

## **Service Call:**

Changing Direction of Flow on a Tandem Vane Pump

## **Tools Required:**

Sturdy Vice

Permanent Marker or Paint Pen

3/8" Drive Ratchet

3/4" Socket

5/8" Socket

in. lb. Torque Wrench

ft. lb. Torque Wrench

Allen Wrench Socket Set

## **Model(s):**

Digger Derricks or Aerials Using a Tandem Vane Pump.

## **Video Tech-tip:**

A [video tech-tip](#) is available as a reference to this written procedure.

## Tech Tip Safety Rules



### **Danger**

Failure to obey the instructions and safety rules in the appropriate Operator's Manual and Service Manual for your machine will result in death or serious injury. Many of the hazards identified in the operator's manual are also safety hazards when maintenance and repair procedures are performed.

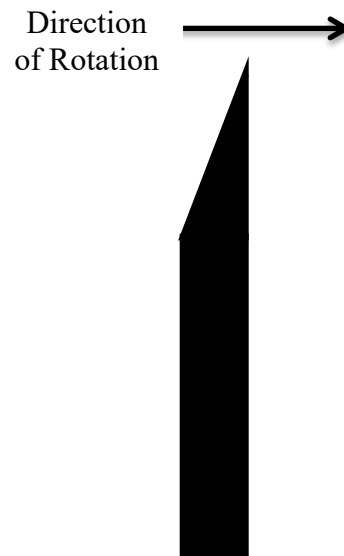
### **Do Not Perform Maintenance Unless:**

- You are trained and qualified to perform maintenance on this machine.
- You read, understand and obey:
  - manufacturer's instructions and safety rules
  - employer's safety rules and worksite regulations
  - applicable governmental regulations
- You have the appropriate tools, lifting equipment and a suitable workshop.

The information contained in this tech tip is a supplement to the service manual. Consult the appropriate service manual of your machine for safety rules and hazards.

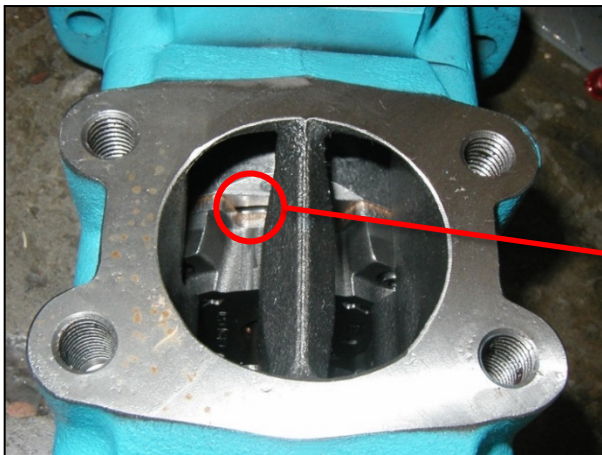
## Step 1

Identify pump direction of rotation. The direction of rotation will be indicated by the direction the tip of the vane travels. When spinning the pump observe the direction that the vane is traveling, if the tip of the vane is not leading the direction of rotation then the rotation is opposite the direction the input is turning.



While viewing the vane cartridges through the inlet section as shown in the picture below, start by turning the pump input shaft clockwise as viewed from the input of the pump.

- If the leading edge of the vane is traveling the same direction of rotation, then the pump is a clockwise rotation pump.
- If the leading edge of the vane is traveling the opposite direction of rotation, then the pump is a counterclockwise rotation pump.
- If a replacement pump is being installed verify that both pumps rotation direction matches. If not skip to Step 3 to change the direction of rotation.



