CLUTCH

GENERAL

The clutch is a single plate, dry disc type. A steel cover assembly bolted to the flywheel contains the clutch driven plate, release levers and springs.

Two types of clutch covers are used, a 10-1/2 inch diameter direct spring pressure type and an 11-inch diameter semicentrifugal type. The direct spring pressure type and semicentrifugal type are similar. Both apply direct spring pressure to the pressure plate to provide engagement. However, the semicentrifugal cover utilizes six rollers that are forced outward by centrifugal action to apply extra force to the pressure plate and positive clutch action at high engine rpm (fig. 5-1).

Although no internal adjustment is provided for wear of the disc, release lever height should be checked and adjusted

The operating linkage components are shown in figures 5-2 and 5-3.

SERVICE DIAGNOSIS

Condition	Possible Cause	Correction
CLUTCH CHATTER	(1) Grease on driven plate (disc) facing	(1) Replace disc
	(2) Binding clutch linkage	(2) Check for worn, bent, broken parts. Replace as required. Lube linkage.
	(3) Loose, damaged facings on driven plate (disc)	(3) Replace disc
	(4) Engine mounts loose	(4) Tighten mounts. Replace if damaged.
	(5) Incorrect height adjustment of pressure plate release levers	(5) Adjust release lever height
	(6) Clutch housing or housing to transmission adapter misalignment	(6) Check bore and face run out. Correct as required.
	(7) Loose driven plate hub	(7) Replace driven plate
CLUTCH GRABBING	(1) Oil, grease on driven plate (disc) facing	(1) Replace driven plate
	(2) Broken pressure plate	(2) Replace pressure plate

SERVICE DIAGNOSIS (Continued)

Condition	Possible Cause	Correction
CLUTCH GRABBING (Continued)	(3) Warped or binding driven plate. Driven plate binding on clutch shaft	(3) Replace warped driven plate. Replace clutch shaft if defective, scored, worn.
CLUTCH SLIPS	(1) Lack of lubrication in clutch linkage (linkage binds, causes incomplete engagement)	(1) Lubricate linkage
	(2) Incorrect pedal, or linkage adjustment.	(2) Adjust as required
	(3) Broken pressure plate springs	(3) Replace pressure plate.
	(4) Weak pressure plate springs	(4) Replace pressure plate.
	(5) Grease on driven plate facings (disc)	(5) Replace driven plate (disc)
INCOMPLETE CLUTCH RELEASE	(1) Incorrect pedal or linkage adjustment or linkage binding	(1) Adjust as required. Lubricate linkage.
	(2) Incorrect height adjustment on pressure plate release levers	(2) Adjust release lever height
	(3) Loose, broken facings on driven plate (disc)	(3) Replace driven plate
	(4) Bent, dished, warped driven plate caused by overheating	(4) Replace driven plate
GRINDING, WHIRRING GRATING NOISE WHEN PEDAL IS DEPRESSED	(1) Worn or defective throwout bearing	(1) Replace throwout bearing
	(2) Starter drive teeth contacting flywheel ring gear teeth	(2) Look for milled or polished teeth on ring gear. Align clutch housing, replace starter drive or drive spring as required.
SQUEAL, HOWL, TRUMPETING NOISE WHEN PEDAL IS BEING RELEASED (OCCURS DURING FIRST INCH TO INCH AND ONE-HALF OF TRAVEL)	(1) Pilot bushing worn or lack of lubricant	(1) Replace worn bushing. If bushing appears OK, polish bushing with emery, soak lube wick in oil, lube bushing

SERVICE DIAGNOSIS (Continued)

Condition	Possible Cause	Correction
SQUEAL, HOWL, TRUMPETING NOISE WHEN PEDAL IS BEING RELEASED (OCCURS DURING FIRST INCH TO INCH AND ONE-HALF OF TRAVEL) (Continued)		with oil, apply film of chassis grease to clutch shaft pilot hub, reassemble. NOTE: Bushing wear may be due to misalignment of clutch housing or housing to transmission adapter
VIBRATION OR CLUTCH PEDAL PULSATION WITH CLUTCH DISENGAGED (PEDAL FULLY DEPRESSED)	(1) Worn or defective engine or transmission mounts (2) Flywheel run out, or damaged or defective clutch components	(1) Inspect and replace as required (2) Replace components as required. (Flywheel run out at face not to exceed 0.005)

CLUTCH LINKAGE ADJUSTMENT

(1) Adjust bellcrank outer support bracket to provide approximately 1/8 inch bellcrank end play.

