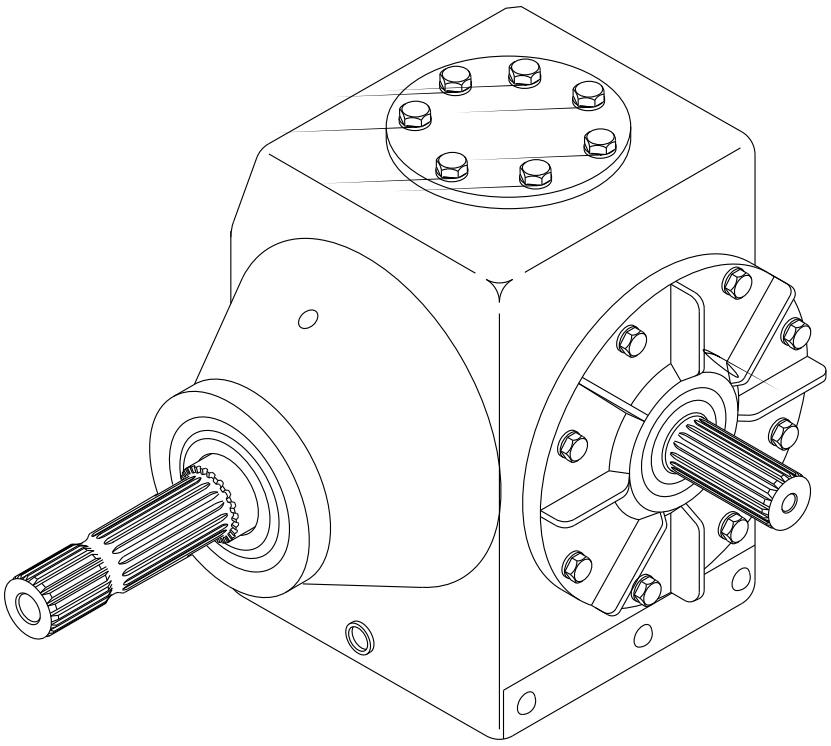
DION MACHINERIES

ANGLE DRIVE
ASSEMBLING PROCEDURES

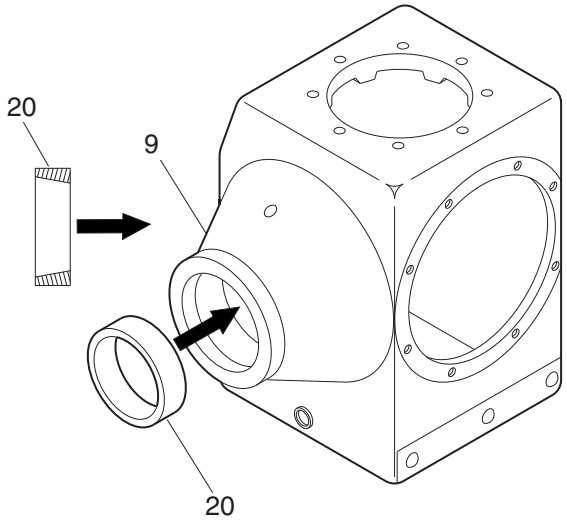
F41-23638P
F41-23639P
F41-23640P



MANUAL #F4103M913

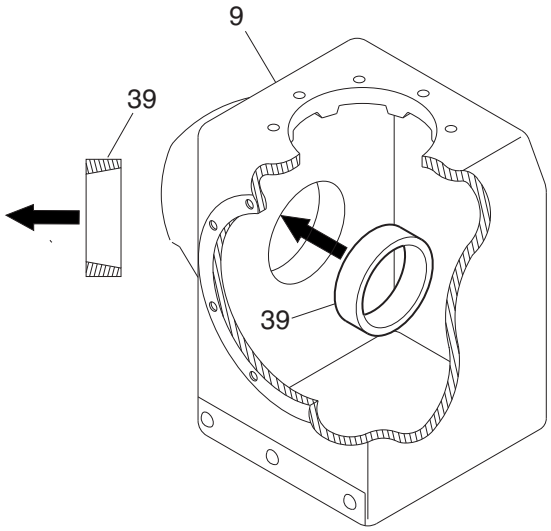
1.

Press bearing cup (20) into open tapered end of main housing (9).



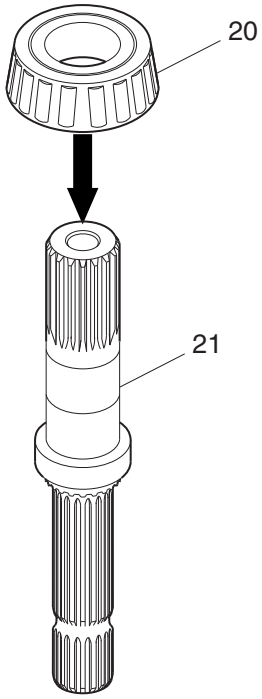
2.

Press bearing cup (39) into main housing (9).



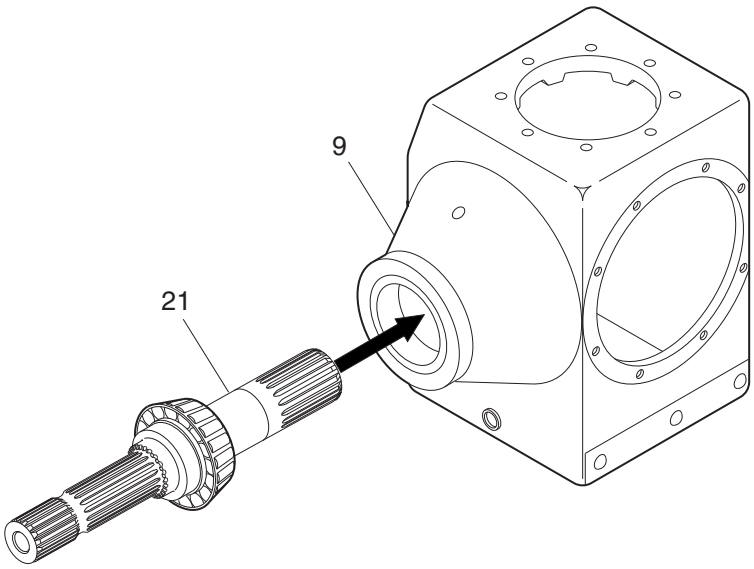
3.

