

1998-99 CLUTCHES

RWD - Corvette

DESCRIPTION

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.

ADJUSTMENTS

CLUTCH PEDAL FREE PLAY & PEDAL HEIGHT

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, then continue to hold in position. Release pressure from pressure plate diaphragm spring fingers. Release adjusting ring tension spring stops.

CLUTCH PRESSURE PLATE (ON-VEHICLE)

NOTE: **Following procedure must be performed with aid of an assistant.**

1. Raise and support vehicle. Remove flywheel inspection cover. Have an 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, then continue to hold in position. Have assistant release clutch pedal. Release adjusting ring tension spring stops. Install flywheel inspection cover. Lower vehicle.

BLEEDING HYDRAULIC SYSTEM

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 and memory systems may lose memory data. Driveability problems may exist until computer

systems have completed a relearn cycle. For 1998 models, see **COMPUTER RELEARN PROCEDURES - GENERAL MOTORS** article in **GENERAL INFORMATION** before disconnecting battery. For 1999 models, see **COMPUTER RELEARN PROCEDURES - GENERAL MOTORS** article in **GENERAL INFORMATION** before disconnecting battery.

1. Disconnect negative battery cable. Raise and support vehicle. Remove rear stabilizer bar bolts and straps from rear crossmember. Position stabilizer bar downward. Disconnect HO2S connectors. Remove intermediate pipe-to-rear pipe bolts. Remove both side muffler hangars and mufflers. Remove take-down pipe bolts. Remove front and rear exhaust hangar bolts. Remove exhaust intermediate pipe.
2. Remove driveline tunnel closeout panel. Fill reservoir and keep full throughout procedure. Attach hose to bleed screw on actuator and submerge other end in container of hydraulic fluid.

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

3. 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.

TROUBLE SHOOTING

NOTE: For troubleshooting not covered in this article, see appropriate table in **TROUBLE SHOOTING - BASIC PROCEDURES** article in **GENERAL INFORMATION**.

REMOVAL & INSTALLATION

CLUTCH ASSEMBLY & FLYWHEEL

NOTE: To prevent damage while removing or tilting rear of driveline, observe clearance between rear of engine and dash panel. Observe clearance between rear of transmission assembly and underbody. Also, have an assistant insert a putty knife (or similar tool) between shift control bracket on driveline support assembly and brake pipe retainer on driveline tunnel left wall.

Removal

Disconnect negative battery cable. Raise and support vehicle. Remove exhaust system. See **EXHAUST SYSTEM** . Remove driveline support assembly and transmission. See **DRIVELINE SUPPORT & TRANSMISSION** . Remove flywheel housing. Remove pressure plate and clutch plate. See **Fig. 1** . If removing flywheel, mark position and direction of engine flywheel before removal. Mark location of any existing balance weights. Remove flywheel bolts and flywheel.

Inspection (Flywheel Condition)

CAUTION: Replace flywheel if damaged. DO NOT resurface.

