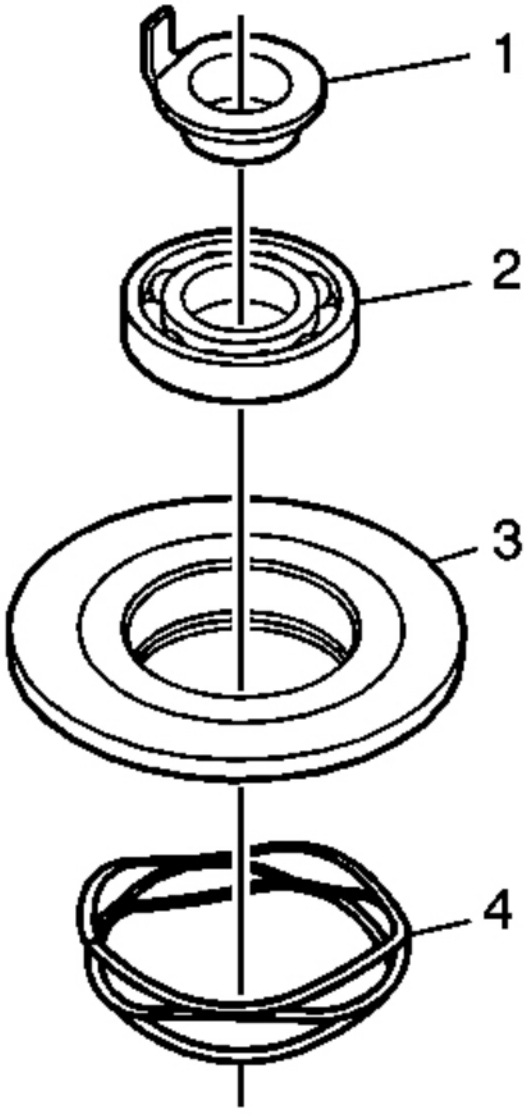


Fig. 151: Clutch Pressure Plate, Bearing & Hub
Courtesy of GENERAL MOTORS CORP.

5. Clean the clutch pressure plate (3), the clutch pressure plate bearing (2) and the clutch pressure plate hub (1) in cleaning solvent and air dry.
6. Inspect the pressure plate bearing (2) for the following conditions:
    - Roughness

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- Brinelling
- Pitting
- Broken bearing cage

7. Replace the pressure plate bearing if it is damaged or worn.
8. Inspect the clutch pressure plate (3) for wear or damage.
9. Replace a faulty clutch pressure plate.
10. Inspect the clutch pressure plate bearing hub (1) for wear or damage.
11. Replace a faulty clutch pressure plate bearing hub.
12. Inspect for a damaged clutch return spring (4).
13. Replace a faulty clutch spring.

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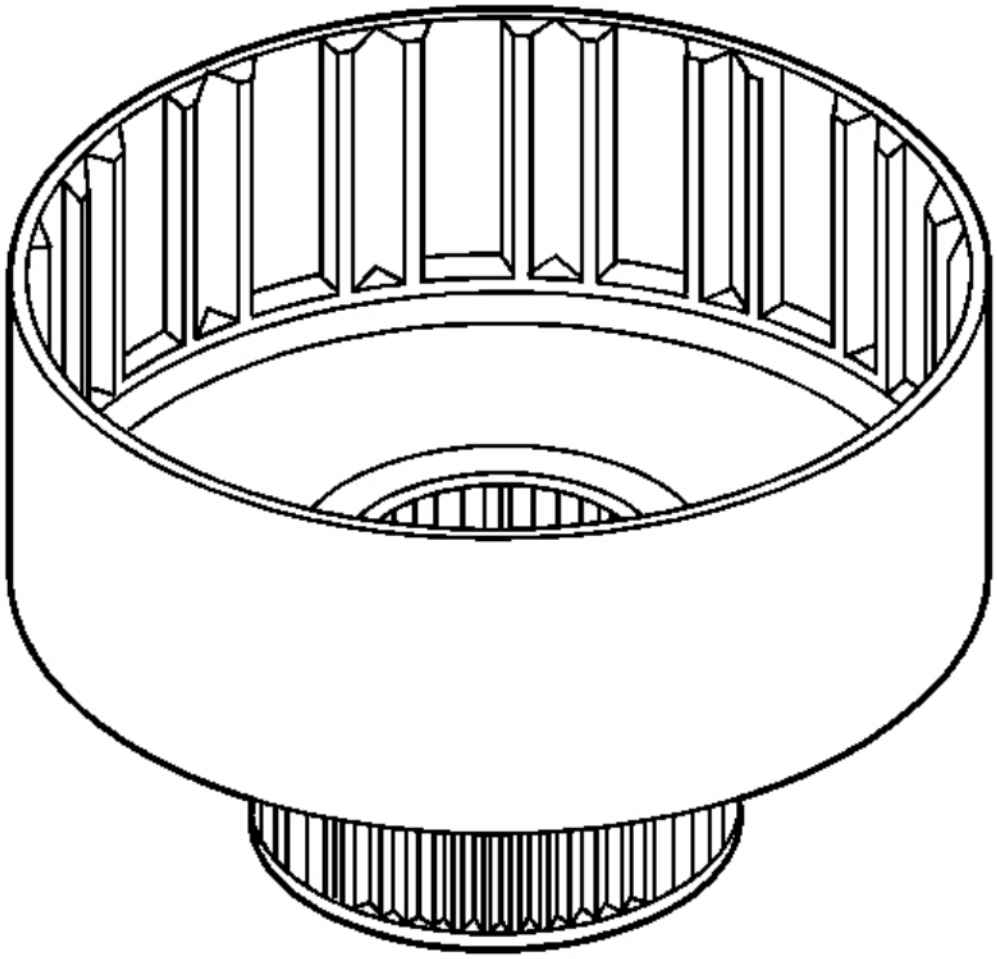


Fig. 152: View Of Clutch Housing
Courtesy of GENERAL MOTORS CORP.

14. Clean the clutch housing, with the bearing, in cleaning solvent.
15. Air dry and ensure all solvent is removed from the bearing.
16. Inspect the bearing for wear or damage.
17. Replace the clutch housing bearing if faulty. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.
18. Inspect the clutch housing disc teeth for burrs or excessive wear. Excessive wear is identified by the steps in the teeth, which prevents the clutch disc from moving freely.
19. Remove any burrs from the clutch housing disc teeth.

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20. Replace the clutch housing if the clutch disc teeth cannot be deburred.

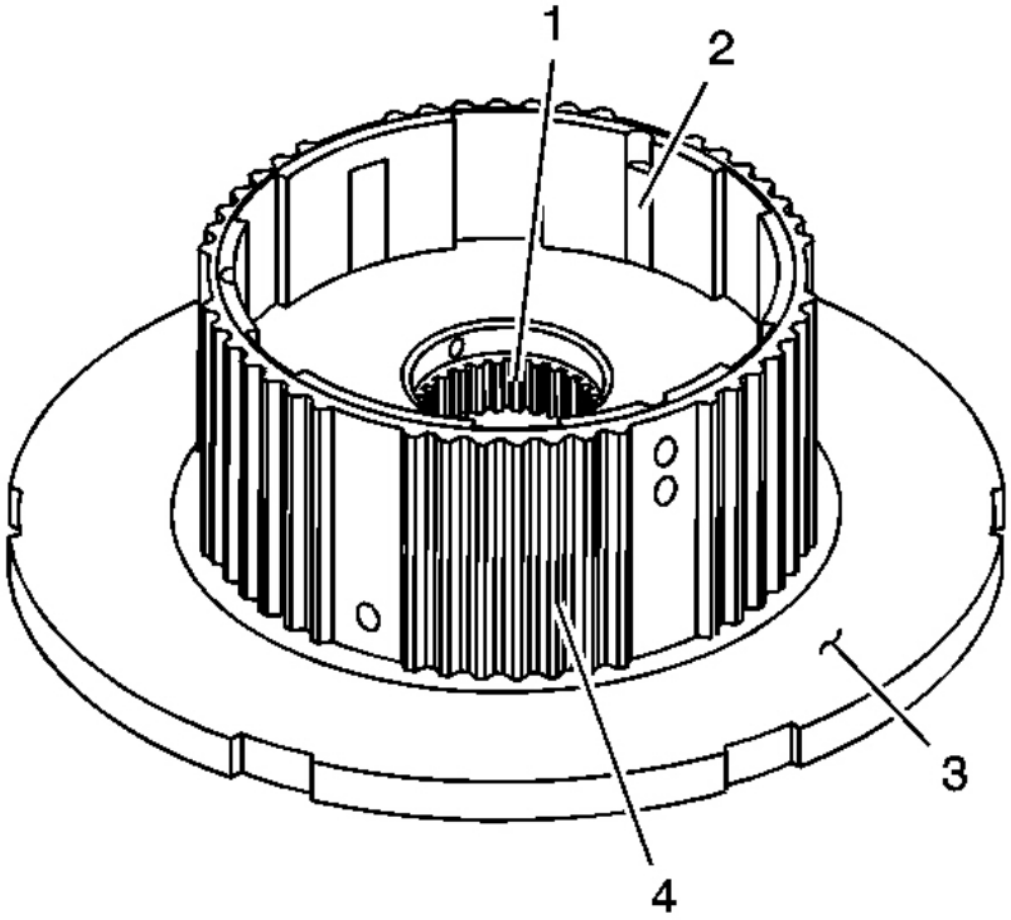


Fig. 153: Locating Clutch Hub Inspection Areas
Courtesy of GENERAL MOTORS CORP.

21. Clean the clutch hub in cleaning solvent and air dry.
22. Inspect the clutch disc surface (3) for excessive wear, warpage, or grooves.
23. Inspect the rear output shaft to the clutch inner hub splines (1) for excessive looseness.
24. Inspect the clutch hub teeth (4) for excessive wear. Steps in the teeth can identify excessive wear, which prevents the clutch disc from moving freely.
25. Inspect the clutch pressure plate tab slots (2) for excessive wear.
26. Replace the clutch hub if any of the above conditions are found.

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High/Low Planetary Carrier

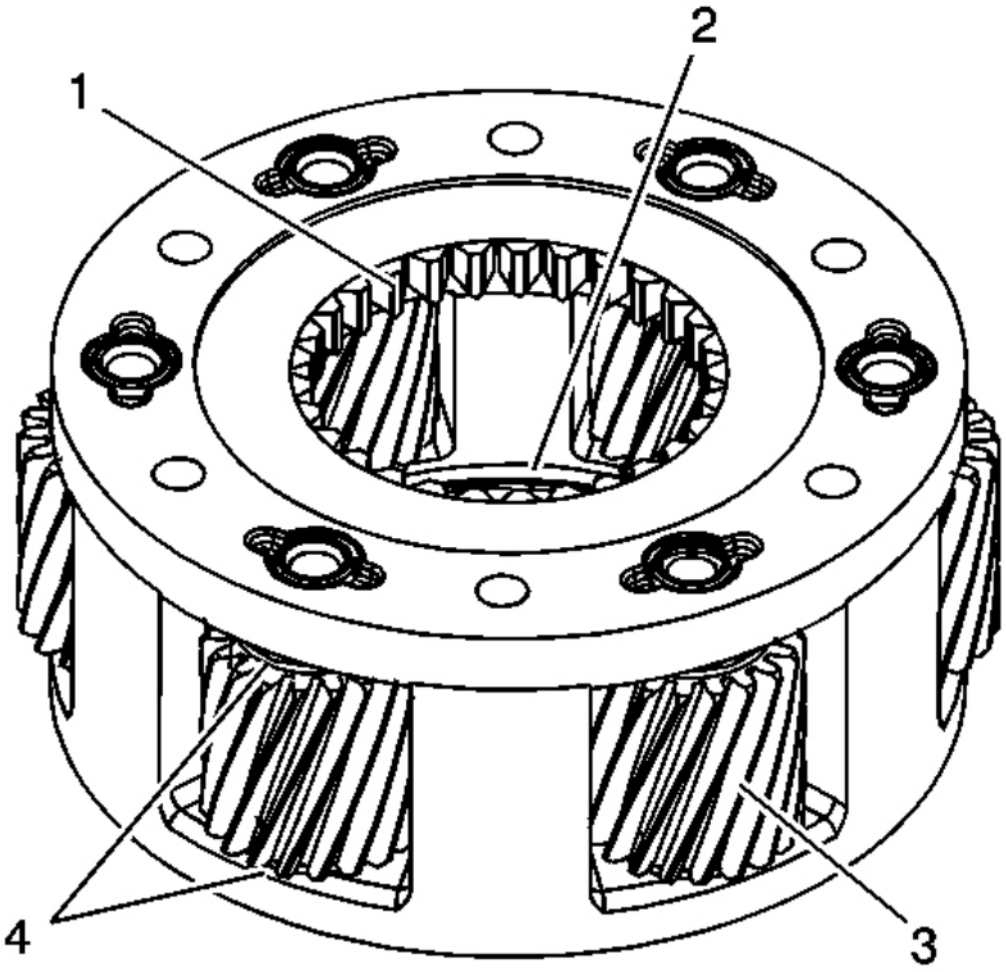


Fig. 154: View Of Inspection Areas On High/Low Planetary Carrier
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Depending on the version of the transfer case, it may have either a 3 pinion gear or 6 pinion gear planetary carrier assembly. The 3 pinion gear planetary carrier is used with transmission RPO M30 and the input gear splines are 27 teeth. The 6 pinion gear planetary carrier is used with transmission RPO MT1 and MN8 and the input gear splines are 32 teeth. The repair procedures are the same for both planetary carriers.

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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 (3). 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 for a washer (4) being on each side of the planetary gears.
6. Inspect the low range teeth (1) for damage or excessive wear.
7. Inspect the thrust washer surface (2) for scoring or excessive wear.
8. Replace the high/low planetary carrier if any of the above conditions are found.

Drive Chain and Sprockets

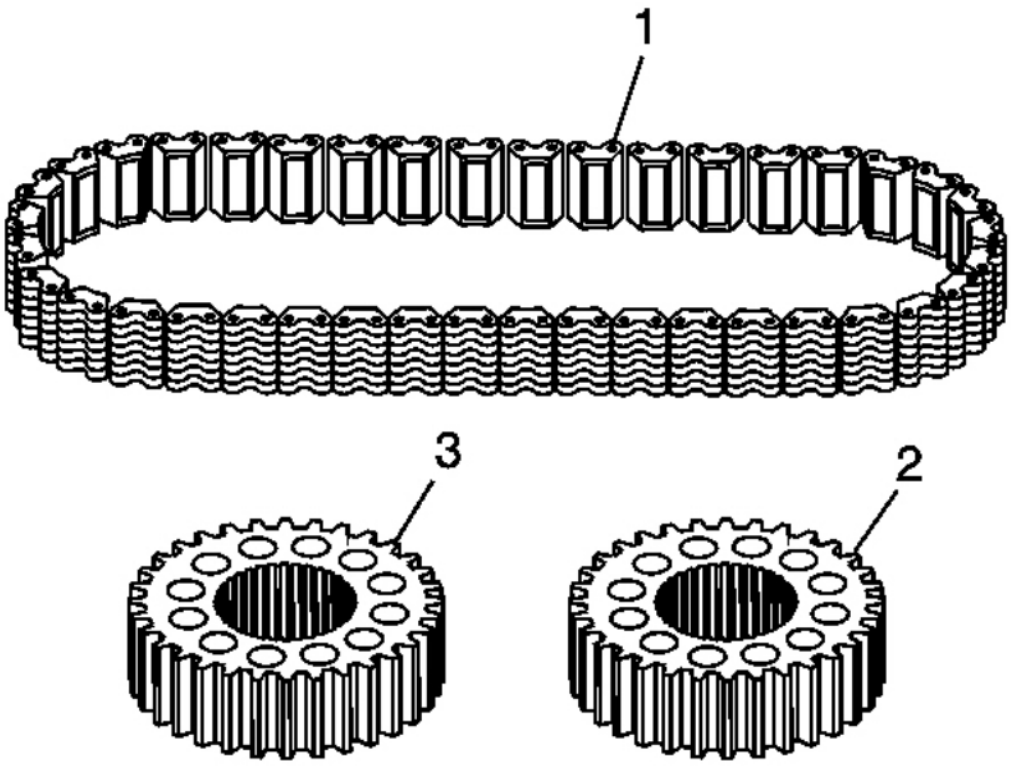


Fig. 155: Drive Chain & Sprockets
Courtesy of GENERAL MOTORS CORP.

1. Clean the drive chain (1), drive sprocket (3), and driven sprocket (2) in cleaning solvent and air dry.

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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 (2) and the drive sprocket (3) for the following conditions:
    - Chipped teeth
    - Excessively worn gear surfaces

      Slight wear marks are normal.

    - Debris embedded in the root of the teeth
5. Replace the sprocket if any of the above conditions are found. The chain and sprockets may be replaced separately.

Front Output Shaft

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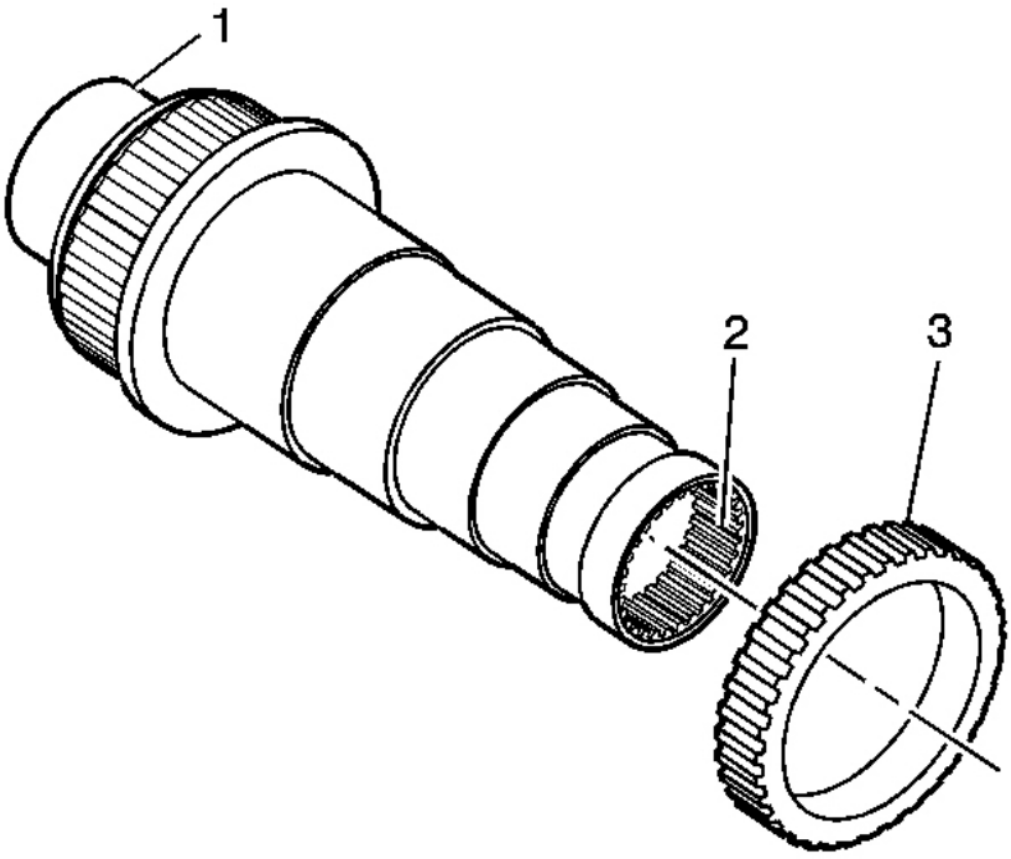


Fig. 156: Front Output Shaft
Courtesy of GENERAL MOTORS CORP.

1. Clean the front output shaft in cleaning solvent and air dry.
2. Inspect the teeth on the speed sensor reluctor wheel (3) for damage.
3. Replace the speed sensor reluctor wheel if it is damaged. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.
4. Inspect the front output shaft rear bearing race (1) for the following conditions:
   - Scoring
   - Pitting
   - Brinelling
   - Excessive wear
5. Inspect the front output shaft splines (2) for damage.
6. Replace the front output shaft if any of the above conditions are found.

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Input Gear

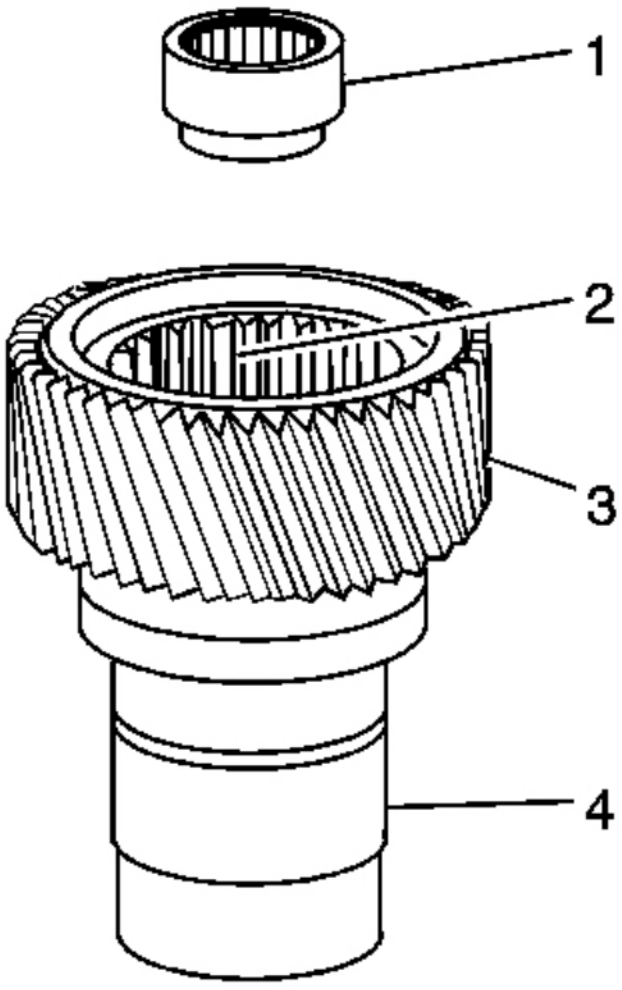


Fig. 157: Input Gear
Courtesy of GENERAL MOTORS CORP.

1. Clean the input gear, with pilot bearing, in cleaning solvent.
2. Air dry and ensure all solvent is removed from the pilot bearing.
3. Inspect the pilot bearing (1) for the following conditions:
    - Pitted
    - Wear

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- Corrosion

4. Replace the input gear pilot bearing if any of the above conditions are found. Refer to **Transfer Case Disassemble** and **Transfer Case Assemble**.
5. Inspect the input gear engagement teeth (2) for chips.
6. Inspect the input gear for broken or damaged planetary teeth (3).
7. Inspect the input gear for debris embedded in the root of the teeth.
8. Inspect the input gear seal surface (4) for pitting or excessive wear.
9. Replace the input gear if any of the above conditions are found.
10. Inspect the input gear thrust washers for excessive wear or scoring.
11. Replace the thrust washers if they are faulty.

Shift System Components

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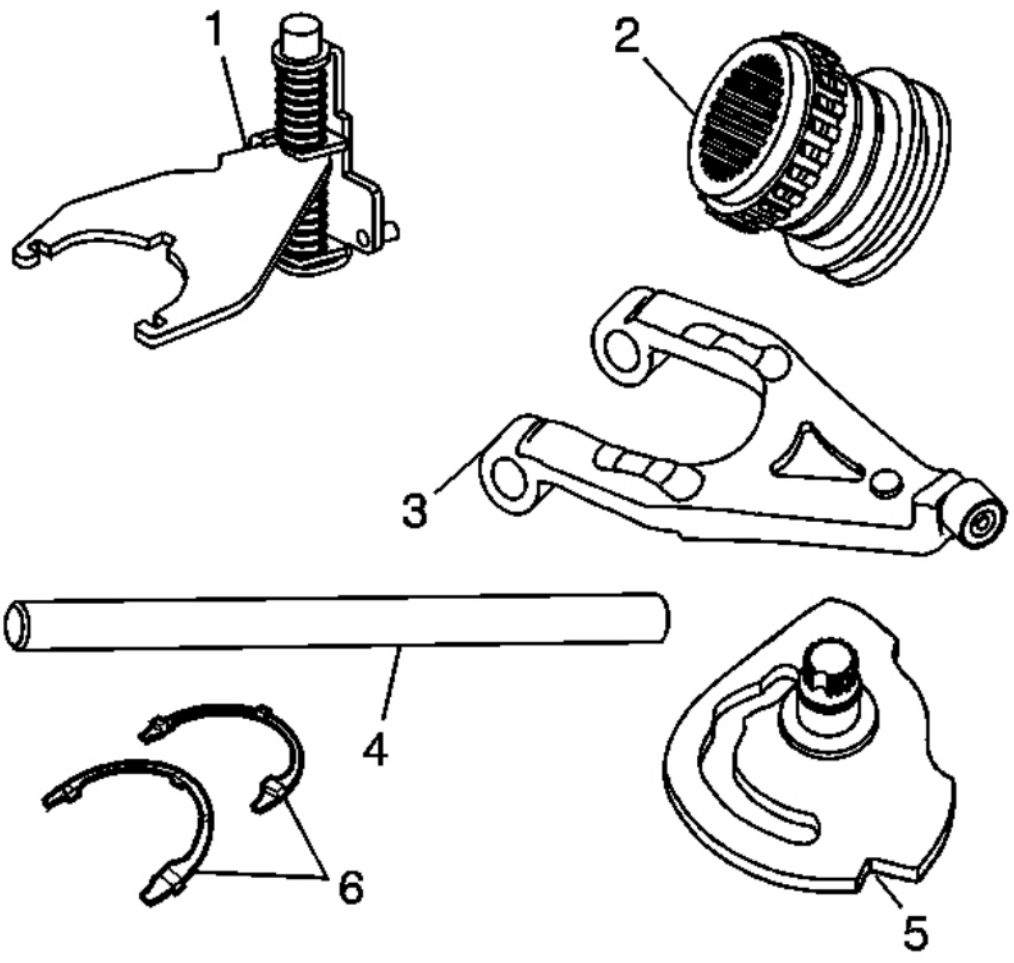


Fig. 158: Identifying Shift System Components
Courtesy of GENERAL MOTORS CORP.

1. Clean the following shift system components in cleaning solvent and air dry:
   - The high/low shift fork (1)
   - The range sleeve (2)
   - The clutch lever (3)
   - The shift fork shaft (4)
   - The control actuator lever shaft (5)
   - The Vespel® pads (6)
2. Inspect the shift fork shaft for straightness (4).
3. Replace the shift fork shaft if it is not straight.

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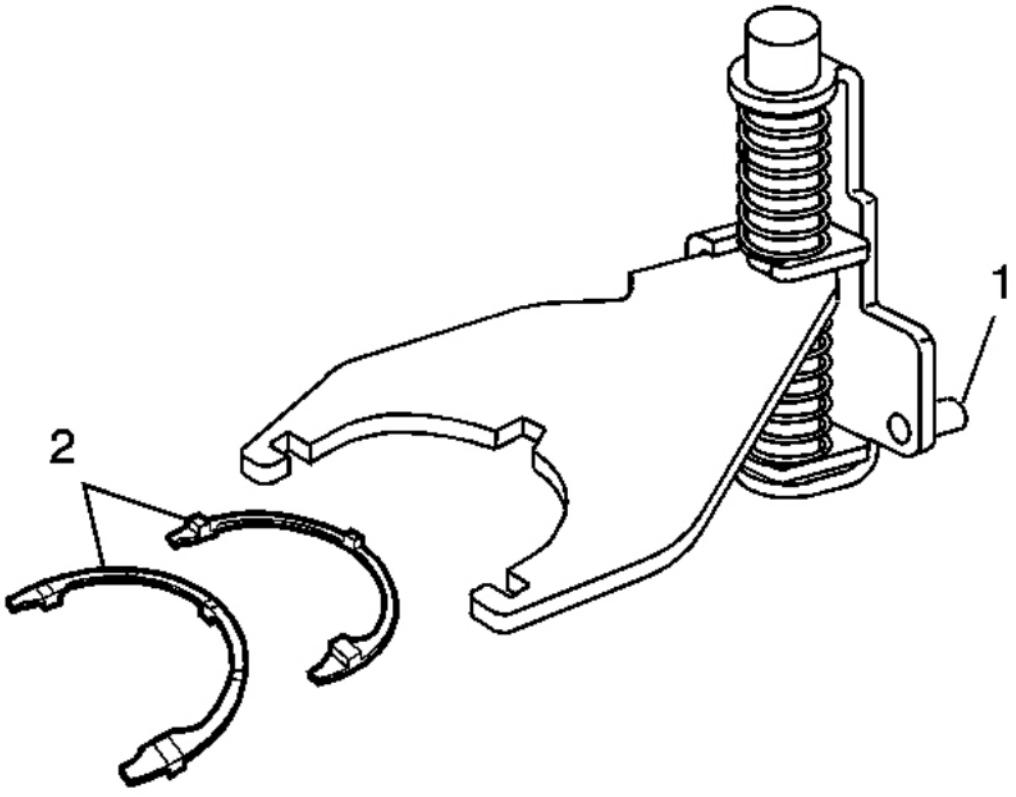


Fig. 159: Inspecting Shift Fork Pads
Courtesy of GENERAL MOTORS CORP.

4. Inspect the pads (2) on the shift fork for wear or breakage.
5. Replace the pads if worn or broken.
6. Inspect the roller (1) on the shift fork for wear or damage.
7. Replace the shift fork if the roller is faulty.

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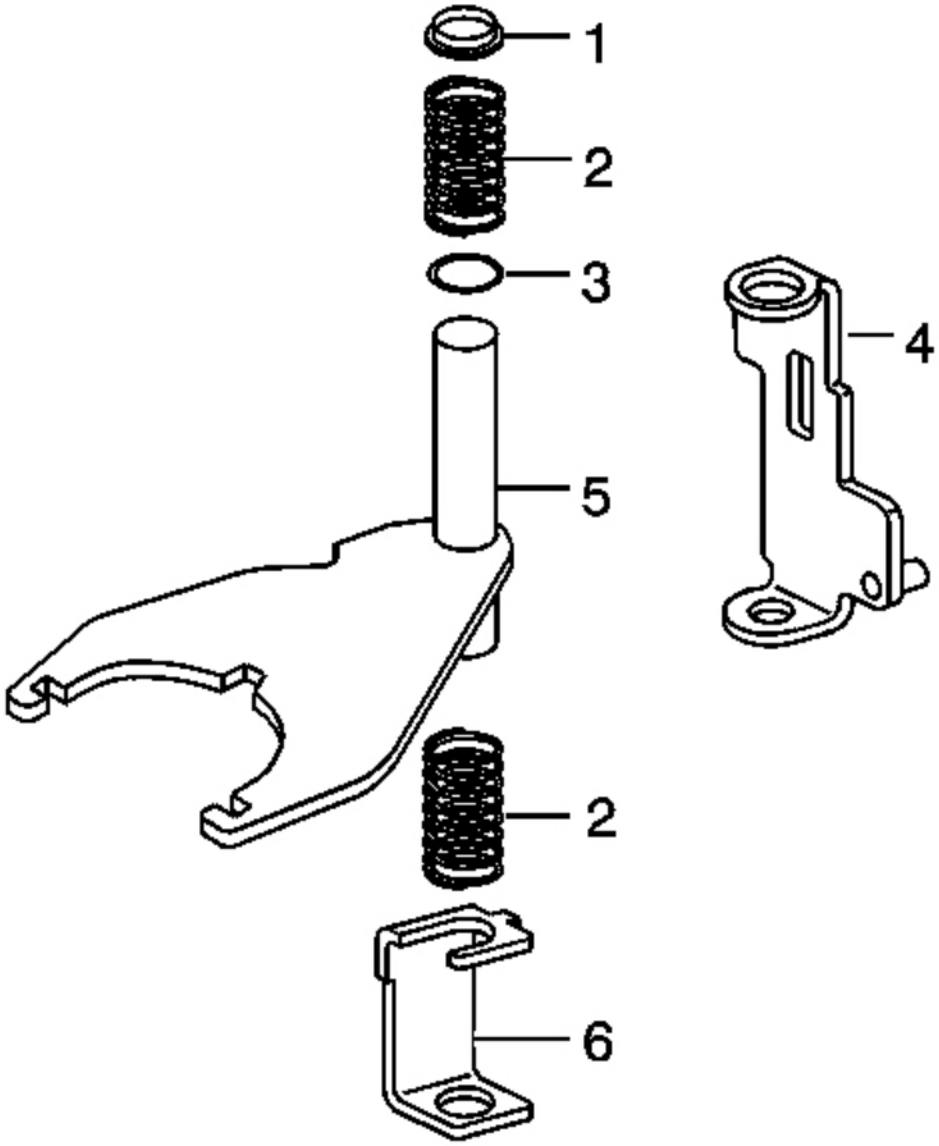


Fig. 160: Identifying Shift Fork Assembly Inspection Areas
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not disassemble the shift fork. Replace as an assembly only.

