

Drillhead Assembly

The assembly of the drillhead is accomplished in the sequence listed below. However, extra attention should be taken when installing the following;

- 1) Taper Roller Bearings - Preload (installing shims)
- 2) Chuck Assembly - location and tightening locknut

NOTE: a) the housing and all internal parts must be thoroughly cleaned and free from burrs before assembly.

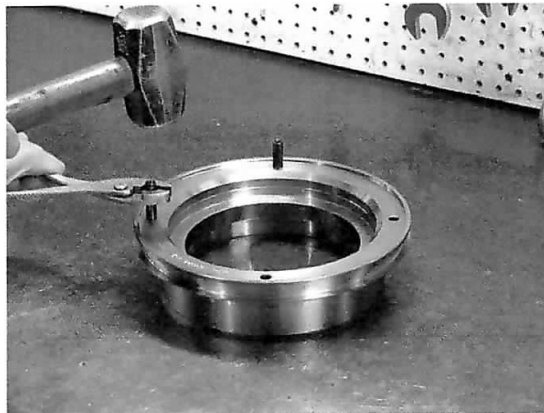
b) all seals, o-rings and other internal parts must be oiled and/or greased before assembly.

c) all bolts should have an Anti-seize compound on them before being installed

The following is a detailed step by step procedure.....

We begin by assembling the lower portion of the chuck assembly which we refer to as the cylinder assembly.

Cylinder Assembly



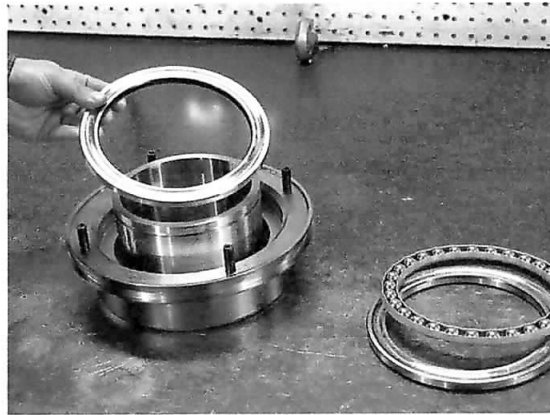
Install the 4 roll pins in the piston (18100023).



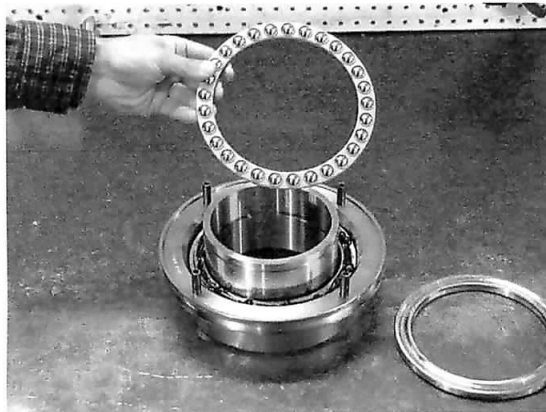
Place the piston over top of the actuator sleeve (18100123)



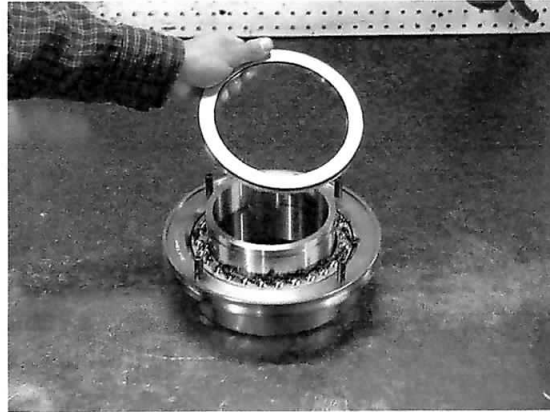
Install the 3 part bearing.



Install the outer race with the largest bore first.



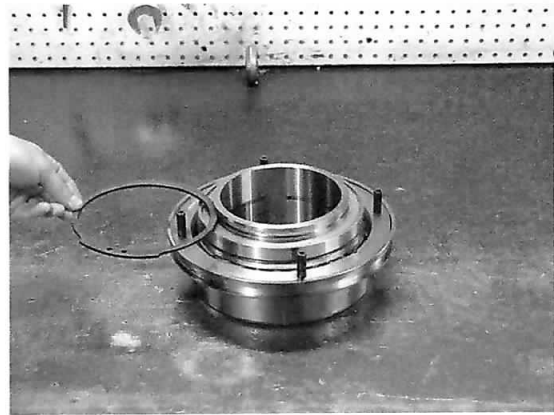
Put a bead of grease in the outer race, and then install the bearing cage.



Put a bead of grease on the bearing, and then install the outer race with the smallest bore.



The 2nd outer race must be hammered on.



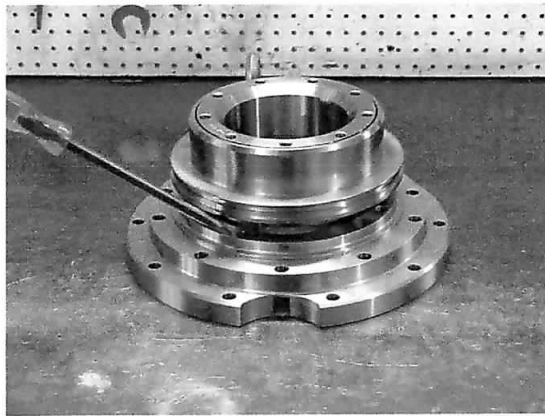
Install the Back Up Ring (18100086), with the groove facing up.
The Back Up Ring must also be hammered on below the retaining ring groove.



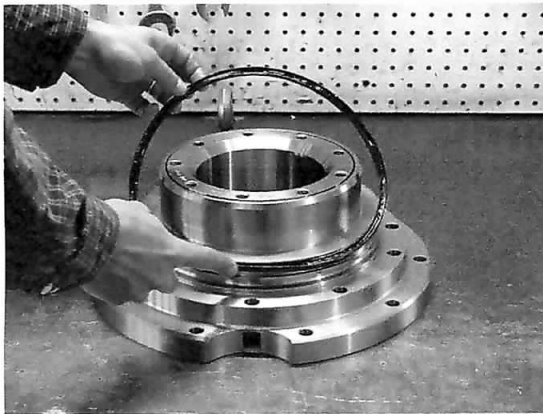
Install the Retaining Ring (18100285)



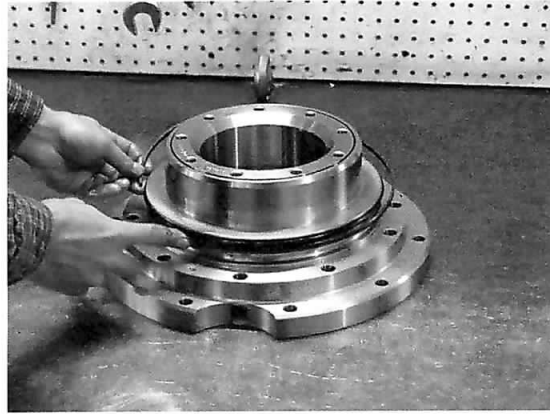
Turn the piston and actuator sleeve over and gently tap on the work bench, to properly locate the back up ring against the retaining ring



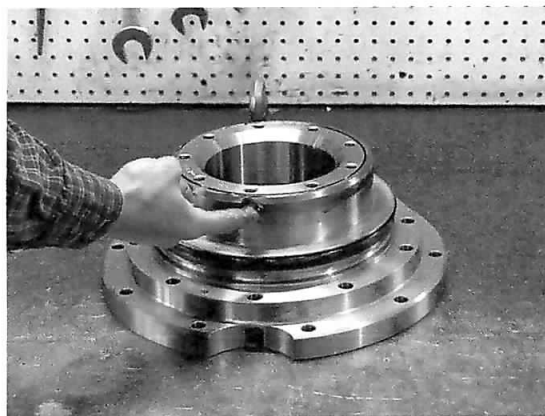
Place the piston/actuator sleeve assembly over the Adapter Flange (18100147).
The 4 roll pins in the piston must be properly aligned in the Adapter Flange.



Install the U-Cup Seal (18100061) with the groove facing up. (Apply a small bead of grease in the U-Cup Seal).



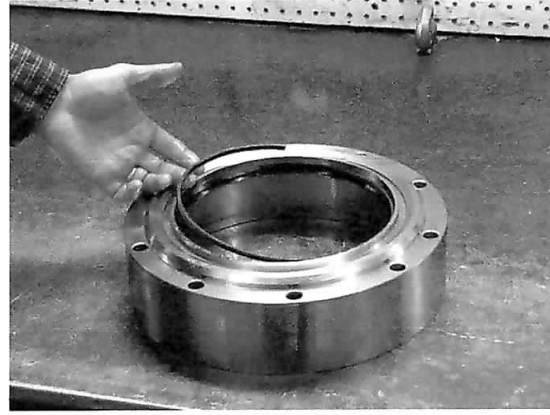
Install the Wear Ring (18100063)



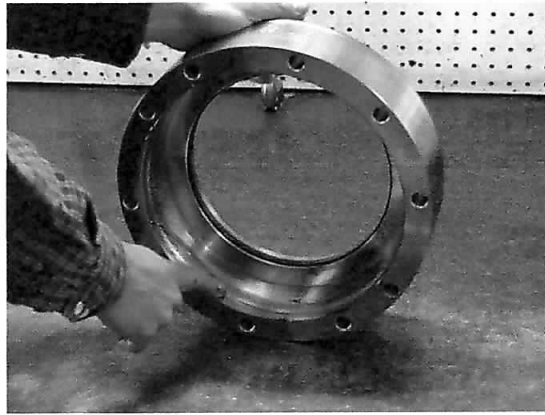
Apply grease at the top of the piston, to facilitate the installation of the cylinder



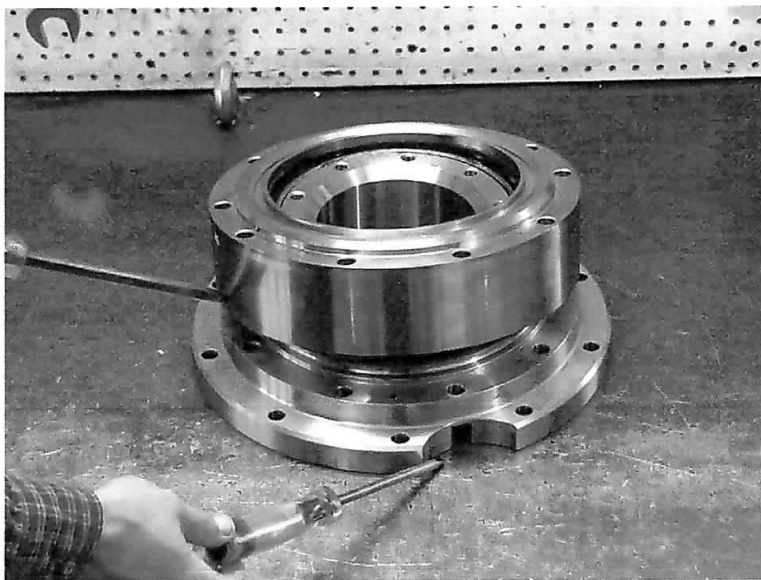
Install the U-Cup Seal (18100062) in the bottom groove, with the groove facing down. (Apply a small bead of grease in the U-Cup Seal).



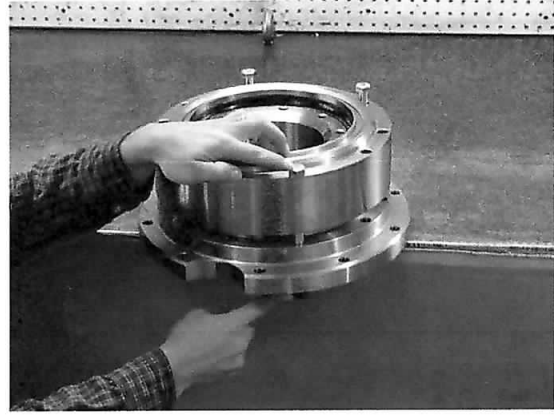
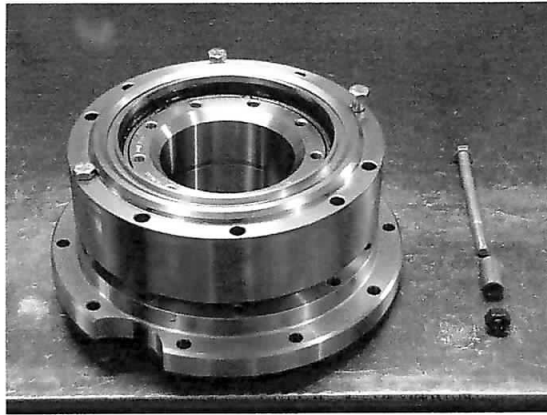
Install the Wear Ring (18100064) in the top groove.



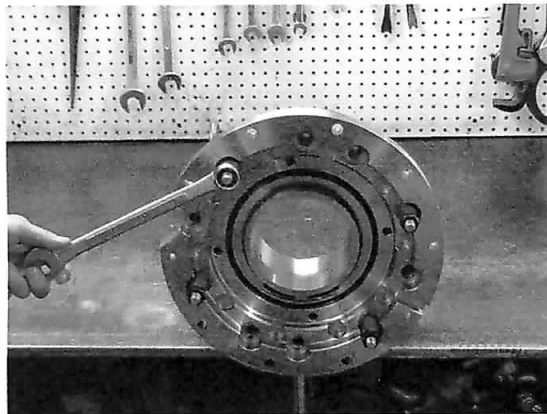
Apply grease at the bottom of the cylinder, to facilitate the installation on the piston.



