

2000-01 CLUTCHES**Corvette****APPLICATION****MANUAL TRANSMISSION APPLICATIONS**

Application	Transmission Model (RPO Code)
Chevrolet Corvette	Borg-Warner T56 6-Speed (MM6)

DESCRIPTION & OPERATION

System uses a single-plate clutch disc, a diaphragm spring pressure plate and a permanently lubricated clutch release bearing. Clutch release system is hydraulic. Corvette uses a concentric actuator/release bearing assembly located in the clutch housing. The hydraulic system provides automatic clutch release adjustment.

BLEEDING

NOTE: Bleeding is necessary if system has been opened or if air has been drawn into system due to low fluid level in reservoir.

CAUTION: When battery is disconnected, vehicle computer, memory systems and remote keyless entry transmitters lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. Information transmitters (tire pressure, door lock/unlock, seat position memory, etc.) if equipped, may not operate until reprogrammed. See **COMPUTER RELEARN PROCEDURES** article in **GENERAL INFORMATION** and appropriate **POWER DOOR LOCKS & REMOTE KEYLESS ENTRY SYSTEMS** article in **ACCESSORIES & EQUIPMENT** before disconnecting battery.

CAUTION: DO NOT use silicone, mineral or paraffin base oil in clutch hydraulic system, or damage to rubber parts in cylinders may occur.

1. Clean cap. Remove reservoir cap and diaphragm. Fill reservoir and keep full throughout procedure. Disconnect negative battery cable. Raise and support vehicle. Disconnect heated oxygen sensor connectors. Remove exhaust take-down pipe flange nuts. Remove exhaust intermediate pipe-to-rear pipe bolts. Remove front exhaust hanger bolts from bracket. Remove rear exhaust hanger bolts from intermediate pipes. Remove intermediate pipe assembly.

2. Remove driveline tunnel closeout panel. Attach hose to bleed screw on actuator and submerge other end in container of hydraulic fluid. Have an assistant depress clutch pedal slowly and hold. Loosen bleeder on clutch actuator cylinder to purge air from system. Tighten bleeder and release pedal. Repeat procedure until all air is completely purged and no bubbles are visible. Fill reservoir. Install diaphragm and cap.
3. Install driveline tunnel closeout panel and exhaust intermediate pipe. Lower vehicle. Apply parking brake and block drive wheels. Shift transmission into Neutral. Start engine and run at idle. Release clutch pedal. Depress clutch pedal and hold for 9 seconds. Attempt to shift transmission into Reverse. If gears grind, bleed system again.

ADJUSTMENTS

CLUTCH PEDAL FREE PLAY & PEDAL HEIGHT

NOTE: Clutch pedal free play and pedal height are automatically adjusted. No manual adjustment is required.

CLUTCH PRESSURE PLATE (OFF-VEHICLE)

1. Place pressure plate (flat surface down) on a press. Compress pressure plate diaphragm spring fingers until tension is released from stepped adjusting ring. Place 2 screwdrivers against 2 of 3 stepped adjusting tension spring stops, just ahead of adjusting ring tension springs.
2. Using screwdrivers, rotate stepped adjusting ring counterclockwise (compressing tension springs) until adjusting ring steps are fully adjusted out, and then continue to hold in position. Release press pressure from pressure plate diaphragm spring fingers. Release adjusting ring tension spring stops. Remove pressure plate from press.

CLUTCH PRESSURE PLATE (ON-VEHICLE)

NOTE: The following procedure must be performed with aid of an assistant.

1. Raise and support vehicle. Remove flywheel inspection cover. Have assistant press clutch pedal until tension is released from clutch pressure plate stepped adjusting ring. Continue to hold pedal. Place 2 screwdrivers against 2 of 3 stepped adjusting tension spring stops, just ahead of adjusting ring tension springs.
2. Using screwdrivers, rotate stepped adjusting ring counterclockwise (compressing tension springs) until adjusting ring steps are fully adjusted out, and then continue to hold in position. Have assistant release clutch pedal. Release adjusting ring tension spring stops. Install flywheel inspection cover. Lower vehicle.

TROUBLE SHOOTING

NOTE: For trouble shooting, see appropriate table in **TROUBLE SHOOTING** article in **GENERAL INFORMATION**.

REMOVAL & INSTALLATION

NOTE: Transmission removal and installation procedures are included in **CLUTCH ASSEMBLY** .

CAUTION: When battery is disconnected, vehicle computer, memory systems and remote keyless entry transmitters lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. Information transmitters (tire pressure, door lock/unlock, seat position memory, etc.) if equipped, may not work until reprogrammed. See **COMPUTER RELEARN PROCEDURES** article in **GENERAL INFORMATION** and **POWER DOOR LOCKS & REMOTE KEYLESS ENTRY SYSTEMS** article in **ACCESSORIES & EQUIPMENT** before disconnecting battery.

