HydraulicPump Instruction Manual

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Overview

INTRODUCTION

Thank you for purchasing a Hydraulic Hand Pump from Crystal Engineering. This pump provides you with a portable pressure source for calibration of high pressure gauges, recorders, switches, and transmitters. The built-in variable volume gives you precision at any pressure.

There are two pressure ports on the pump. Mount a Crystal Gauge or Calibrator directly to the front of the pump, connect the spare port directly to the device being tested, and you have a complete field pressure calibration system. A 1m (3ft.) CPF high pressure hose, and CPF Female to1/4" Male NPT is included, along with a convenient plastic bottle for hydraulic fluid. A rebuild kit is available (P/N 2940), so that you can service the pump yourself, if necessary.

Included

HydraulicPump with CPF MPF (7/16-20 MP) port & fluid bottle

P/N MPH-1 . . . . . CPF Hose (1m)

P/N MPF-1/4MPT . . . . . Female CPF to Male NPT adapter

P/N MPM-PLUG . . . . . CPF Plug for port seal

SPECIFICATIONS

Pressure Range . . . . . 35 MPa / 350 bar / 5000 PSI

Connections . . . . . One 1/4" Female National Pipe Thread (NPT) and one (female) CPF fitting.

Weight . . . . . 677g (1 lb., 8 oz.)

Dimensions . . . . . Approximately 26.7 cm (10.5") tall

Wetted Materials . . . . . Buna-N, aluminum, Viton, synthetic cork, brass, and stainless steel. The pump can be used with oil, water, or other compatible fluids. Use of water will accelerate wear of "O" rings and some sticking of piston may result. The recommended fluid is any petroleum based hydraulic oil, light weight motor oil, or mineral oil. Do not use brake fluid or synthetic oils; they may crack the polycarbonate reservoir or cause swelling or decomposition of the "O" rings.

Features

For safe and reliable operation please spend a few minutes reading the following instructions.

! WARNING: To prevent damage to the pump and possible injury, never connect your pump to a pressure source greater than 35 MPa (5000 PSIG, 350 bar). Turn off, or isolate, all pressure-generating equipment from the pressure tap prior to connecting the pump.

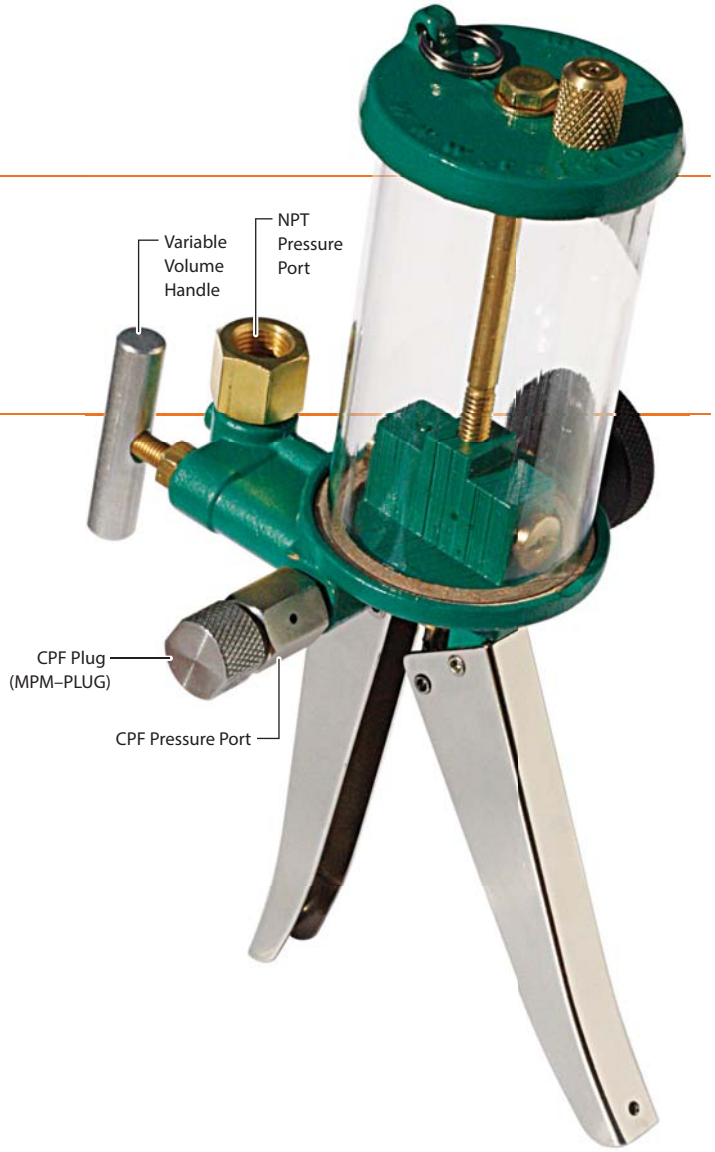
Note: Since handpumps are small displacement pumps, be sure to minimize the volume to be pressurized.

