

2008 Chevrolet Silverado 1500

2008 TRANSMISSION Clutch - Cab & Chassis Sierra, Cab & Chassis Silverado, Sierra & Silverado

2008 TRANSMISSION

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SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Clutch Actuator Cylinder Bolt	8 N.m	71 lb in
Clutch Pedal to Brake Module Bolt	50 N.m	37 lb ft
Clutch Pedal to Clutch Pedal Bracket Bolt	36 N.m	27 lb ft
Clutch Pressure Plate Bolt	70 N.m	52 lb ft

SEALERS, ADHESIVES, AND LUBRICANTS

Application	Type of Material	GM Part Number	
		United States	Canada
Clutch Hydraulic System	Hydraulic Fluid	12345347	10953517

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - CLUTCH

Reviewing the **Clutch System Description and Operation** helps you determine the correct clutch symptom diagnostic procedure when a condition exists. Reviewing the **[Clutch System Description and Operation](#)** also helps you determine if the condition described by the customer is normal operation. Refer to **Symptoms - Clutch** in order to identify the correct procedure for diagnosing the system and where the procedure is located.

SYMPTOMS - CLUTCH

Strategy Based Diagnostics

Review the clutch system operations in order to familiarize yourself with the system functions. Refer to **Clutch System Description and Operation**.

Visual/Physical Inspection

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- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Inspect the clutch master cylinder for the correct fluid level.
- Inspect the hydraulic clutch lines for dents, kinks, or other obvious damage that may affect the clutch system operations.
- Inspect the clutch system for contamination of dirt, oil, or other substances that may affect the clutch system operations.
- Inspect for aftermarket components and power take-off (PTO) set-ups.

Intermittent

Test the vehicle under the same conditions that the customer reported in order to verify the system is operating properly.

Symptom List

IMPORTANT: Due to the variety of clutch options there may be components in the mechanical diagnostic tables that are not on a particular vehicle.

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

- Clutch Drag Hard Shifting
- Clutch Slipping
- Clutch Grabbing
- Clutch Rattle
- Clutch Noisy
- Clutch Pedal Spongy Low Pedal Effort
- Clutch Pedal Hard to Push
- Clutch Vibration

CLUTCH DRAG HARD SHIFTING

Cause	Action
DEFINITION: The clutch does not disengage completely to allow smooth shift operations. It may cause gear clashing while the vehicle is not moving, at idle, and shifting out of neutral, or hard shifting in and out of gears while driving the vehicle.	

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Review the **Symptoms - Clutch** and perform the necessary inspections.

Pedal blocked from full travel	1. Inspect for obstacles that prevent the pedal from going to the floor. 2. Clear any obstacles from under the pedal area, such as floor mats, damaged floor, or interior panels.
Too much travel between pedal and clutch master cylinder	1. Inspect the pedal for worn bushings. 2. Replace the pedal bushings if worn. Refer to <u>Clutch Pedal Replacement</u>.
Clutch pedal mounting loose	1. Inspect the clutch pedal mounting bracket for loose or missing fasteners. 2. Replace or repair the fasteners. Refer to <u>Clutch Pedal Replacement</u>.
Linkage at pedal worn or damaged	1. Inspect the linkage at the pedal for excessive wear. 2. Repair or replace the linkage as required. Refer to <u>Clutch Pedal Replacement</u>.
Clutch master cylinder seized or binding	1. Inspect the master cylinder for the piston being able to move freely and full range of travel. 2. Replace the clutch master cylinder as required. Refer to <u>Clutch Master Cylinder Replacement</u>.
Air in the clutch hydraulic system	Bleed the clutch hydraulic system. Refer to <u>Hydraulic Clutch Bleeding</u> .
Clutch actuator cylinder seized or binding	1. Inspect the clutch actuator piston for moving freely. 2. Replace the clutch actuator cylinder if the piston is binding. Refer to <u>Clutch Actuator Cylinder Replacement (TZ0)</u> or <u>Clutch Actuator Cylinder Replacement (M96)</u>.
Clutch master cylinder leaking internally	1. Inspect for proper pedal reserve. Refer to <u>Clutch System Description and</u>

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	<u>Operation.</u> 1. Let up halfway on pedal. 2. Apply the pedal a few times and hold down for 30 seconds. 3. Inspect to ensure there is still the proper pedal reserve, without letting pedal fully up. 2. Replace the clutch master cylinder if it will not hold pedal reserve. Refer to <u>Clutch Master Cylinder Replacement.</u>
Damaged clutch assembly components	1. Remove the clutch assembly. 2. Inspect the following clutch assembly components for damage: • Damaged clutch disc hub splines • Bent clutch disc • Bent drive straps • Broken or warped pressure plate 3. Replace the clutch assembly if any of the above damage is found. Refer to <u>Clutch Assembly Replacement.</u>
Excessive side loading on the release bearing	1. Inspect the following clutch system components: • Worn or damaged pilot bearing • Excessive flywheel runout • Excessive engine to transmission misalignment • Clutch actuator cylinder mounting surface out of alignment 2. Repair or replace any faulty components.
Faulty pilot bearing	Replace the pilot bearing. Refer to <u>Clutch Pilot Bearing Replacement.</u>
Transmission input shaft splines worn or damaged	Replace the transmission input shaft. Refer to <u>Transmission Disassemble</u> for the Tremec

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	5-Speed (M96) or <u>Transmission Disassemble</u> for the Tremec 5-Speed (TZO).
Tight or contaminated clutch disc splines	1. Clean the clutch disc and input shaft splines. 2. If the clutch disc will not clean, replace the clutch assembly. Refer to <u>Clutch Assembly Replacement</u>.
Flywheel housing, engine block to clutch housing, or transmission front case excessively misaligned	1. Inspect the clutch housing or the transmission front case for being faulty. 2. Replace the clutch housing if it is faulty. Refer to <u>Transmission Replacement</u> for the Tremec 5-Speed (M96) or <u>Transmission Replacement</u> for the Tremec 5-Speed (TZO). 3. Replace the transmission front case half. Refer to <u>Transmission Disassemble</u> for the Tremec 5-Speed (M96) or <u>Transmission Disassemble</u> for the Tremec 5-Speed (TZO).
Grease or oil contamination on the clutch discs facing	1. Repair the oil leak. 2. Repair the grease leak. 3. Clean the clutch disc facing and the other clutch assembly components. 4. Replace the clutch assembly if it will not clean. Refer to <u>Clutch Assembly Replacement</u>.

CLUTCH SLIPPING

Cause	Action
DEFINITION: The clutch does not engage completely after the pedal is released, after shifting gears, or the clutch slips during maximum engine loads, such as climbing hills or high vehicle speeds. Clutch slipping is identified by increase in engine RPM without increase in vehicle speed. Review the <u>Symptoms - Clutch</u> and perform the necessary inspections.	
Incorrect clutch pedal height, not allowing the clutch master cylinder to return	Faulty clutch start switch. Refer to <u>Clutch Pedal Engine Start Switch Replacement</u> .

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The clutch pedal return spring is broken or missing	Replace the clutch pedal return spring, if equipped. Refer to <u>Clutch Pedal Replacement</u> .
The clutch pedal is binding or sticking	1. Clear away any items that may be contacting the pedal. 2. Inspect the pedal bushings for ease of movement. 3. Replace the clutch pedal if it is faulty. Refer to <u>Clutch Pedal Replacement</u>.
Clutch master cylinder binding or seized	Replace the clutch master cylinder. Refer to <u>Clutch Master Cylinder Replacement</u> .
Clutch actuator cylinder binding or seized	Replace the clutch actuator cylinder. Refer to <u>Clutch Actuator Cylinder Replacement (TZ0)</u> or <u>Clutch Actuator Cylinder Replacement (M96)</u> .
Kinked or damaged clutch hydraulic hose	1. Inspect for the correct routing of the clutch hydraulic hose. 2. Route the hose properly. 3. Inspect for loose or faulty engine mounts that may allow the hydraulic hose to be kinked or pinched. 4. Repair or replace faulty engine mounts. Refer to <u>Engine Mount Replacement - Left Side</u> and <u>Engine Mount Replacement - Right Side</u> for the 4.3L engine or <u>Engine Mount Replacement - Left Side (1500 LY2)</u> or <u>Engine Mount Replacement - Left Side (1500 LH6, LMG, LY5, L76 and L92)</u> or <u>Engine Mount Replacement - Left Side (2500LY6)</u> and <u>Engine Mount Replacement - Right Side (1500 LH6, LMG, LY5, L76 and L92)</u> or <u>Engine Mount Replacement - Right Side (1500 LY2)</u> or <u>Engine Mount Replacement - Right Side (2500 LY6)</u> for the 6.0L engine.

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	5. Repair or replace the clutch hydraulic hose if it is damaged. Refer to <u>Clutch Master Cylinder Replacement</u> .
Grease or oil contamination of the clutch disc	1. Repair the source of the oil leak. 2. Repair the source of the grease leak. 3. Clean the contamination from the clutch components. 4. If contaminants cannot be removed, replace the clutch assembly. Refer to <u>Clutch Assembly Replacement</u>.
Worn or damaged flywheel	Replace the engine flywheel. Refer to <u>Engine Flywheel Replacement</u> for the 4.3L engine or <u>Automatic Transmission Flex Plate Replacement</u> for the 6.0L engine.
Worn clutch disc facing	Replace the clutch assembly. Refer to <u>Clutch Assembly Replacement</u> .
Clutch discs splines worn	Replace the clutch assembly. Refer to <u>Clutch Assembly Replacement</u> .
Low pedal from self-adjusted clutch adjusted forward	Replace the clutch assembly. Refer to <u>Clutch Assembly Replacement</u> .
Burnt or glazed clutch discs	Replace the clutch assembly. Refer to <u>Clutch Assembly Replacement</u> .
Input shaft splines worn	Replace the input shaft. Refer to <u>Transmission Disassemble</u> for the Tremec 5-Speed (M96) or <u>Transmission Disassemble</u> for the Tremec 5-Speed (TZO).
Improper resurfacing of the flywheel	Replace the flywheel if it has been improperly resurfaced, allowing contact of the clutch disc hub or insufficient clamping load of the pressure plate. Refer to <u>Engine Flywheel Replacement</u> for the 4.3L engine or <u>Automatic Transmission Flex Plate Replacement</u> for the 6.0L engine.

CLUTCH GRABBING

Cause	Action
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DEFINITION: The clutch grabs, or chatters, or the clutch is unable to release without the vehicle jerking. An abrupt engagement of the clutch.

Review the **Symptoms - Clutch** and perform the necessary inspections.

Grease or oil contamination on the clutch facings	1. Repair the cause of the oil leak or grease contamination. 2. Clean the clutch facings. 3. Replace the clutch components if they will not clean. Refer to <u>Clutch Assembly Replacement</u>.
Loose or faulty engine mounts	1. Inspect the engine mounts for being loose or faulty. Refer to <u>Engine Mount Inspection</u> for the 4.3L engine or <u>Engine Mount Inspection</u> for the 6.0L engine. 2. Repair or replace the engine mounts as required. Refer to <u>Engine Mount Replacement - Left Side</u> and <u>Engine Mount Replacement - Right Side</u> for the 4.3L engine or <u>Engine Mount Replacement - Left Side (1500 LY2)</u> or <u>Engine Mount Replacement - Left Side (1500 LH6, LMG, LY5, L76 and L92)</u> or <u>Engine Mount Replacement - Left Side (2500LY6)</u> and <u>Engine Mount Replacement - Right Side (1500 LH6, LMG, LY5, L76 and L92)</u> or <u>Engine Mount Replacement - Right Side (1500 LY2)</u> or <u>Engine Mount Replacement - Right Side (2500 LY6)</u> for the 6.0L engine.
Clutch pedal sticking	1. Inspect the clutch pedal for correct operation. 2. Replace the clutch pedal if it is faulty. Refer to <u>Clutch Pedal Replacement</u>.
Clutch actuator binding	1. Inspect the clutch actuator for the piston seals binding or sticking in the seal bore. 2. Replace the clutch actuator if it is

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	binding. Refer to <u>Clutch Actuator Cylinder Replacement (TZ0)</u> or <u>Clutch Actuator Cylinder Replacement (M96)</u> .
Clutch master cylinder binding	1. Inspect the clutch master cylinder for the piston binding or sticking in the cylinder. 2. Replace the master cylinder if it is faulty. Refer to <u>Clutch Master Cylinder Replacement</u>.
Improper clutch installation	1. Inspect the pressure plate for distortion caused by improperly tightening the pressure plate bolts. 2. Inspect the clutch disc for a bent hub caused by forcing the installation of the transmission. 3. Inspect for the correct clutch disc. 4. Inspect the clutch disc for being installed backwards. 5. Replace the clutch assembly if it is damaged or the wrong components were installed. Refer to <u>Clutch Assembly Replacement</u>.
Clutch disc binding on the input shaft	1. Inspect the input shaft for rust dirt or debris. 2. Clean the input shaft. 3. Inspect the clutch disc for a bent hub. 4. Replace the clutch assembly if the clutch disc is faulty. Refer to <u>Clutch Assembly Replacement</u>. 5. Inspect the input shaft for excessive wear on the splines, causing the clutch disc to bind. 6. Replace the transmission input shaft if it is worn. Refer to <u>Transmission Disassemble</u> for the Tremec 5-Speed

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	(M96) or <u>Transmission Disassemble</u> for the Tremec 5-Speed (TZO).
Clutch pressure plate damaged	1. Inspect the pressure plate for bent drive straps caused by improper vehicle use. 2. Replace the clutch assembly if the clutch pressure plate is damaged. Inform the customer. Refer to <u>Clutch Assembly Replacement</u>.
Flywheel improperly machined	1. Inspect the flywheel for being machined, and causing interference with the clutch disc. 2. Replace the flywheel if it has been machined. Refer to <u>Engine Flywheel Replacement</u> for the 4.3L engine or <u>Automatic Transmission Flex Plate Replacement</u> for the 6.0L engine.
Flywheel uneven	1. Inspect the flywheel surface for being warped or uneven. 2. Replace the flywheel if it is faulty. Refer to <u>Engine Flywheel Replacement</u> for the 4.3L engine or <u>Automatic Transmission Flex Plate Replacement</u> for the 6.0L engine.

CLUTCH RATTLE

Cause	Action
DEFINITION: A rattle noise coming from the clutch components with the clutch disengaged or engaged. Review the <u>Symptoms - Clutch</u> and perform the necessary inspections.	
Idle rattle clutch engaged	Replace the clutch disc, due to faulty dampener springs. Refer to <u>Clutch Assembly Replacement</u> .
Clutch is improperly installed	Remove the clutch and install it correctly. Refer to <u>Clutch Assembly Replacement</u> .
Clutch disc dampener worn or damaged	1. Inspect the clutch disc for a broken or worn dampener.

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	2. Replace the clutch assembly. Refer to <u>Clutch Assembly Replacement</u> .
Clutch disc splines and input shaft splines worn	1. Inspect the clutch disc hub to input shaft splines for excessive clearance. 2. Replace the clutch assembly if the clutch splines are worn. Refer to <u>Clutch Assembly Replacement</u>. 3. Replace the input shaft. Refer to <u>Transmission Disassemble</u> for the Tremec 5-Speed (M96) or <u>Transmission Disassemble</u> for the Tremec 5-Speed (TZO).

CLUTCH NOISY

Cause	Action
DEFINITION: A growl or whine noise is coming from the clutch when engaged or disengaged. Review the <u>Symptoms - Clutch</u> and perform the necessary inspections.	
Pilot bearing is worn or damaged	Replace the pilot bearing. Refer to <u>Clutch Pilot Bearing Replacement</u> .
Release bearing damaged or worn	Replace the release bearing. Refer to <u>Clutch Actuator Cylinder Replacement (TZ0)</u> or <u>Clutch Actuator Cylinder Replacement (M96)</u> .