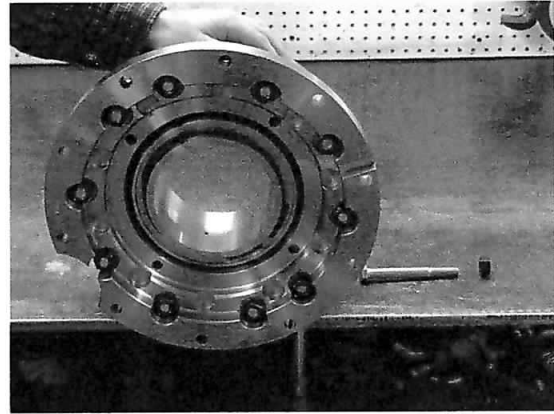
Install the cylinder on the piston as shown in the above photo. The grease fitting and hydraulic fitting ports are to be located on the left hand side.



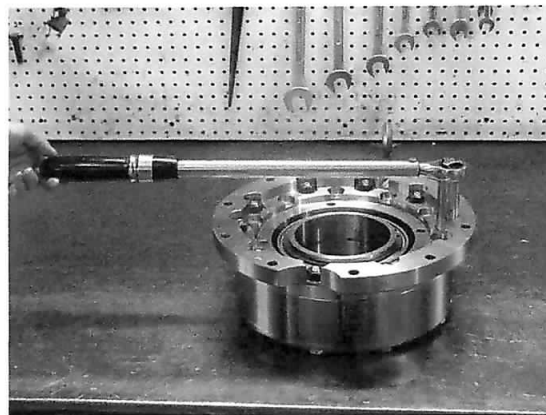
Use 4 bolts (1/2" x 6-1/2" long), the Top Spacers (18100058) and nuts, to properly install the cylinder on the piston.



Tighten the 4 nuts evenly, to ensure proper installation of the cylinder



Once the cylinder is properly installed, install the 10 bolts (1/2" x 4-1/2" long) and nuts.

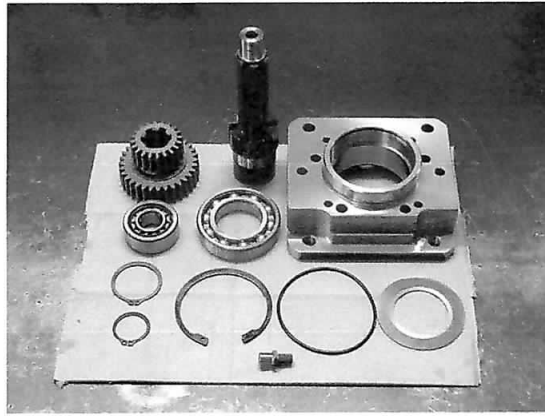


Torque the 10 nuts to 70 ft.lbs.

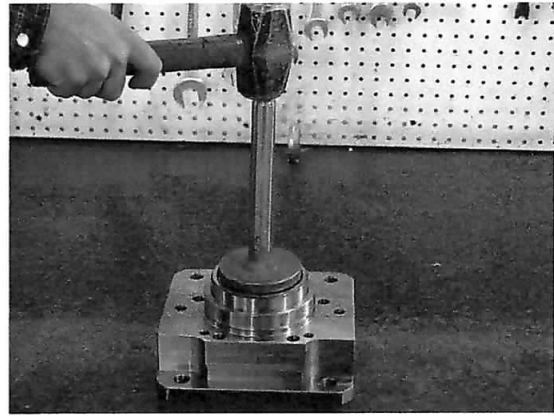
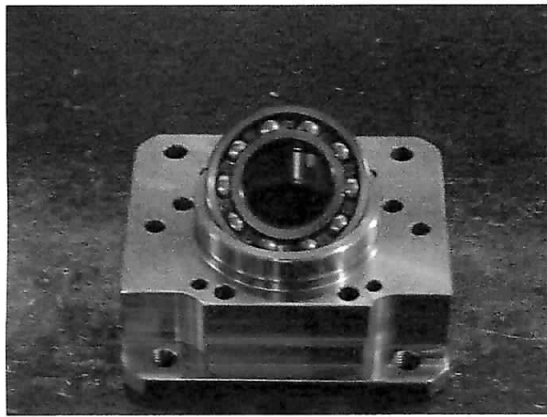
The assembling of the Cylinder Assembly is now complete.
You can put this aside, until it is required further on in the assembly.

We will now assemble the Input Shaft and Primary Gear.

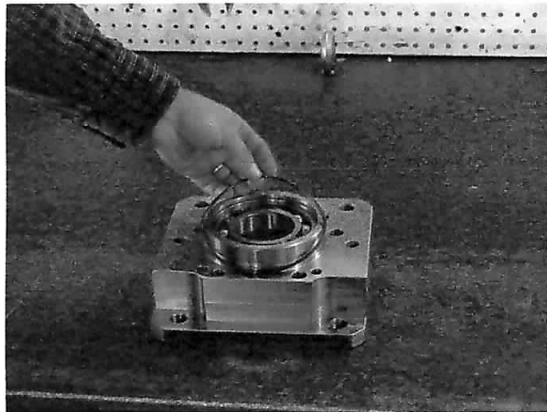
Input Shaft and Primary Gear Assembly



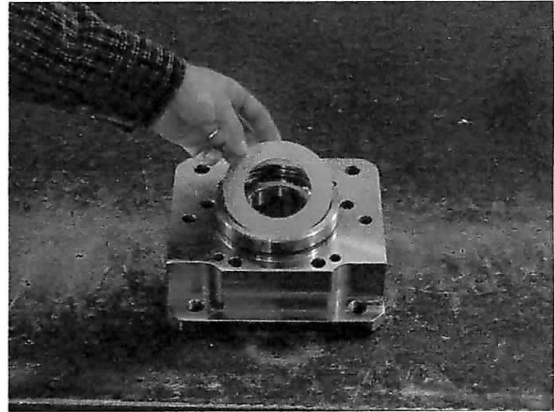
Parts which make up the Input Shaft and Primary Gear Assembly.



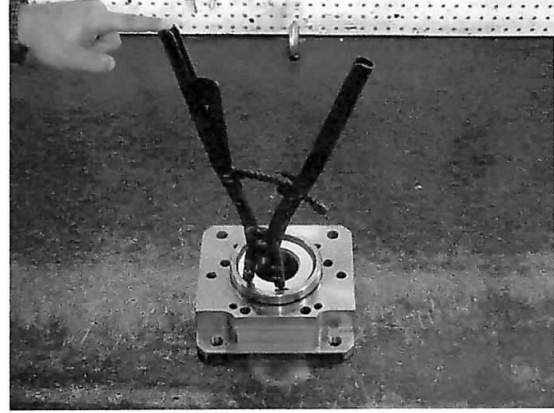
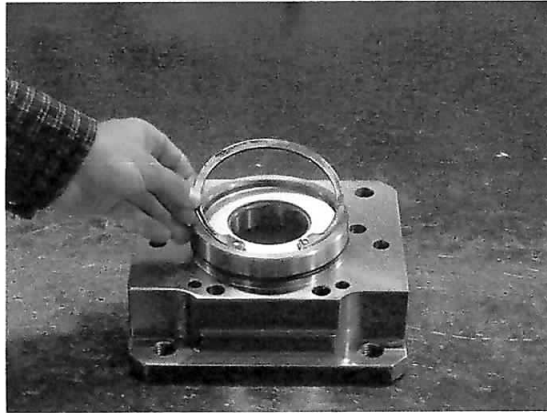
Install the Ball Bearing (18100356) into the Motor Adapter Plate (18100244).
Must be hammered into place. Ensure that the bearing bottoms out in the Motor Adapter Plate



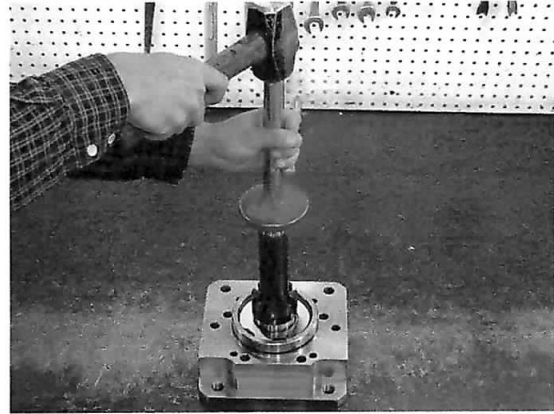
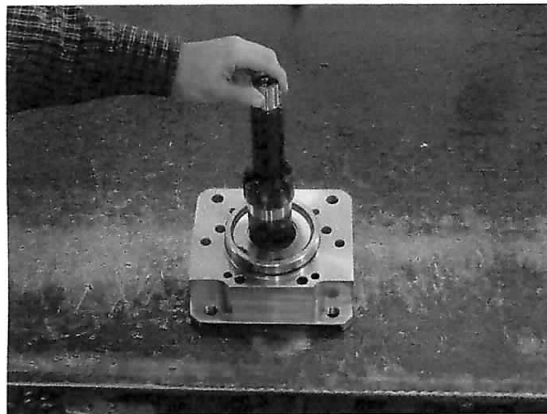
Install the O-Ring (18100357)



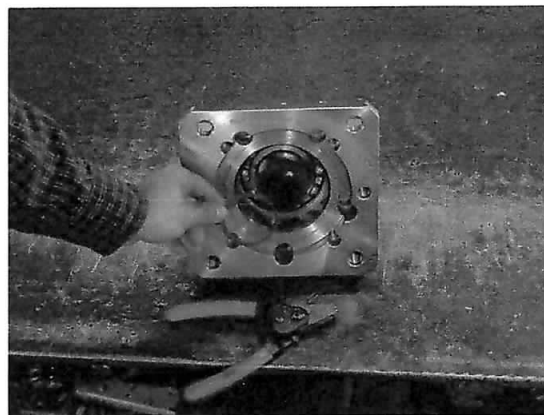
Install the Bearing Shield (18100255)
with the notch facing down



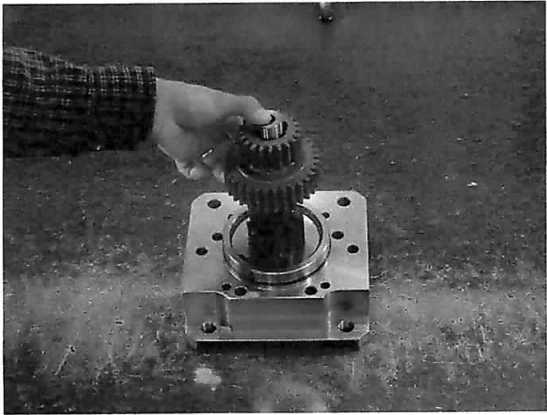
Install the Retaining Ring (18100360)



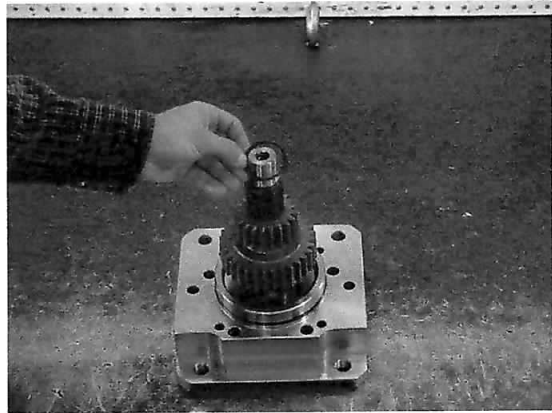
Install the Input Drive Shaft (18100242) and hammer into the ball bearing



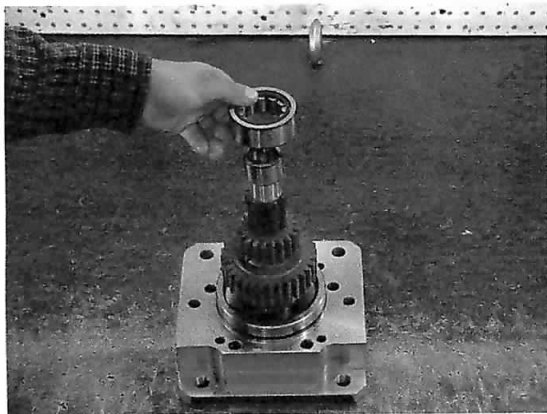
Flip onto its side and install the Retaining Ring (18100358).



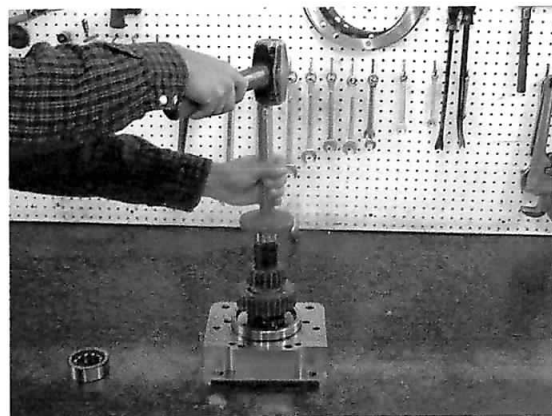
Flip back over and install the Primary Gear (18100240)



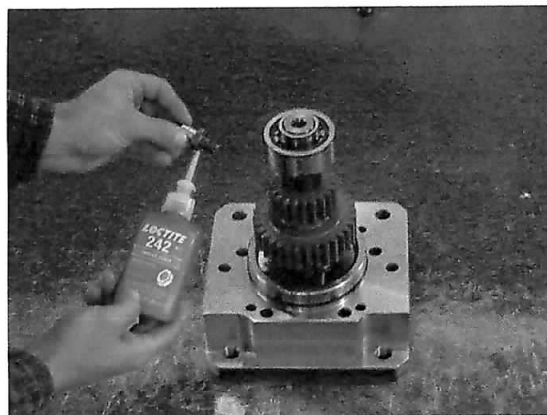
Install the Retaining Ring (18100355)



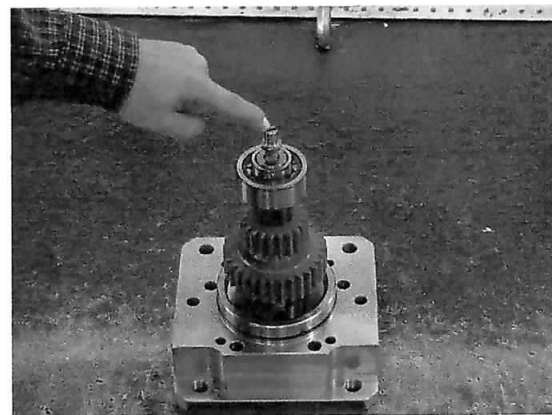
Install the Ball Bearing (18100354)



It must be hammered into place.