8. Inspect the following components of the shift fork assembly for wear or damage:

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- The bushing (1)
- The springs (2)
- The washer (3)
- The outer bracket (4)
- The shift fork (5)
- The inner bracket (6)

9. Replace the shift fork assembly if any of the above components are faulty.

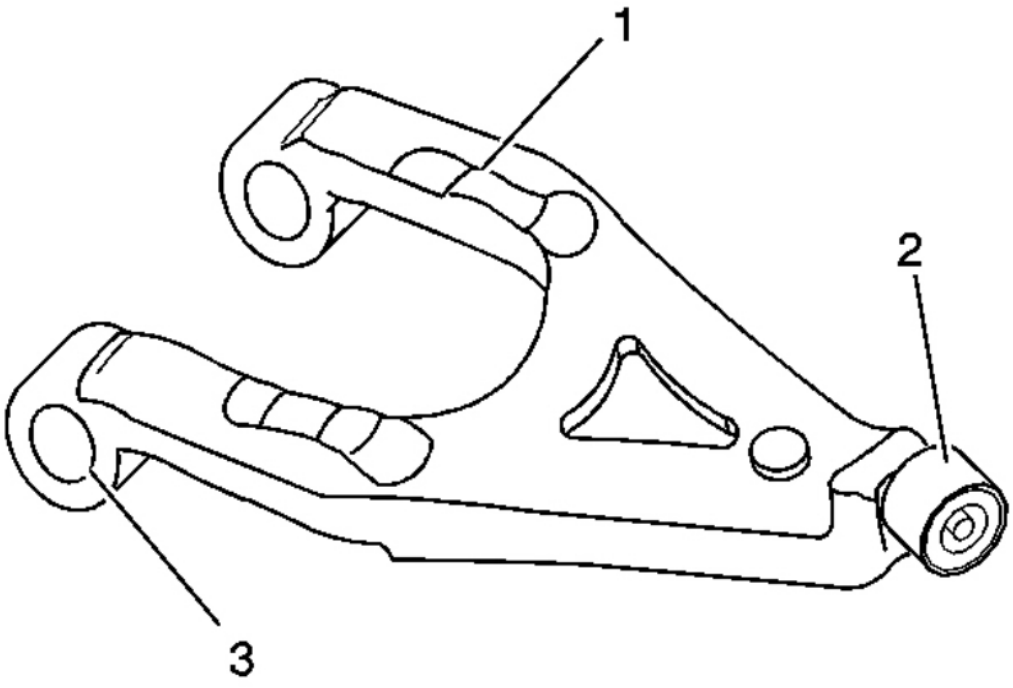


Fig. 161: Clutch Lever Assembly Inspection Areas
Courtesy of GENERAL MOTORS CORP.

10. Inspect the clutch lever roller (2) for the following conditions:
    - Wear
    - Rotating smoothly
11. Inspect the clutch lever for worn wear pads (1).
12. Inspect the clutch lever for wear at the pivot pin holes (3).
13. Replace the clutch lever if the above conditions are found.

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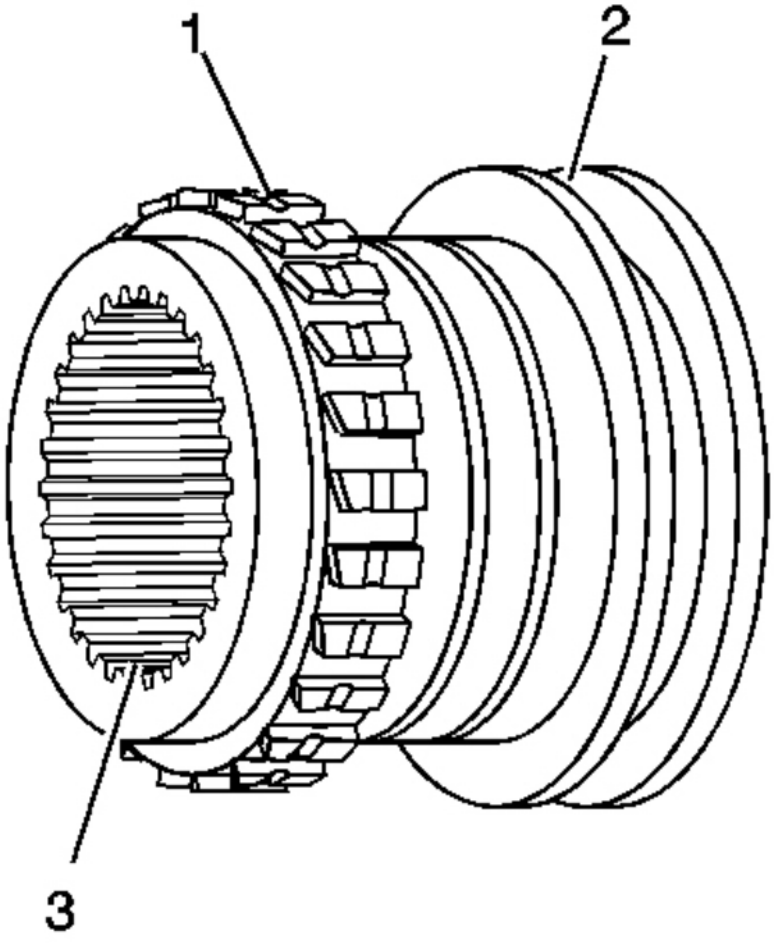


Fig. 162: View Of Inspection Areas On Range Sleeve
Courtesy of GENERAL MOTORS CORP.

14. Inspect the range sleeve for chipped or excessively worn teeth (1).
15. Inspect the shift fork collar (2) on the range sleeve for wear.
16. Inspect the inner splines (3) of the range sleeve for excessive looseness on the rear output shaft.
17. Replace the range sleeve if the above conditions are found.

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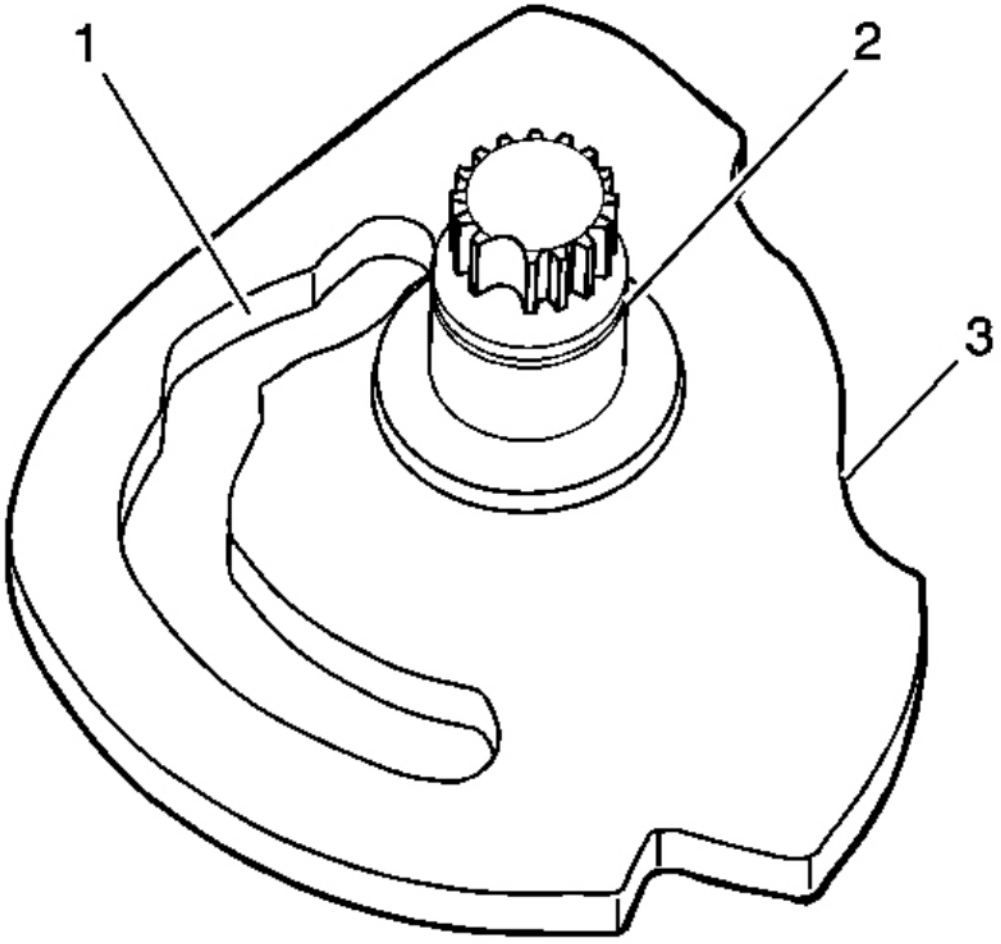


Fig. 163: Control Actuator Lever Shaft Inspection Areas
Courtesy of GENERAL MOTORS CORP.

18. Inspect the shift fork roller slot (1) on the control actuator lever shaft for excessive wear or roughness.
19. Inspect the bearing (2) and the seal surface on the control actuator lever shaft for the following conditions:
    - Pitted
    - Wear
    - Corrosion
20. Inspect the clutch lever cam lobes (3) on the control actuator lever shaft for excessive wear or roughness.
21. Replace the control actuator lever shaft if any of the above conditions are found.

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TRANSFER CASE ASSEMBLE

Tools Required

- **J 3289-20** Holding Fixture
- **J 8092** Universal Handle
- **J 22873** Mainshaft Bushing Installer. See **Special Tools**.
- **J 36370** Drive Sprocket Needle Bearing Installer. See **Special Tools**.
- **J 36850** Transjel Lubricant
- **J 37668-A** Seal Installer. See **Special Tools**.
- **J 42738** Seal Installer
- **J 43484** Seal Installer
- **J 44295** Clutch Pack Shimming Kit. See **Special Tools**.
- **J 45239** Needle Bearing Installer. See **Special Tools**.
- **J 45380** Transfer Case Rear Bushing Remover and Installer. See **Special Tools**.
- **J 45383** Input Gear Pilot Bearing Installer. See **Special Tools**.
- **J 45759** Assembly Fixture

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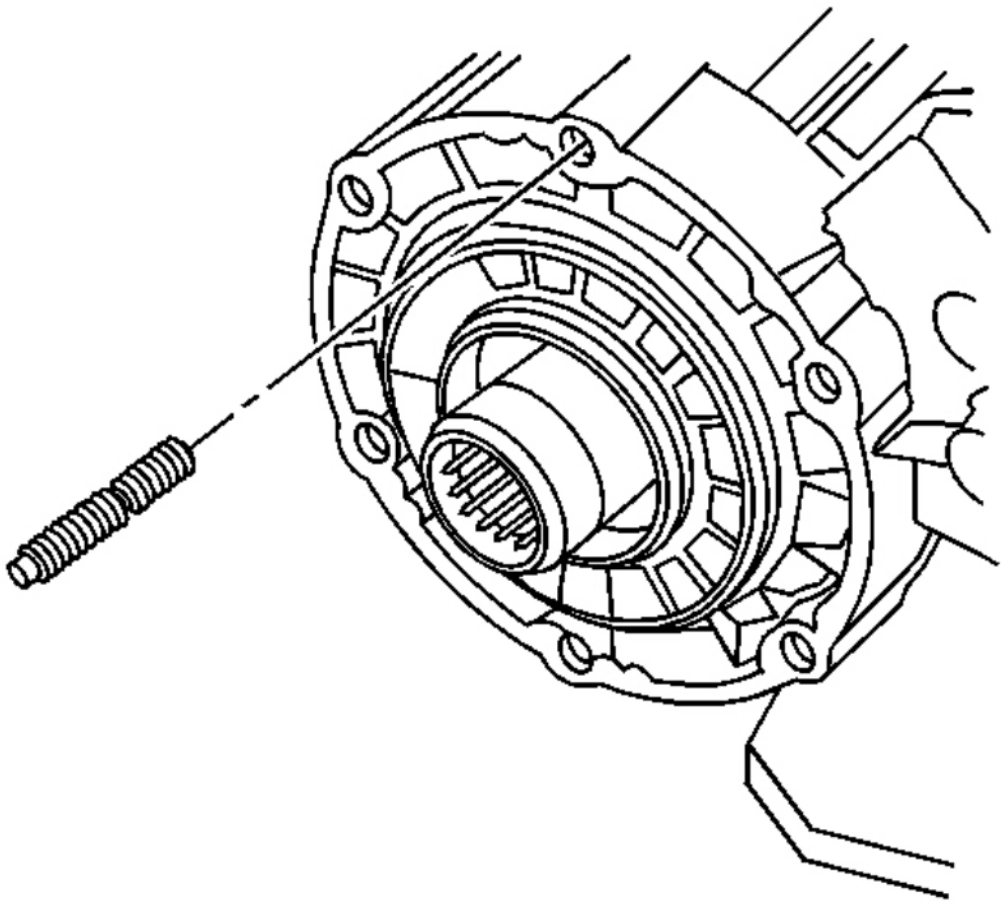


Fig. 164: View Of Mounting Studs
Courtesy of GENERAL MOTORS CORP.

1. If removed, install the transfer case mounting studs to the height of 29.5 mm-30.5 mm (1.16-1.20 in).

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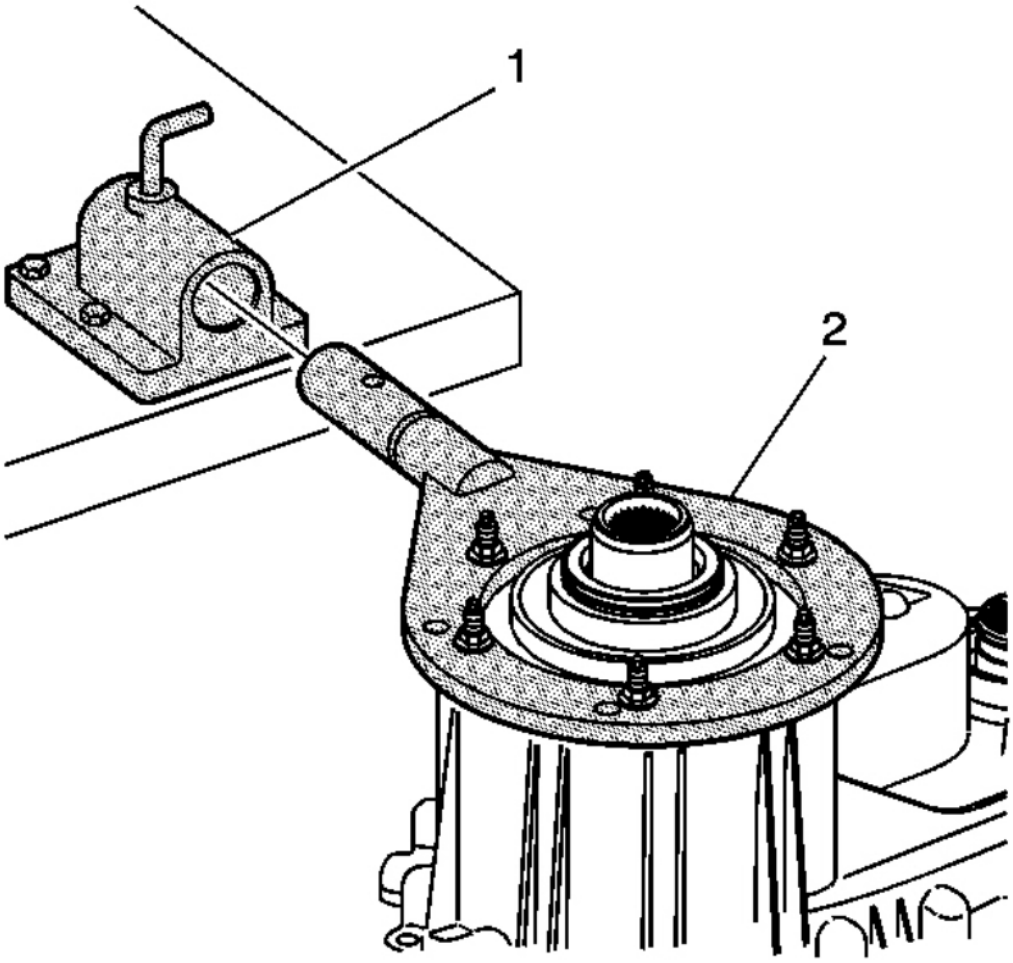


Fig. 165: View Of Front Transfer Case Bench Mount
Courtesy of GENERAL MOTORS CORP.

2. Attach the **J 45759** to the front transfer case using the adapter studs. 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.

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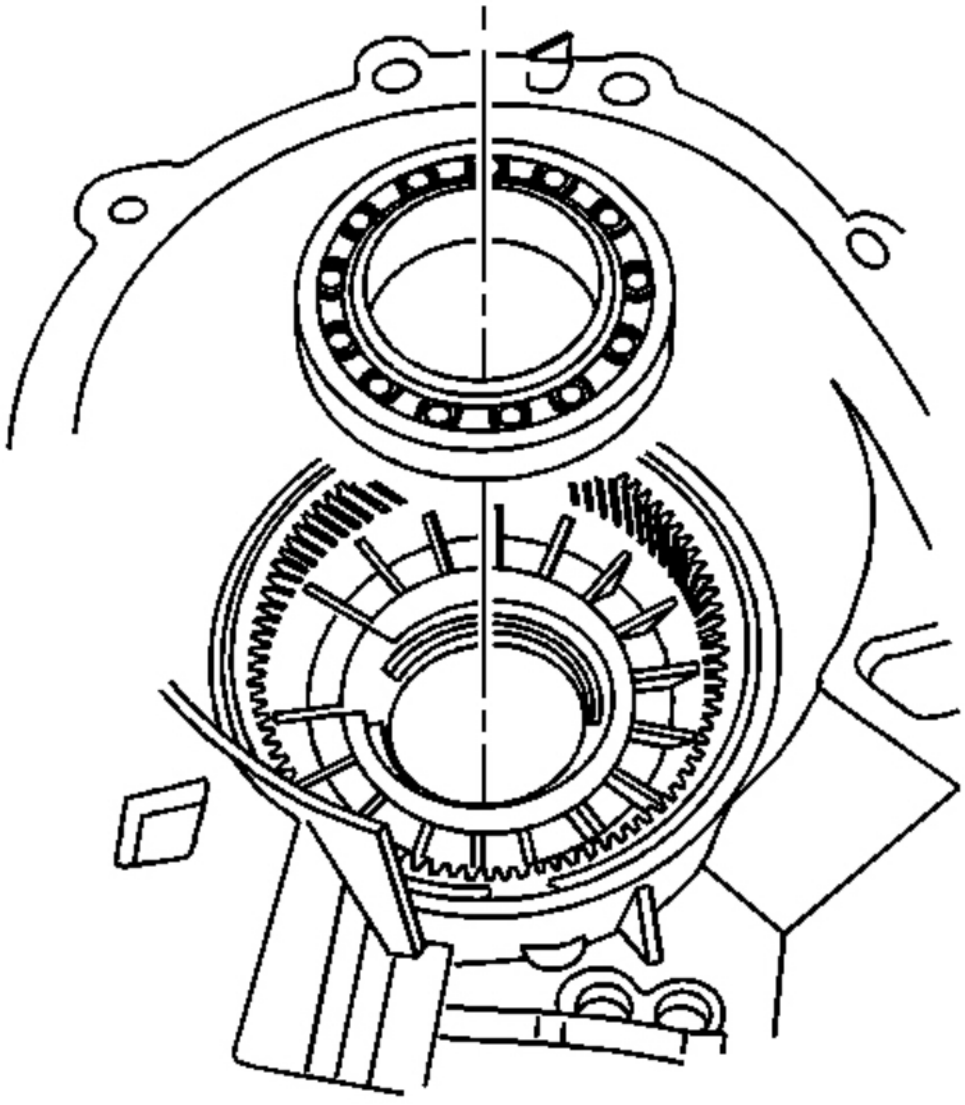


Fig. 166: Identifying Input Bearing
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Use only new retaining rings.

4. Install the input bearing. The cage side of the bearing faces to the case front.

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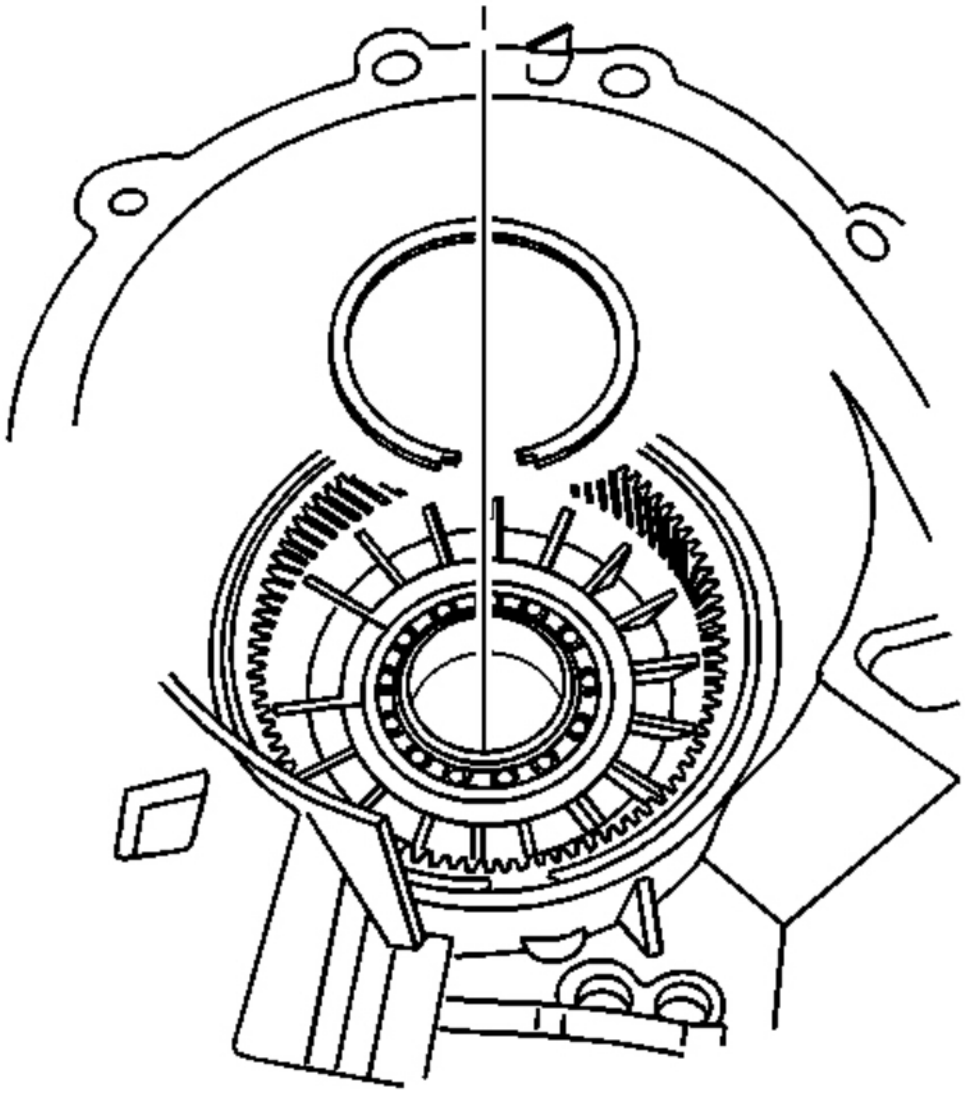


Fig. 167: Locating Input Bearing Retaining Ring
Courtesy of GENERAL MOTORS CORP.

5. Install the input bearing retaining ring.

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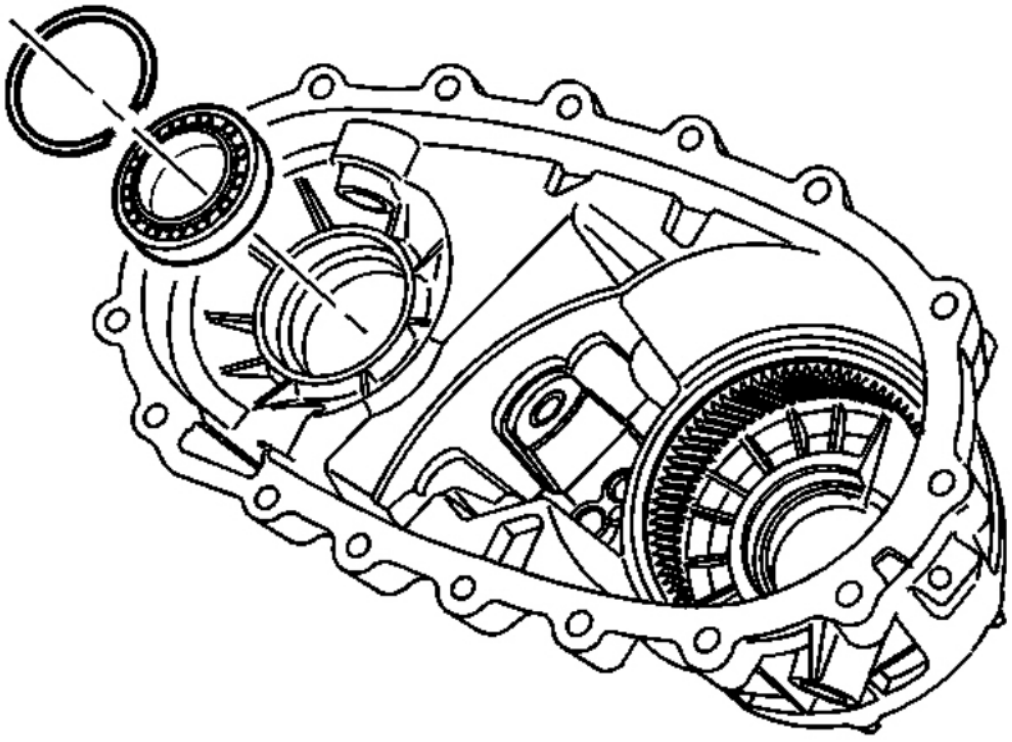


Fig. 168: View Of Output Shaft Front Bearing & Retaining Ring
Courtesy of GENERAL MOTORS CORP.

6. Install the front output shaft front bearing. The cage side of the bearing faces to the front of the case.
7. Install the front output shaft front bearing retaining ring.

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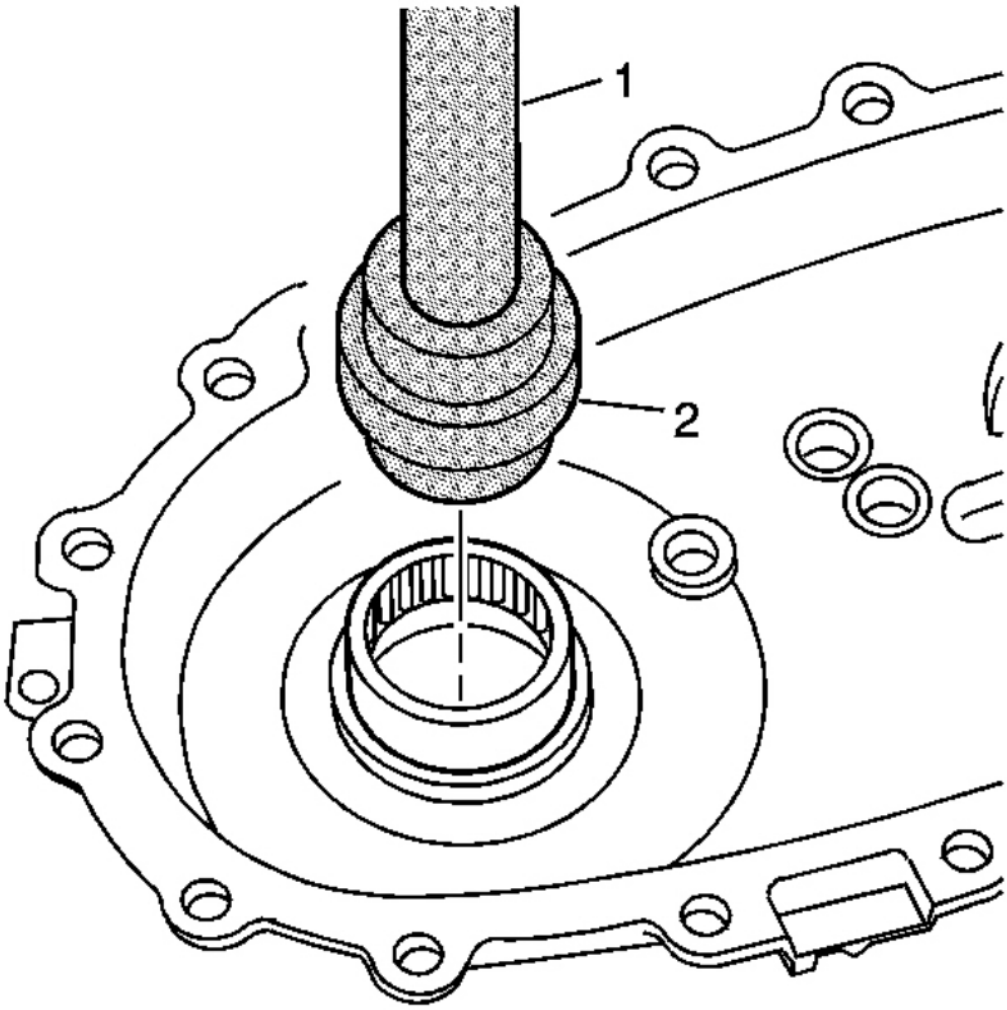


Fig. 169: Installing Front Output Shaft Rear Bearing
Courtesy of GENERAL MOTORS CORP.

8. Using the **J 8092** (1) and the **J 36370** (2), install the front output shaft rear bearing. See **Special Tools**.
   - The lettering on the bearing faces toward the tool.
   - Use the double shoulder side of the **J 36370** to install the bearing recessed in the bore. See **Special Tools**.

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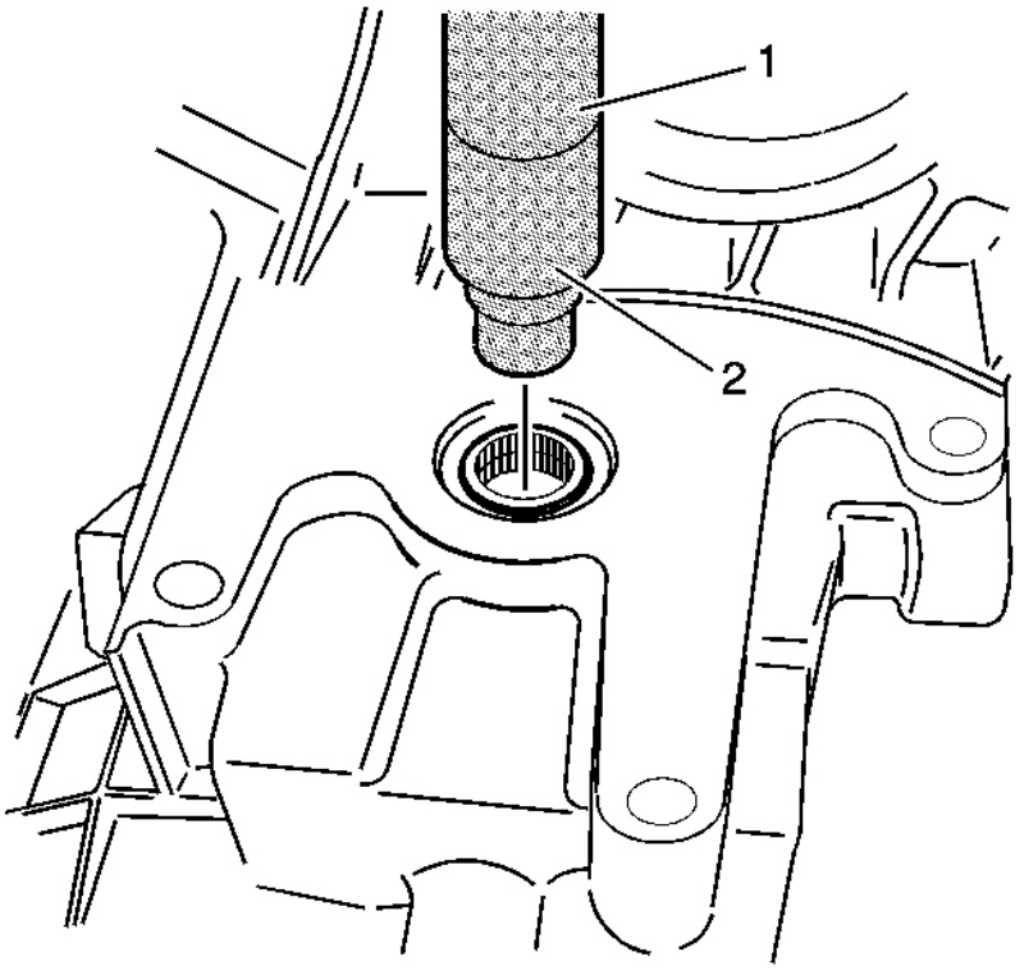


Fig. 170: Using J 8092 & J 45239 To Install Control Actuator Lever Shaft Bearing
Courtesy of GENERAL MOTORS CORP.

9. Using the **J 45239** (2) and **J 8092** (1), install the control actuator lever shaft bearing. The seal on the bearing faces outward. See **Special Tools**.

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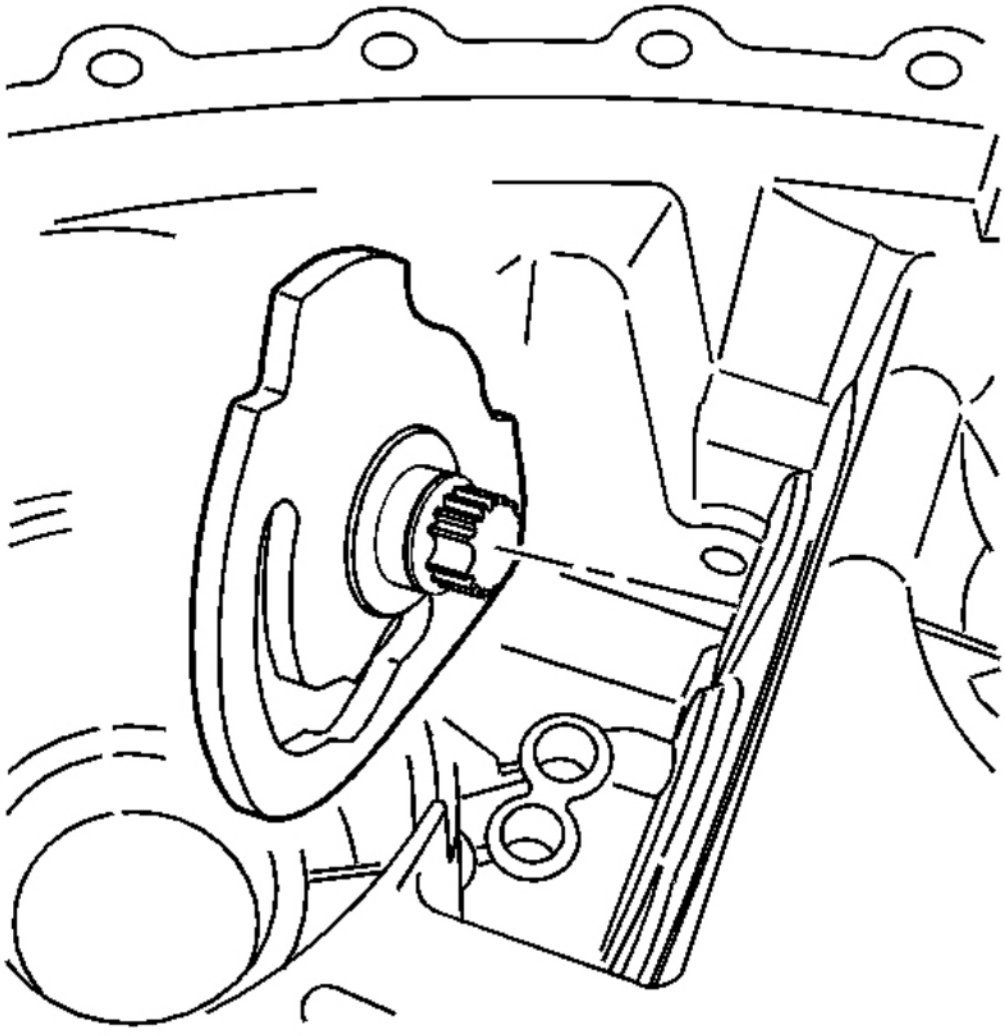


Fig. 171: Identifying Control Actuator Lever Shaft
Courtesy of GENERAL MOTORS CORP.