(2) Lift clutch pedal up against pedal stop.

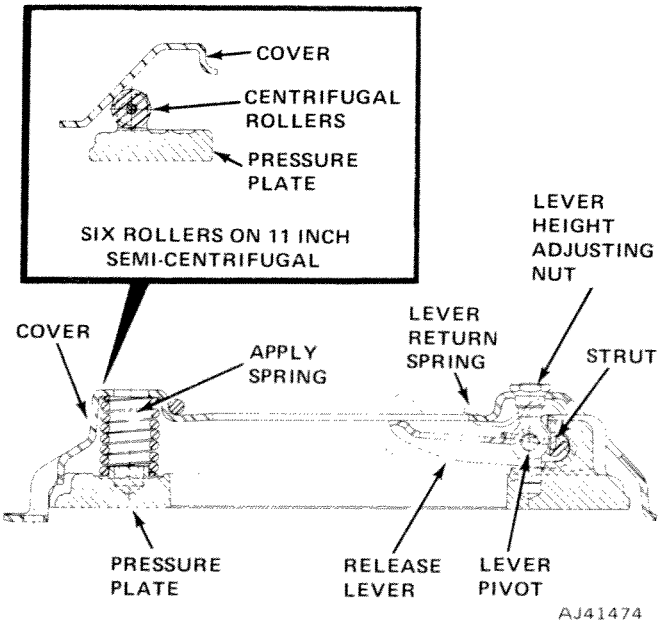


Fig. 5-1 Direct Spring Pressure and Semicentrifugal Type Clutches

(3) On clutch push rod (pedal-to-bellcrank), adjust lower ball pivot assembly on or off of rod as required to position bellcrank inner lever parallel to front face of clutch housing (slightly forward from vertical).

(4) Adjust clutch fork release rod (bellcrank to release fork) to obtain maximum specified clutch pedal free play.

CLUTCH REMOVAL

(1) Remove transmission and transfer case.

(2) Remove starter, throwout bearing and sleeve assembly and clutch housing.

(3) Align mark clutch cover, pressure plate and flywheel to ensure correct alignment during assembly.

CAUTION: *When removing the clutch cover from the flywheel, loosen the attaching screws in rotation, one or two turns at a time, until spring tension on the cover is released. The clutch cover is a steel stamping which could be warped by improper removal procedure, resulting in clutch chatter when re-used.*

(4) Inspect crankshaft pilot bushing, flywheel, transmission clutch shaft, throwout bearing and sleeve assembly, driven plate, clutch cover, and clutch housing alignment.