CLUTCH PEDAL SPONGY LOW PEDAL EFFORT

Cause	Action
DEFINITION: The clutch pedal may feel spongy, or it requires very little effort to operate. Review <u>Symptoms - Clutch</u> and perform the necessary inspections.	
Air in the hydraulic system	Bleed the clutch hydraulic system. Refer to <u>Hydraulic Clutch Bleeding</u> .
Master cylinder fluid level low	1. Inspect for leakage in the clutch master cylinder, hose connections, and the clutch actuator. 2. Repair or replace any faulty

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	components.
Incomplete pedal return	1. Inspect the pedal for full return. 2. Clear any obstacles that may interfere with the pedal operation. 3. Replace the clutch pedal return spring, if equipped. Refer to <u>Clutch Pedal Replacement</u>. 4. Faulty clutch start switch. Refer to <u>Clutch Pedal Engine Start Switch Replacement</u>.
Clutch incorrectly installed	Remove the clutch and install it correctly. Refer to <u>Clutch Assembly Replacement</u> .
Clutch mounting bolts loose or broken	1. Remove the broken bolts. 2. Replace the broken or loose bolts and tighten. Refer to <u>Clutch Assembly Replacement</u>.
Release bearing worn or damaged	Replace the release bearing. Refer to <u>Clutch Actuator Cylinder Replacement (TZ0)</u> or <u>Clutch Actuator Cylinder Replacement (M96)</u> .
Contaminated hydraulic fluid	1. Inspect the clutch hydraulic fluid for contamination of water. If available, use a brake fluid boiling point tester. Boiling point should be above 177°C (350°F). 2. Inspect the reservoir cap for being faulty if water is present. 3. Inspect the clutch hydraulic fluid for dirt or debris. 4. Flush and bleed the clutch hydraulic system if the above conditions are found. Refer to <u>Hydraulic Clutch Bleeding</u>. 5. If mineral oil was added, replace the clutch master cylinder and clutch actuator cylinder due to seal damage.

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Refer to **Clutch Master Cylinder Replacement** and **Clutch Actuator Cylinder Replacement (TZ0)** or **Clutch Actuator Cylinder Replacement (M96)**.

CLUTCH PEDAL HARD TO PUSH

Cause	Action
DEFINITION: The clutch pedal requires high effort to operate. Review the <u>Symptoms - Clutch</u> and perform the necessary inspections.	
Incorrect hydraulic fluid	1. Inspect for the correct fluid in the master cylinder. Refer to <u>Hydraulic Clutch Bleeding</u>. 2. Replace the clutch master cylinder and clutch actuator cylinder. Refer to <u>Clutch Master Cylinder Replacement</u> and <u>Clutch Actuator Cylinder Replacement (TZ0)</u> or <u>Clutch Actuator Cylinder Replacement (M96)</u>. 3. Flush the hydraulic system and fill with the correct fluid.
Contaminated hydraulic fluid	1. Inspect the hydraulic fluid for water. 2. Inspect the hydraulic fluid for dirt or debris. 3. Flush the hydraulic system and fill with the correct fluid. Refer to <u>Hydraulic Clutch Bleeding</u>.
Clutch pedal binding	1. Inspect the pedal for binding. 2. Repair or replace the pedal. Refer to <u>Clutch Pedal Replacement</u>.
Kinked or damaged clutch hydraulic pipe	1. Inspect for a kinked or damaged hydraulic hose. 2. Repair or replace the clutch hydraulic hose. Refer to <u>Clutch Master Cylinder</u>

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	<u>Replacement.</u>
Clutch disc worn too thin	Replace the clutch assembly. Refer to <u>Clutch Assembly Replacement.</u>

CLUTCH VIBRATION

Cause	Action
DEFINITION: Vibration from the clutch components during disengagement or engagement. Review the <u>Symptoms - Clutch</u> and perform the necessary inspections.	
Excessive driveline torsional activity	Review the <u>Vibration Analysis - Driveline</u> .
Clutch incorrectly installed	Remove the clutch and install it correctly. Refer to <u>Clutch Assembly Replacement.</u>
Pilot bearing worn or damaged	1. Replace the pilot bearing. Refer to <u>Clutch Pilot Bearing Replacement.</u> 2. Inspect the input shaft pilot bearing journal for wear or damage. 3. Replace the input shaft if it is damaged or worn. Refer to <u>Transmission Disassemble</u> for the Tremec 5-Speed (M96) or <u>Transmission Disassemble</u> for the Tremec 5-Speed (TZO).
Transmission input shaft splines worn or damaged	1. Inspect the clutch disc to input splines for wear or damage. 2. Replace the input shaft if the splines are excessively worn. Refer to <u>Transmission Disassemble</u> for the Tremec 5-Speed (M96) or <u>Transmission Disassemble</u> for the Tremec 5-Speed (TZO).
Clutch disc facings damaged	Replace the clutch assembly. Refer to <u>Clutch Assembly Replacement.</u>
Flywheel housing to clutch housing excessively misaligned	Replace the faulty clutch housing or transmission front case. Refer to <u>Transmission Disassemble</u> for the Tremec 5-Speed (M96) or <u>Transmission Disassemble</u> for the Tremec 5-Speed (TZO).
Clutch out of balance	Replace the clutch assembly. Refer to <u>Clutch</u>

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Assembly Replacement.

REPAIR INSTRUCTIONS

CLUTCH PEDAL REPLACEMENT

Removal Procedure

1. Move the instrument panel to the service position. Refer to **Instrument Panel Service Positioning (Without SLT)** or **Instrument Panel Service Positioning (With SLT)** .

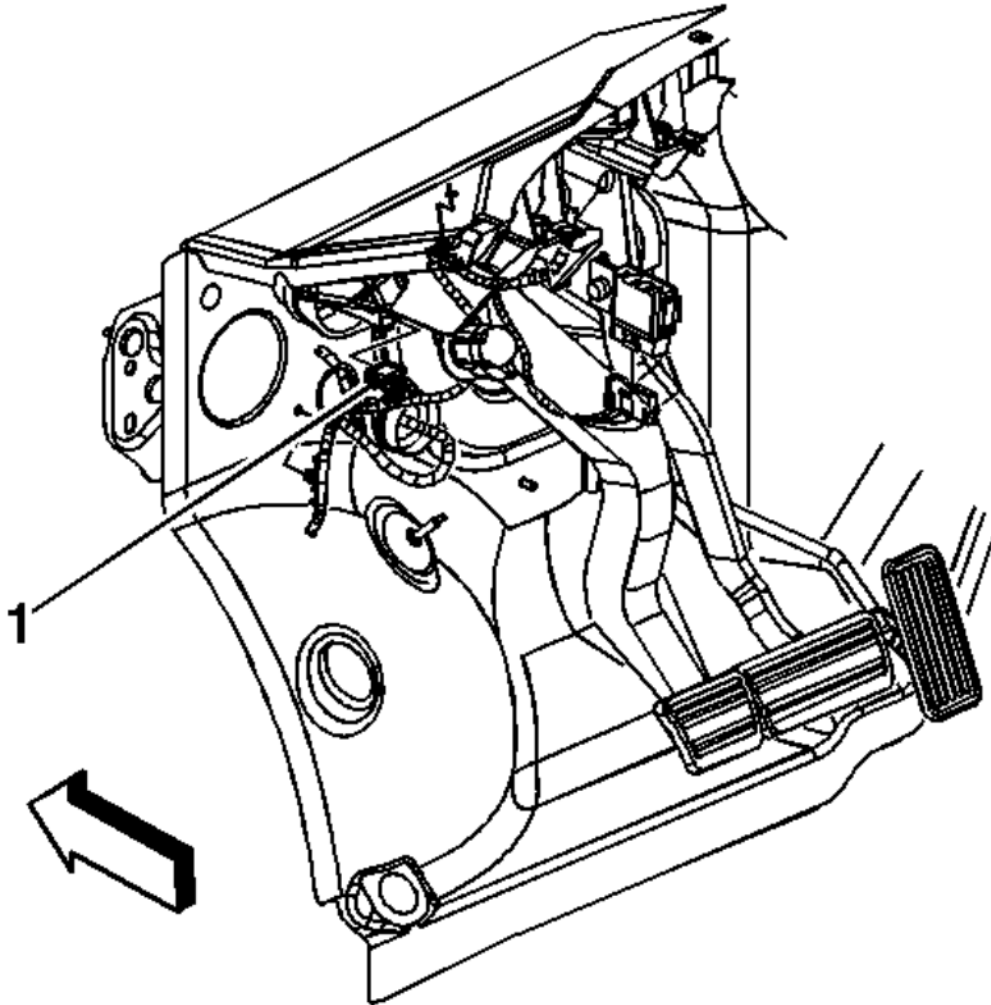


Fig. 1: Clutch Pedal Position Switch Electrical Connector
Courtesy of GENERAL MOTORS CORP.

2. Disconnect the clutch pedal engine start switch electrical connector (1).
3. Remove the clutch master cylinder. Refer to **Clutch Master Cylinder Replacement**.

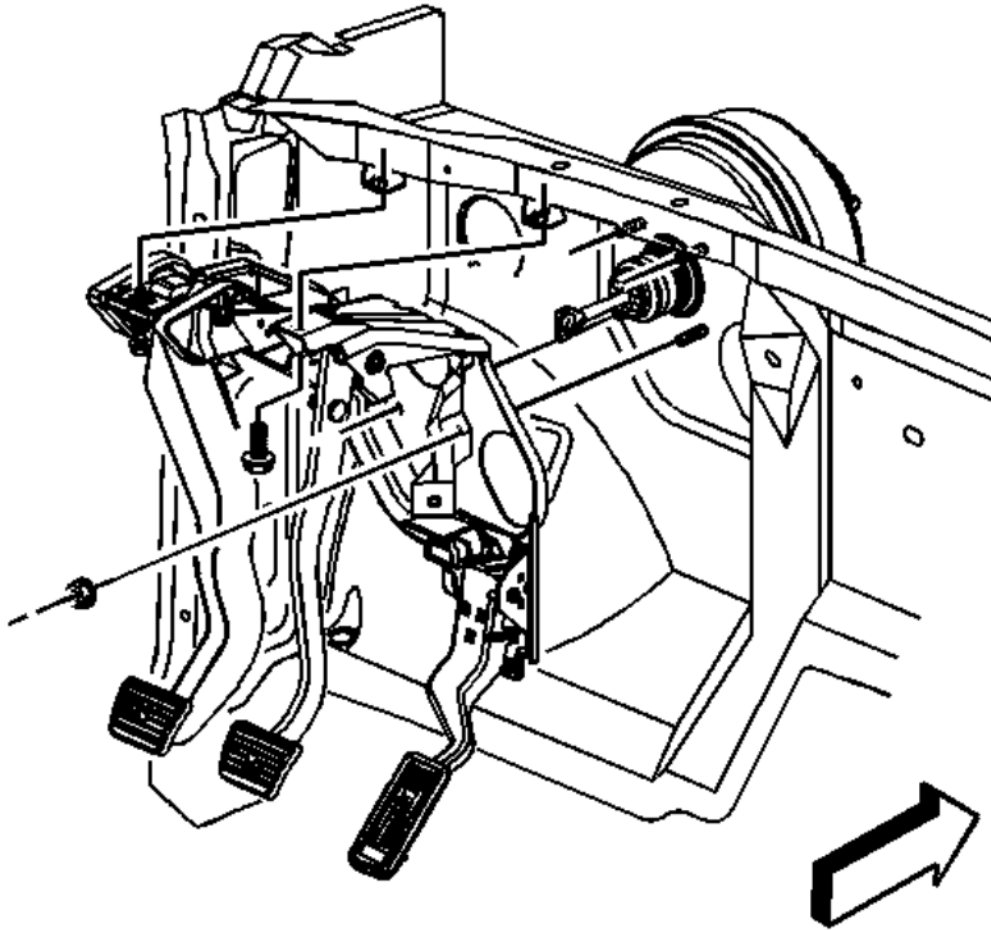


Fig. 2: Clutch Pedal Bracket Assembly
Courtesy of GENERAL MOTORS CORP.

4. Remove the clutch pedal to clutch pedal bracket bolt.

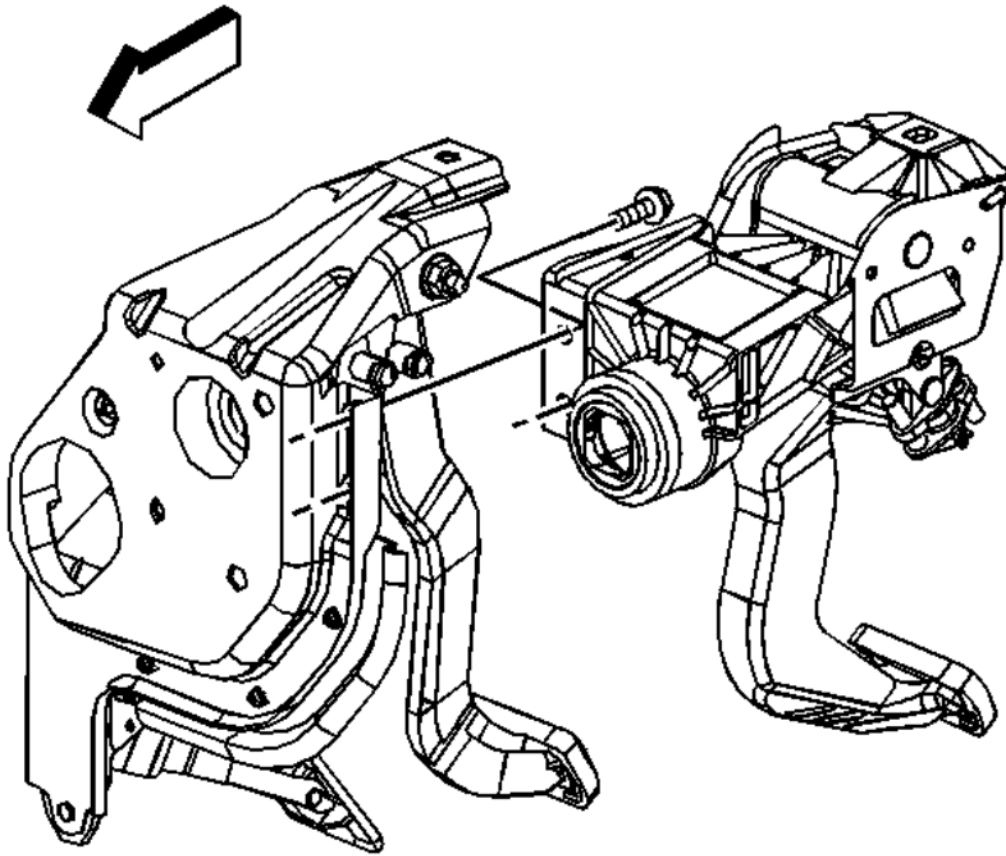


Fig. 3: Clutch Pedal And Brake Module Assembly
Courtesy of GENERAL MOTORS CORP.

5. Remove the clutch pedal to brake module bolts.
6. Remove the clutch pedal sub-assembly.

Installation Procedure

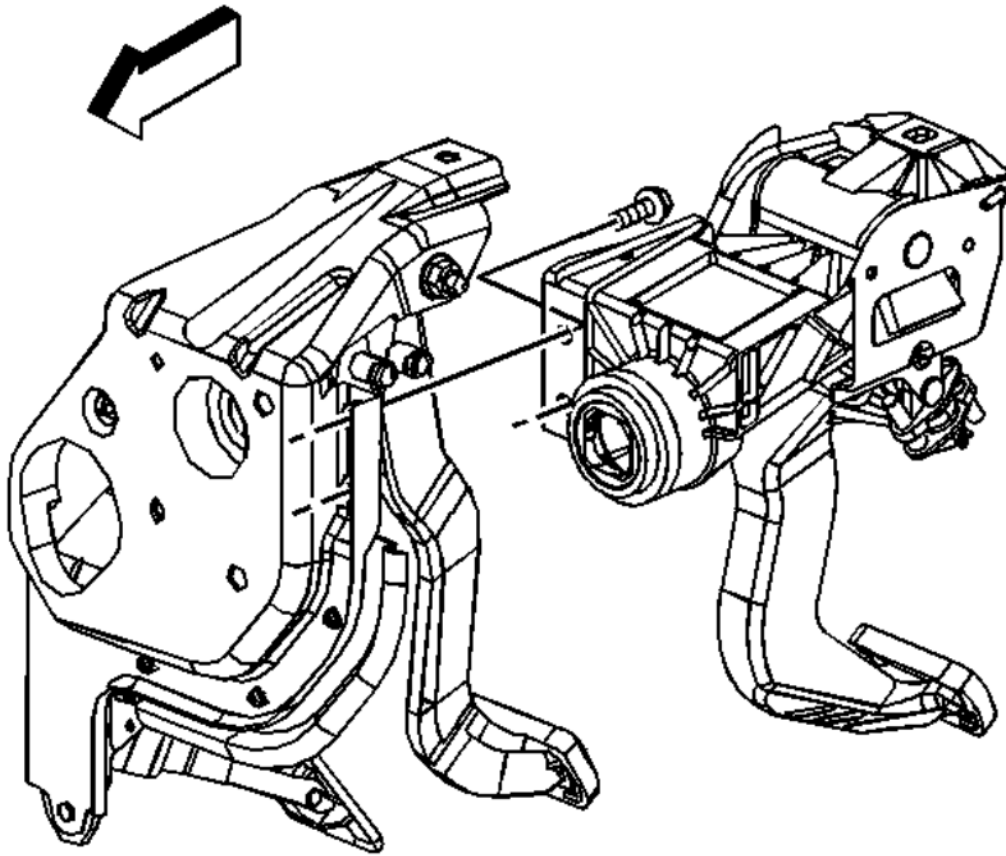


Fig. 4: Clutch Pedal And Brake Module Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the clutch pedal sub-assembly.

