ENERPAC

Instruction Sheet

ULTIMA Series Hand Pumps
P-18, P-39, P-77, P-80, P-801 and P-84

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Repair Parts Sheets for this product are available from the Enerpac web site at www.enerpac.com, or from your nearest Enerpac Authorized 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 information about an 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.

WARNING: Never set the relief valve pressure above 10,500 psi [725 bar]. Serious personal injury could result if this maximum limit is exceeded. Damage to pump and components may also occur.

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 pump lifting/transport 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 150° F [65° C] 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 with 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.

CAUTION: Always use the pump lifting/transport handle to carry the pump. Carrying the pump by the hose may damage the hose and/or the pump.

3.0 PRODUCT INFORMATION

Table 1, Specifications - ULTIMA Series Hand Pumps

Pump Model	Pump Type (Speed)	Max. Pressure Rating psi [bar]		Oil Volume Per Stroke in^3 [cm^3]		Usable Oil Capacity in^3 [cm^3]	Weight With Oil lbs [kg]	Max. Handle Effort lbs [kg]
		Stage 1	Stage 2	Stage 1	Stage 2			
P-18	1	—	2850 [200]	—	0.15 [2,46]	22 [360]	11.0 [5,2]	34 [16]
P-39	1	—	10,000 [700]	—	0.15 [2,46]	41 [680]	13.6 [6,2]	85 [38]
P-77	2	500 [34]	10,000 [700]	1.00 [16.38]	0.15 [2,46]	41 [680]	15.6 [7,1]	88 [40]
P-80	2	500 [34]	10,000 [700]	1.00 [16.38]	0.15 [2,46]	134 [2195]	23.6 [10,7]	77 [35]
P-801	2	500 [34]	10,000 [700]	1.00 [16.38]	0.15 [2,46]	250 [4095]	31.0 [14,0]	77 [35]
P-84	2	500 [34]	10,000 [700]	1.00 [16.38]	0.15 [2,46]	134 [2195]	26.0 [11,7]	77 [35]

Table 2, Features and Major Components - ULTIMA Series Hand Pumps

Item (See figures 1 thru 4 for item locations)	Pump Model					
	P-18	P-39	P-77	P-80	P-801	P-84
A	Release Valve	Release Valve	Release Valve	Release Valve	Release Valve	4-Way, 3-Position Control Valve
B	One 3/8" NPTF Outlet Port	One 3/8" NPTF Outlet Port	One 3/8" NPTF Outlet Port	One 3/8" NPTF Outlet Port	One 3/8" NPTF Outlet Port	Two 3/8" NPTF Outlet Ports
C	Oil Fill Plug	Oil Fill Plug	Oil Fill Plug	Oil Fill Plug	Oil Fill Plug	Oil Fill Plug
D	Mounting Slots	Mounting Slots	Mounting Slots	Mounting Slots	Mounting Slots	Mounting Slots
E	User-Adjustable Relief Valve	User-Adjustable Relief Valve	User-Adjustable Relief Valve	User-Adjustable Relief Valve	User-Adjustable Relief Valve	User-Adjustable Relief Valve
F	—	—	—	3/8" NPTF Return to Tank Port	3/8" NPTF Return to Tank Port	—
G	—	—	Bypass Valve	Bypass Valve	Bypass Valve	Bypass Valve

3.1 Pump Features and Major Components

See figures 1 through 4 for the locations of pump features and major components. Refer to Table 2 for descriptions of items A through G.

