ENERPAC
Hydraulic Technology Worldwide

Instruction Sheet

1/2 hp Submerged Pumps

PEM/WEM PER/WER PEJ/WEJ PES/WES PED/WED

L1498 Rev. B 06/03

Repair Parts Sheets for this product are available from the Enerpac web site at www.enerpac.com, or from your nearest Authorized Enerpac Service Center or Enerpac Sales office.

1.0 IMPORTANT RECEIVING INSTRUCTIONS

Visually inspect all components for shipping damage. Shipping damage is **not** covered by warranty. If shipping damage is found, notify carrier at once. The carrier is responsible for all repair and replacement costs resulting from damage in shipment.

SAFETY FIRST

2.0 SAFETY ISSUES

Read all instructions, warnings and cautions carefully. Follow all safety precautions to avoid personal injury or property damage during system operation. Enerpac cannot be responsible for damage or injury resulting from unsafe product use, lack of maintenance or incorrect product and/or system operation. Contact Enerpac when in doubt as to the safety precautions and operations. If you have never been trained on high-pressure hydraulic safety, consult your distribution or service center for a free Enerpac Hydraulic safety course.

Failure to comply with the following cautions and warnings could cause equipment damage and personal injury.

A **CAUTION** is used to indicate correct operating or maintenance procedures and practices to prevent damage to, or destruction of equipment or other property.

A **WARNING** indicates a potential danger that requires correct procedures or practices to avoid personal injury.

A **DANGER** is only used when your action or lack of action may cause serious injury or even death.

WARNING: Wear proper personal protective gear when operating hydraulic equipment.

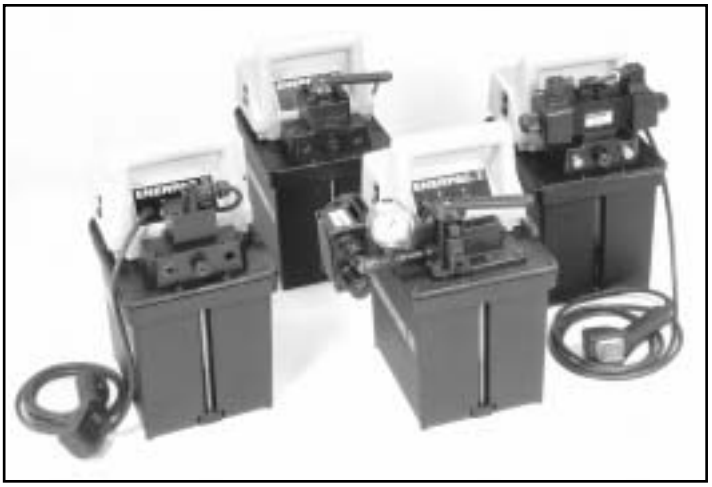
WARNING: Stay clear of loads supported by hydraulics. A cylinder, when used as a load lifting device, should never be used as a load holding device. After the load has been raised or lowered, it must always be blocked mechanically.

WARNING: USE ONLY RIGID PIECES TO HOLD LOADS. Carefully select steel or wood blocks that are capable of supporting the load. Never use a hydraulic cylinder as a shim or spacer in any lifting or pressing application.

DANGER: To avoid personal injury keep hands and feet away from cylinder and workpiece during operation.

WARNING: Do not exceed equipment ratings. Never attempt to lift a load weighing more than the capacity of the cylinder. Overloading causes equipment failure and possible personal injury. The cylinders are designed for a max. pressure of 700 bar [10,000 psi]. Do not connect a jack or cylinder to a pump with a higher pressure rating.

Never set the relief valve to a higher pressure than the maximum rated pressure of the pump. Higher settings may result in equipment damage and/or personal injury.



WARNING: The system operating pressure must not exceed the pressure rating of the lowest rated component in the system. Install pressure gauges in the system to monitor operating pressure. It is your window to what is happening in the system.

CAUTION: Avoid damaging hydraulic hose. Avoid sharp bends and kinks when routing hydraulic hoses. Using a bent or kinked hose will cause severe back-pressure. Sharp bends and kinks will internally damage the hose leading to premature hose failure.

Do not drop heavy objects on hose. A sharp impact may cause internal damage to hose wire strands. Applying pressure to a damaged hose may cause it to rupture.