CONNECTION PORTS

Your pump has two connections; A 1⁄4" female NPT pressure port for a reference gauge or calibrator and a CPF female connection. Always use PTFE (polytetrafluoro-ethylene) tape on the threads of any pressure fittings installed into the NPT port. Connect your reference gauge, or plug the 1⁄4" female NPT port prior to priming or using your pump. As for the hose connection, we offer a wide variety of CPF fittings to permit using the system with most commonly used fittings.

FLUID OPTIONS

We recommend any petroleum based hydraulic oil, lightweight motor oil, or mineral oil. Water can also be used, but it will accelerate the wear of "O" rings, and may cause some sticking of the piston. Do not use brake fluid or synthetic oils which may attack the polycarbonate reservoir, or cause swelling or decomposition of the "O" rings. Your fluid can be stored in the convenient plastic fluid dispensing bottle (supplied with the pump). See Priming the Pump on page 3 for more information.



Operation

PRIMING THE PUMP

1 Put a small amount of fluid in the Reservoir; enough to cover the bleed-off valve hole in the bottom of the reservoir.

The easiest way to fill the Reservoir is to remove the Vent Plug, and use the fluid bottle to squirt fluid into the Reservoir.

2 Turn the variable volume handle clockwise until it stops turning.

3 Open the Bleed-off Valve by turning it counter-clockwise, then squeeze the Handle.

Fluid and trapped air should circulate out of the Bleed-off Valve hole back into the Reservoir.

4 Squeeze the Handle repeatedly until no air is seen coming out of the Bleed-off Valve hole.

5 Fill the Reservoir, in prepation for use.

Note: We recommend that you keep the pump primed.

USING THE PUMP

1 Shut-off the Bleed-off Valve.

2 Squeeze the handle until fluid is seen in the NPT port.

3 Open the Variable Volume Handle counter-clockwise until it stops.

4 Attach a pressure standard to the NPT port.

5 Remove the CPF Plug and connect your CPF hose.

We suggest that you squeeze the pump handle to fill the hose with fluid, prior to connecting the other end of the hose to the instrument to be calibrated.

6 Squeeze the pump handle to generate 20–30 psi and loosen the CPF fitting connection at the end of the hose to bleed air from the system through the CPF weep / bleed hole.

7 Repeat until no air escapes.

This minimizes the volume of air you will need to compress to achieve your desired pressure. In fact, the less air you have in your system, the better the pump will perform.

