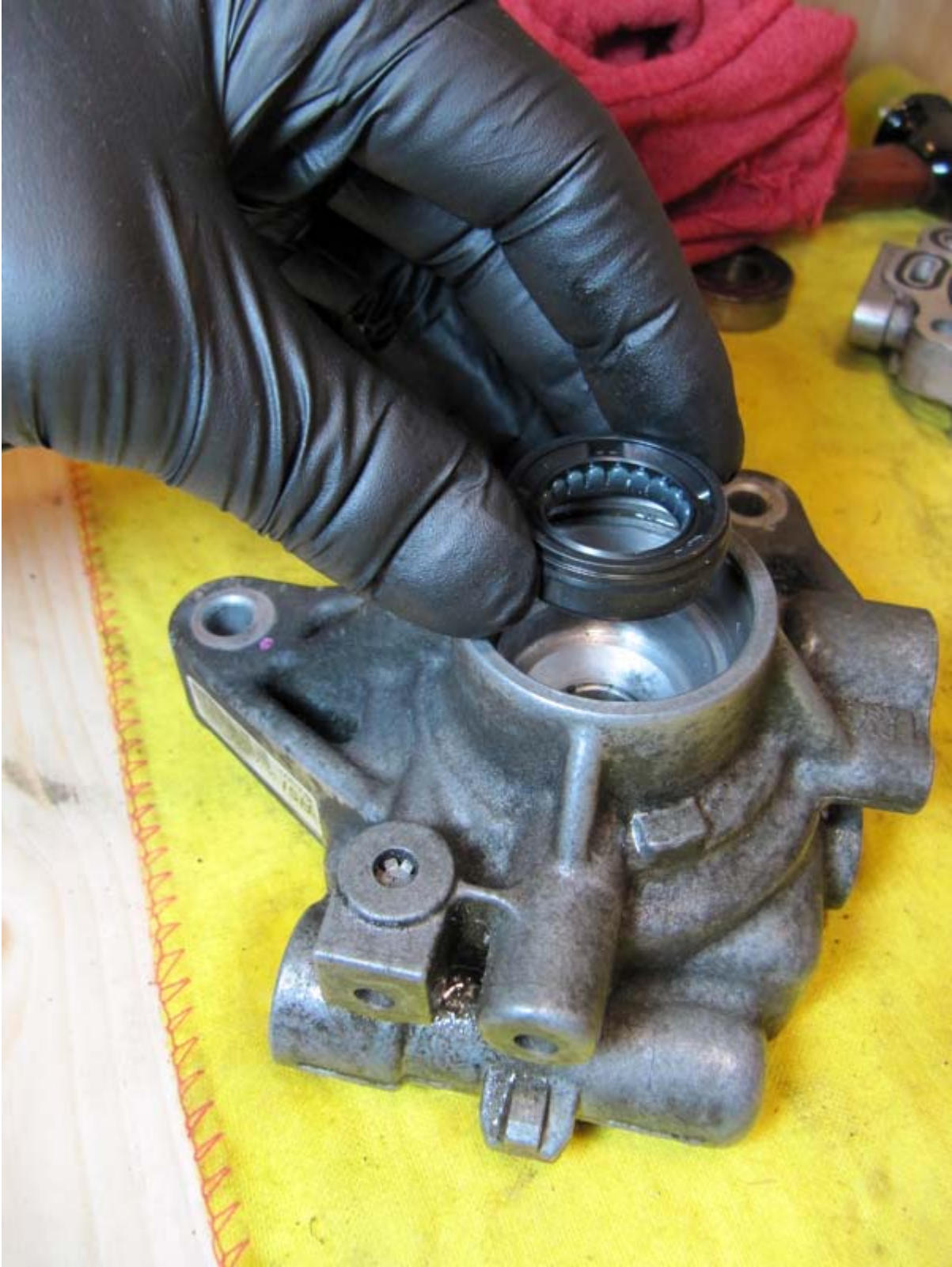
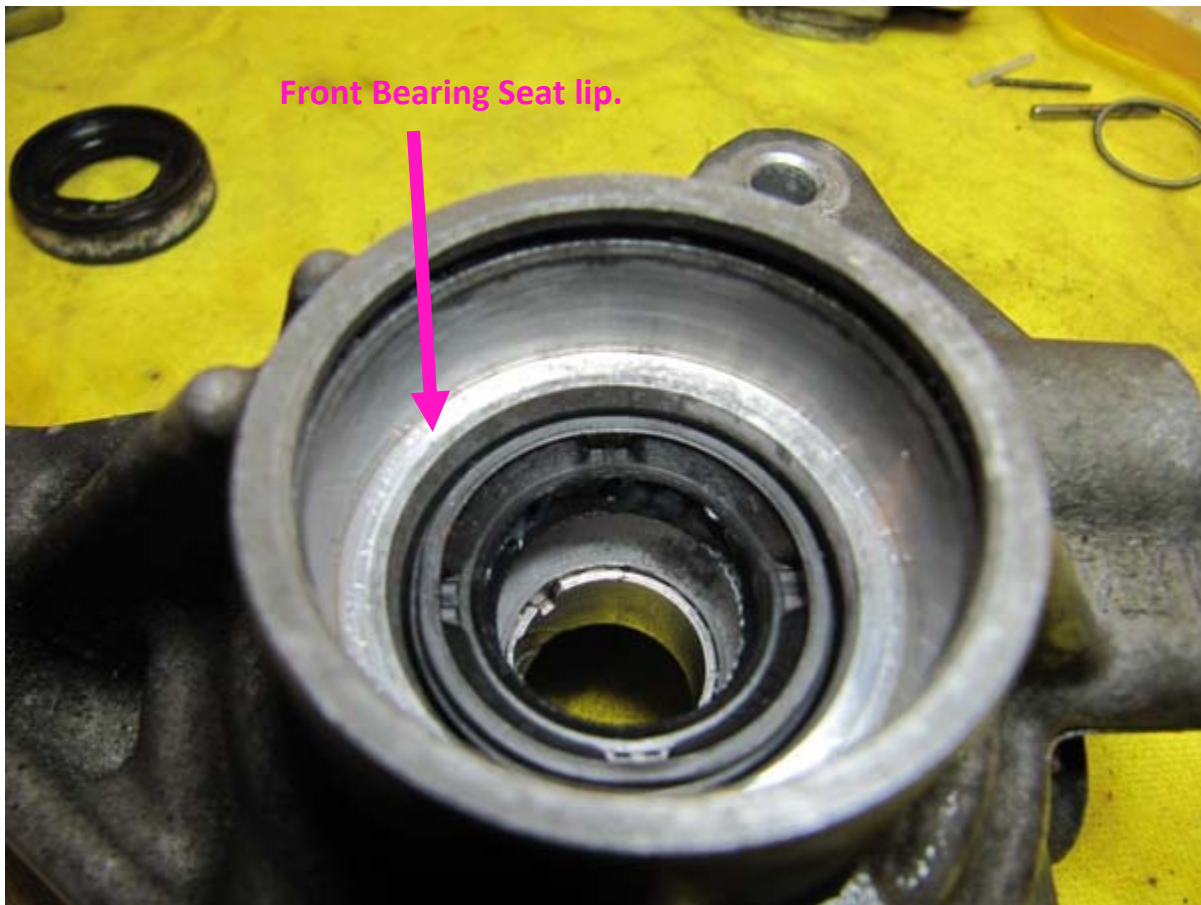


#24 – Insert the new seal.



