SPECIFICATIONS

FASTENER SPECIFICATIONS

Transfer Case Front Case Half and Components

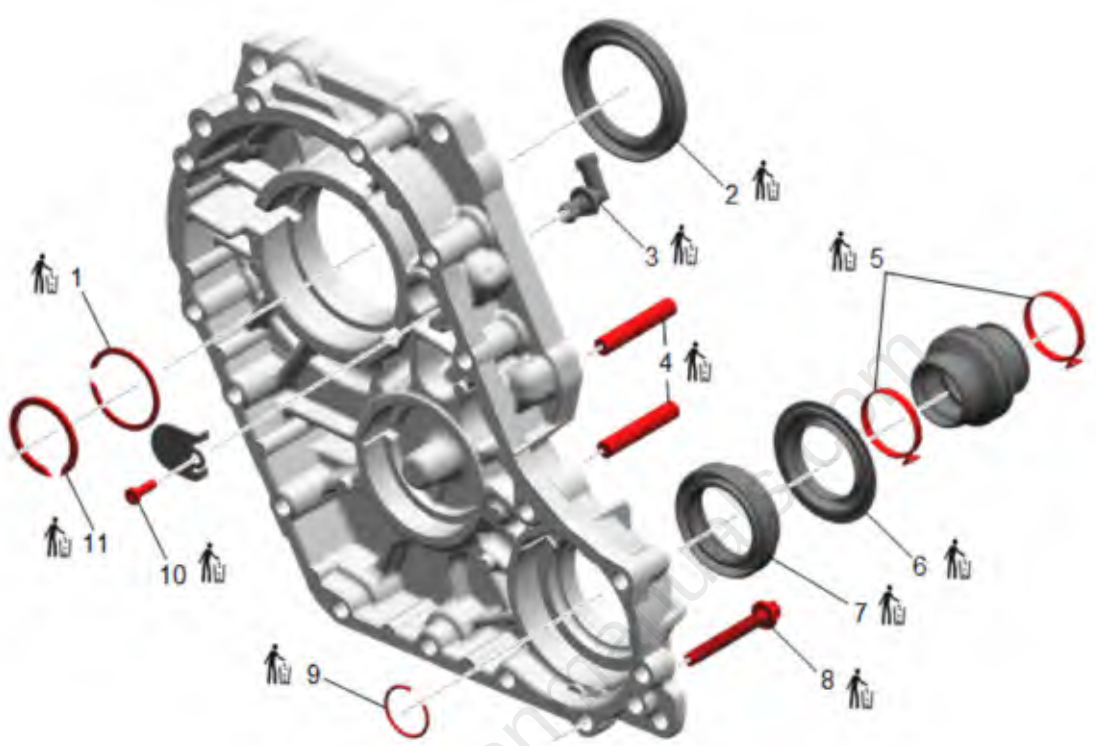


Fig. 1: Exploded View Of Transfer Case Front Case Half Components
Courtesy of GENERAL MOTORS COMPANY

Transfer Case Front Case Half and Components

Callout	Component Name	Single Use Fastener/Component	Thread Locking Adhesive Required	Specification	Procedure
				Metric (English)	
1	Transfer Case Two/Four Wheel Drive Clutch Retaining Ring	Yes	-	-	Transfer Case Assemble
2	Transfer Case Input Shaft Seal	Yes	-	-	Transfer Case Assemble
3	Transfer Case Vent	Yes	-	-	Transfer Case Assemble
4	Transfer Case Stud	Yes	Yes	11 N.m (97 lb in)	Transfer Case Assemble
5	Transfer Case Front Output Shaft Boot Clamp [2x]	Yes	-	-	Transfer Case Assemble
6	Transfer Case Rear Output Shaft Oil Slinger	Yes	-	-	Transfer Case Assemble
7	Transfer Case Rear Output Shaft Seal	Yes	-	-	Transfer Case Assemble

Callout	Component Name	Single Use Fastener/Component	Thread Locking Adhesive Required	Specification	Procedure
				Metric (English)	
8	Transfer Case Half Bolt [15x]	Yes	-	36 N.m (27 lb ft)	Transfer Case Assemble
9	Transfer Case Output Shaft Ring	Yes	-	-	Transfer Case Assemble
10	Transfer Case Vent Baffle Bolt	Yes	-	8 N.m (71 lb in)	Transfer Case Assemble
11	Transfer Case Rear Output Shaft Rear Bearing Retaining Ring	Yes	-	-	Transfer Case Assemble

Transfer Case Rear Case Half and Components

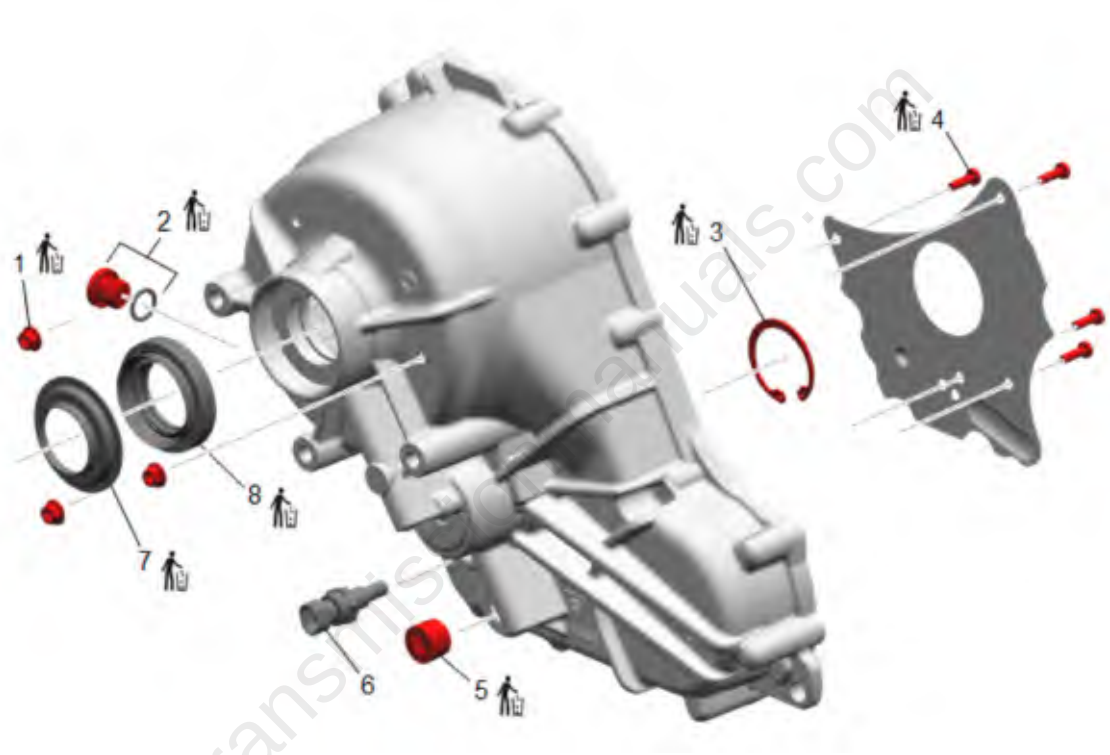


Fig. 2: Exploded View Of Transfer Case Rear Case Half Components
Courtesy of GENERAL MOTORS COMPANY

Transfer Case Rear Case Half and Components

Callout	Component Name	Single Use Fastener/Component	Thread Locking Adhesive Required	Specification	Procedure
				Metric (English)	
1	Transfer Case Two/Four Wheel Drive Clutch Coil Nut [3x]	Yes	-	10 N.m (89 lb in)	Transfer Case Assemble
2	Transfer Case Fill Plug	Yes	-	15 N.m (11 lb ft)	Transfer Case Assemble
3	Transfer Case Oil Pump Retaining Ring	Yes	-	-	Transfer Case Assemble
4	Transfer Case Oil Pump Bolt	Yes	-	15 N.m (11 lb ft)	Transfer Case Assemble

Callout	Component Name	Single Use Fastener/Component	Thread Locking Adhesive Required	Specification	Procedure
				Metric (English)	
5	Transfer Case Drain Plug	Yes	Yes	25 N.m (18 lb ft)	Transfer Case Assemble
6	Transfer Case Fluid Temperature Sensor	-	-	22 N.m (16 lb ft)	Transfer Case Assemble
7	Transfer Case Rear Output Shaft Oil Slinger	Yes	-	-	Transfer Case Assemble
8	Transfer Case Rear Output Shaft Seal	Yes	-	-	Transfer Case Assemble

Transfer Case Vibration Dampener



Transfer Case Vibration Dampener

Callout	Component Name	Single Use Fastener/Component	Thread Locking Adhesive Required	Specification	Procedure
				Metric (English)	
1	Transfer Case Vibration Dampener Bolt [3x]	Yes	-	36 N.m (27 lb ft)	Transfer Case Assemble

APPROXIMATE FLUID CAPACITIES

Application	Specification	
	Metric	English
Transfer Case - BW4475		
Transfer Case Fluid - Mobil LT	0.78 L	0.80 qt

TRANSFER CASE MECHANICAL SPECIFICATIONS

Application	Specification	
	Metric	English
Clutch Coil Resistance	2.5 - 3.5 ohms @ 20B°C (68B°F)	

SPACER AND SHIM SPECIFICATIONS

Application	Specification		Stamp
	Metric	English	
Transfer Case All-Wheel Drive Clutch Shim	4.50 - 4.60	0.177 - 0.181	79
	4.70 - 4.80	0.185 - 0.189	82
	4.90 - 5.00	0.193 - 0.197	83
	5.10 - 5.20	0.200 - 0.205	84
	5.30 - 5.40	0.209 - 0.213	85
	5.50 - 5.60	0.216 - 0.220	86
	5.70 - 5.80	0.224 - 0.228	87

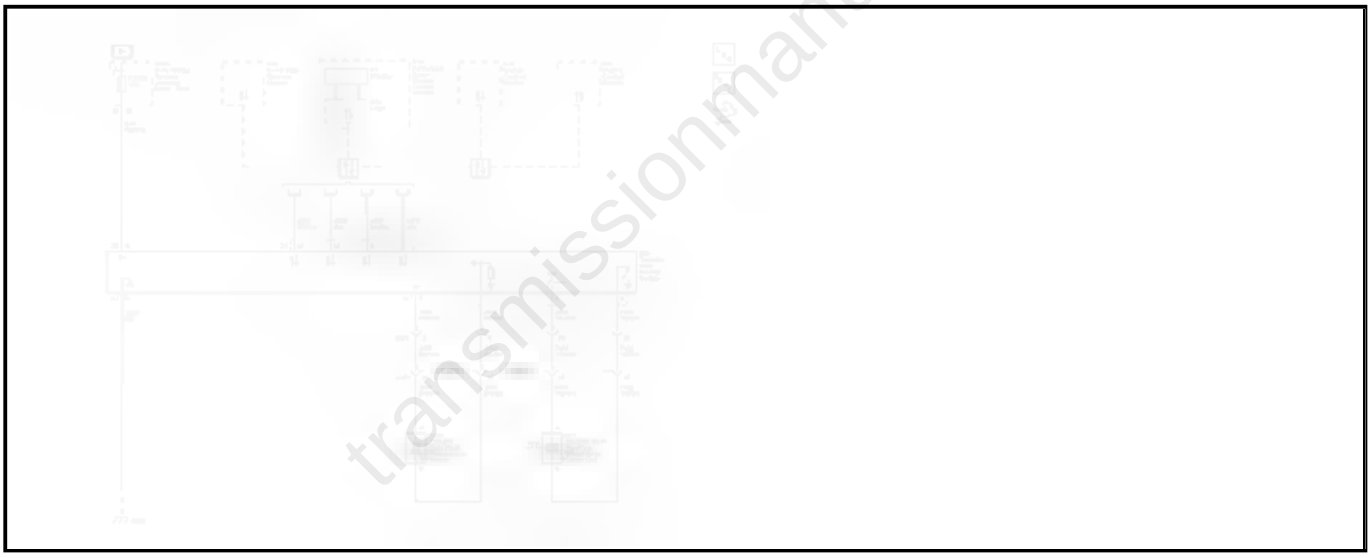
ADHESIVES, FLUIDS, LUBRICANTS, AND SEALERS

Application	Type of Material	GM Part Number	
		United States	Canada
Case Half Sealing Surfaces	Sealant	12346286	10953472
Oil Drain Plug Threads	Sealant	12346004	10953480
Oil Fill Plug Threads	Sealant	12346004	10953480
Transfer Case Fluid - Mobil LT	Transfer Case Fluid	88861950	88861951

SCHEMATIC WIRING DIAGRAMS

ALL-WHEEL DRIVE WIRING SCHEMATICS

Transfer Case Control Module (F46)



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TRANSFER CASE DISASSEMBLED VIEW

FRONT CASE HALF AND COMPONENTS

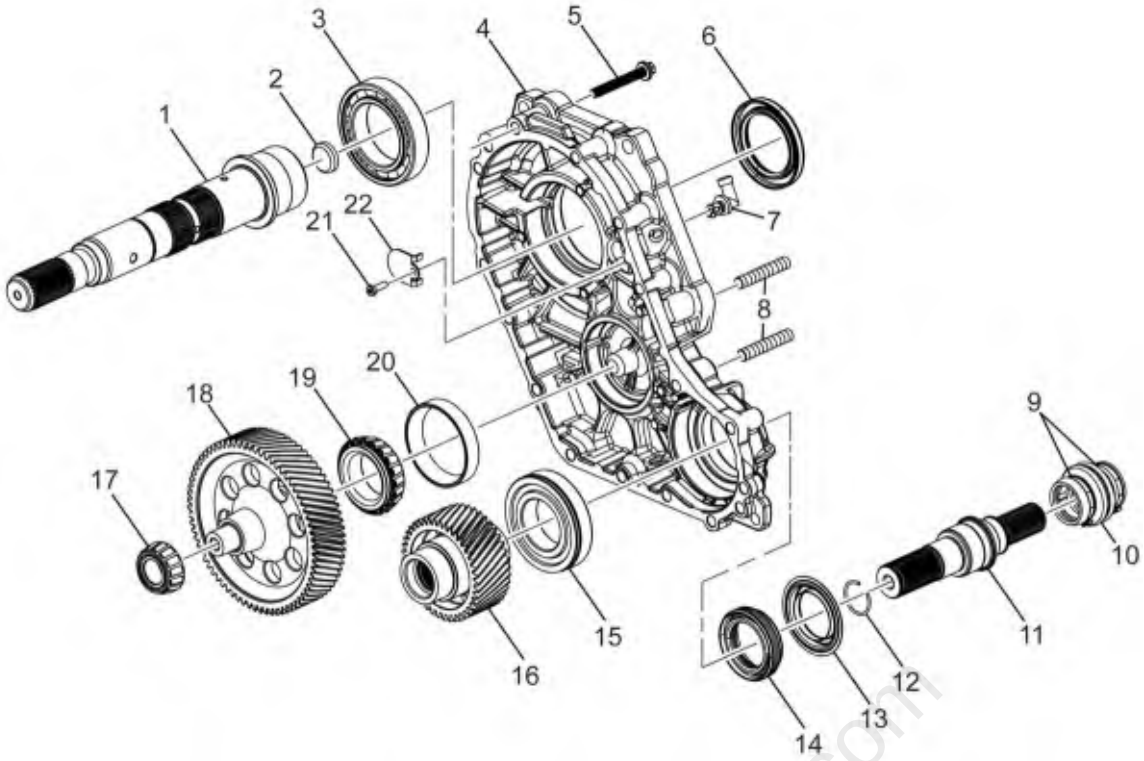


Fig. 3: Exploded View Of Front Case Half Components
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Transfer Case Input Shaft
2	Transfer Case Input Shaft Bore Plug
3	Transfer Case Input Shaft Bearing
4	Transfer Case Front Case Half
5	Transfer Case Half Bolt [15x]
6	Transfer Case Input Shaft Seal
7	Transfer Case Vent
8	Transfer Case Stud [2x]
9	Transfer Case Front Output Shaft Boot Clamp [2x]
10	Transfer Case Front Output Shaft Boot
11	Transfer Case Output Shaft
12	Transfer Case Output Shaft Ring
13	Transfer Case Front Output Shaft Oil Slinger
14	Transfer Case Front Output Shaft Seal
15	Transfer Case Front Output Shaft Front Bearing
16	Transfer Case Front Output Shaft Gear
17	Transfer Case Idler Gear Rear Bearing
18	Transfer Case Idler Gear
19	Transfer Case Idler Gear Front Bearing
20	Transfer Case Idler Gear Front Bearing Race
21	Transfer Case Vent Baffle Bolt
22	Transfer Case Vent Baffle

REAR CASE HALF AND COMPONENTS

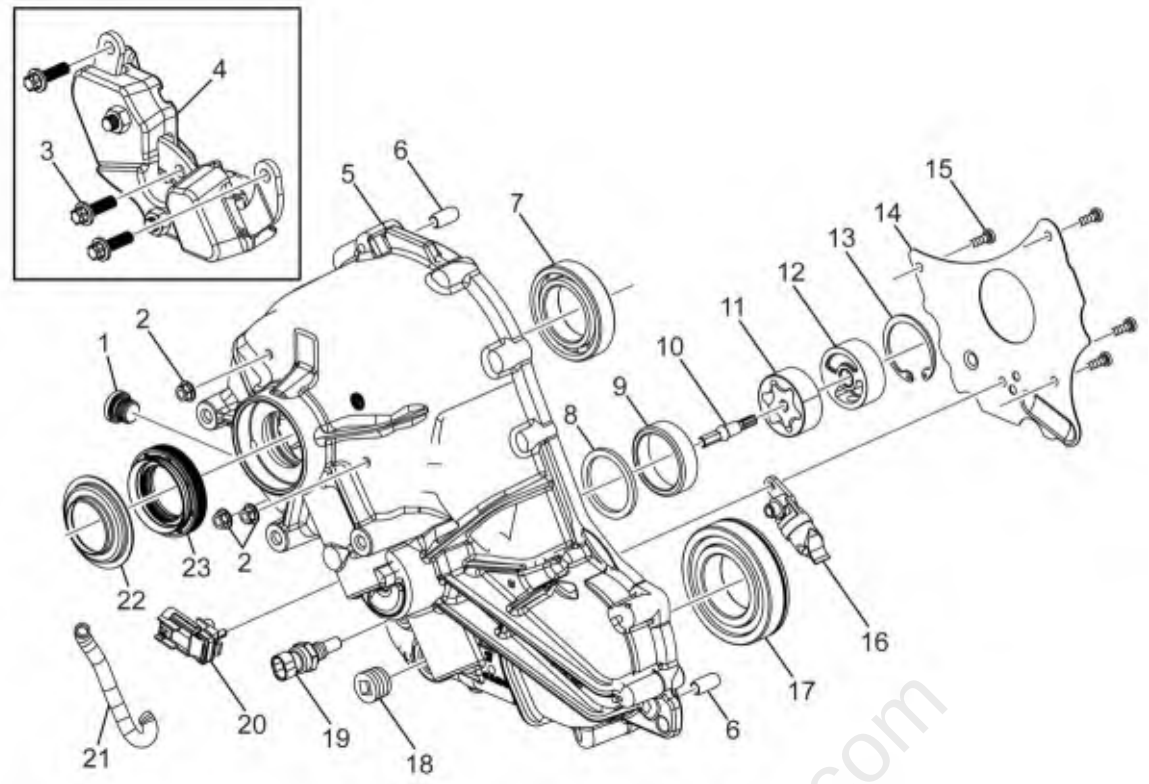


Fig. 4: Exploded View Of Rear Case Half Components
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Transfer Case Oil Fill Plug
2	Transfer Case Two/Four Wheel Drive Clutch Coil Nut [3x]
3	Transfer Case Vibration Dampener Bolt [3x]
4	Transfer Case Vibration Dampener
5	Transfer Case Rear Case Half
6	Transfer Case Half Locating Pin [2x]
7	Transfer Case Rear Output Shaft Rear Bearing
8	Transfer Case Idler Gear Bearing Shim
9	Transfer Case Front Output Shaft Rear Bearing
10	Transfer Case Oil Pump Shaft
11	Transfer Case Oil Pump
12	Inlet Pump Port
13	Transfer Case Oil Pump Retaining Ring
14	Transfer Case Separator Plate
15	Transfer Case Oil Pump Bolt [4x]
16	Transfer Case Oil Pump Screen
17	Transfer Case Idler Gear Rear Bearing Race
18	Transfer Case Oil Drain Plug
19	Transfer Case Fluid Temperature Sensor
20	Wiring Harness Connector
21	Conduit
22	Transfer Case Rear Output Shaft Oil Slinger
23	Transfer Case Rear Output Shaft Seal

INTERNAL COMPONENTS

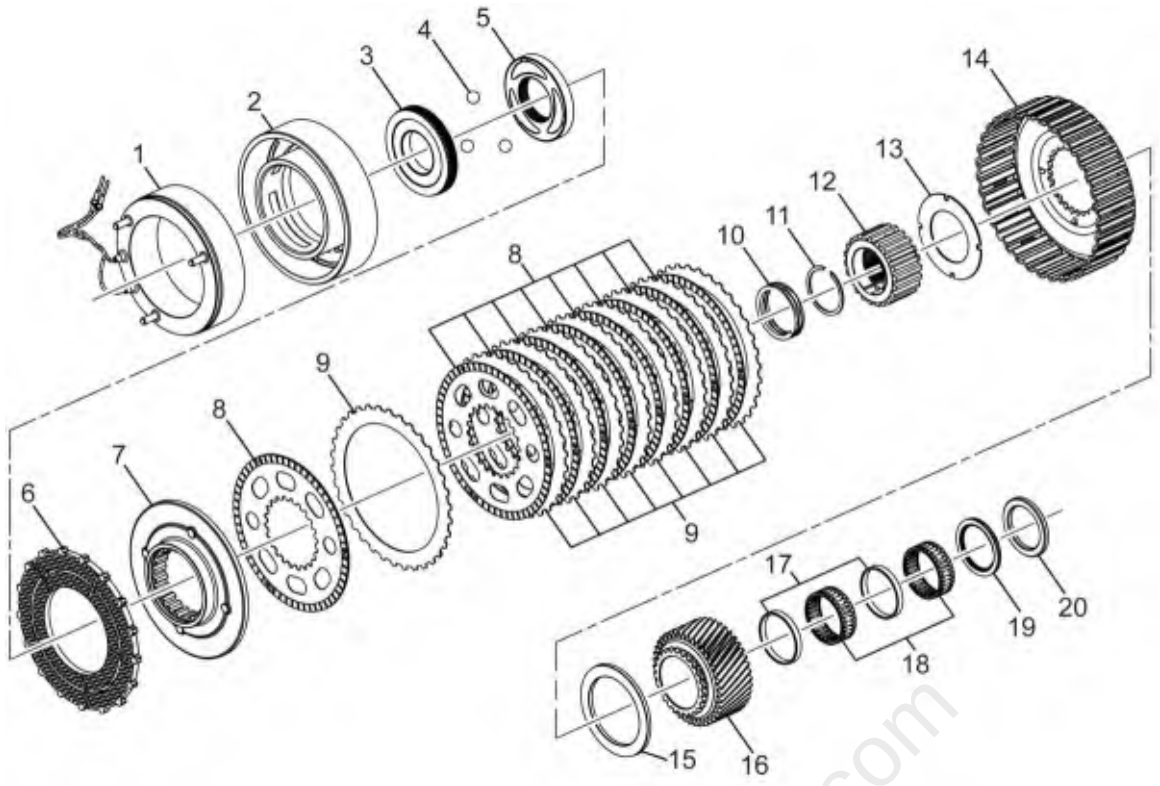


Fig. 5: Exploded View Of Internal Components
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Transfer Case Two/Four Wheel Drive Clutch Coil
2	Transfer Case Two/Four Wheel Drive Clutch Coil Housing
3	Cam
4	Transfer Case Scissor Lever Ball [3x]
5	Transfer Case Scissor Mechanism Lever
6	Transfer Case Armature
7	Transfer Case Pressure Plate
8	Transfer Case Friction Plate
9	Transfer Case Clutch Plate
10	Transfer Case Four Wheel Drive Clutch Pressure Plate Spring
11	Transfer Case Rear Output Shaft Rear Bearing Retaining Ring
12	Gear
13	Transfer Case Front Output Shaft Driven Sprocket Spacer
14	Transfer Case High/Low Clutch Housing
15	Transfer Case Input Shaft Washer
16	Transfer Case Input Shaft Gear
17	Transfer Case Front Output Shaft Drive Sprocket Spacer [2x]
18	Transfer Case Front Output Shaft Drive Sprocket Bearing [2x]
19	Transfer Case Four Wheel Drive Clutch Housing Bearing
20	Transfer Case Four Wheel Drive Clutch Shim

DIAGNOSTIC INFORMATION AND PROCEDURES

DTC C05D8

Diagnostic Instructions

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

- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC C05D8 11

Transfer Case Clutch Control Circuit Short To Ground

DTC C05D8 12

Transfer Case Clutch Control Circuit Short To Battery

DTC C05D8 13

Transfer Case Clutch Control Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Battery	Signal Performance
Control	C05D8 11	C05D8 12	C05D8 13	-
Low Reference	C05D8 11	C05D8 12	C05D8 13	-

Circuit/System Description

The transfer case normally operates in 2WD mode. When all wheel drive (AWD) is requested, the transfer case control module sends 12 volts to the transfer case clutch coil via the clutch coil control circuit. This engages the transfer case clutch assembly through a ball and cam apply system. The transfer case clutch coil is controlled by a high and low side driver. Both circuits must be activated to engage the system.

Conditions for Running the DTC

- Engine ON.
- System voltage 9 - 17.5 V.
- High side and low side drivers must be commanded OFF.
- These DTC's run during transfer case control module power up.

Conditions for Setting the DTC

C05D8 11

The voltage detected by the transfer case control module, on the control circuit and the low reference circuit, when both the high side driver and the low side driver are off, is 0.00 V for greater than 5 s.

C05D8 12

The voltage detected by the transfer case control module, on the control circuit and the low reference circuit when both the high side driver and the low side driver are off, is greater than a specified voltage for greater than 5 s.

C05D8 13

The voltage detected by the transfer case control module is greater than 0.9 V on the control circuit when the high side driver is off, and 0.0 V on the low reference circuit when the low side driver is off for greater than 5 s.

Action Taken When the DTC Sets

- The transfer case will be in 2WD mode while the fault is present.
- AWD disabled.
- The SERVICE AWD indicator remains illuminated for the remainder of the current ignition cycle.
- The transfer case control module records the operating conditions at the time of the failure in the Failure Records.

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Conditions for Clearing the DTC

- The transfer case control module clears the DTC on the next ignition cycle, once the conditions for setting the DTC are no longer present.
- DTC C05D8 is ignition cycle latched.
- A history DTC clears after 40 consecutive warm up cycles without a fault present.
- All DTCs can be cleared using a scan tool.
- Clearing DTCs will also clear failure records.

Diagnostic Aids

- Check failure records for further information on the conditions present when this DTC set.
- Make sure system voltage is above 9.0 volts as Special Functions will not work correctly if the system is below this voltage.
- The default actions for DTC P0562 or P0563 may cause this DTC to set.
- The transfer case drain plug is a good source for ground.
- **EL-49742** harness is a good source for B+ and ground.
- The transfer case drain plug is a good source for ground.

Reference Information

Schematic Reference

All-Wheel Drive Wiring Schematics

Connector End View Reference

Master Electrical Component List , or **Component Connector End Views - Index**

Electrical Information Reference

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

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Special Tools

J 35616 GM-Approved Terminal Test Kit

Circuit/System Verification

1. Ignition ON, engine OFF.
2. Verify DTC C05D8 is only set as a history DTC.
    - **If the DTC is set as current**

      Refer to Circuit/System Testing.

    - **Go to next step: If the DTC is set as history**

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NOTE: **After inspection, apply Nyogel lubricant 760G to each connector terminal. Ensure each connector and CPA is correctly seated.**

3. Visually inspect each connector terminal of the K69 Transfer Case Control Module connector for damage or corrosion.
    - **If damage or corrosion exists**

      Repair as necessary.

    - **Go to next step: If damage or corrosion does not exist**
4. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data. The DTC should not set.
    - **If the DTC sets**

      Refer to Circuit/System Testing.

    - **Go to next step: If the DTC does not set**
5. All OK.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the M71 Transfer Case Clutch Coil.
2. Ignition ON, engine OFF.
3. Test for 3.4 - 3.9 V between the control circuit, terminal A, and ground.
    - **If less than 3.4 V**
    1. Ignition OFF, disconnect the X1 harness connector at the K69 Transfer Case Control Module.
    2. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground in the circuit.
        - Go to next step: If infinite resistance
    3. Test for less than 2 Ω in control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - Go to next step: If less than 2 Ω
    4. Test for infinite resistance between the control circuit, terminal 5, and all other pins of the K69 Transfer Case Control Module X1 harness connector.
        - If less than infinite resistance, repair the shorted together condition in the affected circuits.
        - If infinite resistance, replace the K69 Transfer Case Control Module and perform the Transfer Case Clutch Identifier Configuration/Reset function.
    - **If greater than 3.9 V**
    1. Ignition OFF, disconnect the X1 harness connector at the K69 Transfer Case Control Module.
    2. Ignition ON, engine OFF.
    3. Test for less than 1 V between the control circuit and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - Go to next step: If less than 1 V
    4. Test for infinite resistance between the control circuit, terminal 5, and all other pins of the K69 Transfer Case Control Module X1 harness connector.
        - If less than infinite resistance, repair the shorted together condition in the affected circuits.
        - If infinite resistance, replace the K69 Transfer Case Control Module and perform the Transfer Case Clutch Identifier Configuration/Reset function.
    - **Go to next step: If between 3.4 - 3.9 V**
4. Test for 3.4 - 3.9 V between the control circuit, terminal A, and the low reference circuit, terminal B.
    - **If less than 3.4 V**
    1. Ignition OFF, disconnect the X1 harness connector at the K69 Transfer Case Control Module.

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2. Ignition ON, engine OFF.
3. Test for less than 1 V between the low reference circuit and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - Go to next step: If less than 1 V
4. Test for less than 2 Ω in the low reference circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - Go to next step: If less than 2 Ω
5. Test for infinite resistance between the low reference circuit, terminal 4, and all other pins of the K69 Transfer Case Control Module X1 harness connector.
    - If less than infinite resistance, repair the shorted together condition in the affected circuits.
    - If infinite resistance, replace the K69 Transfer Case Control Module and perform the Transfer Case Clutch Identifier Configuration/Reset function.

- **If greater than 3.9 V**

1. Ignition OFF, disconnect the X1 harness connector at the K69 Transfer Case Control Module.
2. Ignition ON, engine OFF.
3. Test for less than 1 V between the low reference circuit and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - Go to next step: If less than 1 V
4. Test for infinite resistance between the low reference circuit, terminal 4, and all other pins of the K69 Transfer Case Control Module X1 harness connector.
    - If less than infinite resistance, repair the shorted together condition in the affected circuits.
    - If infinite resistance, replace the K69 Transfer Case Control Module and perform the Transfer Case Clutch Identifier Configuration/Reset function.

- **Go to next step: If between 3.4 - 3.9 V**

5. Test or replace the M71 Transfer Case Clutch Coil.

Component Testing

M71 Transfer Case Clutch Coil

1. Ignition OFF, disconnect the harness connector at the M71 Transfer Case Clutch Coil.

> **NOTE:** **Testing for step 2 is performed on the M71 Transfer Case Clutch Coil using the PU probe J 35616-5.**

2. Test for 2.5 - 3.5 Ω between the control circuit, terminal A, and the low reference circuit, terminal B.
    - **If not between 2.5 - 3.5 Ω**

      Replace the M71 Transfer Case Clutch Coil and perform the Transfer Case Clutch Identifier Configuration/Reset function.

    - **Go to next step: If between 2.5 - 3.5 Ω**
3. M71 Transfer Case Clutch Coil OK.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Transfer Case Assembly Replacement**
- **Control Module References** for transfer case control module replacement, setup, and programming
- **K69 Transfer Case Control Module: Programming and Setup** for the Transfer Case Clutch Identifier Configuration/Reset function

DTC C1057

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Diagnostic Instructions

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

DTC Descriptors

DTC C1057 16

Transfer Case Fluid Temperature Sensor Circuit Low Voltage

DTC C1057 17

Transfer Case Fluid Temperature Sensor Circuit High Voltage

DTC C1057 29

Transfer Case Fluid Temperature Sensor Circuit Performance - Signal Invalid

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
5 V Reference	P0641	P0641	P0641	P0641
Low Reference	-	C1057 16	C1057 17	C1057 29

Circuit/System Description

The transfer case fluid temperature sensor is a thermistor. The transfer case control module supplies a 5-volt reference circuit and a low reference circuit to the sensor. When the transfer case fluid is cold, the sensor resistance is high and the transfer case control module senses a low signal voltage on the low reference circuit. As the transfer case fluid warms, the sensor resistance lowers and the transfer case control module senses higher voltage on the low reference circuit. The transfer case control module uses this information to modify all-wheel drive duty cycle.

Conditions for Running the DTC

- Engine ON for at least 5 s.
- System voltage is 9 - 17.5 V.
- DTC P0641 is not set.
- DTC C1057 16 and DTC C1057 29 run continuously.
- DTC C1057 17 runs at key ON provided there has been an engine off period of at least 10 minutes prior to the key ON.

Conditions for Setting the DTC

C1057 16

- Vehicle speed greater than 73 kph (45 mph) for 5 minutes during an ignition cycle. Time at speed does not have to be continuous.
- The transfer case control module detects that the transfer case temperature is less than -40B°C (-40B°F) (0.03 V). (Sensor stuck LOW).
- This DTC runs continuously.

C1057 17

- Engine off time since last engine ON, 10 minutes.
- The transfer case control module detects that the transfer case temperature is greater than 149B°C (300B°F) (4.97 V). (Sensor stuck HIGH).

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- This DTC runs at transfer case control module power up.

C1057 29

- The transfer case control module detects an abrupt transfer case temperature change of greater than 20B°C (36B°F) per second with the low reference stuck high or stuck low for 5 s.
- This DTC runs continuously.

Action Taken When the DTC Sets

- Transfer case remains in AWD mode.
- The transfer case fluid temperature will default to estimated values based on engine intake air temperature and transmission fluid temperature.
- Failure record recorded.
- The SERVICE AWD indicator will NOT illuminate.
- The AWD OFF indicator will illuminate if due to an actual overheat condition.

Conditions for Clearing the DTC

- The transfer case shift control module clears the active DTC C1057 16 once the conditions for setting the DTC are no longer present.
- DTC C1057 17 & DTC C1057 29 are ignition cycle latched.
- The transfer case shift control module clears the active DTCs C1057 17 & C1057 29 on the next ignition cycle, once the conditions for setting the DTC are no longer present.
- A history DTC clears after 40 consecutive warm up cycles without a fault present.

Diagnostic Aids

- Check failure records for further information on the conditions present when this DTC set.
- If the transfer case oil temperature sensor circuits are open or have high resistance the scan tool will indicate -40B°C (-40B°F).
- If the transfer case oil temperature circuits are shorted to voltage the scan tool will read 154B°C (300B°F).
- If the transfer case fluid temperature DTC is set due to an actual overheat condition, and not an electrical fault, the SERVICE AWD indicator will NOT illuminate, but the AWD OFF indicator WILL illuminate for as long as the temperature stays above the 135B°C (275B°F) thermal reset threshold.
- Once corrected, you must power down the K69 transfer case control module in order to clear this code.
- **EL-49742** harness is a good source for B+ and ground.
- The transfer case drain plug is a good source for ground.

Reference Information

Schematic Reference

All-Wheel Drive Wiring Schematics

Connector End View Reference

Master Electrical Component List , or **Component Connector End Views - Index**

Electrical Information Reference

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

DTC Type Reference

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Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information.

Circuit/System Verification

1. Ignition ON, Engine OFF.
2. Verify DTC P0641 is NOT set.
   - **If DTC P0641 is set**

     Refer to **DTC P0641**.

   - **Go to next step: If DTC P0641 is NOT set**
3. Verify DTC C1057 is only set as a history DTC.
   - **If the DTC is set as current**

     Refer to Circuit/System Testing.

   - **Go to next step: If the DTC is set as history**

NOTE: **After inspection, apply Nyogel lubricant 760G to each connector terminal. Ensure each connector and CPA is correctly seated.**

4. Verify the integrity of each connector terminal of the K69 Transfer Case Control Module connector and the B109 Transfer Case Fluid Temperature Sensor connector for damage or corrosion. Repair as necessary.
5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.
6. Verify the DTC C1057 does not set.
   - **If the DTC sets**

     Refer to Circuit/System Testing.

   - **Go to next step: If the DTC does not set**
7. All OK.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the B109 Transfer Case Fluid Temperature Sensor.
2. Test for 4.8 - 5.2 V between the transfer case 5 V reference circuit terminal A, and ground.
   - **If less than 4.8 V**
   1. Ignition OFF, disconnect the X1 harness connector at the K69 Transfer Case Control Module.
   2. Test for infinite resistance between the 5 V reference circuit, K69 Transfer Case Control Module X1 harness terminal 9, and body ground.
      - If less than infinite resistance, repair the short to ground in the circuit.
      - Go to next step: If infinite resistance
   3. Test for less than 2 Ω in the 5 V reference circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - Go to next step: If less than 2 Ω
   4. Test for infinite resistance between the 5 V reference circuit, terminal 9, and all other pins of the K69 Transfer Case Control Module X1 harness connector.
      - If less than infinite resistance, repair the shorted together condition in the affected circuits.
      - If infinite resistance, replace the K69 Transfer Case Control Module and perform the Transfer Case Clutch Identifier Configuration/Reset Function.
   - **If greater than 5.2 V**

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1. Ignition OFF, disconnect the X1 harness connector at the K69 Transfer Case Control Module.
2. Ignition ON, Test for less than 1 V between the 5 V reference circuit and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - Go to next step: If less than 1 V
3. Ignition OFF.
4. Test for infinite resistance between the 5 V reference circuit, terminal 9, and all other pins of the K69 Transfer Case Control Module X1 harness connector.
    - If less than infinite resistance, repair the shorted together condition in the affected circuits.
    - If infinite resistance, replace the K69 Transfer Case Control Module and perform the Transfer Case Clutch Identifier Configuration/Reset Function.

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

3. Test for 4.8 - 5.2 V between the transfer case 5 V reference circuit terminal A, and the low reference circuit terminal B.
    - **If less than 4.8 V**
    1. Ignition OFF, disconnect the X1 harness connector at the K69 Transfer Case Control Module.
    2. Ignition ON, Test for less than 1 V between the low reference circuit and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - Go to next step: If less than 1 V
    3. Test for less than 2 Ω in the low reference circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - Go to next step: If less than 2 Ω
    4. Test for infinite resistance between the low reference circuit, terminal 1, and all other pins of the K69 Transfer Case Control Module X1 harness connector.
        - If less than infinite resistance, repair the shorted together condition in the affected circuits.
        - If infinite resistance, replace the K69 Transfer Case Control Module and perform the Transfer Case Clutch Identifier Configuration/Reset Function.
    - **If greater than 5.2 V**
    1. Ignition OFF, disconnect the X1 harness connector at the K69 Transfer Case Control Module.
    2. Test for infinite resistance between the low reference circuit, terminal 1, and all other pins of the K69 Transfer Case Control Module X1 harness connector.
        - If less than infinite resistance, repair the shorted together condition in the affected circuits.
        - If infinite resistance, replace the K69 Transfer Case Control Module and perform the Transfer Case Clutch Identifier Configuration/Reset Function.
    - **Go to next step: If between 4.8 - 5.2 V**
4. Test or replace the B109 Transfer Case Fluid Temperature Sensor.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Transfer Case Fluid Temperature Sensor Replacement**
- **K69 Transfer Case Control Module: Scan Tool Information** for Transfer Case Clutch Identifier Configuration/Reset function information
- **Control Module References** for transfer case control module replacement, setup, and programming

DTC C1155

Diagnostic Instructions

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

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DTC Descriptor

DTC C1155

Transfer Case Clutch Identifier Not Programmed

Circuit/System Description

- This is an internal fault detection of the transfer case control module. No external circuits are involved.
- This DTC is set anytime the transfer case control module is replaced or reprogrammed.
- The Transfer Case Clutch Identifier Configuration/Reset function must be performed to clear this code.

Conditions for Running the DTC

- Engine ON.
- System voltage 9 - 17.5 V.
- The diagnostic is run 5 s after engine ON.

Conditions for Setting the DTC

- The transfer case control module detects an invalid transfer case clutch identifier number in memory.
- The valid production transfer case clutch identifier numbers are 1 - 9, when programming utilize the transfer case clutch calibration identification number from the transfer case tag.
- The valid service part transfer case clutch identifier numbers are 1 - 9, when a complete transfer case assembly is replaced utilize the transfer case clutch calibration identification number from the transfer case tag.
- The valid transfer case clutch calibration identification number is 9, when transfer case clutch is replaced.

Action Taken When the DTC Sets

- The K69 Transfer Case Control Module defaults to transfer case clutch identifier number 9 performance.
- The SERVICE 4WD indicator will NOT illuminate.
- Failure records will be recorded.

Conditions for Clearing the DTC

The K69 Transfer Case Control Module clears the DTC once the Transfer Case Clutch Identifier Configuration/Reset function has been successfully performed.

Diagnostic Aids

- Any time the clutch pack assembly, the K69 Transfer Case Control Module, or the transfer case assembly has been replaced, the Transfer Case Clutch Identifier Configuration/Reset function needs to be run.
- If power is lost during Transfer Case Clutch Identifier Configuration/Reset, the transfer case control module may get stuck in a programming loop and will not be able to update. If this occurs, and the DTC resets, replace the transfer case control module.

Reference Information

Schematic Reference

All-Wheel Drive Wiring Schematics

Connector End View Reference

Master Electrical Component List , or **Component Connector End Views - Index**

Electrical Information Reference

- **Circuit Testing**

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

Scan Tool Reference

Control Module References for scan tool information.

Circuit/System Verification

1. Ignition OFF and all vehicle systems OFF. It may take up to 2 minutes for all vehicle systems to power down.
2. Engine running for at least 1 minute.
3. Verify that DTC C1155 is not set.
    - **If the DTC is set**
    1. Ignition ON.
    2. Perform the Configuration/Reset function - Transfer Case Clutch Identifier.
    3. Ignition OFF, disconnect the data link connector.
    4. Wait 30 seconds, ignition ON.
    5. Verify DTC C115 is not set.
        - If DTC is set

          Ignition OFF, Refer to step 3.1

        - Go to next step: If the DTC is not set
    6. All OK.
    - **Go to next step: If the DTC is not set**
4. All OK.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Control Module References for K69 Transfer Case Control Module replacement, setup, and programming
- K69 Transfer Case Control Module: Programming and Setup for Transfer Case Clutch Identifier Configuration/Reset

DTC P0641

Diagnostic Instructions

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

DTC Descriptor

DTC P0641 00

5 V Reference Circuit

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
5 V Reference	P0641	P0641	P0641	P0641
Low Reference	-	C1057 16	C1057 17	C1057 29

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Circuit/System Description

The transfer case fluid temperature sensor is a thermistor. The transfer case control module supplies a 5-volt reference circuit and a low reference circuit to the sensor. When the transfer case fluid is cold, the sensor resistance is high and the transfer case control module senses a low signal voltage on the low reference circuit. As the transfer case fluid warms, the sensor resistance lowers and the transfer case control module senses higher voltage on the low reference circuit. The transfer case control module uses this information to modify all-wheel drive duty cycle.

Conditions for Running the DTC

- Engine ON for at least 5 s.
- System voltage is 9 - 17.5 V.
- DTC P0641 runs continuously.

Conditions for Setting the DTC

Transfer case oil temperature 5 V reference voltage NOT 4.875 - 5.125 V.

Action Taken When the DTC Sets

- DTC P0641 is a type C DTC.
- The transfer case fluid temperature will default to estimated values based on engine intake air temperature and transmission fluid temperature.
- Failure record recorded.
- The Service AWD indicator will NOT illuminate.

Conditions for Clearing the DTC

- DTC P0641 is a type C DTC.
- The transfer case control module clears an active DTC once the conditions for setting the DTC are no longer present.
- A history DTC clears after 40 consecutive warm up cycles without a fault present.

Diagnostic Aids

- Check failure records for further information on the conditions present when this DTC set.
- If the transfer case oil temperature sensor circuits are open, or have high resistance, the scan tool will indicate -40B°C/-40B°F.
- If the transfer case oil temperature circuits are shorted to voltage, the scan tool will read 154B°C/300B°F.
- This fault will likely not be noticed by the driver. However, you can address this fault by looking at the transfer case 5 V reference parameter on the scan tool. The voltage should never be below 4.875 volts or above 5.125 volts.
- Once corrected, you must power down the K69 Transfer Case Control Module in order to clear this code.
- The transfer case drain plug is a good source for ground.
- **EL-49742** harness is a good source for B+ and ground.

Reference Information

Schematic Reference

All-Wheel Drive Wiring Schematics

Connector End View Reference

Master Electrical Component List , or **Component Connector End Views - Index**

Electrical Information Reference

- **Circuit Testing**

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

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: This fault will not likely be noticed by the driver.

1. Ignition ON, Engine OFF.
2. Verify DTC P0641 is only set as a history DTC.
   - **If the DTC is set as current**

     Refer to Circuit/System Testing.

   - **Go to next step: If the DTC is set as history**

   NOTE: After inspection, apply Nyogel lubricant 760G to each connector terminal. Ensure each connector and CPA is correctly seated.

3. Verify the integrity of each connector terminal of the K69 Transfer Case Control Module connector and the B109 Transfer Case Fluid Temperature Sensor connector for damage or corrosion. Repair as necessary.
4. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data. The DTC should not set.
   - **If the DTC sets**

     Refer to Circuit/System Testing.

   - **Go to next step: If the DTC does not set**
5. All OK.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the B109 Transfer Case Fluid Temperature Sensor.
2. Test for 4.8 - 5.2 V between the transfer case 5 V reference circuit terminal A, and ground.
   - **If less than 4.8 V**
   1. Ignition OFF, disconnect the X1 harness connector at the K69 Transfer Case Control Module.
   2. Test for infinite resistance between the 5 V reference circuit, K69 Transfer Case Control Module X1 harness terminal 9, and ground.
      - If less than infinite resistance, repair the short to ground in the circuit.
      - Go to next step: If infinite resistance
   3. Test for less than 2 Ω in the 5 V reference circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - Go to next step: If less than 2 Ω
   4. Test for infinite resistance between the 5 V reference circuit, terminal 9, and all other pins of the K69 Transfer Case Control Module X1 harness connector.
      - If less than infinite resistance, repair the shorted together condition in the affected circuits.
      - If infinite resistance, replace the K69 Transfer Case Control Module and perform the Transfer Case Clutch Identifier Configuration/Reset Function.

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- **If greater than 5.2 V**

1. Ignition OFF, disconnect the X1 harness connector at the K69 Transfer Case Control Module.
2. Ignition ON, engine OFF.
3. Test for less than 1 V between the 5 V reference circuit and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - Go to next step: If less than 1 V
4. Ignition OFF.
5. Test for infinite resistance between the 5 V reference circuit, terminal 9, and all other pins of the K69 Transfer Case Control Module X1 harness connector.
    - If less than infinite resistance, repair the shorted together condition in the affected circuits.
    - If infinite resistance, replace the K69 Transfer Case Control Module and perform the Transfer Case Clutch Identifier Configuration/Reset Function.