TO ESTABLISH A ZERO PRESSURE REFERENCE

1 Check that the pump at the same elevation as the device being tested

2 Open the Bleed-off Valve.

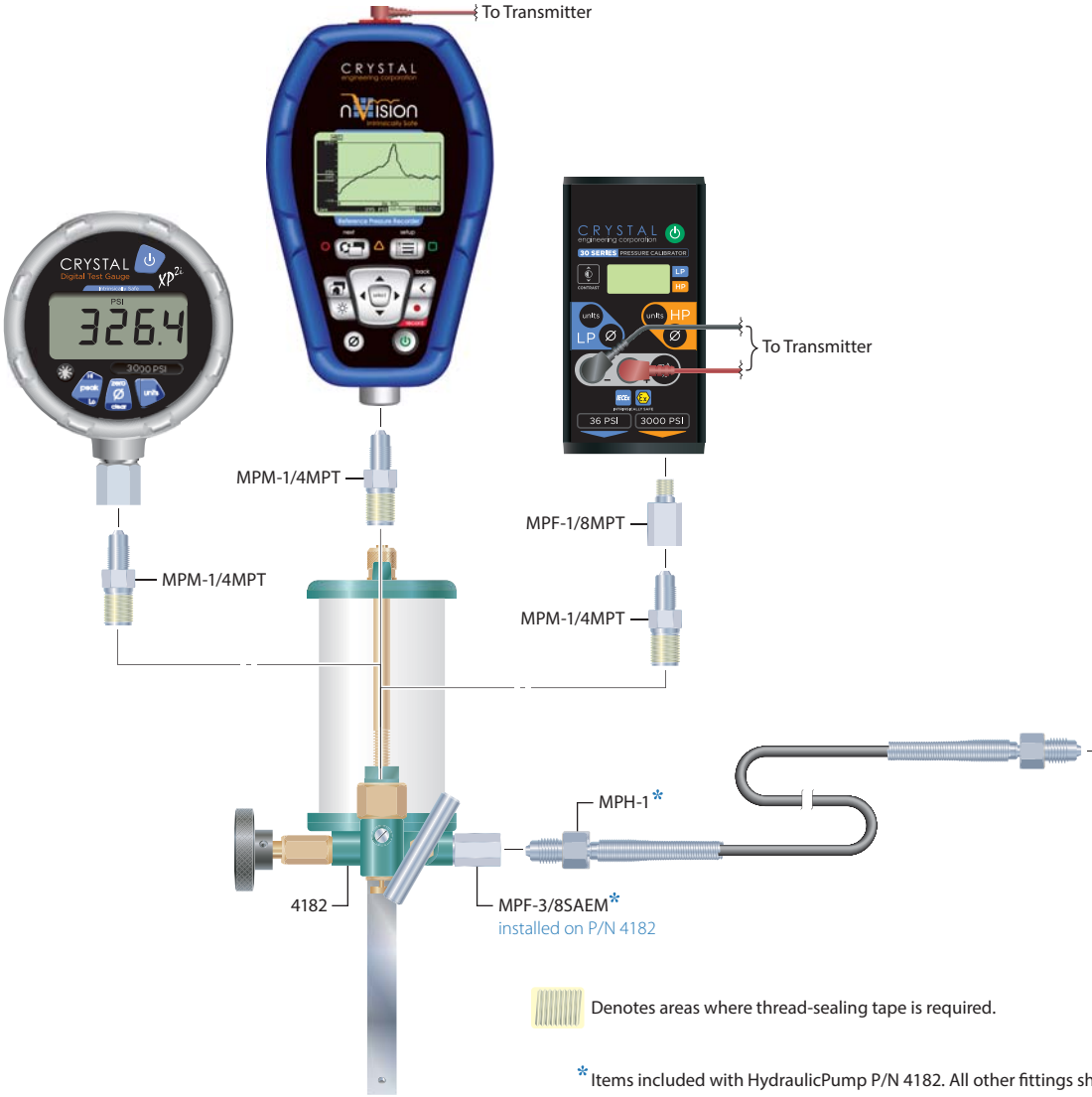
3 Close the Bleed-off Valve, and repeatedly squeeze the Handle until you are close to, but not greater than, your desired pressure point.

4 Use the the Variable Volume Handle to adjust the pressure to precisely your desired pressure.

The pressure may initially appear to be unstable, and dropping. This is usually due to either a small amount of expansion of the hose under pressure, and/or residual air or gas dissolving into the hydraulic fluid. If there are no leaks, both of these effects will diminish until the pressure is stable. Of course, very high resolution pressure calibrators will detect this effect better than low cost mechanical gauges.