Apply Loctite to the Input Drive Shaft Tip (18100243) and install in the end of the Input Drive Shaft.

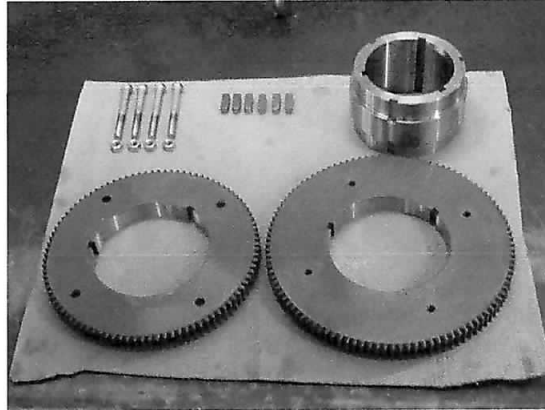


NOTE: The Input Drive Shaft Tip has a Left Hand Thread

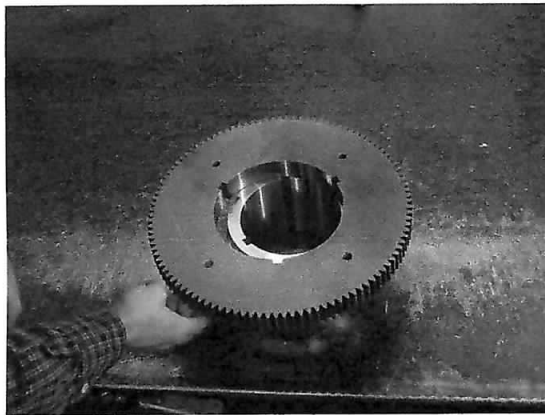
The assembling of the Input Shaft and Primary Gear Assembly is now complete. You can put this aside, until it is required further on in the assembly.

We will now assemble the Drive Sleeve Gears.

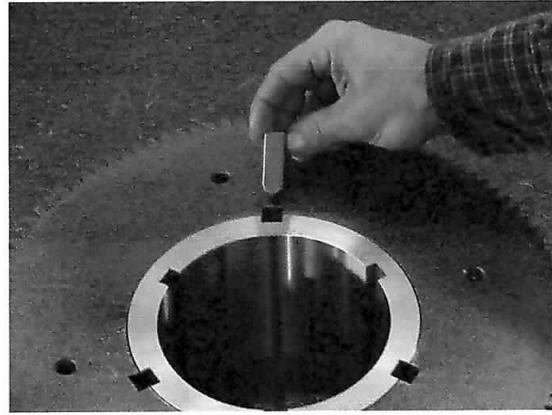
Drive Sleeve Gears Assembly



Parts which make up the Drive Sleeve Gears Assembly.



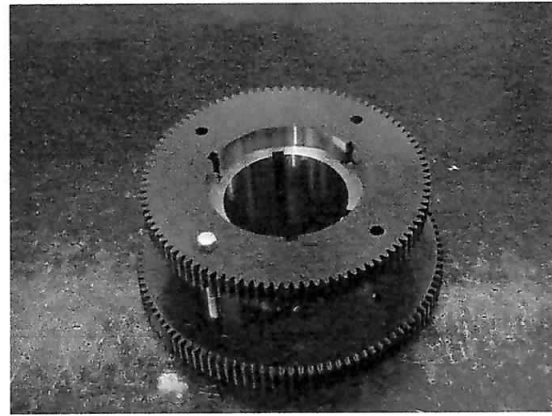
Install the large Drive Sleeve Gear (108T) (18100229) over the Drive Sleeve (18100230)
NOTE: the rounded edge of the gear must face down towards the middle of the drive sleeve.



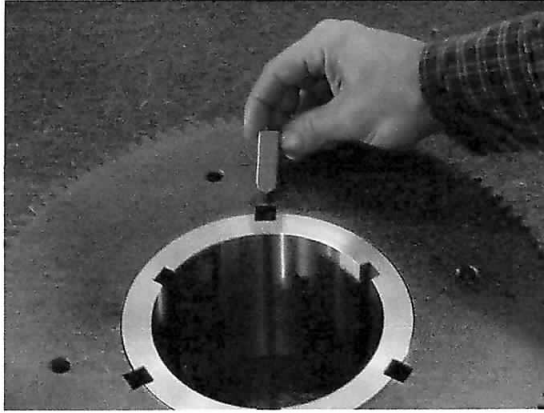
Install the 3 short keys (18100233) with the round end facing down.



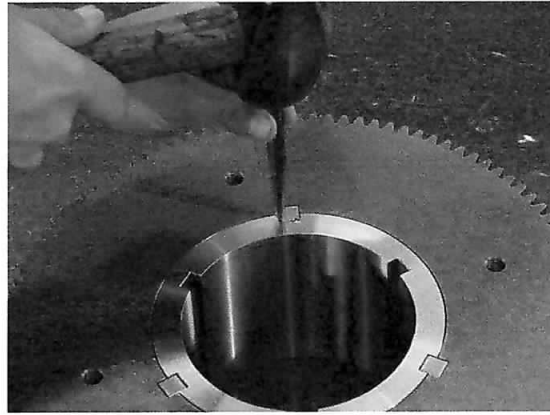
Punch the edge of the key and the drive sleeve to ensure that the keys do not fall out



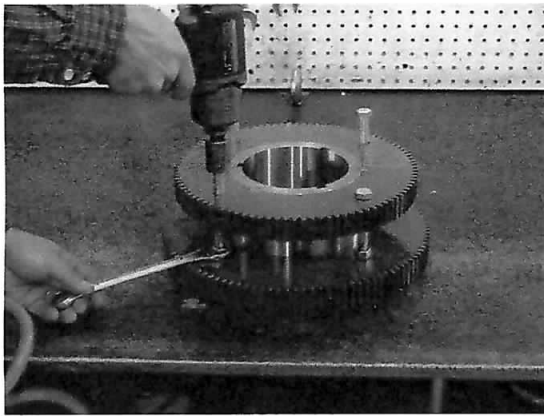
Install the small Drive Sleeve Gear (96T) (18100232). Ensure proper alignment with the threaded holes in the large gear



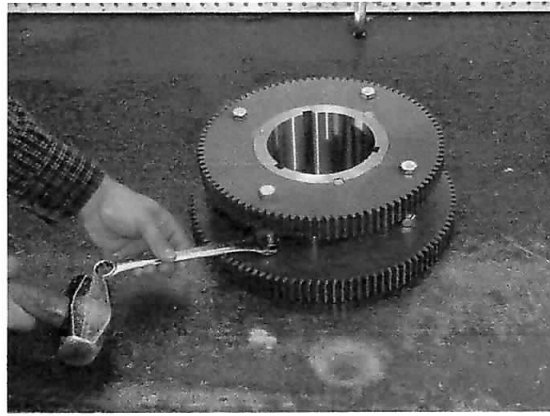
Install the 3 short keys (18100233) with the round end facing down.



Punch the edge of the key and the drive sleeve to ensure that the keys do not fall out



Install the 4 modified bolts and screw the jam nuts on before screwing the bolts into the large Drive Sleeve Gear



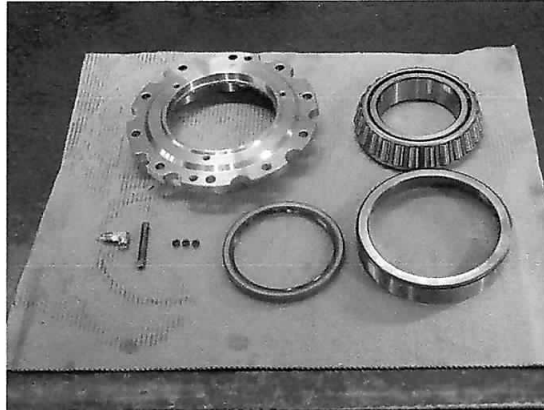
Tighten the jam nuts with an open end wrench and a hammer

The assembling of the Drive Sleeve Gears Assembly is now complete.

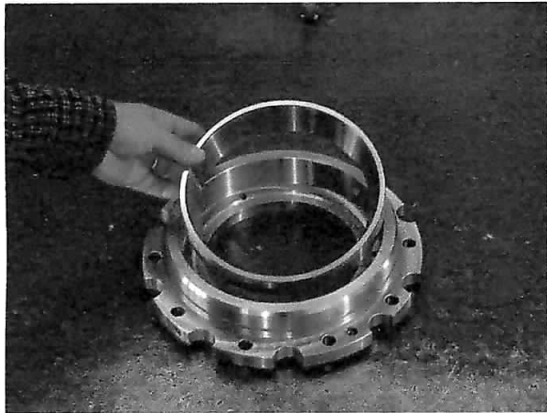
You can put this aside, until it is required further on in the assembly.

We will now assemble the Upper Bearing Retainer.

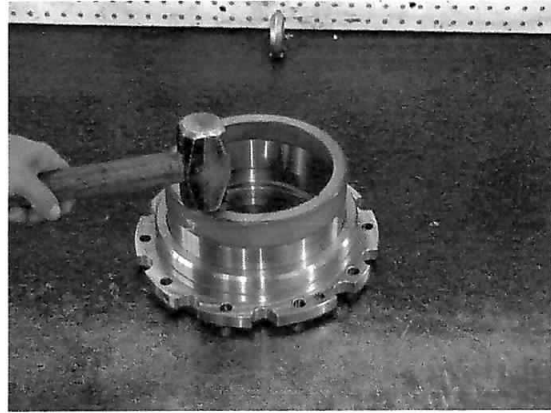
Upper Bearing Retainer Assembly



Parts which make up the Upper Bearing Retainer Assembly.



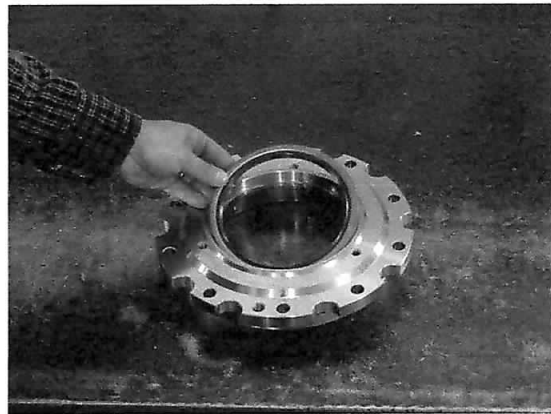
Install the bearing cup in the Upper Bearing Retainer (18100236)



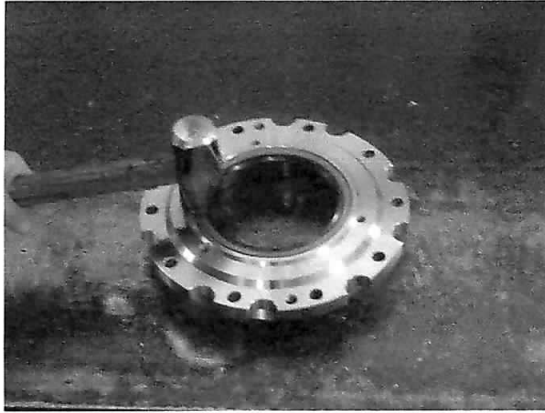
The cup can be pressed or hammered into place.



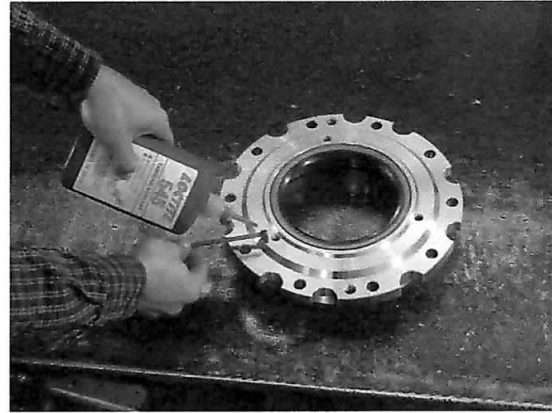
The bearing cup **must** bottom out in the Bearing Retainer



Flip the Bearing Retainer over and install the Oil Seal (18100351). Spring facing down.



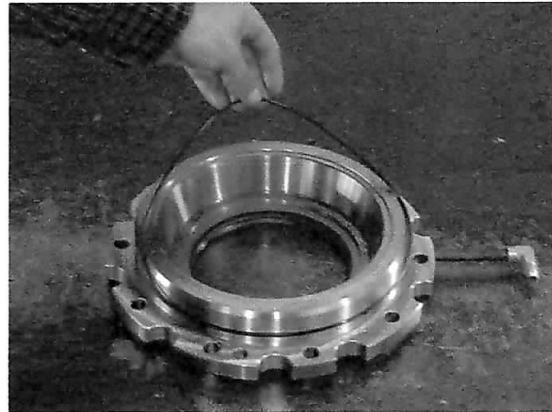
Hammer the Oil Seal into place.