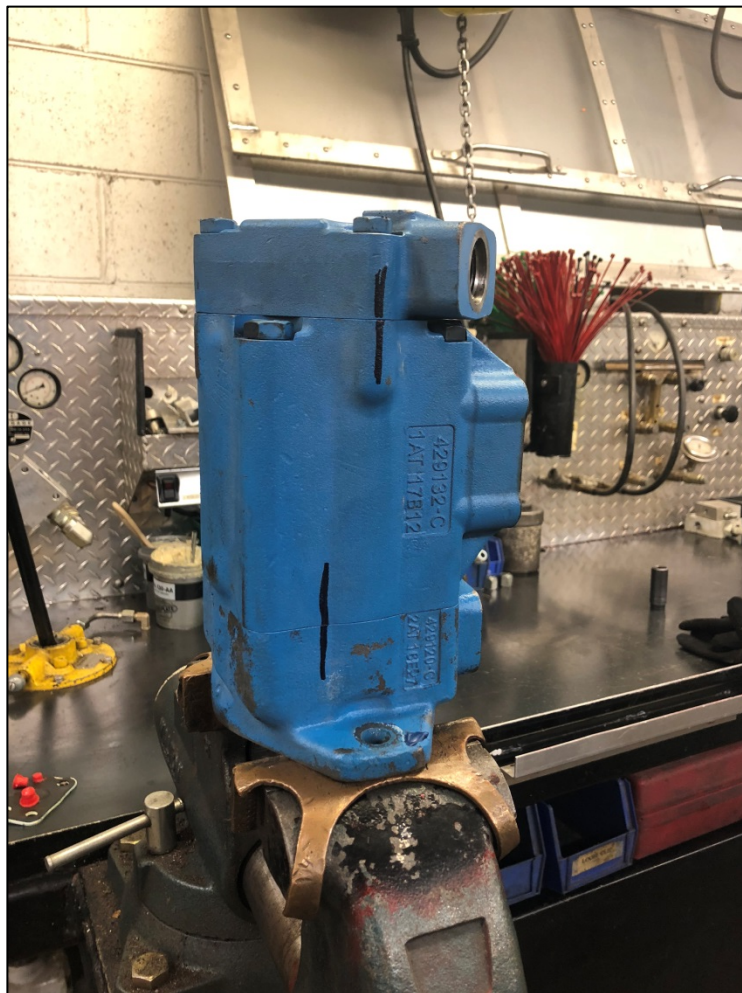
## Step 2

Identify the direction of rotation that the pump should turn based on the transmission and PTO that the truck is equipped with. Consult the PTO manufacturers application information for direction of PTO rotation.

- If the PTO manufacturer lists Crankshaft (Crnk) or Engine (Eng) rotation for the PTO output, then the direction of rotation for the pump as viewed from the input shaft would be clockwise.
- If the PTO manufacturer lists Opposite (OPP) rotation for the PTO output, then the direction of rotation for the pump as viewed from the input shaft would be counterclockwise.

## Step 3

Clamp the pump in a sturdy vice and mark the orientation of the inlet and outlet sections with a marker. If replacing a currently installed pump, the inlet and outlet orientation will need to be set when the pump is re-assembled.





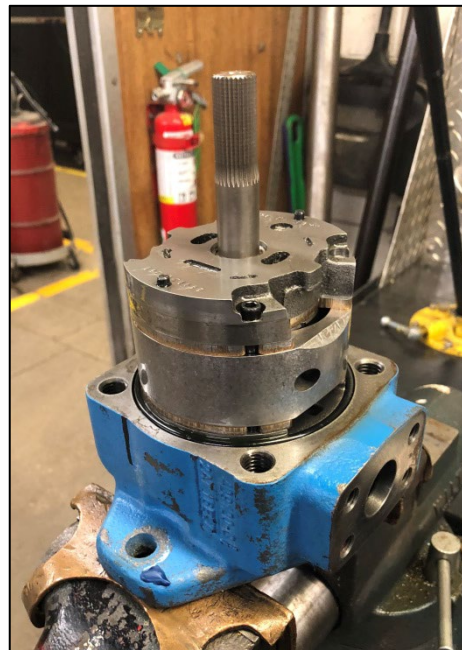
## Step 4

Remove end cover bolts, end cover and pump cartridge from the housing. Place square seal and O-ring aside for reassembly.



