

Manual Transmission - MM6

Specifications

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Backup Lamp Switch	27 N·m	20 lb ft
Clutch Actuator Cylinder Bolt	8 N·m	71 lb in
Clutch Housing Bolt	50 N·m	37 lb ft
Control Lever Handle Bolt	25 N·m	18 lb ft
Gear Select/Skip Shift Solenoid	40 N·m	30 lb ft
Reverse Lockout Assembly Bolt	18 N·m	13 lb ft
Reverse Lockout Solenoid	40 N·m	30 lb ft
Shift Control Bolt	18 N·m	13 lb ft
Shift Control Closeout Boot Bolt	2 N·m	18 lb in
Shift Control Knob	3 N·m	27 lb ft
Transmission Bolt	50 N·m	37 lb ft
Transmission Drain/Fill Plug	27 N·m	20 lb ft
Transmission Mount Bolt	48 N·m	38 lb ft
Transmission Mount Nut	105 N·m	77 lb ft
Transmission Support Bolt	90 N·m	66 lb ft
Vehicle Speed Sensor Bolt	10 N·m	89 lb in

GM SPO Group Numbers

Application	GM SPO Group Number
Back-Up Lamp Switch	2.000
Front Floor Console Transmission Shift Opening Trim Boot	4.000
Main Shaft Seal	4.000
Manual Transmission Control Lever Boot	4.000
Manual Transmission Control Lever Handle	4.000
Manual Transmission Control Lever Knob	4.000
Reverse Lockout Solenoid	4.000
Skip Shift Solenoid	4.000
Transmission Mount	4.000
Transmission Shift Control	4.000
Transmission Support	4.000
Vehicle Speed Sensor	3.000

Lubrication Specifications

Capacities

Application	Metric	English
Dextron™ III, IIE	3.9 liters	4.1 quarts

Diagnostic Information and Procedures

Transmission Shifts Hard

Step	Action	Value(s)	Yes	No
DEFINITION: The transmission does not shift smoothly or without difficulty into another gear.				
1	Check the clutch pedal travel. Is there sufficient clutch pedal travel?	—	Go to Step 3	Go to Step 2
2	Remove any clutch pedal restrictions. Does the transmission shift hard?	—	Go to Step 3	System OK
3	Check for air in the clutch hydraulic system. Is there air in the hydraulic system?	—	Go to Step 4	Go to Step 5
4	Bleed the air from the clutch hydraulic system. Refer to <i>Hydraulic Clutch Bleeding</i> in Clutch. Does the transmission still shift hard?	—	Go to Step 5	System OK
5	Inspect the transmission shift control for binding. Is the transmission shift control binding?	—	Go to Step 6	Go to Step 7
6	Replace the transmission shift control. Refer to <i>Shift Control Assembly Replacement</i> . Does the transmission still shift hard?	—	—	System OK
7	Check the transmission for the correct type transmission fluid. Is the correct type fluid being used?	—	Go to Step 9	Go to Step 8
8	Drain and refill the transmission with the correct type fluid. Does the transmission still shift hard?	—	—	System OK
9	Inspect the clutch pressure plate and/or clutch driven plate. Is the clutch pressure plate and/or clutch driven plate worn or faulty?	—	Go to Step 10	Go to Step 11
10	Replace the clutch pressure plate and/or clutch driven plate. Refer to <i>Clutch Pressure Plate and Clutch Driven Plate (5.7 L)</i> in Clutch. Does the transmission still shift hard?	—	—	System OK
11	Remove the transmission. Refer to <i>Transmission Replacement</i> . Inspect the transmission for an internal bind, possibly caused by one of the following: • Shift forks • Selector plates • Synchronizers Is there an internal bind?	—	—	—
12	1. Replace worn or damaged components as necessary. Refer to <i>Transmission/Transaxle/Transfer Case Unit Repair Manual</i> . 2. Install the transmission. Refer to <i>Transmission Replacement</i> . Does the transmission shift hard?	—	—	System OK

Transmission Shifts Hard into Reverse

Step	Action	Value(s)	Yes	No
DEFINITION: The transmission does not shift smoothly or without difficulty in reverse gear.				
1	Verify that the reverse lockout solenoid circuit is functioning properly. Is the reverse lockout solenoid circuit functioning properly?	—	Go to Step 3	Go to Step 2
2	1. Review the reverse lockout solenoid circuit. Refer to <i>DTC P0801 Reverse Inhibit Solenoid Control Circuit</i> in Engine Controls - 5.7 L. 2. Repair or replace components as necessary. Does the transmission still shift hard into reverse?	—	—	System OK
3	Review the function of the reverse lockout solenoid. Refer to <i>DTC P0801 Reverse Inhibit Solenoid Control Circuit</i> in Engine Controls - 5.7 L. Does the reverse lockout solenoid function properly?	—	Go to Step 5	Go to Step 4
4	Replace the reverse lockout solenoid. Refer to <i>Reverse Lockout Solenoid</i> . Does the transmission still shift hard into reverse?	—	—	System OK
5	Verify that the reverse lockout mechanism is functioning properly. Is the reverse lockout mechanism functioning properly?	—	Go to Step 8	Go to Step 6
6	1. Remove the transmission. Refer to <i>Transmission Replacement</i> . 2. Disassemble and inspect the reverse lockout mechanism for function, wear and damage. Refer to <i>Transmission/Transaxle/Transfer Case Unit Repair Manual</i> . Is there any wear or damage?	—	Go to Step 7	—
7	1. Replace worn or damaged components as necessary. 2. Install the transmission. Refer to <i>Transmission Replacement</i> . Does the transmission still shift hard into reverse?	—	—	System OK
8	1. Remove the transmission. Refer to <i>Transmission Replacement</i> . 2. Disassemble and inspect the transmission for an internal bind, possibly caused by a synchronizer. Refer to <i>Transmission/Transaxle/Transfer Case Unit Repair Manual</i> . Is there an internal bind?	—	Go to Step 9	—
9	1. Replace worn or damaged components as necessary. 2. Install the transmission. Refer to <i>Transmission Replacement</i> . Does the transmission still shift hard into reverse?	—	—	System OK

Gear Clash When Shifting Gears

Step	Action	Value(s)	Yes	No
DEFINITION: The transmission gears clash when shifting from one gear into another gear.				
1	Check for proper clutch operation. Refer to <i>Preliminary Checking Procedure</i> in Clutch. Does the clutch operate properly?	—	Go to Step 2	—
2	Verify that the clutch is releasing properly. Refer to <i>Clutch Spin Down Time</i> in Clutch. Is the clutch releasing properly?	—	Go to Step 4	Go to Step 3
3	Repair the clutch system. Refer to <i>Release Bearing Replacement</i> in Clutch. Does the clutch release?	—	System OK	—
4	Check for air in the clutch hydraulic system. Is there air in the hydraulic system?	—	Go to Step 5	Go to Step 6
5	Bleed the clutch hydraulic system. Refer to <i>Hydraulic Clutch Bleeding</i> in Clutch. Do the gears still clash?	—	Go to Step 6	System OK
6	Inspect the transmission control for wear. Is the transmission control worn?	—	Go to Step 7	Go to Step 8
7	Replace the transmission control. Refer to <i>Shift Control Assembly Replacement</i> . Do the gears still clash?	—	Go to Step 8	System OK
8	Check the transmission fluid level. Refer to <i>Manual Transmission Fluid Level Check</i> . Do the gears still clash?	—	Go to Step 9	System OK
9	Check for the correct type transmission fluid. Is the correct type transmission fluid being used?	—	Go to Step 11	Go to Step 10
10	Drain and refill the transmission. Refer to <i>Transmission Oil Drain and Fill</i> . Do the gears clash?	—	Go to Step 11	System OK
11	1. Remove the transmission. Refer to <i>Transmission Replacement</i> . 2. Disassemble and inspect the gear shift components and/or synchronizers for damage or wear. Refer to <i>Transmission/Transaxle/Transfer Case Unit Repair Manual</i> . Are the gear shift and/or synchronizers worn or damaged?	—	Go to Step 12	Go to Step 13
12	1. Replace worn and/or damaged components as necessary. 2. Install the transmission. Refer to <i>Transmission Replacement</i> . Do the gears still clash?	—	—	System OK
13	Inspect the clutch pilot bearing for binding. Is the pilot bearing binding?	—	Go to Step 14	—
14	1. Replace the clutch pilot bearing. Refer to <i>Pilot Bearing Replacement</i> in Clutch. 2. Install the transmission. Refer to <i>Transmission Replacement</i> . Do the gears still clash?	—	—	System OK

Transmission Noisy

Step	Action	Value(s)	Yes	No
DEFINITION: The transmission is noisy and the noise may carry into the passenger compartment.				
1	Check the transmission fluid level. Is the fluid level correct?	—	Go to Step 3	Go to Step 2
2	Add transmission fluid. Refer to <i>Manual Transmission Fluid Level Check</i> . Is the transmission noisy?	—	Go to Step 3	System OK
3	Check the transmission for the correct fluid type. Is the transmission the correct type?	—	Go to Step 5	Go to Step 4
4	Drain and refill the transmission with the correct type fluid. Refer to <i>Transmission Oil Drain and Fill</i> . Is the transmission noisy?	—	Go to Step 5	System OK
5	Inspect the shift control closeout boot. Is the closeout boot loose or damaged?	—	Go to Step 6	Go to Step 7
6	Position and tighten the closeout boot to specification, or replace the boot as necessary. Refer to <i>Shift Control Boot Replacement</i> . Is the transmission noisy?	—	Go to Step 6	System OK
7	Inspect the clutch housing for loose bolts and/or misalignment with the engine. Is there any loose bolts or misalignment with the engine?	—	Go to Step 8	Go to Step 9
8	Tighten the clutch housing bolts to specifications. Refer to <i>Fastener Tightening Specifications in Clutch</i> . Is the transmission noisy?	—	Go to Step 8	System OK
9	1. Remove the transmission. Refer to <i>Transmission Replacement</i> . 2. Disassemble and inspect the following transmission components for wear or damage: • Gear shift • Transmission gears • Bearings Is there any wear or damage?	—	Go to Step 10	Go to Step 10
10	1. Replace worn or damaged components as necessary. Refer to <i>Transmission/Transaxle/Transfer Case Unit Repair Manual</i> . 2. Install the transmission. Refer to <i>Transmission Replacement</i> . Is the transmission noisy?	—	Go to Step 10	System OK
11	1. Replace the clutch pilot bearing. Refer to <i>Pilot Bearing Replacement in Clutch</i> . 2. Install the transmission. Refer to <i>Transmission Replacement</i> . Is the transmission noisy?	—	Go to Step 10	System OK
12	1. Replace the clutch pilot bearing. Refer to <i>Pilot Bearing Replacement in Clutch</i> . 2. Install the transmission. Refer to <i>Transmission Replacement</i> . Is the transmission noisy?	—	Go to Step 10	System OK

Transmission Jumps Out of Gear

Step	Action	Value(s)	Yes	No
DEFINITION: Gear disengagement occurs during normal operation.				
1	Inspect the transmission shift control closeout boot. Is the closeout boot out of position?	—	Go to Step 2	Go to Step 3
2	Reposition or replace the closeout boot. Refer to <i>Shift Control Closeout Boot Replacement</i> . Does the transmission jump out of gear?	—	Go to Step 3	System OK
3	Inspect the transmission shift control. Is the shift control loose or damaged?	—	Go to Step 4	Go to Step 5
4	Replace the transmission shift control. Refer to <i>Shift Control Assembly Replacement</i> . Does the transmission jump out of gear?	—	Go to Step 5	System OK
5	Inspect the engine and/or transmission mounts. Are the engine and/or transmission mounts worn or damaged?	—	Go to Step 6	Go to Step 7
6	Replace the engine mounts and/or transmission mounts. Refer to <i>Engine Mount Replacement (Left)</i> , <i>Engine Mount Replacement (Right)</i> in Engine Mechanical - 5.7 L or <i>Transmission Support and Mount Assembly</i> . Does the transmission jump out of gear?	—	Go to Step 9	System OK
7	Inspect the engine and/or transmission mounts for loose fasteners. Are there any loose fasteners?	—	Go to Step 8	Go to Step 9
8	Tighten the engine mount and/or transmission mount fasteners to specifications. Refer to <i>Fastener Tightening Specifications</i> in Engine Mechanical - 5.7 L or <i>Fastener Tightening Specifications</i> . Does the transmission still jump out of gear?	—	—	System OK
9	Inspect the clutch housing for loose bolts or misalignment. Are there any loose bolts or misalignment?	—	Go to Step 10	Go to Step 11
10	Tighten any loose housing bolts and/or align the housing. Refer to <i>Clutch Housing Replacement</i> in Clutch. Does the transmission still jump out of gear?	—	—	System OK
11	1. Remove the transmission. Refer to <i>Transmission Replacement</i> . 2. Disassemble and inspect the following internal components for wear or damage: • Gearshift • Transmission gears • Bearings Is there any worn or damaged components?	—	Go to Step 12	—
12	1. Replace any worn or damaged components. Refer to Transmission/Transaxle/Transfer Case Unit Repair Manual. 2. Install the transmission. Refer to <i>Transmission Replacement</i> . Does the transmission still jump out of gear?	—	—	System OK

