

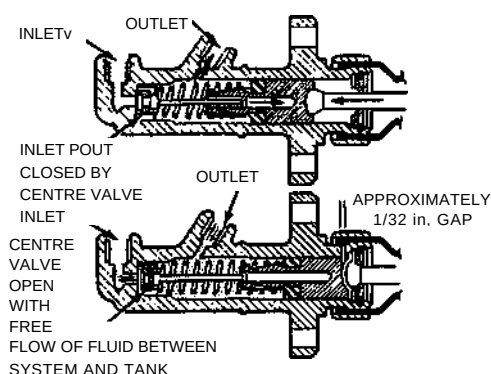
Clutch and Transmission



CLUTCH

Two types of mechanical clutch assemblies have been available on Stingray. The standard clutch is a bent-finger, centrifugal diaphragm unit first introduced in 1963. This design permits heavy plate loads, yet allows low pedal effort without resorting to center booster springs. The second type of clutch is a dual-plate, bent-finger diaphragm model that was available in 1969 and 1970. It was optional on the 427/454 high performance engines and requires a 14 in. diameter ring gear. The throwout bearing used with 1963 and 1981 models is 1 $\frac{1}{2}$ " long; the bearing used with 1964-80 models is 1 $\frac{1}{4}$ " long. DO NOT replace either of these bearings with the 17s" unit which is popular in other Chevrolet models.

1984 and later models use a hydraulic clutch system. The hydraulic system consists of a master cylinder and a slave cylinder. When pressure is applied to the clutch pedal (pedal depressed), the push rod contacts the plunger and pushes it up the bore of the master cylinder. In the first $\frac{1}{2}$ in. of movement, the center valve seal closes the port to the fluid reservoir tank and as the plunger continues to move up the bore of the cylinder, the fluid is forced through the outlet line to the slave cylinder mounted on the clutch housing. As fluid is pushed down the pipe from the master cylinder, this in turn forces the piston in the slave cylinder outward. A push rod is connected to the slave cylinder and rides in the pocket of the clutch fork. As the slave cylinder piston moves rearward the push rod forces the clutch fork and release bearing to disengage the pressure plate from the clutch disc. On the return stroke (pedal released), the plunger moves back as a result of the re-

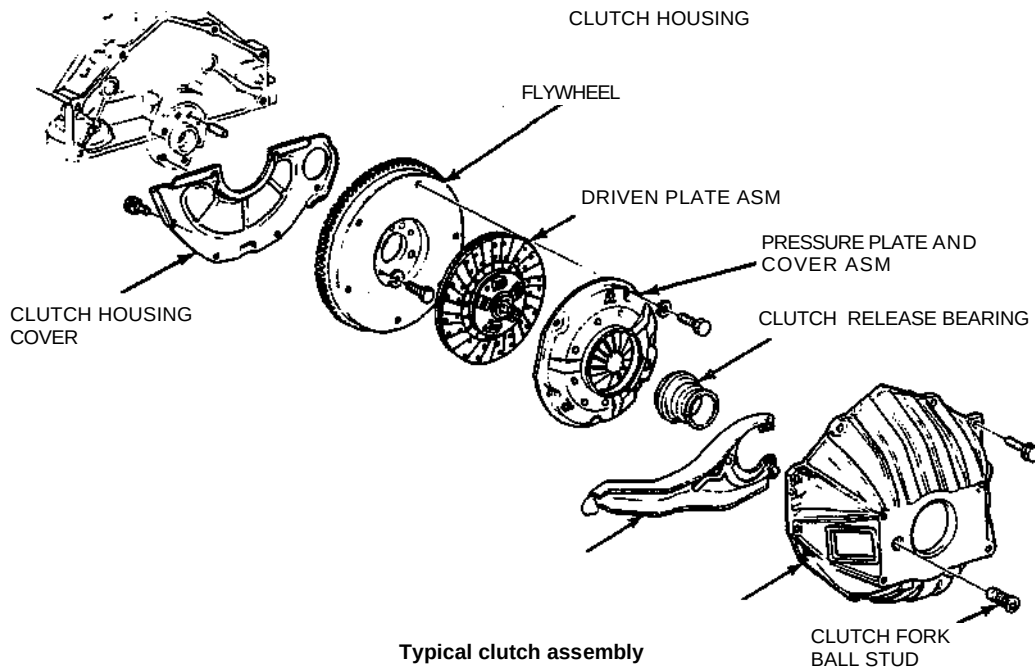


Cross section of master cylinder on 1984 and later hydraulic clutch system

turn pressure of the clutch. Fluid returns to the master cylinder and the final movement of the plunger lifts the valve seal off the seat, allowing an unrestricted flow of fluid between system and reservoir. A piston return spring in the slave cylinder preloads the clutch linkage and assures contact of the release bearing with the clutch release fingers at all times. As the driven disc wears, the diaphragm spring fingers move rearward forcing the release bearing, fork and push rod to move. This movement forces the slave cylinder piston forward in its bore, displacing hydraulic fluid up into the master cylinder reservoir, thereby providing the "self-adjusting" feature of the hydraulic clutch linkage system.

Before attempting to repair the clutch, transmission, hydraulic system or related linkages for any reason other than an obvious Mure, the problem and probable cause should be identified. A large percentage of clutch and manual transmission problems are manifested by shifting difficulties such as high shift

CLUTCH FORK



Typical clutch assembly

effort, gear clash and grinding or transmission blockout. When any of these problems occur, a careful analysis of these difficulties should be accomplished and the basic checks and adjustments performed before removing the clutch or transmission for repairs. Run the engine at a normal idle with transmission in neutral and clutch engaged. Disengage the clutch, wait about 10 seconds and shift the transmission to reverse. No grinding noise should be heard. A grinding noise indicates incorrect clutch travel, lost motion, clutch misalignment, or internal problems such as failed dampers, facings, cushion springs, diaphragm spring fingers, pressure plate drive straps, pivot rings, etc.

CAUTION: When servicing clutch parts, do not create dust by grinding or sanding clutch disc or by cleaning parts with a dry brush or with compressed air. (A water dampened cloth—NOT SOAKED—should be used) The clutch disc contains asbestos fibers which can become airborne if dust is created during servicing. Breathing dust containing asbestos fibers may cause serious bodily harm.

REMOVAL AND INSTALLATION

1. Remove the transmission from the car as outlined in this chapter.

2. Disconnect the clutch-fork push rod and spring. On 1984 models, remove the slave cylinder attaching bolts.

3. Remove the bell housing.

4. Install a clutch pilot tool (wooden versions available at most automotive parts stores) to hold the clutch plate during removal.

5. The flywheel and clutch cover are marked with x's for correct assembly, if these are not visible, scribe new marks.

6. Gradually loosen the clutch-to-flywheel bolts one turn at a time until all spring pressure is released.

7. Remove the bolts and remove the clutch assembly.

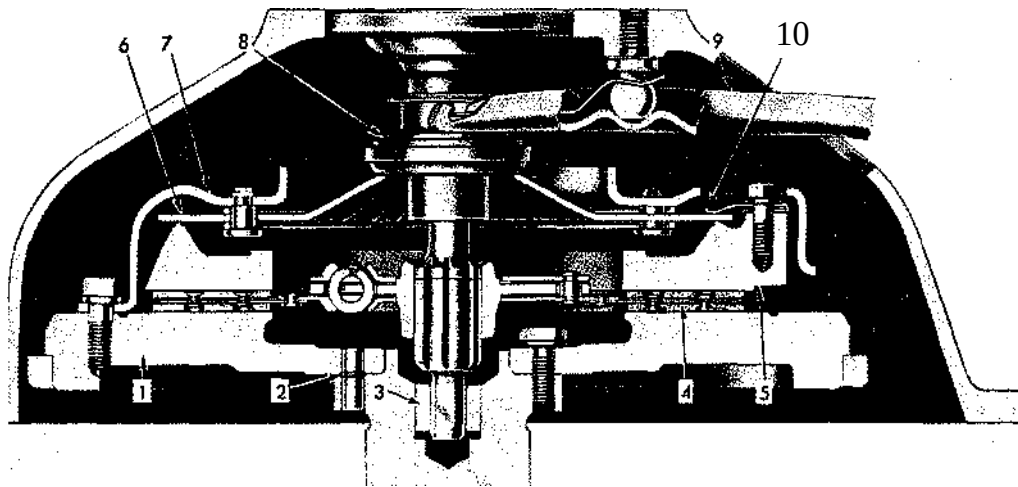
8. To install, crank the engine over by hand until the x-mark on the flywheel is on the bottom.

9. Position the clutch disc and pressure plate in the same relative location as removed and support with the clutch pilot tool.

NOTE: On single-disc models, the clutch disc is installed with the damper springs and slinger toward the transmission. On dual disc models, the discs are installed with the springs away from the flywheel, as shown.

10. Rotate the clutch assembly until the x-marks on the flywheel and clutch assembly align. Align the cover bolt holes with those in the flywheel.

11. Install bolts in every hole and tighten



- | | |
|-------------------|-----------------------|
| 1. Flywheel | 6. Diaphragm spring |
| 2. Dowel hole | 7. Cover |
| 3. Pilot bushing | 8. Throwout bearing |
| 4. Driven disc | 9. Fork |
| 5. Pressure plate | 10. Retracting spring |

Cutaway of single disc clutch

down evenly and gradually. Install the remaining bolts.

12. Remove the clutch pilot tool.

13. Lubricate the ball socket on the clutch fork and reinstall on the ball stud.

14. Pack the recess on the inside of the throwout bearing collar and the throwout groove with graphite grease.

15. Install the bell housing, along with the slave cylinder, if equipped.

16. Install the throwout bearing on the fork. Lubricate the bearing groove.

17. Install the transmission as previously outlined.

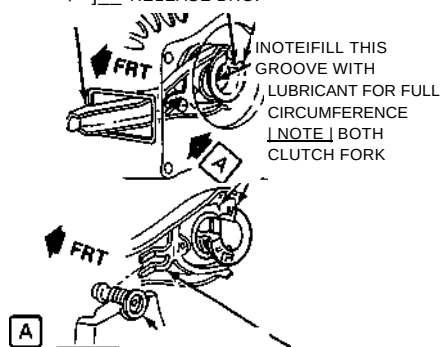
18. Connect the fork push rod and spring.