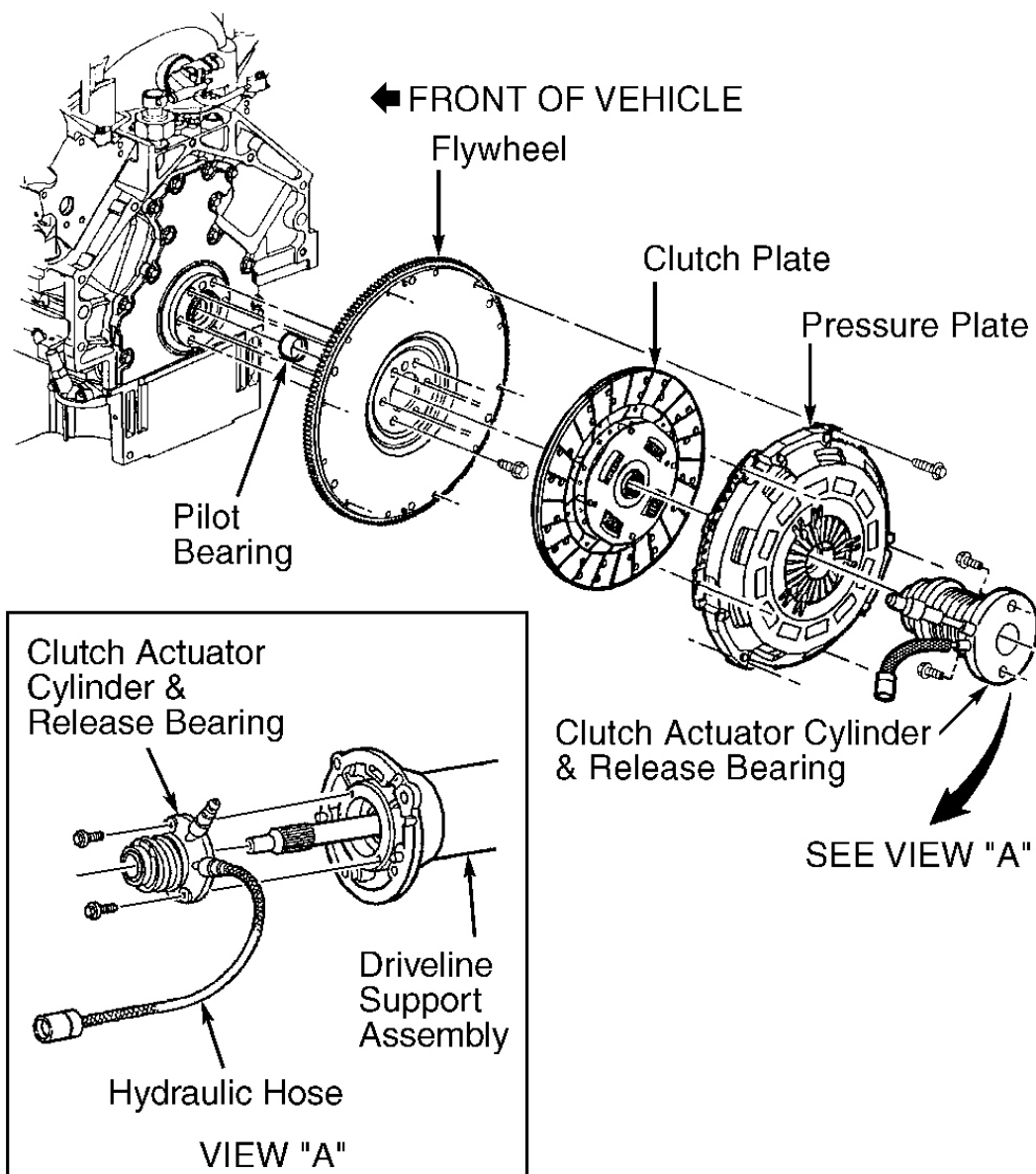
Check for excessive lubricant leakage from internal bearing due to extreme heat. Lubricant may accumulate at bottom of clutch housing if seal has failed. Replace flywheel if excessive lubricant is present. Replace flywheel if flywheel friction surface exhibits signs of excessive heating (burned or heat-checked metal).

Inspection (Flywheel Replacement)

Check old flywheel for balance weight. If weights are installed on old flywheel, new balance weights **MUST** be installed on new flywheel in same locations as found on old flywheel. Balance weights must be either flush with or below face of flywheel.

