

Manual Transmission - NV 4500

Specifications

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Backup Lamp Switch	28 N·m	21 lb ft
Clutch Cover Bolts	14 N·m	10 lb ft
Main Drive Gear Bearing Retainer Bolts	35 N·m	26 lb ft
Oil Fill and Drain Plugs	37 N·m	27 lb ft
Transmission to Engine Cover Bolts	14 N·m	10 lb ft
Extension Housing to Case Bolts	54 N·m	40 lb ft
Shift Boot Screws	2 N·m	18 lb in
Shift Housing to Transmission Bolts	10 N·m	89 lb in
Shift Lever Nut	47 N·m	35 lb ft
Speed Sensor	20 N·m	15 lb ft
Transmission Support Bracket Bolts	100 N·m	74 lb ft
Transmission to Engine Bolts and Studs	50 N·m	37 lb ft
Mainshaft/Yoke Nut	441 N·m	325 lb ft

Lubrication Specifications

Application	Specification	
	Metric	English
New Venture Gear NV4500 Manual Transmission Recommended Lubricant: Castrol Syntorq LT Transmission Fluid	3.78 liters	4.0 quarts

Diagnostic Information and Procedures

Manual Transmission Diagnosis

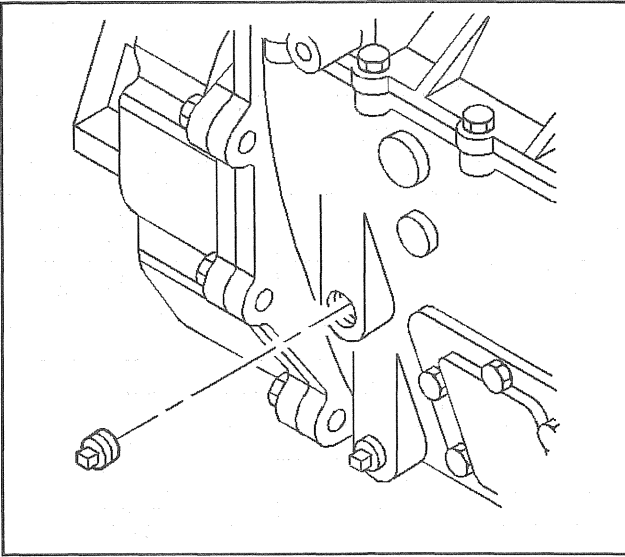
Step	Action	Value	Yes	No
1	With the clutch pedal engaged, can the shift lever be positioned into all of the five gear positions?	—	Go to Step 2	Go to Step 3
2	Check the clutch system. Refer to <i>Unable To Select Gears</i> or <i>Preliminary Checking Procedure</i> in Clutch Diagnostic Procedures. Is the clutch system operating correctly?	—	Go to Step 3	Go to Step 4
3	Check the transmission for the proper oil level. Refer to <i>Fluid Replacement</i> and <i>Lubrication Specifications</i> . Is the oil level correct?	—	Go to Step 5	Go to Step 6
4	Refer to <i>Preliminary Checking Procedure</i> in Clutch Diagnostic Procedures	—	—	—
5	Replace or repair the transmission. Refer to <i>Transmission Replacement</i> .	—	—	—
6	Check the transmission rear oil seal for leaks. Is the transmission oil seal leaking?	—	Go to Step 8	Go to Step 9
7	Add or replace the oil as required. Refer to <i>Transmission Replacement</i> and <i>Lubrication Specifications</i> . Is the oil level correct?	—	Go to Step 9	Go to Step 7
8	Replace the transmission rear oil seal. Refer to <i>Transmission Housing Oil Seal Replacement (Rear Wheel Drive)</i> or <i>Transmission Housing Oil Seal Replacement (Four Wheel Drive)</i> . Is the oil seal replaced?	—	Go to Step 7	Go to Step 8
9	Add or replace oil as required. Refer to <i>Fluid Replacement</i> and <i>Lubrication Specifications</i> . Does the transmission operate properly?	—	System OK	Go to Step 5

Repair Instructions

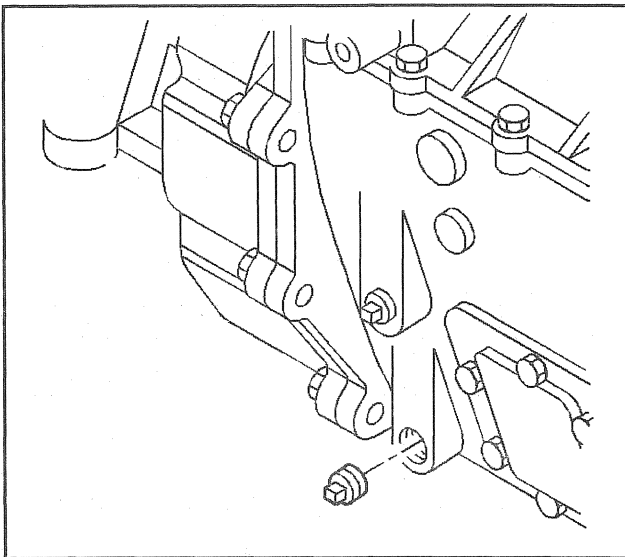
Fluid Replacement

Removal Procedure

1. Remove the oil fill plug.
2. Catch the oil in a suitable container.



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3. Remove the oil drain plug.

Installation Procedure

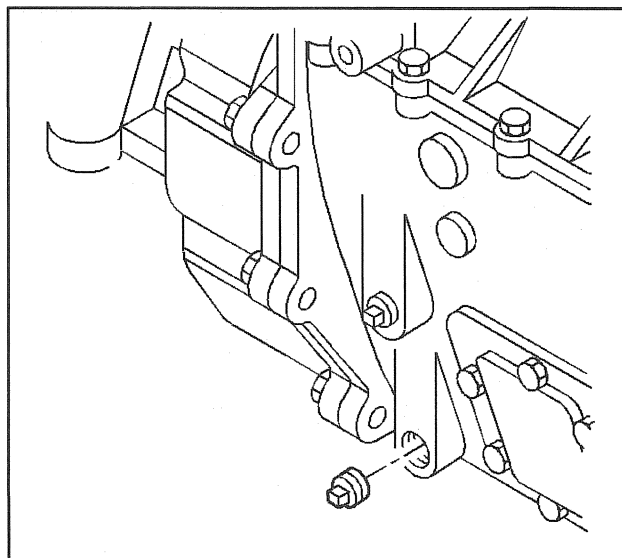
1. Remove all of the existing sealant from the oil drain plug.
2. Apply a thin bead of sealant GM P/N 12346004 to the treads of the oil drain plug.

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

3. Install the oil drain plug.

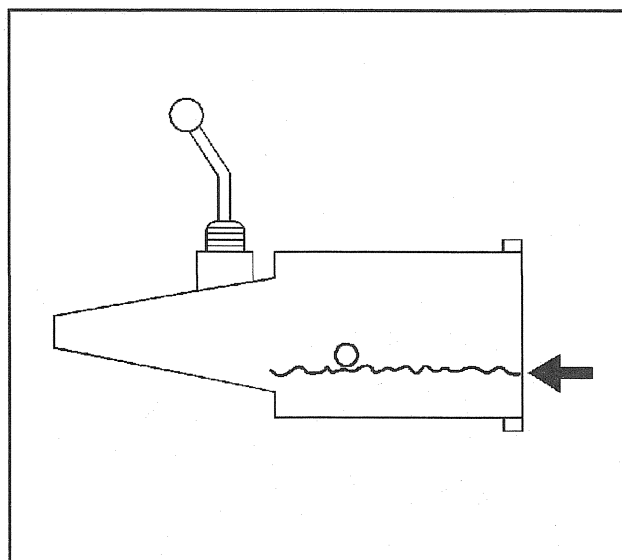
Tighten

Tighten the oil drain plug to 37 N·m (27 lb ft).



