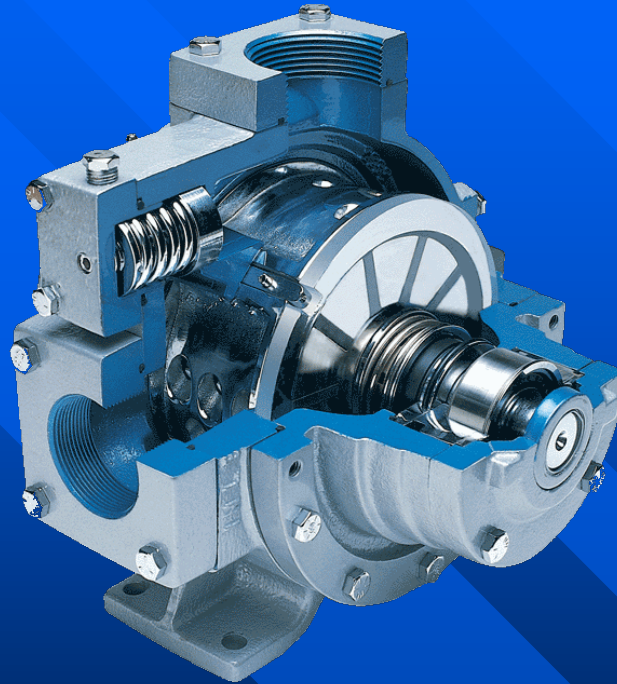


Coro-Vane Maintenance and Disassembly



CoroVane Pumps

Pumps all have discharge and suction pressure openings.



The following slides depict a 1021, but all standard pumps are repaired the same.

Grease fittings

Grease fittings are on both sides of the pump. Typical pump should be lubricated every 1 – 3 months depending on service



Lubricate the bearings only until the relief fitting pin moves.
Do not over-grease!

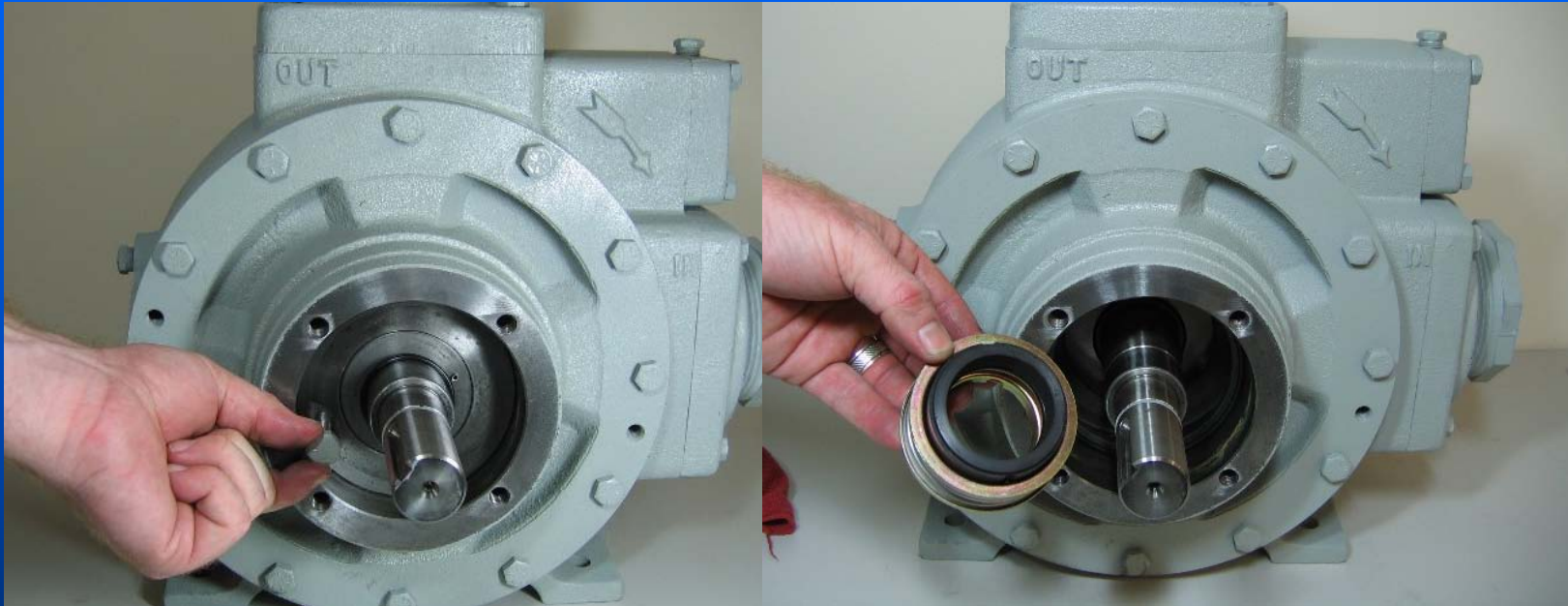
A seal vent is located on the bottom of each head. All seals leak a small amount of vapor, this is normal. It should not leak liquid or excessive vapor.