10. Using transfer case fluid, lubricate the control actuator lever shaft bearing.
11. Install the control actuator lever shaft.

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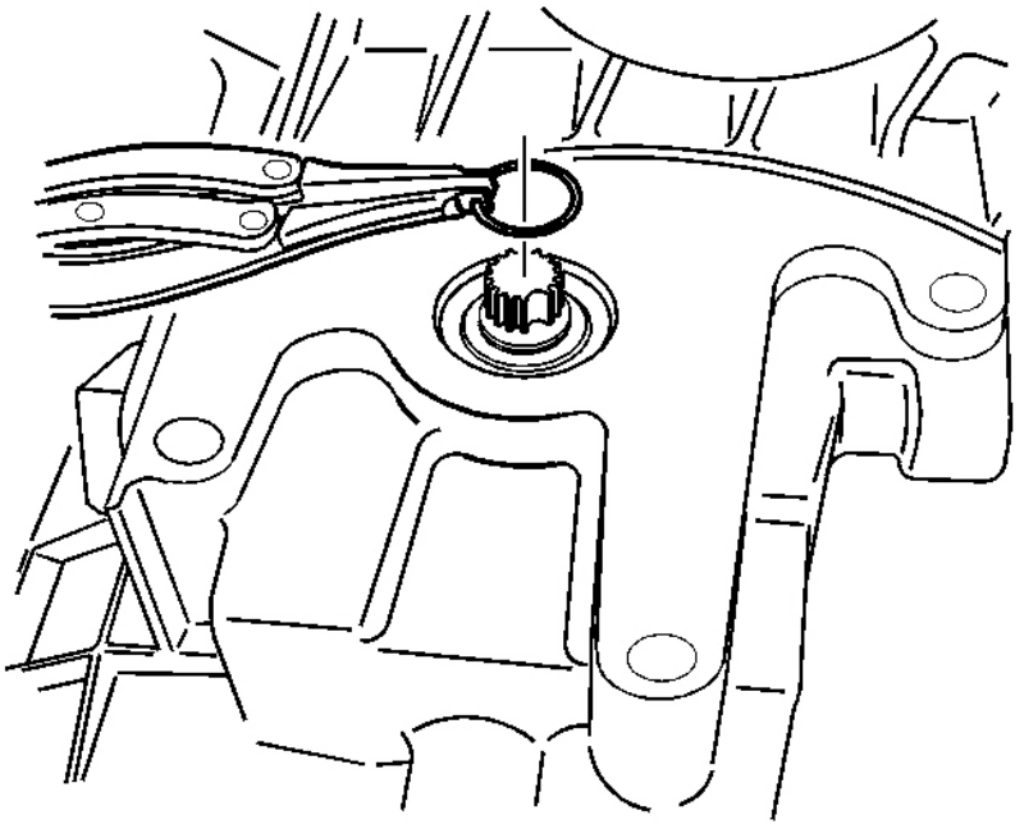


Fig. 172: Locating Control Actuator Lever Shaft Retaining Ring
Courtesy of GENERAL MOTORS CORP.

12. Install the NEW retaining ring for the control actuator lever shaft. Ensure the retaining ring is fully seated.

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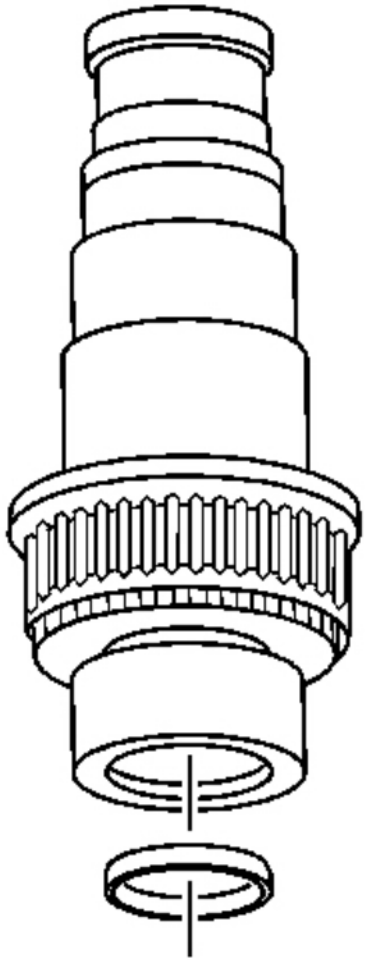


Fig. 173: View Of Cup Plug
Courtesy of GENERAL MOTORS CORP.

13. If it is a new shaft, or if the cup plug was removed, install the cup plug in the front output shaft using a suitable driver.

    The installed depth of the cup plug is 26.75 mm (1.05 in) from the end of the shaft.

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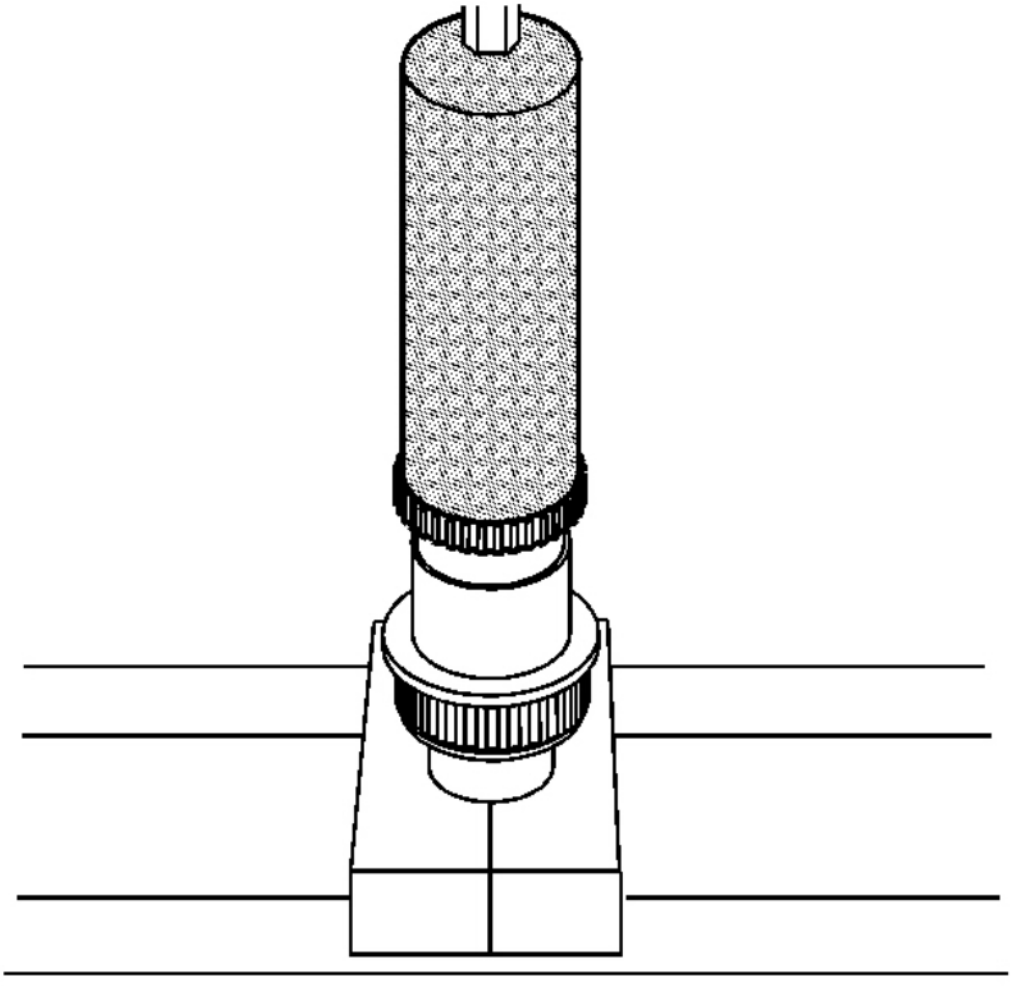


Fig. 174: Installing The Tone Wheel On The Front Output Shaft Using J 22873
Courtesy of GENERAL MOTORS CORP.

14. Using the **J 22873** and a hydraulic press, install a NEW tone wheel on the front output shaft. See **Special Tools**.

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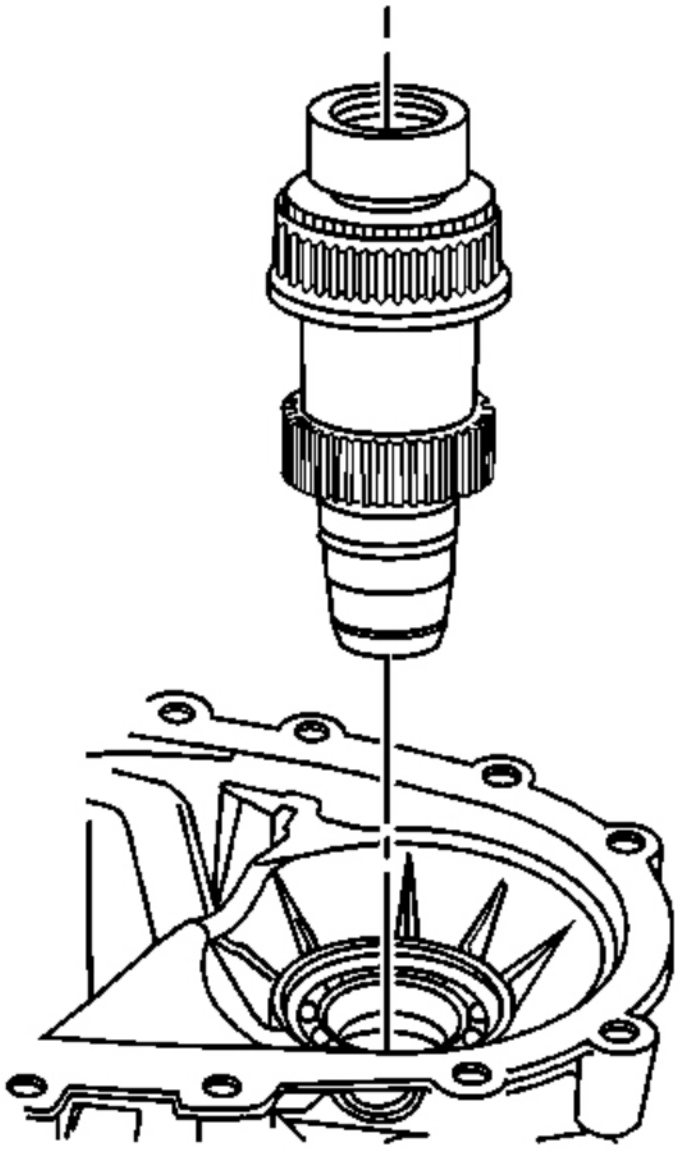


Fig. 175: Tapping Front Output Shaft Into Bearing
Courtesy of GENERAL MOTORS CORP.

15. Install the front output shaft assembly. Use a soft-face hammer to tap the front output shaft into the bearing.

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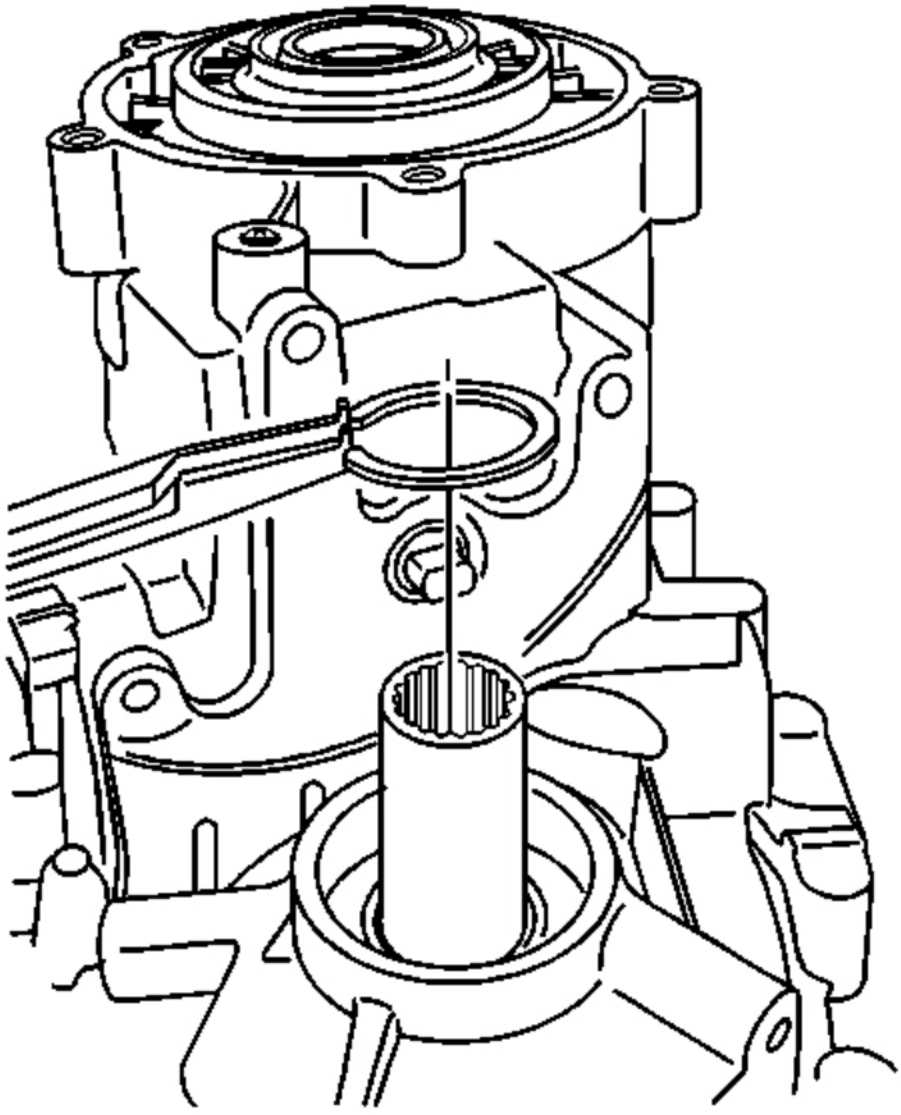


Fig. 176: Installing Front Output Shaft Retaining Ring
Courtesy of GENERAL MOTORS CORP.

16. Install the front output shaft retaining ring.

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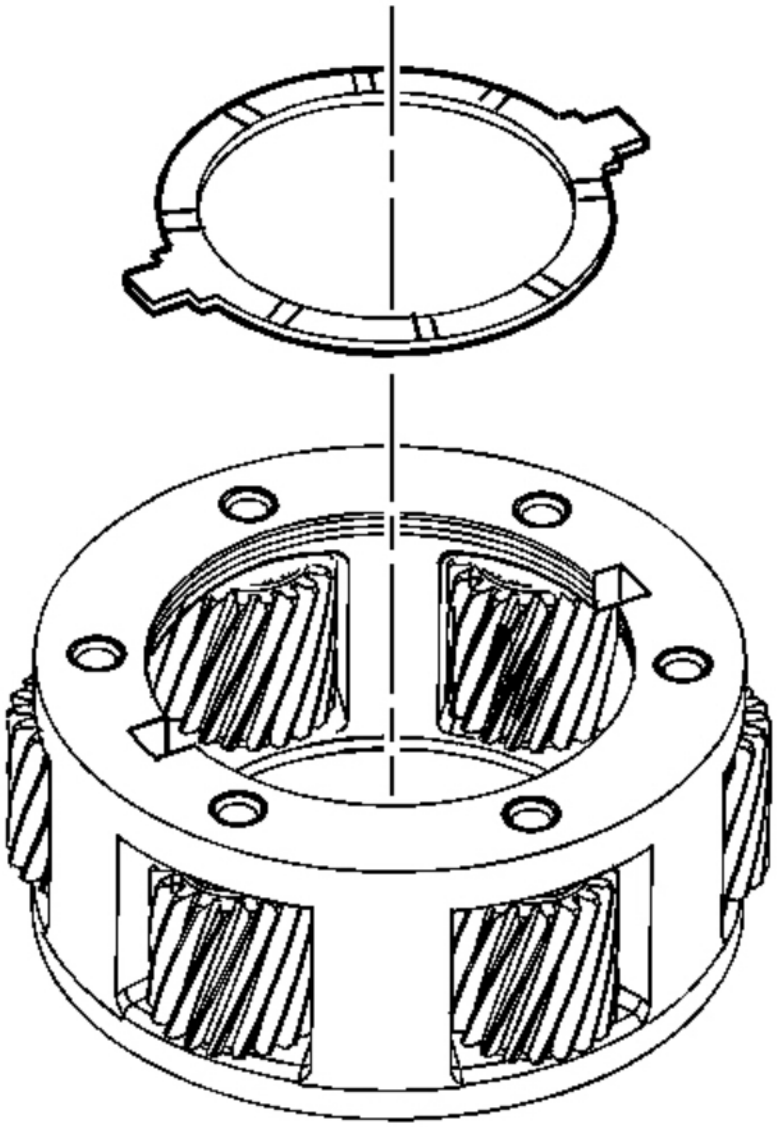


Fig. 177: View Of Input Shaft Thrust Washer
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Depending on the version of the transfer case, it may have either a 3 pinion gear or 6 pinion gear planetary carrier assembly. The 3 pinion gear planetary carrier is used with transmission RPO M30 and the input gear splines are 27 teeth. The 6 pinion gear planetary carrier is used with

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transmission RPO MT1 and MN8 and the input gear splines are 32 teeth. The repair procedures are the same for both planetary carriers.

17. Lubricate the thrust washer for the input shaft with **J 36850** , or equivalent.
18. Install the input shaft thrust washer. Align the tabs on the thrust washer with the slots in the planetary carrier.

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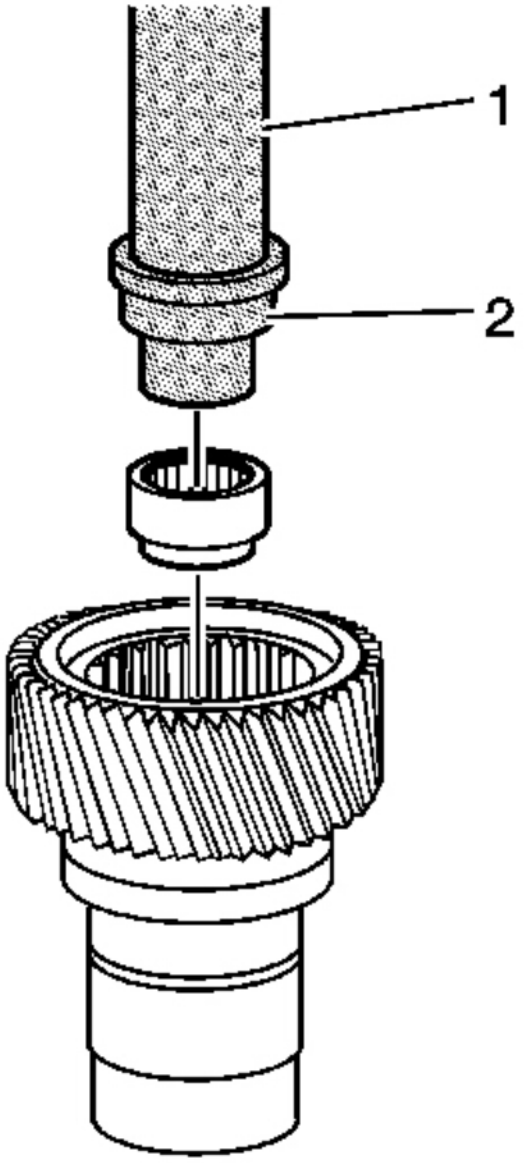


Fig. 178: Installing Pilot Bearing In The Input Shaft With J 45383
Courtesy of GENERAL MOTORS CORP.

19. Using the **J 8092** (1) and the **J 45383** (2), install the pilot bearing in the input shaft. See **Special Tools**.

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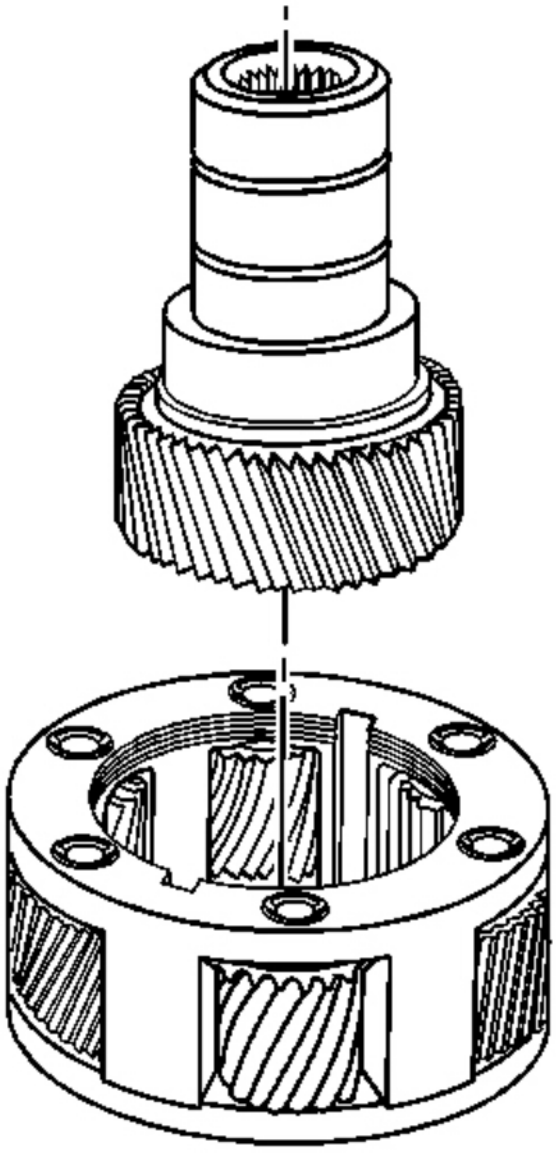


Fig. 179: View Of Input Gear
Courtesy of GENERAL MOTORS CORP.

20. Install the input shaft assembly.

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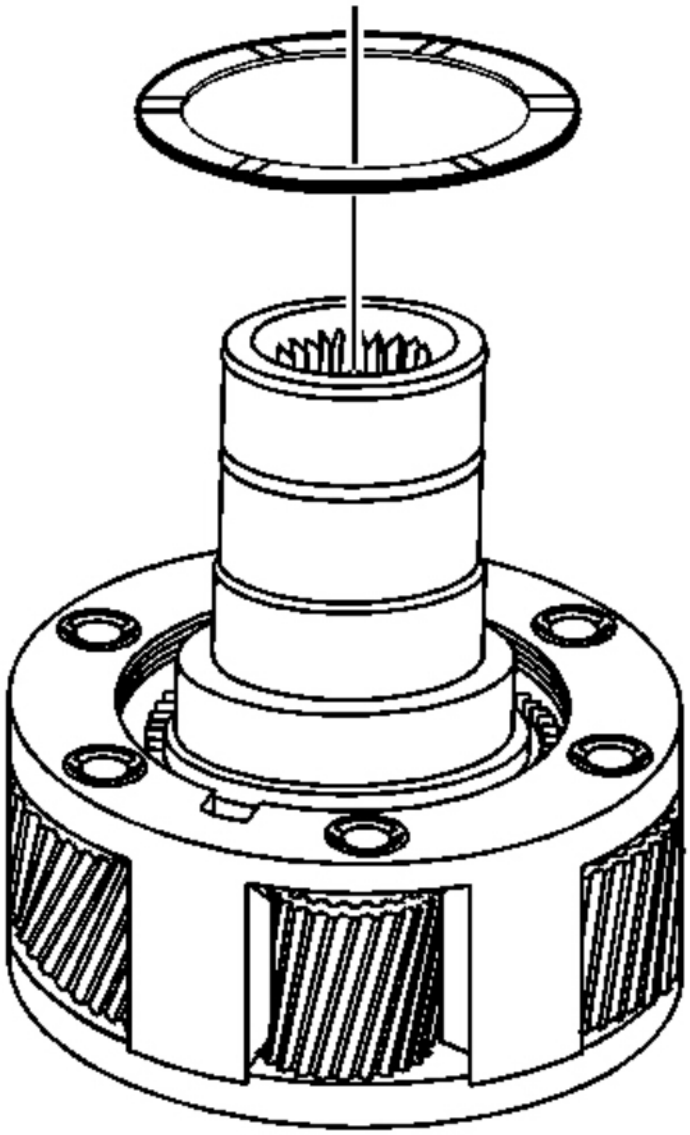


Fig. 180: Identifying Input Shaft Thrust Washer
Courtesy of GENERAL MOTORS CORP.

21. Lubricate the input shaft thrust washer with **J 36850** , or equivalent.
22. Install the input shaft thrust washer.

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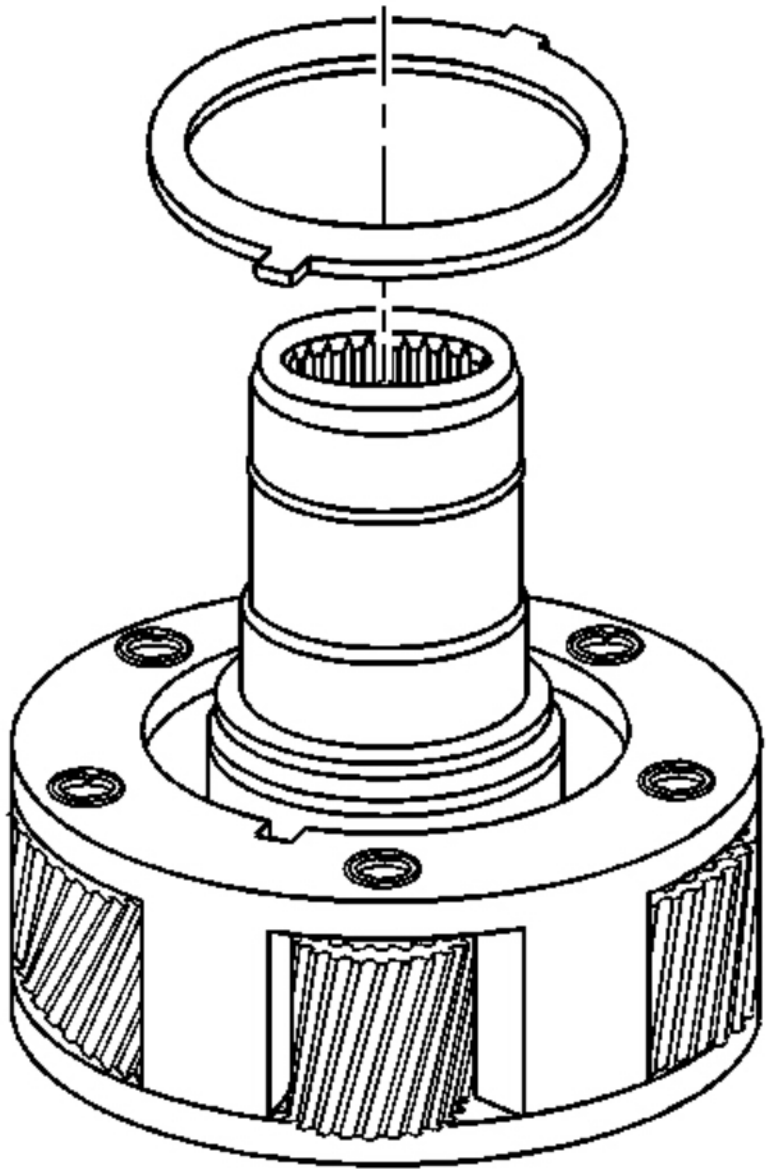


Fig. 181: Locating Input Gear Thrust Plate
Courtesy of GENERAL MOTORS CORP.

23. Lubricate the carrier lock plate with **J 36850** , or equivalent.
24. Install the carrier lock plate.

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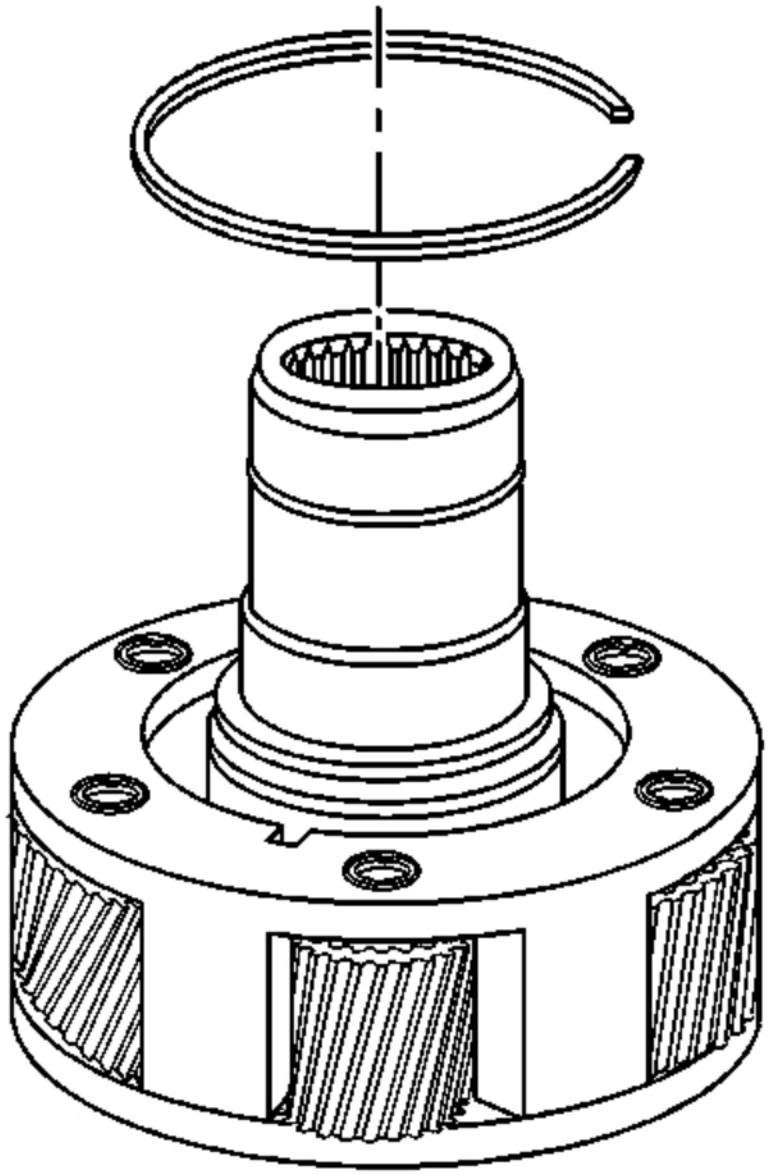


Fig. 182: View Of Input Gear Retaining Ring
Courtesy of GENERAL MOTORS CORP.

25. Install the retaining ring for the planetary gear shaft.

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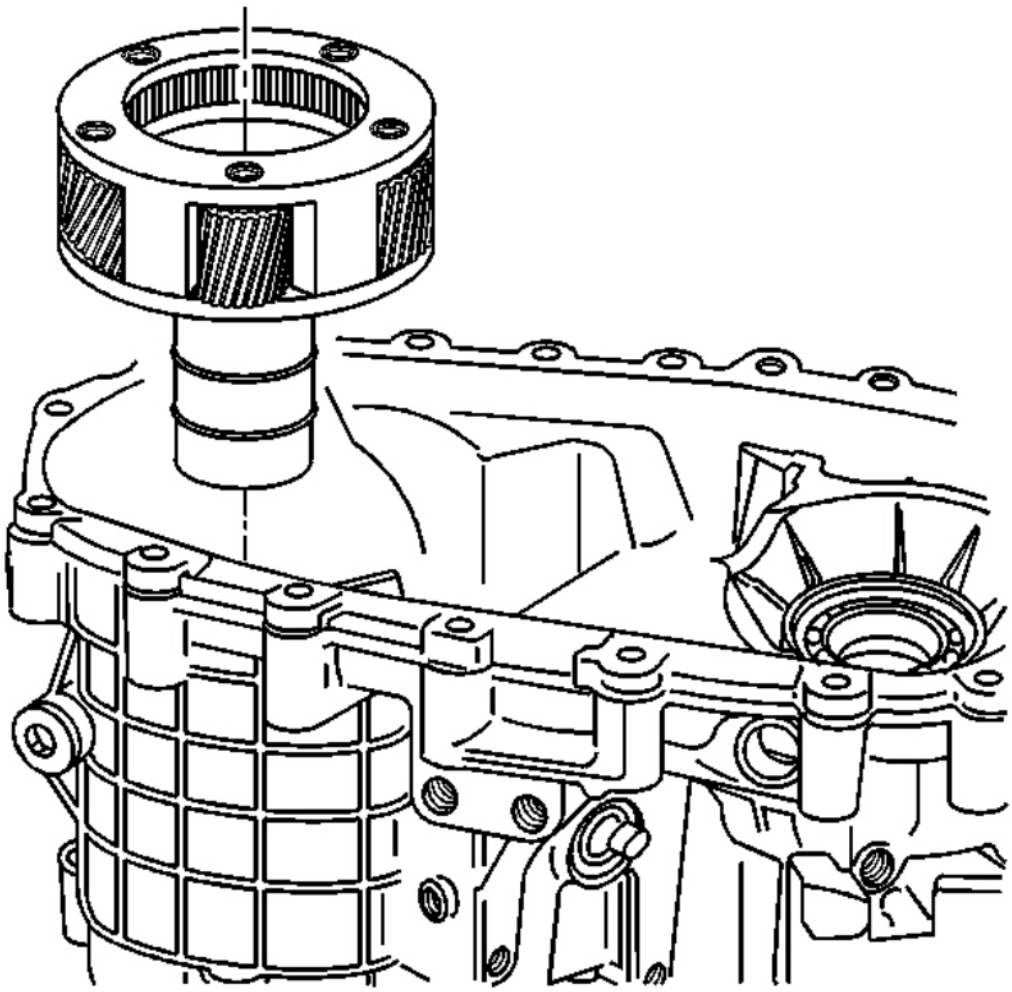


Fig. 183: View Of Planetary Assembly
Courtesy of GENERAL MOTORS CORP.

