



OIL SOLUTIONS

PO Box 38  
Strathfieldsaye, VIC, 3551  
1800 OIL SOL  
1800 645 765  
[sales@oilsolutions.com.au](mailto:sales@oilsolutions.com.au)  
[www.oilsolutions.com.au](http://www.oilsolutions.com.au)  
"For All Your Hydraulic Needs"



# Service & Parts Manual Hydraulic Power Unit



*Skill and quality go into every  
Continental Hydraulics system.*

**POLYPAC SYSTEMS CENTER**  
**MAINTENANCE MANUAL INFORMATION SHEET**

PSC DISTRIBUTOR:

CUSTOMER:

DISTRIBUTOR PO:

CUSTOMER PO:

ITEM NO:

ASSEMBLY DRAWING #:

HYDRAULIC SCHEMATIC DRAWING #:

ELECTRICAL SCHEMATIC DRAWING #:

PSC ORDER #:

MODEL CODE:

PUMP #1:

PUMP #2:

PUMP #3:

*PLEASE CONTACT YOUR LOCAL CONTINENTAL HYDRAULICS DISTRIBUTOR  
FOR SALES AND SERVICE*



1800-OILSOL  
1800-645765

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[sales@oilsolutions.com.au](mailto:sales@oilsolutions.com.au)



## Before Starting Your New Power Unit . . .

Congratulations! You've purchased a quality power unit from Continental Hydraulics - a leading designer and builder of power units. Proper attention to start-up procedure will help assure that your power unit will give long, trouble-free service. Please review and follow the procedures below. If you have any questions or comments, please call us at (952) 895-64800.

We inspect every power unit for circuit integrity. We test at maximum pressure and flow based on electric motor capacity. Any special pump or relief valve setting you've requested have been made, and noted on a card attached to the component that was set.

**Units shipped without special settings are set at low pressure - around 300 PSI.**

### I. Fill the Reservoir

Use premium grade hydraulic fluid to fill the reservoir. Recommended fluid viscosity is as follows:

Maximum System Pressure	Minimum Operating Viscosity	Recommended Operating Viscosity	Recommended Minimum Fluid Viscosity Rating
1000 PSI	80 SUS	100-250 SUS	ISO 32 (150 SUS @ 100° F)
1500 PSI	100 SUS	150-250 SUS	ISO 46 (220 SUS @ 100° F)
2000 PSI	120 SUS	150-250 SUS	ISO 46 (220 SUS @ 100° F)
3000 PSI	120 SUS	150-250 SUS	ISO 46 (220 SUS @ 100° F)

FILL THROUGH A SUITABLE FILTER, COMPATIBLE WITH THE FLUID. Check the fluid code on the Model Designation Label affixed to your power unit. (Fig. 1)

H1 = Hydraulic Oil

H2 = Water-in-Oil Emulsion

H3 = Phosphate Ester

H4 = Water Glycol

H5 = Automatic Transmission Fluid

Fluid  
Code

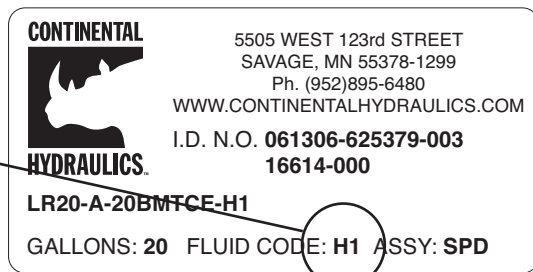


Figure 1

**If the fluid you are using does not match the code on the label, contact your nearest Continental Hydraulics Representative before operating the power unit.**

For cold weather operation, down to 0° F, premium multi-purpose automatic transmission fluid (ATF) Type "A", or Type "F" may be used. When using ATF, reservoir temperature should not exceed 130° F.

Maintain fluid level. During normal operation, fluid should be visible in the sight gauge.

### II. Alignment



**CAUTION: Before energizing the power unit, make sure that any resulting equipment motion will not cause personal injury or equipment damage.**

Great care has been taken to protect your power unit during shipment. However, no one can predict the amount of jarring and shaking that the unit will be subjected to. Therefore, all foot bracket type pump/motor assemblies should be checked for proper alignment before start up. This can be accomplished by wiring the motor to a proper electrical source. Check the motor nameplate for correct wiring on dual voltage motors. Jog the motor to check rotation. Polyphase motors are bidirectional. Proper rotation can be established by reversing any two power leads.