IMPORTANT: Do not lift hydraulic equipment by the hoses or swivel couplers. Use the carrying handle or other means of safe transport.

CAUTION: Keep hydraulic equipment away from flames and heat. Excessive heat will soften packings and seals, resulting in fluid leaks. Heat also weakens hose materials and packings. For optimum performance do not expose equipment to temperatures of 65°C [150°F] or higher. Protect hoses and cylinders from weld spatter.

DANGER: Do not handle pressurized hoses. Escaping oil under pressure can penetrate the skin, causing serious injury. If oil is injected under the skin, see a doctor immediately.

WARNING: Only use hydraulic cylinders in a coupled system. Never use a cylinder with unconnected couplers. If the cylinder becomes extremely overloaded, components can fail catastrophically causing severe personal injury.

WARNING: BE SURE SETUP IS STABLE BEFORE LIFTING LOAD. Cylinders should be placed on a flat surface that can support the load. Where applicable, use a cylinder base for added stability. Do not weld or otherwise modify the cylinder to attach a base or other support.

Avoid situations where loads are not directly centered on the cylinder plunger. Off-center loads produce considerable strain on cylinders and plungers. In addition, the load may slip or fall, causing potentially dangerous results.

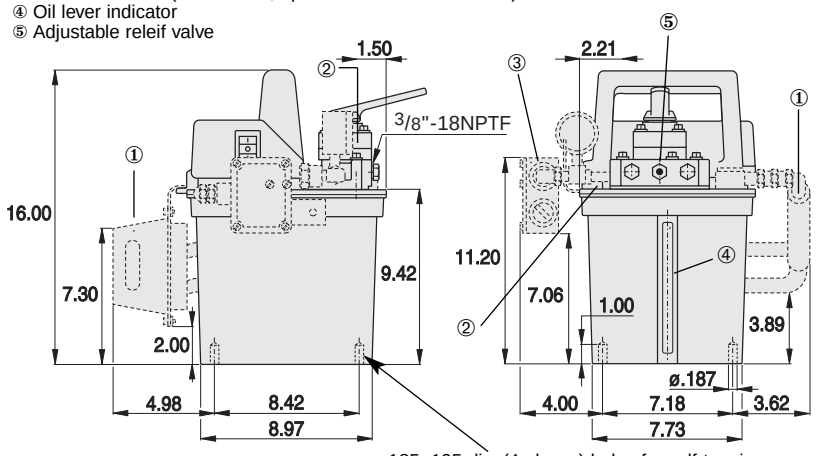
Distribute the load evenly across the entire saddle surface. Always use a saddle to protect the plunger.

IMPORTANT: Hydraulic equipment must only be serviced by a qualified hydraulic technician. For repair service, contact the Authorized ENERPAC Service Center in your area. To protect your warranty, use only ENERPAC oil.

WARNING: Immediately replace worn or damaged parts by genuine ENERPAC parts. Standard grade parts will break causing personal injury and property damage. ENERPAC parts are designed to fit properly and withstand high loads.