26. Install the planetary gear carrier. Use a soft-face hammer to tap the input shaft into the bearing.

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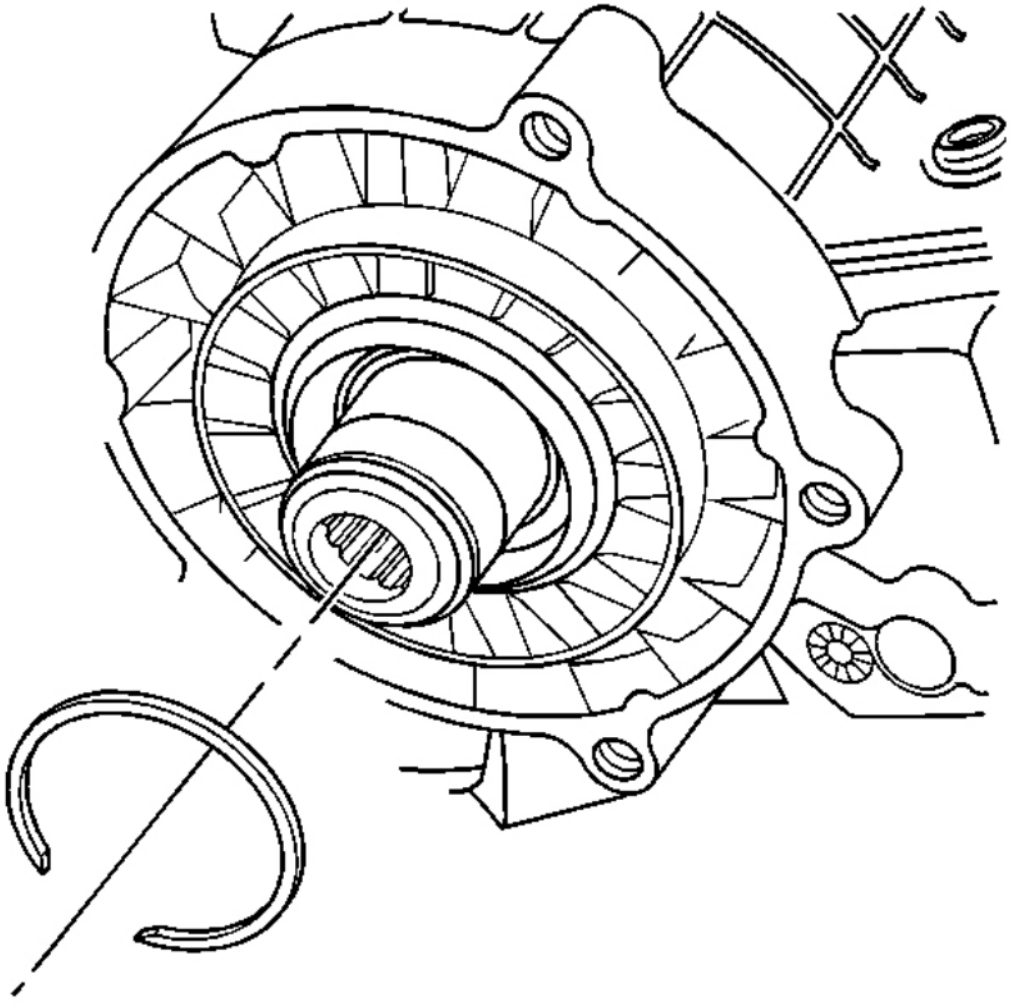


Fig. 184: View Of Outer Retaining Ring For The Input Gear Bearing
Courtesy of GENERAL MOTORS CORP.

27. Install the outer retaining ring for the input gear bearing.

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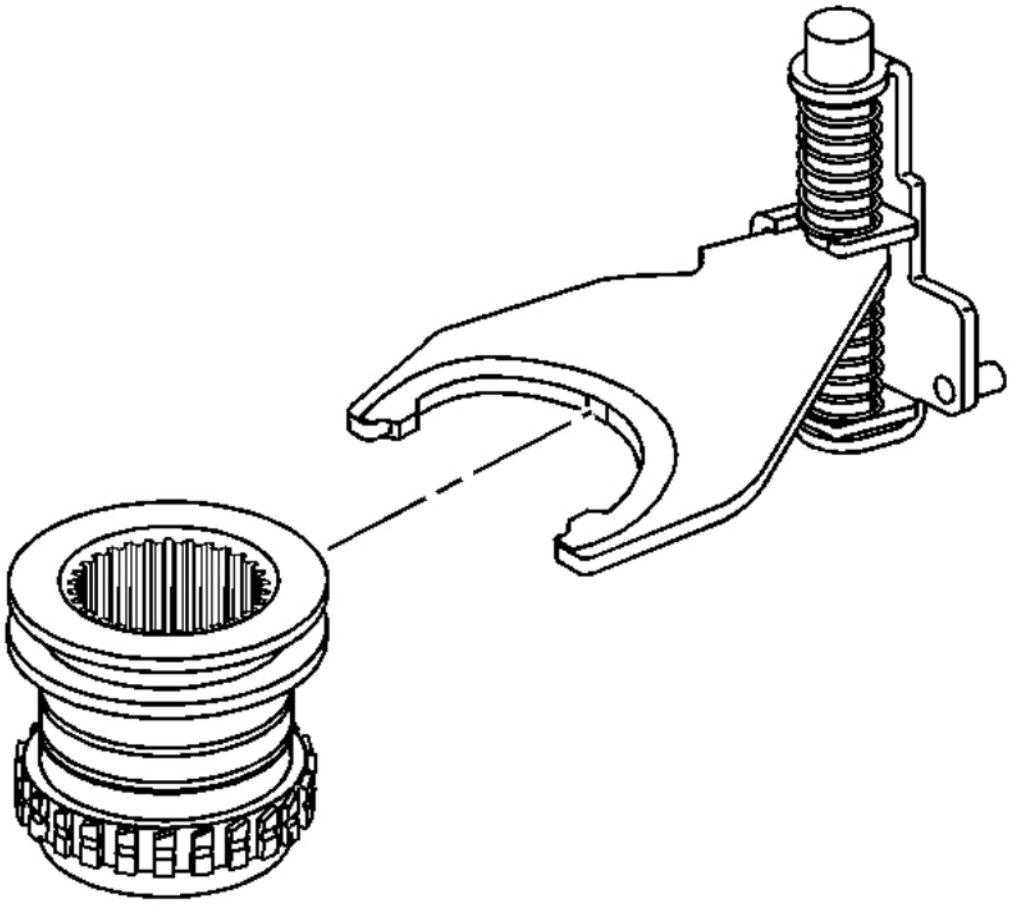


Fig. 185: View Of Range Shift Sleeve & Range Shift Fork
Courtesy of GENERAL MOTORS CORP.

28. Install new shift fork pads.
29. Install the range shift sleeve in the range fork.

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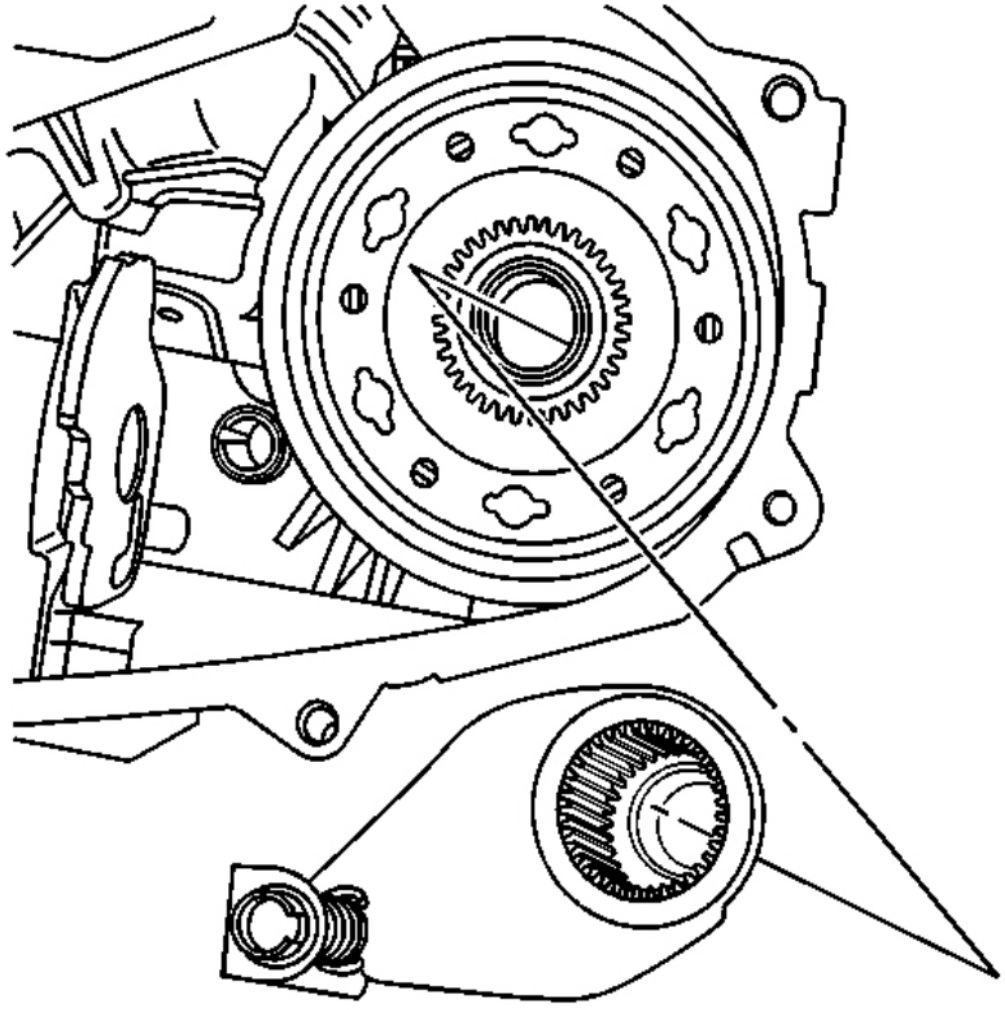


Fig. 186: Checking Range Shift Fork Assembly In Sector Assembly
Courtesy of GENERAL MOTORS CORP.

30. Align the range shift sleeve on the planetary carrier.
31. Align the roller on the range fork in the control actuator lever slot.
32. Install the range shift fork.

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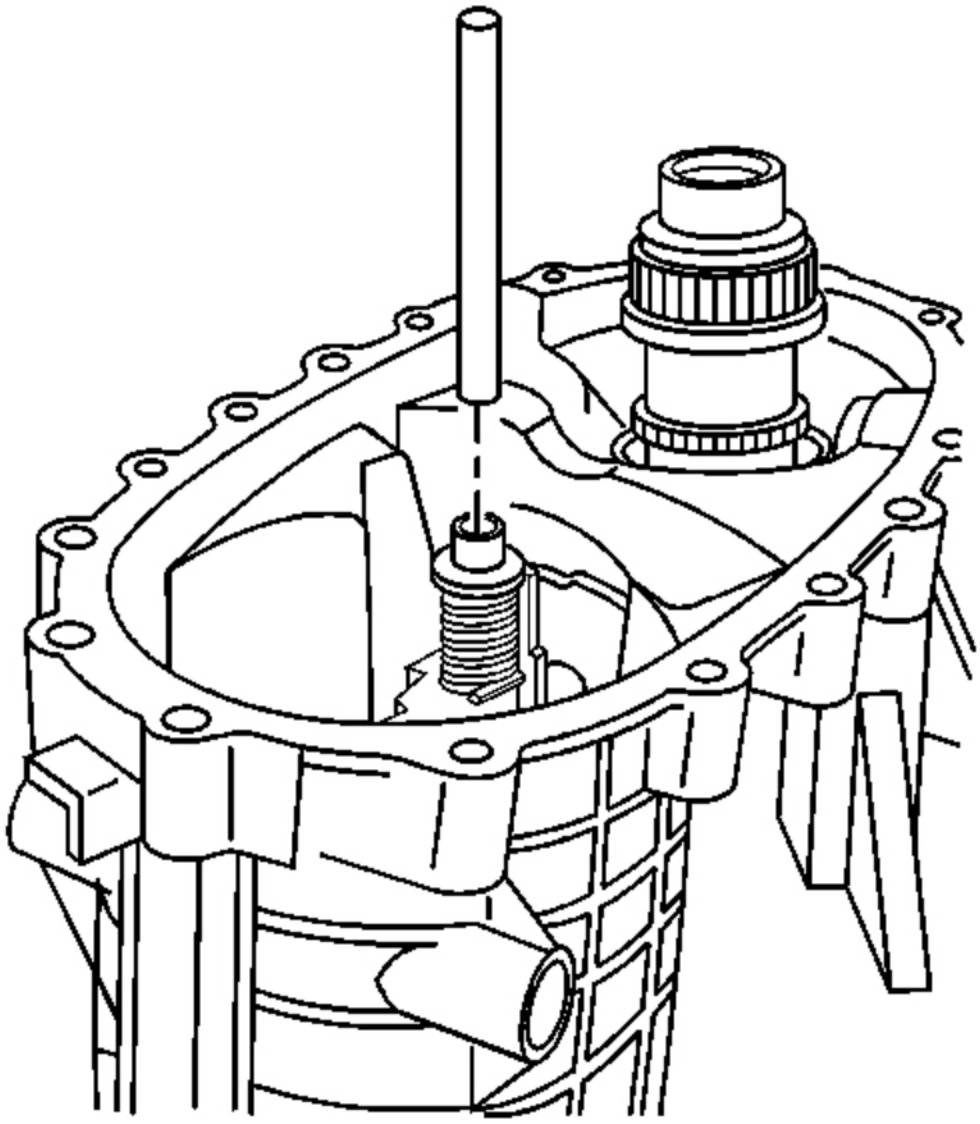


Fig. 187: Locating Shift Fork Shaft
Courtesy of GENERAL MOTORS CORP.

33. Install the shift fork shaft.

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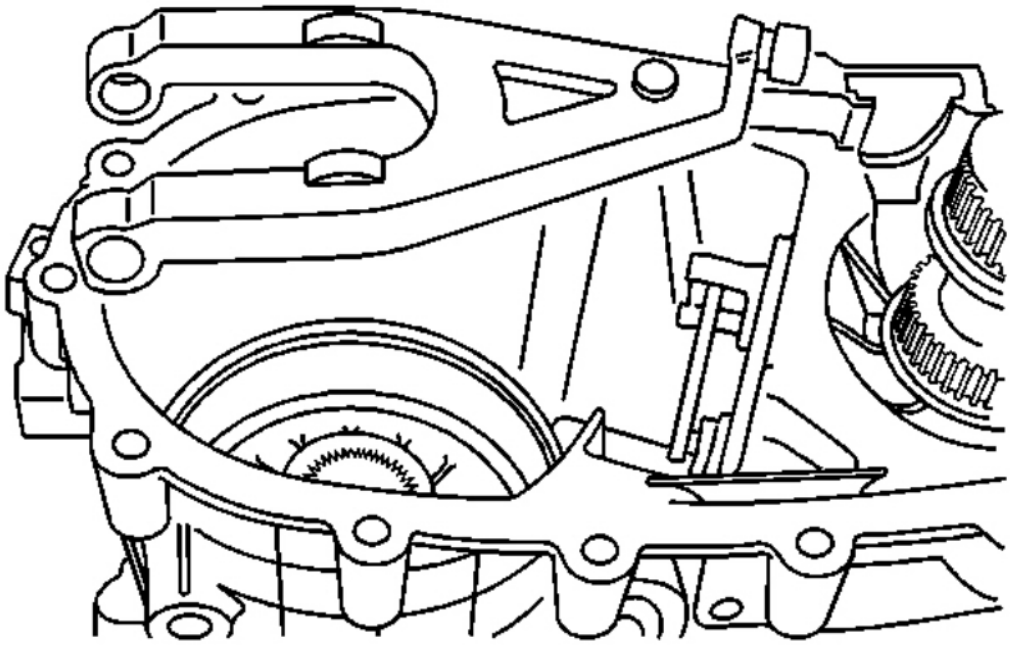


Fig. 188: View Of Clutch Lever Assembly
Courtesy of GENERAL MOTORS CORP.

34. Install the clutch lever assembly.

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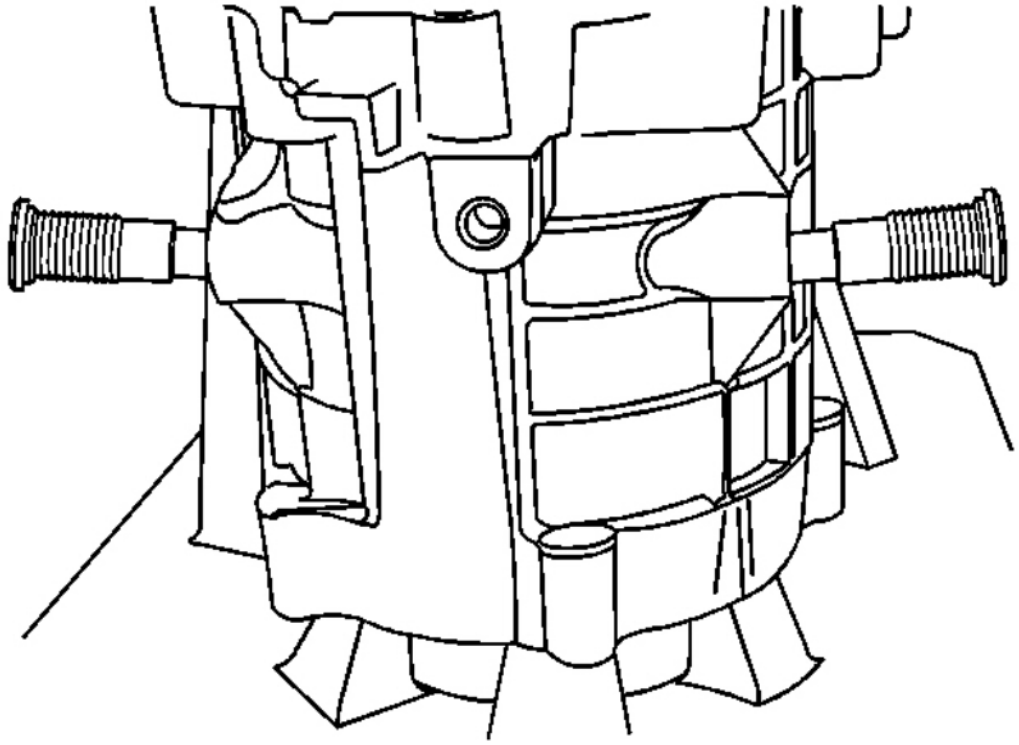


Fig. 189: Identifying Clutch Lever Pivot Pins
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: When performing the following service procedure, ensure that the clutch lever pivot pins are tightened evenly. Ensure that the clutch lever moves freely after the pivot pins are tightened and engaging the lever.

35. Install new O-ring seals on the clutch lever pivot pins.
36. Lubricate the O-ring seals with transfer case fluid.
37. Apply threadlock GM P/N 12345493 (Canadian P/N 10953488), or equivalent, to the clutch lever pivot pin threads.

NOTE: Refer to Fastener Notice .

38. Install the clutch lever pivot pins, with the aluminum washers and O-ring seals, in the front case half.

Tighten: Tighten the clutch lever pivot pins to 61 N.m (45 lb ft).

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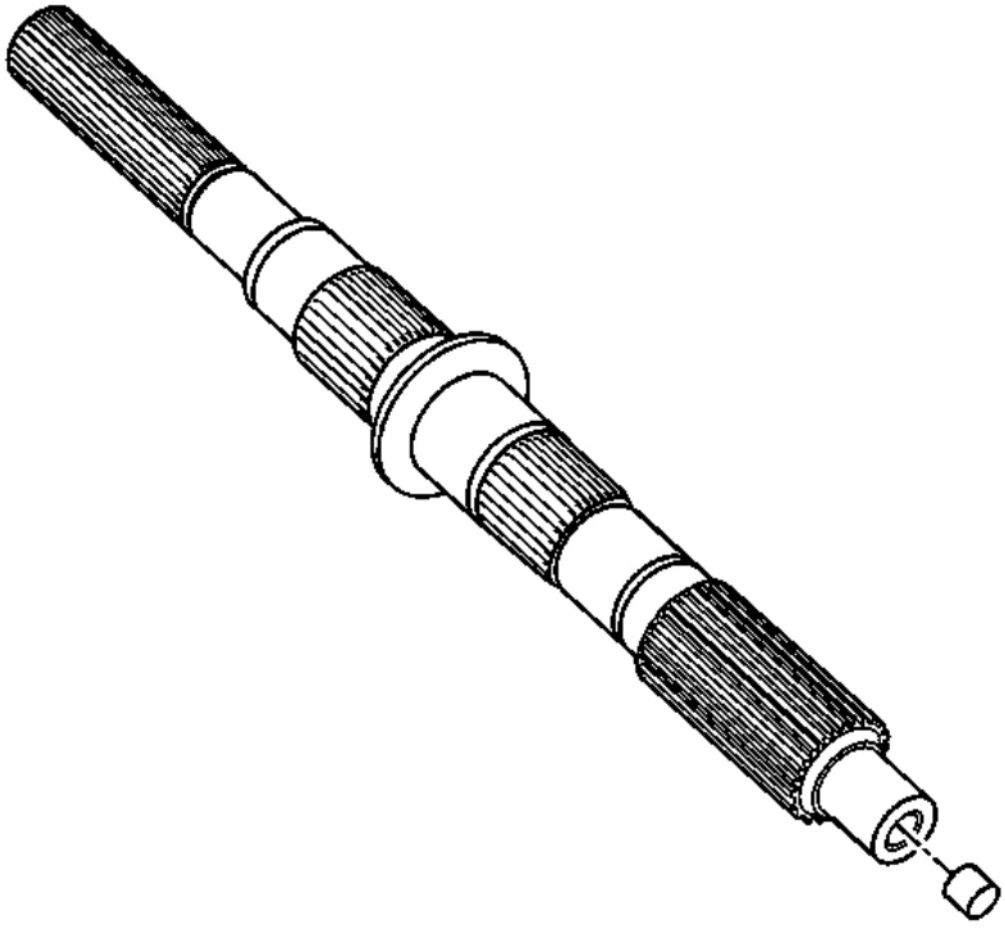


Fig. 190: View Of Rear Output Shaft Oil Restrictor
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The following service procedure is to be performed only if the rear output shaft is new.

39. Install the rear output shaft oil restrictor flush with the end of the shaft.

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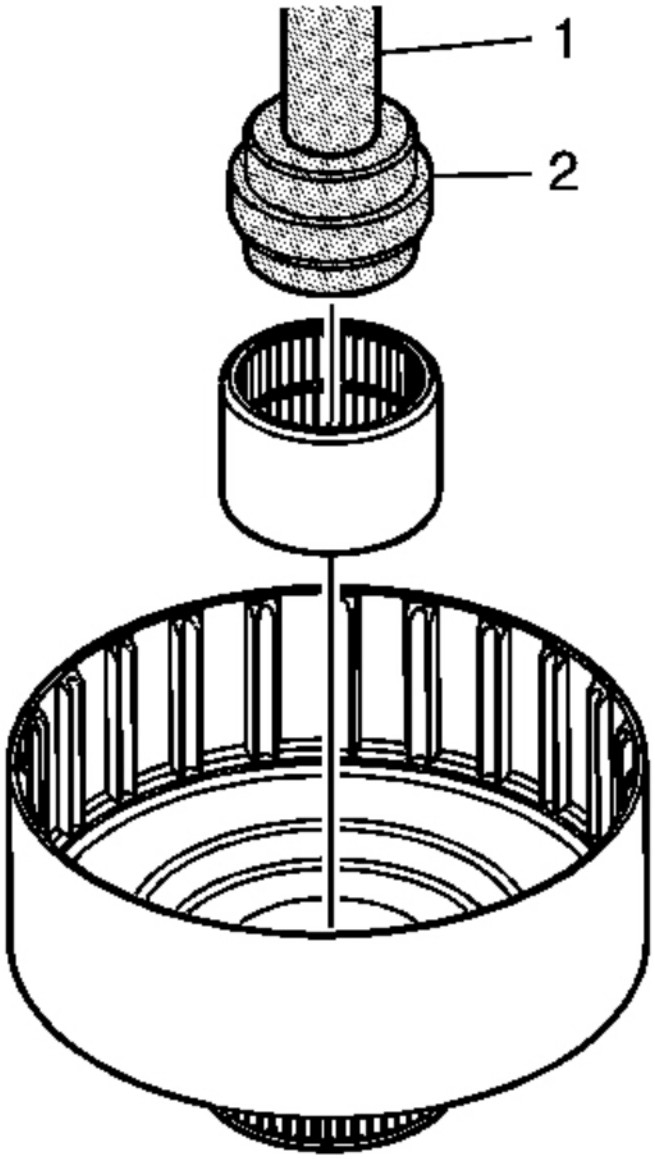


Fig. 191: Installing The Clutch Housing Bearing Using J 36370
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: In order to position the bearing at the proper depth, ensure that the double shoulder of the J 36370 is against the bearing. See Special Tools.

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40. Using the **J 8092** (1) and the **J 36370** (2), install the clutch housing bearing. See **Special Tools**.

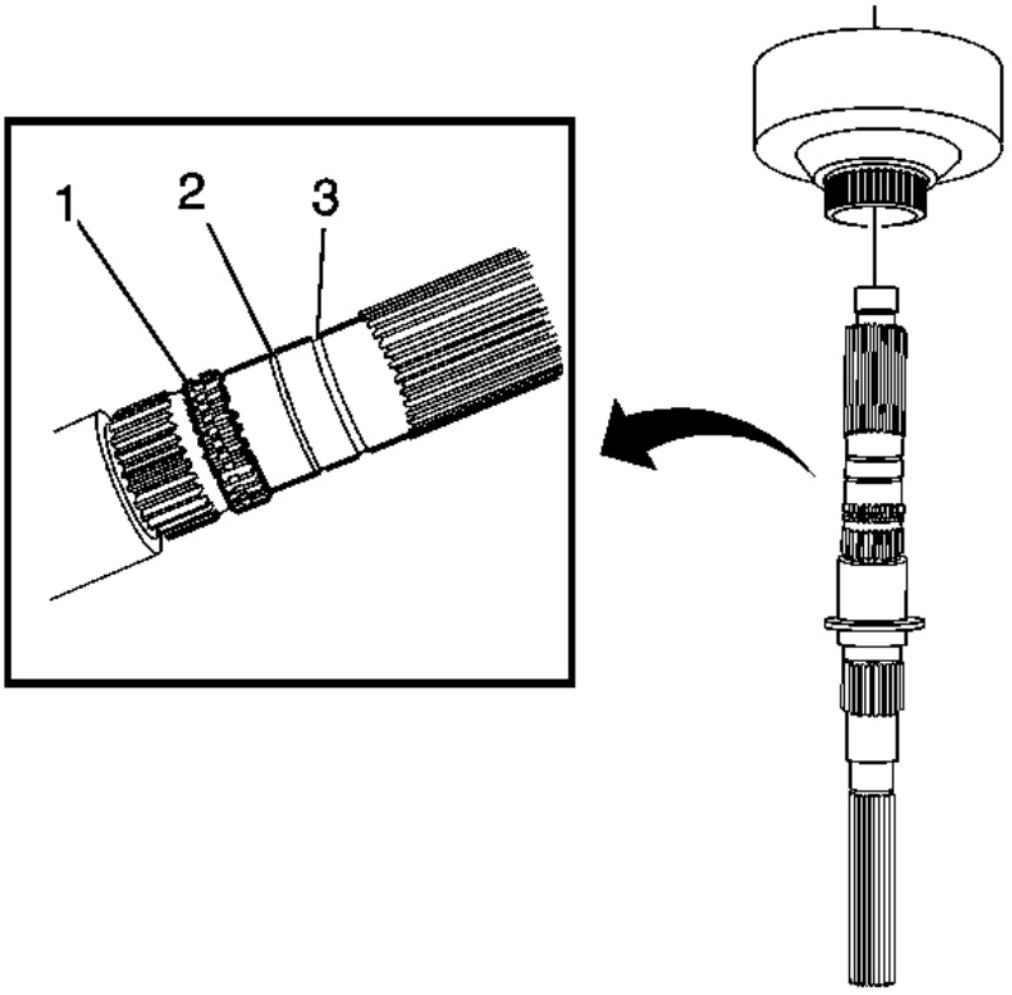


Fig. 192: Identifying 2nd Design Rear Output Shaft By Additional Groove (2)
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The press fit rear output shaft can be identified by an additional groove (2) cut into the shaft between the clutch hub retaining ring groove (1) and the clutch apply plate retaining ring groove (3).

41. Install the clutch housing on the rear output shaft.

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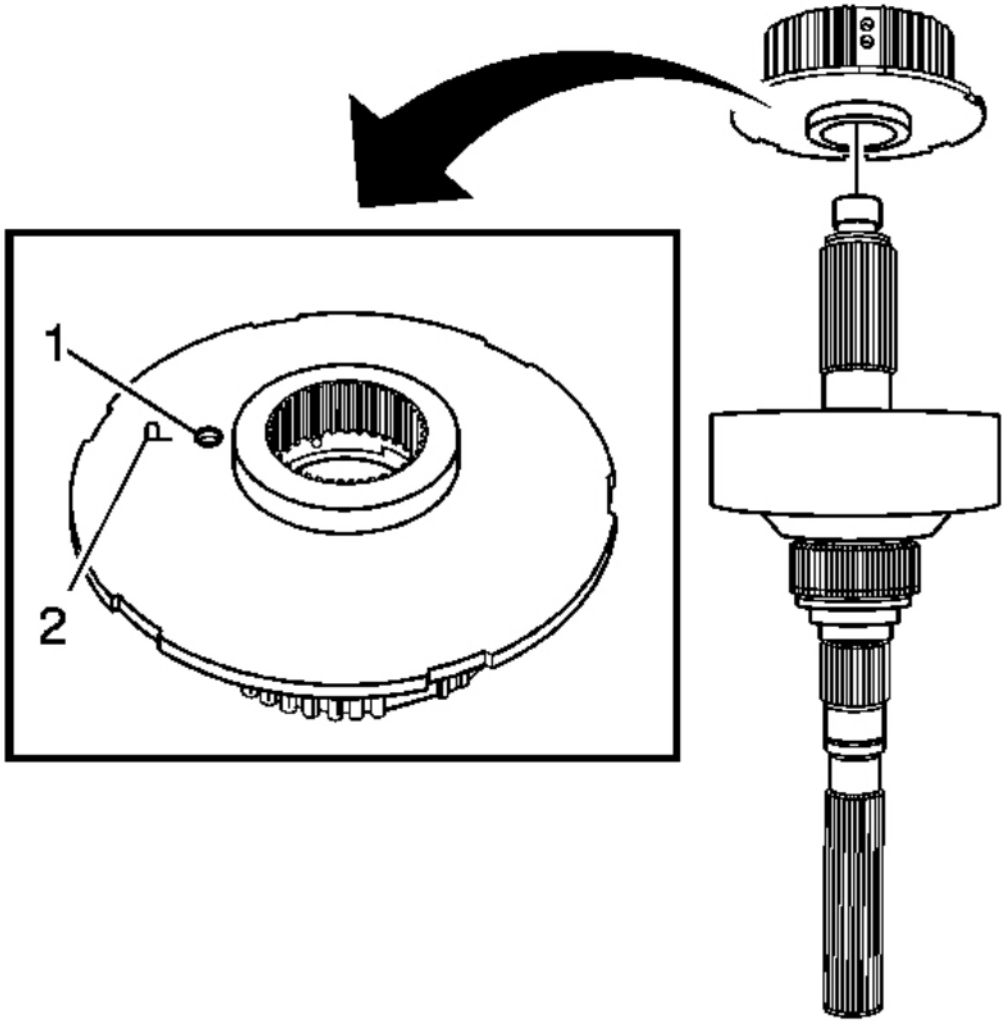


Fig. 193: Identifying Press Fit Clutch Hub
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The press fit clutch hub can be identified by the letter P (2) raised and cast at the rear, 180 degrees from the locator hole (1).

42. Place the clutch hub over the rear output shaft, aligning the clutch hub splines with the mating splines of the shaft.