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

3. Test for 4.875 - 5.125 V between the transfer case 5 V reference circuit terminal A, and the low reference circuit terminal B.
    - **If less than 4.8 V**

    1. Ignition OFF, disconnect the X1 harness connector at the K69 Transfer Case Control Module.
    2. Ignition ON, engine OFF.
    3. Test for less than 1 V between the low reference circuit and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - Go to next step: If less than 1 V
    4. Test for less than 2 Ω in the low reference circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - Go to next step: If less than 2 Ω
    5. Test for infinite resistance between the low reference circuit, terminal 1, and all other pins of the K69 Transfer Case Control Module X1 harness connector.
        - If less than infinite resistance, repair the shorted together condition in the affected circuits.
        - If infinite resistance, replace the K69 Transfer Case Control Module and perform the Transfer Case Clutch Identifier Configuration/Reset Function.

    - **If greater than 5.2 V**

    1. Ignition OFF, disconnect the X1 harness connector at the K69 Transfer Case Control Module.
    2. Ignition ON, engine OFF.
    3. Test for less than 1 V between the low reference circuit and ground.
        - If 1 V or greater, repair the short to voltage on the circuit.
        - Go to next step: If less than 1 V
    4. Test for infinite resistance between the low reference circuit, terminal 1, and all other pins of the K69 Transfer Case Control Module X1 harness connector.
        - If less than infinite resistance, repair the shorted together condition in the affected circuits.
        - If infinite resistance, replace the K69 Transfer Case Control Module and perform the Transfer Case Clutch Identifier Configuration/Reset Function.

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

4. Test or replace the B109 Transfer Case Fluid Temperature Sensor.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Transfer Case Fluid Temperature Sensor Replacement**
- **K69 Transfer Case Control Module: Programming and Setup** for Transfer Case Clutch Identifier Configuration/Reset function information

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- **Control Module References** for K69 Transfer Case Control Module replacement, setup, and programming

SYMPTOMS - TRANSFER CASE

Strategy Based Diagnostics

Review the system operation in order to familiarize yourself with the system functions. Refer to **Transfer Case Description and Operation**.

Visual/Physical Inspection

- Inspect the easily accessible or visible system components for obvious damage, or for conditions which could cause the symptom.
- Inspect the transfer case for the proper fluid. Refer to **Transfer Case Fluid Replacement**.

Symptom List

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

- **No Correction for Slip in All-Wheel Drive Mode**
- **Service All-Wheel Drive Indicator Always On**
- **All-Wheel Drive Off Indicator Always On**
- **Transfer Case Popping Noise**
- **Transfer Case Whine or Rumble Noise**
- **Transfer Case Clunk During Acceleration and Deceleration**
- **Transfer Case Leak Diagnosis**

NO CORRECTION FOR SLIP IN ALL-WHEEL DRIVE MODE

Diagnostic Instructions

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

Circuit/System Description

When transfer case is in AWD mode the transfer case control module monitors the front wheel speeds and the rear wheel speeds. When a noticeable difference between the front and rear is seen the transfer case control module sends a PWM voltage to the clutch coil so it can apply the clutch in order to correct a slip condition. The slip condition is the difference in speed between the front and rear axles. The module has a thermal model based system so when the slip correction can not be made when a high percentage PWM signal has been sent, it will disable the system temporarily to prevent damage to the clutches.

Diagnostic Aids

- Erratic wheel speed sensors can cause this condition to occur. Monitor the wheel speeds using the transfer case scan tool data list.
- Make sure system voltage is above 10.5 volts as Special Functions will not work correctly if the system is below this voltage.

Reference Information

Schematic Reference

All-Wheel Drive Wiring Schematics

Connector End View Reference

Master Electrical Component List , or **Component Connector End Views - Index**

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Electrical Information Reference

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

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information.

Circuit/System Testing

1. Monitor the wheel speed sensors using the transfer case scan tool data list. If the wheel speeds are erratic or there is a large difference between front and rear then diagnose and repair as necessary. Check for EBCM DTCs as they have likely set for wheel speed performance.
2. While in a parking lot with a scan tool using transfer case special functions go to clutch coupling request and request 100%. Drive the vehicle while making sharp turns, if the vehicle binds on turns this indicates the system is working properly. If it does not bind on turns go to the next step.

   IMPORTANT: This test is intended for short duration use for testing purposes, long term use of this function at 100% request may result in extensive damage to the front axle or other driveline components.

3. If nothing is found with wheel speed performance then the clutches may be excessively worn. Refer to **Transfer Case Disassemble**.
4. Repair as necessary.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Transfer Case Disassemble

SERVICE ALL-WHEEL DRIVE INDICATOR ALWAYS ON

Diagnostic Instructions

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

Circuit/System Description

If the service indicator needs to be turned on the transfer case shift control module sends a signal via the serial data line to the BCM which then sends a message to the instrument panel asking the I/P to command the Service AWD indicator.

Reference Information

Schematic Reference

All-Wheel Drive Wiring Schematics

Connector End View Reference

Master Electrical Component List , or **Component Connector End Views - Index**

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Electrical Information Reference

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

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information.

Circuit/System Testing

1. If the Service AWD indicator is on and there are no DTCs, using a scan tool check under transfer case data list to see if the transfer case shift control module is requesting the service AWD indicator. If the module will not communicate check the fuse for the transfer case as this would cause the transfer case control module to drop off the serial data line causing a service indicator.
2. If the fuse is good check the module power and grounds for proper connections as this could cause the same thing as a blown fuse.
3. If this checks OK, then check all other U codes that may be set against the transfer case shift control module such as I/P, BCM, PCM, and follow the proper U code diagnostic.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for TCSCM replacement, setup, and programming.

ALL-WHEEL DRIVE OFF INDICATOR ALWAYS ON

Diagnostic Instructions

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

Circuit/System Description

If the AWD OFF Indicator needs to be turned on the transfer case shift control module sends a signal via the serial data line to the BCM which then sends a message to the instrument panel asking the I/P to command the AWD OFF Indicator. The AWD OFF Indicator is turned on for three reasons, the transfer case has overheated, the transfer case has lost both rear wheel speeds and vehicle speed, the transfer case has lost the front wheel speeds.

Reference Information

Schematic Reference

All-Wheel Drive Wiring Schematics

Connector End View Reference

Master Electrical Component List , or **Component Connector End Views - Index**

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**

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

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information.

Circuit/System Testing

IMPORTANT: The instrument panel will display AWD OFF once 135B°C (275B°F) has been met or exceeded. The transfer case temperature sensor DTC will not set until 154B°C (309B°F) has been met.

1. Check for any transfer case DTCs and diagnose as necessary.
2. Check for any U codes which may indicate the reason why wheel speed or vehicle speeds are missing and diagnose as necessary using the U code diagnostics.
3. Using a scan tool under transfer case data list look at the transfer case oil temperature. If the temperature is at or above 135B°C (275B°F) determine that the vehicle is not being used beyond its design intent. If this is not the case then the overheat condition may be due to excessively slipping clutches. Allow the transfer case to cool and retest. If the condition persists then disassemble the transfer case and repair as necessary. If an overheating issue is not present go to the next step.
4. Check the ECM and EBCM for DTCs as these modules will likely have set DTCs due to faulty wheel or vehicle speeds. Follow the proper diagnostics and repair as necessary.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Transfer Case Disassemble

TRANSFER CASE POPPING NOISE

Cause	Correction
DEFINITION: A faulty AWD system component or internal transfer case component that causes a LIGHT popping noise WHEN engaging-into or disengaging-out-of AWD. Review the **Symptoms - Transfer Case** and perform the necessary inspections. 1. Compare the noise to a similar vehicle to see if a normal condition. 2. Identify the source of the noise using chassis ears and refer to the appropriate service manual section. 3. Note specifics such as when the noise is present. 4. Note if the noise is relative to vehicle speed, is noisy on turns, or other specifics. 5. If the source of the noise is the transfer case, inspect for the correct fluid level. 6. Inspect the drain plug for large metal deposits. Small metal flakes and fine metal dust on the plug magnet are to be considered normal.	
Transmission Or Transfer Case Mounts Loose Or Damaged	Repair or replace the mounts as required.
Propeller Shaft Loose Or Damaged	**NOTE:** **A popping noise that increases as vehicle speed increases**

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Cause	Correction
	may be caused by a loose or damage propeller shaft. Inspect and repair the propeller shaft as required.**Symptoms - Propeller Shaft**
Suspension Components Worn	Replace the suspension components as required. **Front Wheel Drive Half Shaft Replacement - Left Side** , or **Front Wheel Drive Half Shaft Replacement - Right Side** , **Rear Wheel Drive Shaft Replacement - Right Side (LSY)** , or **Rear Wheel Drive Shaft Replacement - Right Side (L3B)** , or **Rear Wheel Drive Shaft Replacement - Left Side**
Front Or Rear Axle Noise	**NOTE:** • **A popping noise that increases as vehicle speed increase may be caused by worn axle bearings or other internal axle components.** • **To determine if the noise is front axle related, remove the front propeller shaft and retest.** Repair or replace the axle as required.**Symptoms - Front Drive Axle** , or **Symptoms - Rear Drive Axle**
Transmission Rear Output Shaft Bearing Worn	**NOTE:** **A popping noise that increases as transmission output shaft speed increases may be caused by a worn transmission output shaft bearing or other**

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Cause	Correction
	internal transmission components. Repair or replace the transmission as required.**Symptoms - Automatic Transmission**

TRANSFER CASE WHINE OR RUMBLE NOISE

Cause	Correction
Definition: a faulty AWD system component or internal transfer case component that causes a whine or rumble noise. 1. Compare the noise to a similar vehicle to see if a normal condition. 2. Identify the source of the noise using chassis ears and refer to the appropriate service manual section. 3. Note specifics such as when the noise is present. 4. Note if the noise relative to vehicle speed, is noisy on turns, or other specifics. 5. If the source of the noise is the transfer case, inspect for the correct fluid level. 6. Inspect the drain plug for large metal deposits. Small metal flakes and fine metal dust on the plug magnet are to be considered normal. Review the **Symptoms - Transfer Case** and perform the necessary inspections.	
Propeller Shaft Loose Or Damaged	**NOTE:** **A whine or rumble noise that increases as vehicle speed increases may be caused by a loose or damage propeller shaft.** Inspect and repair the propeller shaft as required.Refer to **Symptoms - Propeller Shaft** .
Tire Pressure Uneven	**NOTE:** **A whine or rumble noise that occurs when performing slow speed turns in AWD may be caused by low or uneven tire pressure.** 1. Check the tire pressure and adjust as required to the value recommended by the label on the vehicle.

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Cause	Correction
	2. Road test the vehicle
Tire Noise	**NOTE:** **A whine or rumble noise that increases as vehicle speed increases may be caused by tires with an uneven wear condition or of different sizes.** 1. Reference the vehicle owner's manual and inspect for the correct size tires in the correct locations. Refer to Owner's Manual. 2. Inspect the tires for excessive or uneven wear. 3. Rotate or substitute tires and retest. **Tire and Wheel Inspection**
Front Or Rear Axle Bearings Worn	**NOTE:** • **A whine or rumble noise that increases as vehicle speed increases may be caused by worn axle bearings.** • **To determine if the noise is front axle related, remove the front propeller shaft and retest.** Repair or replace the axle as required.**Front Wheel Drive Half Shaft Replacement - Left Side** , or **Front Wheel Drive Half Shaft Replacement - Right Side** ,, **Rear Wheel Drive Shaft Replacement -**

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Cause	Correction
	Right Side (LSY) , or Rear Wheel Drive Shaft Replacement - Right Side (L3B) , or Rear Wheel Drive Shaft Replacement - Left Side
Transmission Rear Output Shaft Bearing Worn	**NOTE:** **A whine or rumble noise that increases as transmission output shaft speed increases may be caused by a worn transmission output shaft bearing or other internal transmission components.** Repair or replace the transmission as required.Symptoms - Automatic Transmission
Transfer Case Fluid Level Low	**NOTE:** **A whine or rumble noise that increases as transmission output shaft speed increases may be caused by a low transfer case fluid level.** Fill the transfer case to the correct fluid level and retest.
Transfer Case Bearings Worn	**NOTE:** **A whine or rumble noise that increases as transmission output shaft speed increases may be caused by a worn transfer case internal bearing.**

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Cause	Correction
	Replace the bearings as required.Transfer Case Disassemble, Transfer Case Assemble
Transfer Case Gear Wear Or Gear Damage	**NOTE:** **A slight whine noise that occurs a 35-40 mph should be considered normal. Compare to another similar vehicle.** **NOTE:** **Normal transfer case noise can be described as a slight noise heard only at a certain speed or under unusual or remote conditions. For example, the noise tends to reach a peak at speeds from 56 - 64 km/h (35 - 40 mph) depending on road and load conditions, or on gear ratio and tire size. This slight noise is in no way indicative of trouble in the transfer case assembly.** **1. Test drive and compare to a similar vehicle to determine if this is a normal operating condition.** **2. Repair or replace**

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Cause	Correction
	the transfer case as required. Transfer Case Disassemble, Transfer Case Assemble

TRANSFER CASE CLUNK DURING ACCELERATION AND DECELERATION

Cause	Correction
Definition: during acceleration or deceleration, a clunk is heard or felt within the awd system or within the transfer case. 1. Compare the noise to a similar vehicle to see if a normal condition. 2. Identify the source of the noise using chassis ears and refer to the appropriate service manual section 3. Note specifics such as when the noise is present. 4. Note if the noise is relative to vehicle speed, is noisy on turns, or other specifics. 5. If the source of the noise is the transfer case, inspect for the correct fluid level. 6. Inspect the drain plug for large metal deposits. Small metal flakes and fine metal dust on the plug magnet are to be considered normal. Review the Symptoms - Transfer Case and perform the necessary inspections.	
Transmission Or Transfer Case Mounts Loose Or Damaged	Repair or replace the mounts as required
Propeller Shaft Loose Or Damaged	**NOTE:** **A clunk noise that is heard during acceleration or deceleration may be caused by a loose or damage propeller shaft.** Inspect and repair the propeller shaft as required.Refer to Symptoms - Propeller Shaft .
Transfer Case Fluid Level Low	**NOTE:** **A clunk noise that is heard during acceleration or deceleration may be caused by a low transfer case fluid level and clutch pack slippage.**

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Cause	Correction
	Fill the transfer case to the correct fluid level and retest.
Clutch Pack Noise	**NOTE:** **A shudder or binding type noise when awd is engaging or disengaging may indicate worn clutch pack friction discs.** Disassemble the transfer case and inspect the clutch pack for worn components. Replace the clutch pack assembly and reprogram the transfer case control module as required.Refer to **K69 Transfer Case Control Module: Programming and Setup**

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. See below for suggested diagnostic method(s).	
Special Tools **GE-28431-6** Fluorescent Oil Dye **GE-28428-E** High Intensity Black Light Kit Equivalent regional tools: **Special Tools** **Fluorescent Dye Method** 1. Add **GE-28431-6** Fluorescent Oil Dye 2. Operate the vehicle. 3. Inspect for the presence of dye within the oil leak using the **GE-28428-E** High Intensity Black Light Kit. A presence or non-presence of dye within the oil leak will indicate which component is the source of the leak. **Powder Method** **CAUTION:** **Do not clean using brake cleaner or other reactive solvents as these solvents can damage rubber gaskets, seals and bushings.** 1. Thoroughly clean the suspected leak area using a rag. 2. Apply an aerosol type leak tracing powder to the suspected leak area.	

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Cause	Correction
	NOTE: **Do not drive the vehicle on the freeway as this will splatter oil inhibiting leak diagnosis.** 3. Operate the vehicle for 15 - 20 minutes under city driving conditions until normal operating temperatures are reached. 4. Shut OFF the engine. 5. Inspect the suspected leak area. 6. Trace the leak path through the powder in order to find the source of the leak.
Transmission-to-Transfer Case Weep Hole Leak	**NOTE:** **Transmission fluid is sealed at the rear of the transmission by the transmission rear output shaft seal. Transfer case fluid is sealed at the front of transfer case by the transfer case input shaft seal. If a leak is present at the weep hole area of the transmission-to-transfer case adapter, fluorescent dye must be added to one of the two components to determine the source of the leak.** 1. Inspect for a restricted vent hose assembly. Repair as required. 2. Add **GE-28431-6** Fluorescent Oil Dye to the transmission to determine the source of the leak. 3. Operate the vehicle.

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Cause	Correction
	4. Inspect the weep hole area for a fluid leak and for traces of dye within the oil using the **GE-28428-E** High Intensity Black Light Kit. 5. If fluorescent dye is present within the fluid leak, replace the transmission rear output shaft seal. 6. If fluorescent dye is not present within the fluid leak, replace the transfer case input shaft oil seal. • **Transfer Case Disassemble** • **Transfer Case Assemble**
Transmission Vent Hose Leak	1. Inspect for a loose, disconnected, restricted, or damaged transmission vent hose assembly. 2. Replace components as required.
Oil Drain Plug or Oil Fill Plug Leak	1. Inspect for an under-tightened oil fill plug, a damaged fill plug seal, or damage to the rear case half sealing surface 2. Inspect for an under-tightened drain plug or incorrect type or missing sealant on the drain plug threads. **Adhesives, Fluids, Lubricants, and Sealers** 3. Replace the oil fill plug if seal damage is present and tighten to the correct torque value. 4. Install the correct sealer onto the threads of the oil drain plug and tighten to the correct torque value. **Transfer Case Fluid Replacement**
Oil Temperature Sensor Leak	1. Remove the oil temperature sensor. **Transfer Case Fluid Temperature Sensor Replacement** 2. Inspect for the following conditions: • Sensor cross threaded into the housing • Damage to the sensor seal • Sensor over tightened causing deformation of the sensor • Damage to the case half sealing surface 3. Replace components as required.
Rear Output Shaft Oil Seal Leak	1. Inspect for a leaking rear output shaft oil seal. • **Transfer Case Disassemble** • **Transfer Case Assemble** 2. Inspect the rear output flange sealing surface for excessive wear, rust, or other damage. Minor abrasions may be repaired using very fine emery cloth sandpaper. 3. Replace components as required.
Front Output Shaft Oil Seal Leak	1. Inspect for a restricted vent hose assembly. Repair as required. 2. Inspect for a leaking front output shaft oil seal. Refer to Transmission-to-Transfer Case Adapter Weep Hole Leak in this table. • **Transfer Case Disassemble** • **Transfer Case Assemble** 3. Inspect the front output shaft sealing surface for excessive wear, rust, or other damage. Minor abrasions may be repaired using very

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Cause	Correction
	fine emery cloth sandpaper. • **Transfer Case Disassemble** • **Transfer Case Assemble** 4. Replace components as required.
Clutch Coil O-ring Seal Leak	**NOTE:** **The clutch coil has an O-ring seal at each coil stud and coil wire location.** 1. Inspect the rear case half at the clutch coil locations. 2. Replace the clutch coil assembly as required.
Front case half-to-rear case half seam leak	1. Disassemble the transfer case and Reseal the case halves. • **Transfer Case Disassemble** • **Transfer Case Assemble**
Case leak	1. Inspect for a cracked case half or porosity. 2. Add J-28431 - 6 fluorescent Dye to the transfer case. 3. Operate the vehicle. 4. Inspect the location of the leak for presence of dye within the oil using the J-28428-E High Intensity Black Light Kit. 5. Replace components as required. • **Transfer Case Disassemble** • **Transfer Case Assemble**

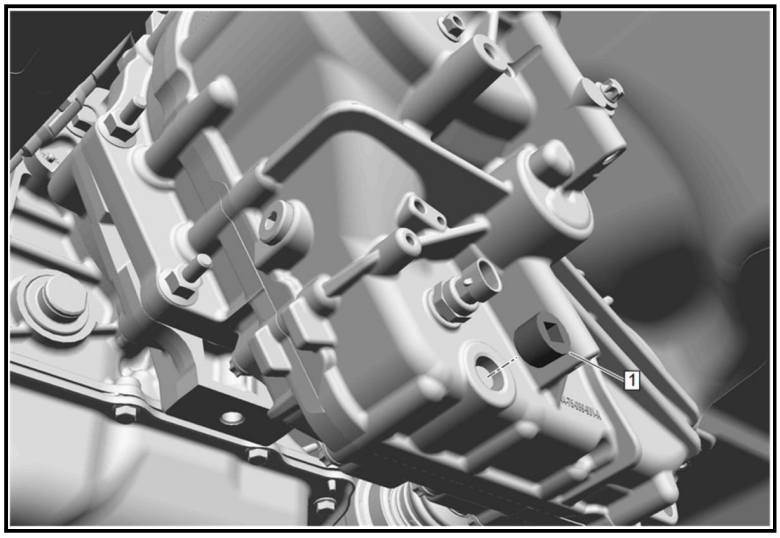
REPAIR INSTRUCTIONS - ON VEHICLE

TRANSFER CASE FLUID REPLACEMENT

Removal Procedure

1. Raise the vehicle. **Lifting and Jacking the Vehicle**
2. Place a drain pan under the vehicle.

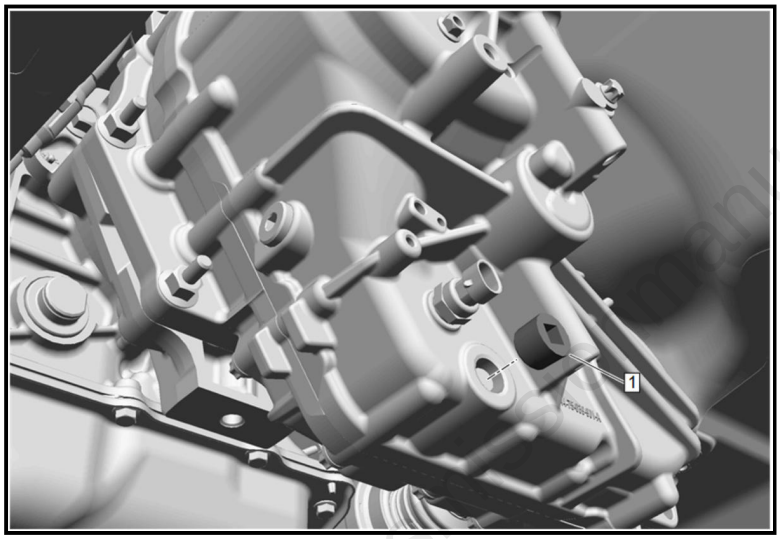
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3. 

   Transfer Case Drain Plug (1) - Remove

4. Drain the fluid from the transfer case.

Installation Procedure

1. 

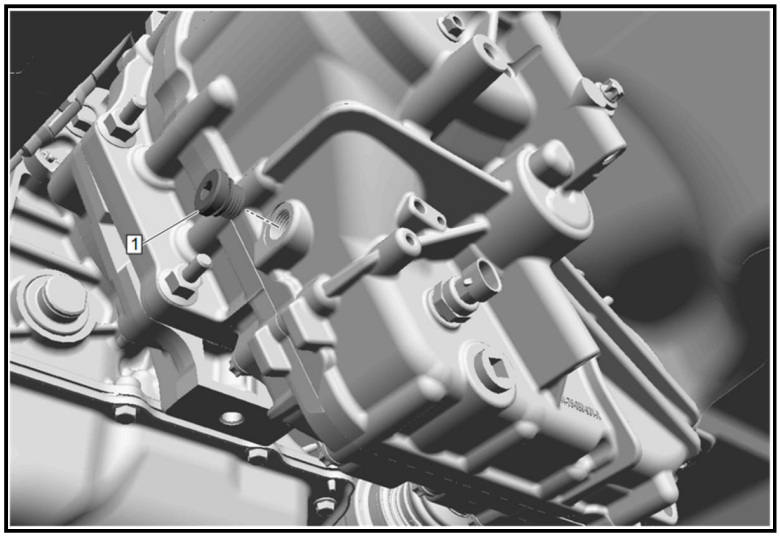
   Prepare the transfer case drain plug (1) for installation as follows:

   1. Remove any loose cured adhesive from the external threads of the components using a lint free cloth.
   2. Thread the cleaned components into the internal mating threads and remove to loosen trapped cured adhesive.
   3. Apply thread locking adhesive to the external threads of the components. **Adhesives, Fluids, Lubricants, and Sealers**
   4. Ensure there are no gaps in the thread locking adhesive once applied to the component.

   CAUTION: **Refer to Component Fastener Tightening Caution .**

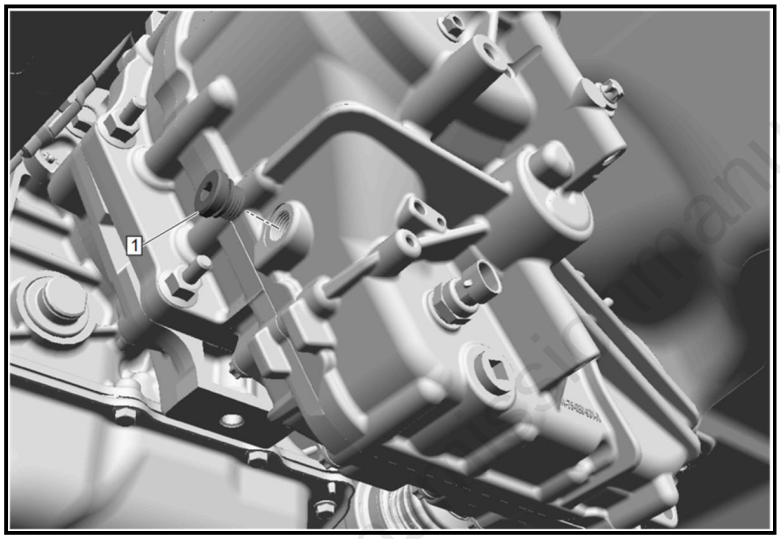
2. Transfer Case Drain Plug (1) - Install and tighten - **Fastener Specifications**

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3. 

   Transfer Case Oil Fill Plug (1) - Remove

4. Fill the transfer case with fluid.
   - **Approximate Fluid Capacities**
   - **Adhesives, Fluids, Lubricants, and Sealers**

5. 

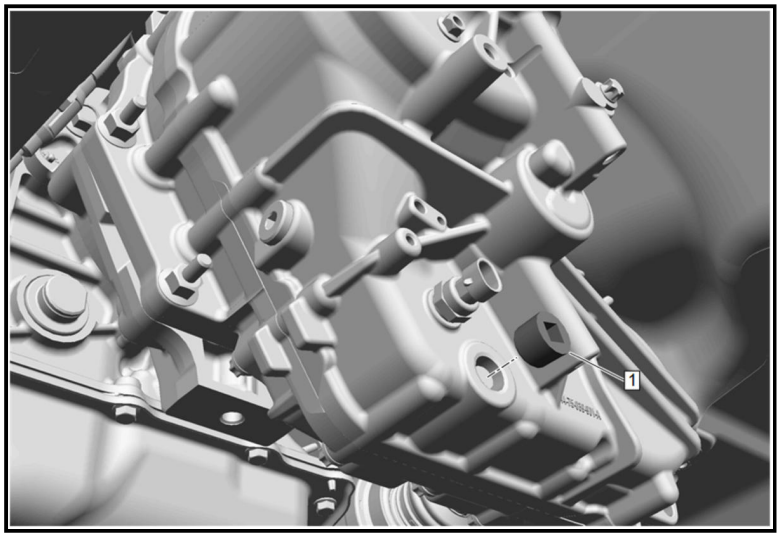
NOTE: **Inspect the transfer case oil fill plug and seal and replace as necessary.**

Transfer Case Oil Fill Plug (1) - Install and tighten - **Fastener Specifications**

DRAIN PLUG REPLACEMENT

Removal Procedure

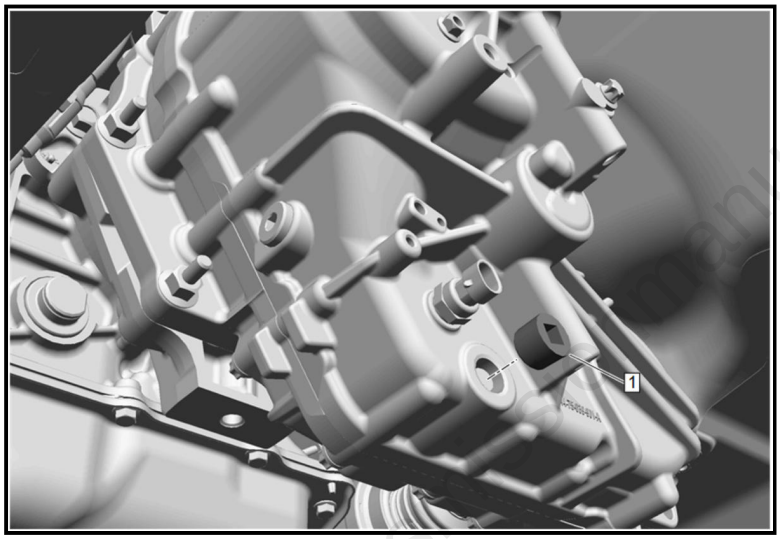
1. Raise the vehicle. **Lifting and Jacking the Vehicle**
2. Place a drain pan under the vehicle.

3. 

   Transfer Case Drain Plug (1) - Remove

4. Drain the fluid from the transfer case.

Installation Procedure

1. 

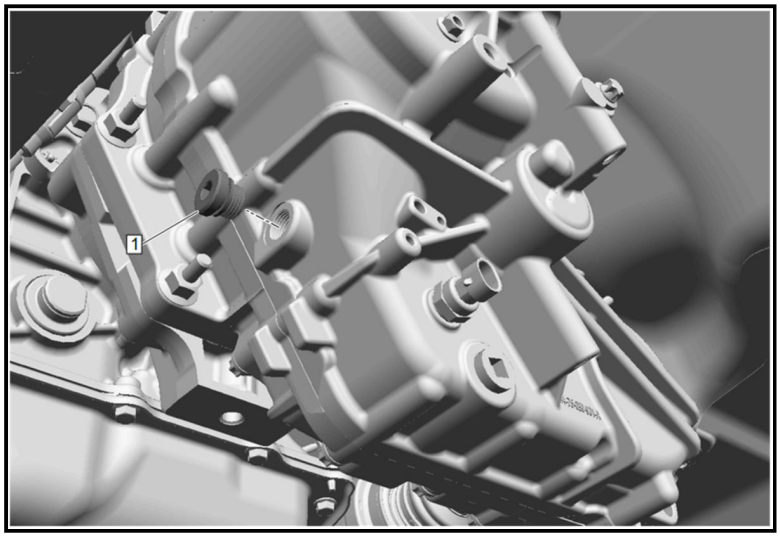
   Prepare the transfer case drain plug (1) for installation as follows:

   1. Remove any loose cured adhesive from the external threads of the components using a lint free cloth.
   2. Thread the cleaned components into the internal mating threads and remove to loosen trapped cured adhesive.
   3. Apply thread locking adhesive to the external threads of the components. **Adhesives, Fluids, Lubricants, and Sealers**
   4. Ensure there are no gaps in the thread locking adhesive once applied to the component.

   CAUTION: **Refer to Component Fastener Tightening Caution .**

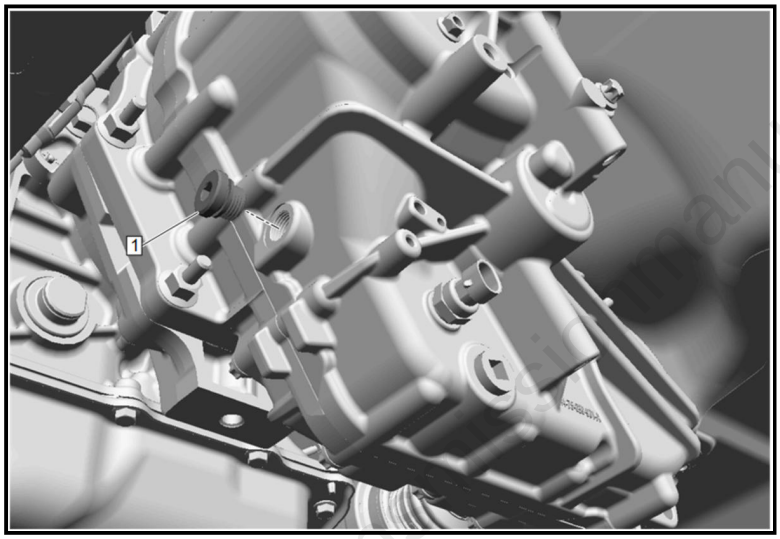
2. Transfer Case Drain Plug (1) - Install and tighten - **Fastener Specifications**

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3. 

   Transfer Case Oil Fill Plug (1) - Remove

4. Fill the transfer case with fluid.
   - **Approximate Fluid Capacities**
   - **Adhesives, Fluids, Lubricants, and Sealers**

5. 

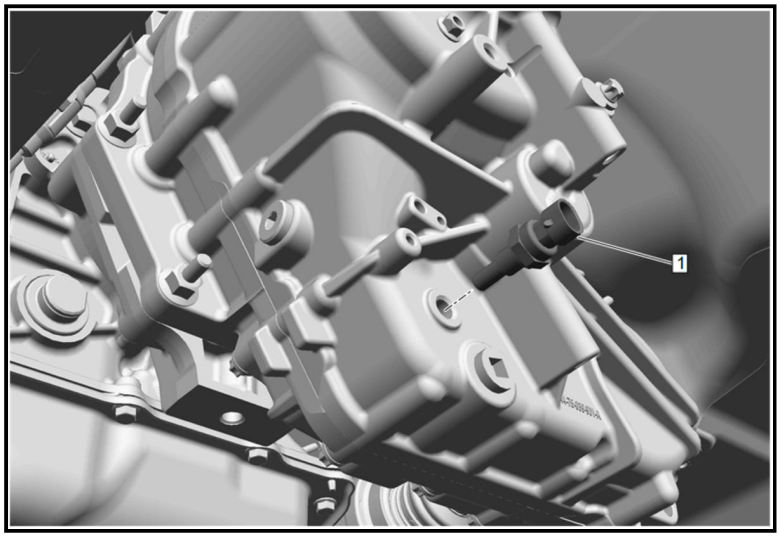
NOTE: **Inspect the transfer case oil fill plug and seal and replace as necessary.**

Transfer Case Oil Fill Plug (1) - Install and tighten - **Fastener Specifications**

TRANSFER CASE FLUID TEMPERATURE SENSOR REPLACEMENT

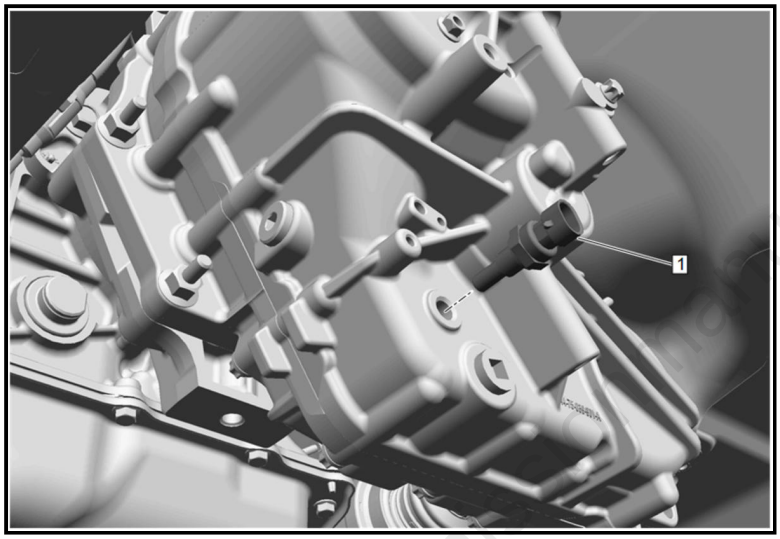
Removal Procedure

1. Raise the vehicle. **Lifting and Jacking the Vehicle**
2. Place a drain pan under the vehicle.
3. Disconnect the transfer case fluid temperature sensor electrical connector.

4. 

Transfer Case Fluid Temperature Sensor (1) - Remove

Installation Procedure

1. 

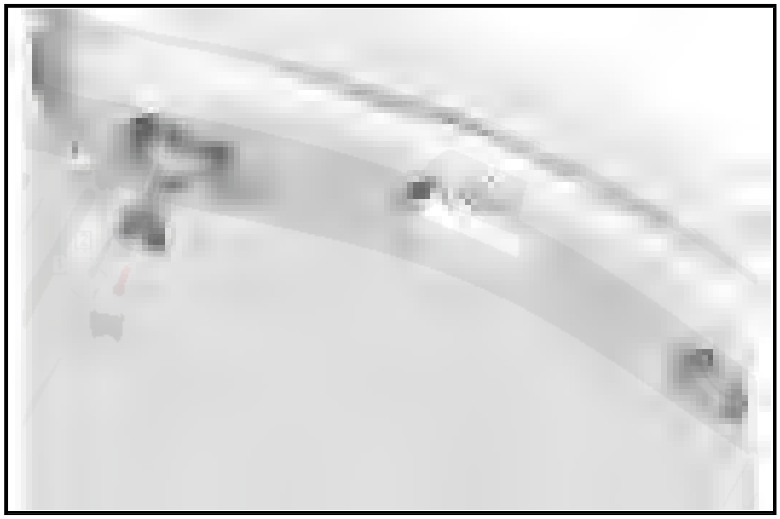
CAUTION: **Refer to Component Fastener Tightening Caution .**

Transfer Case Fluid Temperature Sensor (1) - Install and tighten - **Fastener Specifications**

2. Connect the transfer case fluid temperature sensor electrical connector.
3. Fill the transfer case to the correct level with the correct fluid.
   - **Approximate Fluid Capacities**
   - **Adhesives, Fluids, Lubricants, and Sealers**
4. Remove the drain pan.
5. Lower the vehicle.

TRANSFER CASE CONTROL MODULE REPLACEMENT

Removal Procedure

1. 

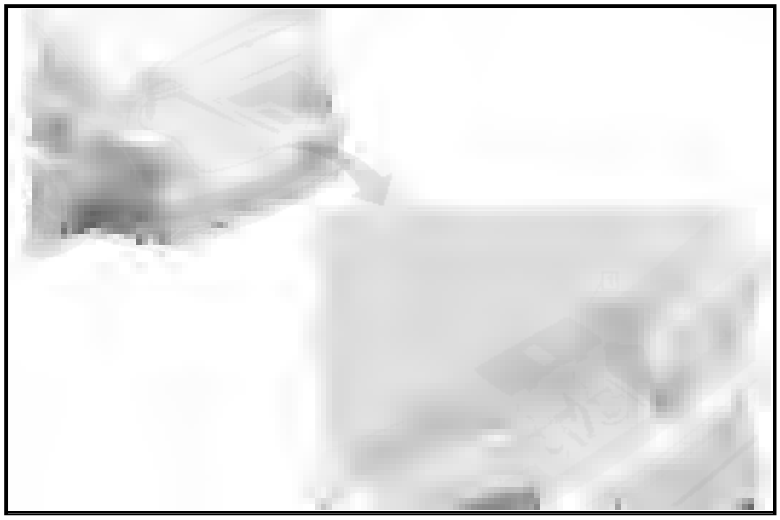
NOTE: **Use a small flat-bladed tool to disengage integral tabs on cargo tie down loop bolt cap**

Cargo Tie Down Loop Bolt Cap (1) - Remove [2x]

2. Cargo Tie Down Loop Bolt (2) - Remove [2x]
3. Cargo Tie Down Loop (3) - Remove [2x]

4. 

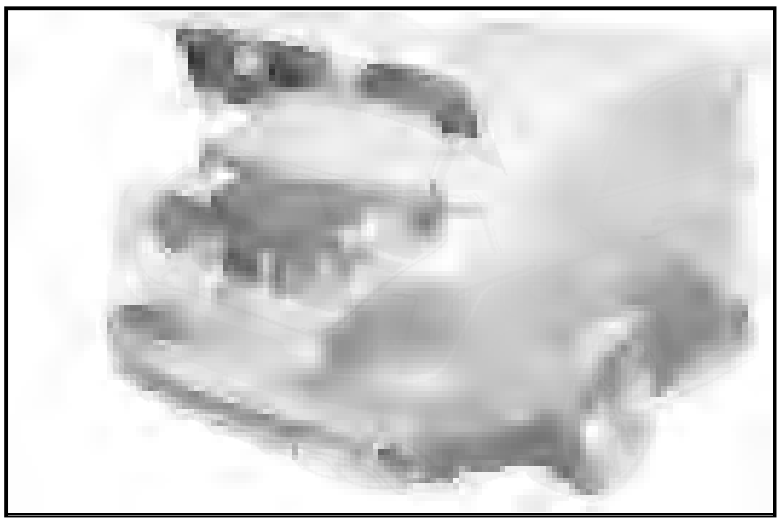
Rear Compartment Floor Panel Trim (1) - Remove

5. 

Use a small flat-bladed tool to disengage integral tabs on rear end trim finish panel opening cover (1).

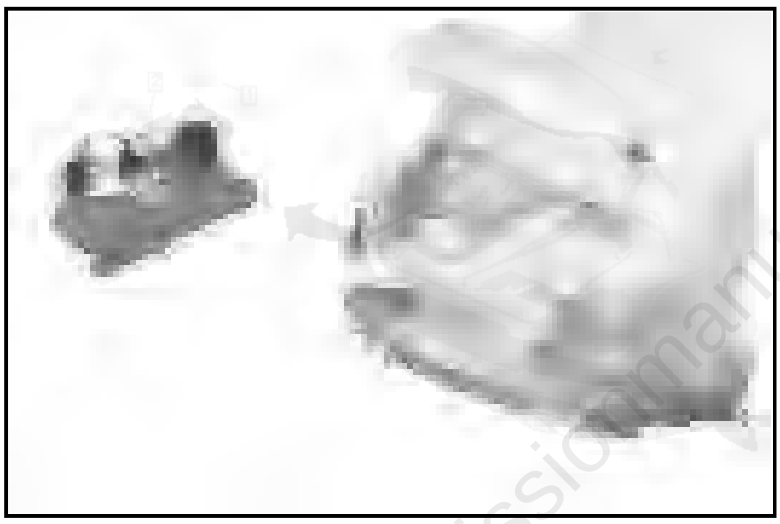
6. Rear End Trim Finish Panel Opening Cover (1) - Remove

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7. 

With a flat bladed plastic trim tool, disengage the integral clips.

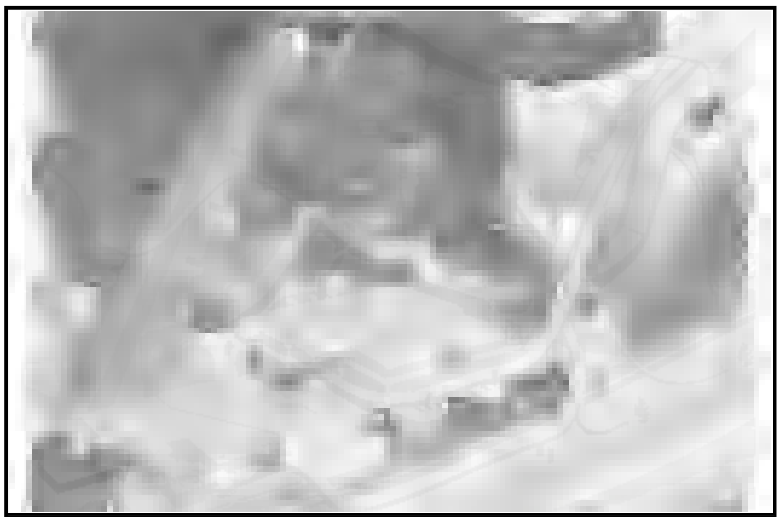
8. Rear End Trim Finish Panel (1) - Remove

9. 

NOTE: **Carefully manipulate the deck lid hinge opening of the rear compartment side trim past the hinge cover.**

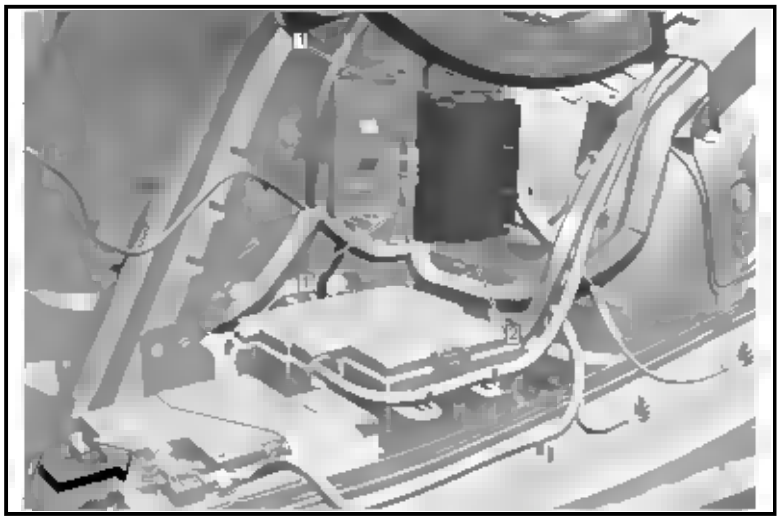
Rear Compartment Side Trim Insulator Retainer (1) - Remove [4x]

10. Rear Compartment Side Trim-Left Side (2) - Remove
11. Disconnect the transfer case control module electrical connectors.

12. 

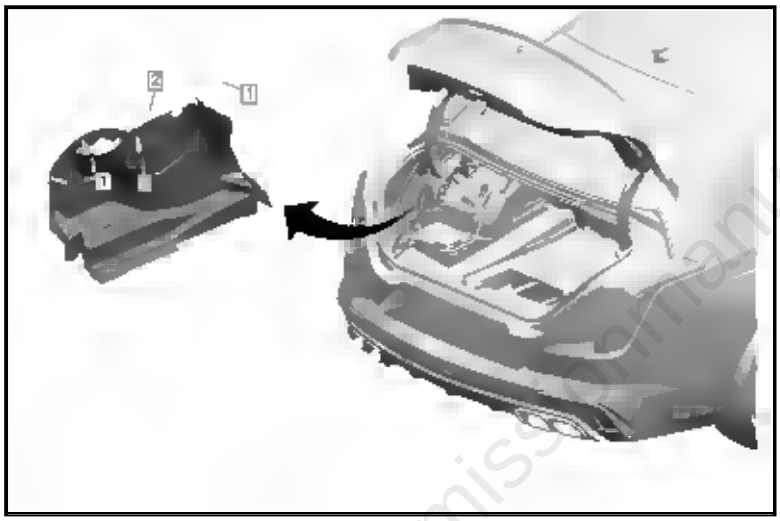
Release the 2 retaining tabs (1) then remove the transfer case control module (2).

Installation Procedure

1. 

