



**SERVICE INSTRUCTIONS:** These *Service Instructions* are intended to be used by qualified personnel at Authorized Enerpac Service Centers. Users of Enerpac equipment should see the pump *Instruction Sheet* for installation, operation, and maintenance information.

**IMPORTANT:** This guide shows how to completely tear down the pump, which may not be required. The pump should be tested prior to service to avoid unnecessary labor. Please refer to Pump Test Procedure on page 2 and Troubleshooting Guide on page 4.

#### YOU MAY NEED:

- |                               |                                |                         |
|-------------------------------|--------------------------------|-------------------------|
| ✓ test bench                  | ✓ torque wrench                | ✓ snap-ring pliers      |
| ✓ 0-10,000 psi hand pump      | ✓ box end wrenches             | ✓ O-ring pick           |
| ✓ 0-15,000 psi pressure gauge | ✓ Allen wrenches (5/32" 7/32") | ✓ RTV sealant           |
| ✓ V-152 relief valve          | ✓ roll pin punch (5/32")       | ✓ roller bearing grease |
|                               |                                | ✓ Enerpac hydraulic oil |

#### DISASSEMBLY



**WARNING:** Be sure pump is disconnected from power source before disassembling.

#### Shroud Removal

1. Remove the six 1/8" socket head screws (item 18) from bottom of yellow pump motor shroud.
2. Remove shroud (item 16) from pump, making sure foam baffle (item 19) stays on electric motor. Use care to not disconnect or damage wiring in the shroud. **NOTE:** Foam baffle may be glued to shroud.

#### Wire Removal

**NOTE:** Refer to wiring diagram on Repair Parts sheet. Mark wires before removing to aid during re-assembly.

1. Disconnect black power cord wire from thermostat (item 6).
2. Disconnect black power switch jump wire from thermostat (item 6).
3. **PUJ, 4001 only:** Disconnect black pendant wire from transformer (item 38) at connection #8.
4. **PUJ, 4001 only:** Disconnect white pendant wire from relay (item 39).
5. **PUJ, 4001 only:** Disconnect transformer lead wire (item 45) from white power cord wire and black motor wire by unplugging connector.
6. **PUJ, 4001 only:** Disconnect black motor wire from relay (item 39) and power switch (item 20) by unplugging respective flags.
7. **PUM, 4001 only:** Disconnect black motor wire (item 22) from power switch (item 20).  
Shroud may now be removed from pump.
8. Disconnect power cord (item 9) and pendant cord (item 41) from the pump by removing their anchor screws.
9. Remove foam baffle (item 19) from motor (item 102).

**NOTE:** Foam baffle may be glued to motor.

#### Remove 2-Way Valve

1. Remove the screw, valve handle, o-ring, washer, stem, and 5/16" ball (items 138, 139, 135, 132, 133, 134).
2. Stem, ball and seat can now be inspected if necessary.

#### Disassemble Pump

1. To disassemble the adjustable relief valve, remove cap nut, lock nut, gasket, adjusting screw, spring, ball guide, 3/16" ball, seat, and gasket (items 131, 130, 129, 128, 126, 125, 124).
2. Remove the 8 screws (item 5) and washers (item 4) that hold the pump cover plate onto the reservoir (item 3).
3. Remove pump unit from reservoir.  
**NOTE:** Pump may need to be pried from reservoir and gasket due to the RTV sealant on both sides of the gasket.
4. Remove unloading valve assembly (items 150, 142, 143) from the high flow, low pressure piston block (item 105).
5. Remove check assembly from the high flow piston block by removing the plug, spring and 1/4" ball (items 146, 147, 148).
6. Remove the safety relief valve (item 121) from the pump manifold.

#### Remove Piston Blocks

**IMPORTANT:** During removal of high and low pressure piston block assemblies, hold piston block firmly against the manifold when removing cap screws. This will help prevent the plunger spring from cocking the block and causing damage to the outlets.

1. Remove high flow piston block (item 105, large .53 diameter piston).
  - a. Remove the two 3/16" socket screws (item 109) that anchor the piston block. Use care to prevent block from cocking.
2. Remove high pressure piston block (item 107, small .24 diameter piston).
  - a. Remove the two 3/16" socket screws (item 109) that anchor the piston block. Use care to prevent block from cocking.
  - b. Remove o-ring between block and manifold.

