

CLUTCH

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DESCRIPTION AND OPERATION

CLUTCH PEDAL MECHANISM

GT Only

The pedal lever pivots on a tubular steel shaft and operates the clutch release yoke thru a sheathed cable attached directly to the upper end of the pedal lever. Pedal return is accomplished thru the cable by the clutch yoke return spring at the transmission. The pedal return stop is a nonadjustable rubber bumper inserted through the upper end of the pedal lever just below the cable attaching point. The clutch cable is sheathed in woven steel and weather protected by a plastic and fabric covering. An eyelet is wedged on the upper end and fits over a formed hook on the upper end of the pedal. The lower end is provided with a **swedged** ball stud arrangement that slips into a slot in the clutch release lever. See Figure 7A-6.

Opel 1900 and Manta

The pedal lever pivots on a tubular steel shaft and operates the clutch release yoke through a sheathed cable attached directly to the upper end of the pedal lever. Pedal return is accomplished through a spring attached to the pedal below the pivot shaft and to the pedal assembly mounting bracket at the bulkhead.

Clutch actuation works without pedal-free travel and a warning device is provided which actuates an indicator lamp in the instrument panel indicating necessity of clutch adjustment. The clutch cable is sheathed in **woven** steel and weather protected by a plastic fabric covering. An eyelet is wedged on the upper end and fits over a formed hook on the upper end of the pedal. The lower end is provided with a wedged ball stud arrangement that slips into a slot in the clutch release lever. See Figure 7A-7.

Clutch Mechanism

The clutch assembly is enclosed in the bell housing.

The clutch release bearing and release fork are of conventional design, with the fork pivoting on a ball stud located opposite the control cable attaching point. The bearing flange tits over two vertical pins which are riveted to and extend into the eye of the yoke.

The clutch pressure plate is similar in design to the Buick Century pressure plate. A radially slotted diaphragm pivoting on two steel wire rings is retained to the clutch cover by eight rivets. The clutch driven member is a **6-3/4** inches diameter single plate dry disc with torsional damper springs and spring leaves between facings to cushion application. Dampener springs in clutch disc assembly are **preloaded**.

DIAGNOSIS

CLUTCH TROUBLE DIAGNOSIS

Condition	Possible Cause	Correction
Fails to release (pedal pressed to floor - shift lever does not move freely in and out of "Reverse" gear.	1. Improper cable adjustment.	1. Adjust cable.
	2. Faulty pilot bearing.	2. Replace bearing.
	3. Faulty driven plate.	3. Replace driven plate.
	4. Yoke off ball stud.	4. Install properly.
	5. Clutch driven plate hub binding on main drive gear spline.	5. Repair or replace main drive gear.
Slipping	1. Improper adjustment (no lash).	1. Adjust cable.
	2. Oil-soaked driven plate.	2. Install new driven plate and correct oil leak at its source.
	3. Worn facing or facing torn from driven plate.	3. Replace driven plate.
	4. Warped pressure plate or flywheel.	4. Replace same.
	5. Weak diaphragm spring.	5. Replace cover assembly.
	6. Driven plate not seated in.	6. Make 20-50 normal starts.
	7. Driven plate overheated.	7. Allow to cool - check lash.
Grabbing	1. Oil on facing or burned or glazed facings.	1. Repair oil leak and install new driven plate.
	2. Worn splines on main drive gear.	2. Replace transmission main drive gear.
	3. Loose engine mountings.	3. Tighten or replace mountings.
	4. Warped pressure plate or flywheel.	4. Replace pressure plate or flywheel.
	5. Burned or smeared resin on flywheel or pressure plate.	5. Sand off if superficial, replace burned or heat checked parts.

Condition	Possible Cause	Correction
Rattling ■ Transmission Click	1. Yoke loose on ball stud in bearing groove.	1. Check ball stud and retaining spring and replace if necessary.
	2. Oil in driven plate damper.	2. Replace driven plate.
	3. Driven plate damper spring failure.	3. Replace driven plate,
Throw-out bearing noise with clutch fully engaged.	1. Improper adjustment.	1. Adjust cable.
	2. Throw-out bearing binding on transmission bearing retainer.	2. Clean, relubricate, check for burrs , nicks, etc.
	3. Insufficient tension between yoke and ball stud.	3. Replace yoke.
	4. Yoke improperly installed.	4. Install properly.
	5. Weak linkage return spring.	5. Replace spring.
Noisy	1. Worn throw-out bearing.	1. Replace bearing.
	2. Fork off ball stud (heavy clicking).	2. Install properly.
Pedal stays on floor when disengaged.	1. Bind in cable.	1. Lubricate and free up cable.
	2. Spring weak in pressure plate.	2. Replace
	3. Weak linkage return spring.	3. Replace
High Pedal Effort	1. Bind in cable.	1. Lubricate and free up cable.
	2. Driven plate worn.	2. Replace driven plate.
Clutch facings worn near rivets.	1. Normal wear.	1. Replace driven plate assembly only, and readjust clutch pedal and cable.
Pressure plate assembly friction surface badly scored or rough.	1. Improper clutch pedal lash causing pressure plate to come in contact with rivets.	1. If roughness can be smoothed with fine emery cloth, do not replace pressure plate assembly; if it cannot, replace the pressure plate and driven plate assembly. Adjust clutch.