Bearing Cap Removal



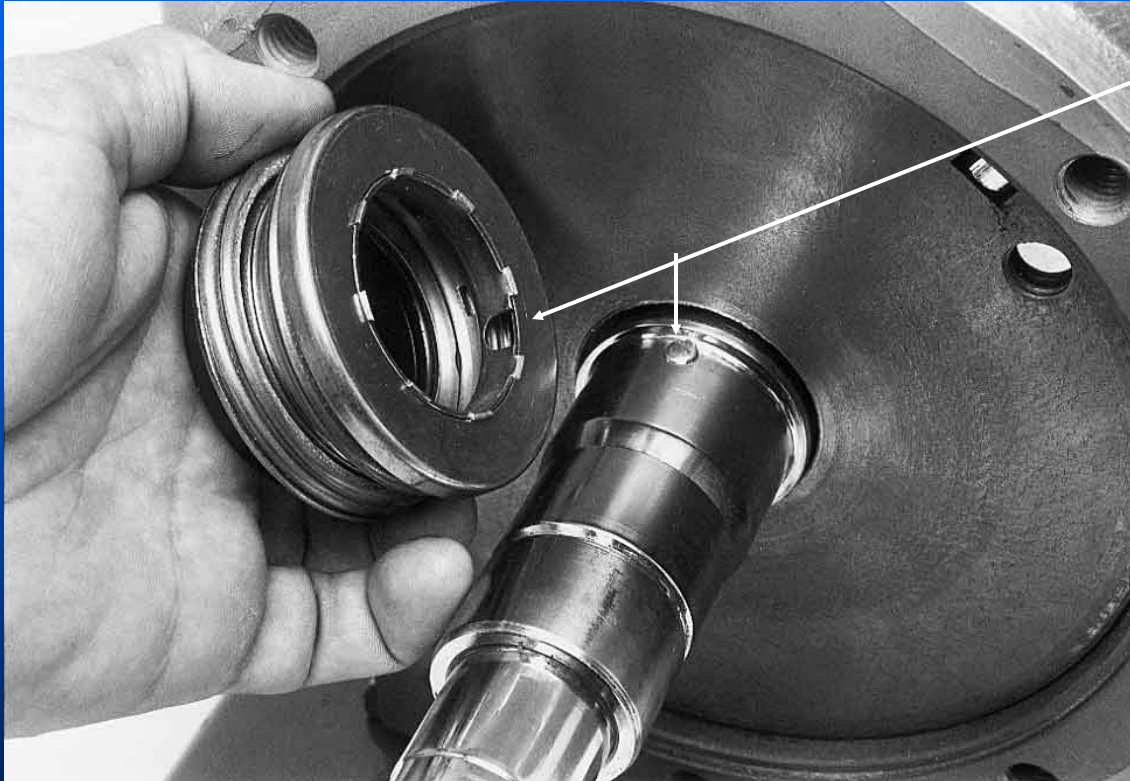
Before any repairs, confirm all pressure has been relieved. Remove the bearing cap bolts and bearing cap. The grease should be cleaned from the bearing cap and the grease seal removed and replaced. The bearing housing may be removed with one or two screwdrivers using the groove on the diameter of the housing to pry out the housing. If the housing is difficult to remove the head may be removed and using a rubber hammer or piece of wood, drive the housing out from the back.

Seal Removal



The inside of the head and the shaft should be cleaned before installing a new seal. The seal may be lubricated with a light oil or spray lubricant during assembly. Seals are precision parts and care must be taken during handling. **KEEP HANDS CLEAN!**

Seal Spring Alignment



The seal spring has a notch that must align with the pin on the shaft. It is best to install the spring first, then install the carbon and O-ring.

The seal may be lubricated with light oil or a spray lubricant. Seal are precision parts. Care should be taken handling the seal faces.

KEEP HANDS CLEAN!

Seal Installation

Seals are a precision machined part and care should be taken to maintain the surfaces clean. Light oil or spray lubricant may be applied to the surfaces.



Clean the shaft surface where the O-ring seals prior to installing the spring. When installing the seal it is easier to install the spring retainer first, watching the seal pin alignment.

After the spring retainer is installed the carbon can be inserted into the spring, watching that the notches on the O.D. of the carbon align to the tabs on the retainer.

Installing Bearing Housing



Install the seat in the seat adapter and carefully install the assembly over the shaft. Take care not to hit the seat against the shaft. Using a spray lubricant to rinse the faces will assure the surfaces are clean.