CLUTCH ACTUATOR

Removal

1. Disconnect negative battery cable. Remove left instrument panel lower insulator panel. Using a flat-blade tool, carefully pry instrument panel courtesy lamp assembly from left lower closeout panel. Remove push-on retaining nut from steering column bracket stud.
2. Disconnect left lower closeout panel twist-rivets from instrument panel lower support beam. Insert instrument panel courtesy lamp assembly up through closeout panel. Lower and remove closeout panel. Remove clutch master cylinder rod retainer. Remove clutch master cylinder rod from clutch pedal. Raise and support vehicle.
3. Disconnect actuator hose from hose retaining clip at rear of engine. Using Hydraulic Clutch Separator (J-36221), depress White circular release ring on actuator hose while pulling lightly on master cylinder hose. Remove actuator cylinder hose from hose retaining clip. Disconnect clutch actuator cylinder hose from clutch master cylinder hose. Protect both hose coupling ends from dirt and damage.
4. Remove driveline support assembly and transmission from vehicle. See **CLUTCH ASSEMBLY** . Remove clutch actuator cylinder mounting bolts and actuator cylinder from driveline support assembly.

Installation

NOTE: When reconnecting quick-connect hydraulic hose fittings, pull

back on fittings to verify engagement. DO NOT rely on audible click or visual verification. Also check clutch hydraulic hoses for twists or kinks.

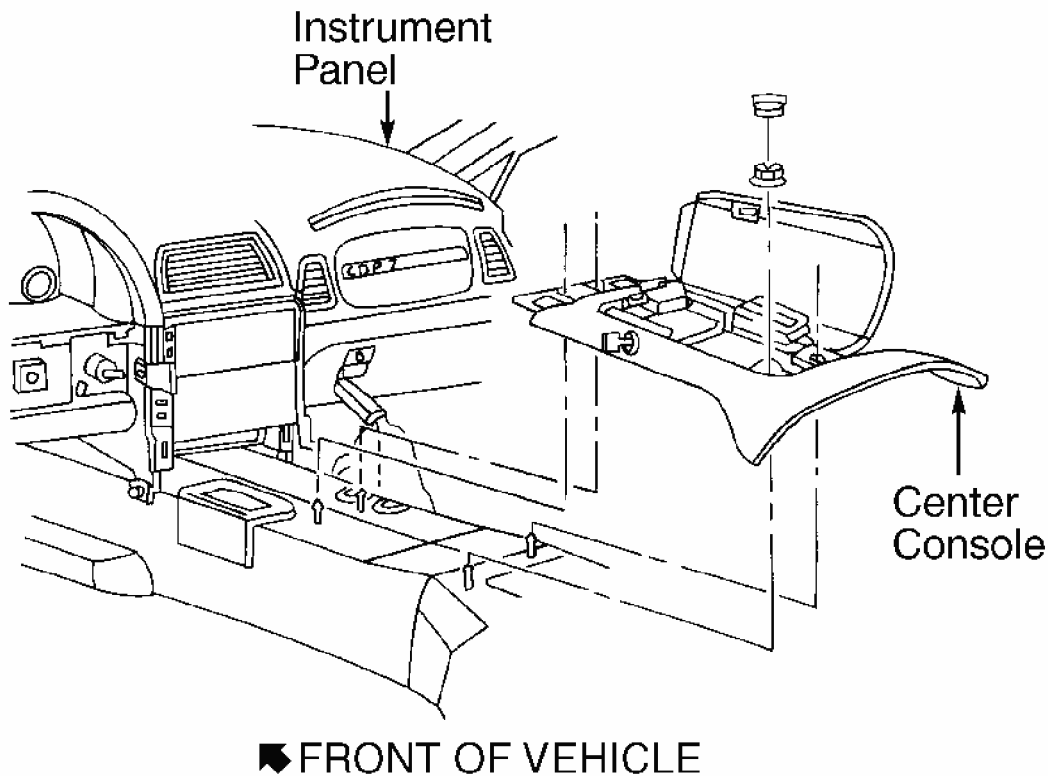
When installing clutch hydraulic hoses, position hoses away from other components to prevent damage. To install, reverse removal procedure. Tighten all bolts and nuts to specification. See **TORQUE SPECIFICATIONS** . Bleed hydraulic system. See **BLEEDING** .

CLUTCH ASSEMBLY

CAUTION: When tilting rear of driveline downward, observe clearances between rear of engine and composite dash panel, and between rear of transmission assembly and underbody. To prevent vehicle damage, DO NOT allow engine to rest unsupported against composite dash panel.