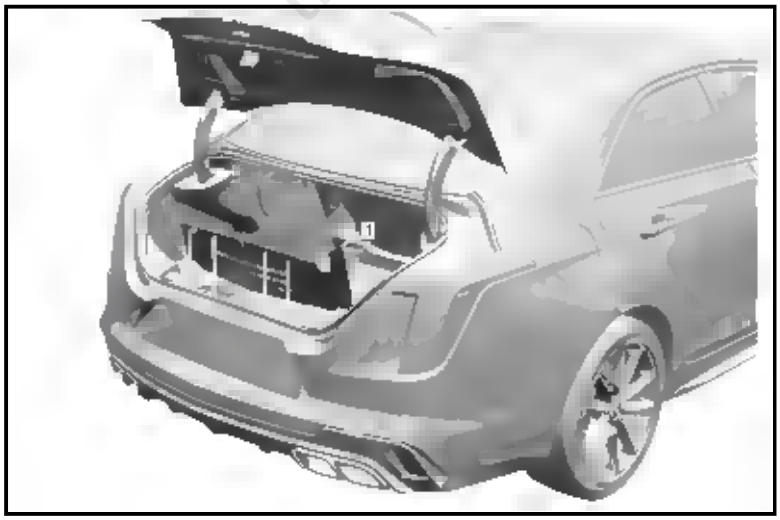
   Install the transfer case control module (2) then engage the 2 retaining tabs (1).

2. Connect the transfer case control module electrical connectors.

3. 

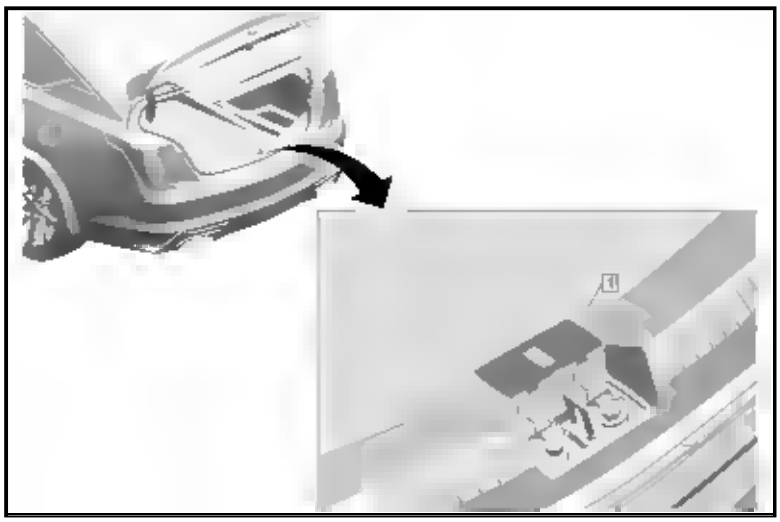
   Rear Compartment Side Trim-Left Side (2) - Install

4. Rear Compartment Side Trim Insulator Retainer (1) - Install [4x]

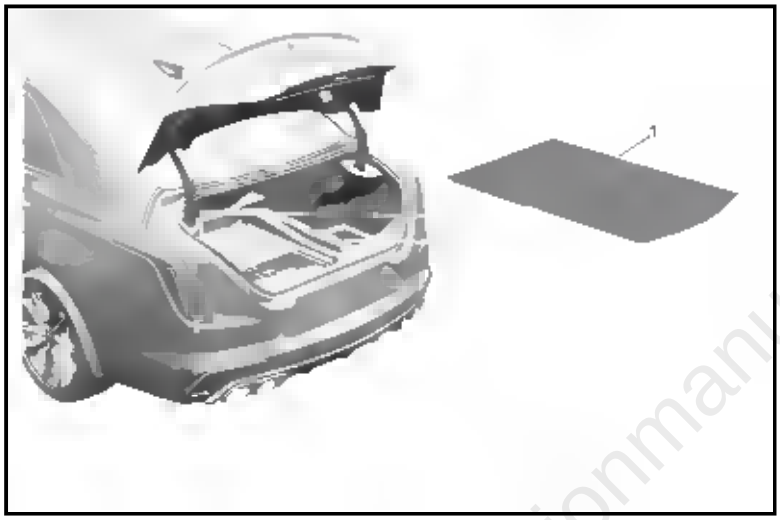
5. 

   Rear End Trim Finish Panel (1) - Install

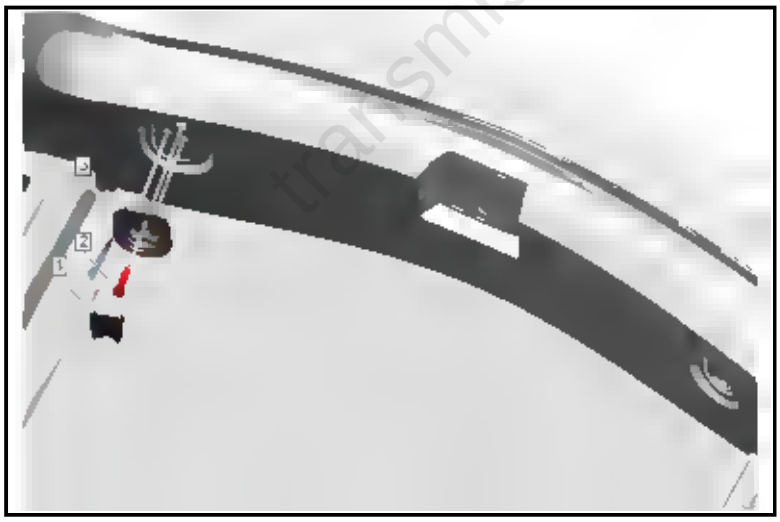
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6. 

Rear End Trim Finish Panel Opening Cover (1) - Install

7. 

Rear Compartment Floor Panel Trim (1) - Install

8. 

Cargo Tie Down Loop (3) - Install [2x]

CAUTION: **Refer to Fastener Caution .**

9. Cargo Tie Down Loop Bolt (2) - Install and tighten [2x] - **Fastener Specifications**
10. Cargo Tie Down Loop Bolt Cap (1) - Install [2x]
11. After replacing the transfer case control module, record the clutch calibration identification number. **Transfer Case Identification**

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12. Program K69 transmission control module. **K69 Transfer Case Control Module: Programming and Setup**

TRANSFER CASE ASSEMBLY REPLACEMENT

Single Use Fasteners and Components

- Catalytic Converter Gasket
- Exhaust Pipe Clamp
- Propeller Shaft Hub Clamp
- Transfer Case Front Output Shaft Boot Clamp

Special Tools

Driveline

DT-35910 Drive Axle Seal Clamp Pliers

Equivalent regional tools: **Special Tools**

Exhaust

EN-6179 Heated Oxygen Sensor Remover/Installer

Equivalent regional tools: **Special Tools (Diagnostic)** , or **Special Tools (Mechanical)**

Removal Procedure

WARNING: **In order to avoid being burned, do not service the exhaust system while it is still hot. Service the system when it is cool.**

WARNING: **Avoid contact with HOT components. Wear safety glasses and protective gloves to avoid personal injury.**

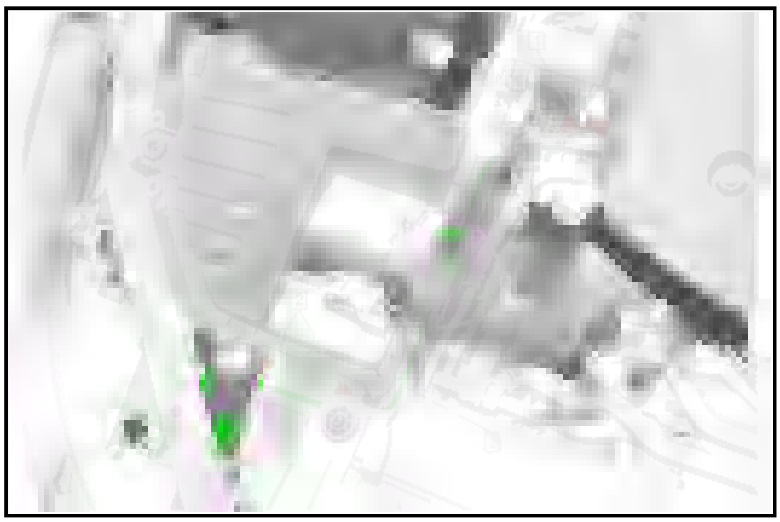
1.

2. 

   Air Cleaner Bolt (1) - Remove

3. Evaporative Emission Canister Purge Tube (2) - Disconnect - **Plastic Collar Quick Connect Fitting Service**
4. Positive Crankcase Ventilation Tube (3) - Disconnect - **Plastic Collar Quick Connect Fitting Service**
5. Electrical Connector (4) - Disconnect [2x]

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6. 

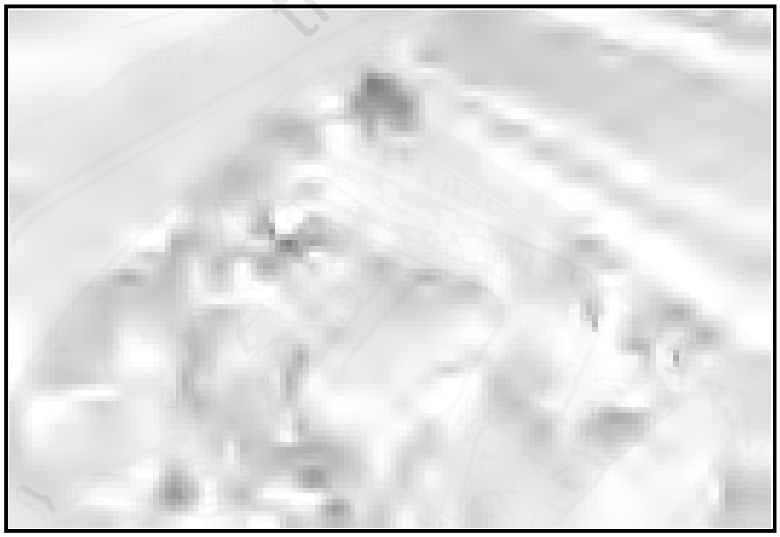
   Air Cleaner Outlet Duct Clamp (1) - Loosen

7. Wiring Harness Retainer (2) @ Air Cleaner Assembly - Remove [4x]
8. Engine Wiring Harness (3) - Reposition

9. 

   Remove the air cleaner (1) and air cleaner outlet duct (2) as an assembly.

10. Disconnect and reposition the heated oxygen sensor electrical connector as necessary.

11. 

    CAUTION: **Refer to Heated Oxygen and Oxygen Sensor Caution .**

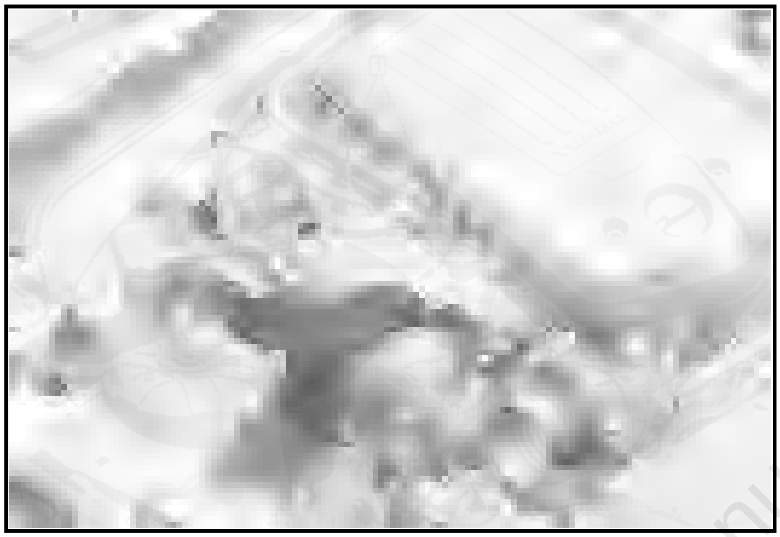
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CAUTION: **The use of excessive force may damage the threads in the exhaust manifold/pipe.**

NOTE: **The heated oxygen sensor in-line connector and louvered end MUST be kept clear of all grease, dirt, and other contaminants. Do NOT use cleaning solvents of any type. Do NOT drop or roughly handle the sensor.**

NOTE: **The heated oxygen sensor MAY be difficult to remove when the engine temperature is less than 48B°C (120B°F).**

Using the **EN-6179** Heated Oxygen Sensor Remover/Installer, remove the heated oxygen sensor (1).

12. 

Turbocharger Heat Shield Bolt (1) - Remove [2x]

13. 

Turbocharger Heat Shield Bolt (1) - Remove [2x]

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14. 

    Turbocharger Heat Shield (1) - Remove

15. Raise and support the vehicle. **Lifting and Jacking the Vehicle**



16. Disconnect and reposition the heated oxygen sensor electrical connector as necessary.

    NOTE: **The heated oxygen sensor MAY be difficult to remove when the engine temperature is less than 48B°C (120B°F).**

    NOTE: **The heated oxygen sensor in-line connector and louvered end MUST be kept clear of all grease, dirt, and other contaminants. Do NOT use cleaning solvents of any type. Do NOT drop or roughly handle the sensor.**

17. Using the **EN-6179** Heated Oxygen Sensor Remover/Installer, remove the heated oxygen sensor (1).
18. Drain the fluid from the transfer case. **Transfer Case Fluid Replacement**

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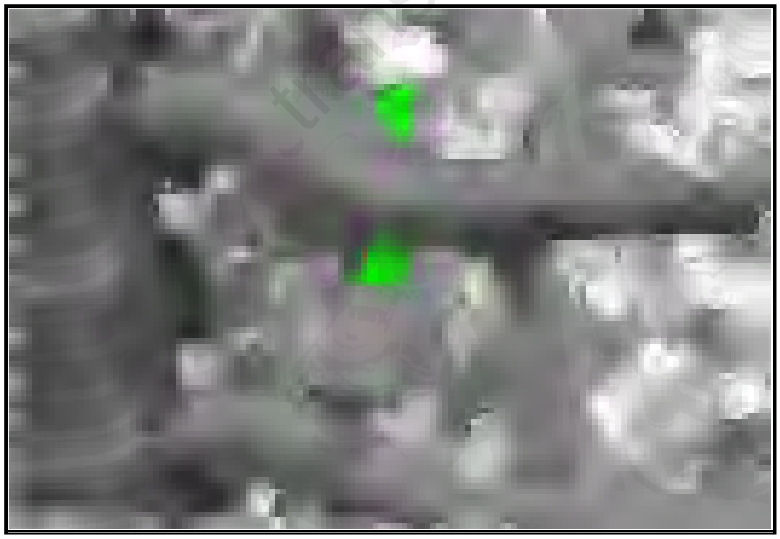
19. 

    Floor Panel Number 4 Cross Bar Reinforcement Bolt (1) - Remove [6x]

20. Floor Panel Reinforcement (2) - Remove

21. 

    Catalytic Converter Nut (1) - Remove [2x]

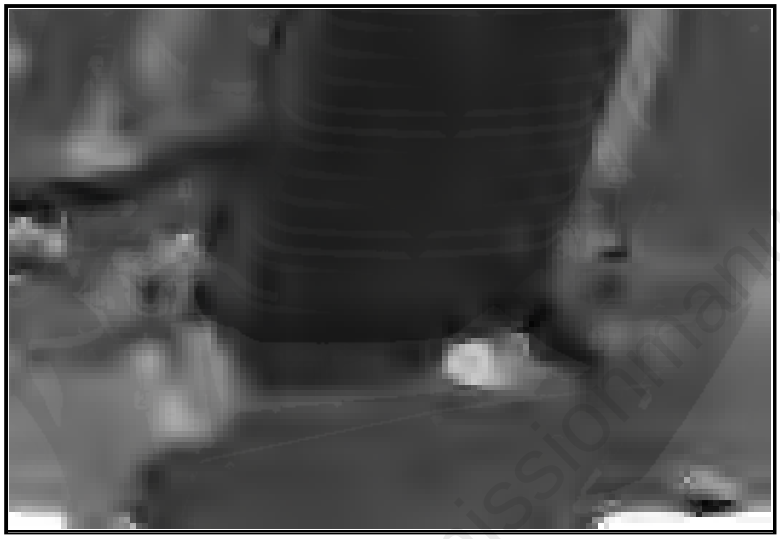
22. 

    Electrical Connector (1) @ Exhaust Control Valve Actuator - Disconnect [2x]

23. 

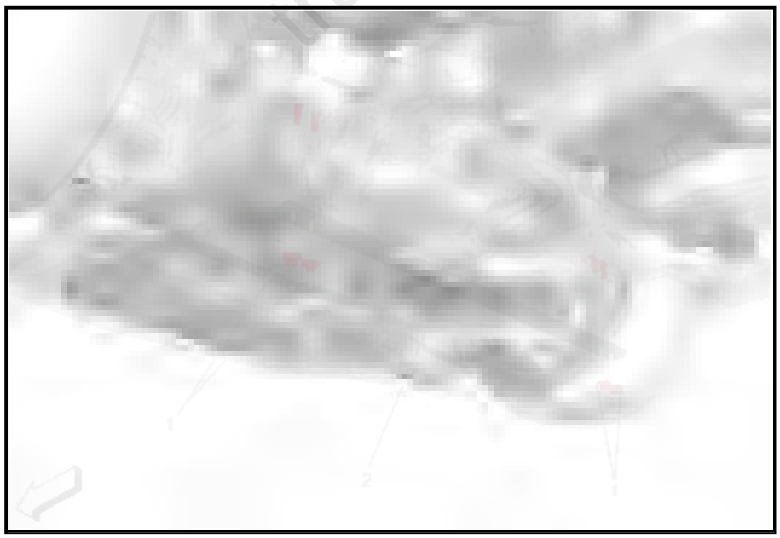
Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Left Side (2) - Separate

24. Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Left Side (3) - Separate

25. 

Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Right Side (2) - Separate

26. Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Right Side (3) - Separate

27. 

{If equipped} Front Crossmember Brace Nut (1) - Remove [4x]

28. {If equipped} Front Crossmember Brace (2) - Remove

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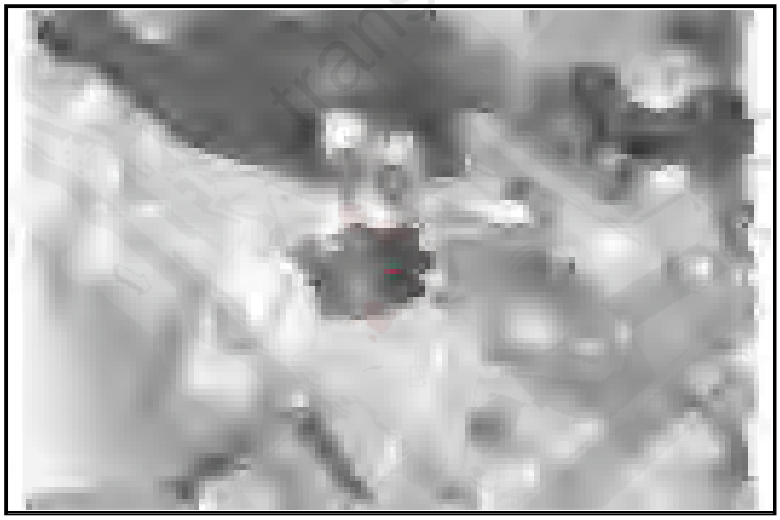
29. 

Exhaust Muffler (1) - Remove

30. Catalytic Converter Gasket (2) - Remove and DISCARD

31. 

Exhaust Pipe Clamp (1) - Loosen

32. 

Catalytic Converter Brace Bracket Nut (1) - Remove [2x]

33. Catalytic Converter Brace Bolt (2) - Remove [2x]
34. Catalytic Converter Brace (3) - Remove

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35. 

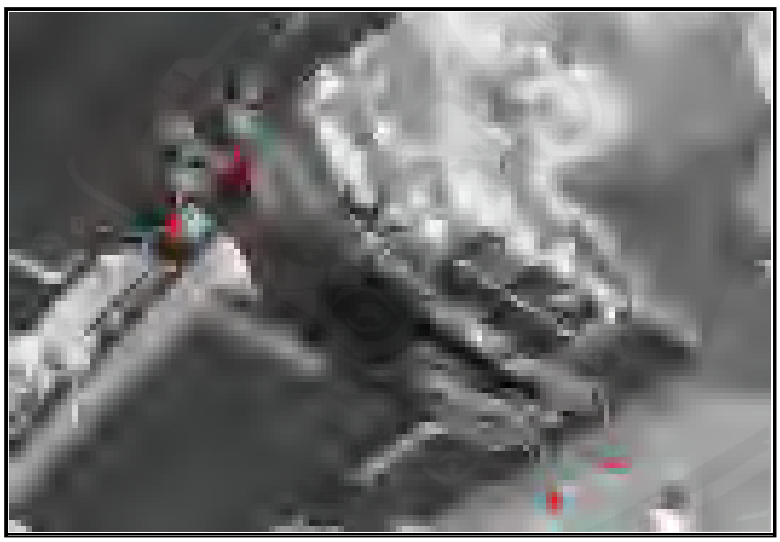
Warm Up Three-Way Catalytic Converter (1) - Remove

36. Exhaust Pipe Clamp (2) - Remove and DISCARD
37. Catalytic Converter Gasket (3) - Remove and DISCARD

38. 

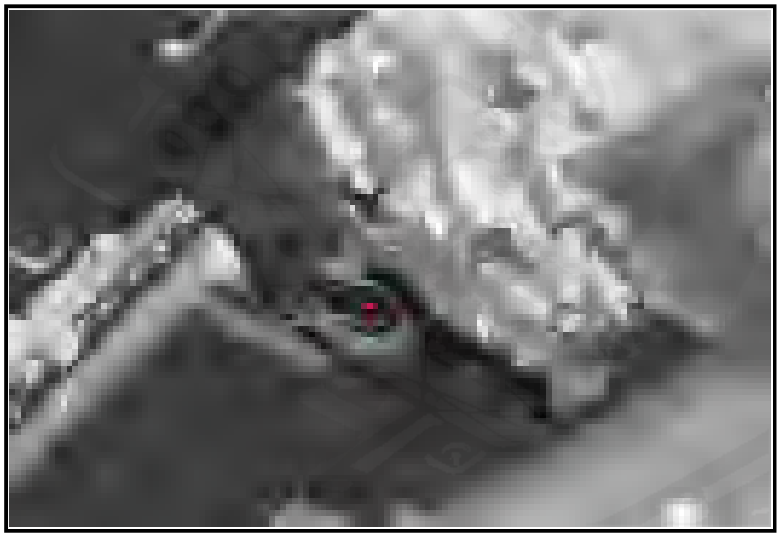
Front Axle Propeller Shaft Heat Shield Bolt (1) - Remove [2x]

39. Front Axle Propeller Shaft Heat Shield Stud (2) - Remove
40. Front Axle Propeller Shaft Heat Shield (3) - Remove
41. Support the transmission with an appropriate jack.

42. 

Transmission Mount Bracket Bolt (1) - Remove [4x]

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43. 

NOTE: **The transmission mount bolt is retained in the mount, loosen the bolt to disengage the threads and remove the mount and bolt as an assembly.**

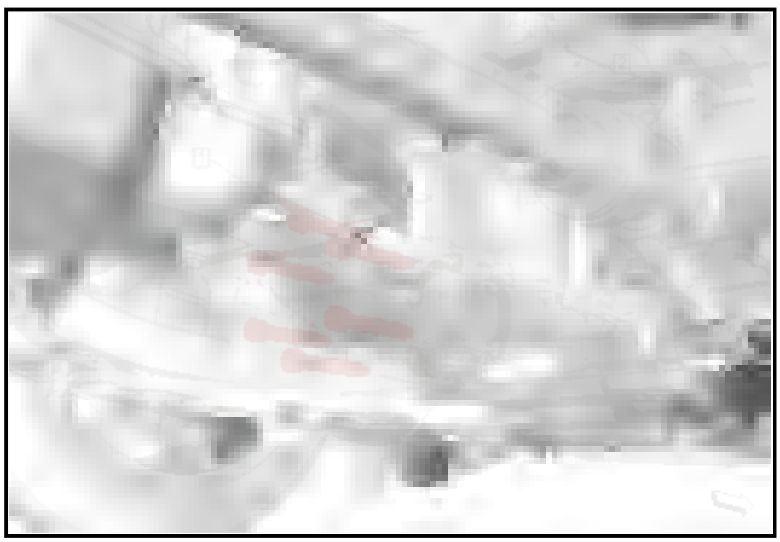
Transmission Mount Bolt (1) - Remove

44. Transmission Mount (2) - Remove

45. 

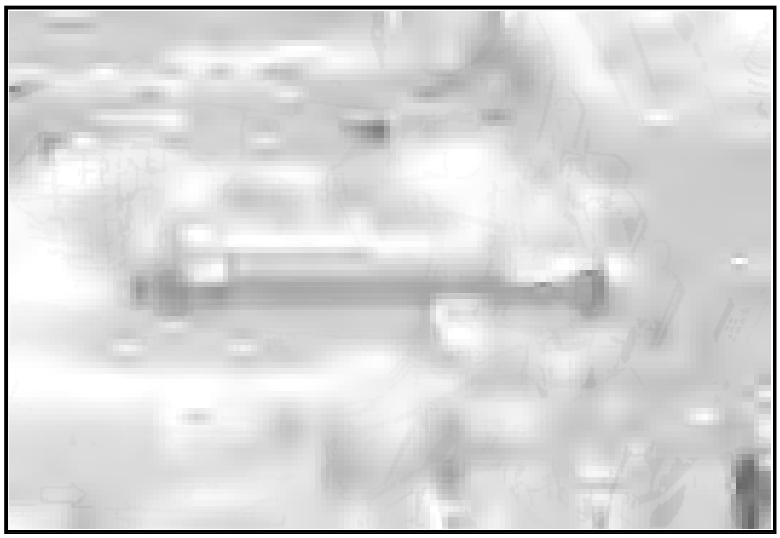
Transfer Case Front Output Shaft Boot Clamp (1) @ Transfer Case Front Output Shaft - Remove and DISCARD

46. Release the transfer case front output shaft boot (2) from the groove in the transfer case front output shaft.

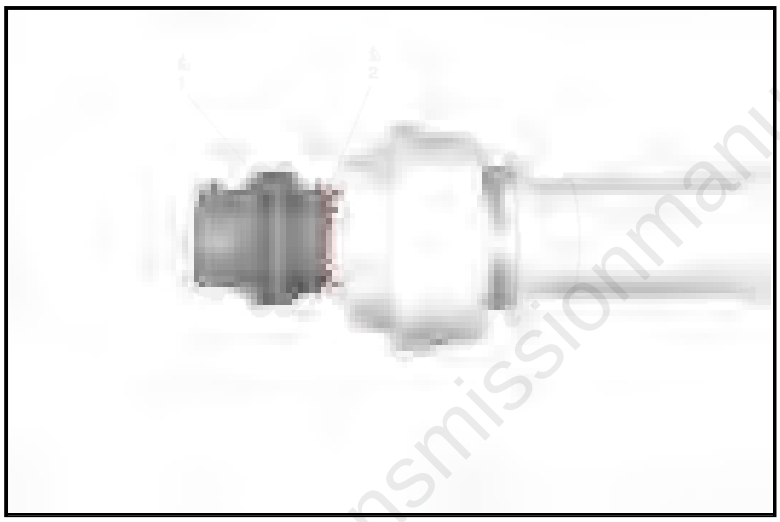
47. 

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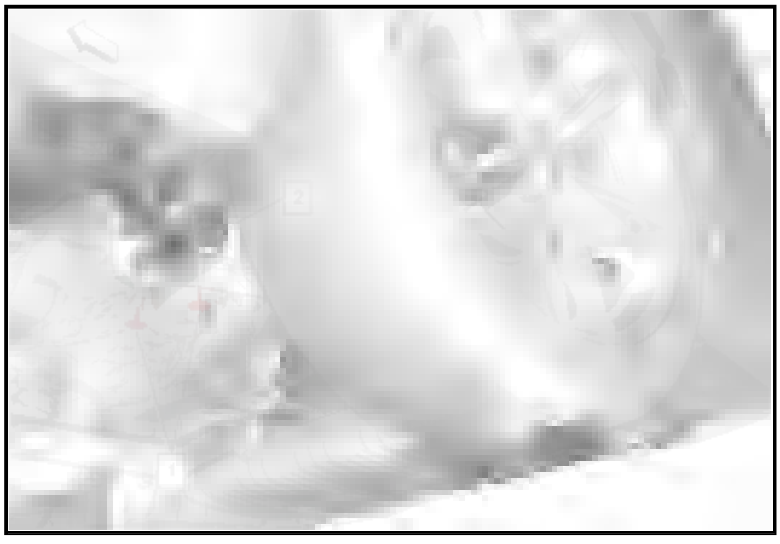
Mark the relationship between the front axle propeller shaft (2) and the front differential carrier flange with a grease pencil.

48. Front Axle Propeller Shaft Bolt (1) - Remove [6x]
49. Front Axle Propeller Shaft Washer (3) - Remove [3x]
50. 

Front Axle Propeller Shaft (1) - Remove

51. 

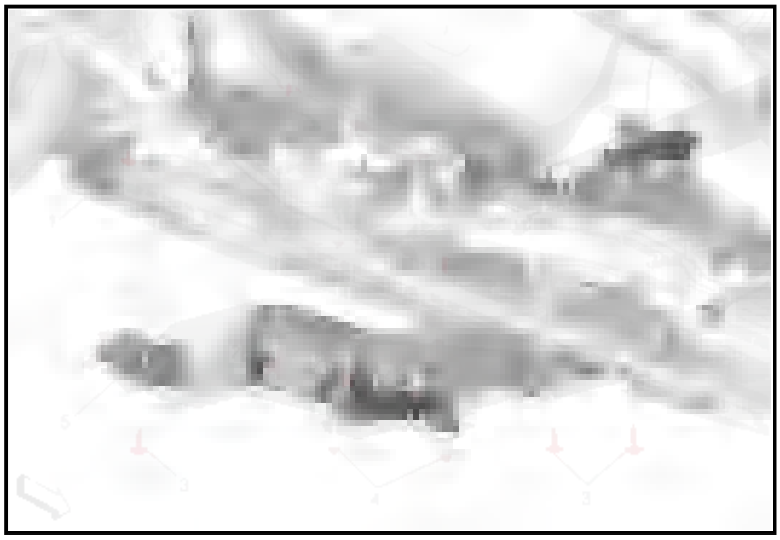
Inspect the transfer case front output shaft boot (1), if damage is found, remove and DISCARD the transfer case front output shaft boot clamp (2) and the transfer case front output shaft boot (1).

52. 

Rear Tire Front Air Deflector Bolt (1) - Remove [2x]

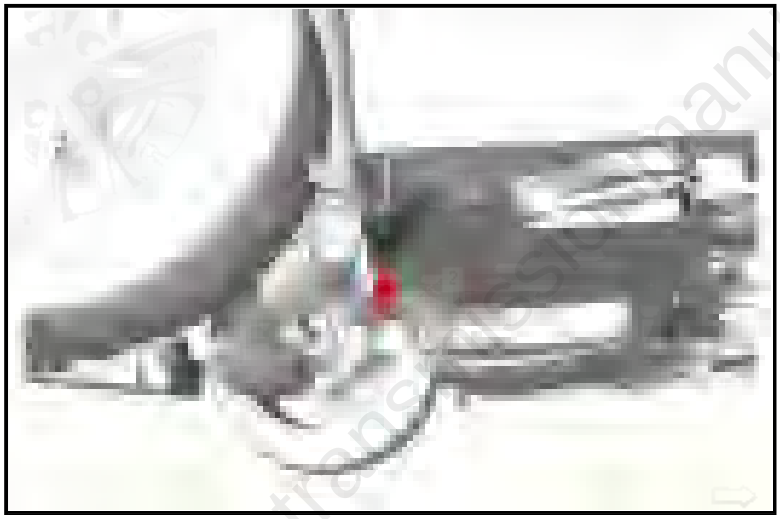
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53. Rear Tire Front Air Deflector - Left Side (2) - Remove

54. 

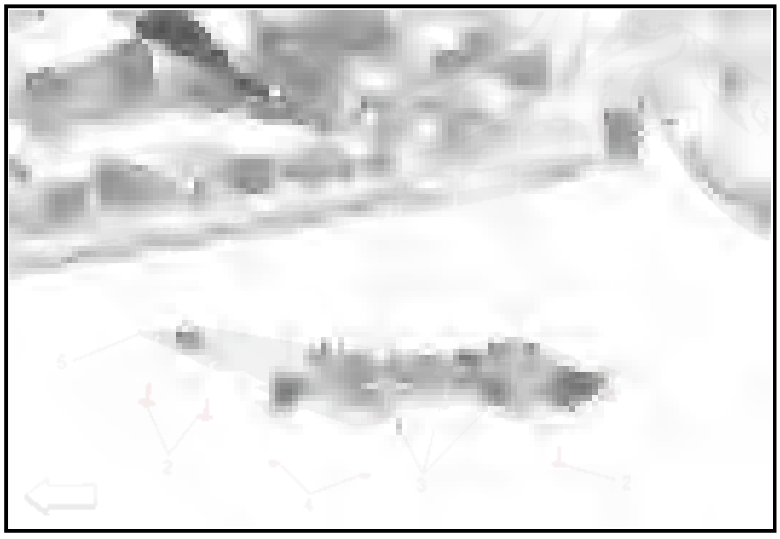
Rear Wheelhouse Liner Screw (1) - Remove

55. Underbody Rear Air Deflector Plastic Nut (2) - Remove [3x]
56. Underbody Rear Air Deflector Bolt (3) - Remove [3x]
57. Underbody Rear Air Deflector Nut (4) - Remove [2x]
58. Underbody Rear Air Deflector - Left Side (5) - Remove

59. 

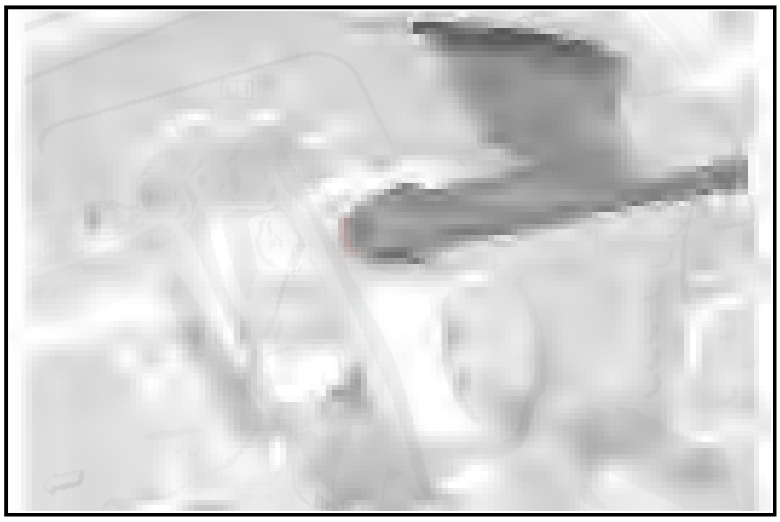
Rear Tire Front Air Deflector Bolt (2) - Remove [2x]

60. Rear Tire Front Air Deflector - Right Side (1) - Remove

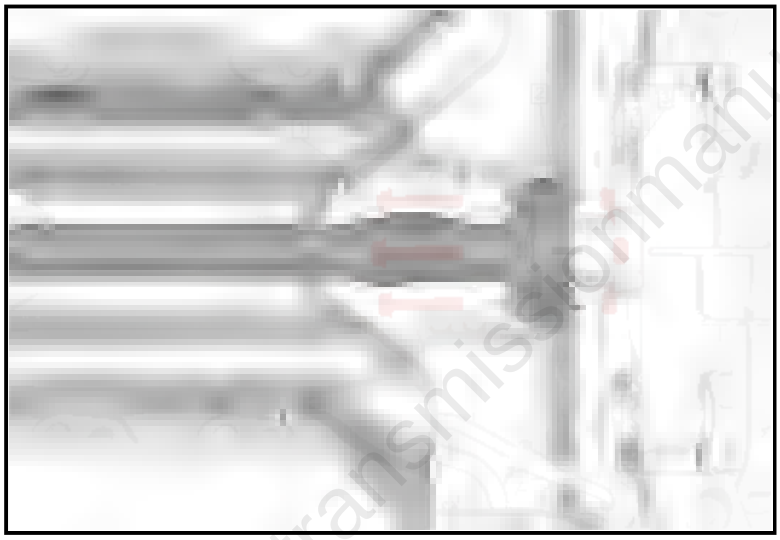
61. 

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Rear Wheelhouse Liner Screw (1) - Remove

62. Underbody Rear Air Deflector Bolt (2) - Remove [3x]
63. Underbody Rear Air Deflector Plastic Nut (3) - Remove [3x]
64. Underbody Rear Air Deflector Nut (4) - Remove [2x]
65. Underbody Rear Air Deflector - Right Side (5) - Remove
66. 

Propeller Shaft Hub Clamp (1) - Remove and DISCARD

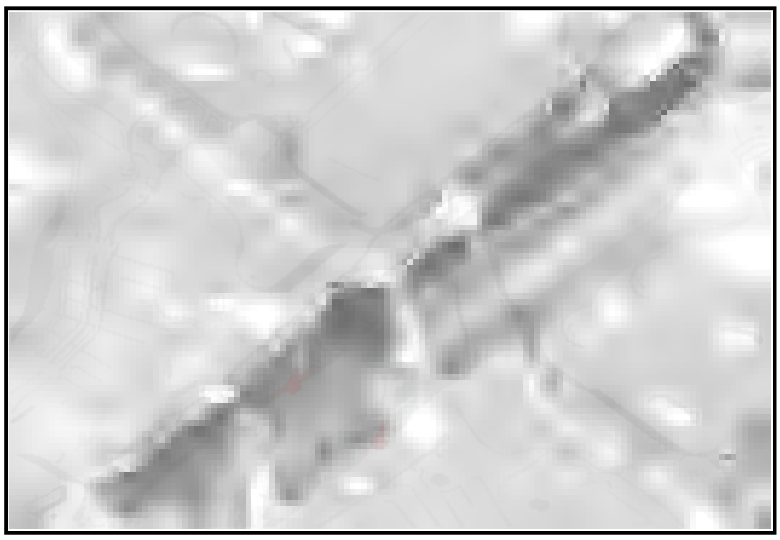
67. 

Mark (2) the relationship of the propeller shaft to the rear differential flange using a paint pen.

CAUTION: **When removing the propeller shaft, do not remove the propeller shaft coupler from the propeller shaft assembly. The only bolts that should be removed are those that mount each coupler to the transmission output flange, and to the rear drive axle input flange. Failure to properly remove the propeller shaft assembly may cause coupler damage, resulting in necessary replacement of the entire propeller shaft.**

68. Rear Propeller Shaft Nut (3) - Remove [3x]
69. Rear Propeller Shaft Bolt (1) - Remove [3x]
70. Support and secure the propeller shaft to a suitable hydraulic jack stand.

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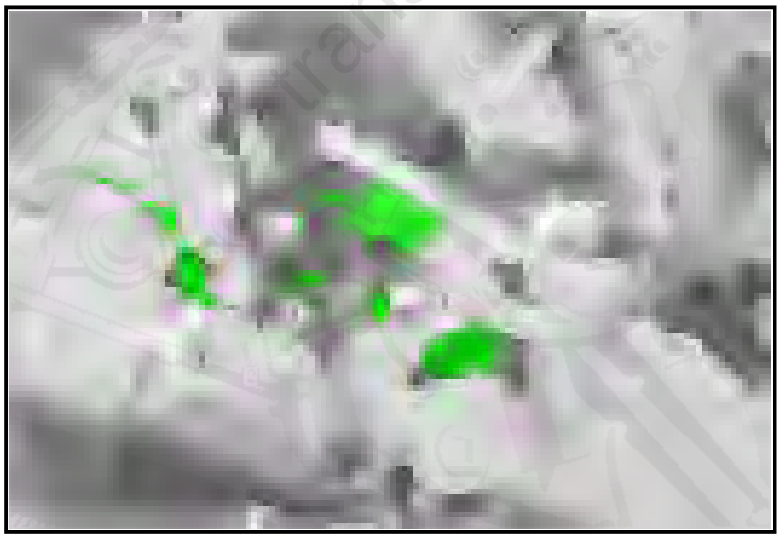
71. 

Propeller Shaft Bearing Support Bolt (1) - Remove [2x]

72. 

Propeller Shaft (1) - Remove

73. Support the transmission with a suitable jack.

74. 

Disconnect the electrical connectors (1)

75. Wiring Harness Retainer (2) - Remove [2x]

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76. 

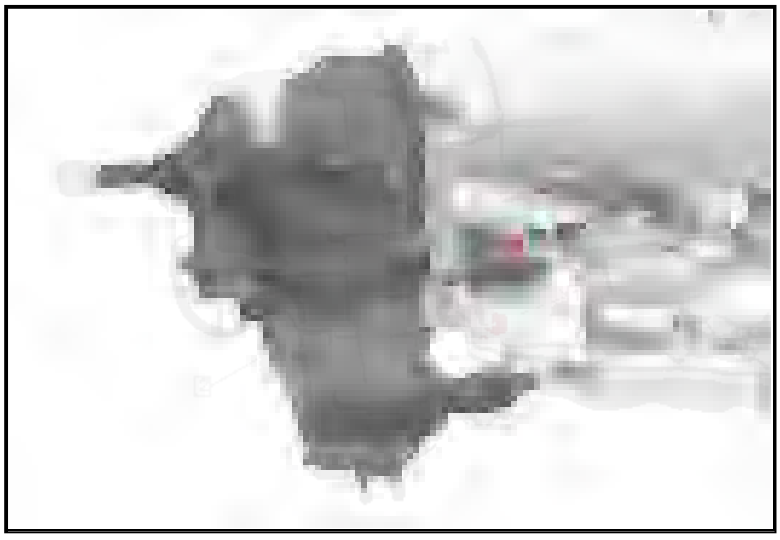
Electronic Transmission Range Selector Manual Park Release Cable Clamp Bolt (1) - Remove

77. Electronic Transmission Range Selector Manual Park Release Cable (2) @ Transmission - Remove

78. 

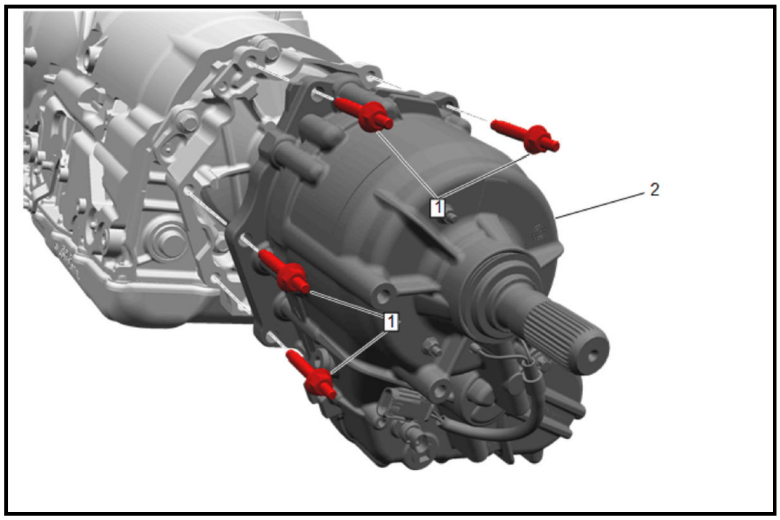
Unclip the electronic transmission range selector manual park release cable (1) retainer from the electronic transmission range selector manual park release cable bracket.

79. Remove the electronic transmission range selector manual park release cable (2) from the transmission.
80. Using the jack, lower the transmission enough to access the transfer case fasteners.
81. Using a suitable transmission jack, support the transfer case.
82. Using suitable straps or chains, secure the transfer case to the transmission jack.

83. 

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Transfer Case Nut (1) - Remove [2x]

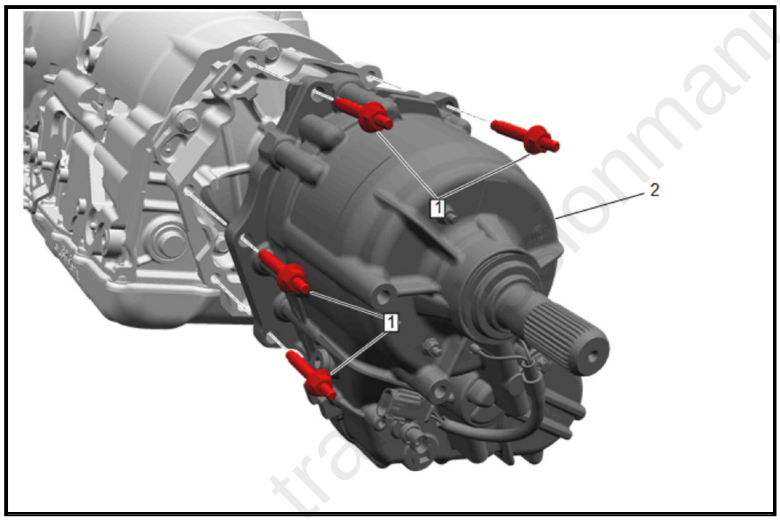
84. 

Transfer Case Stud (1) - Remove [4x]

85. Transfer Case Assembly (2) - Remove

Installation Procedure

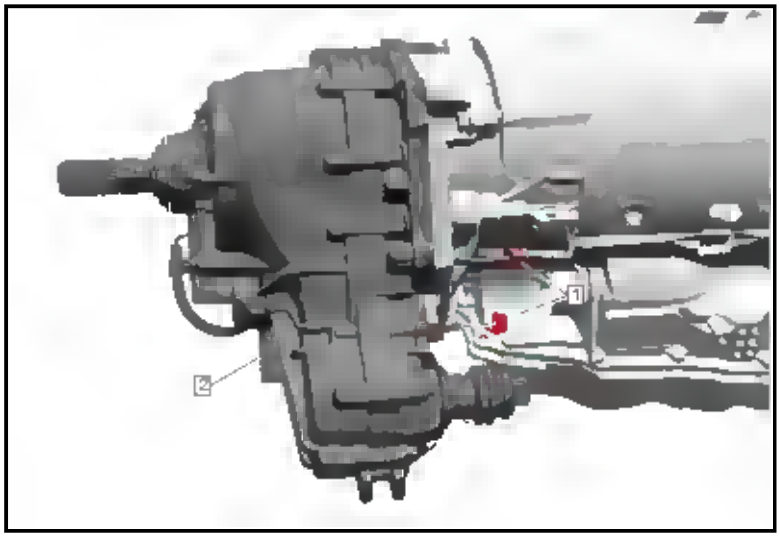
1. Record the clutch calibration identification number. **Transfer Case Identification**
2. Raise the transfer case into position.

3. 

Transfer Case Assembly (2) - Install

4. Transfer Case Stud (1) - Install and tighten [4x] - **Fastener Specifications**

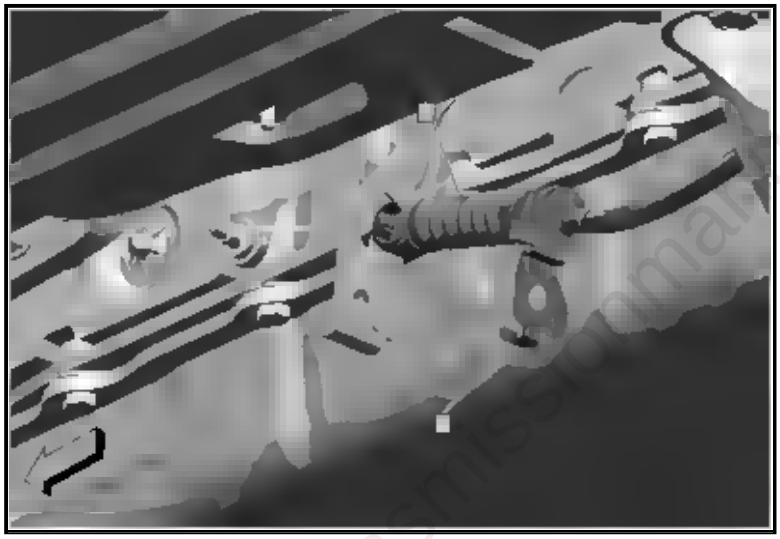
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5. 