Condition	Possible Cause	Correction
Heat-blued driven plate and pressure plate assembly.	1. Improper pedal adjustment.	1. Replace only driven plate , and adjust clutch pedal and cable.
Grab and chatter with oil present on clutch assembly.	1. Oil leak.	1. Correct oil leakage, clean pressure plate in solvent, replace driven plate and adjust pedal lash.

MAINTENANCE AND ADJUSTMENTS

CLUTCH LASH ADJUSTMENT

GT

Pedal lash, free pedal travel must be adjusted occasionally to compensate for normal wear of the clutch facings. As the driven plate wears thinner, pedal lash decreases. Adjust clutch pedal free travel only with ball stud located on right side of clutch housing if cable length is not to be changed. To adjust pedal lash proceed as follows:

1. Loosen lock nut on ball stud end located to the right of the transmission on the clutch housing. Position ball stud so that the outer end protrudes $\frac{3}{4}$ inches out of housing and finger tighten lock nut. See Figures 7A-1 and 7A-6.
2. Adjust ball stud, pivoting clutch release fork, to obtain $\frac{3}{4}$ to 1- $\frac{1}{4}$ inches pedal lash, free pedal. See Figure 7A-6.

Opel 1900 and Manta

The clutch actuation works without clutch pedal free travel. A readjustment of the clutch is only required if the indicator lamp at the instrument panel lights up.

In synchronism with the gradual wear of the clutch linings the clutch pedal travels from its basic **adjustment** position upwards, *i.e.*, towards driver. If the clutch lining wear has reached such an extent that the clutch pedal rests against switch, the indicator lamp at the instrument panel lights up.

This is an indication that the clutch pedal position has to be corrected to ensure proper clutch operation.

To **ensure** proper clutch operation, observe the following adjustment instructions. For all adjustment dimensions, refer to Figure 7A-7.

1. If the parking brake is provided with an indicator lamp, the parking brake has to be disengaged, **other-**

wise the same indicator lamp as for the clutch lights up.

2. Carry out adjustment only with ball stud on clutch **housing** whereby the distance (Item 20, Figure 7A-7) between clutch housing contacting surface and clutch release lever has to be adjusted in the rear to 4 $\frac{1}{4}$ inches.

Clutch Control Cable Adjustment(Only on Installation of a New Clutch Disc or Bowden Control Wire)

GT

1. Adjust ball stud so that outer end protrudes approximately $\frac{3}{4}$ inches out of clutch housing.
2. Adjust distance between release lever and clutch housing face at eye for control cable to approximately 4 $\frac{1}{4}$ inches. See Figure 7A-6. Hold cable in this position and place E-ring two grooves ahead of washer on rubber grommet. Clutch pedal free travel is now between $\frac{3}{4}$ and 1 $\frac{1}{4}$ inches and clutch release **bearing** has proper clearance from pressure plate.

Opel 1900 and Manta

1. Adjust ball stud on clutch housing to basic dimension of approximately $\frac{3}{4}$ inch. With lower end of **bowden** control wire unhooked, push clutch release lever towards the front so that the clutch release bearing rests against clutch spring. Now, adjust ball stud so that the dimension (Item 20, Figure 7A-7) between clutch housing contacting surface and clutch release lever amounts in the rear to 4 $\frac{1}{4}$ inches.

2. Pull reattached **bowden** control wire out of dash panel so that clutch pedal rests against switch (indicator lamp lights up).