Removal

1. Disconnect negative battery cable. On convertible models, remove folding top storage compartment lid extension panel. On all models, open console door. Pull up on rear of traction/ride control switch to release retaining clips. If switch does not release from trim plate, carefully insert screwdriver into recess at rear of switch and gently pull up on rear of switch. Disconnect electrical connector from switch, and remove switch.
2. Using small flat-blade screwdriver, carefully remove console retaining nut covers. Remove front and rear retaining nuts. Remove instrument panel accessory trim plate nuts. Lift rear of console slightly and pull rearward to release front of console from under instrument panel trim plate. Disconnect electrical accessory plug connector. Unscrew electrical accessory plug retainer from housing, and remove housing from console.
3. Disconnect fuel door release switch connector. Remove fuel door release switch. Turn console over. Using small flat-blade screwdriver, carefully release switch tabs. Remove console from vehicle. See **Fig. 1** . Pry up and remove shift lever knob button. Pry control knob retainer out of slots and remove retainer. Unscrew shift lever knob.



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Fig. 1: Removing Center Console
 Courtesy of GENERAL MOTORS CORP.

4. Grasp sides of shift control boot and apply light pressure inward (toward shift lever) to release boot retaining tabs from instrument panel accessory trim plate. Release all boot retaining tabs. Lift boot away from trim plate and remove boot. Apply parking brake and shift transmission into 4th gear to provide clearance. Open lighter door and remove ashtray. Pry gently at side edge of accessory trim plate grille with flat-blade screwdriver to release tab. Remove grille.
5. Remove accessory trim plate retaining screws next to lighter, behind ashtray, and in grille opening. Grasp sides of accessory trim plate near curve at base. Lift rear of trim plate to clear driveline tunnel studs and pull trim plate rearward to release locking tabs. Disconnect electrical connector from lighter. Remove trim plate. Remove shift control closeout cover retaining nuts, and remove cover. Shift transmission into Neutral.
6. Press down to engage shift control neutral lock pin. Remove transmission shift rod clamp bolt. Remove shift control mounting bolts. Raise shift control assembly to release locator from shifter bracket on side of driveline support assembly. Release shift control from transmission shift rod and remove shift control assembly. See **Fig. 2**.

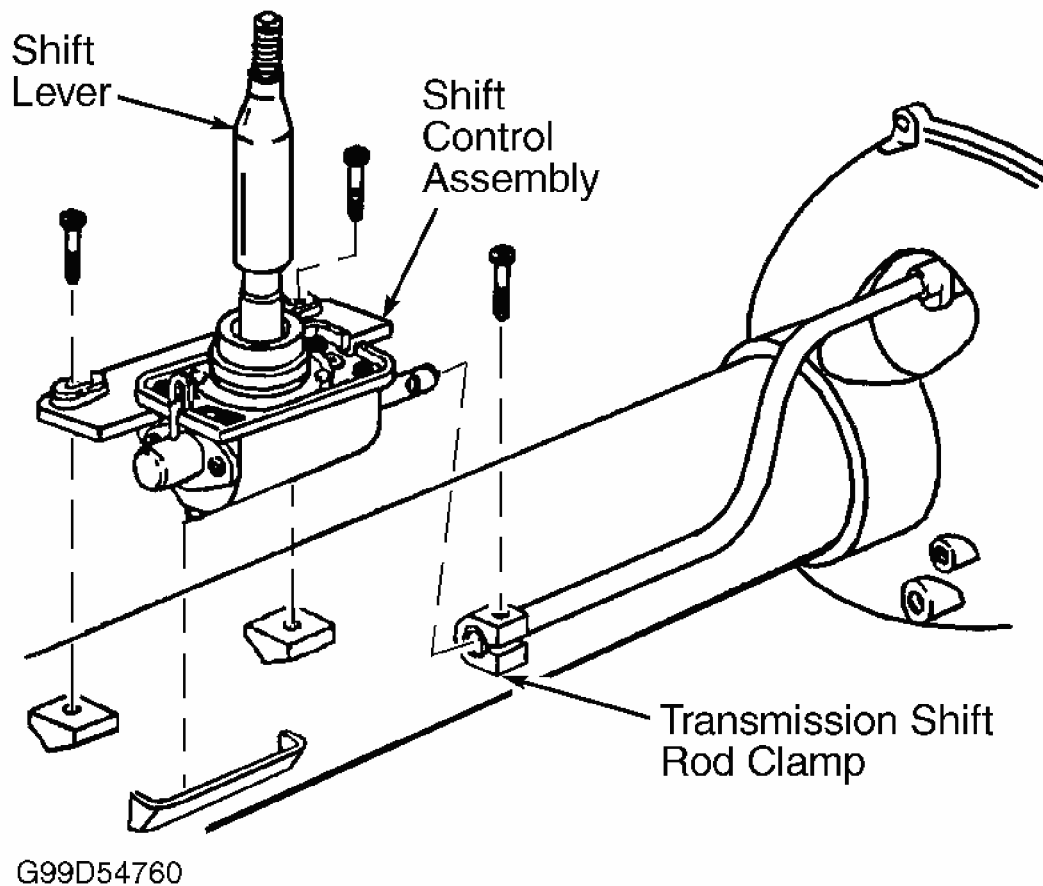


Fig. 2: Removing Shift Control Assembly
 Courtesy of GENERAL MOTORS CORP.