NOTE: Refer to Fastener Notice .

2. Install the clutch pedal to brake module bolts.

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

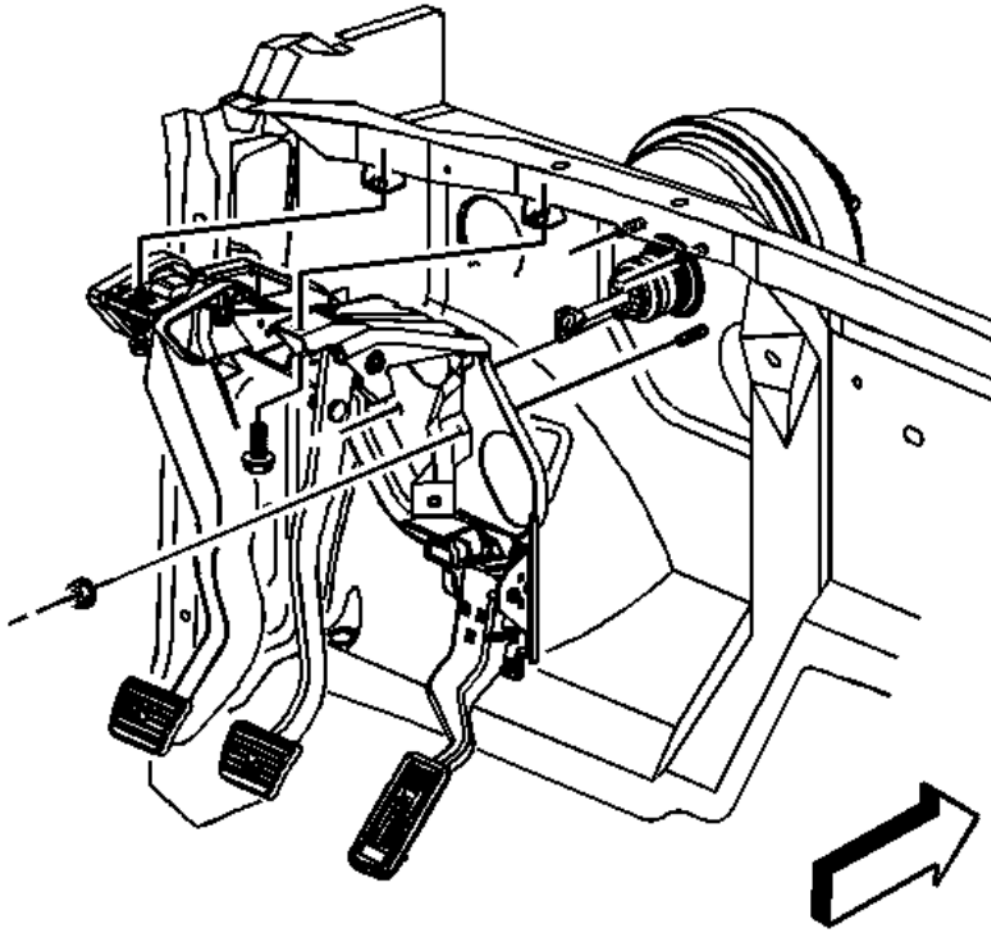


Fig. 5: Clutch Pedal Bracket Assembly
Courtesy of GENERAL MOTORS CORP.

3. Install the clutch pedal to clutch pedal bracket bolt.

Tighten: Tighten the bolt to 36 N.m (27 lb ft).

4. Remove the clutch master cylinder. Refer to **Clutch Master Cylinder Replacement**.

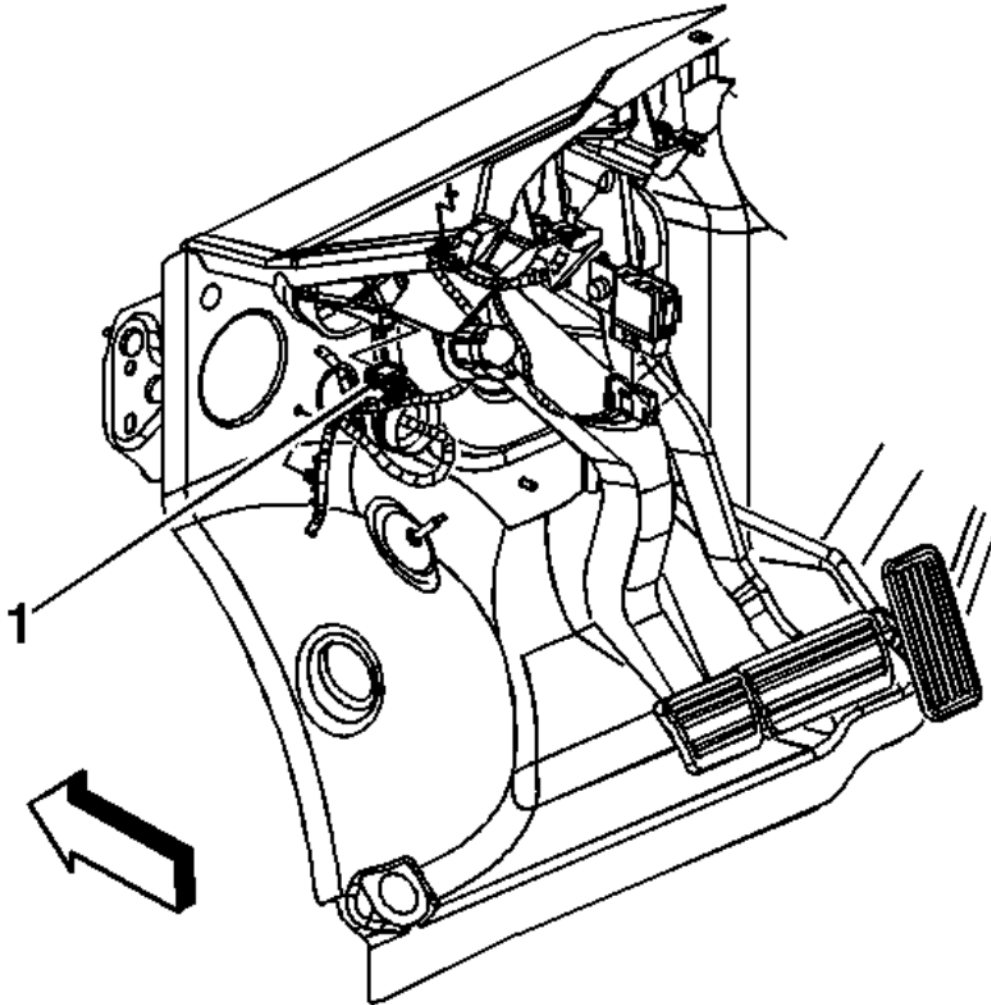


Fig. 6: Clutch Pedal Position Switch Electrical Connector
Courtesy of GENERAL MOTORS CORP.

5. Connect the clutch pedal engine start switch electrical connector (1).
6. Install the instrument panel. Refer to **Instrument Panel Service Positioning (Without SLT)** or **Instrument Panel Service Positioning (With SLT)** .

CLUTCH MASTER CYLINDER REPLACEMENT

Removal Procedure

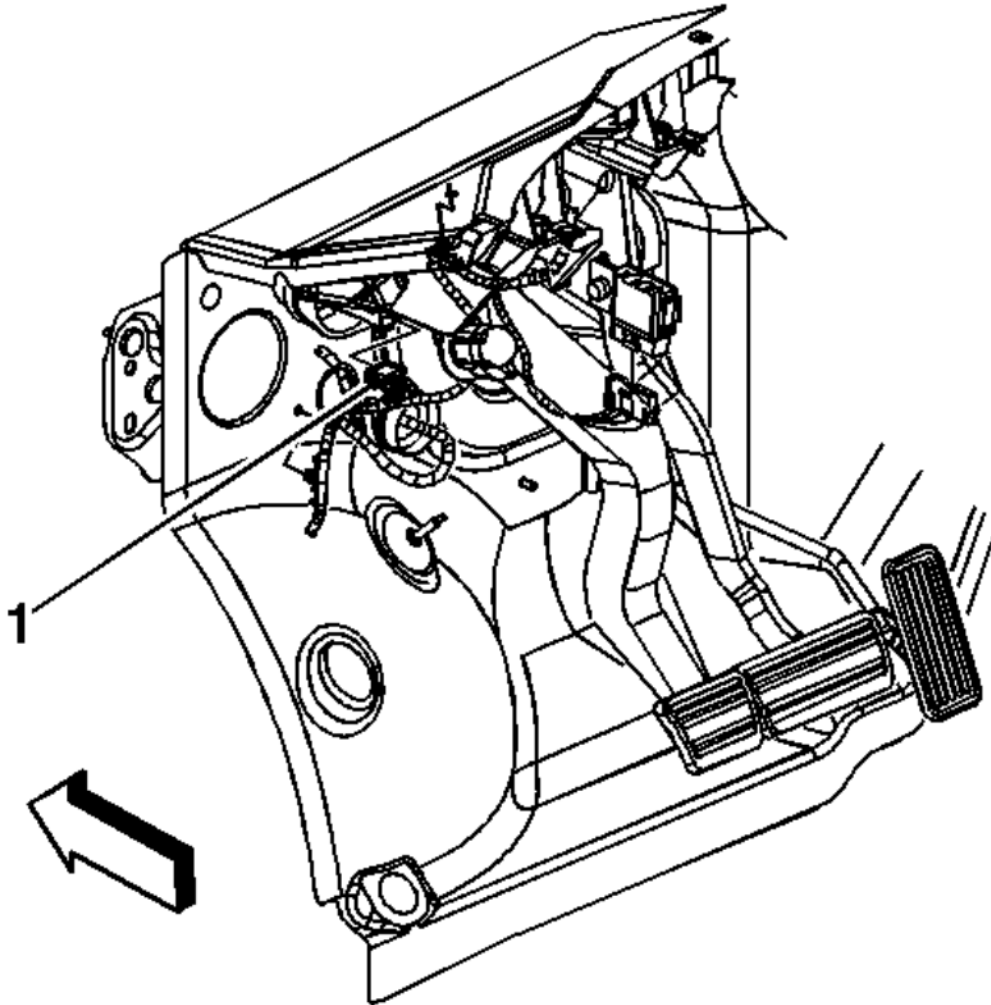


Fig. 7: Clutch Pedal Position Switch Electrical Connector
Courtesy of GENERAL MOTORS CORP.

1. Disconnect the clutch pedal position switch electrical connector (1).
2. Push the clutch pedal in and squeeze the pushrod bushing tabs in, in order to release the pushrod bushing from the clutch pedal.

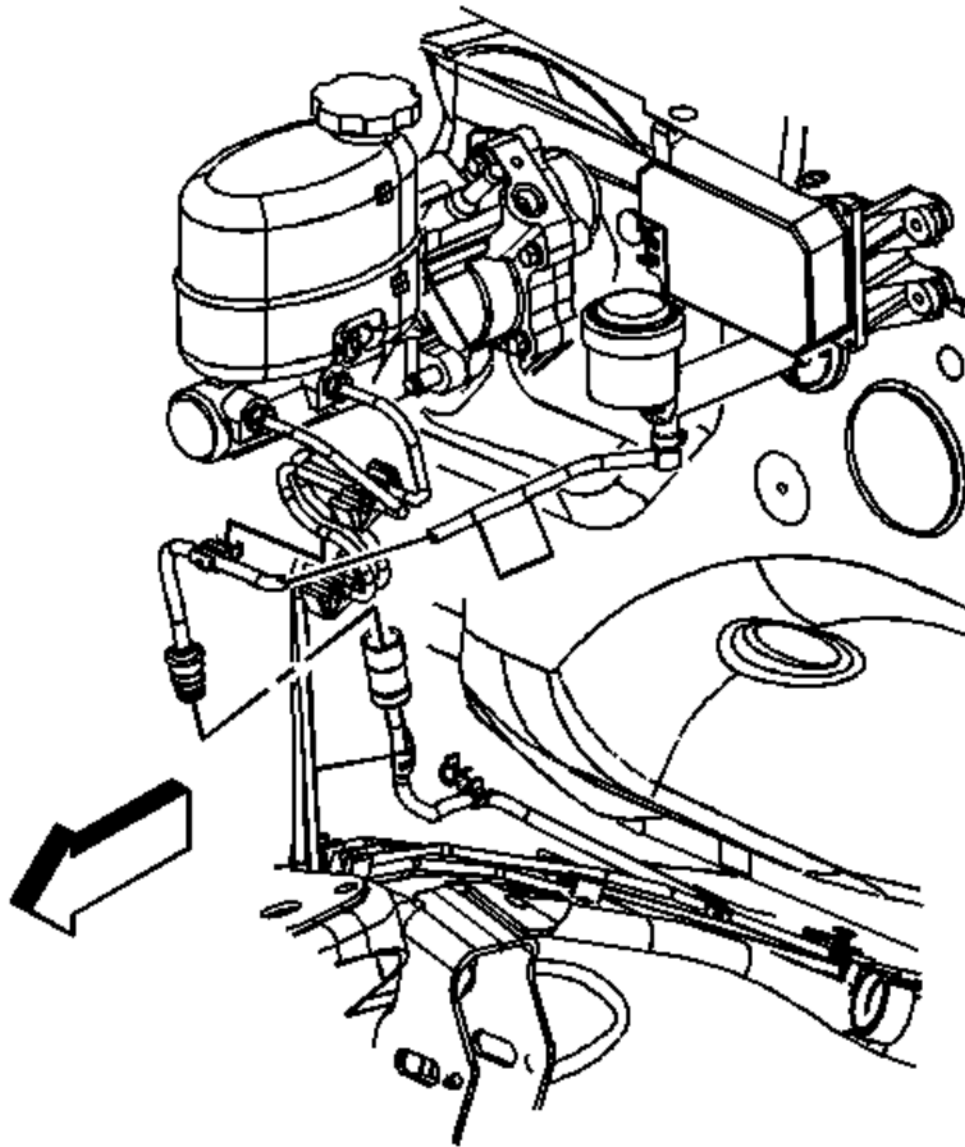


Fig. 8: Clutch Master Cylinder To Clutch Actuator Cylinder Quick Connect Fitting (NV 3500 or NV 4500 Transmission)

Courtesy of GENERAL MOTORS CORP.

3. Disconnect the clutch actuator cylinder to clutch master cylinder quick connect fitting.
4. Remove the clutch master cylinder clip from the brake pressure module valve pipe.