Press bearing cone (20) into output shaft (21).



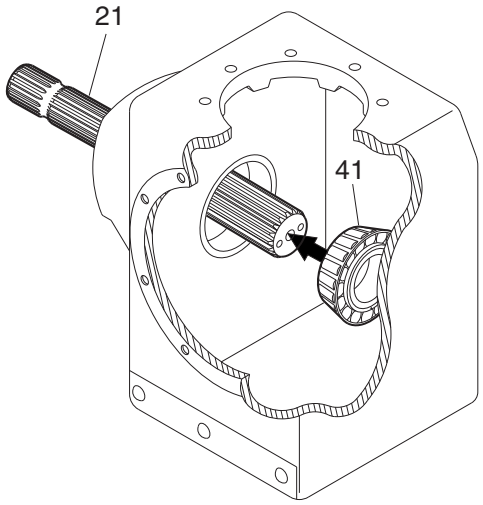
4.

Place output shaft assembly (21) into main housing (9).



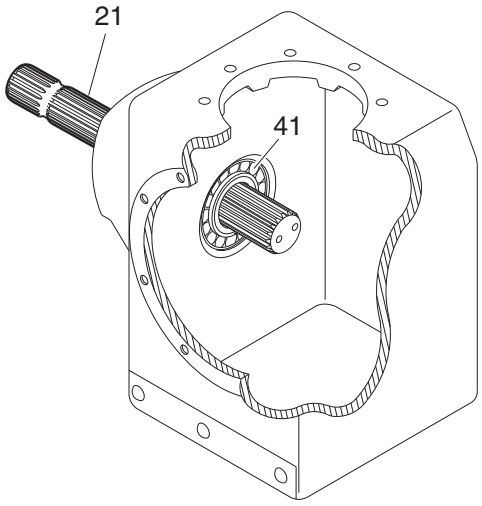
5.

Press bearing cone (41) onto output shaft (21) until there is slight end play in shaft bearings.



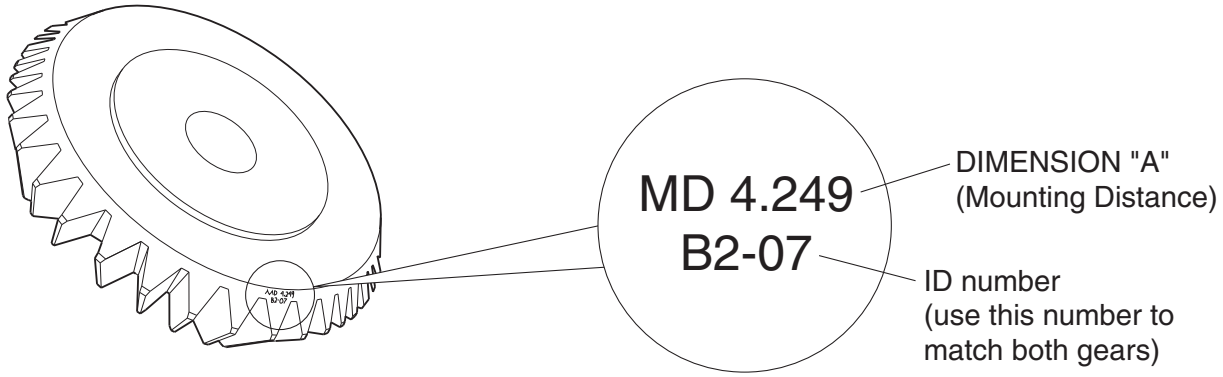
6.

Adjust bearing cone (41) to a range of no end play or preload to .001 end play. Do this by tapping the inside end of the shaft or bearing cone (depending on whether more or less end play is desired) lighty.



7.

Read and record the exact mounting distance that is etched on the output gear. This will be recorded as dimension "A".



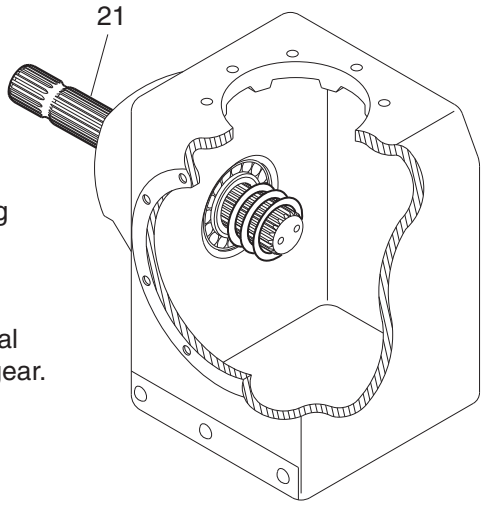
8.

Read and record the backslash amount etched on one or both of the spiral bevel gears.

9.