7. Using a flat-blade screwdriver, carefully pry out courtesy lamp assembly from left lower instrument panel closeout panel. Remove push-on retaining nut from steering column bracket stud. Release lower closeout panel push-in retainers from instrument panel support beam. Insert courtesy lamp assembly up through opening in closeout panel. Lower and remove panel by releasing notch in right front edge of panel from tab on accelerator pedal bracket.
8. Remove clutch master cylinder push rod retainer. Disconnect push rod from clutch pedal. Raise and support vehicle. Remove clutch actuator hose from retaining clip at rear of engine. Using Hydraulic Clutch Separator (J-36221), depress White circular release ring on actuator hose while pulling lightly on master cylinder hose to disconnect. Plug hose openings. Remove rear wheels.
9. Disconnect oxygen sensor electrical connectors. Remove take-down pipe flange nuts. Remove intermediate exhaust pipe-to-rear pipe bolts. Remove front exhaust hanger bolts at take-down pipe bracket. Remove rear exhaust hanger bolts from rear intermediate pipes. Remove intermediate pipe assembly. Wire muffler assemblies to

underbody to support out of way.

10. Remove driveline tunnel closeout panel bolts, and remove closeout panel. Measure rear transverse spring stud height. See **Fig. 3** . Carefully install Transverse Spring Compressor and Adapters (J-33432-A and J-33432-97), and compress spring. DO NOT scratch or damage transverse spring. Spring must be replaced if scratch is significant. Remove retainers, nuts, bolts and insulators attaching transverse spring to lower control arms. Remove mounting bolts, spacers and insulators attaching spring to crossmember. Remove spring from vehicle.