#25 – And push down on the new seal to seat it in place. Make sure the top of the seal sits below the lip of the bearing seat. I was able to push in the new seal fully by hand.



*#26 – Push the new bearing onto the drive shaft using a socket that sits only on the inner race of the bearing so that the bearing is not damaged.*



*#27 – Insert the drive shaft with new bearing into the pump housing.*



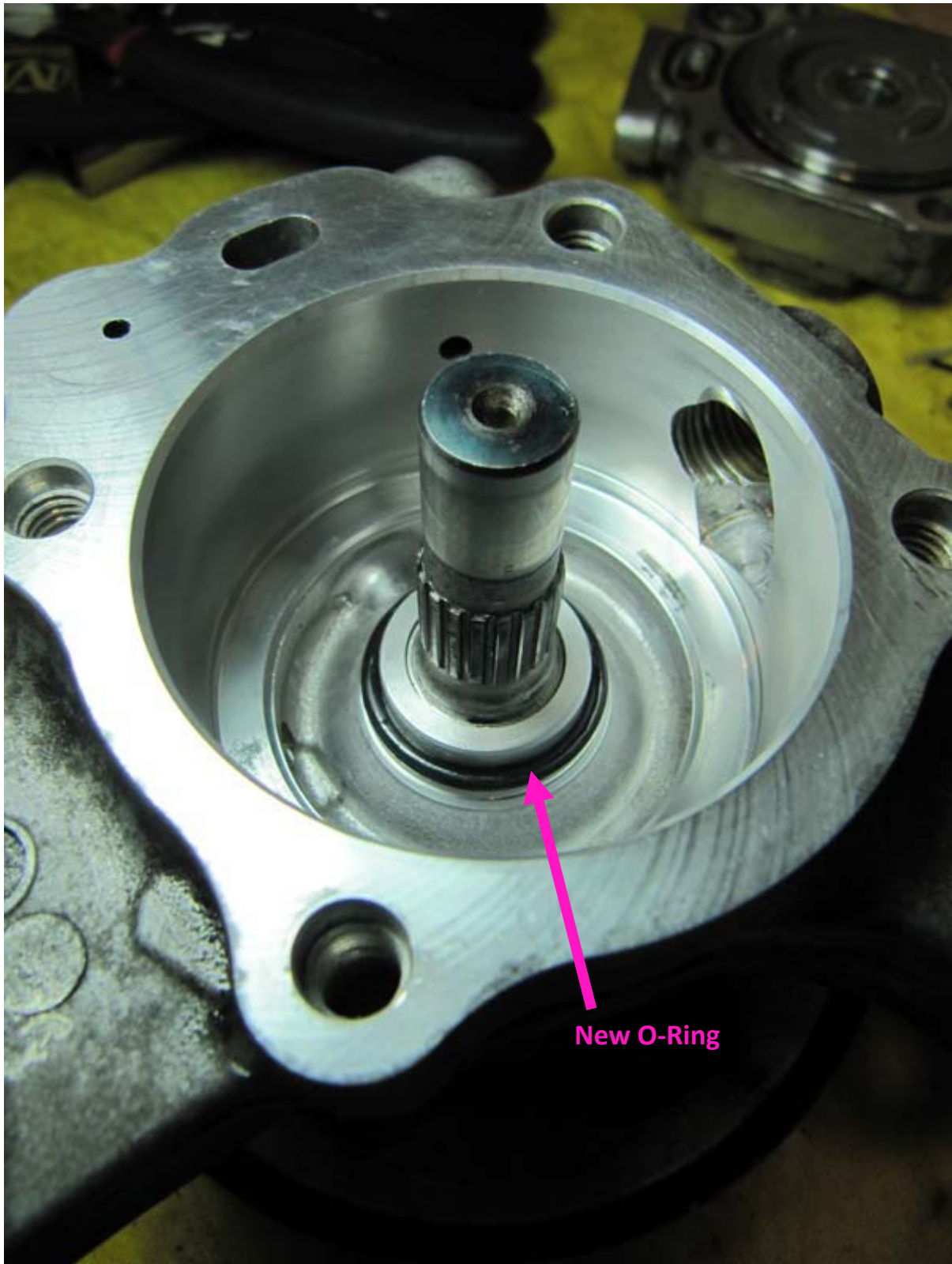
#28 – Using an appropriately sized socket (that presses down only on the OUTER bearing race), press the bearing into the pump housing.