When installing the bearing housing watch the pin to notch alignment. Install the grease O-ring prior to installing the housing.

If the seal pin is missed it may leave a mark on the back of the housing. This mark should be filed flat to assure proper surface contact and seat alignment



Seal Assembly



The seal assembly includes the seal parts along with the small grease seal O-ring.

<<<< This is as far as one needs to go if only changing the seal assembly! >>>>

Seal Notes

All mechanical seals have a small amount of leaking “vapor”. The seal utilizes the liquid to lubricate the seal faces, which causes a small amount of vapor leakage. This should not be “dripping liquid” or “blowing vapor”. One may note a bubble slowly growing if tested with soap. There are many possible causes of seal leaks. Typically operating “dry” or without liquid in the pump or foreign material such as rust, cause the majority of the seal leaks.

Alignment is critical. Watch both alignment pins.



Cracked seal from misalignment

This is an example of a “dry” or hot seal.



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Bearing Removal



The main bearing can be removed by removing the spiral retainer ring and pressing the bearing out. A tool such as a socket or punch may be used to drive out the bearing. Both the inner and outer bearing should be changed together. The bearings may be “pre-packed” with grease during assembly, but it is not required.

Head Removal



Remove the head bolts. There are threaded holes that may be used if needed to “push” the head off of the casing. If just changing a seal the head does not have to be removed.



The head may be removed and the O-ring area of the case and head should be cleaned before assembly.

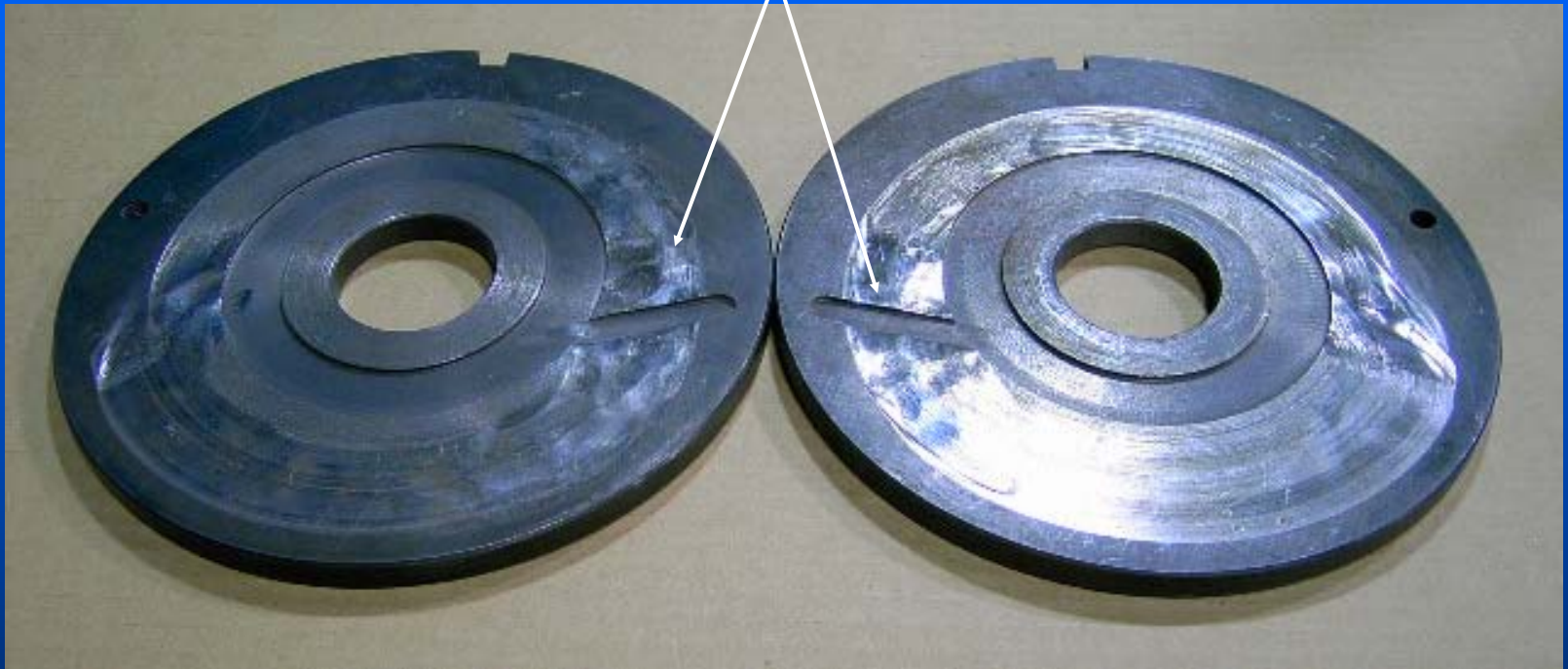
Feeder channel toward the discharge..