19. Adjust the free pedal play and check the clutch release position. Lubricate all linkage pivot points.

NOTE: The clutch pilot bearing is an oil impregnated type bearing pressed into the crankshaft. This bearing requires attention when the clutch is removed from the vehicle, at which time it should be cleaned and inspected for excessive wear or damage and should be replaced if necessary.

[NOTE] LIGHTLY COAT FULL CIRCUMFERENCE.

CLUTCH FORK \] _ RELEASE BRG.



FINGERS 81 SPRING TABS MUST BE INSTALLED IN BEARING GROOVE.
* BALL-STUD

VIEW **[NOTE]** BOTH RETAINING SPRING TANGS TO BE INSTALLED TO REAR OF BALL STUD SHOULDER.

Clutch release bearing lubrication points—typical

PEDAL REPOSITIONING

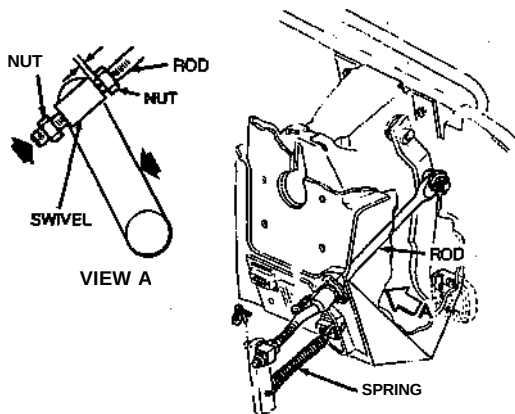
Earlier Corvette clutch linkage includes a provision for a second clutch setting which reduces total pedal travel approximately 1Y2 in. The reduced travel will make the release faster and permit faster gear shifting.

1. Remove the clutch return spring at the cross-shaft and the pedal push rod at the pedal.

2. Loosen the pedal bracket lower bolt, remove the upper bolt, and rotate the bracket so that it will align with the extra upper bolt hole. Install the upper bolt.

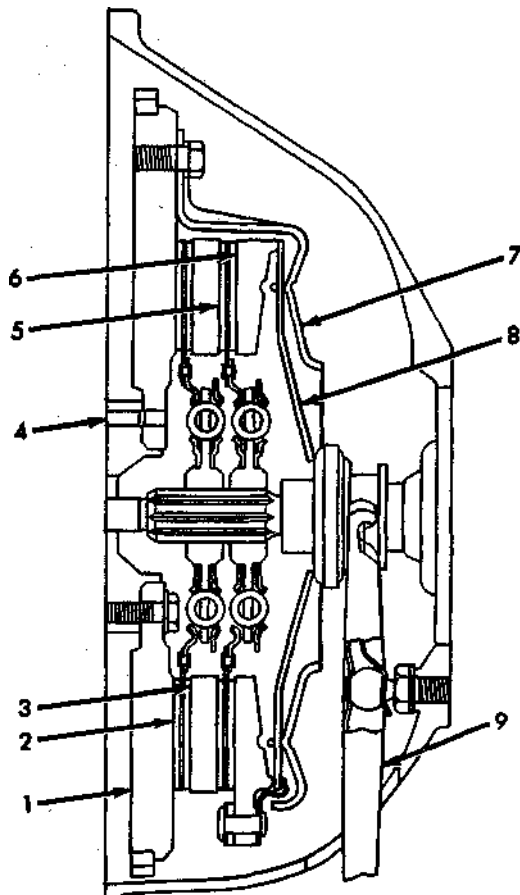
3. Disconnect the pedal push rod at the cross-shaft and turn it V₂ turn. Reconnect the push rod at the cross-shaft.

4. Tighten the bracket bolts and connect the pedal push rod.



Clutch linkage

1. Flywheel
2. Front driven disc
3. Front pressure plate
4. Dowel hole



5. Rear driven disc
Cutaway of dual disc clutch
6. Rear pressure plate
7. Cover
8. Retracting spring
9. Fork

CLUTCH ADJUSTMENT**1963-74**

1. Disconnect the spring between the clutch push rod and cross shaft lever.

2. While holding the clutch pedal against the stop, loosen the two locknuts enough to allow the adjusting rod to move against the clutch fork until the throwout bearing lightly touches the pressure plate springs.

3. Turn the upper nut against the swivel and then back it off $4\frac{1}{2}$ turns. Tighten the bottom locknut to lock the swivel against the top nut.

4. Reinstall the return spring. Pedal free travel, the distance the pedal can be moved before the throwout bearing contacts the pressure plate spring, should be:

- 1963-64 Corvette— $\frac{1}{2}$ -1 in.
- 1965-71 Corvette— $\frac{1}{4}$ -2 in.
- 1969-70 Corvette with HD clutch— $2\frac{1}{2}$ in.
- 1972 Corvette— $1\frac{1}{4}$ - $1\frac{1}{2}$ in.
- 1973 Corvette— $\frac{1}{4}$ - $\frac{1}{2}$ in.
- 1974 Corvette— $1\frac{1}{4}$ in.

1975-81

NOTE: No manual transmission was available in 1982.

1. Disconnect the return spring between the floor and the cross shaft.

2. Push the clutch lever and shaft assembly until the clutch pedal is tightly against the rubber stop under the dash.

3. Loosen the two locknuts on the shaft.

4. Push the shaft until the throwout bearing just touches the pressure plate spring.

5. Tighten the top locknut toward the swivel until the distance between it and the swivel is 0.4 in.

6. Tighten the bottom locknut against the swivel.

7. Check pedal free travel. It should be $1\frac{1}{4}$ in.

BLEEDING HYDRAULIC CLUTCH**1984 and Later Models**

Bleeding air from the hydraulic clutch system is necessary whenever any part of the system has been disconnected, or level of fluid in the reservoir has been allowed to fall so low that air has been drawn into the master cylinder.

1. Fill master cylinder reservoir with new brake fluid conforming to Dot 3 or Dot 4 specifications.

CAUTION: Never, under any circum-

210 CLUTCH AND TRANSMISSION

stances, use fluid which has been bled from a system to fill the reservoir as it may be aerated, have too much moisture content and possibly be contaminated.

2. Raise the vehicle and support it safely.
3. Remove the slave cylinder attaching bolts.

4. Hold slave cylinder at approximately 45° with the bleeder at highest point. Fully depress clutch pedal and open bleeder.

5. Close bleeder valve and release clutch pedal.

6. Repeat Steps 4 and 5 until all air is evacuated from the system. Check and refill master cylinder reservoir as required to prevent air from being drawn through the master cylinder.

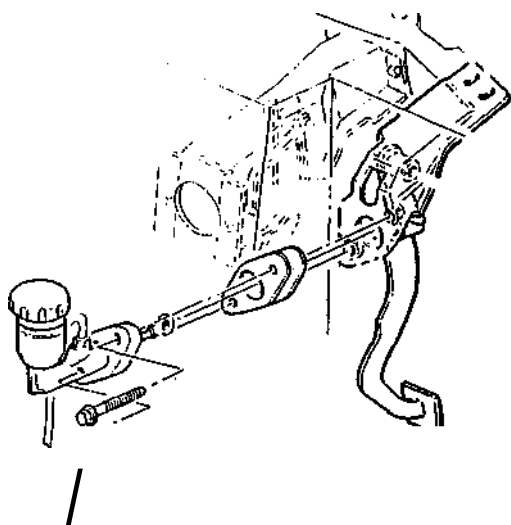
NOTE: *Never release a depressed clutch pedal with the bleeder screw open, or air will be drawn into the system.*

Clutch Master Cylinder

REMOVAL AND INSTALLATION

1984 and Later Models

1. Disconnect negative battery cable.
2. Remove hush panel from under dash.
3. Disconnect push rod from clutch pedal.
4. Disconnect hydraulic line at the clutch master cylinder.
5. Remove the mounting bolts for the master cylinder at the front of dash assembly. Remove master cylinder and overhaul, if necessary, as described later.
6. Install mounting bolts for master cylinder at front of dash. Torque bolts to 15–22 ft. lbs. (20–30 N-m).



20–30 N-m (15–22 FT. LBS.)

Clutch master cylinder mounting—1984 and later

7. Connect hydraulic line at master cylinder.

8. Connect push rod at clutch pedal. Lubricate pivot point.

9. Install hush panel.

10. Fill master cylinder with new hydraulic fluid conforming to Dot 3 or Dot 4 specifications.

11. Raise vehicle and bleed hydraulic clutch system as previously described. Check all hydraulic lines and fittings for damage or leaks.

OVERHAUL

1. Remove filler cap and drain fluid from master cylinder.

2. Pull back the dust cover and remove the circlip.

3. Remove retaining washer and push rod. Tap the master cylinder on a block of wood to eject the plunger assembly from the cylinder bore.

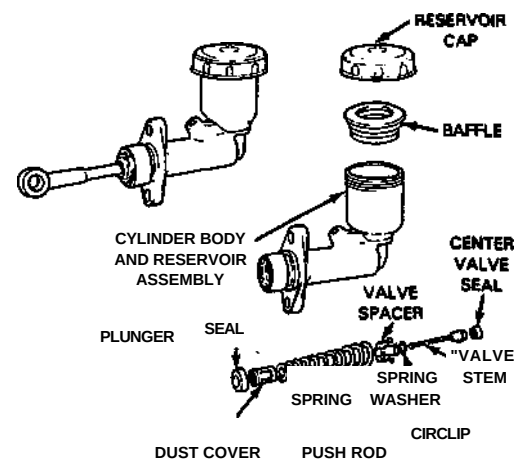
4. Lift the tab on the spring retainer and remove the spring assembly from the plunger.