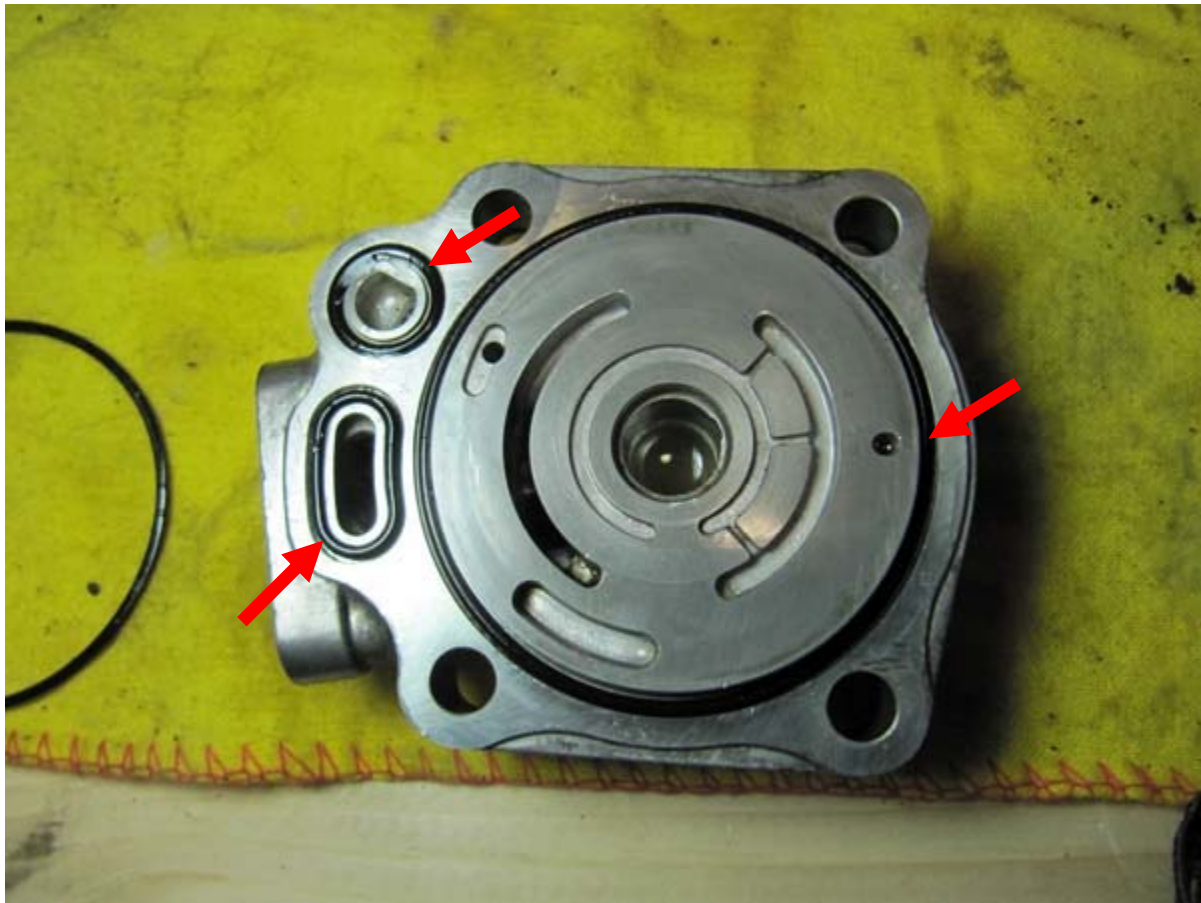
#29 – With the bearing installed, re-install the snap ring with its radiused edge facing out (per the service manual, although when I took it out it was actually installed the opposite way).



#30 – Clean out the inside of the pump housing and insert a new O-Ring (apply PS fluid to the O-Ring before installing).



#31 – Clean off the pump cover and install three new O-Rings (every O-Ring should be coated in PS fluid before it is installed so I won't necessarily say that for every one in the remainder of his write-up!).





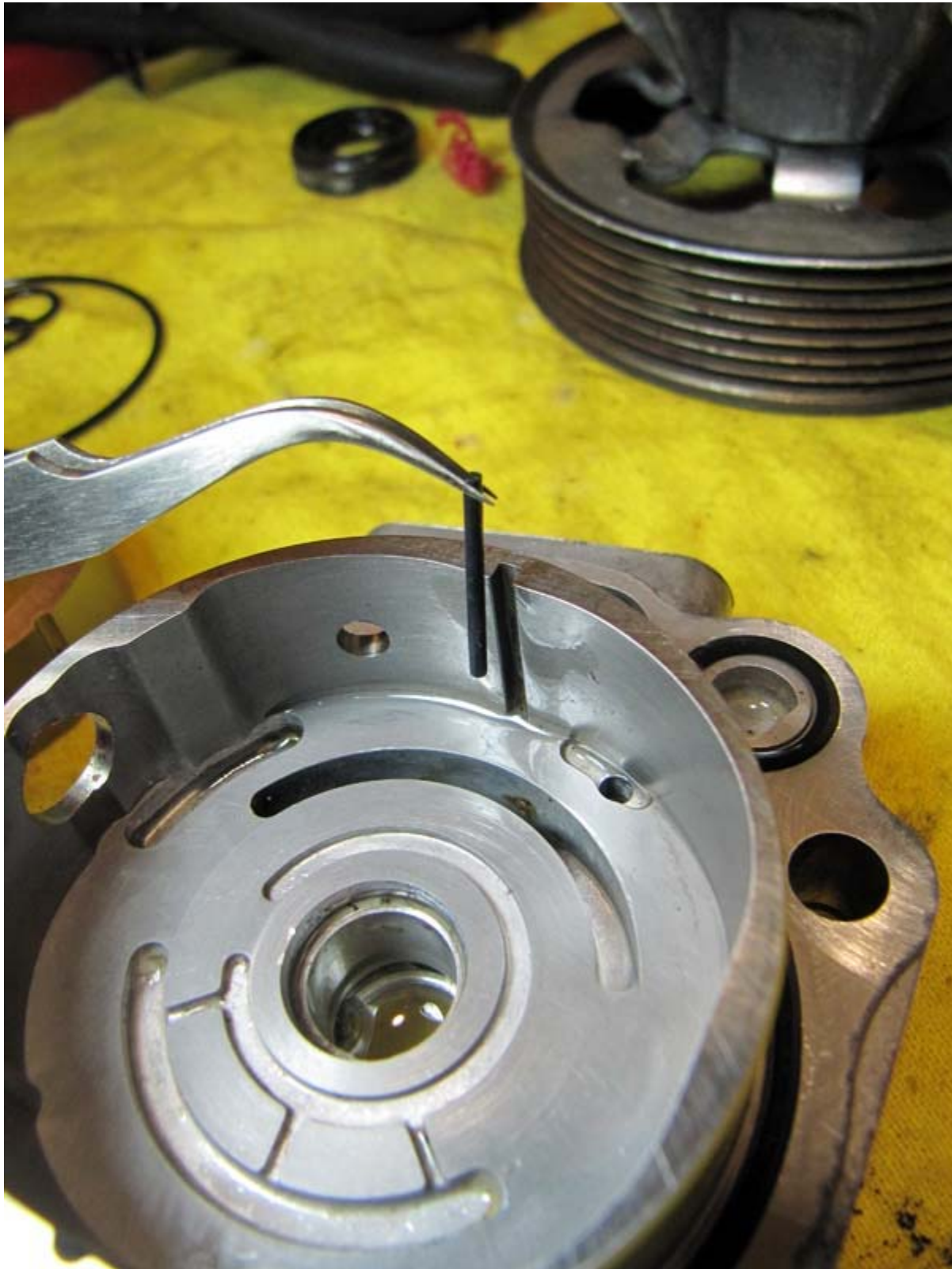
#32 – Set the Outer Case on top of the Pump Cover, so that the indent in the Outer Case lines up with the hole in the Pump Cover (red arrow).