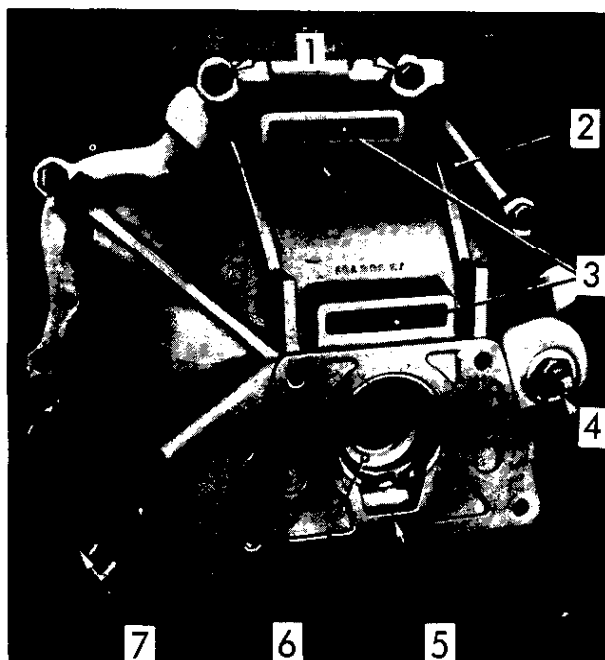
3. In this position, install lockwasher at upper control wire attachment three grooves towards the front, thereby completing control wire adjustment.

MAJOR REPAIR

CLUTCH REMOVAL AND INSTALLATION

Remove Clutch

1. Remove transmission. Refer to Manual Transmission for removal procedure.
2. Remove bolts from engine support **brackets**, both sides. Let brackets hang by front bolts.
3. Remove flywheel cover pan.
4. Remove flywheel housing to engine attaching bolts and pry housing from locating pins. See Figure 7A-1.

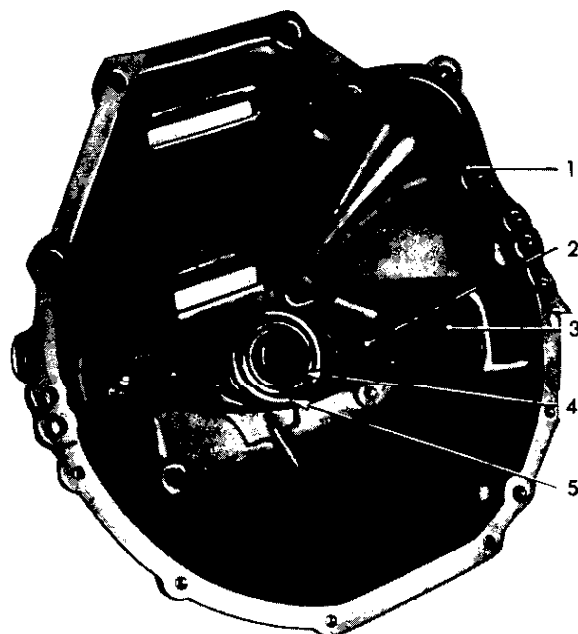


1. UPPER ATTACHING BOLTS
2. FLYWHEEL HOUSING
3. VENT HOLES
4. CLUTCH RELEASE LEVER BALL STUD AND LOCK NUT
5. RECESS IN FLYWHEEL HOUSING
6. CLUTCH RELEASE BEARING SLEEVE
7. CLUTCH RELEASE LEVER AND BOOT

7A-1

Figure 7A-1

5. To remove release bearing from clutch fork, slide lever off ball stud against spring action. Remove ball stud lock nut and remove stud from housing. See Figure 7A-2.



1. FLYWHEEL HOUSING
2. CLUTCH RELEASE LEVER
3. RELEASE LEVER BOOT
4. RELEASE BEARING SLEEVE
5. CLUTCH RELEASE BEARING

7A-2

Figure 7A-2

6. If assembly marks on clutch assembly and flywheel have **become** indistinct, renew with paint or centerpunch.
7. Loosen clutch cover to flywheel attaching bolts one turn at a time to avoid bending of clutch cover flange until spring pressure is released.
8. Support the pressure plate and cover assembly while removing last bolt, then remove pressure plate and clutch driven plate assemblies. Clutch cover, spring, and pressure plate must not be disassembled. If necessary, replace complete assembly.

Inspection of Clutch

Wash all metal parts of clutch, except release bearing and driven plate, in suitable cleaning solution to remove dirt and grease. Soaking release bearing in cleaning solution would permit solution to seep into bearing and destroy the lubricant. Soaking driven plate in cleaning solution would damage the facings.

1. Flywheel and Pressure Plate

Examine friction surfaces of flywheel and pressure plate for scoring or roughness. Slight roughness may be smoothed with fine emery cloth, but if surface is deeply scored or grooved the part should be replaced.

2. Clutch Driven Plate

Inspect driven plate for condition of facings, loose rivets, broken or very loose torsional springs.

If facings are worn down near rivets or are oily, the plate assembly should be replaced. A very slight amount of oil on clutch facings will cause clutch grab and chatter. A large amount of oil on facings will cause slippage. Removal of oil by solvents or by buffing is not practical since oil will continue to bleed from facing material when hot.

When oil is found on driven plate facings, examine transmission drainback hole, pilot bushing, engine rear main bearing and other points of possible oil leakage.

Test the fit of driven plate hub on transmission main drive gear for an easy sliding fit.