Transmission Does Not Shift into One Gear

Step	Action	Value(s)	Yes	No
DEFINITION: The transmission does not shift into a gear.				
1	Check the operation of the transmission shift control. Is the control worn, binding, or damaged?	—	Go to Step 2	Go to Step 3
2	Replace the transmission shift control. Refer to <i>Shift Control Assembly Replacement</i> . Will the transmission shift into gear?	—	System OK	—
3	Inspect the hydraulic clutch operation. Refer to <i>Preliminary Checking Procedure</i> in Clutch. Is the clutch operating properly?	—	Go to Step 5	Go to Step 4
4	Replace the clutch actuator cylinder. Refer to <i>Clutch Actuator Cylinder Replacement</i> in Clutch. Will the transmission shift into gear?	—	System OK	—
5	1. Remove the transmission. Refer to <i>Transmission Replacement</i> . 2. Inspect the transmission input shaft and the clutch pilot bearing. Is there signs of the input shaft binding in the pilot bearing?	—	Go to Step 6	Go to Step 7
6	1. Replace the clutch pilot bearing. Refer to <i>Pilot Bearing Replacement</i> in Clutch. 2. Install the transmission. Refer to <i>Transmission Replacement</i> . Will the transmission shift into gear?	—	System OK	—
7	Disassemble and inspect the following transmission internal components for wear or damage: • Gearshift components • Transmission gears • Bearings Are any of the components worn or damaged?	—	Go to Step 8	—
8	1. Replace all worn or damaged components. Refer to <i>Transmission/Transaxle/Transfer Case Unit Repair Manual</i> . 2. Install the transmission. Refer to <i>Transmission Replacement</i> . Will the transmission shift into gear now?	—	System OK	—
9	Disassemble and inspect the following internal components for wear or damage: • Gearshift • Transmission gears • Bearings Is there any worn or damaged components?	—	Go to Step 12	—
10	1. Replace any worn or damaged components. Refer to <i>Transmission/Transaxle/Transfer Case Unit Repair Manual</i> . 2. Install the transmission. Refer to <i>Transmission Replacement</i> . Will the transmission shift into gear now?	—	System OK	—

Transmission Locked in One Gear

Step	Action	Value(s)	Yes	No
DEFINITION: The transmission cannot be shifted out of a gear.				
1	Check the transmission fluid level. Refer to <i>Manual Transmission Fluid Level Check</i> . Is the transmission fluid level correct?	—	Go to Step 3	Go to Step 2
2	Add transmission fluid if necessary. Can the transmission be shifted out of gear?	—	System OK	—
3	Check for the correct type transmission fluid. Is the correct type transmission fluid being used?	—	Go to Step 5	Go to Step 4
4	Drain and refill the transmission with the correct type fluid. Refer to <i>Transmission Oil Drain and Fill</i> . Can the transmission be shifted out of gear?	—	System OK	—
5	Check the clutch actuator cylinder operation. Refer to <i>Preliminary Checking Procedure in Clutch</i> . Is the clutch actuator operating properly?	—	Go to Step 7	Go to Step 6
6	Replace the clutch actuator cylinder. Refer to <i>Clutch Actuator Cylinder Replacement in Clutch</i> . Can the transmission be shifted out of gear?	—	System OK	Go to Step 7
7	1. Remove the transmission. Refer to <i>Transmission Replacement</i> . 2. Disassemble and inspect the transmission for a dented or damaged shift fork. Is there a dented or damaged shift fork?	—	Go to Step 8	Go to Step 9
8	1. Replace the worn or damaged components as necessary. Refer to <i>Transmission/Transaxle/Transfer Case Unit Repair Manual</i> . 2. Install the transmission. Refer to <i>Transmission Replacement</i> . Can the transmission be shifted out of gear?	—	System OK	—
9	Disassemble and inspect the transmission for a incorrectly assembled or broken shift mechanism. Is there a incorrectly assembled or broken shift mechanism?	—	Go to Step 10	Go to Step 11
10	1. Replace worn or damaged components as necessary. Refer to <i>Transmission/Transaxle/Transfer Case Unit Repair Manual</i> . 2. Install the transmission. Refer to <i>Transmission Replacement</i> . Can the transmission be shifted out of gear?	—	System OK	—
11	Disassemble and inspect the transmission for a worn or damaged geartrain component. Are there any worn or damaged geartrain components?	—	Go to Step 12	—
12	1. Replace worn or damaged geartrain components as necessary. Refer to <i>Transmission/Transaxle/Transfer Case Unit Repair Manual</i> . 2. Install the transmission. Refer to <i>Transmission Replacement</i> . Can the transmission be shifted out of gear?	—	System OK	—

Clunk on Acceleration or Deceleration

Step	Action	Value(s)	Yes	No
DEFINITION: A clunk is heard and/or felt on acceleration or deceleration.				
1	Inspect the engine mounts for looseness or damage. Refer to <i>Engine Mount Inspection</i> . Are the engine mounts loose or damaged?	—	Go to Step 2	Go to Step 3
2	1. Tighten the engine mounts to specifications. Refer to <i>Fastener Tightening Specifications</i> in Engine Mechanical - 5.7L. 2. Replace the engine mounts. Refer to <i>Engine Mount Replacement (Left)</i> or <i>Engine Mount Replacement (Right)</i> in Engine Mechanical - 5.7L. Is the clunk still heard/felt?	—	Go to Step 5	System OK
3	1. Remove the transmission. Refer to <i>Transmission Replacement</i> . 2. Inspect the clutch driven plate hub for wear or damage. Is the clutch driven plate worn or damaged?	—	Go to Step 4	—
4	1. Replace the clutch driven plate. Refer to <i>Clutch Pressure Plate and Clutch Driven Plate (5.7 L) in Clutch</i> . 2. Install the transmission. Refer to <i>Transmission Replacement</i> . Is the clunk still heard/felt?	—	—	System OK
5	Inspect the universal joints for wear or damage. Are the universal joints worn or damaged?	—	Go to Step 6	—
6	Replace the universal joints. Refer to <i>Universal Joint and Slip Yoke Replacement</i> in Propeller Shaft. Is the clunk still heard/felt?	—	—	System OK

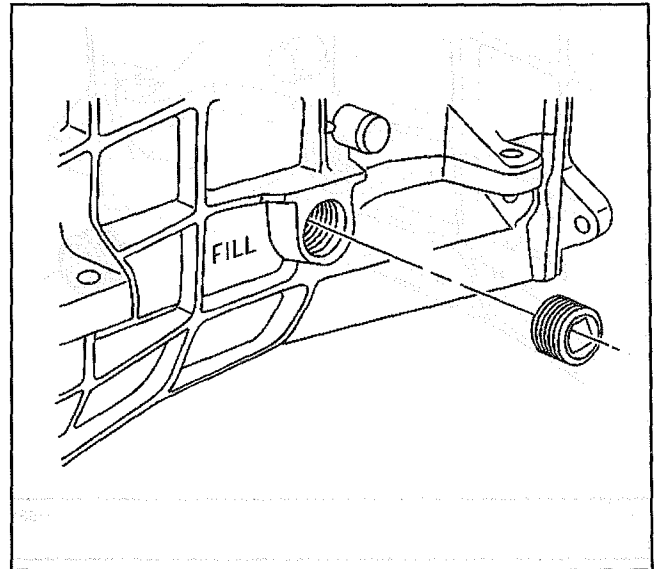
Oil Leak Diagnosis

Step	Action	Value(s)	Yes	No
DEFINITION: Transmission oil level low or oil dripping/collecting below vehicle.				
1	Check the transmission fluid level. Refer to <i>Manual Transmission Fluid Level Check</i> . Was the transmission fluid level over full?	—	Go to Step 2	Go to Step 3
2	Adjust the transmission fluid level as necessary. Refer to <i>Transmission Oil Drain and Fill</i> . Is there still a oil leak?	—	—	System OK
3	Inspect the transmission vent tube for a blockage. Is the transmission vent tube blocked?	—	Go to Step 4	Go to Step 5
4	Replace the transmission vent tube. Refer to <i>Transmission Vent Tube Replacement</i> . Is there still a oil leak?	—	—	System OK
5	1. Remove the transmission. Refer to <i>Transmission Replacement</i> . 2. Inspect the transmission seals for wear damage. Are the seals worn or damaged?	—	Go to Step 6	—
6	1. Replace the worn or damaged transmission seals. Refer to <i>Transmission/Transaxle/Transfer Case Unit Repair Manual</i> . 2. Install the transmission. Refer to <i>Transmission Replacement</i> . Is there still a oil leak?	—	—	System OK

Repair Instructions

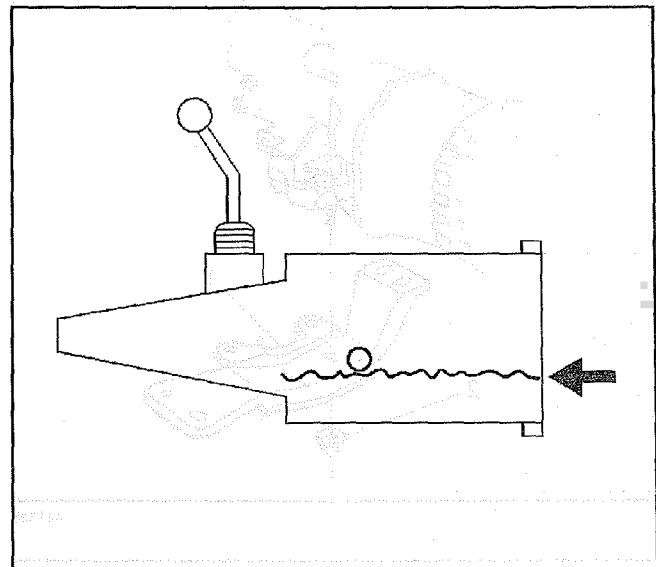
Manual Transmission Fluid Level Check

1. Raise and suitably support the vehicle. Refer to *Lifting and Jacking the Vehicle* in General Information.
2. Clean any dirt from around the fill plug.
3. Remove the transmission fill plug from the transmission.

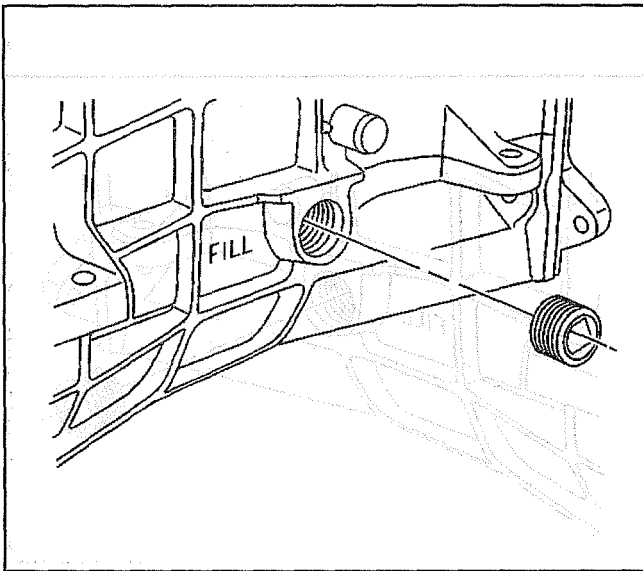


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4. Check that the transmission fluid level is even with the bottom of the fill plug hole.
5. Add Dexron-III transmission fluid, if necessary.



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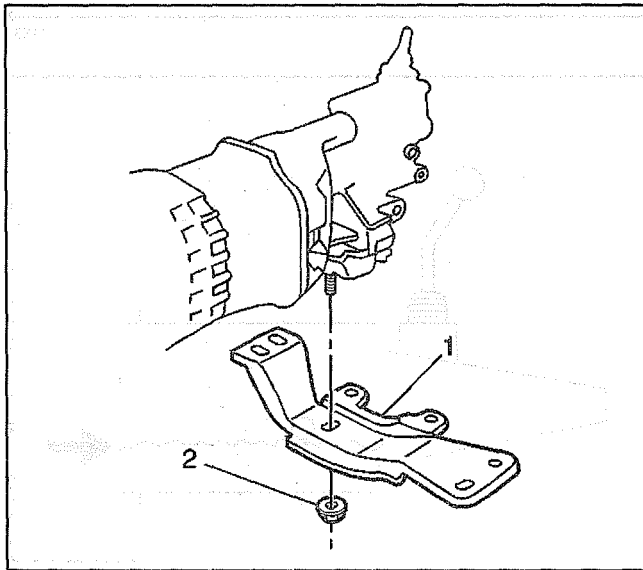
Notice: Refer to *Fastener Notice* in Cautions and Notices.

6. Install the transmission fill plug to the transmission.

Tighten

Tighten the transmission fill plug to 27 N·m (20 lb ft).

7. Lower the vehicle.

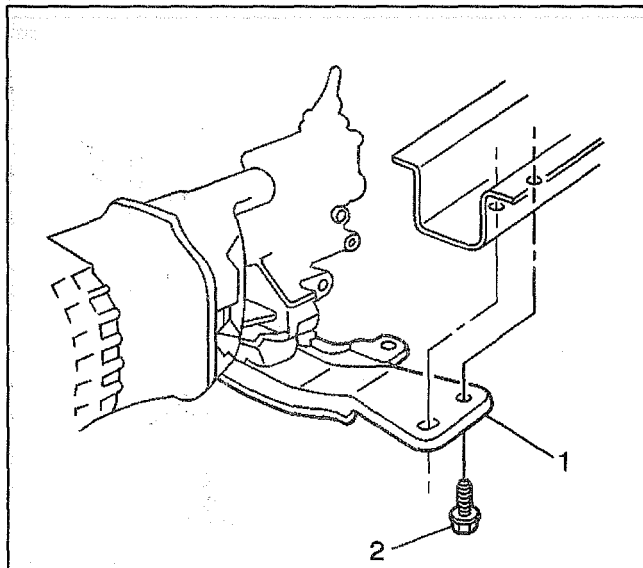


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Transmission Support and Mount Assembly

Removal Procedure

1. Raise and suitably support the vehicle. Refer to *Lifting and Jacking the Vehicle* in General Information.
2. Support the transmission with a transmission jack.
3. Remove the transmission mount nut (2) and washer.

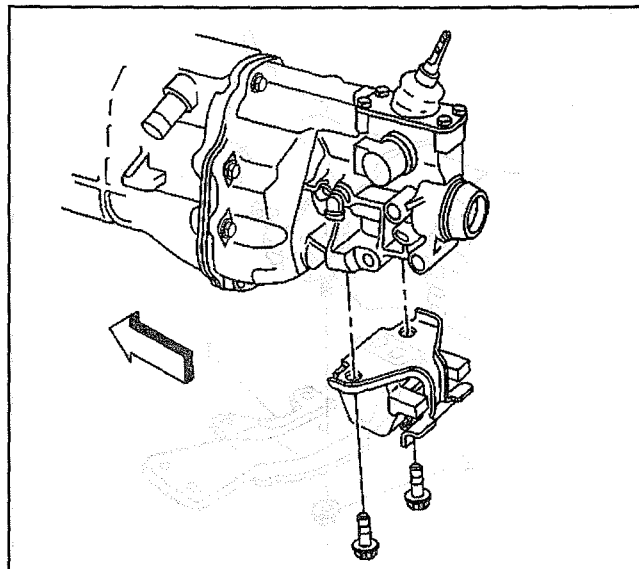


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4. Remove the transmission support bolts (2).
5. Remove the transmission support (1).

