

CLUTCH

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GENERAL

A single plate, dry disc-type clutch is used. The steel clutch cover, which is bolted to the flywheel, consists of a pressure plate, release levers, apply springs and a cover. The clutch driven plate friction material is riveted to the driven plate hub. Cushion springs are mounted in the driven plate hub to absorb torque.

Two clutch cover designs 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 in appearance. Both cover designs apply direct spring pressure to the pressure plate to provide clutch engagement. However, the semicentrifugal cover also utilizes six rollers, located between the pressure plate and cover, to exert additional apply force at higher engine speeds. At higher engine speeds, centrifugal force moves the rollers outward to exert additional pressure on the pressure plate for increased clutch action (fig. 5-1).

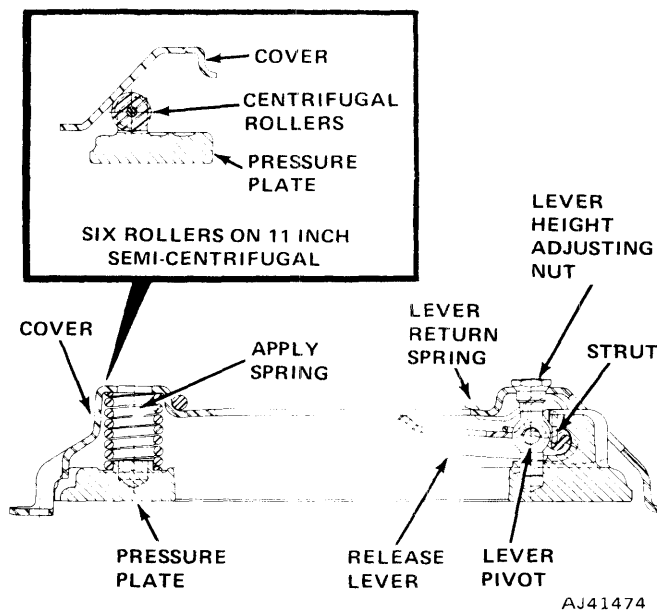


Fig. 5-1 Direct Spring Pressure and Semicentrifugal Type Clutches

Clutch Adjustment

There are two clutch adjustments that can be performed: clutch pedal free-play and clutch cover pressure plate release lever height adjustment.

Clutch pedal free-play should be checked and adjusted at the intervals specified in the Mechanical Maintenance Schedule, or whenever diagnosis indicates adjustment is needed. Clutch cover release lever height should be checked and adjusted whenever the clutch cover is removed or replaced during service operations, or whenever diagnosis indicates adjustment is needed.

Clutch Service

The clutch cover and driven plate are each serviced as an assembly only. Do not attempt to disassemble the cover or the driven plate to effect a repair. If either or both components have become damaged or severely worn, replace the component as an assembly only.

SERVICE DIAGNOSIS

General

Clutch problems can generally be assigned to one of the following categories defined as:

- Clutch chatter
- Clutch slippage or inadequate clutch pedal free play
- Clutch drag or inadequate clutch release
- Clutch pedal pulsation
- Clutch-related vibration
- Clutch area noises

Each category is described in common complaint language and followed by simplified diagnosis and repair procedures.

NOTE: Before performing any of the following diagnosis and repair procedures, adjust pedal free play and be sure the clutch pedal returns to the pedal stop completely.

Clutch Chatter

Clutch chatter can be described as a shaking or shuddering sensation that is felt throughout the vehicle. Chatter usually develops when the clutch cover pressure plate makes initial contact with the driven plate and ceases when the clutch is fully engaged (clutch pedal released). Check clutch operation as follows:

WARNING: *The following test requires clutch engagement to the point of vehicle movement. The area to the front and rear of the vehicle must be clear.*

(1) Start engine, depress clutch pedal and shift transmission into first gear.

(2) Increase engine speed to 1200 to 1500 rpm and slowly release clutch pedal. When pressure plate makes initial contact with driven plate, observe clutch operation. Depress clutch pedal and reduce engine speed.

(3) Shift transmission into reverse and repeat the procedure outlined in step (2).

(4) If clutch chatter does not develop, increase engine speed to 1700 to 2200 rpm and repeat steps (2) and (3).

(5) If clutch chatter does not develop after performing tests outlined in steps (1) through (4), problem may be improper operation by owner. If clutch chatter does develop, proceed to next step.

(6) Raise vehicle on hoist.

(7) Check for loose or broken front or rear engine support cushions. Tighten or replace as necessary. Check for loose clutch housing-to-engine or housing adapter-to-transmission attaching bolts. Tighten as necessary. Refer to torque specifications in this section. Check for binding, worn, bent or broken clutch linkage components. Lubricate or replace as necessary.

(8) If components inspected were in good condition, proceed to next step. If one or more problems were discovered and corrected, lower car and repeat step (1). If chatter is still evident, proceed to next step.

(9) Remove transmission and clutch components as outlined in this section.

NOTE: *Whenever the clutch components are removed, also remove the pilot bushing lubricating wick and soak the wick in engine oil. Install the wick before assembly.*

(10) Check for oil or grease contamination of driven plate. If contaminated, correct cause of contamination and replace driven plate.

(11) Check clutch cover for broken or collapsed apply springs and inspect surface of pressure plate for deep scoring, cracks, heat checking, or warping (check surface with straightedge). Replace clutch cover if it exhibits any of these conditions. If clutch cover is in good condition, do not replace it.

(a) Clean oil and dirt from cover with mineral spirits and allow to air dry.

(b) Lightly sand pressure plate surface with fine emery cloth.

(c) Lubricate release lever pivots and check release lever height. Adjust height if necessary.

CAUTION: *Apply lubricant to pivots sparingly. Excessive lubrication could result in grease contamination of the pressure plate and driven plate surfaces.*

(12) Inspect crankshaft pilot bushing. Replace bushing if worn, deeply scored, or discolored.

NOTE: *Soak replacement bushing in engine oil before installation.*

(13) Inspect condition of splines on transmission clutch shaft and in driven plate hub. If splines are worn, galled, chipped or broken, replace clutch shaft or driven plate. Remove corrosion, rust, or burrs from splines using oilstone or fine-tooth file. Install driven plate on clutch shaft. Plate must move freely on shaft.