CAUTION: **Refer to Fastener Caution .**

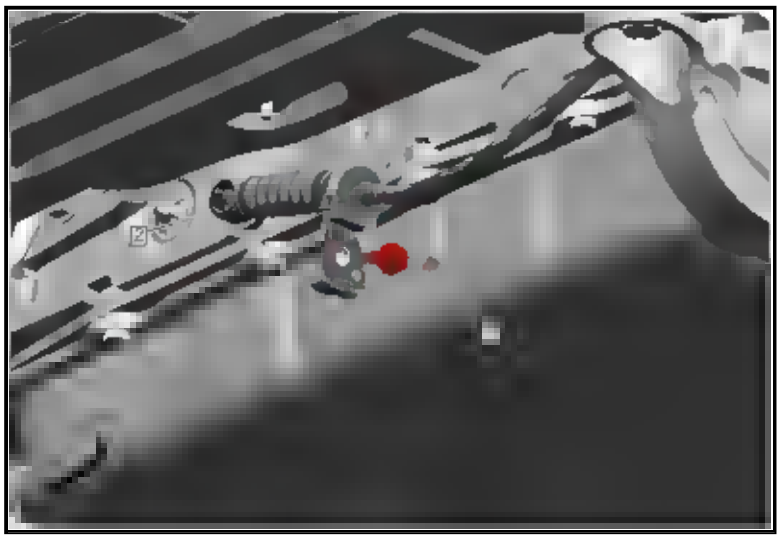
Transfer Case Nut (1) - Install and tighten [2x] - **Fastener Specifications**

6. Raise the transmission.

7. 

Install the electronic transmission range selector manual park release cable (2) to the electronic transmission range selector manual park release cable bracket on the transmission.

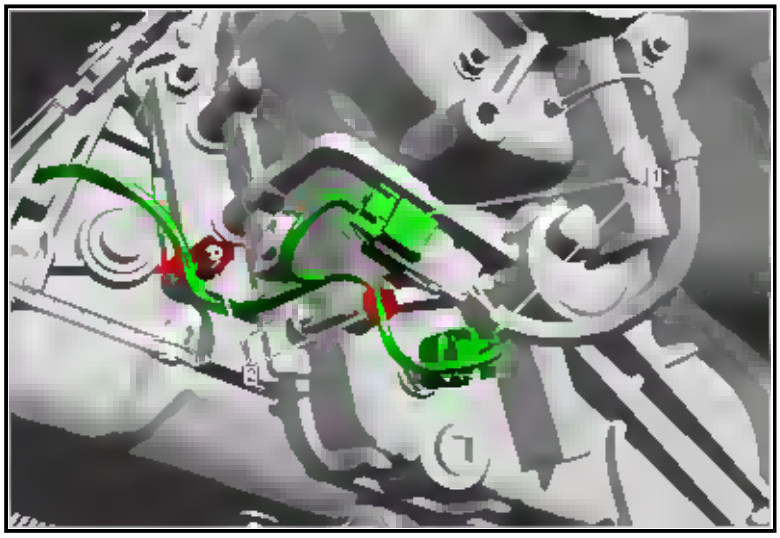
8. Clip the electronic transmission range selector manual park release cable (1) retainer to the electronic transmission range selector manual park release cable bracket.

9. 

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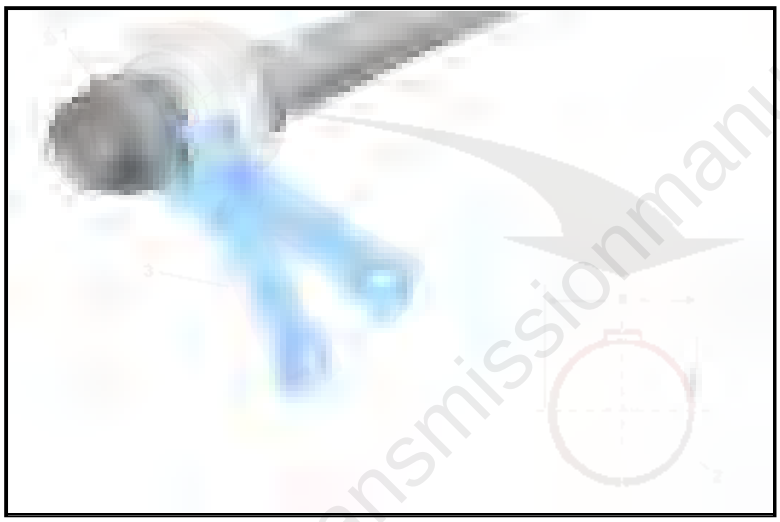
Electronic Transmission Range Selector Manual Park Release Cable (2) @ Transmission - Install

10. Electronic Transmission Range Selector Manual Park Release Cable Clamp Bolt (1) - Install and tighten - **Fastener Specifications**

11. 

    Connect the electrical connectors (1)

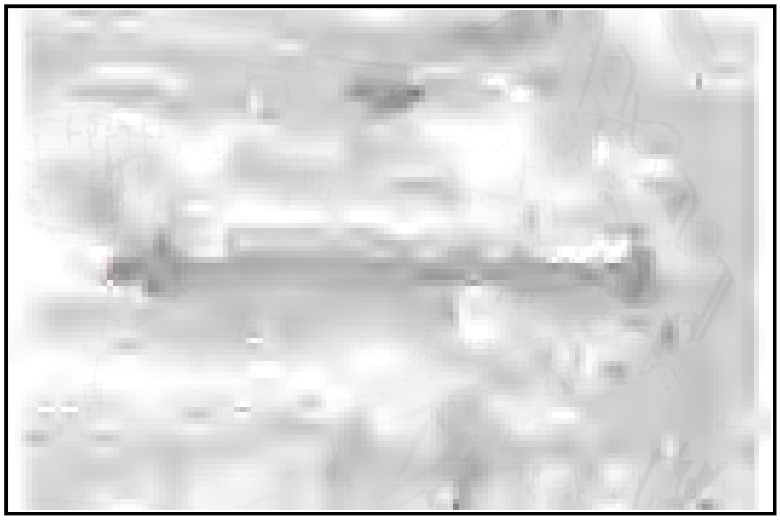
12. Wiring Harness Retainer (2) - Install [2x]

13. 

    If the transfer case front output shaft boot (1) was removed, perform the following:

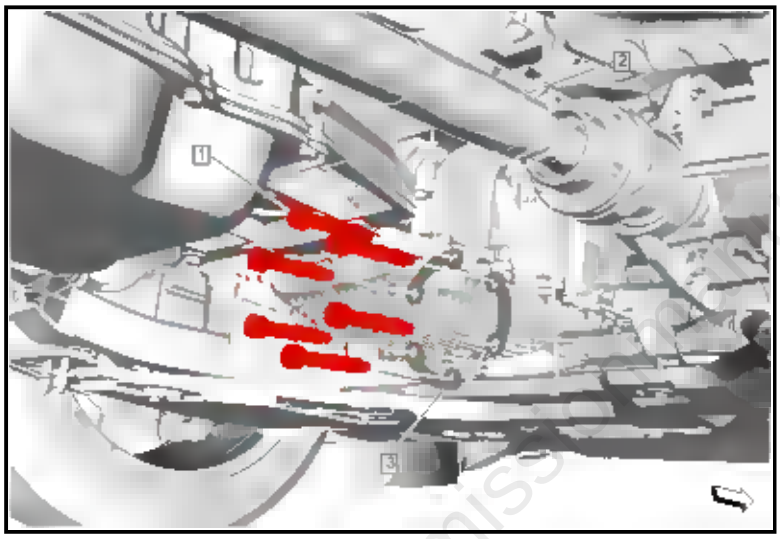
    1. Loosely install a NEW transfer case front output shaft boot clamp (2) to the groove of the transfer case front output shaft boot (1).
    2. Install the transfer case front output shaft boot (1) to the front axle propeller shaft groove ensuring that it is completely engaged.
    3. Using the **DT-35910** Drive Axle Seal Clamp Pliers (3), crimp the transfer case front output shaft boot clamp (2) until the final crimped diameter (a) of 37.5 mm (1.48 in) is achieved.

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14. 

    Loosely install a NEW transfer case front output shaft boot clamp (3) into the groove of the transfer case front output shaft boot (2).

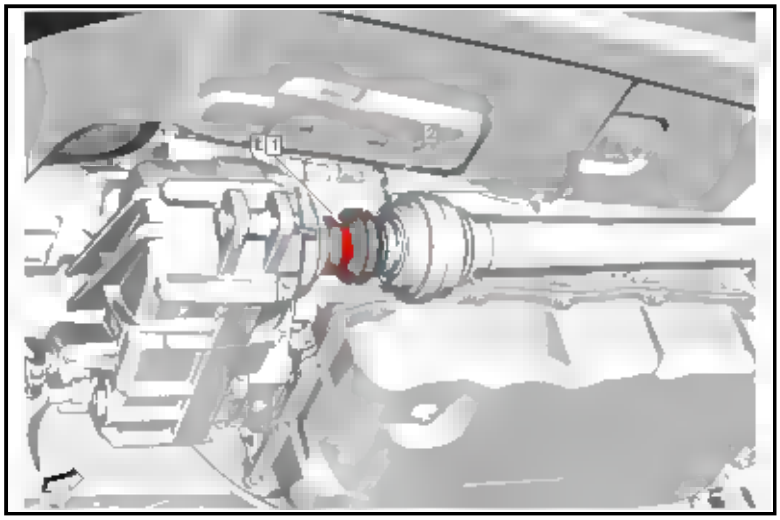
15. Front Axle Propeller Shaft (1) - Install

16. 

    Prepare the 6 front axle propeller shaft bolts (1) for installation as follows:

    1. Remove any loose cured adhesive from the external threads of the components using a lint free cloth.
    2. Thread the cleaned components into the internal mating threads and remove to loosen trapped cured adhesive.
    3. Apply thread locking adhesive to the external threads of the components. **Adhesives, Fluids, Lubricants, and Sealers**
    4. Ensure there are no gaps in the thread locking adhesive once applied to the component.

17. Align the marks made between the front axle propeller shaft (2) and the front differential carrier flange.
18. Front Axle Propeller Shaft Washer (3) - Install [3x]
19. Install and tighten the 6 front axle propeller shaft bolts (1) in a crisscross pattern. **Fastener Specifications**

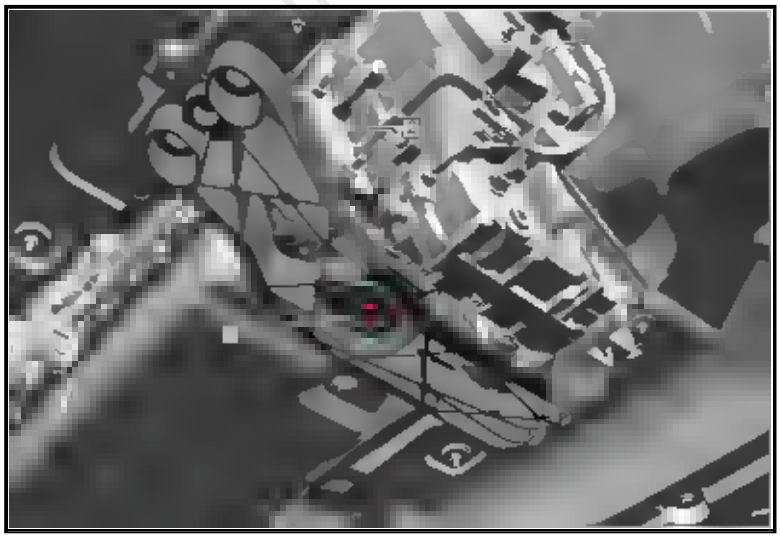
20. 

    Ensure that the front transfer case front output shaft boot (2) is completely engaged into the transfer case front output shaft.

21. Ensure that the front transfer case front output shaft boot clamp (1) is completely engaged into the front transfer case front output shaft boot (2).

22. 

    Using the **DT-35910** Drive Axle Seal Clamp Pliers (1), crimp the transfer case front output shaft boot clamp (2) until the final crimped diameter (a) of 37.5 mm (1.48 in) is achieved.

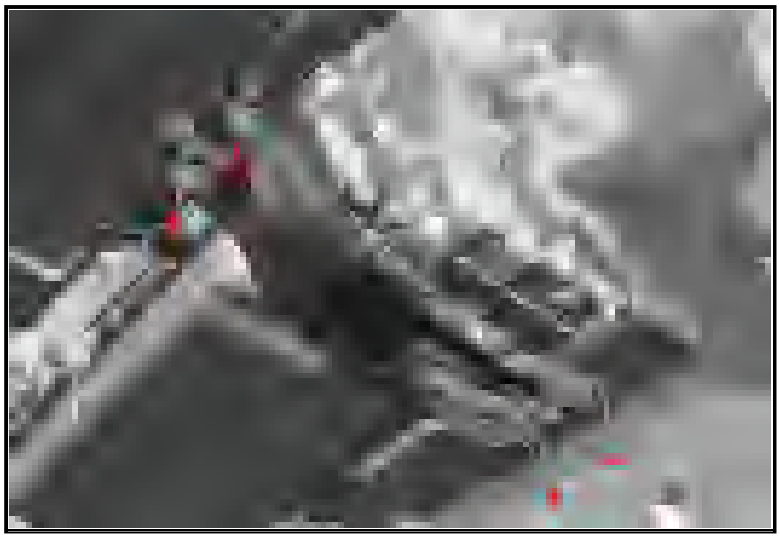
23. 

    Transmission Mount (2) - Install

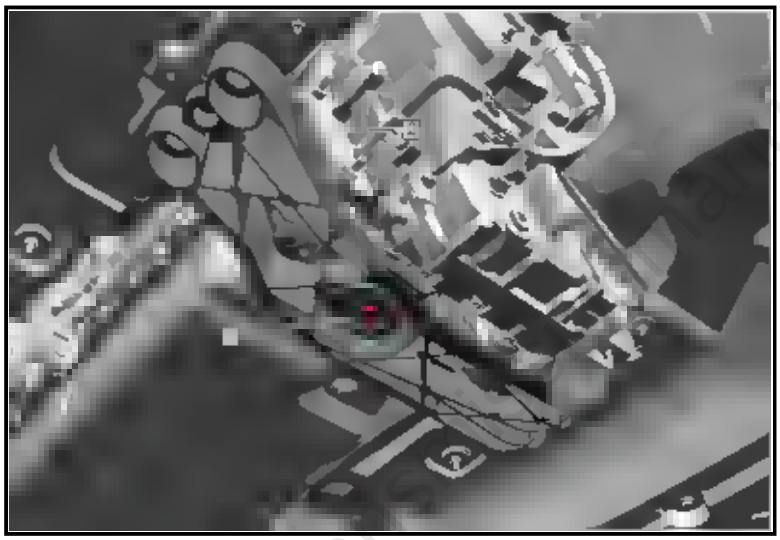
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NOTE: **For proper bolt alignment, loosely install all mount bolts prior to tightening to specifications.**

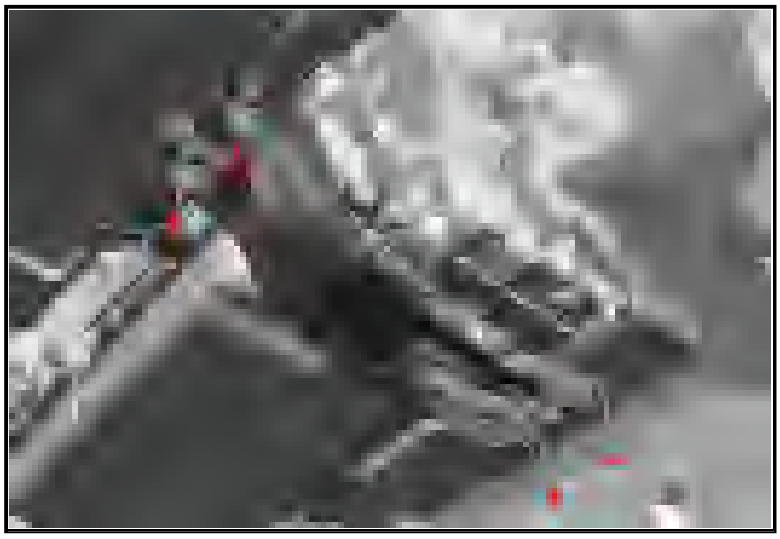
24. Transmission Mount Bolt (1) - Loosely install

25. 

Transmission Mount Bracket Bolt (1) - Loosely install [4x]

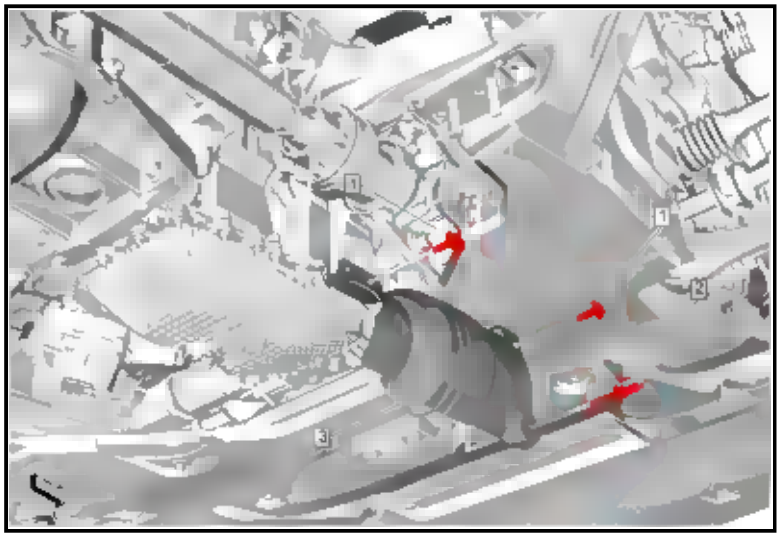
26. 

Transmission Mount Bolt (1) - Tighten - **Fastener Specifications**

27. 

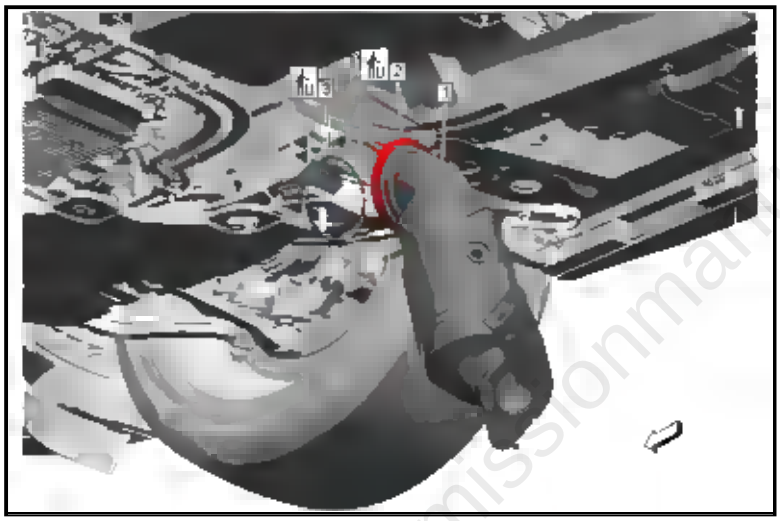
Transmission Mount Bracket Bolt (1) - Tighten [4x] - **Fastener Specifications**

28. Remove the jack from beneath the transmission.

29. 

    Front Axle Propeller Shaft Heat Shield (3) - Install

30. Front Axle Propeller Shaft Heat Shield Bolt (1) - Install and tighten [2x] - **Fastener Specifications**
31. Front Axle Propeller Shaft Heat Shield Stud (2) - Install and tighten - **Fastener Specifications**

32. 

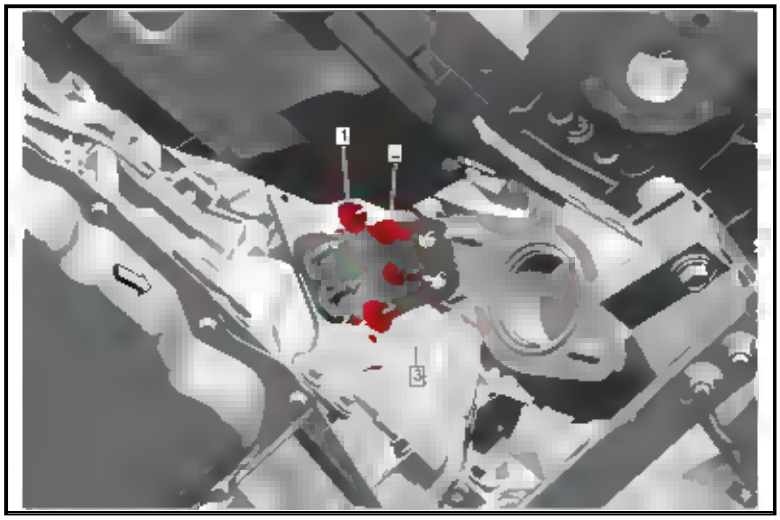
    Catalytic Converter Gasket (3) - Install NEW

33. Exhaust Pipe Clamp (2) - Install NEW

    NOTE: **Ensure that the catalytic converter gasket is fully seated on the warm up three-way catalytic converter inlet flange.**

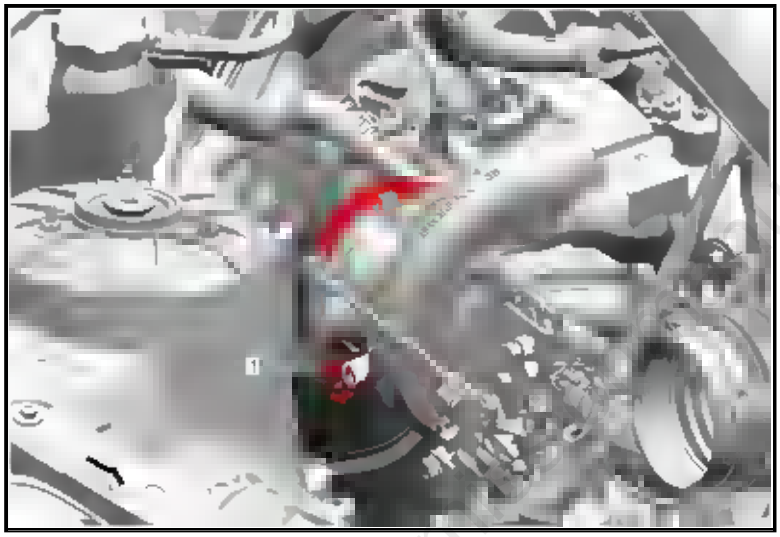
34. Warm Up Three-Way Catalytic Converter (1) - Install

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35. 

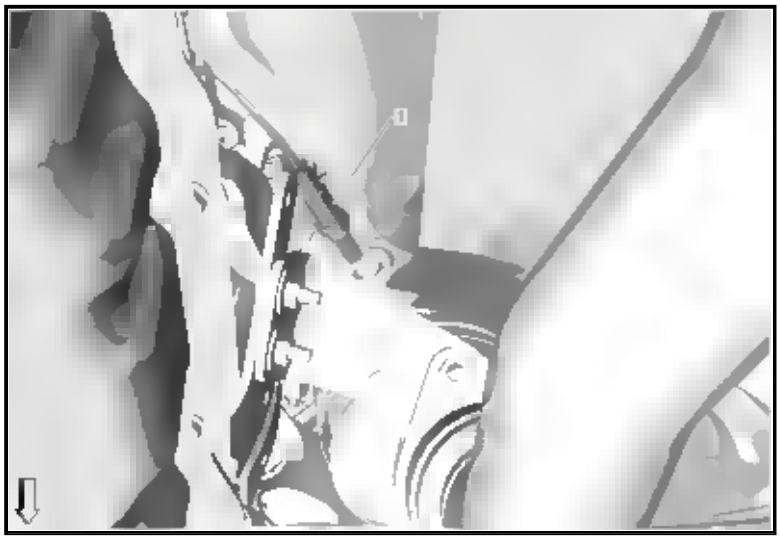
Catalytic Converter Brace (3) - Install

36. Catalytic Converter Brace Bolt (2) - Install and tighten [2x] - **Fastener Specifications**
37. Catalytic Converter Brace Bracket Nut (1) - Install and tighten [2x] - **Fastener Specifications**

38. 

NOTE: **Inspect on all sides of the warm up three-way catalytic converter to verify it is fully seated prior to tightening the exhaust pipe clamp.**

Exhaust Pipe Clamp (1) - Tighten - **Fastener Specifications**

39. 

NOTE: **A special anti-seize compound is used on the heated oxygen sensor threads. The compound consists of liquid graphite and glass beads. The graphite will**

burn away, but the glass beads will remain, making the sensor easier to remove. New or service sensors will have the compound already applied to the threads. IF a sensor is removed and is to be reinstalled, the threads MUST have an anti-seize compound applied before installation. Adhesives, Fluids, Lubricants, and Sealers

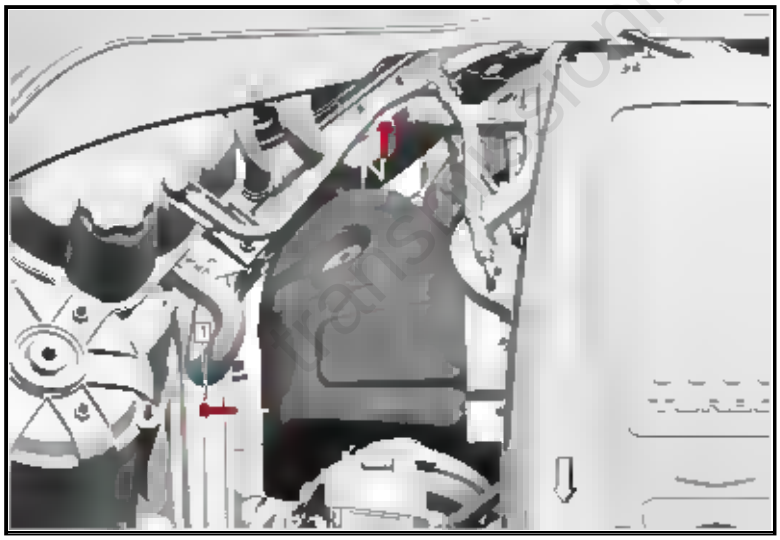
CAUTION: **Refer to Component Fastener Tightening Caution .**

Using the **EN-6179** Heated Oxygen Sensor Remover/Installer, install the heated oxygen sensor (1). **Fastener Specifications**

40. Connect the heated oxygen sensor electrical connector.

41. 

Turbocharger Heat Shield (1) - Install

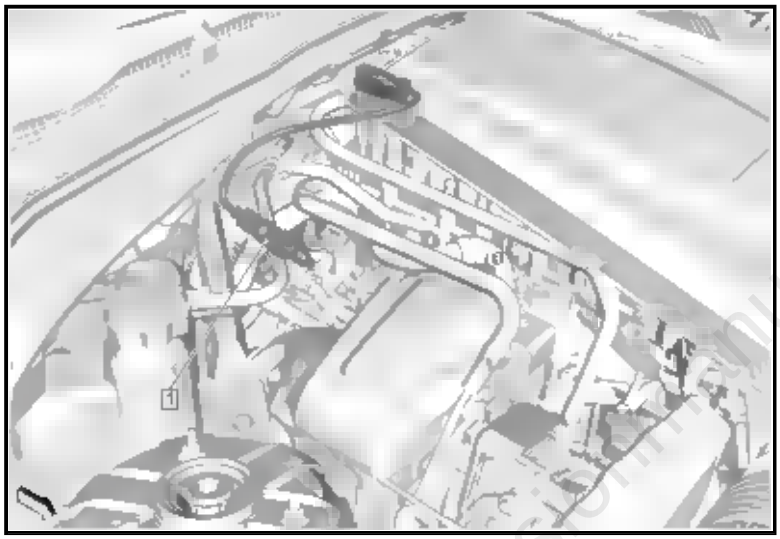
42. 

Turbocharger Heat Shield Bolt (1) - Install and tighten [2x] - **Fastener Specifications**

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43. 

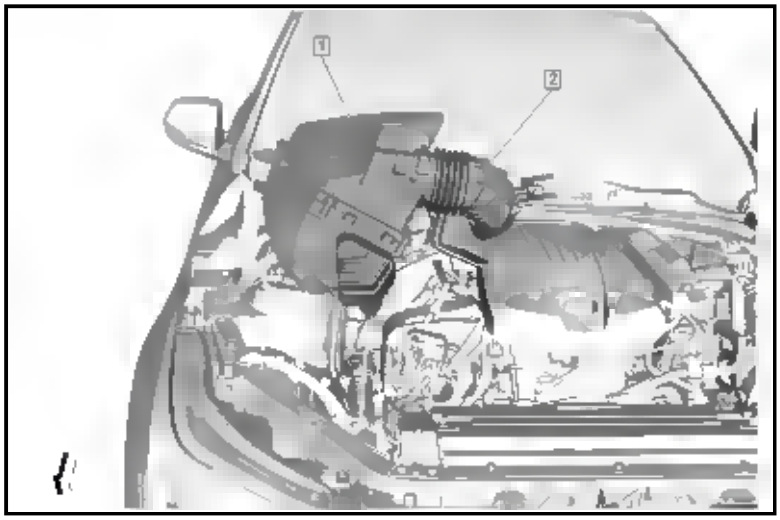
Turbocharger Heat Shield Bolt (1) - Install and tighten [2x] - **Fastener Specifications**

44. 

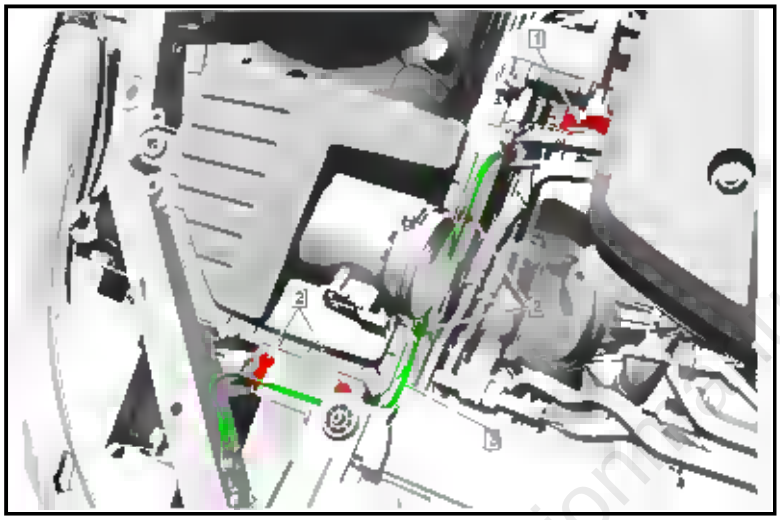
NOTE: **A special anti-seize compound is used on the heated oxygen sensor threads. The compound consists of liquid graphite and glass beads. The graphite will burn away, but the glass beads will remain, making the sensor easier to remove. New or service sensors will have the compound already applied to the threads. IF a sensor is removed and is to be reinstalled, the threads MUST have an anti-seize compound applied before installation. Adhesives, Fluids, Lubricants, and Sealers**

Using the **EN-6179** Heated Oxygen Sensor Remover/Installer, install the heated oxygen sensor (1). **Fastener Specifications**

45. Connect the electrical connector.

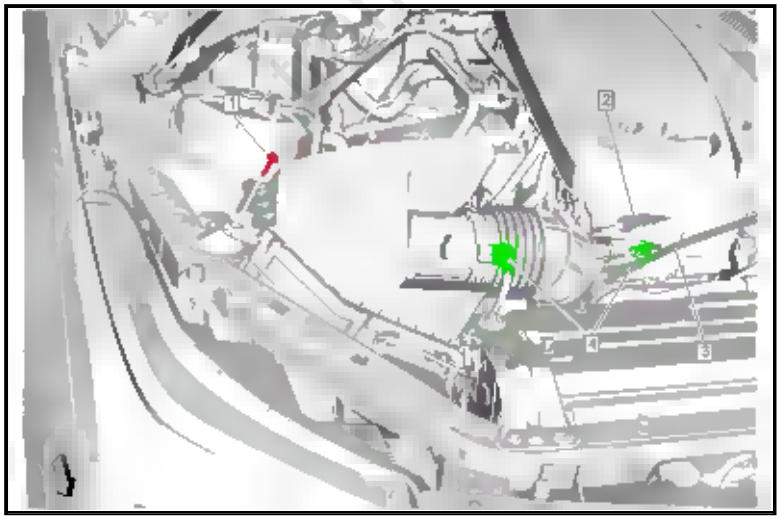
46. 

Install the air cleaner (1) and air cleaner outlet duct (2) as an assembly.

47. 

Engine Wiring Harness (3) - Move into position

48. Wiring Harness Retainer (2) @ Air Cleaner Assembly - Install [4x]
49. Air Cleaner Outlet Duct Clamp (1) - Tighten - **Fastener Specifications**

50. 

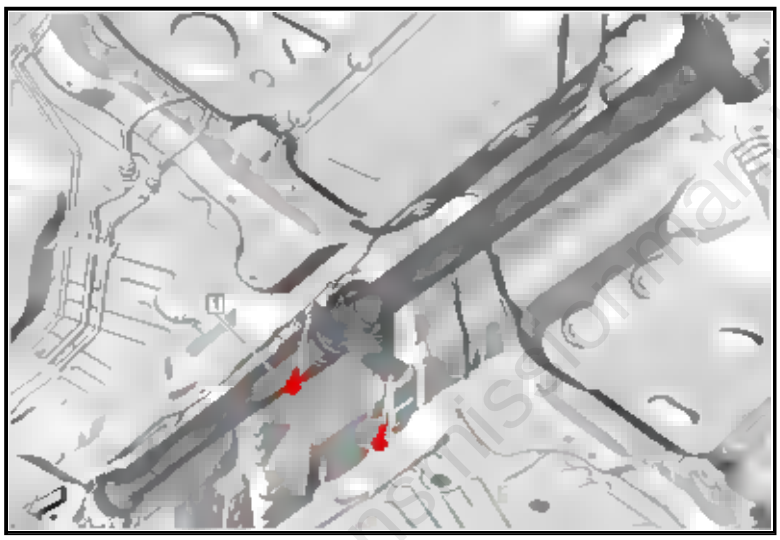
Electrical Connector (4) - Connect [2x]

51. Positive Crankcase Ventilation Tube (3) - Connect - **Plastic Collar Quick Connect Fitting Service**
52. Evaporative Emission Canister Purge Tube (2) - Connect - **Plastic Collar Quick Connect Fitting Service**
53. Air Cleaner Bolt (1) - Install and tighten - **Fastener Specifications**

54. 

    Apply a thin layer of grease to the transmission output shaft splines (1). **Adhesives, Fluids, Lubricants, and Sealers**

55. Loosely install a NEW propeller shaft hub clamp (3) to the propeller shaft joint boot.
56. Support and secure the propeller shaft (2) to a suitable hydraulic jack stand.
57. Propeller Shaft (2) - Install

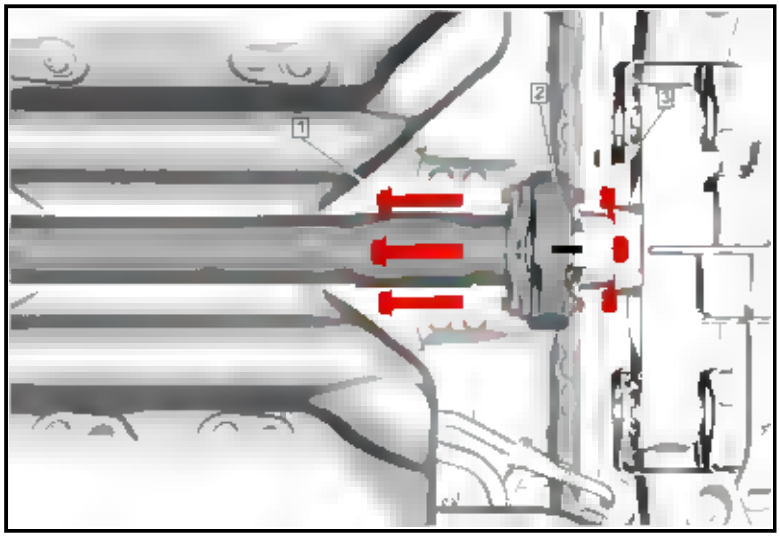
58. 

    Prepare the 2 propeller shaft bearing support bolts (1) for installation as follows:

    1. Remove any loose cured adhesive from the external threads of the components using a lint free cloth.
    2. Thread the cleaned components into the internal mating threads and remove to loosen trapped cured adhesive.
    3. Apply thread locking adhesive to the external threads of the components. **Adhesives, Fluids, Lubricants, and Sealers**
    4. Ensure there are no gaps in the thread locking adhesive once applied to the component.

59. Propeller Shaft Bearing Support Bolt (1) - Install and tighten [2x] - **Fastener Specifications**
60. Remove the hydraulic jack stand supporting the propeller shaft.

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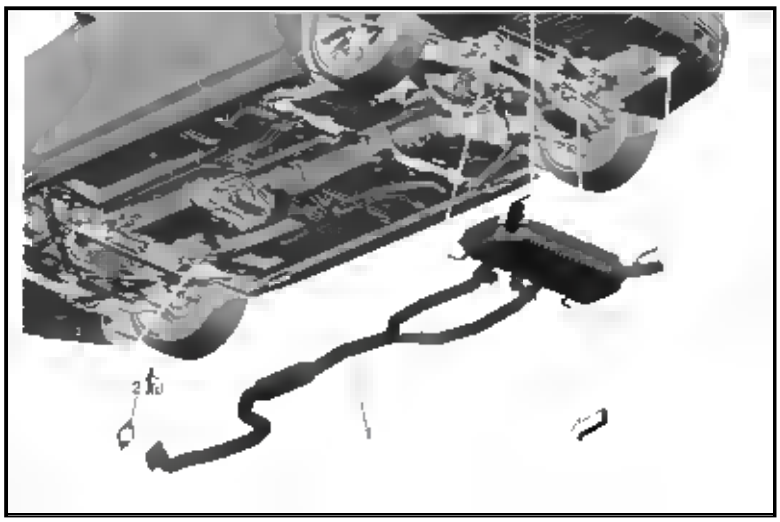
61. 

    Prepare the 3 rear propeller shaft bolts (1) and nuts (3) for installation as follows:

    1. Remove any loose cured adhesive from the external threads of the components using a lint free cloth.
    2. Thread the cleaned components into the internal mating threads and remove to loosen trapped cured adhesive.
    3. Apply thread locking adhesive to the external threads of the components. **Adhesives, Fluids, Lubricants, and Sealers**
    4. Ensure there are no gaps in the thread locking adhesive once applied to the component.

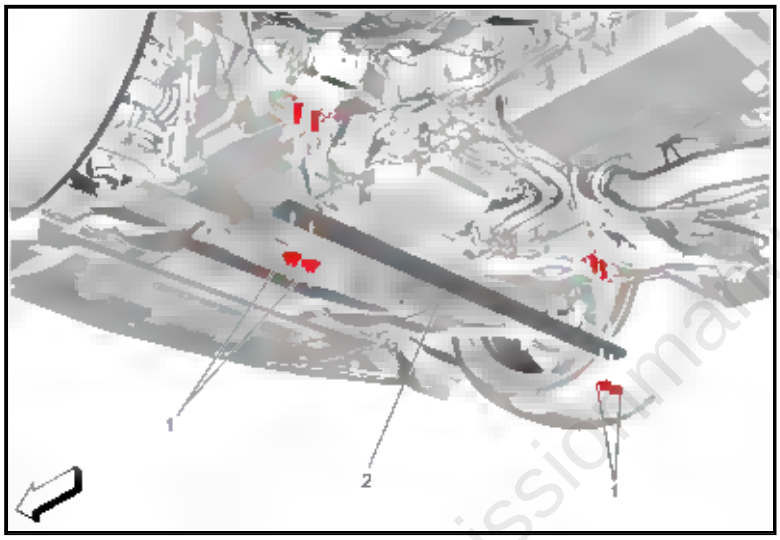
62. Align the relationship marks (2) made on the propeller shaft and the rear differential flange.
63. Rear Propeller Shaft Bolt (1) - Install [3x]
64. Rear Propeller Shaft Nut (3) - Loosely install [3x]
65. Rear Propeller Shaft Bolt (1) - Tighten [3x] - **Fastener Specifications**
66. 
67. Ensure that the drive shaft boot is completely seated in the output shaft groove prior to crimping the propeller shaft hub clamp (2).
68. Using the **DT-35910** Drive Axle Seal Clamp Pliers (1), crimp the propeller shaft hub clamp (2) until the final crimped outer diameter (a) is 39 - 41 mm (1.54 - 1.61 in).

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69. 

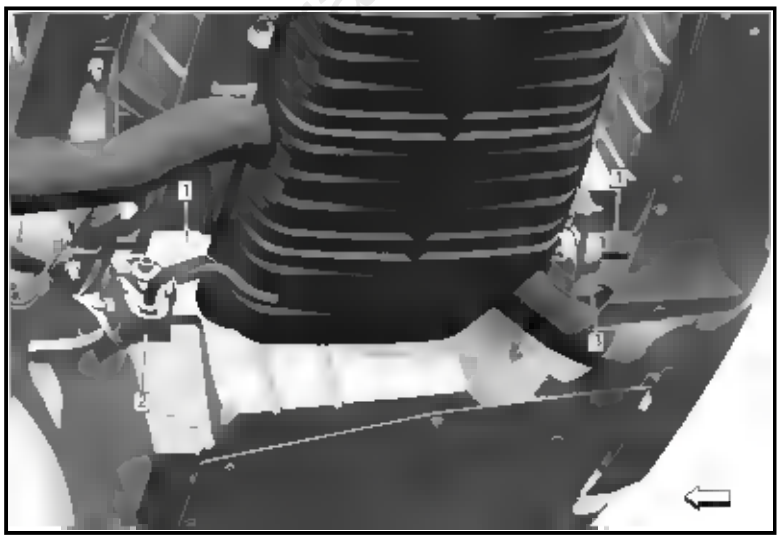
Catalytic Converter Gasket (2) - Install NEW

70. Exhaust Muffler (1) - Install

71. 

{If equipped} Front Crossmember Brace (2) - Install

72. {If equipped} Front Crossmember Brace Nut (1) - Install and tighten [4x] - **Fastener Specifications**

73. 

Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Right Side (3) - Install

74. Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Right Side (2) - Install

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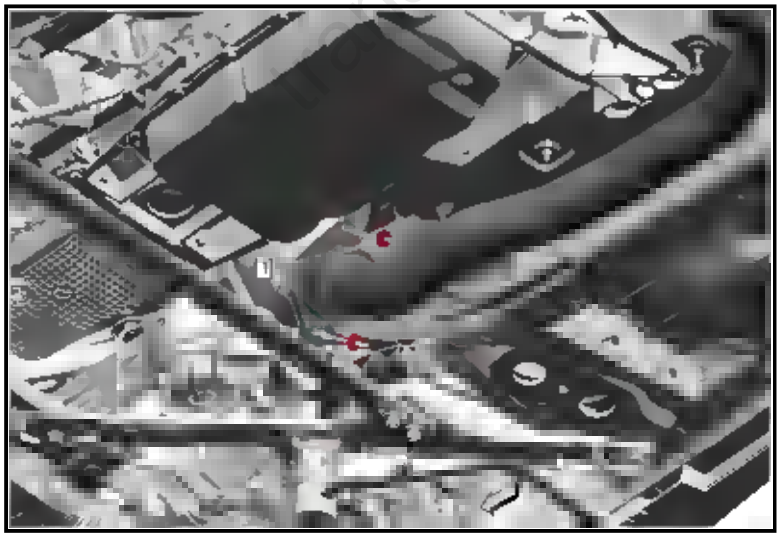
75. 

Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Left Side (3) - Install

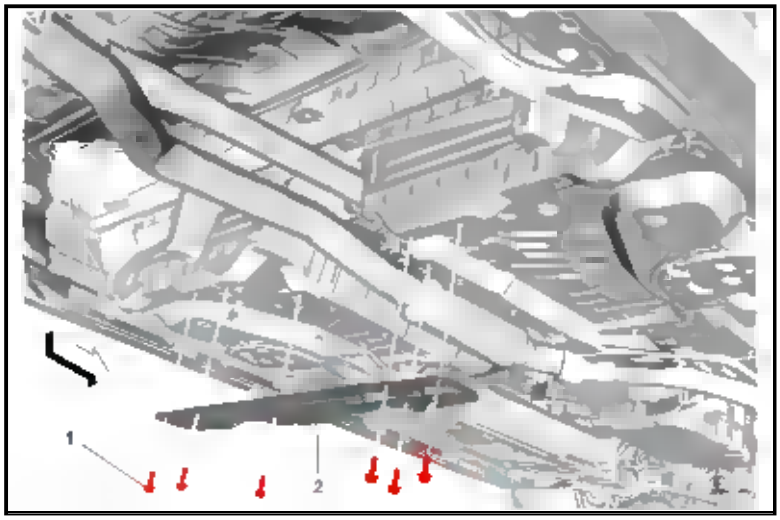
76. Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Left Side (2) - Install

77. 

Electrical Connector (1) @ Exhaust Control Valve Actuator - Connect [2x]

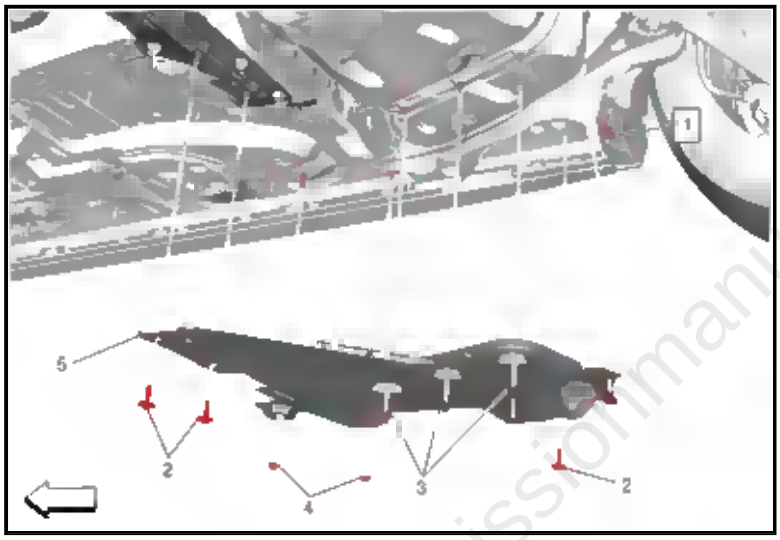
78. 

Catalytic Converter Nut (1) - Install [2x] - **Fastener Specifications**

79. 

