CONTINENTAL HYDRAULICS
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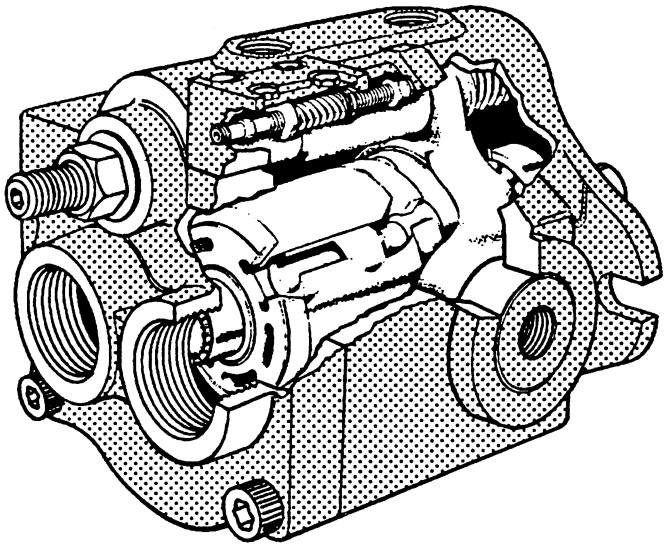
HPV SERIES PUMPS

Installation & Start-Up



HPV — FRAME & PRESSURE — ROTATION — SEALS — PORTS — SHAFT — COMPENSATOR — DESIGN

ROTATION

CODE	DESCRIPTION
RF	CW ROTATION
LF	CCW ROTATION

SEALS

CODE	TYPE
O	BUNA
P	VITON

SHAFT

CODE	DESCRIPTION
OMIT	STRAIGHT KEY
12	MALE SPLINE

SIZE

CODE	DESCRIPTION
6B35	6 GPM @ 1750 RPM 3500 PSI CONTINUOUS
10B35	10 GPM @ 1750 RPM 3500 PSI CONTINUOUS
15B35	15 GPM @ 1750 RPM 3500 PSI CONTINUOUS
20B35	20 GPM @ 1750 RPM 3500 PSI CONTINUOUS
29B30	29 GPM @ 1750 RPM 3000 PSI CONTINUOUS

PORTS

CODE	DESCRIPTION
1R	SAE O-RING THREAD REAR PORTS
2R	BRITISH STD. PIPE THREAD (BSPP) REAR PORTS

COMPENSATOR

CODE	DESCRIPTION
OMIT	STD. PRESSURE COMPENSATOR
7	REMOTE PRESSURE
19	LOAD SENSE
26	H. P. LIMITING

MOUNTING

This pump is designed to operate in any position. The mounting hub and two bolt mounting flange conform with SAE standard. The pump shaft must be in alignment with the shaft of the Prime Mover and should be checked with a dial indicator. The mounting pad or adaptor into which the pump pilots must be concentric with the pump shaft to prevent bearing failure. This concentricity is particularly important if the shaft is rigidly connected to the Prime Mover without a flexible coupling or a coupling that allows only for minor misalignment. In that case the diametric concentricity and squareness of the mounting faces must be within 0.06 mm or .002 inch T.I.R. when the pump is foot mounted and 0.03 mm or .001 inch T.I.R. when flange mounted. The HPV series is designed for "inline drive" and side load on the shaft is not recommended.

SHAFT INFORMATION

Splined:

The coupling interface must be lubricated. Continental Hydraulics recommends lithium molydisulfate or similar grease. The female coupling should be hardened to 27-45 Rc and must conform to SAE-J498B (1971) Class 1 flat root side fit.

Keyed:

High strength heat treated keys must be used. Replacement keys must be hardened to 27-34 Rc. The key corners must be chamfered .030-.040-inch (.75-1 mm) at 45° to clear radii that exist in the keyway.

PLUMBING

Connect inlet and outlet lines to the end cap of the pump. The fluid connections are SAE straight thread, O-ring seal or B.S.P.P.:

- HPV6 model: SAE-12 or 3/4" B.S.P.P.
- HPV10, 15, 20 & 29 models: SAE-20 or 1-1/4" B.S.P.P.

The maximum case pressure is 10 PSI (0.70 bar). Case pressures must never exceed inlet pressure by more than 15 PSI (1 bar). When connecting case drain line make certain that drain plumbing passes above the highest point of the pump before passing to the reservoir. If not, install a 5 PSI (.3 bar) case pressure check valve to be certain the case is filled with oil at all times.

The case drain line must be of sufficient size to prevent back pressure in excess of 10 PSI (0.70 bar. Case drain should be returned to the reservoir below the surface of the oil as far from the supply suction as possible. All fluid lines (whether pipe, tubing, or hose) must be of adequate size and strength to assure free flow through the pump.