(14) If all clutch components were in good condition, proceed to next step. If one or more components were determined to be faulty, repair as outlined and proceed to next step.

(15) Check clutch housing alignment as outlined in this section. Correct alignment if necessary and proceed to next step.

(16) Apply thin film of chassis lubricant to transmission clutch shaft splines. Do not apply lubricant to pilot hub.

(17) Install pilot bushing lubricating wick. Install clutch components and transmission as outlined in this section.

NOTE: *Do not replace any throwout bearing unless it is defective or damaged. Refer to Clutch Area Noises.*

Clutch Slippage Or Inadequate Clutch Linkage Free Play

Clutch slippage can be described as a condition in which the engine overspeeds (overrevs) but does not generate any increase in torque supplied to the wheels. Clutch slippage occurs when the driven plate is not gripped firmly between the flywheel and clutch cover pressure plate and rotates or slips between them at high torque. Clutch slippage can occur during initial acceleration or during subsequent shifts. Check clutch operation as follows:

(1) Block wheels and apply parking brake.

(2) Start engine (engine should be at operating temperature), shift transmission into third gear and increase engine speed to 2000 rpm.

WARNING: *Do not permit anyone to stand in front of the vehicle during this test.*

(3) Slowly release clutch pedal until clutch is fully engaged.

CAUTION: *Do not allow the clutch to be engaged for more than 5 seconds at a time as the clutch components could become damaged.*

(4) If engine stalls within 5 seconds, clutch is not defective. If engine continues to run, proceed to next step.

(5) Raise vehicle on hoist. Check clutch linkage for binding, worn, broken, or bent components. Lubricate or replace as necessary. If all components tested are in good operating condition, proceed to next step.

(6) If one or more problems were discovered during inspection in step (5), repeat steps (1) through (4). If clutch slippage is corrected, stop. If slippage persists, proceed to next step.

(7) Remove transmission and clutch components as outlined in this section.

NOTE: *Whenever the transmission is removed, also remove the pilot bushing lubricating wick and soak the wick in engine oil. Install the wick before assembly.*

(8) Inspect driven plate. If excessively worn (1/16 inch or less friction material remains above rivets), highly glazed, or if plate is contaminated by oil or grease, replace driven plate.

NOTE: *If driven plate is contaminated, determine the cause and make correction before proceeding any further.*

(9) Inspect clutch cover. If cover is heat-checked, has broken or collapsed springs, or exhibits signs of overheating (e.g., has blue coloration), replace clutch cover. If cover does not exhibit any of these conditions, do not replace it.

(a) Clean oil and dirt from cover using mineral spirits and allow cover to air dry.

(b) Lightly sand pressure plate surface with fine emery cloth.

(c) Lubricate clutch cover release lever pivots and check and adjust release lever height if necessary.

CAUTION: *Apply lubricant to pivots sparingly. Excessive lubrication could result in grease contamination of the driven plate and pressure plate surfaces.*

(10) Check throwout bearing mounting surface of transmission front bearing cap for galling, deep scores, or roughness. Install bearing on front bearing cap and check for smooth fore-and-aft movement. Replace bearing or front bearing cap as necessary. Apply chassis lubricant to throwout bearing groove and apply thin coat of lubricant to bearing mounting surface of front bearing cap.

CAUTION: *The throwout bearing used with the T-150 transmission has retaining springs which position the bearing on the throwout lever. Check these springs for distortion, loss of tension, or for being bent or broken. Replace the bearing if these springs are damaged. Also, when installing the bearing, be sure the retaining projections on the throwout lever are properly engaged in the retaining holes in the bearing sleeve.*

NOTE: *Do not replace the throwout bearing unless it is actually defective or damaged. Refer to Clutch Area Noises.*

(11) Apply thin film of chassis lubricant to transmission clutch shaft splines. Do not apply lubricant to pilot hub.

(12) Install pilot bushing and lubricating wick. Install clutch components and transmission as outlined in this section.

(13) Lower vehicle.

Clutch Drag Or Inadequate Release

Clutch drag can be described as a condition in which the clutch driven plate, and consequently the transmission clutch shaft, does not come to a complete stop after the clutch pedal is depressed (clutch disengaged). Clutch drag can cause gear clash when shifting into reverse or hard or difficult shifting. Check clutch operation as follows.

NOTE: *Occasionally, the clutch driven plate and clutch shaft will require approximately 5 seconds to lose momentum and come to a complete stop after initial clutch disengagement. This is normal and should not be confused with clutch drag.*

(1) Start engine, depress clutch pedal fully, and shift transmission into first gear.

(2) Shift transmission into neutral but **do not** release clutch pedal.

(3) Wait 5 to 10 seconds and shift transmission into reverse. If shift is smooth with no gear clash, clutch operation is normal. If shifting into reverse produces gear clash, proceed to next step.

(4) Raise vehicle on hoist. Check clutch linkage for binding, worn, broken or bent components. Lubricate or replace as necessary. If components are in good operating condition, proceed to next step. If one or more problems were discovered and repaired, lower vehicle and repeat steps (1) through (3). If clutch now operates correctly, stop. If clutch drag persists, proceed to next step.

(5) Remove transmission and clutch components as outlined in this section.

NOTE: *Whenever the transmission is removed, also remove the pilot bushing lubricating wick and soak the wick in engine oil. Install the wick before assembly.*

(6) Observe wear pattern on driven plate. If wear pattern is uneven (e.g., two areas heavily worn on one side, two only partially worn on opposite side), or has opposing wear patterns on front and reverse side, the driven plate is warped and should be replaced.

(7) Inspect clutch cover assembly. If clutch cover assembly has worn, bent, or broken release levers or lever pivots, is heavily scored or warped, replace clutch cover assembly. If cover assembly does not exhibit any of these conditions, do not replace it.

- (a) Clean oil and dirt from clutch cover using solvent and allow it to air dry.
- (b) Lightly sand pressure plate with fine emery cloth.
- (c) Lubricate clutch release lever pivots.

NOTE: *Apply lubricant to pivots sparingly. Excessive lubricant could result in grease contamination of pressure plate and driven plate surfaces.*

- (8) Check and adjust release lever height as necessary.

NOTE: *If the release lever height cannot be adjusted, the release lever(s) are bent. Replace the clutch cover.*

- (9) Inspect crankshaft pilot bushing for heavy scoring, angular wear pattern, or discoloration. Replace as necessary.