## Step 5

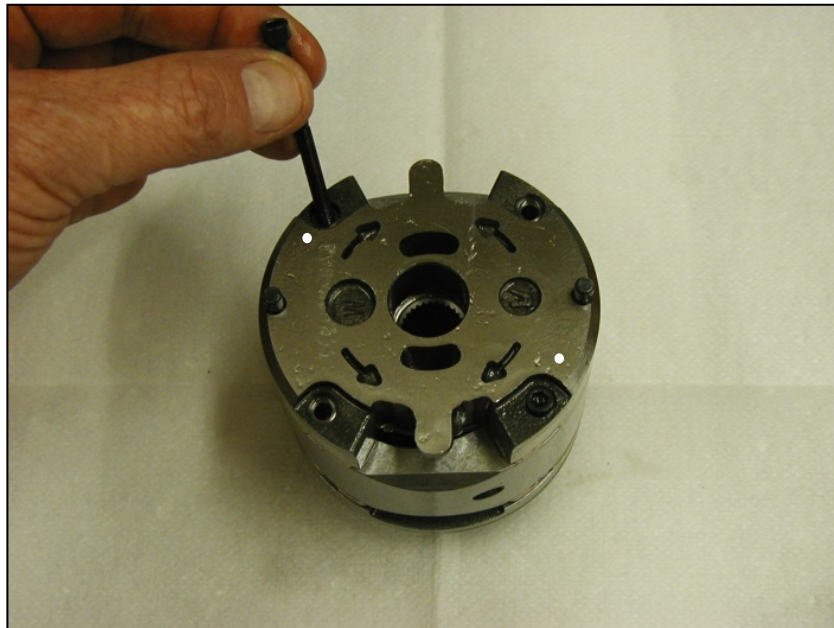
Remove the four bolts from the inlet body. Separate the inlet housing from the outlet body, leaving the seals in the outlet body. Remove the shaft end cartridge and leave the seals in the outlet body.





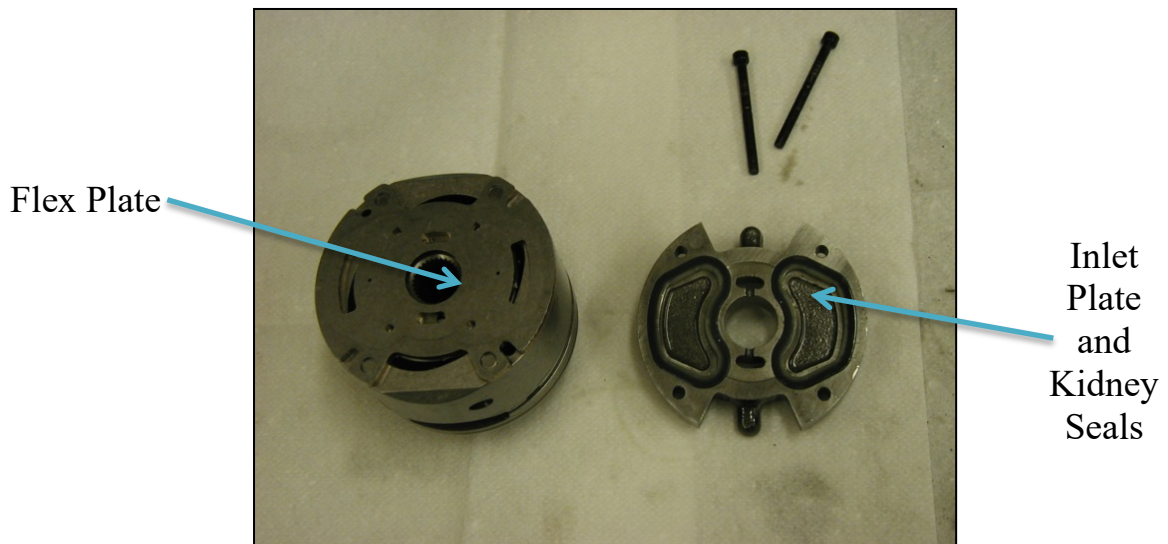
## Step 6

To reverse the direction of flow on the cartridge, place the outlet end of the cartridge down on a clean work surface. Identify and mark screw locations before disassembly. Remove the Allen screws that hold the cartridge together.