6. Remove the transmission mount bolts.

7. Remove the transmission mount.



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Installation Procedure

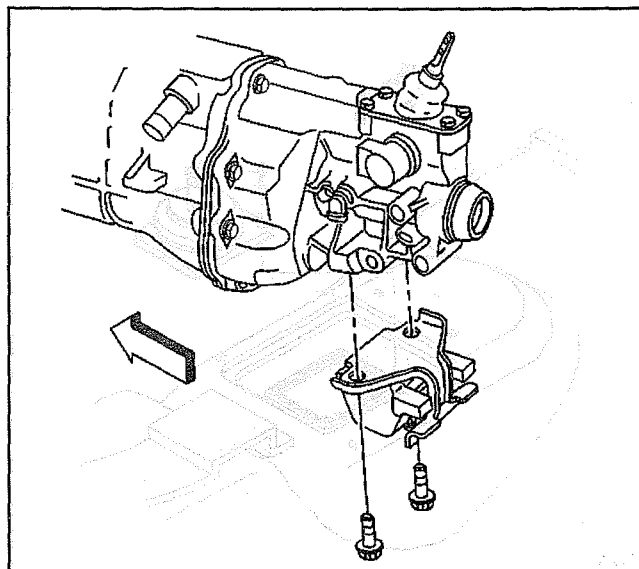
1. Install the transmission mount.

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

2. Install the transmission mount bolts.

Tighten

Tighten the transmission mount bolts to 48 N·m (36 lb ft).



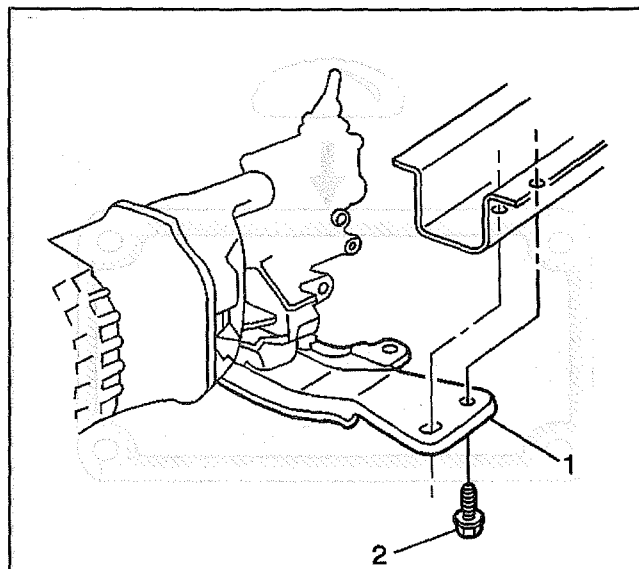
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3. Install the transmission support (1).

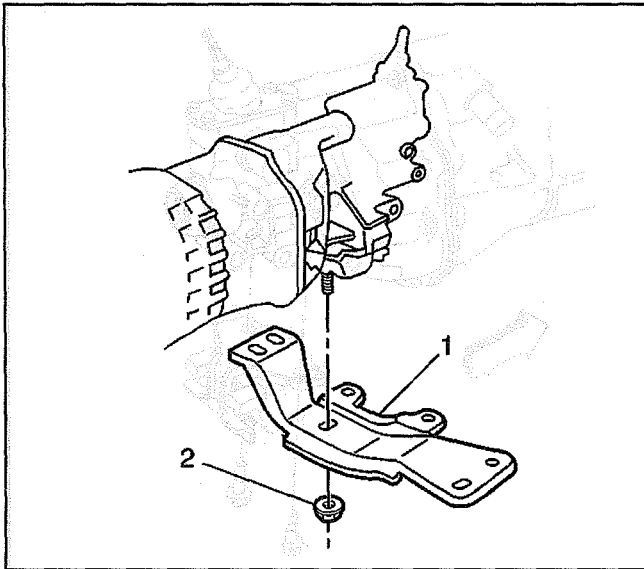
4. Install the transmission support bolts (2).

Tighten

Tighten the transmission support bolts (2) to 90 N·m (66 lb ft).



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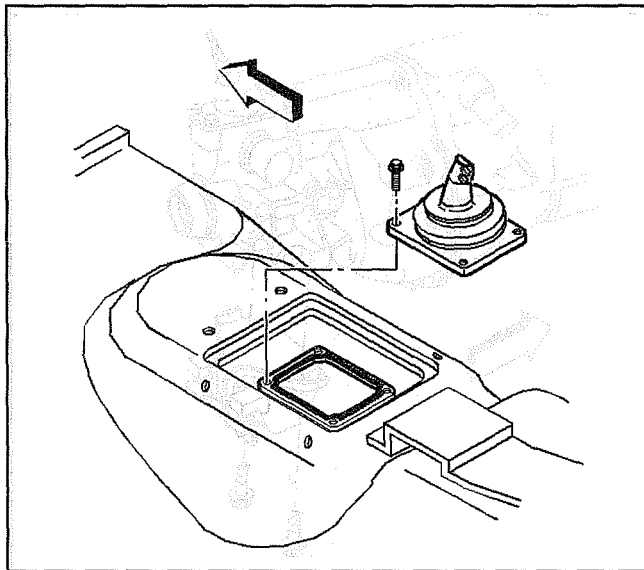
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5. Install the transmission mount nut (2) and washer.

Tighten

Tighten the transmission mount nut to (2)
105 N·m (77 lb ft).

6. Remove the transmission jack.
7. Lower the vehicle.



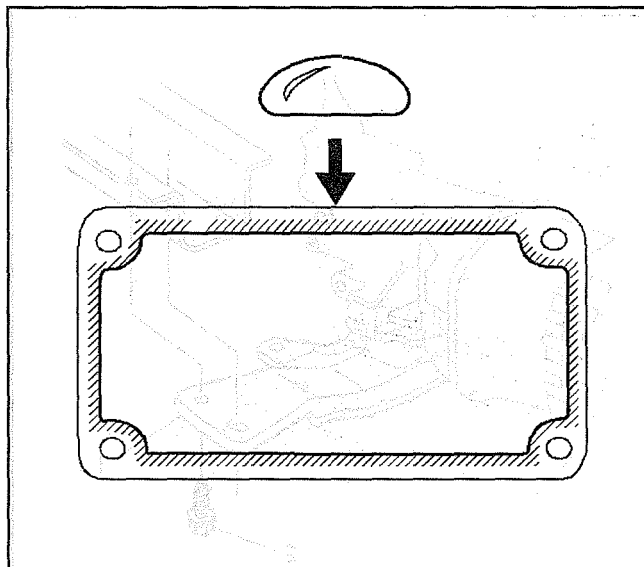
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Shift Control Assembly Replacement

Removal Procedure

1. Remove the shift control closeout boot. Refer to *Shift Control Closeout Boot Replacement*.
2. Remove the shift control bolts.
3. Remove the control.
4. Clean the old sealant from the housing and the shift control sealing surfaces.



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Installation Procedure

1. Apply a continuous 3 mm (0.125 in) bead of RTV Sealant on the extension housing-to-shift control sealing surface. Use GM P/N 12345739 or equivalent.

2. Install the shift control.

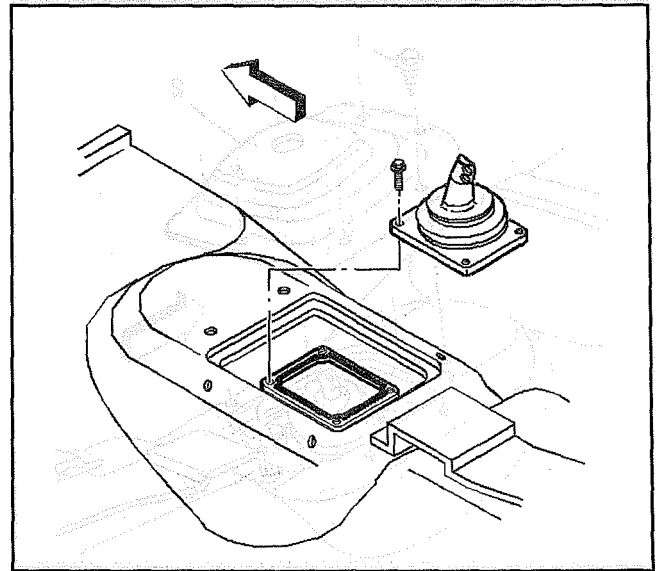
Notice: Refer to *Fastener Notice* in Cautions and Notices.

3. Install the shift control bolts.

Tighten

Tighten the shift control bolts to 18 N·m (13 lb ft).

4. Install the shift control closeout boot. Refer to *Shift Control Closeout Boot Replacement*.

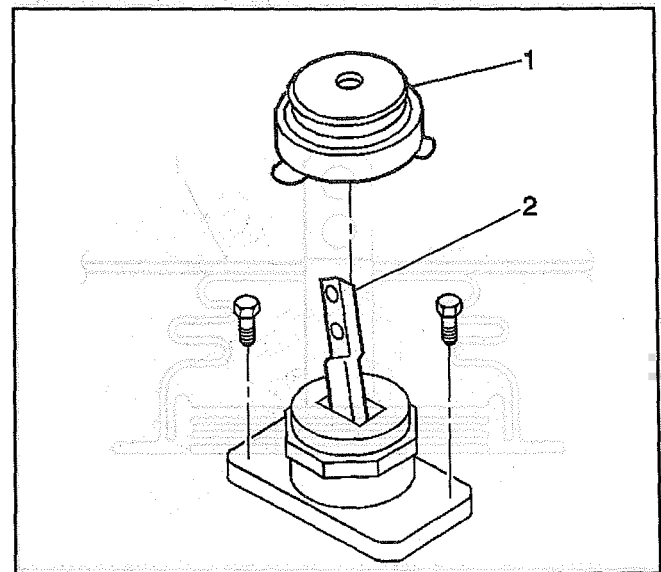


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Shift Control Boot Replacement

Removal Procedure

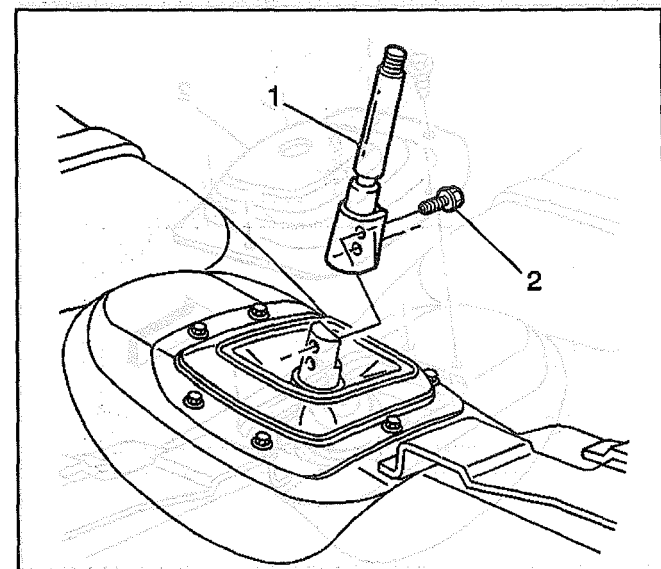
1. Remove the shift control closeout boot. Refer to *Shift Control Closeout Boot Replacement*.
2. Remove the control lever boot (1) from the control lever (2).



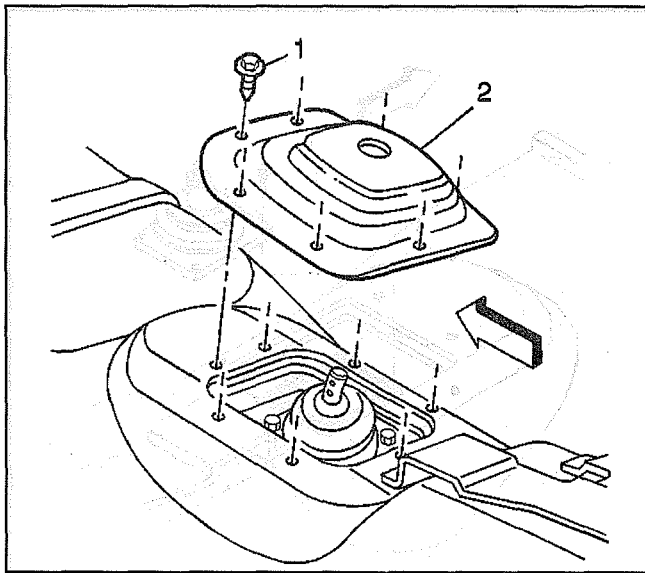
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Installation Procedure

1. Install the control lever boot (1) to the control lever (2).
2. Install the shift control closeout boot. Refer to *Shift Control Closeout Boot Replacement*.



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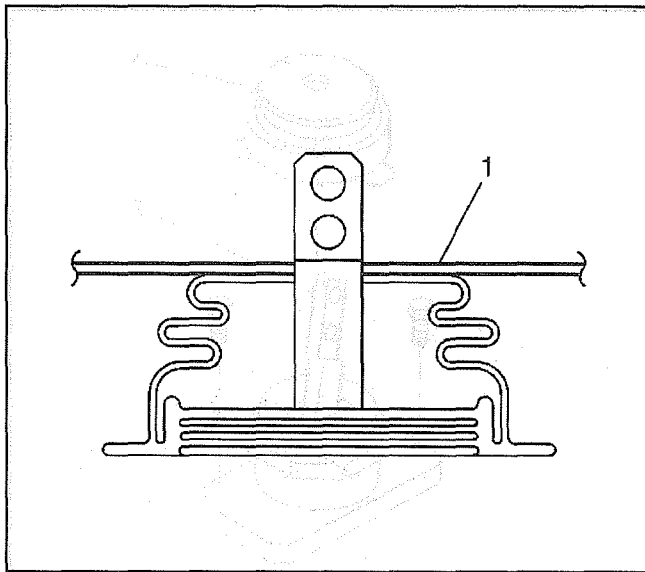
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Shift Control Closeout Boot Replacement

Removal Procedure

1. Remove the control lever handle. Refer to *Control Lever Handle Assembly*.
2. Remove the shift control closeout boot bolts (1).
3. Remove the shift control closeout boot (2).