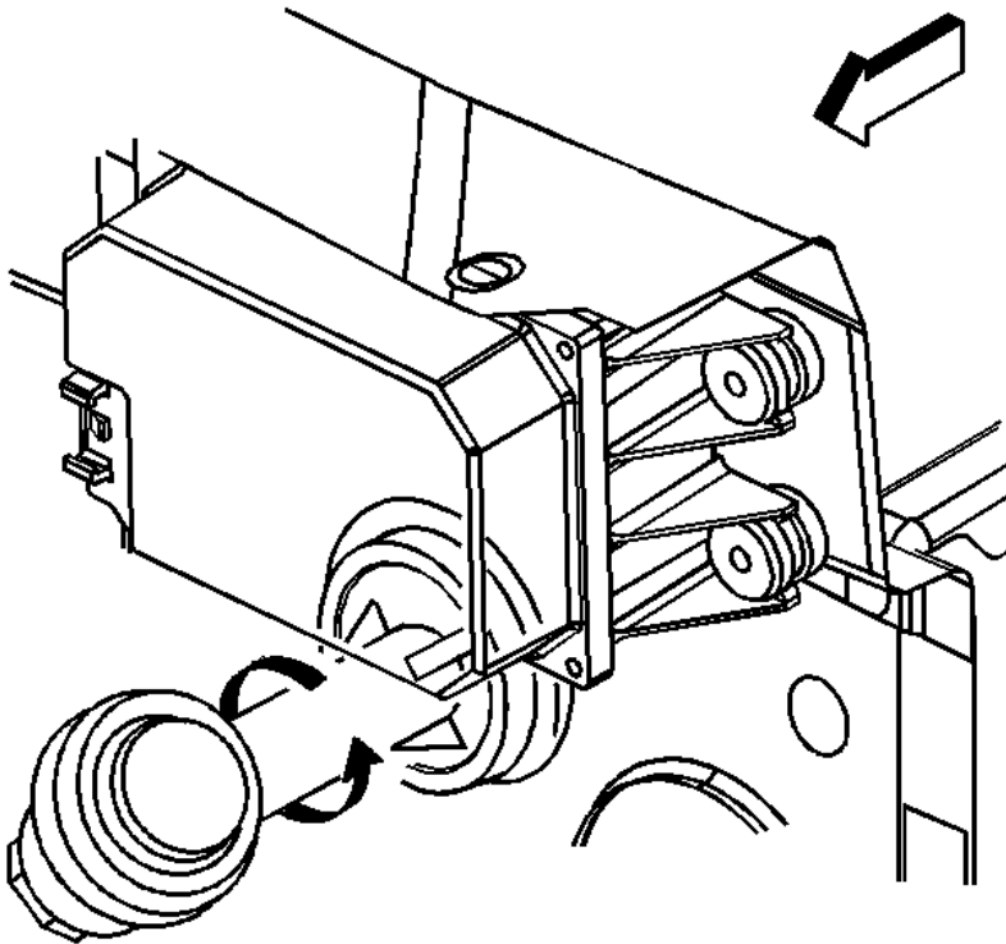


Fig. 9: Rotating Clutch Master Cylinder 45 Degrees
Courtesy of GENERAL MOTORS CORP.

5. Rotate the clutch master cylinder 45 degrees clockwise to the unlocked position.

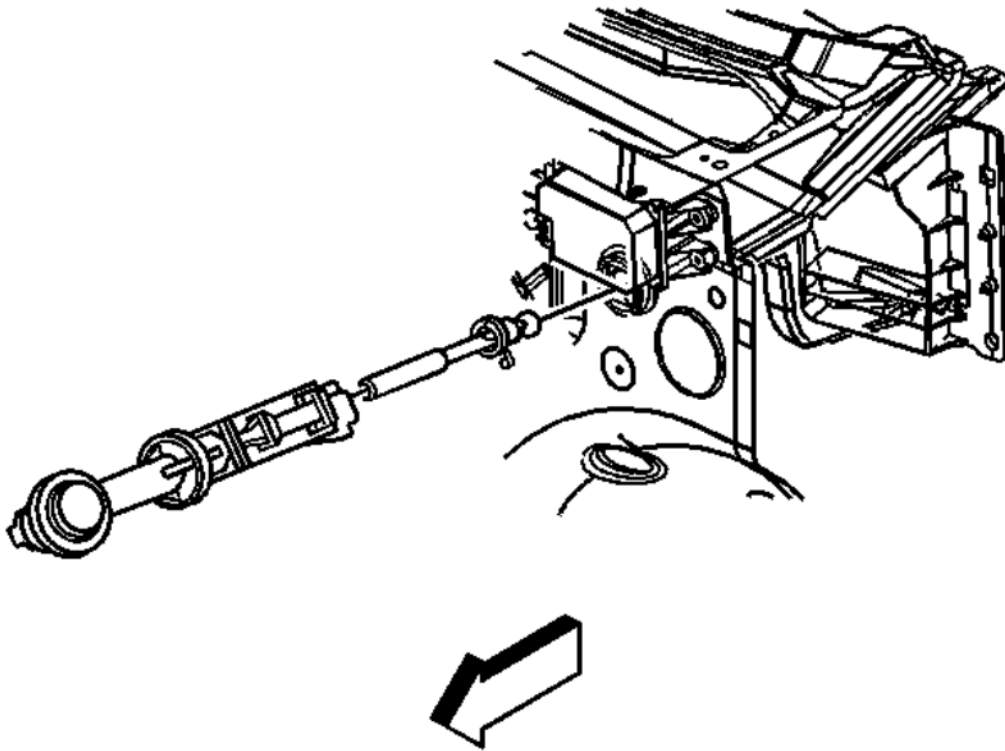


Fig. 10: Clutch Master Cylinder (NV 3500 or NV 4500 Transmission)
Courtesy of GENERAL MOTORS CORP.

6. Remove the clutch master cylinder.

Installation Procedure

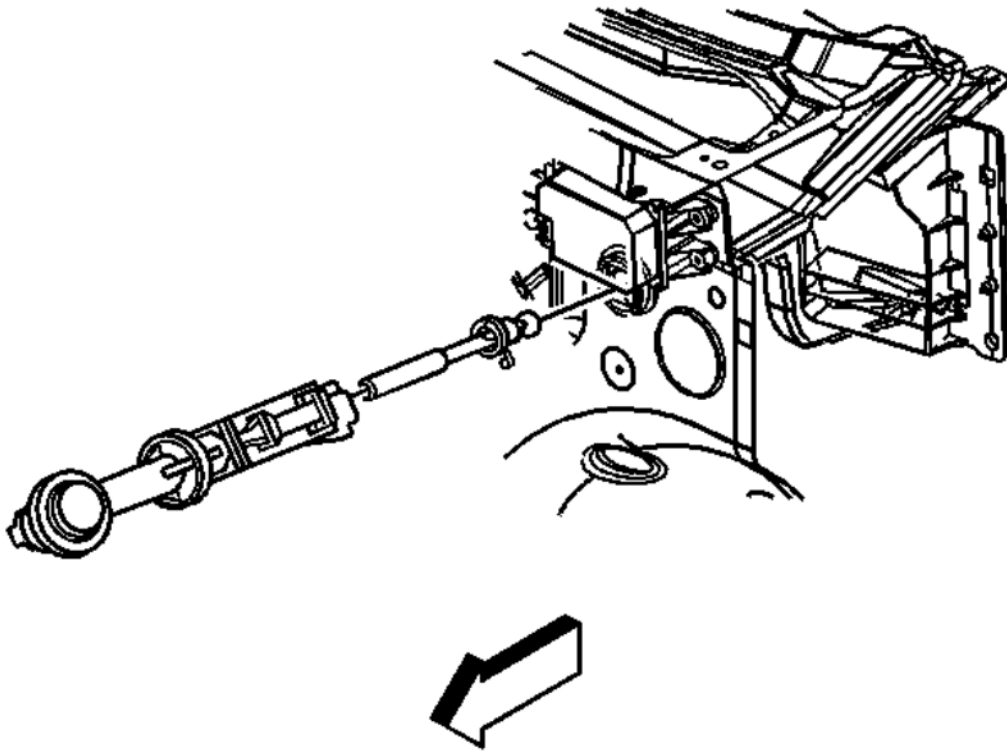


Fig. 11: Clutch Master Cylinder (NV 3500 or NV 4500 Transmission)
Courtesy of GENERAL MOTORS CORP.

1. Install the clutch master cylinder.

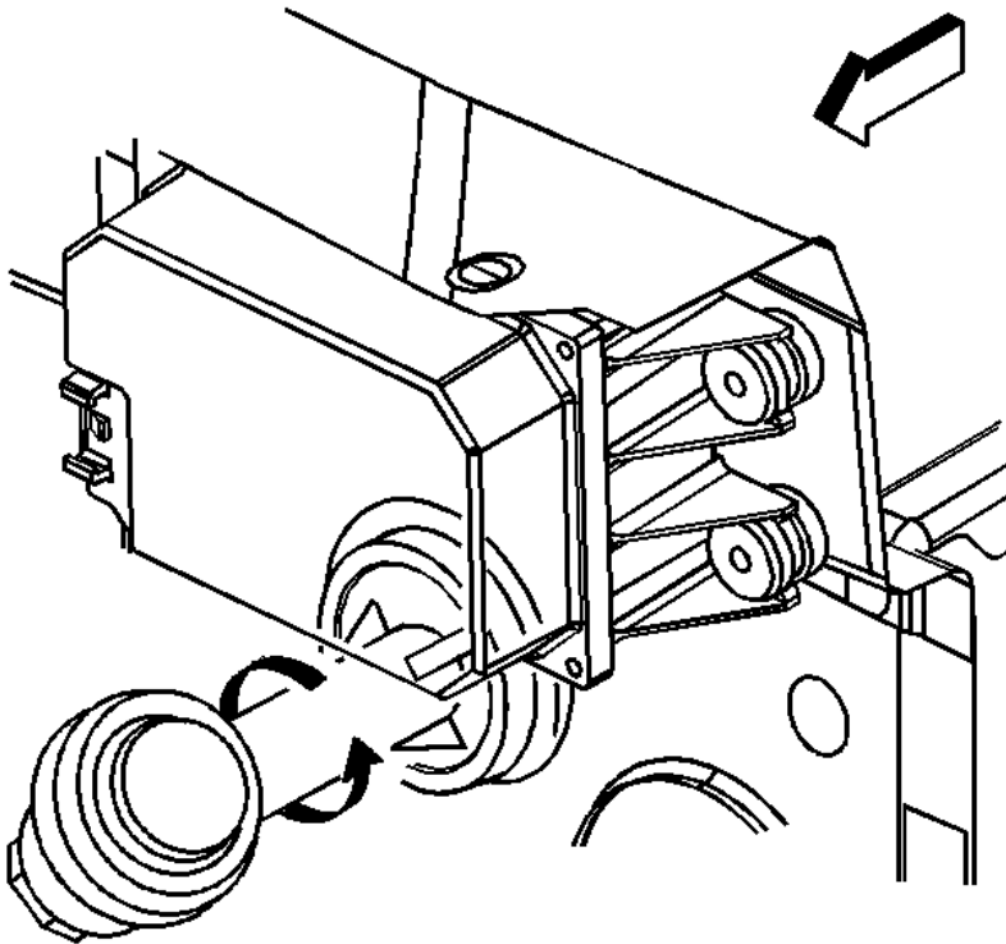


Fig. 12: Rotating Clutch Master Cylinder 45 Degrees
Courtesy of GENERAL MOTORS CORP.

2. Push in and rotate the clutch master cylinder 45 degrees counterclockwise to the locked position.

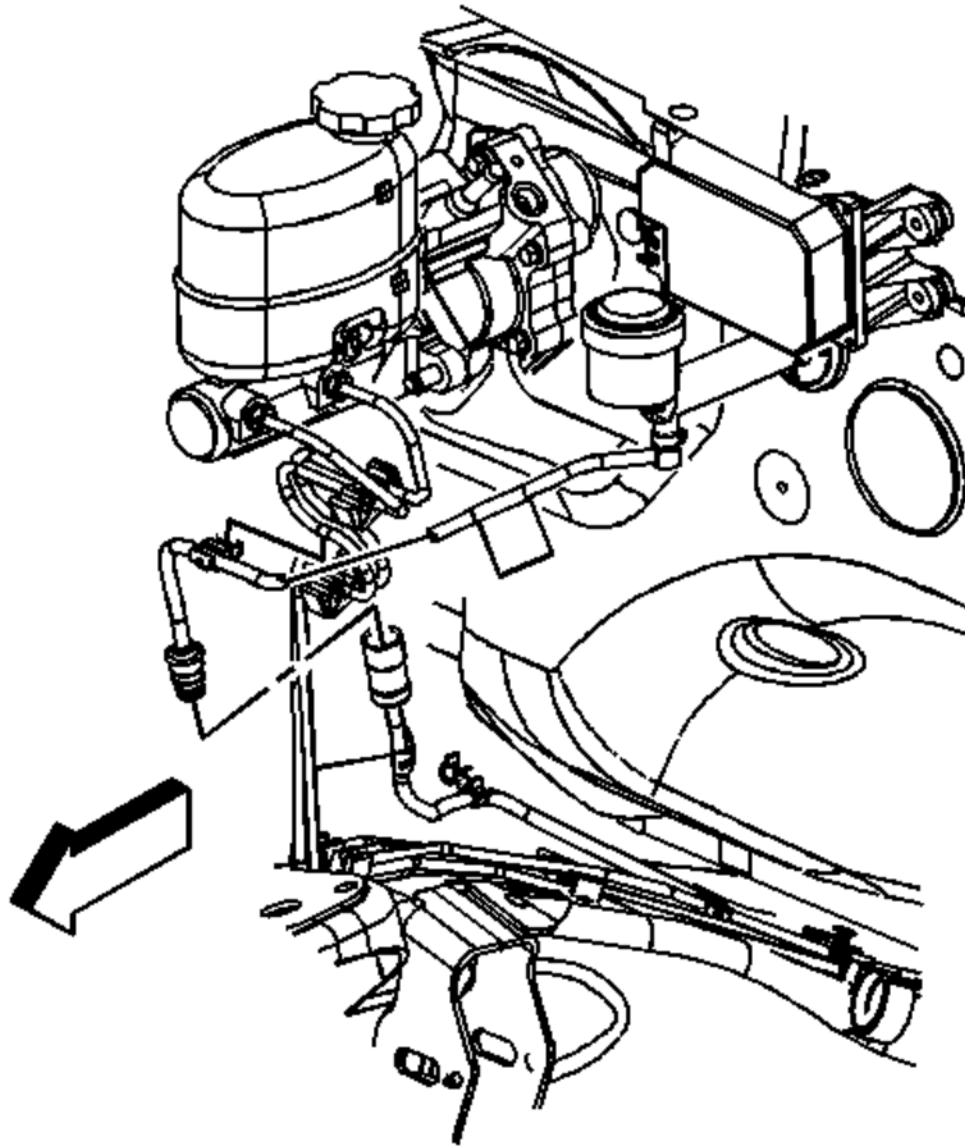


Fig. 13: Clutch Master Cylinder To Clutch Actuator Cylinder Quick Connect Fitting
(NV 3500 or NV 4500 Transmission)

Courtesy of GENERAL MOTORS CORP.

3. Disconnect the clutch actuator cylinder to clutch master cylinder quick connect fitting.
4. Install the clutch master cylinder clip to the brake pressure module valve pipe.