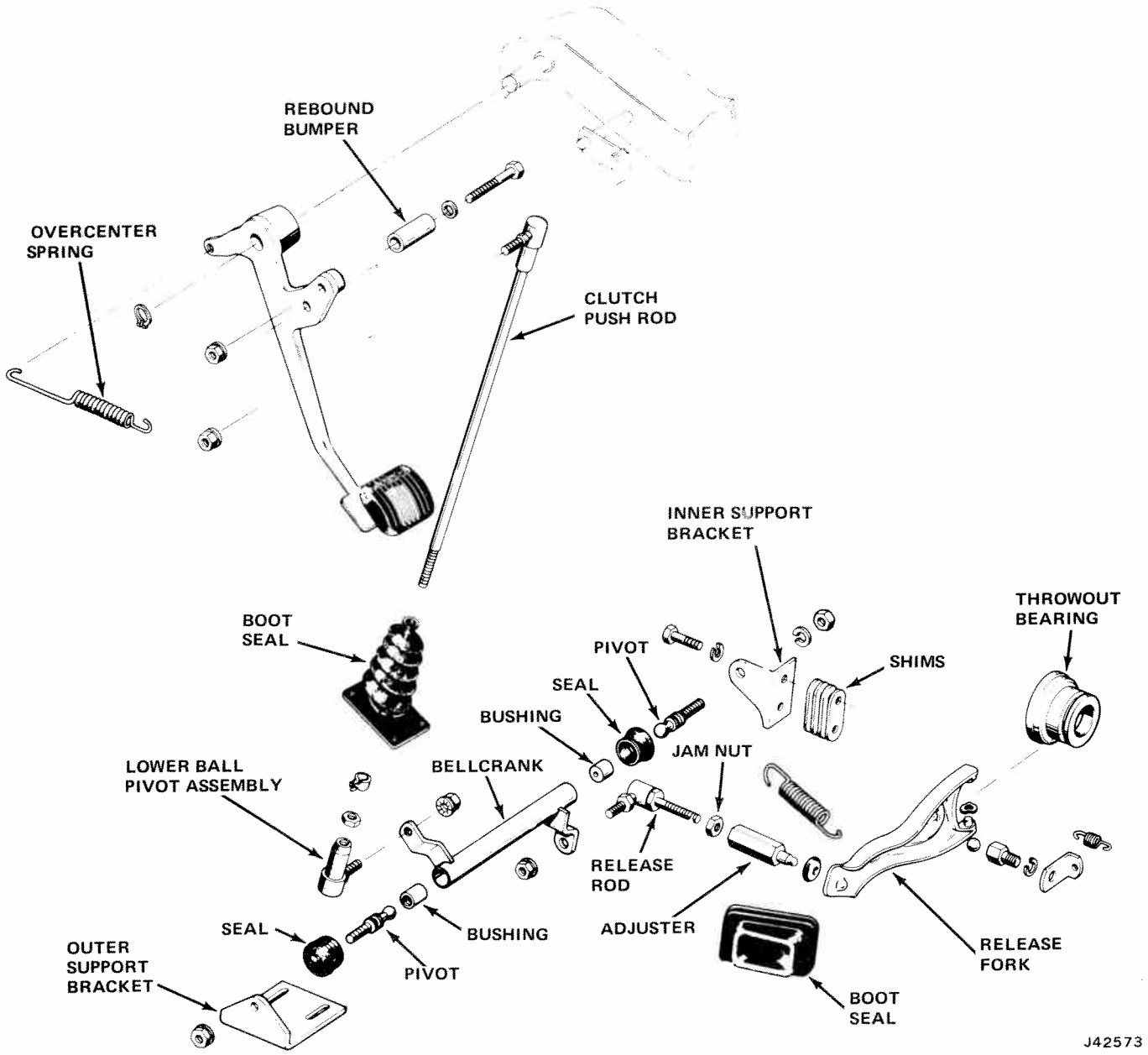


Fig. 5-2 Clutch Operating Linkage Components - CJ Models

DRIVEN PLATE

No repair of the clutch driven plate is recommended. A new plate should be installed if the plate or cushion springs are defective. The cushion springs must not be bent out of shape or flattened, but may be loose in the hub.

THROWOUT RELEASE BEARING

The clutch throwout or release mechanism consists of a forked lever which pivots on a ball pivot threaded into the clutch housing. A clutch fork return spring (fig. 5-2 and 5-3) is anchored to a clip under the ball pivot and holds the lever in contact with the ball pivot. The clutch throwout bearing and sleeve, which is a prelubricated unit, is attached to the forked end of the throwout lever with a wave washer on the lower pin.

Never wash the clutch throwout release bearing in any solvent that will dissolve the lubricant. It is neither necessary nor possible to lubricate this bearing.

CRANKSHAFT PILOT BUSHING

Inspection

When the clutch assembly is removed from the flywheel, inspect the pilot bushing for wear, scoring, and looseness. Replace any damaged bushings.