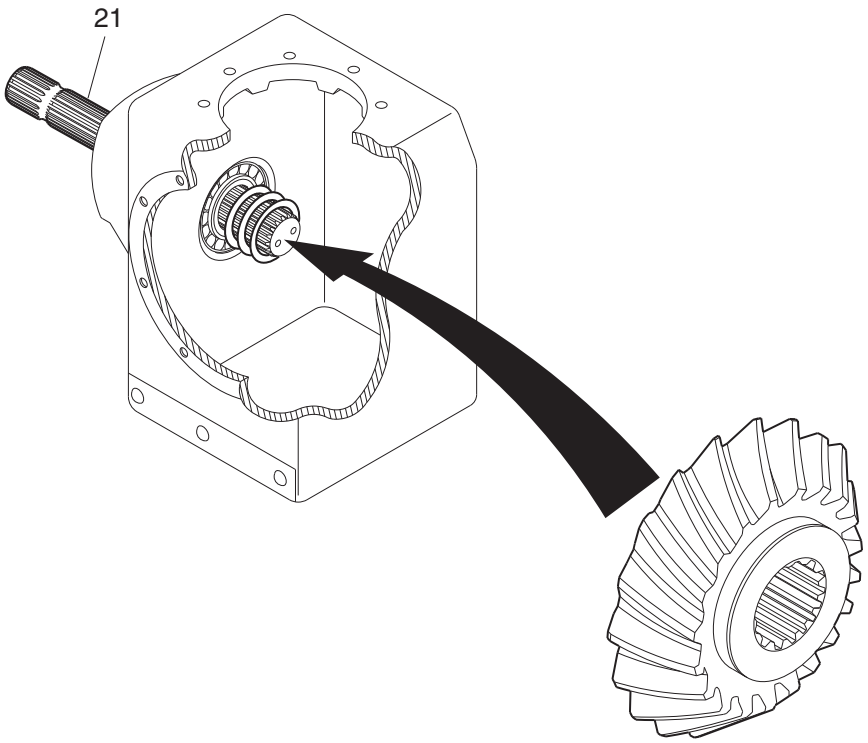
Place shims (16), (17) and (18) on output shaft (21) using the following formula to calculate the amount of shims required.

4.249 - "A" + .008 = Amount of initial shims to be placed behind output gear.



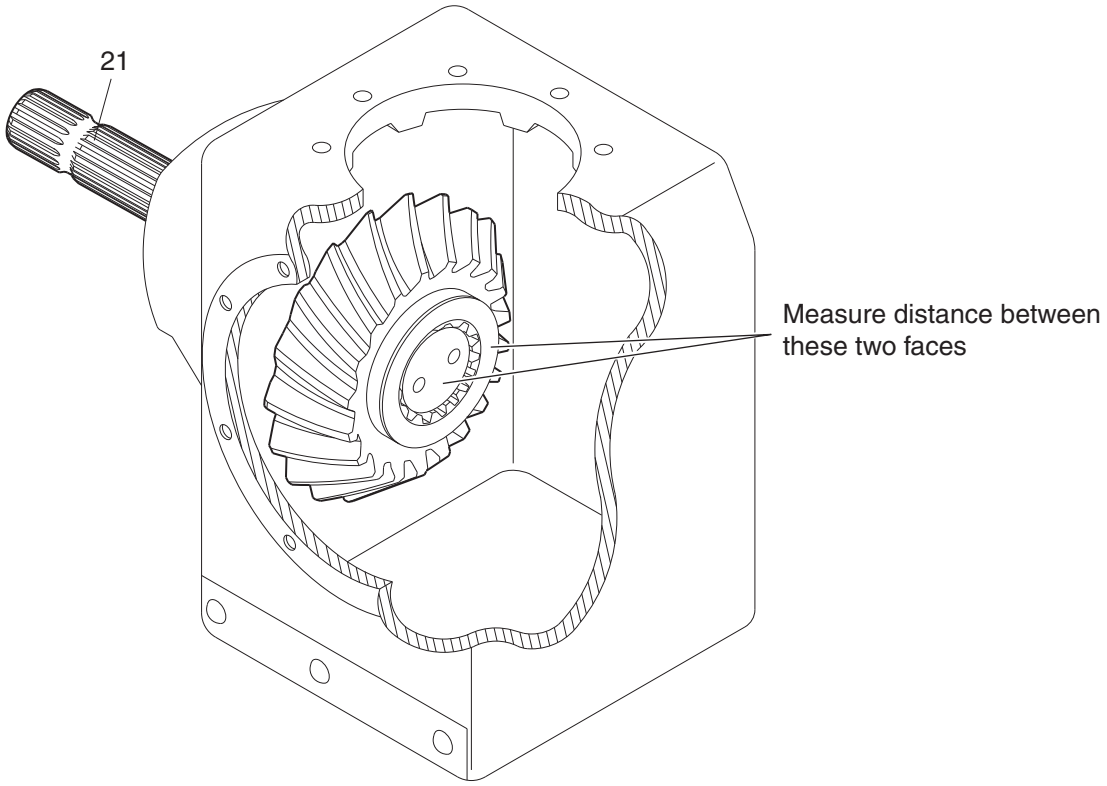
10.

Slide output gear onto shaft (21)



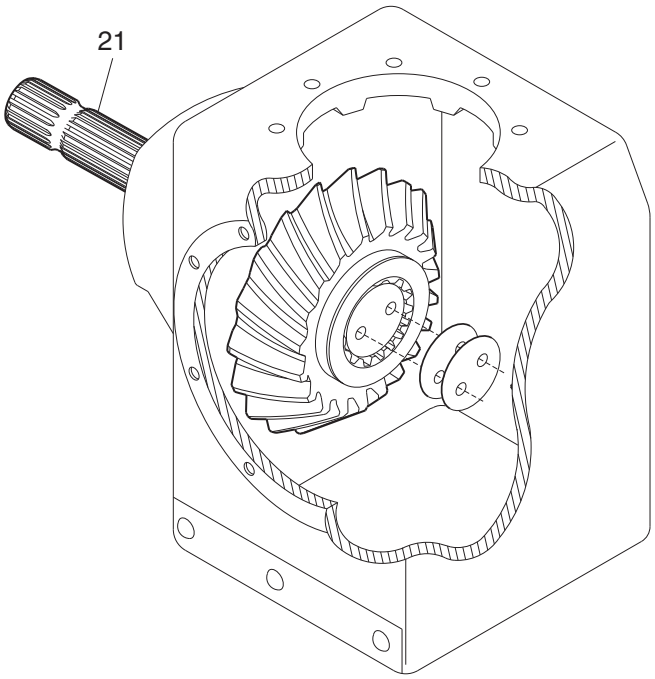
11.