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4. Fill the transmission to the bottom of the oil fill plug hole. Refer to *Lubrication Specifications*.

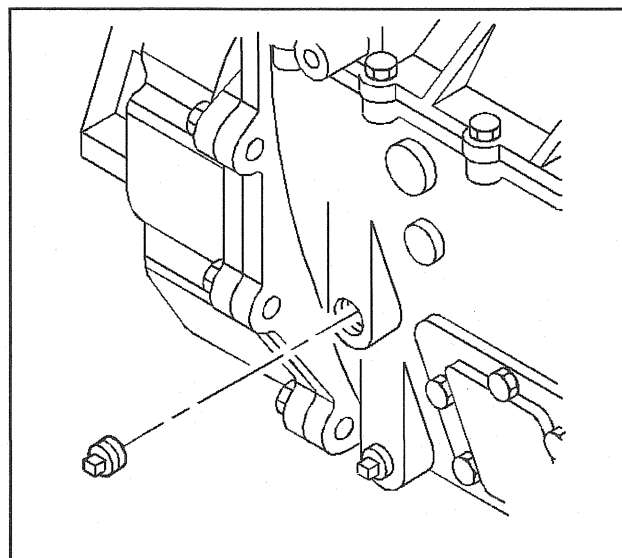


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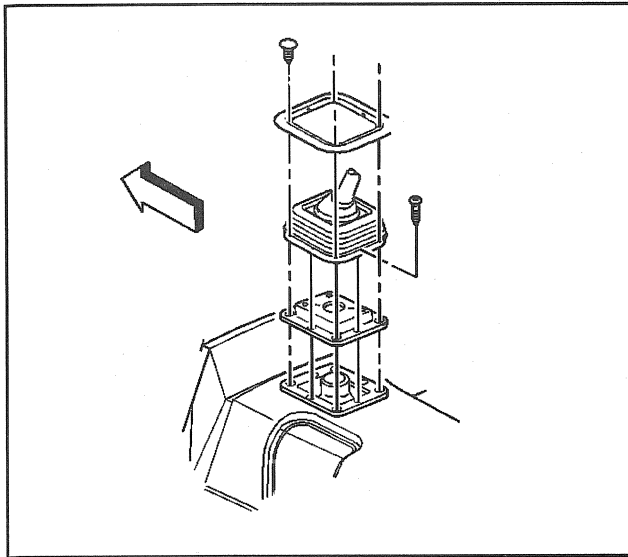
5. Remove all of the existing sealant from the oil drain plug.
6. Apply a thin bead of sealant GM P/N 12346004 to the treads of the oil fill plug.
7. Install the oil drain plug.

Tighten

Tighten the oil fill plug to 37 N·m (27 lb ft).



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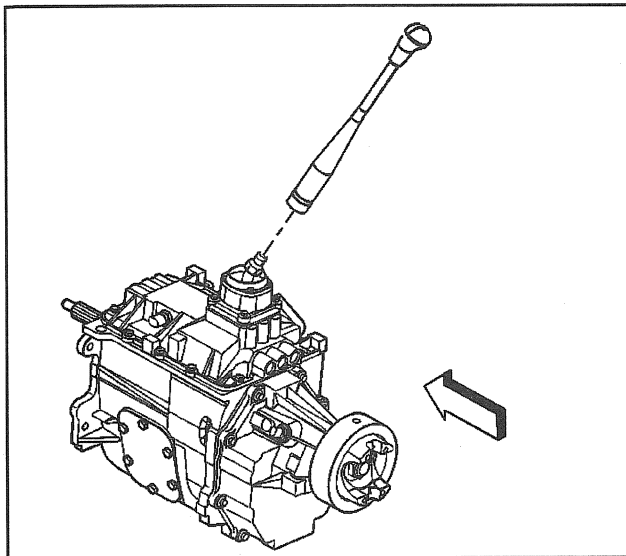


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Shift Lever

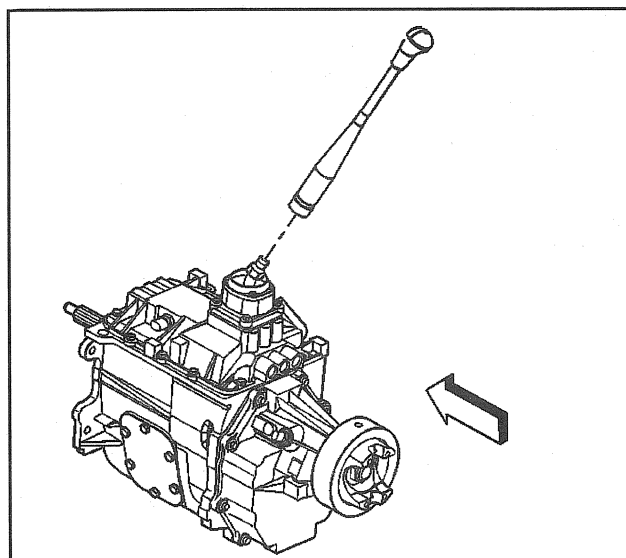
Removal Procedure

1. Remove four plastic retainer plugs securing the shift boot retainer to the shift boot.
2. Remove eight screws securing the shift boot and insulator to the floor panel.
3. Remove the retainer and shift boot from the shift lever.



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4. Remove the shift lever from the shift tower.
Do not remove the shift lever adjusting nut.



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Installation Procedure

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

1. Install the shift lever to the shift tower.
If required, use the shift lever adjusting nut to center the shift lever.

Tighten

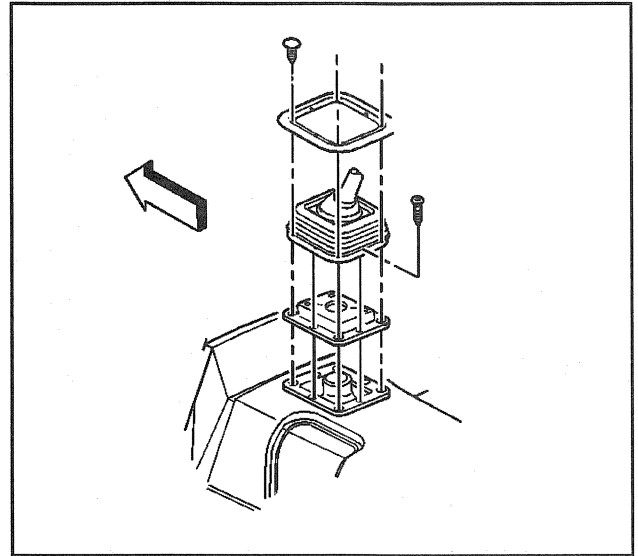
Tighten the shift lever nut to 47 N·m (35 lb ft).

2. Position the retainer and shift boot onto the shift lever.
3. Install eight screws securing the shift boot and insulator to the floor panel.

Tighten

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

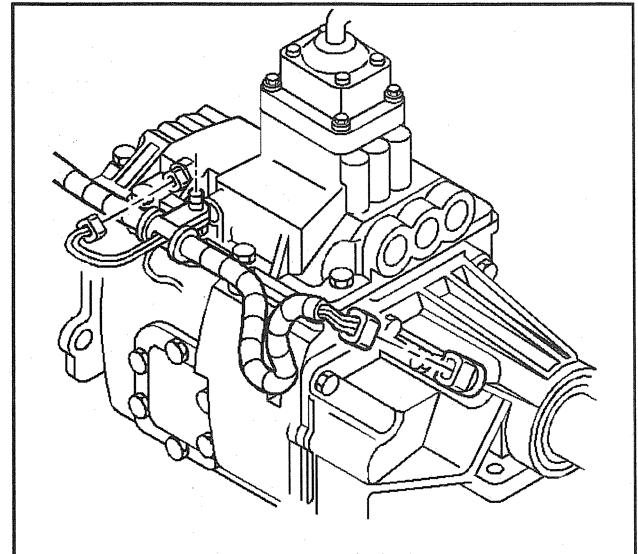
4. Install four plastic retainer plugs securing the shift boot retainer to the shift boot.