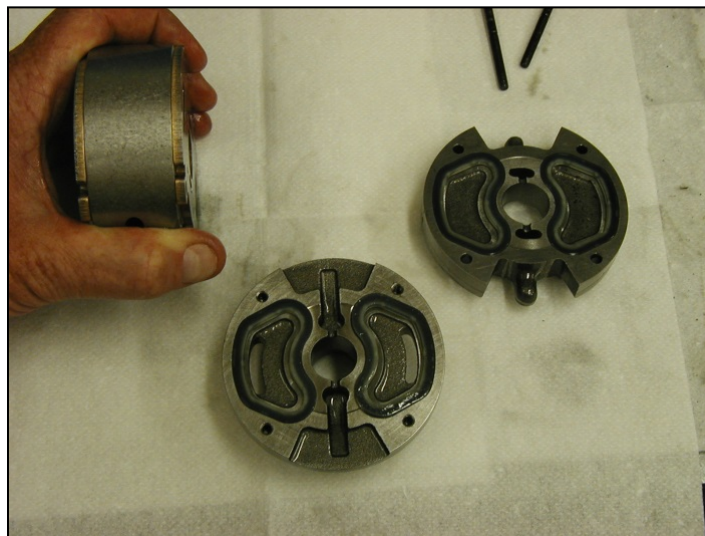
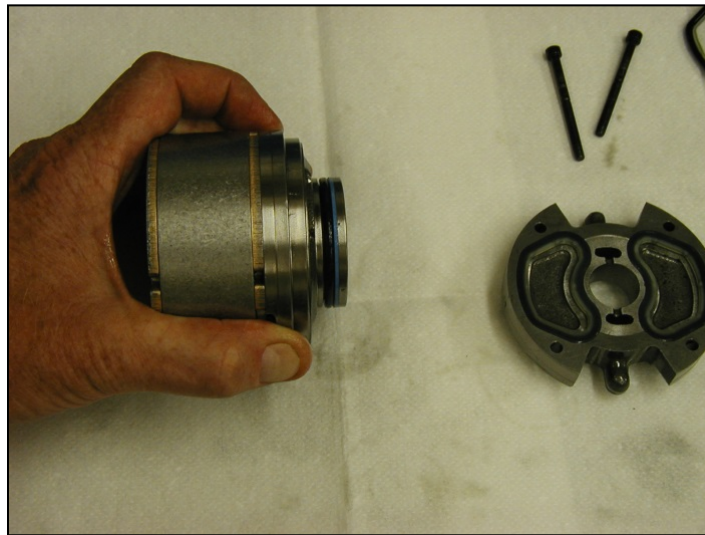
## Step 7

Slide the inlet support plate off and verify that the kidney seals are kept in place on the inlet plate. The flex plate must remain in place.



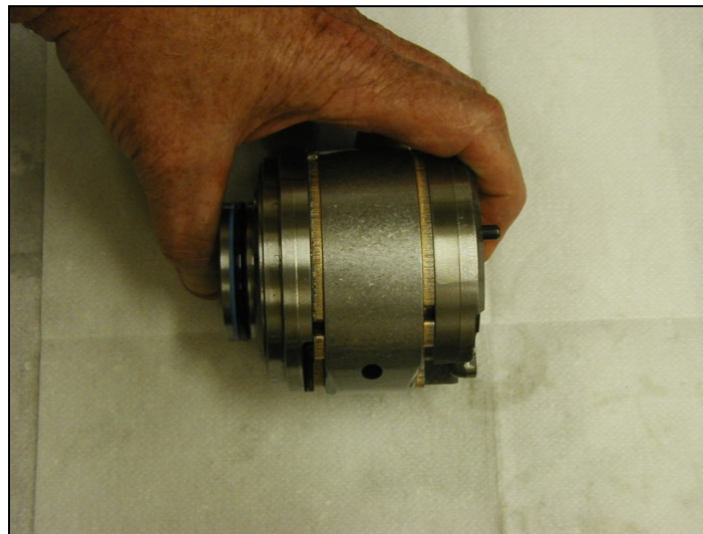
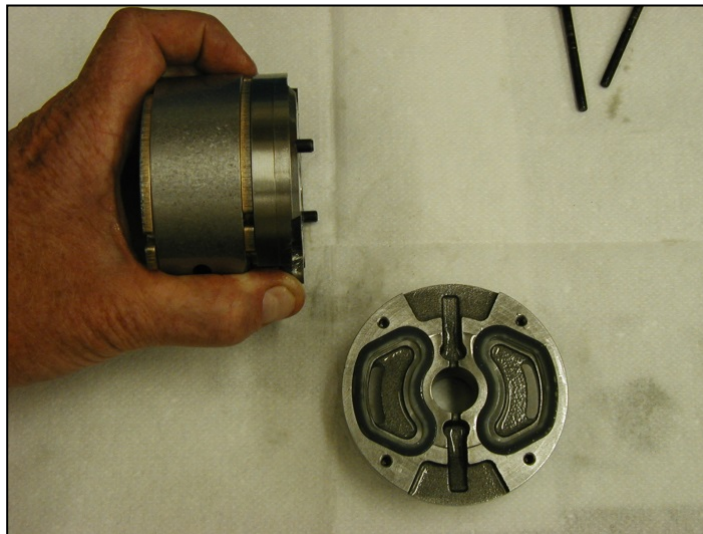
## Step 8

Turn the cartridge on its side and maintain orientation of all pieces. Slide the outlet support plate off and verify that the kidney seals are kept in place on the outlet plate. The flex plate must remain in place as the support plate is slid off.