After placing shims from step 10 behind output gear, measure and record the distance that the end of the shaft (21) is below the front surface of the output gear. This can be measured by using a depth micrometer.



12.

Make up a shim pack with the exact shim amount plus .001 (shim pack thickness same as depth measured above plus .001) on the end of the shaft (21).

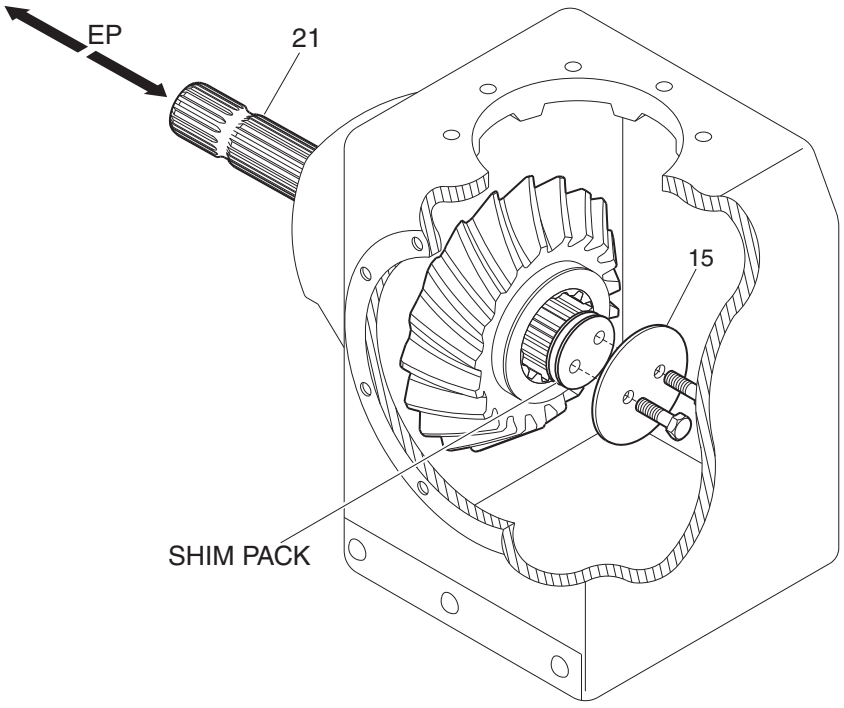


13.

Place plate (15) on output gear with the two through holes lined up with the threaded holes at the end of the shaft (21).

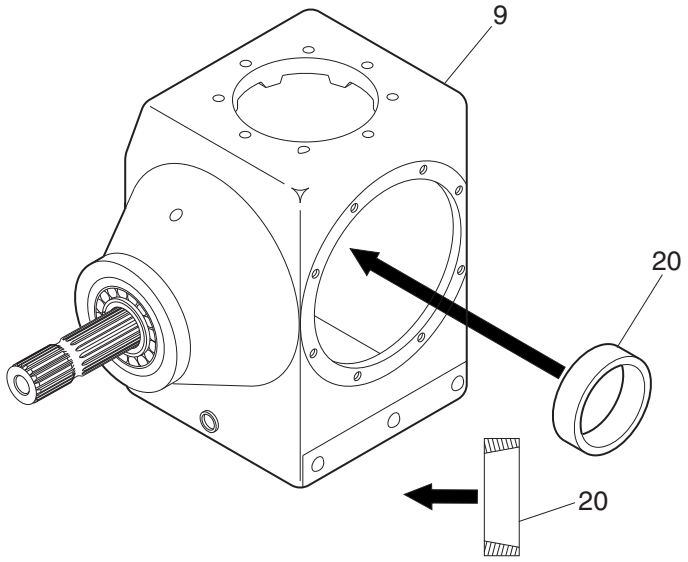
14.

Install hex head bolts (14) into end of shaft. Tighten to 40 ft-lb torque. Make sure that shaft rolls freely and does not bind. End play (EP) should be in th erange of 0.000 to 0.002 EP.



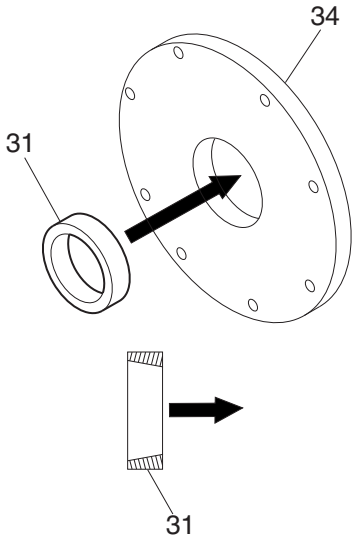
15.

Press bearing cup (20) into inside closed off bore in main housing (9).