NOTE: *If the pilot bushing indicates angular wear, proceed to next step after completing step (10). Soak replacement bushing in engine oil before installation.*

- (10) Inspect condition of splines on transmission clutch shaft and in driven plate hub. If severely worn, galled, or corroded, replace clutch shaft or driven plate. Corrosion, rust, or burrs can be removed from splines using an oilstone or fine-tooth file. Install driven plate on clutch shaft. Driven plate must move freely on shaft.

(11) If components inspected in step (10) are in good condition, proceed to next step. If one or more problems were discovered in steps (3) through (10), repair as outlined and proceed to next step.

- (12) Check clutch housing alignment as outlined in this section. Correct as necessary and proceed to next step.

(13) Apply thin film of chassis lubricant to transmission clutch shaft splines. Do not apply lubricant to pilot hub.

(14) Install pilot bushing lubricating wick. Install transmission and clutch components as outlined in this section.

- (15) Lower vehicle.

NOTE: *Do not replace the throwout bearing unless actually defective. Refer to Clutch Area Noises.*

Clutch Pedal Pulsation

Clutch pedal pulsation can be described as a rapid up-and-down (pumping-type) movement of the pedal that is not accompanied by any noise. This pedal movement, which is slight, can be felt by the driver. However, on occasion, pedal movement will be great enough to be visually observed and cause a noticeable vibration.

Clutch pedal pulsation occurs when the throwout bearing makes initial contact with the clutch cover release levers (clutch partially disengaged), or at any time the bearing is in contact with the release levers. Pulsation is usually caused by incorrect clutch release lever height or clutch housing misalignment. Check clutch operation as follows.

- (1) Start engine, slowly depress clutch pedal until throwout bearing makes initial contact with clutch release levers, and check for pulsation.

NOTE: *Some minor pulsation is normal.*

- (2) Continue to depress clutch pedal while checking for pulsation until pedal is fully depressed.

(3) If pulsation is not evident or is minor, stop repair. If pulsation is very rapid and can be felt throughout car, refer to Clutch-Related Vibrations. If car displays pulsation symptoms, proceed to next step.

- (4) Remove transmission and clutch components as outlined in this section.

(5) Remove pilot bushing lubricating wick and soak wick in engine oil. Install wick before assembly.

(6) Inspect clutch cover for excessively worn or bent release levers. If release levers are bent or excessively worn, replace clutch cover and proceed to step (8). If release levers are in good condition, clean oil and dirt from clutch cover assembly using mineral spirits, allow assembly to air dry and proceed to next step.

(7) Lightly sand clutch cover pressure plate with fine emery cloth, lubricate clutch release lever pivots, check and adjust release lever height as necessary and proceed to next step.

NOTE: *Apply lubricant to the pivots sparingly. Excessive lubrication could result in grease contamination of the driven plate and pressure plate surface.*

- (8) Check clutch housing alignment as outlined in this section. Correct as necessary and proceed to next step.

(9) Apply thin film of chassis lubricant to transmission clutch shaft splines. Do not apply lubricant to pilot hub.

- (10) Install pilot bushing lubricating wick.

(11) Install clutch components and transmission as outlined in this section.

Clutch Related Vibrations

Clutch related vibrations differ from pedal pulsations in frequency and magnitude and can be felt throughout the car. Clutch vibrations usually occur at a relatively high engine speed (over 1500 rpm) regardless of clutch pedal position. However, vibrations related to clutch component imbalance occur infrequently as the clutch cover and driven plate are balanced as a unit at assembly. At assembly, the clutch unit is installed on the crankshaft/flywheel assembly and given a final fine-tune balance. Replacement of clutch components to correct vibrations should be performed only after checking all other possibilities. Check clutch operation as follows.

- (1) Raise vehicle on hoist and check engine front support cushion interlocks for grounding. Repair as necessary. Check for any other engine component (e.g., exhaust manifold, valve cover, etc.) for grounding on body or frame. If one of these components is grounded, repair and check for vibration. If vibration ceases, stop

repair. If vibration continues, lower vehicle and proceed to next step.

(2) Disconnect accessory drive belts one at a time, start engine and check for vibration. If vibration is corrected after removal of a drive belt, cause of vibration is related to the accessory driven by the belt or by the belt itself. Repair as necessary. If vibration continues, proceed to next step.

(3) Raise vehicle on hoist and remove transmission and clutch housing as outlined in this section.

(4) Support engine firmly.

(5) Check for loose flywheel mounting bolts. Tighten bolts to 105 foot-pounds torque if necessary and operate engine. If vibration ceases, stop repair. If vibration is still evident, proceed to next step.

(6) Check flywheel face runout. If runout is 0.005 inch or less, proceed to next step. If runout exceeds 0.005 inch, replace flywheel and operate engine. If vibration ceases, stop repair. If vibration is still evident, proceed to next step.

(7) Check for damaged crankshaft vibration dampener. If dampener is OK, proceed to next step. If dampener is damaged, replace dampener and operate engine. If vibration ceases, stop repair. If vibration is still evident, proceed to next step.

(8) Check clutch cover imbalance as follows:

(a) Remove clutch components from flywheel.

(b) Start and operate engine at speed where vibration occurred.

(c) If vibration ceases, replace clutch cover and check operation. If OK, install transmission as outlined in this section and lower vehicle.

Clutch Noises

Clutch Throwout Bearing Noise

Clutch throwout bearing noises can be described as whirring, grating, or grinding noises which occur when the clutch pedal is depressed (clutch disengaged).

These noises usually continue until the clutch pedal is fully released (clutch engaged) and the bearing is no longer in contact with the clutch cover release levers.

Throwout bearing noise is corrected by replacing the bearing as outlined in this section.

NOTE: *The throwout bearing should not be replaced as a matter of course when the clutch cover or driven member are serviced. The bearing should be replaced only when actually defective.*

Clutch Shaft or Countershaft Bearing Noise

Clutch shaft or countershaft bearing noises can be described as whirring, grating, or grinding noises which cease when the clutch pedal is depressed (clutch disengaged) or when the transmission is shifted into gear. These noises are most noticeable when the clutch pedal is fully released and the transmission is in neutral.

Correction of these noises will require transmission removal and replacement of the problem bearing(s).