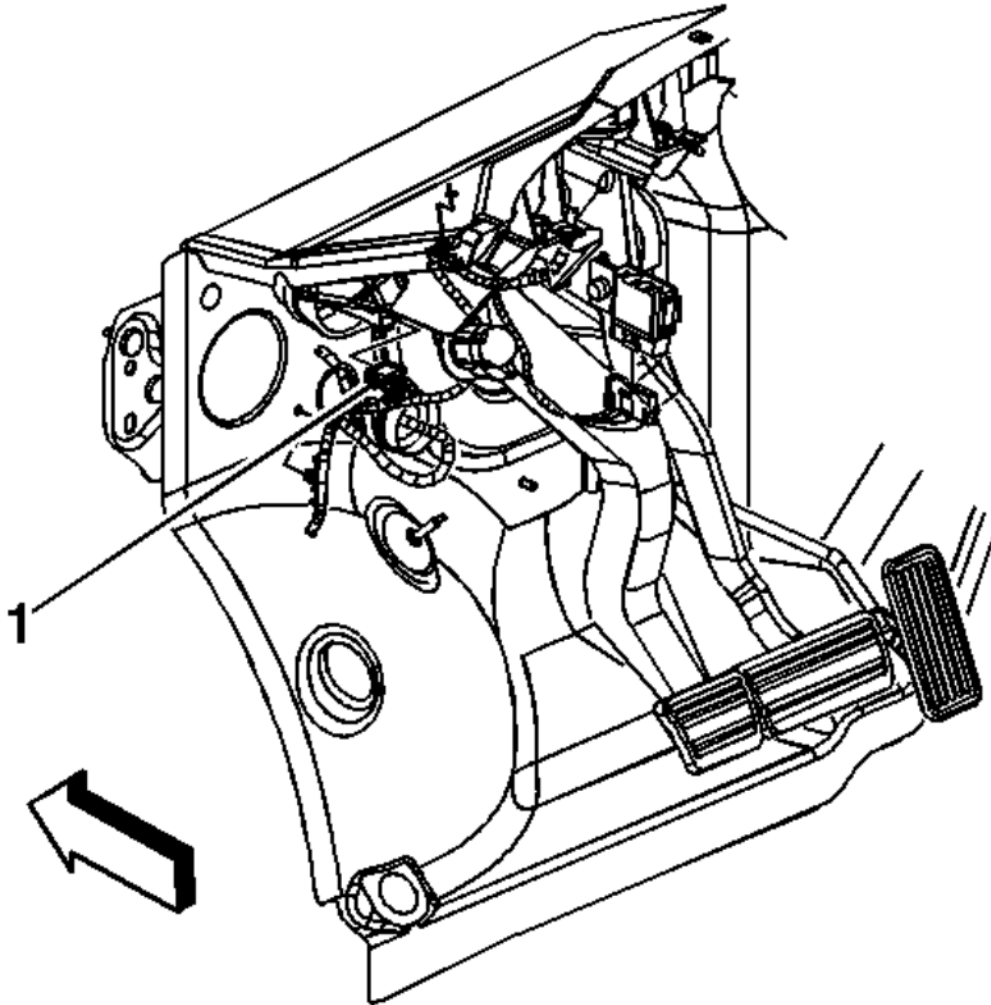


Fig. 14: Clutch Pedal Position Switch Electrical Connector
Courtesy of GENERAL MOTORS CORP.

5. Apply light pressure to the clutch pedal to couple the pushrod socket to the clutch pedal.
6. Connect the clutch pedal position switch electrical connector (1).
7. Pump the clutch pedal 3 time prior to starting the vehicle to ensure connection is complete.

HYDRAULIC CLUTCH BLEEDING

NOTE: **DO NOT use fluid which has been bled from a hydraulic clutch system, in order to fill the clutch master cylinder reservoir, due to the possibility that the fluid may be aerated, have too much moisture content, or be contaminated and may cause system or vehicle damage.**

1. Ensure the reservoir is filled to the fill line with new hydraulic clutch fluid. Add fluid if required. Use hydraulic clutch fluid GM P/N 12345347 (Canadian P/N 10953517).
2. Press the clutch pedal in completely to the floor panel.
3. Open the bleeder screw in order to purge the air from the system.
4. Close the bleeder and release the clutch pedal.

IMPORTANT: Ensure no air is drawn into the clutch system.

5. Repeat steps 2, 3, and 4 until all the air is out of the clutch system.
 1. Check and refill the reservoir as needed while bleeding.
 2. After bleeding, pump the clutch pedal several times. If clutch engagement is not satisfactory, repeat the bleed procedure.
6. If the previous procedures are unsuccessful, perform the following steps.
 1. Pump the clutch pedal very fast with full strokes for 30 seconds.
 2. Stop pumping and let the air escape into the reservoir while moving the rubber pad up and down 12 mm (0.5 in) for 30 seconds.
 3. Repeat this procedure, as necessary.

CLUTCH PEDAL ENGINE START SWITCH REPLACEMENT

Removal Procedure

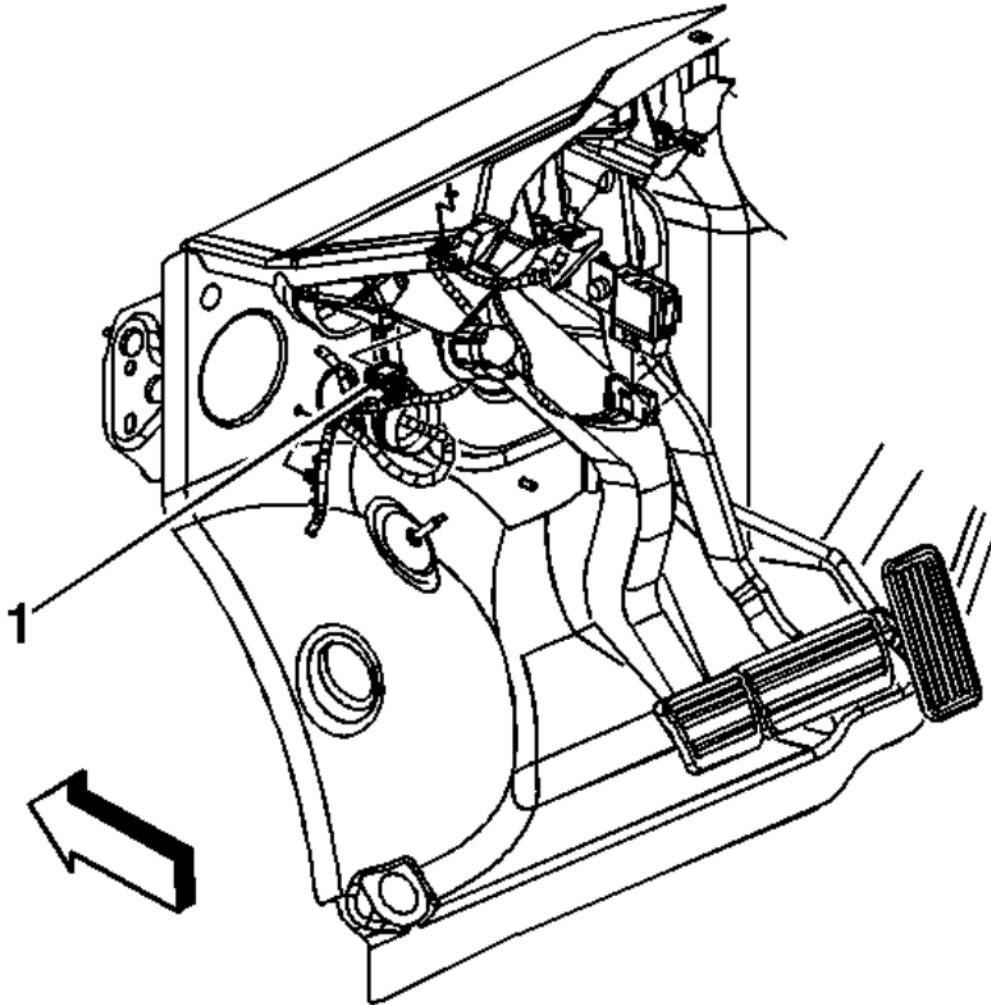


Fig. 15: Clutch Pedal Position Switch Electrical Connector
Courtesy of GENERAL MOTORS CORP.

1. Disconnect the clutch pedal position switch electrical connector (1).

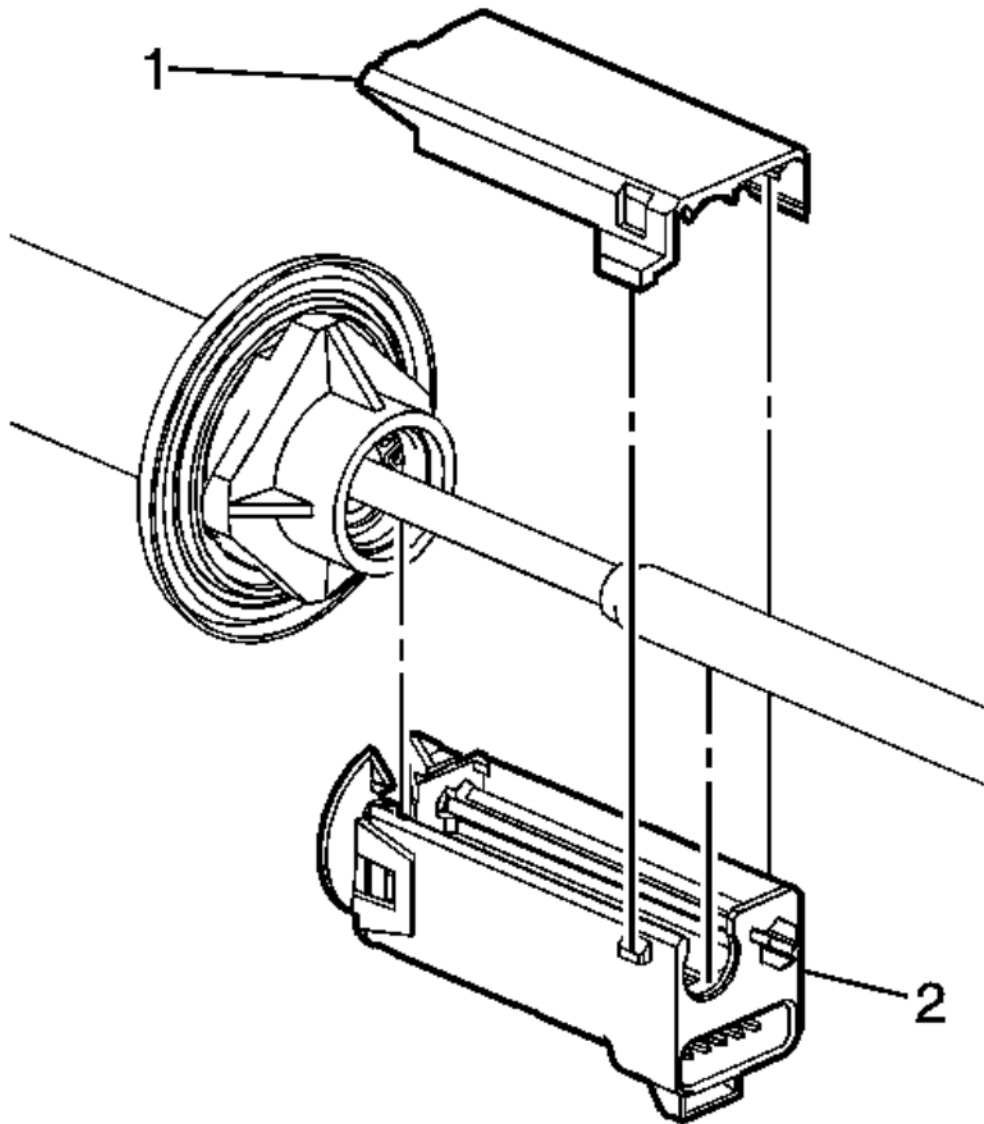


Fig. 16: Clutch Pedal Engine Start Switch
Courtesy of GENERAL MOTORS CORP.

2. Remove the plastic retainer (1) tabs from the clutch pedal position switch (2).
3. Remove the clutch pedal position switch (2) from the pushrod.

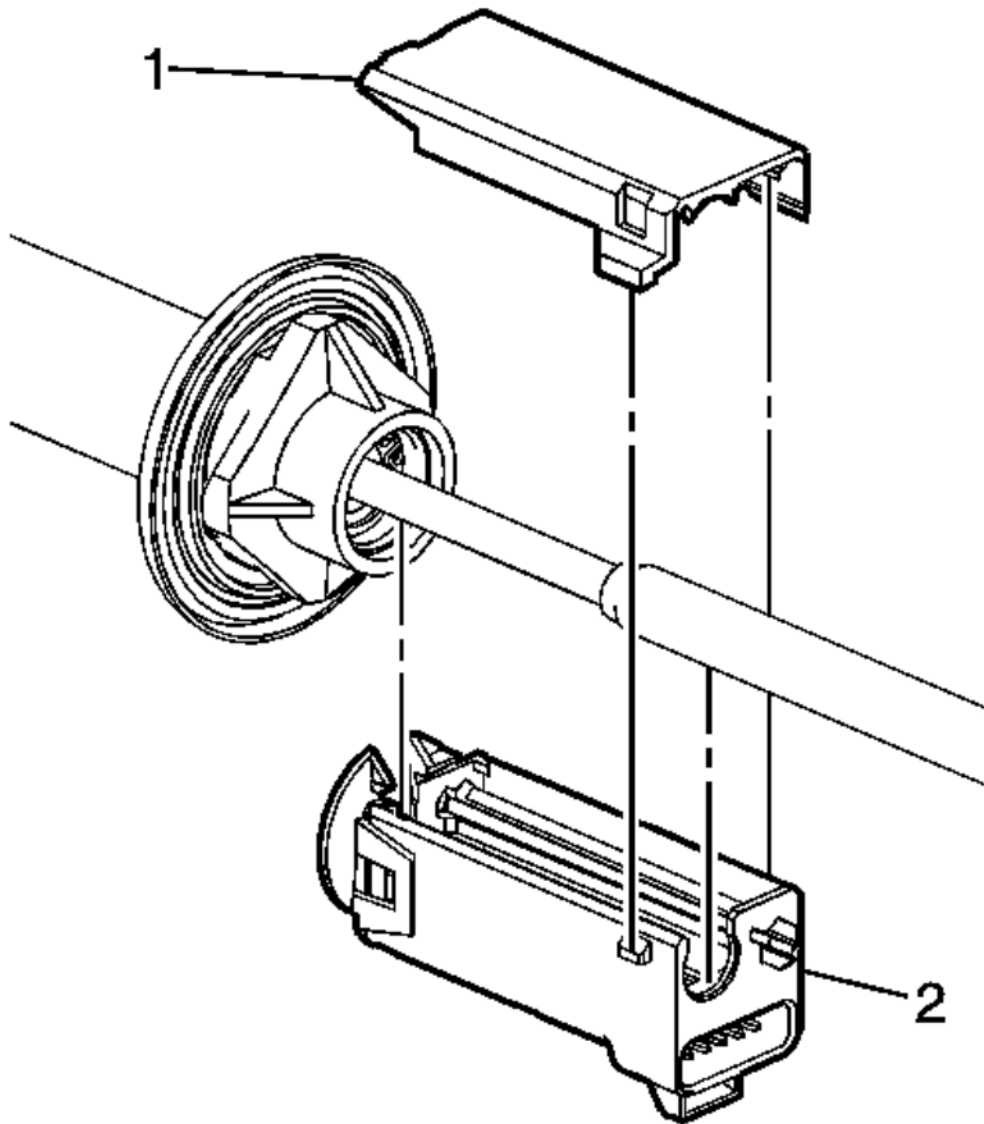


Fig. 17: Clutch Pedal Engine Start Switch
Courtesy of GENERAL MOTORS CORP.

1. Install the clutch pedal position switch (2) to the pushrod.
2. Install the plastic retainer (1) tabs to the clutch pedal position switch (2).