### Remove Motor (If necessary)

1. Remove the two nuts and washers (items 15, 14) from the underside of the pump manifold and remove motor (item 102).  
**NOTE:** Motor is secured with RTV sealant and must be pried from manifold to remove.

### Disassemble Pump Shaft

1. Remove retaining ring (item 144), and bearings (items 117 and 118) from shaft, if required.
2. Remove roll pin (item 115) from gear and shaft (items 144, 119), by using a 5/32" roll pin punch.
3. Remove shaft (item 13) from pump manifold.
4. Remove gear (item 114) and disc bearings; two white (item 145), and one black bearing (item 116).

### ASSEMBLY

Refer to Repair Parts Sheet L2071 and use repair kit PUJ-1200BK1.

**IMPORTANT:** Use suitable solvent to clean all parts prior to assembly. Clean RTV sealant from motor end cap, top and bottom of pump manifold and reservoir assembly. Rebuild using replacement items from repair kit.

### Assemble Pump Shaft

1. Assemble gear (item 114) and disc bearings into pump manifold. Install one white bearing (item 145 from new kit) above the gear, the black bearing (item 115) directly below gear and the other new white bearing at the bottom.
2. Install shaft (item 119) through lower manifold bearing, gear and washers, and into upper manifold bearing.
3. Install new roll pin (item 115) from kit through hole in gear and shaft (items 114 and 119). With these holes aligned, use a 5/32" roll pin punch and tap the roll pin onto place.
4. Assemble bearings (items 117 and 118) to shaft. Using retaining ring pliers, place retaining ring (item 144) onto shaft.

### Install Motor

**NOTE:** Before installation, apply a thin continuous bead of RTV sealant to motor end cap at three locations: around the tie rods and at the center boss.

1. Position the motor onto manifold with wire leads at top of motor facing to the left with hydraulic output port facing you.
2. Secure the motor to the manifold by placing the two lock washers (item 14) and nuts (item 15) on the motor tie rods under the manifold. Torque nuts to 34-38 in-lbs.

### Assemble Piston Block

**IMPORTANT:** During installation of piston blocks, hold manifold firmly when tightening cap screws. This will help prevent plunger spring from cocking block and causing damage to the outlets.

1. Assemble high-pressure piston block (item 107, small .24 diameter piston).
  - a. Place new white o-ring (item 108) from kit between block and manifold.
  - b. Anchor piston block by compressing piston spring against eccentric bearing and hold firmly in place. Use care to prevent block from cocking. Tighten the two 3/16" socket screws (item 109). Torque to 14-16 ft-lbs.
2. Assemble high-flow piston block (item 105, large .53 diameter piston).
  - a. Place new black o-ring from kit between block and manifold.

- b. Anchor piston block by compressing piston spring against eccentric bearing and hold firmly in place. Use care to prevent block from cocking. Tighten the two 3/16" socket screws (item 109). Torque to 14-16 ft-lbs.

### Pump Re-Assembly

1. Install safety relief valve (item 121) to manifold to manifold.
2. Install check for high flow piston block by replacing the 1/4" ball, spring, and plug (items 146, 147, 148) with new ones from kit.  
Coin seat if required by using a 1/4" coining tool.
3. Install unloading valve assembly (item 150) into high flow piston block (item 105).  
**NOTE:** Unloading valve comes preset from factory and is not adjustable. If valve is defective, replace.  
Position and tighten elbow (item 142) and unloading tube (item 143) to point at the gear mesh (item 114) so gear will be lubricated.
4. Install new gasket (item 156) on reservoir (item 3). Align holes on pump manifold with holes on reservoir.  
**NOTE:** Apply sealant to the top of the reservoir before installing the cork gasket. Do not use any sealant on the nitrile gasket.
5. Install the 8 slot head screws (items 5) and washers (items 4) that hold the pump cover plate onto the reservoir. Torque to 47-53 in-lbs. (5.3-6.0 Nm).