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Vehicle Speed Sensor**Removal Procedure**

1. Raise the vehicle. Refer to *Lifting and Jacking the Vehicle*.
2. Disconnect the electrical connector from the speed sensor.
3. Remove the speed sensor from the transmission.



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Installation Procedure

1. Coat the new O-ring seal with a thin film of transmission fluid. Use Castrol® Syntorq GL-4 Transmission Fluid GM P/N 12346190 or the equivalent.

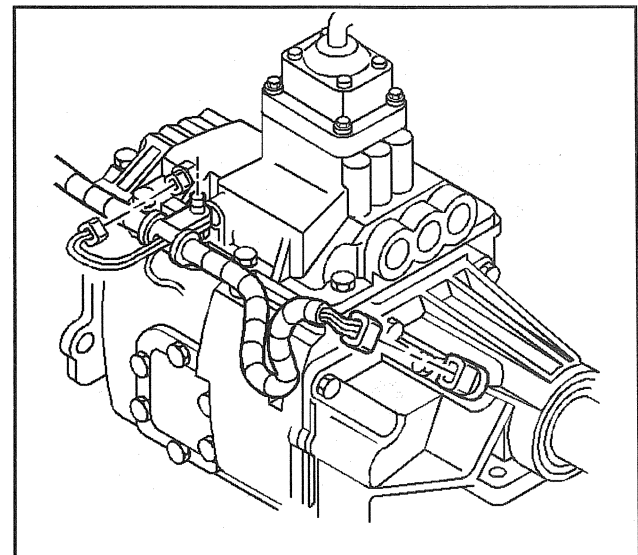
Notice: Refer to *Fastener Notice* in Cautions and Notices.

2. Secure the speed sensor to the transmission.

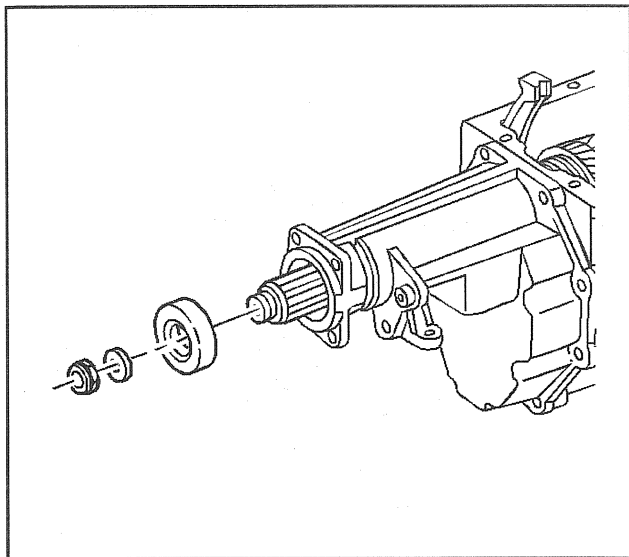
Tighten

Tighten the speed sensor to 22 N·m (16 lb ft).

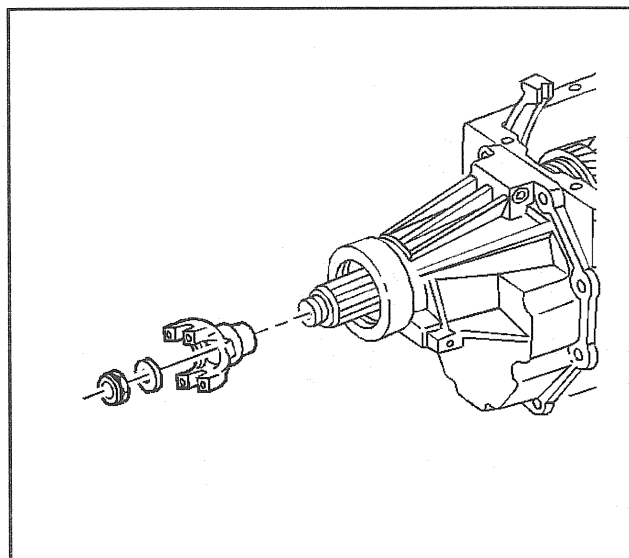
3. Install the electrical connector onto the vehicle speed sensor.
4. Lower the vehicle.



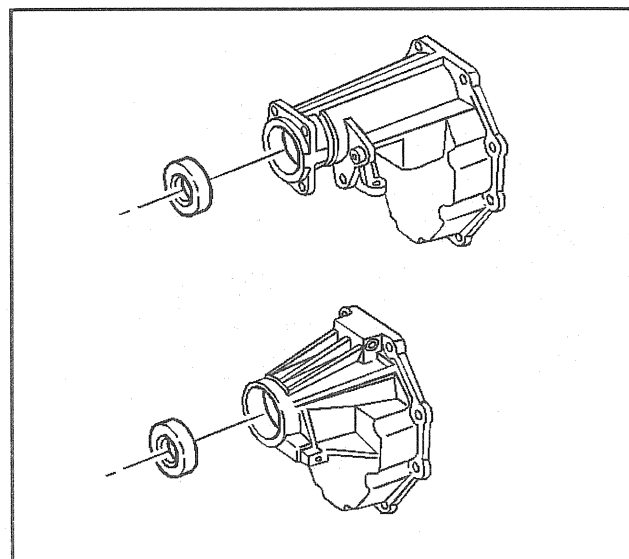
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Transmission Housing Oil Seal Replacement (Rear Wheel Drive)

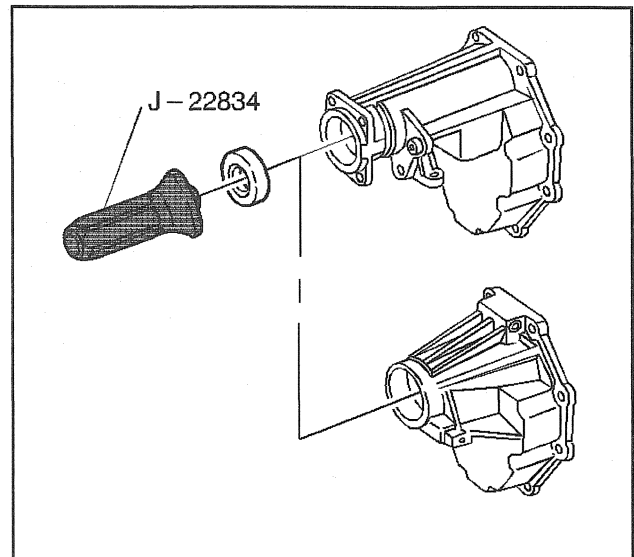
Removal Procedure

1. Raise the vehicle. Refer to *Lifting and Jacking the Vehicle* in General Information.
2. Remove the rear propeller shaft. Refer to
 - *Propeller Shaft Replacement - One Piece* in Propeller Shaft.
 - *Propeller Shaft Replacement - Two Piece* in Propeller Shaft.
 - *Propeller Shaft Replacement - Three Piece* in Propeller Shaft.
3. If the vehicle is equipped with a P model NV4500 transmission, perform the following:
 - 3.1. Remove the mainshaft nut.
 - 3.2. Remove the washer.
 - 3.3. Remove the spline seal.
4. If the vehicle is equipped with a C model NV4500 transmission, perform the following:
 - 4.1. Remove the mainshaft nut.
 - 4.2. Remove the washer.
 - 4.3. Remove the yoke.
5. Remove the rear oil seal from the extension housing.