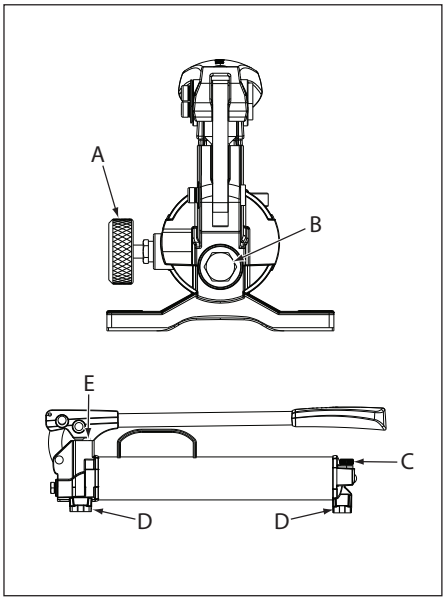


Figure 1, Models P-18 and P-39

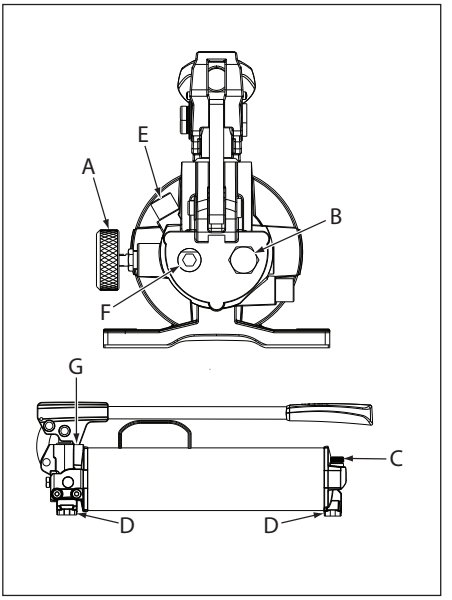


Figure 3, Models, P-80 and P-801

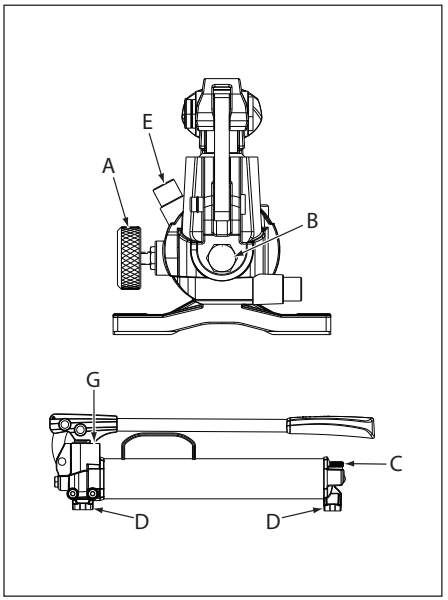


Figure 2, Model P-77

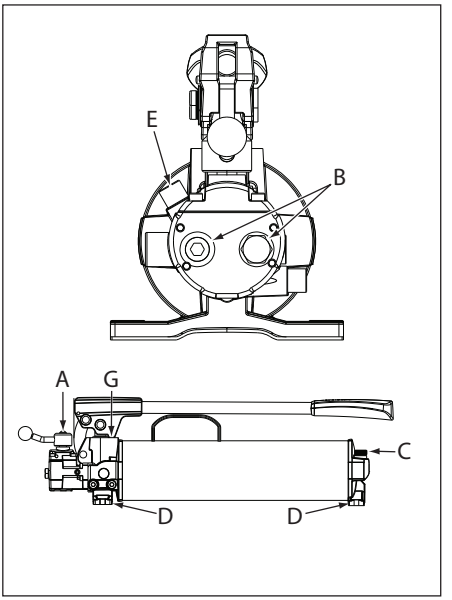
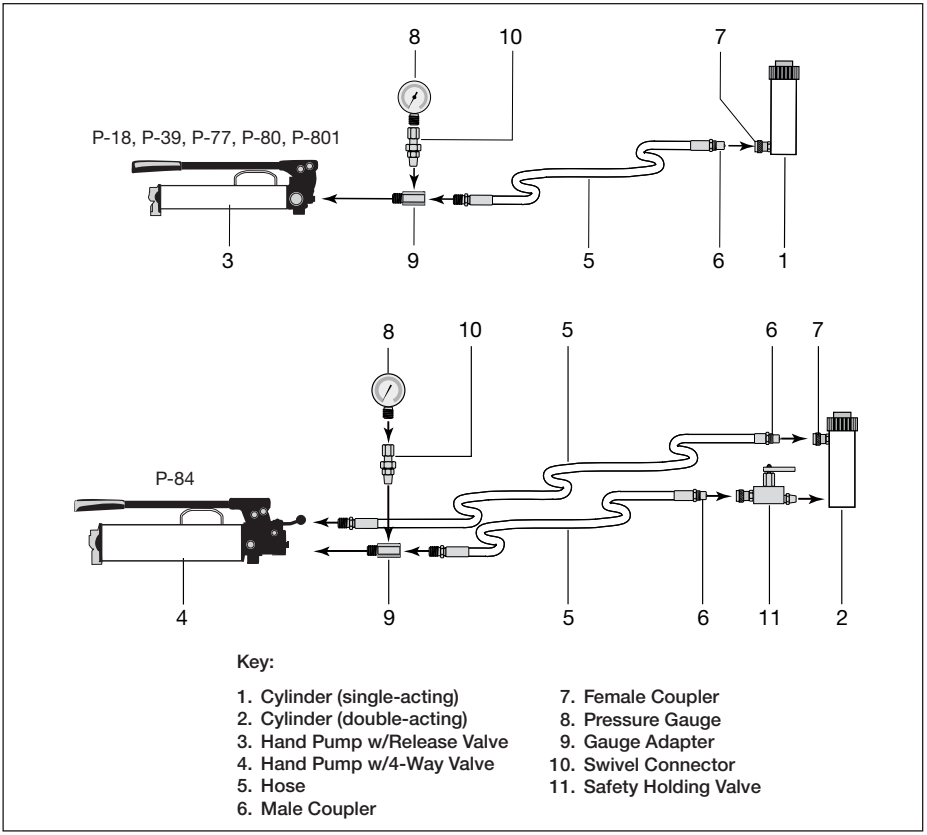