Crankshaft Pilot Bushing Noise

Pilot bushing noises can be described as squealing, howling, or elephant-type trumpeting noises which are most noticeable when the engine is cold. These noises occur during the first few inches of clutch pedal travel as the pedal is being released (partial clutch engagement) with the transmission in gear. It can also occur in very cold weather when the pedal is fully depressed (clutch disengaged) and the engine is started with the transmission in neutral. To correct pilot bushing noise, replace the bushing as outlined in this section.

CLUTCH LINKAGE AND PEDAL FREE PLAY ADJUSTMENT

(1) Lift clutch pedal upward and against pedal stop.

(2) On Cherokee and Truck models, adjust clutch push rod lower ball pivot assembly in or out (on push rod) to position bellcrank inner lever parallel to front face of clutch housing. Position should be slightly forward from vertical.

(3) Loosen jamnut and turn throwout fork adjuster in or out to obtain specified clutch pedal free play and tighten jamnut.

CLUTCH REMOVAL

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

(2) Remove pilot bushing lubricating wick and soak wick in engine oil.

(3) Remove starter, throwout bearing and clutch housing.

(4) Mark position of clutch cover, pressure plate, and flywheel for assembly alignment reference.

(5) Remove clutch cover and driven plate from flywheel.

CAUTION: *When removing the clutch cover from the flywheel, loosen the cover attaching bolts 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, causing clutch chatter when installed.*

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

CLUTCH DRIVEN PLATE

Repair of the driven plate is not recommended. If the plate or cushion springs are bent, worn, or damaged, replace the driven plate. Do not replace the plate if the cushion springs only appear loose. This is normal.

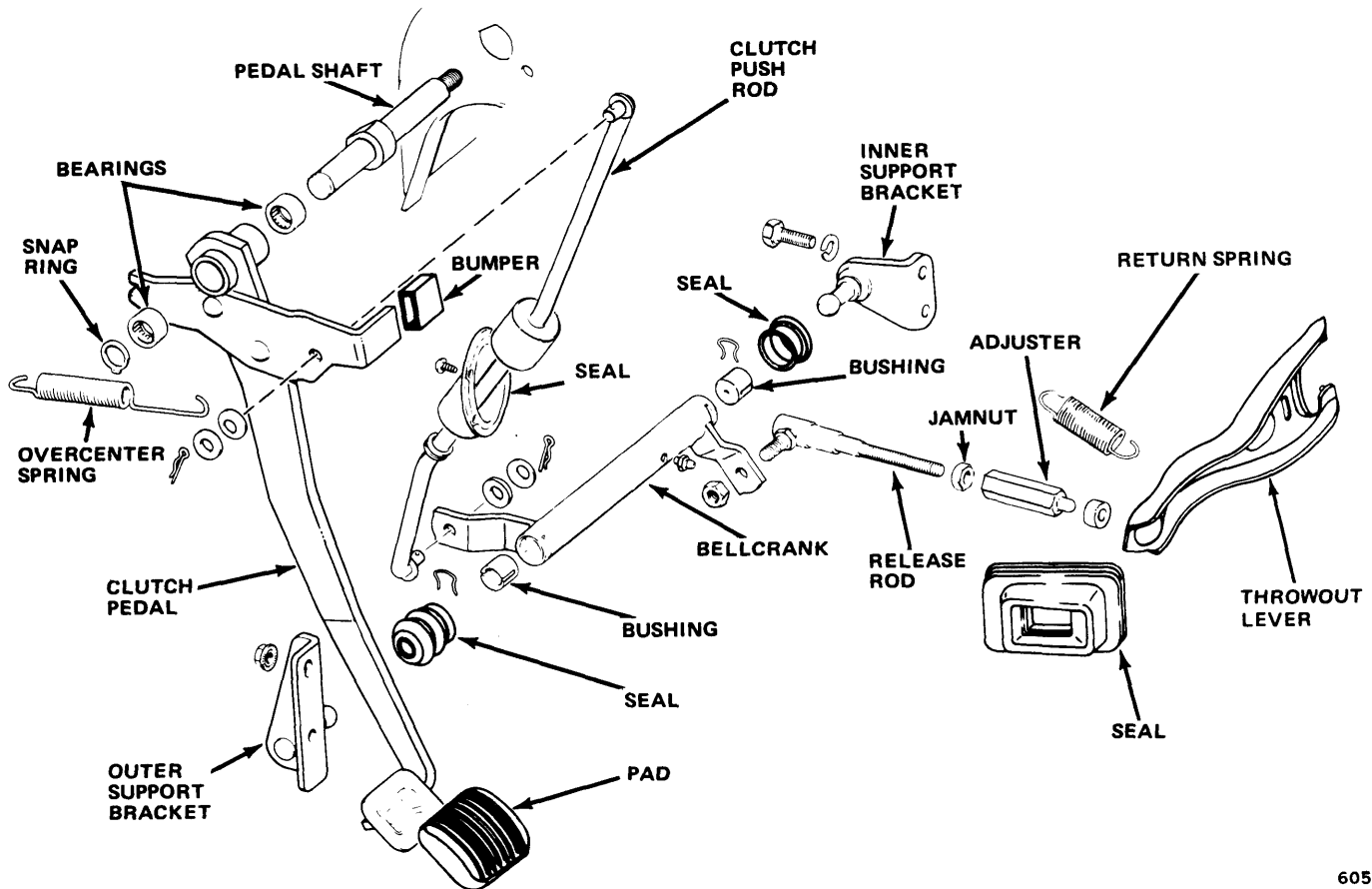


Fig. 5-2 Clutch Linkage—CJ Models

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THROWOUT BEARING

The clutch release mechanism consists of a forked lever which pivots on a ball and stud threaded into the clutch housing. A clutch fork return spring is anchored to a clip under the ball pivot and holds the lever in contact with the ball pivot. On Cherokee and Truck models, the throwout bearing is attached to the forked end of the throwout lever with a wave washer on the lower pin. On CJ models, the bearing is attached to the fork by tension springs. The throwout bearing is permanently lubricated during manufacture.

Do not wash the throwout bearing in solvent as the bearing lubricant could be dissolved.

CRANKSHAFT PILOT BUSHING

When the clutch assembly is removed from the flywheel inspect the pilot bushing for wear, scoring, cracks, and looseness. Replace the bushing if worn or damaged.