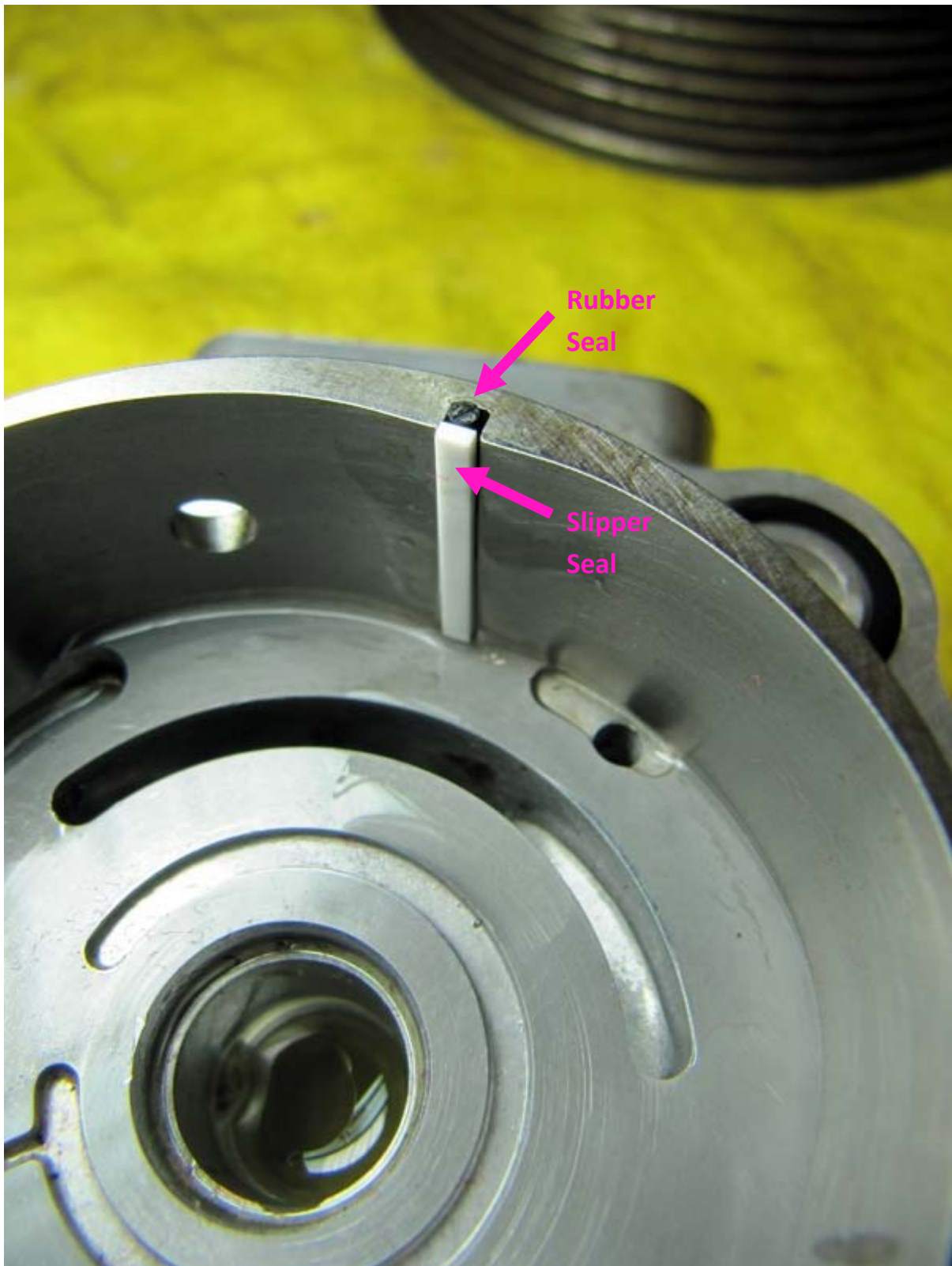
And the hole in the Outer Case is in the alignment shown (i.e. not on the other side of the pump)



*#33 – Take the Rubber Seal, dip it in PS fluid, and insert it into the slot on the Outer Case.*



#34 – Take the Slipper Seal (White), dip it in PS fluid, and place it in the slot on top of the Rubber Seal. The power steering fluid really helps to hold the seals in place while you are assembling the pump.



#35 – Carefully (so as not to disturb the position of the Seals) insert the Cam Ring, keeping the cam ring tight against the Outer Case in the direction shown by the red arrow (to keep the seals from moving). Also, note that the dot on the Cam Ring must be facing UP as shown.



*#36 – Here's what it looks like when you get the Cam Ring inserted. If the Rubber or Slip Seals have moved out of the groove, then remove the Cam Ring, reposition the Seals and try again.*



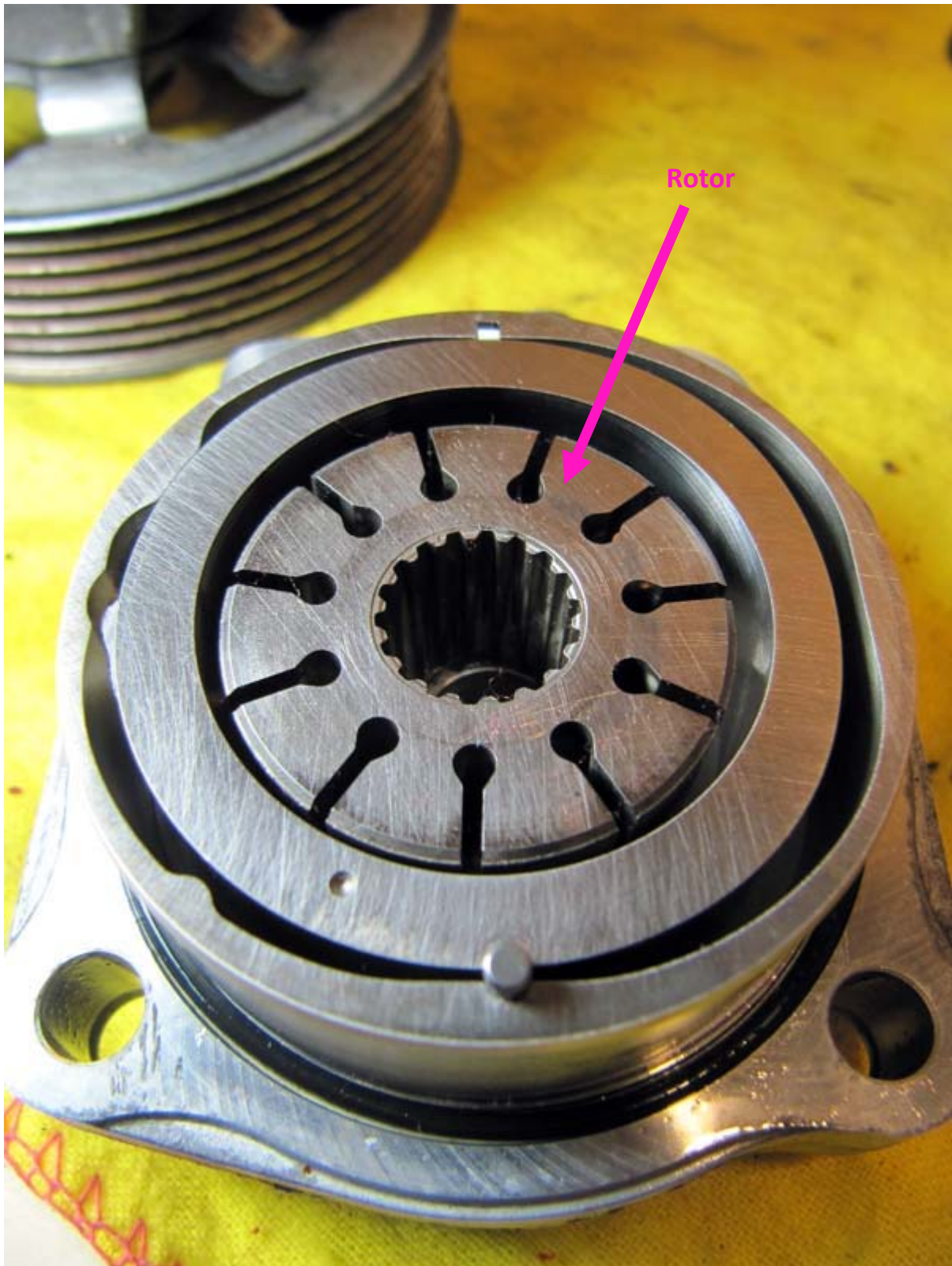
*#37 – Insert the Roll Pin as shown. This will apply pressure on the Seals and hold them in place.*