Installation Procedure**Tools Required**

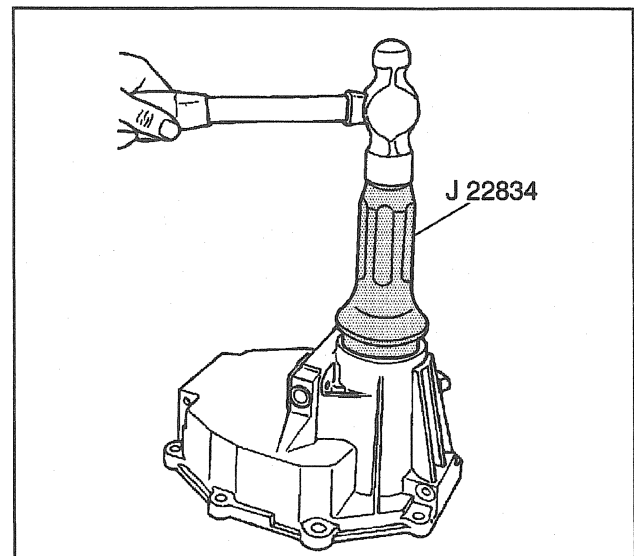
J 22834 Extension Housing Seal Installer

1. Using *J 22834* install the new rear oil seal into the extension housing.



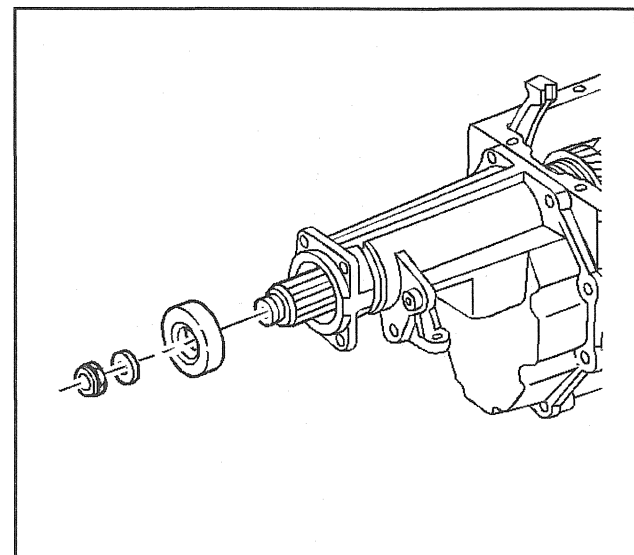
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2. Ensure *J 22834* is centered on the seal during installation.

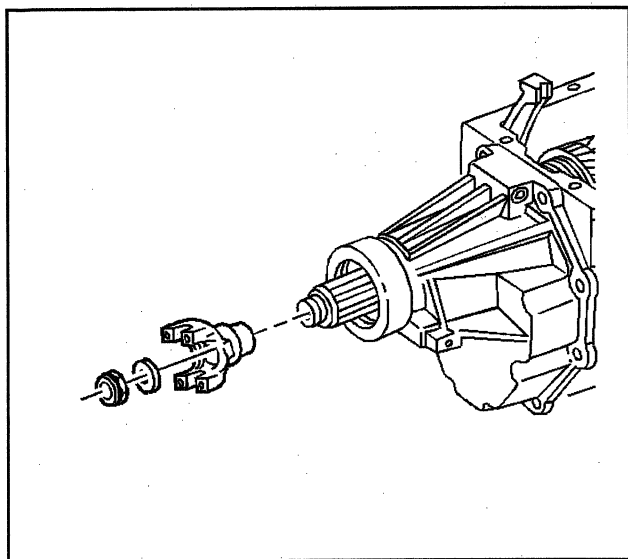


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3. If the vehicle is equipped with a P model NV4500 transmission, perform the following:
 - 3.1. Install the spline seal.
 - 3.2. Install the washer.
 - 3.3. Install the mainshaft nut.

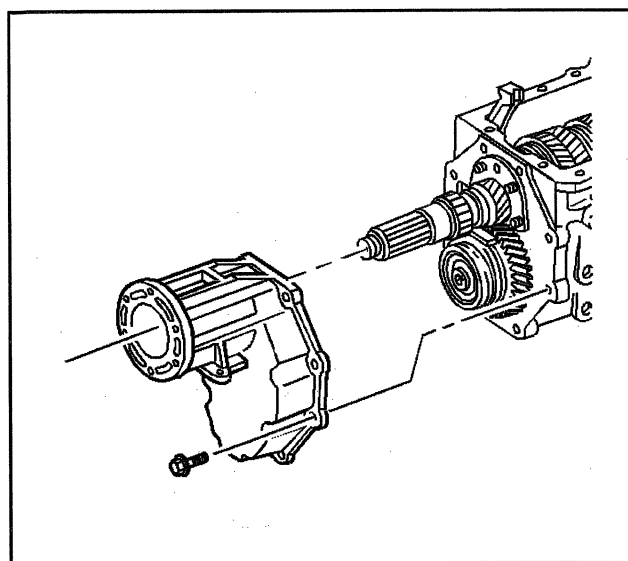


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4. If the vehicle is equipped with a C model NV4500 transmission, perform the following:
 - 4.1. Install the yoke.
 - 4.2. Install the washer.
 - 4.3. Install the mainshaft nut.
5. Install the rear propeller shaft. Refer to
 - *Propeller Shaft Replacement - One Piece* in Propeller Shaft.
 - *Propeller Shaft Replacement - Two Piece* in Propeller Shaft.
 - *Propeller Shaft Replacement - Three Piece* in Propeller Shaft.
6. Check the transmission oil level. Refer to *Fluid Replacement*.
7. Lower the vehicle.



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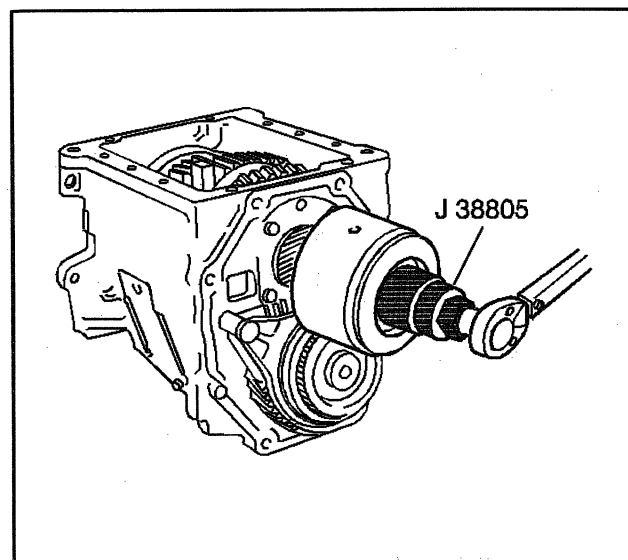
Transmission Housing Oil Seal Replacement (Four Wheel Drive)

Removal Procedure

Tools Required

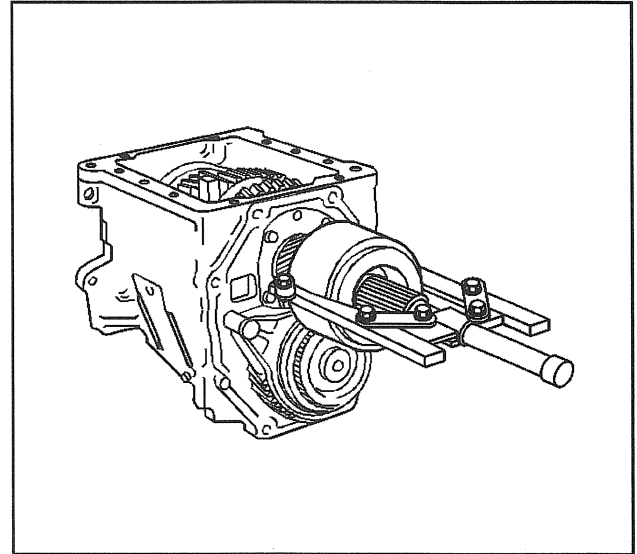
J 38805 Main Shaft Nut Socket

1. Raise the vehicle. Refer to *Lifting and Jacking the Vehicle* in General Information.
2. Remove the transfer case.
3. Perform the following:
 - 3.1. Remove the bolts securing the extension housing to the transmission.
 - 3.2. Remove the extension housing from the transmission.
4. Remove the mainshaft nut and washer from the mainshaft using *J 38805*.