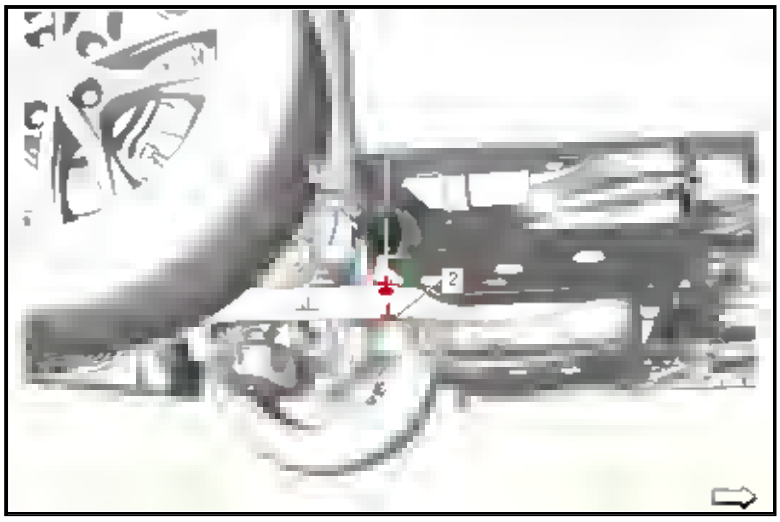
Floor Panel Reinforcement (2) - Install

80. Floor Panel Number 4 Cross Bar Reinforcement Bolt (1) - Install and tighten [6x] - **Fastener Specifications**

81. 

Underbody Rear Air Deflector - Right Side (5) - Install

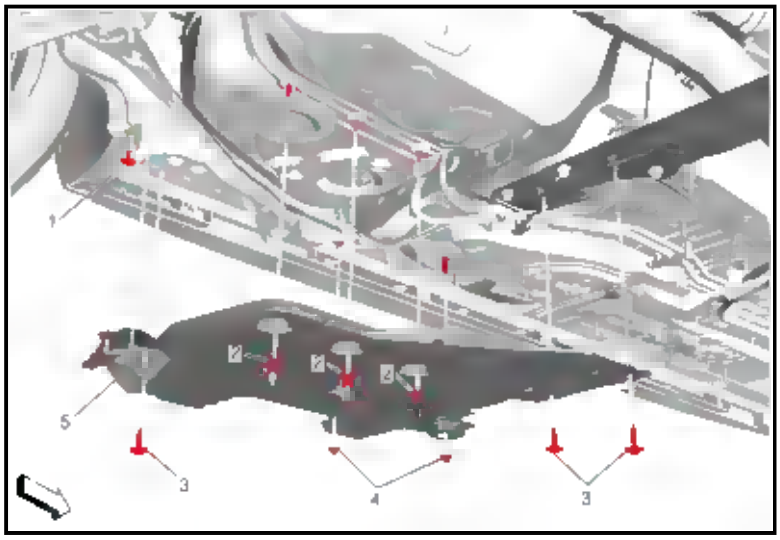
82. Underbody Rear Air Deflector Plastic Nut (3) - Install and tighten [3x] - **Fastener Specifications**
83. Underbody Rear Air Deflector Bolt (2) - Install and tighten [3x] - **Fastener Specifications**
84. Underbody Rear Air Deflector Nut (4) - Install and tighten [2x] - **Fastener Specifications**
85. Rear Wheelhouse Liner Screw (1) - Install and tighten - **Fastener Specifications**

86. 

Rear Tire Front Air Deflector - Right Side (1) - Install

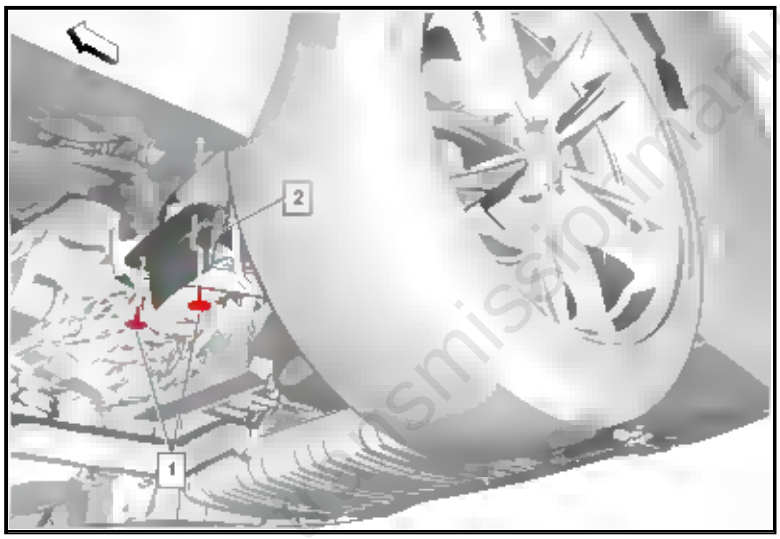
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87. Rear Tire Front Air Deflector Bolt (2) - Install and tighten [2x] - **Fastener Specifications**

88. 

Underbody Rear Air Deflector - Left Side (5) - Install

89. Underbody Rear Air Deflector Plastic Nut (2) - Install and tighten [3x] - **Fastener Specifications**
90. Underbody Rear Air Deflector Bolt (3) - Install and tighten [3x] - **Fastener Specifications**
91. Underbody Rear Air Deflector Nut (4) - Install and tighten [2x] - **Fastener Specifications**
92. Rear Wheelhouse Liner Screw (1) - Install and tighten - **Fastener Specifications**

93. 

Rear Tire Front Air Deflector - Left Side (2) - Install

94. Rear Tire Front Air Deflector Bolt (1) - Install and tighten [2x] - **Fastener Specifications**
95. Refill the transfer case. **Transfer Case Fluid Replacement**
96. Remove the support and lower the vehicle.
97. Program the module transfer case control module. **Control Module References**
98. Enter 3 digit clutch calibration identification number when prompted.
99. Inspect the exhaust system for leaks.

INPUT SHAFT SEAL REPLACEMENT

Single Use Fasteners and Components

- Transfer Case Input Shaft Seal

Special Tools

- **J-42738** Seal Installer

Equivalent regional tools: **Special Tools**

Removal Procedure

1. Transfer Case Assembly - Remove - **Transfer Case Assembly Replacement**
2. 

   Using a suitable tool, remove and DISCARD the transfer case input shaft seal (1).

Installation Procedure

1. 

   NOTE: **Install the transfer case input shaft seal until flush with the face of the transfer case.**

   Using **J-42738** Seal Installer (1), install a NEW transfer case input shaft seal (2).

2. Transfer Case Assembly - Install - **Transfer Case Assembly Replacement**

REAR OUTPUT SHAFT SEAL REPLACEMENT

Single Use Fasteners and Components

- Catalytic Converter Gasket
- Propeller Shaft Hub Clamp
- Transfer Case Rear Output Shaft Oil Slinger
- Transfer Case Rear Output Shaft Seal

Special Tools

Transmission/Transfer Case

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- **DT-49861-A** Seal Installer
- **J-44907** Bearing Installer

Equivalent regional tools: **Special Tools**

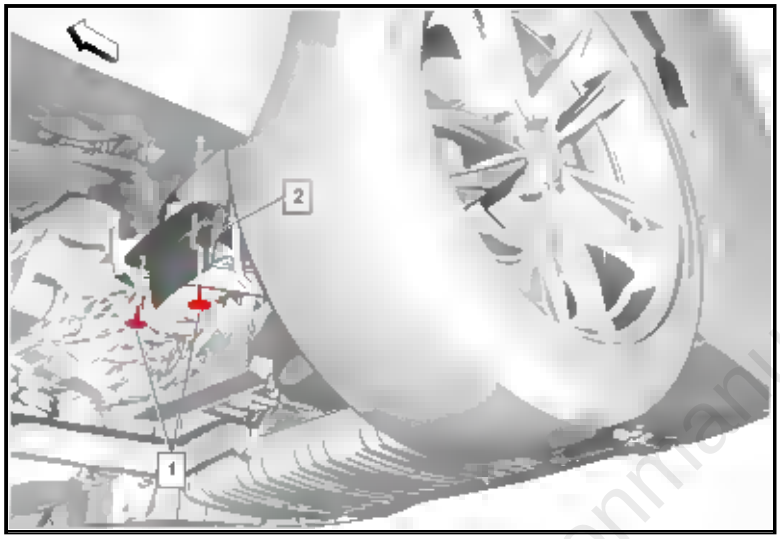
Special Tools

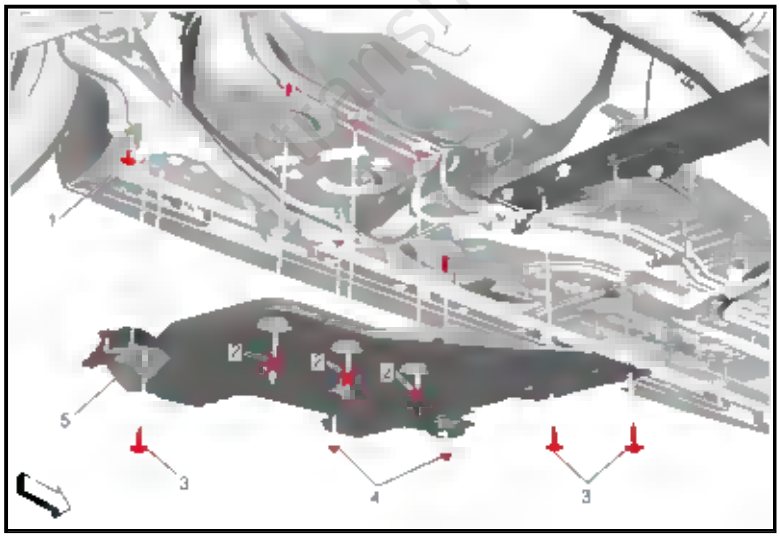
Driveline/Axle

- **DT-35910** Drive Axle Seal Clamp Pliers

Equivalent regional tools: **Special Tools**

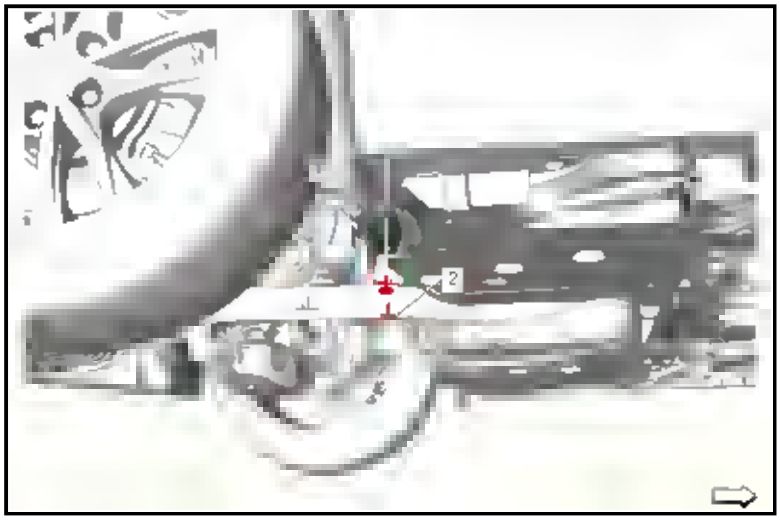
Removal Procedure

1. Raise and support the vehicle. **Lifting and Jacking the Vehicle**
2. 

   Rear Tire Front Air Deflector Bolt (1) - Remove [2x]
3. Rear Tire Front Air Deflector - Left Side (2) - Remove
4. 

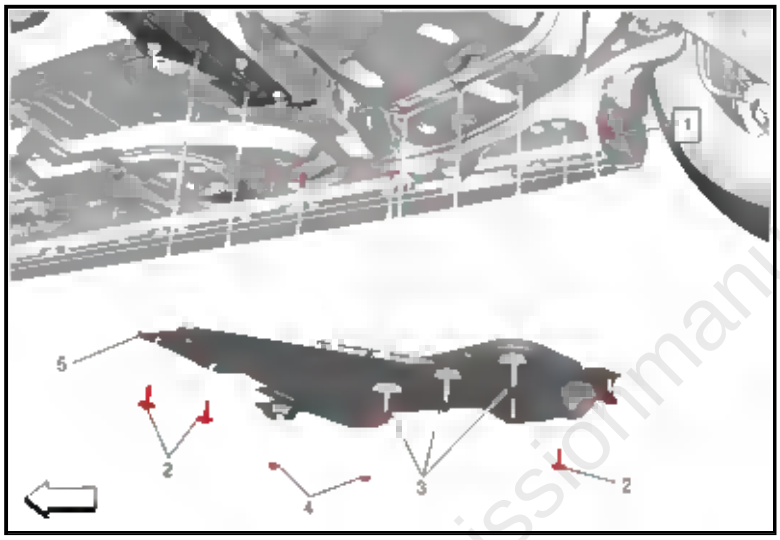
   Rear Wheelhouse Liner Screw (1) - Remove
5. Underbody Rear Air Deflector Plastic Nut (2) - Remove [3x]
6. Underbody Rear Air Deflector Bolt (3) - Remove [3x]
7. Underbody Rear Air Deflector Nut (4) - Remove [2x]
8. Underbody Rear Air Deflector - Left Side (5) - Remove

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9. 

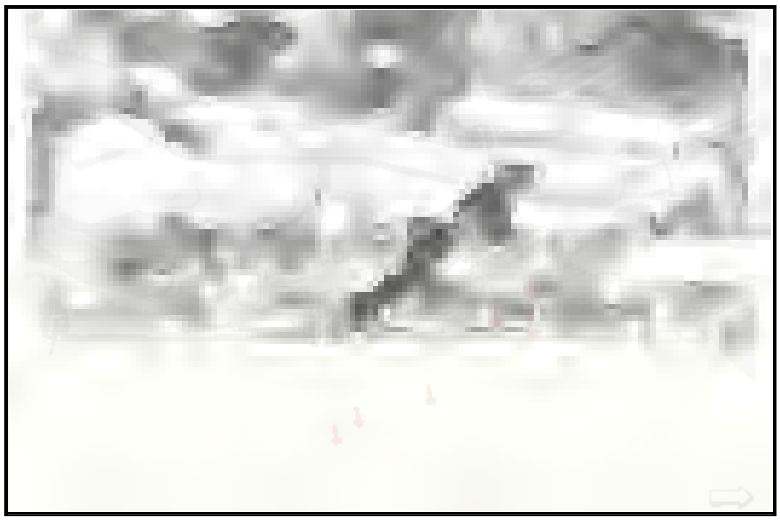
Rear Tire Front Air Deflector Bolt (2) - Remove [2x]

10. Rear Tire Front Air Deflector - Right Side (1) - Remove

11. 

Rear Wheelhouse Liner Screw (1) - Remove

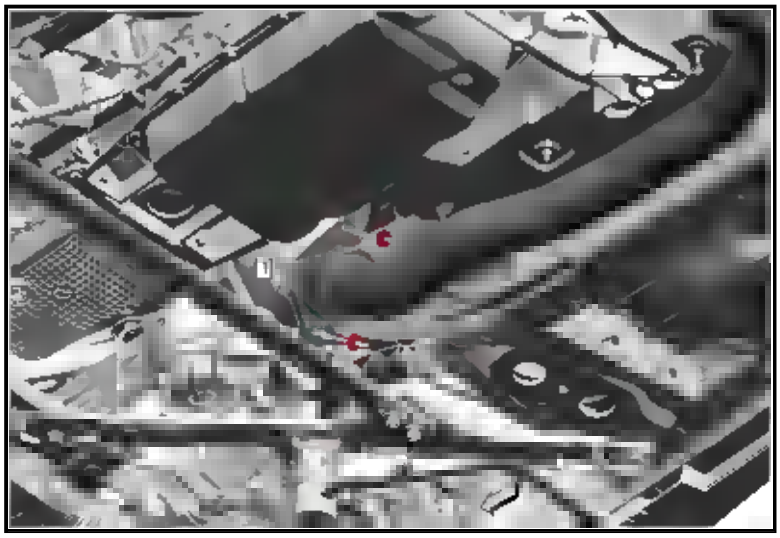
12. Underbody Rear Air Deflector Bolt (2) - Remove [3x]
13. Underbody Rear Air Deflector Plastic Nut (3) - Remove [3x]
14. Underbody Rear Air Deflector Nut (4) - Remove [2x]
15. Underbody Rear Air Deflector - Right Side (5) - Remove

16. 

Floor Panel Number 4 Cross Bar Reinforcement Bolt (2) - Remove [6x]

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17. Floor Panel Reinforcement (1) - Remove

18. 

Catalytic Converter Nut (1) - Remove [2x]

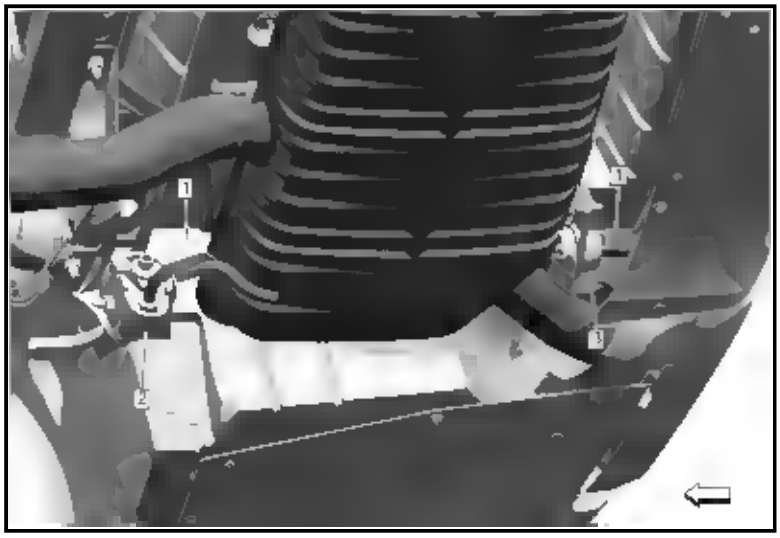
19. 

Electrical Connector (1) @ Exhaust Control Valve Actuator - Disconnect [2x]

20. 

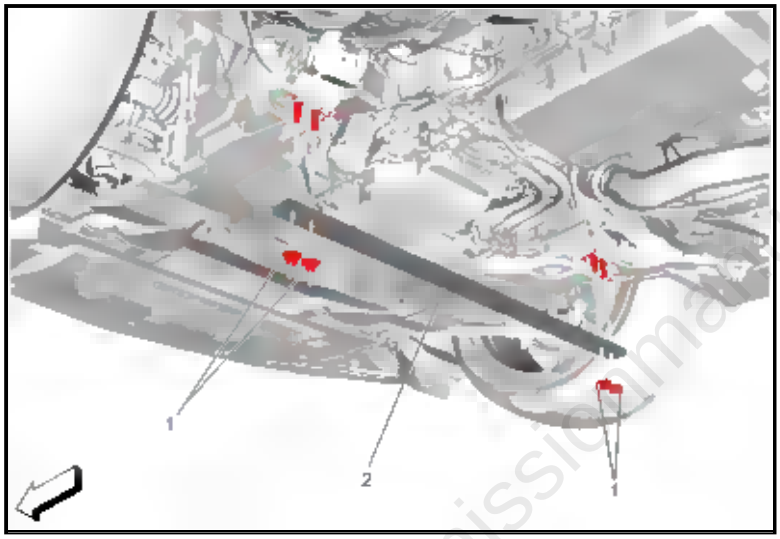
Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Left Side (2) - Separate

21. Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Left Side (3) - Separate

22. 

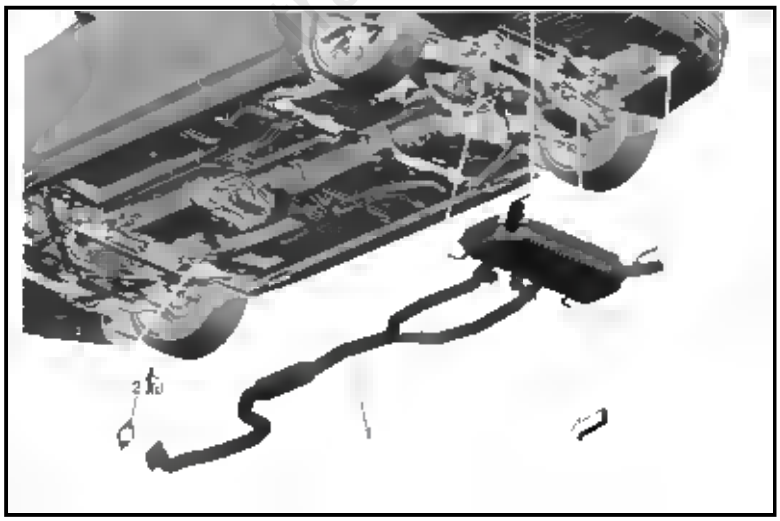
    Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Right Side (2) - Separate

23. Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Right Side (3) - Separate

24. 

    {If equipped} Front Crossmember Brace Nut (1) - Remove [4x]

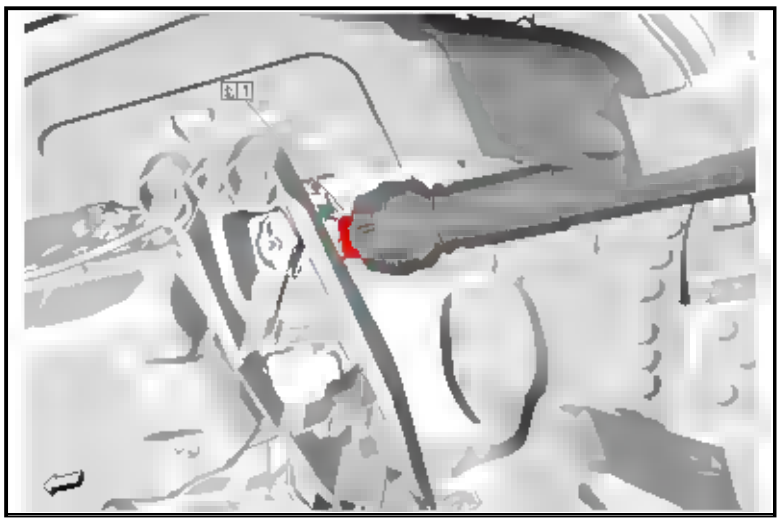
25. {If equipped} Front Crossmember Brace (2) - Remove

26. 

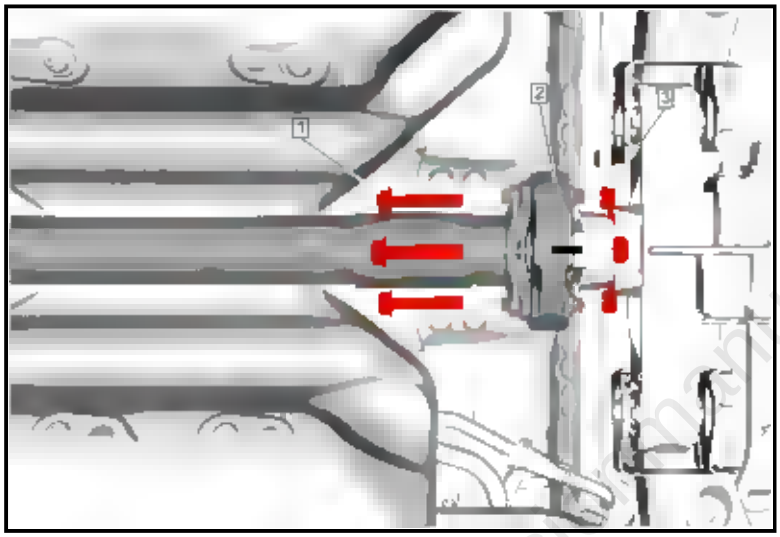
    Exhaust Muffler (1) - Remove

27. Catalytic Converter Gasket (2) - Remove and DISCARD

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28. 

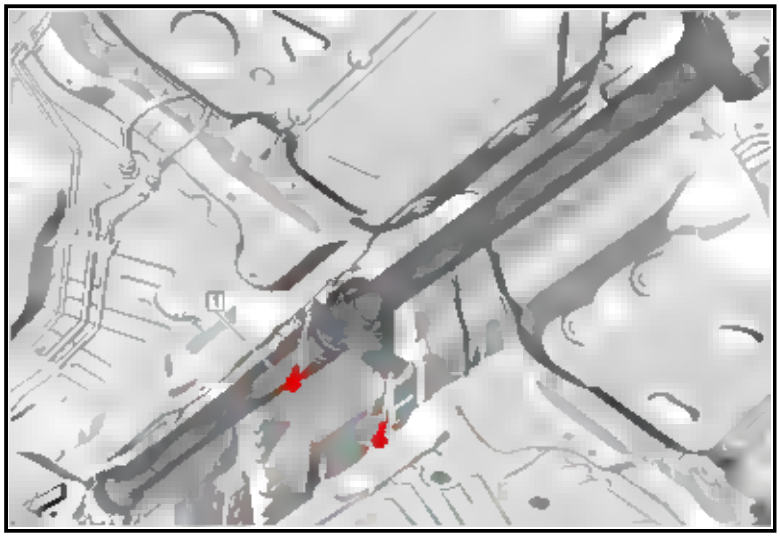
Propeller Shaft Hub Clamp (1) - Remove and DISCARD

29. 

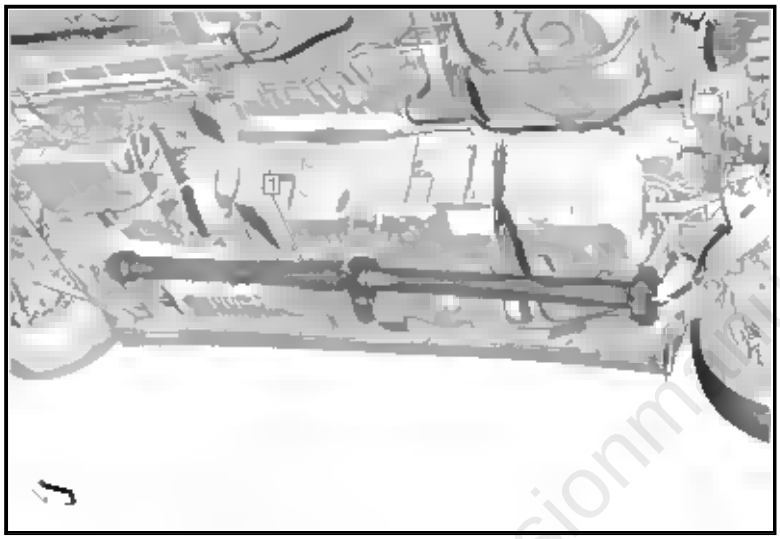
Mark (2) the relationship of the propeller shaft to the rear differential flange using a paint pen.

CAUTION: **When removing the propeller shaft, do not remove the propeller shaft coupler from the propeller shaft assembly. The only bolts that should be removed are those that mount each coupler to the transmission output flange, and to the rear drive axle input flange. Failure to properly remove the propeller shaft assembly may cause coupler damage, resulting in necessary replacement of the entire propeller shaft.**

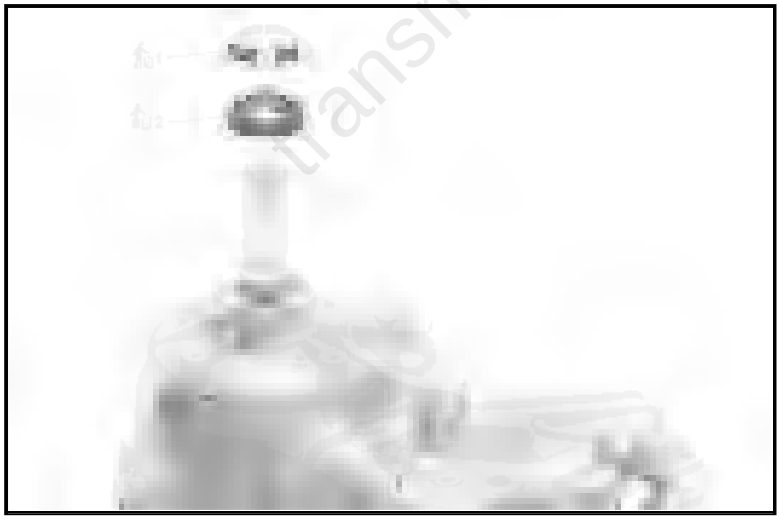
30. Rear Propeller Shaft Nut (3) - Remove [3x]
31. Rear Propeller Shaft Bolt (1) - Remove [3x]
32. Support and secure the propeller shaft to a suitable hydraulic jack stand.

33. 

Propeller Shaft Bearing Support Bolt (1) - Remove [2x]

34. 

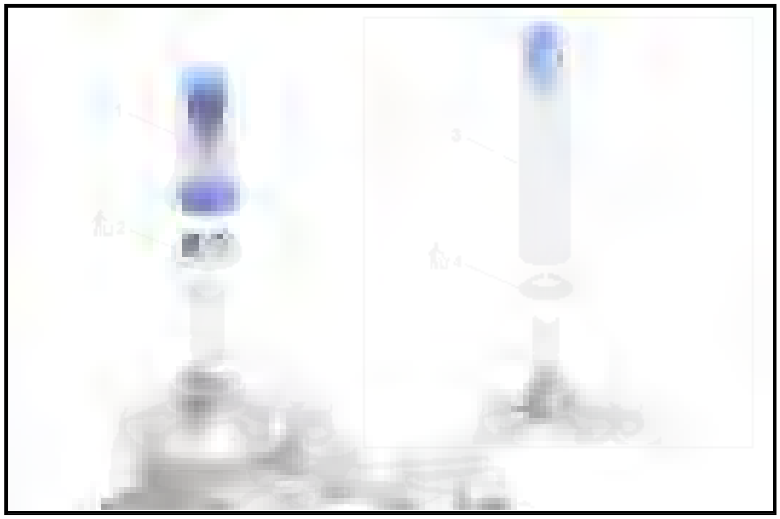
Propeller Shaft (1) - Remove

35. 

Using a suitable tool, remove and DISCARD the rear output shaft seal slinger (1) and the rear output shaft seal (2).

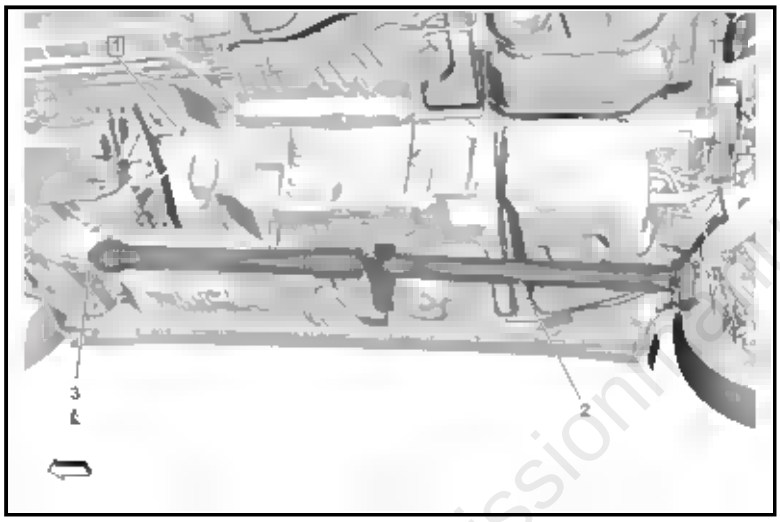
Installation Procedure

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1. 

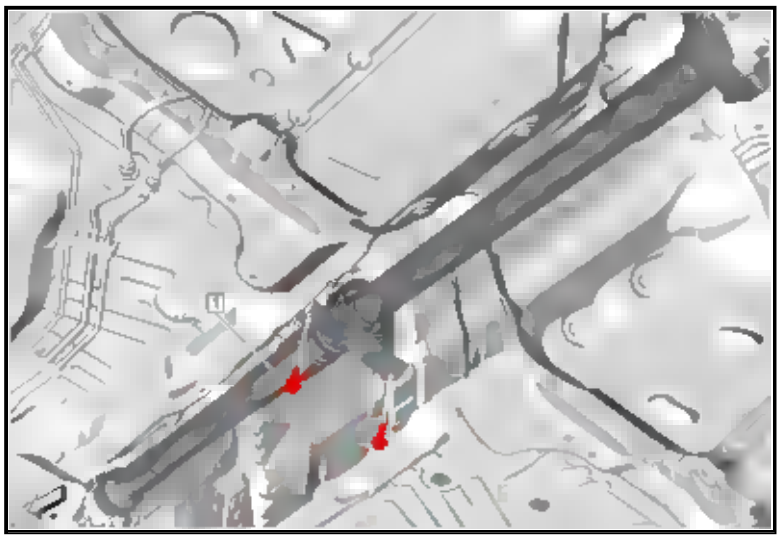
   Using the **DT-49861-A** Seal Installer (1), install a NEW rear output shaft seal (2).

2. Using the **J-44907** Bearing Installer (3), install a NEW rear output shaft oil slinger (4).

3. 

   Apply a thin layer of grease to the transmission output shaft splines (1). **Adhesives, Fluids, Lubricants, and Sealers**

4. Loosely install a NEW propeller shaft hub clamp (3) to the propeller shaft joint boot.
5. Support and secure the propeller shaft (2) to a suitable hydraulic jack stand.
6. Propeller Shaft (2) - Install

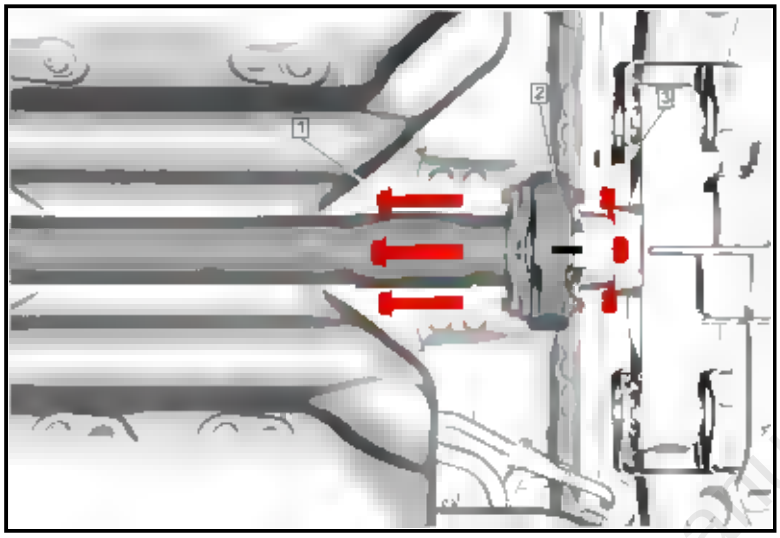
7. 

   Prepare the 2 propeller shaft bearing support bolts (1) for installation as follows:

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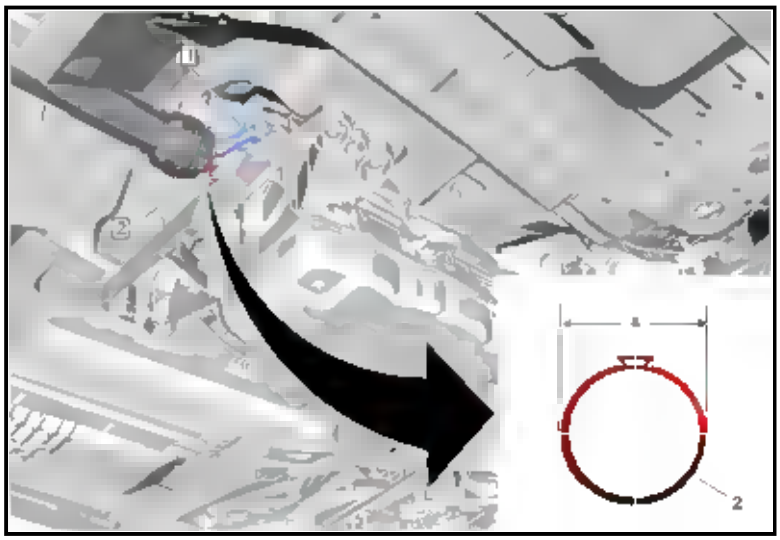
1. Remove any loose cured adhesive from the external threads of the components using a lint free cloth.
2. Thread the cleaned components into the internal mating threads and remove to loosen trapped cured adhesive.
3. Apply thread locking adhesive to the external threads of the components. **Adhesives, Fluids, Lubricants, and Sealers**
4. Ensure there are no gaps in the thread locking adhesive once applied to the component.

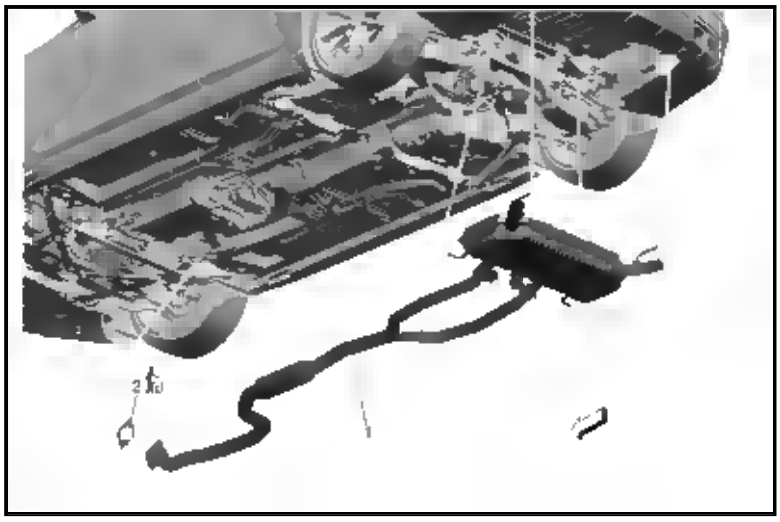
CAUTION: **Refer to Fastener Caution .**

8. Propeller Shaft Bearing Support Bolt (1) - Install and tighten [2x] - **Fastener Specifications**
9. Remove the hydraulic jack stand supporting the propeller shaft.
10. 

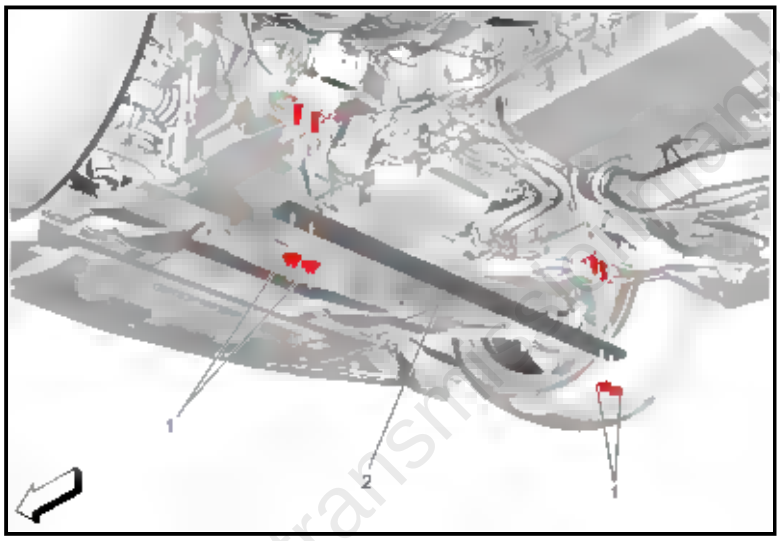
Prepare the 3 rear propeller shaft bolts (1) and nuts (3) for installation as follows:

1. Remove any loose cured adhesive from the external threads of the components using a lint free cloth.
2. Thread the cleaned components into the internal mating threads and remove to loosen trapped cured adhesive.
3. Apply thread locking adhesive to the external threads of the components. **Adhesives, Fluids, Lubricants, and Sealers**
4. Ensure there are no gaps in the thread locking adhesive once applied to the component.

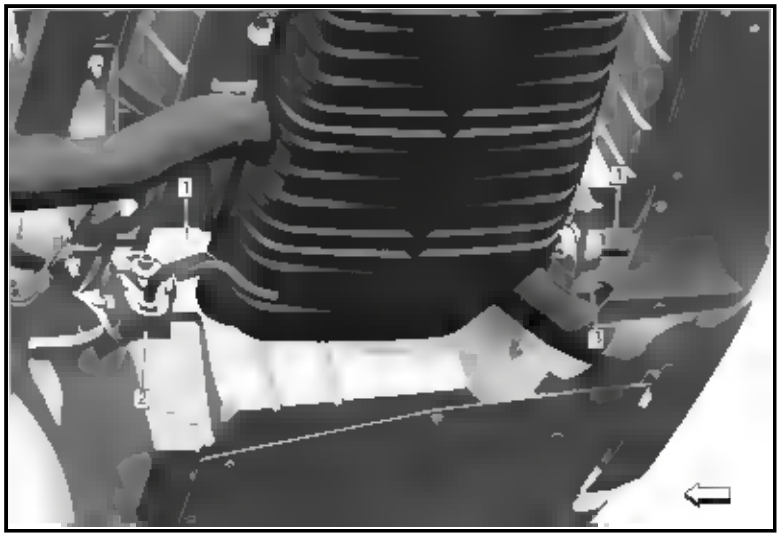
11. Align the relationship marks (2) made on the propeller shaft and the rear differential flange.
12. Rear Propeller Shaft Bolt (1) - Install [3x]
13. Rear Propeller Shaft Nut (3) - Loosely install [3x]
14. Rear Propeller Shaft Bolt (1) - Tighten [3x] - **Fastener Specifications**
15. 

16. Ensure that the drive shaft boot is completely seated in the output shaft groove prior to crimping the propeller shaft hub clamp (2).
17. Using the **DT-35910** Drive Axle Seal Clamp Pliers (1), crimp the propeller shaft hub clamp (2) until the final crimped outer diameter (a) is 39 - 41 mm (1.54 - 1.61 in).
18. 

    Catalytic Converter Gasket (2) - Install NEW

19. Exhaust Muffler (1) - Install
20. 

    {If equipped} Front Crossmember Brace (2) - Install

21. {If equipped} Front Crossmember Brace Nut (1) - Install and tighten [4x] - **Fastener Specifications**
22. 

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Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Right Side (3) - Install

23. Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Right Side (2) - Install

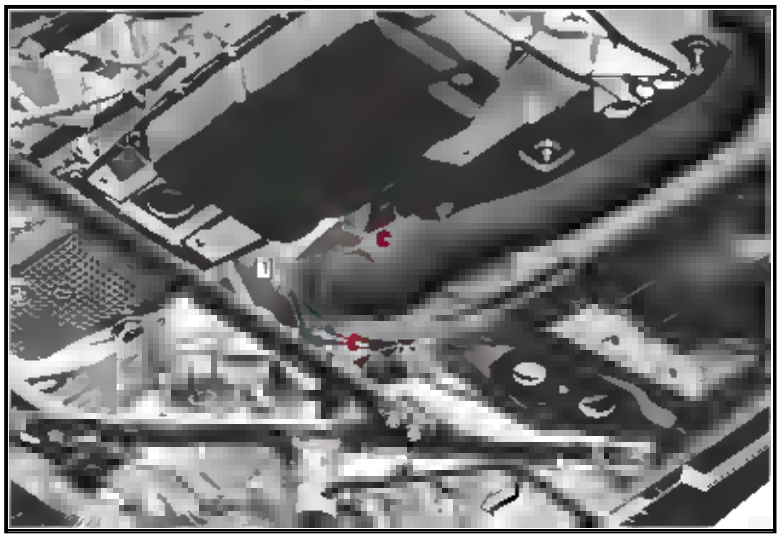
24. 

Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Left Side (3) - Install

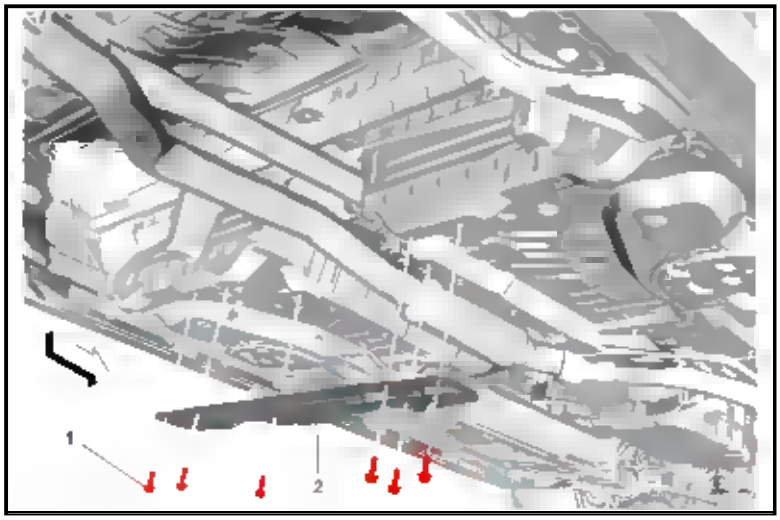
25. Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Left Side (2) - Install

26. 

Electrical Connector (1) @ Exhaust Control Valve Actuator - Connect [2x]

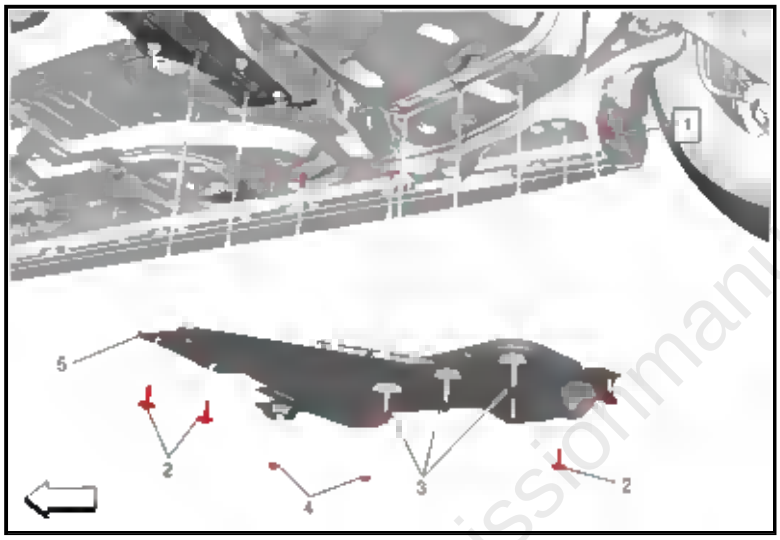
27. 

Catalytic Converter Nut (1) - Install [2x] - **Fastener Specifications**

28. 

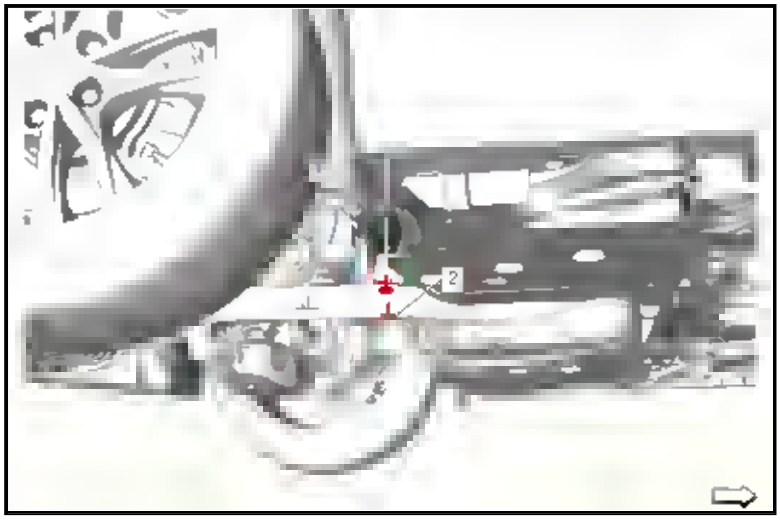
Floor Panel Reinforcement (2) - Install

29. Floor Panel Number 4 Cross Bar Reinforcement Bolt (1) - Install and tighten [6x] - **Fastener Specifications**

30. 