## Step 9

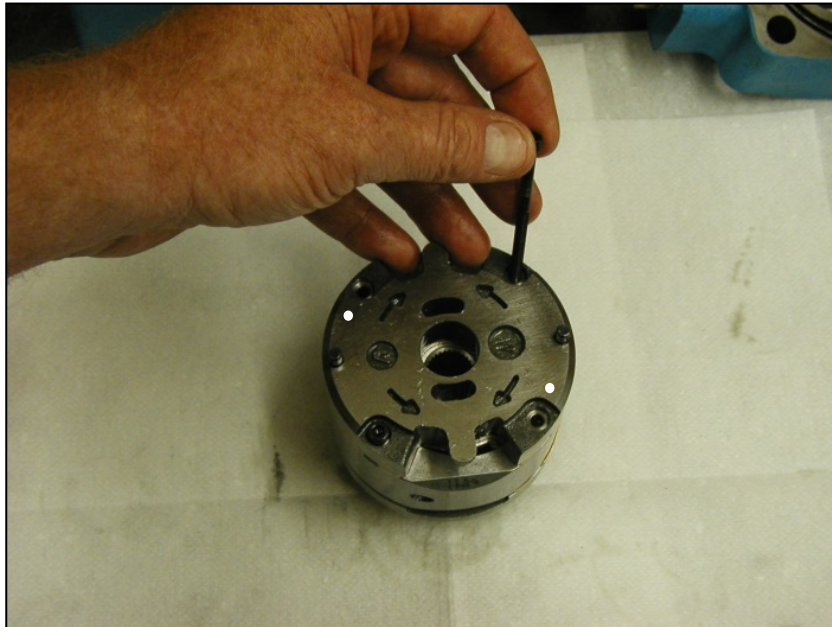
Install the inlet and outlet support plates on the opposite side of where they were originally installed. Verify kidney seals are kept in place on both support plates.





## Step 10

Turn cartridge so it is standing on the outlet support plate. Install screws making sure components remain aligned, do not tighten the screws. If the cartridge has been assembled correctly the screws will be installed in the holes not marked during disassembly.

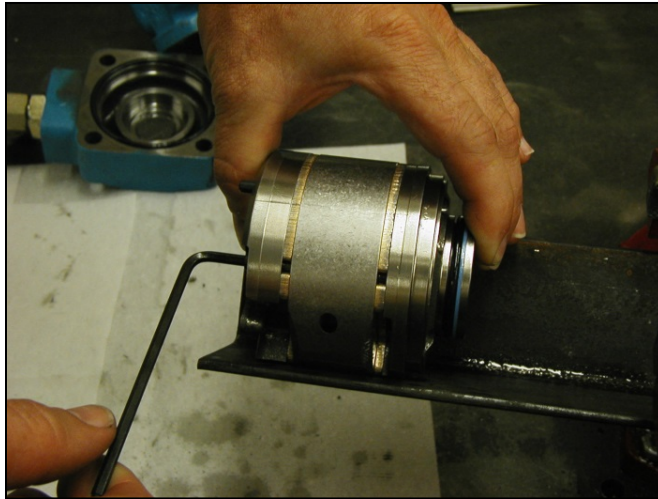




## Step 11

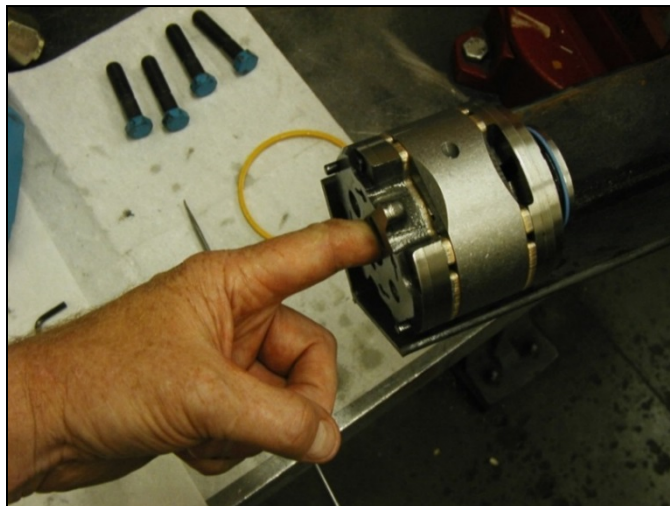
Place cartridge in “V” block to align plates and torque to spec.