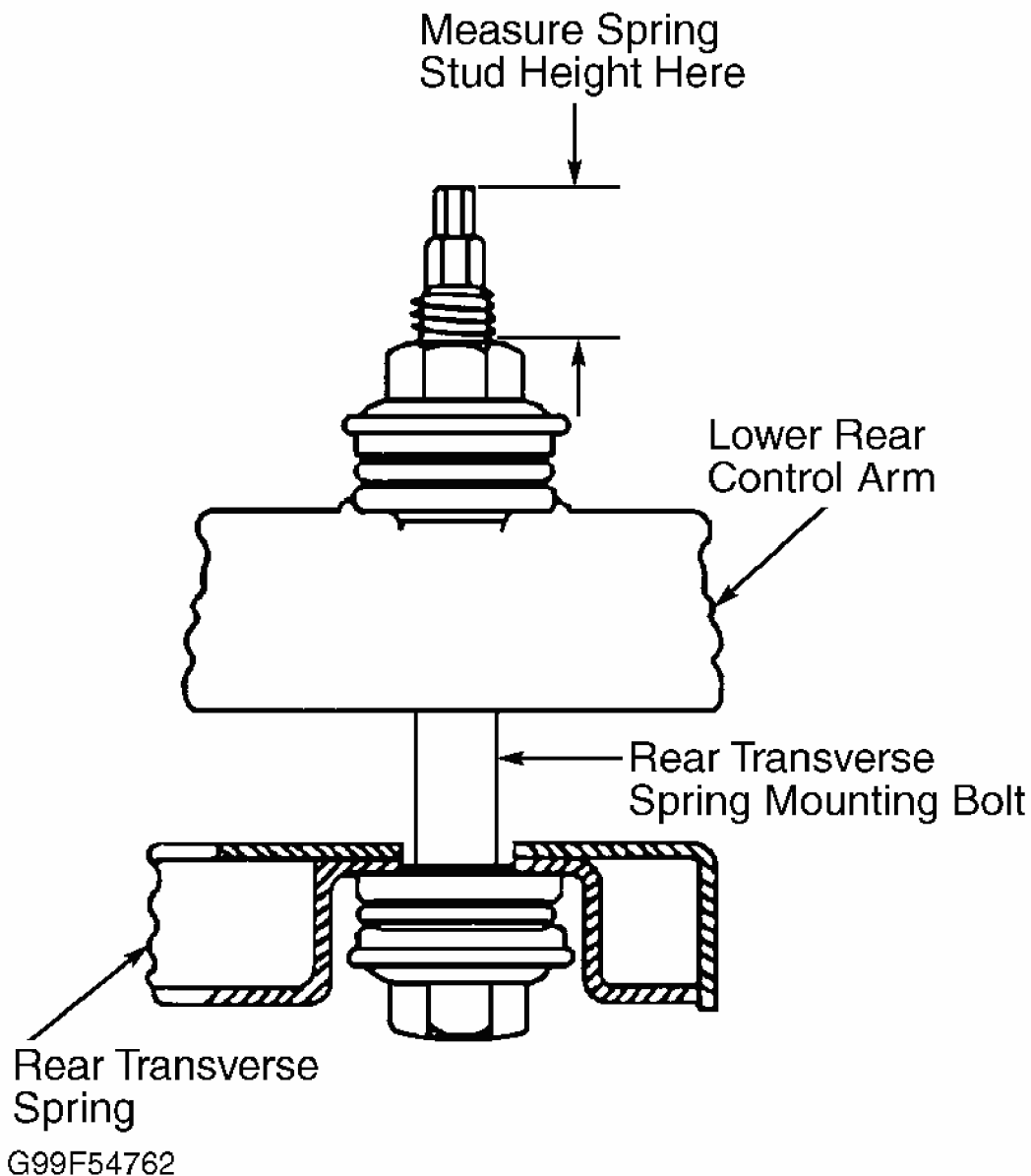


Fig. 3: Measuring Rear Transverse Spring Stud Height

Courtesy of GENERAL MOTORS CORP.

11. Support lower control arm with jack. Loosen, but do not remove, left outer tie rod end stud nut. Install Ball Joint Separator (J-42188) between suspension knuckle and tie rod end stud. Tighten separator bolt until stud separates from knuckle. Remove separator and stud nut, and separate tie rod end from knuckle. Remove left lower shock absorber mounting bolt.
12. Disconnect lower ball joint from steering knuckle. Loosen, but do not remove, left lower ball joint stud nut. Install Ball Joint Separator (J-42188) between suspension knuckle and ball joint stud. Tighten separator bolt until stud separates from knuckle. Remove separator and stud nut, and separate ball joint from knuckle.
13. Repeat steps 11 and 12 for right side of vehicle. Install Transmission Support Fixture (J-42055) on transmission jack. Position jack and firmly secure jack to transmission. Disconnect wiring harness and brake hose clips from rear crossmember. Remove lower differential-to-transmission nut. Remove transmission mount-to-rear crossmember nuts. Place a transmission jack under rear crossmember and secure crossmember to jack. Using hand tools only, remove rear crossmember retaining nuts.

CAUTION: Use an assistant to remove driveline and transmission assembly to prevent damage to vehicle.

14. With aid of an assistant, slowly lower rear crossmember and remove from vehicle. Remove transmission mount bracket-to-differential bolts, and remove mount with bracket. Using pry bar, gently release axle shafts from differential. Wire axle shafts to underbody. Remove retainers holding wiring harness to driveline support and position out of way.
15. Slowly lower driveline about 2" (50 mm), while adjusting angle of tilt to prevent damage to body structure, until electrical connectors can be accessed. Disconnect vehicle speed sensor electrical connector. Disconnect wiring harness retainer and clip from stud on top of differential rear cover. Disconnect back-up light, reverse lockout solenoid, gear select (skip shift) solenoid and transmission fluid temperature sensor electrical connectors from transmission.

CAUTION: To prevent damage when tilting down, lowering and removing rear of driveline, insert a putty knife or similar tool between shift control bracket on driveline support assembly and brake pipe retainer on driveline tunnel wall.

16. Insert putty knife between edge of shifter bracket on side of driveline support and brake hose retainer on driveline tunnel wall. SLOWLY lower driveline while adjusting angle of tilt, and check relationship between top rear of differential and lowest part of luggage compartment floor. Differential should not be lowered past lowest point of

luggage compartment floor. PCV hoses, routed along rear of engine intake manifold, may contact dash panel.

17. Release wiring harness retainer along top of transmission. Ensure harness is free of driveline. Using a block of wood under rear of engine oil pan, place a jack under wood to support engine and to keep engine from resting on composite dash panel. Remove 5 driveline support-to-flywheel housing bolts. Carefully bend wiring harness bracket away from driveline to allow clear path for driveline removal.
18. Have an assistant insert a flat-blade tool between edge of driveline support and engine flywheel housing. Gently begin to pry driveline loose from engine. With an assistant guiding front of driveline, slowly lower driveline, while watching angle of tilt and separating driveline from engine, until drive shaft at front of driveline just clears flywheel housing. Slowly lower driveline completely out of vehicle.
19. With driveline and transmission removed from vehicle, clutch assembly can now be serviced. Remove flywheel inspection cover bolts, and remove inspection cover. Remove flywheel housing-to-engine bolts, and remove housing. Loosen pressure plate-to-flywheel bolts alternately and evenly (one turn at a time) in a diagonal pattern until spring pressure is released. Remove pressure plate and clutch disc. See **Fig. 4** .
20. To continue transmission removal, position chain hoist around driveline assembly while protecting exhaust hangers on driveline support. Raise transmission with hoist to remove weight from transmission jack. Remove transmission support fixture from transmission jack only. Place transmission/driveline assembly on workbench with hoist still attached. Ensure adequate support is placed around assembly on workbench. Remove hoist from driveline.
21. Remove transmission-to-driveline bolts and studs. Using flat-blade screwdriver, pry driveline support assembly away from transmission. Slowly slide driveline support assembly away from transmission while guiding shift rod through opening in driveline support assembly. Using a drift or punch, remove roll pin securing shift rod to shift shaft. Remove shift rod. Remove differential-to-transmission bolts. Slowly separate differential from transmission. If necessary, remove support fixture from transmission.