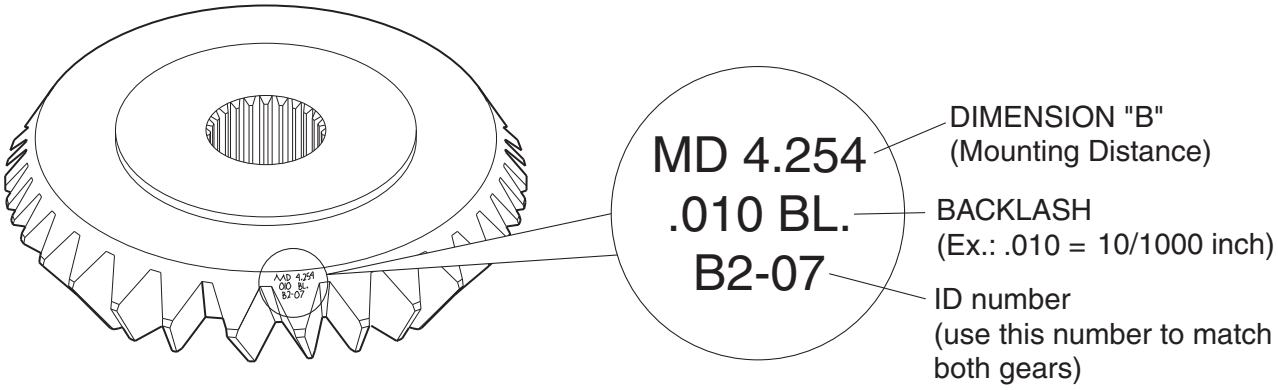
16.

Press bearing cup (31) into main cover (34).



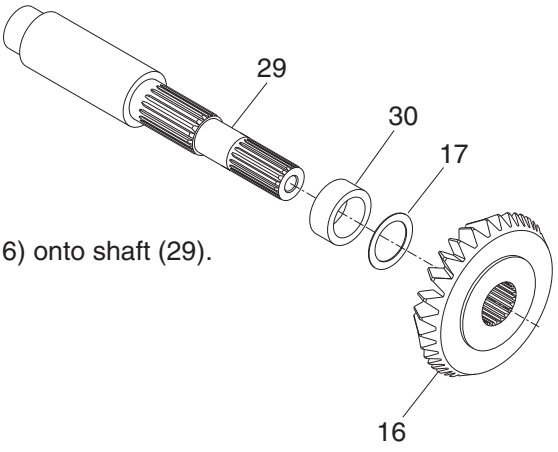
17.

Read and record the exact mounting distance that is eatched on the input gear. This will be recorded as dimension "B".



18.

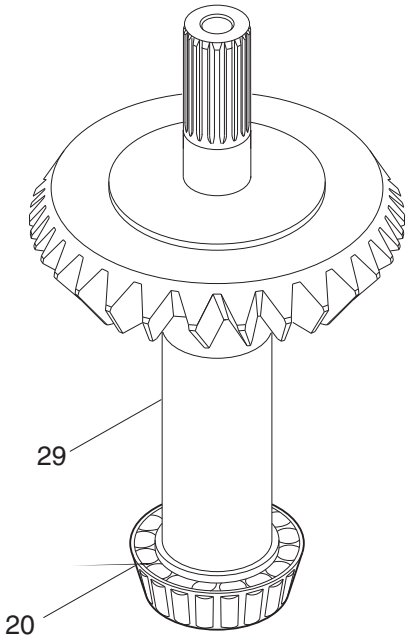
Calculate the amount of shims (17) to install between spacer (30) and output gear (16) using the following formula: 4.249 - "B" + .020 = Amount of initial shims to be placed between spacer (30) and output gear.



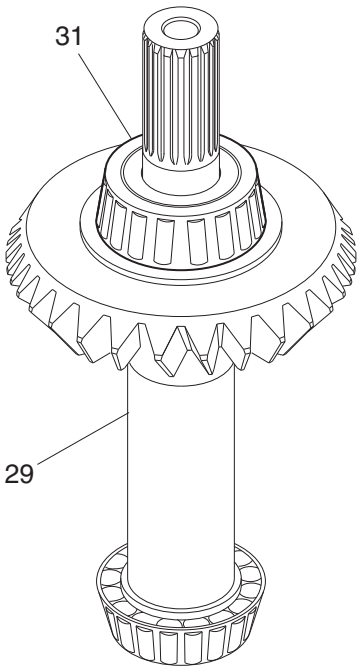
19.

After placing shims from step (18), install input gear (16) onto shaft (29).