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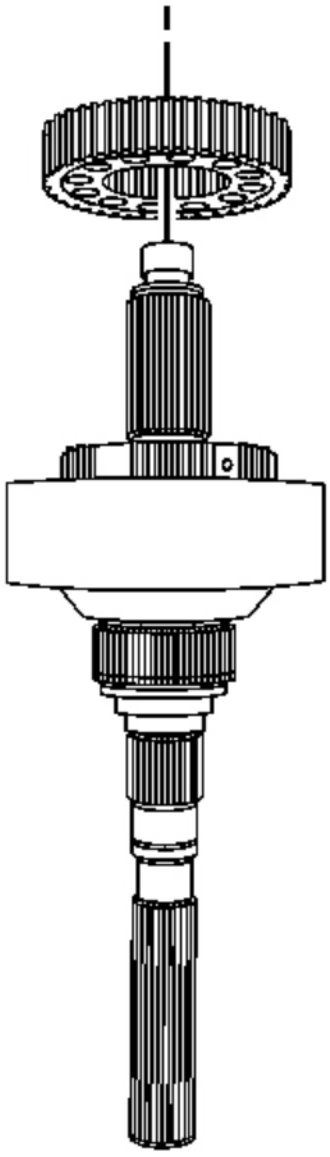


Fig. 194: Installing Drive Sprocket
Courtesy of GENERAL MOTORS CORP.

43. Place the drive sprocket removed during disassembly over the rear output shaft against the outer portion of the clutch hub. The drive sprocket will be used as a spacer to press against, in order to fully seat the clutch hub.

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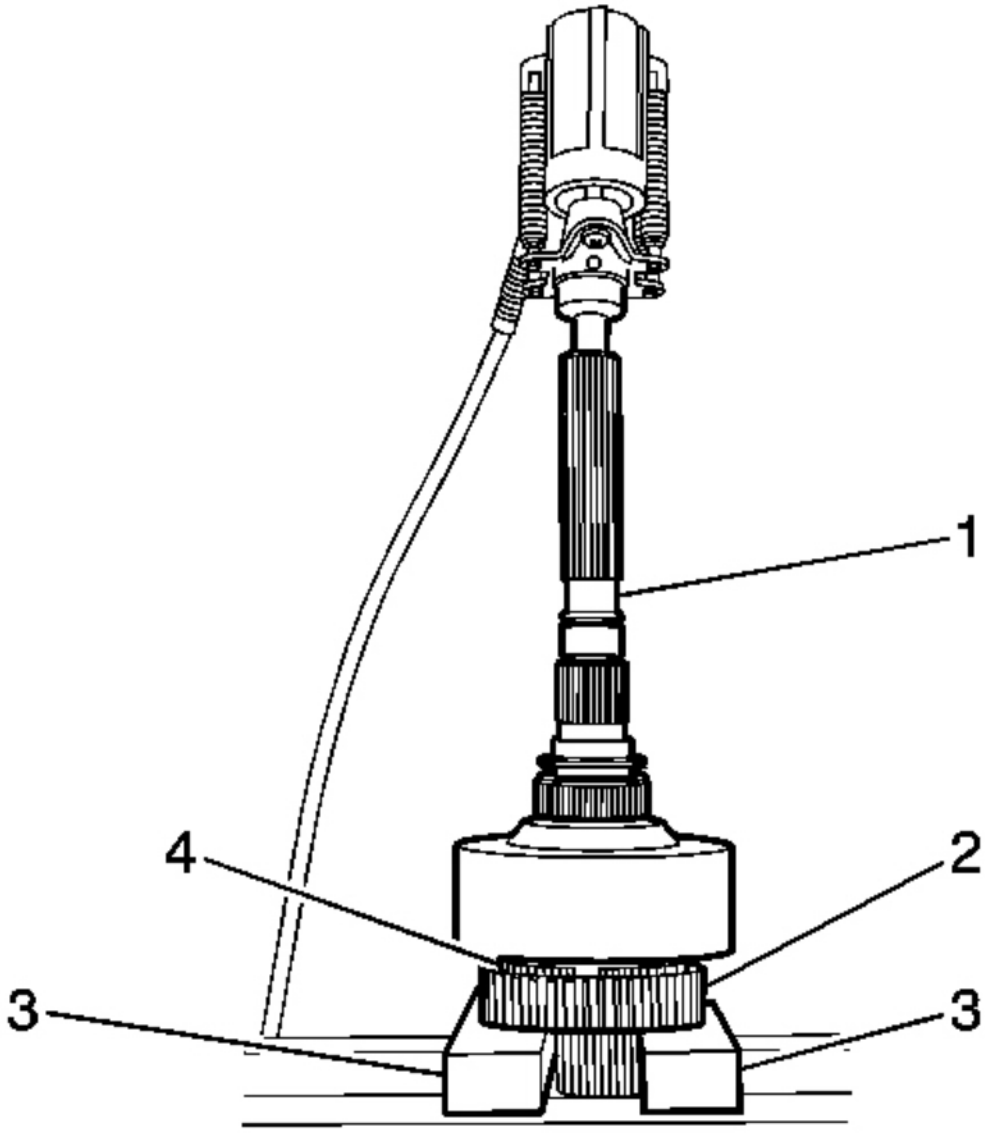


Fig. 195: Pressing Assembly Together
Courtesy of GENERAL MOTORS CORP.

44. Place the rear output shaft assembly into a hydraulic press with the input end facing down and the drive sprocket (2) supporting the assembly against the hydraulic press blocks (3).

IMPORTANT: A maximum of 2 500 kg (5,500 lbs) may be necessary to fully seat the rear

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output shaft into the clutch hub.

45. Press the assembly together until the rear output shaft (1) has fully seated into the clutch hub (4).
46. Remove the assembly from the hydraulic press.
47. Clamp the rear output shaft (1) in a soft-jaw vise with the input end facing up.

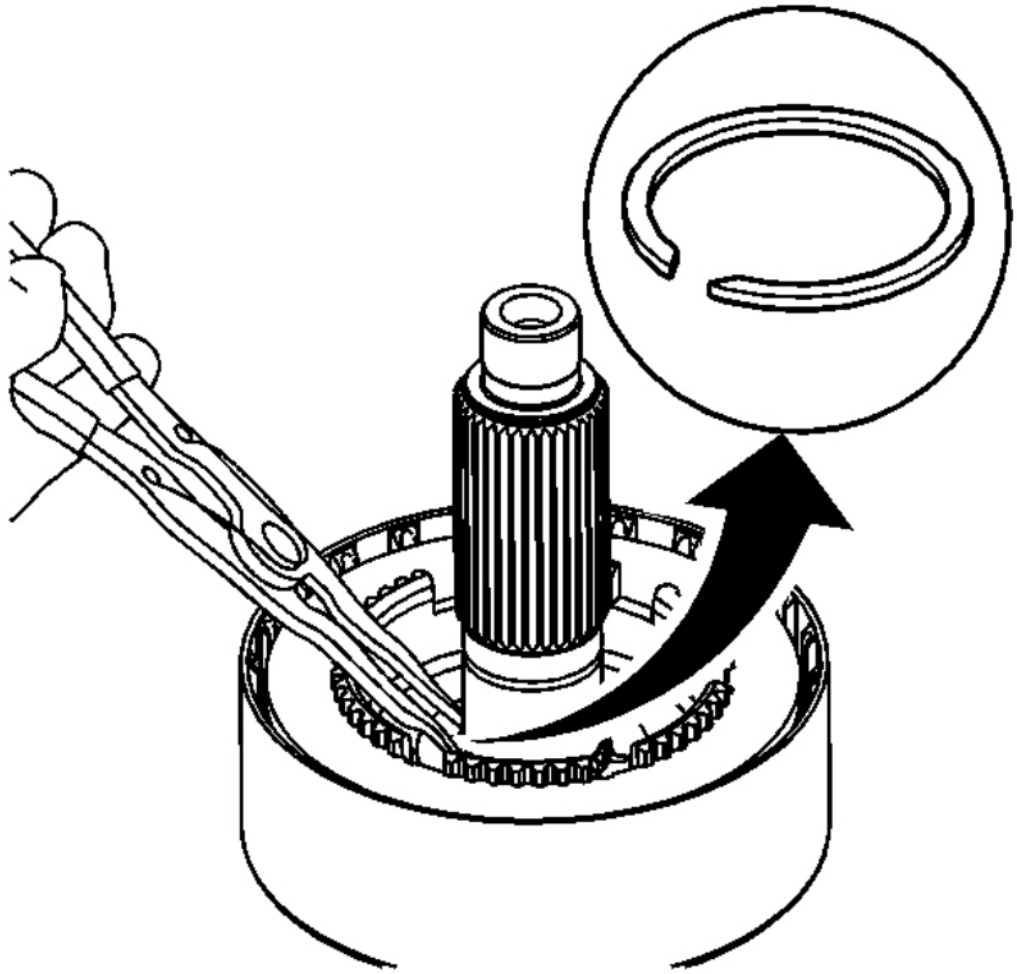


Fig. 196: Removing Clutch Hub Retaining Ring
Courtesy of GENERAL MOTORS CORP.

48. Install the oil restrictor plate.

IMPORTANT: If the clutch hub retaining ring cannot be installed into the groove, then

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the rear output shaft is not fully seated into the clutch hub and must be pressed again until seated.

49. Install the clutch hub retaining ring into the groove.

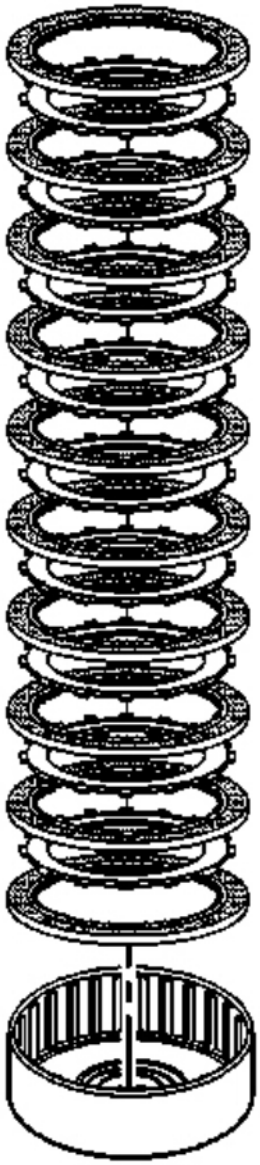


Fig. 197: Identifying Clutch Plates

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Courtesy of GENERAL MOTORS CORP.

50. Install a friction clutch pressure plate.
51. Install a steel clutch pressure plate.
52. Continue to install the friction and the steel clutch plates, alternating until 10 friction plates and 9 steel plates are installed.

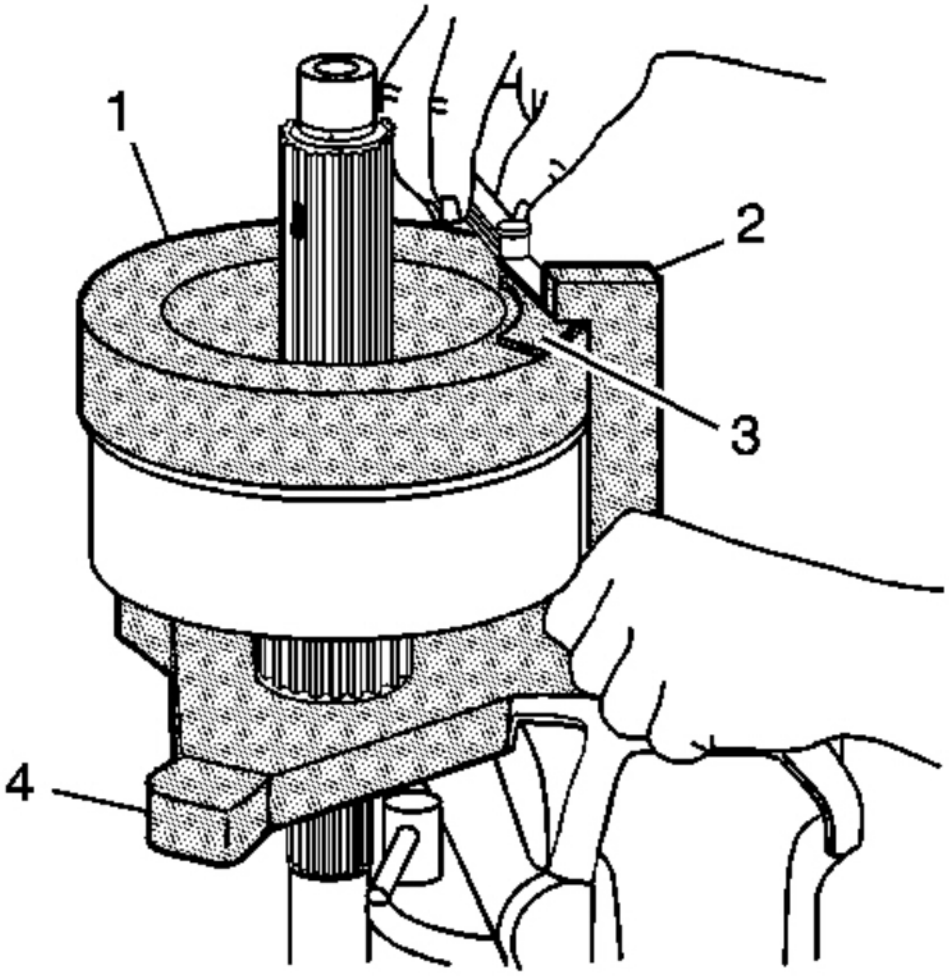


Fig. 198: Measuring Gage Block, J 44295-4 & Spacers
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: A clutch plate shim package is necessary in order to have the proper

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shims available for setting up the clutch pack. Improper shimming can cause driveability concerns and failure of the transfer case.

53. Securely install the base plate (4) of the **J 44295** in a vise with the machined surface of the locating tabs facing up. See **Special Tools**.
54. Install the assembled rear output shaft, with the clutch housing, the inner clutch plates, and the outer clutch plates, on the base plate (4) of the **J 44295** . See **Special Tools**.
55. Install the weight (1) of the **J 44295** on top of the assembled clutch plates. See **Special Tools**.
56. Place the gage block (2) of the **J 44295** on 1 of the locating tabs of the base plate (4) of the **J 44295** . See **Special Tools**.
57. Place the spacer (3) of the **J 44295** under the gage block (2) of the **J 44295** . See **Special Tools**.
58. Using a feeler gage, measure between the gage block (2) and the spacer (3).
59. Measure with the gage block (2), the spacer (3), and the feeler gage on the remaining 2 locating tabs of the base plate (4).

IMPORTANT: The specification is the average clearance remaining between the gage block (2) and the spacer (3).

60. The average of the 3 measurements is the required shim thickness.

IMPORTANT: Measure the clutch shims in the center area of the shim. The shims may have a burr or ridge around the inner or outer edge causing an incorrect measurement. The available shims may not combine to the desired measurement.

61. Select, from the clutch plate shim package, the correct shim or shims plus or minus 0.10 mm (0.004 in). You may use a combination of 2 shims to obtain the correct thickness.

    The shims in the clutch plate shim package are the following thickness:

    - 0.30 mm (0.12 in)
    - 0.56 mm (0.022 in)
    - 0.81 mm (0.032 in)
    - 1.04 mm (0.041 in)
    - 1.30 mm (0.051 in)
    - 1.55 mm (0.061 in)
    - 1.80 mm (0.071 in)
    - 2.08 mm (0.081 in)

62. Remove the weight (1) of the **J 44295** . See **Special Tools**.

IMPORTANT: After obtaining the desired thickness of shims, do not remove the clutch plates from the clutch housing. If you remove, and then install the clutch

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plates again, it could change the measurement.

63. Install the shim or shims.

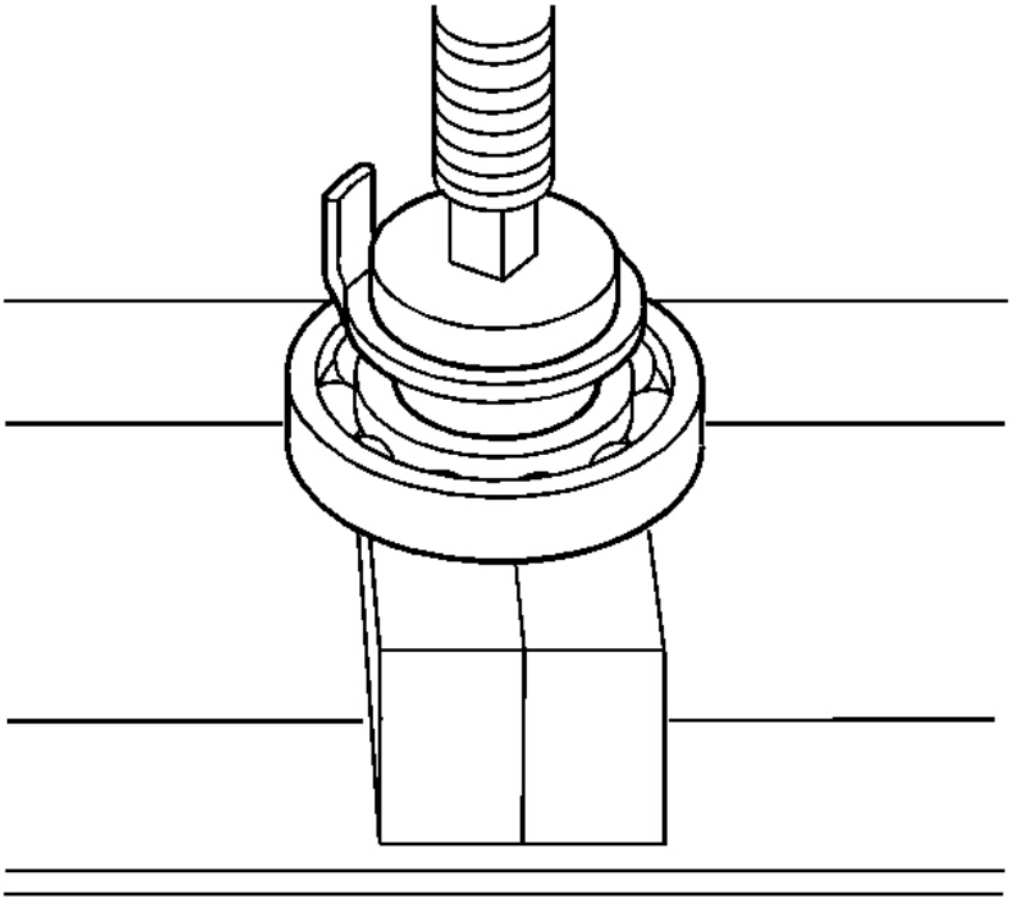


Fig. 199: Ensuring Bearing Inner Bearing Race Is Properly Supported
Courtesy of GENERAL MOTORS CORP.

64. Using a suitable press plate and a hydraulic press, press the clutch bearing inner support in the clutch apply plate bearing. Ensure the bearing inner bearing race is supported.

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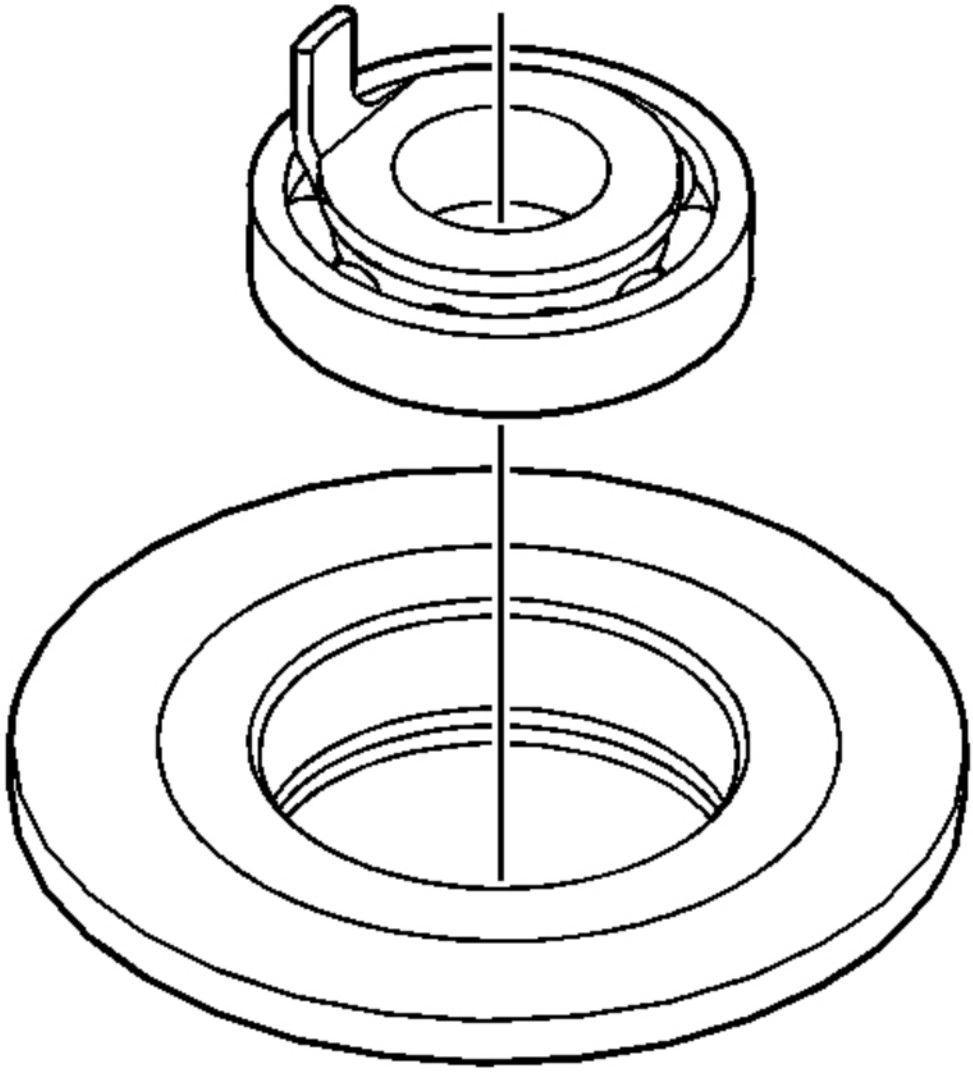


Fig. 200: View Of Clutch Pressure Plate Bearing With The Inner Support
Courtesy of GENERAL MOTORS CORP.

65. Install the clutch pressure plate bearing, with the inner support, in the clutch pressure plate.

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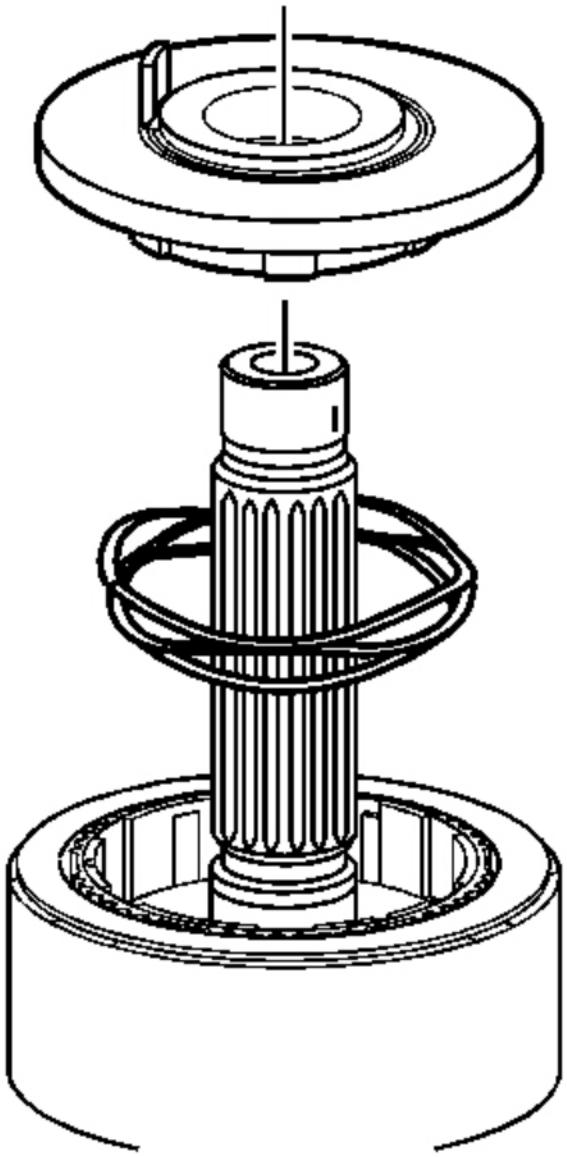


Fig. 201: Installing Clutch Return Spring
Courtesy of GENERAL MOTORS CORP.

66. Install the clutch return spring.
67. Install the clutch pressure plate. Align the lugs of the pressure plate with the slots in the hub.

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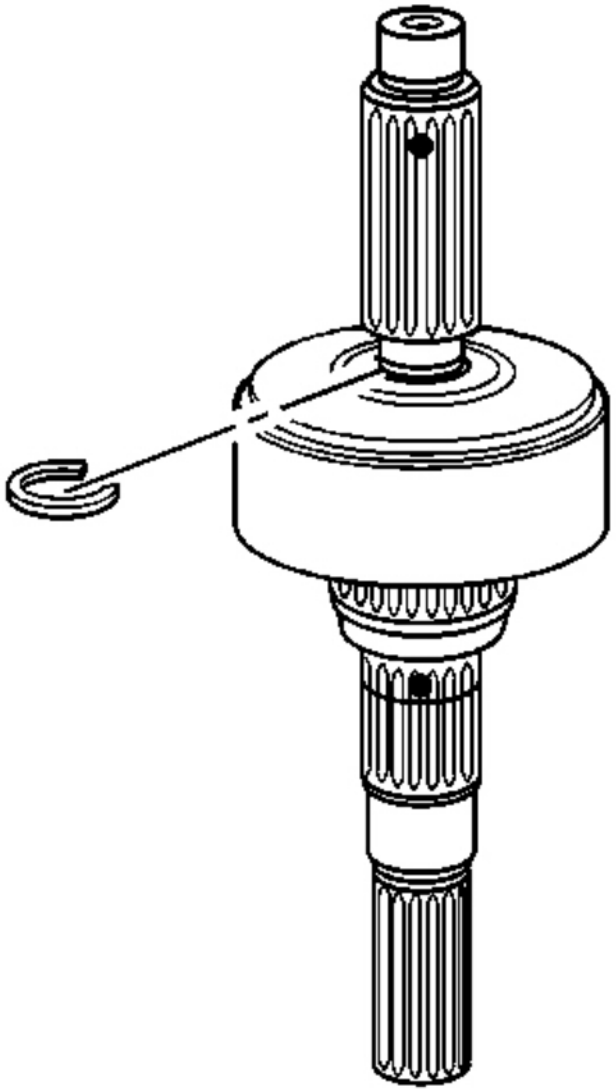


Fig. 202: View Of Clutch Pressure Plate Retaining Ring
Courtesy of GENERAL MOTORS CORP.

68. Install the clutch apply plate retaining ring. Push down on the apply plate to access the retaining ring groove.

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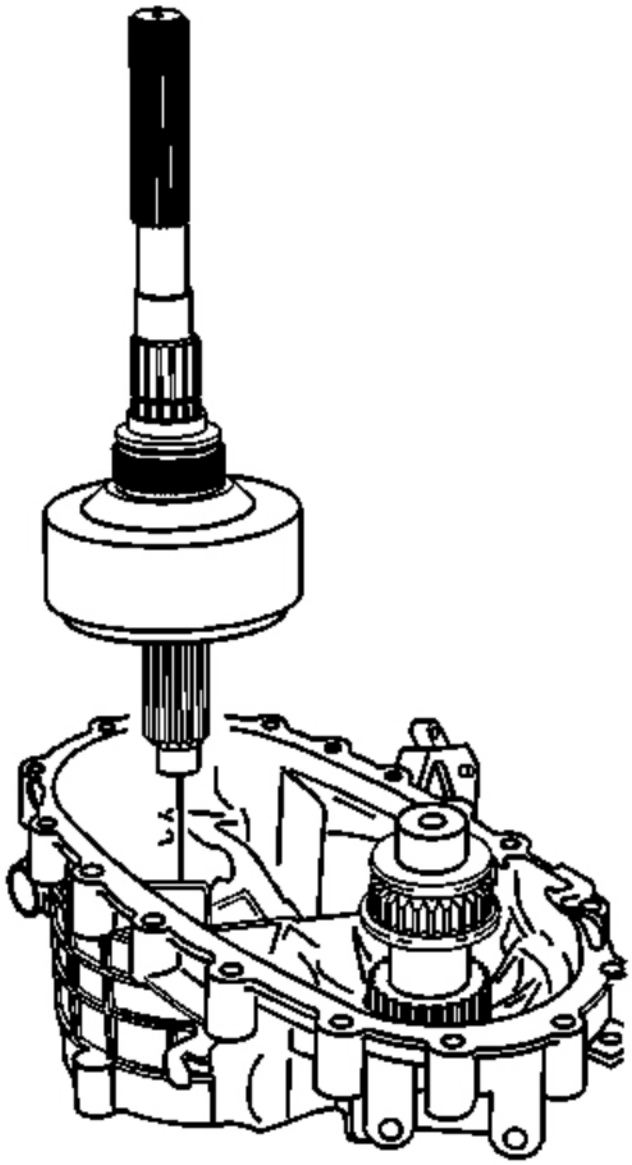


Fig. 203: Locating Rear Output Shaft Assembly
Courtesy of GENERAL MOTORS CORP.

69. Align the tab on the clutch bearing inner support between the clutch lever.
70. Align the rear output shaft teeth to the planetary carrier and range sleeve teeth.
71. Install the rear output shaft assembly.

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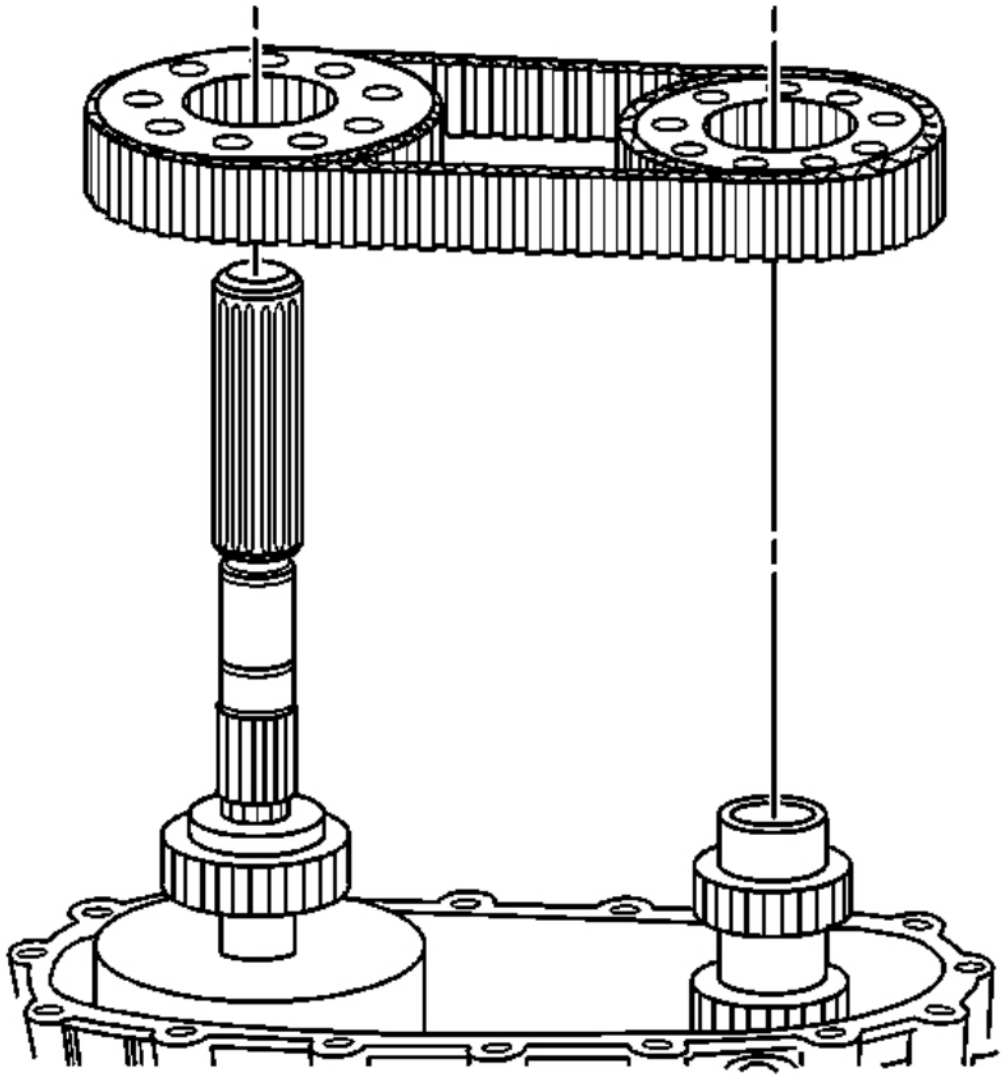


Fig. 204: Identifying Drive Chains & Sprockets
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Align the marks of the drive chain and sprockets, if using the chain and sprockets again.