Bushing Removal

- (1) Remove lubrication wick and fill crankshaft bore and pilot bushing with multi-purpose grease.
- (2) Insert clutch aligning tool into bushing and tap end of tool with lead hammer. Hydraulic pressure generated by compressed grease will force bushing out of crankshaft.

Bushing Installation

- (1) Clean grease from crankshaft bore.
- (2) Soak replacement bushing and lubrication wick in engine oil.
- (3) Using clutch aligning tool as bushing driver, install bushing in crankshaft bore. Keep bushing straight during installation and be sure it is fully seated.
- (4) Install lubrication wick.

FLYWHEEL

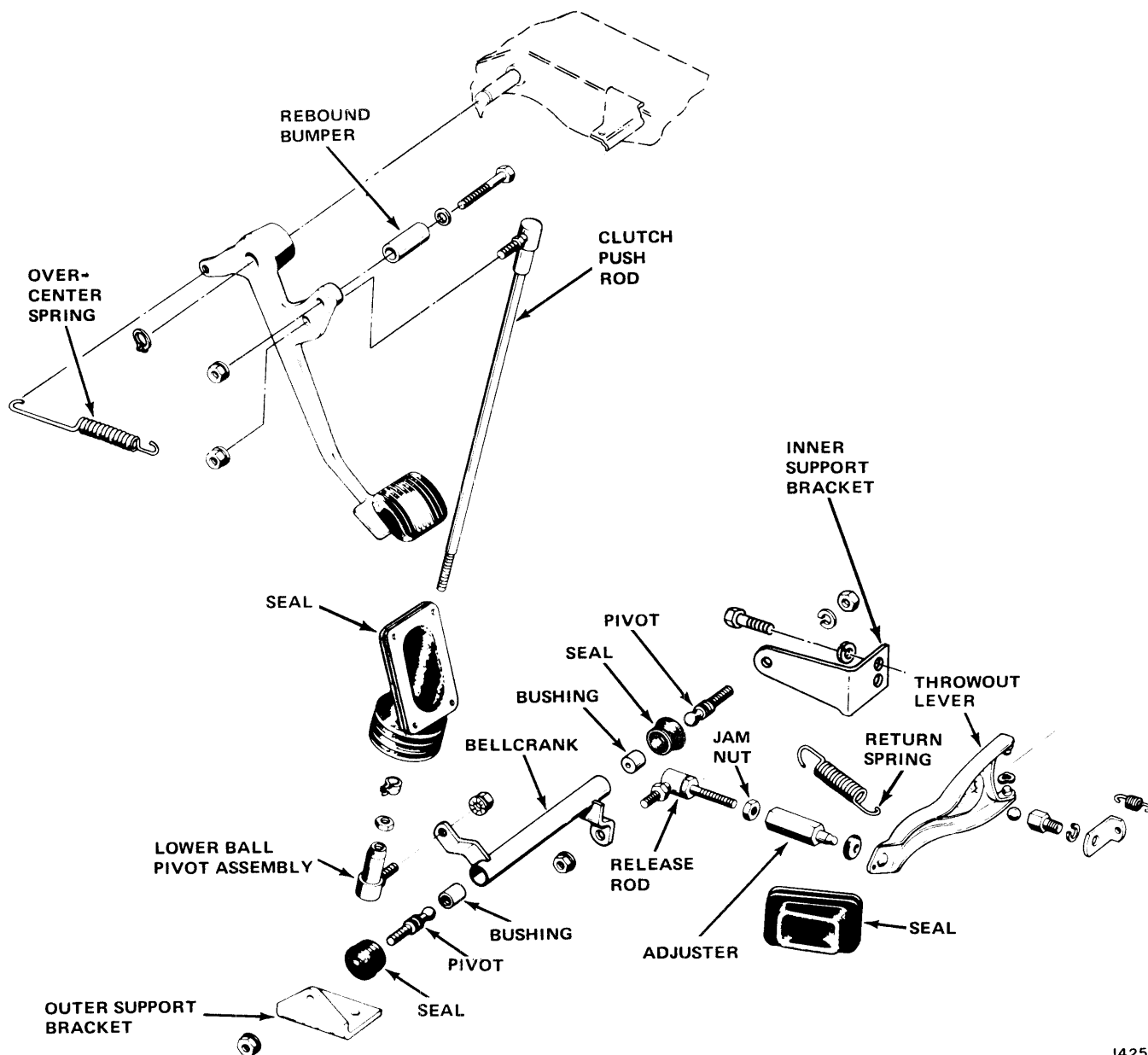
Inspect the flywheel and pressure plate surfaces for roughness. Check the flywheel bolts for proper torque. Tighten bolts to 105 foot-pounds torque if necessary.

TRANSMISSION CLUTCH SHAFT

Install the clutch driven plate on the clutch shaft. The driven plate must move freely on the shaft splines. If the clutch shaft splines are burred, remove the burrs using a file or oilstone. If the driven plate does not move freely on the splines, incomplete clutch release will occur resulting in hard shifting.

CLUTCH HOUSING ALIGNMENT

Clutch housing misalignment is caused by excessive face or bore runout of the clutch housing or housing-to-transmission adapter. Misalignment can cause improper



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Fig. 5-3 Clutch Linkage—Cherokee and Truck

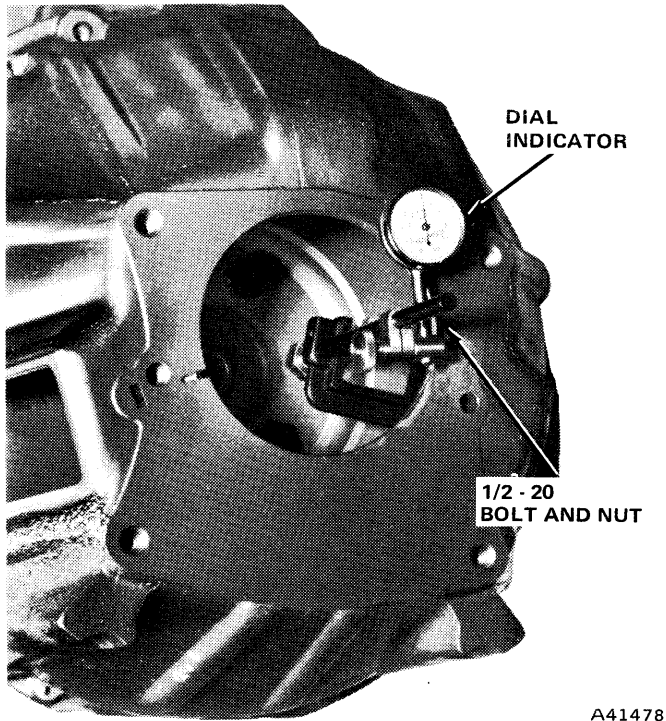
clutch release, driven plate failure, front transmission bearing failure, premature crankshaft pilot bushing wear, clutch noise and vibration. In severe cases, misalignment can also cause jumping out of gear on deceleration. If these malfunctions occur, the rear face and bore of the clutch housing or housing-to-transmission adapter must be checked for excessive runout.