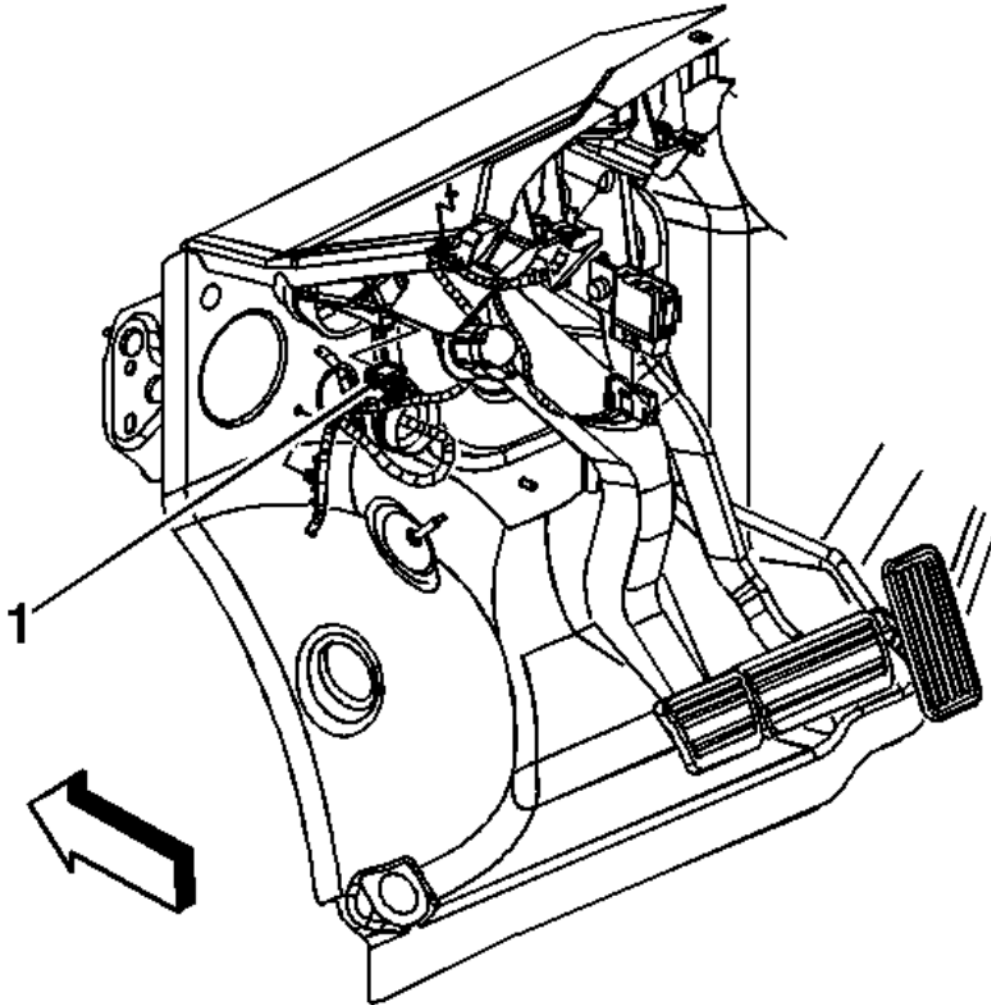


Fig. 18: Clutch Pedal Position Switch Electrical Connector
Courtesy of GENERAL MOTORS CORP.

3. Connect the clutch pedal position switch electrical connector (1).

CLUTCH PILOT BEARING REPLACEMENT

Tools Required

- **J 43276** Clutch Pilot Bearing Remover

- **J 38836** Bushing Installer/Clutch Arbor. See Special Tools.

Removal Procedure

NOTE: When using the **J 43276** Clutch Pilot Bearing Remover, always secure the **J 43276-1** Clutch Pilot Bearing Remover tool body using a wrench. Do not allow the **J 43276-1** tool body to rotate. Failing to do so causes damage to the **J 43276-1** tool body.

IMPORTANT: The flywheel spacer (if applicable) must be removed prior to clutch pilot bearing removal.

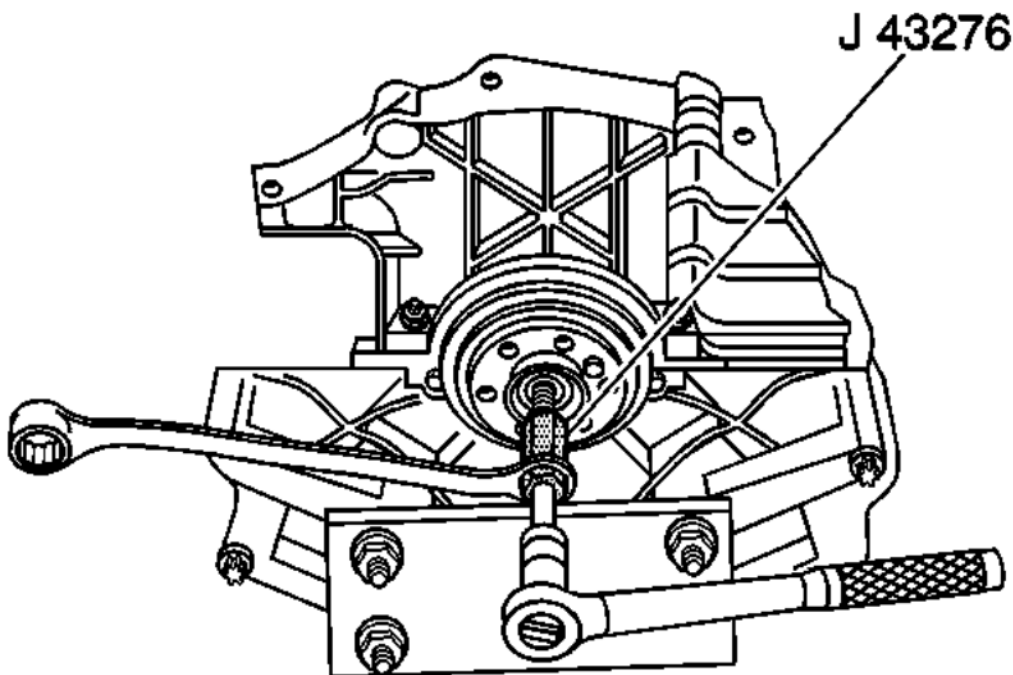


Fig. 19: Removing Clutch Pilot Bearing Using J 43276
Courtesy of GENERAL MOTORS CORP.

1. Remove the clutch assembly. Refer to Clutch Assembly Replacement.
2. Using **J 43276** perform the following in order to remove the clutch pilot bearing:

2008 Chevrolet Silverado 1500

2008 TRANSMISSION Clutch - Cab & Chassis Sierra, Cab & Chassis Silverado, Sierra & Silverado

1. Install the J 43276-1 into the clutch pilot bearing.
2. Using a wrench, secure the J 43276-1.
3. Insert the J 43276-2 into the J 43276-1.
4. Rotate the J 43276-2 clockwise into the J 43276-1 until the clutch pilot bearing is completely removed from the crankshaft.
5. Rotate the J 43276-2 counterclockwise to remove the J 43276-2 from the J 43276-1.
6. Remove the J 43276-1 from the tool body.

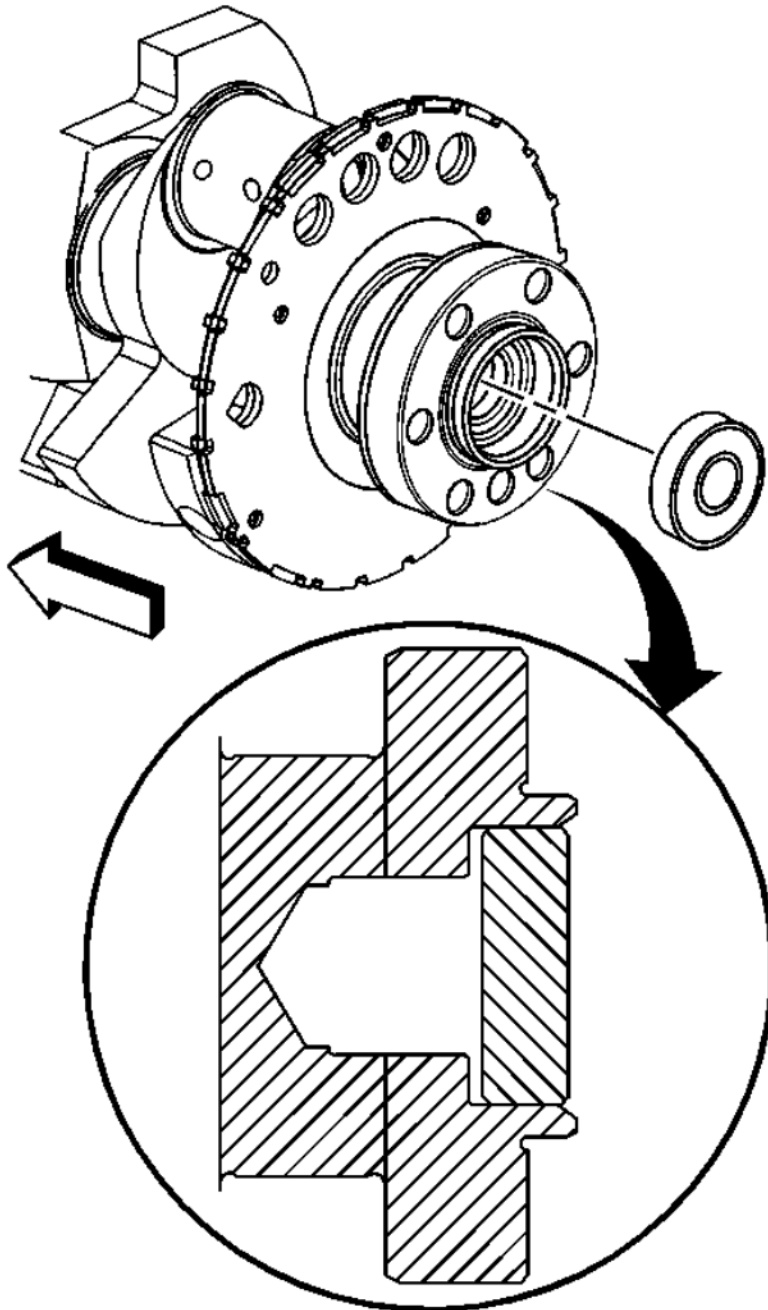


Fig. 20: View Of Pilot Bearing (without RPO HP2)
Courtesy of GENERAL MOTORS CORP.

3. Discard the old clutch pilot bearing.

Installation Procedure

IMPORTANT: The flywheel spacer (if applicable) must be removed prior to pilot bearing installation.

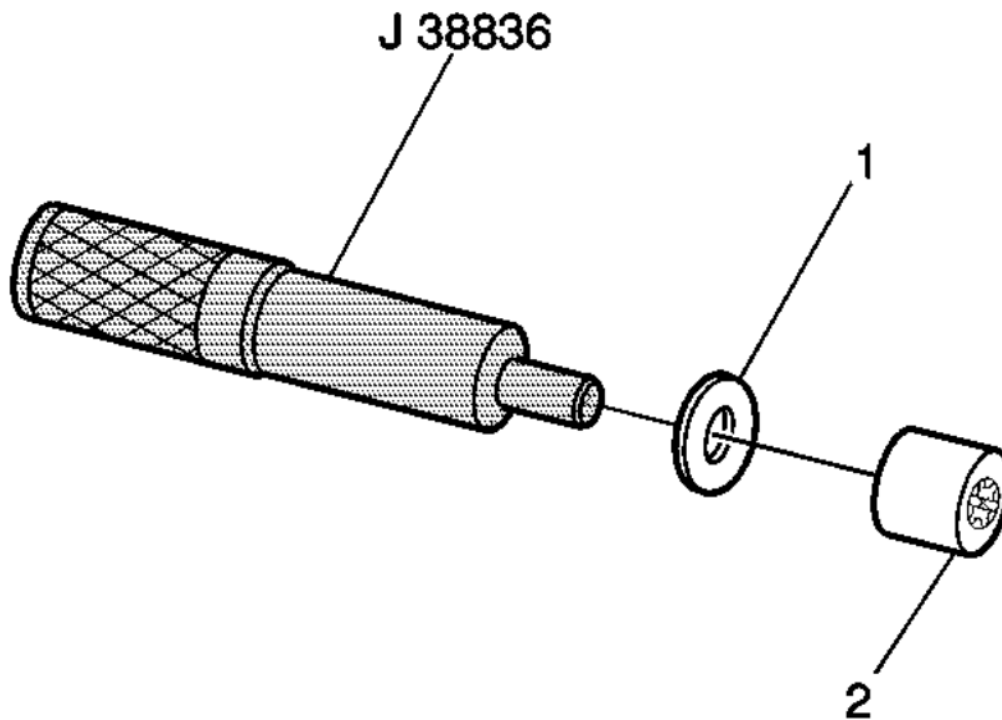


Fig. 21: View Of J 38836, Washer & Pilot Bearing (without RPO HP2)
Courtesy of GENERAL MOTORS CORP.

1. Install a 5/8 inch washer (1) onto the **J 38836** or equivalent. See Special Tools.
2. Install a NEW clutch pilot bearing (2) onto the tool.

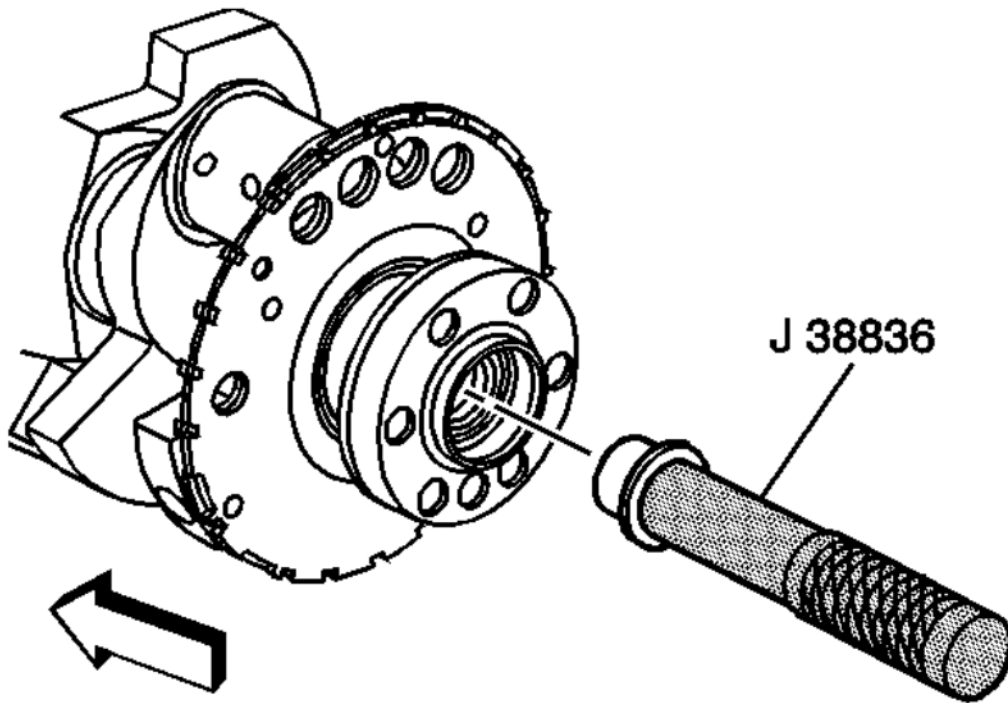


Fig. 22: Installing Pilot Bearing Using J 38836 (without RPO HP2)
Courtesy of GENERAL MOTORS CORP.

3. Install the NEW clutch pilot bearing into the crankshaft using **J 38836** . See **Special Tools**.

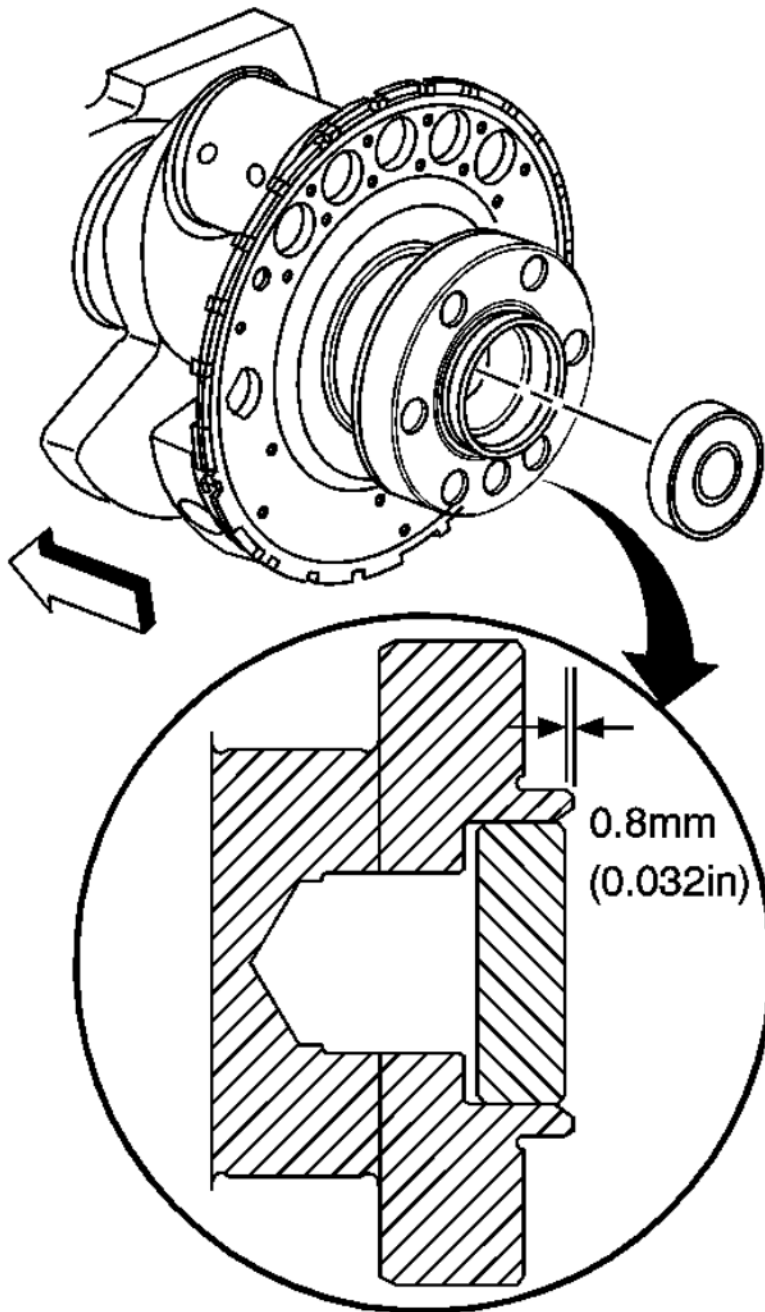


Fig. 23: View Of Clutch Pilot Bearing Proper Installation Position (without RPO HP2)

Courtesy of GENERAL MOTORS CORP.