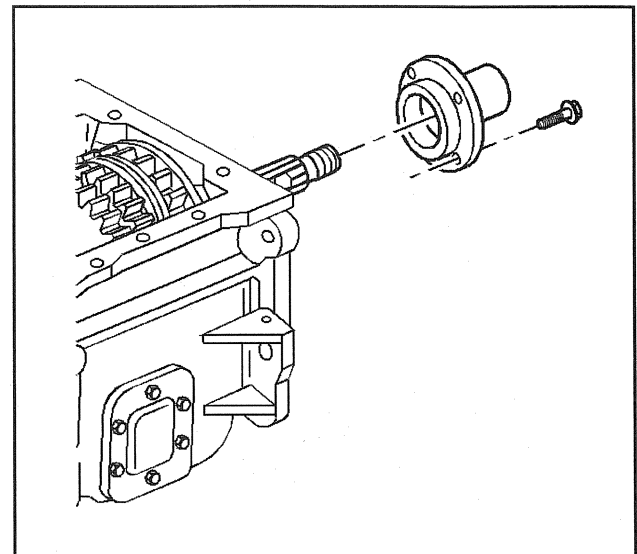
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5. Remove the vibration damper from the mainshaft using a suitable gear puller.



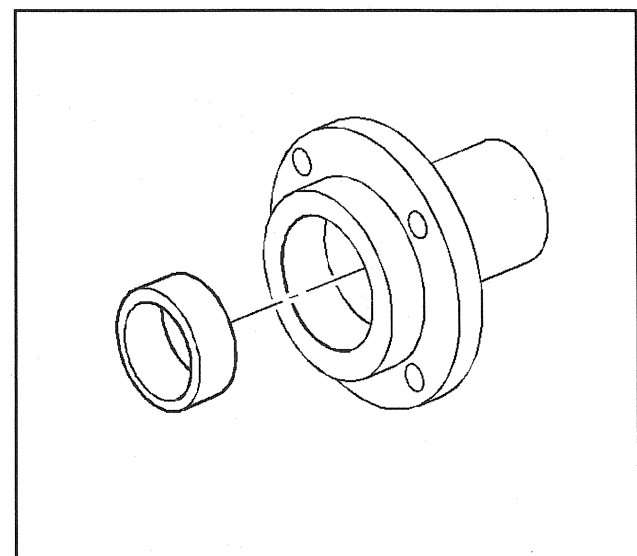
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6. Mark the main drive gear bearing retainer and case for alignment.
7. Remove four bolts securing the main drive gear bearing retainer.
8. Remove the main drive gear bearing retainer.

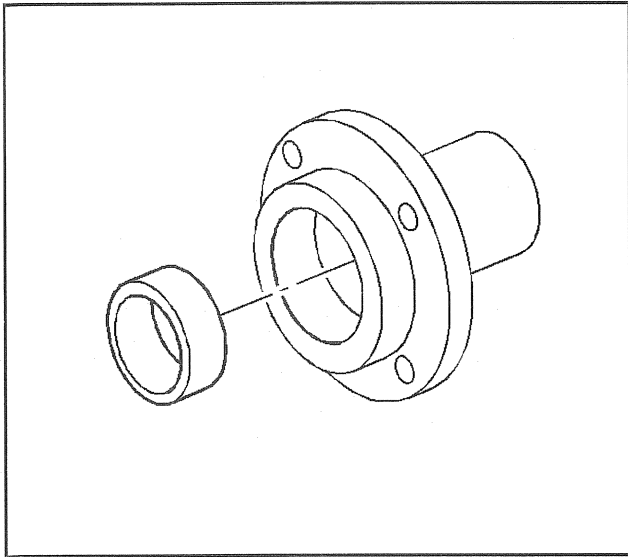


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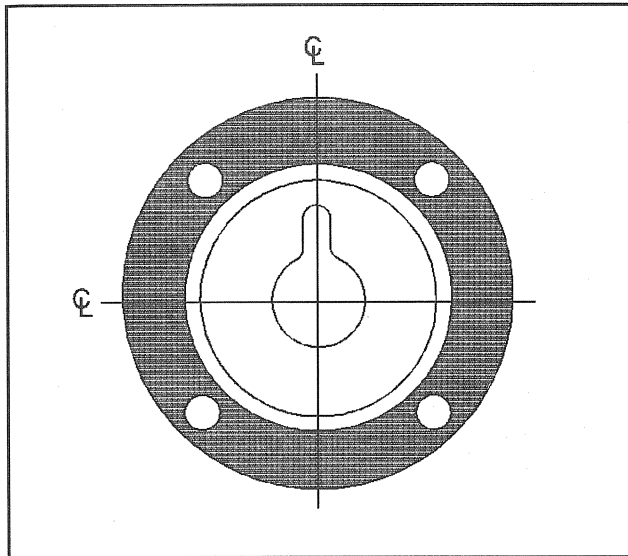
9. Remove the seal from the main drive gear bearing retainer.



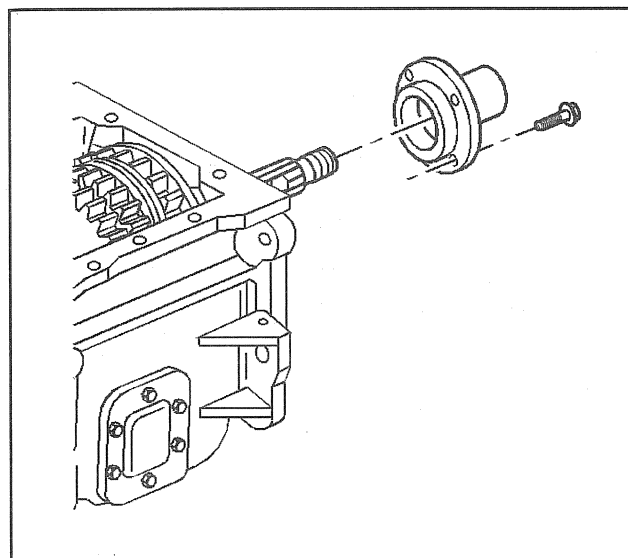
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Installation Procedure

Tools Required

- J 38807 Rear Drive Gear Bearing Retainer Seal Installer
- J 39314 Vibration Damper Installer
- J 38805 Main Shaft Nut Socket

1. Install the seal into the main drive gear bearing retainer using J 38807.

2. Apply sealant GM P/N 12346004 to the main drive gear bearing retainer mating surface. Ensure the oil hole on the main drive gear bearing retainer is not covered with the sealant.

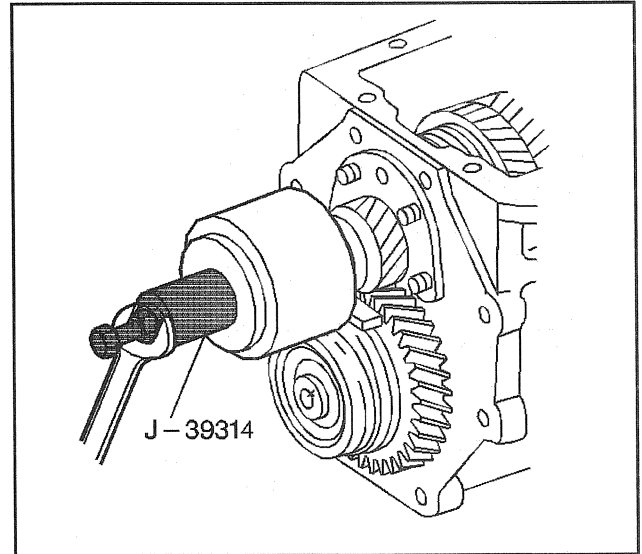
Notice: Refer to *Fastener Notice* in Cautions and Notices.

3. Install the main drive gear bearing retainer to the transmission with four bolts.

Tighten

Tighten the bolts to 35 N·m (26 lb ft).