Inspection

CAUTION: Replace flywheel and pressure plate as a set if either has burn damage, heat check damage, or runout exceeds specification. Flywheel can be resurfaced only to clean up superficial scoring.

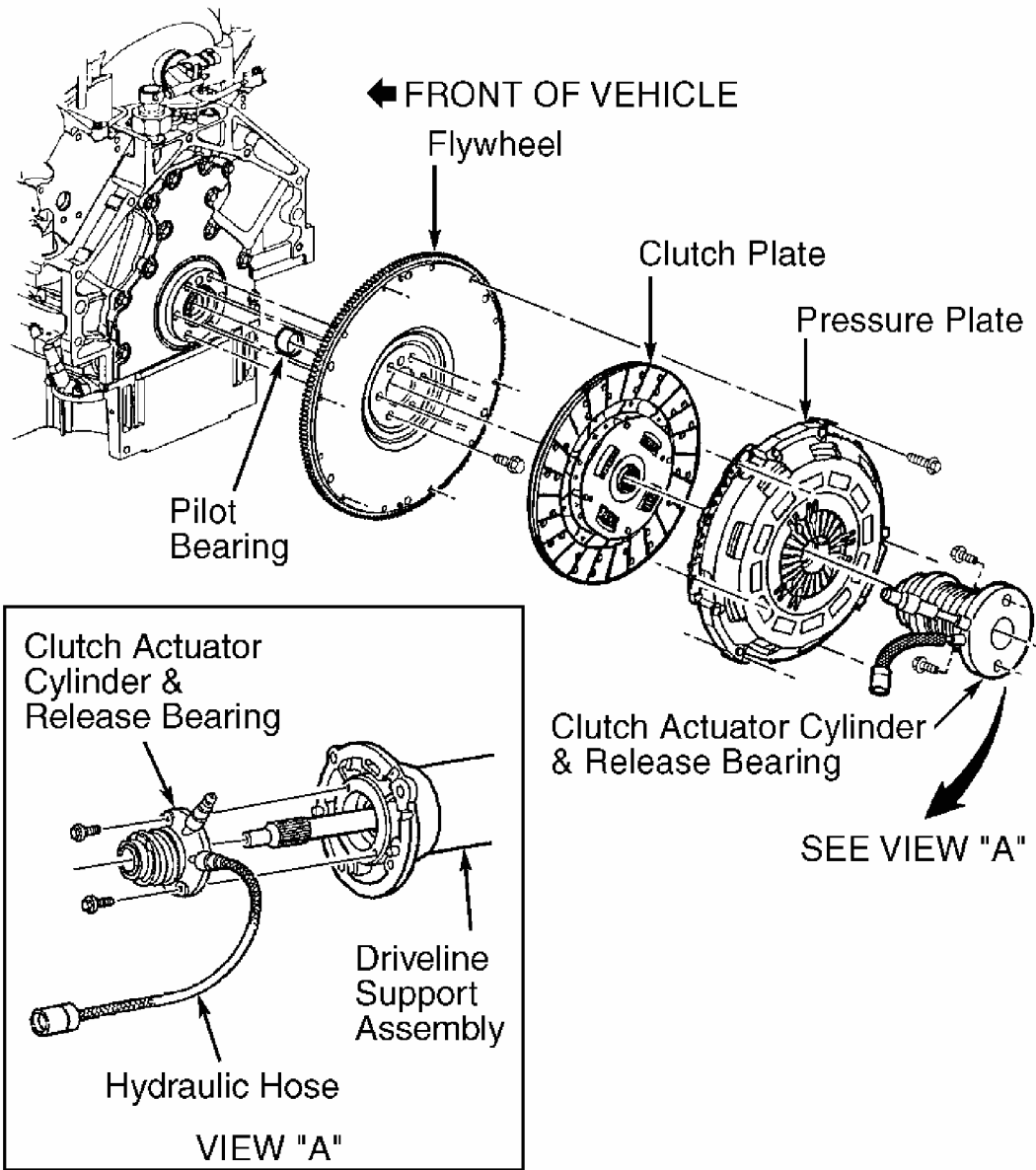
1. Clean oil, grease, metal deposits, etc. from flywheel mating surfaces. If flywheel or pressure plate runout is greater than .050" (1.27 mm), flywheel and pressure plate must be replaced. Inspect flywheel for cracks, heat marks, warpage or other damage. Slight surface scoring can be removed with sandpaper. Replace or resurface as necessary.
2. Check pressure plate for warpage, heat marks (Blue in color) and cracks. Check diaphragm spring fingers for uneven height and wear at throw-out bearing contact area.