Figure 4, Model P-84



Key:

1. Cylinder (single-acting)
2. Cylinder (double-acting)
3. Hand Pump w/Release Valve
4. Hand Pump w/4-Way Valve
5. Hose
6. Male Coupler
7. Female Coupler
8. Pressure Gauge
9. Gauge Adapter
10. Swivel Connector
11. Safety Holding Valve

Figure 5, Hydraulic Connections (typical)

4.0 INSTALLATION

4.1 Connecting the Pump

1. Remove shipping plug(s) from pump outlet port(s).
2. Adjust the relief valve to the desired hydraulic pressure limit. See Section 7.0 for instructions.
3. Connect hose(s) to pump. To seal threads, use anaerobic thread sealer, Teflon® paste or Teflon® tape.

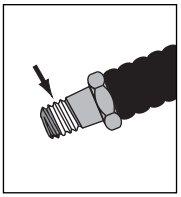


Figure 6

IMPORTANT: When using Teflon® tape, apply the tape one thread back from the end of the fitting to prevent pieces of tape from entering the hydraulic system. See Figure 6.

4. Install a pressure gauge in-line from the pump for added safety and better control.
5. Connect the hose(s) to your cylinder or tool.

   • For single-acting cylinders, connect one hose from the pump to the cylinder.

   • For double-acting cylinders, connect two hoses. Connect one hose from port (A) of the pump to the advance port of the cylinder. Connect another hose from port (B) of the pump to the retract port of the cylinder.

   Models P-80 and P-801 only: If an external pressure reducing valve is being used in the circuit, connect the tank port of the valve to the return-to-tank port on the pump.

Note: Cylinders, hoses and accessories shown in Figure 5 are sold separately and not included with pump. Refer to the Enerpac catalog for a complete description of available components and accessories. The exact components required for your system will vary, depending on application and other factors.

4.2 Pump Venting

The ULTIMA series hand pumps are designed for non-vented operation. The oil fill plug can be loosened if needed to vent air from the system but should be fully installed before using the pump.

IMPORTANT: To prevent contaminants from entering the hydraulic system, do not operate pump with oil fill plug loosened or removed.

4.3 Pump Position

The pump may be operated in either the horizontal or vertical position. See Figure 7.

When operated in the vertical position, hose end of pump must be pointed down, or the pump will pick up air and will not properly build pressure.

Note: The pump is not designed for use in the inverted (upside-down) position.

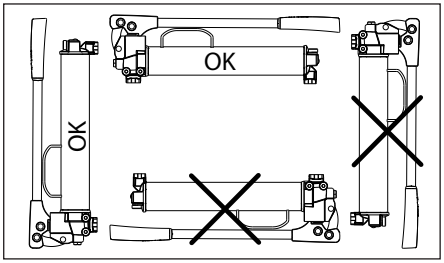


Figure 7, Pump Orientation

5.0 OPERATION

5.1 Before Using the Pump

1. Check all system fittings and connections to be sure they are tight and leak free.
2. Check oil level in reservoir and add oil if required. Refer to instructions in Section 9.1.
3. Read and understand the following precautions before operating pump:

WARNING: In certain situations the pump handle can "kick back". Always keep your body to the side of the pump, away from the line of force of the handle.