4. Install the vibration damper to the mainshaft using *J 39314*.

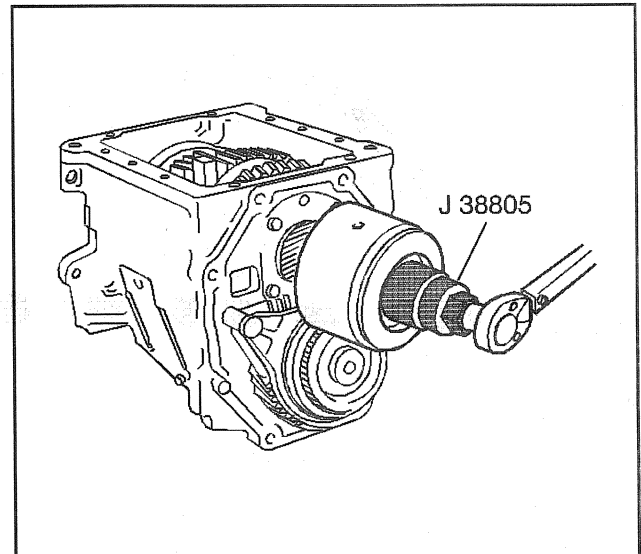


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5. Install the mainshaft washer and nut using *J 38805*.

Tighten

Tighten the nut to 441 N·m (325 lb ft).



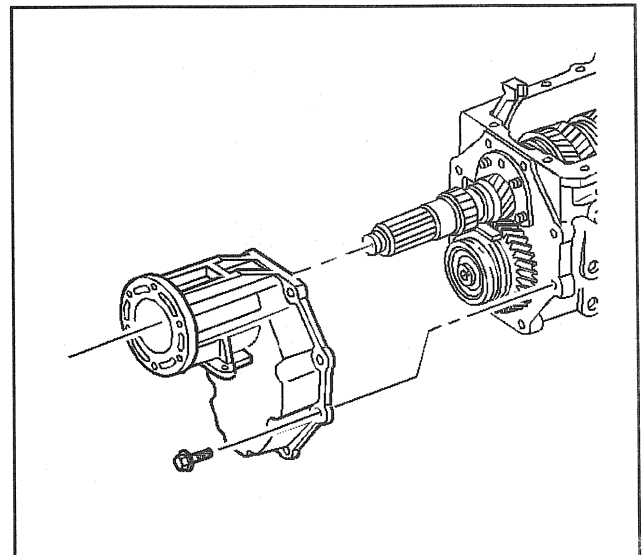
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6. Install the extension housing to the transmission with eight bolts.

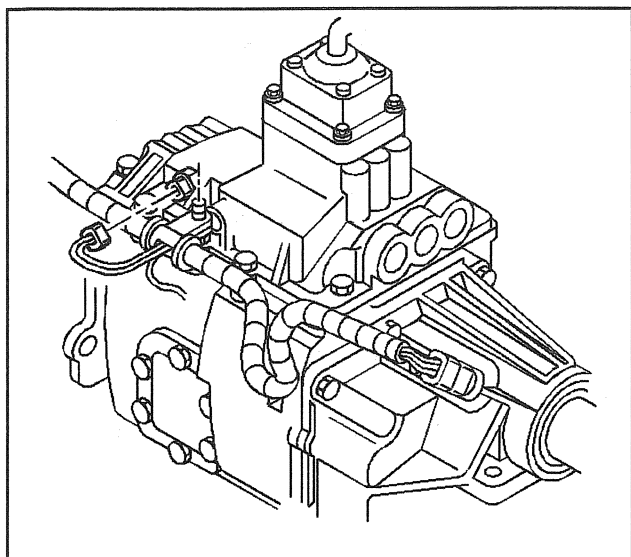
Tighten

Tighten the nut to 54 N·m (40 lb ft).

7. Install the transfer case.
8. Check the transmission oil level. Refer to *Fluid Replacement*.
9. Lower the vehicle.



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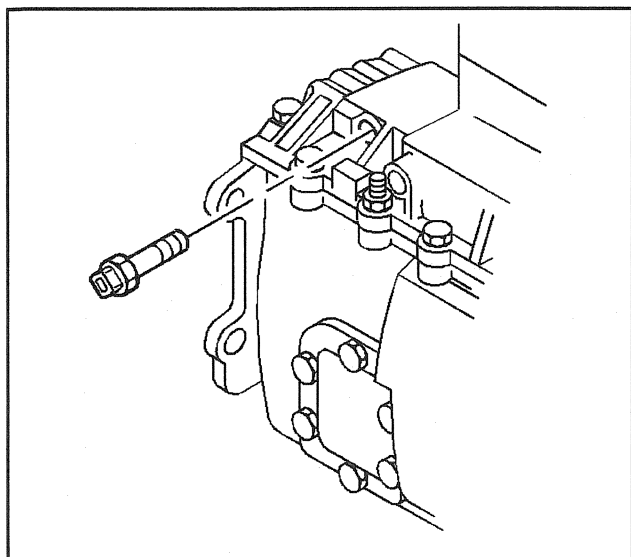
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Backup Lamp Switch Replacement

Removal Procedure

1. Raise the vehicle. Refer to *Lifting and Jacking the Vehicle* in General Information.
2. Disconnect the backup lamp switch electrical connector.

3. Remove the backup lamp switch.



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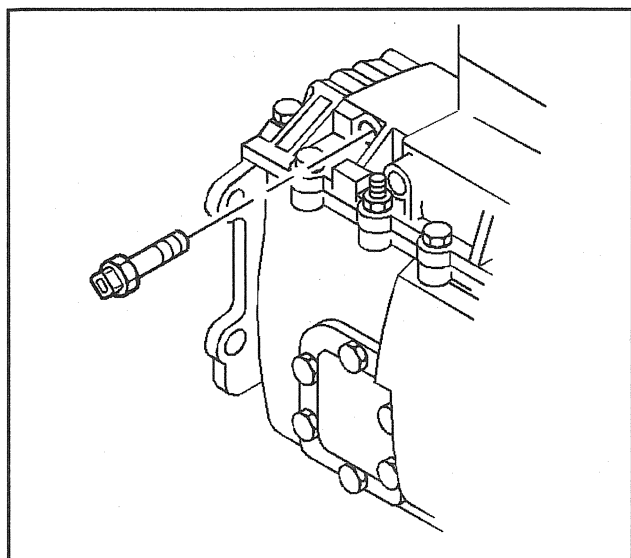
Installation Procedure

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

1. Install the backup lamp switch. The backup lamp switch has pre-applied thread sealant on the threads.

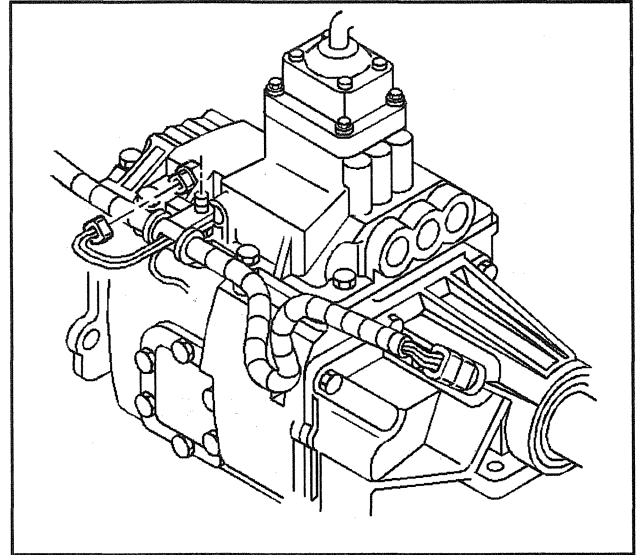
Tighten

Tighten the backup lamp switch to 28 N·m (21 lb ft).



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2. Connect the backup lamp switch electrical connector.
3. Lower the vehicle.