Regardless of whether the old plate or a new one is to be installed, the plate should be checked for run-out. Lateral run-out measured at disc circumference should not exceed .016 inch.

3. Bearings

Inspect clutch release bearing for scoring or excessive wear on front contact face. Test for roughness of balls and races by pressing and turning front race slowly. Inspect main drive gear pilot bushing in crankshaft. If bushing is rough or worn it should be

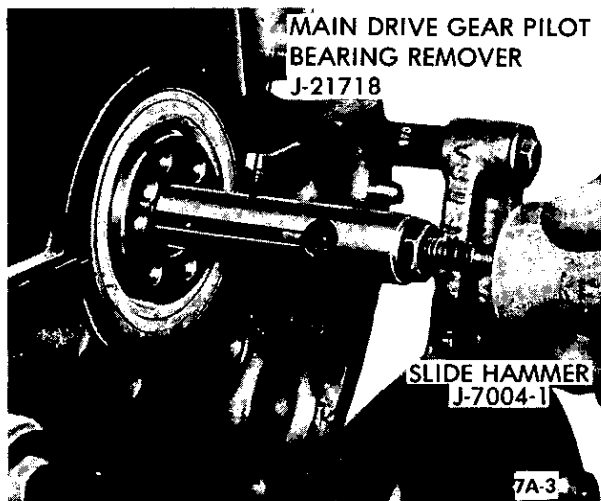


Figure JA-3

replaced. If replacement is necessary, remove bearing with Tool J-21718 and Slide Hammer J-7004-1. Install new bearing using J-21706. See Figure 7A-3 for removal procedure and Figure 7A-4 for installation.

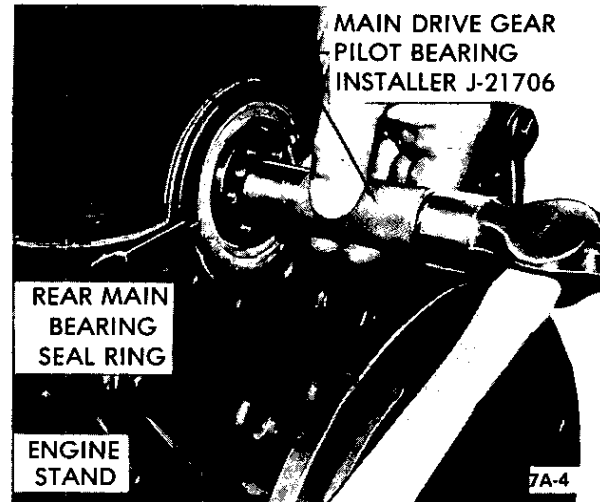
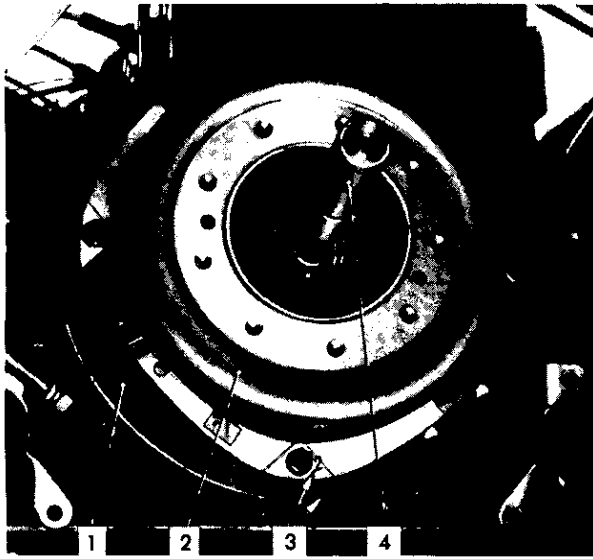


Figure JA-4

Installation of Clutch

1. Index alignment marks on clutch assembly and flywheel. Place driven plate on pressure plate with long end of splined hub facing *forward* toward the flywheel. See Figure 7A-5.
2. Insert alignment Tool J-22934 through clutch cover and driven plate.
3. Hold complete assembly against flywheel while inserting end of Tool J-22934 into pilot bearing in crankshaft.
4. Index the alignment marks and install four (4) clutch cover to flywheel bolts finger tight. Complete torquing bolts alternately and evenly one at a time.
5. Torque attaching bolts to 36 lb.ft. and remove alignment tool.
6. Install release bearing.
7. Install flywheel housing and torque lower bolts to 36 lb.ft.
8. Install flywheel housing lower cover.
9. Install clutch return spring and control cable.
10. Install transmission. See Manual Transmission Section for procedure.
11. Adjust clutch control cable. Refer to paragraph 7A-3.