WARNING: When operating the pump handle, keep hands and fingers away from pinch point area between pump handle and lifting/transport handle.

CAUTION: Always remove shipping plug(s) from pump outlet port(s) and replace with proper hydraulic fitting(s) before operating pump handle. If pump handle is operated with shipping plug(s) installed, plug(s) could eject from port(s) with great force, resulting in possible personal injury.

CAUTION: Never add extensions to pump handle. Extensions cause unstable pump operation.

CAUTION: To prevent mechanical damage, do not pull on pump handle after it has reached the end of its travel. Do not apply side force to pump handle.

IMPORTANT: To reduce handle effort at high pressure, take short strokes. Maximum leverage is obtained in the last 5 degrees of stroke.

5.2 Two Stage Flow Models P-77, P-80, P-801 and P-84

Two-speed pumps provide two stage flow. Under no-load, the pump operates in the high flow first stage for rapid advance. When the load is contacted, the pump automatically shifts to the second stage for building pressure. After the pump shifts, pumping takes less effort.

Note: For best performance, operate pump handle at moderate speed during the high flow first stage. Rapid handle speed in the first stage will prevent the pump from delivering full volume of oil.

5.3 Pump Operation Models P-18, P-39, P-77, P-80 and P-801

All pump models except the P-84 are designed for use with single-acting cylinders and are equipped with an integral release valve.

1. Close the release valve by turning knob clockwise until it stops. See Figure 8.

CAUTION: Close release valve finger tight ONLY. Using tools on release valve can damage it and cause the pump to malfunction.

2. Operate pump handle to deliver hydraulic power to system. Pressure will be maintained until release valve is opened.
3. Open the release valve by turning knob counter-clockwise. Pressure will be released, allowing oil to flow back to the reservoir.

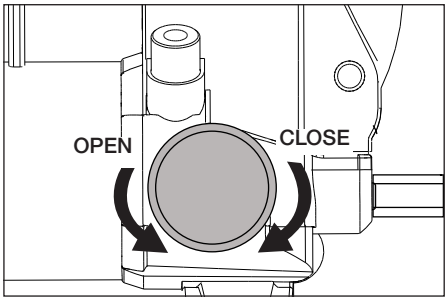


Figure 8, Release Valve (all except P-84)

CAUTION: If release valve knob is difficult to turn or becomes stuck, immediately discontinue using pump. Have pump inspected and repaired by an Enerpac Authorized Service Center.

5.4 Pump Operation - Model P-84

The model P-84 is equipped with a 4-way, 3-position control valve. It is designed for use with double-acting cylinders. See figures 9 and 10.

1. Position lever on 4-way valve to select function as follows:

   (A) Flow directed to port "A"; port "B" returns flow to the reservoir.

   (N) Neutral - ports "A" and "B" open to the reservoir.

   (B) Flow directed to port "B"; port "A" returns flow to the reservoir.

WARNING: Valve contains no load holding device. Be sure load is supported by blocking, mechanical stands or other appropriate supports before moving valve lever to the neutral (N) position.

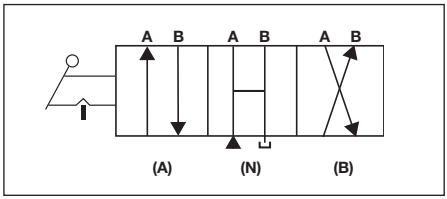


Figure 9, 4-Way Valve Diagram (P-84)

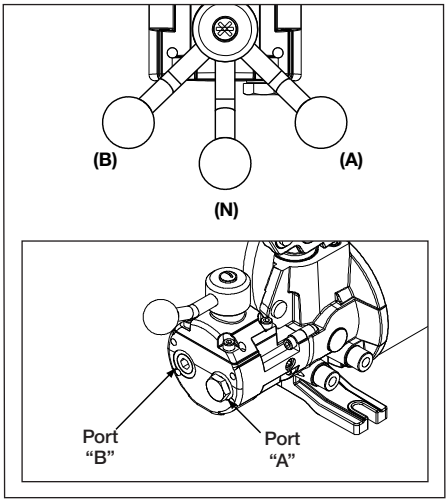


Figure 10, Control Valve Lever Positions and Hose Connections (P-84)

2. Operate pump to perform work.
3. Change valve positions as needed.

WARNING: Operate double-acting cylinder only when both hoses are connected to the pump. If one coupler is left unconnected, high pressure will build behind the coupler which could cause personal injury and/or equipment damage.