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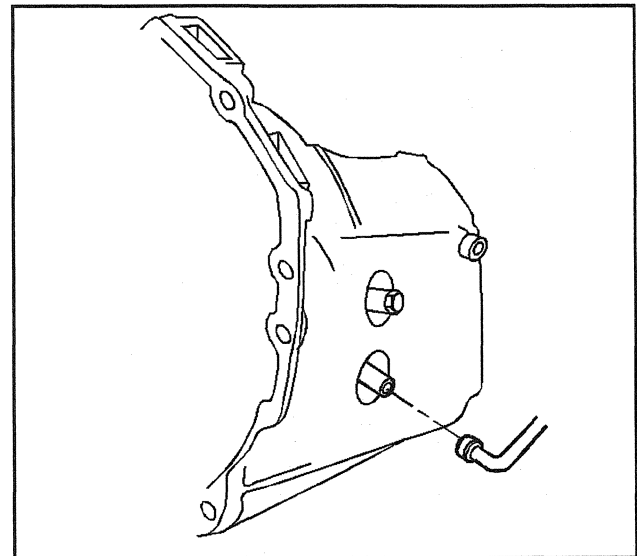
Transmission Replacement

Removal Procedure

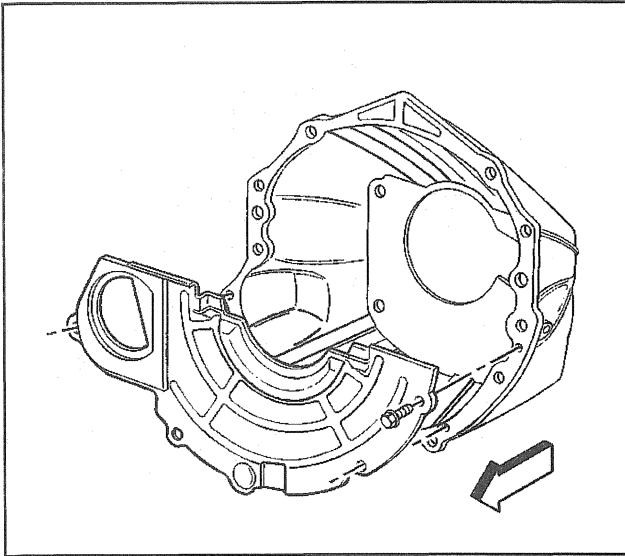
Tools Required

J 42371 Quick Connect Disengagement Tool

1. Shift the transmission into 3rd or 4th speed gear.
2. Remove the shift lever. Refer to *Shift Lever*.
3. Raise the vehicle. Refer to *Lifting and Jacking the Vehicle* in General Information.
4. Drain the transmission oil. Refer to *Fluid Replacement*
5. If equipped with a transfer case, remove the front propeller shaft. Refer to *Propeller Shaft Replacement - One Piece* or *Propeller Shaft Replacement - Two Piece* or *Propeller Shaft Replacement - Three Piece* in Propeller Shaft.
6. Remove the rear propeller shaft. Refer to *Propeller Shaft Replacement (Front Axle - NP8)* in Propeller Shaft.
7. Remove the exhaust cross over pipe. Refer to *Exhaust Crossover Pipe Replacement (Diesel)* in Engine Exhaust.
8. Use the *J 42371*, push back on the white plastic sleeve on the quick connect in order to separate the hydraulic clutch line from the concentric slave cylinder quick connect.
9. Disconnect the wiring harness and connector from the vehicle speed sensor, backup lamp switch, and transmission harness retainers.

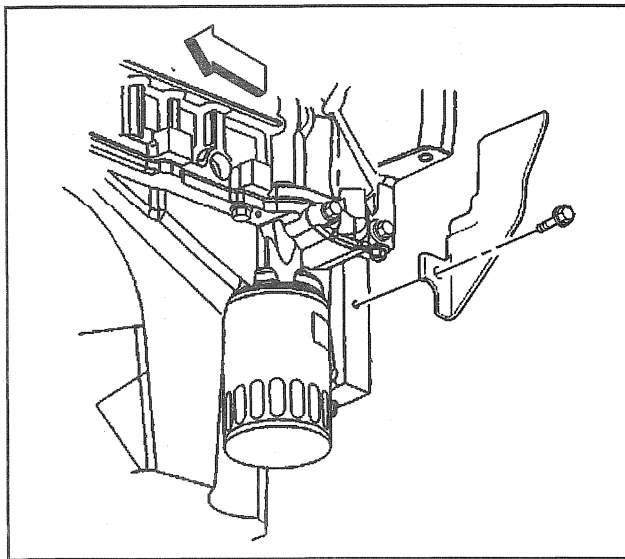


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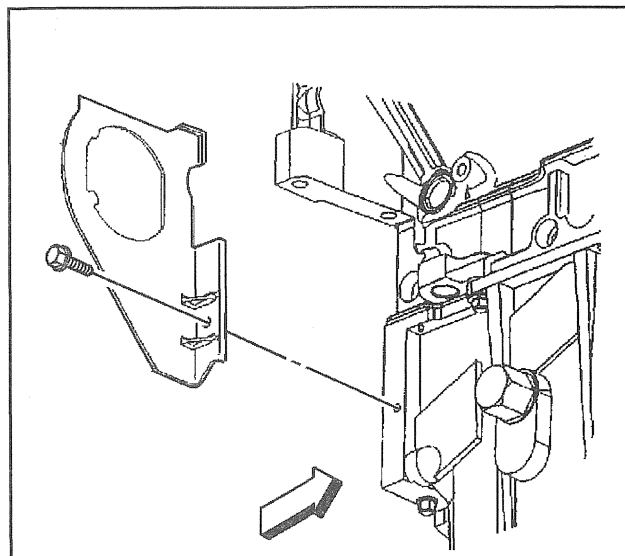
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10. Remove the four bolts securing the clutch housing cover to the transmission.



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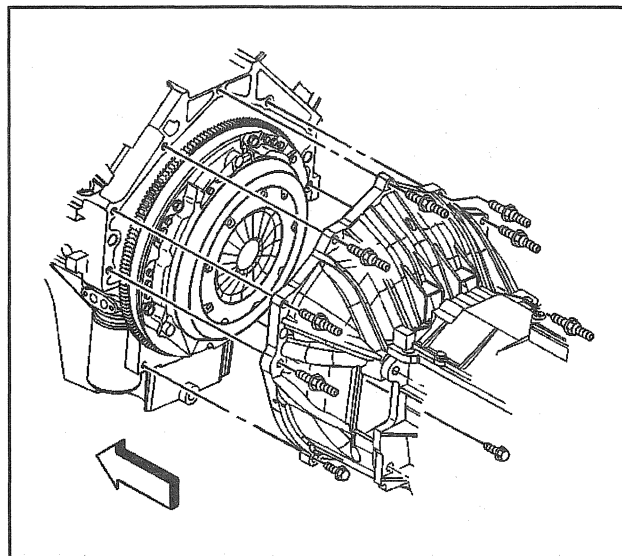
11. Remove the bolt securing the left side transmission to engine cover.



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12. Remove the bolt securing the right side transmission to engine cover.
13. Remove the transmission rear mount.
14. Support the transmission with a transmission jack.

15. Remove the bolts and studs securing the transmission to the engine.
16. Pull the transmission straight back on the clutch hub splines. Do not let the transmission hang from the clutch plate and the clutch cover.
17. Remove the transmission from the vehicle.