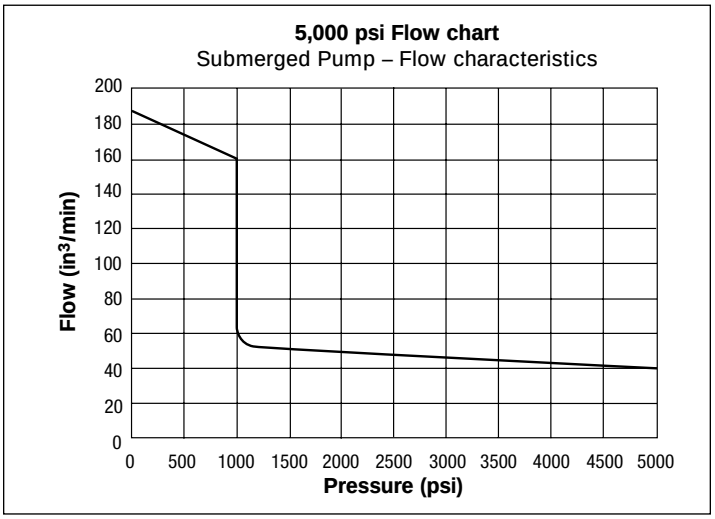
PUMP EXTERIOR DIMENSIONS

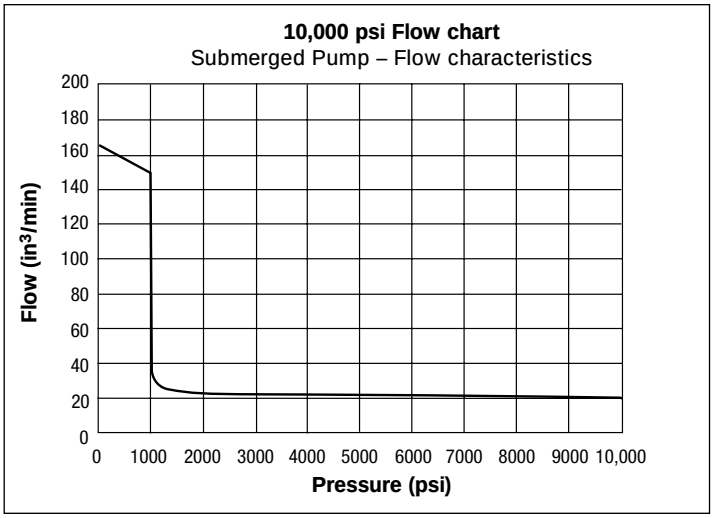
① Heat exchanger (optional for all models)
② Fill port
③ Pressure switch (PES-series, optional for all other models)
④ Oil lever indicator
⑤ Adjustable releif valve



Dimensions are in inches.

.185-.195 dia. (4 places) holes for self-tapping screws.





SPECIFICATIONS		
	5,000 PSI Models	**10,000 PSI Models**
Flow vs Pressure	150 cu. in./min at 0 - 1,000 psi	
	40 cu. in./min at 1,000 - 5,000 psi	20 cu. in./min at 1,000 - 10,000 psi
Motor Voltage	B models - 115V, 1 phase, 50/60 cycle D models - 115V, 1 phase, 50/60 cycle with heat exchanger E models - 230V, 1 phase, 50/60 cycle F models - 230V, 1 phase, 50/60 cycle with heat exchanger	
Amperage Draw	13.5 Amps at maximum pressure @ 115 volts 6.75 Amps at maximum pressure @ 230 volts	
Relief Valve Adjustment Range	1,000 psi to 5,000 psi	1,000 psi to 10,000 psi
Oil Capacity	1.75 gal. total - 1.5 gal. usable	1.75 gal. total - 1.5 gal usable
Pressure Switches • **NEMA Classification** • **Pressure Range** • **Max. Differential**	 NEMA 1 500 - 5,000 psi 50 - 400 psi	 NEMA 13 700 - 10,000 psi 115 - 500 psi
DBA	62 - 78	62 - 78

3.0 Description

The submerged, 1/2 hp pump exists in five basic models. Each model is built with a common motor, cover plate and reservoir. The differences, between models, begins with variations in valves, pressure switches, heat exchangers and the combination of all the available options.

PEM/WEM

A basic pump with a manual valve.

PEJ/WEJ

Pump with a manual valve and remote pendant with "JOG" feature. Turns motor on or off.

PER/WER

Pump with electric solenoid valve and remote pendant.

PES/WES

Pump with manual valve, pressure switch and gauge.

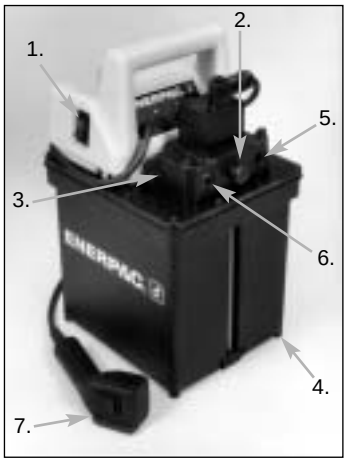
PED/WED

Basic pump with dump (auto-return) valve. Remote pendant to control motor.