- 1. FLYWHEEL
 - 2. CLUTCH ASSEMBLY
 - 3. ASSEMBLY MARKS
 - 4. CLUTCH ALIGNING
- ARBOR J-22934

7A-5

Figure 7A-5 Clutch Installation

CLUTCH CONTROL CABLE REMOVAL AND INSTALLATION

(SEE FIGURE 7A.6 OR 7A-7)

If a new cable was installed or the cable adjustment was changed during an operation, x-adjust cable afterwards.

Removal

1. Disconnect return spring and cable with ball end from release lever. Slide control cable out of eye in clutch housing.

2. With a screwdriver, pry E-ring out of groove in control cable, at tirewall, and disconnect cable from clutch pedal.

3. Pull cable out of retainer on dash panel and remove washers and rubber grommet.

Installation

1. Slide control cable ball end through eye in clutch housing. Connect to lever and (on GT) install return spring.

2. Replace washers and rubber grommet, slide cable through retainer on dash panel, and connect to clutch pedal. To adjust, refer back to Clutch Adjustment paragraph c or d.

SPECIFICATIONS

GENERAL SPECIFICATIONS

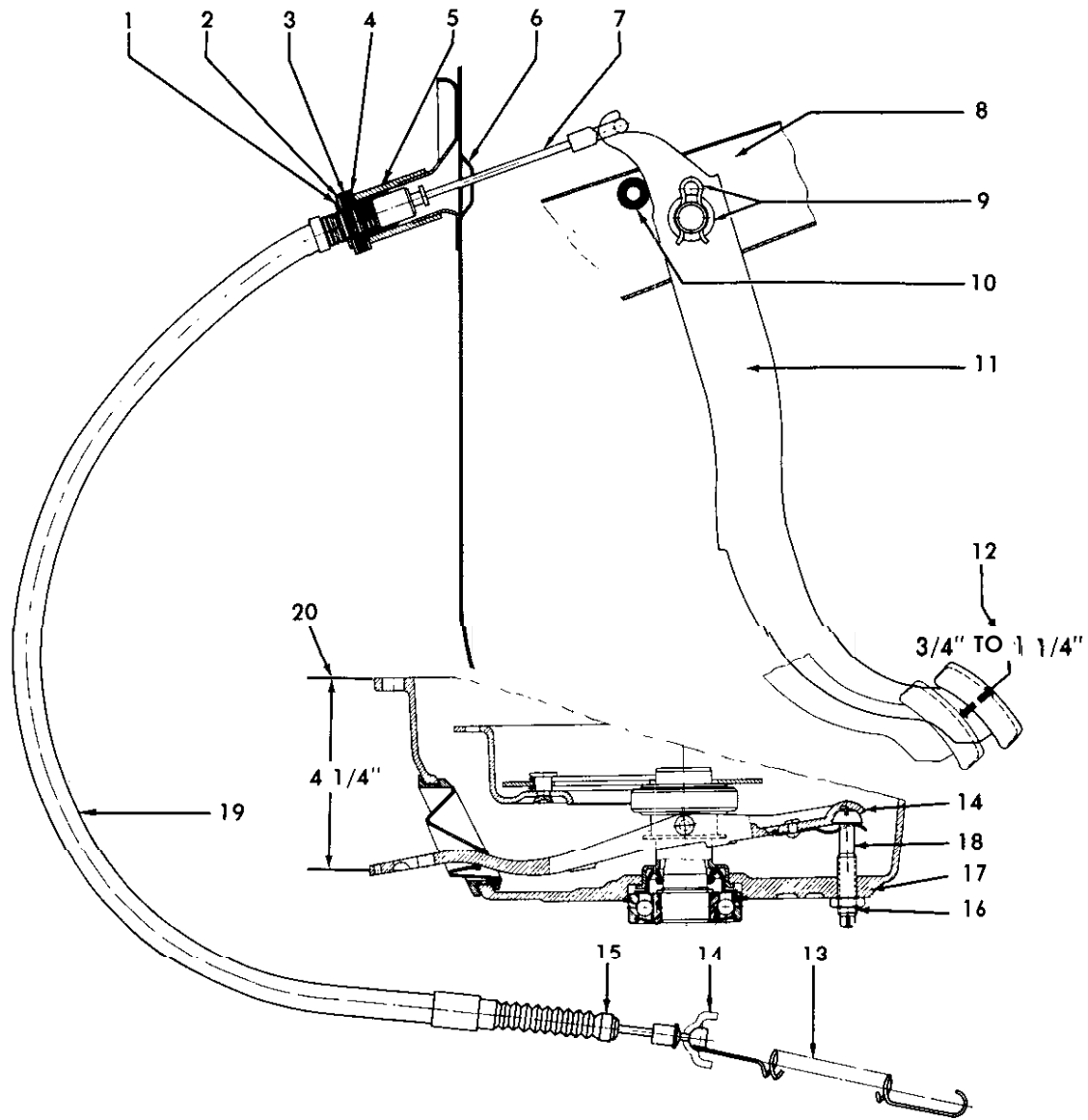
Clutch Specifications

Type	Single Plate • Dry Disc
Pedal Lash • 3/4" to 1-1/4"	
Driven Plate Diameter	6-3/4"
Driven Plate Facings	Woven Asbestos
Number of Facings	2
Facing Attachment	Riveted
Vibration Dampening	4 Torsional Springs