CPF Connection Diagram

CONNECTING TO A CRYSTAL REFERENCE



NPT MALE

MPF-1/8QTM	1/8" Quick Test NPT Male
MPF-1/8MPT	1/8" NPT Male
MPF-1/4QTM	1/4" Quick Test NPT Male
MPF-1/4MPT*	1/4" NPT Male

Additional NPT sizes available in non-CPF MP adapters

NPT FEMALE

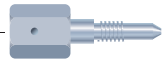
MPF-1/8QTF	1/8" Quick Test NPT Female
MPF-1/4QTF	1/4" Quick Test NPT Female
MPF-1/4FPT	1/4" NPT Female
MPF-1/2QTF	1/2" Quick Test NPT Female

Additional NPT sizes available in non-CPF MP adapters

BSP

MPF-1/8BSPF	G 1/8" Female
MPF-1/4BSPF	G 1/4" Female
MPF-3/8BSPF	G 3/8" Female
MPF-1/2BSPF	G 1/2" Female

TRANSMITTER

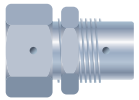


MPF-5/16TRM	for Foxboro, Rosemount, & Yokogawa
MPF-1/4TRM	for Honeywell

TUBE

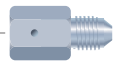
MPF-1/4TBM	1/4" Tube Male
MPF-3/8TBM	3/8" Tube Male
MPF-1/2TBM	1/2" Tube Male

CPF



MPF-MPF	Female to Female
MPF-MPFTU	T-Union (Female)
MPF-MPFBULK	Bulkhead (Female to Female)
MPF-CAP	Cap

ADDITIONAL



MPF-M20QTF	M20 x 1.5 Quick Test Female
MPF-M20X1.5F	M20 x 1.5 Female
MPF-QCN	Quick-Connect Nut
MPF-AN4M	AN4 Male

Support

TROUBLESHOOTING

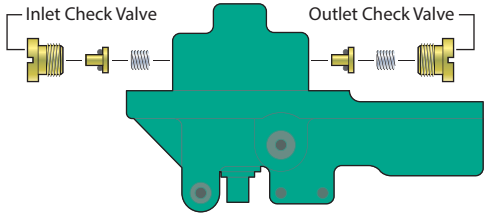
The Pump Will Not Generate Pressure

▶ **Reason**

The pump has probably lost its prime.

▶ **Solution**

If it will not prime, remove the reservoir and insert a small wire into the inlet check valve hole to make sure the valve moves freely. Squirt oil into the inlet check valve while squeezing and releasing the handle. Then reinstall the reservoir and prime the pump. Another possible reason for pump failure is dirt under one of the check valves, which may prevent fluid from flowing freely back into the reservoir. We recommend removing, cleaning, and reinstalling the check valves. See the diagram below for proper check valve reassembly.



The Pump Does Not Hold Pressure

▶ **Reason**

The pump may be leaking internally or externally.

▶ **Solution**

If pressure goes up when the handle is squeezed and drops when the handle is released, there may be dirt under the outlet check valve. Remove the brass plug, clean the check valve, and reinstall.

CONTACT US

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REPAIR

Please complete the Return Material Authorization (RMA) form. It will generate an authorization number and provide return instructions.

WARRANTY

Crystal Engineering Corporation warrants the HydraulicPump to be free from defects in material and workmanship under normal use and service for one (1) year from date of purchase to the original purchaser. It does not apply to batteries or when the product has been misused, altered or damaged by accident or abnormal conditions of operation.

Crystal Engineering will, at our option, repair or replace the defective device free of charge and the device will be returned, transportation prepaid. However, if we determine the failure was caused by misuse, alteration, accident or abnormal condition of operation, you will be billed for the repair.

CRYSTAL ENGINEERING CORPORATION MAKES NO WARRANTY OTHER THAN THE LIMITED WARRANTY STATED ABOVE. ALL WARRANTIES, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, ARE LIMITED TO A PERIOD OF ONE (1) YEAR FROM THE DATE OF PURCHASE. CRYSTAL ENGINEERING SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, WHETHER IN CONTRACT, TORT OR OTHERWISE.

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CRYSTAL

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