

# CLUTCH, MANUAL TRANSMISSIONS

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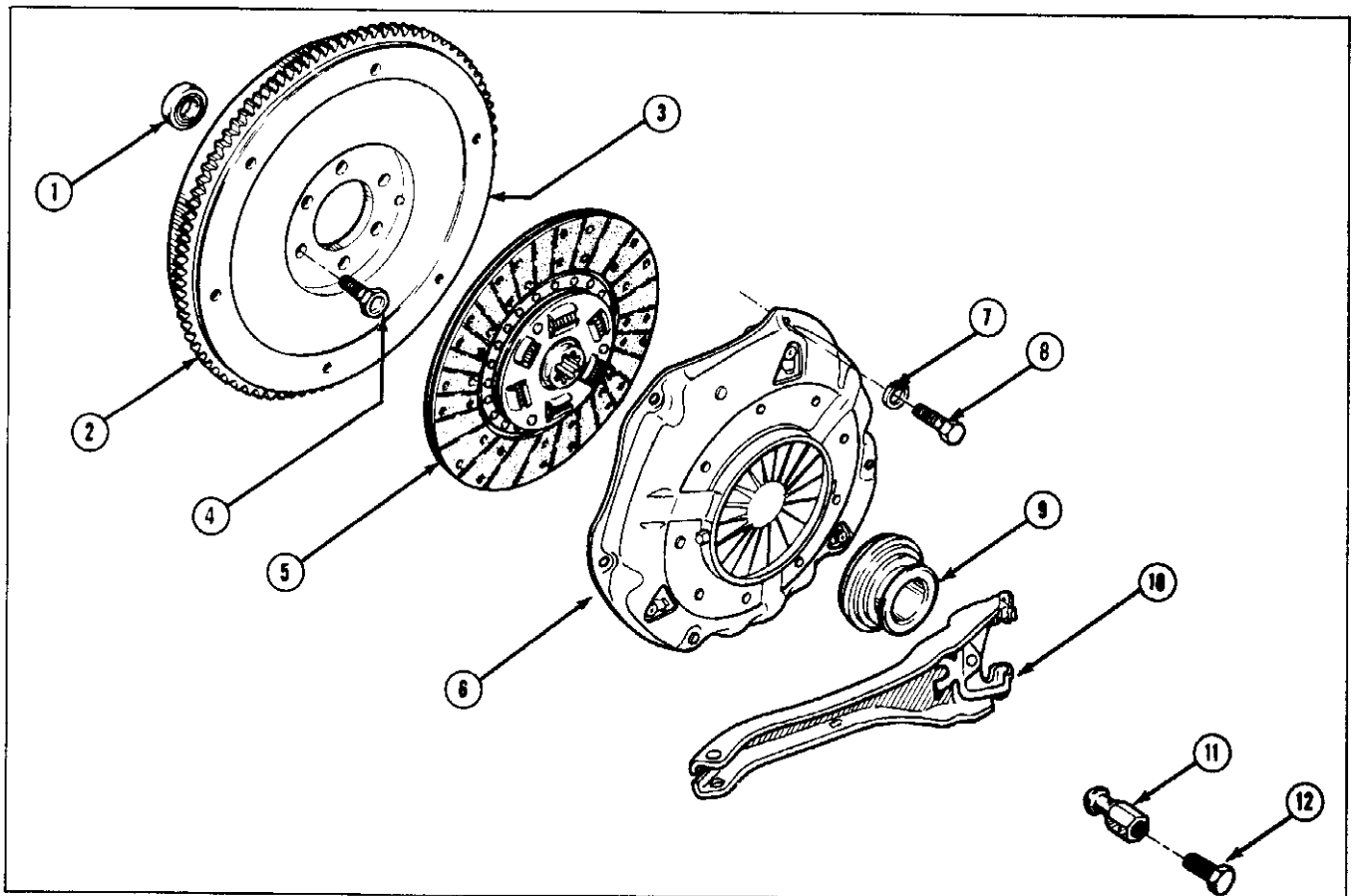
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## GENERAL DESCRIPTION

A single plate, dry disc-type clutch is used on all cars with manual transmission. The clutch assembly consists of the clutch driven plate assembly, clutch cover and pressure plate assembly, and the clutch release mechanism (Fig. 7-1).