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Installation Procedure

1. Install the shift control closeout boot (1).
2. Push the shift control closeout boot (1) down until it seats on the control.

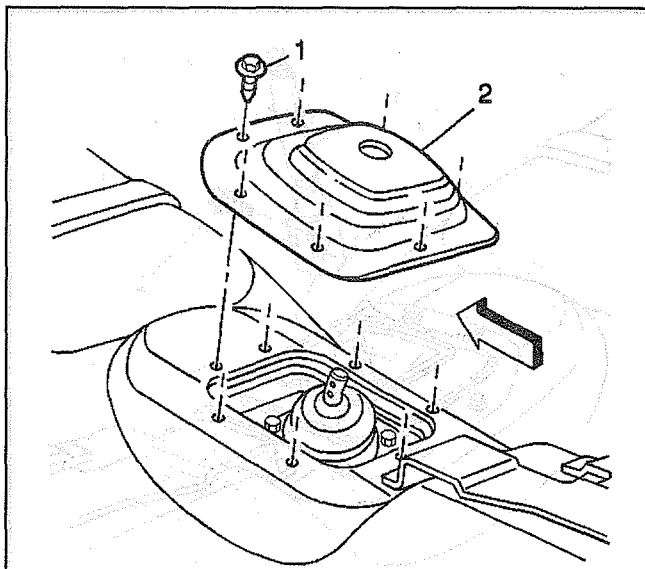
Notice: Refer to *Fastener Notice* in Cautions and Notices.

3. Install the shift control closeout boot bolts (1).

Tighten

Tighten the shift control closeout boot bolts (1) to 2 N·m (18 lb in).

4. Install the control lever handle. Refer to *Control Lever Handle Assembly*.



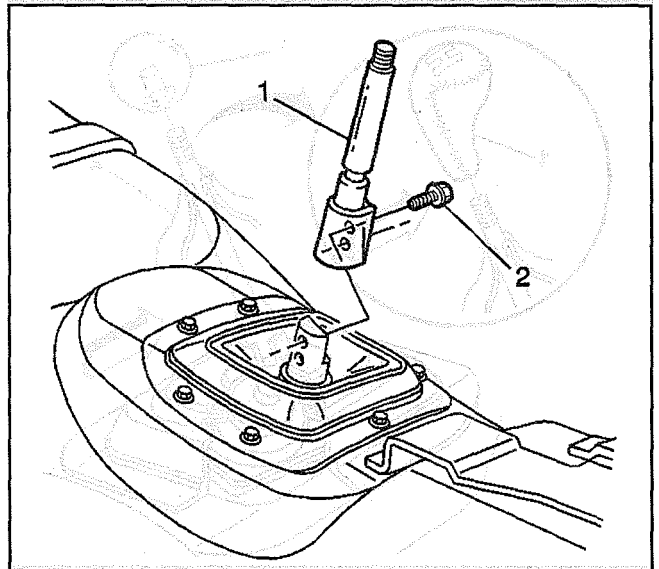
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Control Lever Handle Assembly

Removal Procedure

1. Remove the front floor console. Refer to *Console Replacement - Front Floor* in Instrument Panel, Gauges and Console.
2. Remove the control lever handle bolt (2).
3. Remove the control lever handle (1).



33327

Installation Procedure

1. Install the control lever handle (1) to the shift control.

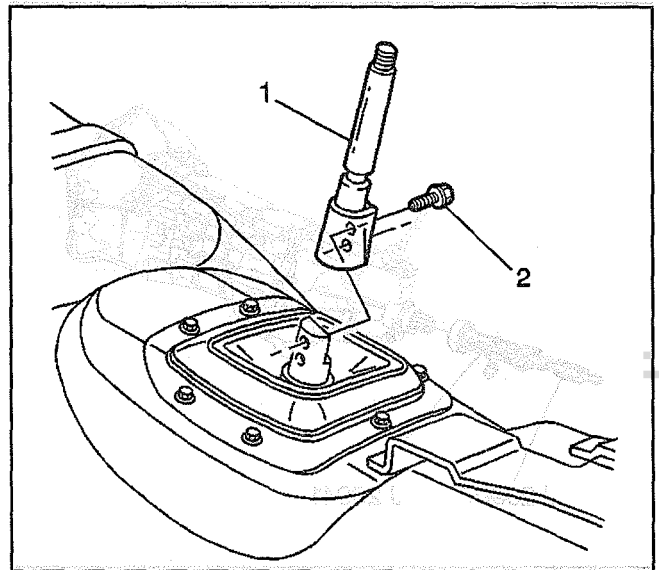
Notice: Refer to *Fastener Notice* in Cautions and Notices.

2. Install the control lever handle bolt (2).

Tighten

Tighten the control lever handle bolt (2) to 25 N·m (18 lb ft).

3. Install the front floor console. Refer to *Console Replacement - Front Floor* in Instrument Panel, Gauges and Console.

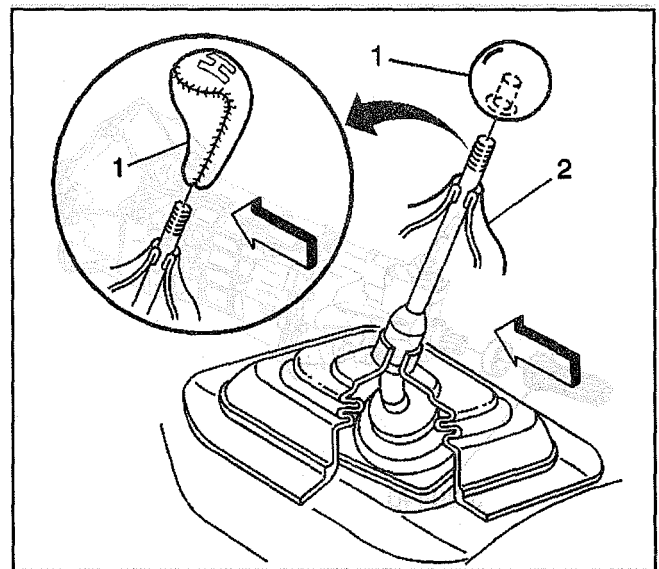


33327

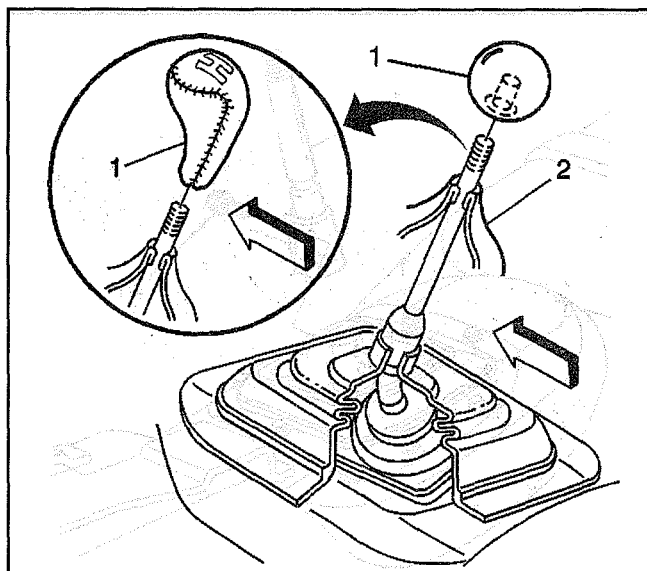
Shift Control Knob Replacement

Removal Procedure

1. Set the park brake.
2. Place the transmission control in neutral.
3. Unscrew the control lever knob (1).



441471



441471

Installation Procedure

1. Push the shift lever boot (2) down to access the lever threads.

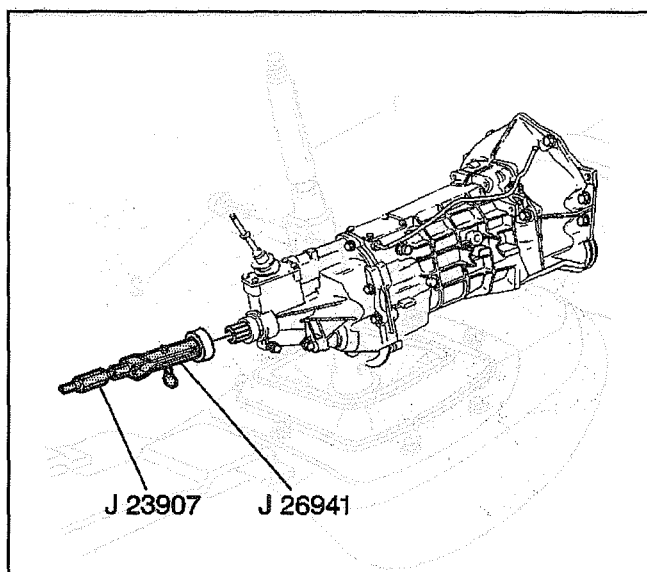
Notice: Refer to *Fastener Notice* in Cautions and Notices.

2. Screw the shift control knob (1) onto the shift control lever.

Tighten

Tighten the shift control knob to 3 N·m (27 lb in).

3. Rotate the Hurst shift control knob (1) until the face is parallel to the instrument panel.
4. Place the transmission in gear.
5. Release the park brake.

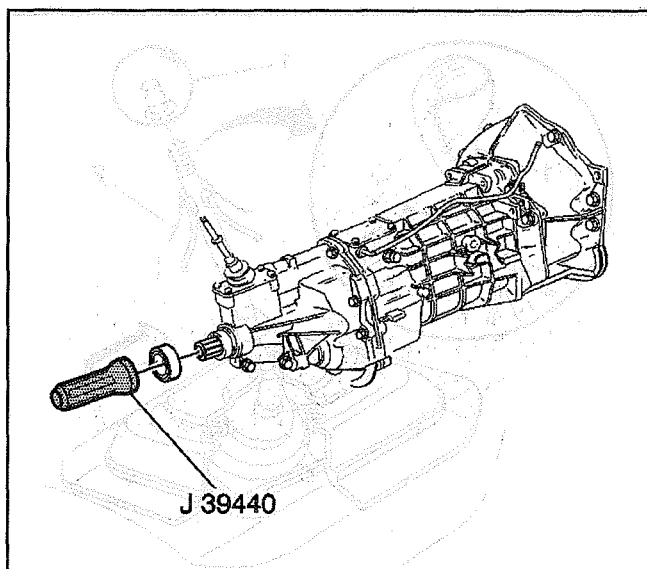


349689

Mainshaft Rear Oil Seal**Removal Procedure****Tools Required**

- J 23907 Slide Hammer
- J 26941 Extension Housing Seal Remover

1. Remove the propeller shaft. Refer to *Propeller Shaft Replacement - One Piece* in Propeller Shaft.
2. Remove the main shaft seal using J 23907 and J 26941.



349677

Installation Procedure**Tools Required**

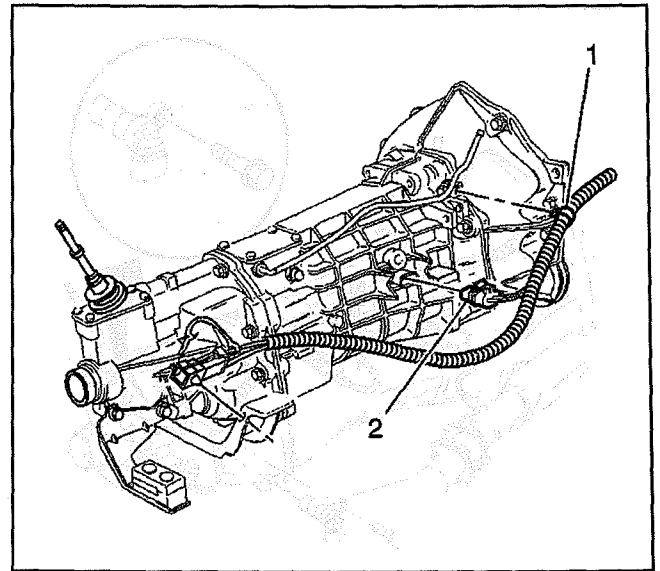
J 39440 Extension Housing Seal Installer

1. Install the main shaft seal using J 39440.
2. Lubricate the inside diameter of the seal. Use only Dexron® III automatic transmission fluid.
3. Install the propeller shaft. Refer to *Propeller Shaft Replacement - One Piece* in Propeller Shaft.
4. Inspect the transmission fluid level. Refer to *Manual Transmission Fluid Level Check*.
5. Add transmission fluid, if necessary.

Backup Lamp Switch Replacement

Removal Procedure

1. Raise and suitably support the vehicle. Refer to *Lifting and Jacking the Vehicle* in General Information.
2. Disconnect the backup lamp switch electrical connector (2).
3. Remove the backup lamp switch.



477352

Installation Procedure

1. Apply pipe sealant with Teflon® to the threads of the backup lamp switch. Use GM P/N 1052080 or equivalent.

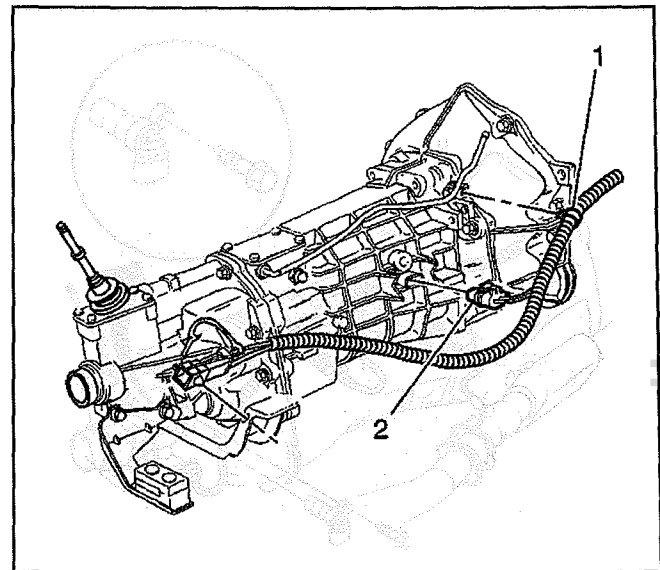
Notice: Refer to *Fastener Notice* in Cautions and Notices.