4.0 INSTALLATION

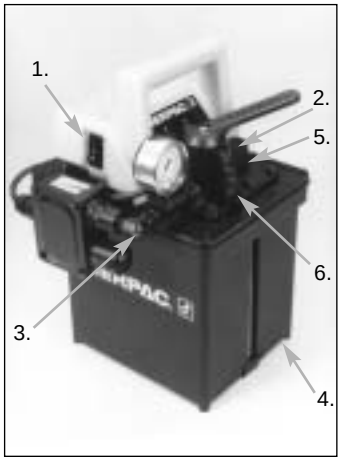
Dump Valve Model

1. ON - OFF switch
2. External relief valve
3. Gauge port
4. Mounting holes
5. Return-to-tank port
6. Advance port
7. Remote pendant



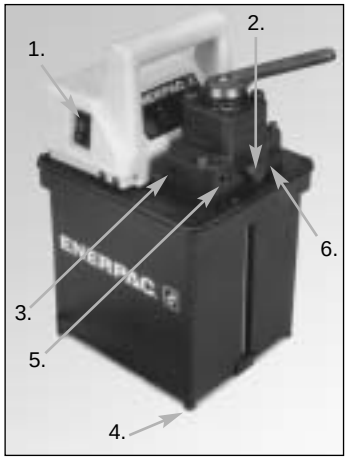
3-Way, 2-Position Manual Valve

1. ON - OFF switch
2. External relief valve
3. Gauge port
4. Mounting holes
5. Return-to-tank port
6. Advance port



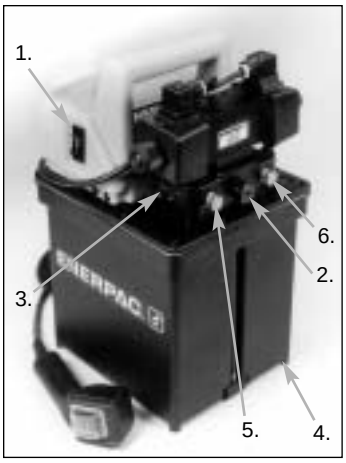
3-Way, 3-Position Manual and Solenoid Valve

1. ON - OFF switch
2. External relief valve
3. Gauge port
4. Mounting holes
5. Retract port
6. Advance port



4-Way Manual and Solenoid Valve

1. ON - OFF switch
2. External relief valve
3. Gauge port
4. Mounting holes
5. Retract port
6. Advance port



Gauges are recommended to monitor system pressure. A shutoff valve can be installed between gauge and pump to bypass the gauge and prolong its usefulness.

4.1 Electric Wiring

All 115V and 230V pumps are equipped with power cords and plugs. No additional wiring is required.

Local electrical power sources may require changes to standard plugs and cords on 230V models. If changes are required, use only qualified electricians to accomplish the wiring.

4.2 Pump Mounting

1. Mount pumps in vertical position with reservoir on a firm foundation.
2. Mounting holes rae located at each corner of the reservoir. Hole size is .185 diameter - .195. Use self tapping screws.

5.0 OPERATION

1. Open reservoir vent one complete turn. Leave vent open whenever pump is operating.

2. Check oil level prior to starting pump. Oil level gauge must be full. If required, add oil to reservoir.

3. Install hydraulic hoses to valve (on pump) and cylinders. Firmly tighten all couplers.

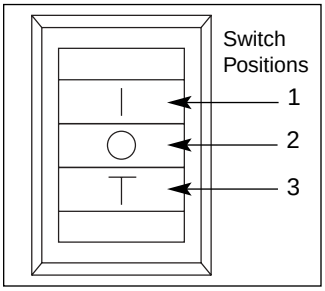
CAUTION: Hand tighten couplers. Do not use tools. Excessive force will cause damage which may lead to premature coupler failure.

4. A separate gauge port is located on the valve manifold. To install a gauge, remove the plug; thread gauge and appropriate fitting into the port.

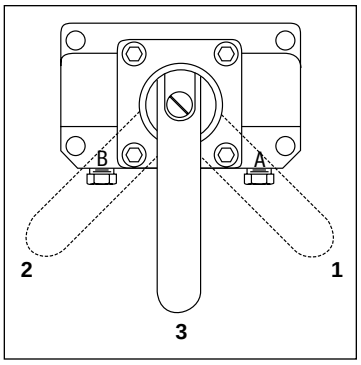
CAUTION: Teflon tape is an excellent thread sealer. Use only 1½ wraps on thread. Caution must be used to prevent tape from tearing off and entering the hydraulic system. Tape does not dissolve and will cause blockage which damages the pump.