Pontiac - Two basic clutches are offered for 1967, the standard and heavy duty. Driven plate diameter of the standard clutch is 10.4 inches. Heavy duty clutch diameter is 11 inches.

Tempest - Each Tempest clutch contains one of four different clutch driven plates:



- |                                    |   |   |                                      |
|------------------------------------|---|---|--------------------------------------|
| 1. Crankshaft Clutch Pilot Bearing | 5. Clutch Driven Plate (with facings)       | 7. Clutch Cover to Flywheel Bolt Washer | 10. Clutch Release Fork              |
| 2. Flywheel Ring Gear              | 6. Clutch Cover and Pressure Plate Assembly | 8. Clutch Cover to Flywheel Bolt        | 11. Clutch Release Fork Ball         |
| 3. Engine Flywheel                 |   | 9. Clutch Release Bearing               | 12. Clutch Release Ball Support Bolt |
| 4. Flywheel to Crankshaft Bolt     |   |   |                                      |

Fig. 7-1 Clutch and Flywheel Assembly — Exploded View (Typical)

- 1 - Single Bbl. - 6 cyl.
- 2 - 4 Bbl. - 6 cyl.
- 3 - 326 cu. in. - V-8.
- 4 - G.T.O.

The differences are in disc size and damper spring calibration. The six cylinder, single Bbl., clutch driven plate is 10.0 inches in diameter and the six cylinder, 4 Bbl., and all V-8's are 10.4 inches in diameter.

The clutch driven plate has a 6-spring damper hub assembly to prevent the transmitting of torsional vibrations from the engine to the transmission.

Grooves on both sides of the clutch driven plate lining prevent sticking of the plate to the flywheel and pressure plate due to vacuum between the members on disengaging.

The clutch cover and pressure plate of all clutch

assemblies is of the disc-spring type. The heavy duty clutch pressure plate differs from the standard in that it has a bent-finger disc spring. These disc-spring clutches feature rate decreasing pedal effort, which eliminates need for an over-center spring assist. Pressure plate spring pressure forces the driven plate against the flywheel, thereby coupling the engine to the transmission.

The clutch release mechanism consists of a ball thrust bearing, appropriate levers and linkage to manually control the action of the bearing. The ball thrust bearing (clutch release bearing) is piloted on a tubular support which is concentric with and enclosing the transmission main drive (clutch) gear. When pressure is applied to the clutch pedal to release the clutch, the clutch fork pivots on its ball socket. The inner end of the fork then pushes the release bearing forward so that it presses against the inner ends of the clutch release levers, releasing the clutch (Fig. 7-1). Pedal effort is transmitted by the pedal through countershaft and lever assembly to the clutch fork.