72. Install the drive chain and sprockets. The blue chain links must face up, or toward the rear of the vehicle.

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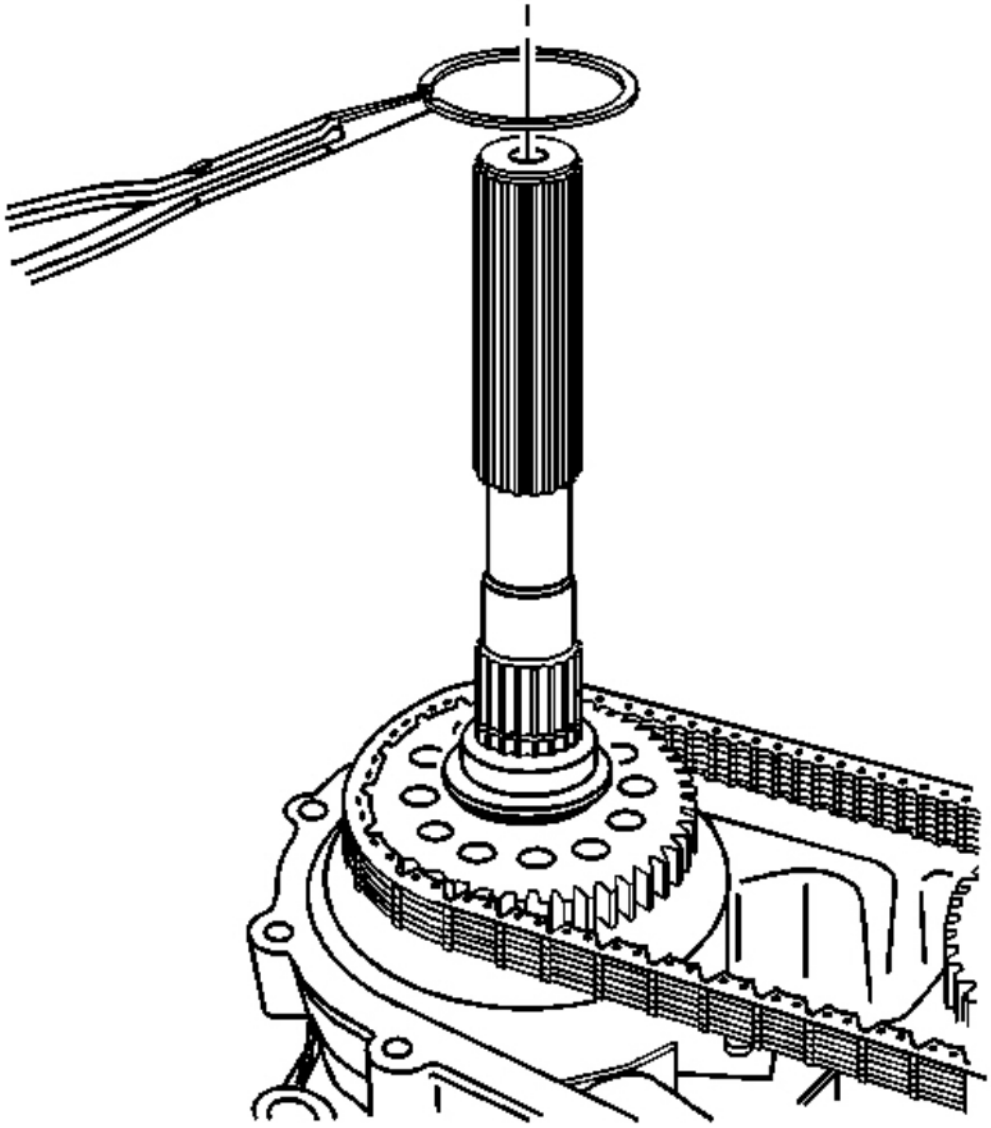


Fig. 205: View Of Drive Sprocket Retaining Ring
Courtesy of GENERAL MOTORS CORP.

73. Install the drive sprocket retaining ring.

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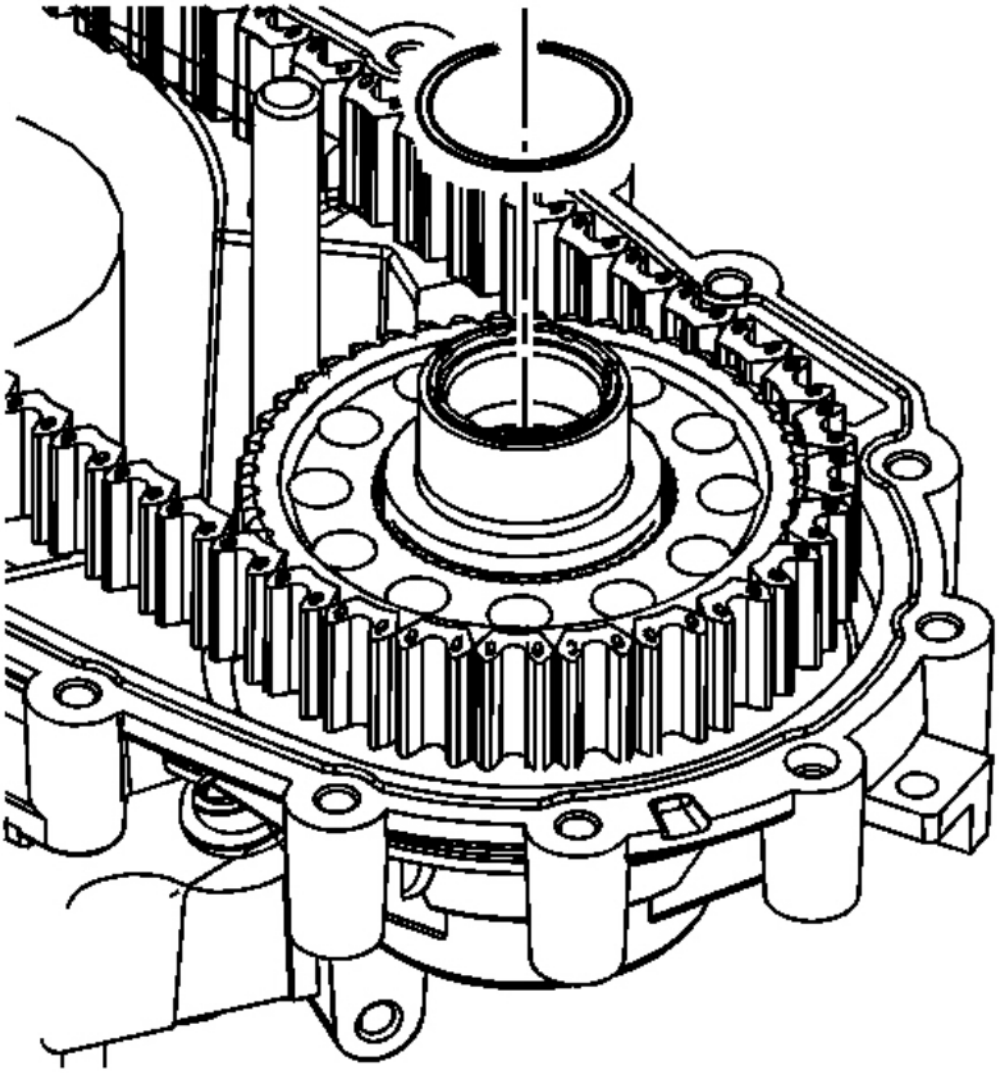


Fig. 206: Locating Driven Sprocket Retaining Ring
Courtesy of GENERAL MOTORS CORP.

74. Install the driven sprocket retaining ring.

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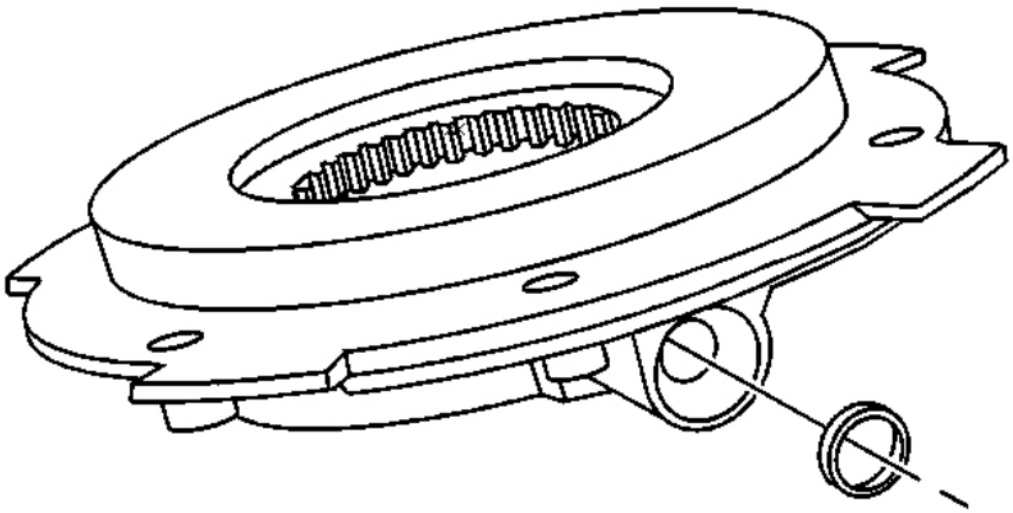


Fig. 207: Identifying Oil Pump Suction Pipe O-Ring
Courtesy of GENERAL MOTORS CORP.

75. Install a new oil pump suction pipe O-ring in the oil pump.

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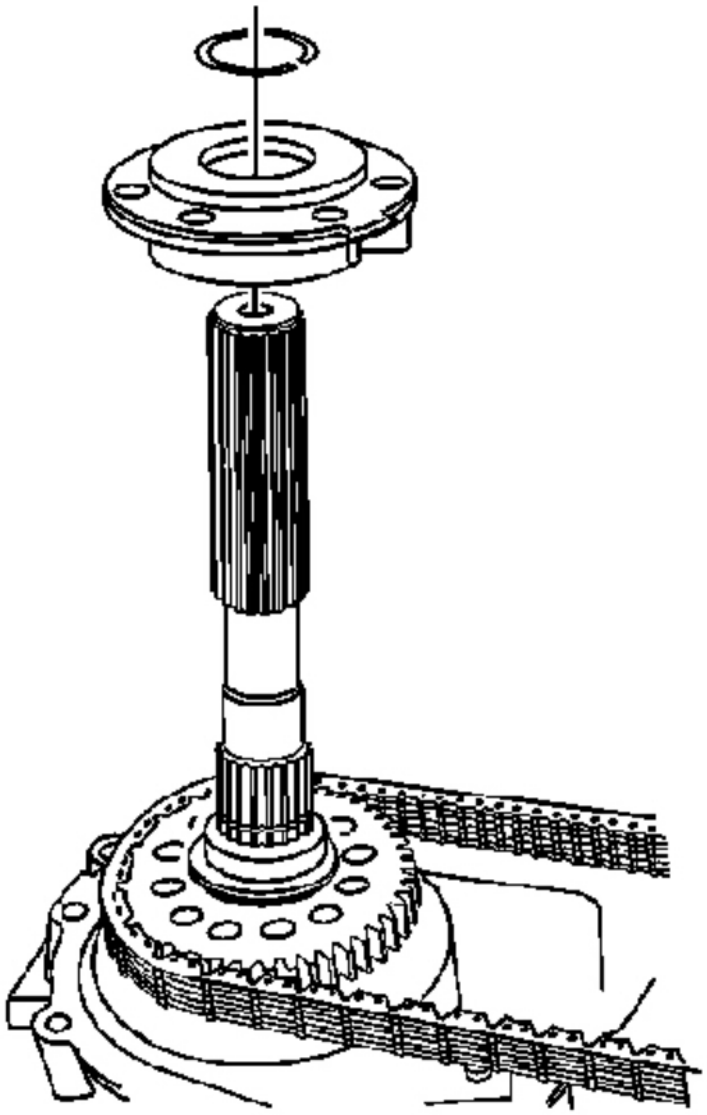


Fig. 208: Oil Pump Assembly
Courtesy of GENERAL MOTORS CORP.

76. Install the oil pump assembly.
77. Install the oil pump wave spring.

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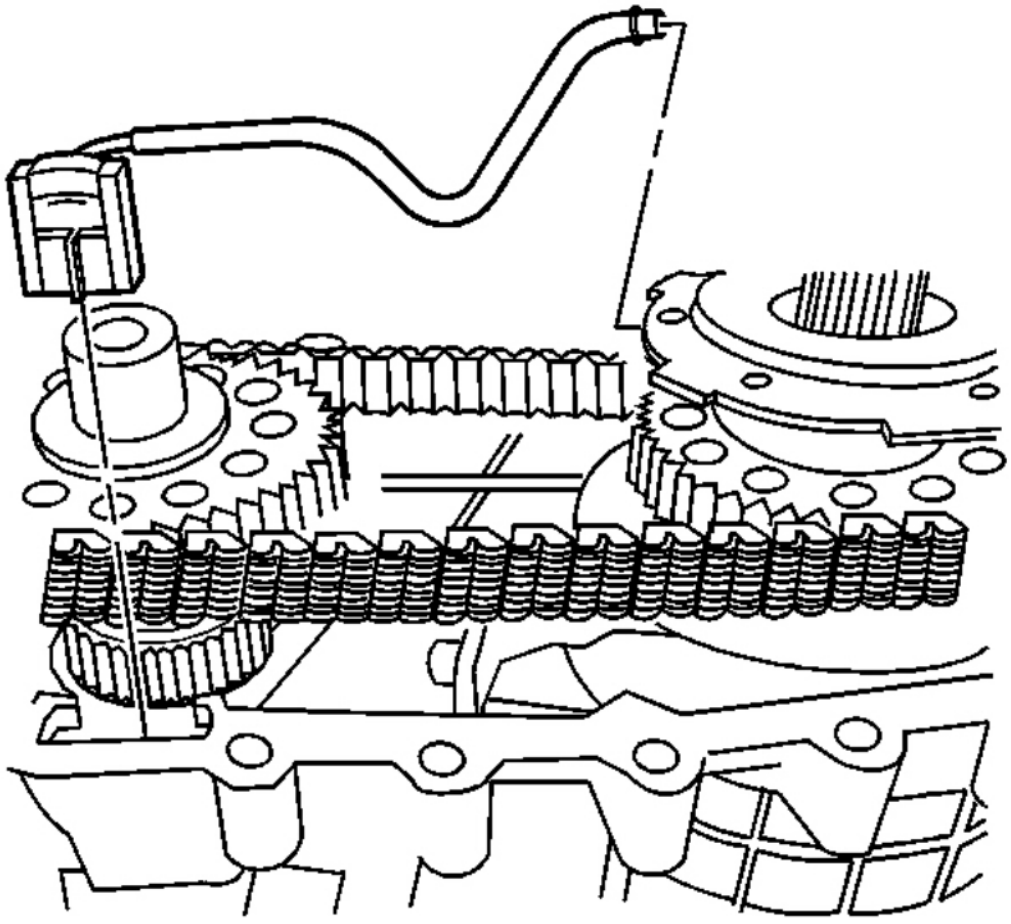


Fig. 209: Locating Oil Pump Suction Pipe Assembly
Courtesy of GENERAL MOTORS CORP.

78. Install the oil pump suction pipe assembly.
    1. Install the screen in the case.
    2. Install the suction pipe to the oil pump.
    3. Inspect for the O-ring not being damaged and in the proper position.

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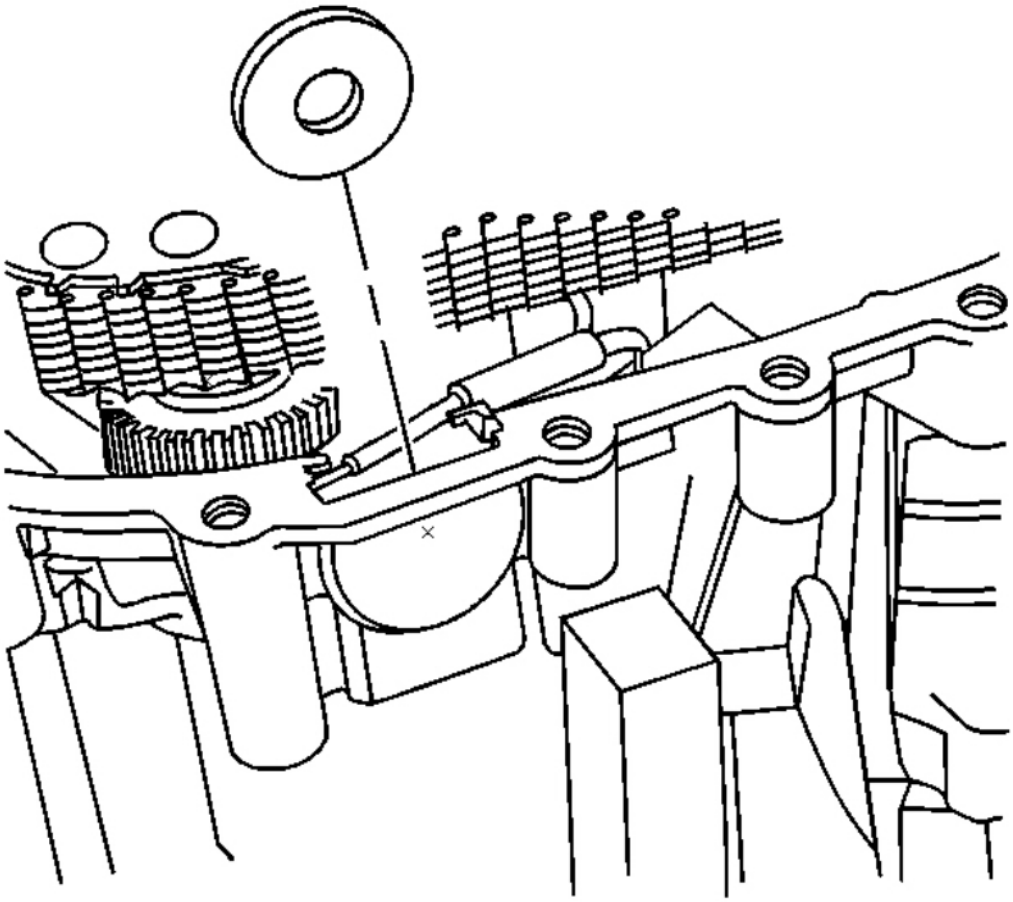


Fig. 210: Locating Magnet
Courtesy of GENERAL MOTORS CORP.

79. Install the transfer case magnet.

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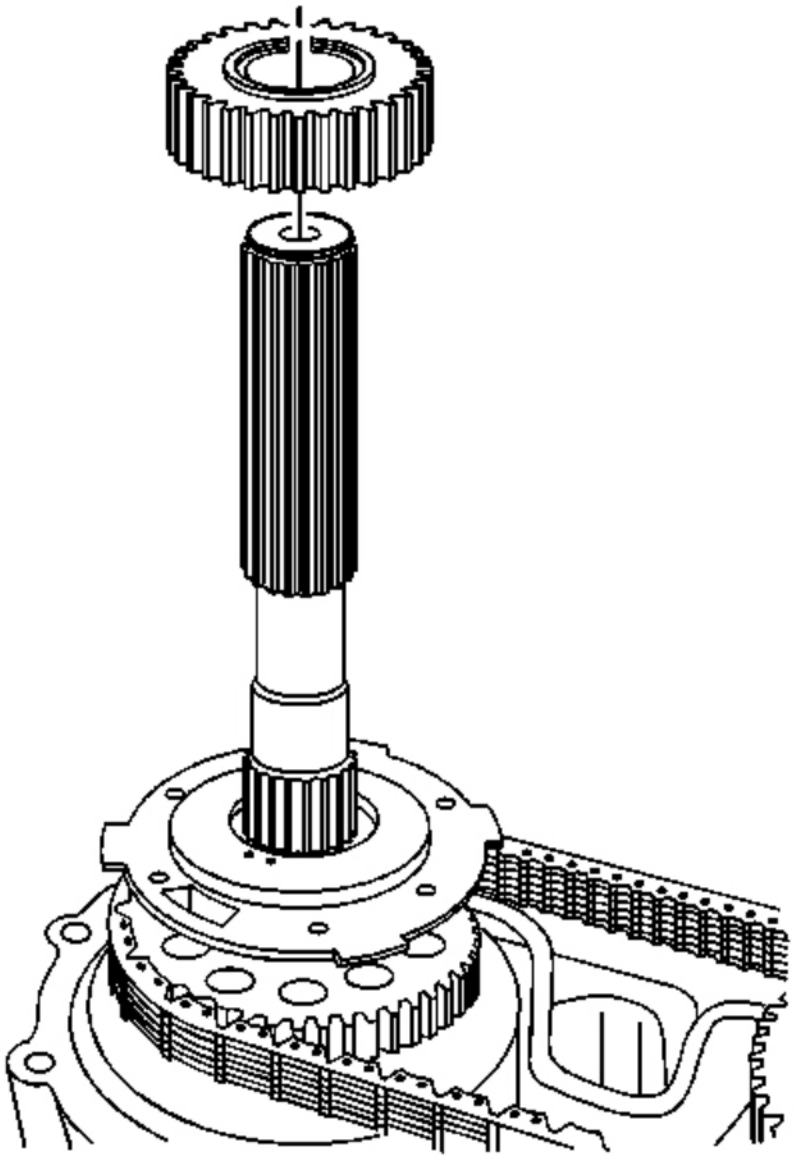


Fig. 211: Identifying Rear Output Shaft Speed Sensor Reluctor Wheel
Courtesy of GENERAL MOTORS CORP.

80. Install the rear output shaft speed reluctor wheel.

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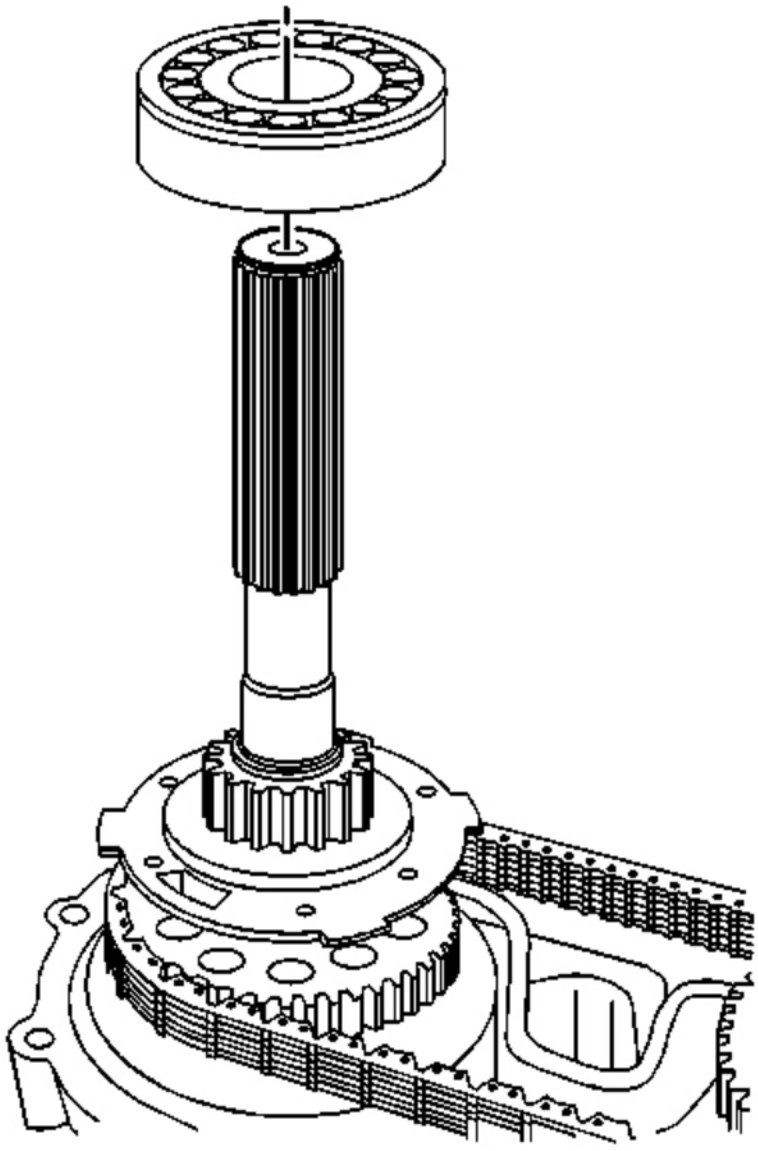


Fig. 212: View Of Rear Output Shaft Bearing
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Install the rear output shaft bearing, with the groove for the retaining ring, facing up.

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81. Install the rear output shaft bearing.

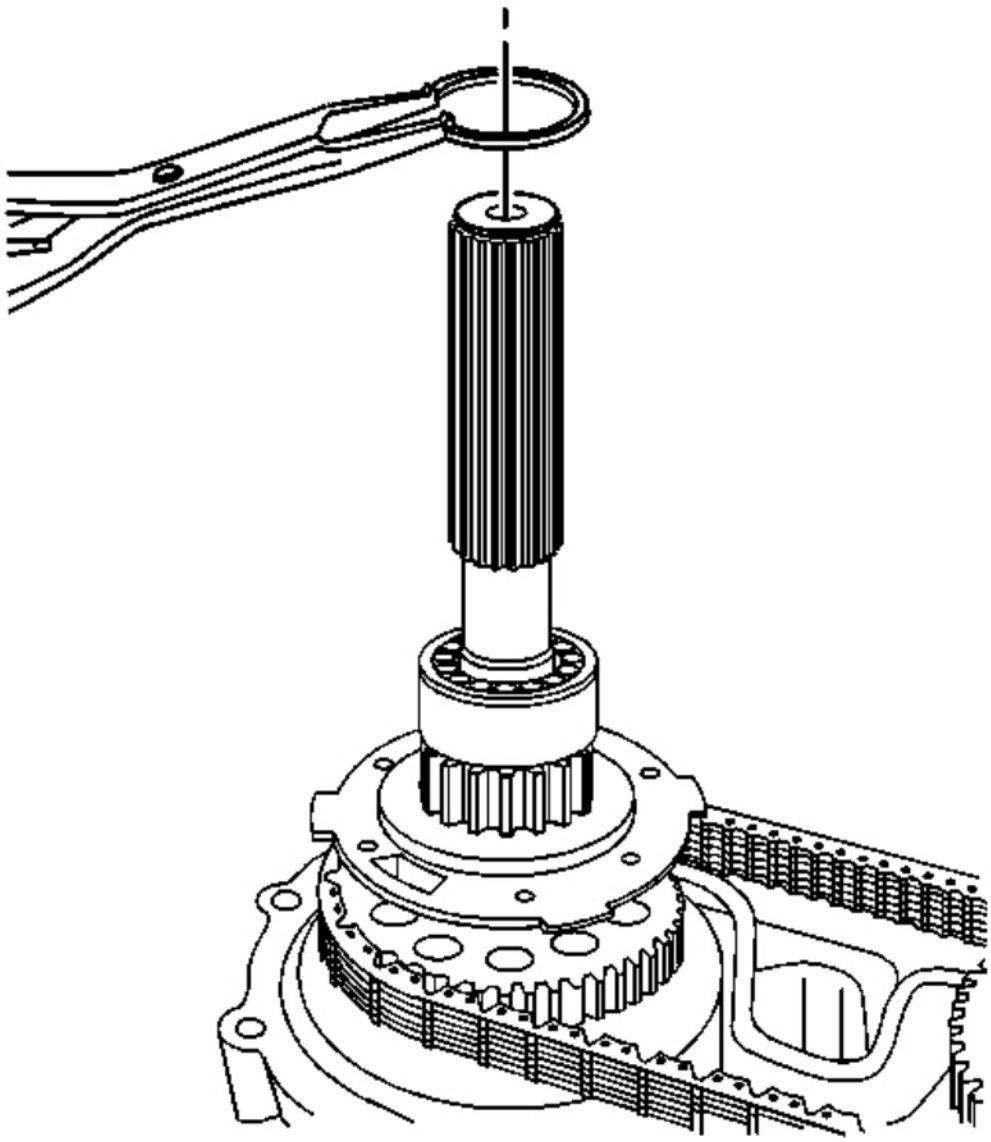


Fig. 213: Locating Rear Output Shaft Bearing Retaining Ring
Courtesy of GENERAL MOTORS CORP.

82. Install the rear output shaft bearing retaining ring. Push down on the rear output shaft bearing to compress the oil pump wave spring.

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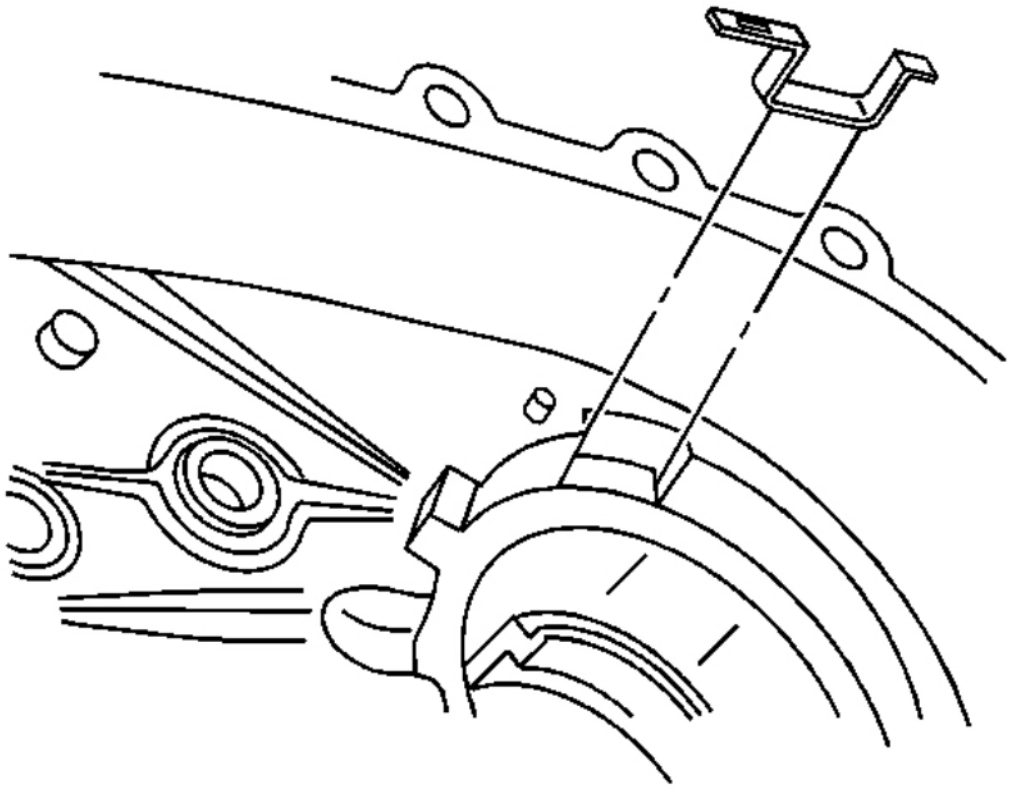


Fig. 214: View Of Oil Pump Wear Sleeve
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: A new oil pump wear sleeve may have a star shaped hole or a spring clip hole.

83. If necessary, install the oil pump wear sleeve.
84. Lightly stake the oil pump wear sleeve pin to hold the sleeve in place, if star shaped hole style.

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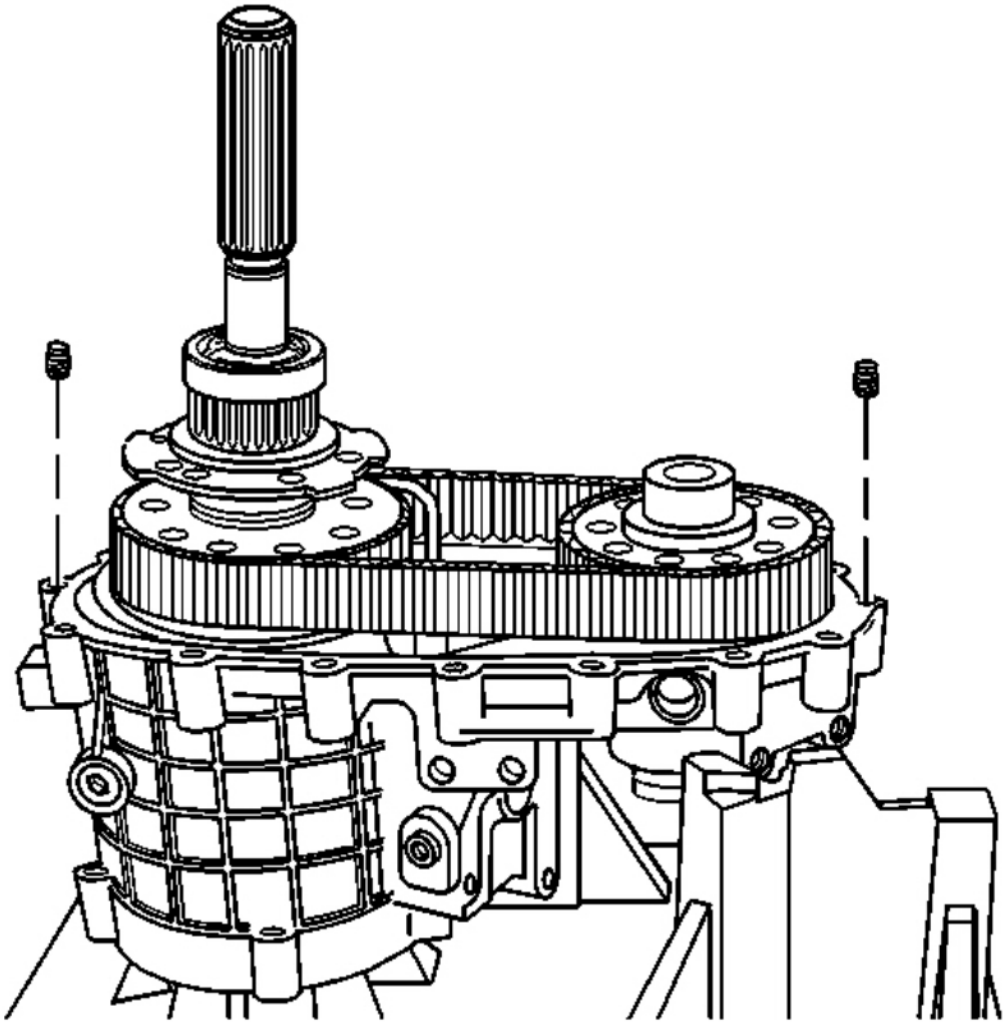


Fig. 215: Identifying Locating Pins
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Ensure the locating pins are installed in the front case half.