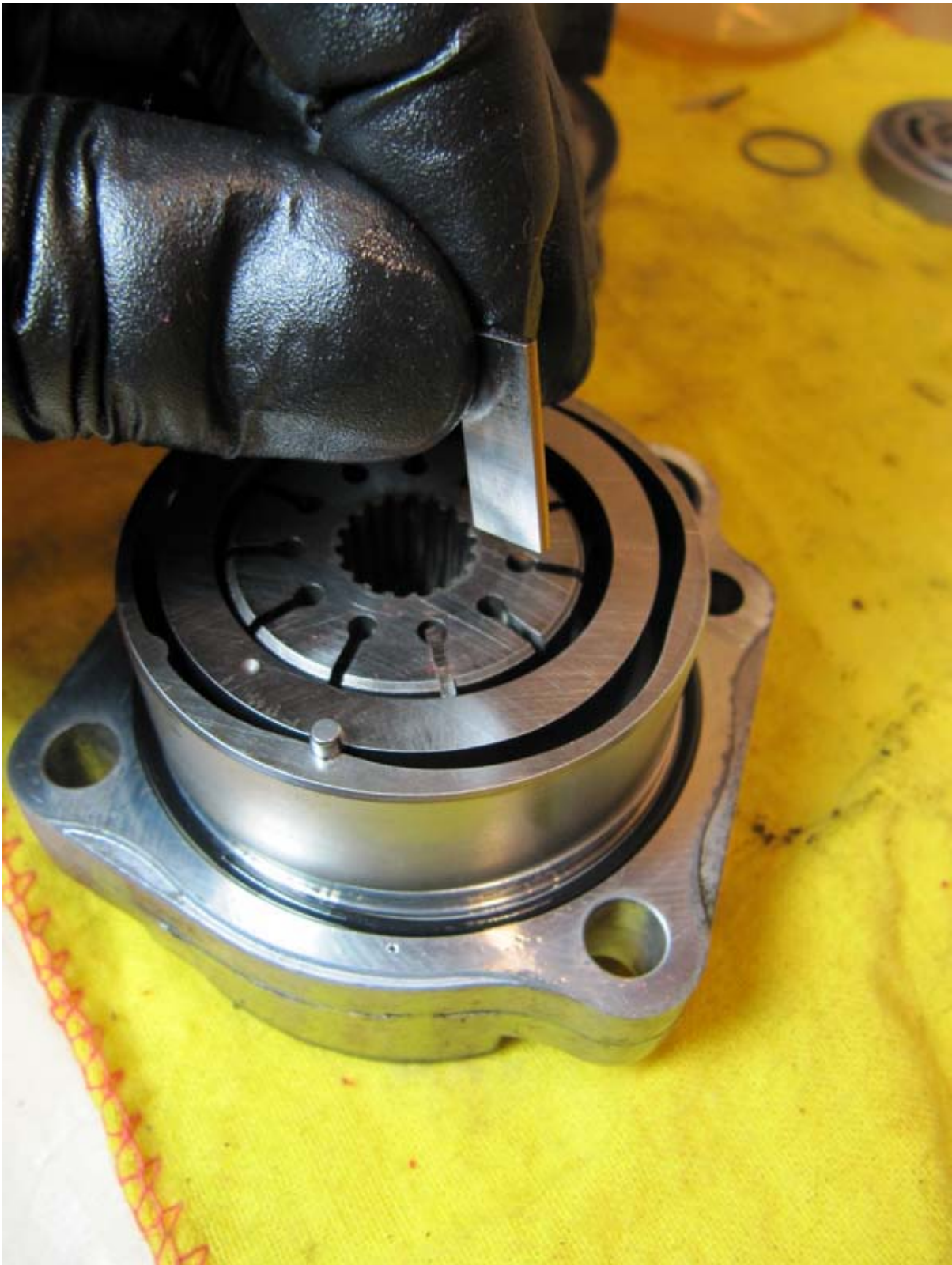
*Push down on the roll pin and slide the Outer Case/Cam Ring assembly around until the Roll Pin fits into the hole in the Pump Cover (it might not be lined up perfectly to begin with so you might need to wiggle it around a bit). When the Roll Pin is fully inserted, it should stick up only about 1/8" as shown below.*



#38 – Insert the Rotor (just place it in there, since there is nothing to hold it in place yet!).