Apply Loctite to the 3 pipe plugs (1/8 NPT) and insert as shown.



Insert the 3" long pipe nipple and 90 deg. fitting as shown



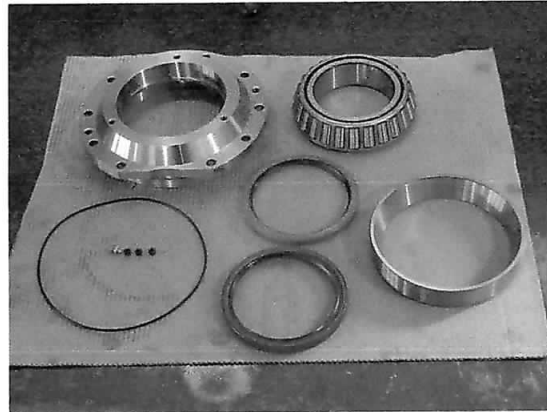
Flip the Bearing Retainer over and install the O-Ring (18100350)

The assembling of the Upper Bearing Retainer Assembly is now complete.

You can put this aside, until it is required further on in the assembly.

We will now assemble the Lower Bearing Retainer.

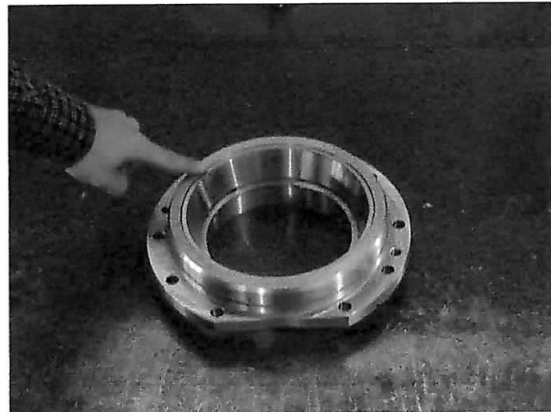
Lower Bearing Retainer Assembly



Parts which make up the Lower Bearing Retainer Assembly.



Install the bearing cup in the Lower Bearing Retainer (18100237). The cup can be pressed or hammered into place.



The bearing cup **must** bottom out in the Bearing Retainer



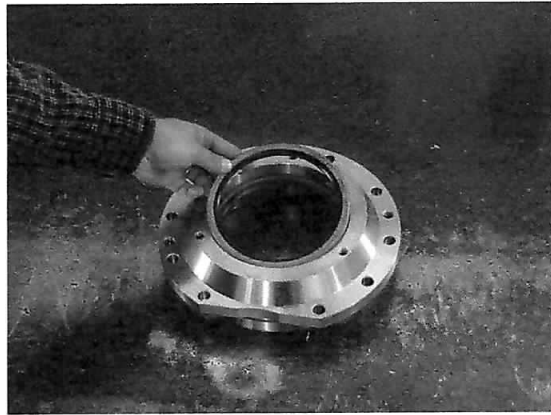
Flip the Bearing Retainer over and install the first Oil Seal (18100351).
Spring facing down.



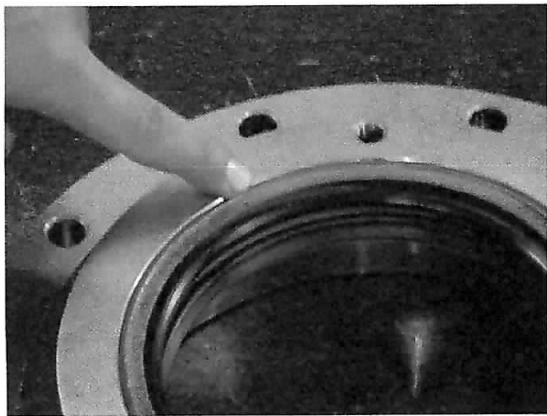
Hammer the oil seal into place



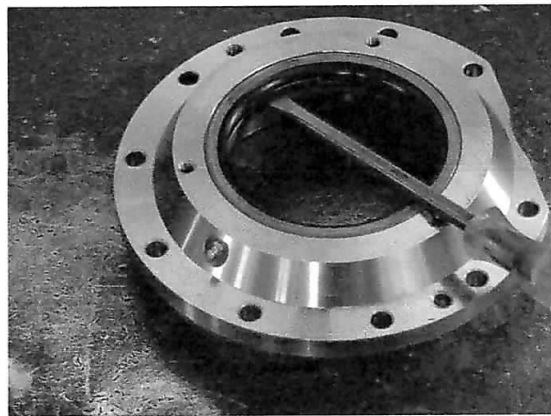
The oil seal **must** bottom out in the Bearing Retainer



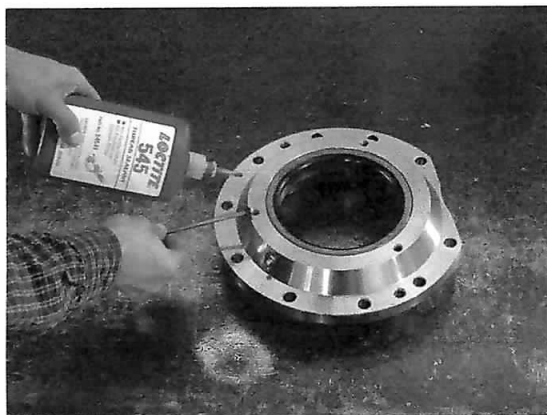
Install the second oil seal with the spring facing up



The 2nd oil seal must be flush with the top of the Bearing Retainer



There must be a gap between the two oil seals to allow grease to enter.



Apply Loctite to the 3 pipe plugs (1/8 NPT) and insert as shown



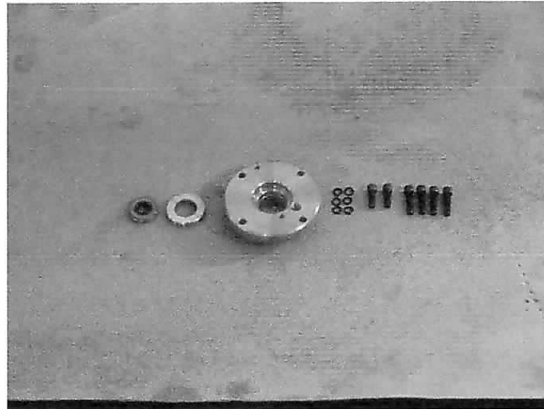
Flip the Bearing Retainer over and install the O-Ring (18100350).

The assembling of the Lower Bearing Retainer Assembly is now complete.

You can put this aside, until it is required further on in the assembly.

We will now assemble the Pump Mounting Plate.

Pump Mounting Plate Assembly



Parts which make up the Pump Mounting Plate Assembly.



Insert the Oil Seal (18100361) into the Pump Mounting Adapter (18100271)



Hammer the oil seal into place



Insert the Bushing Spacer (18100254), and hammer it into place.

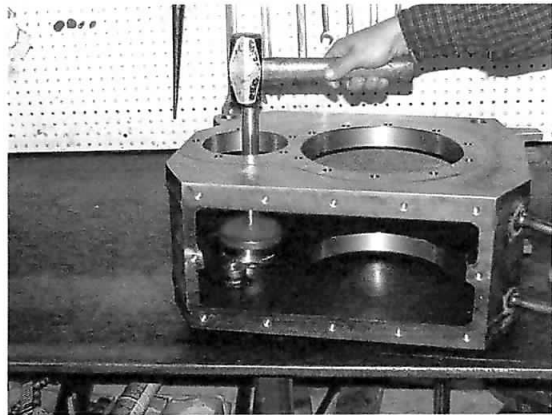
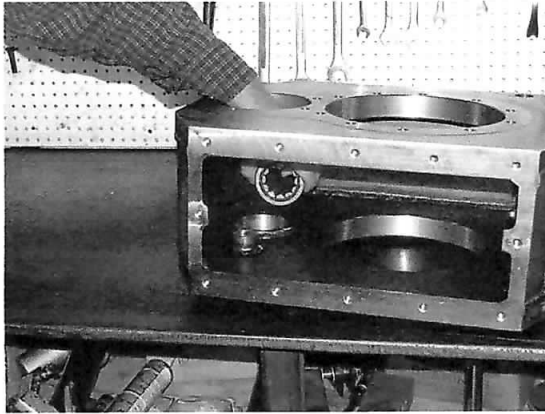


You can put this aside, until it is required further on in the assembly.

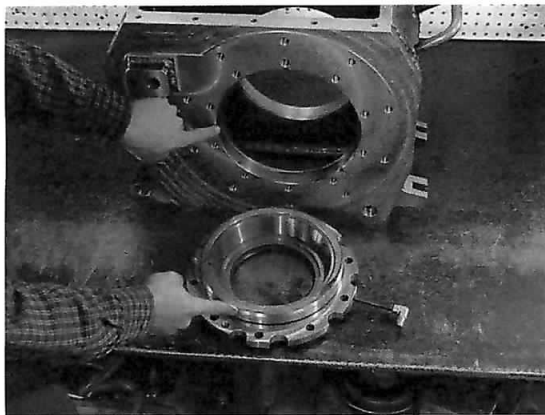
We will now start the final steps in assembling the Drillhead.

NOTE: ensure that the Drillhead housing is properly cleaned and de-burred before starting.

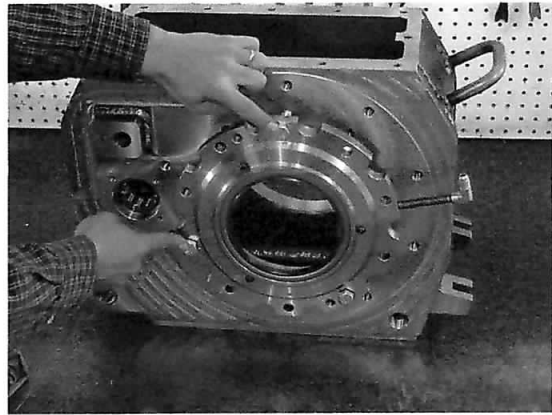
Drillhead Assembly



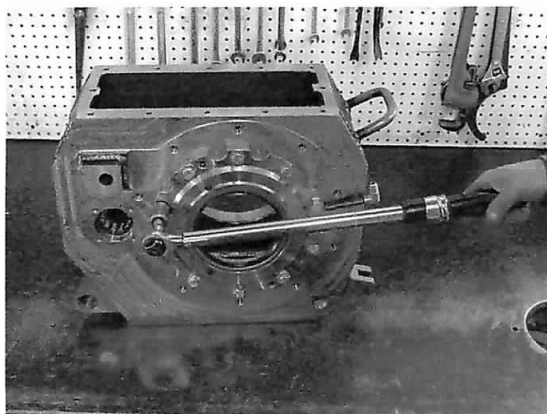
Install the Ball Bearing (18100354) for the Input Drive Shaft, by hammering it into the housing



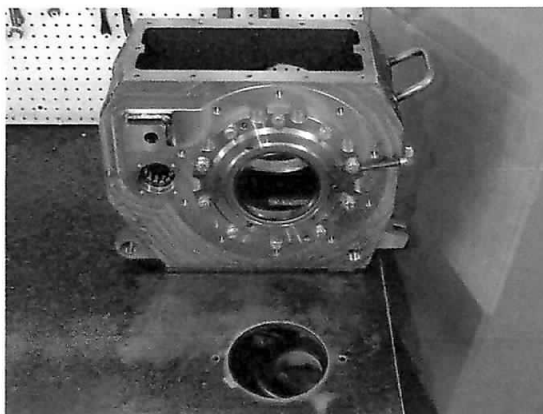
Apply grease to the Drillhead housing and the Upper Bearing Retainer



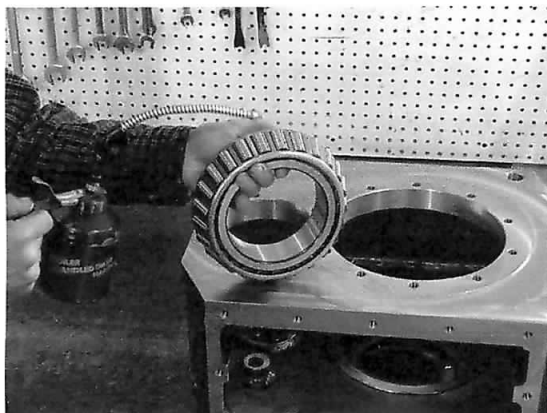
Use 3 bolts (1/2" x 2" long) to pull the Upper Bearing Retainer into the Drillhead housing



Install the 10 bolts (1/2" x 1-1/2" long) and the External Tooth Lock washers and torque to 70 ft.lbs.



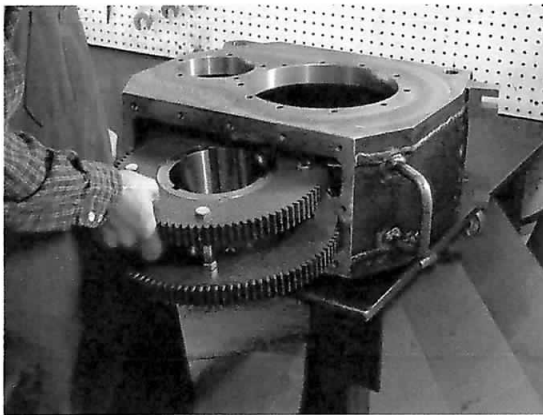
To make it easier to install the Spindle, it is best to turn the Drillhead housing over on its side over a hole on the work bench



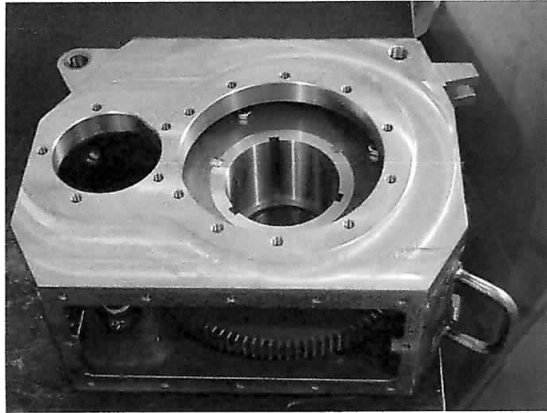
Oil the bearing cone before installing it in the bearing cup.