- Torque large section to 50 in. lb.
- Torque small section to 35 in. lb.



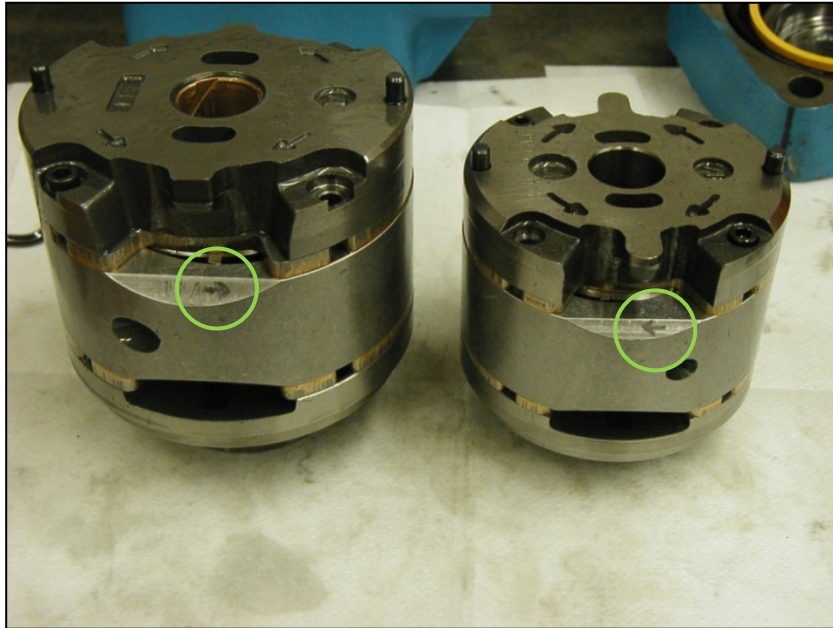
## Step 12

After tightening screws, make sure the rotor turns freely.



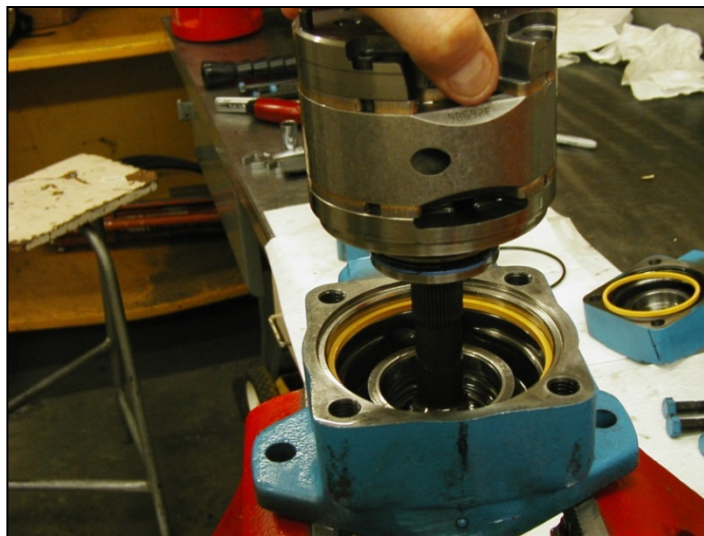
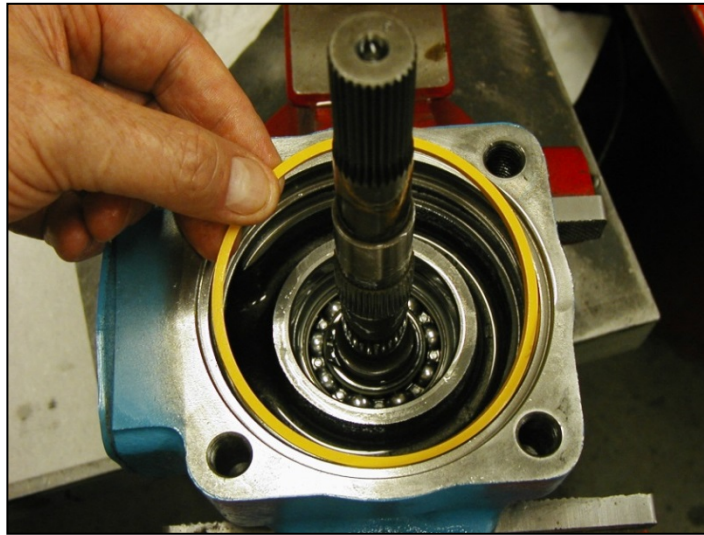
## Step 13

Repeat Steps 6-12 for the other cartridge. On a tandem vane pump the arrows on the rings should be opposite when the pump cartridges are set next to each other on the bench. This is due to the inlet support plates facing each other when the pump is assembled. The notches and cutouts on the cartridges should also be aligned.