2. Install the backup lamp switch.

Tighten

The backup lamp switch to 27 N·m (20 lb ft).

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

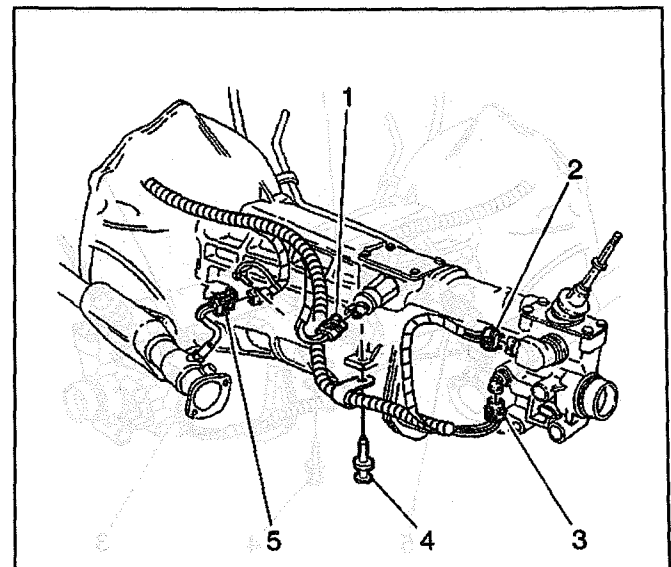


477352

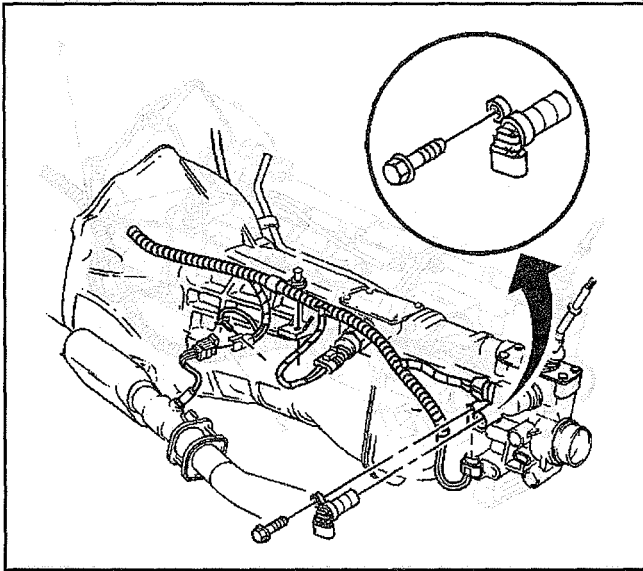
Vehicle Speed Sensor

Removal Procedure

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

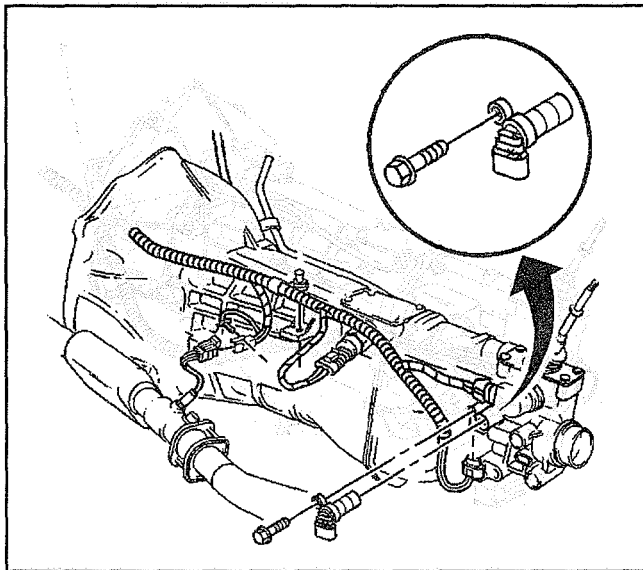


477355



349950

3. Remove the attaching bolt and the vehicle speed sensor.
4. Remove the vehicle speed sensor.



349950

Installation Procedure

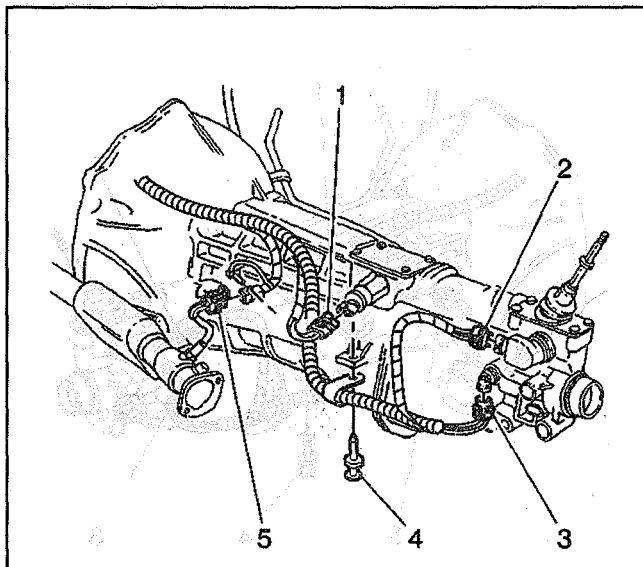
1. Install the vehicle speed sensor.

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

2. Install the vehicle speed sensor bolt.

Tighten

Tighten the vehicle speed sensor bolt to 10 N·m (89 lb in).



477355

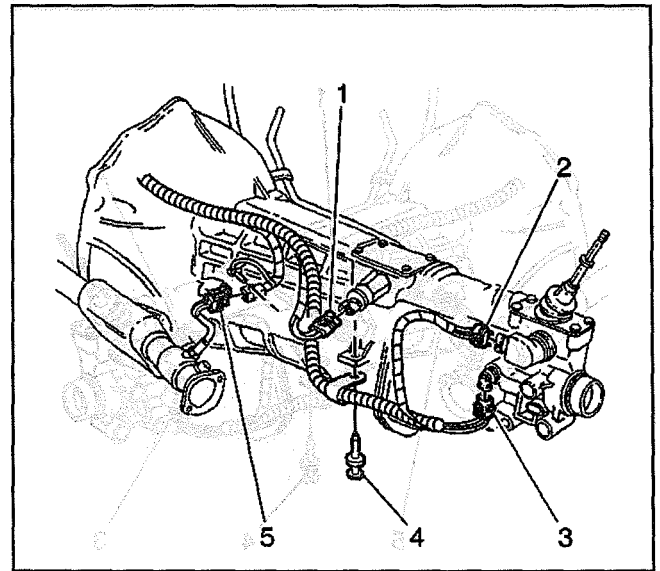
3. Connect the vehicle speed sensor electrical connector (3).

4. Lower the vehicle.

Reverse Lockout Solenoid**Removal Procedure****Tools Required**

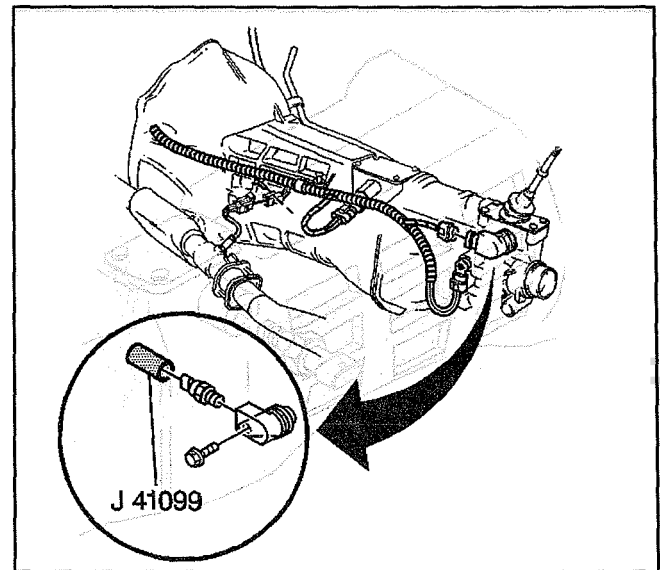
J 41099 Gear Select/Reverse Lockout Solenoid Socket

1. Raise and suitably support the vehicle. Refer to *Lifting and Jacking the Vehicle* in General Information.
2. Remove the reverse lockout solenoid electrical connector (2).
3. Place a drain pan under the transmission in case any fluid drips out.



477355

4. Remove the reverse lockout solenoid using J 41099.
5. Remove the reverse lockout assembly bolt.
6. Remove the reverse lockout assembly, if necessary.



349934

Installation Procedure**Tools Required**

J 41099 Gear Select/Reverse Lockout Solenoid Socket

1. Install the reverse lockout assembly, if necessary.

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

2. Install the reverse lockout assembly bolt.

Tighten

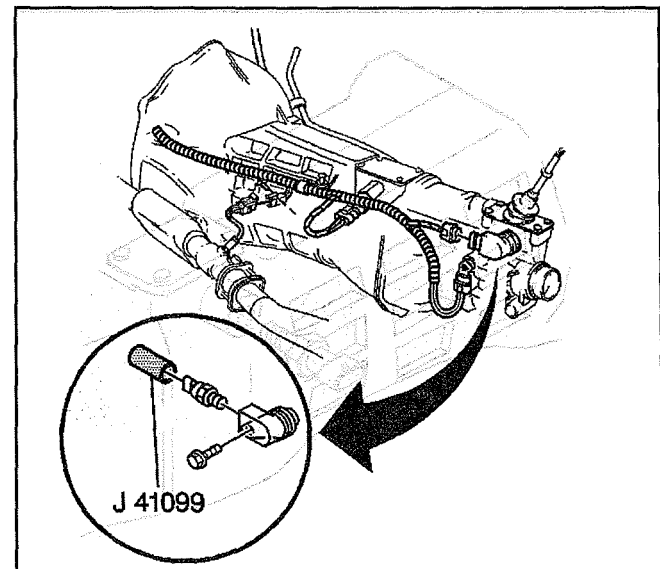
Tighten the reverse lockout assembly bolt to 18 N·m (13 lb ft).

3. Install the reverse lockout solenoid using the J 41099.

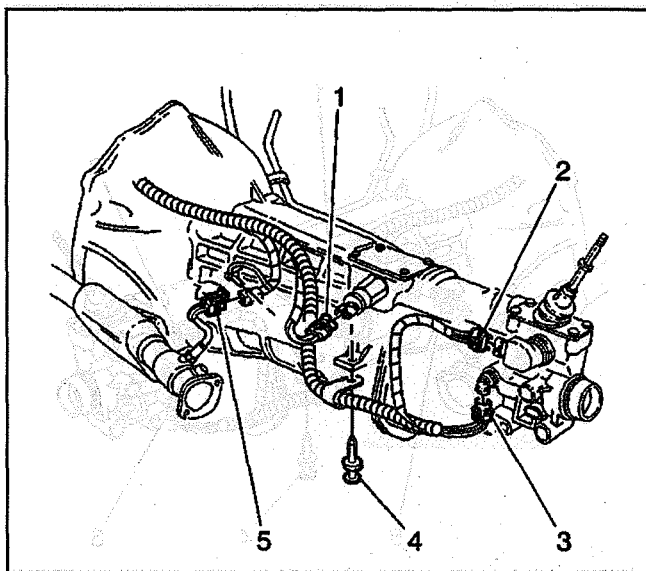
Tighten

Tighten the reverse lockout solenoid to 40 N·m (30 lb ft).

4. Remove the drain pan.

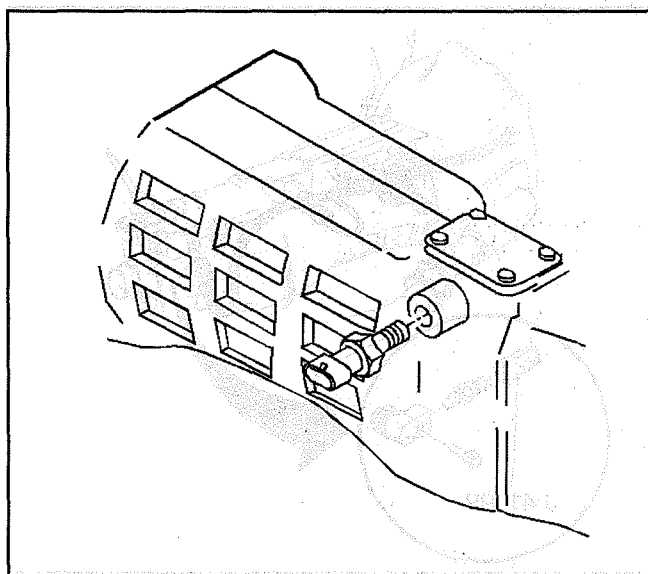


349934



477355

5. Connect the reverse lockout solenoid electrical connector (2).
6. Check the transmission fluid level. Refer to *Manual Transmission Fluid Level Check*.
7. Lower the vehicle.

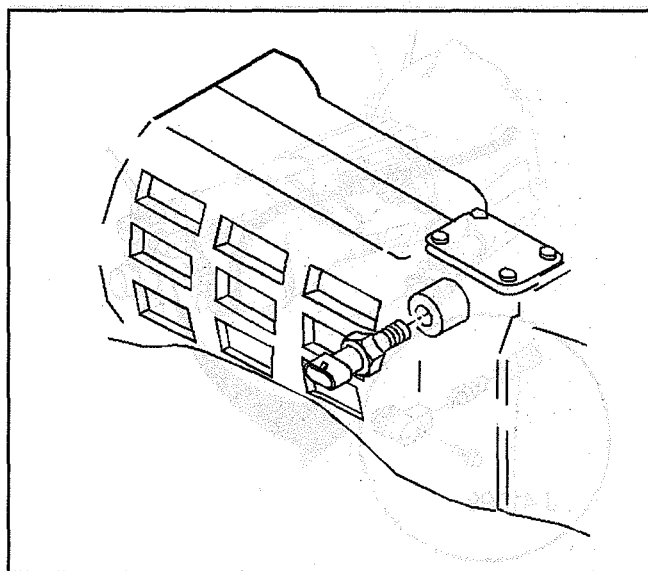


33363

Gear Select/Skip Shift Solenoid Replacement

Removal Procedure

1. Remove the transmission. Refer to *Transmission Replacement*.
2. Remove the skip shift solenoid from the transmission.