5. Compress the spring to free the valve stem from the keyhole of the spring retainer.

6. Remove the spring, valve spacer and spring washer from the valve stem and the valve seal from the valve head.

7. Remove the seal carefully from the plunger, ensuring no damage occurs to the plunger surfaces.

8. Replace all seals and clean the remaining parts in clean brake fluid. Inspect the cylinder bore for visible scores and ridges and check that it's smooth to the touch. Replace the master cylinder if any of the above conditions exist.



Exploded view of clutch master cylinder



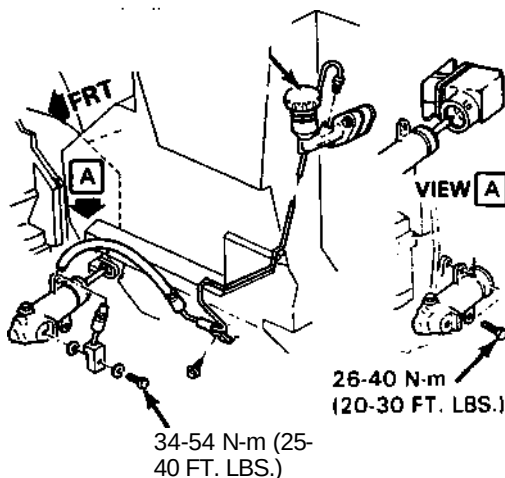
9. Fit the plunger seal to the plunger.
10. Fit the valve seal, smallest diameter leading to the valve head.
11. Position the spring washer on the valve stem so that it flares away from the valve stem shoulder and follow with valve spacer, legs first, and spring.
12. Fit the spring retainer to the spring and compress the spring until the valve stem passes through the key hole slot and engages in the center.
13. Fit the spring to the plunger and press the tab of the spring retainer to secure.
14. Lubricate the seals and the cylinder bore with new hydraulic brake fluid conforming to Dot 3 or Dot 4 specifications.
15. Insert the plunger assembly, valve end leading into the cylinder bore, easing the entrance of the plunger seal.
16. Position the push rod and retaining washer into the cylinder bore. Install a new circlip to retain the push rod. Install dust cover onto the master cylinder. Lubricate the inside of the dust cover with Girling Rubber Grease or equivalent.

NOTE: Be careful not to use any lubricant that will deteriorate rubber dust covers or seals.

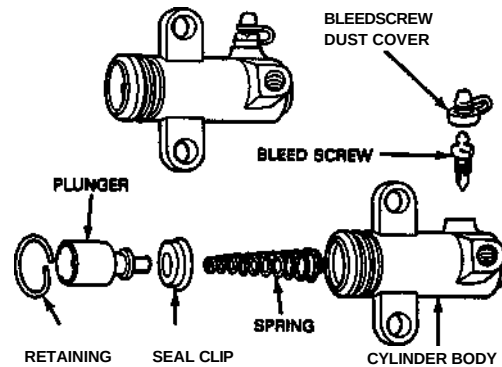
Clutch Slave Cylinder

REMOVAL AND INSTALLATION

1. Disconnect negative battery cable.
2. Raise the vehicle and support it safely.
3. Disconnect hydraulic line at slave cylinder.
4. Remove mounting bolts for the slave cylinder at clutch housing.



Clutch slave cylinder—1984 and later



Exploded view of slave cylinder

5. Remove the push rod and slave cylinder from the vehicle. Overhaul, if necessary, as described later.
5. Install the hydraulic line to the slave cylinder.
6. Fill master cylinder with new brake fluid conforming to Dot 3 or Dot 4 specifications.
5. Bleed the hydraulic system as previously outlined.
5. Install slave cylinder to clutch housing. Lubricate leading end of cylinder with Girling Rubber Lube or equivalent. Torque mounting bolts to 20-30 ft. lbs. (26-40 N-m).

OVERHAUL

1. Remove pushrod and dust cover from the slave cylinder. Inspect the cover for damage or deterioration.
2. Remove the retaining ring.
 1. Tap the slave cylinder on a block of wood to eject the piston and seal.
 2. Replace all seals and clean the remaining parts in clean brake fluid. Inspect the cylinder bore for visible scores and ridges and check that it's smooth to the touch. Replace the slave cylinder if any of the above conditions exist.
3. Lubricate the seal and the piston bore with new brake fluid conforming to Dot 3 or Dot 4 specifications.
4. Position spring on piston.
 1. Install the piston into the cylinder bore, easing the entrance of the plunger seal.
 2. Install the retaining clip.

MANUAL TRANSMISSION

Identification

The manual transmissions used in the 1963-81 Corvettes are the Muncie 3-speed, Sagi-

212 CLUTCH AND TRANSMISSION

naw 3-speed, Muncie 4-speed, and the Warner 4-speed. Identification is determined by the side cover design and linkage. The 3-speed Muncie side cover has two bolts on the side cover top edge and the Saginaw 3-speed one. The Muncie and Warner 4-speeds have the reverse fork mounted in the tailshaft. These two may be differentiated by the shape of the side cover; the Warner has a nine bolt curved bottom and the Muncie a seven bolt straight bottom.

1984 models use a new, computer-controlled 4-speed overdrive manual transmission, which is essentially a combination of two separate transmissions. The first is a conventional 4-speed (83MM) manual system with a 1:1 ratio in 4th gear. The second is a two-speed (overdrive) system electronically controlled by the electronic control module (ECM), which operates with a 1:1 or a .68 to one ratio. By combining these two transmissions, the complete unit is actually capable of operating with seven separate gear ratios; one of which is an overdrive. The two-speed, or overdrive unit performs its function using a planetary gear system in combination with two sets of clutch packs.

The operation of these clutch packs is controlled by a hydraulic circuit which causes the movement of the -main finger plate via a piston and accumulator assembly. The accumulator is used to regulate the speed at which the piston moves, and thus, the speed of the complete shift from direct to overdrive or vice versa. This also serves to reduce shock-loading during speed shifting. The ECM is programmed to control the shift solenoid and thus, the entire overdrive unit. It does this by monitoring both vehicle speed and throttle position. The overdrive mode cannot occur when the 4-speed transmission is in first gear. Overdrive is automatically engaged at speeds above 110 mph. The overdrive mode can be forced off by means of a switch on the vehicle console.

REMOVAL AND INSTALLATION

1963-65 Muncie Three-Speed and 1963 Borg-Warner T-10, Four-Speed

1. Jack the car high enough to provide working clearance.
2. Disconnect the speedometer cable from the transmission. Support with jack-stands.
3. Disconnect the shift linkage from the

shift rods on the transmission. Remove the shift lever assembly and linkage.

4. Remove the driveshaft as described in the driveshaft section of Chapter 7.

5. Support the engine at the rear of the oil pan with a jack.

6. Remove the left and right exhaust pipes.

7. Remove the transmission tailshaft-to-crossmember attaching bracket.

8. Remove the two top transmission-to-bell housing bolts and replace them with two guide pins; these may be fabricated from studs. This will prevent damaging the clutch disc.

9. Remove the bottom two bolts and slide the transmission straight back on the guide pin until the input shaft is clear of the clutch splines.

10. Move the transmission back to clear the bell housing; Tilt the forward end of the transmission down and withdraw from the car.

11. To install, insert a guide pin in the upper right bell housing bolt hole.

12. Raise the transmission and support it on the guide pin.

13. Rotate the transmission and engage the input shaft with the clutch disc. Slide the transmission forward until it bottoms against the clutch housing.

14. Install the two, bottom transmission-to-bell housing bolts. Remove the guide pin, and install the top two bolts. Torque all four bolts to 40-50 ft. lbs.

15. Position the tailshaft mount-to-frame crossmember bracket and install the bolts hand tight. Install the bracket-to-extension mount bolts.

16. Tighten the support bracket-to-frame retaining bolts. Remove the jack from under the oil pan and tighten the bracket-to-extension mount bolts.

17. Install the driveshaft.

18. Install the speedometer cable to the transmission.

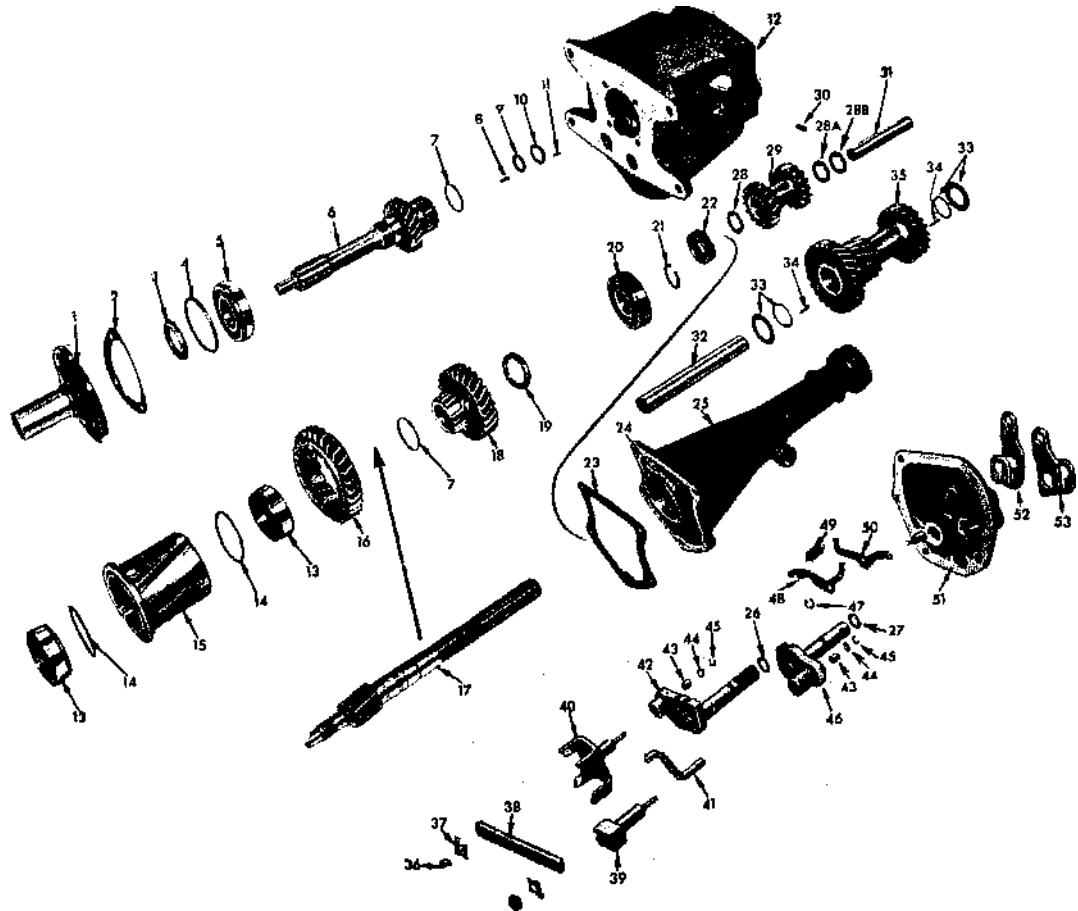
19. Install the shift lever assembly onto the transmission and connect the shift linkage.