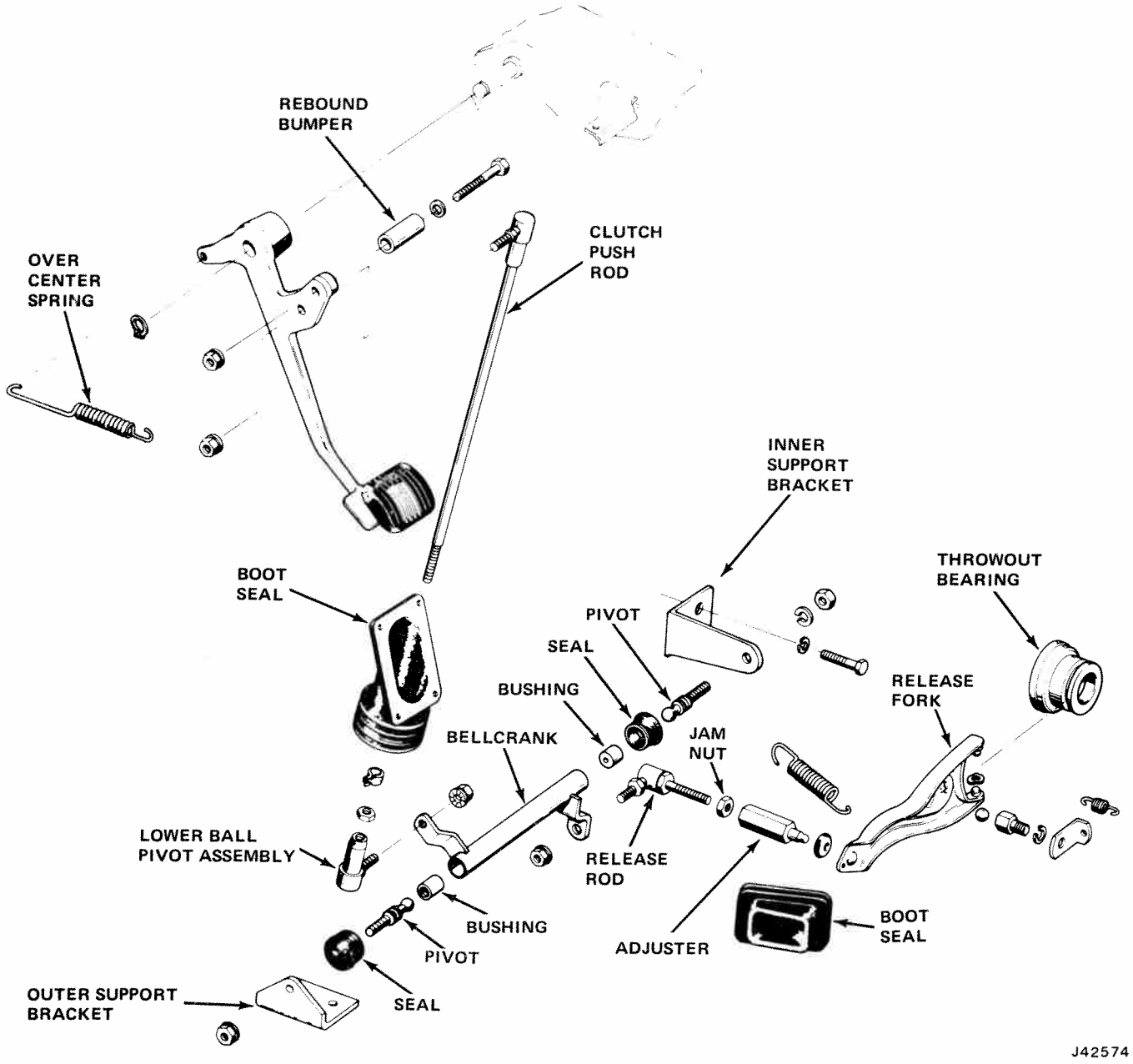


Fig. 5-3 Clutch Operating Linkage Components - Cherokee, Wagoneer, and Truck

Removal

(1) Fill crankshaft cavity and pilot bushing bore with an all-purpose lubricant.

(2) Insert clutch aligning tool straight into bushing and tap end of tool with a lead or brass hammer. Hydraulic pressure will force the bushing out of crankshaft without damaging bushing.

Installation

(1) Clean all grease from the crankshaft cavity.

(2) Soak bushing in engine oil. Soak lubrication wick in engine oil. Apply film of chassis grease to clutch shaft pilot hub.

(3) Use clutch aligning tool as a bushing driver and install bushing straight into crankshaft until bushing is seated.

FLYWHEEL

Inspect the condition of the flywheel as well as the pressure plate for any roughness. Check all flywheel capscrews for tightness. Tighten the capscrews to 105 foot-pounds.

TRANSMISSION CLUTCH SHAFT

Slide the clutch driven plate onto the transmission clutch shaft to make sure that it is free on the splines. If the splines on the transmission clutch shaft are bur-

red, remove the burrs with a file or stone. If the clutch drive plate is not free to move on the splines, incomplete release will result and cause hard shifting of the transmission.

CLUTCH HOUSING ALIGNMENT PROCEDURE

A misaligned clutch housing can cause improper clutch release, driven plate failure, front transmission bearing failure, uneven wear in the crankshaft pilot bushings, clutch cackle noise, vibration, and in extreme cases of misalignment, jumping out of gear on deceleration. Should any of these malfunctions occur, the rear face of the flywheel housing should be checked for alignment.

Without Transmission Adapter

Use the following procedure to check clutch housing alignment when the vehicle is not equipped with a clutch housing-to-transmission adapter.

(1) Remove transmission as outlined in Section 6 - Manual Transmission.

(2) Remove clutch housing and clutch assembly.

(3) Remove one flywheel attaching bolt.

(4) Use a four-inch long 1/2 -20 bolt and a nut for a dial indicator support.

(5) Install nut on bolt so that 10 or 12 threads are exposed and install bolt in crankshaft.

(6) Tighten nut so bolt is held securely in place.