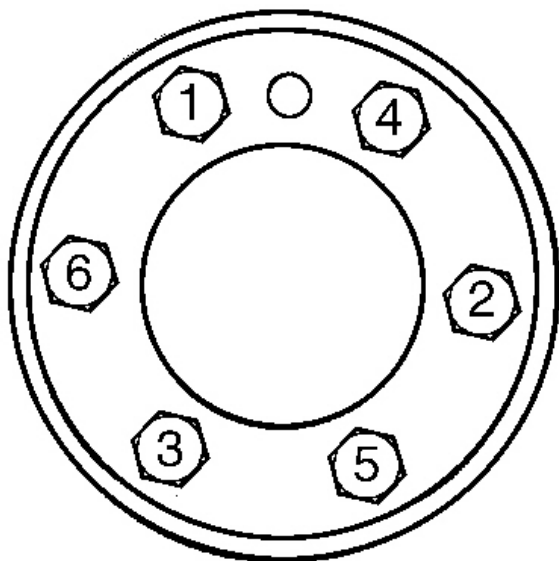
Installation

Align engine flywheel locator hole to crankshaft pin. Tighten flywheel bolts in sequence in 3 steps. Adjust clutch pressure plate. See **CLUTCH PRESSURE PLATE (ON-VEHICLE)** or **CLUTCH PRESSURE PLATE (OFF-VEHICLE)** under ADJUSTMENTS. Tighten clutch pressure plate bolts in sequence over 4 steps. See **Fig. 2** . Apply Loctite No. 262 to bolt threads. Use Clutch Arbor (J-38836) to support and center clutch disc. To complete installation, reverse removal procedure. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** table.



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Fig. 1: Exploded View Of Clutch Assembly
 Courtesy of GENERAL MOTORS CORP.



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Fig. 2: Pressure Plate Tightening Sequence
Courtesy of GENERAL MOTORS CORP.

EXHAUST SYSTEM

Removal & Installation

Disconnect negative battery cable. Raise and support vehicle. Remove rear stabilizer bar bolts and straps from rear crossmember. Position stabilizer bar downward. Disconnect HO2S connectors. Remove intermediate pipe-to-rear pipe bolts. Remove both side muffler hangers and mufflers. Remove take-down pipe bolts. Remove front and rear exhaust hanger bolts. Remove exhaust intermediate pipe. To install, reverse removal procedure.

DRIVELINE SUPPORT & TRANSMISSION

Removal & Installation

1. Disconnect negative battery cable. Remove center console cover. Pry up and remove shifter lever button. Remove set screw and shifter knob. Remove shift control boot. Remove center console trim plate. Remove shift control closeout cover. Remove shift control assembly. Remove instrument panel lower insulator panel.
2. Disconnect clutch push rod from clutch pedal. Raise and support vehicle. Remove clutch actuator hose from retaining clip at rear of engine. Using Clutch Depressor (J-36221), depress release ring on actuator hose while pulling on master cylinder hose to disconnect. Plug hose openings. Remove rear wheels.

Remove intermediate exhaust pipe. Wire muffler assemblies out of way. Remove driveline tunnel closeout panel.

3. Remove rear transverse spring. Support lower control arm with jack. Disconnect left outer tie rod end from suspension knuckle. Remove left lower shock absorber mounting bolt. Disconnect lower ball joint from steering knuckle.
4. Remove jack supporting left control arm. Repeat step 3), on right side of vehicle. Install Transmission Support Fixture (J-42055) onto transmission jack. Position jack and firmly secure jack to transmission. Disconnect wiring harness and brake hose clip from rear crossmember.
5. Remove lower differential-to-transmission nut. Remove transaxle mount-to-rear crossmember nuts. Place a transmission jack under rear crossmember and secure crossmember to jack. Using hand tools, remove rear crossmember retaining nuts.
6. With aid of an assistant, slowly lower rear crossmember and remove from vehicle. Remove transaxle mount-to-differential bolts, and remove mount. Using pry bar, gently release axle shafts from transaxle. Wire axle shafts to underbody.
7. Remove retainers holding wiring harness to driveline support and position out of way. Slowly lower driveline about 2" (50 mm) until electrical connectors can be accessed. Disconnect VSS electrical connector. Disconnect wiring harness retainers from differential rear cover and top of differential.
8. Disconnect back-up light, reverse lockout solenoid, gear select solenoid and transmission fluid sensor electrical connectors from transaxle. Insert a putty knife between edge of shifter bracket on side of driveline support and brake hose retainer on driveline tunnel wall.
9. 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.
10. Release wiring harness retainer along top of transmission. Ensure harness is free of driveline. Place a block of wood under engine oil pan and support engine with jack. Remove 5 driveline support-to-flywheel housing bolts.
11. Carefully bend wiring harness bracket away from driveline to allow clear path for driveline removal.

NOTE: The following steps require the help of an assistant.