20. Refill the transmission with lubricant. Check and adjust the shift pattern, if necessary.

1963-81 Four-Speed and 1966-69 Three-Speed

1. Disconnect the negative cable from the battery.

2. Disassemble the shift lever. Unscrew the ball from the lever, lift out the "T" handle



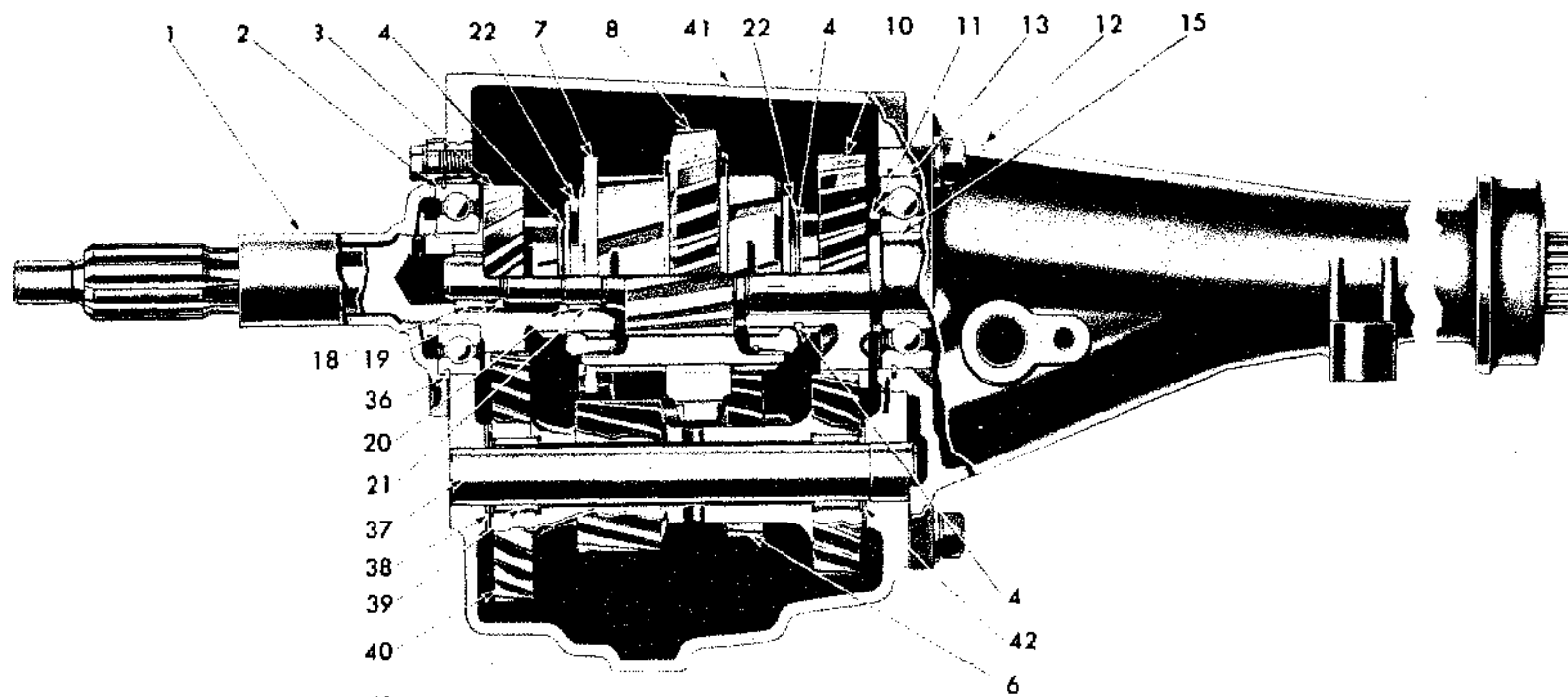
- | | | |
|------------------------------------|--|--|
| 1. Clutch gear bearing retainer | 21. Snap-ring | 37. Shifter interlock retainer stud nut lock |
| 2. Bearing retainer gasket | 22. Speedometer drive gear | 38. Shifter interlock retainer |
| 3. Bearing nut and oil slinger | 23. Case extension gasket | 39. Second and Third shifter fork |
| 4. Bearing snap-ring | 24. Rear bearing snap-ring | 40. First and Reverse shifter fork |
| 5. Clutch gear bearing | 25. Case extension | 41. Shifter interlock shaft |
| 6. Clutch gear | 26. First and Reverse shifter shaft O-ring | 42. First and Reverse shifter shaft and plate assembly |
| 7. Energizing spring | 27. Second and Third shifter shaft O-ring | 43. Shifter fork spacer |
| 8. Front pilot bearing roller | 28. Thrust washer | 44. Shifter fork washer |
| 9. Thrust washer | 28a. Thrust bearing | 45. Shifter fork retainer |
| 10. Thrust washer | 28b. Thrust bearing washer | 46. Second and Third shifter shaft and plate assembly |
| 11. Rear pilot bearing rollers | 29. Reverse idler gear | 47. Detent cam retainer |
| 12. Transmission case | 30. Reverse idler shaft pin | 48. First and Reverse detent cam |
| 13. Synchronizer ring | 31. Reverse idler shaft | 49. Detent cam spring |
| 14. Snap-ring | 32. Countershaft | 50. Second and Third detent cam |
| 15. Second and third speed clutch | 33. Countergear and roller thrust washers | 51. Side cover |
| 16. First and Reverse sliding gear | 34. Bearing roller | 52. First and Reverse shifter lever (outer) |
| 17. Mainshaft | 35. Countergear | 53. Second and Third shifter lever (outer) |
| 18. Second speed gear | 36. Shifter interlock retainer stud nut | |
| 19. Thrust washer | | |
| 20. Mainshaft rear bearing | | |

Exploded view of Muncie 3-speed

r
o

O
f-

O
DO
>
v)
S
W
tft



- | | | |
|-----------------------------------|---------------------------------|--------------------------|
| 1. Clutch gear bearing retainer | 11. Thrust washer | 22. Synchronizer ring |
| 2. Clutch gear bearing | 12. Case extension | 36. Snap-ring |
| 3. Clutch gear | 13. Mainshaft rear bearing | 37. Countershaft |
| 4. Energizing spring | 15. Mainshaft | 38. Thrust washer |
| 6. Reverse idler gear | 18. Front pilot bearing rollers | 39. Roller bearing |
| 7. Second and Third speed clutch | 19. Thrust washer | 40. Countergear |
| 8. First and Reverse sliding gear | 20. Thrust washer | 41. Transmission case |
| 10. Second speed gear | 21. Rear pilot bearing rollers | 42. Roller thrust washer |

Cross-section of Munice 3-speed

return spring and "T" handle, and remove the anti-rattle bushings. On 1968 and later cars, remove the console trim plate.

3. Jack the car high enough to provide working clearance. Support with jackstands.

4. Remove the driveshaft as described in the driveshaft section of Chapter 7.

5. Remove the exhaust pipe heat deflectors and remove the left and right exhaust pipes. On a large block engine it is necessary to remove the forward stud on each manifold.

6. Remove the two rear-mount, cushion-to-bracket attaching bolts. Support the rear of the oil pan with a jack to take off the load from the rear mount cushion.

CAUTION: Place a board between the oil pan and jack to prevent damage.

7. Remove the three transmission mount bracket-to-crossmember bolts and remove the bracket.

8. Remove the two mount pad-to-transmission bolts and remove the rubber mount cushion and the exhaust pipe.

9. Disconnect the shift linkage by removing the shift levers at the transmission side cover.

10. Disconnect the speedometer cable at the tailshaft. Disconnect the TCS switch wiring, on cars so equipped.

11. Remove the two shift lever-and-bracket bolts; lower and remove the assembly.

12. Remove the four transmission-to-bellhousing bolts and lower left extension bolt on later models.

13. Pull the transmission rearward until it clears the bell housing. Turn the transmission to the left while pulling to the rear.

14. Slowly lower the rear of the engine until the tachometer drive cable on the distributor just clears the horizontal ledge across the front of the firewall.

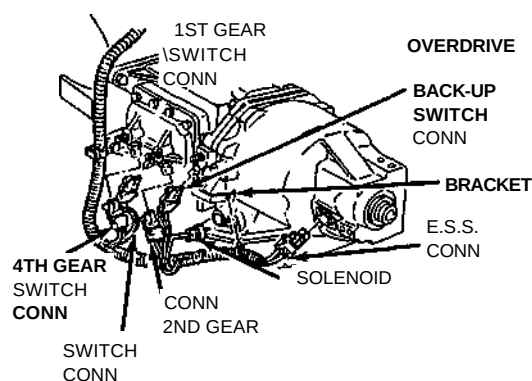
CAUTION: The tachometer cable can be easily damaged.

15. Slide the transmission rearward out from the clutch. Lower the front end of the transmission and remove it from the car.