6.0 PUMP AND VALVE ACTUATION

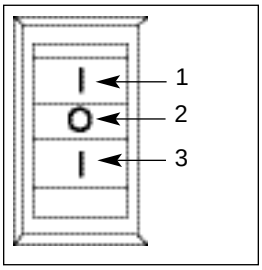
1. Manual Valves (PEM/WEM Models)
   a. Select switch position
      1. ON
      2. OFF
      3. JOG



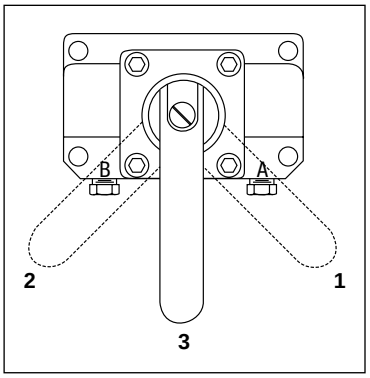
   b. Control hydraulic fluid flow by moving valve handle to:
      1. ADVANCE
      2. RETRACT
      3. NEUTRAL



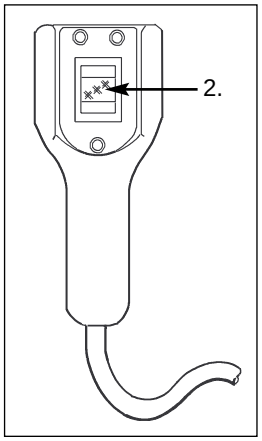
2. Manual Valve - JOG (PEJ/WEJ models)
   a. Select switch position
      1. ON (power to pendant only)
      2. OFF
      3. ON (Motor runs continuously)



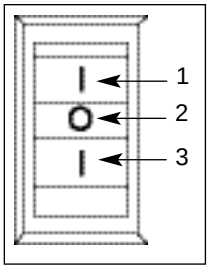
   b. Control hydraulic fluid flow by moving valve handle to:
      1. ADVANCE
      2. RETRACT
      3. NEUTRAL



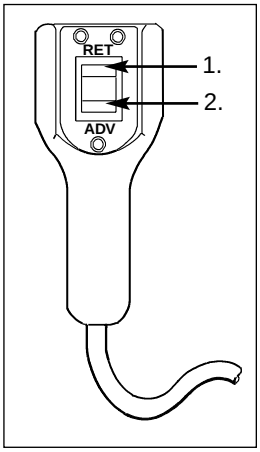
   c. Pendant Control
      1. Switch on shroud must be in power to pendant position (top pushed in).
      2. Press pendant switch to run motor. Release to stop motor.



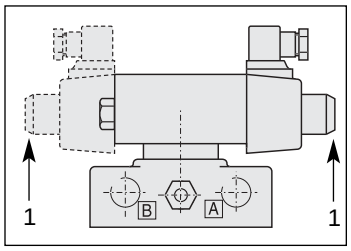
3. Solenoid Valve (PER/WER Models)
   a. Switch on shroud
      1. ON: Motor runs, power to pendant.
      2. OFF
      3. ON: Motor runs, no power to pendant.



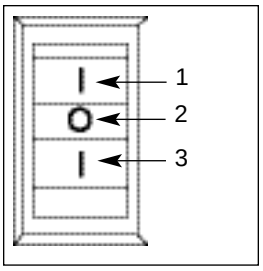
   b. Valve operation is controlled by the pendant switch.
      1. Press to retract
      2. Press to advance



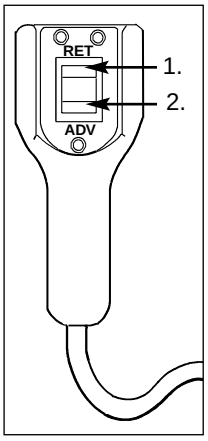
c. Solenoid valve has a manual override (1). Valve can be manually shifted in either direction, when needed.