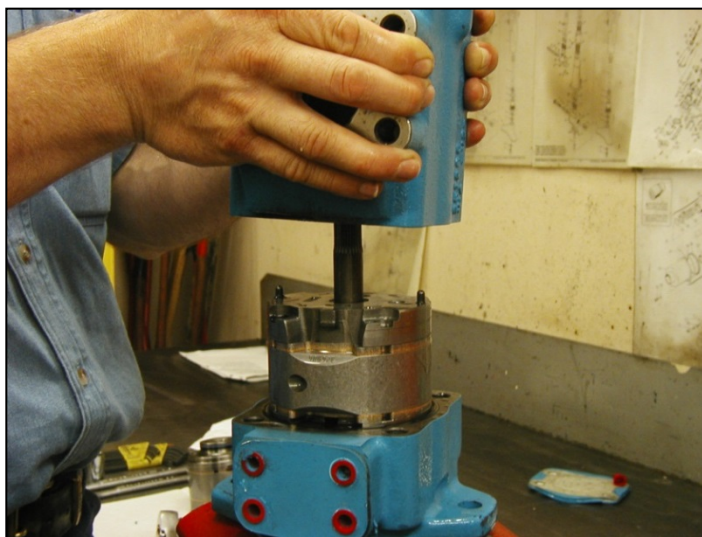
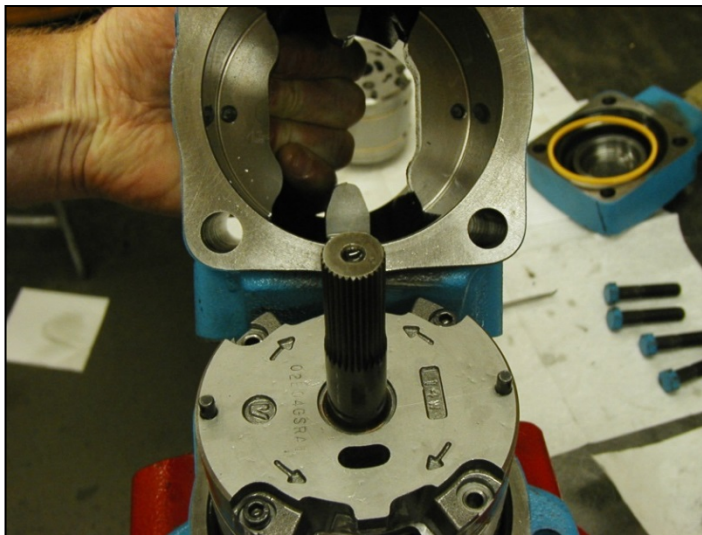
## Step 14

To reassemble the pump, verify that the square cut seal is placed down on the outlet body and remove the O-ring from the outlet body seal surface. Slide the pump cartridge over the shaft and seat down into the outlet body.