Underbody Rear Air Deflector - Right Side (5) - Install

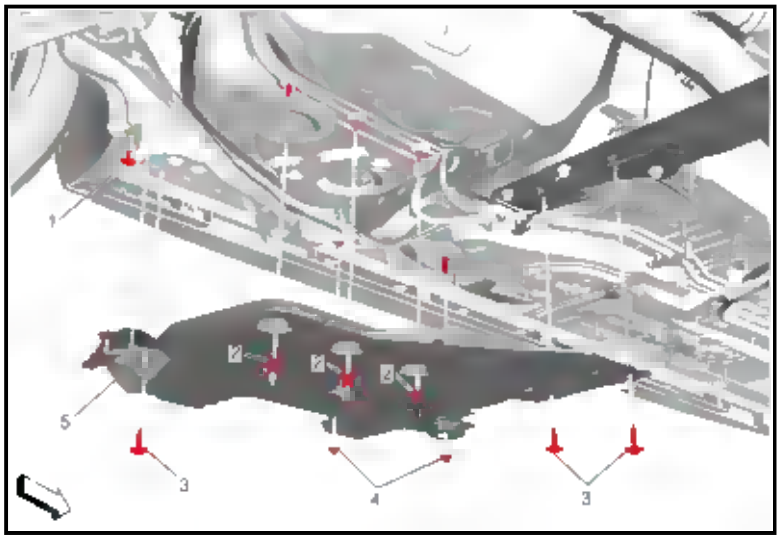
31. Underbody Rear Air Deflector Plastic Nut (3) - Install and tighten [3x] - **Fastener Specifications**
32. Underbody Rear Air Deflector Bolt (2) - Install and tighten [3x] - **Fastener Specifications**
33. Underbody Rear Air Deflector Nut (4) - Install and tighten [2x] - **Fastener Specifications**
34. Rear Wheelhouse Liner Screw (1) - Install and tighten - **Fastener Specifications**

35. 

Rear Tire Front Air Deflector - Right Side (1) - Install

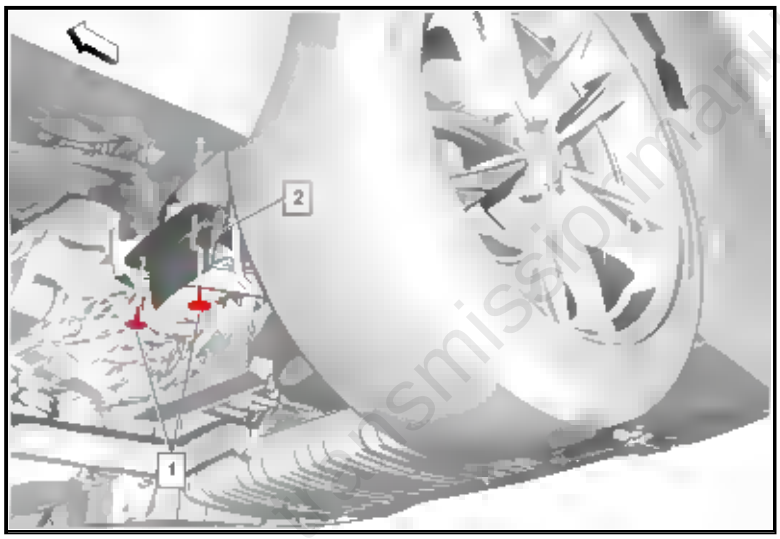
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36. Rear Tire Front Air Deflector Bolt (2) - Install and tighten [2x] - **Fastener Specifications**

37. 

    Underbody Rear Air Deflector - Left Side (5) - Install

38. Underbody Rear Air Deflector Plastic Nut (2) - Install and tighten [3x] - **Fastener Specifications**
39. Underbody Rear Air Deflector Bolt (3) - Install and tighten [3x] - **Fastener Specifications**
40. Underbody Rear Air Deflector Nut (4) - Install and tighten [2x] - **Fastener Specifications**
41. Rear Wheelhouse Liner Screw (1) - Install and tighten - **Fastener Specifications**

42. 

    Rear Tire Front Air Deflector - Left Side (2) - Install

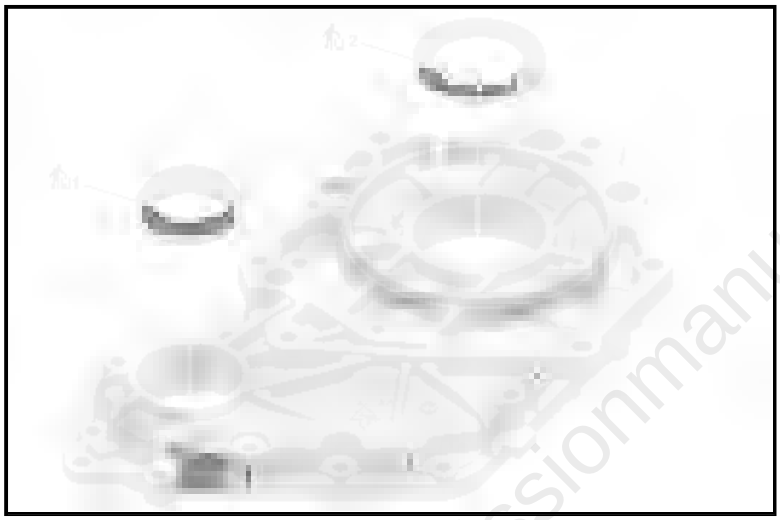
43. Rear Tire Front Air Deflector Bolt (1) - Install and tighten [2x] - **Fastener Specifications**
44. Inspect the exhaust system for leaks.
45. Fill the transfer case to the correct level with the correct fluid.
    - **Approximate Fluid Capacities**
    - **Adhesives, Fluids, Lubricants, and Sealers**
46. Remove the support and lower the vehicle.

FRONT OUTPUT SHAFT SEAL REPLACEMENT

Removal Procedure

1. 

   Front Axle Propeller Shaft (1) - Remove - **Front Axle Propeller Shaft Replacement (L3B)** , or **Front Axle Propeller Shaft Replacement (LSY)**

2. 

   Front Output Shaft Seal (1) - Remove - **Transfer Case Disassemble**

Installation Procedure

1. 

   Front Output Shaft Seal (1) - Install - **Transfer Case Assemble**

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2. 

   Front Axle Propeller Shaft (1) - Install - **Front Axle Propeller Shaft Replacement (L3B)** , or **Front Axle Propeller Shaft Replacement (LSY)**

3. Refill the transfer case with fluid. **Transfer Case Fluid Replacement**

REPAIR INSTRUCTIONS - OFF VEHICLE

TRANSFER CASE DISASSEMBLE

Single Use Fasteners and Components

- Transfer Case Drain Plug
- Transfer Case Fill Plug
- Transfer Case Front Output Shaft Boot Clamp [2x]
- Transfer Case Half Bolt [15x]
- Transfer Case Input Shaft Seal
- Transfer Case Oil Pump Bolt
- Transfer Case Oil Pump Retaining Ring
- Transfer Case Rear Output Shaft Oil Slinger
- Transfer Case Rear Output Shaft Rear Bearing Retaining Ring
- Transfer Case Output Shaft Ring
- Transfer Case Rear Output Shaft Seal
- Transfer Case Stud [2x]
- Transfer Case Two/Four Wheel Drive Clutch Coil Nut [3x]
- Transfer Case Two/Four Wheel Drive Clutch Retaining Ring
- Transfer Case Vent
- Transfer Case Vent Baffle Bolt
- Transfer Case Vibration Dampener Bolt [3x]
- Transfer Case Front Output Shaft Seal
- Transfer Case Two/Four Wheel Drive Clutch Coil Seal [3x]
- Transfer Case Front Output Shaft Oil Slinger

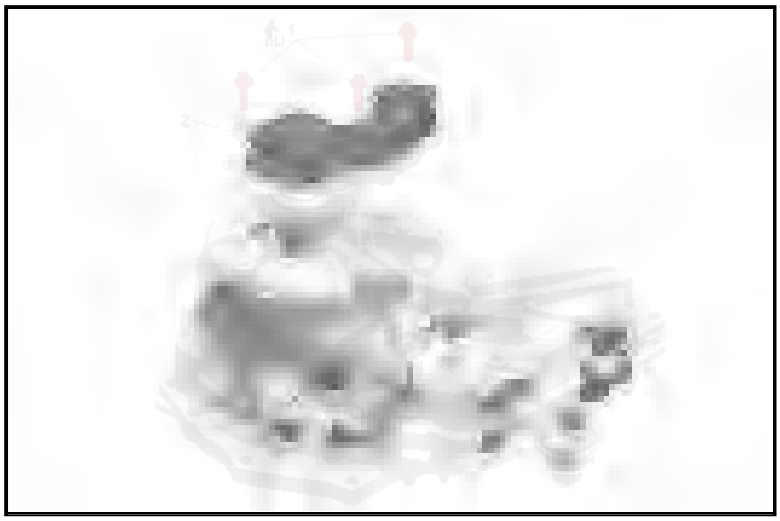
Special Tools

- **DT-3289 - 20** Holding Fixture
- **DT - 49308** Stud Remover and Installer
- **J - 36842** Transaxle Holding Fixture
- **J-45124** Removal Bridge

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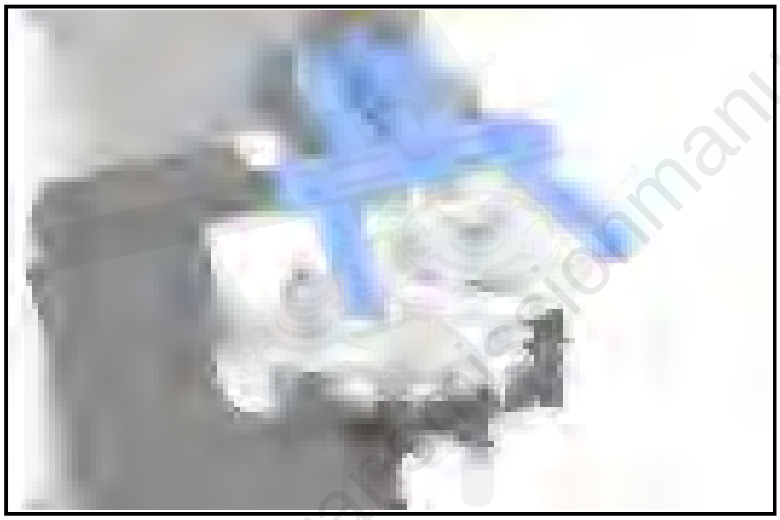
- **J-45124 - 9** Puller Leg
- **J-29369 - 2** Bushing and Bearing Remover - 2 - 3 in

Equivalent regional tools: **Special Tools**

1. 

   Transfer Case Vibration Dampener Bolt (1) - Remove and DISCARD - {If equipped}

2. Transfer Case Vibration Dampener (2) - Remove - {If equipped}

3. 

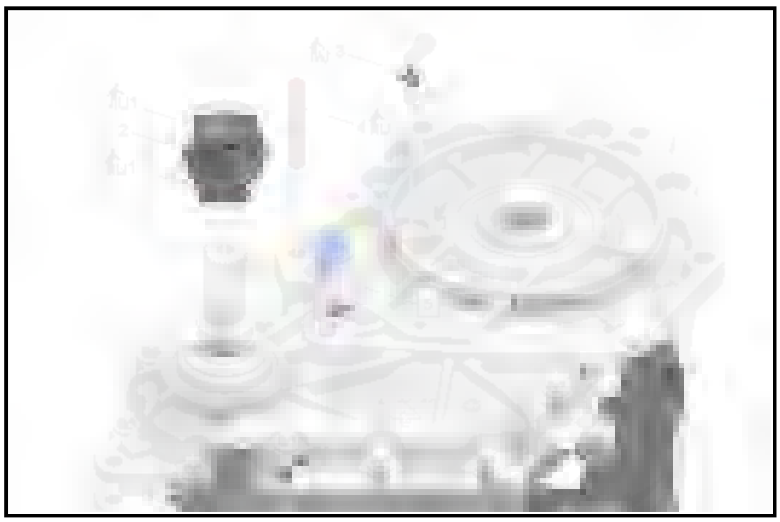
   Use M10 x 1.5 mm nuts and bolts to retain the assembly to the fixture.

4. **J - 36842** Transaxle Holding Fixture (1) - Install @ Transfer Case (3)

   NOTE: **Always secure with the pivot pin after rotating.**

5. Attached transfer case and **J - 36842** Transaxle Holding Fixture (1) to the **DT-3289 - 20** Holding Fixture (2).

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6. 

   Remove and DISCARD the 2 transfer case front output shaft boot clamps (1).

7. Transfer Case Front Output Shaft Boot (2) - Remove

   NOTE: **Remove the vent as required. If vent removal is required, install a NEW vent during assembly.**

8. Transfer Case Vent (3) - Remove and DISCARD

   NOTE: **Remove the transfer case-to-transmission studs as required.**

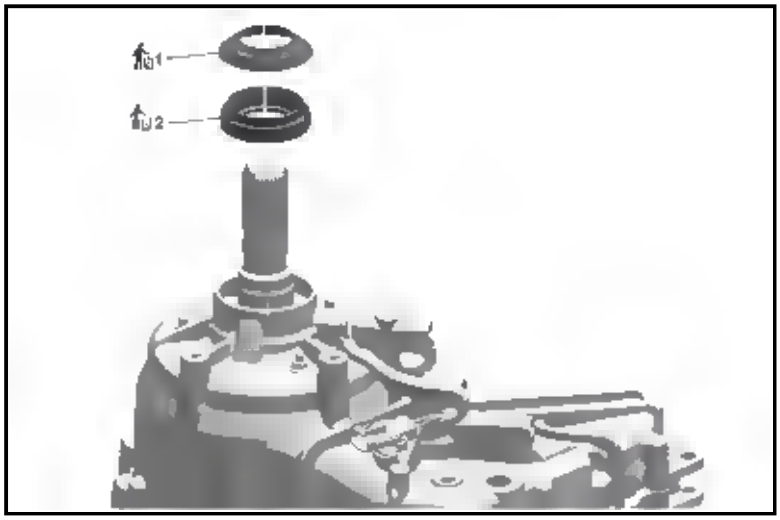
9. Use **DT - 49308** Stud Remover and Installer (5) @ Transfer Case Stud (4) - Remove and DISCARD

10. 

    Transfer Case Oil Fill Plug (1) - Remove and DISCARD

11. Transfer Case Oil Drain Plug (3) - Remove and DISCARD
12. Transfer Case Fluid Temperature Sensor (4) - Remove

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13. 

CAUTION: **Refer to Machined Surface Damage Caution .**

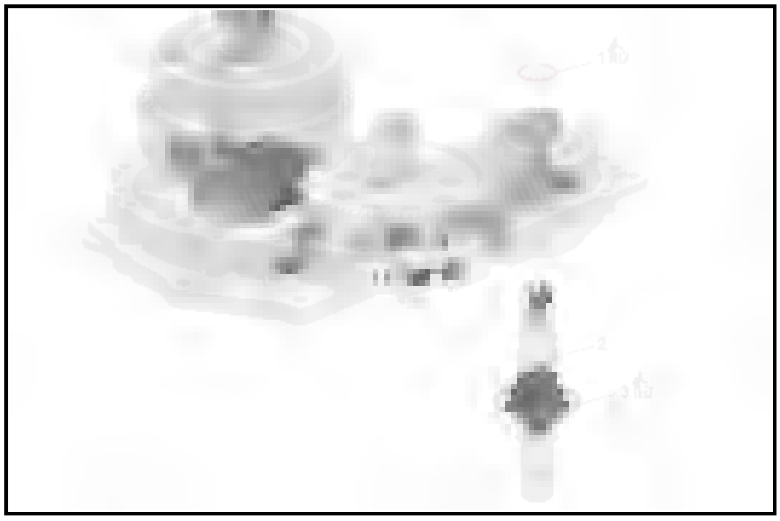
Transfer Case Rear Output Shaft Oil Slinger (1) - Remove and DISCARD

14. Transfer Case Rear Output Shaft Seal (2) - Remove and DISCARD

15. 

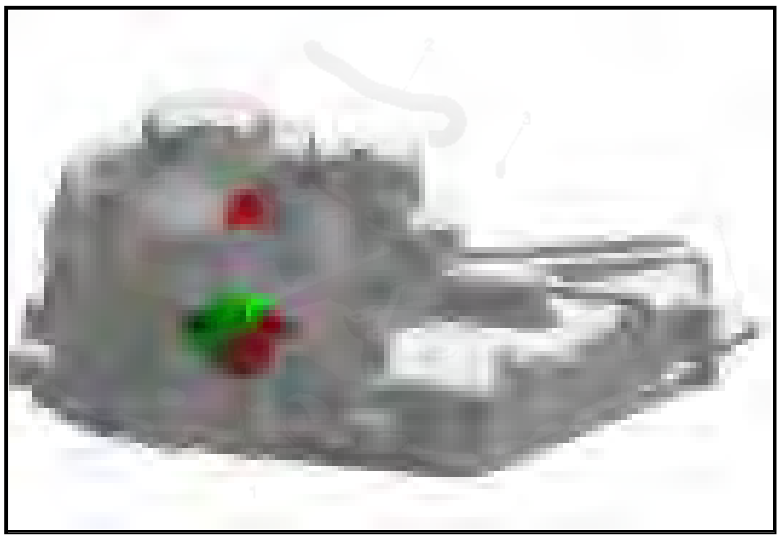
Transfer Case Half Bolt (1) - Remove and DISCARD [15x]

16. Separate the case halves using a pry bar at the pry point locations.
17. Remove the transfer case rear case half (2) from the transfer case front case half (3).

18. 

Transfer Case Output Shaft Ring (1) - Remove and DISCARD

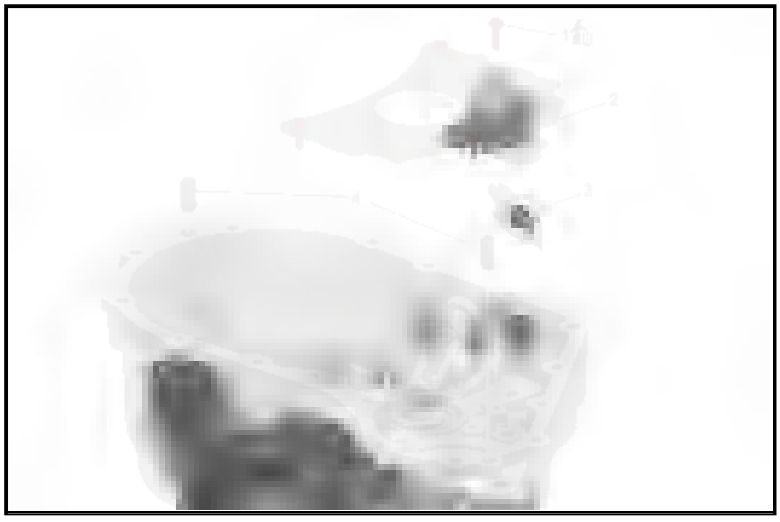
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19. Transfer Case Output Shaft (2) - Remove
20. Transfer Case Front Output Shaft Oil Slinger (3) - Remove and DISCARD
21. 

    Remove the connector wire retaining clip (1) and separate the wires from the connector.

22. Conduit (2) - Remove
23. Transfer Case Access Hole Plug (3) - Remove [2x]
24. 

    Transfer Case Two/Four Wheel Drive Clutch Coil Nut (1) - Remove and DISCARD [3x]

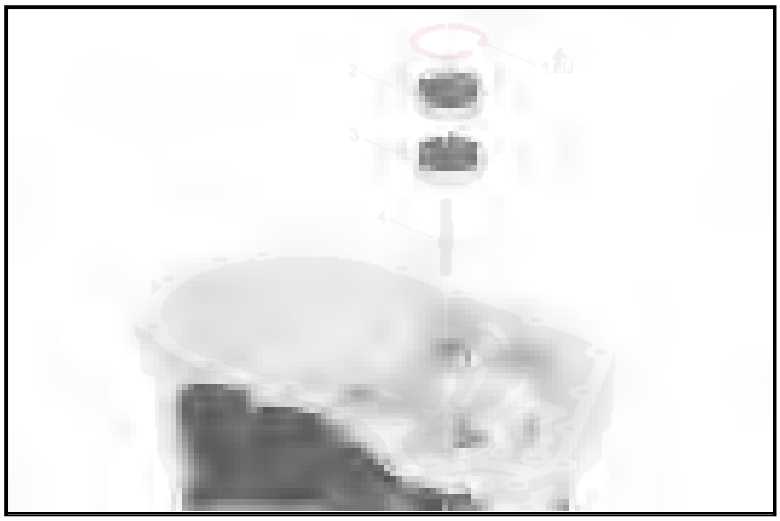
25. Transfer Case Two/Four Wheel Drive Clutch Coil (2) - Remove
26. 

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Transfer Case Oil Pump Bolt (1) - Remove and DISCARD [4x]

27. Transfer Case Separator Plate (2) - Remove
28. Transfer Case Oil Pump Screen (3) - Remove

NOTE: **Remove the pins only as required.**

29. Transfer Case Half Locating Pin (4) - Remove [2x]
30. 

Transfer Case Oil Pump Retaining Ring (1) - Remove and DISCARD

31. Inlet Pump Port (2) - Remove
32. Transfer Case Oil Pump (3) - Remove
33. Transfer Case Oil Pump Shaft (4) - Remove
34. 

Assemble special tools **J-29369 - 2** Bushing and Bearing Remover - 2 - 3 in (4), **J-45124** Removal Bridge (2), **J-45124 - 9** Puller Leg (3), to remove the bearing.

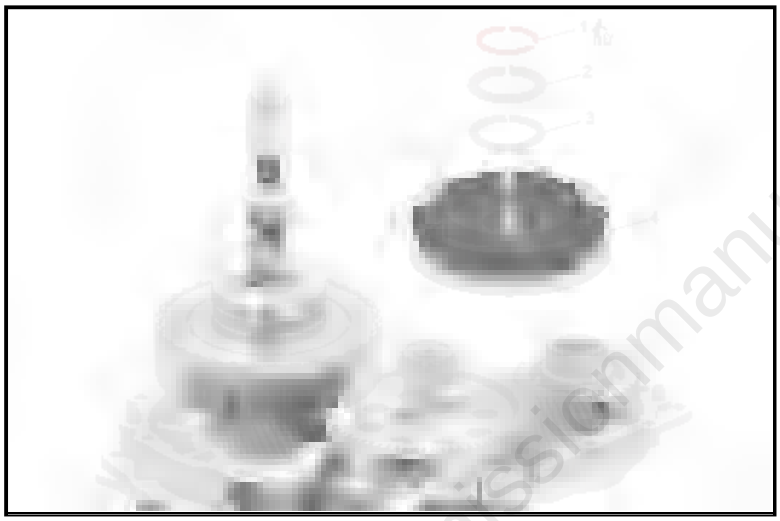
35. Transfer Case Front Output Shaft Rear Bearing (1) - Remove

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36. 

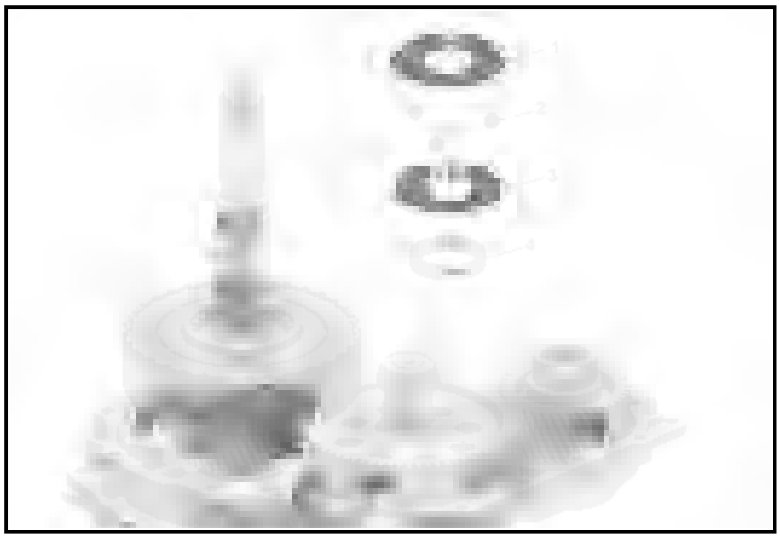
Use special tools **J-29369 - 2** Bushing and Bearing Remover - 2 - 3 in (4), **J-45124** Removal Bridge (2), **J-45124 - 9** Puller Leg (1), to remove the bearing.

37. Transfer Case Rear Output Shaft Rear Bearing (1) - Remove

38. 

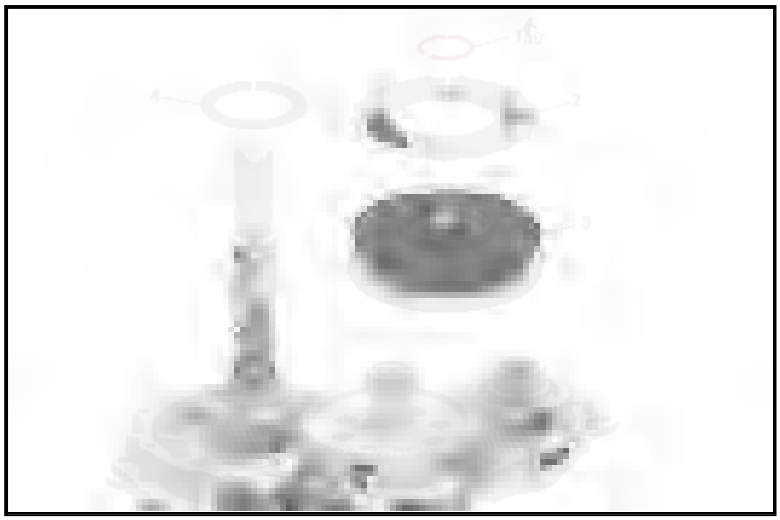
Transfer Case Rear Output Shaft Rear Bearing Retaining Ring (1) - Remove and DISCARD

39. Transfer Case Four Wheel Drive Clutch Shim (2) - Remove
40. Transfer Case Four Wheel Drive Clutch Housing Bearing (3) - Remove
41. Transfer Case Two/Four Wheel Drive Clutch Coil Housing (4) - Remove

42. 

43. Cam (1) - Remove

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44. Transfer Case Scissor Lever Ball (2) - Remove [3x]
45. Transfer Case Scissor Mechanism Lever (3) - Remove
46. Transfer Case Four Wheel Drive Clutch Pressure Plate Spring (4) - Remove
47. 

    Transfer Case Two/Four Wheel Drive Clutch Retaining Ring (1) - Remove and DISCARD

48. Transfer Case Armature (2) - Remove

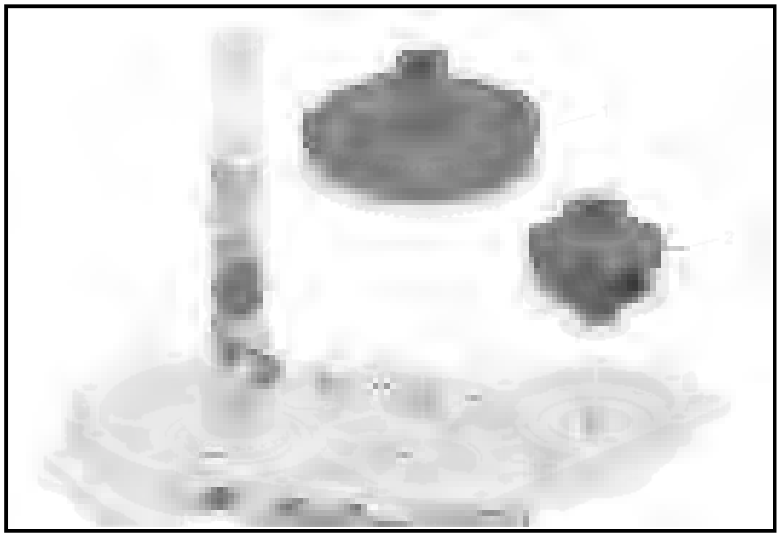
    NOTE: **If the clutch pack assembly is replaced, reprogramming of the transfer case module is required. K69 Transfer Case Control Module: Programming and Setup .**

49. Transfer Case High/Low Clutch (3) - Remove
50. Transfer Case Front Output Shaft Driven Sprocket Spacer (4) - Remove
51. 

    Transfer Case Input Shaft Gear (1) - Remove

52. Transfer Case Front Output Shaft Drive Sprocket Spacer (2) - Remove [2x]
53. Transfer Case Front Output Shaft Drive Sprocket Bearing (3) - Remove [2x]

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54. 

NOTE: **The case halves, idler gear, and idler gear bearings and races are not available as separate service parts. If component replacement is required, the transfer case is to be replaced as an assembly.**

Transfer Case Idler Gear (1) - Remove

NOTE: **The orientation and of the gear and the location of the front output shaft snap ring groove for assembly. The gear is to be installed with the front output shaft snap ring groove facing away from the front case half.**

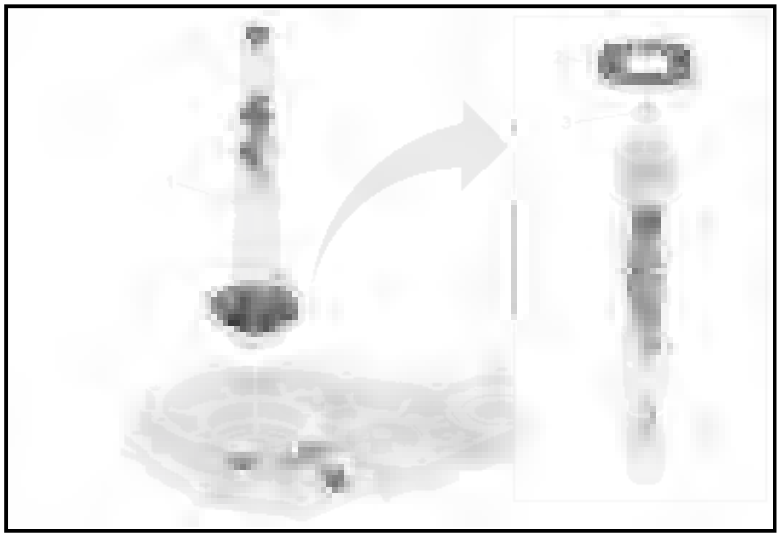
55. Transfer Case Front Output Shaft Gear (2) - Remove

56. 

Transfer Case Input Shaft Washer (1) - Remove

57. Transfer Case Front Output Shaft Drive Sprocket Bearing (2) - Remove
58. Transfer Case Vent Baffle Bolt (3) - Remove and DISCARD
59. Transfer Case Vent Baffle (4) - Remove

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60. 

NOTE: **Spread the input shaft front bearing retainer ring to remove the input shaft.**

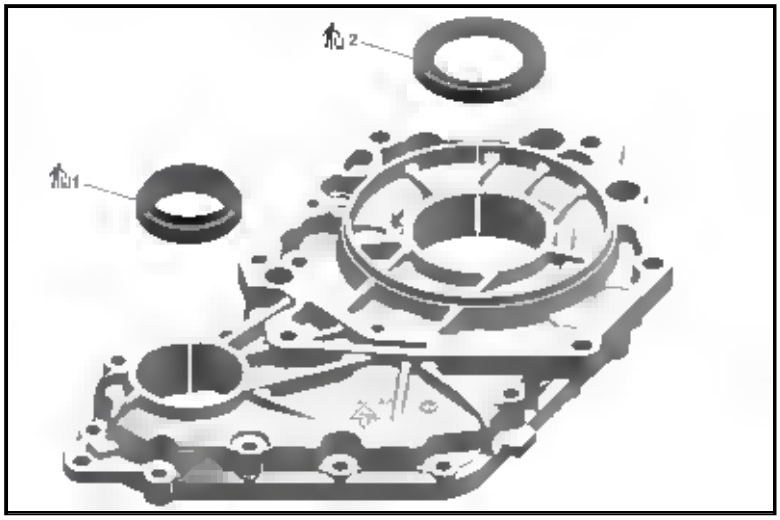
Transfer Case Input Shaft (1) - Remove

61. Transfer Case Input Shaft Bearing (2) - Remove
62. Transfer Case Input Shaft Bore Plug (3) - Remove

63. 

Assemble special tools **J-29369 - 2** Bushing and Bearing Remover - 2 - 3 in (4), **J-45124** Removal Bridge (2), **J-45124 - 9** Puller Leg (3), to remove the bearing.

64. Transfer Case Front Output Shaft Front Bearing (1) - Remove

65. 

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Transfer Case Front Output Shaft Seal (1) - Remove and DISCARD

66. Transfer Case Input Shaft Seal (2) - Remove and DISCARD

TRANSFER CASE FRONT DRIVE AXLE VISCOUS CLUTCH DISASSEMBLE

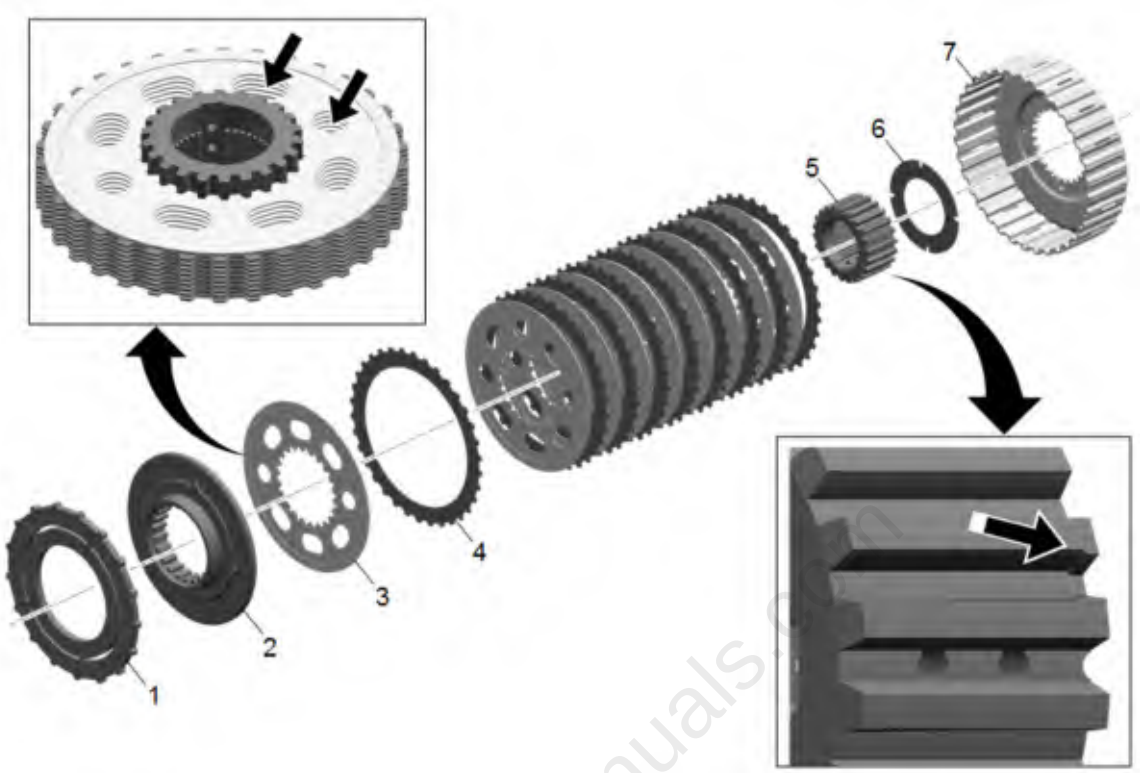
1. 

Fig. 6: Exploded View Of Transfer Case Front Drive Axle Viscous Clutch Components
Courtesy of GENERAL MOTORS COMPANY

If the clutch pack assembly is replaced, the TCCM must be recalibrated using the service calibration. **Transfer Case Information Label**

2. Transfer Case Armature (7) - Remove
3. Transfer Case Pressure Plate (6) - Remove

NOTE: **Remember the orientation of the friction plates for assembly.**

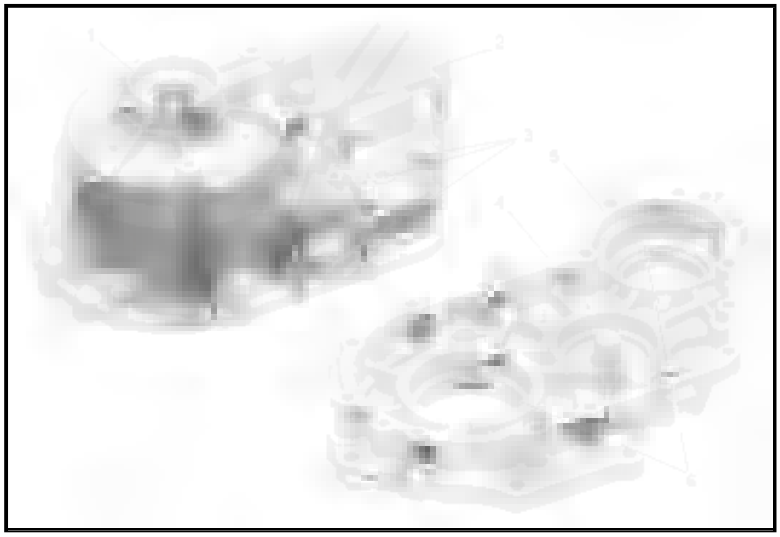
4. Transfer Case Friction Plate (5) - Remove
5. Transfer Case Separator Plate (4) - Remove

NOTE: **Remember the orientation of the clutch hub for assembly.**

6. Transfer Case Clutch Hub (3) - Remove
7. Thrust Washer (2) - Remove
8. Transfer Case Clutch Drum (1) - Remove

TRANSFER CASE CLEANING AND INSPECTION

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1. 

CAUTION: **Refer to Machined Surface Damage Caution .**

NOTE: **The case halves, idler gear, and idler gear bearings and races are not available as separate service parts. If component replacement is required, the transfer case is to be replaced as an assembly.**

Inspect all components or sub-components and perform any repair procedure necessary to fix the damage.

2. Inspect and remove any sealer from the case sealing surfaces (5).
3. Clean the front case (4) and rear case (2) in cleaning solvent and air dry.
4. Inspect for cracks, broken areas, or other damage. Repair small scratches on the sealing surfaces with light sanding.
5. Inspect rear case bearing race bores (1)
6. Inspect plug holes (3)
7. Inspect front case bearing race bores (6)

8. 

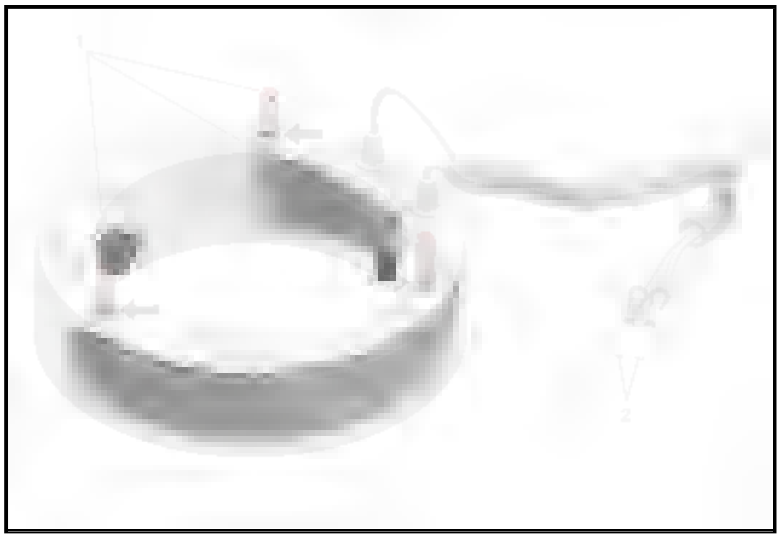
Clean the shafts in solvent and air dry, including the input shaft oil galleries.

9. Inspect all components or sub-components and perform any repair procedure necessary to fix the damage.
10. Inspect the splines (1) for damage or excessive wear. Witness marks are normal.
11. Inspect the plug area (2) for scoring, rust or other damage.

NOTE: **Do not attempt to smooth roughness in the bearing journals.**

12. Inspect the bearing journals (3) for scoring, pitting, or excessive wear.

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13. Inspect the splines (4) for damage or excessive wear. Witness marks are normal.
14. Inspect the front output shaft snap ring groove (5) for damage.
15. Inspect the front output shaft sealing surface (6) for scoring, rust or other damage.
16. 

    Clean all components in solvent and air dry.

17. Inspect all components or sub-components and perform any repair procedure necessary to fix the damage.

    NOTE: **The clutch coil wire and stud O-ring seals are not serviceable separately. If O-ring seal damage is present, replace the clutch coil and seals as an assembly.**

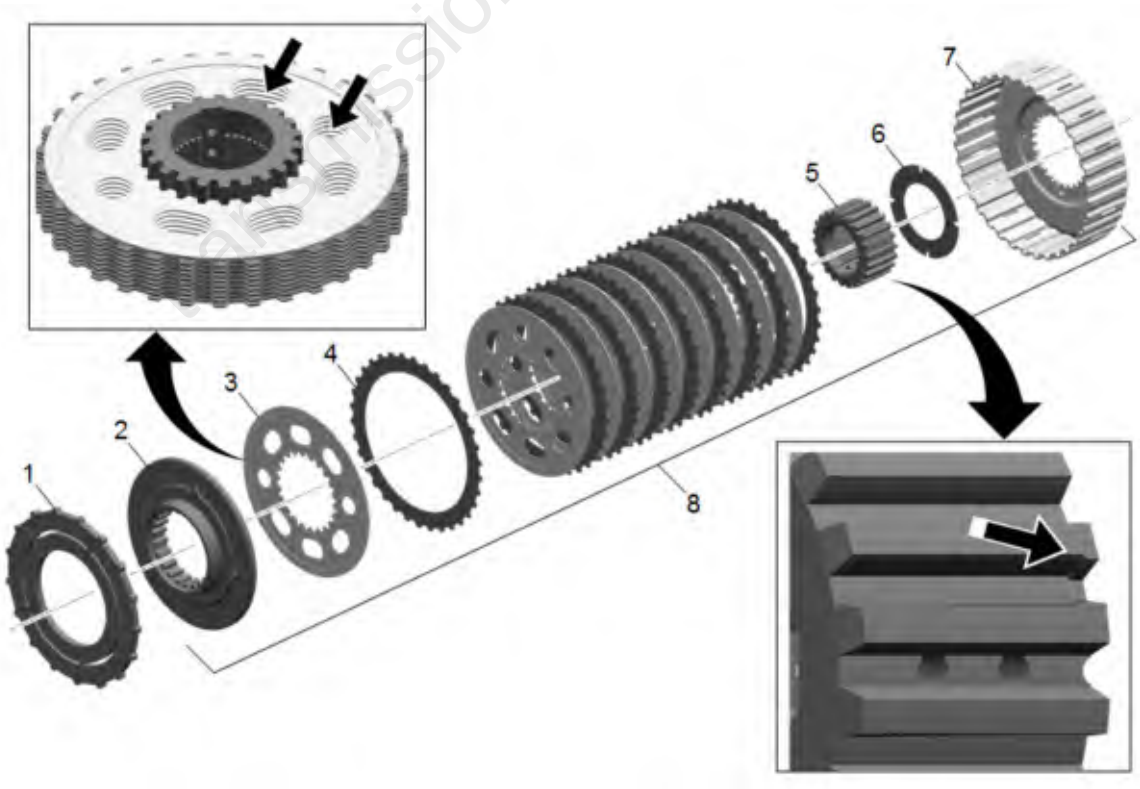
18. Inspect the stud threads (1) and coil O-rings for damage.
19. Inspect the wires and terminals (2) for damage. Repair, as required.
20. Check the clutch coil resistance, should not exceed 2.5-3.5 ohms at 20B°C (68B°F).
21. 

    Fig. 7: Exploded View Of Transfer Case Clutch Pack Assembly Components
    Courtesy of GENERAL MOTORS COMPANY

Inspect all components or sub-components and perform any repair procedure necessary to fix the damage. The clutch pack is only available for service as an assembly. If the clutch pack assembly is replaced, reprogramming of the transfer case module is required. Refer to **K69 Transfer Case Control Module: Programming and Setup** , and **Transfer Case Information Label**.

22. Do not clean the clutch friction plates in solvent.
23. Other components may be cleaned in solvent.
24. Small scratches or wear are allowed. Deep gouges or raised metal on the armature (1) require transfer case replacement and transfer case module reprogramming.
25. Inspect the pressure plate (2) for flatness, warping, or scoring to the friction plate contact surface.
26. The clutch friction plates (3) are assembled with the lube holes aligned as indicated in order to provide an unrestricted oil path when assembled.
27. The clutch plates (4) are assembled with the lube holes aligned as indicated in order to provide an unrestricted oil path when assembled.
28. Inspect the clutch hub (5) for worn, scored, or burnt friction material.
29. Transfer case thrust washer (6) for excessive wear or damage.
30. Inspect the clutch drum (7) for excessive wear or damage. Excessive wear can be identified by steps in the teeth, which prevent the plates from moving freely.
31. If the clutch pack assembly (8) is replaced, reprogramming of the transfer case module is required. **K69 Transfer Case Control Module: Programming and Setup**

TRANSFER CASE FRONT DRIVE AXLE VISCOUS CLUTCH ASSEMBLE

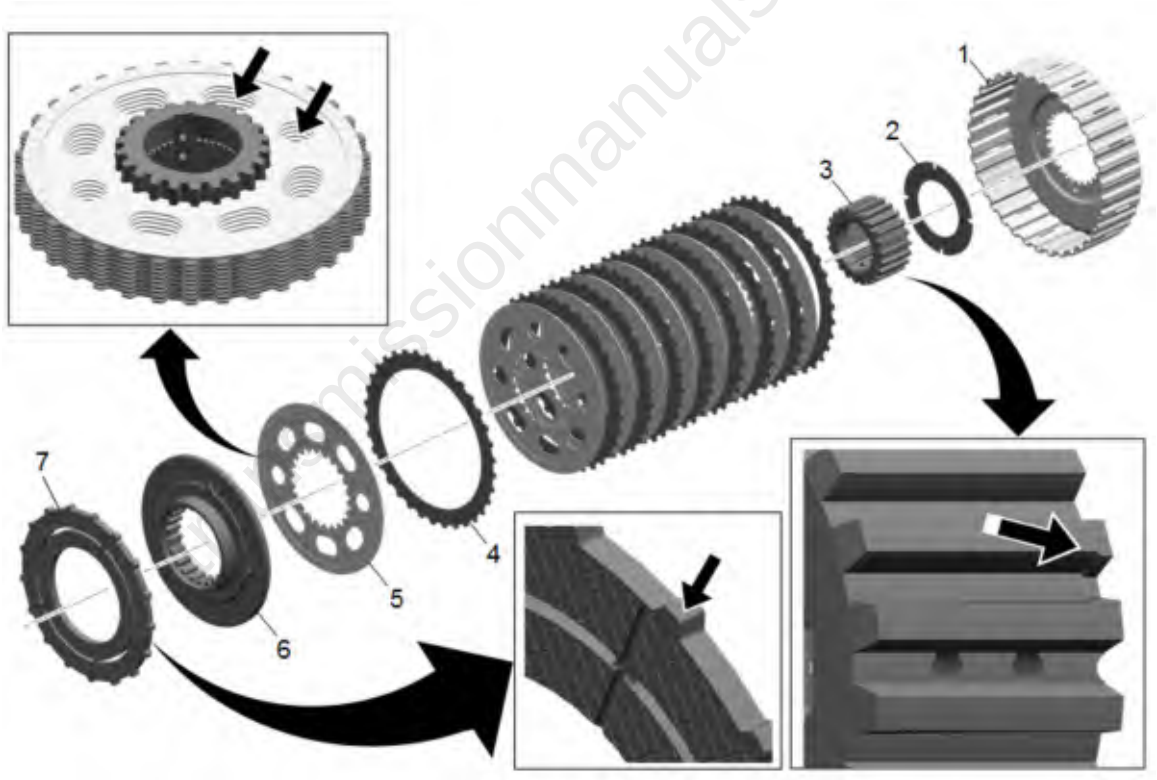
1. 