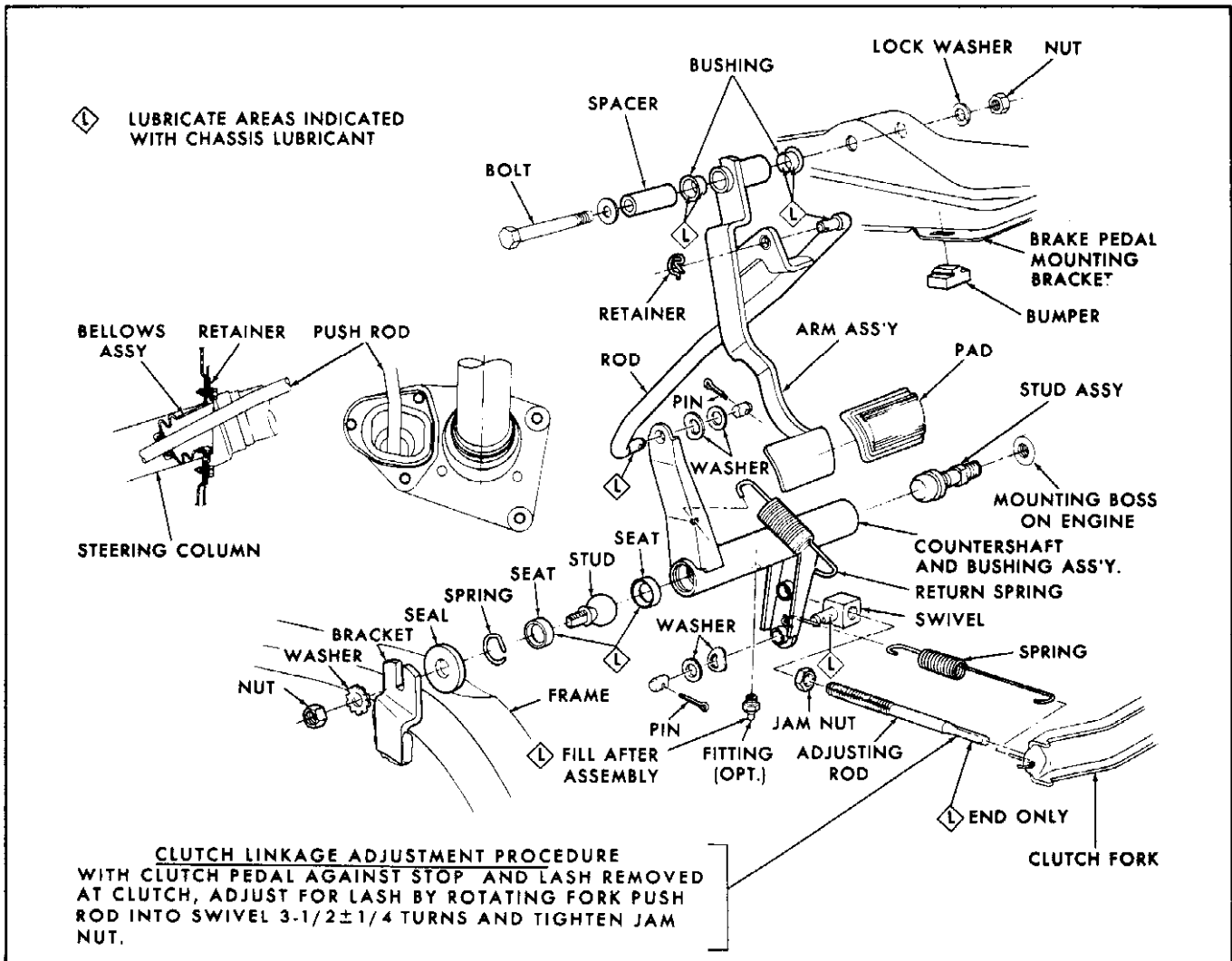


Fig. 7-2 Clutch Linkage (Typical)

## PERIODIC SERVICE

### LUBRICATION

Every 6,000 miles, lubricate all pivot points with engine oil. Use light grease at push rod to clutch fork pin joint and chassis grease at high pressure lubrication fitting. The ball type release bearing is lubricated and sealed for life and requires no lubrication.

### CLUTCH PEDAL ADJUSTMENT

Wear on the clutch parts necessitates occasional lash adjustment. No other adjustment is made. Lash adjustment should be made as follows:

1. Remove the anti-rattle spring (Fig. 7-2).

2. With clutch pedal against stop: Loosen jam nut sufficiently to allow the adjusting rod to be turned out of swivel and rearward against the clutch fork until the release bearing contacts pressure plate fingers lightly.

3. Rotate fork push rod into swivel 3 1/2 turns and tighten jam nut 10 lb. ft. torque.

4. Reinstall spring. Approximately 1" of lash should be at the pedal.

## SERVICE AND REPAIRS

### CLUTCH CONTROL LINKAGE— REMOVE AND REPLACE

#### REMOVE

1. Remove return spring and anti-rattle spring.

2. Disconnect retainer from each end of intermediate rod.

3. Loosen nut and lockwasher from ball stud at frame bracket and remove countershaft assembly.

#### REPLACE

1. Reverse removal steps. Tighten ball stud nut 21 lb. ft. torque for Pontiac, 30 lb. ft. torque for Tempest.

2. Adjust lash. See Clutch Pedal Adjustment under Periodic Service.

### CLUTCH—REMOVE AND REPLACE

#### REMOVE

1. Disconnect battery to starter lead at battery.

2. Remove propeller shaft and transmission. See TRANSMISSION SECTION. Exercise care to avoid damaging transmission front bearing retainer (release bearing support) when transmission is pulled back to free main drive (clutch) gear from flywheel housing.