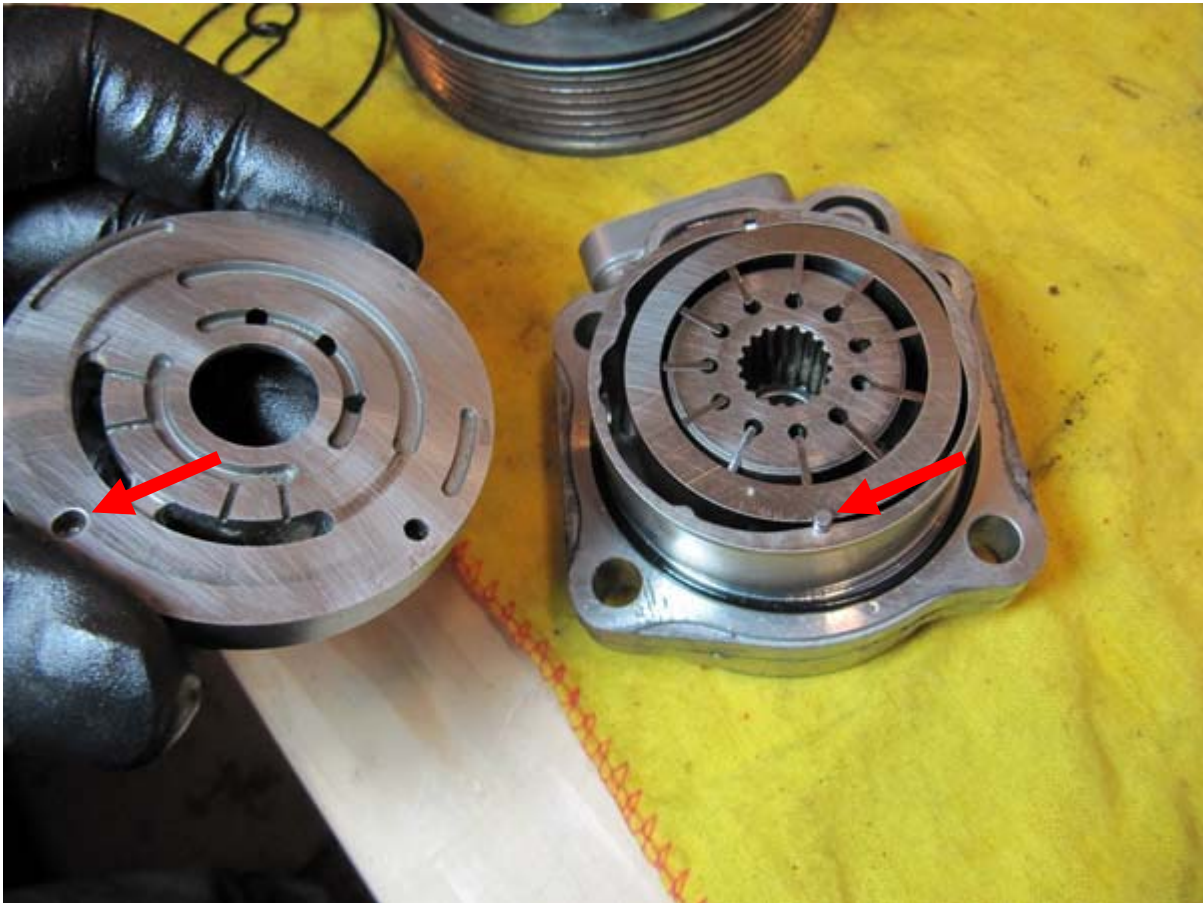


*#39 – Insert the Vanes into the Rotor with the rounded edge facing outward (or just put them in the same orientation as they were when you took them out).*





*#40 – Now, put the Side Plate on, lining up the Roll Pin with the hole in the Side Plate.*



#41 – Notice that there are two holes in the Side Plate. The Roll Pin should align with the one shown by the red arrow below (it is slightly elongated). The other hole is a duct and goes completely through the Side Plate.



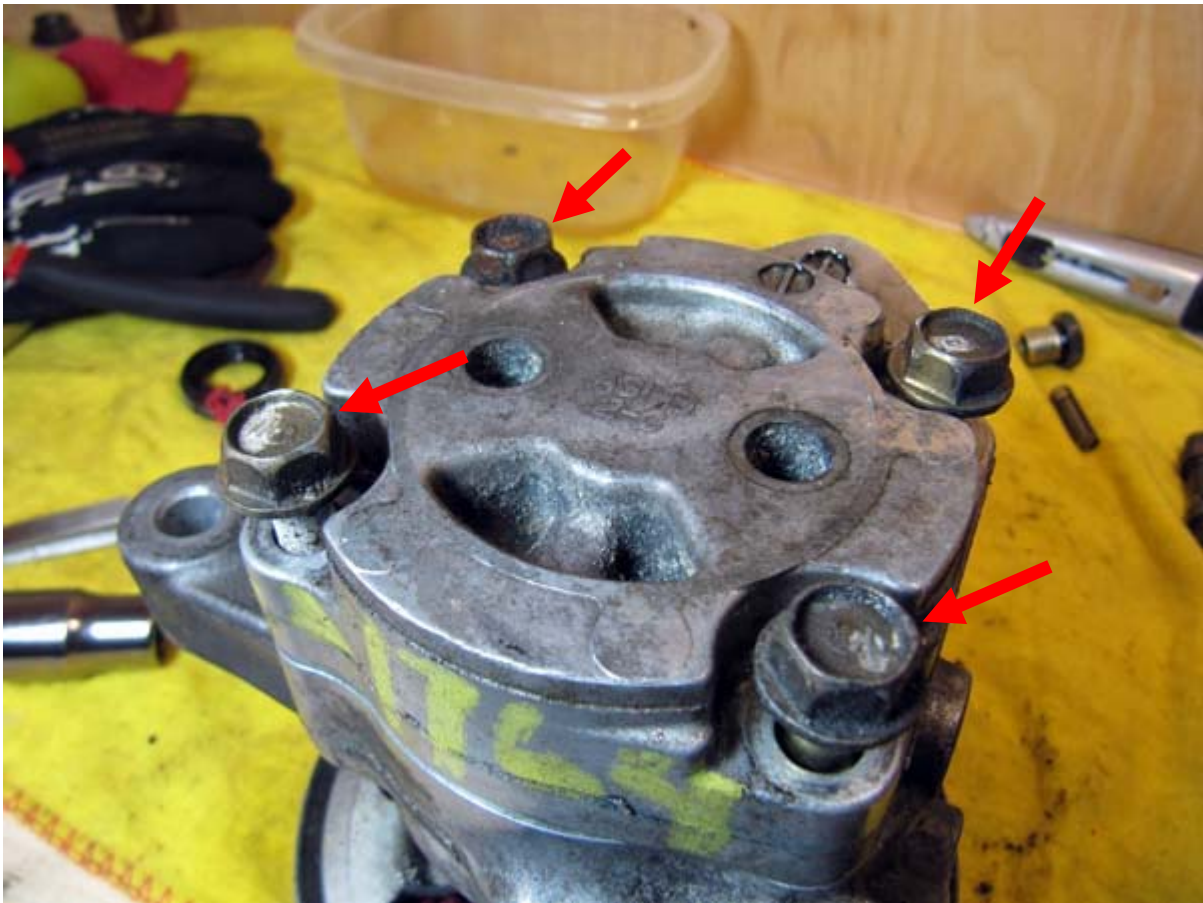
#42 – Replace the O-Ring on the Side Plate (shown by red arrow). Lubricate it with PS fluid.