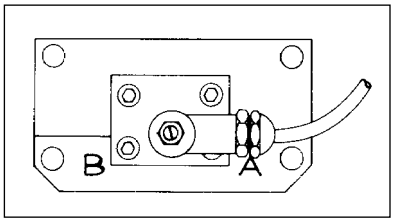


4. Dump Pump - PED/WED Models
   a. Switch
      1. Power to pendant.
      2. OFF
      3. ON (Motor runs, cylinder will advance.) To retract cylinder, press top of switch (1).

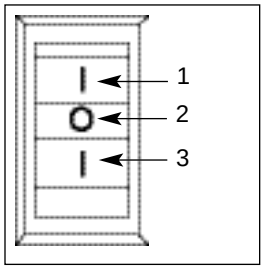


   b. Valve Operation (no external handle)
      1. Press pendant switch to start motor and advance cylinder.
      2. Release pendant switch to shut off motor and retract cylinder.

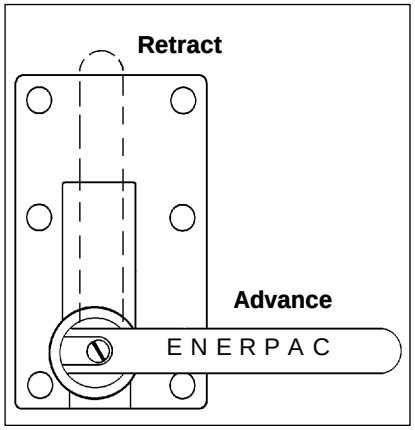




5. Pressure Switch Pumps - PES/WES Models
   a. Switch
      1. ON
      2. OFF
      3. OFF



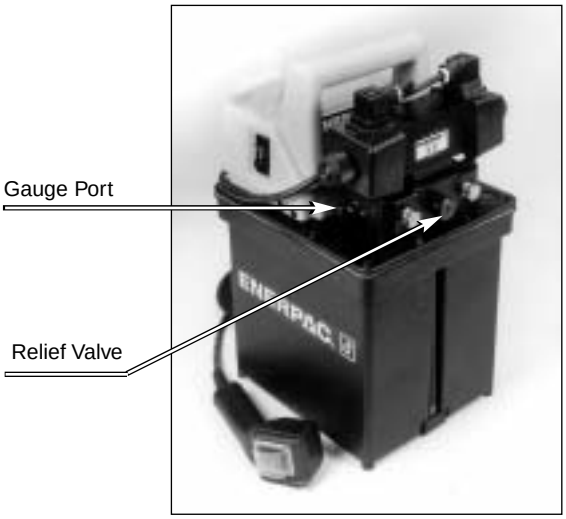
   b. Valve operation
      1. Valve handle moves to control oil flow.
      2. Pump runs until reaching preset pressure.
         PES models = 10,000 psi
         WES models = 5,000 psi
      3. Pressure adjustment– refer to switch and valve adjustment section.



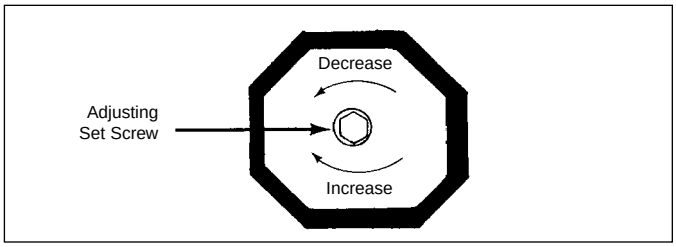
3-way, 2-postion valve shown. Other valves are available.

7.0 ADJUSTMENTS

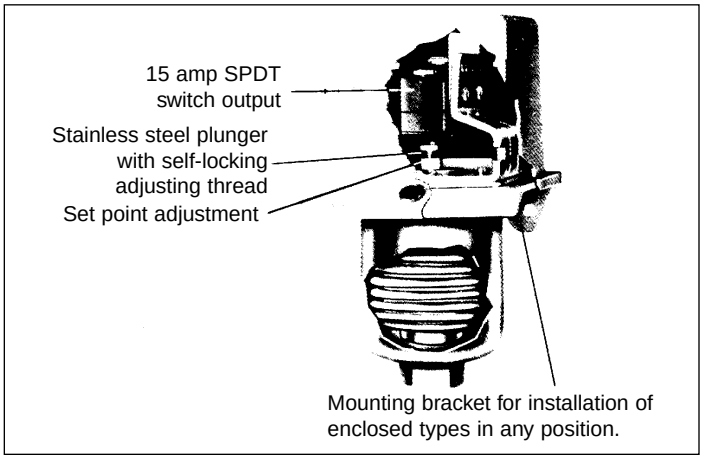
1. Relief Valves (External)
   Factory set at 10,000 psi or 5,000 psi depending on pump models.



   a. Install a gauge and fitting in pump port.
   b. With system hoses and cylinders connected, run pump.
   c. Turn adjusting set screw counter-clockwise to decrease pressure.
   d. Check setting by running two or three complete cycles.