85. Install the locating pins in the front case, if necessary.

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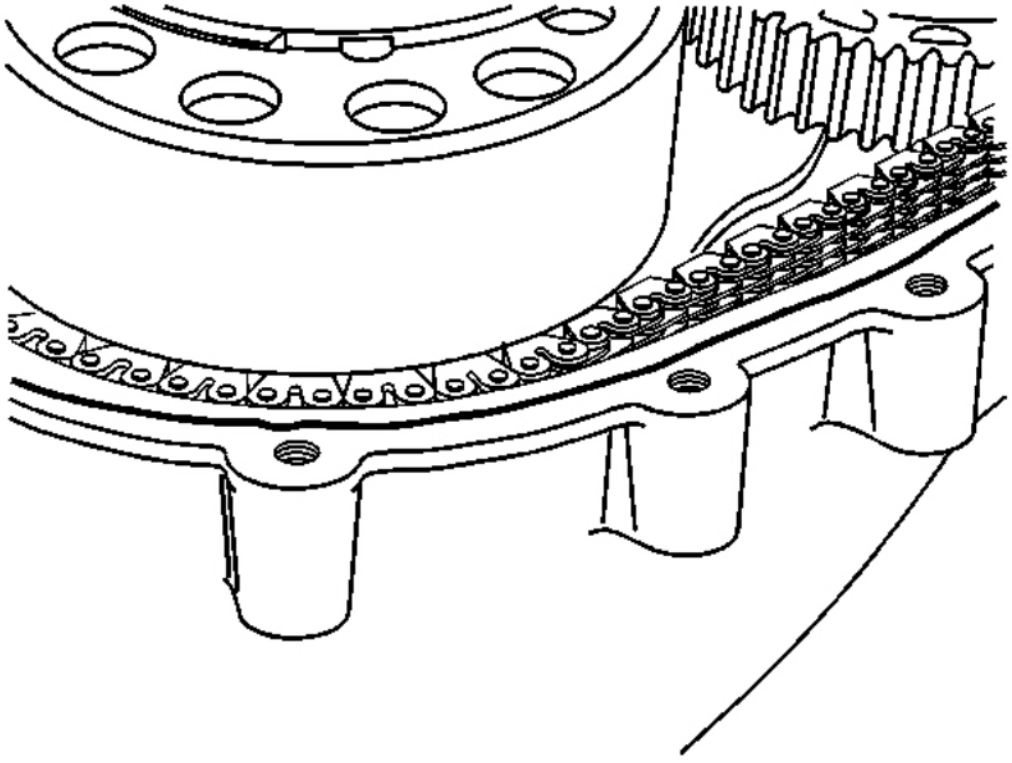


Fig. 216: Applying Sealant To Front Case Sealing Surface
Courtesy of GENERAL MOTORS CORP.

NOTE: Apply the proper amount of sealant to the flange when assembling the transfer case. Excessive amounts of sealant can plug the oil pump screen, resulting in internal component failure.

IMPORTANT: Ensure both sealing surfaces of the front and rear case halves are free of dirt, oil, and cleaning solvent.

86. Apply a 2 mm (0.078 in) bead of RTV sealant GM P/N 12345739 (Canadian P/N 10953541), or equivalent, to the mating surfaces of the front case half.

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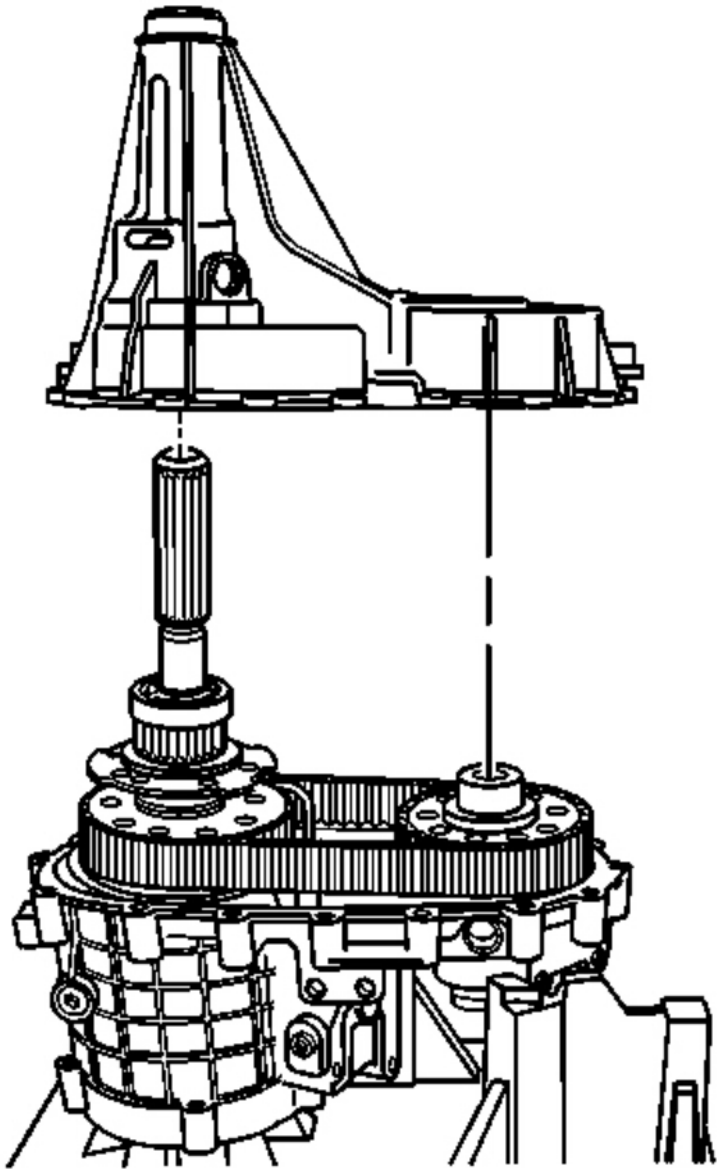


Fig. 217: Front Case & Rear Case Half Assembly
Courtesy of GENERAL MOTORS CORP.

87. Align the outside retaining ring, for the rear output shaft bearing, so that it is easily accessed through the opening in the rear case half.
88. Lower the rear case half in to place.

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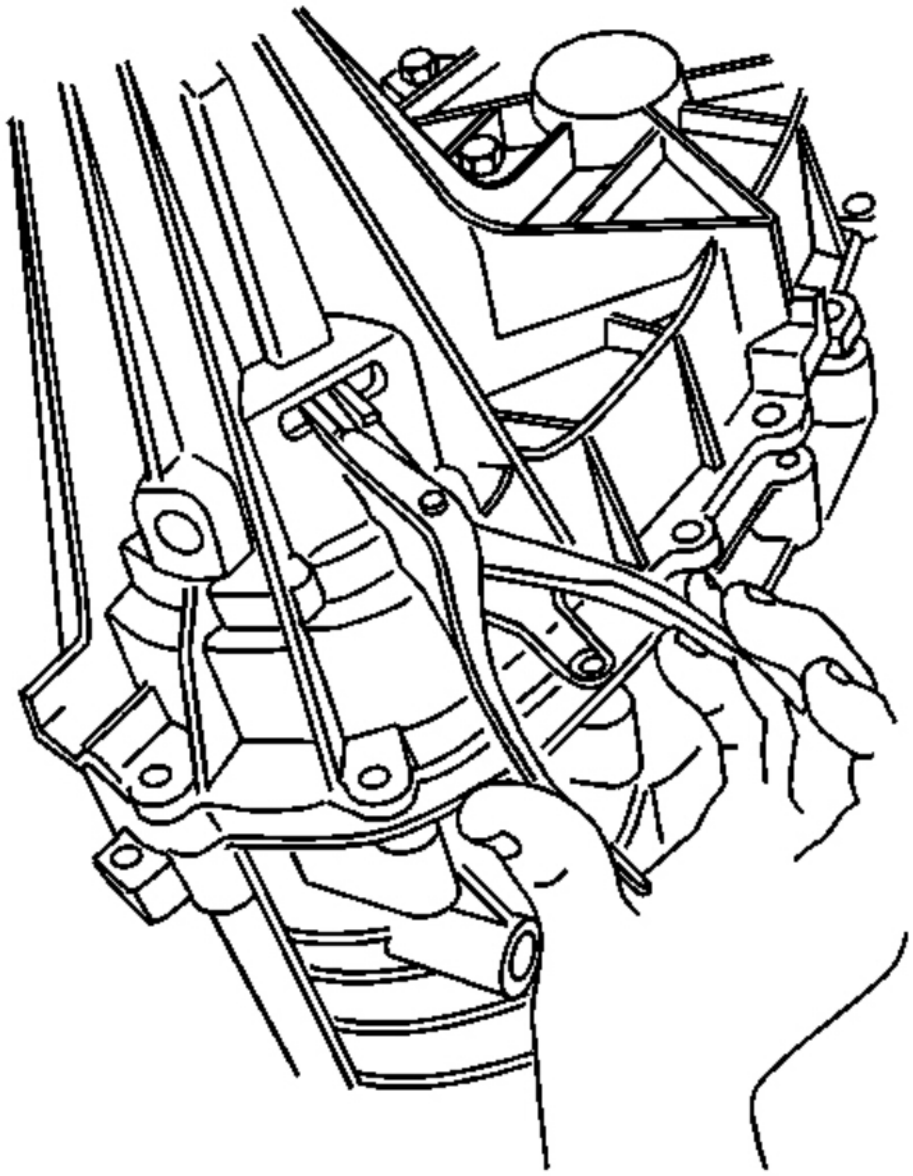


Fig. 218: Positioning Snap Ring Pliers In Access Opening
Courtesy of GENERAL MOTORS CORP.

89. Using a pair of snap ring pliers, open the retaining ring for the rear output shaft bearing.
90. Insert a rubber coated screwdriver into 1 of the speed sensor holes and lift up on the speed reluctor wheel, then seat the retaining ring.

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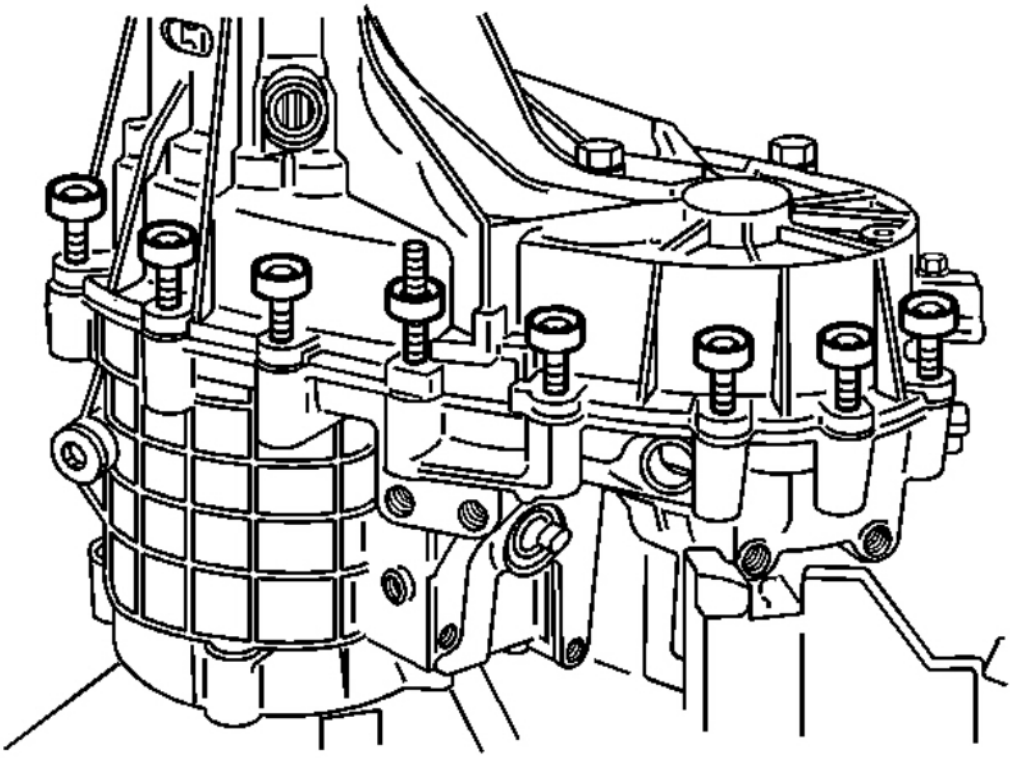


Fig. 219: View Of Case Half Bolts/Studs With Cup Washers
Courtesy of GENERAL MOTORS CORP.

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. Use only the transfer case bolts/studs with the cup style aluminum washer. 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.**

91. Install the case bolts with cup washers, and the brackets.

Tighten: Tighten the case bolts to 37 N.m (27 lb ft).

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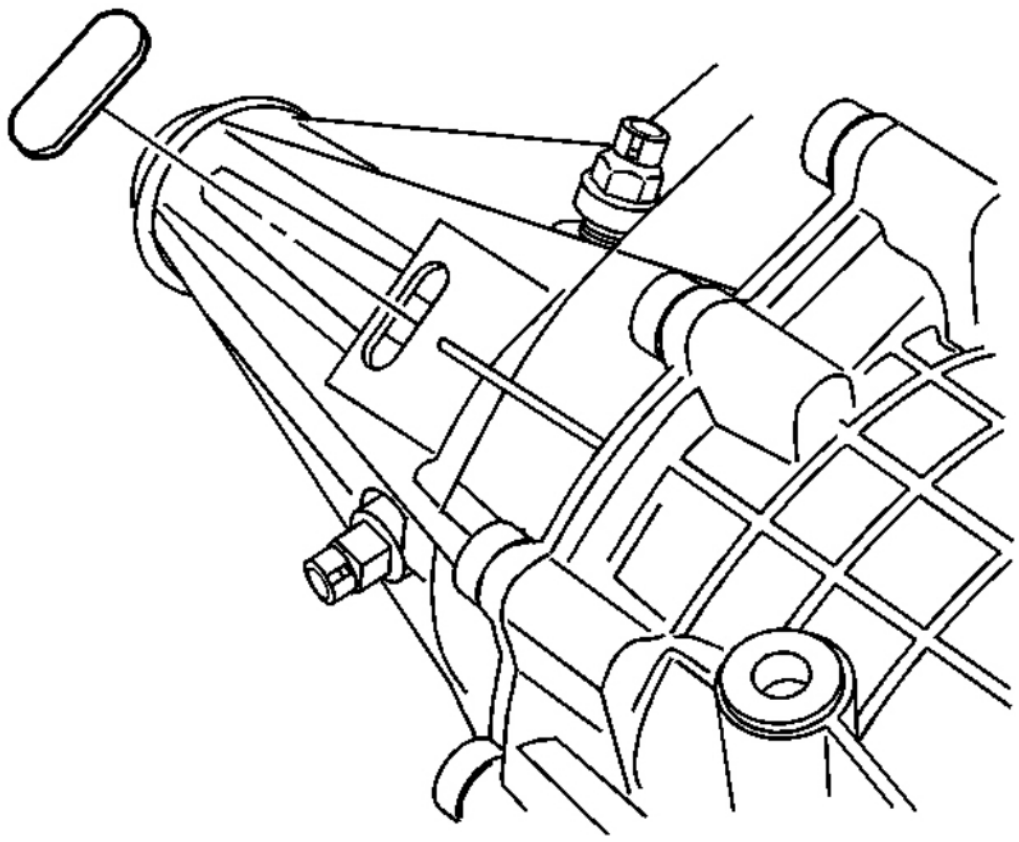


Fig. 220: Identifying Rubber Plug
Courtesy of GENERAL MOTORS CORP.

92. Install the access hole plug.

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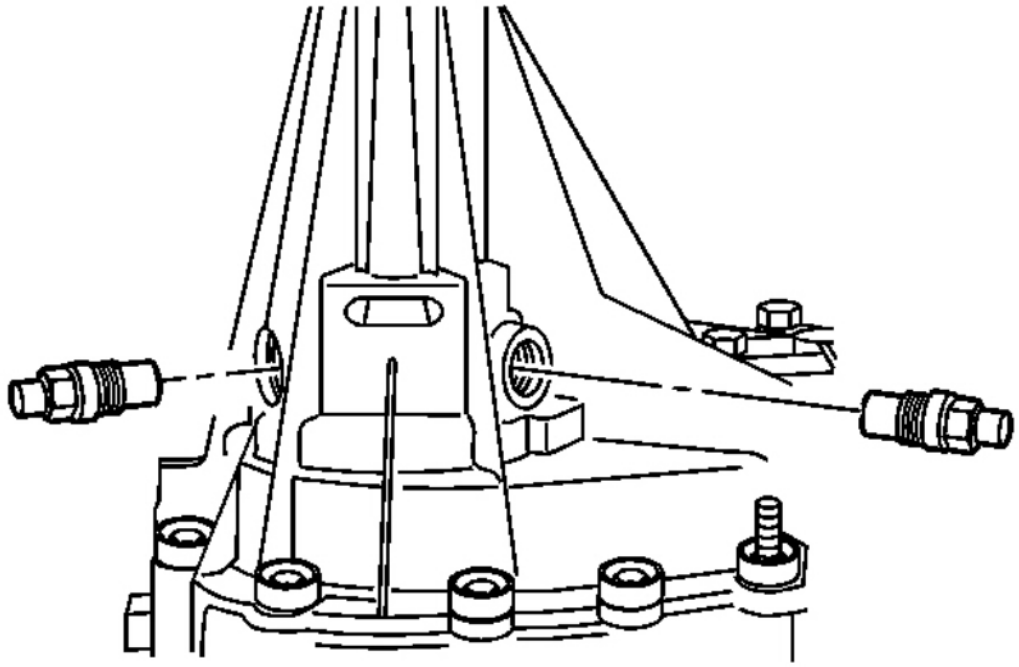


Fig. 221: View Of Left Rear & Right Rear Speed Sensor
Courtesy of GENERAL MOTORS CORP.

93. Install new O-ring seals on the vehicle speed sensors.
94. Lubricate the vehicle speed sensor O-ring seals with transfer case fluid.
95. Install the rear vehicle speed sensors.

Tighten: Tighten the speed sensor to 15 N.m (11 lb ft).

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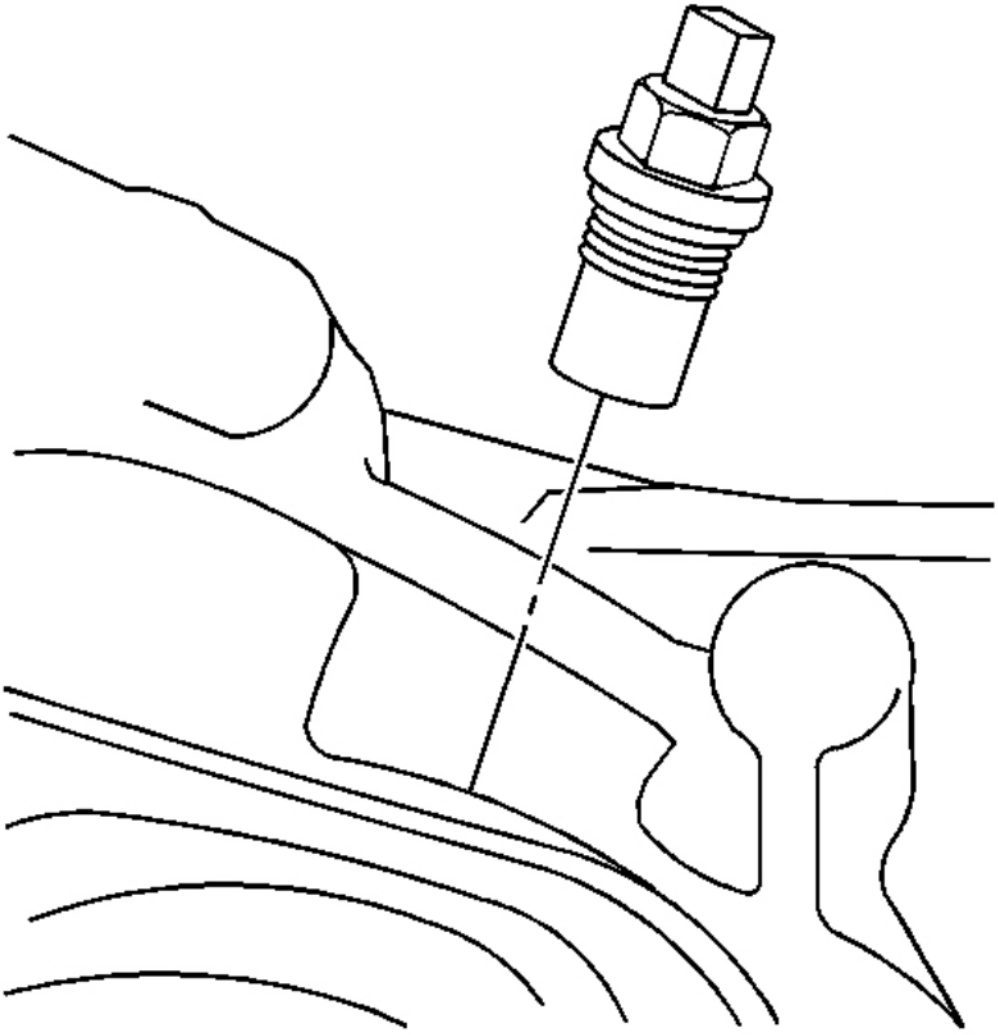


Fig. 222: View Of Vehicle Speed Sensor
Courtesy of GENERAL MOTORS CORP.

96. Install the front vehicle speed sensor.

Tighten: Tighten the speed sensor to 15 N.m (11 lb ft).

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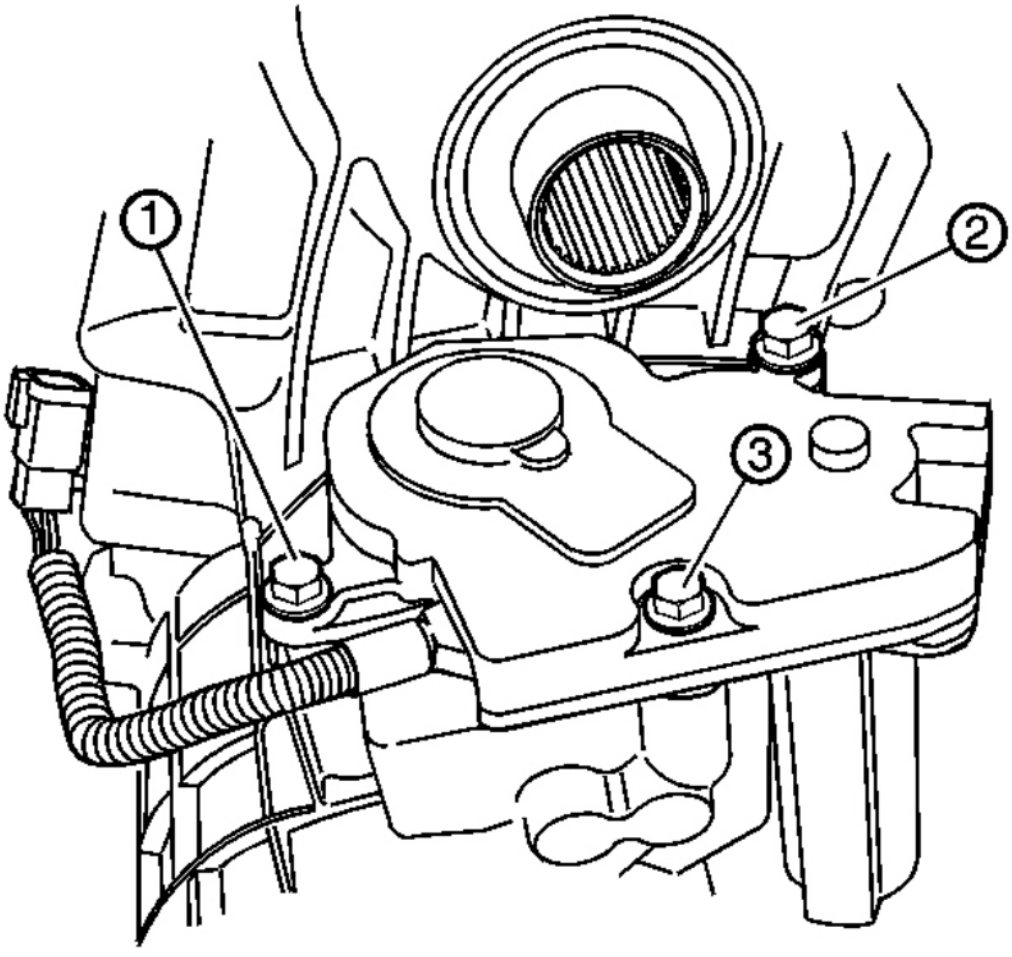


Fig. 223: View Of Encoder Motor Bolts Tightening Sequence
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: A new actuator encoder motor does not come with locating pins. Locating pins must be installed in the encoder motor, for proper operation.

97. Install the locating pins in the actuator encoder motor.
98. Install the actuator insulator gasket to the encoder motor.
99. Install the actuator encoder motor to the transfer case. Rotate the control actuator lever shaft to align to the encoder motor.
100. Install the mounting bolts for the actuator encoder motor.

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Tighten: Tighten the actuator encoder motor mounting bolts, in the sequence shown, to 20 N.m (15 lb ft).

101. Install the connector in the wiring harness bracket.

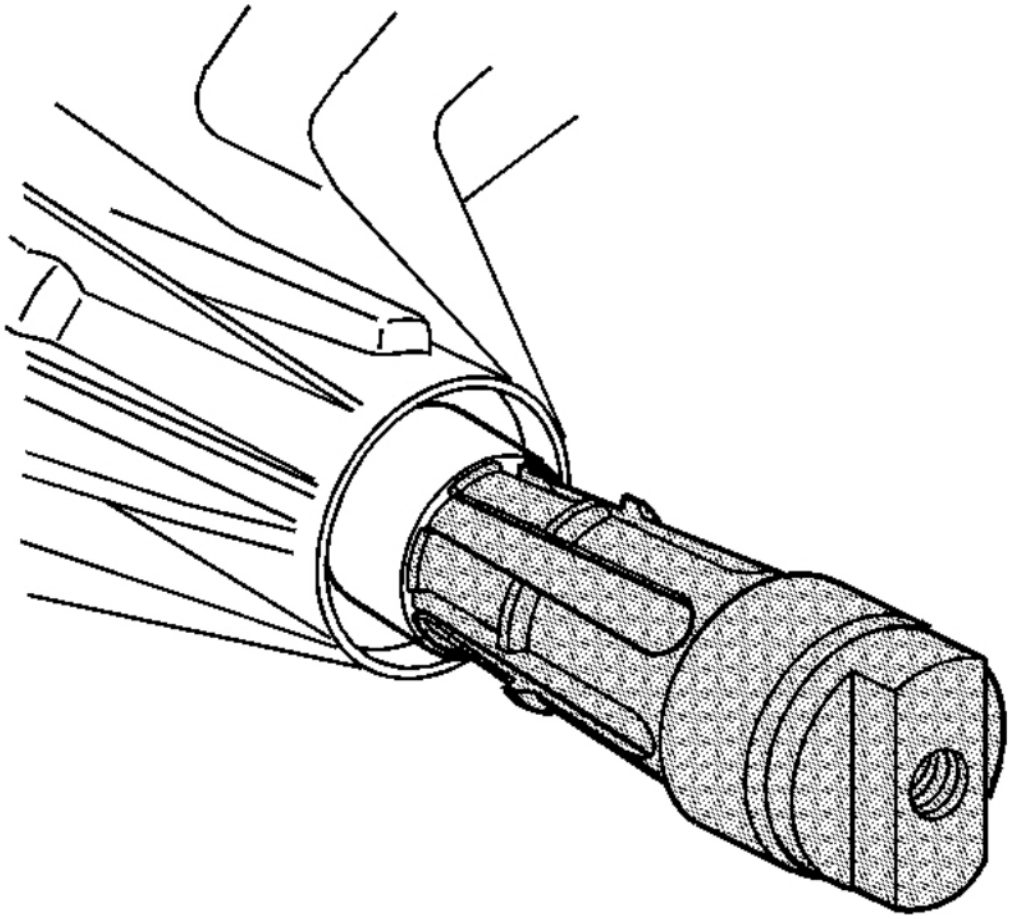


Fig. 224: Installing Rear Output Shaft Bushing
Courtesy of GENERAL MOTORS CORP.

102. Using the **J 45380** , install a new rear output shaft bushing. See **Special Tools**.
    1. Install the bushing on the finger section of the **J 45380** . See **Special Tools**.
    2. Install the finger section to the main body of the **J 45380** . See **Special Tools**.
    3. Position the bushing and tool to the case.
    4. Using a hammer and the **J 45380** , install the bushing. See **Special Tools**.

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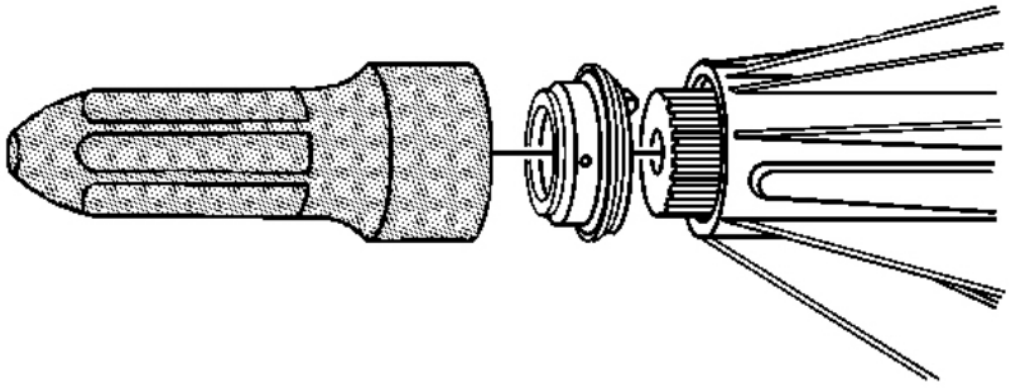


Fig. 225: Installing Output Shaft Seal
Courtesy of GENERAL MOTORS CORP.

103. Align the rear output shaft seal to the rear case, with the square tab up and the drain hole down.
104. Using the **J 37668-A** , install the rear output shaft seal. See **Special Tools**.

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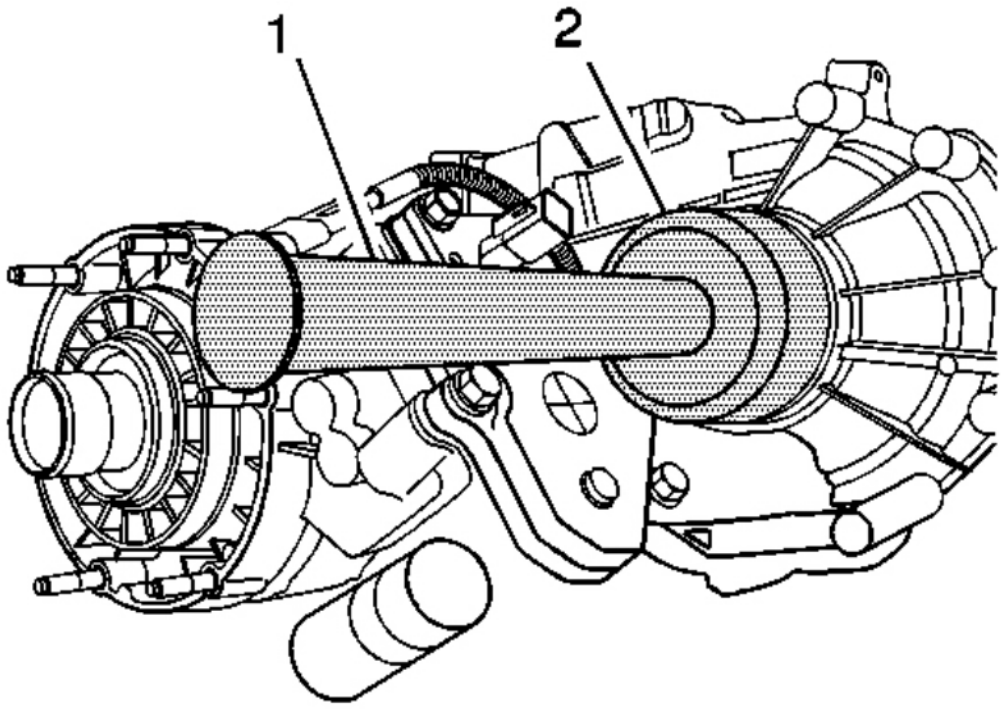


Fig. 226: J 8092 & J 43484
Courtesy of GENERAL MOTORS CORP.

105. Using the **J 43484** (2) and the **J 8092** (1), install the front output shaft seal.

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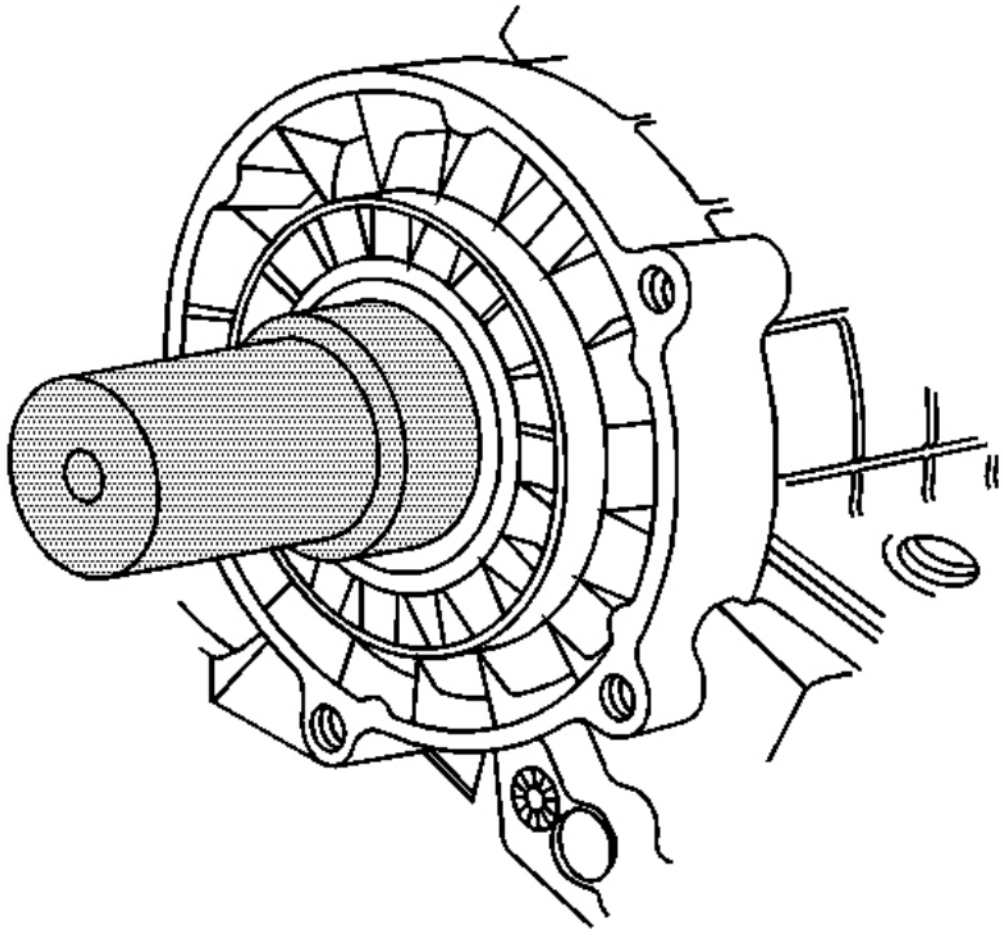


Fig. 227: Installing Transfer Case Input Shaft Seal
Courtesy of GENERAL MOTORS CORP.