33363

Installation Procedure

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

1. Install the skip shift solenoid to the transmission.
- Tighten**
Tighten the skip shift solenoid to 40 N·m (30 lb ft).
2. Install the transmission. Refer to *Transmission Replacement*.

Transmission Oil Drain and Fill

Draining Procedure

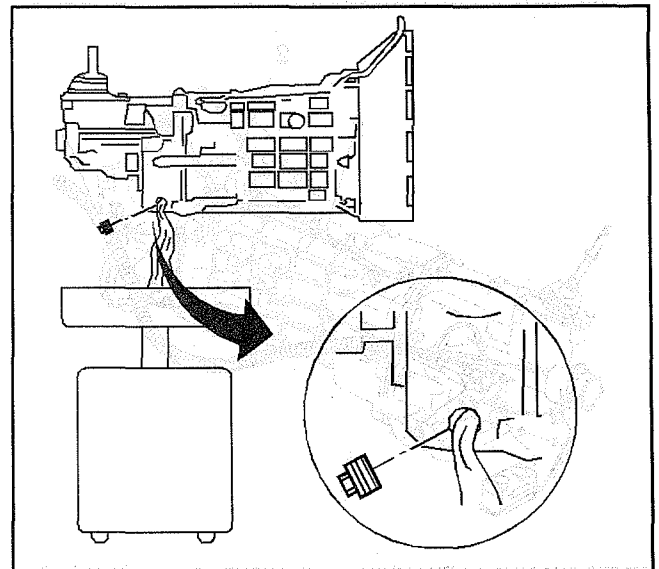
1. Raise and suitably support the vehicle. Refer to *Lifting and Jacking the Vehicle* in General Information.
2. Clean away all dirt and debris from the transmission fluid drain plug area.
3. Remove the drain plug.
4. Allow the system to drain.

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

5. Install the transmission fluid drain plug.

Tighten

Tighten the transmission fluid drain plug to 27 N·m (20 lb ft).



33370

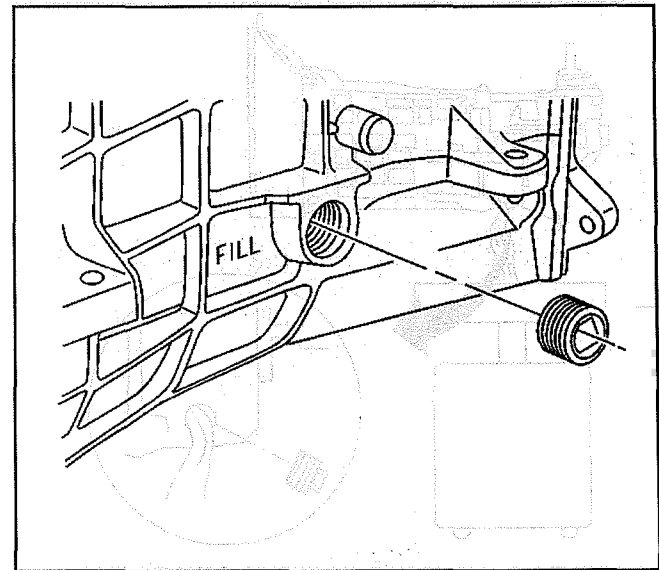
Filling Procedure

1. Clean away all dirt and debris from the transmission fluid fill plug area.
2. Remove the transmission fluid fill plug.
3. Fill the transmission with DEXRON®-III transmission fluid, until even with the bottom of the fill plug hole.
4. Install the transmission fluid fill plug.

Tighten

Tighten the transmission fluid fill plug to 27 N·m (20 lb ft).

5. Lower the vehicle.

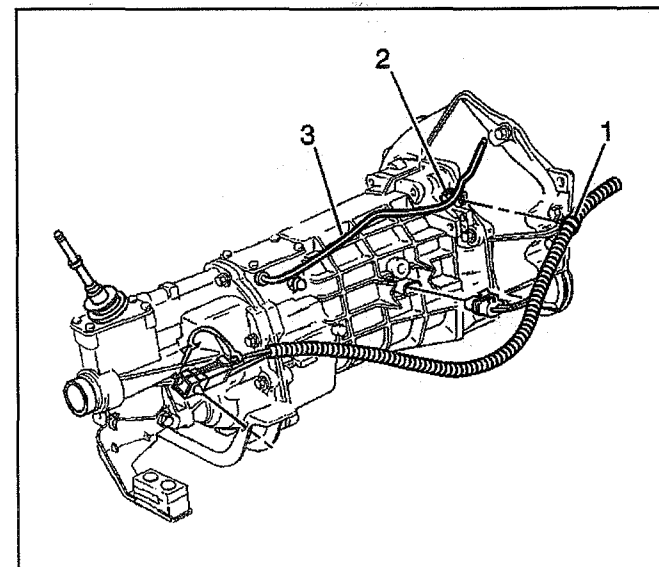


71531

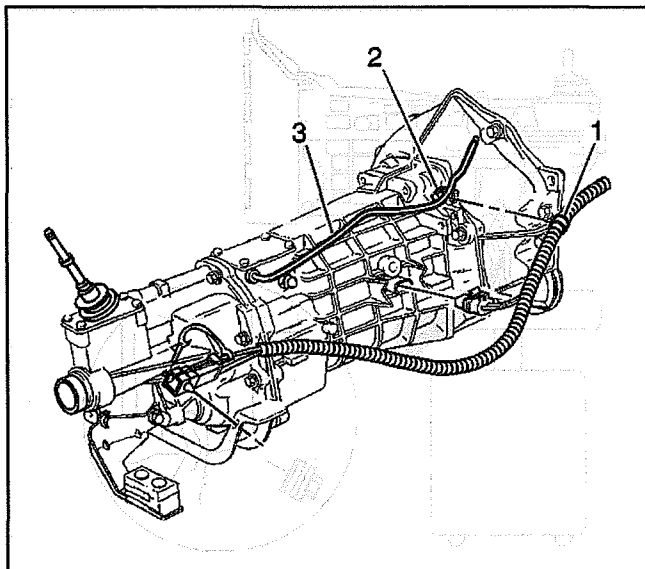
Transmission Vent Tube Replacement

Removal Procedure

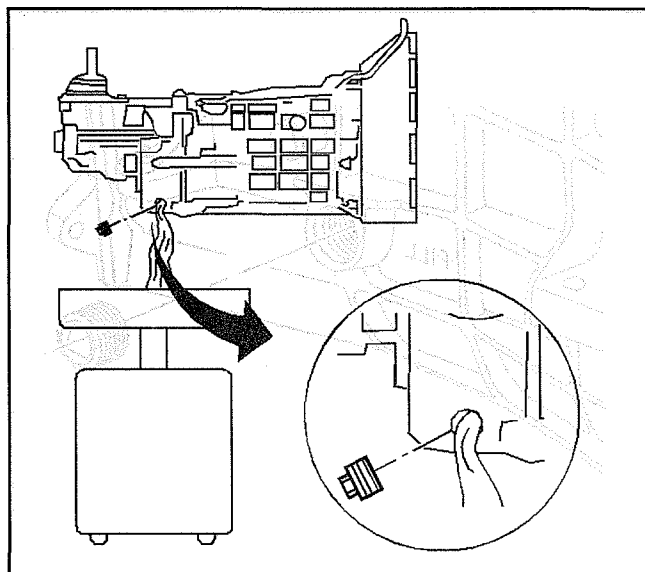
1. Remove the transmission support. Refer to *Transmission Support and Mount Assembly*.
2. Remove the propeller shaft. Refer to *Propeller Shaft Replacement - One Piece* in Propeller Shaft.
3. Remove the torque arm. Refer to *Torque Arm Replacement* in Rear Suspension.
4. Lower the tail shaft of the transmission enough to access the transmission bolt (2).
5. Remove the transmission bolt (2).
6. Remove the vent tube (3) from the vent pipe.



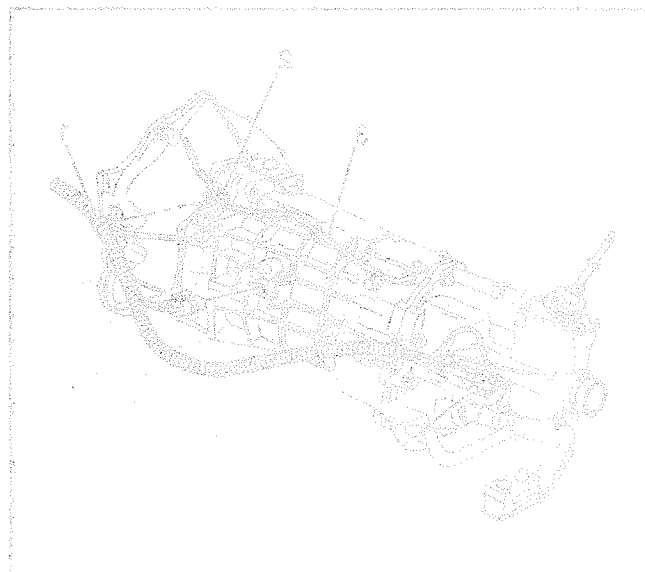
474579



474579



33370



33370

Installation Procedure

1. Install the vent tube (3) to the vent pipe.

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

2. Install the transmission bolt (2).

Tighten

Tighten the transmission bolt (2) to 50 N·m (37 lb ft).

3. Raise the tail shaft of the transmission.
4. Install the torque arm. Refer to *Torque Arm Replacement* in Rear Suspension.
5. Install the propeller shaft. Refer to *Propeller Shaft Replacement - One Piece* in Propeller Shaft.
6. Install the transmission support. Refer to *Transmission Support and Mount Assembly*.

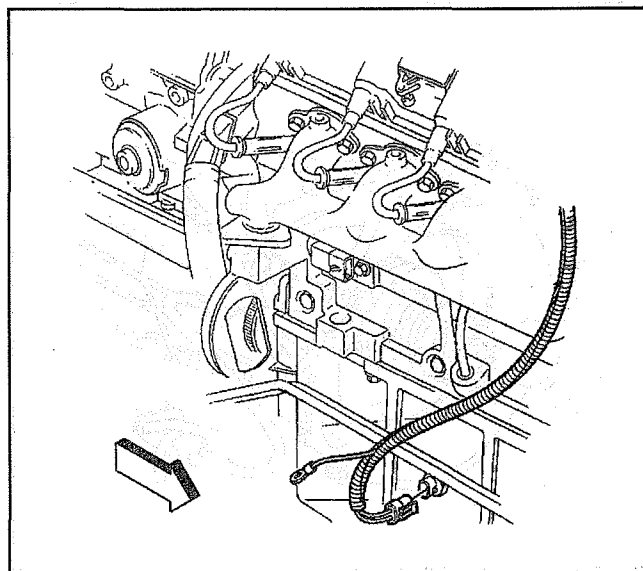
Transmission Replacement

Tools Required

- J 3289-20 Bench Mount Holding Fixture Base
- J 39430 Transmission Holding Fixture
- J 42055 Transmission Support Fixture
- J 36221 Hydraulic Clutch Line Separator

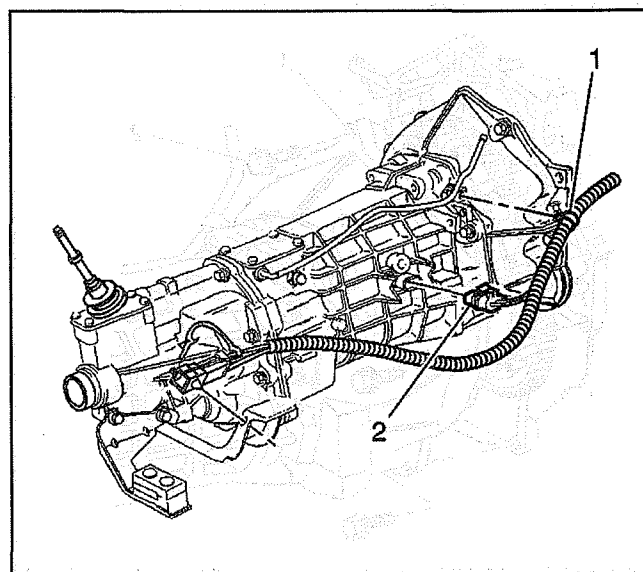
1. Remove the transmission control. Refer to *Shift Control Assembly Replacement*.
2. Raise and suitably support the vehicle. Refer to *Lifting and Jacking the Vehicle* in General Information.
3. Remove the transmission oil drain plug.
4. Drain the oil from the transmission.
5. Support the rear axle with safety stands.
6. Remove the propeller shaft. Refer to *Propeller Shaft Replacement - One Piece* in Propeller Shaft.
7. Remove the rear axle torque arm. Refer to *Torque Arm Replacement* in Rear Suspension.
8. Remove the right side catalytic converter. Refer to *Oxidation Catalytic Converter Replacement (5.7 L Right)* in Engine Exhaust.

9. Disconnect the oil level sensor electrical connector.
10. Remove the starter motor. Refer to *Starter Motor Replacement (5.7 L)* in Engine Electrical.