(7) Install clutch housing on engine and tighten attaching bolts to specified torque.

(8) Install a dial indicator so that it contacts rear face of clutch housing approximately 1/8 inch from edge of rear opening (fig. 5-4).

(9) Check squareness of face of housing by turning crankshaft.

(10) Total indicator reading should not exceed 0.010 inch.

NOTE: *Crankshaft end play must be held to zero when checking face alignment.*

(11) The following procedure may be used to correct indicated mislignment of clutch housing.

(12) Install shims between clutch housing and engine to clutch housing spacer.

(13) Refer to figure 5-5. Shims should be installed at points A to correctly align top with bottom of housing. Shims installed at points B and D or C and E will correct misalignment at either side of clutch housing. Shims installed at points D and E will correctly align bottom to top.

(14) To install shims, loosen clutch housing assembly.

(15) Locate shims where necessary by loosening bolts and inserting shims in place.

(16) Tighten bolts and recheck face alignemnt.

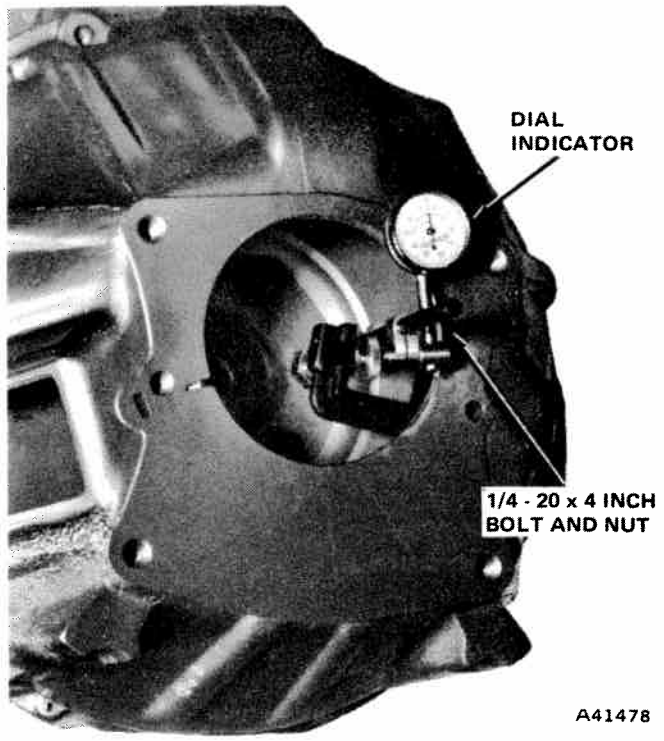


Fig. 5-4 Location of Dial Indicator

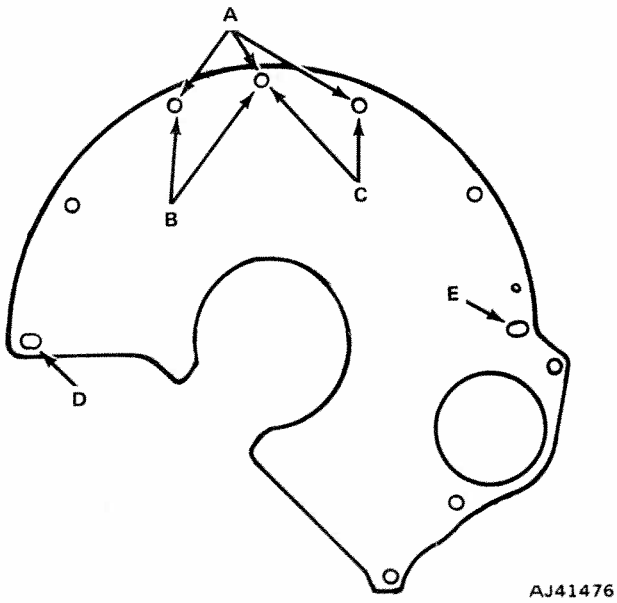


Fig. 5-5 Shim Locations - 232 CID Engine Shown

(17) Total indicator reading on face of flywheel housing should not exceed 0.010 inch. Relocate shims if necessary to bring reading within limits.

(18) To check bore alignment, locate dial indicator on inside diameter of rear opening of clutch housing.

(19) Rotate crankshaft and note indicator reading at four equally spaced points. Total indicator reading must not exceed 0.010 inch.

(20) Any change in face alignment will change bore alignment. Therefore, it may be possible to correct

bore alignment by changing face alignment. Where it is impossible to correct bore alignment to within a maximum of 0.010 inch runout with change of face alignment (not to exceed 0.010 inch), replace housing.