SYSTEM RELIEF VALVES

Although the HPV series pumps have very fast off-stroke compensator response, fast acting relief valves are recommended in all cases for safety considerations. This will also serve in clipping transient pressure spikes.

RECOMMENDED FLUIDS

Fluids for use in the HPV series piston pumps should be designated by the fluid manufacturer for use in hydraulic systems and contain oxidation inhibition, anti-rust, anti-foam, and deaerating agents. For other fluid types, please contact your Continental Application Engineer.

VISCOSITY

- Maximum at full power -- 750 SUS (160 Cst)
- Optimum for maximum life -- 140 SUS (30 Cst)
- Minimum at full power -- 60 SUS (10 Cst)

VISCOSITY INDEX

90 V.I. minimum. Higher values extend the range of operating temperature but may reduce the service life of the fluid.

TEMPERATURE

Operating Temperature

The operating temperature should be determined by the viscosity characteristics of the fluid used. Because high temperatures degrade seals, reduce the service life of the fluid, and create hazards, fluid temperatures should not exceed 180° F. (82° C.) at the case drain.

MAINTENANCE

This pump is self-lubricating and preventative maintenance is limited to keeping the system fluid clean by changing filters frequently. Keep all fittings and screws tight Do not operate at pressures and speeds in excess of the recommended limit. If the pump does not operate properly, check the Trouble Shooting section before attempting to overhaul the unit.

Overhauling is relatively simple and may be accomplished by referring to the Parts & Service booklet.

NOTE: It is especially important that the suction or inlet piping and fittings be tight and in good repair to prevent air from being drawn into the system.

FLUID CLEANLINESS

Fluid must be cleaned before and continuously during operation by filters that maintain a cleanliness level of NAS 1638 Class 8. This corresponds approximately to ISO 16/13. This fluid level cleanliness can usually be accomplished by the effective use of 10 micron filters. Better cleanliness levels will significantly extend the life of the components. Since contaminant generation may vary with each application, each must be analyzed to determine proper filtration to maintain the required cleanliness level.

START UP PROCEDURE FOR NEW INSTALLATION

1. Read and understand the instruction manual. Identify components and their functions.
2. Visually inspect components and lines for possible damage.
3. Check reservoir for cleanliness. Drain and clean as required.
4. Check fluid level and fill as required with filtered fluid at least as clean as that recommended. Fill pump case with clean oil prior to starting.
5. Check alignment of drive.
6. Check oil cooler and activate it (if included in circuit). Check fluid temperature.
7. Reduce pressure settings of relief valve. Make sure accurate pressure readings can be made at appropriate places.
8. If solenoids are in the system, check for actuation.
9. Confirm electric motor rotation.
10. Start pump drive. Make sure pump is priming. Case is full of clean filtered oil.
11. Bleed system of air. Recheck fluid level.
12. Cycle unloaded machine at low pressure and observe actuation (at low speed, if possible).
13. Increase pressure settings gradually. Check for leaks in all lines especially in pump and motor inlet lines.
14. Make correct presure adjustments.
15. Gradually increase speed. Be alert for trouble as indicated by changes in sounds, system shocks and air in fluid.
16. Equipment is operational.

INSTALLING A REPLACEMENT PUMP

In some cases a replacement pump does not provide the same service life as did the pump it is replacing. This is because of failure to completely clean and flush the entire hydraulic circuit before installing and operating the replacement pump.

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INSTALLING A REPLACEMENT PUMP (Continued)

The following procedures provide a checklist for hydraulic maintenance personnel to confidently replace a hydraulic pump with assurance that it will provide satisfactory pump life.

1. Determine the cause of the failure (be sure you have found the cause and not simply a symptom).
2. Eliminate the cause of the failure.
3. Drain the entire circuit including cylinders, motors, tank, etc.
4. Remove system lines and components. Flush with a compatible solvent or clean filtered oil to remove contamination that may have entered the system when the pump failed. Be certain that fluid has been flushed from the cylinders.
5. Visually inspect components for possible contamination and to be sure they function properly. Pay special attention to the wipers on the cylinder rods, and be sure that the rods are free of nicks and scratches.
6. Flush the reservoir using a pressurized solvent. Use clean, dry, lint free cloths to insure a clean interior. Inspect the filler breather (if used), as well as the suction strainer, to be certain the components are clean.
7. Install a new filter that is 10 micron or better and has a low Beta ratio. If the machine does not have a filter, install a 10 micron nominal.
8. Fill the reservoir with new, FILTERED oil of the recommended fluid. Be certain to observe the fill level since the entire system must be filled (not just the reservoir).
9. Re-install all system lines. Visually inspect to be sure they are clean and free of contamination. Pay special attention to be sure that all inlet fittings are tight.
10. Install the new pump.
11. Follow the recommended start-up procedures for the pump used. Be certain that the pump case is full of clean filtered oil.
12. Cycle all cylinders and operate all motors at operating speeds for 20 minutes. While operating observe the reservoir fluid level, since the components will be filling with hydraulic fluid.
13. Replace the filter element and check the fluid level. Add new, clean, filtered oil if required.