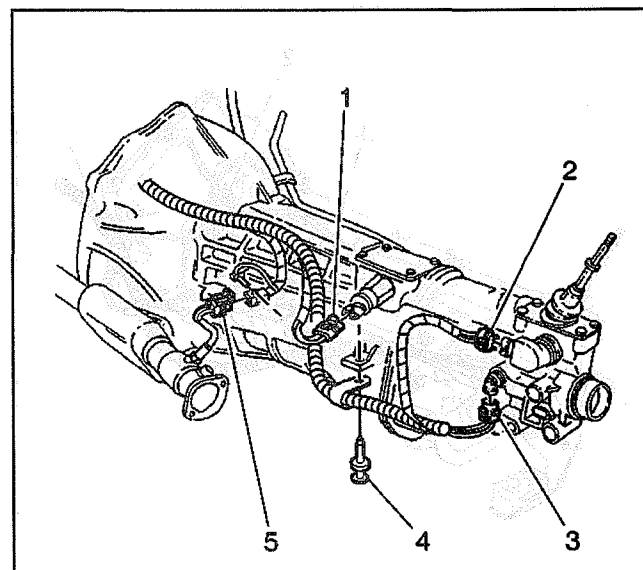
220633

11. Remove the rosebud clip (1) from the transmission.
12. Disconnect the backup lamp switch electrical connector (2).

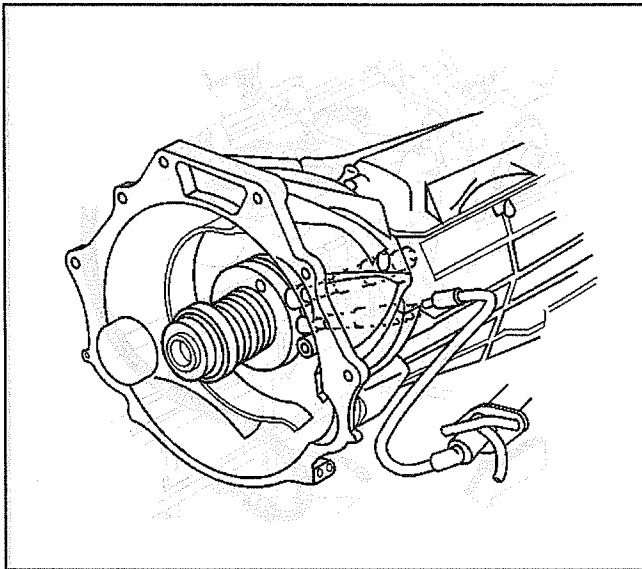


477352

13. Disconnect the following electrical connectors:
 - Skip shift solenoid (1)
 - Reverse lockout solenoid (2)
 - Vehicle speed sensor (3)
 - Oxygen sensor (5)
14. Remove the push in retainer (4) and wiring harness bracket.
15. Support the engine with safety stands.

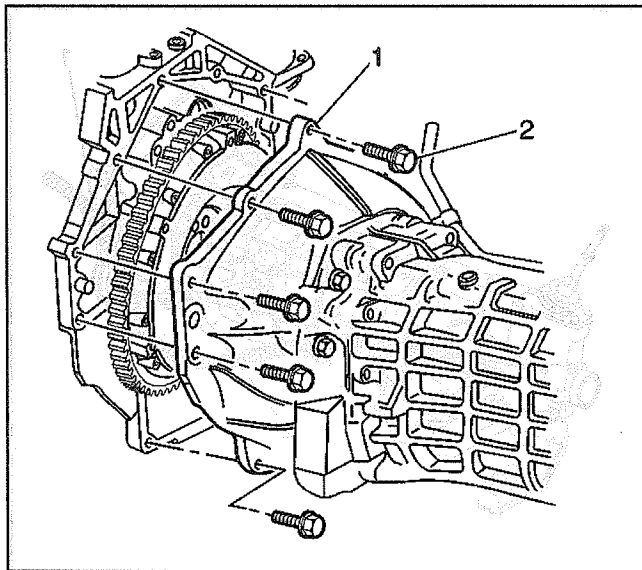


477355



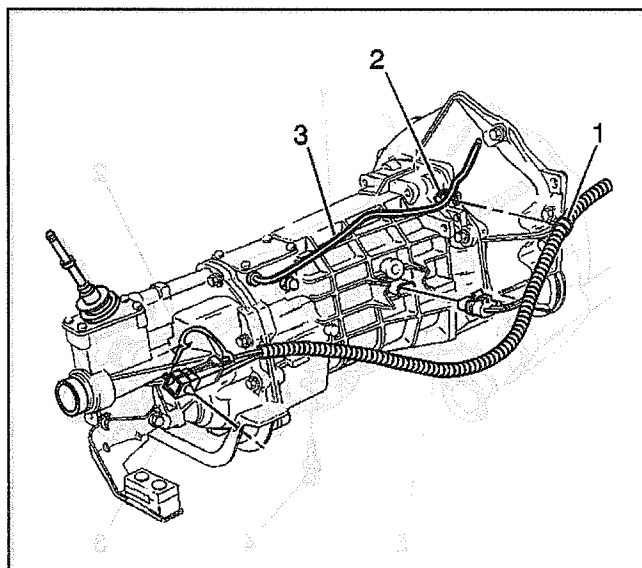
43255

16. Using *J 36221*, depress the white circular release ring on the actuator cylinder hose and simultaneously pull lightly on the master cylinder hose to disconnect.
17. Protect both hose coupling ends from dirt and damage.
18. Install the *J 42055* to the transmission jack.
19. Support the transmission with a transmission jack.
20. Position and firmly secure the *J 42055* with the transmission jack to the transmission.
21. Remove the transmission support. Refer to *Transmission Support and Mount Assembly*.
22. Slowly lower the transmission to access the transmission bolts.



210528

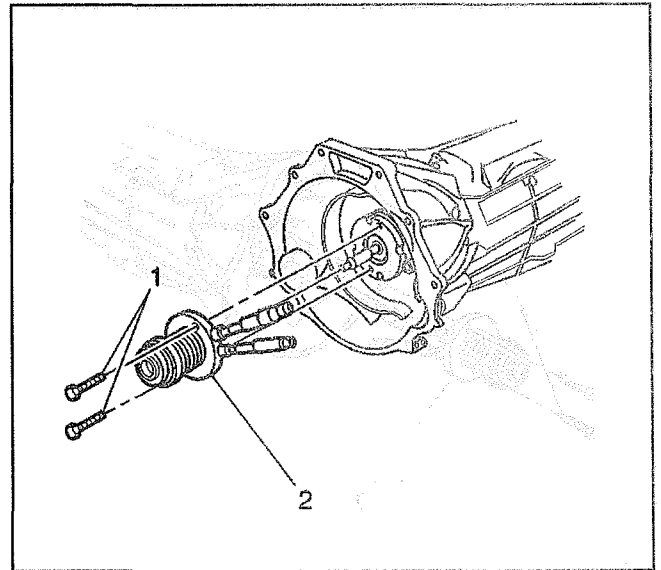
23. Remove the transmission bolts (2).
24. Remove the transmission (1) from the vehicle.



474579

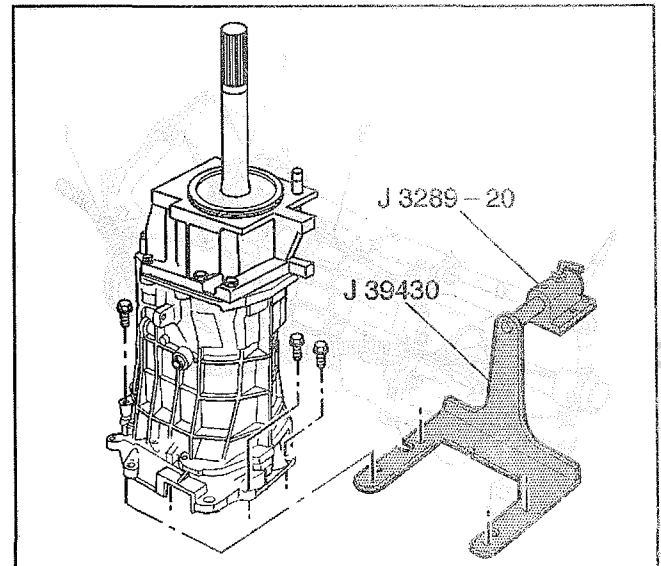
25. Remove the transmission vent tube bolt (2).
26. Remove the transmission vent tube (3).

27. Remove the clutch actuator cylinder bolts (1).
28. Remove the clutch actuator cylinder (2).
29. Remove the clutch housing bolts.
30. Remove the clutch housing from the transmission case.



43256

31. Install the *J 39430* to the transmission.
32. Remove the transmission from *J 42055* and the transmission jack.
33. Mount the transmission on a workbench using *J 3289-20*.



74206

Installation Procedure

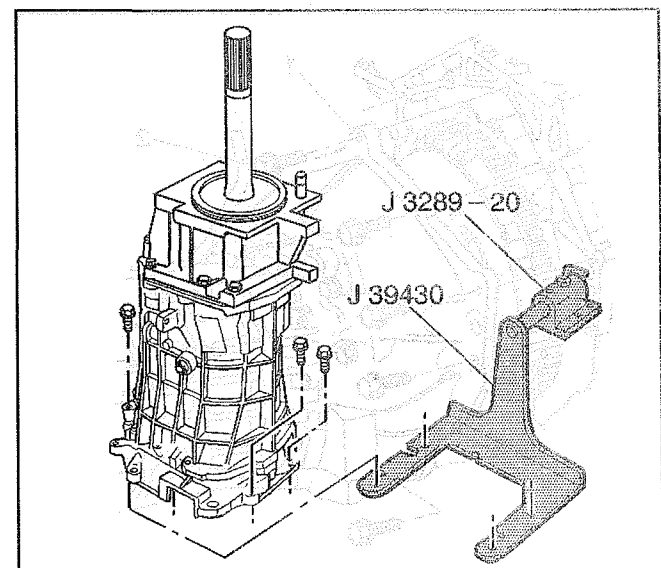
1. Remove the transmission from the *J 3289-20* mounted on the workbench.
2. Position and firmly secure the *J 42055* mounted on the transmission jack to the transmission.
3. Remove the *J 39430* from the transmission.
4. Install the clutch housing to the transmission case.

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

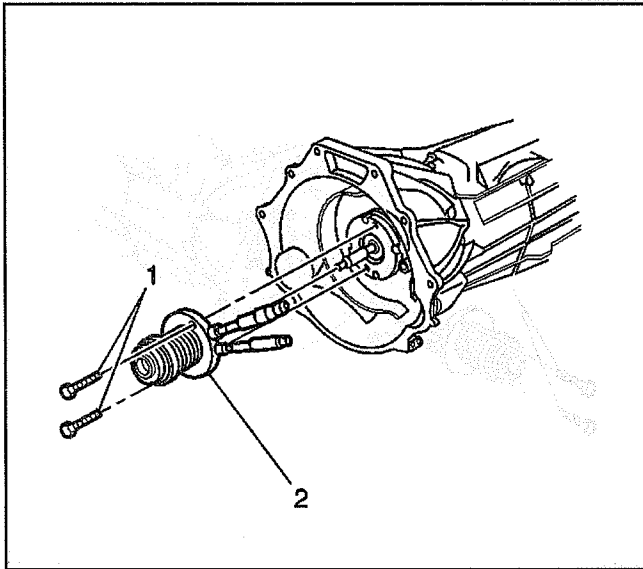
5. Install the clutch housing bolts.

Tighten

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



74206

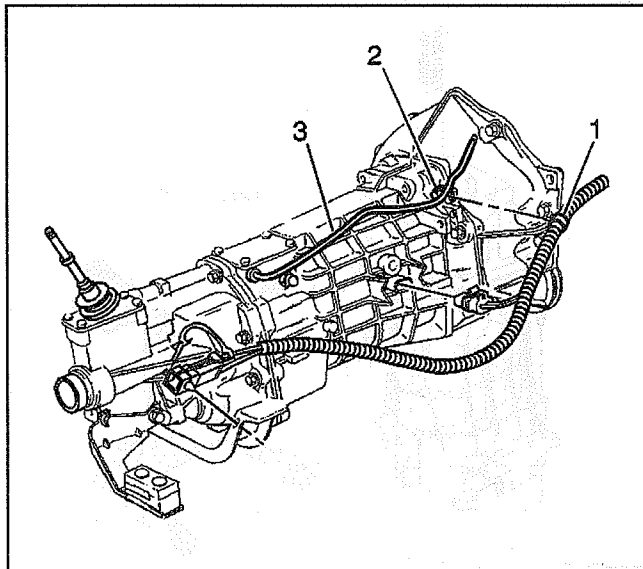


43256

6. Install the clutch actuator cylinder (2).
7. Install the clutch actuator cylinder bolts (1).

Tighten

Tighten the clutch actuator cylinder bolts (1) to 8 N·m (71 lb in).

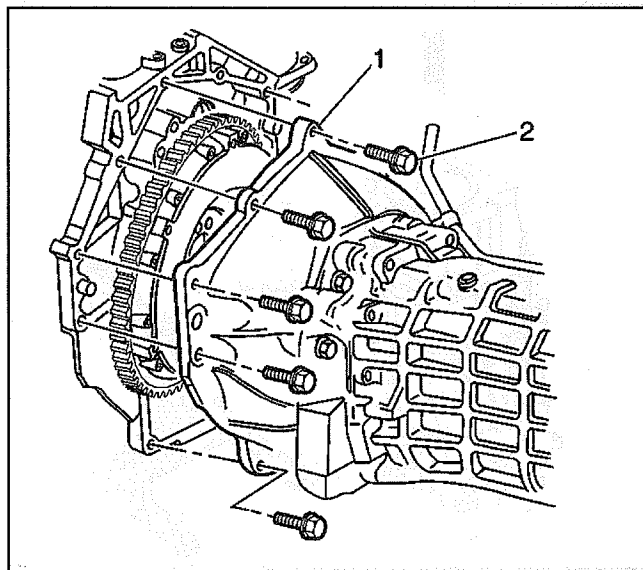


474579

8. Install the transmission vent tube (3) to the vent.
9. Install the transmission vent tube bolt (2).

Tighten

Tighten the transmission vent tube bolt (2) to 50 N·m (37 lb ft).