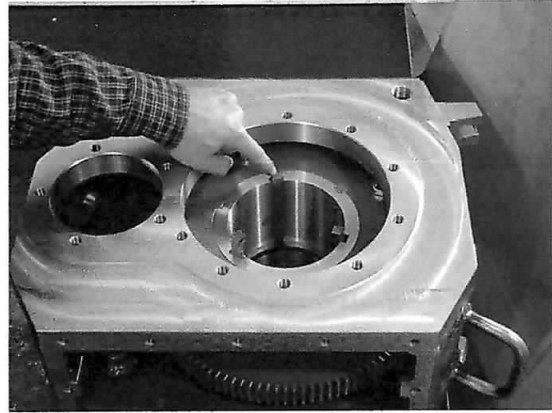
Install a Thrust Washer (18100234) on top of the bearing cone



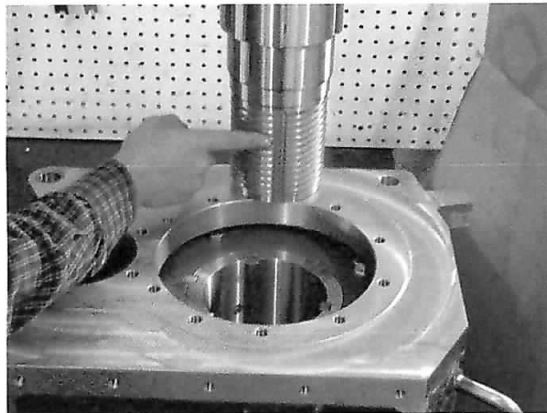
Install the Drive Sleeve Gears Assembly in the Drillhead housing on top of the Thrust Washer, with the small gear on top



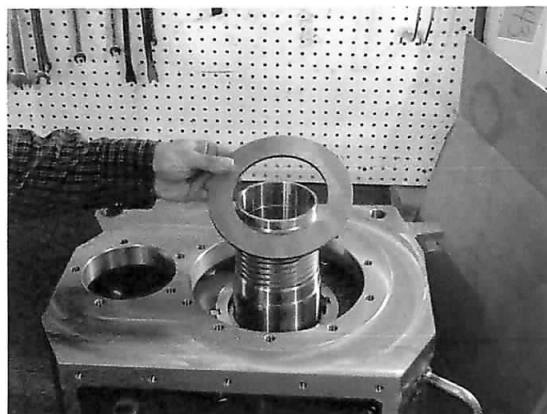
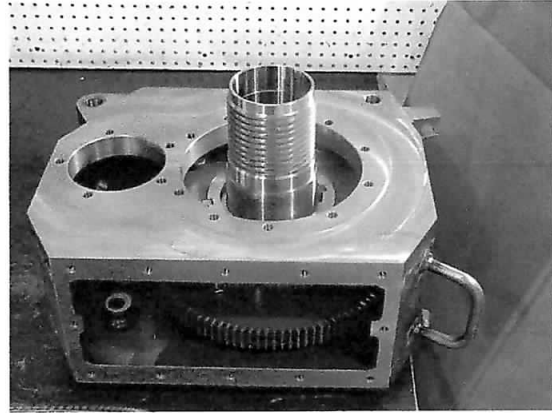
Center the gears and thrust washer over the bearing.



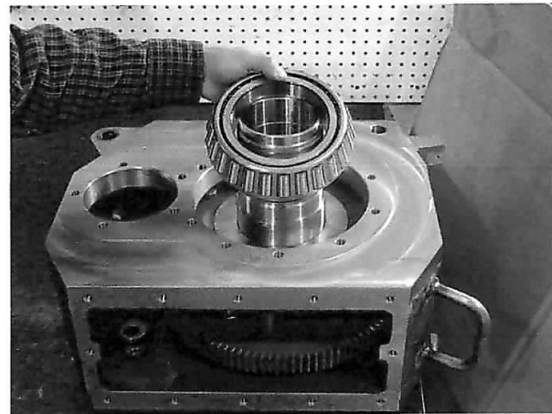
Apply an Anti-Seize compound on the 3 Drive Sleeve Keys (18100231), and insert in the Drive Sleeve



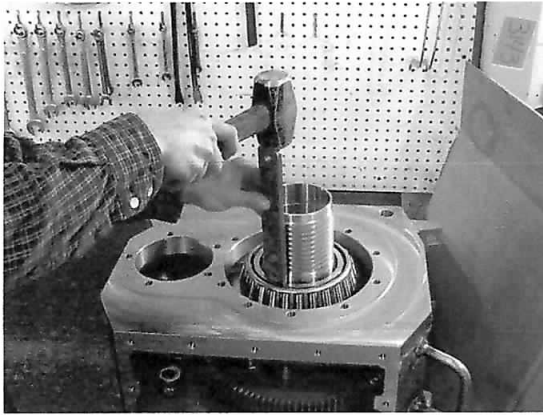
Apply oil to the largest outside diameter of the Spindle (18100002), and insert it into the housing with the end that has the 3 keyways first. Slight tapping might be required.



Insert the 2nd Thrust Washer over the spindle



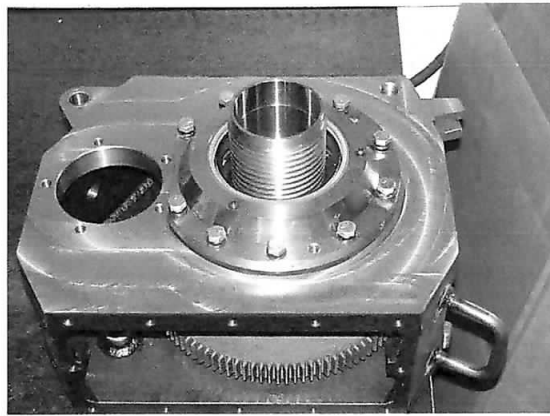
Oil the 2nd bearing and install it over the Spindle.



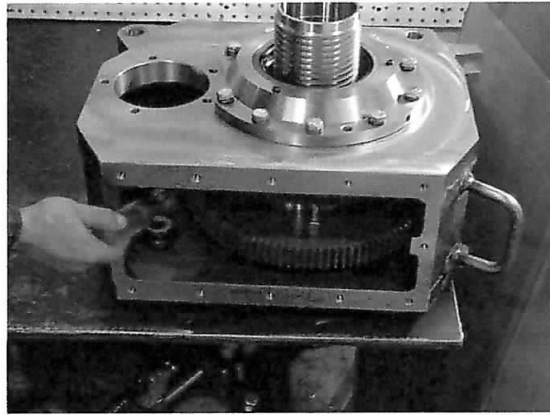
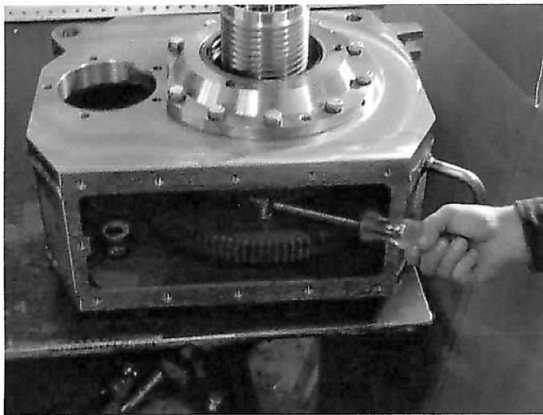
Tap the bearing into place.



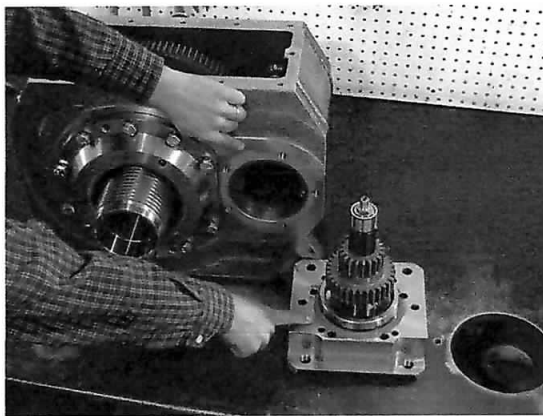
Install 0.034" of shims (18100235).



Install the lower bearing retainer (18100237) in the Drillhead housing. Use an object with a point on it to properly align the holes of the bearing retainer and the shims with the tapped holes in the Drillhead housing. Install the 10 bolts (1/2" x 1-1/2" long) and lock washers. Torque bolts to 70 ft. lbs.



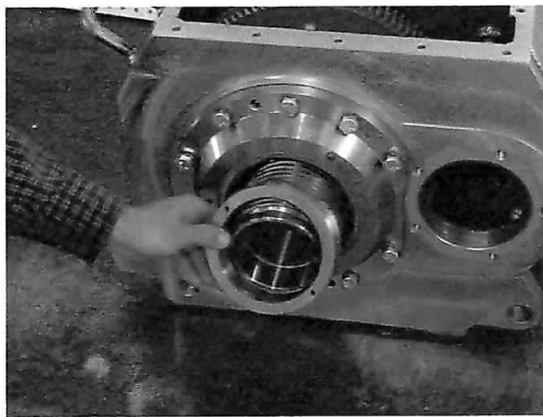
Verify that the gear assembly rolls freely. Grab one of the four bolts and turn the gear assembly. If the gear assembly can rotate approximately a $\frac{1}{4}$ turn, then you have the proper preload (correct quantity of shims). If the gear assembly turns more, then you must remove the lower bearing retainer and remove some shims. If the gear assembly does not turn, then you must remove the lower bearing retainer and add more shims. Continue this procedure until the proper preload is attained.



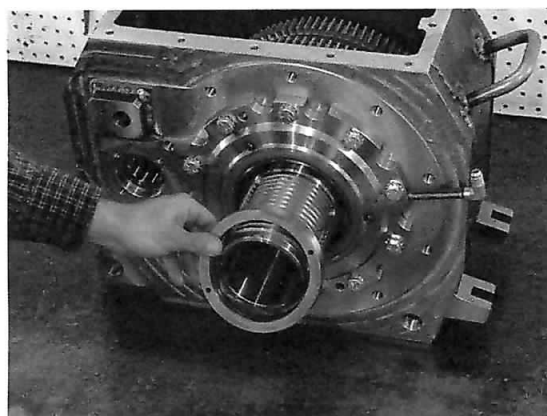
Apply silicone to the Drillhead housing and the Input Shaft Primary Gear Assembly plate. Allow the silicone to dry before installing the Input Shaft Assembly in the Drillhead housing.



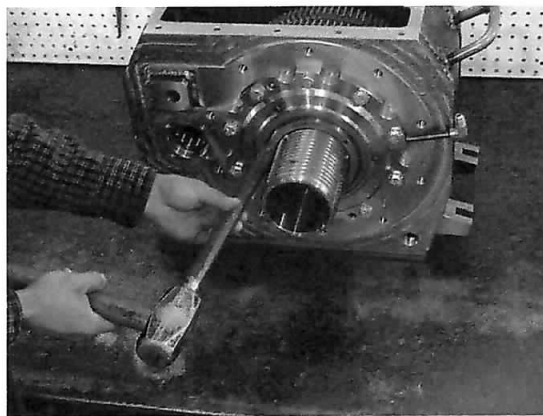
Install the O-Rings (18100323) in both the Upper Clamp Ring (18100296), single seal and the Lower Clamp Ring (18100310) double seal.



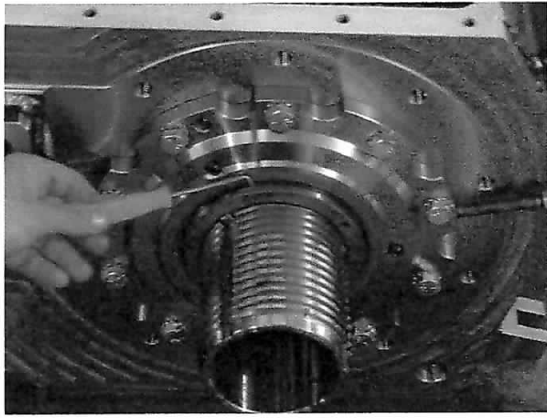
Apply grease to the outside of the Lower Clamp Ring and install it in the Lower Bearing Retainer



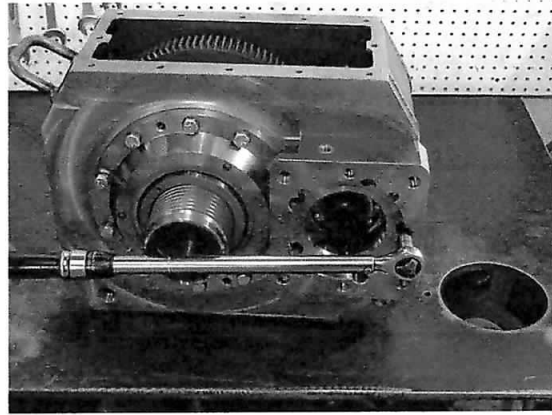
Apply grease to the outside of the Upper Clamp Ring and install it in the Upper Bearing Retainer.



