

**UNIT ALIGNMENT AND TOOTH CONTACT CHECK**

1. Prepare foundation for installation, providing smooth machined flat surfaces for the gear unit mounting flanges.
2. Place unit on foundation in approximate position, using jackscrews in mounting flange or temporary shim packs at "A" and "B," and a shim pack at "X," for initial support. (See Figure 1).
3. Shift unit as required to obtain specified fore and aft and athwartship position and approximate alignment with propeller shaft, using feelers and indicator.
4. Adjust jackscrews at "C" and "D" to install equally fitting shim packs if desired, and remove shim pack at "X."
5. To achieve specified offset and angular alignment constants with propeller shaft, make the required adjustments by measured (feeler or micrometer) increments at the four corners. To change elevation adjust jackscrews or shim packs at the four corners "A-B-C-D." The adjustments must be EQUAL at the four corners. For vertical angular alignment, adjust in equal amounts at either the two forward corners, "A-C," or the two aft corners "B-D."
6. To prepare for tooth contact check:
  - A. Secure unit to foundation with clamps or temporary bolts at the four corners "A-B-C-D."
  - B. Brush Prussian Blue, "Dykem" paste, or equivalent on several teeth of main ahead pinion in an axial band. Then rotate pinion until coated teeth engage gear teeth.
  - C. Mount indicator with extension shaft bearing on aft end of pinion shaft. See Figure 2.

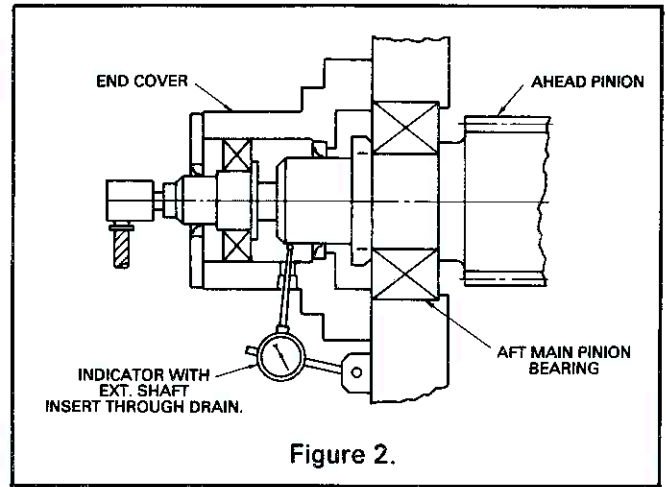


Figure 2.

- D. With sling on forward clutch or spacer (with clutch inflated), carefully raise forward end of pinion just sufficiently to determine and insure that aft end of pinion is seated in the bottom of its bearing as shown by the indicator. Note that the weight of the clutch assembly on the forward end of the pinion may tip pinion in bearing clearances, resulting in false tooth contact impression if procedure is not followed carefully. Do NOT lift forward end further after indicator hand has reached maximum (plus) reading.
7. Bar pinion back and forth circumferentially to rap pinion teeth sharply against both flanks of gear teeth.
8. Roll blued teeth out of mesh and check contact pattern as indicated by diagonal transfer marks on gear teeth or impression in bluing on pinion teeth. Pattern should show contact 90-100% across the face, heavier aft on the ahead driving tooth flanks.