The electrical characteristics of control valves are shown on their solenoids. Make sure they are wired to a matching voltage/cycle source.



**CAUTION: Energizing both solenoids on the same double solenoid valve could cause the coils to burn out.**

### III. Pressure Adjustment - Pressure Compensated Pumps

After the pump has been primed, run it for several minutes at lower than normal pressure, with an open, or intermittently open system to permit oil flow. This will purge entrapped air from the pump and system.

Pressure adjustment should be made when the circuit is in a no-flow condition, with the electric motor running, and after the pump has been primed and the system bled.

Pressure compensated pumps will operate in a no-flow condition without damage. System pressure should be set as low as possible to overcome dynamic pressure drop and provide acceleration required to move the load.



**Never operate above rated pressure indicated on the pump nameplate.**

Fixed displacement pumps should have a relief valve installed as close to the pump outlet as possible. This valve should be set 200-300 PSI higher than the maximum system working pressure.



**Failure to use some type of relief or unloading circuit with a fixed displacement pump is dangerous, and is not approved by Continental Hydraulics.**

All piston pumps and vane pumps operated above 1500 PSI valve in their circuit. The relief valve should be set at a minimum of 100 PSI above operating pressure.

If the unit you received is not equipped with a relief valve, and if it is equipped with a piston pump or vane pump operating above 1500 PSI, check to see that there is a relief valve elsewhere in the circuit. If you need advice, contact your nearest Continental Hydraulics Distributor.

#### IV. Operating Temperature

For most industrial applications, and operating temperature of 140° F is considered maximum. The system should be designed so that heat rise at the reservoir does not exceed 40° F above ambient air temperature.

At higher temperatures it will be difficult to maintain reliable and consistent hydraulic control. At higher temperatures, hydraulic fluid deteriorates, and component life is reduced.



**CAUTION: Hydraulic fluid at temperatures greater than 140° F poses a significant threat of burns.**

#### V. Fluid Level, Fluid Cleanliness, Pressure Gauges

Always maintain operating oil level at a level visible on the sight gauge. When starting up the system, be sure to check the oil level after the system is filled. Add oil as needed. Low oil level can cause the system to draw in air or cause excessive heat in the system.

Most foreign material in a system flushes to the reservoir after a few hours of operation. We recommend that you drain the tank, replace the fluid, change the filter, and clean the strainer after 3-5 hours of operation. After the initial cleaning, the strainer should be cleaned at a minimum of every 4000 hours of operation. More frequent cleaning is required if the power unit and actuators are used in a highly contaminated atmosphere such as a foundry or lumber mill.

If the unit is equipped with a pressure/return filter, replace the element as needed to assure fluid cleanliness. We recommend specifying filters equipped with indicators that identify when it's time to change elements.

Pressure gauges should have some type of shut-off so they can be shut off when they are not being read. Occasionally, the shut-off valve should be opened at atmospheric pressure to exhaust any pressurized fluid between the gauge and the valve.

Should any component malfunction, contact your nearest Continental Hydraulics Distributor for advice about the most effective means of repair.

Good preventive maintenance is the best insurance against unscheduled downtime. Unscheduled downtime is usually more expensive than providing good preventive maintenance.



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<https://oilsolutions.com.au/>

[sales@oilsolutions.com.au](mailto:sales@oilsolutions.com.au)

#### Continental Hydraulics Inc

4895 12th Avenue East  
Shakopee, MN 55379  
Phone: (952) 895-6400  
Fax: (952) 895-6490