3. Remove release bearing through rear opening in clutch housing. Do not place bearing in any degreasing or cleaning solvent.

4. Remove return spring.

5. Remove starter.

6. Remove front flywheel housing shield.

7. Remove flywheel housing bolts and pull housing off of dowels.

8. Remove flywheel housing.

9. Disconnect clutch fork from ball stud by forcing it toward the center of the vehicle. Remove fork through inside of flywheel housing.

10. Mark clutch pressure plate cover and flywheel to insure reassembly in the same position as balanced at factory.

11. Loosen bolts holding clutch cover to flywheel one turn at a time until tension is relieved.

12. Remove all but top bolt and move clutch assembly away from flywheel at bottom so as to permit removal of clutch driven plate.

13. Remove remaining bolt to remove clutch cover plate assembly.

### INSPECTION

1. Inspect clutch driven plate for broken or distorted torsion springs, worn or loose facings, oil on facings and damaged spline which could cause binding. If any of the above defects are present, replace driven plate with new assembly.

2. Inspect pressure plate and cover assembly to see that it is free of oil and grease. Check pressure plate for scores or cracked surface.

*NOTE: Servicing of clutch driven plate or pressure plate and cover assembly must be made by replacement of assemblies only.*

3. Examine transmission bearing retainer carefully to be certain there are no burrs on outer surface which pilots clutch release bearing.

4. Try release bearing on transmission bearing retainer to make sure no binding exists.

5. Check release bearing by placing thrust load on bearing by hand and turning bearing race. Replace if bearing feels rough or seems noisy when turning.

6. Clean flywheel face with cleaning solvent, sandpaper or steel wool. Inspect pilot bearing in crankshaft for roughness.

#### REPLACE

1. Position clutch driven plate so that long end of hub is in flywheel and install clutch driven plate and cover assembly on flywheel but do not tighten bolts (install lock washer under each cover to flywheel bolt).

*NOTE: Align marks placed on flywheel and on cover during disassembly.*

2. Use a spare transmission main drive gear, inserted in spline of clutch driven disc, to move disc into correct alignment so pilot on end of drive gear will enter clutch pilot bearing. Tighten clutch cover and pressure plate to flywheel bolts one at a time until snug, then tighten to 25 lb. ft. torque. Remove spare main drive gear used to align clutch disc.

3. Lubricate surface of release fork fingers which contact release bearing, sides of pressure plate lugs protruding through cover plate stamping and the release fork ball fulcrum with high melting point wheel bearing lubricant and install release fork.

4. Apply a light coat of grease to inner diameter of clutch release bearing and fill recess in inner diameter of bearing.

5. Install clutch release bearing to fork in flywheel housing.

6. Apply a light coat of high melting point wheel bearing lubricant to full length of outer diameter of transmission release bearing support (retainer).

*CAUTION: Do not overlubricate.*

7. Install flywheel housing and tighten bolts to 40 lb. ft. torque.

8. Install transmission. See TRANSMISSION SECTION.

*CAUTION: Use two transmission guide pins in upper holes in clutch housing.*

9. Connect clutch linkage to release fork (Fig. 7-2).

10. Adjust pedal lash. See lash adjustment under Periodic Service.

*NOTE: If interference is encountered with the clutch fully engaging, the transmission shift linkage should be adjusted as outlined in section 7A, because the shift linkage interlock mechanism is controlled by clutch action.*

#### FLYWHEEL OR CLUTCH PILOT BEARING— REMOVE AND REPLACE

1. Remove transmission.

2. Remove clutch assembly.

3. If clutch pilot bearing is to be replaced, use cold chisel to remove staking in end of crankshaft which keeps bearing in place when transmission is removed (Fig. 7-3). Remove clutch pilot bearing from hole in crankshaft.

If bearing is a snug fit in crankshaft, use puller J 4383 and slide hammer J 2619-A or J 942 to remove bearing. When installing new bearing see that hole in crankshaft is thoroughly clean. Install new bearing with shielded side toward transmission. Start bearing into hole and tap into place by using clutch pilot bearing installer J 5736 against outer race. Stake slightly as shown in Fig. 7-3, to keep bearing in place in case transmission is removed in the future.