16. Perform the above steps in reverse order to install the transmission.

1984 4-Speed Overdrive

1. Disconnect the negative battery cable.
2. Remove the air cleaner assembly.
3. Disconnect the throttle valve (T.V.) cable at the left TBI unit.
4. Remove the distributor cap and lay aside.
5. Raise the vehicle and support it safely.



Electrical connectors on 4-speed overdrive transmission

6. Remove the complete exhaust system assembly as follows:

- a. Disconnect A.I.R. pipe at the catalytic converter.
- b. Disconnect A.I.R. pipe clamps at exhaust manifold.
- c. Disconnect oxygen sensor electrical lead.
- d. Remove the bolts attaching the mufflers to the hangers.
- e. Remove hanger bracket at the converter.
- f. Disconnect the exhaust pipes from the exhaust manifolds and remove the exhaust system.

7. Remove the exhaust hanger at the transmission.

8. Support the transmission with a jack.

9. Remove the bolts attaching the driveline beam at the axle and transmission. Remove the driveline beam from the vehicle.

10. Mark the relationship of the propeller shaft to the axle companion flange. Remove the trunnion bearing straps and disengage the rear universal joint from the axle. Slide the propeller shaft slip yoke out from the overdrive unit and remove shaft from the vehicle.

11. Disconnect the cooler lines at the overdrive unit.

12. Disconnect the T.V. cable at the overdrive unit.

13. Disconnect the shift linkage at the side cover.

14. Disconnect the electrical connectors at the side cover switches, backup light switch, overdrive unit and speedometer sensor.

15. Lower the transmission and support the engine.

16. Remove the bolts attaching the transmission to the bellhousing. Slide the trans-

216 CLUTCH AND TRANSMISSION

mission rearward to disengage the input shaft from the clutch. Remove the transmission from the vehicle.

17. Inspect the clutch components for signs of wear or heat damage. See the Clutch Section, if necessary.

18. Installation is the reverse of removal. Clean and repack the clutch release bearing.

19. Refer to the Rear Suspension Section for installation and specifications for the driveline beam.

20. Torque all fasteners to specifications. Do not overtighten.

21. Adjust the throttle valve (T.V.) cable.

22. Refill the transmission with fluid—(4 Speed) SAE-80W or SAE-80W-90 GL-5 gear lube (Overdrive Unit) Dexron II Automatic Transmission Fluid.

CAUTION: Do not over-torque the bolts attaching the driveline beam to the transmission. Over-torquing can damage the bushing and seal in the overdrive unit and result in fluid leakage. Inadequate fluid level will damage the transmission.

LINKAGE ADJUSTMENT

1963 Muncie Three-Speed

1. Position both transmission side-cover selector fork levers and the shift lever in Neutral.

2. Attach rod to lever, then adjust the clevis on its opposite end until the clevis pin will freely enter the side cover lever.

3. Insert the pin and secure it with a cotter pin.

4. Position the shift lever so that it acti-

vates the first and reverse lever, but still remains in Neutral.

5. Attach the first/reverse shift rod to the shift lever, adjust the clevis as done with the other shift rod, and secure it to the selector lever.

6. Tighten the locknuts on both shift rod clevis fittings, and check the shift pattern for correct operation.

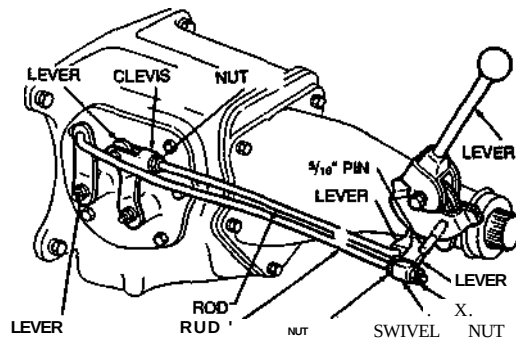
1964-68 Three-Speed

1. Set the side cover selector levers in Neutral and position the shift lever in Neutral and lock it in place with a $\frac{5}{16}$ in. (early models) or $\frac{41}{64}$ in. (late models) locating pin.

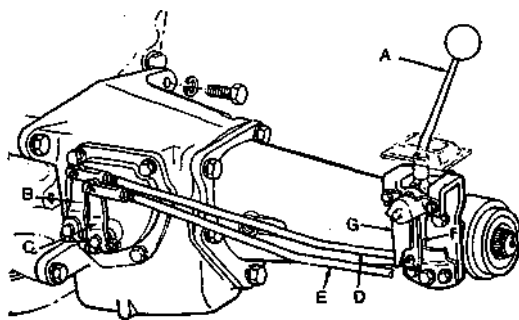
2. Attach the first and reverse rod as with earlier transmissions and secure it.

3. Attach the second/third shift rod and attach it in the same manner.

4. Secure the locknuts on the clevis of each rod, then withdraw the locating pin and check the shift pattern.



1965-68 3-speed linkage



- A. Shift lever
- B. 2-3 fork lever
- C. First/Reverse fork lever
- D. 2-3 shift rod
- E. First/Reverse shift rod
- F. 2-3 shift lever
- G. First/Reverse shift lever

1963-64 3-speed linkage

1969 Three-Speed with Backdrive

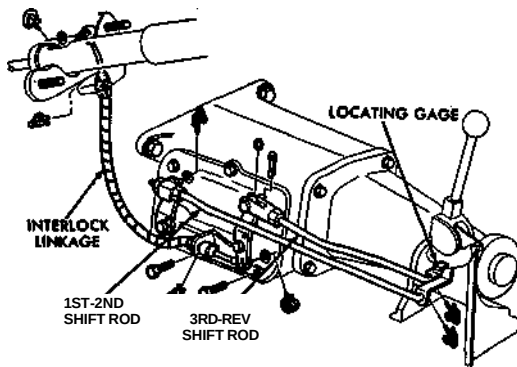
1. Place the ignition switch in the OFF position and the side cover selector levers in Neutral.

2. Position the shift lever in Neutral and secure it with a $\frac{41}{64}$ in. locating gauge, between the shift lever notch and the linkage bracket.

3. Adjust the clevis of each rod so that they freely enter the attachment locations on their respective ends. Secure the locknuts, remove the gauge, and shift the transmission into Reverse.

4. Loosen the bracket assembly on the dash and allow any tension in the backdrive cable to position the bracket.

5. Secure the bracket and switch the key from "off" to "lock." Binding of the key will



1969 3-speed linkage

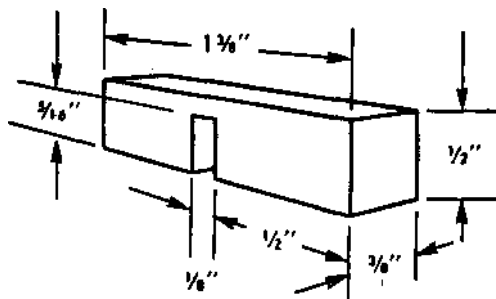
necessitate readjustment of the interlock mechanism.

6. Check the shift pattern.

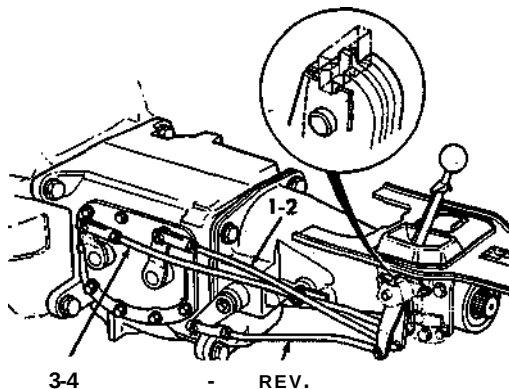
1963 Borg-Warner, T-10 Four-Speed

The illustrated wooden gauge, if made, will greatly aid in shift linkage adjustment.

1. Put the shift lever in Neutral, install the block gauge, and remove the clevis pin from the clevis of each shift rod.
2. Adjust the threaded clevis until the



Borg-Warner T-10 adjustment gauge



1963—Borg Warner T-10 linkage

clevis pin freely enters the holes in the clevis and the selector levers.

3. Secure the pins and lock the clevis securing nuts.

Remove the gauge block and check the shift pattern. Minor adjustment of the rods may be necessary to remove all traces of shifting roughness.

1963-68 Murrchie Four-Speed

1. Position the individual selector levers and the shift lever in Neutral.

2. Construct a block gauge $1\frac{1}{2}$ in. thick by $\frac{1}{4}$ in. wide and install it in the shift lever bracket assembly.

3. Attach the first/second shift rod to the lever. Hold the lever against the gauge block and adjust the threaded swivel on the shift rod until the clevis pin freely enters the clevis hold and hole in selector lever. Secure the locking nuts.

4. Repeat the procedure and attach the reverse rod to the selector lever, and the bracket lever. Repeat again to adjust the third/fourth rod.

5. Remove the block gauge, check the pattern for correct shifting, and adjust, if necessary, to correct minor shifting, and adjust, if necessary, to correct minor shifting difficulties.

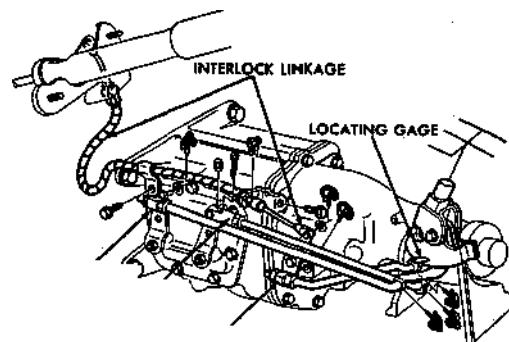
6. An alternate clevis pin hole is placed on each selector lever below the regular pattern hole. This lower placement of the shift rods will tighten the pattern and permit shorter shift lever movement for a faster shift. Bear in mind, however, that this adjustment will increase the shifting effort.