When followed, the above procedure will allow the replacement pump to be installed with the knowledge that you will receive satisfactory pump life.

Daily inspection of fluid levels, filters, and checking for leaks, along with hydraulic fluid changes at recommended intervals, will help maintain the performance level of the original pump. For fluids other than mineral base, good fluid maintenance is crucial.

TROUBLE SHOOTING

Component problems and circuit problems are often interrelated. An improper circuit may operate with apparent success but will cause failure of a particular component with it. The component failure is the effect, not the cause of the problem. The following general guide is offered to help in locating and eliminating the cause of problems by studying their effects.

Effect of Trouble	Possible Cause	Fault Needing Remedy
Noisy Pump	Air in Fluid	Leak in suction line Leak at shaft seal Low fluid level Turbulent fluid Return lines above fluid level Gas leak from accumulator Excessive pressure drop in the inlet line from a pressurized reservoir Suction line strainer acting as an air trap
	Cavitation in pump or motor rotating group	Fluid too cold, too viscous or too heavy Shaft speed too high Suction line too small or collapsed Suction strainer too small or too dirty
	Misaligned shaft	Faulty installation Distortion in mounting Axial interference Faulty coupling
	Mechanical fault in pump	Piston & shoe looseness or failure Bearing failure Incorrect port plate selection or index Eroded or worn parts in the displacement control
Erosion on cylinder block ports & port plate	Air in fluid	Refer to above
	Cavitation	Refer to above
High wear in pump	Excessive loads	Reduce speeds or pressure settings
	Contaminant particles in fluid	Improper filter maintenance Filters to coarse Dirty fluid introduced to the system Reservoir openings or breather Improper line replacement

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TROUBLE SHOOTING (Continued)

Effect of Trouble	Possible Cause	Fault Needing Remedy
High wear in pump (Continued)	Improper fluid	Fluid too thin or thick for operating temperature range Breakdown of fluid with time/temperature/shearing effects Incorrect additives in new fluid Destruction of additive effectiveness with chemical aging.
	Improper repair	Incorrect parts, procedure, dimensions or finishes
High wear in pump	Unwanted water in fluid	Condensation Faulty breather/strainer Heat exchanger leakage Faulty clean-up, practice Water in makeup fluid
Pressure shocks	Clogging load Slow acting relief valve Worn relief valve Worn compensator Slow response in check valves Small line capacitance (line volume, line stretch, accumulator effects) Cylinder block lift	Mechanical considerations Replace with fast acting relief valve Needed repairs Needed repairs Replace or relocate Increase line size or lengths Bleed air Recheck pump hold-down, rotating group, drain pressure
Heating of fluid	Excessive pump leakage	Recheck case drain flow & repair as required Fluid too thin Improper assembly, port timing
	Relief valve	Set too low (compared to load or to compensator) Instability caused by back pressure, worn parts
	Compensator	Set too high (compared to relief) Worn parts
	Heat exchanger	Water turned off or too little flow Water too hot Fan clogged or restricted Efficiency reduced by mud or scale deposits Intermittent hydraulic fluid flow

TROUBLE SHOOTING (Continued)

Effect of Trouble	Possible Cause	Fault Needing Remedy
Heating of fluid (Continued)	Reservoir	Too little fluid Entrained air in fluid Improper baffles Insulating air blanket that prevents heat rejection Heat pickup from adjacent equipment
Decrease in set pressure	Loose compensator adjusting screw Defective function or relief valves Lowering of tank oil level Deterioration in pump function	Tighten the adjusting screw (28-11) Overhaul or exchange Check the relief valve setting Repair or replace the relief valve Replenish fluid * Check drain (below 5% of discharge at rated pressure) Check internally & exchange defective or worn out parts
Pressure does not rise	Improper direction of rotation Lowering of tank oil level Wrong setting of relief valve or compensator Fault in relief valve or compensator Clogging of suction line Deterioration in pump function	Change the rotating direction Replenish fluid Readjust & lock Overhaul or exchange Check & clean suction strainers Open gate valve Repair or replace as required
Insufficient flow	Lowering of tank oil level Wrong sealing of suction line Improper adjustment of pump stroke control Deterioration in pump function Worn compensator valve	Replenish fluid Tighten fittings & exchange Readjust as required Repair or replace as required Change compensator valve