4. Inspect the clutch pilot bearing for proper installation.
5. Install the clutch assembly. Refer to **Clutch Assembly Replacement**.

CLUTCH ASSEMBLY REPLACEMENT

Special Tools

J 5824-A Clutch Alignment Tool. See **Special Tools**.

Removal Procedure

1. Remove the transmission. Refer to **Transmission Replacement** .

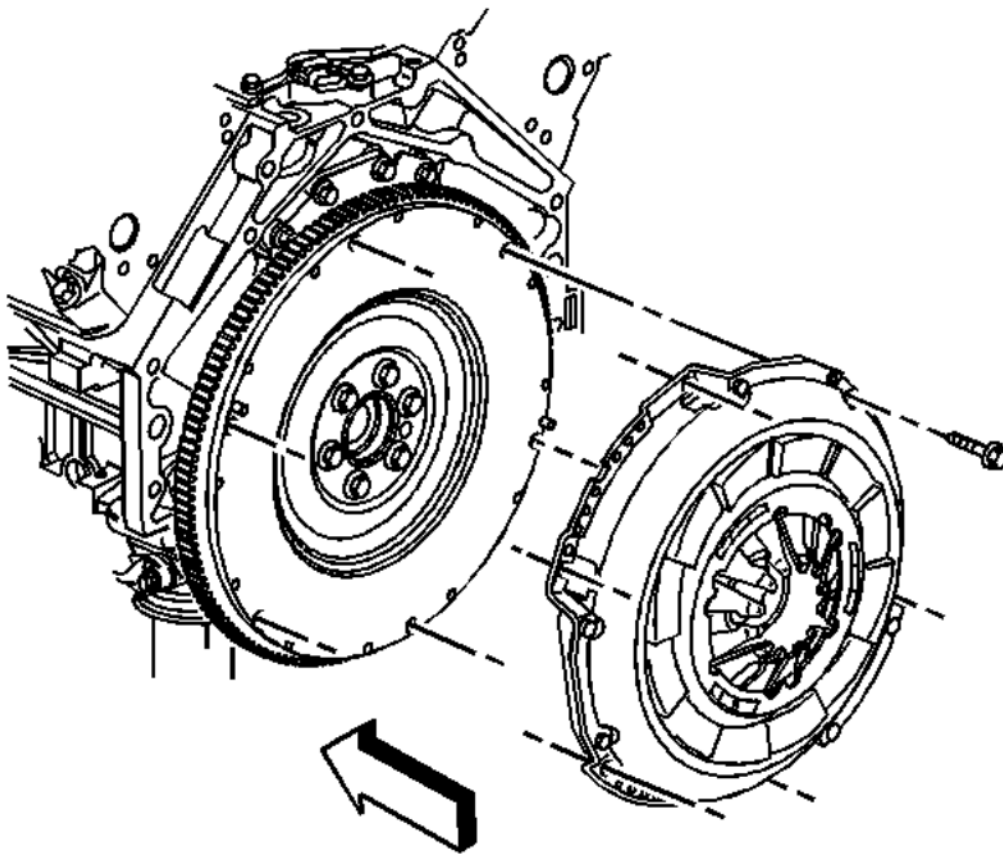


Fig. 24: Clutch Pressure Plate And Driven Plate (4.8L Or 6.0L)

Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Dowel pins are used to align the flywheel and pressure plate. When removing the pressure plate check to see if the dowel pins are rusted into the pressure plate, if so remove, clean, and reinstall the dowel pins into the correct location(s) on the flywheel.

2. Remove the clutch pressure plate bolts.
3. Remove the clutch pressure plate and disc from the dowel pins.

Installation Procedure

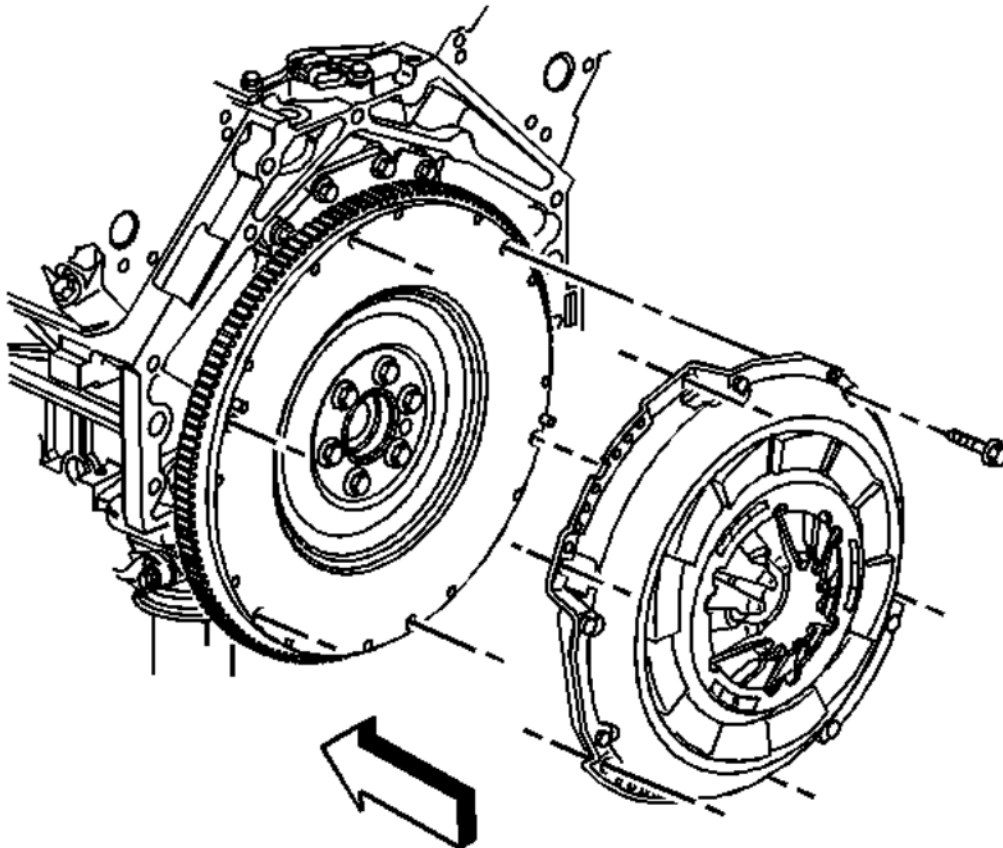


Fig. 25: Clutch Pressure Plate And Driven Plate (4.8L Or 6.0L)

Courtesy of GENERAL MOTORS CORP.

1. If equipped with a 4.8L or 6.0L engine, install the clutch pressure plate and driven plate to the dowel pins.
2. Install **J 5824-A** in order to align the clutch. See **Special Tools**.
3. Install the clutch pressure plate bolts finger tight.

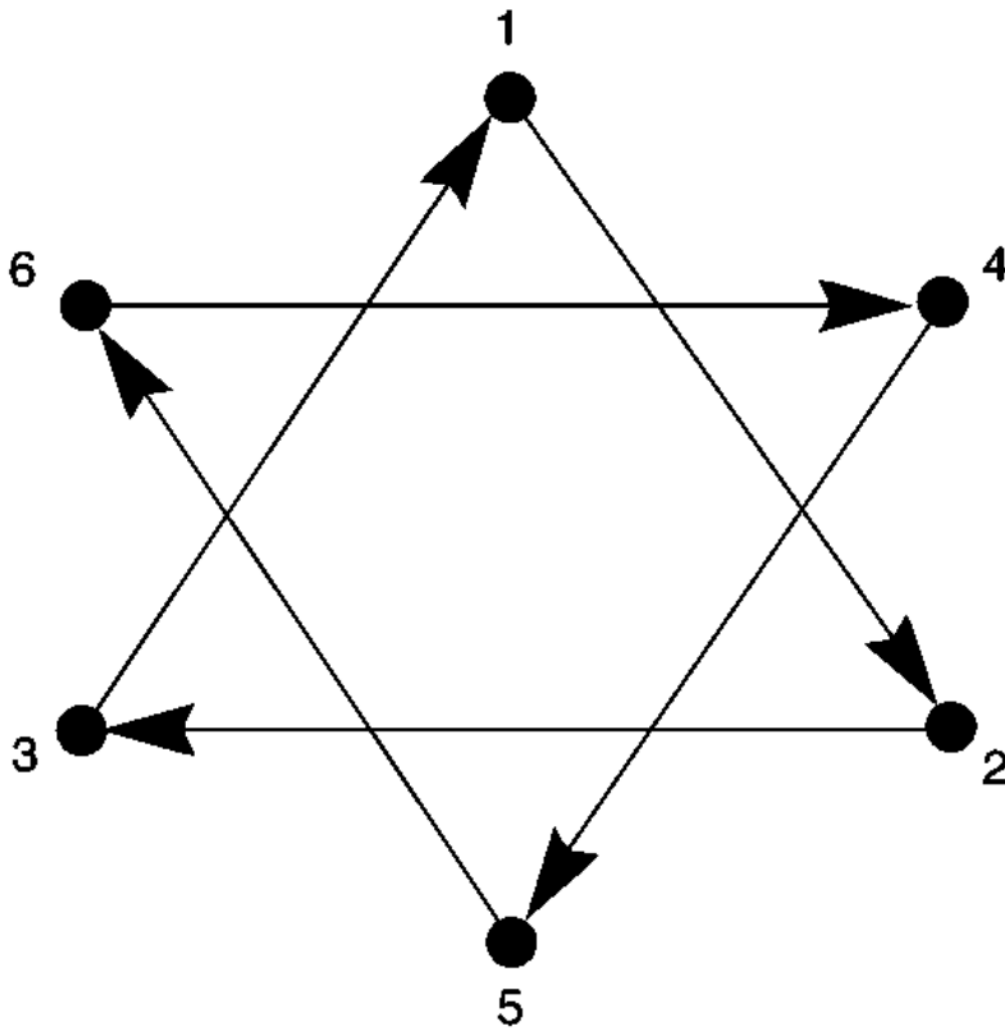


Fig. 26: Clutch Pressure Plate Bolts Tightening Sequence (4.8L, 5.3L, and 6.0L Engines)

Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

4. If equipped with a 4.8L or 6.0L engine, tighten the clutch pressure plate bolts in the sequence shown.

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

5. Remove the **J 5824-A** . See Special Tools.
6. Install the transmission. Refer to Transmission Replacement .

RELEASE BEARING REPLACEMENT

Removal Procedure

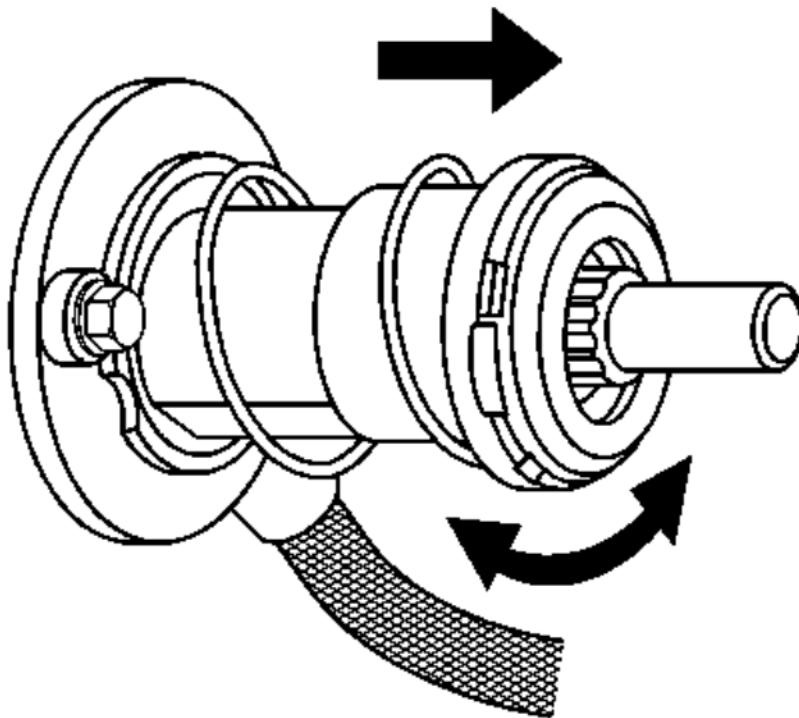


Fig. 27: Clutch Release Bearing
Courtesy of GENERAL MOTORS CORP.

1. Remove the transmission. Refer to **Transmission Replacement** .
2. Remove the clutch release bearing.
 - Rotate the bearing in either direction.
 - The compression spring load will push the release bearing off the end of the clutch actuator bearing.

Installation Procedure

IMPORTANT: DO NOT use cleaners or chemicals to clean the quill and DO NOT grease the quill.

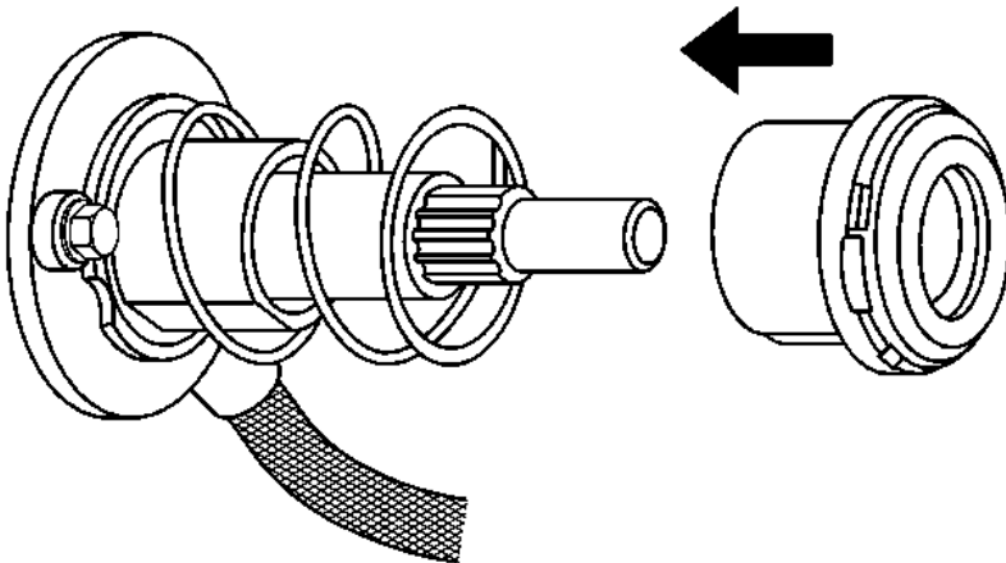


Fig. 28: Clutch Release Bearing
Courtesy of GENERAL MOTORS CORP.

1. Using a clean dry cloth, clean the exposed area of the actuator cylinder quill.
2. Install the NEW clutch release bearing to the clutch actuator cylinder.
 - Firmly push the clutch release bearing into place.

- The release bearing will snap over the retainer tab and will be self-retained to the actuator cylinder.