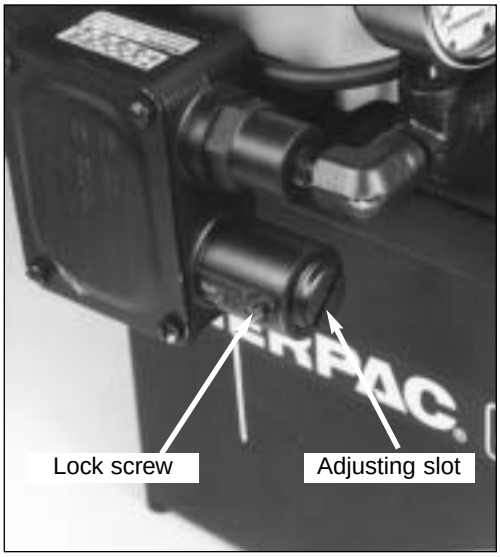


2. Pressure Switches
   a. Adjust pressure settings.
      5,000 psi model
      1. Adjustable range is 3,000-5,000 psi.
      2. Remove switch cover.
      3. To change set point, turn hex on base of plunger.
      4. Run pump. Observe gauge to check pressure settings. Re-adjust switch until desired limits are obtained.
      5. Re-install switch cover.

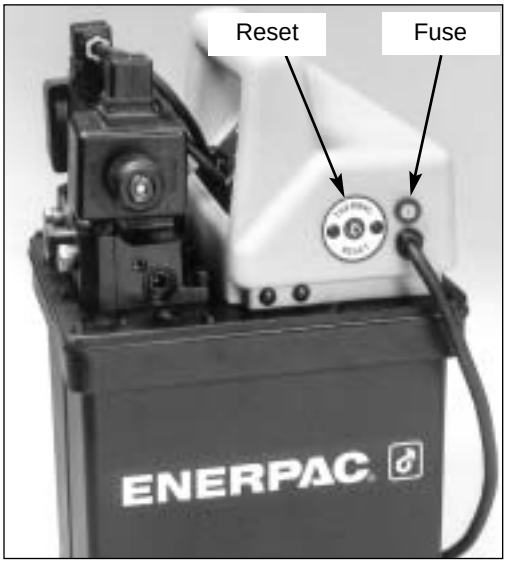


SPECIFICATIONS	
5,000 psi Pump (WES Models)	**10,000 psi Pump (PES Models)**
Pressure switch Model No. IC51	Pressure switch Model No. IC72
NEMA 1 Classification	NEMA 12 Classification
Pressure range: 3,000-5,000 psi	Pressure range: 700-10,000 psi
Maximum Differential: 350-800 psi	Maximum Differential: 115-550 psi
Electrical: 5 Amps at 125 VAC	Electrical: 10 Amps at 125 VAC 250 VAC or 480 VAC

b. Adjust pressure settings.
10,000 psi model
1. Loosen setscrew with No. 10 Allen wrench.
2. Using a screwdriver, turn adjustment screw clockwise to raise and counter-clockwise to lower actuation point.
3. Tighten setscrew.
4. Run pump to verify pressure.



