Vane Pump Installation and Start-Up Manual

General Information

Thorough system preparation is of the utmost importance if satisfactory component life is to be achieved. Sufficient care in system preparation and fluid selection, as well as filtration, can mean the difference between successful operation and shutdown.

Prior to installing the pump, the entire system, reservoir, cylinders, valves and all piping must be drained, flushed and filled with new or re-filtered fluid. Once drained, the reservoirs inside surfaces must be cleaned of all chips, scale, rust, etc. All return and/or pressure line filter elements must be inspected and replaced if necessary. We do not recommend the use of suction strainers as they tend to be the leading cause of cavitation. If suction strainers are used, we recommend oversizing them.

Fluid Recommendations

Continental Hydraulics recommends the use of premium quality hydraulic fluids, such as Mobil DTE 25, DTE 26 or equivalent, with zinc anti-wear additives. The viscosity grade selected for your system should be based on the information shown on the chart below.

Fluid Temperature

Pump reservoir (bulk) fluid temperature should not exceed 140° F. (60° C.). Always select fluid for optimum viscosity at operating temperature.

Maximum start-up viscosity should not exceed 4000 SUS (864 cSt).

Filtration

For increased component life, fluid contamination should not exceed 18/15 (up to 2000 psi or 140 bar), or 17/14 (from 2000 to 3000 psi or 140 to 210 bar), per ISO/DIS 4406 “Solid Particulate Contamination Code”. We do not recommend the use of inlet strainers as they tend to be a leading cause of cavitation.

When converting your system from petroleum base fluids to water-glycol, water-in-oil emulsion, or synthetic fluids, contact the factory and/or your fluid supplier for system preparation instructions.

Continental Hydraulics recommend that the users of fire resistant fluids obtain a copy of the NFPA publication entitled “Recommended Practice – Hydraulic Fluid Power – Use of Fire Resistant Fluids in Industrial Systems”

Installation Instructions

1. Remove all plastic protective cap plugs from the components before installation.

2. Prior to installation, Continental Hydraulics recommends pouring a small amount of clean hydraulic fluid into the pump inlet port. Then rotate the pump shaft by hand in the direction indicated by the arrow cast into the pump body. All Continental Vane pumps rotate clockwise as viewed from the shaft end of the pump.

3. Mount the pump and drive motor to a rigid base not more than three (3) feet (91.4 cm) above the fluid level. Align the pump shaft to within 0.006 inch (0.152 mm) of full indicator movement of the motor shaft. The coupling selected should provide a clearance fit on the pump and motor shafts. Never use couplings with interference or sweat fits. Do not press jaw-coupling hub together tightly. Allow air gap

between the hubs and insert to prevent end thrust into the pump rotor, which will damage the pump. No external forces (other than rotational) should be applied to the shaft.

4. Carefully connect the inlet, outlet and drain plumbing to the pump. Do not force hard piping to align to the pump ports. This may pull the pump out of alignment with the motor.

- The inlet line must be plumbed full size to within three (3) inches (76 mm) of the bottom of the reservoir. Never reduce or restrict the inlet.

- Case flow on all pumps exit through the port located on the pump body.

- The case drain line must be plumbed to within three (3) inches (76 mm) of the bottom of the reservoir. The case drain and main system return lines must be separated from the pump inlet line by a baffle.

- The case drain line must also be plumbed to be higher than the pump centerline to insure the case is filled with oil.

5. The case drain lines from multiple pump in a combination should independently be plumbed back into the reservoir to prevent problems. Continental Hydraulics recommends not to install check valves in case drain lines if possible. If so, Continental strongly suggest "swing style" check valves which have low mass and will limit case drain spikes.

6. Fill the reservoir with fluid recommended for your application

System Start-Up Procedures

Start-Up Instructions

1. Rotate the shaft by hand in the direction of the arrow on the pump body to insure freedom of rotation.

2. To prime the pump on initial start-up, it is imperative to clear all air from the pumping chambers. To do this, open center valves should be immediately downstream of the pump outlet port, which allows all flow (fluid and air) to pass directly to the tank upon start-up. If open center valves are not included in your circuit, position your valves so as to move cylinders and/or motors in a no-load condition (75-150 psi or 5-10 bar) until the pump has primed. This "no-load condition" value is not a pump compensating value, but is strictly the result of system resistance.

3. If your pump incorporates the optional screw volume control, Continental Hydraulics recommends not reducing the pump's output flow by more than 50% on start-up (pump flow is reduced by turning the adjustment screw clockwise).

4. Jog the motor (no more than ten (10) revolutions if possible) and observe the direction of rotation. If the pump shaft is not rotating in the correct direction as the arrow on the pump body indicates, reverse the direction of rotation of the motor. If rotation is correct, continue jogging the electric motor until the pump is primed. You will notice a definite pump tone change as well as pressure gauge movement when the pump begins to prime. Once the pump has primed, pressure adjustments can be made.