### 2-Way Valve Installation

1. To Install 2-way valve, use the stem, handle, and screw (items 133, 138, 139) that came with pump and replace the ball, o-ring, and washer (items 132, 134, 135) with new parts from the repair kit.
2. Replace adjustable relief assembly and install new gasket, ball, and gasket (items 193, 123, 106, 192, 124, 195, 125, 126, 128, 129, 130, 131) from kit. Do not adjust screw until testing procedure.

### Wiring Connections

Refer to wiring diagram in repair parts sheet.

1. Install the foam baffle (item 19) on motor. Center baffle between upper and lower air vent holes in motor.
2. Attach power cord (item 9) and pendant cord to pump manifold by using the anchor strap and screws.
3. **PUJ, 4001 only:** Connect black motor wire (item 43) flag to relay (item 39) and then to power switch (item 20).
4. **PUJ, 4001 only:** Connect transformer lead wire (item 45) to white power cord wire and black motor wire by plugging in connector.
5. **PUJ, 4001 only:** Connect white pendant wire to relay (item 39).
6. **PUJ, 4001 only:** Connect black pendant wire to transformer (item 38) at transformer connection #8.
7. **PUM only:** Connect black motor wire (item 22) to power switch (item 20).
8. Connect black power switch jump wire to thermostat (item 6).
9. Connect black power cord wire to thermostat (item 6).

### Shroud Assembly

1. Carefully lower shroud over motor and baffle. Use care to not disturb wiring and to not damage foam baffle.  
**NOTE:** Make sure baffle is between air vents on motor and NOT blocking vent slots in shroud.
2. Align holes in shroud with holes in pump manifold.

- Attach shroud to manifold by tightening the six screws (item 18). Lubricate screws with one drop of Loctite #242 and torque screws to 12-18 in-lbs (1,4-2,0 Nm).

## TEST PROCEDURE

### Back Pressure Test

Perform the back pressure test to determine if the high pressure portion of the system is correctly adjusted and free from leaks. The pump must be able to reach and hold 10,000 psi. See Table 1 for expected test values.

- Place the pump assembly on a test bench, lying on its side where the bottom of the pump can easily be observed. Wipe oil from bottom of pump assembly.
- To test the pump, connect a 0-10,000 psi hand pump with a 0-15,000 psi pressure gauge to the coupler on the pump outlet valve.
- If the safety relief valve or the adjustable relief valve were replaced or are out of adjustment, they must be set prior to performing the back pressure test. The safety relief valve must be set before the adjustable relief.
- To set the adjustment of the relief and safety valves, activate the hand pump and observe the pressure gauge. The valve with the lowest pressure setting will release oil first.
- To set the safety relief valve, use a 7/32" Allen wrench to set the adjusting screw. Turn the safety relief set screw clockwise until the valve releases pressure at 10,250-10,750 psi.

If desired pressure is unattainable, the adjustable relief valve may be releasing at a lower pressure. Turn in set screw on the adjustable relief valve to raise setting.

**IMPORTANT:** Do not "Bottom Out" the adjusting screw on the valves, as damage may occur. Continue to adjust the safety valve.

- To set the adjustable relief valve:
  - Remove cap nut, and loosen lock nut from adjustable relief assembly. Using a 5/16" Allen wrench, turn in set screw until valve releases pressure at 10,000 to 10,250 psi.
  - Replace and tighten lock nut and cap nut using care to not alter set screw.

**NOTE:** Relief valves may also be set during the Performance Test.

- Close the manual valve on the pump being tested and slowly build pressure until the gauge reads 10,000 psi. During this step, observe for any leakage on the underside of the pump. If any leaks are found, stop the test and repair

the leaking items. Once all leaks are corrected, the test must be performed again to reach a maximum pressure of 10,000 psi and hold that pressure.

### Performance Test

This test will check the functional performance of the pump in the following areas: low pressure flow rate, by-pass valve operation, high pressure flow rate, and current draw. See Table 2 for expected test values.