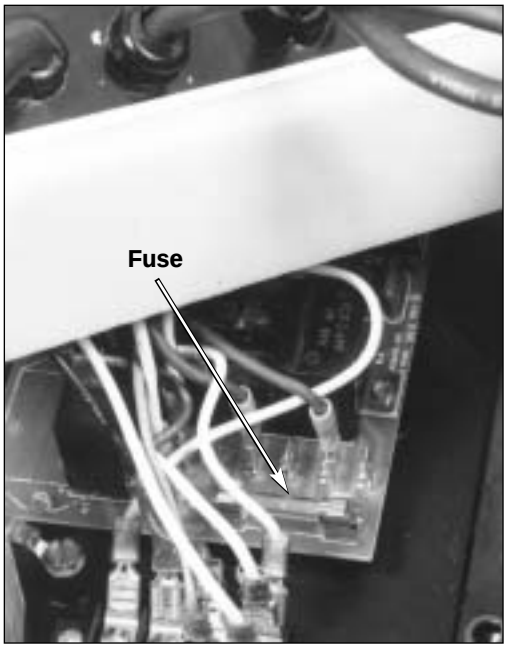
3. Thermal Relay
1. A thermal relay monitors oil temperature.
2. Motor will be shut off if oil temperature exceeds 190°-195°F.
3. Allow oil to cool. Press "reset" button to operate pump.



8.0 MAINTENANCE

8.1 Fuses

1. Main circuit board and solenoid protection.
Mounted on board:
115V models, 2 amp fuse;
230V models, 1 amp fuse



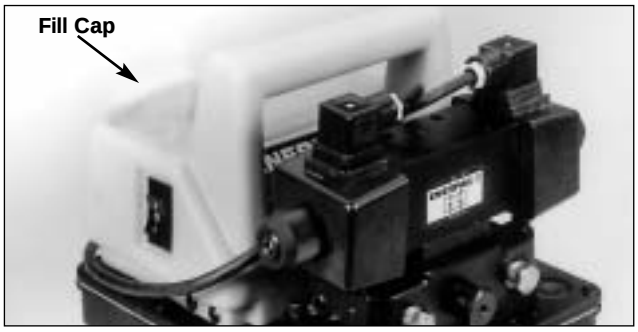
2. Line fuse located in the side of shroud.
Protects complete electric circuit.
Size: 115V models - 20 amp
230 V models - 10 amp plus an in-line 10 amp fuse to protect pump motor.

8.2 Hydraulic System

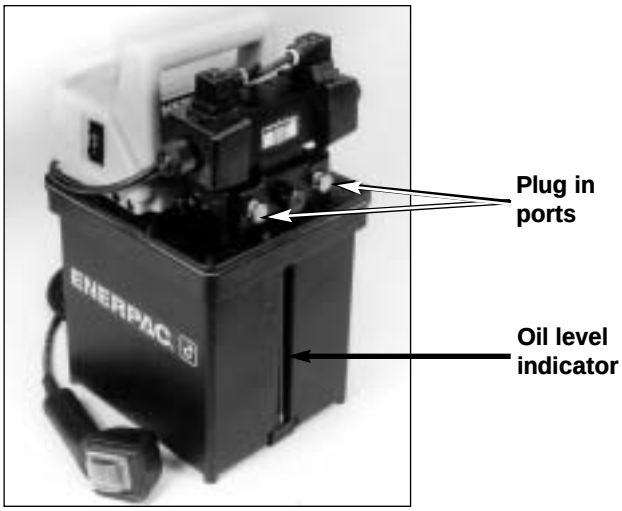
1. Return line filter.
   a. Check and clean every 150 hours of operation. Replace if clogged or damaged.
   b. To replace, unplug motor power cord, remove control valve and connectors.
   c. Lift filter canister out of cover.
   d. Grasp canister with vise grip. Insert a 3/8" Allen wrench into top hex and unthread top. Remove filter element and clean or replace.
   e. Re-assemble filter canister. Check o-ring. Place canister into cover plate and install the control valve and connectors.

NOTE: Pumps with heat exchangers: Filter canister cannot be totally removed from coverplate. Leave partially in cover, grip canister and use 3/8" Allen wrench to remove the top. Remove filter element, clean or replace filter. Reassemble filter canister.

2. Changing Hydraulic Oil
   a. Drain oil and fill with new oil every 300 hours of operation.
   b. To drain oil, remove the fill plug. Tip the pump and drain oil out of fill opening.
   c. Re-fill reservoir with ENERPAC hydraulic oil. Use of any other oil or fluids could damage the pump, seals and hydraulic system components.



3. Storing the Pump
   a. Thoroughly clean the pump.
   b. Drain oil and fill with new oil. Install plugs in all ports.
   c. Cover the pump and store in a clean, dry location.



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