## GENERAL TROUBLESHOOTING GUIDE

### PUMPS

#### EXCESSIVE PUMP NOISE:

- **Check Pump Rotation.** Direction of rotation must correspond with arrow on the pump case.
- **Check Fluid Level.** Surface fluid should be well above the end of the suction line during all of the work cycle.
- **Check Fluid Types.** Make sure fluid is a good clean hydraulic fluid with a minimum of 100 SUS viscosity at operating temperature.
- **Check Coupling Alignment.** Pump and motor should be aligned within .003 T.I.R.
- **Check For Air Leaks In Suction Line And Case Line.** Locate by pouring oil or grease around suspect areas while listening for change in the sound of operation. Tighten or repair as required.
- **Check For Restricted Flow In The Suction Piping.** Make sure all piping and fittings are full size throughout. Make sure suction line is not plugged. Avoid excessively long suction lines and elbows.
- **Check For Restriction At Filter Or Strainer.** Calculate required size and double to allow for partial blocking by contaminants.
- **Check For Sticking Vanes.** Remove pump cover and check rotor and vanes for presence of chips, sticky oil or varnish deposits.
- **Check Pump Speed.** Speeds above maximum rating are harmful and cause premature failure.
- **Check For Air Or Air Bubbles In Intake Line.** Make sure reservoir has baffles and return lines terminate below fluid level on the opposite side of the baffle from the intake lines.

#### SYSTEM EXCESSIVELY HOT:

- **Check Operating Pressure.** Reduce pressure to minimum required for installation.
- **Check To See If The Pump Is Discharging Through Relief Valve.** Remove relief valve. Relief valves are not required with the Continental pumps and they create additional heat.
- **Check To See If Pump Is Unloading During Idle Periods Of Machine Operating Cycle.** Use an open center valve or dual pressure governor when applicable on machine cycle.
- **Check Cooling System.** Install cooler or increase reservoir capacity.
- **Check For Excessive Pump Slippage.** Tighten bolts on the pump cover.
- **Check Case Drain Return Location.** Make sure the drain and suction lines are separated by a baffle in reservoir or that drain is located at a distance practical before fluid re-enters pump.
- **Check Progressively Through The System Components.** Feel components to locate excessively hot ones and repair or replace them.
- **Check For High Ambient Or Radiant Temperatures.** Relocate power unit, baffle against heat, or use fan directed against reservoir to increase air flow across the reservoir.





## LEAKAGE AT SHAFT SEALS:

- **Check For Abrasives On The Pump Shaft.** Protect shaft from abrasive dust and foreign materials.
- **Check For Damage At Installation.** Possible scratched or damaged seals. Replace seals, avoiding cuts when passing over keyways.
- **Check Coupling Alignment.** Pump and motor should be aligned within .003 T.I.R.
- **Check For Pressure In Pump Case.** Inspect case drain for restrictions. Pipe should be full size direct to reservoir. Pressure should not exceed 10 PSI.
- **Check For Fluid Incompatibility.** Fluid aniline point must be 220 Deg F +/- 15 Deg F. Fire resistant fluid may require special seals – convert seals.

## BEARING FAILURE:

- **Check For Chips Or Other Foreign Materials.** Make sure clean fluid is used.
- **Check Coupling Alignment.** Pump and motor should be aligned within .003 T.I.R.
- **Check For Excessive Shock Loads.** Observe maximum rating of operating pressure, reduce operating pressure.
- **Check For Overhung Loads.** Overhung loads are not recommended. Continental pump are not designed to handle overhung loads. Make provisions for outboard bearings to alleviate condition.
- **Check For High Operating Pressure.** Reduce to maximum pressure at no flow.
- **Check For Incorrect Fluids.** See data pages for proper pump start-up procedures.

## PUMP NOT DELIVERING FLUID:

- **Check Pump Rotation.** Direction of rotation must correspond with arrow on the pump case.
- **Check Fluid Level.** Surface fluid should be well above the end of the suction line during all of the work cycle.
- **Check Minimum Pump Speed Recommendations.** To be sure of proper priming characteristics.
- **Check For Improper Pressure Adjustment.** Turn in pressure adjustment screw two or three turns after spring tension is left.
- **Check For Air Leaks In Suction Line.** Tighten joints and eliminate any possible places for air to enter system.
- **Check Fluid Viscosity.** May be too heavy for proper priming. Check recommendations on pump data page.
- **Check Maximum Volume Control.** Turn volume control counterclockwise to increase delivery.
- **Check For Plugged Suction Lines.** A periodic check should be made as a preventive maintenance procedure.
- **Check For Excessive Pump Slippage.** Tighten bolts on the pump cover.
- **Check For Broken Pump Shaft Or Rotor.** Check for signs of excessive shock, dirt, foreign material or other cause of failure.
- **Check For Sheared Key At The Coupling.** Replace when required.