On the 1021 and 1521 the sideplate has a groove that must be directed toward the discharge side of the pump. If the plate is reversed it must move to the opposite side.

Sideplates

Excessive wear due to improper feeder channel position.



Scoring on sideplates may be caused by foreign materials such as rust, welding slag and other materials being pumped. Light scoring will not typically reduce pumping performance. Sideplates may be reversed or “flipped over” on all models except the F/T1521. Care should be taken to maintain the feeder channel toward the discharge side of the pump. The 1021 plates must change pump sides to be reversed.



The sideplate can now be removed using a head bolt to assist. This allows access to the inside of the pump for inspection of the blades and cam.

Standard Blades / Vanes



Standard 521/1021/F1521 pump blades are of solid design and may be reversed or flipped if any chipping or damage is noted. The blade should be changed when more of the blade is extended out of the rotor slot than is remaining in the slot. See the IOM manual for more dimensions.

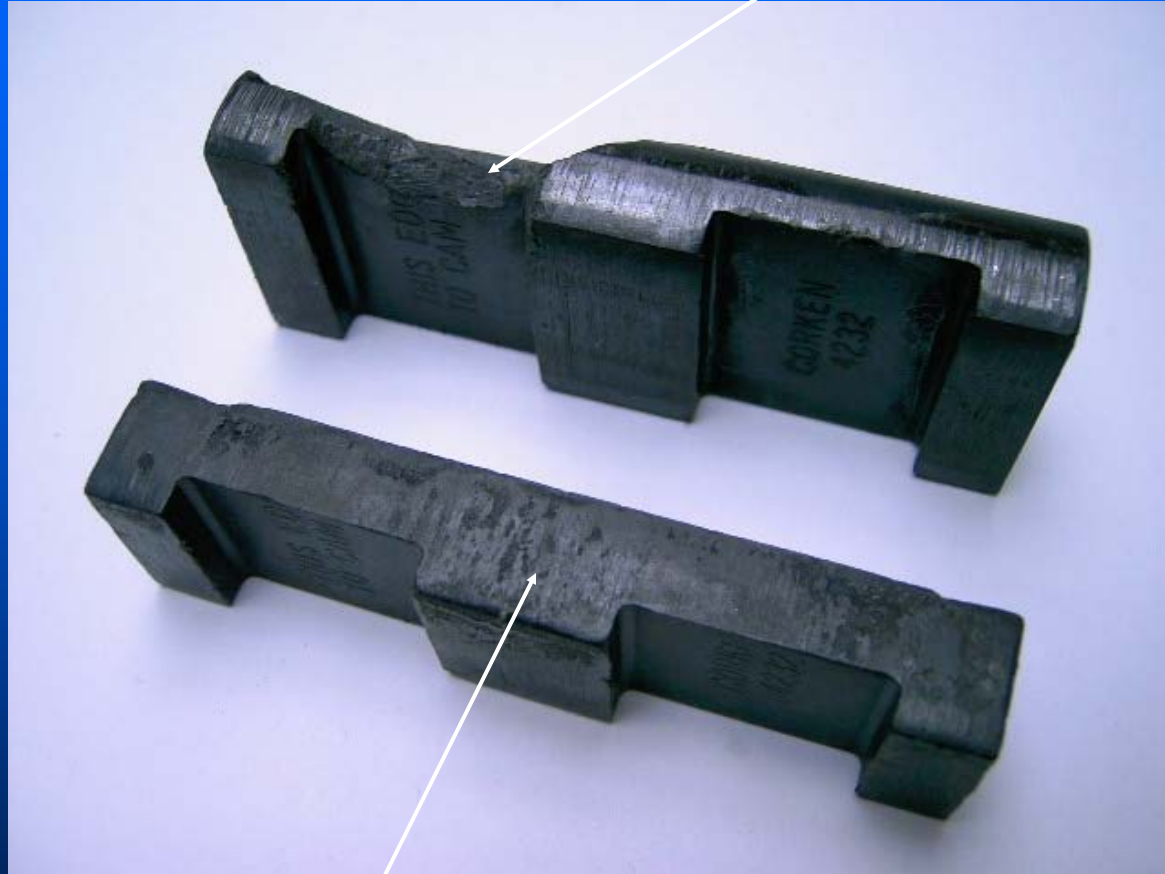
CD / CP / Z / PZ Blades



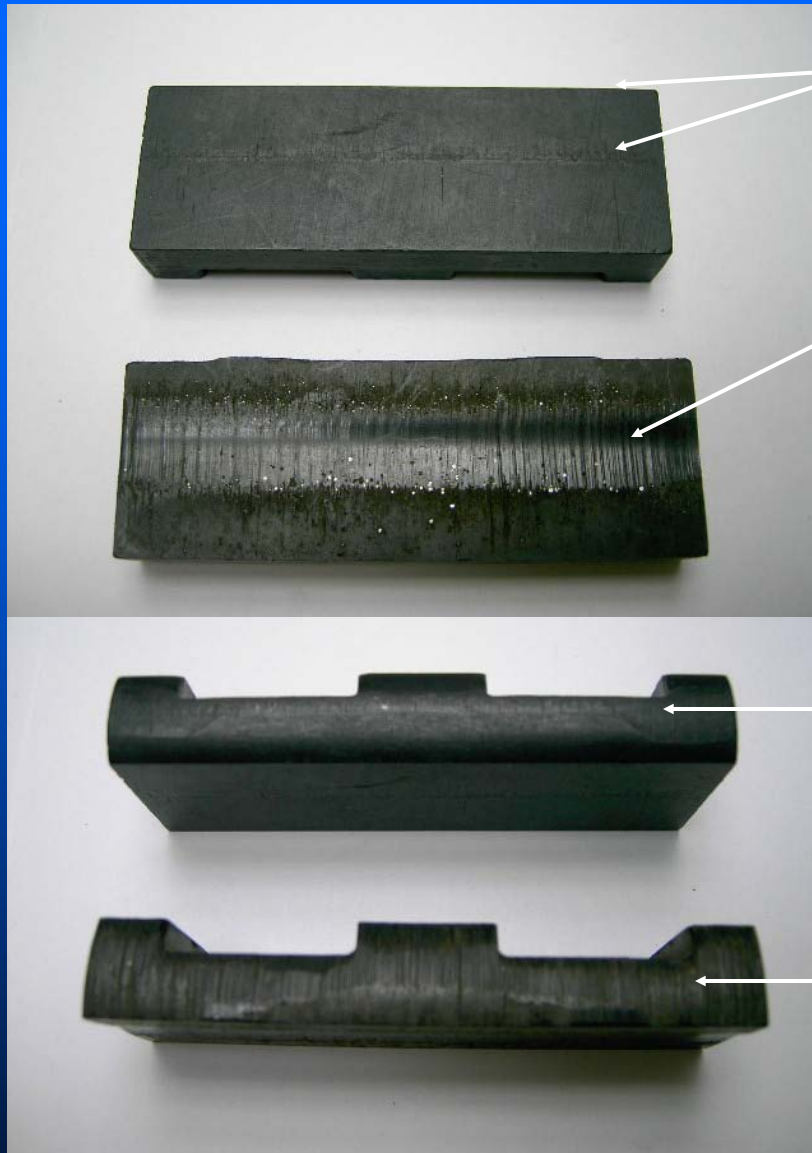
The leading edge of the blades must be toward the direction of rotation.

CD/CP/Z/PZ Blades vary in design of the leading edges and notches.

Blade damaged from foreign material



Blade damaged from "dry" running, and melted.



Blades should be inspected on both the back and the top that wears on the cam.

The higher the differential the more the "back" wear on the blade. Note the foreign material embedded in the blade. It appears to have had welding slag or other material go through the pump

Normal wear, operating with clean liquid.

Excessive wear from dry running and foreign material.

Melted blades – Dry Running



Melted blade material in cam
Inside diameter.

If a pump operates “dry” for very long it is possible to melt the blades.

Cam Removal / Installation



The cam may be removed by using a piece of hardwood and tapping around the outer edge of the casting. The cam should be inspected for wear and scoring on the inside diameter. Small scratches seldom reduce pump efficiency, but if deep grooves are present the cam should be changed. "Washboard" type wear is usually caused by cavitation and the cam should be replaced.

Cam/Liner

Cams or liners are marked for inlet and outlet or suction and discharge. They must be installed correctly or there will be a decrease in capacity and an increase in noise and wear. Typically the inlet will have more or larger openings.