20.
Press bearing cone (20) onto opposite end of shaft (29).

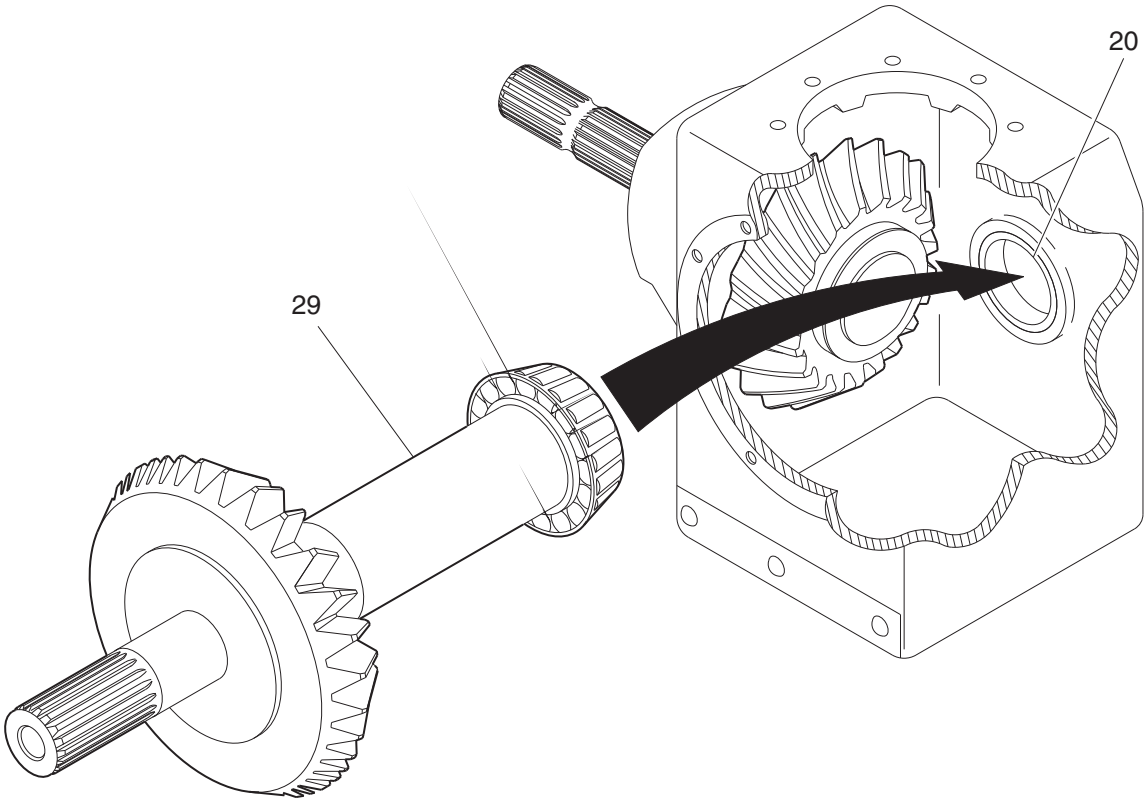


21.
Press bearing cone (31) onto gear end of shaft (29).



22.
Paint teeth of input gear with bevel gear marking compound that is used to check tooth contact patterns.

23.
Place the shaft (29) sub-assembly into main housing and into previously installed bearing cup (20).



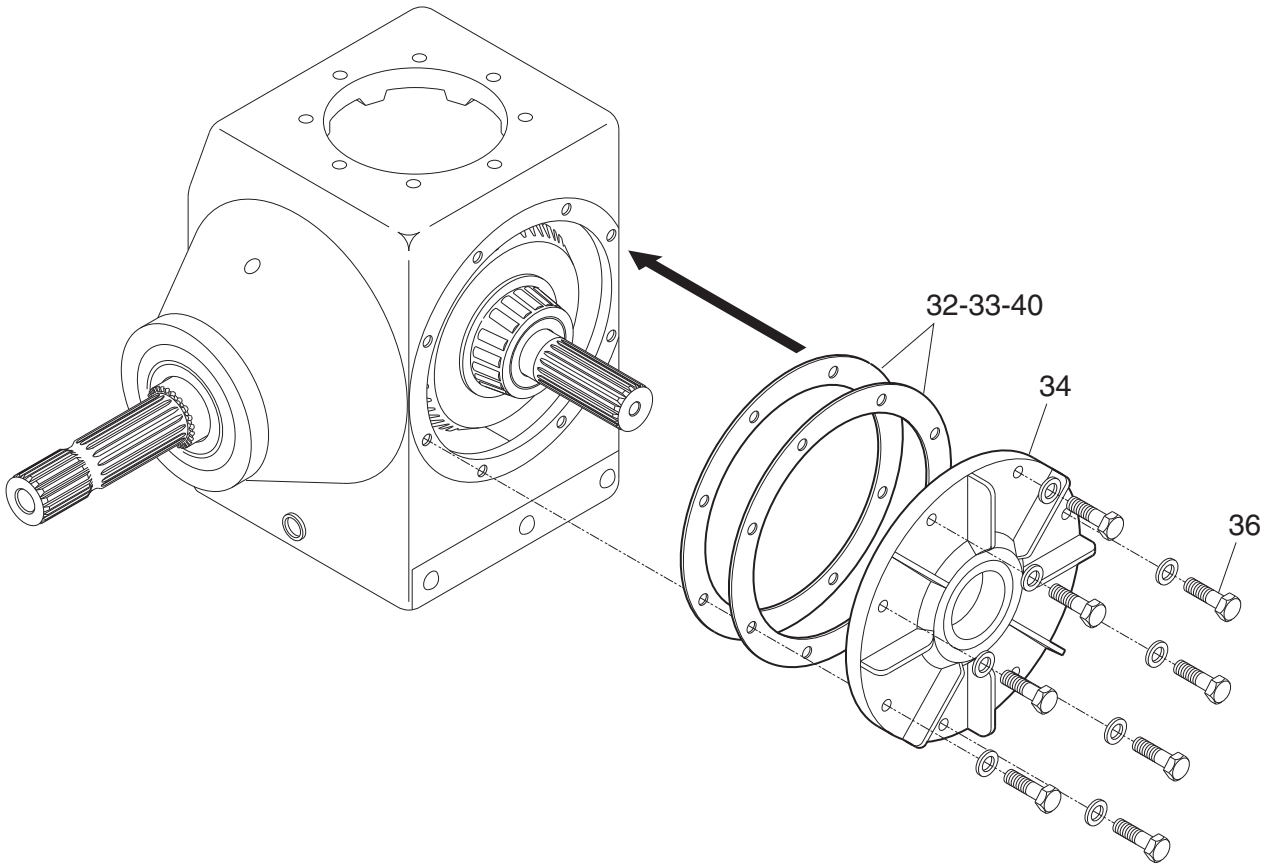
24.
Place main housing cover (34) onto bearing cone (31) and into main housing (9).