Alignment Check—Without Transmission Adapter

Use the following procedure to check housing alignment when the vehicle is not equipped with 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 nine-inch long 1/2-20 bolt and nut for dial indicator support.
- (5) Install nut on bolt so that 10 or 12 threads are exposed and thread bolt into crankshaft.
- (6) Tighten nut to secure bolt.
- (7) Install clutch housing on engine and tighten attaching bolts to specified torque. Refer to Specifications.
- (8) Mount dial indicator on long bolt. Indicator stylus must contact rear face of clutch housing approximately 1/8 inch from edge of bore (fig. 5-4).
- (9) Turn crankshaft and check face runout of housing. Face runout must not exceed 0.010 inch total indicator reading at any point through 360 degrees of rotation.



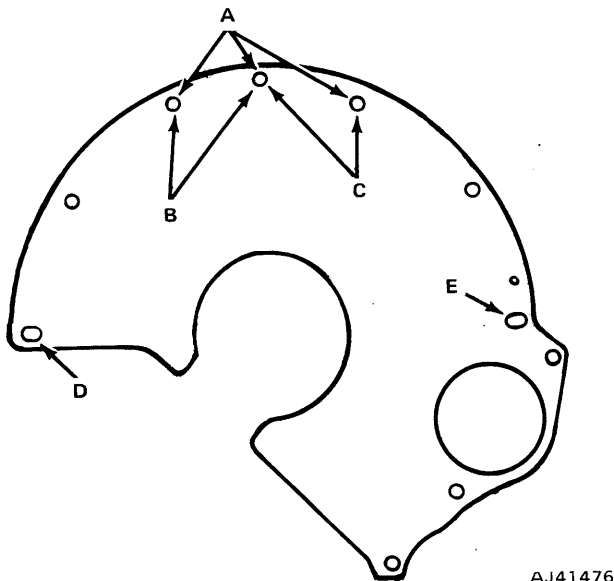
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Fig. 5-4 Mounting Dial Indicator

CAUTION: Crankshaft end play must be held to zero when checking face runout to obtain an accurate reading. Move and hold the crankshaft forward or backward using a pry bar to remove end play.

(10) Use following procedure to correct face runout of clutch housing.

(a) Install shims between clutch housing and engine-to-clutch housing spacer (fig. 5-5).



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Fig. 5-5 Shim Locations—Six-Cylinder Engine Shown

(b) Shims should be installed at points A to correctly align top of housing with bottom of housing. Shims installed at points B and D or C and E will correct runout at either side of clutch housing. Shims installed at points D and E will align housing from bottom to top.

(c) Loosen clutch housing bolts.

(d) Install shims where necessary, tighten housing bolts and recheck face runout.

(e) Total face runout of clutch housing must not exceed 0.010 inch. Relocate shims as necessary to correct runout.

(11) Check clutch housing bore alignment by positioning dial indicator stylus on inside diameter of housing bore.

(12) Hold crankshaft end play to zero, rotate crankshaft and note dial indicator reading at four equally spaced points. Bore runout must not exceed 0.010 inch total indicator reading at any point.

(13) Any change in face alignment will change bore alignment and may make it possible to correct bore alignment by changing face alignment. Where it is impossible to correct bore alignment to maximum of 0.010-inch runout after changing face alignment, replace housing.

Alignment Check—With Transmission Adapter

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

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

(2) Remove clutch housing and adapter as assembly. Do not remove adapter.

(3) Remove clutch cover and driven plate.

(4) Remove one flywheel attaching bolt.

(5) Obtain 1/2-20 by 15-inch long bolt and 1/2-20 nut. Bolt and nut will serve as support for dial indicator.

(6) Thread nut onto bolt so that 10 to 12 threads are exposed. Thread bolt into flywheel and tighten nut securely.

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

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

(9) Zero dial indicator and rotate crankshaft to check runout at adapter face. Runout must not exceed 0.010 inch total indicator reading at any point through 360 degrees of rotation.

CAUTION: Crankshaft end play must be held to zero while checking face runout to obtain an accurate reading.

(10) Position dial indicator so stylus contacts bore surface of adapter at approximate center of bore.

(11) Zero dial indicator and rotate crankshaft to check runout of adapter bore. Runout must 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.

(12) Correct adapter misalignment as outlined in following steps.

(13) If runout at adapter bore is within acceptable limits but out of tolerance at face, shim clutch housing as required to obtain runout of 0.010 inch or less. Shim housing as outlined under Alignment Check—Without Transmission Adapter.

(14) If runout at adapter face is within acceptable limits but out of tolerance at bore, proceed as follows:

(a) Loosen adapter-to-clutch housing bolts one turn.

(b) 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.

(c) When runout is corrected, tighten adapter bolts to 35 foot-pounds torque.

(d) Recheck runout and adjust if necessary.

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

(16) If adapter and housing were replaced, install and check runout of replacement parts.

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

CAUTION: If the clutch housing was shimmed, mark the location of the shims for assembly reference.

(18) Remove 1/2-20 bolt and nut from flywheel and install flywheel bolt removed previously. Tighten bolt to 105 foot-pounds torque.

(19) Install clutch assembly on flywheel. Tighten clutch cover bolts to 40 foot-pounds torque.

(20) Install clutch housing and adapter assembly. Tighten housing bolts to specified torque. Refer to Specifications.

(21) Install transmission as outlined in Section 6—Manual Transmission.