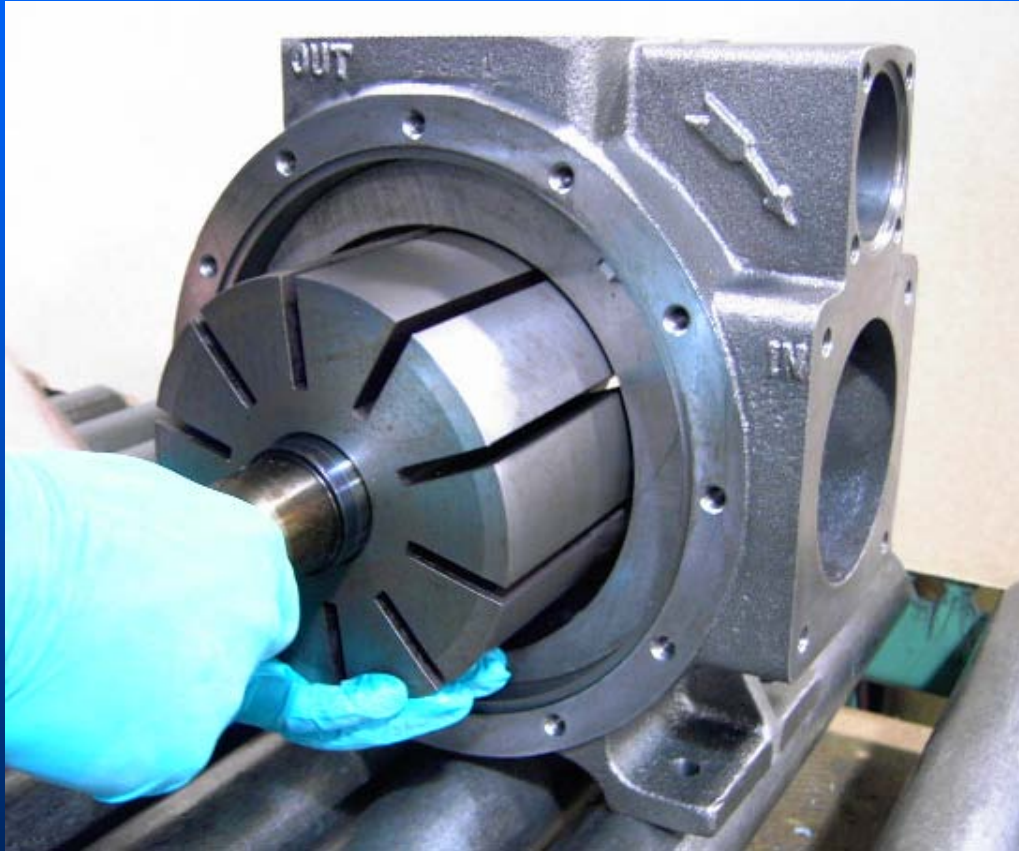


Note feeder channel marks are towards the suction side of the cam.



The above cam is severely worn due to the improper installation of the sideplates. The sideplates had been reversed, but had not changed sides placing the feeder channel towards the suction. This position maintains a low pressure behind the blades causing the blades to move back into the rotor slots instead of holding against the cam inside diameter.

Rotor Installation



To install the rotor shaft assembly, install the cam, one head and sideplate. Then insert the rotor shaft assembly into the casing taking care not to hit the shaft on the sideplate.

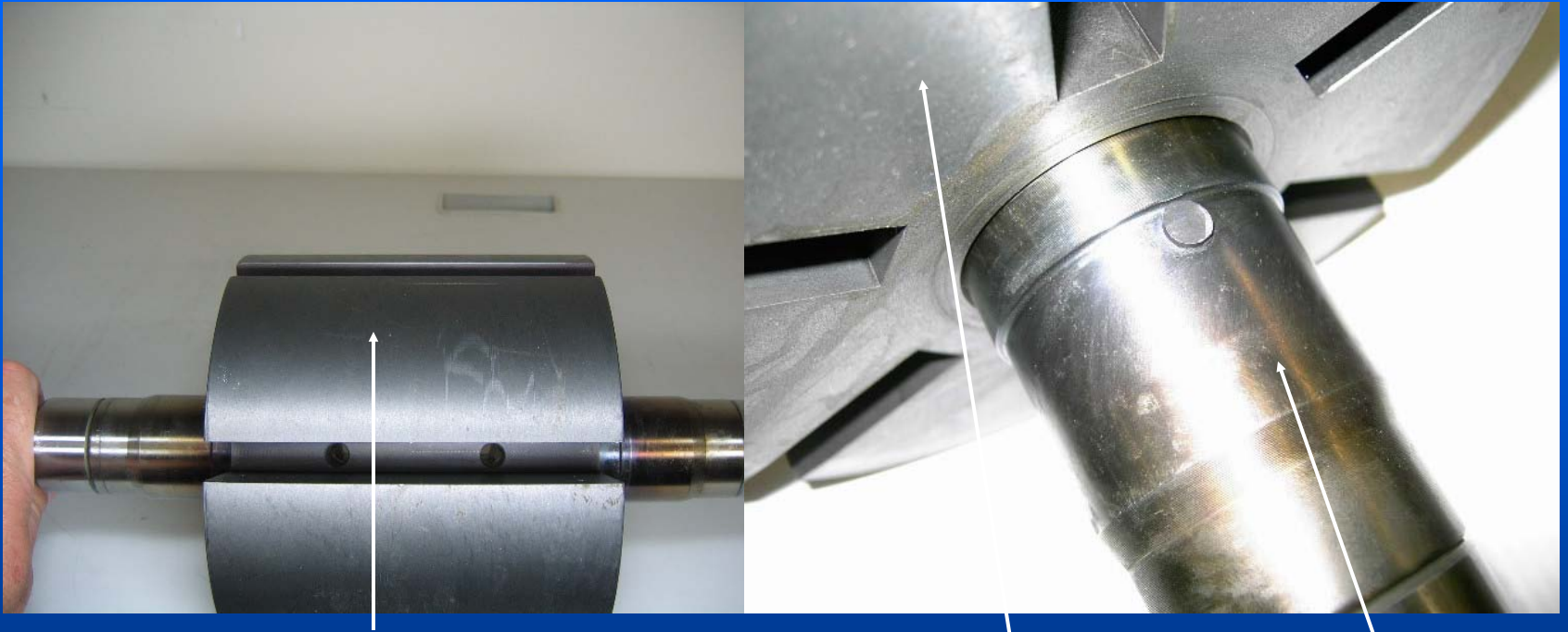
After the shaft is inserted, install the blades and sideplate before installing the second head.