- To perform the low pressure flow test, choose one of the methods described below.
  - Check the low pressure flow by connecting an unrestricted hose from the valve on the pump to the flow meter on the test bench. The flow meter should read 0.65 GPM.
  - An alternate method can be performed by directing the unrestricted hose from the pump valve to a one liter graduated cylinder. Collect the flow for 10 seconds. You should collect 410 ml. in 10 seconds.
- When the unloading, or by-pass valve releases at 250 to 400 psi, the bench ammeter will show a drop in current. The by-pass valve is preset at the factory and is not adjustable. Replace valve if defective.
- To perform the high pressure flow test, connect a hose to the outlet valve on the pump to the V-152 relief valve on the test bench. The V-152 (tank port) should be connected to an unrestricted hose that will be used to direct the flow from the pump into a graduated cylinder for measurement.
- Start pump. Close valve and slowly adjust the T-handle on the V-152 until the pump is producing 8,500 psi.
- Collect the flow from the V-152 for 30 seconds. You should collect 147 ml. in 30 seconds to establish a flow rate of 18 cu. in/min.
- After flow rate is verified, check current draw with the ammeter on the test bench. To check the current draw, run the pump so that the oil is going over the internal relief valve or the pressure gauge reads over 10,000 psi and observe the ammeter.
  - Maximum draw is 9.50 Amps for the 115 VAC model and 4.50 Amps for the 220 VAC model.
  - Repeat test with pendant jog switch.
- To perform pressure holding test, operate pump and close valve. Allow pressure to build to 8,000 psi. Turn off pump to see if it will hold pressure. If pump does not hold pressure, refer to Troubleshooting Guide on page 4. If pump holds pressure satisfactorily at this point, it should be able to start under full load (10,000 psi).

**TABLE 1 - USE FOR BACK PRESSURE TEST**

Expected Test Valves	110 VAC Pump	220 VAC Pump
Safety relief valve	10,250 to 10,750 psi	10,250 to 10,750 psi
Adjustable relief valve	10,000 to 10,250 psi	10,000 to 10,250 psi
Unloading or by-pass valve	250 to 400 psi	250 to 450 psi

**TABLE 2 - USE FOR PERFORMANCE TEST**

Expected Test Valves	110 VAC Pump	220 VAC Pump
Flow at 100 psi	0.65 GPM	0.65 GPM
Flow at 8,500 psi	0.078 GPM	0.078 GPM
Flow at 10,000 psi	9.50 Amperes	4.50 Amperes

## TROUBLESHOOTING GUIDE

Problem	Probable Cause	Remedy
Motor current draw is excessive.	<ol style="list-style-type: none"> <li>1. Defective motor.</li> <li>2. By-pass valve malfunction.</li> <li>3. Damaged or worn piston blocks.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove the motor. Test and replace if necessary.</li> <li>2. Inspect and test the by-pass valve if required. Valve is preset. If damaged or incorrectly set, replace.</li> <li>3. Test and inspect the piston blocks. Replace if necessary.</li> </ol>
Noisy pump operation.	<ol style="list-style-type: none"> <li>1. Piston block piston sticking. Springs or balls damaged, or missing springs.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove the piston blocks. Inspect and replace as required. Each piston block is non-serviceable.</li> </ol>
Pump fails to maintain pressure.	<ol style="list-style-type: none"> <li>1. Oil leaking from one or more components within the reservoir.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove the pump from the reservoir and perform the back pressure test outlined in the test procedure.</li> </ol>
Low oil output.	<ol style="list-style-type: none"> <li>1. Pump component parts leaking.</li> <li>2. By-pass valve may be malfunctioning.</li> <li>3. Oil intake screens on piston blocks may be clogged with debris.</li> </ol>	<ol style="list-style-type: none"> <li>1. Perform the back pressure test to isolate leaks.</li> <li>2. Test and inspect by-pass valve. Replace and set if necessary. Valve is pre-set at factor and is non-adjustable.</li> <li>3. Inspect intake screens. Flush all components of contamination. Replace damaged components.</li> </ol>
Dump feature not responding or dumping slowly.	<ol style="list-style-type: none"> <li>1. Dump valve may be malfunctioning, or contamination plugging dump valve.</li> </ol>	<ol style="list-style-type: none"> <li>1. Disassemble dump valve. Inspect ball seat, piston and o-rings for damage. Check if valve bleed hole may be plugged by contamination.</li> </ol>

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