CLUTCH COVER RELEASE LEVER ADJUSTMENT

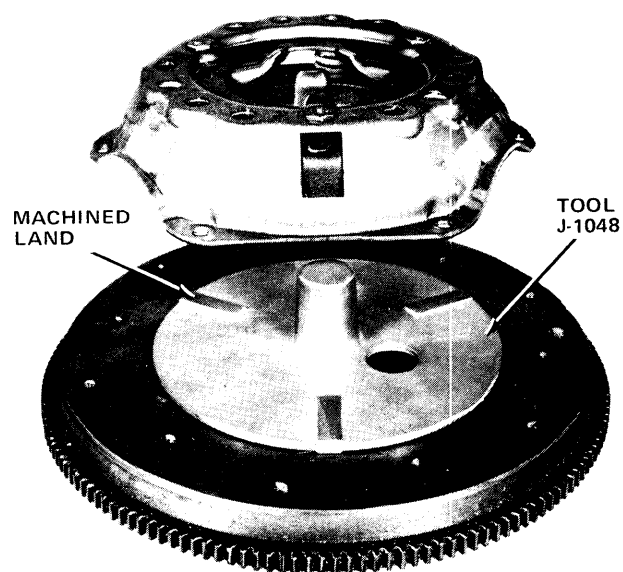
NOTE: Always inspect release lever height adjustment before installing the clutch cover.

(1) Install Gauge Plate Tool J-1048, on flywheel in position normally occupied by driven plate (fig. 5-6).

(2) Position clutch cover over gauge plate. Release levers must be directly over machined lands of gauge plate and gauge plate hub must be centered between ends of release levers.

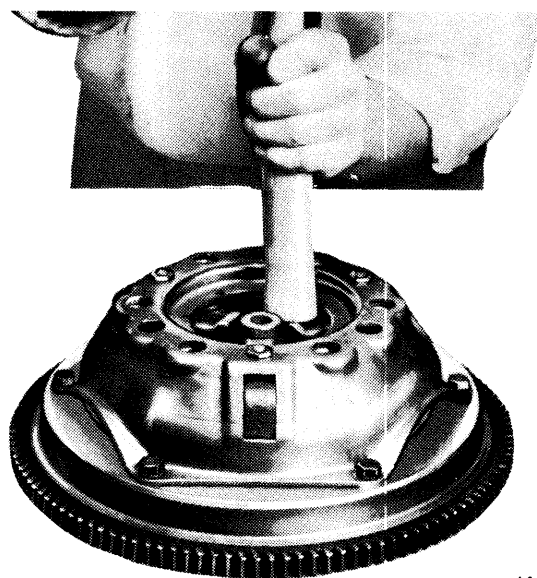
(3) Install clutch cover on flywheel. Tighten cover attaching bolts in rotation, one or two turns at a time to avoid distorting cover.

(4) Compress each release lever several times to seat levers in operating position (fig. 5-7). Use hammer handle to compress levers.



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Fig. 5-6 Mounting Gauge Plate J-1048



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Fig. 5-7 Compressing Release Levers

(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 desired height.

(7) After each lever has been adjusted, work lever down and up several times and recheck adjustment. If adjustment is correct, stake nut with punch to secure.

CLUTCH INSTALLATION

(1) Check clutch release lever height and correct if necessary.

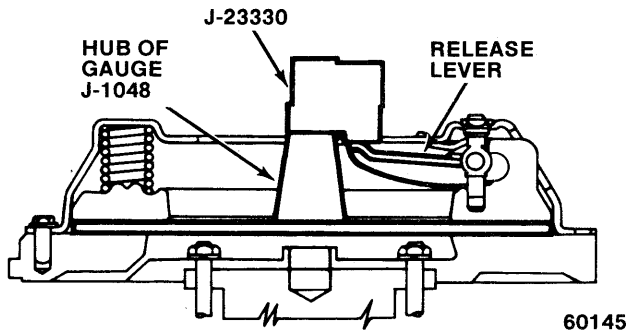


Fig. 5-8 Measuring Release Lever Height

(2) Insert Clutch Aligning Tool J-22056 or J-25353 (or spare clutch shaft) in driven plate hub and mount assembled plate and tool on flywheel. Be sure pilot hub of tool is fully seated in pilot bushing.

(3) Mount clutch cover on flywheel and loosely install cover bolts.

(4) Align driven plate using tool or clutch shaft and tighten cover bolts to 40 foot-pounds torque.

CAUTION: Tighten the cover bolts alternately and evenly to avoid distorting the cover.

(5) Install clutch housing, starter and throwout bearing (fig. 5-9 and 5-10).

CAUTION: Do not operate the clutch pedal until the transmission has been installed.

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

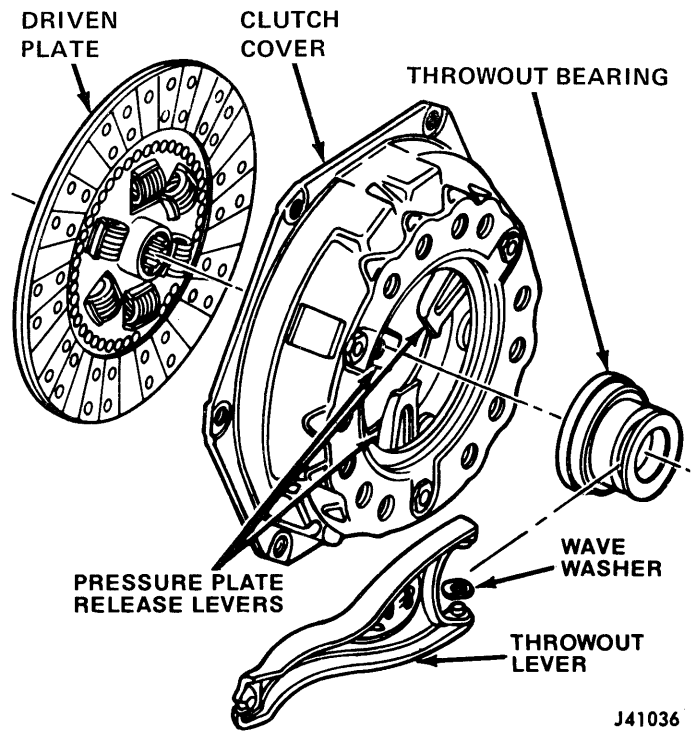


Fig. 5-10 Clutch Components—Cherokee and Truck

SPECIFICATIONS

Clutch Specifications

Model	Engine (CID)	Clutch Diameter (Inches)	Release Lever Height (Inches Above Gauge Hub)	Pedal Free Play (Inches)
CJ-5/CJ-7	232,258, 304	10.5	3/32 to 7/64	0.88 to 1.00
Cherokee, Wagoneer, Truck,	258	10.5	3/32 to 7/64	0.38 to 0.62
	360	11.0	3/16	0.38 to 0.62