4. If flywheel is to be removed and reinstalled, scribe marks on flywheel and crankshaft flange, remove flywheel to crankshaft bolts and remove flywheel. When reinstalling, clean the mating flanges of flywheel and crankshaft carefully, making sure there are no burrs on either mounting face. Position flywheel on crankshaft flange with scribe marks in alignment and install flywheel to crankshaft bolts and tighten evenly to 95 lb. ft. torque.

*NOTE: Flywheel bolts do not require lock washers.*

5. Install clutch and transmission.

#### PROCEDURE FOR REMOVING AND INSTALLING STARTER RING GEAR ON FLYWHEEL

##### REMOVING RING GEAR FROM FLYWHEEL

1. Place the flywheel, crankshaft side down, on a solid flat surface or block which is slightly smaller in diameter than the flywheel.

2. Drive the ring gear off the flywheel, using a suitable drift and hammer.

*NOTE: Keep working around the circumference of the ring gear to avoid binding the ring gear on the flywheel.*

3. Remove all burrs and rough spots from flywheel.



## TROUBLE DIAGNOSIS

PROBLEM	REMEDY
<b>THROW-OUT BEARING NOISE WITH CLUTCH FULLY ENGAGED</b>	
a. Improper adjustment	a. Adjust linkage
b. Throw-out bearing binding on transmission bearing retainer	b. Clean, relubricate, check for burrs, nicks, etc.
c. Insufficient tension between clutch fork spring and ball stud	c. Replace fork
d. Fork improperly installed	d. Install properly
e. Weak linkage return spring	e. Replace spring
<b>NOISY</b>	
a. Worn throw-out bearing	a. Replace bearing
b. Fork off ball stud (heavy clicking)	b. Install properly and lubricate fork fingers at bearing
<b>PEDAL STAYS ON FLOOR WHEN DISENGAGED</b>	
a. Bind in linkage	a. Lubricate and free up linkage
b. Springs weak in pressure plate	b. Replace
c. Weak pedal return spring	c. Replace
<b>HIGH PEDAL EFFORT</b>	
a. Bind in linkage	a. Lubricate and free up linkage
b. Driven plate worn	b. Replace driven plate
<b>FAILS TO RELEASE (PEDAL PRESSED TO FLOOR—SHIFT LEVER DOES NOT MOVE FREELY IN AND OUT OF REVERSE GEAR)</b>	
a. Improper linkage adjustment	a. Adjust linkage
b. Improper pedal travel	b. Trim bumper stop and adjust linkage
c. Loose linkage	c. Replace as necessary
d. Faulty pilot bearing	d. Replace bearing
e. Faulty driven disc	e. Replace disc
f. Fork off ball stud	f. Install properly and lubricate fingers at throw-out bearing
g. Clutch disc hub binding on clutch gear spline	g. Free up splines or replace clutch disc

**TROUBLE DIAGNOSIS (Continued)**

PROBLEM	REMEDY
<b>SLIPPING</b>	
a. Improper adjustment (no lash)	a. Adjust linkage
b. Oil soaked disc	b. Install new disc and correct oil leak at its source
c. Worn facing or facing torn from disc	c. Replace disc
d. Warped pressure plate or flywheel	d. Replace same
e. Weak diaphragm spring	e. Replace cover assembly
f. Driven plate not seated in	f. Make 20-50 normal starts
g. Drive plate overheated	g. Allow to cool--Check lash
<b>GRABBING</b>	
a. Oil on facing or burned or glazed facings	a. Install new disc
b. Worn splines on clutch gear	b. Replace transmission clutch gear
c. Loose engine mountings	c. Tighten or replace mountings
d. Warped pressure plate or flywheel	d. Replace pressure plate or flywheel
e. Burned or smeared resin on flywheel or pressure plate	e. Sand off if superficial, replace burned or heat checked parts
<b>RATTLING--TRANSMISSION CLICK</b>	
a. Throw-out fork loose on ball stud or in bearing groove	a. Check ball stud and retaining spring and replace if necessary
b. Oil in driven plate damper	b. Replace driven disc
c. Driven plate damper spring failure	c. Replace driven disc