E-1 J 1 5/8

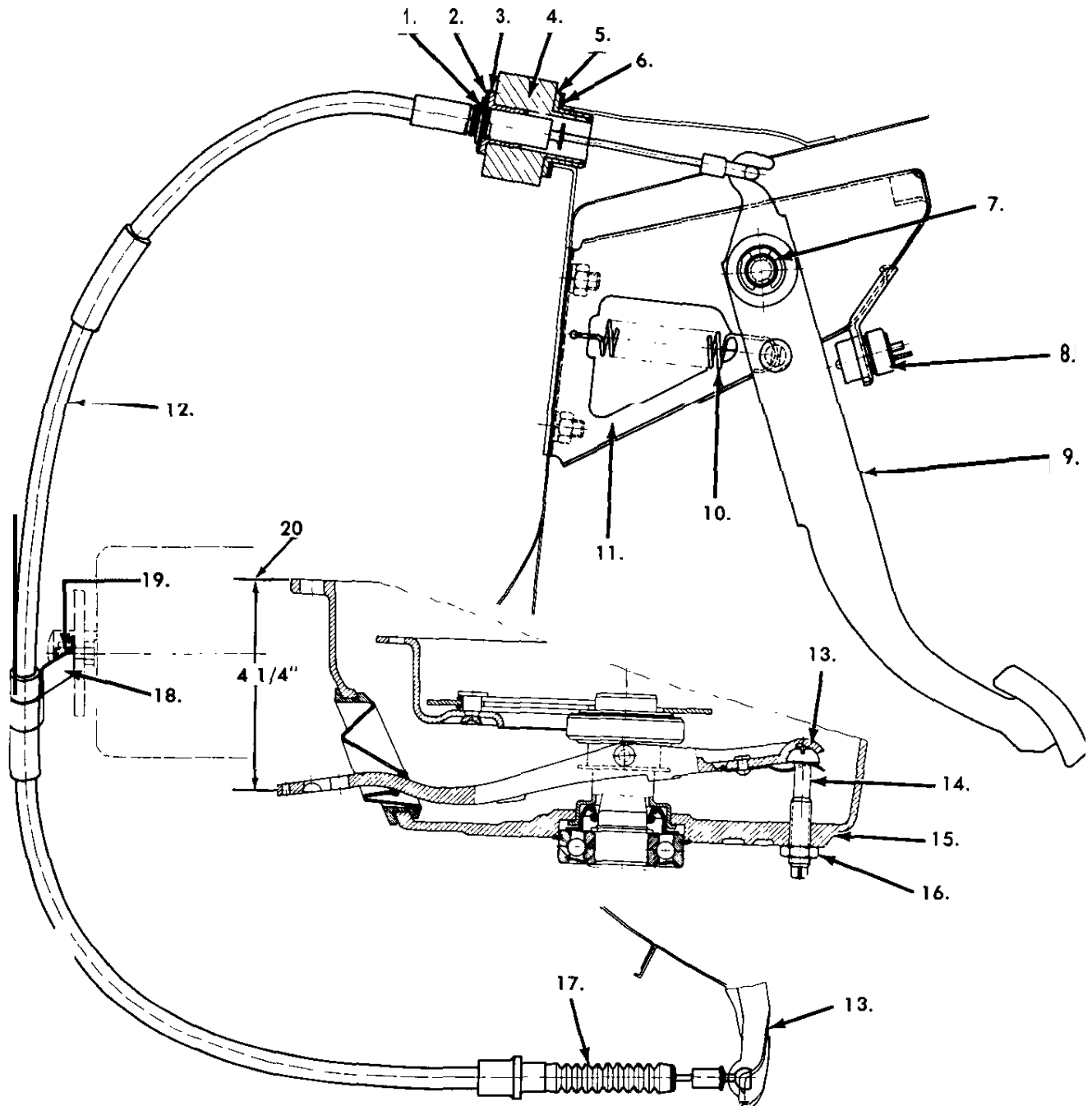
Bolt Tightening Specifications

Part	Location	Torque Lbs.Ft.
Bolt	Flywheel to Crankshaft	43
Bolt	Clutch Cover to Flywheel	36
Bolt	Transmission to Clutch Housing	32.36
Bolt	Starter to Clutch Housing	40
Nut	Support to Clutch Housing	4
Bolt	Intake and Exhaust Manifold to Cylinder Head	33