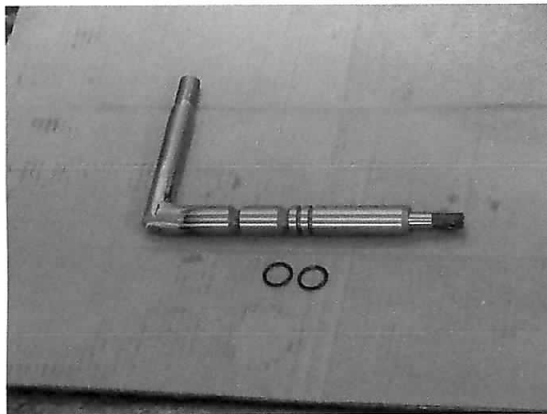
Hammer both Clamp Rings in until they bottom out on the bearings



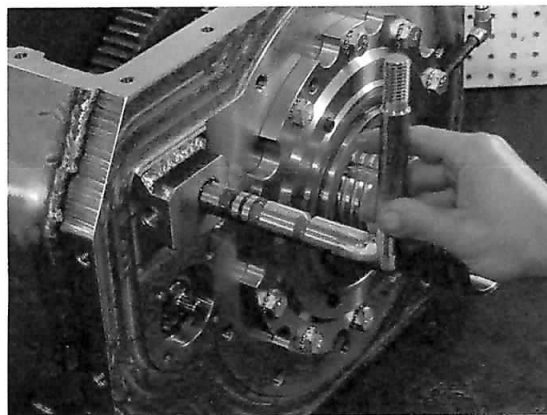
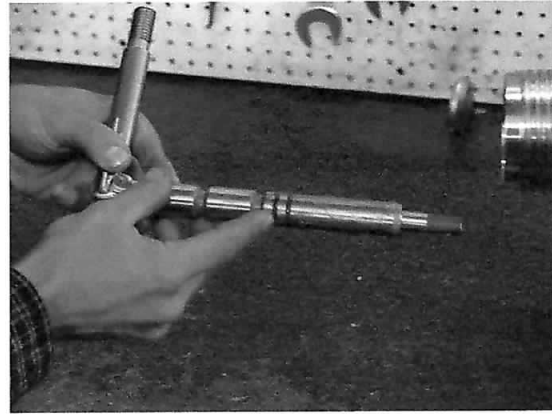
Use a pick with a hook to pull the oil seal lip out towards the outside of the Drillhead



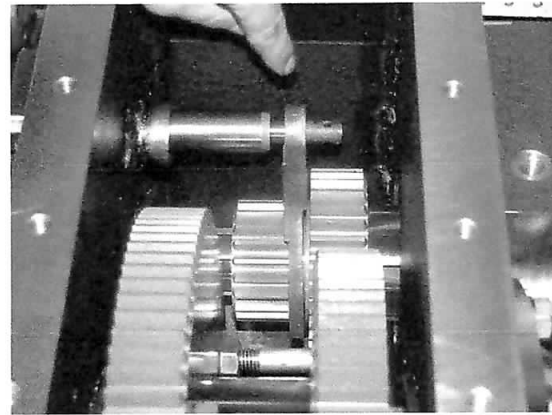
Install the Input Shaft Assembly plate in the Drillhead. Ensure that the shaft is properly entered in the ball bearing on the other end. Torque the 5 bolts ($\frac{1}{2}$ " x 1- $\frac{3}{4}$ " long) to 70 ft.lbs.



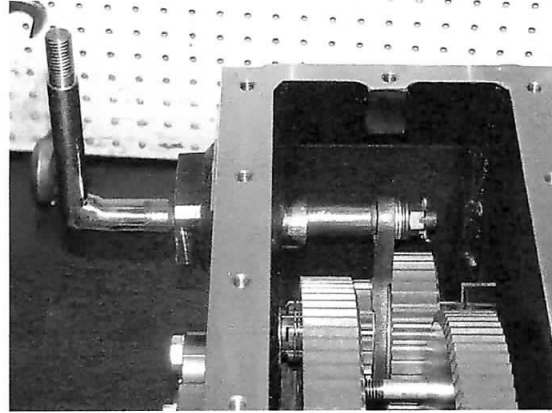
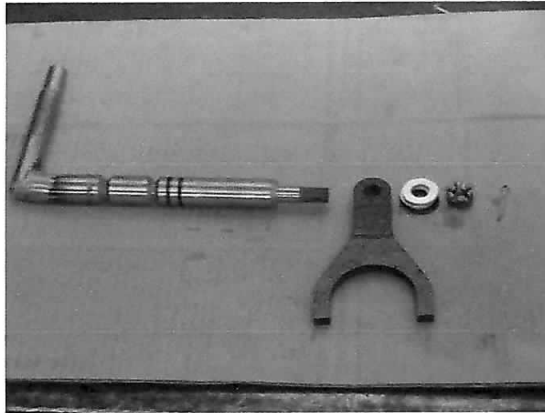
Install the 2 O-Rings (18100359) in the Shifter Rod (18100250).
Apply grease on the shaft and O-rings.



Install the Shifter Rod in the Drillhead housing.



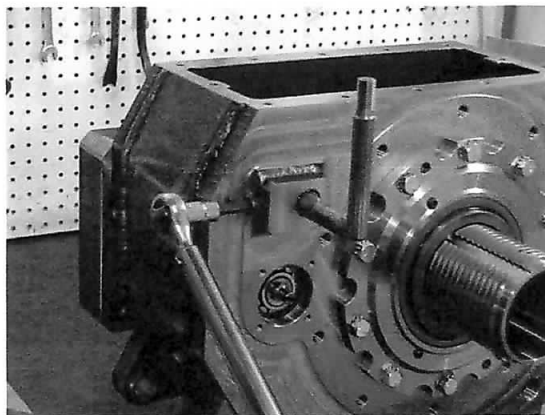
Install the Primary Gear Shifter Yoke (18100115) over the Primary Gear. Ensure that the notches are on the proper side. Slide the Shifter Rod through.



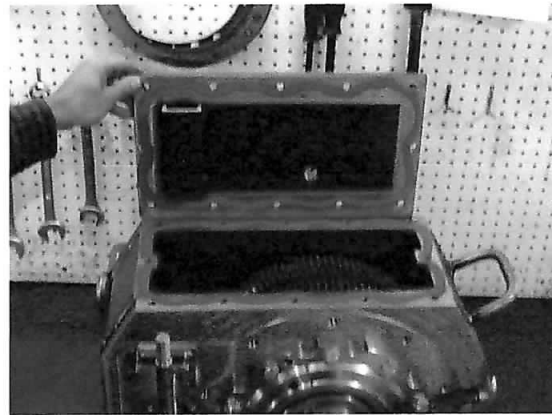
Install the 4 Washers, the Castle Nut and the Cotter Pin on the end of the Shifter Rod to hold the Shifter Yoke.



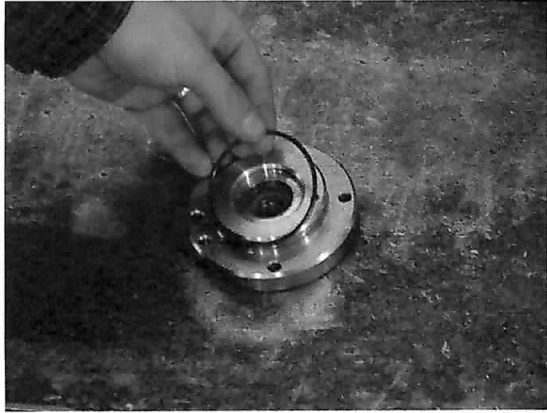
Install the Steel Ball, the Spring and the Spring Retainer (18100248) in the side of the housing.



Tighten the Spring Retainer.



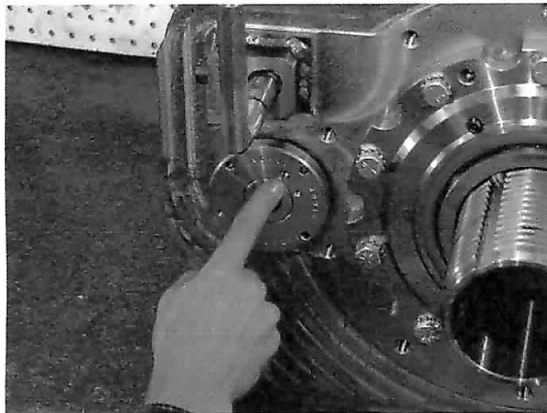
Apply silicone to the Drillhead housing and the Housing Cover (18100245). Allow the silicone to dry before installing



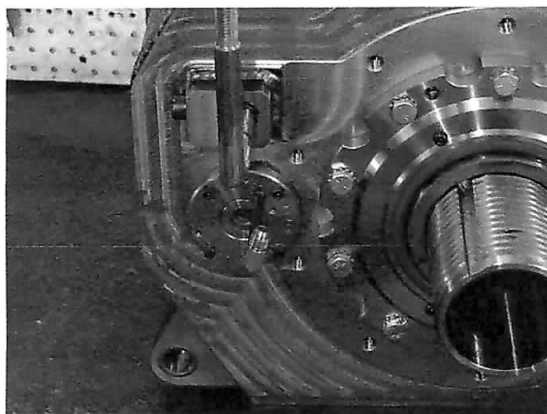
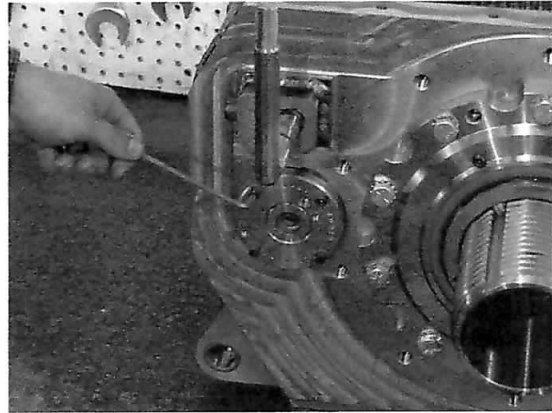
Install the O-Ring (18100353) in the Mounting Adapter (18100271).



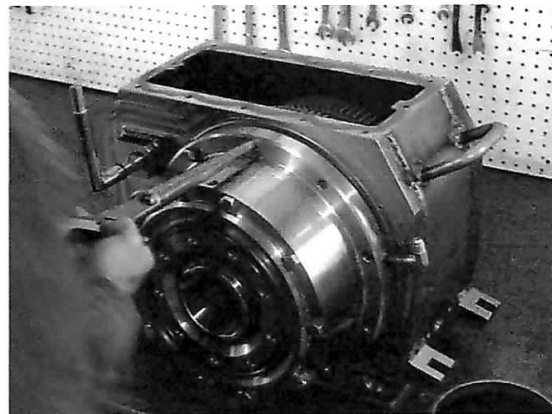
Apply grease to the outside of the Mounting Adapter.



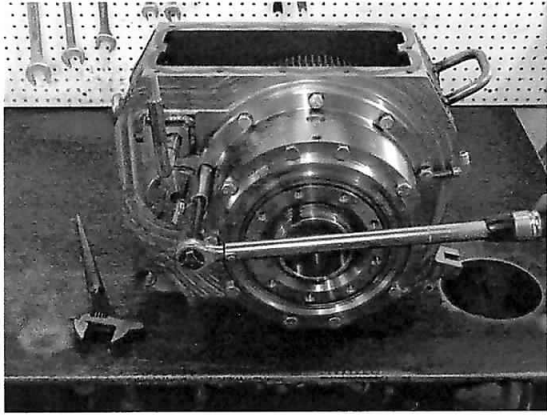
Install the Mounting Adapter in the Drillhead housing. The 1/8 NPT hole must be located in the top right hand corner (one o'clock). Tighten the 4 bolts (1/4" x 1" long) and the lock washers.



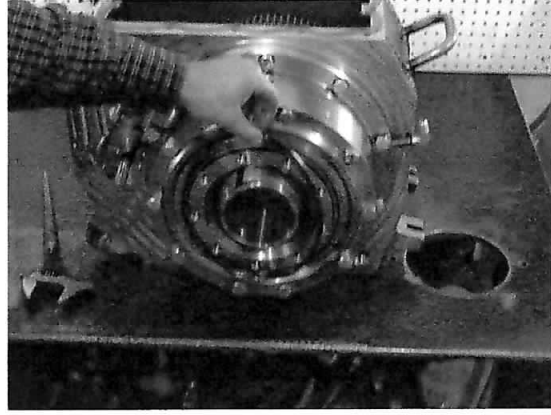
Install the 1/8" x 3 1/2" long pipe nipple and the 90 degree elbow



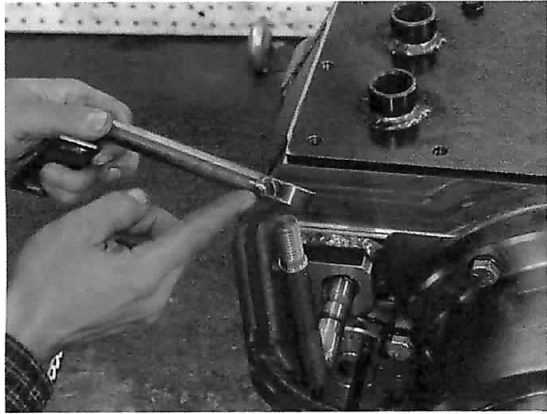
Install the Cylinder Assembly. Use an object with a sharp point to help align the bolt holes.



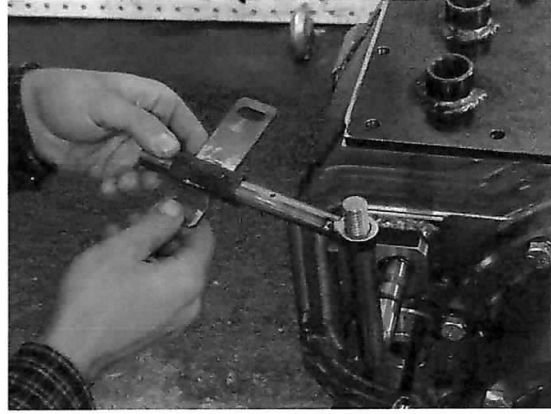
Install the 10 bolts (1/2" x 2" long) and the lock washers and torque to 70 ft.lbs.