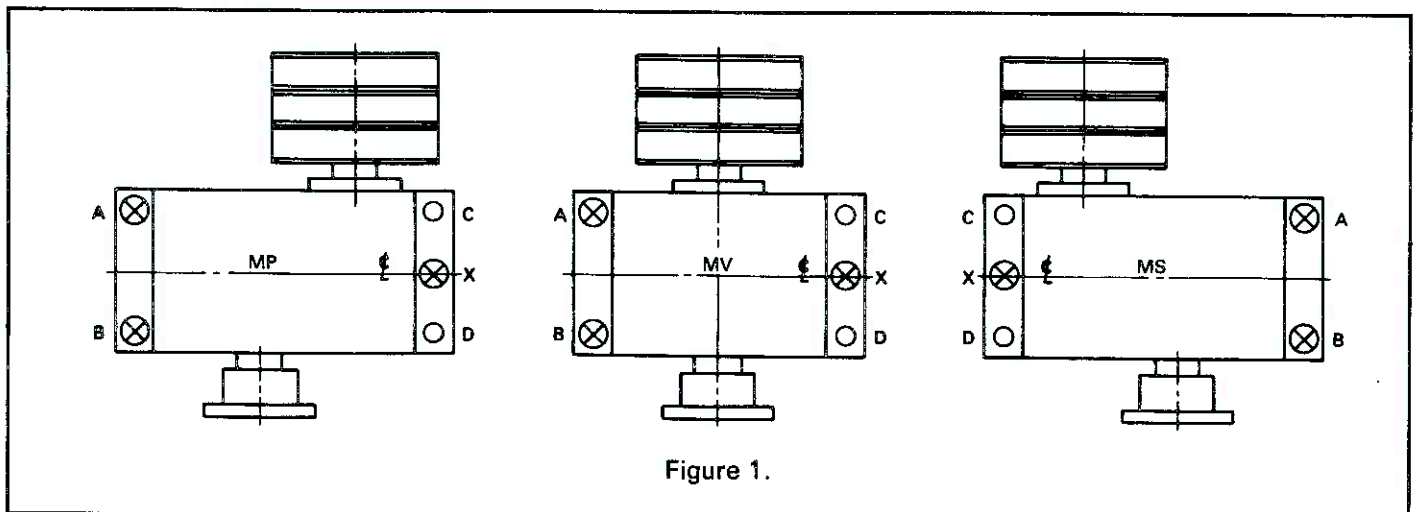


Figure 1.

9. If necessary to improve contact:
  - A. On horizontal offset units - adjust shims as required at two forward corners "A-C" opposite to each other in direction, and with the "C" adjustment twice the "A" in amount. Repeat Steps 6 through 8. Recheck shaft alignment and repeat Step 5 if necessary.
  - B. On vertical offset units - adjust shims as required at two forward corners "A-C" opposite to each other in direction, and in equal amounts. Repeat Steps 6 thru 8. Recheck shaft alignment and repeat Step 5 if necessary.
  - C. In cases where the gear housing is relatively stiffer than the foundation structure, flexing of the foundation as indicated by minor change in the contact pattern, regardless of amount of shimming, may hinder suitable gear case adjustment for proper contact. This condition can be relieved by slacking the cover and main housing split bolts or capscrews while shimming; and retightening after final contact has been achieved.
10. After contact and alignment has been established, substitute properly fitted chocks for the shim packs, taking precautions that the setting and alignment to propeller shaft is not changed or lost in the process. Fit chocks at remaining foundation bolt locations.

It is strongly recommended that fitting of final key chocks at the four corners be deferred until shaft alignment and tooth contact have both been checked and that intermediate chocks be fitted only after the corner key chocks. This will avoid unnecessary refitting of chocks and possible difficulties in carrying out the shaft and gear alignment procedures.

11. Drill and ream for fitted foundation bolts. Insert bolts and tighten nuts securely by slugging or driving.
12. Ream, fit and tighten low speed coupling bolts to propeller shaft flange.
13. Align engine to gear per instructions given on the following pages.

#### ENGINE TO GEAR ALIGNMENT FOR PILOT BEARING MOUNTED CLUTCH (MODEL C)

1. After gear is in place with gear tooth contact checks made per Falk instructions and propeller shaft alignment to gear is satisfactory with chocks, shims and gear foundation bolts made up tight, proceed with engine-to-gear alignment. See Figure 3.
2. Place temporary support under clutch to approximate concentricity with drum and, with clutch deflated, move clutch assembly aft sufficiently to provide clearance for installation of coupling disc and tube assembly.
3. Mount the coupling disc and tube assembly to engine, using a sling from engine or temporary blocking for support of aft end of tube, so as to avoid excessive distortion of disc when bolting to flywheel.
4. Move engine into fore and aft position as shown on engine manufacturer's installation drawings, insuring necessary clearance for future clutch removal and proper centering of clutches on drums.
5. Make a preliminary alignment by moving engine horizontally and vertically such that the coupling tube flange and clutch spacer joint can be made up without forcing or straining parts. Move the clutch assembly forward to engage the rabbit fit and tighten bolts between tube and clutch spacer.