*#43 – Place the front housing on the rear assembly. It takes a little finessing to mate the two pieces together. As you insert the drive shaft you might need to rotate the drive shaft slightly from the top to get the splines to line up allowing the drive shaft and go through the rotor.*



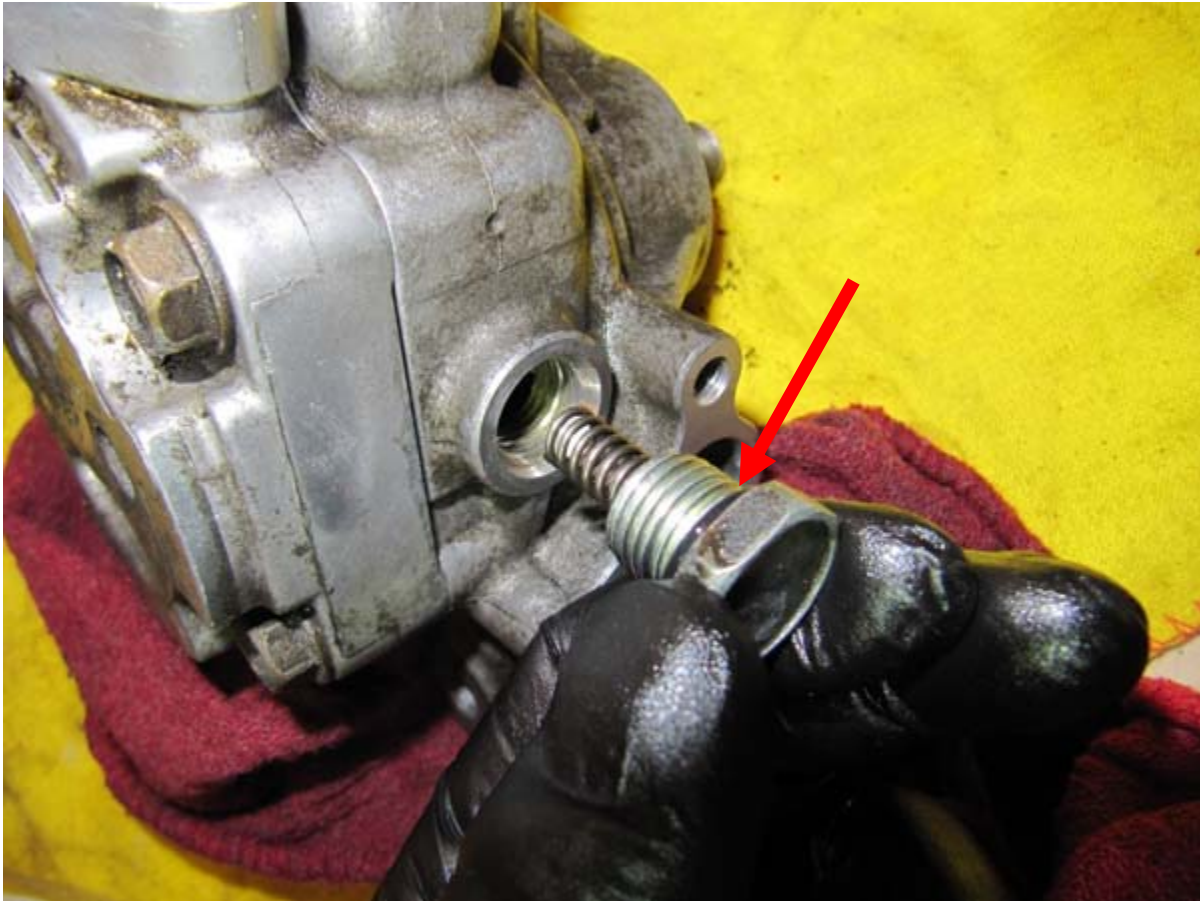
#44 – Once the housing is together, insert the four bolts in the rear pump cover and tighten in a criss-crossing pattern. Then, torque to 14 ft-lb.



*#45 – Per the service manual, insert a flat tipped screwdriver through the Pump Housing Cap and push to make sure the Cam Ring is positioned against the opposite side of the Outer Case.*



#46 – Put a new O-Ring on the Pump Housing Cap (red arrow). Lubricate with PS fluid. Insert the Cap and preload spring and tighten down to 22 ft-lb.