## LACK OF VOLUME:

- **Check Maximum Volume Control.** It may be screws in too far; back out the maximum volume control.
- **Check For Dirt Or Chips Under The Vanes Holding The Pressure Ring On Center.** Dismantle pump, inspect, and clean up dirt and chips.

## PUMP NOT DEVELOPING PRESSURE:

- **Check If Pump Is Delivering Fluid.** See section headed “Pump no delivering fluid”.
- **Check Pressure Adjusting Screw Setting.** Adjust pressure screw to obtain desired operating pressure at deadhead.
- **Check To See If Pressure Is Being Relieved Through A Relief Or Bypass Valve.** Remove relief valve, or set cracking pressure at least 200 PSI above pump pressure valve. Relief valves are not required with Continental pumps and they create additional heat.
- **Check To See If Fluid Is Bypassing To Reservoir.** Test the circuit pressure, progressively watching for open center valves and/or other valves open to reservoir.
- **Check For Sticky Pressure Ring.** Loosen pump cover bolts to prove theory.
- **Check To See If Pressure Gauge Line Is Shut Off.** Check to see if gauge snubber is open. Install a pressure gauge known to be accurate in a line open to direct pump pressure.
- **Check To See If System Requires More Fluid Than Pump Capacity.** Check the pressure at deadhead.
- **Check For Malfunctioning Or Broken Gauge.** Install a new gauge.

## OVERLOADING MOTOR:

- **Check To See If The Motor is Properly Sized For Pressure And Volume Requirements.** Review engineering data pages for proper horsepower recommendations.
- **Check To See If The Pump Is By-Passing Through Relief Valve.** Remove the relief valve. Relief valves are not required with Continental pumps and they create additional heat.
- **Check To See If There Is Excessive Internal Slippage In The Pump.** Tighten the cover bolts on the pump.
- **Check To See If The Pump Is Being Started With Full Pressure And Volume.** Use a higher starting torque motor or start pump with valves closed so no fluid will flow.
- **Check To See If The Motor Overload Protection Is Undersized.** Install a larger capacity unit with a larger heater.
- **Check For Low Voltage.** Check the voltage input and/or increase to larger wire leads.
- **Check The Motor Wiring For The Wrong Voltage.** Check the motor leads for proper voltage connections.
- **Check For Internal Pump Seizure.** Repair or replace pump.

## VALVES

### VALVES SPOOL RESPOSE SLUGGISH:

- **Check For Dirt In The System.** Drain and flush system. Disassemble and clean if necessary.
- **Check For Restricted Drain (External Drain Models Only).** Check fittings or drain lines.
- **Check For Low Pilot Pressure (Pilot Operated Valves Only).** Check for pilot pressure system.
- **Check For Malfunctions Of The Solenoids.** Check for proper source and voltage.
- **Check For Distortion Of The Valve Body.** Check flatness of the mounting surface. Align the valve body and piping to remove strain. Loosen mounting bolts.
- **Check Flow Rate Through Valve.** Must be within valve flow limits.

### VALVE SPOOL FAILS TO MOVE:

- **Check For Dirt In The System.** Disassemble, clean and flush.
- **Check For Blocked Drain (External Drain Model Only).** Inspect for plugs or foreign matter.
- **Check To See If The Pilot Pressure Is Off (Pilot Operated Valves Only).** Check the source of pilot pressure.
- **Check To See If The solenoids Are Inoperative.** Check the electrical source and solenoid coils.
- **Check Distortion Of The Valve Body.** Check flatness if the mounting surface. Align the valve body and piping to remove strain. Loosen mounting bolts.
- **Check For Improper Reassembly After Repair.** Use master parts page and repair pages for proper assembly, parts and procedures.

### VALVE PRODUCES AN UNDERSIRED RESPOSE:

- **Check For Improper Installation Connections.** Check the installation drawings.
- **Check For Improper Assembly Of Valves.** Check master parts pages and installation drawings.
- **Check Flow Rate Thru Valve.**