1969-77

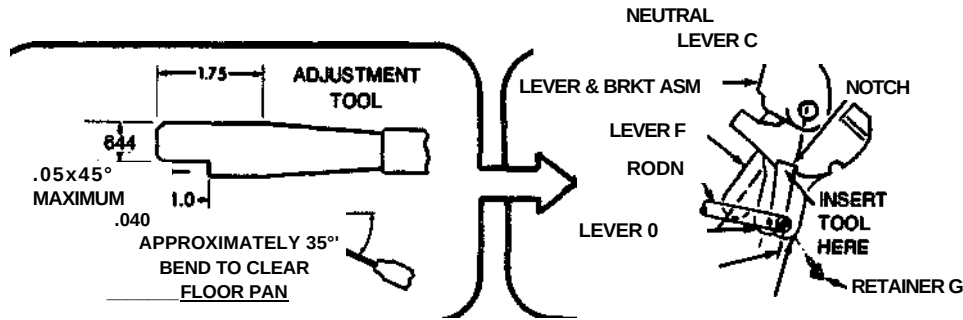
1. Place the ignition switch in "lock."
2. Loosen locknuts at swivels on shift rods and reverse control rod.

3RD.4TH _
1ST-2ND
REVERSE

1964-77 4-speed linkage—typical



218 CLUTCH AND TRANSMISSION



Shift linkage adjustment—1978-81. The locating gauge is shown on the left.

3. Set transmission shift levers in neutral positions.

4. Shift lever into neutral. Insert locating gauge, $\frac{1}{8}$ thick x $\frac{1}{4}$ wide x 3 in. long, into control lever bracket assembly.

5. Hold each lever against the gauge and adjust in turn. Tighten shift rod locknuts and remove gauge.

6. Loosen the interlock bracket assembly bolts at the bottom of the steering column. Make sure that the bracket is not stuck to the dash and then tighten the bracket again.

7. Move the ignition key through "off" and "lock" positions. If there is any binding, readjust the interlock linkage.

1978-81

1. Place the shift lever in the Neutral position.

2. Raise the vehicle and support it safely with jackstands.

3. Disconnect the shift rods from the transmission levers.

4. Perform this step for each of the transmission levers individually: Rotate the transmission lever counterclockwise (forward detent position) then turn it back until the first detent is felt (Neutral position). This is done to verify that each transmission lever is in its Neutral position.

5. Fabricate a locating gauge according to the accompanying illustration. Insert the locating gauge into the notch of the shifter housing and through the shift levers to properly align the levers. It may be necessary to move the shift lever(s) to install the locating gauge completely.

6. Loosen the locknuts of the 3-4 shift rod swivel (front of transmission side cover) and turn the swivel as necessary to allow the swivel to easily enter the hole of the 3-4 transmission lever. Apply a slight rearward pressure to the transmission lever and tighten the swivel locknuts. Attach the shift rod to

the transmission lever with the retaining clip (and washer, if used).

7. Repeat step 6 for the 1-2 and reverse shift rods.

8. Remove the locating gauge and lower the vehicle.

NOTE: After the adjustments have been made, the centerlines of the shifter levers must be aligned to prevent rubbing.

1984 and Later

1. Disconnect the negative battery cable.

2. Remove the left seat from the vehicle.

If equipped with power seats, disconnect the electrical leads.

3. Remove the shift knob.

4. Remove the console cover.

5. Remove the glove box lock.

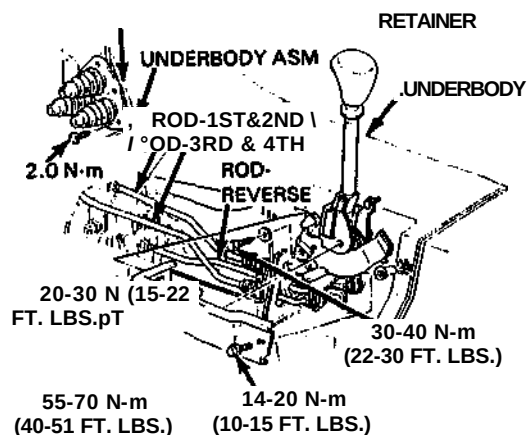
6. Remove the left side panel from the console.

7. Remove the shifter cover.

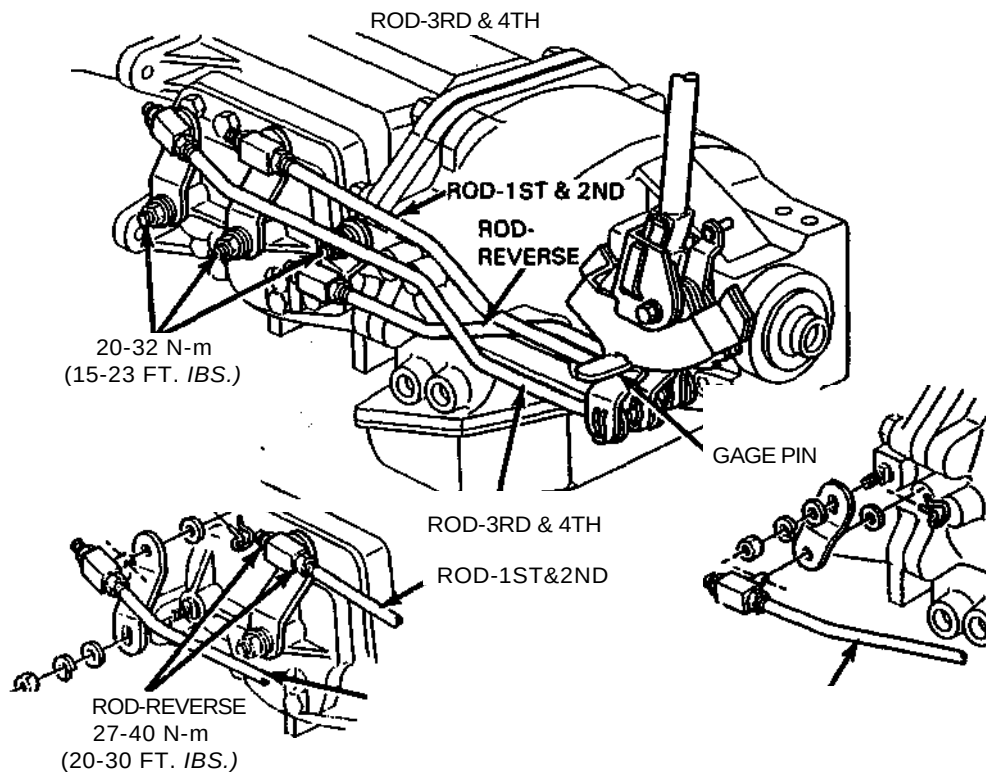
8. Loosen the adjusting nuts on the shifter rods.

9. With the transmission and shifter in neutral, install the alignment pin in shifter as illustrated.

10. Equalize the swivels on all three shift

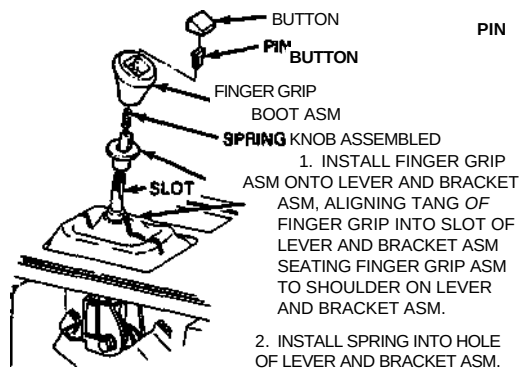


Shifter assembly removal—1984 and later



Linkage adjustments—1984 4-speed overdrive transmission

levers. Hand tighten the forward and rear adjusting nuts at the same time with equal force. Do this for all three shifter rods and then torque the forward and rear adjusting nuts at the same time to specifications.



1. INSTALL FINGER GRIP ASM ONTO LEVER AND BRACKET ASM, ALIGNING TANG OF FINGER GRIP INTO SLOT OF LEVER AND BRACKET ASM SEATING FINGER GRIP ASM TO SHOULDER ON LEVER AND BRACKET ASM.
2. INSTALL SPRING INTO HOLE OF LEVER AND BRACKET ASM.
3. ASSEMBLE KNOB BY TURNING CLOCKWISE ONTO THREADS OF LEVER AND BRACKET ASM UNTIL FIRMLY SEATED IN PLACE. SLOT OF KNOB MUST BE IN LINE WITH SLOT OF LEVER AND BRACKET ASM.
4. ALIGN AND FIRMLY SEAT PIN INTO "T" SLOT OF KNOB AND SLOT OF LEVER AND BRACKET ASM.
6. ALIGN AND ASSEMBLE BUTTON INTO GROOVE OF KNOB THEN FIRMLY SEAT BUTTON IN PLACE AS SHOWN.

Shifter knob removal—1984 and later

11. Reinstall the components removed by reversing Steps 1 through 7. Lubricate all linkage pivot points.

NOTE: //, after adjusting the linkage, it is found that high shift effort still exists, an anti-chatter lubricant (positraction additive) may be used. The lubricant is available in a small plastic bottle and can be squirted into the transmission through the filler plug.

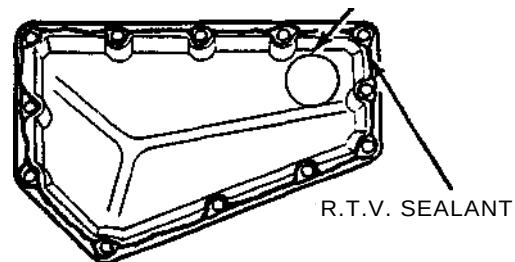
Oil Pan and Filter

REMOVAL AND INSTALLATION

4 Speed Overdrive Only

1. Raise the vehicle and support it safely.
2. With drain pan placed under overdrive

POSITION MAGNET IN



Place magnet as shown when installing oil pan on overdrive unit—1984 and later

CORNER

220 CLUTCH AND TRANSMISSION

oil pan, remove oil pan attaching bolts from front and side of pan.