106. Using the **J 42738** , install the input shaft seal.

DESCRIPTION AND OPERATION

TRANSFER CASE DESCRIPTION AND OPERATION

General Operation

The New Venture Gear model NVG 246 RPO NP8 transfer case is a 2 speed automatic, active, transfer case. The NVG 246 EAU provides 5 modes, Auto 4WD, 4HI, 4LO, 2HI and NEUTRAL. The Auto 4WD position

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allows the capability of an active transfer case, which provides the benefits of on-demand torque biasing wet clutch and easy vehicle tuning through software calibrations. The software calibrations allow more features such as flexible adapt ready position and clutch preload torque levels. The technology allows for vehicle speed dependent clutch torque levels to enhance the performance of the system. For example, the system is calibrated to provide 0-6.78 N.m (0-5 lb ft) of clutch torque during low speed, low engine torque operation, and predetermined higher torque for 40 km/h (25 mph) and greater. This prevents crow-hop and binding at low speeds and provides higher torque biases at higher vehicle speeds, in order to enhance stability.

Transfer Case Shift Control Switch

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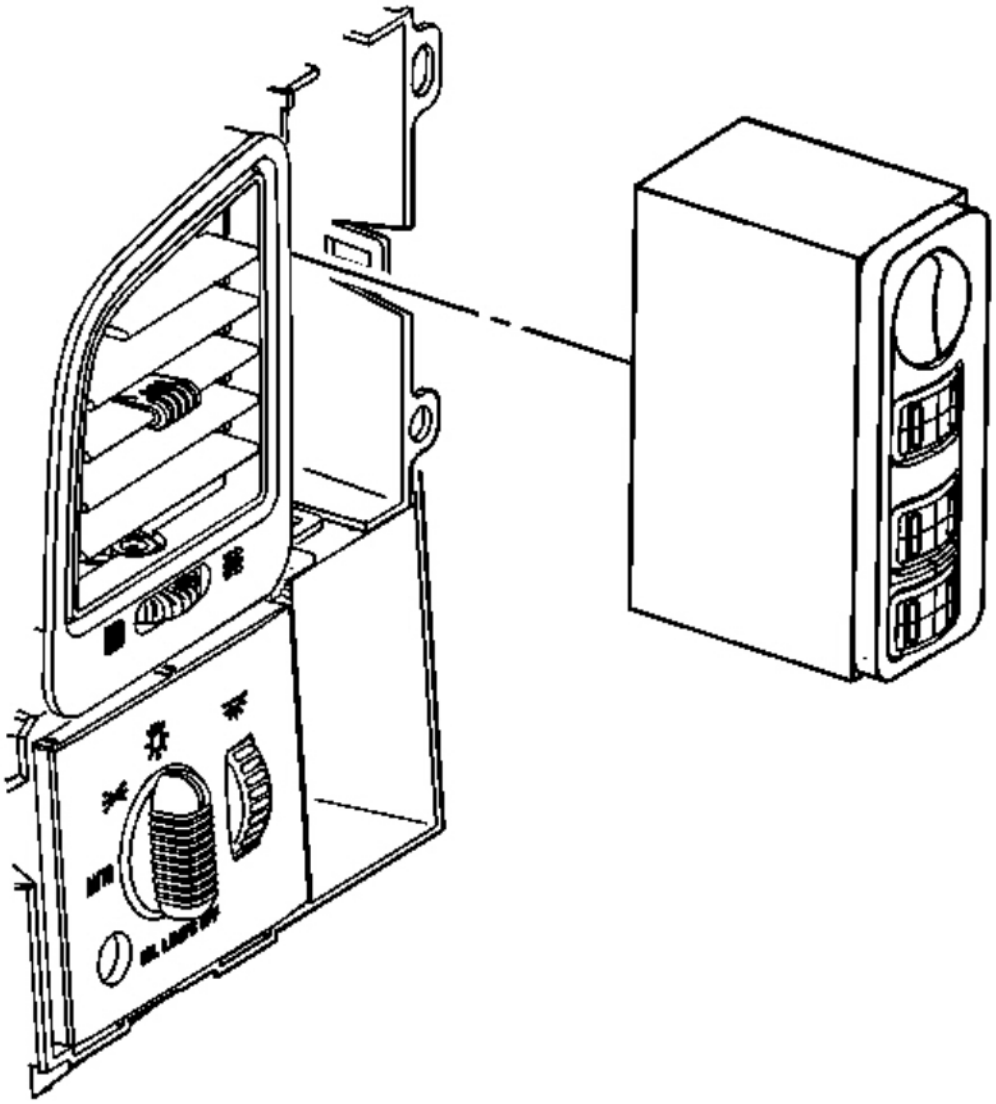


Fig. 228: Transfer Case Shift Control Switch
Courtesy of GENERAL MOTORS CORP.

The NVG 246 EAU transfer case features a 4 button shift control switch located on the instrument panel. When the ignition key is in the RUN position, the transfer case shift control module monitors the transfer case shift control switch to determine if the driver desires a new mode/range position. At a single press of the transfer case shift control switch, the lamp of the new desired position will begin flashing to inform the driver that the transfer case shift control module has received the request for a new mode/range position. The lamp will

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continue to flash until all shifting criteria has been met and the new mode/range position has been reached, or has been engaged. Once the new mode/range position is fully active, the switch indicator lamp for the new position will remain ON constantly.

During normal driving situations, the transfer case can operate in the Auto 4WD mode. In the Auto 4WD mode, the transfer case shift control module monitors rear wheel slip speed, based on the inputs from both the front and rear propshaft speed sensors. When the vehicle experiences a rear wheel slip condition, the transfer case shift control module sends a pulse width modulated (PWM) signal to an electronic motor, which is the transfer case encoder motor. This motor rotates the transfer case control actuator lever shaft, applying a clutch pack. This clutch pack is designed to deliver a variable amount of torque, normally delivered to the rear wheels, and transfers it to the front wheels. Torque is ramped up to the front wheels until the front propshaft speed sensor matches that of the rear propshaft speed sensor. Torque is ramped down to the front wheels. The process would repeat if rear wheel slip is detected again.

The NVG 246 EAU transfer case has the added feature of also providing the driver with 3 manual mode/range positions:

- 4HI - 4 Wheel Drive high range
- 2HI - 2 Wheel Drive high range
- 4LO - 4 Wheel Drive low range

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 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 rotating the transmission output shaft. NEUTRAL position may be obtained only if 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).
- The transfer case is in 2HI mode.

Once these conditions have been met, press and hold both the 2HI and 4LO buttons for 10 seconds. When the system completes the shift to NEUTRAL, the red NEUTRAL lamp will illuminate.

The NVG 246 EAU case halves are high-pressure die-cast magnesium. Ball bearings support the input shaft, the front output shaft, and the rear output shaft. A thrust bearing is located inside of the input shaft gear to support the front of the rear output shaft. The transfer case requires Auto Trac® II Fluid GM P/N 12378508 (Canadian P/N 10953626) which is blue in color. The fluid is designed for smooth clutch application. An oil pump, driven by the rear output shaft, pumps the fluid through the rear output shaft oil gallery to the clutch and bearings.

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There are 2 versions of the NVG 246 EAU, which depend on the transmission applications and vehicle applications. If the vehicle is equipped with a transmission RPO M30, the transmission splines in the input gear will have 27 teeth. With this application the planetary carrier assembly will have 3 pinion gears. If the vehicle is equipped with transmission RPO MT1 or MN8, the transmission splines in the input gear will have 32 teeth. The planetary carrier assembly on this application will have 6 pinion gears.

2WD Power Flow

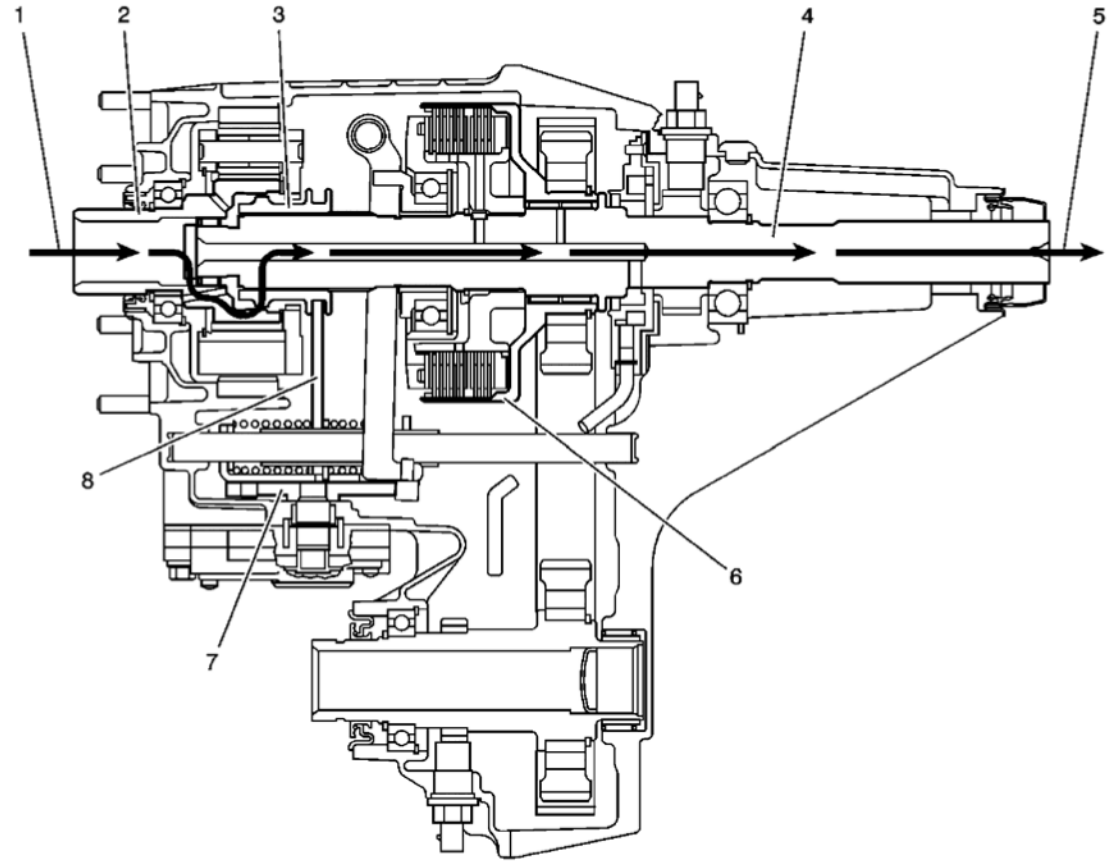


Fig. 229: 2WD Power Flow
Courtesy of GENERAL MOTORS CORP.

When the NVG 246 EAU is in the 2HI mode, the power flows from the transmission (1) to the input shaft gear (2). The input shaft gear (2) is connected to the rear output shaft (4) by the high/low range collar (3). The range collar (3) outer teeth are engaged with the input shaft gear (2) inner, high-speed position teeth. At the same time the range collar is slip splined to the rear output shaft (4). The rear output shaft (4) delivers the power flow to the rear propshaft (5). The position of the control actuator lever shaft (7) allows no clutch (6) engagement. The high/low range shift fork (8), is in the high-speed position on the control actuator lever shaft (7).

4HI and AUTO 4WD Power Flow

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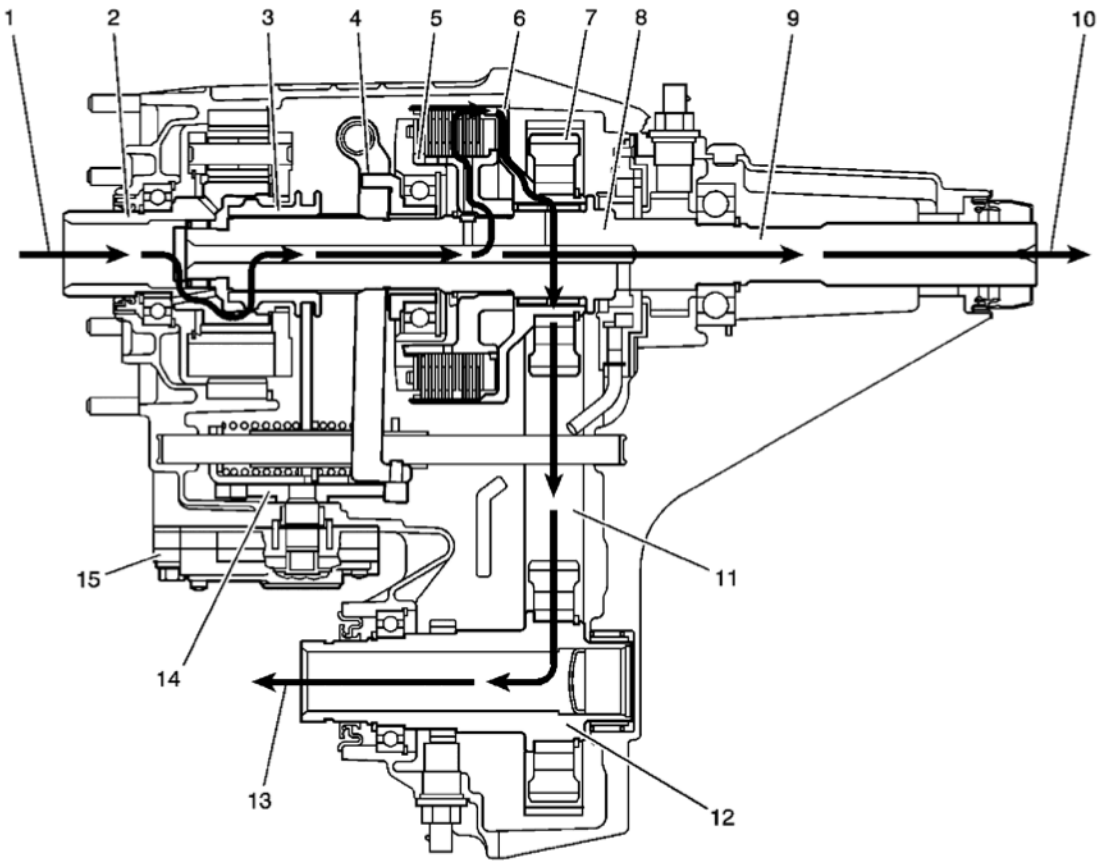


Fig. 230: 4HI & AWD Power Flow
Courtesy of GENERAL MOTORS CORP.

In the 4HI mode, the power flow to the rear propshaft (10) is the same as it is in the 2HI mode. To deliver power flow to the front propshaft (13) during the 4HI position, the transfer control module commands the encoder motor (15) to apply the clutch to a calibrated torque. The encoder motor (15) turns the control actuator lever shaft (14). A brake in the encoder motor (15) holds the control actuator lever shaft (14) in the full clutch position. The control actuator lever shaft (14) is cam designed and the cam action moves the clutch lever (4). The clutch lever (4) pivots on the clutch lever pivot studs and moves toward the clutch apply plate, to engage the clutch. As more pressure is applied to the clutch apply plate, the clutch discs are compressed. Using inner clutch discs, which are engaged with the clutch hub (5), and the outer clutch discs, which are engaged with the clutch housing (6), the power flow is delivered to the clutch housing (6). The clutch hub (5) is splined to the rear output shaft (9), and the clutch housing (6) rotates on a needle bearing on the rear output shaft (9). The chain drive sprocket (7) is splined to the clutch housing (6). The power flows from the drive sprocket (7), through the chain (11), to the chain driven sprocket. The driven sprocket is splined to the front output shaft (12). The power flow is delivered to the front propshaft (13) through the front output shaft (12).

During the Auto 4WD mode, the power flow is the same as it is in the 4HI mode. Except, during the Auto 4WD mode, the encoder motor (15) rotates the control actuator shaft lever (14) to the correct torque level positions. Rotating the control actuator (14) to the various positions changes the clutch torque level. When a difference of front propshaft (13) to rear propshaft (10) speed is recognized, the transfer case control modules command for

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more, or less clutch torque.

4LO Power Flow

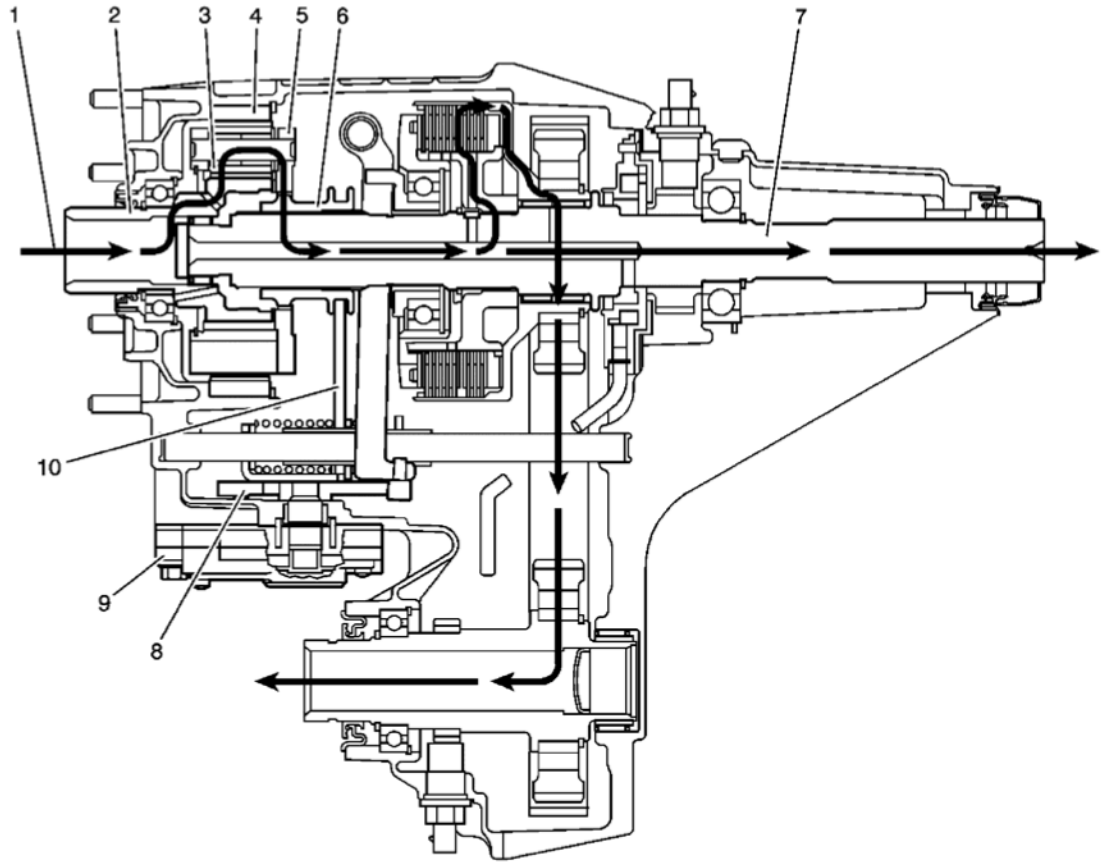


Fig. 231: 4LO Power Flow
Courtesy of GENERAL MOTORS CORP.

When shifting the transfer case to the 4LO mode, it commands the encoder motor (9) to turn the control actuator lever shaft (8), to move the high/low range shift fork (10). The shift fork (10) moves the high/low range collar (6), which is slip splined on the rear output shaft (7) toward the rear of the transfer case. The range collar (6) outer teeth disengage from the input shaft gear (2) inner teeth. The range collar (6) outer teeth then engage in the planetary carrier (5) teeth. The power flow is now from the input shaft gear (2) planetary teeth to the planetary gears (3) in the carrier. Rotating the planetary gears (3), which are engaged in the annulus gear (4), the planetary carrier (5) rotates. The planetary carrier (5) engaged to the range collar (6), drives the rear output shaft (7), providing a 2.72:1 reduction to the speed of the rear output shaft (7). The power flow to the front propshaft is the same as it is in the 4HI.

A NEUTRAL position is obtained when the range collar (6) is not engaged to the input shaft gear (2) or the planetary carrier (5). NEUTRAL position is used for towing the vehicle.

Service 4WD Indicator

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The Service 4WD indicator is an integral part of the cluster and cannot be serviced separately. This lamp is used to inform the driver of the vehicle that a transfer case system malfunctioned. The Service 4WD indicator is controlled by the transfer case shift control module via Class 2.

Transfer Case Encoder

The encoder is mounted to the transfer case motor/encoder assembly and is replaced as an assembly. The encoder converts the shift detent lever shaft position, representing a mode or range, into an electrical signal input to the transfer case shift control module. The module detects what position the transfer case is in by monitoring the voltage returned on the encoder signal circuit. This voltage translates into AUTO 4WD, 2HI, 4HI, NEUTRAL, and 4LO or in transition between gears.

Transfer Case Motor/Encoder

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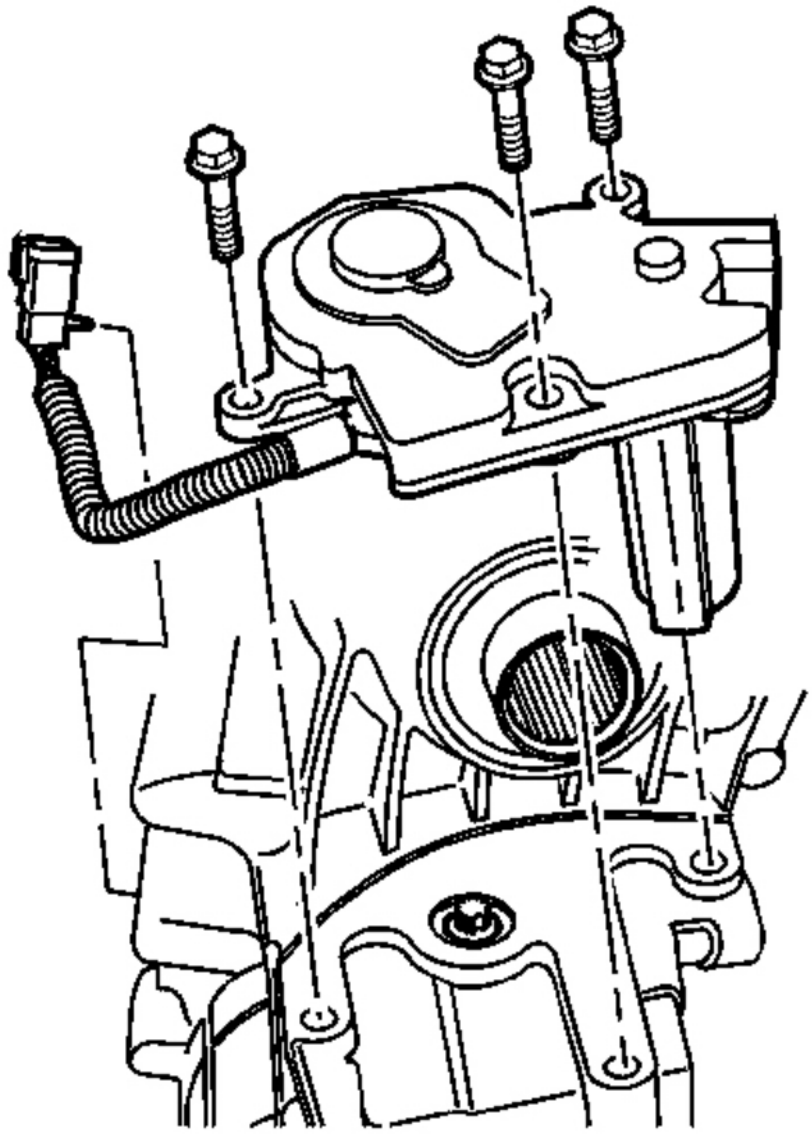


Fig. 232: Transfer Case Motor/Encoder
Courtesy of GENERAL MOTORS CORP.

The transfer case motor/encoder consists of a permanent magnet DC motor and gear reduction assembly. It is located on the left hand side, driver's 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. The motor/encoder is controlled with a PWM signal by the transfer case shift control module. This circuit consists of a driver on both

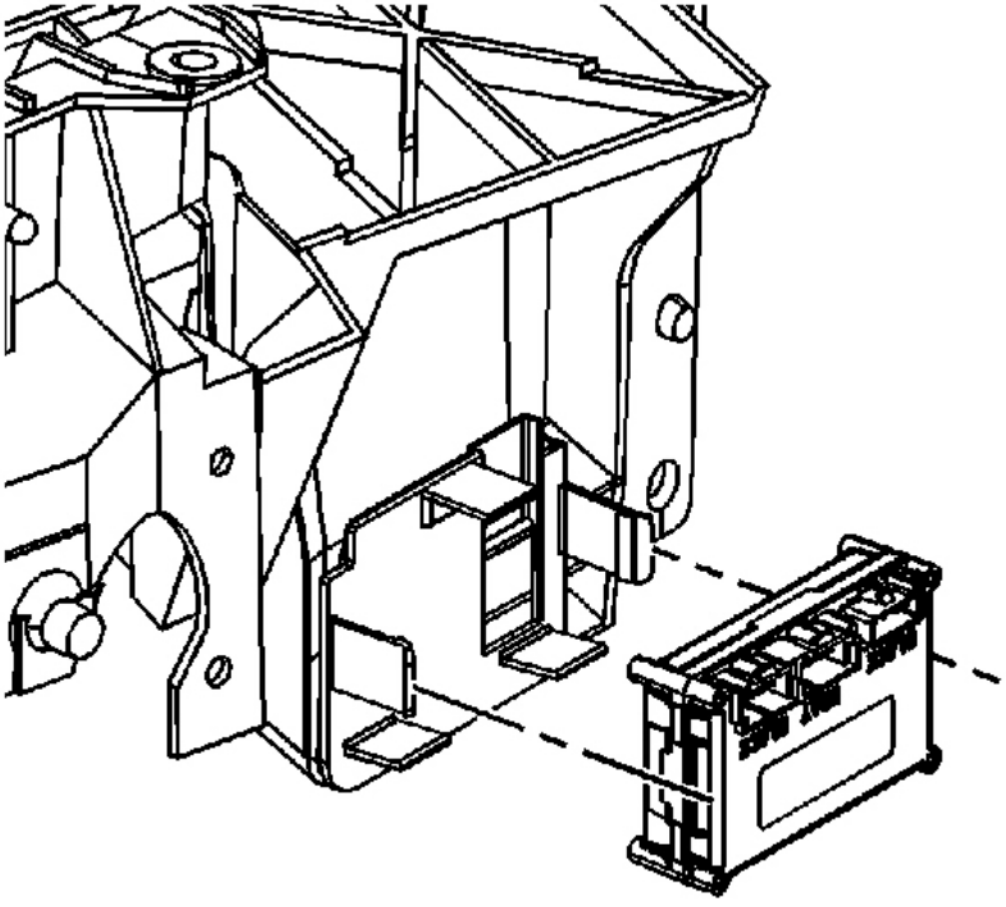
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the Motor A and Motor B circuits. The encoder motor is bi-directional in order to allow the motor to shift the transfer case from 2HI or 4HI to NEUTRAL and 4LO positions.

Transfer Case Motor Lock

The transfer case motor lock is used to provide a 2HI, 4HI, and 4LO lock-up feature. When the lock circuit is energized, the transfer case encoder motor is allowed to turn. When the transfer case is placed 2HI, 4HI, or 4LO the motor lock circuit is de-energized and the lock is applied. This assures that the transfer case remains in the current gear position until a new gear position is requested. When AUTO 4WD is selected, the motor lock remains applied until an adaptive mode, torque being applied to the front propshaft, is required. During an adaptive mode the motor lock circuit is energized and the motor lock is released, enabling the encoder motor to turn and apply or release torque at the front propshaft.

Transfer Case Shift Control Module



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Fig. 233: 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 based on axle ratio, transmission, tire size, and engine. The system does not know which calibration to use without this information. When the vehicle is in the AUTO 4WD mode, the transfer case shift control module monitors the speed of the front and rear propshaft, in order to detect wheel slippage. When wheel slippage is detected, the module applies a clutch pack contained inside the transfer case. This clutch pack is used to lock-in and apply the front propshaft, transferring torque to the front wheels. The clutch pack is applied by a motor/encoder assembly. When slip is no longer detected by the transfer case shift control module, the clutch is no longer applied.

Transfer Case Speed Sensors

There are 3 speed sensors on the automatic transfer case (ATC), 2 on the rear output shaft and 1 on the front output shaft. Each speed sensor is a permanent magnet generator. The permanent magnet generator produces a pulsing AC voltage. The AC voltage level and number of pulses increases as speed increases.

Vehicle Speed Sensor

1 of the 2 speed sensors on the rear output shaft is the vehicle speed sensor (VSS) input to the powertrain control module (PCM). The PCM sends this information to the transfer case shift control module via the Class 2 serial data bus.

Rear Propshaft Speed Sensor

The transfer case shift control module converts the pulsating AC voltage from the rear transfer case speed sensor to a rear propshaft speed in RPM to be used for calculations. The rear propshaft speed can be displayed with a scan tool.

Front Propshaft Speed Sensor

The transfer case shift control module converts the pulsating AC voltage from the front transfer case speed sensor to front propshaft speed in RPM to be used for calculations, and to monitor the difference between the front and rear sensor speed. It is also used in the AUTO 4WD mode to determine the amount of slip and the percent of torque to apply to the front axle. The front propshaft speed can be displayed with a scan tool.

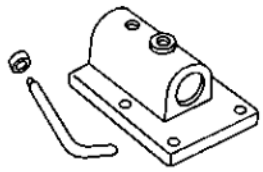
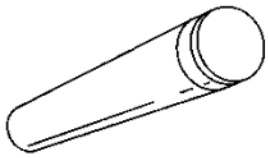
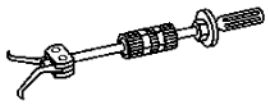
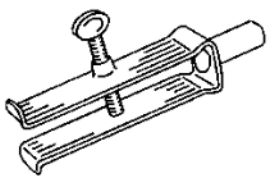
SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

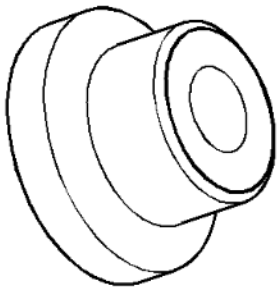
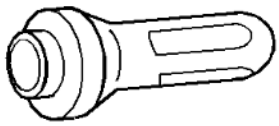
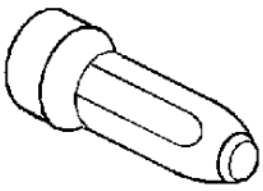
Special Tools

Illustration	Tool Number/Description

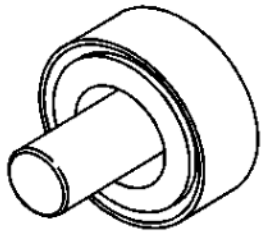
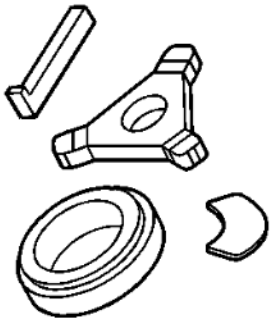
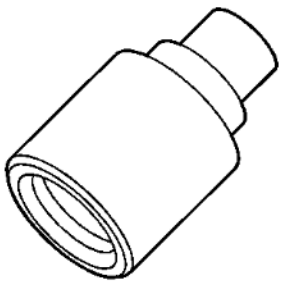
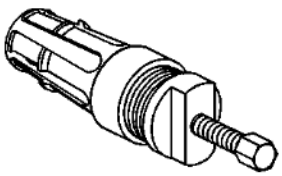
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	J 3289-20 Holding Fixture
	J 8092 Driver Handle
	J 22873 Mainshaft Bushing Installer
	J 23907 Slide Hammer with Bearing Adapter
	J 26941 Bushing and Bearing Remover - 3-4 inch

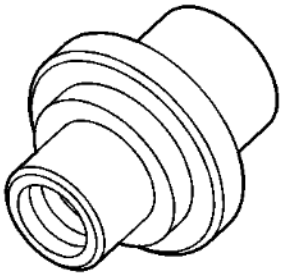
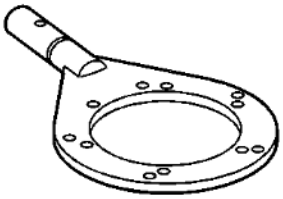
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	J 36370 Drive Sprocket Needle Bearing Installer
	J 36850 Transjel Lubricant
	J 37668-A Output Shaft Seal Installer (4401 and 4470 Transfer Case)
	J 42738 Seal Installer

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	J 43484 Front Output Shaft Seal Installer
	J 44295 Clutch Pack Shimming Kit
	J 45239 Needle Bearing Installer
	J 45380 Transfer Case Rear Bushing Remover and Installer

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	J 45383 Input Gear Pilot Bearing Installer
	J 45759 Assembly Fixture

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