Fig. 8: Exploded View Of Transfer Case Front Drive Axle Viscous Clutch Components
Courtesy of GENERAL MOTORS COMPANY

If the clutch pack assembly is replaced, the TCCM must be recalibrated using the service calibration. **Transfer Case Information Label**

2. Transfer Case Clutch Drum (1) - Install
3. Thrust Washer (2) - Install

NOTE: **Remember the orientation of the clutch hub for assembly.**

4. Transfer Case Clutch Hub (3) - Install

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5. Transfer Case Separator Plate (4) - Install
6. The friction plates are assembled with the lube holes aligned as indicated in order to provide an unrestricted oil path when assembled.

NOTE: **Remember the orientation of the friction plates for assembly.**

7. Transfer Case Friction Plate (5) - Install
8. Transfer Case Pressure Plate (6) - Install
9. The armature is to be installed with the tapered edge outward and facing the rotor.
10. Transfer Case Armature (7) - Install

TRANSFER CASE ASSEMBLE

Single Use Fasteners and Components

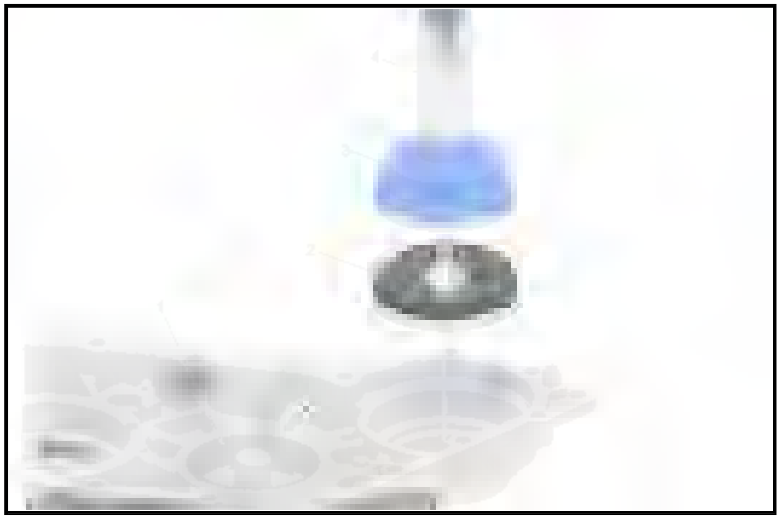
- Transfer Case Drain Plug
- Transfer Case Fill Plug
- Transfer Case Front Output Shaft Boot Clamp [2x]
- Transfer Case Half Bolt [15x]
- Transfer Case Input Shaft Seal
- Transfer Case Oil Pump Bolt
- Transfer Case Oil Pump Retaining Ring
- Transfer Case Rear Output Shaft Oil Slinger
- Transfer Case Rear Output Shaft Rear Bearing Retaining Ring
- Transfer Case Output Shaft Ring
- Transfer Case Rear Output Shaft Seal
- Transfer Case Stud [2x]
- Transfer Case Two/Four Wheel Drive Clutch Coil Nut [3x]
- Transfer Case Two/Four Wheel Drive Clutch Retaining Ring
- Transfer Case Vent
- Transfer Case Vent Baffle Bolt
- Transfer Case Vibration Dampener Bolt [3x]
- Transfer Case Front Output Shaft Seal
- Transfer Case Front Output Shaft Oil Slinger

Special Tools

- **DT-3289 - 20** Holding Fixture
- **DT-8092** Driver Handle
- **DT - 49308** Stud Remover and Installer
- **DT-49861-A** Seal Installer
- **J-33142** Bearing and Seal Installer
- **J - 36842** Transaxle Holding Fixture
- **J-38412** Bearing Cup Installer
- **J-42738** Seal Installer
- **J-44907** Bearing Installer
- **J-45853** Rear Axle Bearing/Seal Installer
- **J-47847** Output Seal Installer

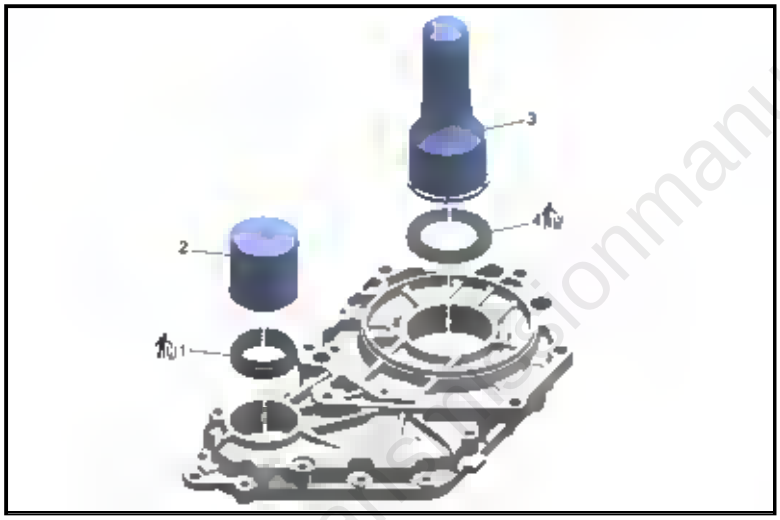
Equivalent regional tools: **Special Tools**

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1. 

NOTE: **DO NOT remove the idler gear bearing race (1) from the case half. The case halves, idler gear, and idler gear bearings and races are not available as separate service parts. If component replacement is required, the transfer case is to be replaced as an assembly.**

Using **DT-8092** Driver Handle (4) & **J-38412** Bearing Cup Installer (3) - Install Transfer Case Front Output Shaft Front Bearing (2)

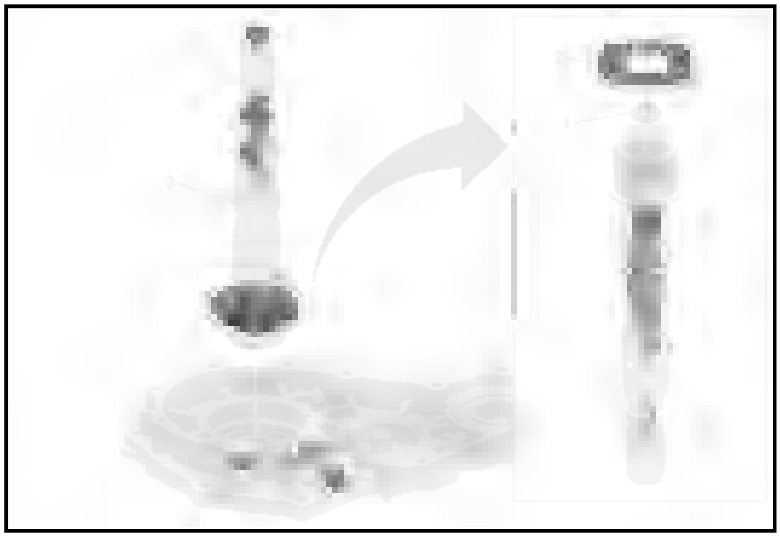
2. 

CAUTION: **Refer to Machined Surface Damage Caution .**

NOTE: **Install the seal until flush with the face of the case.**

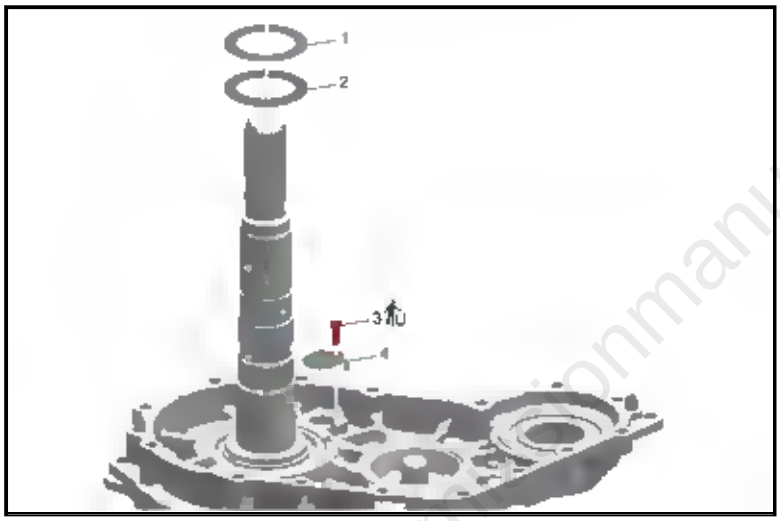
Using **J-47847** Output Seal Installer (2) Install NEW - Transfer Case Front Output Shaft Seal (1)

3. Using **J-42738** Seal Installer (3) Install NEW - Transfer Case Input Shaft Seal (4)

4. 

   Transfer Case Input Shaft Bore Plug (1) - Install

5. Transfer Case Input Shaft Bearing (2) - Install
6. Transfer Case Input Shaft (3) - Install

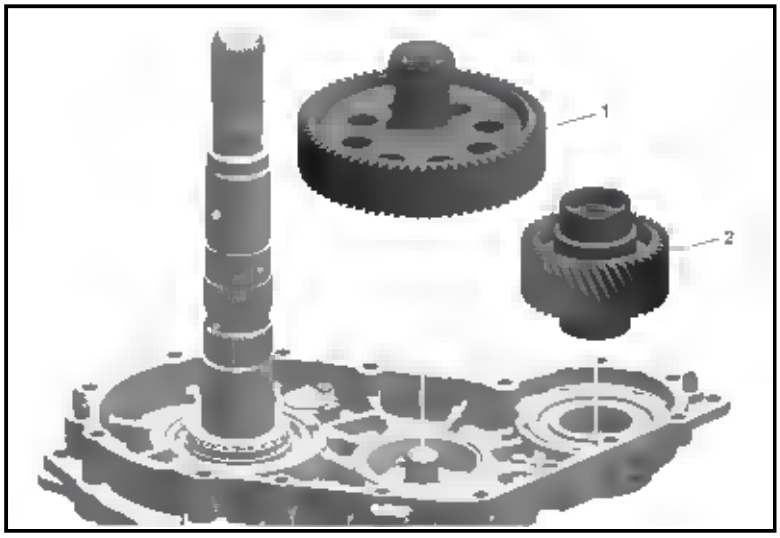
7. 

   Transfer Case Vent Baffle (1) - Install

   CAUTION: **Refer to Fastener Caution .**

8. Transfer Case Vent Baffle Bolt (2) - Install NEW and tighten - **Fastener Specifications**
9. Transfer Case Front Output Shaft Drive Sprocket Bearing (3) - Install
10. Transfer Case Input Shaft Washer (4) - Install

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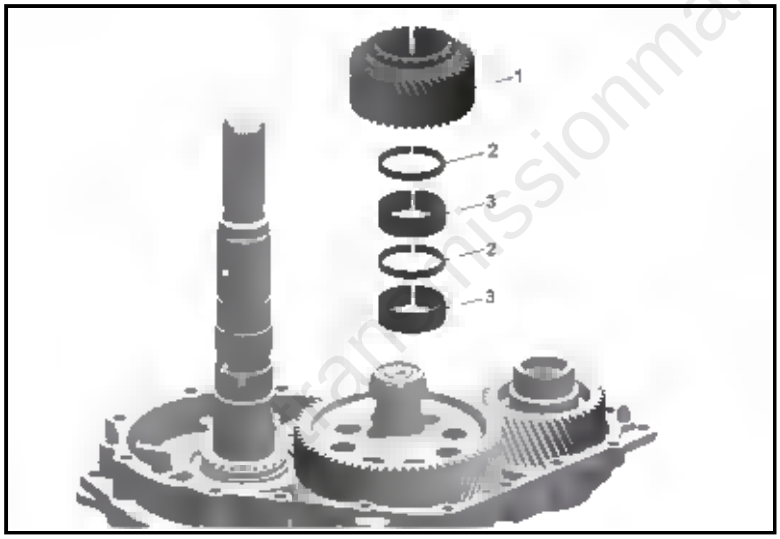
11. 

NOTE: **The case halves, idler gear, and idler gear bearings and races are not available as separate service parts. If component replacement is required, the transfer case is to be replaced as an assembly.**

Transfer Case Idler Gear (1) - Install

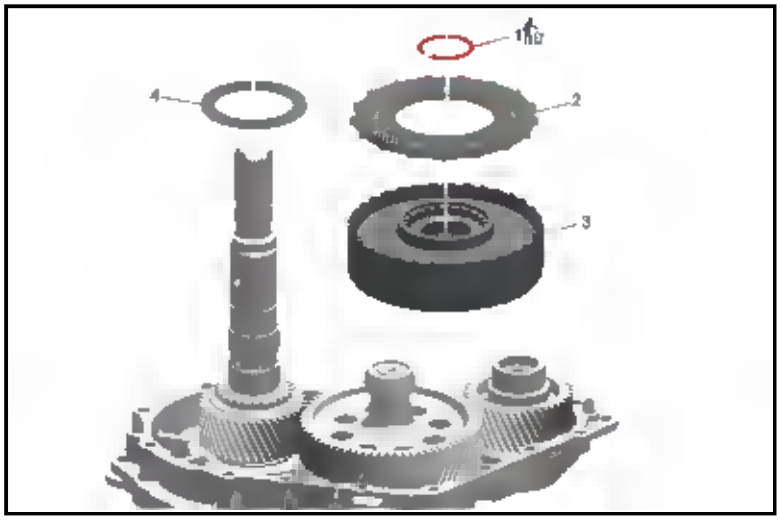
NOTE: **The orientation and of the gear and the location of the front output shaft snap ring groove for assembly. The gear is to be installed with the front output shaft snap ring groove facing away from the front case half.**

12. Transfer Case Front Output Shaft Gear (2) - Install

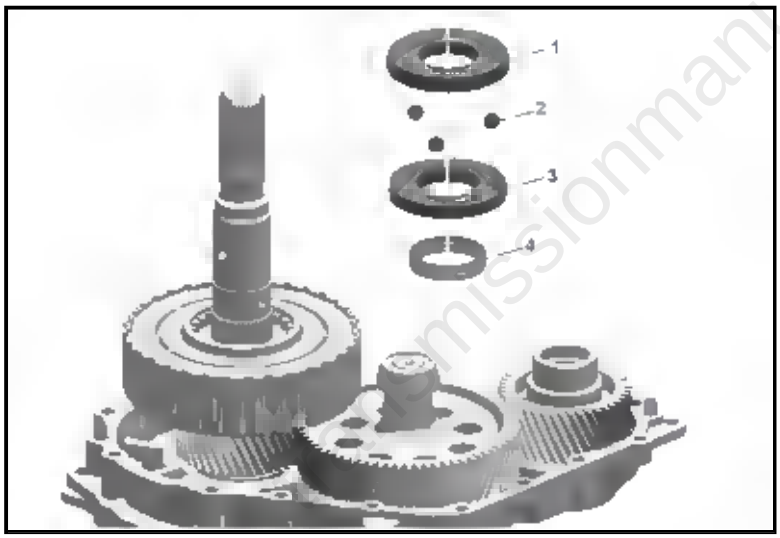
13. 

Transfer Case Front Output Shaft Drive Sprocket Bearing (1) - Install [2x]

14. Transfer Case Front Output Shaft Drive Sprocket Spacer (2) - Install [2x]
15. Transfer Case Input Shaft Gear (3) - Install

16. 

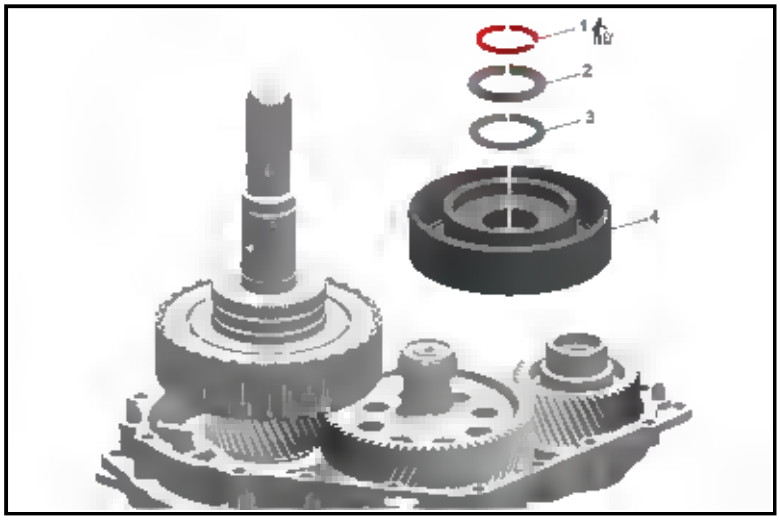
    Transfer Case Front Output Shaft Driven Sprocket Spacer Transfer Case Front Output Shaft Drive Sprocket Bearing (1) - Install

17. Transfer Case High/Low Clutch (2) - Install
    1. If the clutch pack assembly is replaced, reprogramming of the transfer case module is required. **Transfer Case Front Drive Axle Viscous Clutch Assemble**
        1. **K69 Transfer Case Control Module: Programming and Setup**
18. Transfer Case Armature (3) - Install
19. Transfer Case Two/Four Wheel Drive Clutch Retaining Ring (4) - Install NEW
20. 

    Transfer Case Four Wheel Drive Clutch Pressure Plate Spring (1) - Install

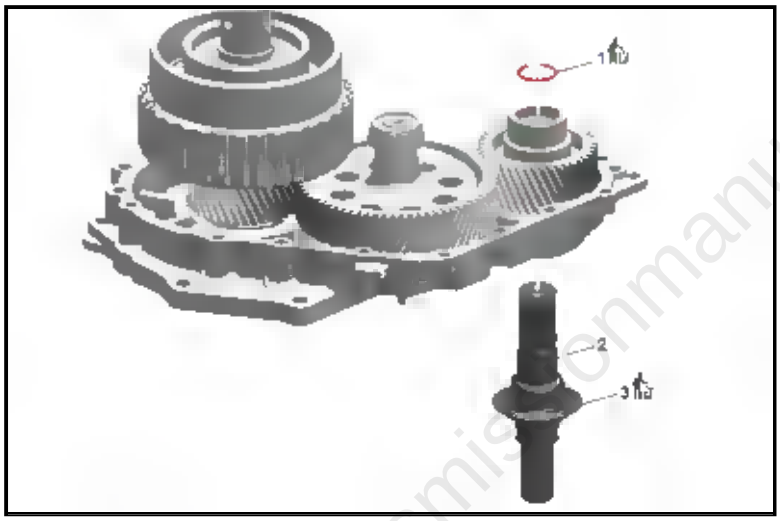
21. Transfer Case Scissor Mechanism Lever (2) - Install
22. Transfer Case Scissor Lever Ball (3) - Install [3x]
23. Cam (4) - Install

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24. 

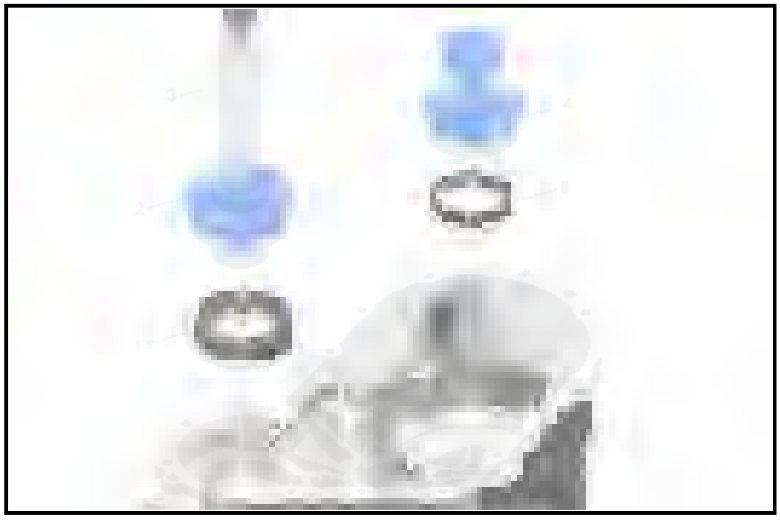
Transfer Case Two/Four Wheel Drive Clutch Coil Housing (1) - Install

25. Transfer Case Four Wheel Drive Clutch Housing Bearing (2) - Install
26. Transfer Case Four Wheel Drive Clutch Shim (3) - Install
27. Transfer Case Rear Output Shaft Rear Bearing Retaining Ring (4) - Install NEW

28. 

Transfer Case Front Output Shaft Oil Slinger (1) - Install NEW

29. Transfer Case Output Shaft (2) - Install
30. Transfer Case Output Shaft Ring (3) - Install NEW

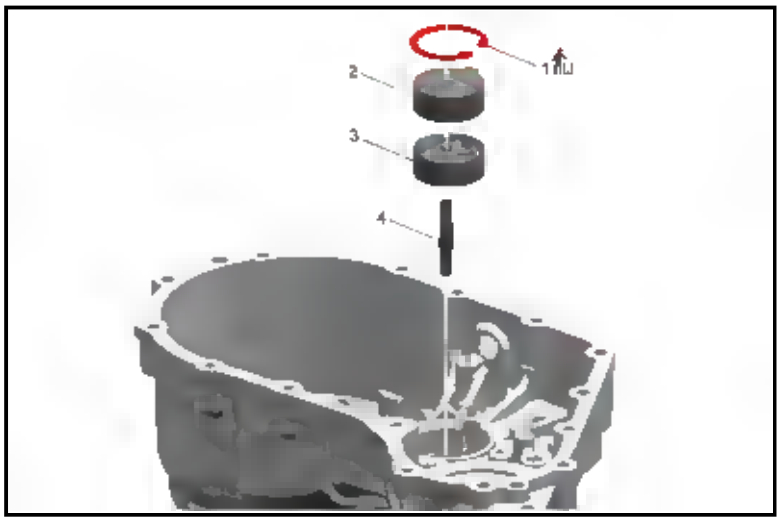
31. 

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NOTE: **DO NOT remove the idler gear bearing race from the case half. The case halves, idler gear, and idler gear bearings and races are not available as separate service parts. If component replacement is required, the transfer case is to be replaced as an assembly.**

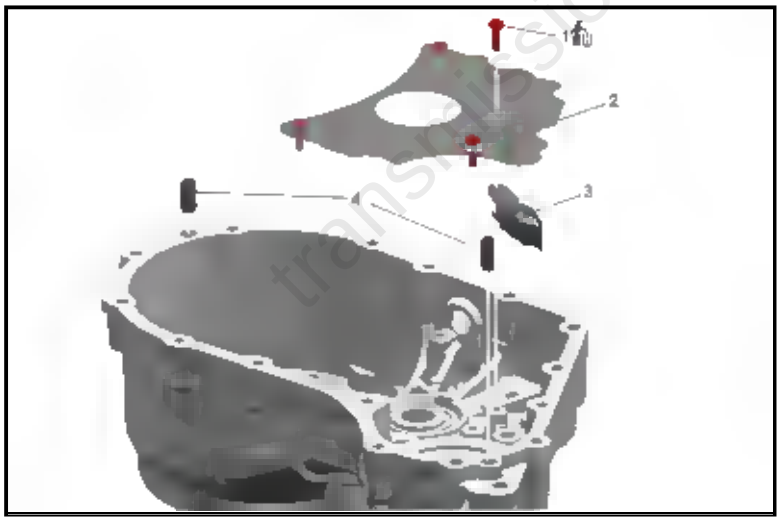
Using **J-33142** Bearing and Seal Installer (2) & **DT-8092** Driver Handle (3) Install - Transfer Case Rear Output Shaft Rear Bearing (1)

32. Using **J-45853** Rear Axle Bearing/Seal Installer (4) Install - Transfer Case Front Output Shaft Rear Bearing (5)

33. 

Transfer Case Oil Pump Shaft (1) - Install

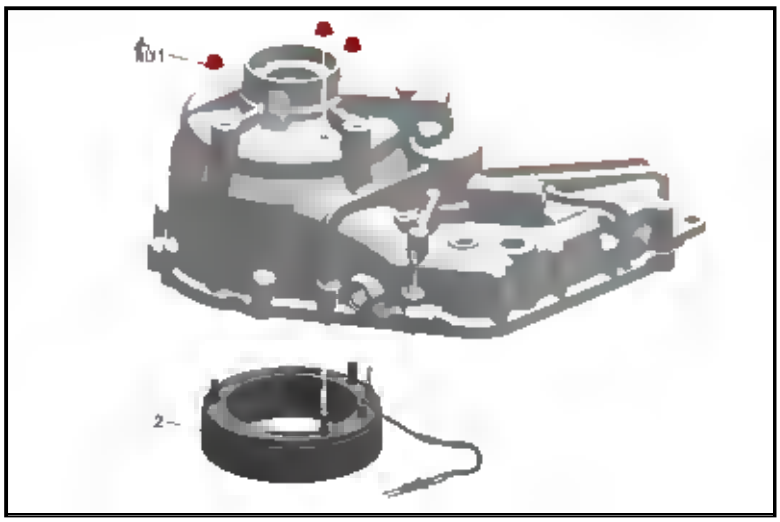
34. Transfer Case Oil Pump (2) - Install
35. Inlet Pump Port (3) - Install
36. Transfer Case Oil Pump Retaining Ring (4) - Install NEW

37. 

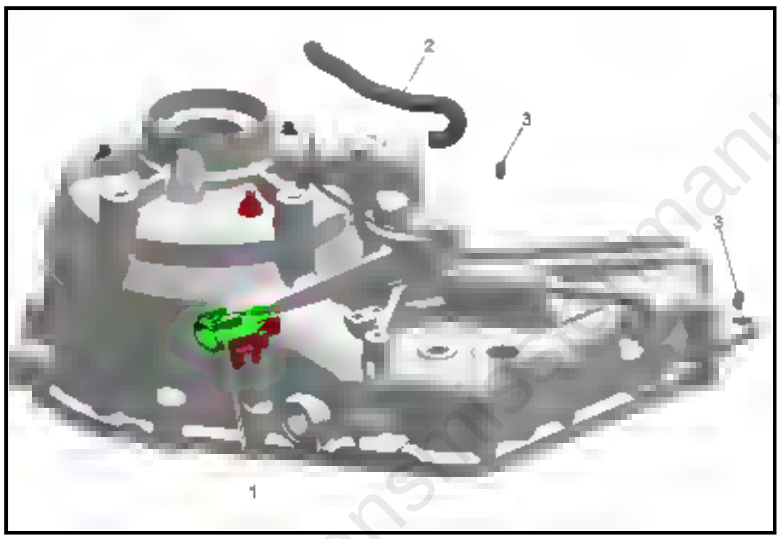
Transfer Case Oil Pump Screen (1) - Install

38. Transfer Case Separator Plate (2) - Install
39. Transfer Case Oil Pump Bolt (3) - Install NEW and tighten [4x] - **Fastener Specifications**
40. Transfer Case Half Locating Pin (4) - Install [2x]

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- The clutch coil stud O-ring seals are not serviceable separately. If seal damage is present, replace the clutch coil assembly.
- Carefully slide the wires through the holes in the case to avoid damage to the wire coating.

41. Transfer Case Two/Four Wheel Drive Clutch Coil (2) - Install
42. Transfer Case Two/Four Wheel Drive Clutch Coil Nut (3) - Install NEW and tighten - **Fastener Specifications**
43. 

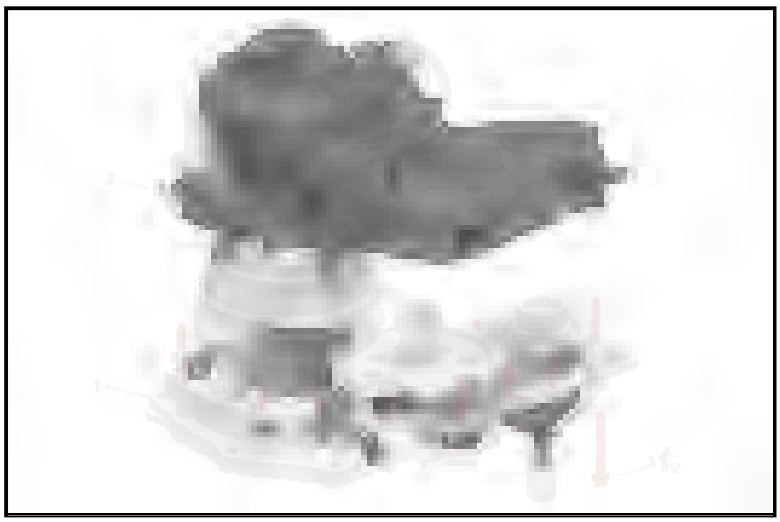
    Slide the conduit (1) over the synchronizer coil wires to install.

44. Insert the wires into the connector (2) and install the connector assembly.

    NOTE: Install a new pump plug as required.

45. Transfer Case Access Hole Plug (3) - Install [2x]

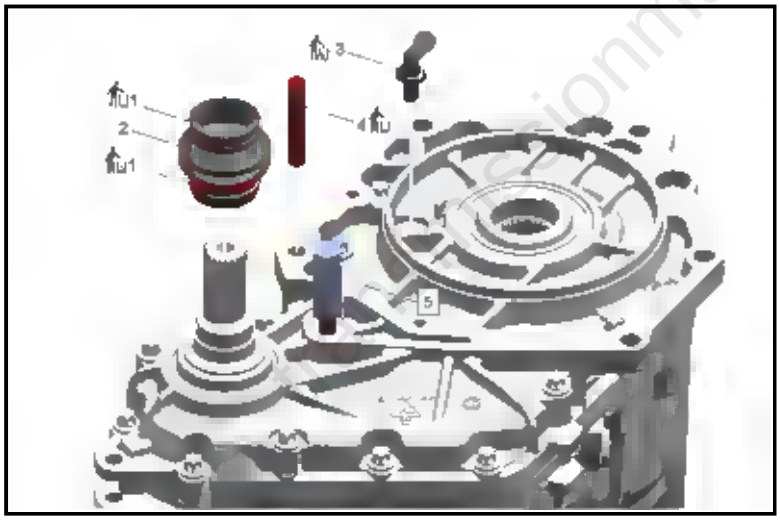
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46. 

Ensure both sealing surfaces of the front and rear case halves are free of dirt, oil and cleaning solvent.

CAUTION: **Apply the proper amount of the sealant when assembling this component. Excessive use of the sealant can prohibit the component from sealing properly. A component that is not sealed properly can leak leading to extensive engine damage.**

47. Apply a 3 - 4 mm (0.12 - 0.16 in) bead of sealant to the sealing service of the front case half. **Adhesives, Fluids, Lubricants, and Sealers**
48. Transfer Case Front Case Half (1) - Install
49. Transfer Case Rear Case Half (2) - Install
50. Transfer Case Half Bolt (3) - Install NEW and tighten [15x] - **Fastener Specifications**

51. 

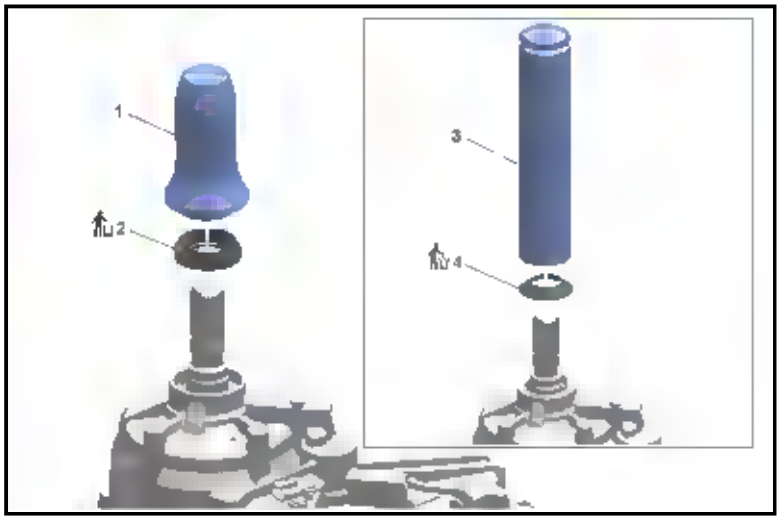
NOTE: **If vent removal is required, install a NEW vent during assembly.**

Transfer Case Vent (1) - Install NEW

52. Apply threadlock to the stud threads before installation. Apply threadlock only to the threads on the end of the stud that will be installed into the transfer case front half. **Adhesives, Fluids, Lubricants, and Sealers**
53. Install **DT - 49308** Stud Remover and Installer onto the stud (2).
54. Rotate the bolt until it contacts the top of the transfer case stud (2).
55. Install a deep socket over both the head of the bolt and the long nut and tighten the transfer case stud. **Fastener Specifications**.
56. Loosen the long nut and remove the tool from the stud (2).
57. Inspect the stud (2) for the proper installation height. A properly installed stud (2) should protrude from the face of the case 30.3 - 31.1 mm (1.19 - 1.23 in).

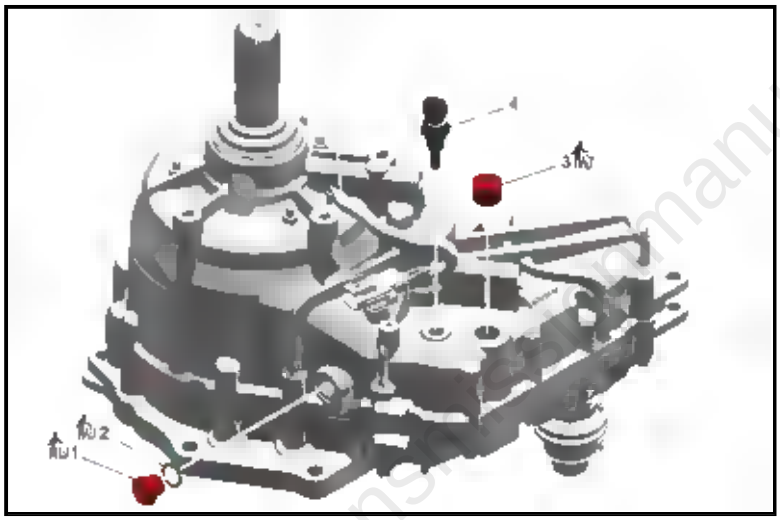
NOTE: **Install 2 NEW transfer case front output shaft boot clamps.**

58. Transfer Case Front Output Shaft Boot (3) - Install

59. 

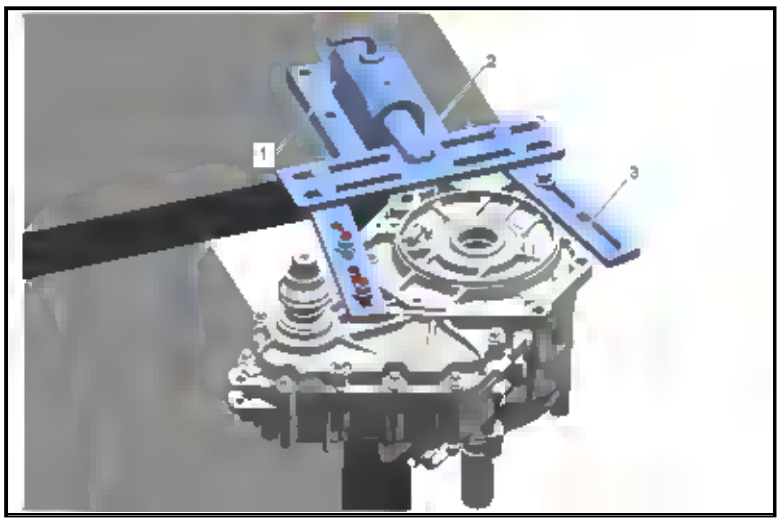
Transfer Case Rear Output Shaft Seal (2) - Install NEW - use **DT-49861-A** Seal Installer (1)

60. Transfer Case Rear Output Shaft Oil Slinger (4) - Install NEW - use **J-44907** Bearing Installer (3)

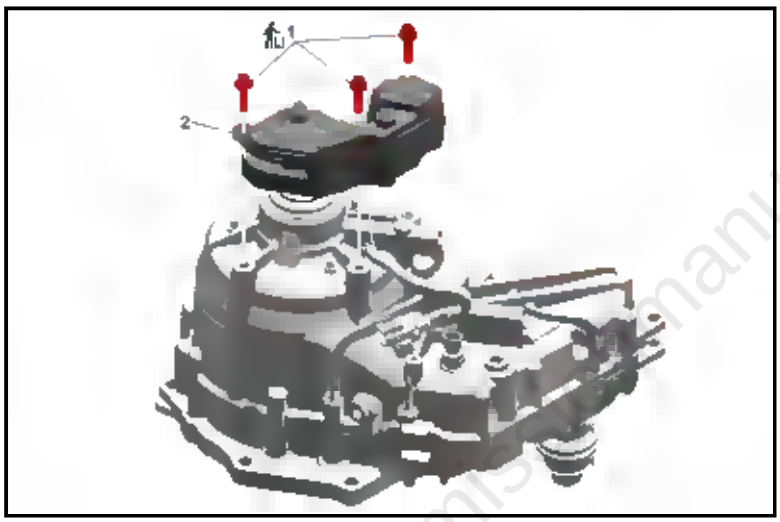
61. 

NOTE: **The seal is not a separate service part. If seal damage is present, replace the plug and seal as an assembly.**

62. Transfer Case Oil Fill Plug (2) - Install NEW and tighten - **Fastener Specifications**
63. Apply sealant to the threads of the drain plug. **Adhesives, Fluids, Lubricants, and Sealers**
64. Transfer Case Oil Drain Plug (3) - Install NEW and tighten - **Fastener Specifications**
65. Transfer Case Fluid Temperature Sensor (4) - Install and tighten - **Fastener Specifications**

66. 

67. Remove transfer case and **J - 36842** Transaxle Holding Fixture (1) from the **DT-3289 - 20** Holding Fixture (2).
68. **J - 36842** Transaxle Holding Fixture (1) - Remove @ Transfer Case (3)
69. Remove the M10 x 1.5 mm nuts and bolts that retain the assembly to the fixture.

70. 

    Transfer Case Vibration Dampener - {If equipped} (1) - Install

71. Transfer Case Vibration Dampener Bolt - {If equipped} (2) - Install NEW and tighten - **Fastener Specifications**

FOUR WHEEL DRIVE CLUTCH SHIM SELECTION

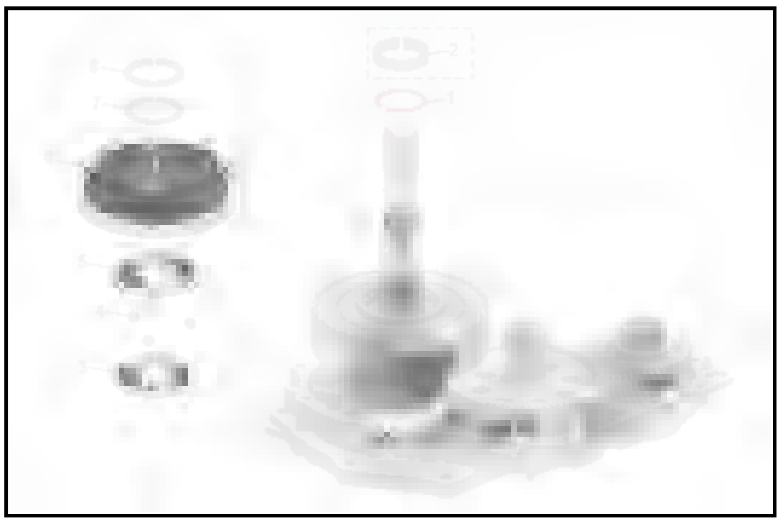
Special Tools

J-8001 Dial Indicator

Equivalent regional tools: **Special Tools**

1. Assemble or disassemble the internal components to the clutch pack snap ring (1).
    1. **Transfer Case Front Drive Axle Viscous Clutch Assemble**
    2. **Transfer Case Assemble**
    3. **Transfer Case Disassemble**

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2. 

   The purpose of this procedure is to obtain a proper clutch travel of 0.7 - 1.2 mm (0.0275 - 0.0472 in.) when assembled with a selective thrust washer.

3. Transfer Case Rear Output Shaft Rear Bearing Retaining Ring (1) - Install

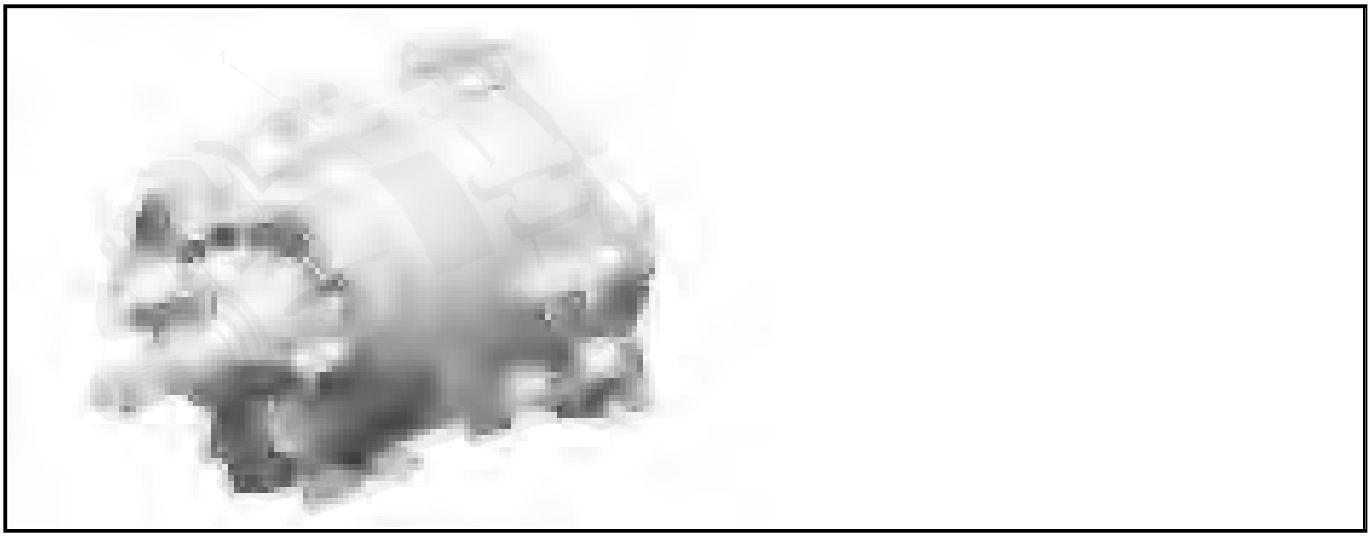
   NOTE: **DO NOT install the spring at this time. Temporarily remove the spring for selective thrust washer measurement.**

4. Transfer Case Four Wheel Drive Clutch Pressure Plate Spring (2) - Remove
5. Cam (3) - Install
6. Transfer Case Scissor Lever Ball (4) - Install [3x]
7. Transfer Case Scissor Mechanism Lever (5) - Install
8. Transfer Case Two/Four Wheel Drive Clutch Coil Housing (6) - Install
9. Transfer Case Four Wheel Drive Clutch Housing Bearing (7) - Install
10. Transfer Case Four Wheel Drive Clutch Shim (8) - Install
11. Attach the **J-8001** Dial Indicator.
12. Zero the **J-8001** Dial Indicator on the rotor assembly in the "free state" assembled position.
13. Rotate the rotor counter clockwise using moderate hand pressure until it stops. Record this measurement.
14. The ideal selected spacer will create the preferred rotor travel value of 0.95 mm (0.0375 in.) The allowable travel range is 0.7 - 1.2 mm (0.0275 - 0.0472 in.)
15. The selective spacer requires verification before proceeding.
    1. Remove the installed spacer and install a selected spacer of the correct thickness.
    2. Refer to **Spacer and Shim Specifications** for a list of available shim sizes.
16. Remove the **J-8001** Dial Indicator and the **DT-50924** Clutch Pack Measurement Adapter.
17. Disassemble the components to the clutch pack retaining ring (1).
18. Assemble the internal components to include the shim (8) and spring (2). **Transfer Case Assemble**

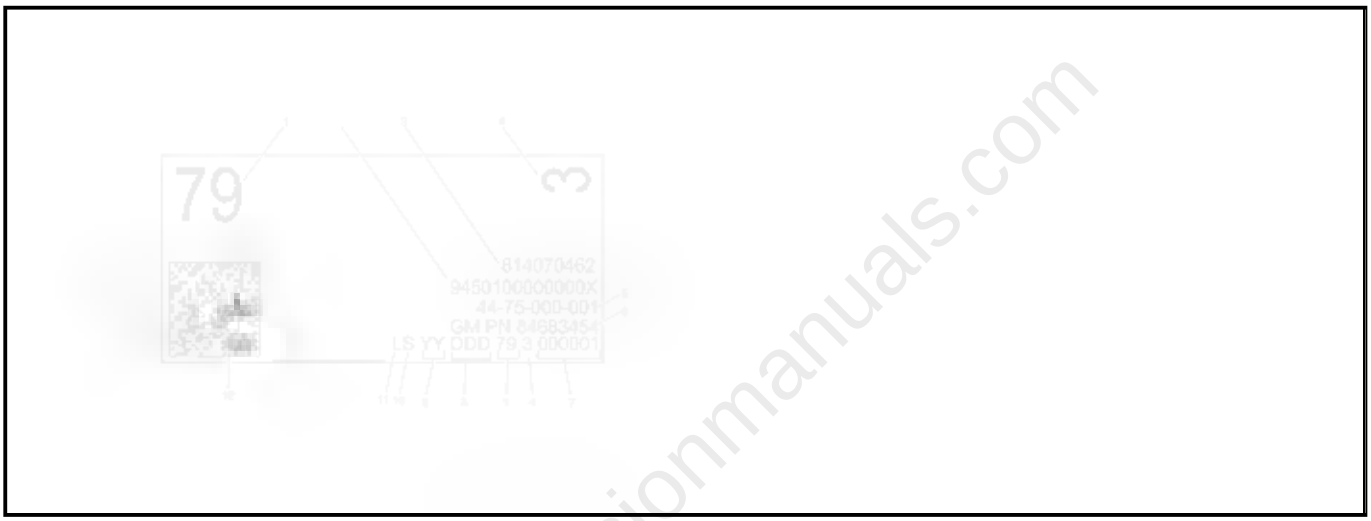
DESCRIPTION AND OPERATION

TRANSFER CASE IDENTIFICATION

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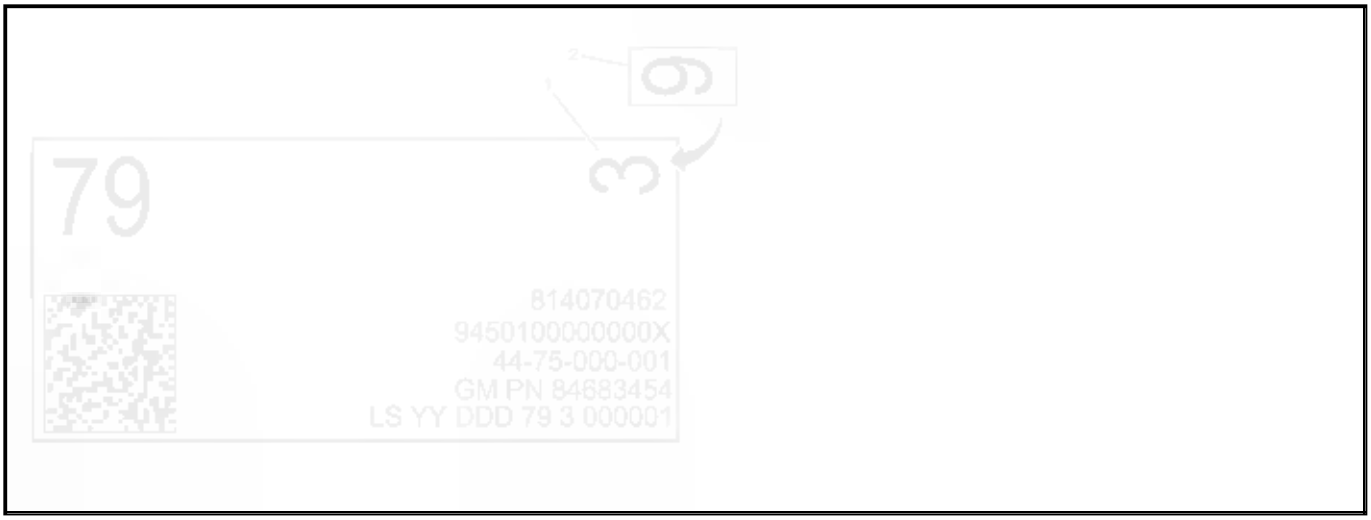
The transfer case identification label (1) is located on the rear case half at left side of unit.