3. Loosen rear pan attaching bolts approximately four turns.

4. Carefully pry oil pan loose, allowing fluid to drain.

5. Remove remaining bolts and remove oil pan.

6. Drain fluid from oil pan. Clean pan with solvent and dry thoroughly with clean compressed air.

7. Remove filter from the transmission.

8. Install new filter, then install the oil pan using R.T.V. sealer as illustrated.

9. Refill with recommended lubricant. Do not overfill.

AUTOMATIC TRANSMISSION

Identification

The two speed Powerglide transmission was used in the Corvette from 1963-67. From 1967-77, either the Turbo Hydra-Matic 350 (TH350) or the TH400 is used. In the years of 1978-81, the TH350 was the only available automatic transmission. In 1980 (except California models), an electrically controlled locking torque converter was introduced to improve fuel economy. All 1981-82 models have this feature. In 1982, the TH700R-4, four speed automatic transmission is the only transmission available in the Corvette. The TH700R-4 is an option on the 1984 model. Identification of the 1967-77 transmissions can be made by the shape of the oil pan.

OIL PAN AND FILTER SERVICE

NOTE: *The fluid should be drained while the transmission is warm.*

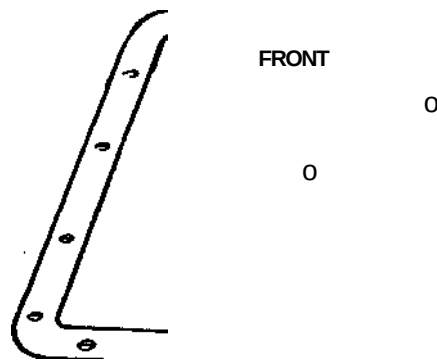
1. Using a jack, raise the front of the vehicle and support it safely with jackstands. If the transmission pan has no drain plug, visually check that you can gain access to all of the transmission pan bolts. If you can, proceed to step 8; if not, proceed to step 2.

2. Place a jack under the transmission with a block of wood (a piece of a 2 x 4 will do) between the jack and the transmission pan.

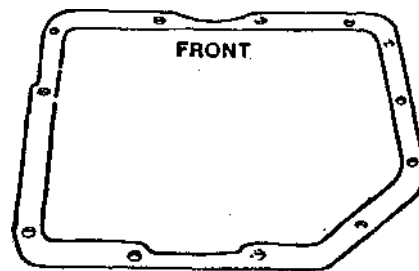
3. Raise the jack until the wood block contacts the transmission pan.

4. Remove the crossmember-to-transmission mount bolts and the crossmember-to-frame bolts.

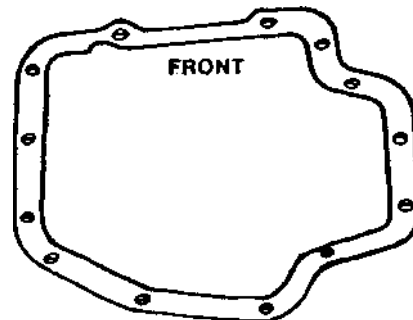
5. Raise the transmission SLIGHTLY—



Powerglide transmission



Turbo Hydra-Matic 350



Turbo Hydra-Matic 400

0

0

700R4

just enough to take the weight of the transmission off of the crossmember.

6. Turn the crossmember sideways and remove it.

7. Place a jackstand close to the transmission tailshaft. Lower the jack until the transmission rests on the stand. Remove the jack and the wood block.

8. Place a drain pan under the transmission pan. If the pan has a drain plug, remove it and allow the fluid to drain.

9. If the pan does not have a drain plug, remove the pan bolts from one side of the pan and loosen the rest of the bolts. This will allow the pan to partially drain. Remove the remaining pan bolts and carefully lower the pan away from the transmission.

NOTE: *If the transmission fluid is dark or has a burnt smell, transmission damage is indicated. Have the transmission checked professionally.*

CAUTION: *If the pan sticks, carefully tap sideways on the pan with a rubber mallet or a plastic hammer to break the pan loose. DO NOT dent the pan. Avoid prying the pan off with a screwdriver—this can bend the pan or crack the transmission case.*

10. Empty the pan, remove the gasket material, and clean the pan with solvent (carburetor cleaner works well).

11. Remove any gasket material which may remain on the transmission case.

12. Remove the transmission filter from the valve body. The filter may have either a fibrous or screen filtering element and is retained by one or two fasteners.

13. Install a new filter using a new gasket or O-ring (TH400's).

NOTE: *// the transmission uses a filter having a fatty exposed screen, it may be cleaned and re-used.*

14. Install the pan using a new gasket. Tighten the bolts to 12-14 ft. lbs. in a criss cross pattern. Recheck the bolt torque after all of the bolts have been tightened once.

15. Add either Dexron or Dexron II transmission fluid through the filler tube. See the Capacities Chart to determine the proper amount of fluid to be added.

CAUTION: *DO NOT OVERFILL the transmission; foaming of the fluid and subsequent transmission damage due to slippage will result.*

16. With the gearshift lever in PARK, start the engine and let it idle. Do not race the engine.

17. Move the gearshift lever through each

position, holding the brakes. Return the lever to PARK, and check the fluid level with the engine idling. The level should be between the two dimples on the dipstick, about $\frac{1}{2}$ in. below the ADD mark. Add fluid, if necessary.

18. Check the fluid level after the vehicle has been driven enough to thoroughly warm up the transmission. Details are given under Fluid Level Checks earlier in Chapter 1. If the transmission is overfilled, the excess must be drained off. Use a suction pump, if necessary.

SHIFT LINKAGE ADJUSTMENT

1963-67 Powerglide

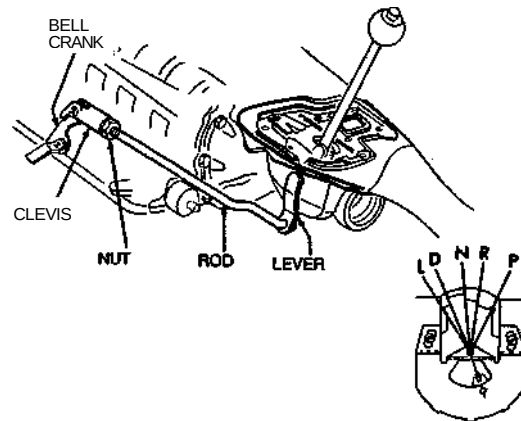
All Powerglides are adjusted in the same manner, although the shift pattern was changed in 1965 from the staggered pattern of 1963-64 to a straight pattern.

1. Disconnect the control rod from the shift lever.

2. Position both the shift lever and the control rod bell crank in Park, then loosen the clevis locknut and rotate the rod until it freely enters the shift lever.

3. Secure the rod to the shift lever and lock the clevis nut.

Powerglide shift linkage



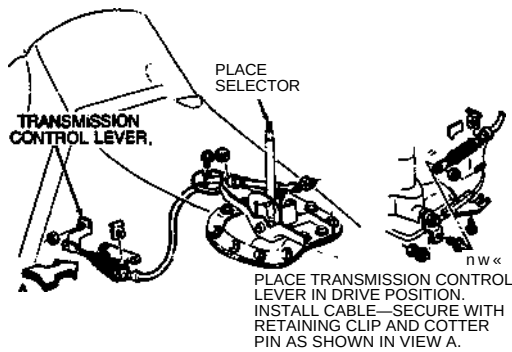
1968-72

1. Disconnect the pushrod at the transmission lever.

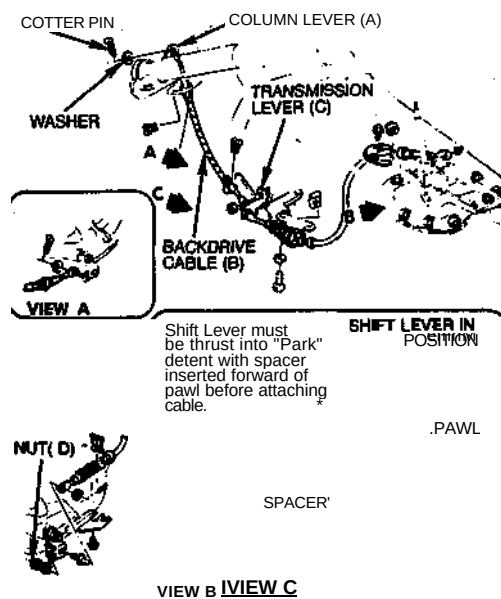
2. With the transmission lever in Drive detent and the selector lever in Drive, rotate the pushrod until the hole lines up with the lever pin.

3. Install the pushrod on the pin and install the retainer clip.

222 CLUTCH AND TRANSMISSION



1968-72 Turbo Hydra-Matic shift linkage



1973-77 Turbo Hydra-Matic shift linkage

4. Check operation of the linkage in all positions.

1973-77 Turbo Hydra-Matic 400

1. Loosen the nut on the transmission lever so that the pin can move in the slot. Remove the console cover.
2. Move the transmission lever counterclockwise to the LI position and then clockwise five detents to Park.
3. Place the shift lever in Park and insert a 0.40 in. spacer in front of the pawl.
4. Tighten the nut on the transmission lever to 20 ft. lbs.
5. Turn the ignition switch to Lock with the shift lever in Park.
6. Remove the cotter pin and washer from the backdrive cable at the column lever. Disconnect the cable.



7. Working under the dash, remove the two nuts at the steering column-to-dash bracket.

8. Turn the lock tube lever counterclockwise (when viewed from the front of the column) to remove any freeplay from the column.

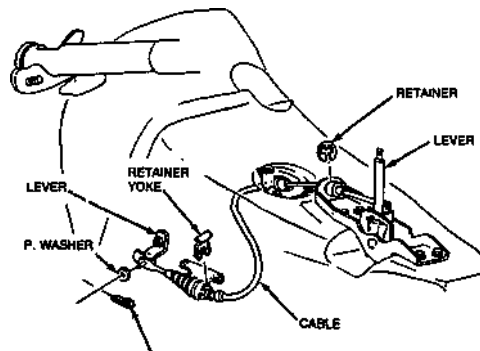
9. Move the bracket until the cable eye passes freely over the retaining pin on the bracket.

