

## Installing the transmission on a Chief engine

First, we'll assume the following is done:

1. Engine crankshaft end play is .005 to .010", sprocket is on and the nut is tight
2. The transmission main shaft has been checked and is straight
3. The clutch drum is on the main shaft with a thrust washer behind it, clutches are out
4. The cluster gear has been fitted, ( i.e., end play ) and installed in the case
5. The sprocket driver gear is installed in the case
6. The transmission case bearings are good
7. All the parts are clean, flat and be-burred
8. The generator drive shaft bushings are installed and reamed, the shaft fits well
9. The clutch worm and nut (in the outer cover) match. 1941 and earlier use a 2 7/8" long worm with a short nut, while the later worms are 3 1/8" and a longer nut.

1. Place the transmission on the engine, screw the 4 bolts in VERY loose, just enough to hang the trans. Let the trans case move around at least 1/16".

2. Put the inner primary cover on and tighten the 3 flat head screws, use regular nuts for this. This will align the trans to the engine.

3. Put the outer cover on and tighten the long bolts that go to the engine case and to the trans case, 2 in the front and 4 in the back. This will add rigidity to the assembly. The transmission is now where it wants to be.

4. Get a feeler gauge and measure the clearance between the 4 trans mounting legs and the engine case. Note these and make or find small U shaped shims to make up the space. Usually shim stock in .003, .005 and .008" works best, you can cut this with scissors. This will prevent the trans legs from breaking off and is VERY important. After the case is shimmed, tighten the 4 bolts. This is where the trans will stay, aligned by the primary covers, the surfaces are square.

5. Remove both primary covers and put the clutch basket in the trans case, get a straight edge about a foot long and align the engine sprocket and the clutch sprocket. Shims can go behind the clutch basket to get them within a couple thou. Occasionally, if the basket is farther out than the engine sprocket, you might have to shim the trans bearing back, into the case more.

6. Put the second thrust washer on the trans main shaft and measure its end play, you want .005" to .010". There is one tricky thing to look for here, You want the shoulder on the trans main shaft to protrude past the sprocket driver gear, threaded end, by .010" or so. The shoulder is where the mainshaft diameter drops from sprocket driver gear bushing size to kicker gear size. In other words, you

don't want the cupped washer, for the kicker gear spring, to sit right against the sprocket driver gear end. You might have to put the thinner thrust washer on the sprocket driver gear end to do this. When that's OK, put the second thrust washer with the clutch basket nut and bend-over lock washer, they go on at the same time.

7. Put the shift fork and shaft in the case, tighten the locking screw and stake it. The trans is done, hopefully.

8. Put the inner primary cover on, I like thin gaskets here, about .015", but Indian used just a non-hardening sealer here. Put a little sealer under the flat head screws too, put the lock nuts on and tighten them. You do NOT want one of these nuts coming off, use good nuts.

9. Put your primary chain around the clutch basket, balling it up in the front. Install the basket, chain and the generator drive shaft, with it's thrust washer, into the trans and bushing. With the clutch basket fully seated against the bearing, look at the position of the generator drive sprocket gear teeth in relation to the chain. The gear MUST be between the chain side rails, riding only on the rollers. Adjust with the thrust washer to get the gear away from either chain rail, roughly centered between both rails.

10. Take the engine sprocket off. Put your clutches into the basket, looking for 1/8" to 3/16" between the pressure plate and the spring plate. Measure this with drill bits. The whole primary drive and generator drive can be installed now. It all has to go in together with the second trans thrust washer, clutch basket nut and lock washer. Don't forget the seal behind the engine sprocket. You do NOT want the clutch basket nut coming loose, don't be afraid to use a hammer and chisel here, along with a tad of Loc-tite.

11. Double and triple check all the endplays and clearances after everything is tight.

12. Get the primary chain adjusting shoe and shaft. Replace the small spring in the shoe and the cotter pin. Put this into the inner primary cover and get that straight edge out again. Put the straight edge along the face of the cover and the shoe shaft. Measure the end play, while looking at the position on the chain rollers in relation to the raised ribs on the shoe. Again, you want the ribs riding only on the rollers, not against the chain rails. The rails will chew the crap out of the shoe. Put shims, available in .003" and .005", on either side of the shoe lever to center it in the chain and get the shaft about flush with the cover face.

12. You're done, just use a thin primary cover gasket here, no thicker than .018" or so. Any thicker will throw out the primary chain shoe shaft end play, allowing the shaft and shoe to move around a lot in the cases. Use more shims with a thicker gasket, if it's all you have. Don't forget to put a small gasket between the covers, at the center bolt, the same thickness as the cover gasket. This keeps the outer cover flat.