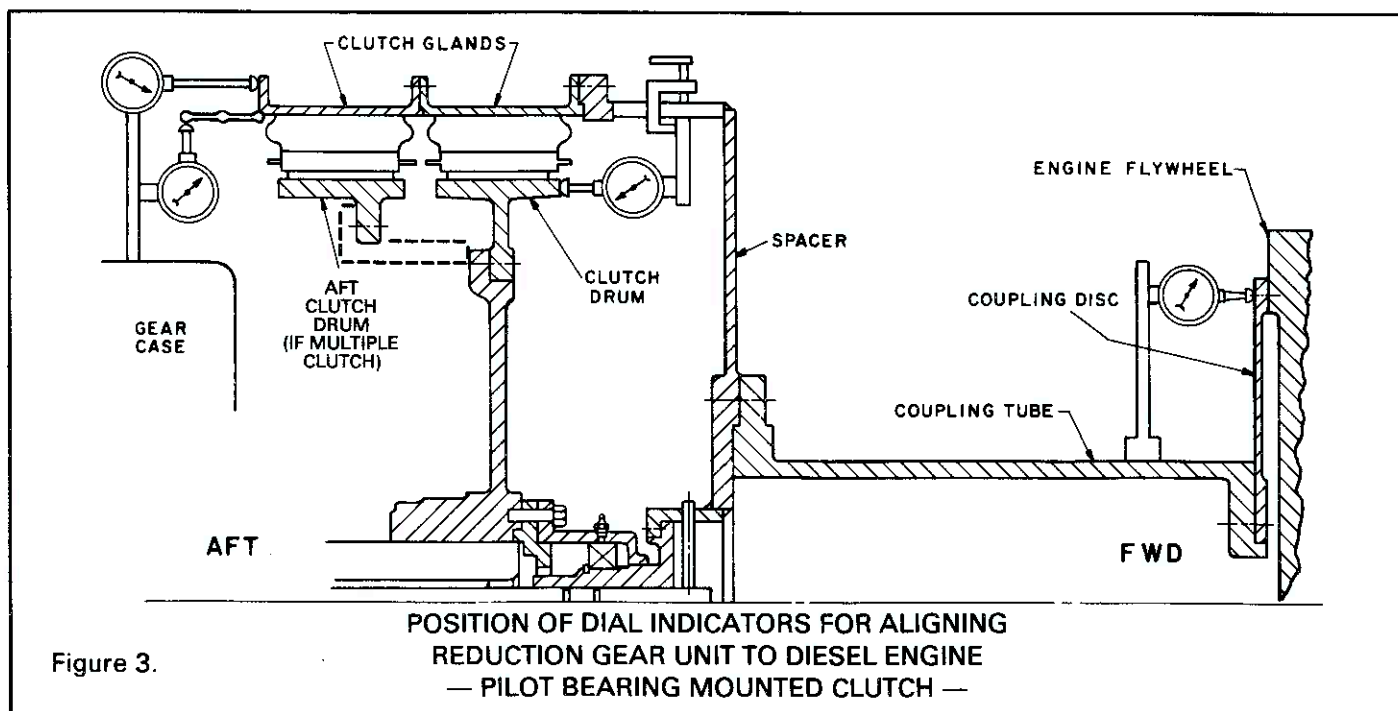


Figure 3.

- Mount dial indicators on 34" bolt circle of engine coupling disc and on bearing clutch drum face as shown. Set both indicators to zero on top starting position.
- With clutches deflated, rotate clutch gland and drum together taking readings every 90°. Make a full revolution of engine before taking readings to center elements in bearings. Adjust the aft engine mounts to get readings per table (TIR#1) at the clutch drum, bottom open and sides equal within .005. Adjust the forward engine mounts to get readings per table (TIR#2) at the engine flywheel, top open and sides equal within .005.

**TIR Table #1 - Clutch Drum Forward Face Reading.** The following readings apply for all gear unit sizes.

Clutch Size	TIR at Drum
26 and 30	$-.015 \pm .002$ open at bottom
35 and 40	$-.019 \pm .002$ open at bottom
48	$-.024 \pm .002$ open at bottom

Top reading is zero. Side readings equal within .005.

**TIR Table #2 - Engine Flywheel Diaphragm Face Reading at Bolt Circle of 34" Diameter.**

Use same setting for all engine and gear sizes.

Bottom reading  $+.012 \pm .002$  closed at bottom.

Top reading is zero. Side readings equal within .005.

- Repeat Step 7 as necessary to obtain both required readings. Make full revolution of engine before taking readings each time an adjustment is made in the engine mounting. Secure engine per engine builder's instructions. Make final indicator sweep and record data.

- Mount dial indicators on the gear case to run on the female pilot surface and the exposed flange face of the clutch and check the concentricity and runout. Total indicator readings should not exceed .015. If these values are exceeded, remove and disassemble glands and spacer to check for burrs, chips or other foreign matter which might interfere with proper assembly and concentric running of these elements. Check to make certain that clutch assembly is airtight after reassembling.

**NOTE:** Any time the clutch spacer is unbolted or removed, the coupling tube must be supported to prevent damage to the coupling disc.

### ENGINE TO GEAR ALIGNMENT FOR ENGINE MOUNTED CLUTCH (MODEL B)

- After gear is in place and bolted down, and jack-shaft and engine are in position in accordance with the engine manufacturer's instructions, move the engine into position until the ahead clutch drum and engine drive disc are the correct distance apart.
- Make a preliminary alignment by moving engine horizontally and vertically such that the clutch assembly can be set in place without forcing or binding of parts. Assemble clutch glands and spacer to driving disc. See Figure 4 below.
- Clamp a dial indicator on the clutch gland so that it will contact the outside diameter of the clutch drum. Have dial indicator at the top of gland when crankpin is at bottom. This indicator will check parallelism between clutch drum and the gland.