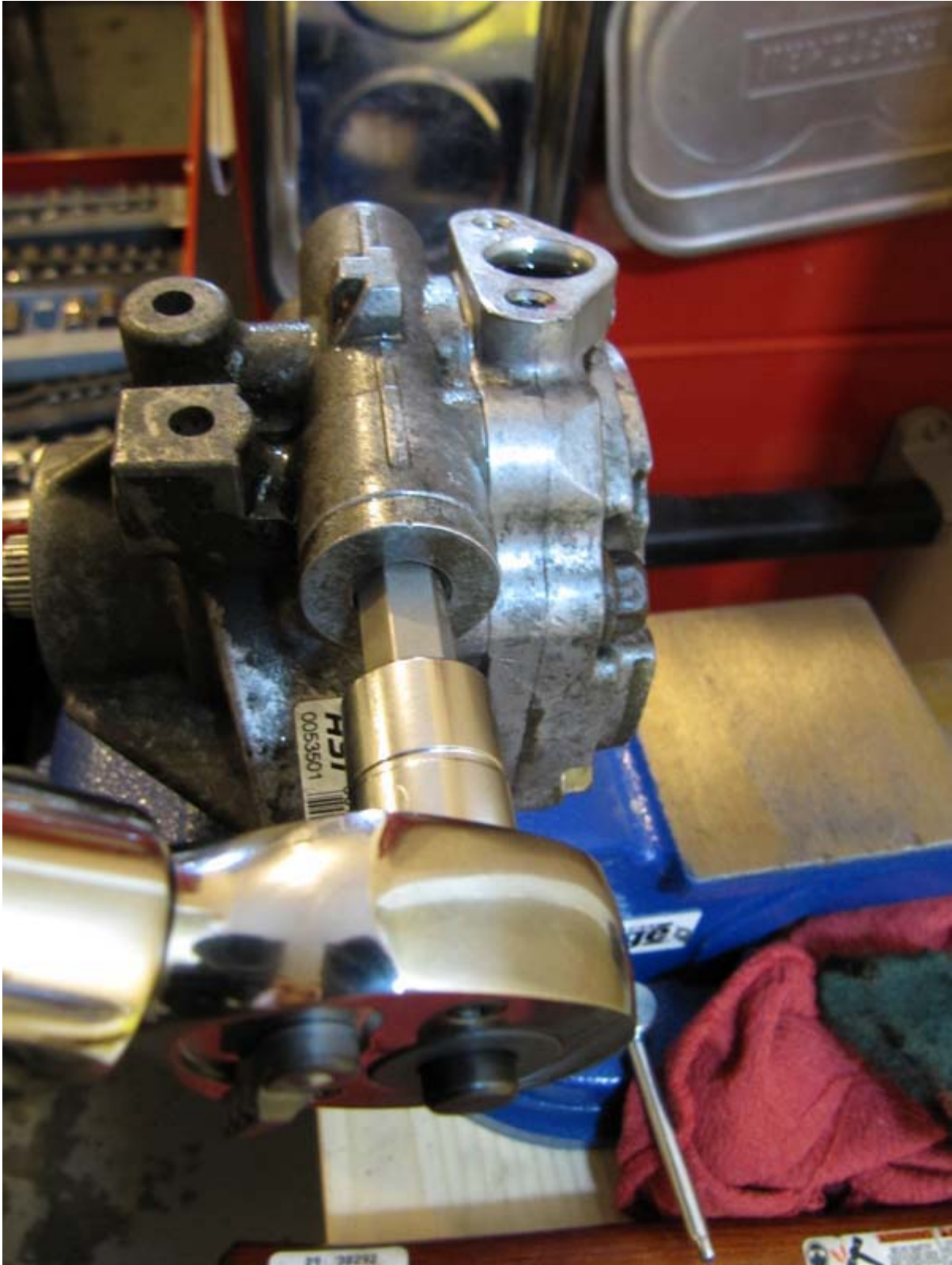


#47 – Insert the Pressure Control Valve Spring, Pressure Control Valve and Cap (with new O-Ring as shown by red arrow). Dip the Pressure Control Valve in PS fluid before inserting it (per service manual).





#48 - Torque down the Pressure Control Valve to 36 ft-lb.



*#49 – Put a new O-Ring in the outlet port.*



*#50 – Put on the Pulley and Pulley Nut. Torque to 47 ft-lb. And you're done!!!*

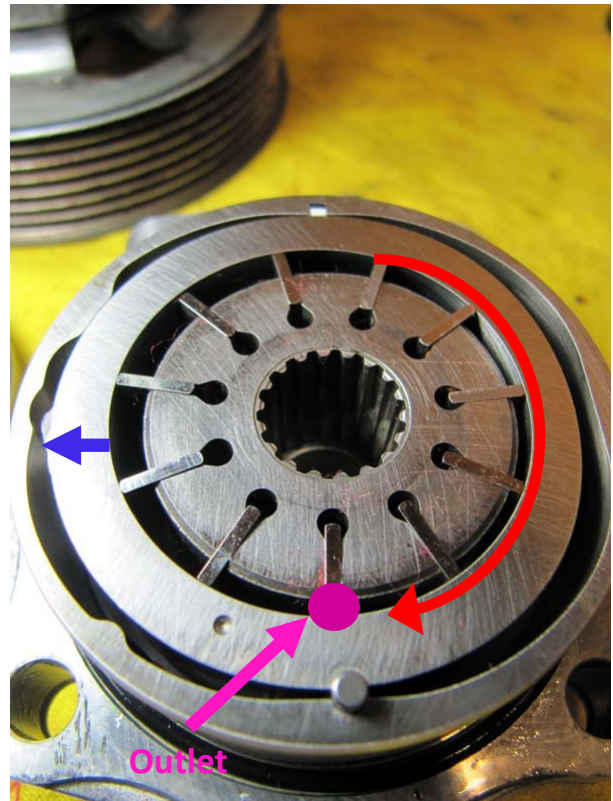
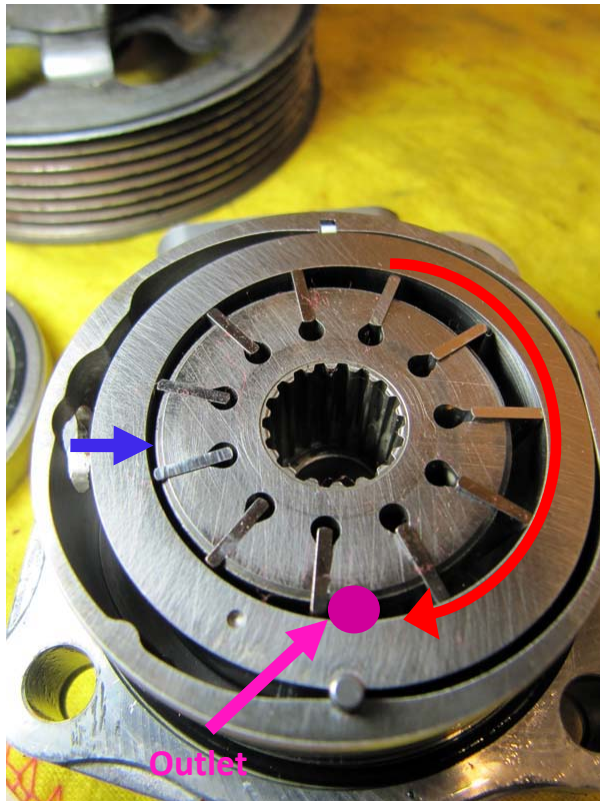


*Disclaimer: This is how I think the pump works based on my reading, but I could be entirely wrong!*

*I was curious why the whole Cam Ring had to be able to swing back and forth (thereby requiring the Sleeper Seal) in this pump design. It turns out that this pump is a variable displacement vane pump. The Cam Ring slides back and forth to change the volume (displacement) of the vane cavities and therefore control the pump pressure. Many power steering pumps do not function this way. Instead, the pump just runs full out (fixed displacement) and if the pressure is too high it is simply bypassed back to the pump input by the pressure control valve. In this Honda pump, it appears that when the pressure gets too high, the pumping capacity itself is reduced rather than simply bypassing the pump. This is achieved by the moving cam ring which reduces the pump's displacement.*

*1. Full Capacity Pumping – In this case, the cam ring is pushed by the spring all the way to the right (blue arrow) which results in large volume vane cavities on the right. As the power steering fluid is pushed by the vanes in the direction of the red arrow, the volume of each vane cavity decreases. This increases the pressure at the outlet under the rotor.*

*2. Reduced Capacity Pumping – If the outlet pressure gets too high, the PS fluid pressure pushes the Cam ring to the left (blue arrow). This reduces the volume of the vane cavities on the right and reduces output pressure. When the output pressure drops then the Cam Ring returns to the higher displacement location (left).*



*Notice also that the PS fluid comes up through the holes in the rotor and pushes against the vanes keeping them pressed against the cam ring.*

*Problems you may encounter:*

*1. The Pressure Control Cap is 10mm Hex and is quite tight. It might be hard to get out with an Allen wrench. I used a Hex socket and breaker bar.*

*2. The Pressure Control Cap and Pump Housing Cap are pretty tight to get out. If you don't have a vise handy, it may be a good idea to break these loose while the pump is still on the car (since it is hard to hold the pump while loosening these otherwise).*

*3. The seal can be pretty stuck in there. Work it out a little at a time by going around the whole circumference of the seal. Be careful not to scratch or gouge the mating surface of the seal while removing it.*

*Hope you found this helpful!*

*John C.*