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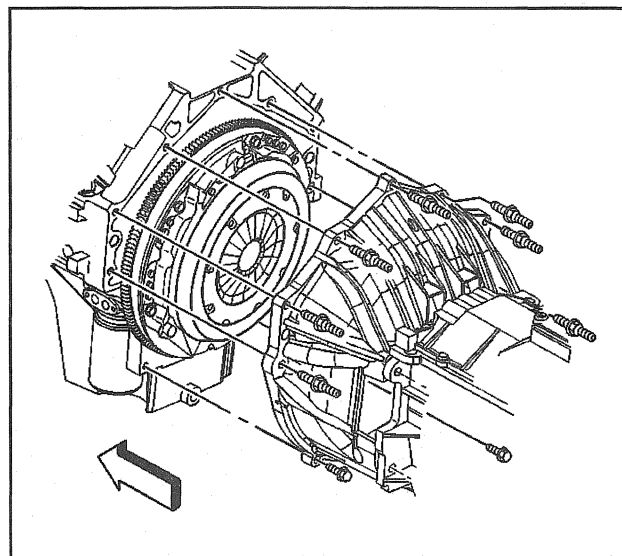
Installation Procedure

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

1. Install the transmission:
 - 1.1. Ensure the transmission is positioned in the 3rd or 4th speed gear.
 - 1.2. Rotate the transmission clockwise onto the clutch hub splines.
 - 1.3. Install the bolt and the studs securing the transmission to the engine.

Tighten

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

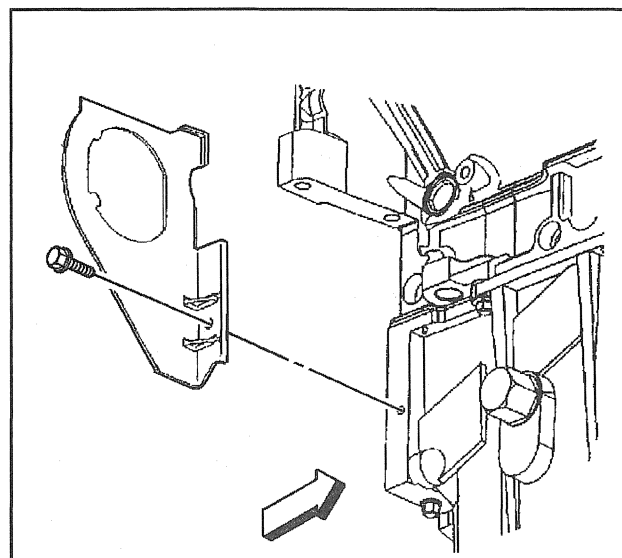


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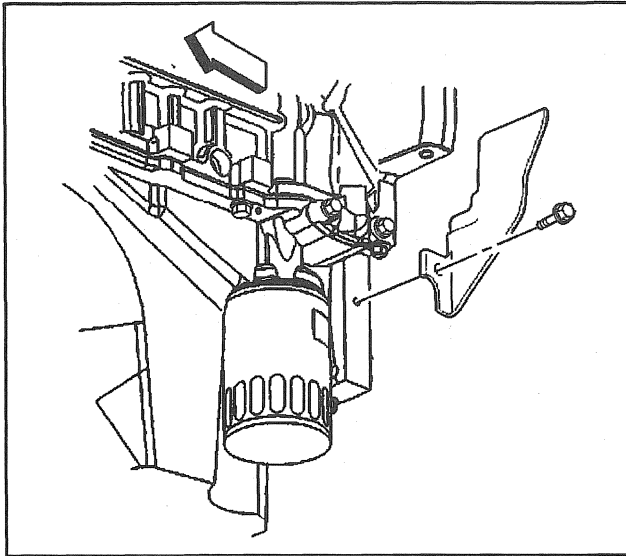
2. Install the bolt securing the right side transmission to engine cover.

Tighten

Tighten the bolt to 14 N·m (10 lb ft).



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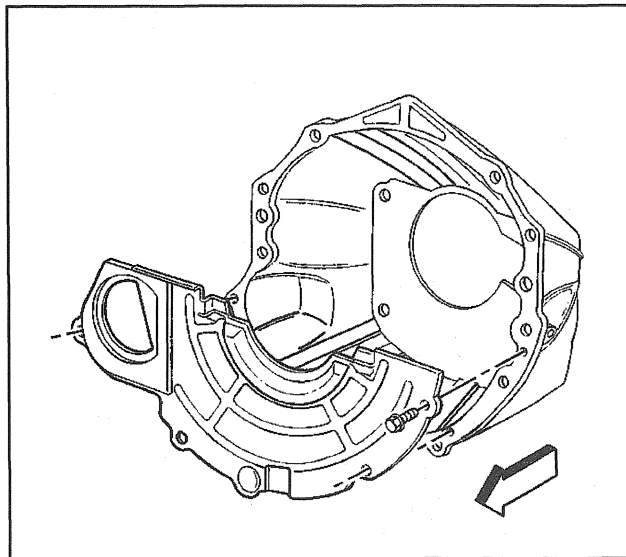


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3. Install the bolt securing the left side transmission to engine cover.

Tighten

Tighten the bolt to 14 N·m (10 lb ft).



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4. Install the four bolts securing the clutch cover to the transmission.

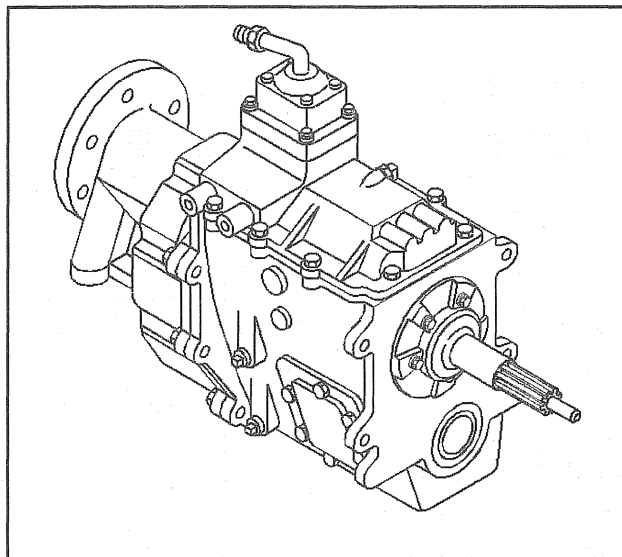
Tighten

Tighten the bolt to 14 N·m (10 lb ft).

5. Install the transmission rear mount.
6. Install the clutch line to the concentric slave cylinder. Refer to *Concentric Slave Cylinder* in Clutch.
7. Install the exhaust cross over pipe. Refer to *Exhaust Crossover Pipe Replacement (Diesel)* in Engine Exhaust.
8. Install the rear propeller shaft. Refer to *Propeller Shaft Replacement (Front Axle - NP8)* in Propeller Shaft.
9. If equipped with a transfer case, Install the front propeller shaft. Refer to *Propeller Shaft Replacement - One Piece* or *Propeller Shaft Replacement - Two Piece* or *Propeller Shaft Replacement - Three Piece* in Propeller Shaft.
10. Fill the transmission with oil. Refer to *Fluid Replacement*
11. Lower the vehicle.
12. Install the shift lever. Refer to *Shift Lever*.

Description and Operation

Transmission Description and Operation



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NV4500 Manual Transmission

The New Venture Gear NV4500 (109 mm) is a five speed manual transmission used on light duty trucks. This manual transmission is identified by the RPO MW3. The 109 mm is the distance between the input shaft and the counter shaft. The transmission is available in rear wheel and four wheel drive versions.

The transmission has the following features:

- Made from cast iron for durability.
- Synchronized shifting in all forward gears.
- Constant mesh helical gearing for reduced noise.
- Overspeed inhibitor from low to second speed gears.
- Dual cone low speed gear and 2 nd speed gear synchronizer.
- Multiple ring sychronizers for smooth shifting.

Special Tools and Equipment

Illustration	Part Number Description
 12375	J 22834 Extension Housing Seal Installer

Illustration	Part Number Description
 102592	J 39314 Vibration Damper Installer
 102584	J 38805 Main Shaft Nut Socket
 404385	J 38807 Rear Drive Gear Bearing Retainer Seal Installer
 4869	J 36511 Oil Fill and Drain Plug Hex Bit (17 mm)
 400483	J 42371 Quick Connect Disengagement Tool