25.
Install 4 hex head bolts (36) in cover (34) and main housing (9) and tighten them slightly more than finger tight.

26.
Using a feeler gauge, measure the gap between the main housing (9) and cover (34). Do this measurement in 4 places at 90 degrees from each other. The 4 measurements should be relatively close to being the same. Average the 4 measurements and record the result as measurement "C",

27.
Remove the 4 bolts (36) in the cover, remove cover and add shims between cover and main housing. Amount of shims (32,33,34) to add is determined by this formula: "C" + .001 = Amount of shims (32,33,40) to place between cover and main housing.

28.
After shims are added, replace cover (34) and bolts (36) on main housing and tighten bolts to 65 ft-lb.

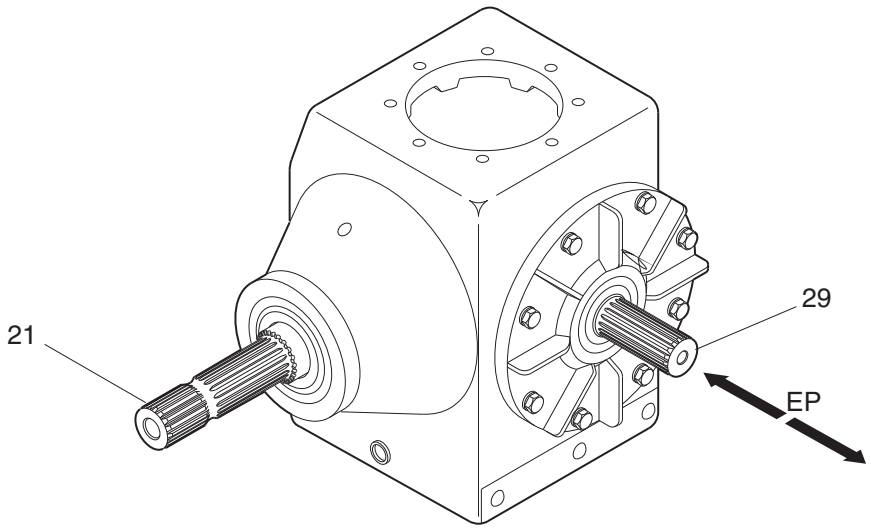


29.

Check end play (EP) in shaft (29). End play (EP) should be in the range of .000 to .002 EP. If it is not, then add or substac
shims (32,33,40) until end play is in this range.

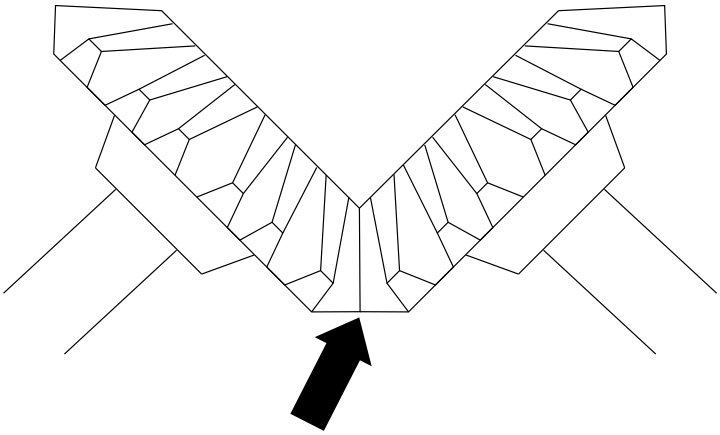
30.

Rotate shafts (21) and (29) several times in each direction.



31.

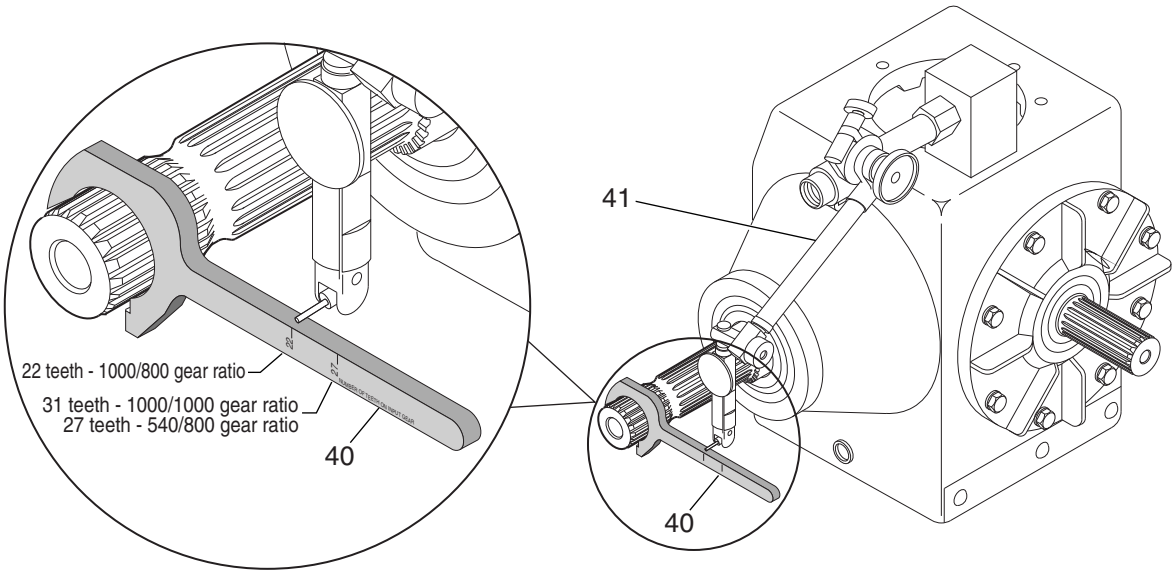
Check contact point between both gears. Back of gears should be even. Rub a finger over the contact point
as shown below. If both gears are not evenly adjusted, make the adjustment by moving the shims.