Install the V-Ring (18100065).



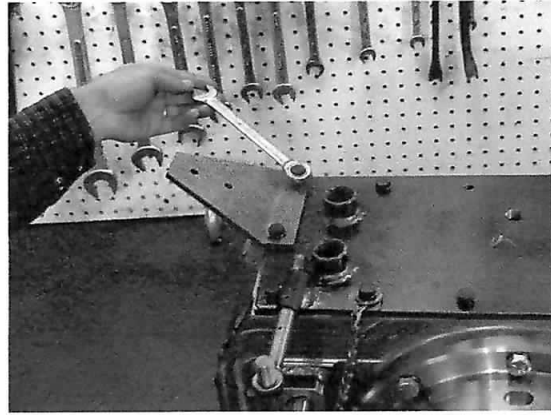
Install the Shifter Lever Guide (18100256)
NOTE: the notch must be on the bottom side



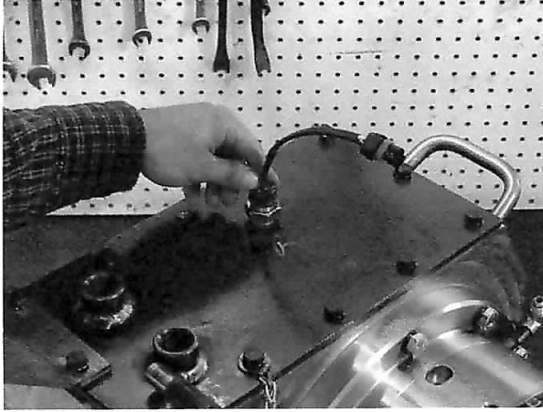
Install the Shifter Lever Bracket (18100249)



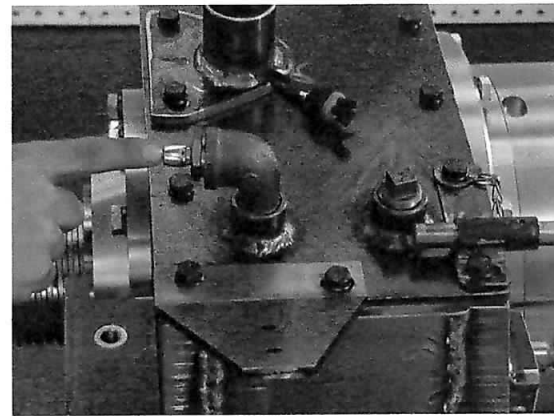
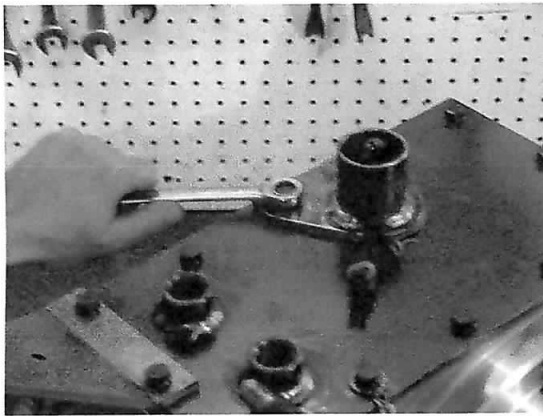
Install the Hitch Pin Clip (18100257) and the Shifter Lever Bracket and fasten to the Housing Cover with 2 bolts (3/8" x 1 1/4" long) and the lock washers.



Install the Filter Bracket (18100246) and fasten to the Housing Cover with 2 bolts (3/8" x 1 1/4" long) and the lock washers.

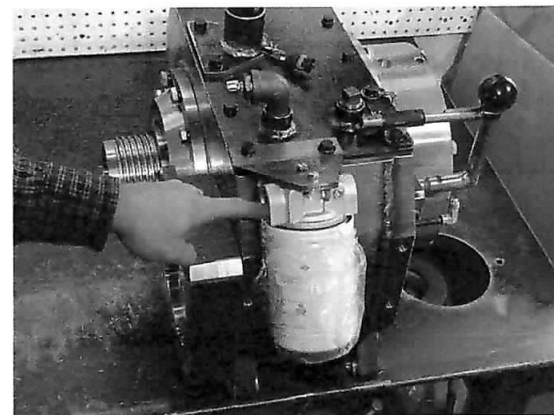
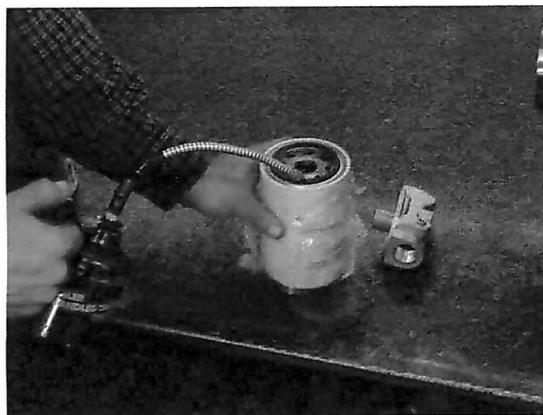


Install the Magnetic Sensor (18100305) in the Housing Cover. Screw in the Sensor until it touches the Drive Sleeve Gear, and then back off (unscrew) the Sensor $\frac{1}{2}$ to $\frac{3}{4}$ of a turn. Tighten the nut on the Sensor. NOTE Do not torque over 25 ft.lbs.

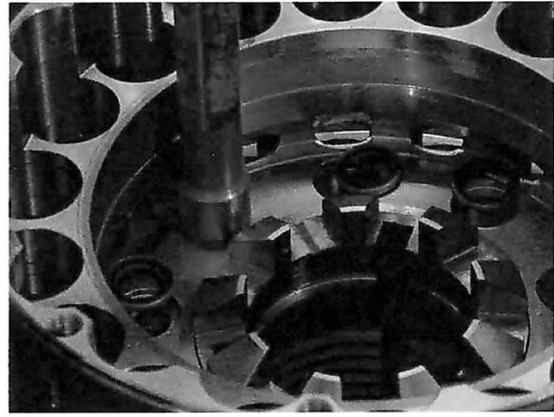
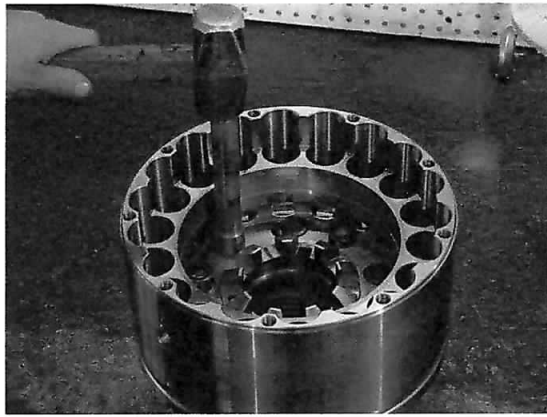


Install the Guard - Magnetic Sensor (18100252) and the 2 bolts ($\frac{3}{8}$ " x $1 \frac{1}{4}$ " long) and the lock washers.

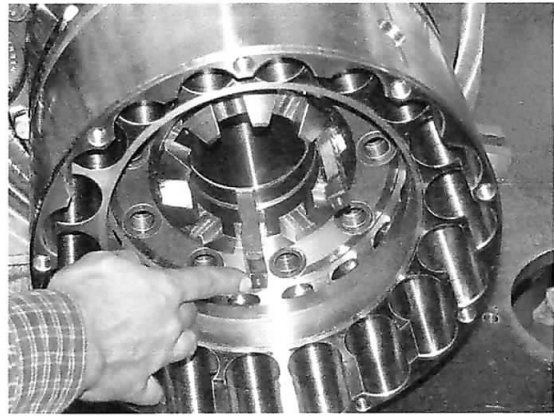
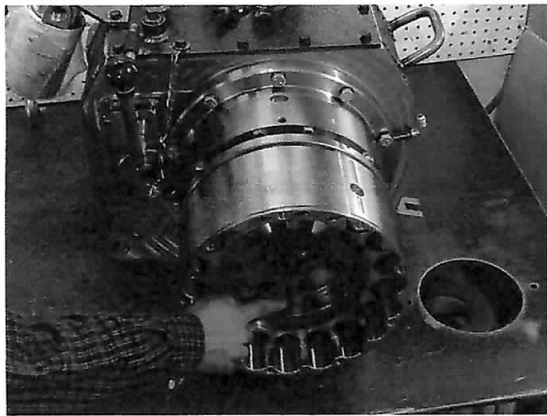
Install the Street Elbow, Reducer and the Breather Plug (18100173).



Apply oil to the Oil Filter gasket, screw on the Oil Filter Head, and install under the Filter Bracket with the 2 bolts ($\frac{1}{4}$ " x $\frac{3}{4}$ " long) and the lock washers.



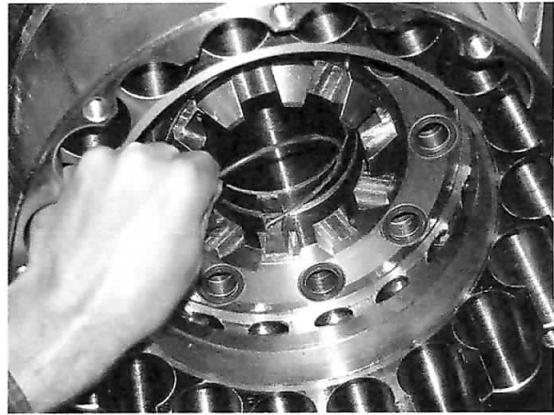
Insert the 9 Oil Seals (18100156) in the Chuck Housing (18100091).



Screw the Chuck Housing onto the Spindle until it bottoms out on the spindle. Then turn back (unscrew) until the keyways line up.

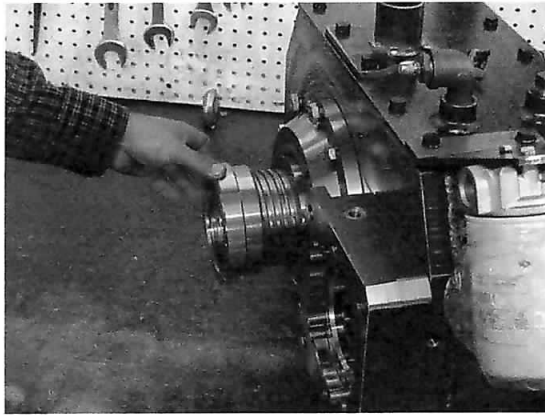
Apply an Anti-seize compound to the keys and insert in the spindle / chuck housing keyways, with the thicker portion of the key facing towards the center of the spindle.

NOTE: DO NOT TURN BACK (UNSCREW) THE CHUCK HOUSING MORE THAN 1/3 TURN TO ALIGN KEYS

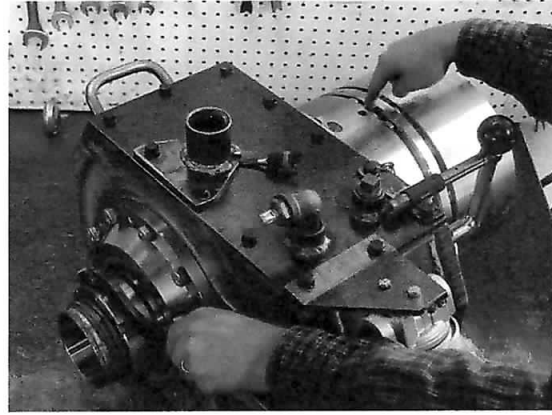


Push the keys in the keyways until they are just passed the slot for the Key Locking Spring

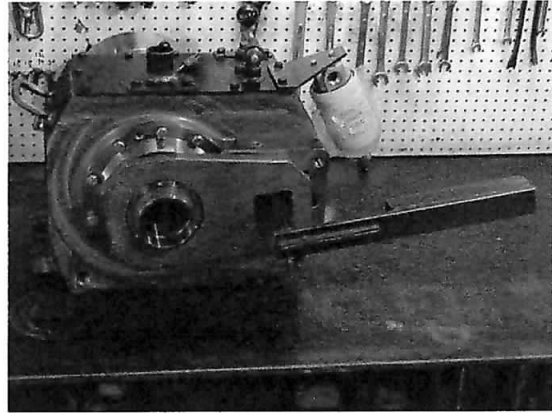
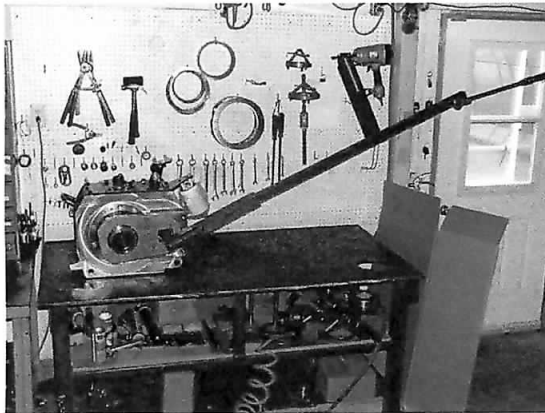
Insert the Key Locking Spring (18100158) with the hook facing toward you.



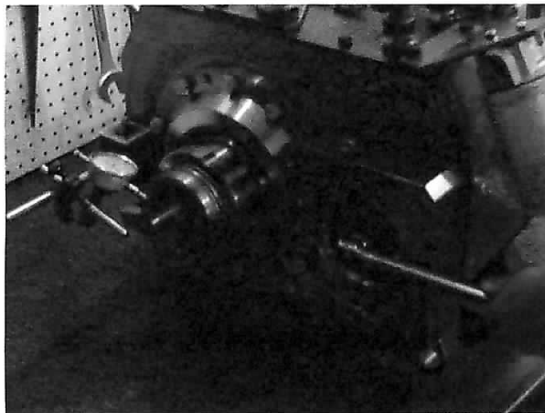
Apply an Anti-seize compound to the Spindle Nut (18100161) and screw it onto the Spindle.