Installing Rotor on CD/CP Models



Insert the lower three blades and pins and support with lower hand during installation.

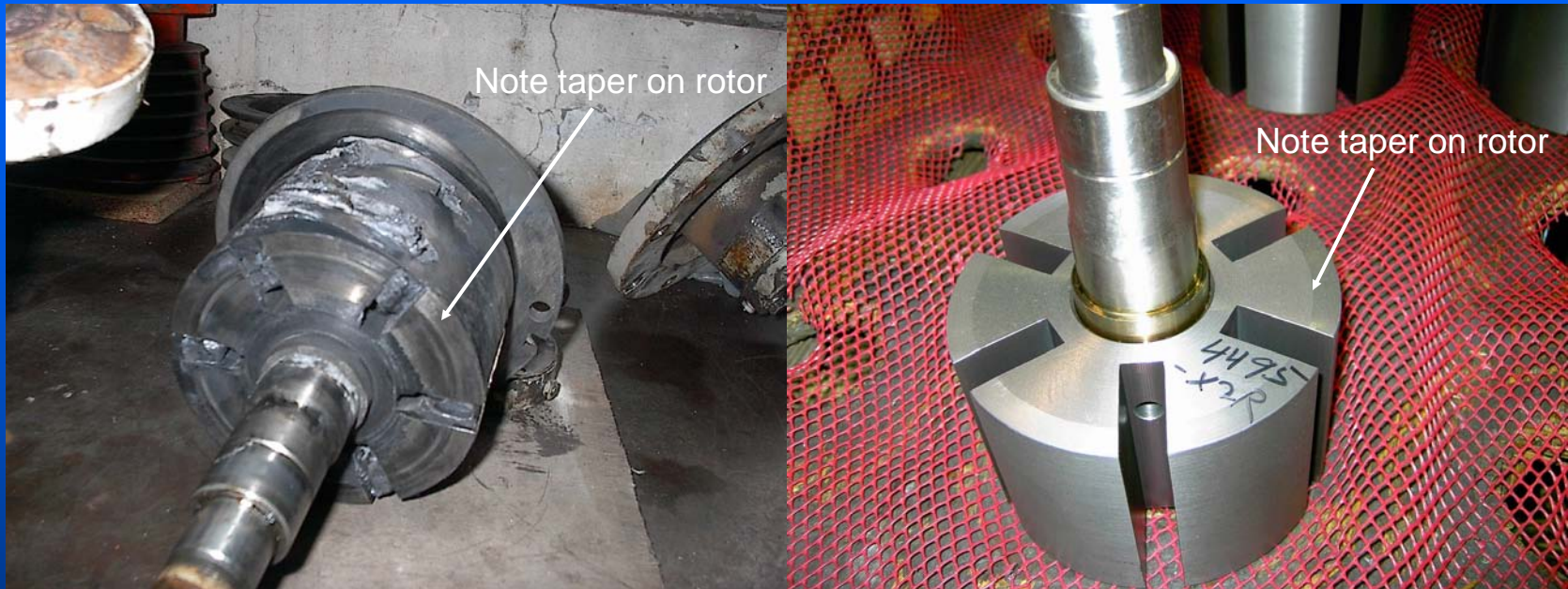
Install the opposite head with bearing and sideplate , but with out the seal. Support the rotor and shaft with one hand and guide with the other hand. Insert three blades and the pins, then with the supporting hand hold the blades and pins in position. Once shaft is installed insert the remaining blades.



Inspect rotor outside diameter for scoring and wear. Wear in this area is typically caused by foreign material such as rust welding slag, etc.

Inspect the side of the rotor and the shaft OD where the seal O-ring rests for scoring and pitting. The shaft can be polished if needed. A file should be used to remove any burrs.