5. Pressure adjustments must be made against a blocked or deadhead system. Increase the pressure by turning the pressure adjustment clockwise; counterclockwise to decrease it. The pump pressure setting should be as low as possible, yet high enough to insure satisfactory machine performance.

6. Continental recommends installing a low resistance check valve to prevent pump reversal on system shutdown.

TROUBLESHOOTING YOUR VANE PUMP

Problem	Possible Cause	Corrective Action
Excessive Noise	1) Coupling misalignment	Align the pump and motor shaft to within .006 of an inch total indicator reading. The tighter the alignment, the quieter the pump will be.
	2) The continuous pressure is significantly above or below rated specifications for 210 bar pumps.	The pumps have been sound tuned at rated pressure. Consult factory for proper pressure setting.
	3) Fluid in the reservoir is low and the pump is sucking air.	Fill the reservoir so that the fluid level is well above the end of the suction line during all of the working cycle.
	4) Restricted inlet.	If a suction strainer is used, check it for obstructions or dirt. We do not recommend the use of strainers. They tend to be a leading cause of cavitation which manifests as excessive noise. Check also for shop rags left in the reservoir.
	5) Air leak in the suction line.	Tighten all fittings. If it still leaks, smear grease over the joints to locate the leak.
	6) Suction line has too many elbows, or is too long.	The suction line should be as short and as straight as possible to reduce resistance to flow.
	7) Air in the fluid.	The return line should terminate below the fluid level to prevent splashing.
	8) Suction line is too small.	Suction line should always be equal in size to the suction port. **Never** reduce it.
Pump will not prime	1) Shaft rotating in the wrong direction.	When installing a pump, always jog the electric motor to check for proper shaft rotation. Rotation should only be clockwise (right hand)
	2) Air leak in the suction line.	Make sure all fittings are tight.
	3) Pump is air bound.	Use an air bleed valve to void the pump and suction line of air.
	4) Fluid level in the reservoir is too low.	Fill the reservoir so that the fluid level is well above the end of the suction line.
	5) Volume Control is turned in too far.	Flow should not be reduced more than 50% of maximum.
	6) Suction port dust plug left in place.	Remove plug.
Pump is unstable	1) Contamination in the compensator.	Thoroughly clean the control orifices and check filtration.
	2) Pressure ring is not moving properly.	Control piston should be checked for freedom of movement.

Pump not delivering oil.	1) Pressure adjustment screw too loose.	Tighten screw 3 to 5 turns after spring tension is felt.
	2) Incorrect pump rotation.	Pump must rotate in the direction indicated on case or nameplate.
	3) Insufficient oil in reservoir.	Fill reservoir so that oil level is well above the end of the suction line during the **entire** work cycle.
	4) Air leak in suction line.	Apply good pipe joint compound, compatible with hydraulic fluid. Tighten all joints.
	5) Oil too thick to prime pump.	See oil viscosity specifications
	6) Maximum volume control turned in too far.	Turn volume control screw counterclockwise to increase delivery.
	7) Bleed-off elsewhere in circuit.	Check for open center valves, or other controls connected with a tank port.
Pump won't hold pressure.	1) Pump not delivering oil.	See troubleshooting section "Pump not delivering oil."
	2) Pressure adjustment screw set too low.	Set adjusting screw to obtain desired operating pressure.
	3) Worn or damaged compensator.	Replace compensator.
	4) One or more vanes stuck in slots.	Inspect for contaminants or sticky oil.
	5) Oil bypassing to reservoir.	Inspect for open center valves, or other valves open to reservoir. Assure that relief valve settings are high enough above system operating pressure.
System is too hot.	1) Case drain line is installed too close to the pump inlet line.	The case drain and pump inlet should be separated by a baffle in the reservoir.
	2) Reservoir is undersized. Rule of thumb is a minimum reservoir displacement of 2 to 3 times pump output flow.	Increase reservoir size, or add a hydraulic fluid cooler.
	3) Pump is operating at higher than required pressure.	Reduce pump pressure to the minimum required for the installation.
	4) Pump is discharging through relief valve.	Clean and re-Adjust Relief Valve. Reliefs are required with PVX pumps having a spring or hydraulic pressure compensator governor. Relief valves create additional heat energy.
	5) Excessive system leakage through cylinders or valves.	Check progressively through the system for sources of leakage.
	6) High ambient or radiant heat.	Relocate power unit, or insulate against radiant heat.
	7) Low oil level in reservoir.	Bring oil up to recommended level. Monitor system for oil loss.
	8) Excessive friction.	Make sure fluid is of proper viscosity.
	9) Restricted or undersized valves or hydraulic lines.	Clean valves and piping. Check for pinched lines. Use adequate pipe sizes.