10. While holding the bracket in place, have an assistant tighten the bracket retaining nuts.

11. Install the cotter pin and washer to retain the cable to the lever retaining pin.

1978-81 Turbo Hydra-Matic 350

1. Loosen the screw from the swivel so the rod moves within the swivel.
2. Put the transmission control lever in drive (D) and loosen the nubso that the pin moves in the slot of the transmission lever.
3. Position the transmission lever in the "Drive" position by moving the lever counterclockwise to the LI detent and then clockwise three detent positions to "Drive."
4. Tighten the nut to 20 ft. lbs.
5. Position the transmission control lever in the park (P) position and the ignition switch in the "Lock" position.
6. Pull down on the rod slightly against the lock stop and tighten the screw to 20 ft. lbs.



1978-81 Turbo Hydra-Matic shift linkage

1982-84

1. Raise the vehicle and support it safely with jackstands.
2. Disconnect the transmission control cable at the transmission lever. Rotate the transmission lever clockwise to the last detent position.
3. Push the shifter lever as far forward as possible, in the Park position.

4. Check the alignment of the control cable hole against the transmission lever stud. If the cable hole aligns with the stud, attach the cable with the washer and retaining pin; the adjustment is okay. If the stud and hole do not align, loosen the stud mounting nut and slide the stud as necessary to align it with the cable hole. Tighten the stud nut and attach the cable with the washer and retaining pin.

5. Lower the vehicle.

THROTTLE VALVE LINKAGE ADJUSTMENT

1963-67 Powerglide

1. Fully open the lever and pull the rod forward until it contacts the internal transmission stop.

2. Adjust the swivel on the rod until the rod freely enters the lever, and then lengthen three full turns.

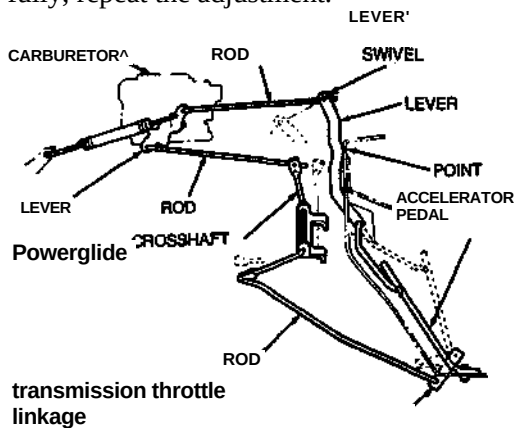
3. Secure the swivel then remove the toe panel carpeting.

4. Fully depress the accelerator pedal until the carburetor lever contacts the firewall.

5. Hold in position and adjust the swivel on the rod for freedom of entry into the lever, then lengthen 2 turns.

6. Check by returning the linkage to idle position and then rotating the lever to fully open.

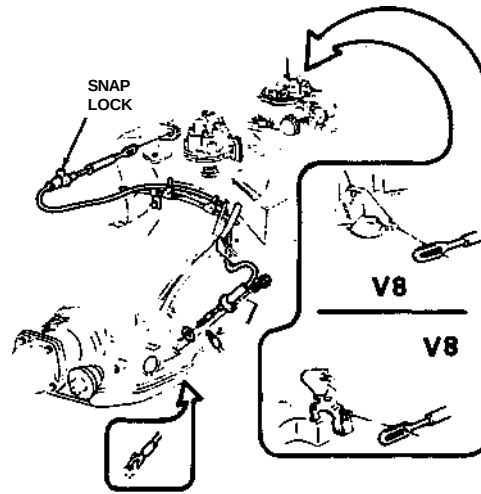
7. Push the lever down to see if the rod deflects. If it does, or if the lever fails to open fully, repeat the adjustment.



THROTTLE VALVE (T.V.) CABLE ADJUSTMENT

1976-80 Turbo Hydra-Matic 350

1. Remove the air cleaner to gain access to the detent cable.



1976-80 Turbo Hydra-Matic 350 detent cable. Note the location of the adjusting snap-lock.

2. Locate the cable adjusting snap-lock which is positioned behind the cable mounting bracket.

3. Release the snap-lock by pushing it upward from underneath.

4. Open the carburetor throttle completely and set the snap-lock by pushing it downward.

5. Install the air cleaner.

1981-84 Turbo Hydra-Matic 350 and 700R-4

1. Remove the air cleaner to gain access to the detent cable.

2. Depress and hold the metal lock tab.

3. Move the slider back through the cable fitting, away from the throttle body or carburetor lever, until the slider stops against the fitting.

4. Release the metal lock tab.

5. Install the air cleaner.

DETENT SWITCH ADJUSTMENT

1968-72 Turbo Hydra-Matic 400

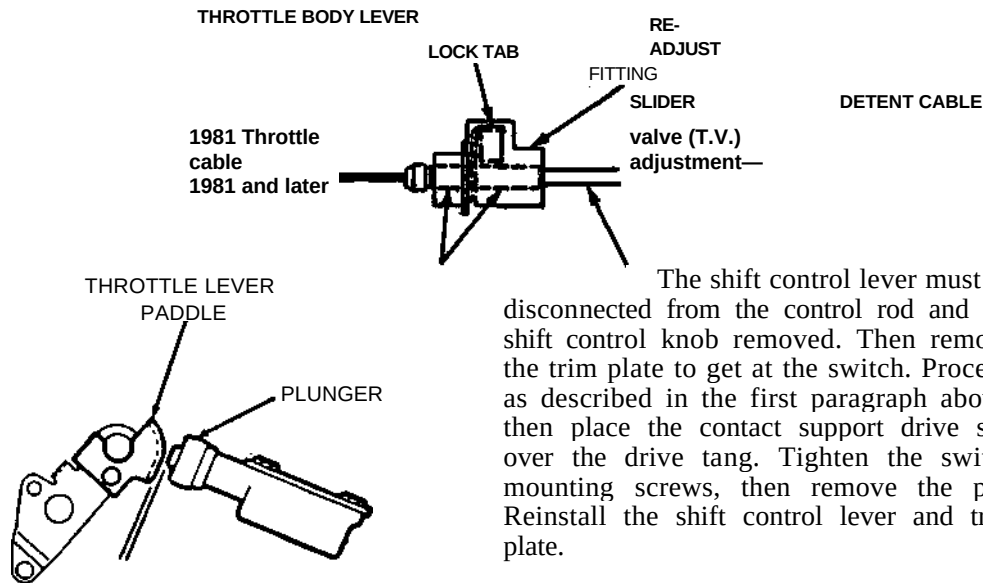
The detent switch is located on the carburetor.

1. Pull the detent switch driver rearward until the hole in the switch body aligns with the hole in the driver.

2. Insert a 0.092 in. pin through the aligned holes to a depth of 0.10 in. to hold the driver in position.

3. Loosen the switch mounting bolt.

224 CLUTCH AND TRANSMISSION



1968-72 detent switch adjustment—Turbo Hydra-Matic 400

4. With the throttle held in wide open position, move the switch forward until the driver contacts the accelerator lever.

5. Tighten the mounting bolt and remove the pin.

1973-77 TURBO HYDRA-MATIC 400

The switch is located over the accelerator pedal. After installing a new switch, adjustment is made by pressing the plunger in. This presets the switch and it will self-adjust the first time the pedal is fully depressed.

NEUTRAL SAFETY SWITCH ADJUSTMENT

1963-65 Powerglide

Adjustment is made by varying the length of the bellcrank-to-switch control rod. One end of the rod has a swivel to allow adjustment.

1966-67 Powerglide and 1968-71 Turbo Hydra-Matic 400

In all models the adjustment is made with the shift lever in Drive position. Loosen the switch mounting screws. Align the slot in the contact support with the hole in the switch and insert a $\frac{3}{32}$ in. pin to hold the support in place.

The shift control lever must be disconnected from the control rod and the shift control knob removed. Then remove the trim plate to get at the switch. Proceed as described in the first paragraph above, then place the contact support drive slot over the drive tang. Tighten the switch mounting screws, then remove the pin. Reinstall the shift control lever and trim plate.

1972 Turbo Hydra-Matic 400

1. Disconnect the shift control lever arm from the control rod.

2. Remove the shift knob.

3. Remove the trim plate.

4. Remove the control assembly retaining screws and lift the assembly away from the seal.

5. Remove the neutral switch from the control assembly.

To install:

6. On early 1972 models put the shifter into Drive or Neutral on later models.

7. Align the hole in the contact support with the hole in the switch and insert a $\frac{3}{32}$ in. pin to hold the support in place.

8. Place the contact support drive slot over the drive tang and tighten the switch mounting screws. Remove the pin.

9. Install the control assembly mounting screws. Connect the switch wiring and check the switch operation.

10. Install the trim plate and shift knob.

11. Connect the shift lever arm to the transmission control rod.

1973 and Later—All Transmissions

Use the 1972 THM 400 procedure outlined previously except that during installation, the shift lever is positioned in Drive. It is only necessary to use the $\frac{3}{32}$ in. pin for alignment when the original switch pin has been sheared off.

LOW BAND ADJUSTMENT**1963-67 Powerglide**

Low band adjustment should be performed at 12,000 mile intervals, or if slipping is encountered.

1. Place the selector lever in Neutral.
2. Jack the car up to the required working height and support with jackstands.
3. Remove the cap from the adjusting screw.
4. Lower the left exhaust pipe for clearance.
5. Loosen the adjusting screw V^* turn and hold with a wrench.
6. Using an in. lbs torque wrench, adjust the band to 70 in. lb and back-off exactly four turns for a band in use over 6,000 miles and three turns for one in use less than 6,000 miles.

NOTE: The locknut must be held at exactly V^* turn loose during the adjustment. The number of back-off turns must be exactly as stated here.



Low band adjustment (Powerglide)

7. Tighten the locknut to 15 ft. lbs.

NOTE: Band and/or clutch adjustments are not required on Turbo Hydra-Matic 350, 400, or 700R-4 transmissions.