6.0 AIR REMOVAL

Removing air from the hydraulic system will help the cylinder to advance and retract smoothly.

6.1 Pump With Single-Acting Cylinder

1. Loosen and remove oil fill plug to provide reservoir venting during the following steps.
2. Fully close release valve.
3. Position pump in the horizontal position at higher elevation than cylinder. See Figure 11.
4. Position cylinder with the plunger end down (up if using pull cylinder).
5. Operate pump to fully extend the cylinder (retract if using pull cylinder).
6. Open release valve to retract cylinder (extend if using pull cylinder). This will force the trapped air to move up to the pump reservoir.
7. Repeat steps 2 through 6 as needed, until cylinder operation is smooth.
8. Add oil if necessary. See Section 9.1.
9. Reinstall oil fill plug.

6.2 Pump With Double-Acting Cylinder

1. Loosen oil fill plug several turns to allow reservoir venting during the following steps.
2. Position pump in the horizontal position at higher elevation than cylinder. See Figure 11.
3. Put cylinder in horizontal position with ports up.
4. Fully advance and retract the cylinder 2 to 3 times.
5. Repeat steps 2 through 4 as needed, until cylinder operation is smooth.
6. Add oil if necessary. See Section 9.1.
7. Reinstall oil fill plug.

7.0 RELIEF VALVE ADJUSTMENT

1. **All models except P-84:** Install a 0-15,000 psi [0-1000 bar] pressure gauge in the pump oil outlet port. Close the release valve (turn knob fully clockwise until it stops).

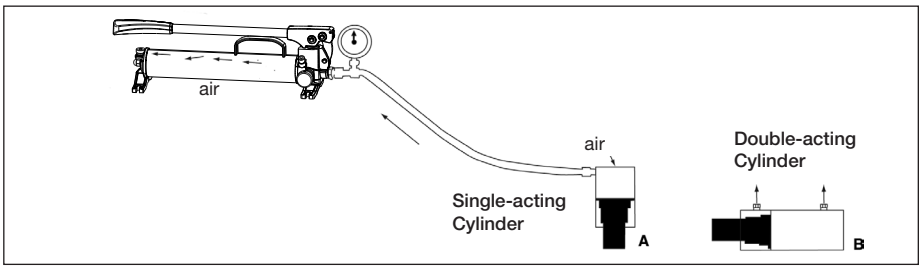


Figure 11, Air Removal

2. **Model P-84 only:** install a 0-15,000 psi [0-1000 bar] pressure gauge in the pump “A” port. Install a pipe plug in the pump “B” port. Move the control valve lever to the **(A)** position.
3. Using a 1/4" Allen wrench, remove the dust plug over the relief valve adjustment screw.

   • On models P-18 and P-39, the relief valve is located on the top surface of the pump head. See Figure 12.

   • On models, P-77, P-80, P-801 and P-84, the relief valve is located on the side of the pump head. See Figure 13.

Note: To obtain an accurate setting during the following steps, always decrease the pressure to a point *below* the desired final setting and then slowly increase the pressure until the final setting is reached.

4. Using a 7/32" Allen wrench, loosen the relief valve adjustment screw about 2 turns. See Figure 14.
5. While operating the pump handle, slowly turn the relief valve adjustment screw clockwise until pressure increases to the desired setting. The pressure setting is indicated when additional pumping does not result in a higher pressure reading on the gauge.

WARNING: Never set the relief valve pressure above 10,500 psi [725 bar]. Serious personal injury could result if this maximum limit is exceeded. Damage to pump and components may also occur.

6. **All models except P-84:** After the desired setting is obtained, turn the release valve counter clockwise to relieve system pressure. Check that pressure gauge indicates zero (0) psi/bar.
7. **Model P-84 only:** After the desired setting is obtained, move the valve handle to the **(N)** neutral position to relieve system pressure. Check that pressure gauge indicates zero (0) psi/bar.
8. **All models except P-84:** Remove pressure gauge from pump oil outlet port. Reinstall dust plug over relief valve adjustment screw.
9. **Model P-84 only:** Remove pressure gauge from pump “A” port. Remove pipe plug from pump “B” port. Reinstall dust plug over relief valve adjustment screw.