CLUTCH HOUSING ALIGNMENT

With Transmission Adapter

Use the following procedure to check clutch housing-to-transmission adapter for proper alignment.

(1) Remove transmission as outlined in Section 6 - Manual Transmission.

(2) Remove clutch housing, with adapter attached, and remove clutch assembly.

(3) Remove one flywheel attaching bolt.

(4) Obtain a 1/2 -20 by 5-inch long bolt and one 1/2 -20 nut. Bolt and nut will serve as support for dial indicator.

(5) Thread nut onto bolt so that 10 to 12 threads are exposed. Install bolt in flywheel and tighten nut securely.

(6) Install clutch housing, with adapter attached, onto engine. Tighten upper bolts to 35 foot-pounds torque, and lower bolts to 45 foot-pounds torque.

(7) Install dial indicator on 1/2 -20 bolt. Position indicator so it contacts transmission mating face of adapter about 1/8 inch in from edge of adapter bore.

(8) Turn dial indicator to zero and rotate crankshaft to check runout at adapter face. Runout should not exceed 0.010 inch at any point through 360 degrees of rotation.

NOTE: *Crankshaft end play must be held at zero while checking face runout.*

(9) Position dial indicator so it contacts bore surface of adapter at approximately center of bore.

(10) Turn dial indicator to zero and rotate crankshaft to check runout of adapter bore. Runout should not exceed 0.010 inch at any point through 360 degrees of rotation.

NOTE: *Crankshaft end play must be held to zero while checking bore runout.*

(11) Correct adapter misalignment as follows:

(a) If runout at adapter bore is OK but out of tolerance at face, shim clutch housing as required to obtain runout of 0.010 inch or less. Shim housing as described under Clutch Housing Alignment (fig. 5-5).

(b) If runout at adapter face is OK but out of tolerance at bore, proceed as follows:

1. Back off adapter-to-clutch housing bolts one turn.

2. Tap adapter lightly with hammer to reposition. Move adapter up, down, or side to side as required to obtain runout of 0.010 inch or less.

3. When runout is corrected, tighten adapter bolts to 35 foot-pounds torque. Recheck runout and readjust if required.

(c) If runout at adapter face or bore cannot be brought within tolerance, replace adapter and clutch housing.

(12) After correcting alignment, remove dial indicator and clutch housing with adapter attached.

NOTE: *If clutch housing was shimmed, note location of shims for correct assembly.*

(13) Remove 1/2 -20 by 5-inch bolt from flywheel and install flywheel bolt removed previously. Tighten bolt to 100 to 110 foot-pounds torque. Install clutch assembly. Tighten clutch cover bolts to 40 foot-pounds torque.

(14) Install clutch housing with adapter attached. Tighten upper bolts to 35 foot-pounds torque, and lower bolts to 45 foot-pounds torque.

(15) Install transmission as outlined in Section 6 - Manual Transmission.

CLUTCH RELEASE LEVER ADJUSTMENT

NOTE: *Always inspect release lever height adjustment before installing clutch cover assembly.*

(1) Place Clutch Gauge Plate, Tool J-1048 on flywheel in position normally occupied by driven plate.

(2) Position cover assembly over gauge plate. Release levers should be directly over machined lands of gauge plate and gauge plate hub should be centered between ends of release levers (fig. 5-6).