## Step 15

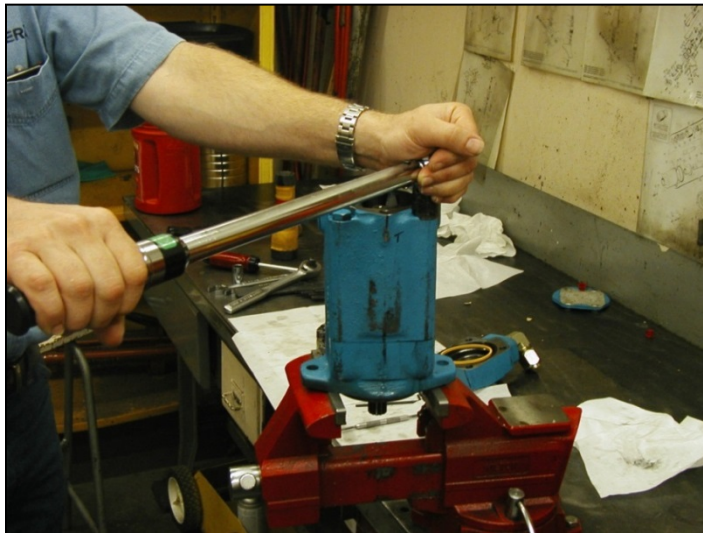
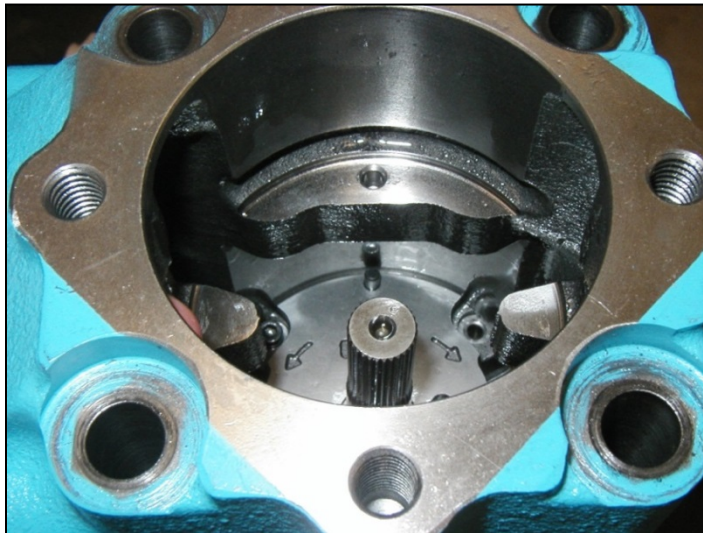
Install O-ring over the pump cartridge and down into the groove on the outlet body. Slide inlet housing over cartridge and make sure dowel pins on the cartridge and housing line up.





## Step 16

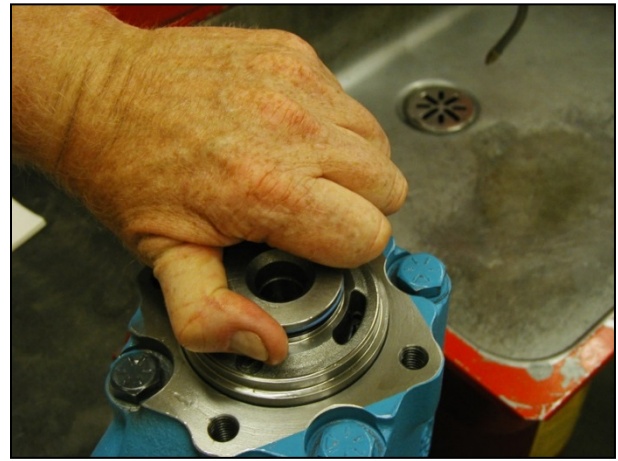
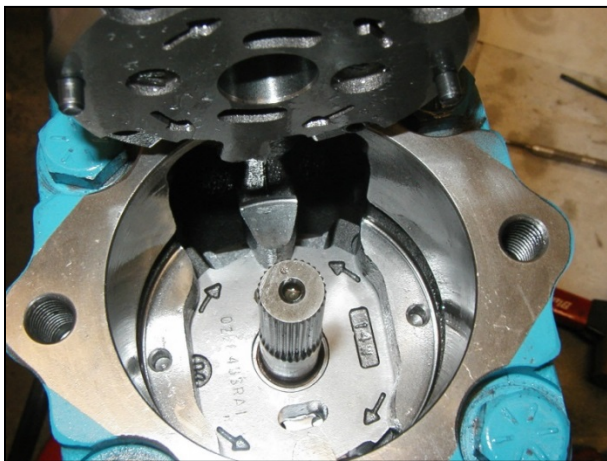
When installing housing pay attention to location of pins, alignment holes, and punch marks, they must all line up. Lube and install bolts and torque to 75 ft. lb. After torqueing, turn the shaft to make sure there is no binding of the pump.





## Step 17

Slide cartridge into housing making sure that the pins line up when installing. Turn the shaft to make sure there is no binding of the pump. Install square seal ring and outlet cover O-ring



## Step 18

Carefully install outlet cover and match up alignment marks. Lube bolts and torque to 50 ft. lb. After torque, turn shaft to make sure there is no binding of the pump.



## Step 19

Follow Step 1 to re-check the direction of rotation to verify that it is correct.