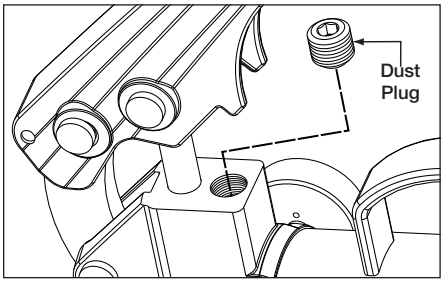


Figure 12, Relief Valve (P-18 and P-39)

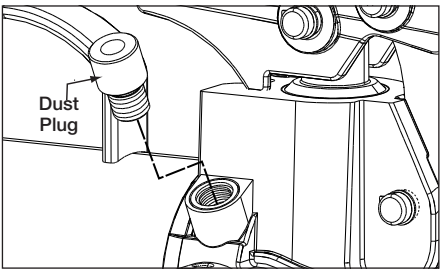


Figure 13, Relief Valve (P-77, P-80, P-801 and P-84)

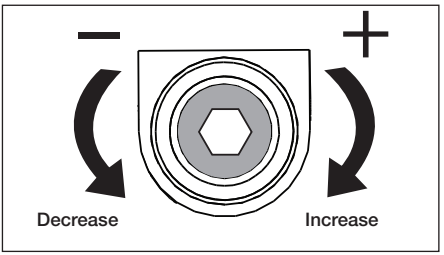


Figure 14, Relief Valve Adjustment Screw

8.0 BYPASS VALVE ADJUSTMENT MODELS P-77, P-80, P-801 and P-84

The bypass valve controls the pressure at which a two-speed pump shifts from the first to the second stage. See Figure 15.

The bypass valve is factory set and should not require readjustment unless the pump is overhauled or repaired. If needed, readjustment should be performed only by an Enerpac Authorized Service Center.

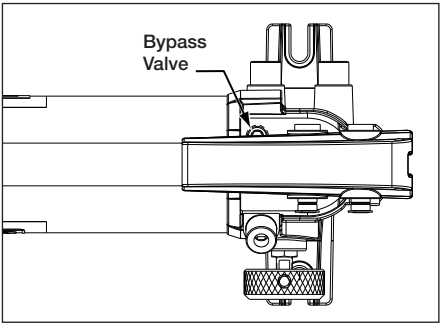


Figure 15, Bypass Valve (P-77, P-80, P-801 and P-84)

9.0 MAINTENANCE

Use only Enerpac hydraulic oil with the pump to promote long pump life and to protect your warranty. Viton and EPR seal kits are available for some hand pump models. Contact your Enerpac representative for more information on these products and their applications.

9.1 Adding Oil to the Pump

WARNING: Always add oil with cylinders fully retracted (extended if pull cylinders) or the system will contain more oil than the reservoir can hold.

Check oil level regularly and add oil if needed. Refer to the following steps:

1. Place pump in the horizontal position on a level surface.
2. Remove oil fill plug from reservoir.
3. Check oil level. See Figure 16. If oil level is low, add additional oil until oil level is up to the bottom thread of the oil fill plug opening.

IMPORTANT: Do not overfill! Some air space must be present in reservoir to allow proper operation. If the reservoir contains too much oil, a vacuum will form, preventing oil flow when pump is operated.

4. Reinstall oil fill plug after adding oil. Be sure that plug is fully installed (not loose).
5. Remove air from system if necessary. See Section 6.0. Recheck oil level after removing air.

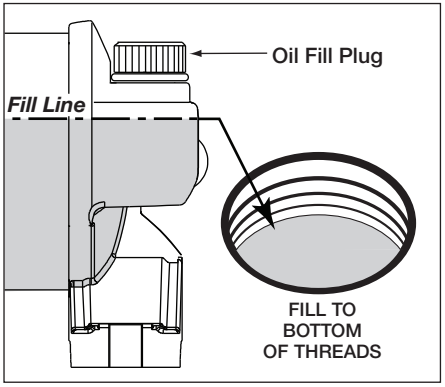


Figure 16, Reservoir Oil Level

WARNING: The oil fill plug contains an integral pressure relief passage, a safety feature that prevents over-pressurization of the reservoir. Use only the oil fill plug supplied with the pump or a genuine Enerpac replacement plug of identical specifications.