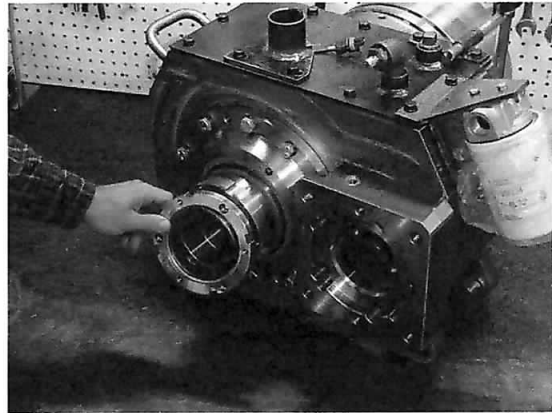
Tightening the Spindle Nut will pull the Chuck Housing closer to the top of the Cylinder. There should be a $\frac{3}{32}$ " gap between the two.



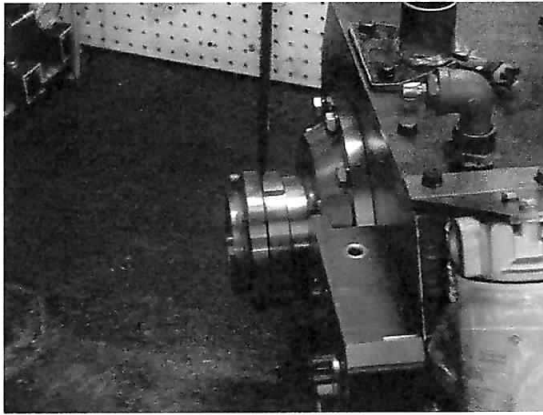
To torque the Spindle Nut properly, we place a large plate over the Spindle Nut, insert a splined shaft into the Input Drive Shaft and a 5 foot long square tubing with a nut welded on the end. By placing the Drillhead in Low Gear (Shifter Rod pulled out toward you) and applying 80 ft.lbs. with the torque wrench, we will arrive at a torque of 2160 ft.lbs. on the Spindle Nut.



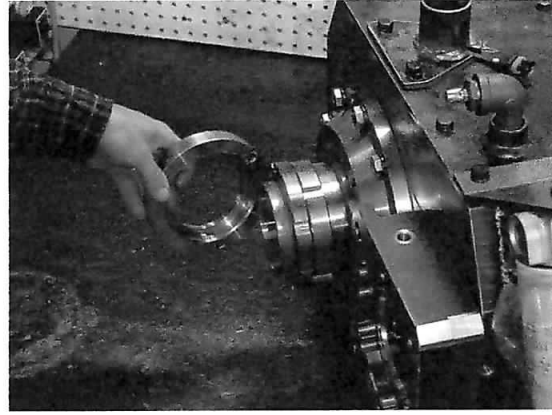
Verifying that the Spindle is running true.
NOTE: must not exceed 0.010"



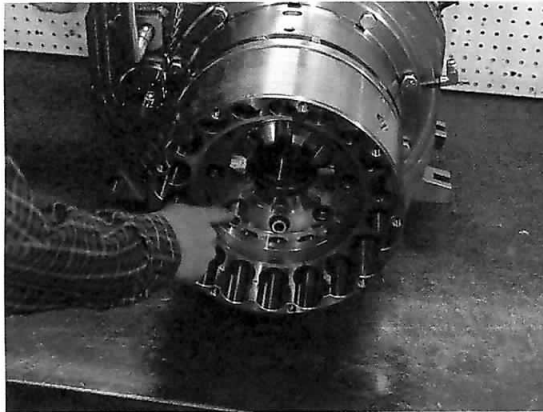
Apply an Anti-seize compound to the Spindle Lock Nut (18100162).



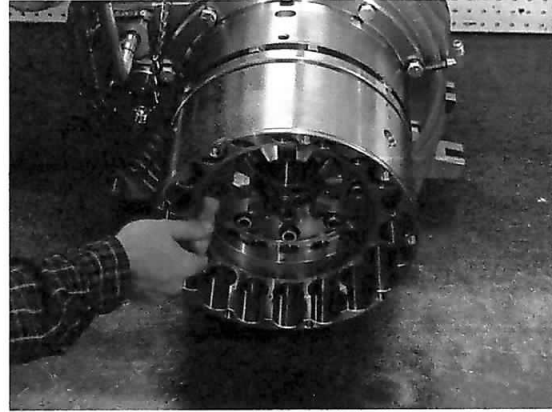
There must be approximately 1/8" gap between the nut and the locknut. Fasten using 3 bolts (5/16" x 1" long).



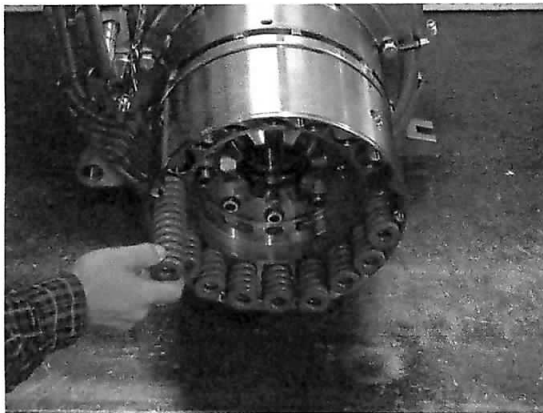
Install the Bushing Retainer (18100239). Fasten to the Spindle Lock Nut with 3 bolts (5/16" x 1 1/4" long).



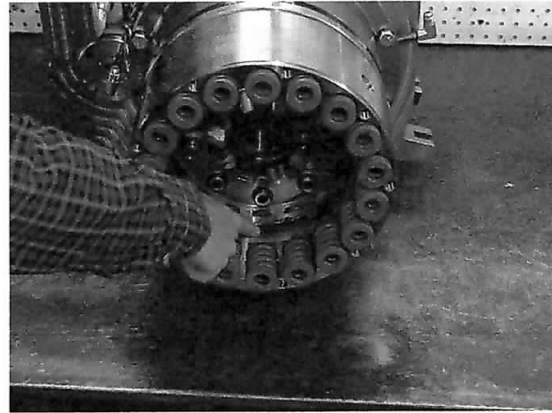
Insert the 9 Bottom Spacers (18100059)



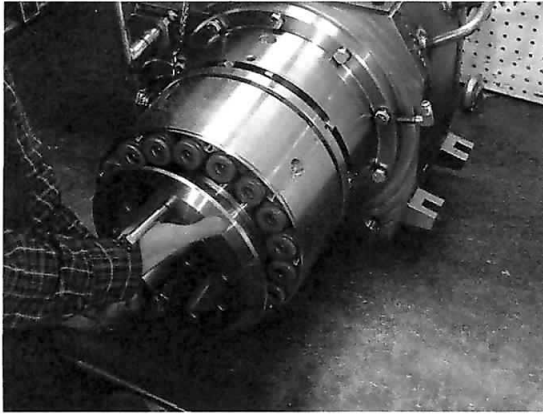
Properly align the 9 tapped holes in the Actuator Sleeve with the holes in the Chuck Housing



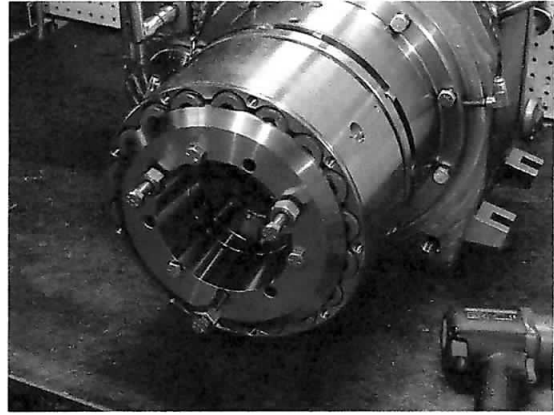
Insert the 18 Springs (18100155).



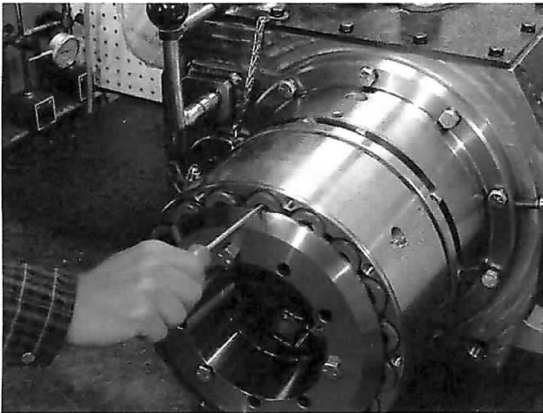
Apply grease to the inside of Chuck Housing



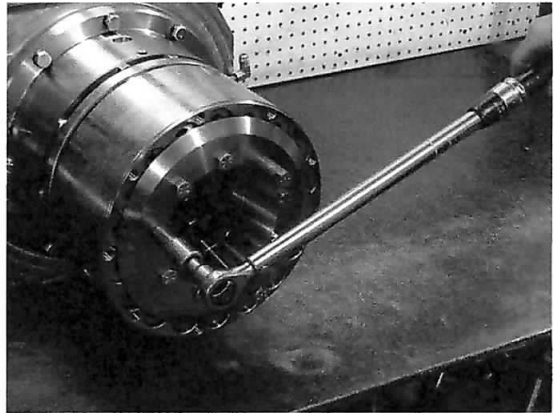
Install the Chuck Bowl (18100067).



Use 3 bolts (1/2" x 8" long) and 5/8" nuts to pull the Actuator Sleeve and Chuck Bowl together. Insert 3 - 6 1/2" long bolts, and fasten these once they make contact with the Actuator Sleeve.



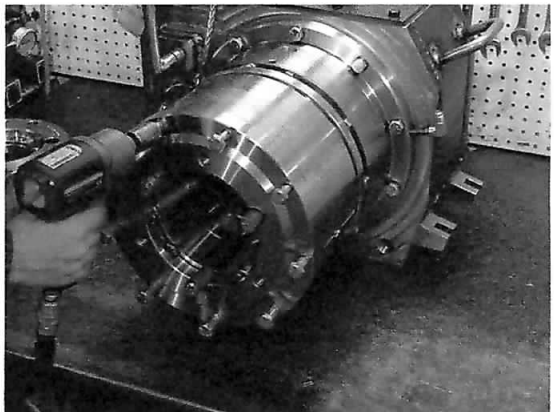
Using a screw driver, pry the springs toward the outside of the Chuck housing. This will ensure that the springs are properly positioned under the Chuck Bowl.

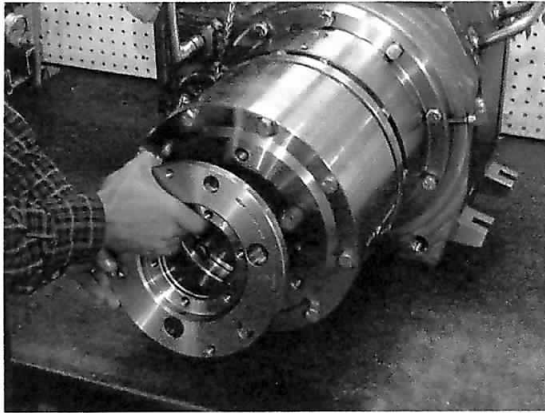


Install the 6 - 6 1/2" long bolts and the 3 - 8" long bolts with the 3 Top Spacers (18100058). Torque all 9 bolts to 70 ft.lbs.

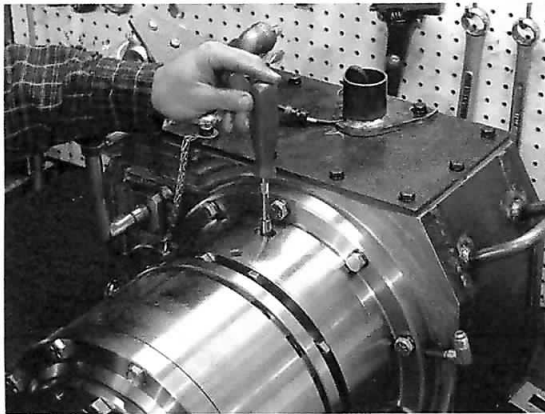


Install the Top Cap Holder (18100122) and torque the 9 bolts (1/2" x 2 1/4" long) to 70 ft.lbs.

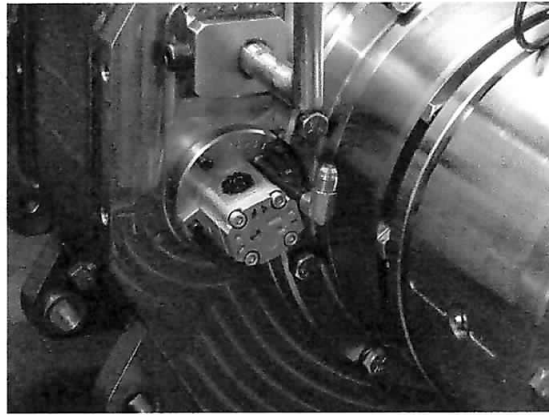




Install the Top Cap (18100071) and torque the 3 bolts (3/4" x 1 1/2" long) to 70 ft.lbs.



Install the 3 Grease Fittings (1 in the Cylinder, and 2 in the Chuck Housing).



When installing the Lube Pump (18100281) ensure that the drive shaft will be properly aligned with the Input Shaft Drive Tip (18100243) in the Drillhead housing. Fasten with 2 bolts (1/4" x 3/4" long).

Hoses and Fittings

For the lubrication system.