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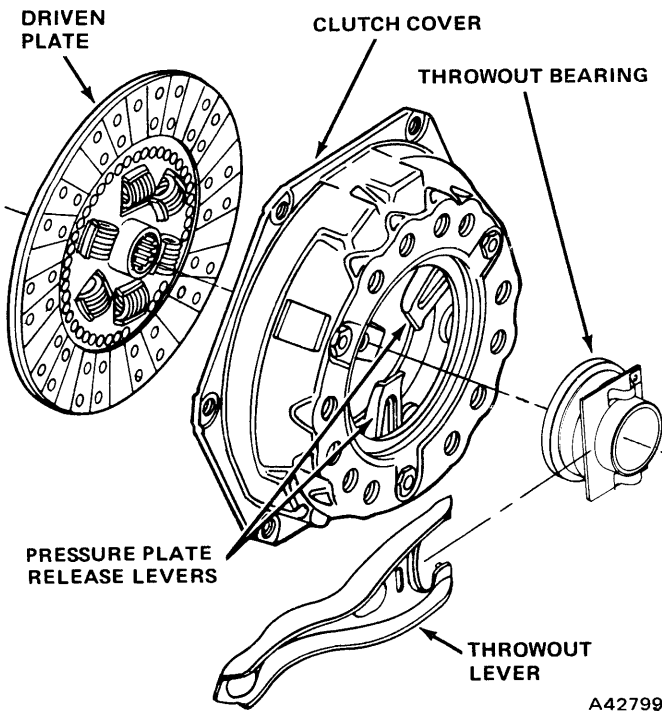


Fig. 5-9 Clutch Components—CJ Models

Clutch Housing Alignment Specifications

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.

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Torque Specifications

Service Set-To Torques should be used when assembling components.
 Service In-Use Recheck Torques should be used for checking a pre-torqued item.

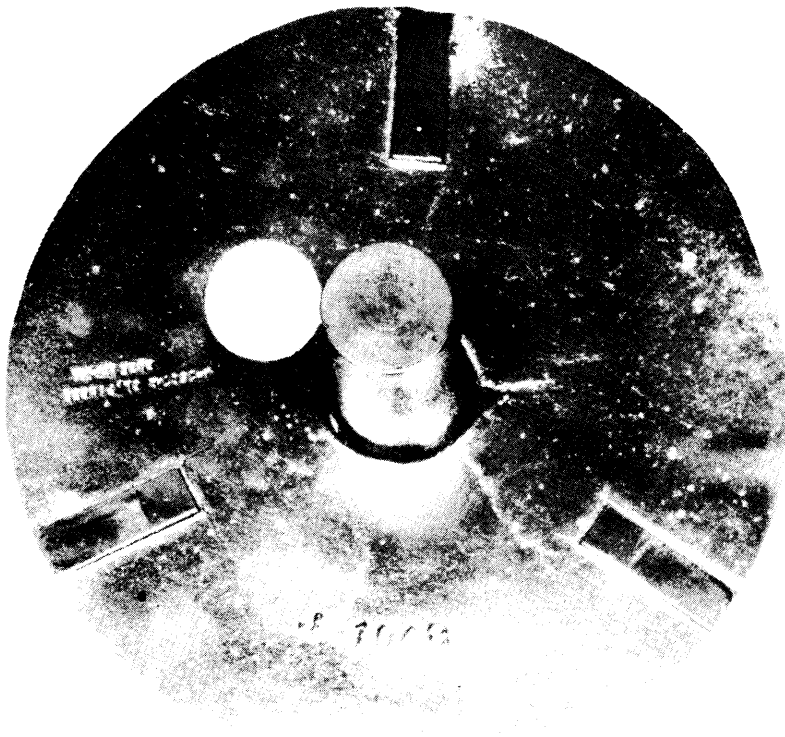
	Service Set-To Torques	Service In-Use Recheck Torques
Clutch Bellcrank Bracket to Frame Rail Bolt (Cke., Trk.)	14	12-16
Clutch Bellcrank Pivot	35	30-40
Clutch Cover Bolt	40	35-45
Clutch Housing to Engine Block Bolt		
232-258 CID Engines		
Top	35	30-40
Bottom	45	40-50
304-360 Engines		
Top	30	25-35
Bottom	30	25-35

	Service Set-To Torques	Service In-Use Recheck Torques
Clutch Housing to Engine Dowel Bolt Nut	45	40-50
Clutch Housing Spacer to Block Bolt (304-360 CID Engines)	15	12-17
Clutch Pedal Rebound Bumper, Bolt, Nut, and Lockwasher Assembly to Pedal	40	35-45
Clutch Pedal Shaft Locknut	33	30-36
Starter Motor to Clutch Housing Bolt	18	12-25
Transmission Case to Clutch Housing Bolt	55	50-60

All Torque values given in foot-pounds with dry fits unless otherwise specified.
 Refer to the Standard Torque Specifications and Capscrew Markings Chart in Section A of this manual for any torque specifications not listed above.

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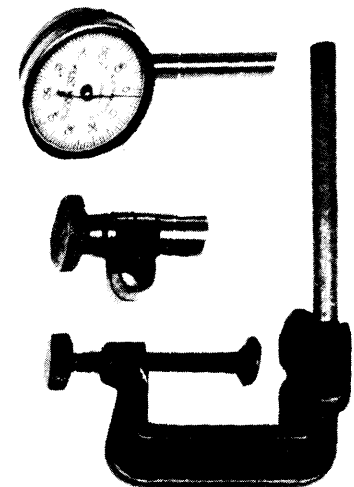
Special Tools



J-1048
CLUTCH
GAUGE
PLATE



J-22056 OR J-25353
ALIGNING
TOOL



J-8001
DIAL
INDICATOR
SET



J-23330
CLUTCH LEVER
HEIGHT GAUGE

J42578