CAUTION:. Never attempt to return more oil to the reservoir than it is capable of holding.

9.2 Changing the Oil

Drain all oil from reservoir and refill with clean Enerpac oil every 12 months. If pump is used in dirty environments, change the oil more frequently.

1. Remove oil fill plug from reservoir.
2. Tilt pump to drain out old oil.

IMPORTANT: Dispose of used oil in accordance with all applicable laws and regulations.

3. Fill reservoir with new Enerpac oil. Refer to Section 9.1 for additional information.
4. Reinstall oil fill plug.

9.3 Lubrication

To extend pump life and improve performance, lubricate the three pump handle pins regularly, using roller bearing grease. See Figure 17.

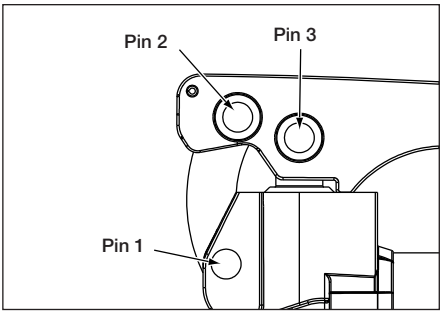


Figure 17, Lubrication Points

9.4 Keeping Oil Lines Clean

Always install dust caps when coupler halves are disconnected. To help prevent failure of pump and other components, use every precaution to guard the system against entrance of dirt and other foreign matter.

10.0 TROUBLESHOOTING GUIDE

The information in the troubleshooting guide (see Table 3) is intended only as an aid to help diagnose and correct selected problems that may occur.

A system failure may or may not be the result of a pump malfunction. To determine the cause of the problem, the complete system must be included in any diagnostic procedure.

For repair service, contact your local Enerpac Authorized Service Center. Only an Enerpac Authorized Service Center should service the pump or system components.

Table 3, Troubleshooting Guide - ULTIMA Series Hand Pumps		
Problem	**Possible Cause**	**Solution**
Cylinder does not advance, advances slowly, or advances erratically.	1. Low oil level in pump reservoir. 2. Release valve open or not fully closed. 3. Relief valve setting too low. 4. Hydraulic coupler not properly connected. 5. Load is too heavy. 6. Air trapped in system. 7. Reservoir overfilled. 8. Cylinder plunger binding.	1. Add oil according to the instructions in Section 9.1. 2. Close the release valve. 3. Set the relief valve pressure according to instructions in Section 7.0. 4. Check that all couplers are fully tightened. 5. Do not attempt to lift more than rated tonnage. 6. Remove air according to the instructions in Section 6.0. 7. Remove excess oil from reservoir. **Note:** If cylinder operates normally when pump oil fill plug is loosened, reservoir may be overfilled with oil. 8. Check for damage to cylinder. Have cylinder serviced by an Enerpac Authorized Service Center.
Cylinder advances, but does not hold pressure.	1. Leaking connection. 2. Leaking seals. 3. Internal leakage in pump. 4. Bypass valve setting too low. (Models P-77, P-80, P-801 and P-84)	1. Check that all connections are tight and leak free. 2. Locate leak(s) and have equipment serviced by an Enerpac Authorized Service Center. 3. Have pump serviced by an Enerpac Authorized Service Center. 4. Have an Enerpac Authorized Service Center adjust the bypass valve setting.
Cylinder does not retract, retracts part way, or retracts more slowly than normal.	1. Release valve closed. 2. Reservoir overfilled. 3. Hydraulic coupler not properly connected. 4. Air trapped in system. 5. Hose inside diameter too narrow. 6. Cylinder retraction spring broken or other cylinder damage. 7. In-line valve closed.	1. Open the release valve. 2. Remove excess oil from reservoir. **Note:** If cylinder operates normally when pump oil fill plug is loosened, reservoir may be overfilled with oil. 3. Check that all couplers are fully tightened. 4. Remove air according to the instructions in Section 6.0. 5. Use larger diameter hydraulic hose. 6. Have cylinder serviced by an Enerpac Authorized Service Center. 7. Ensure that in-line valves (if used) are correctly set.

Note: For the location of your nearest Enerpac Authorized Service Center go to **www.enerpac.com**.