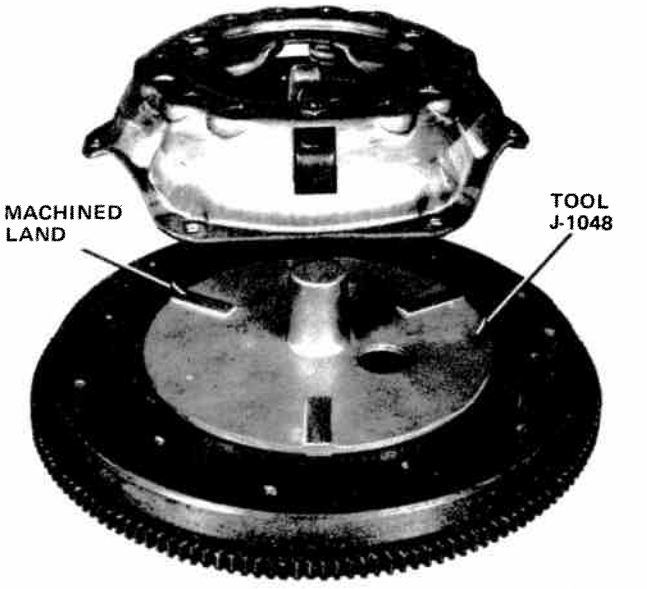


Fig. 5-6 Clutch Gauge Plate J-1048

Fig. 5-7 Depressing Clutch Levers

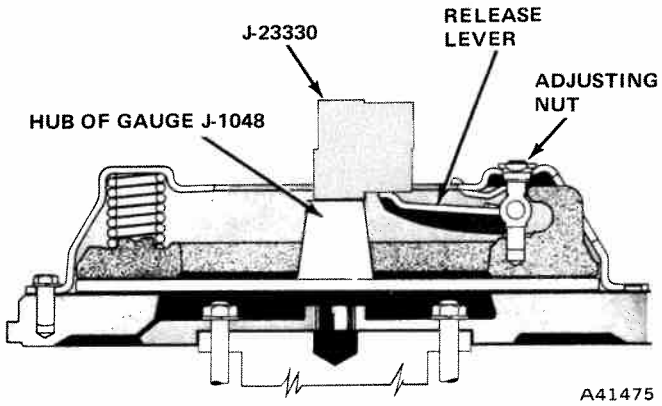


Fig. 5-8 Clutch Release Lever Height Adjustment

(3) Attach cover assembly to flywheel. Tighten cover attaching screws in rotation, one or two turns at a time, to avoid distortion of cover.

(4) Depress each release lever several times to seat levers in their operating positions (fig. 5-7).

(5) Measure height of each lever relative to gauge hub. Clutch Lever Height Gauge, Tool J-23330 has four different dimensional settings which can be used for measuring above and below hub (fig. 5-8).

(6) Adjust release levers by turning lever height adjusting nuts until lever is at specified height.

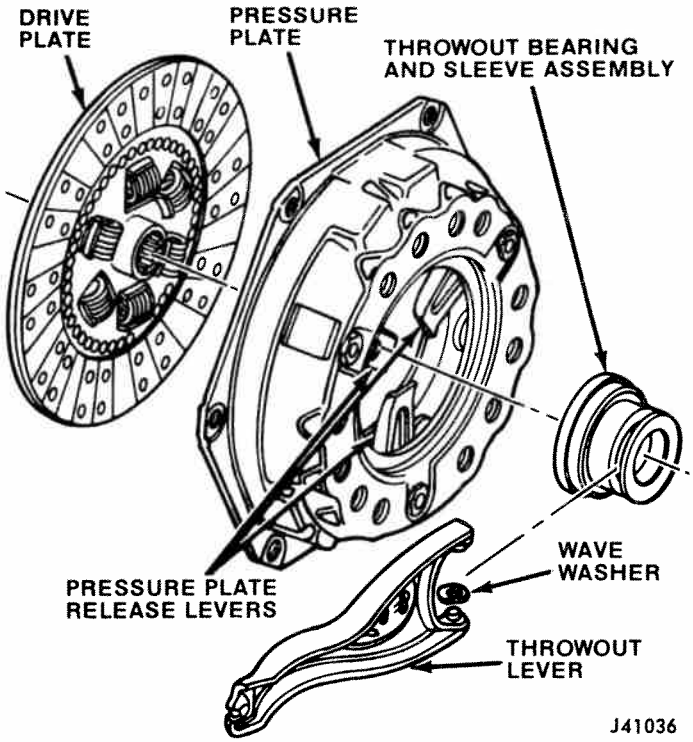


Fig. 5-9 Clutch Components - Assembly Relationship

(7) After each lever has been adjusted, work lever down and up several times and recheck adjustment, if correct, firmly stake nut with a dull punch.

CLUTCH INSTALLATION

(1) Inspect clutch release lever height.

NOTE: *Use Aligning Tool J-22056 to align driven plate during installation. A transmission clutch shaft may be used if proper tool is not available.*

(2) Align driven plate and loosely attach cover assembly to flywheel.

(3) Tighten cover attaching screws in rotation to prevent cover distortion.

(4) Install clutch housing, starter, throwout bearing and sleeve assembly (fig. 5-9).

CAUTION: *Be certain the clutch pedal is not depressed until the transmission has been installed.*

(5) Install transmission and transfer case (refer to Section 6 - Manual Transmission).