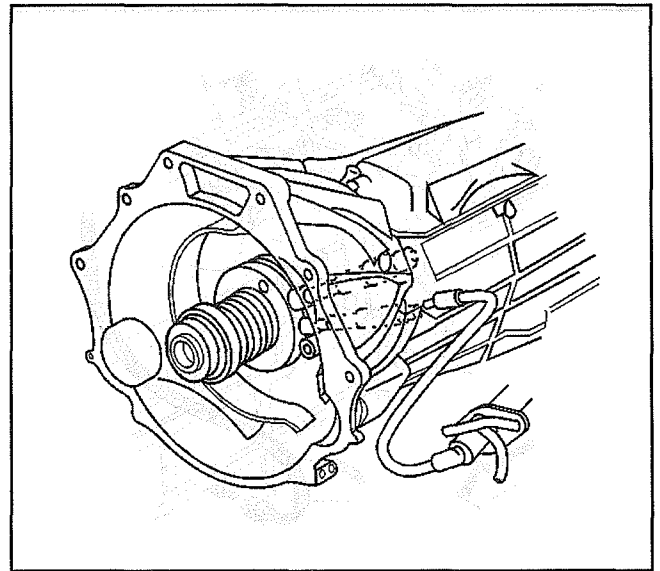


210528

10. Install the transmission (1) to the vehicle.
 11. Slowly raise the transmission until in place.
 12. Install the transmission bolts (2).
- Tighten**
- Tighten the transmission bolts to 50 N·m (37 lb ft).
13. Install the transmission support. Refer to *Transmission Support and Mount Assembly*.
 14. Remove the transmission jack from the transmission.
 15. Remove the J 42055 from the transmission jack.

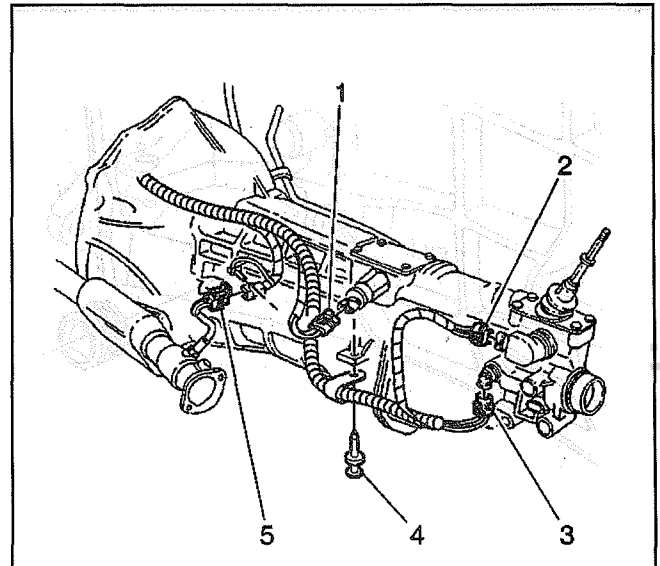
Important: DO NOT rely on an audible click or a visual verification of the clutch hydraulic hose quick connect fitting connection.

16. Connect the clutch actuator cylinder hose to the clutch master cylinder hose.
17. Push together the clutch hydraulic hose quick connect fittings, then pull back on the fittings to verify engagement.
18. Check the clutch hydraulic hoses for kinks or twists.
19. Remove the engine safety stands.



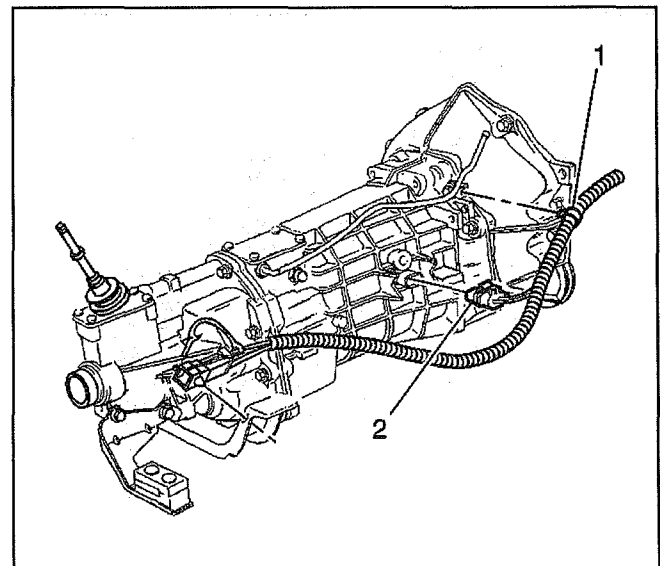
43255

20. Install the wiring harness bracket and push in retainer (4).
21. Connect the following electrical connectors:
 - Oxygen sensor (5)
 - Vehicle speed sensor (3)
 - Reverse lockout solenoid (2)
 - Skip shift solenoid (1)

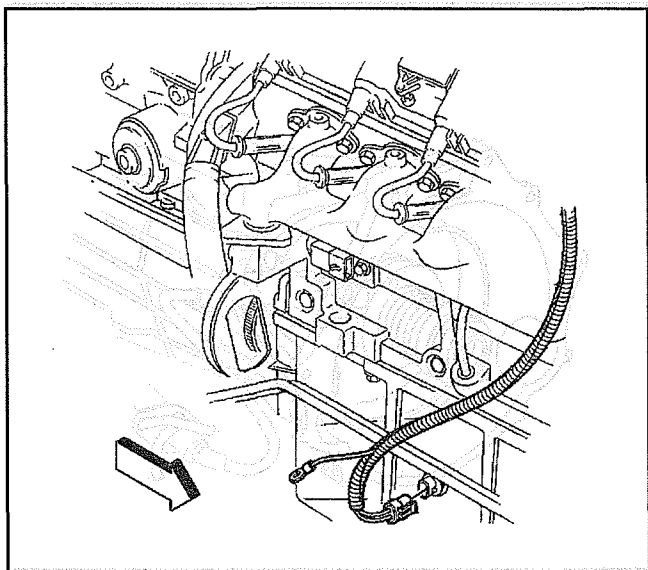


477355

22. Connect the backup lamp switch electrical connector (2).
23. Install the rosebud clip (1) to the transmission.
24. Install the starter motor. Refer to *Starter Motor Replacement (5.7 L)* in Engine Electrical.



477352

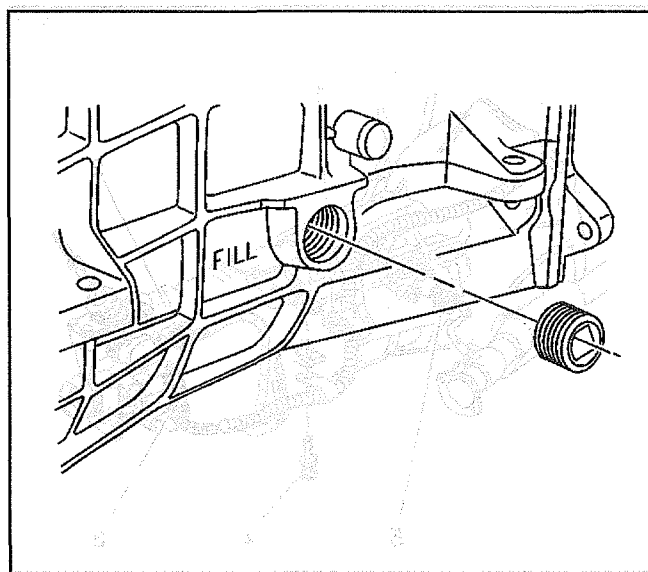


220633

25. Connect the oil level sensor electrical connector.
26. Install the right side catalytic converter. Refer to *Oxidation Catalytic Converter Replacement (5.7 L Right)* in Engine Exhaust.
27. Install the rear axle torque arm. Refer to *Torque Arm Replacement* in Rear Suspension.
28. Install the propeller shaft. Refer to *Propeller Shaft Replacement - One Piece* in Propeller Shaft.
29. Remove the rear axle safety stands.
30. Install the transmission oil drain plug.

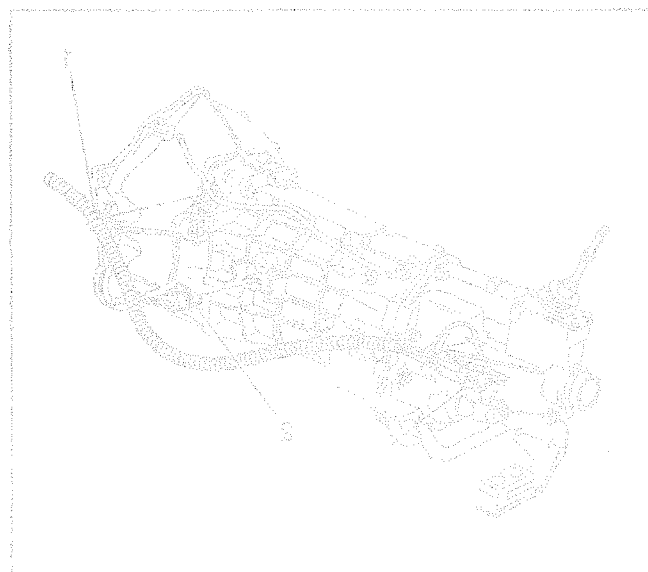
Tighten

Tighten the transmission oil drain plug to 27 N·m (20 lb ft).



71531

31. Remove the transmission fluid fill plug.
32. Refill the transmission with fluid.
33. Bleed the clutch hydraulic system. Refer to *Hydraulic Clutch Bleeding* in Clutch.
34. Lower the vehicle.
35. Install the transmission control. Refer to *Shift Control Assembly Replacement*.



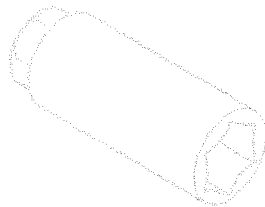
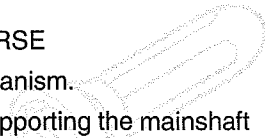
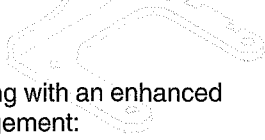
71531

Description and Operation

Manual Transmission

Manual transmissions are identified by the number of forward gears and the measured distance between the centerline of the output shaft and the counter gear. The 6-speed, 85 mm manual transmission (PRO MM6), used in the Camaro/Firebird, incorporates the following features:

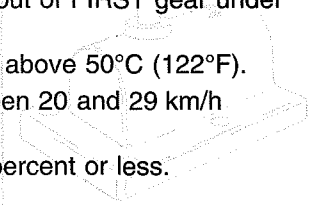
- an aluminum case.
- Fully synchronized gearing with an enhanced synchronizer cone arrangement:
 - Triple-cone: FIRST, SECOND
 - Double-cone: THIRD, FOURTH, FIFTH, SIXTH
 - Single-cone: REVERSE
- An internal shift rail mechanism.
- Tapered roller bearing supporting the mainshaft and countershaft.
- Caged roller bearings under all speed gears.
- Solenoid inhibit of SECOND and THIRD gears.
- Solenoid inhibit of REVERSE gear during predefined forward motion.



Gear Select (Skip Shift)

To ensure good fuel economy and compliance with federal economy standards, SECOND and THIRD gear are inhibited when shifting out of FIRST gear under the following conditions:

- Coolant temperature is above 50°C (122°F).
- Vehicle speed is between 20 and 29 km/h (12 and 19 mph).
- Throttle is opened 35 percent or less.



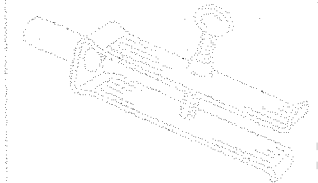
Reverse Lockout

A reverse lockout system (consisting of a reverse lockout solenoid which operates a reverse lockout mechanism) is utilized to prevent shifting into REVERSE gear when the vehicle is moving forward at a speed of 5 km/h (3 mph) or more.

Vehicle Speed Sensor

The vehicle speed sensor (VSS) is pulse type input that informs the PCM how fast the vehicle is traveling. The VSS system uses an inductive sensor mounted in the tail housing of the transmission and a toothed reluctor wheel on the tail shaft. The teeth of the reluctor wheel alternately interfere with the magnetic field of the sensor creating an induced voltage pulse as the reluctor rotates.

Drive Sprocket Support
Bearing Cup



Hydraulic Oil Seal Line
Separator



Special Tools and Equipment

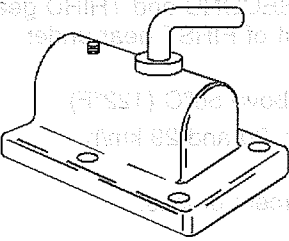
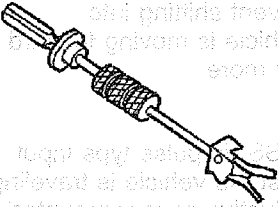
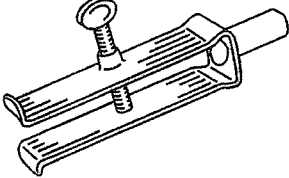
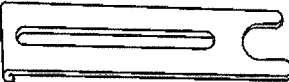
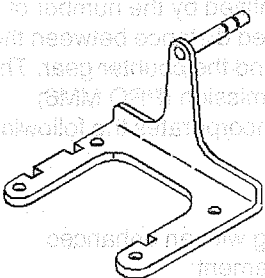
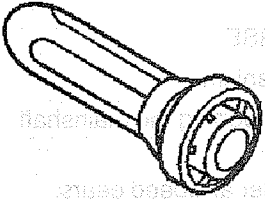
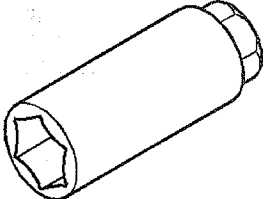
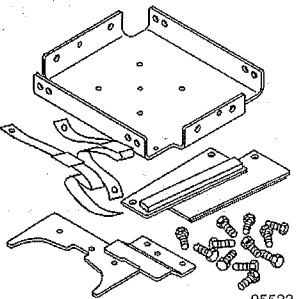
Illustration	Tool Number/ Description
 4850	J 3289-20 Bench Mount Holding Fixture Base
 4855	J 23907 Slide Hammer
 163042	J 26941 Drive Sprocket Support Bearing Cup
 105916	J 36221 Hydraulic Clutch Line Separator

Illustration	Tool Number/ Description
 37232	J 39430 Transmission Holding Fixture
 403244	J 39440 Extension Housing Seal Installer
 37237	J 41099 Gear Select/Reverse Lockout Solenoid Socket
 95523	J 42055 Transmission Support Fixture