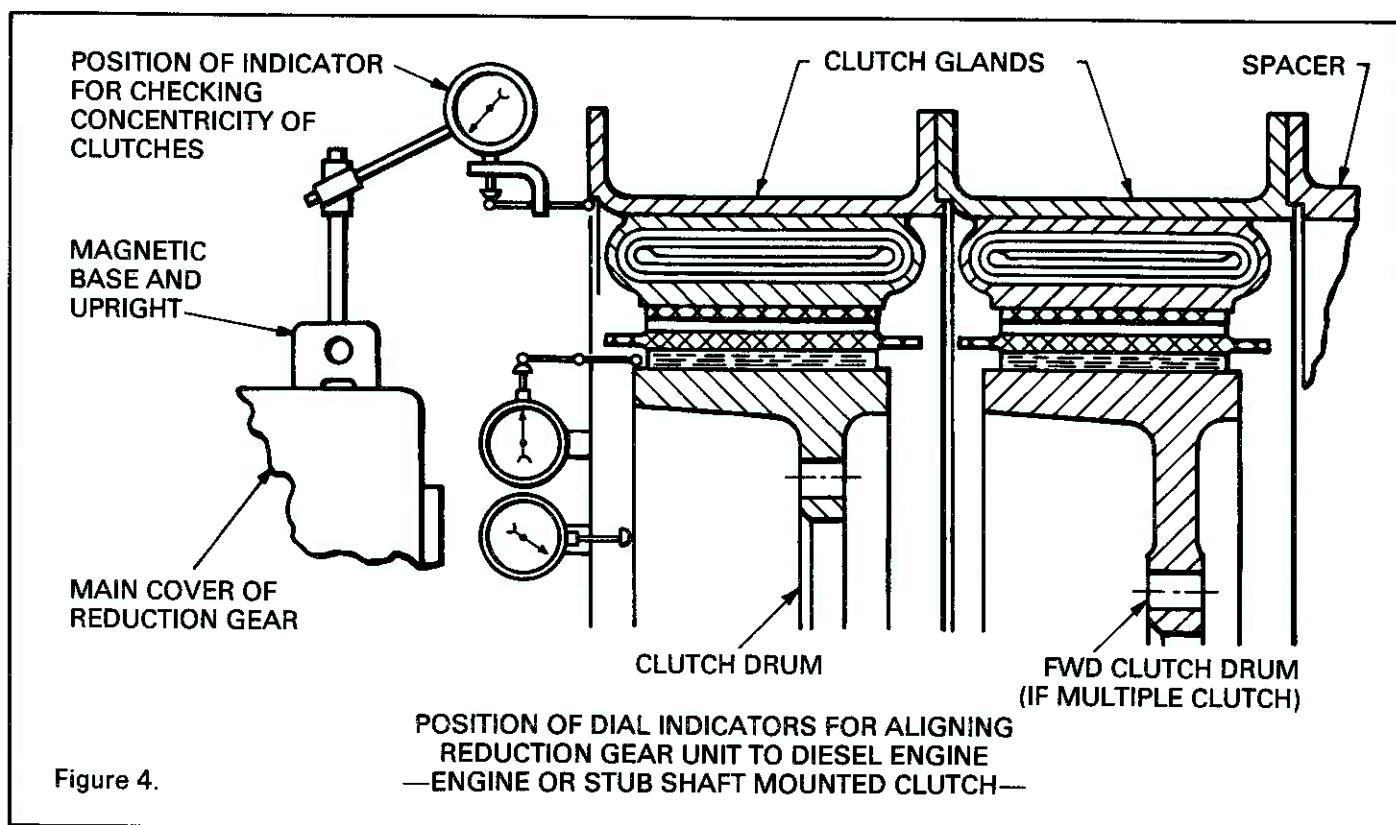


Figure 4.

4. Clamp a second indicator to the clutch gland flange adjacent to the first indicator so that it contacts the after edge of the clutch drum. This indicator will check the angular alignment between the gland and the drum.
5. Set both indicators on zero, rotate clutch gland and drum together and take readings every 90° of rotation.
6. Position the engine and jackshaft until the maximum run-out on each indicator is less than .005" when the gear and drive disc are turned together. Be sure that the engine and gear thrusts remain in the same relative position while taking these indicator readings.
7. Mount a dial indicator on some fixed point on the gear case so that it will run on the female pilot surface of the clutch gland. See Figure 4, Page 3. Rotate the clutch glands and check the concentricity. The maximum total indicator readings should not exceed .015". If this dimension is exceeded, remove and disassemble glands, spacer, and disc, and check for burrs, chips or other foreign matter which might prevent proper assembly and concentric running of these members.
8. Inflate the reverse clutch gland to specified air pressure. Take strain gauge readings on last crank. Record data.