12. Have an assistant insert a flat-blade tool between edge of driveline support and flywheel housing. Gently pry driveline loose from engine. With an assistant guiding front of driveline, slowly lower driveline, while watching angle of tilt, until drive shaft at front of driveline just clears flywheel housing.
13. Slowly lower driveline completely out of vehicle. Position chain hoist around transmission while protecting exhaust hangars. Raise transmission with hoist to remove tension on transmission jack. Remove transmission support fixture from jack.
14. Place transmission/driveline assembly on a workbench with hoist still attached. Ensure adequate support is placed around assembly on workbench. Remove hoist from transmission.
15. Remove transmission-to-driveline bolts. Pry driveline assembly away from transmission. Slowly slide driveline support assembly away from transmission while guiding shift rod through opening in support assembly.
16. To install, reverse removal procedure while noting the following:
 - Have an assistant available to help support and guide transmission/driveline assembly back into

place.

- Carefully maintain proper driveline angle when reinstalling assembly into vehicle.
- Use only hand tools when installing NEW crossmember mounting nuts.
- Tighten all bolts and nuts to specification. See **TORQUE SPECIFICATIONS** .

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. Using Quick Disconnect Tool (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 **DRIVELINE SUPPORT & TRANSMISSION** . 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** table. Bleed the clutch hydraulic system. See **BLEEDING HYDRAULIC SYSTEM** .

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.

3. Raise and support vehicle. Remove clutch actuator cylinder hose from hose retaining clip. Using Quick Disconnect Tool (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. 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. Tighten all bolts and nuts to specification. See **TORQUE SPECIFICATIONS** table. Bleed hydraulic system. See **BLEEDING HYDRAULIC SYSTEM** .

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** table. Check NEW "O" ring for proper placement on hose. Rotate hose to ensure freedom of movement. Bleed hydraulic system. See **BLEEDING HYDRAULIC SYSTEM** .

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.

RELEASE BEARING REPLACEMENT

Removal

Remove driveline support assembly and transmission. See **DRIVELINE SUPPORT & TRANSMISSION** . 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 the **TORQUE SPECIFICATIONS** table.

PILOT BEARING

Removal & Installation

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

Remove driveline support assembly and transmission. See **DRIVELINE SUPPORT & TRANSMISSION** . Remove pressure plate and clutch plate. Using Pilot Bearing Remover (J-23907), remove clutch pilot bearing. Using Pilot Bearing Installer (J-38836), install clutch pilot bearing. To install, reverse removal procedure. Tighten all bolts and nuts to specification. See **TORQUE SPECIFICATIONS** table.

OVERHAUL

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

TORQUE SPECIFICATIONS

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Application	Ft. Lbs. (N.m)
Clutch Housing-To-Engine Bolt	37 (50)
Driveline Support Assembly-To-Engine Flywheel Housing Mounting Bolts	37 (50)
Flywheel-To-Crankshaft Bolt	74 (100)
Front Exhaust Hanger Bolt	37 (50)
Intermediate Exhaust Pipe Bolts	37 (50)
Master Cylinder Bolt/Nut	12 (16)
Muffler Hanger Frame Nut	12 (16)
Pressure Plate-To-Flywheel Bolt	47 (63)
Rear Crossmember Mounting Nuts	81 (110)
Rear Exhaust Hanger Bolt	37 (50)
Rear Stabilizer Bar Bolt	40 (54)
Shift Control Mounting Bolt	20 (27)

Shift Rod Clamp Bolt	20 (27)
Shock Absorber Lower Mounting Bolts	162 (220)
Shock Absorber Upper Mounting Nut	22 (30)
Stabilizer Shaft Insulator Lower Clamp Bolts	70 (95)
Stabilizer Shaft Insulator Upper Clamp Bolts	49 (65)
Stabilizer Shaft Link Nuts	53 (72)
Take Down Exhaust Pipe Bolts	15 (20)
Tie Rod Nut	33 (45)
Tie Rod Nut-To-Crossmember	59 (80)
Transmission-To-Clutch Housing Bolt	37 (50)
Transmission-To-Driveline Support	37 (50)
Transverse Leaf Spring Anchor Bolts	37 (50)
Upper Control Arm Ball Joint Nuts	41 (55)
Upper Control Arm Mounting Bolts	81 (110)
INCH Lbs. (N.m)	
Concentric Actuator Cylinder Bolts	106 (12)