SPECIFICATIONS

MODEL	ENGINE (CID)	CLUTCH DIA. (Inches)	RELEASE LEVER HEIGHT (Inches Above Gauge Hub)	PEDAL FREE PLAY (Inches)
CJ-5/CJ-6	232,258,304	10.5	3/32 to 7/64	0.75 to 0.50
Cherokee, Wag-	258	10.5	3/32 to 7/64	0.62 to 0.38
oneer, Truck	360	11.0	3/16	0.62 to 0.38

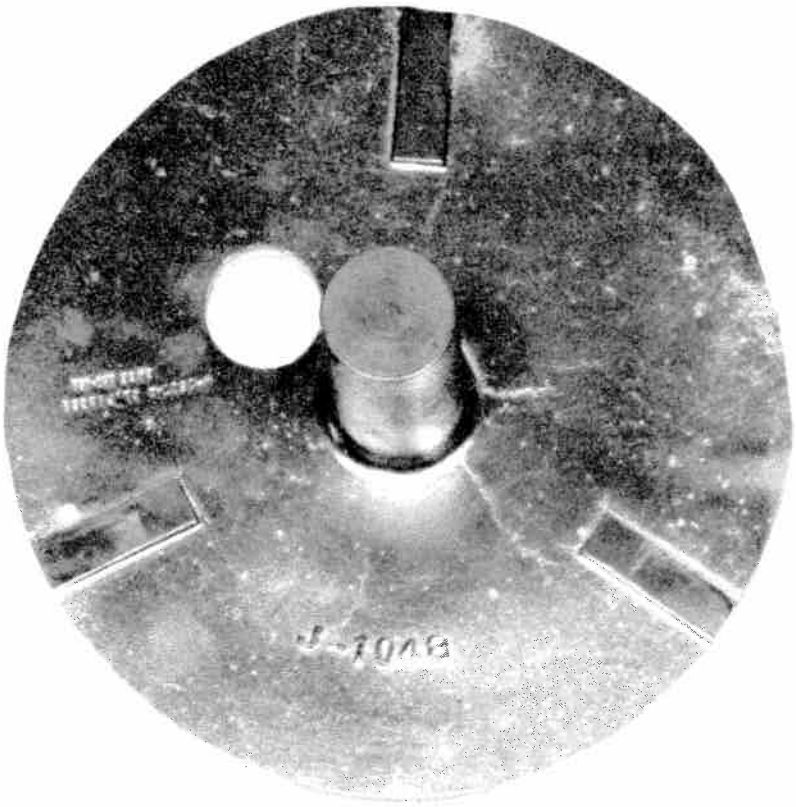
TORQUE SPECIFICATIONS

Clutch cover bolt	40
Clutch housing to engine dowel bolt nut	45
Clutch housing to starter motor bolt	45
Clutch housing to engine block bolt	
232-258 CID Engines	
Top	35
Bottom	45
304-360 Engines	
Top	30
Bottom	30
Clutch housing spacer to block bolt (304-360 CID engines)	15
Clutch throwout lever pivot	35
Transmission case to clutch housing bolt	55
Clutch pedal shaft hug locknut	25 to 40
Clutch pedal rebound bumper, bolt,nut, and lockwasher assembly to pedal	30 to 50
Clutch bellcrank bracket to side rail bolt	12 to 15

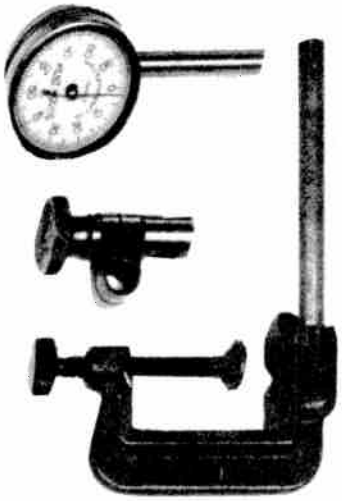
CLUTCH HOUSING ALIGNMENT SPECIFICATIONS

(Inches)

Clutch housing bore to crankshaft centerline	0.010 max.
Clutch housing transmission mounting face to crankshaft centerline	0.010 max.
Clutch housing to transmission adapter bore to crankshaft centerline	0.010 max.
Clutch housing to transmission adapter face to crankshaft centerline	0.010 max.
Flywheel runout at face	0.005 max.



J-1048
CLUTCH
GAUGE
PLATE



J-8001
DIAL
INDICATOR
SET

J-22056
ALIGNING
TOOL

J-23330
CLUTCH LEVER
HEIGHT GAUGE

J42578

Fig. 5-10 Clutch Tools

TECHNICAL SERVICE LETTER REFERENCE

Date	Letter No.	Subject	Changes Information on Page No.