3. Install the transmission. Refer to **Transmission Replacement** .

CLUTCH ACTUATOR CYLINDER REPLACEMENT (TZ0)

Removal Procedure

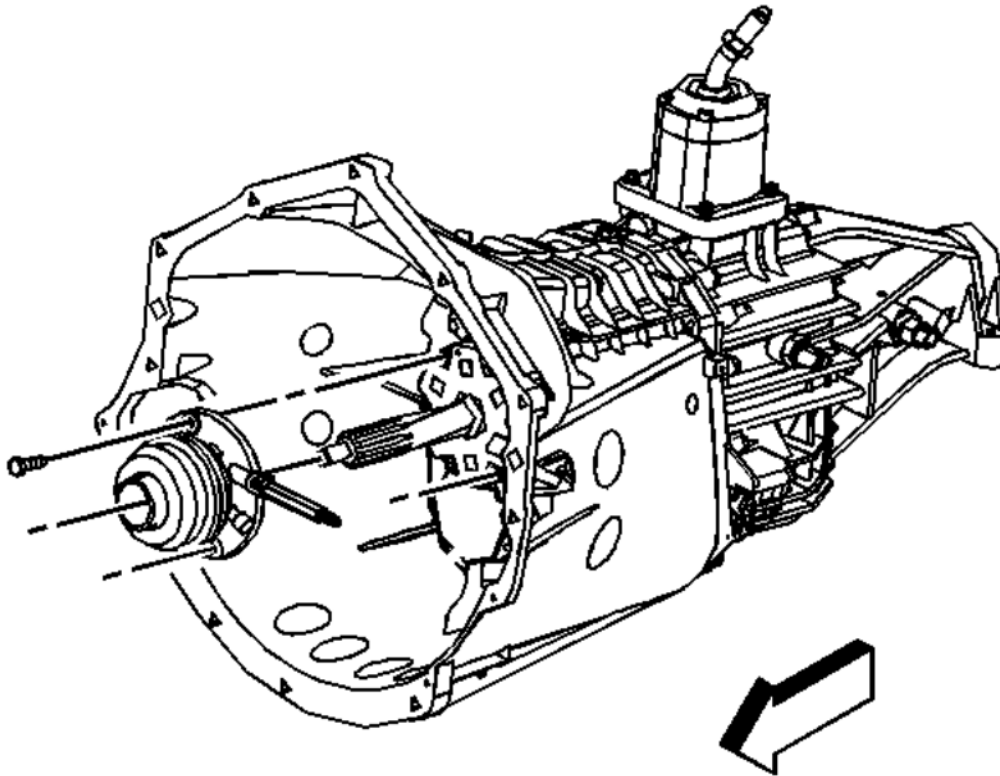


Fig. 29: Identifying Clutch Actuator Cylinder Bolts
Courtesy of GENERAL MOTORS CORP.

1. Remove the transmission. Refer to **Transmission Replacement** .
2. Remove the clutch actuator cylinder bolts.
3. Remove the clutch actuator cylinder.

If required, the clutch release bearing can be removed from the clutch actuator cylinder for replacement.

Installation Procedure

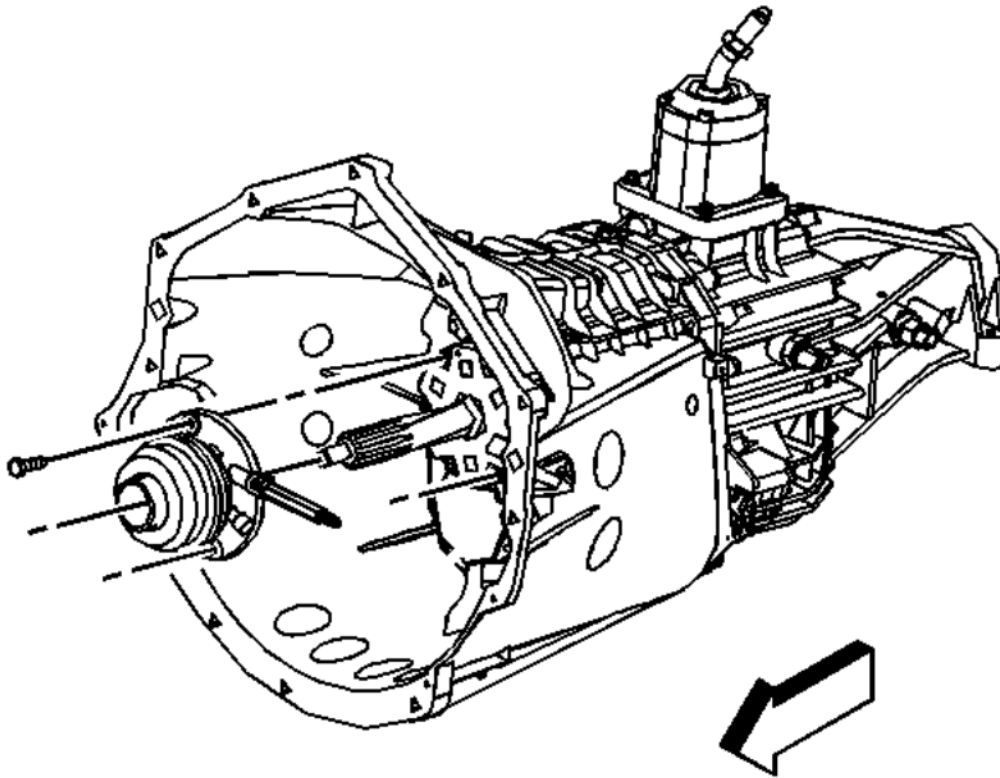


Fig. 30: Identifying Clutch Actuator Cylinder Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

1. Install the clutch actuator cylinder.
2. Install the clutch actuator cylinder bolts.

Tighten: Tighten the bolts to 8 N.m (71 lb in).

3. Install the transmission. Refer to Transmission Replacement .

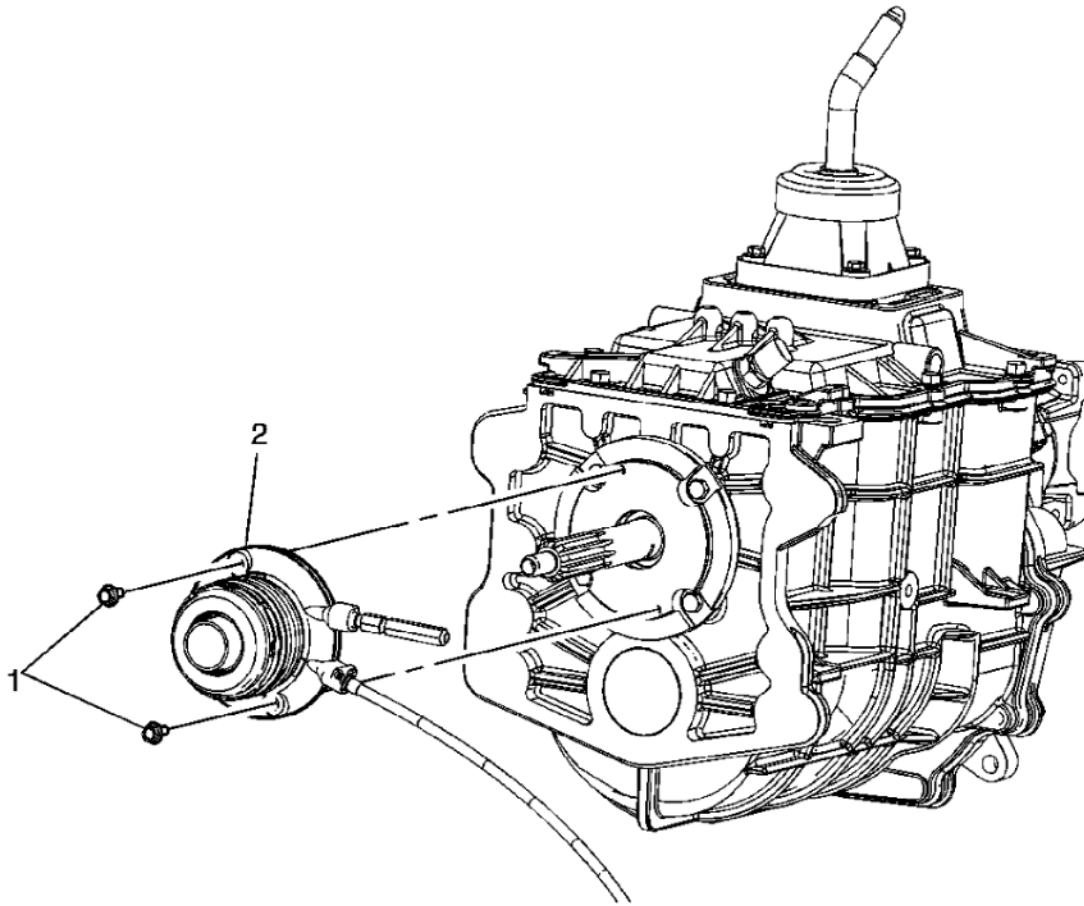
CLUTCH ACTUATOR CYLINDER REPLACEMENT (M96)

Fig. 31: Clutch Actuator Cylinder (M96)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the transmission. Refer to <u>Transmission Replacement</u> .	
1	Clutch Actuator Cylinder Bolt (Qty: 2) NOTE: Refer to <u>Fastener Notice</u> . Tighten:: 8 N.m (71 lb in).
2	Clutch Actuator Cylinder

DESCRIPTION AND OPERATION

CLUTCH SYSTEM DESCRIPTION AND OPERATION

The C/K model vehicle uses 2 different clutch hydraulic systems and 2 different clutch variations. The vehicles with the 5 speed transmission RPO TZO uses a different clutch hydraulic system than the vehicles with the 5 speed transmission RPO M96. For the proper diagnosis, because of the clutch variations, it is important to understand which clutch system is used.

4.3L Clutch

The 4.3L clutch system is described as the following:

- Size - 280 mm (11 in)
- Clutch pressure plate - Diaphragm spring plate, non-self adjusting
- Clutch disc - Damper spring style
- Hydraulic system - 5 speed

6.0L Clutch

The 6.0L clutch system is described as the following:

- Size - 297 mm (11.70 in)
- Clutch pressure plate - Diaphragm spring plate, self adjusting
- Clutch disc - Damper spring style
- Hydraulic system - 5 speed

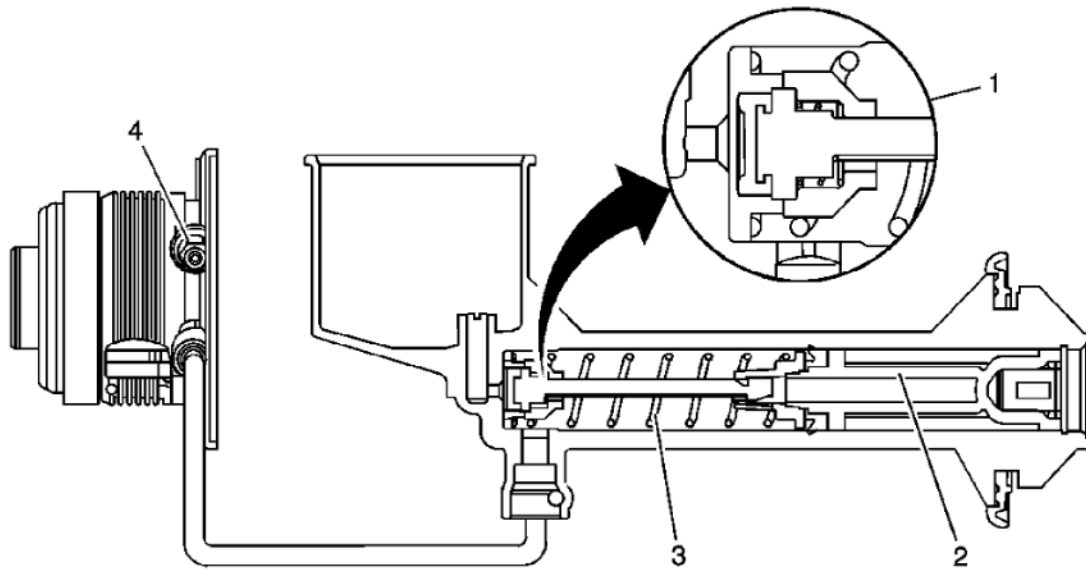


Fig. 32: 5 Speed Transmission Hydraulic Clutch System
Courtesy of GENERAL MOTORS CORP.

The reservoir, which is part of the master cylinder, supplies the fluid at the front of the master cylinder through the center feed port (1). The center feed ports allow the flow of fluid from the reservoir to the cylinder when the pedal is in the complete returned position. The master cylinder uses a spring (3) to return the piston (2) to the clutch engagement position. A bleeder screw (4) is located at the clutch actuator cylinder for bleeding the hydraulic system.

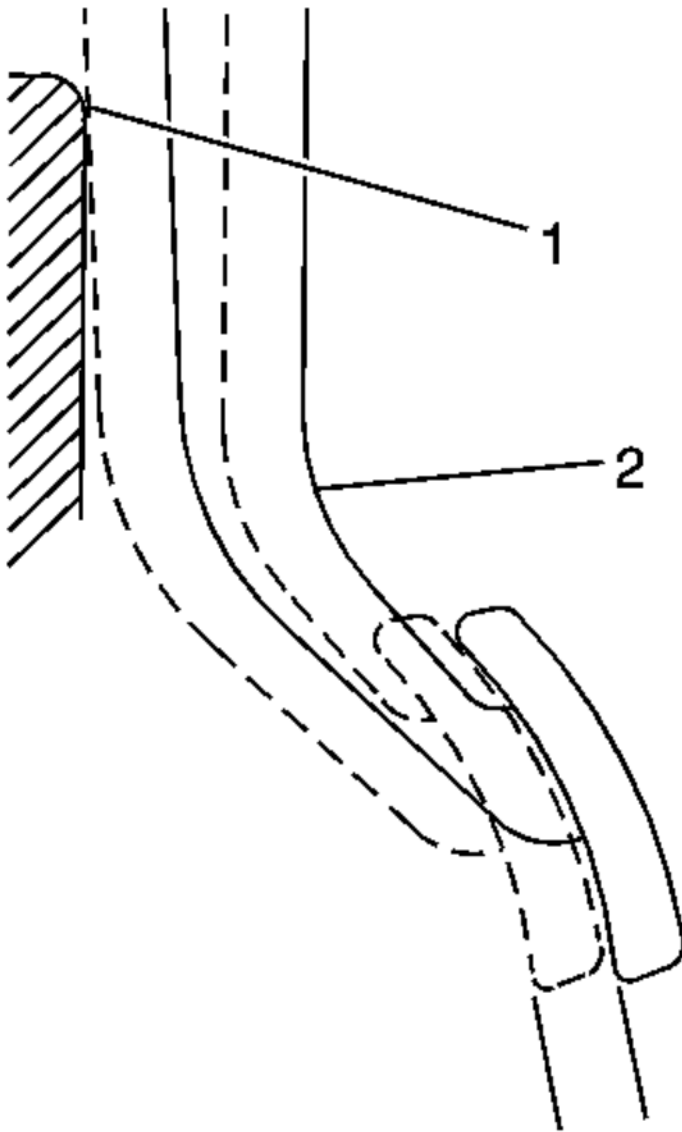


Fig. 33: Clutch Pedal Reserve

Courtesy of GENERAL MOTORS CORP.

Clutch pedal reserve is necessary in order for the clutch to be completely disengaged and allow proper transmission shifting. Clutch pedal reserve is the movement of the pedal after the clutch has fully released. The distance from clutch full release (2) to pedal fully down (1) is the clutch

reserve dimension, typically 25-38 mm (1.0-1.5 in).

In order to test to determine if the clutch is properly releasing, and the hydraulic system is functioning properly:

1. Depress the clutch pedal fully to disengage the clutch.
2. Shift into a low gear, either 1st or REVERSE.
3. Slowly shift out of the gear, only to disengage the synchronizer sleeve from the speed gear engagement teeth.
4. Let up on the pedal, to engage the clutch.
5. Depress the clutch pedal and shift back into gear.

If the clutch is releasing properly, you should be able to engage the gear without grinding after 4-5 seconds, which is the time for the clutch disc to quit spinning.

Clutch System Components