1. Broadcast Code
2. VPPS code
3. Supplier DUNS
4. Clutch Calibration Value
5. BW Transfer Case assembly number
6. GM PN for Transfer Case assembly
7. Serial Number of the Transfer Case
8. Julian Date - Transfer Case assembled date
9. 2-digit year of Transfer Case assembly
10. Shift Identifier
11. Assembly line identifier
12. 2D barcode label

TRANSFER CASE INFORMATION LABEL

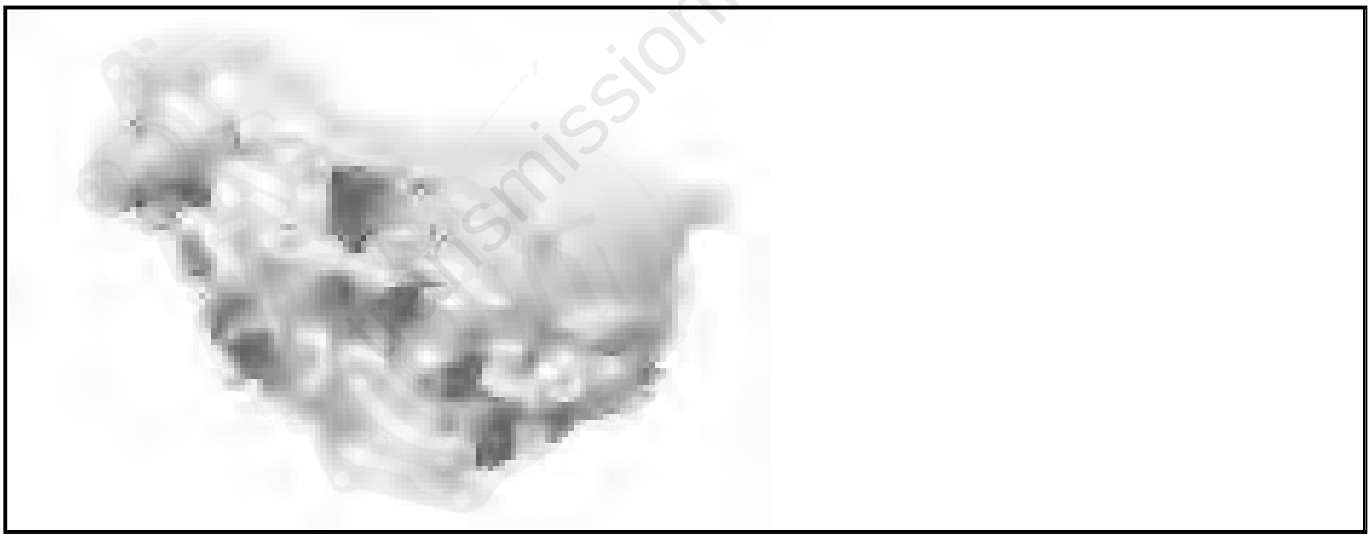
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The Transfer Case Control Module (TCCM) calibration can be identified by the clutch calibration identification number (1) located on the transfer case assembly label. There are 9 variations of production TCCM programming.

- In situations where the transfer case assembly is replaced, the TCCM is to be reprogrammed to the clutch calibration value (1 - 9) as indicated on the NEW transfer case assembly label.
- In situations where the transfer case assembly is repaired and the clutch pack assembly has been replaced, reprogramming of the TCCM is required using the service calibration (variation 9). After completing TCCM re-calibration, the service calibration label (2) is to be installed onto the production label. The service calibration label is to be installed on top of the existing calibration identification. The service calibration label can be identified as having a red background color and the number 9 black in color.
- In situations where only the TCCM is replaced, the TCCM needs to be reprogrammed to the correct clutch calibration value (1 - 9) as identified on the transfer case assembly label.

TRANSFER CASE DESCRIPTION AND OPERATION



The Borg Warner (BW) model 4475, transfer case is a 1-speed active design.

The BW-4475 transfer case allows vehicle speed dependent flexible clutch preload torque levels for enhanced system performance. An on-demand torque biasing friction clutch is tuned through software calibrations. When a driver enters a turn, clutch torque is decreased based on the various CAN inputs, such as steering angle, to prevent crow hop or driveline binding from occurring at low speeds. If the driver were to accelerate hard enough in a turn to induce rear wheel slip the transfer case would immediately correct it and then reduce torque to prevent crow hop or binding.

The system is fully automatic, requires no driver intervention, and has its own control module integrated with the vehicle chassis control system via the vehicle's CAN bus. The torque split between the front and rear axle is not fixed as in an open center differential transfer case meaning the active transfer case has the ability to transfer up to 100% of available torque to the front axle as needed.

The case halves are die-cast aluminum. Ball bearings support the input shaft and front output gear. Tapered bearings support the idler gear. Power from the input shaft is transferred to the front output shaft via a helical gear set. A gerotor type oil pump is driven by a shaft located into the end of the idler gear assembly. Oil is pulled from the sump through the filter and screen, pumped through the oil distribution channels, and into the input shaft oil gallery for the clutch and bearing lubrication.



Fig. 9: Identifying Transfer Case Clutch Pack Assembly Components
Courtesy of GENERAL MOTORS COMPANY

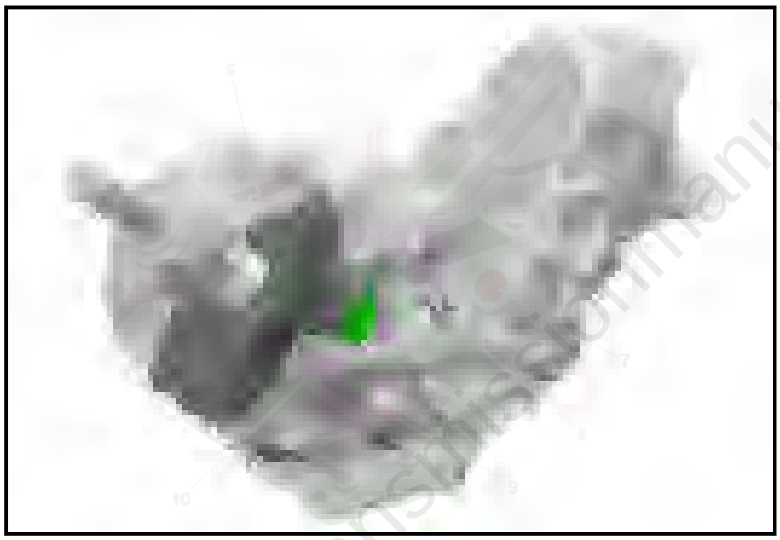
Torque is transferred to the front axle through an active wet clutch within the transfer case. The clutch pack is engaged by an electromagnetic clutch coil and ball ramp assembly. By varying the amount of current, torque output to the front axle can be adjusted.

Whenever the coil (1) is energized as determined by vehicle operating conditions and commanded by TCCM, the armature (8) in the clutch housing is magnetically drawn toward the rotor (2). Torque is generated through friction between the armature and rotor. Friction torque is multiplied through the ball (4) cam (3 and 5) mechanism and applied to the clutch pack (9). The clutch pack assembly contains a predetermined selectable pressure plate, friction, and reaction plates that are to be serviced as a clutch pack assembly. Clutch activation is controlled by a pulse width modulated voltage signal. If the clutch pack assembly is replaced, the TCCM must be recalibrated using the service calibration. Refer to **Transfer Case Information Label**.

External Components

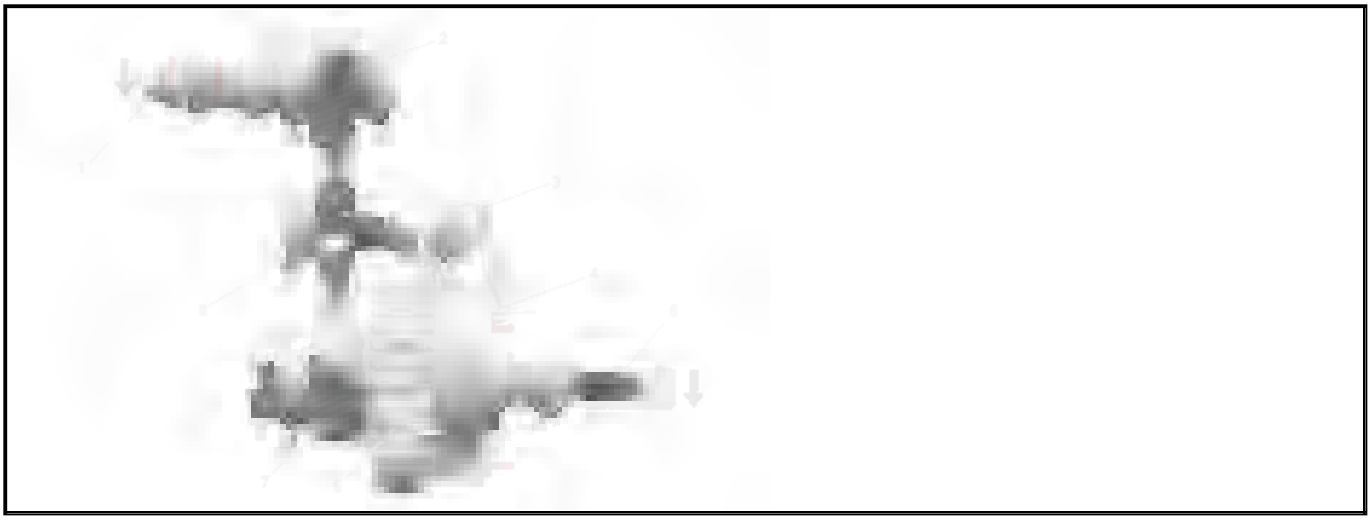
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1. Transfer Case Front Output Shaft
2. Transfer Case Front Output Shaft Boot
3. Transfer Case Input Shaft
4. Transfer Case Label
5. Transfer Case Vent
6. 
7. Transfer Case Vibration Dampener - {If equipped}
8. Transfer Case Oil Drain Plug
9. Transfer Case Fluid Temperature Sensor
10. Transfer Case Oil Fill Plug
11. Two/Four Wheel Drive Inline Wiring Connector

Internal Components

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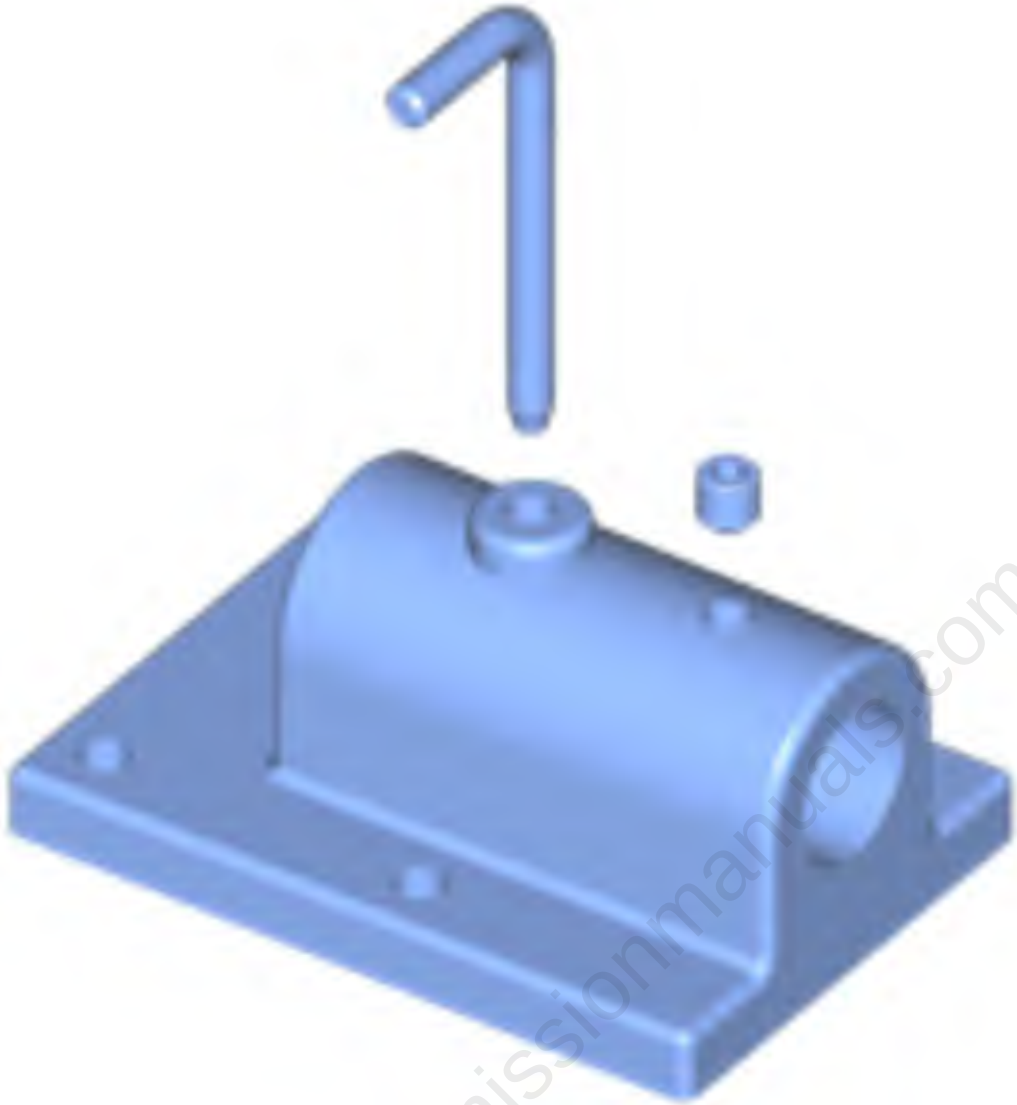


1. Transfer Case Front Output Shaft
2. Transfer Case Output Gear
3. Transfer Case Oil Pump
4. Two/Four Wheel Drive Clutch Coil
5. Transfer Case Input Shaft
6. Transfer Case Clutch Pack Assembly
7. Transfer Case Input Shaft Gear
8. Transfer Case Idler Gear

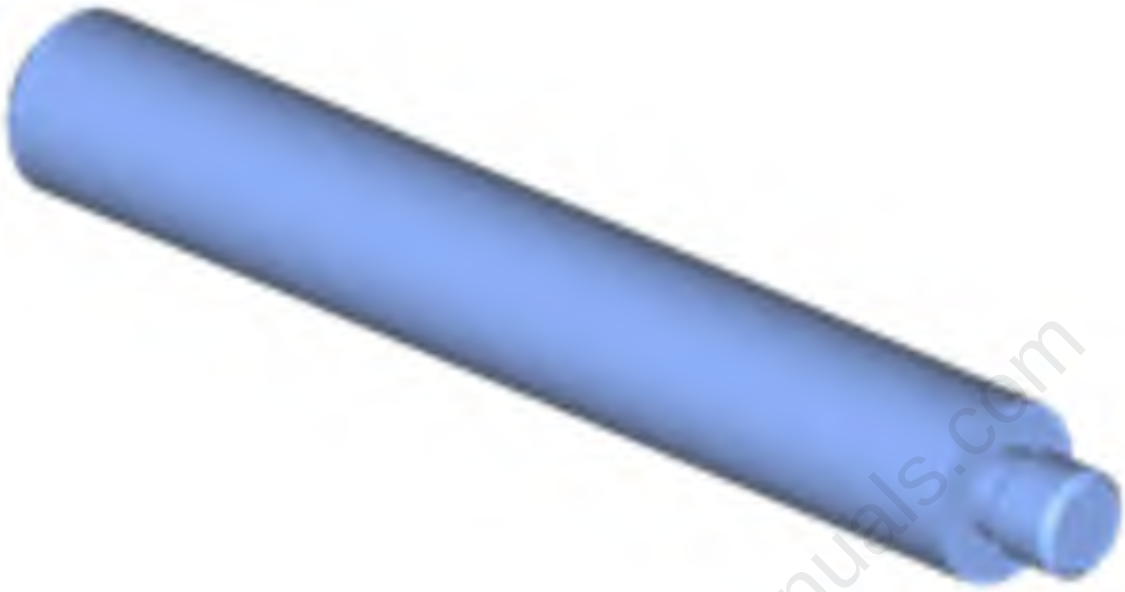
SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

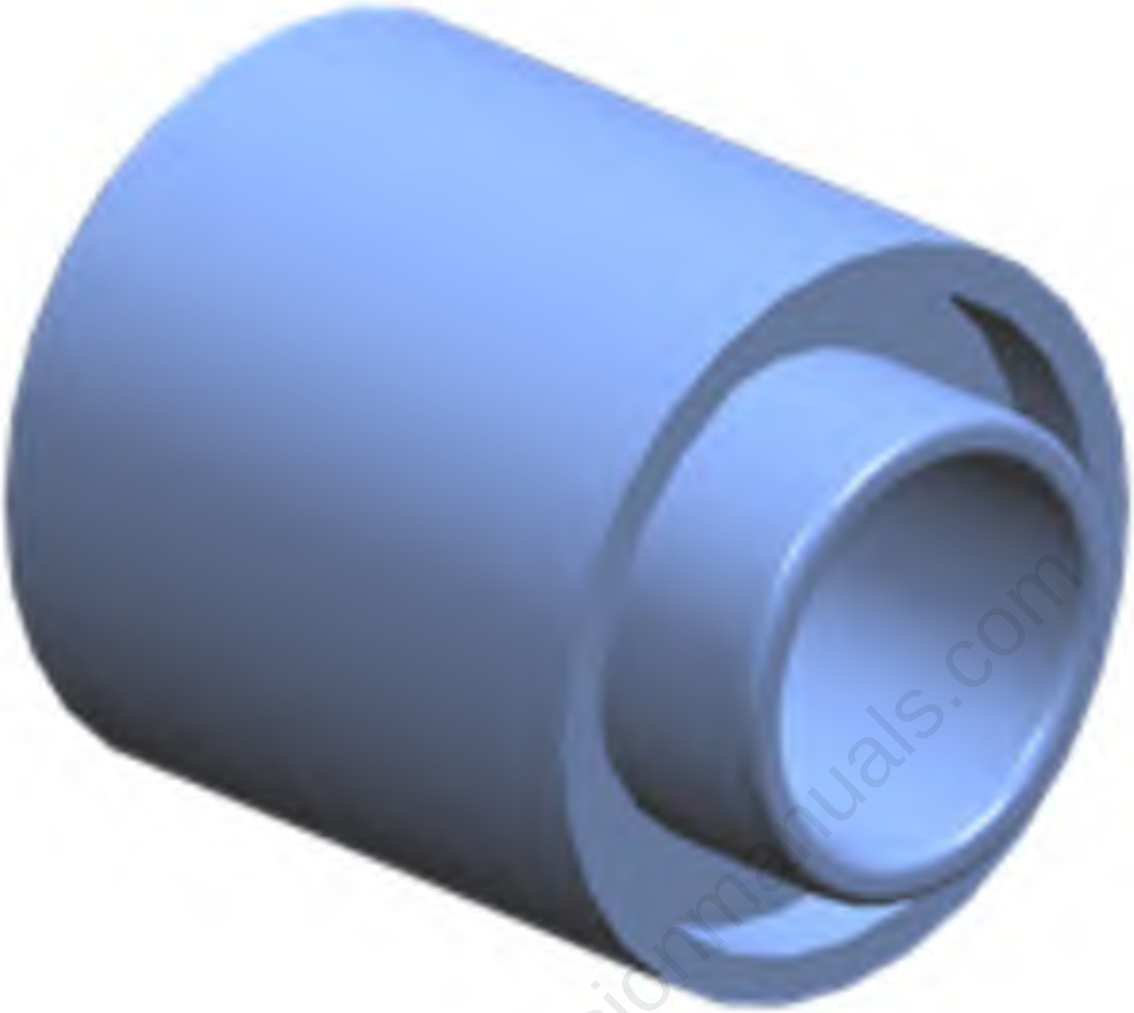
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Illustration	Tool Number/Description
	DT-113-2-A DT-3289-20 KM-113-2 Bracket

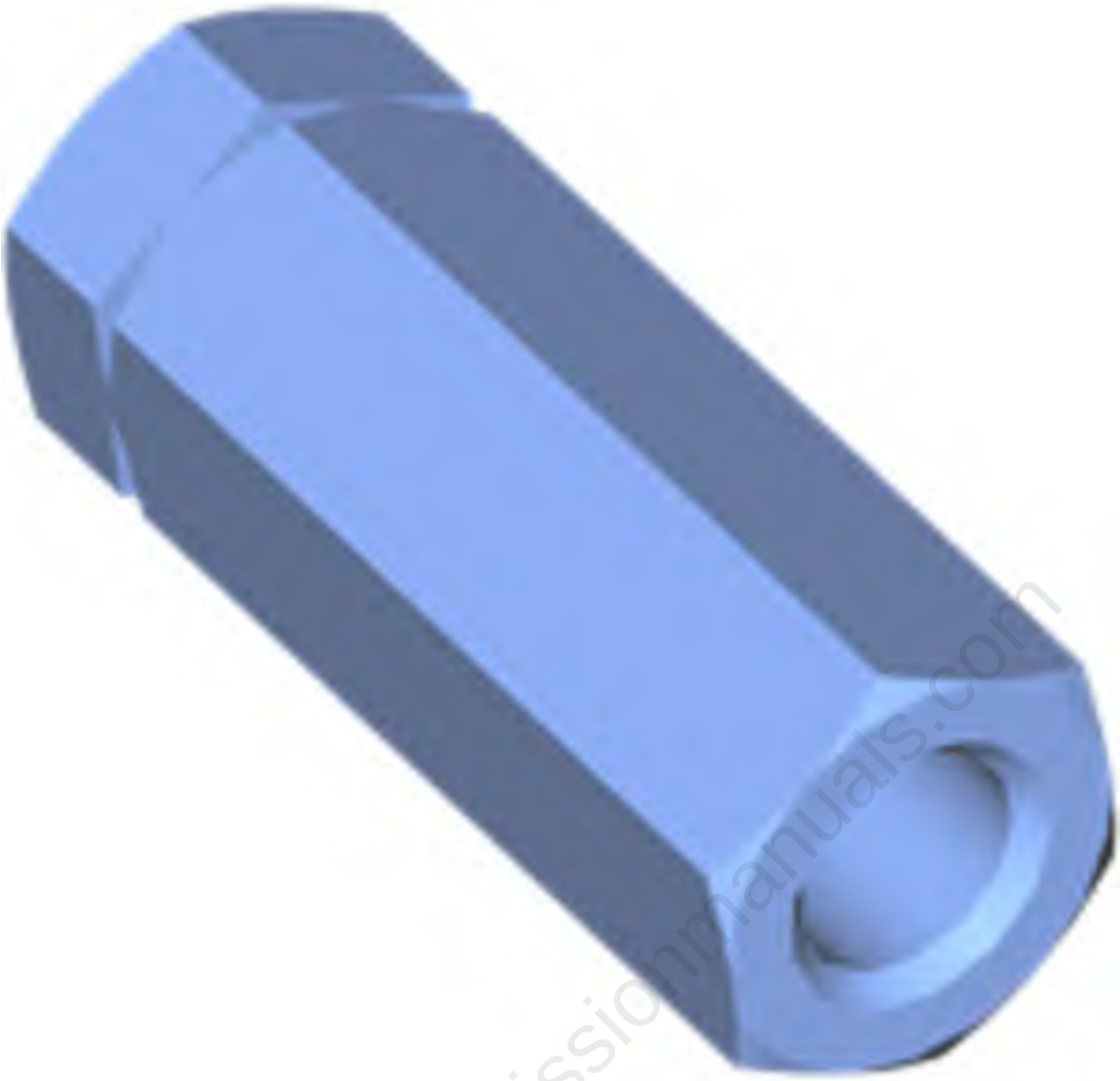
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Illustration	Tool Number/Description
	DT-8092 GE-8092 J-8092 Driver Handle

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Illustration	Tool Number/Description
	DT-47847 Front Output Shaft Seal Installer

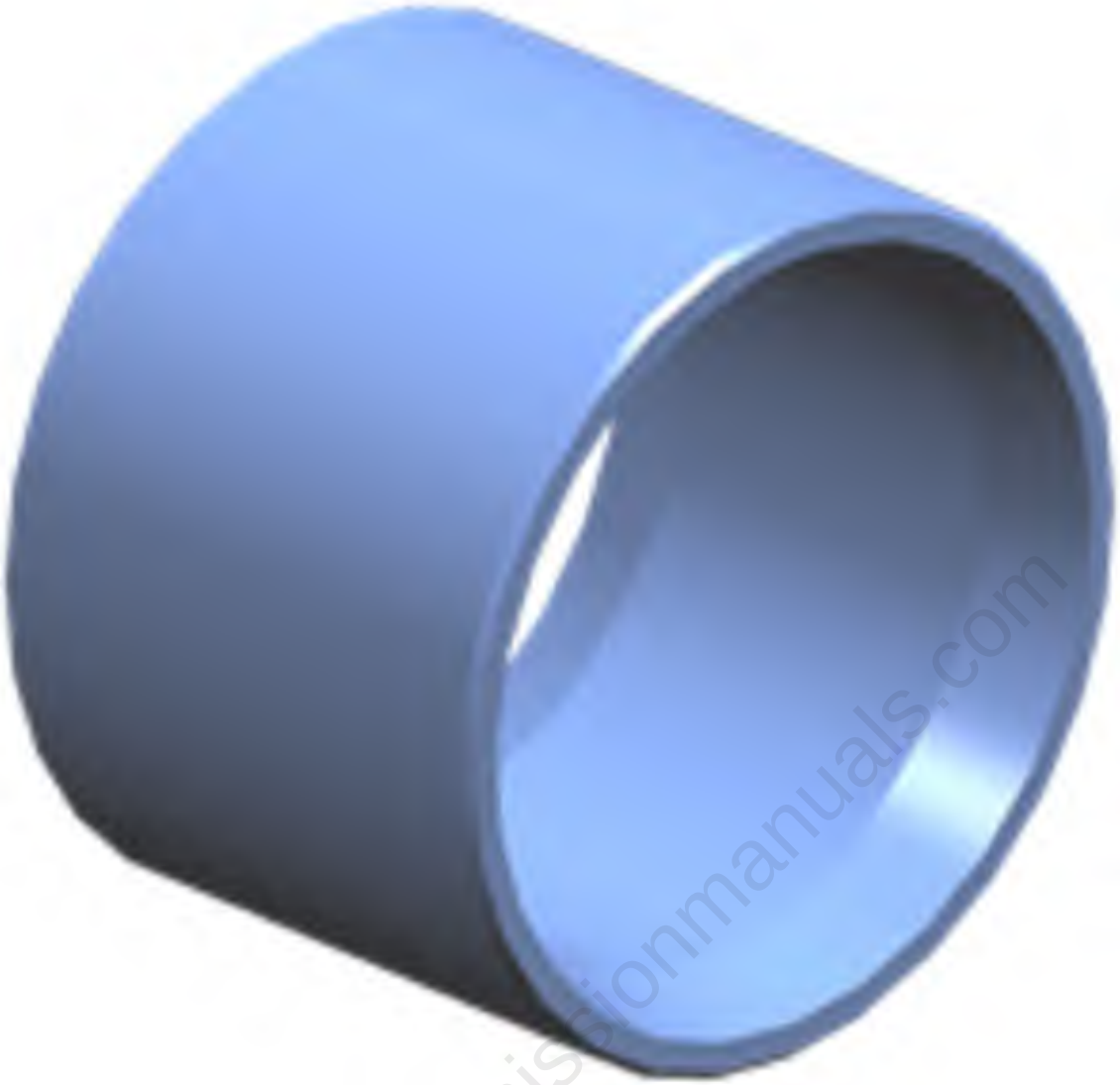
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Illustration	Tool Number/Description
	DT-49308 Stud Remover/Installer

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Illustration	Tool Number/Description
	DT-49861-A Seal Installer

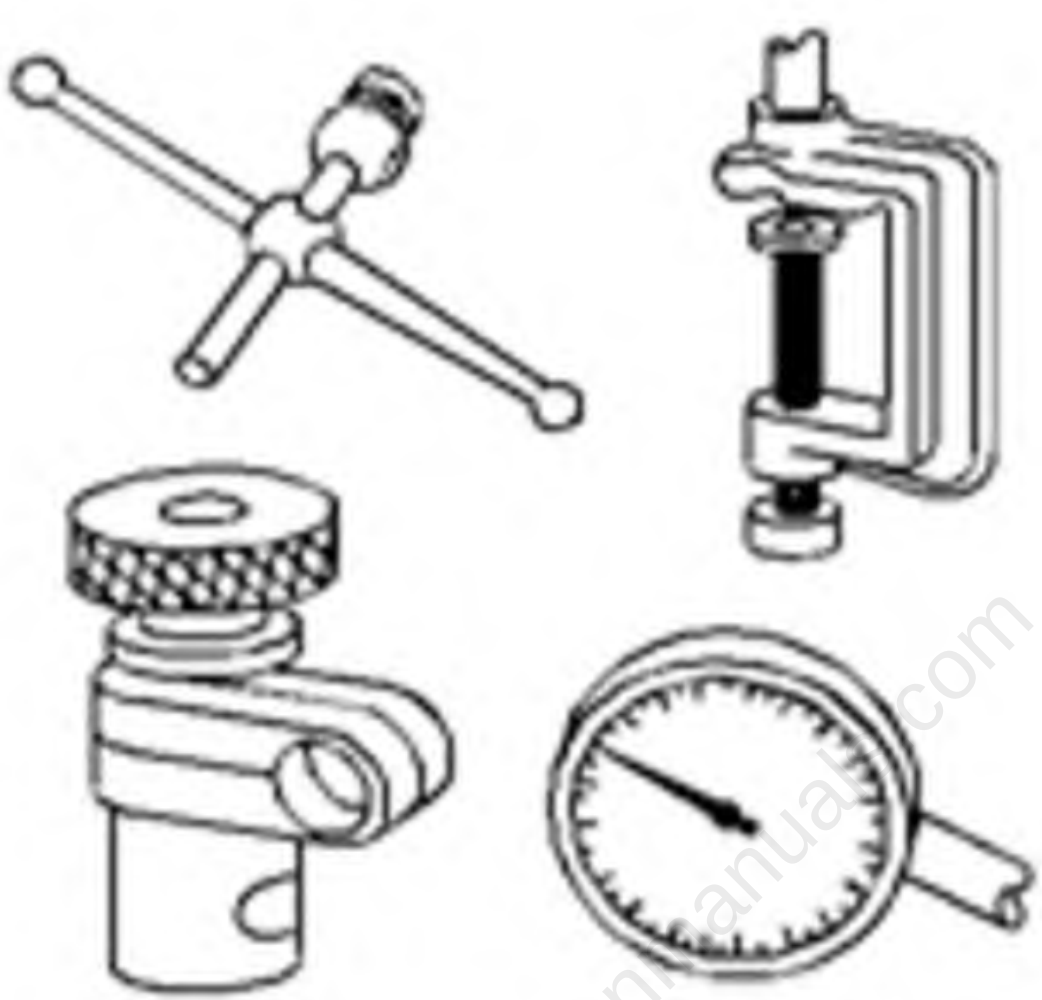
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Illustration	Tool Number/Description
	DT-50978 Seal Sizer

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Illustration	Tool Number/Description
	GE-2619-A J-2619-A Slide Hammer w/Adapter

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Illustration	Tool Number/Description
	J-8001 Dial Indicator Set

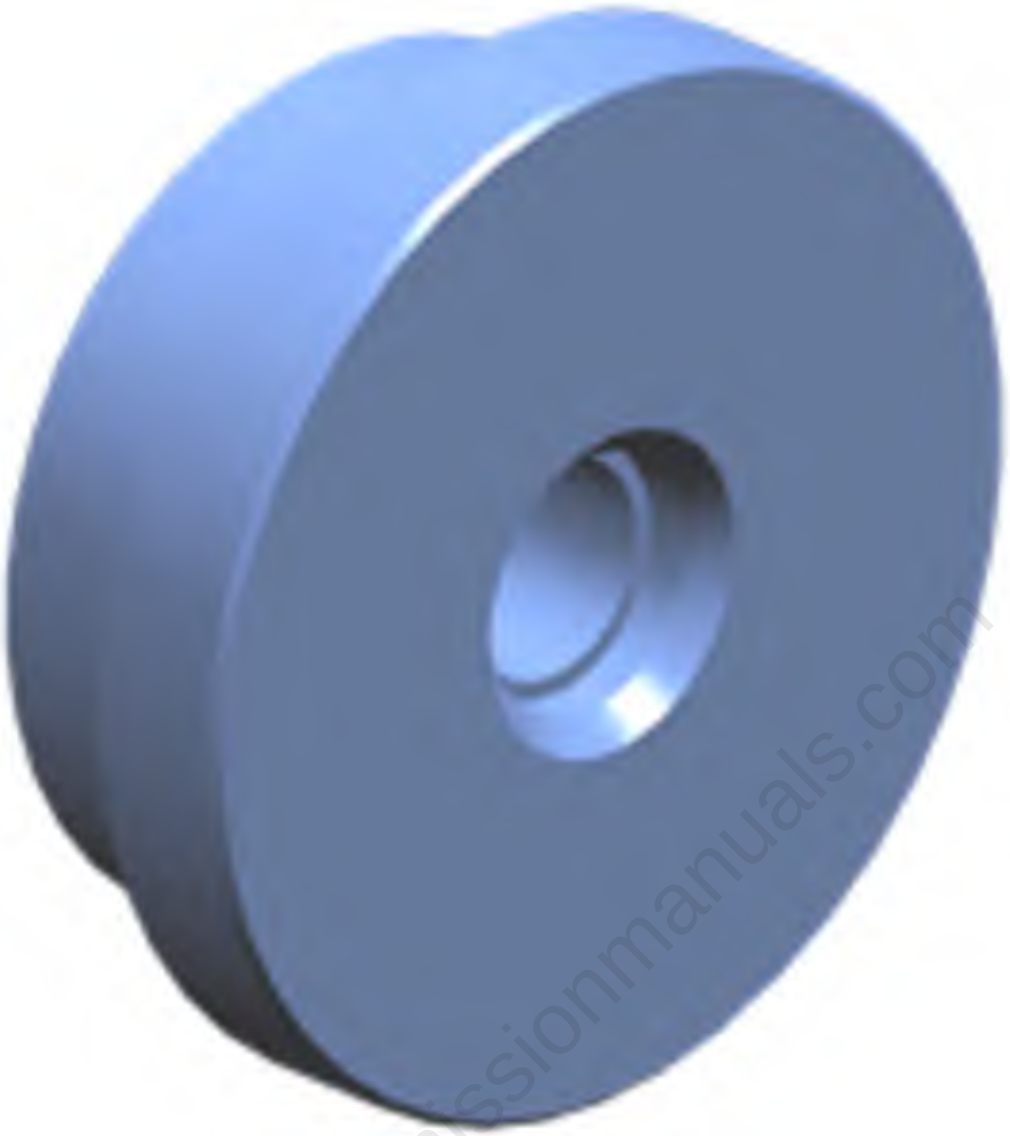
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Illustration	Tool Number/Description
	J-29369-2 Bushing and Bearing Remover - 2 - 3 in

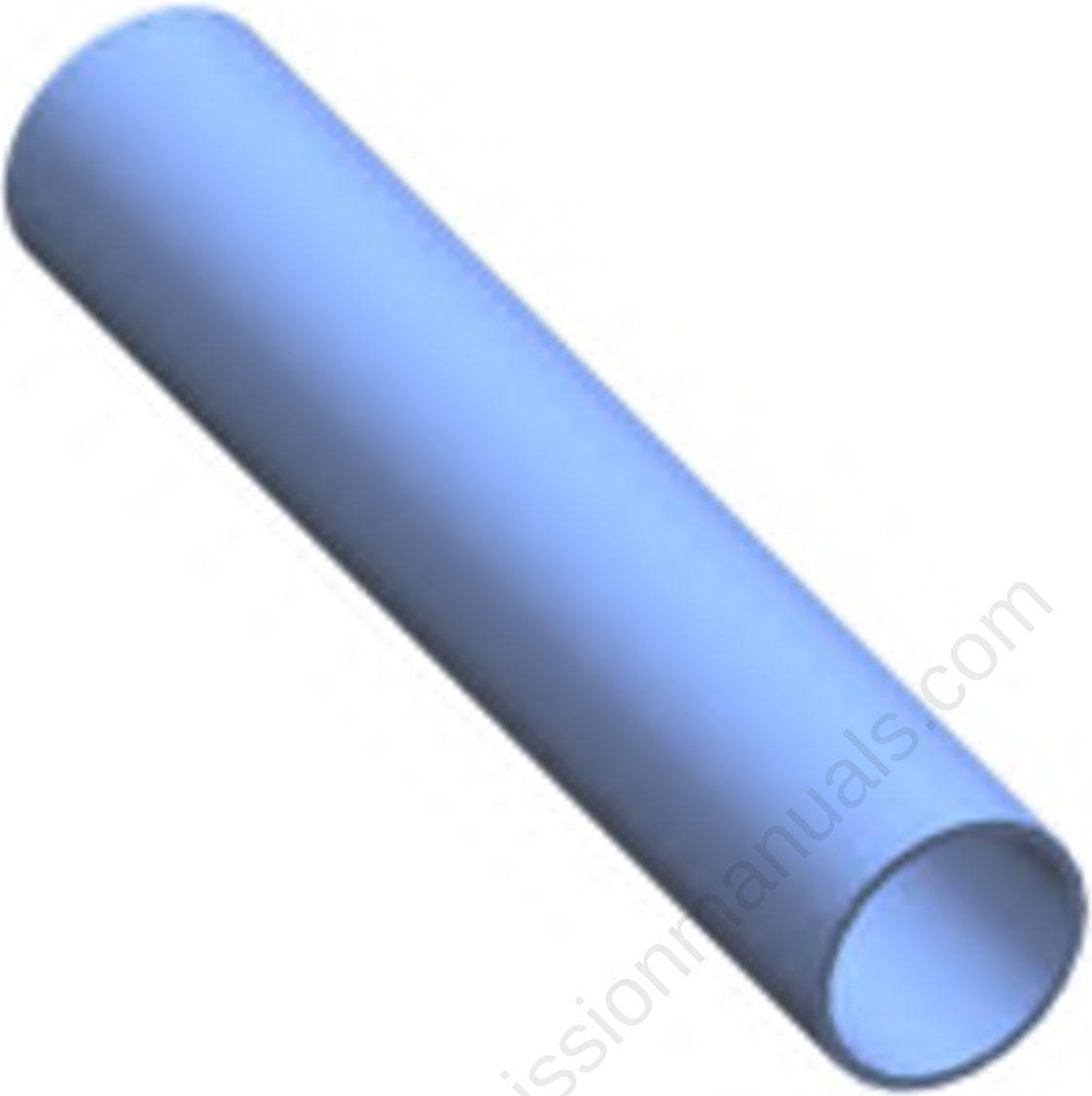
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Illustration	Tool Number/Description
	J-36842 Transaxle Holding Fixture

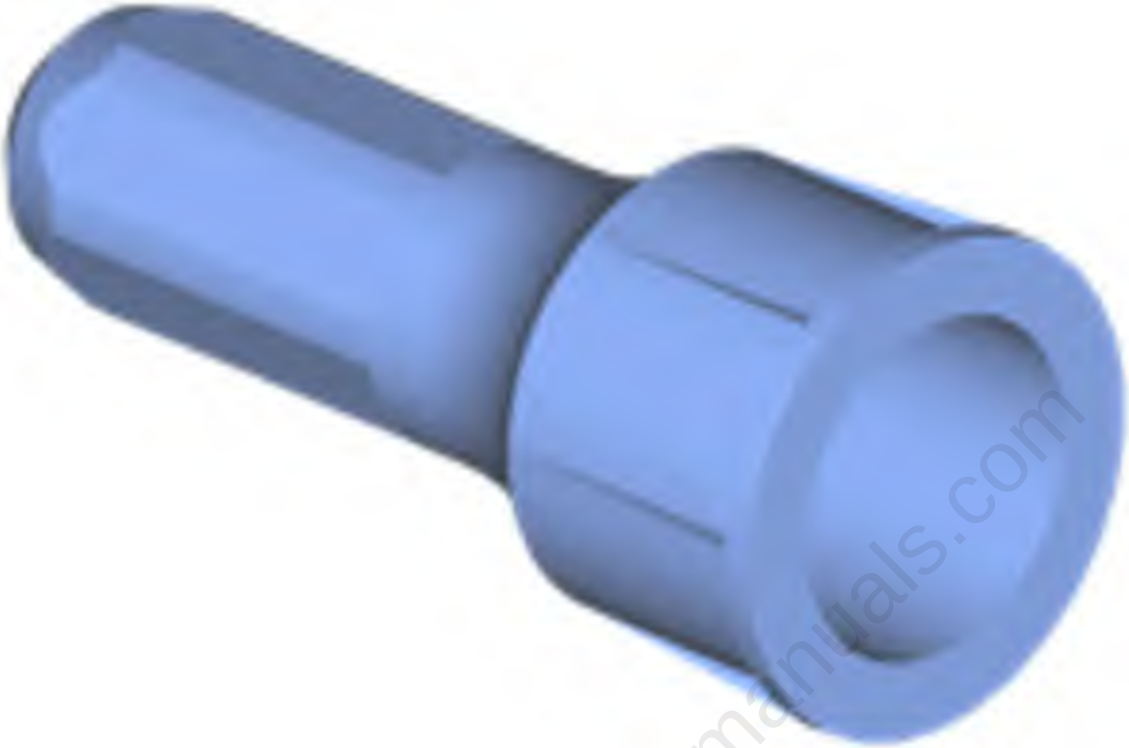
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Illustration	Tool Number/Description
	J-38412 Bearing Cup Installer

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Illustration	Tool Number/Description
	J-41736 Bearing Installer

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Illustration	Tool Number/Description
	J-42738 Seal Installer

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Illustration	Tool Number/Description
	J-44907 Bearing Installer

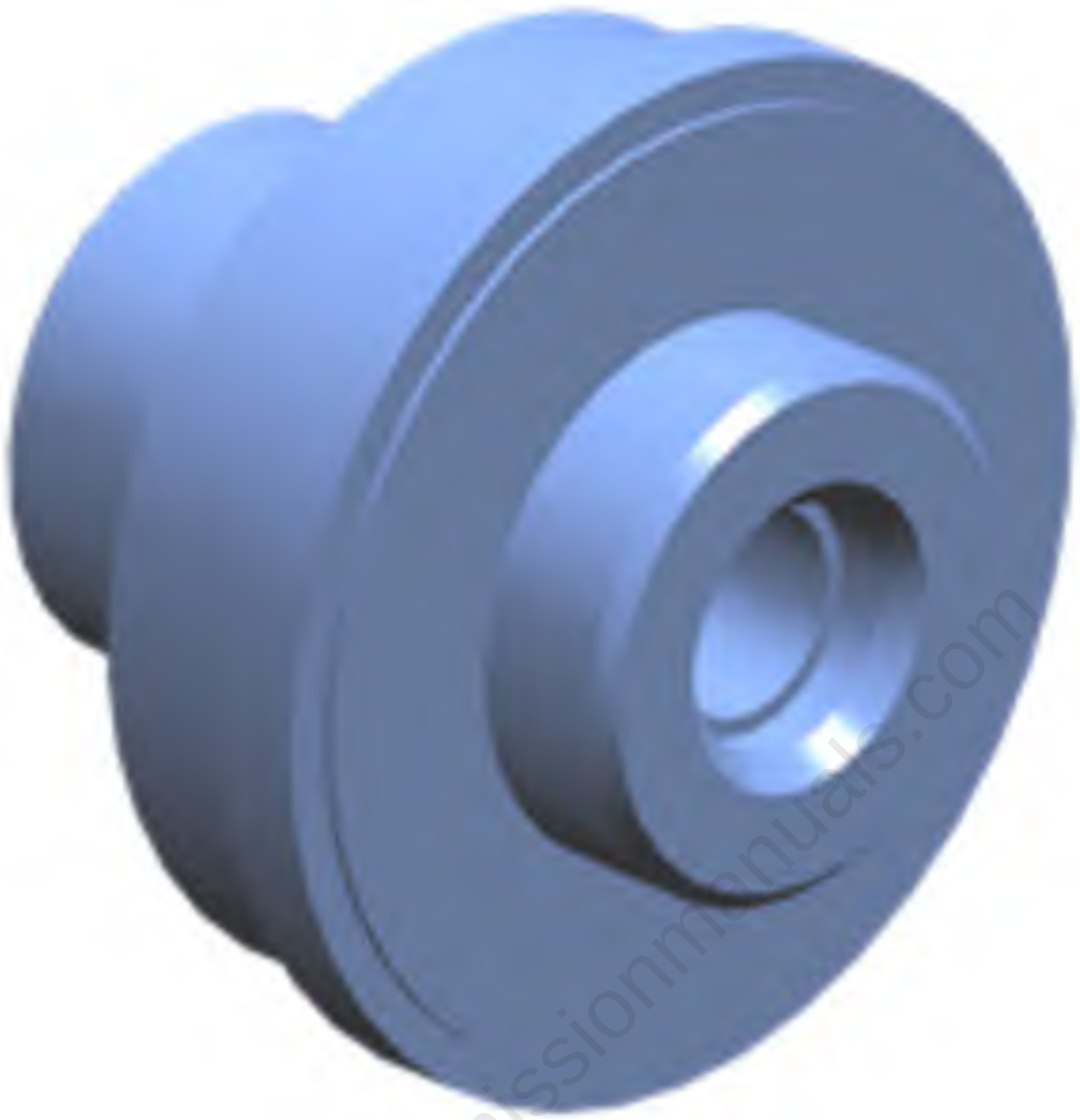
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Illustration	Tool Number/Description
	J-45124 Removal Bridge

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Illustration	Tool Number/Description
	J-45124-9 Puller Leg

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Illustration	Tool Number/Description
	J-45853 Rear Axle Bearing/Seal Installer

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