Replace pressure plate if excessively worn or damaged. Replace clutch disc if runout is greater than .020" (.51 mm). Check pilot bearing rotation. If roughness is felt or bearing does not spin freely, replace bearing.

3. If replacing flywheel, check old flywheel for balance weights inserted in weight holes. If weights are installed on old flywheel, new balance weights **MUST** be installed on new flywheel in same hole locations as on old flywheel. If clutch pressure plate requires replacement, flywheel **MUST** be replaced also.

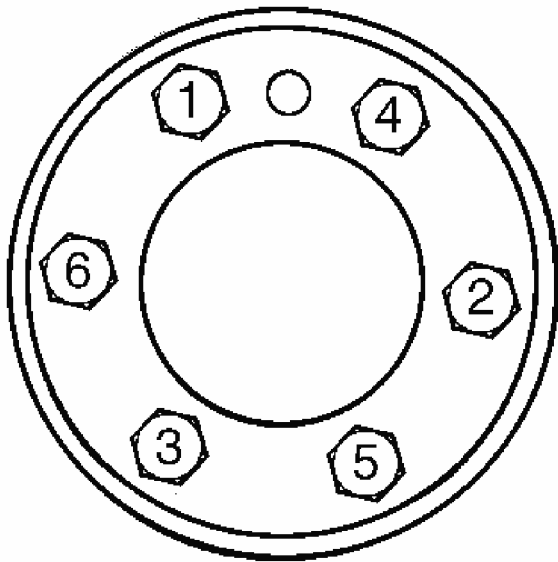
Installation

1. Install flywheel, if removed. Apply Threadlock (12345382) to flywheel bolt threads. Loosely install bolts. Tighten bolts in sequence in three steps. See **Fig. 5** and **TORQUE SPECIFICATIONS** . Assemble clutch disc and pressure plate. Adjust clutch pressure plate. See **CLUTCH PRESSURE PLATE (OFF-VEHICLE)** under **ADJUSTMENTS**. Install clutch assembly to flywheel.
2. Using Clutch Alignment Arbor/Pilot Bushing Installer (J-38836), align clutch assembly to pilot bearing. Tighten bolts in sequence. See **Fig. 5** . Tighten bolts evenly over 3 increments. See **TORQUE SPECIFICATIONS** . Install flywheel cover, inspection cover and cover bolts.
3. Attach driveline to transmission assembly. Use an assistant to install driveline and transmission in vehicle to keep tilt angle accurate to prevent damage to vehicle. Use only hand tools to tighten all nuts and bolts to specification. See **TORQUE SPECIFICATIONS** .
4. To complete installation, reverse removal procedure. Ensure rear transverse spring stud bolt has a **MINIMUM** of 2 threads showing above the nut. Set spring stud height to the height measured during removal. See **Fig. 3** . Adjust vehicle trim height. See appropriate **SPECIFICATIONS & PROCEDURES** article in **WHEEL ALIGNMENT**. Use **NEW** crossmember mounting bolts. When reconnecting quick-connect hydraulic hose fittings, pull back on fittings to verify engagement. **DO NOT** rely on audible click or visual verification. Bleed hydraulic system. See **BLEEDING** .



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Fig. 4: Exploded View Of Clutch Assembly
Courtesy of GENERAL MOTORS CORP.



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**Fig. 5: Flywheel Tightening Sequence (Pressure Plate Sequence Is Same)
Courtesy of GENERAL MOTORS CORP.**

CLUTCH MASTER CYLINDER

Removal

1. Disconnect negative battery cable. Remove left instrument panel lower insulator panel. Using a flat-blade tool, carefully pry instrument panel courtesy lamp assembly from left lower closeout panel. Remove push-on retaining nut from steering column bracket stud.
2. Disconnect left lower closeout panel twist-rivets from instrument panel lower support beam. Insert instrument panel courtesy lamp assembly up through closeout panel. Lower and remove closeout panel. Remove clutch master cylinder rod retainer. Remove clutch master cylinder rod from clutch pedal. Disconnect windshield washer solvent level sensor electrical connector, and remove washer solvent reservoir.
3. Raise and support vehicle. Remove clutch actuator cylinder hose from hose retaining clip at rear of engine. Using Hydraulic Clutch Separator (J-36221), depress White circular release ring on actuator hose while pulling lightly on master cylinder hose. Disconnect clutch actuator cylinder hose from clutch master cylinder hose. Protect both hose coupling ends from dirt and damage.
4. Lower vehicle, but leave on hoist. Remove clutch master cylinder push-in fasteners. Rotate clutch master cylinder counterclockwise 45 degrees. Release cylinder from dash panel, and remove clutch master cylinder and reservoir from vehicle.

Installation

NOTE: When reconnecting quick-connect hydraulic hose fittings, pull back on fittings to verify engagement. DO NOT rely on audible click or visual verification. Also check clutch hydraulic hoses for twists or kinks.