Rotor Shaft



The Rotor/Shaft assembly normally does not need to be changed. It usually is only damaged if foreign material is ran through the pump or if the bearings are not maintained. The rotor has a "taper" towards the outside diameter. If the taper can still be seen, the shaft is probably re-usable.

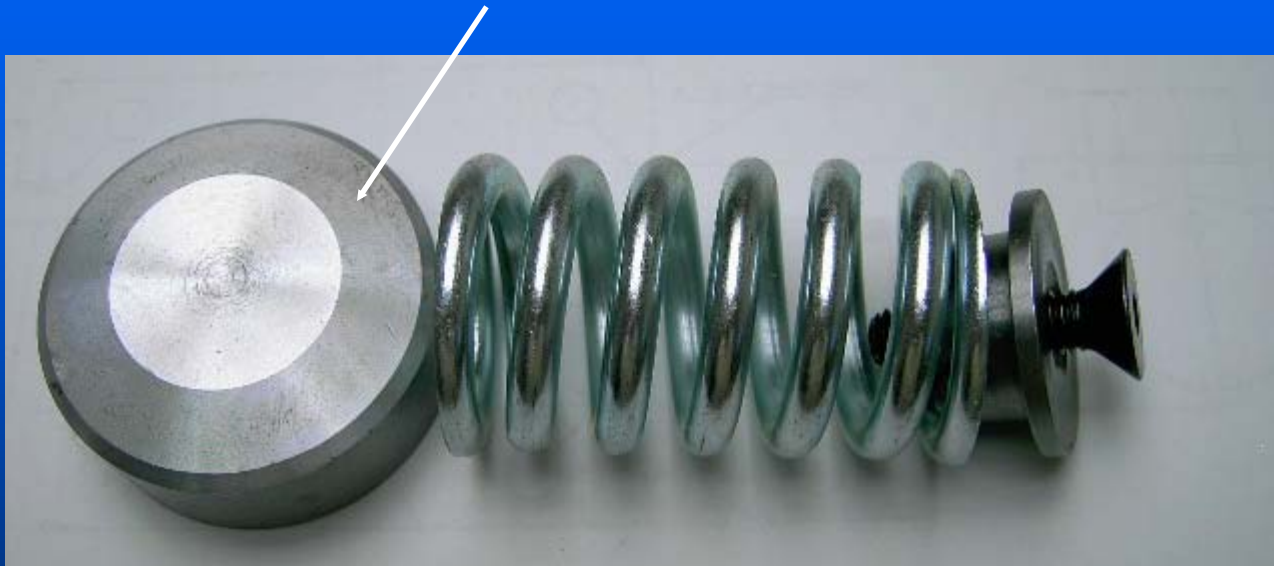
Internal Relief Valve

The internal relief is a safety device and should not operate under normal operating conditions. It is preset from the factory at about 150 PSI depending on the pump model number.



Relief valve – 521/1021

This areas should not be worn. If wear is noted, the pump has been operated at excessive pressures.



The internal relief valve is a “safety relief”. It is not a “bypass valve” and should only open if excess pressure is created. This valve is pre-set from the factory at around 150 PSI differential. The valve should be inspected for wear or rust if the pump is rebuilt. If wear is noted, the “external” bypass setting should be checked. This valve should not open during normal operation. To “field set” this valve turn counter clockwise until completely solid, and turn back clockwise approximately 1-1.5 turns.

For bolt torques refer to the specific pump IOM manual

PUMP

521 / 1021 Series

CPBN / CDBN Series

PT Series

PZ Series

Z Series

MANUAL

IC101

IP100

ID108

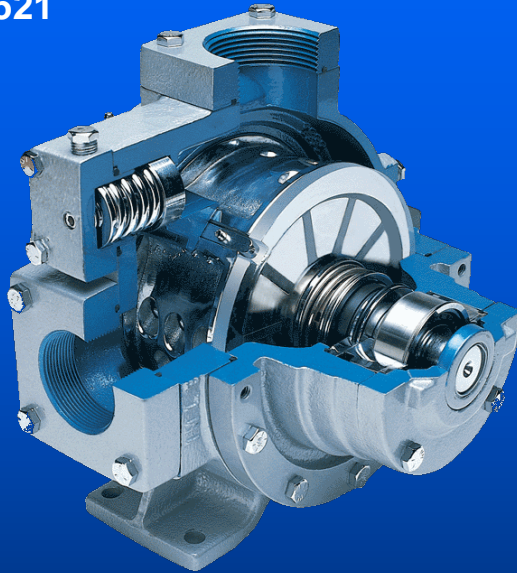
ID107

ID105

Go to www.corken.com for the latest version of a specific manual

Coro-Vane Pumps

521



Z4500

Be sure to rotate the pump to assure it turns freely. Grease the pump before putting it into service. ALWAYS PRESSURIZE LIQUIFIED GAS PUMPS USING VAPOR!