- | | |
|-------------------------|--|
| 1. E-RING | 12. CLUTCH PEDAL FREE TRAVEL-
3/4" TO 1 1/4" |
| 2. WASHER | 13. RETURN SPRING |
| 3. RUBBER GROMMET | 14. RELEASE LEVER |
| 4. WASHER | 15. RUBBER BELLOWS |
| 5. SLEEVE | 16. BALL STUD LOCK NUT |
| 6. DASH PANEL | 17. CLUTCH HOUSING |
| 7. BOWDEN CONTROL CABLE | 18. BALL STUD |
| 8. BRACKET | 19. BOWDEN CONTROL CABLE |
| 9. WASHER, HAIRPIN CLIP | 20. DISTANCE BETWEEN RELEASE
LEVER AND CLUTCH HOUSING |
| 10. RUBBER STOP | |
| 11. CLUTCH PEDAL | |

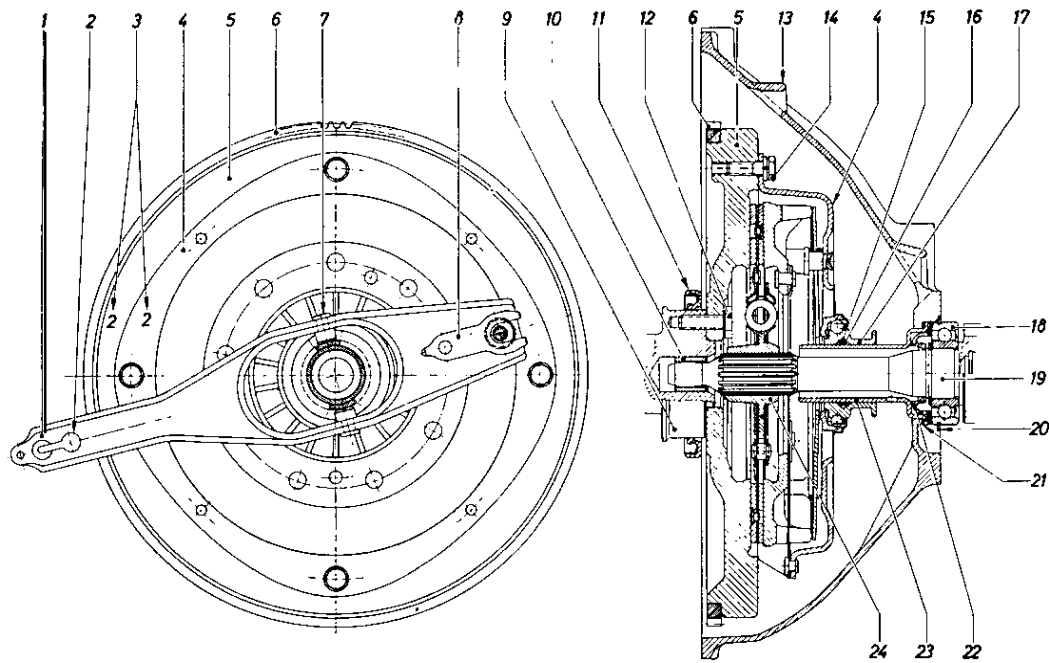
Figure 7A-6 Clutch Pedal Lash - GT Model



- | | |
|----------------------------|---|
| 1. "E" RING | 11. BRACKET |
| 2. WASHER | 12. CABLE |
| 3. RUBBER GROMMET | 13. RELEASE LEVER |
| 4. CLUTCH OPERATING DAMPER | 14. BALL STUD |
| 5. GROMMET | 15. CLUTCH HOUSING |
| 6. WASHER | 16. BALL STUD LOCK NUT |
| 7. "E" RING | 17. RUBBER BELLOWS |
| 8. ADJUSTMENT SWITCH | 18. CABLE SUPPORT BRACKET |
| 9. CLUTCH PEDAL | 19. NUT, CABLE SUPPORT BRACKET |
| 10. RETURN SPRING | 20. DISTANCE BETWEEN RELEASE LEVER AND CLUTCH HOUSING |