Check contact point by rubbing finger here

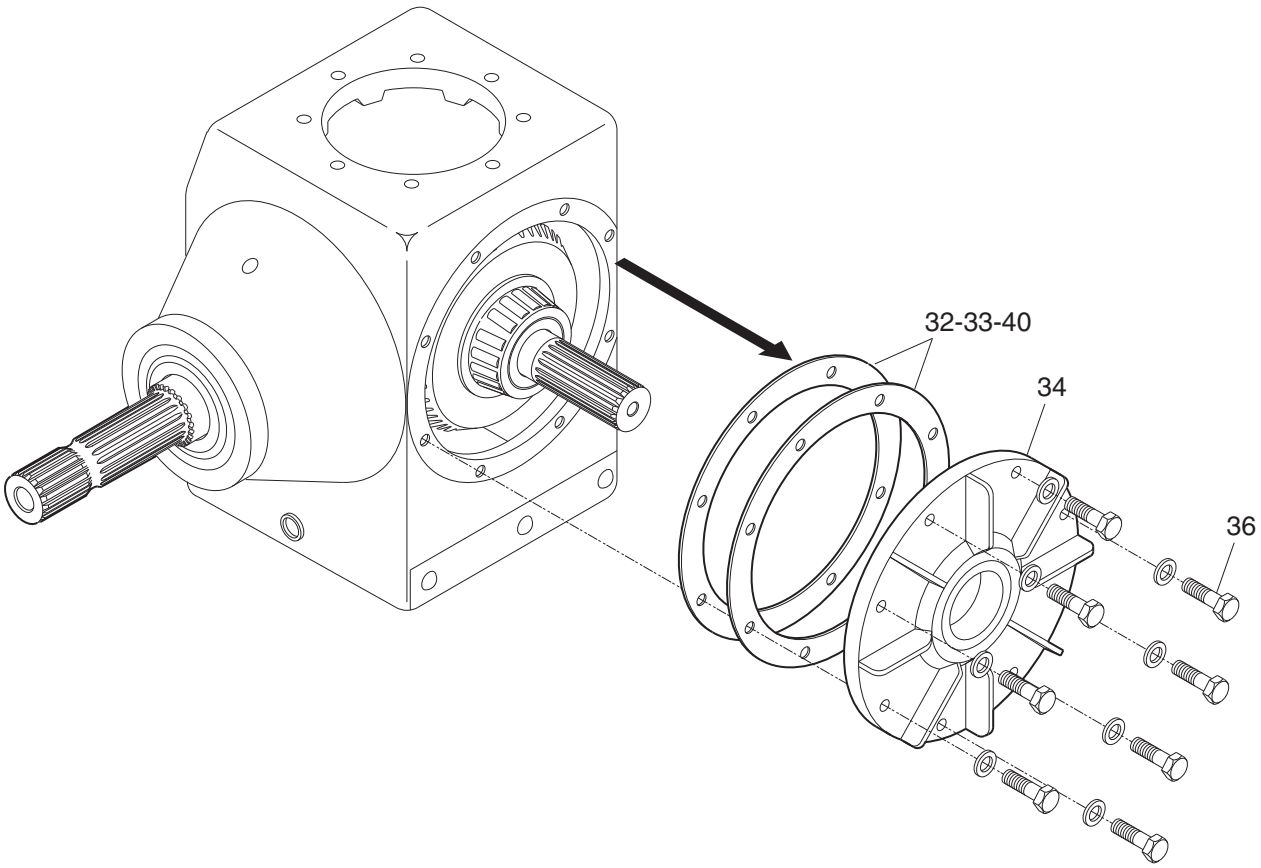
32.

Check backlash using special backlash measuring tools #F41-21549 (40). Amount of backlash should agree with the backlash etched on the gears and recorded earlier. With the use of a dial indiactor fixed with a magnetic stand (41) on the gear box, set the indicator on the correct mark.
Slide the tool (40) on the output shaft and set the indicator on the appropriate mark, which is determined by your input gear. The backlash is correct when between 0.008 and 0.012.



33.

Remove cover bolts (36). Remove cover (34) and gear sub-assembly and check bevel gear tooth contact pattern.



34.
Adjust both gears as necessary to achieve the optimum contact pattern that matches the one left on the gear teeth from the Lap and Test department. When the back of both gears are equal and the backlash is between 0.008 and 0.012, you have the correct adjustment.

35.
Note: to adjust the gear on the short shaft with the bolted on plate in front, you must add or substract the same amount of shims from behind the gear and behind the spacer. For example, if you have to add .005 to the shims behind the gear to get the right contact pattern and mounting position, you wil also have to add the same .005 amount of shims to the existing shims between the spacer and end of shaft. The same is true with both sets of shims on the long shaft (29) sub-assembly. Add or subtract the same amount of shims (17) as you do for shims (32, 33, 40).

36.
Once the correct contact pattern is achieved, recheck backlash and the end play in both shafts. Endplay in both shafts should be .000 to .002 EP. If backlash or endplay is not correct, then add or subtract shims to get the proper amount of backlash and end play. When you have the proper adjustment, remove the cover and use adhesive gasket replacement (F41-23761P).

37.
Use locktite 242 on hex head bolts (15) and cover bolts (36) to 65 ft/lbs. Install lockwashers (28) under bolts (36).

38.
Install seals (26) and (35) into main housing and cover, respectively.

39.
Install a magnetic drain plug (12) in each of the two places as shown on the assembly drawing using thread sealant.

40.
Install a sight plug (11) on the main housing as shown in the assembly drawing using threaded sealant.

41.
Install a breather on the main housing as shown in the assembly drawing using threaded sealant.

42.
Fill the gear box with 8 liters of 80W140 semi-synthetic oil (#F41-23651P).

43.
Install top cover using high-temperature silicone (black neutral silicone).