To install, reverse removal procedure. DO NOT over-rotate master cylinder beyond 45 degrees. Tighten all bolts and nuts to specification. See TORQUE SPECIFICATIONS . Bleed hydraulic system. See BLEEDING .

CLUTCH PEDAL POSITION SWITCH

Removal & Installation

Disconnect negative battery cable. Remove clutch pedal position switch electrical connector. Insert a feeler gauge between switch and clutch pedal bracket to release switch tab. Lift switch slightly, then pull to remove. To install, reverse removal procedure. Insert switch locators into top of slots, then slide down to lock.

HYDRAULIC HOSE

Removal

Remove clutch actuator cylinder or master cylinder. See CLUTCH ACTUATOR or CLUTCH MASTER CYLINDER . Using a small drift or punch, remove roll-pin retaining hydraulic hose. Drain off excess fluid from master cylinder into container.

Installation

NOTE: When reconnecting quick-connect hydraulic hose fittings, pull back on fittings to verify engagement. DO NOT rely on audible click or visual verification. Also check clutch hydraulic hoses for twists or kinks.

To install, reverse removal procedure. Tighten all bolts and nuts to specification. See TORQUE SPECIFICATIONS . Check NEW "O" ring for proper placement on hose. Rotate hose to ensure freedom of movement. Bleed hydraulic system. See BLEEDING .

PILOT BEARING

Removal & Installation

NOTE: DO NOT use grease under pressure to force pilot bearing from crankshaft, or damage may result.

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Remove driveline support assembly and transmission. See **CLUTCH ASSEMBLY** .
Remove pressure plate and clutch disc. Using Pilot Bearing Remover (J-23907), remove clutch pilot bearing. Using Clutch Alignment Arbor/Pilot Bushing Installer (J-38836), install clutch pilot bearing. To install, reverse removal procedure. Tighten all bolts and nuts to specification. See **TORQUE SPECIFICATIONS** .

RELEASE BEARING

Removal

Remove driveline support assembly and transmission. See **CLUTCH ASSEMBLY** .
Remove clutch release bearing. Rotate bearing in either direction. Compression spring load will push release bearing off end of clutch actuator cylinder.

Installation

DO NOT grease new clutch release bearing. New clutch release bearing is prelubed. Firmly push clutch release bearing into place. Release bearing will snap over retainer tab. To install, reverse removal procedure. Tighten all bolts and nuts to specification. See **TORQUE SPECIFICATIONS** .

OVERHAUL

HYDRAULIC COMPONENTS

NOTE: Manufacturer recommends replacement of faulty clutch actuator and master cylinders, and does not provide overhaul procedures.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Back-Up Light Switch	15 (20)
Differential-To-Transmission Bolt	37 (50)
Driveline Support Assembly-To-Engine Flywheel Housing Mounting Bolt	37 (50)
Exhaust Hanger Bolt	37 (50)
Exhaust Take-Down Pipe Flange Nut	15 (20)
Flywheel Housing-To-Engine Bolt	37 (50)
Flywheel Inspection Cover Bolt	18 (25)
Flywheel-To-Crankshaft Bolt ⁽¹⁾	
Step 1	15 (20)
Step 2	37 (50)

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Step 3	74 (100)
Intermediate Exhaust Pipe Bolt	37 (50)
Lower Ball Joint Stud Nut	
Step 1	15 (20)
Step 2	Additional 3 1/2 Flats
Step 3	Minimum 41 (56)
Muffler Hanger Bolt	12 (16)
Outer Tie Rod End Stud Nut	
Step 1	15 (20)
Step 2	Additional 160 Degrees
Step 3	33 (45)
Pressure Plate-To-Flywheel Bolt	47 (64)
Rear Crossmember Mounting Bolt/Nut ⁽²⁾	81 (110)
Rear Drive Axle Spindle Nut	118 (160)
Reverse Lock-Out Solenoid Bolt	30 (41)
Shift Control Assembly Mounting Bolt	22 (30)
Shift Rod Clamp Bolt	22 (30)
Shock Absorber Mounting Bolt	
Lower	162 (220)
Upper	22 (30)
Skip Shift (Gear Select) Solenoid Bolt	37 (50)
Tie Rod Jam Nut	44 (60)
Transmission-To-Driveline Support Bolt	37 (50)
Transmission Mount-To-Rear Crossmember Bolt	37 (50)
Transverse Spring Mounting Bracket Bolt	46 (62)
Wheel Hub Mounting Bolt	96 (130)
INCH Lbs. (N.m)	
Clutch Actuator Cylinder Bolt	106 (12)
Console Retaining Nut	89 (10)
Driveline Tunnel Closeout Panel Bolts	89 (10)
Instrument Panel Trim Plate Screw	27 (3)
Shift Control Closeout Cover Nut	106 (12)

(1) Apply Threadlock (12345382) to all bolts.

(2) Always use NEW bolts and nuts.