JA-7

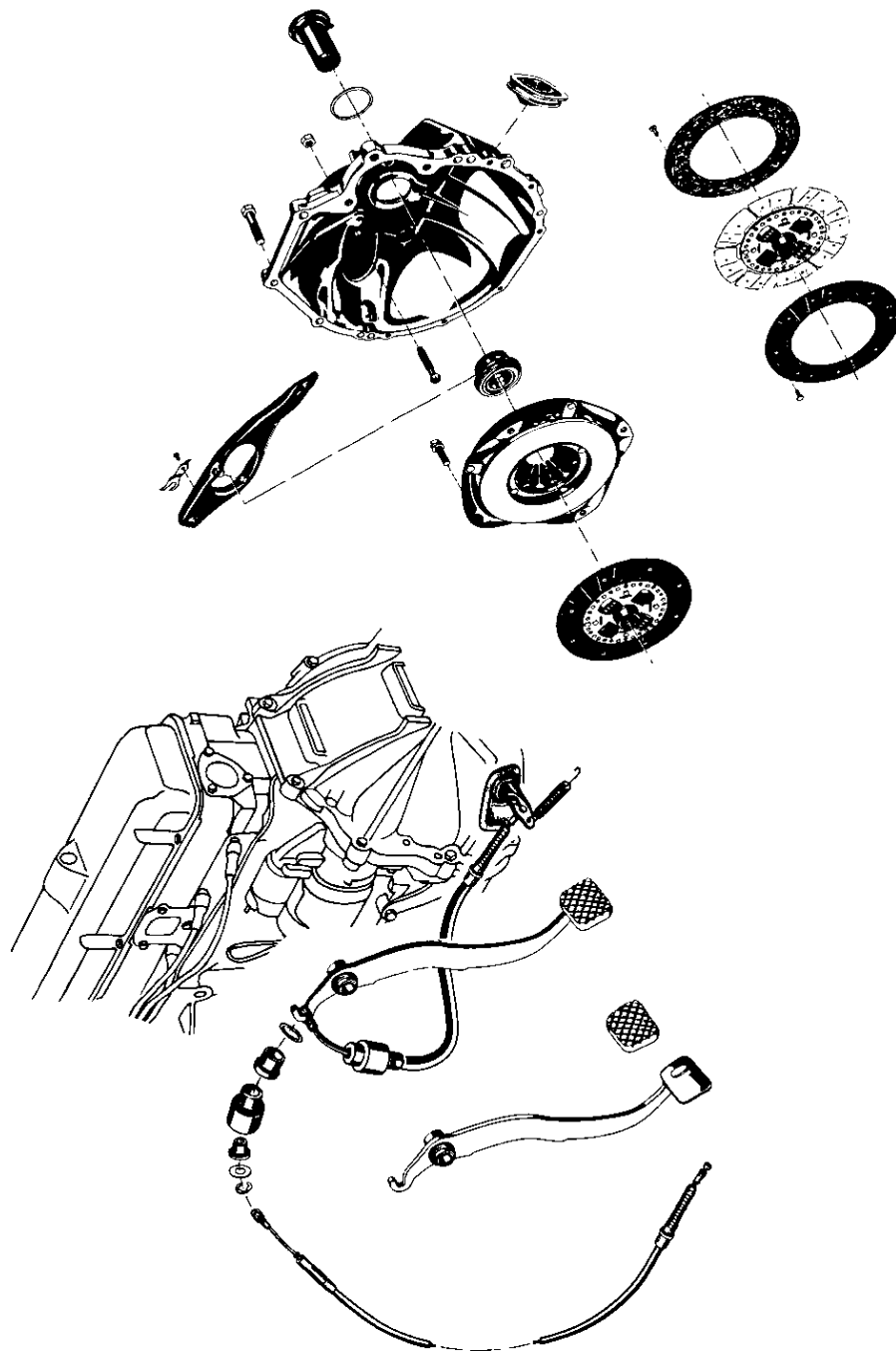
Figure JA-7 Clutch Pedal Adjustment • Opel 1900 and Manta



Arrangement Of Clutch

- | | |
|--|--|
| 1 Clutch release lever | 14 Clutch assy, bolt, lockwasher |
| 2 Slot in lever for control cable boll end | 15 Hollow space under felt ring filled with molybdenum disulfide paste |
| 3 Assembly marks | 16 Felt ring |
| 4 Clutch assembly | 17 Clutch release bearing |
| 5 Flywheel | 18 Clutch gear ball bearing |
| 6 Flywheel ring gear | 19 Clutch gear |
| 7 Thrust pin | 20 Snap ring |
| 8 Retaining spring | 21 Paper gasket |
| 9 Crankshaft | 22 Clutch gear oil seal |
| 10 Clutch gear pilot bushing | 23 Clutch release bearing sleeve |
| 11 Oil seal | 24 Clutch disc, long end of hub facing forward. |
| 12 Flywheel bolt | |
| 13 Clutch housing | |

Figure 7A-8 Arrangement of Clutch



7A-9

Figure 7A-9 Exploded View of Clutch Pedal and Housing