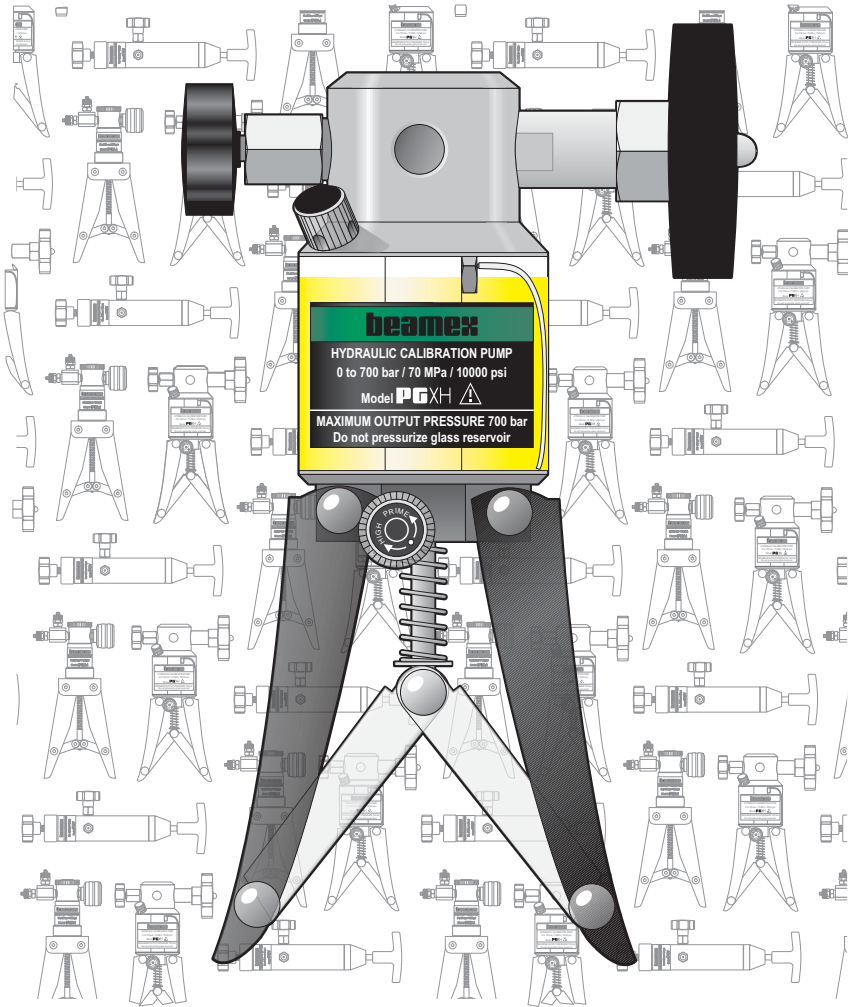


INSTRUCTION MANUAL

# HYDRAULIC PRESSURE PUMP MODEL PGXH



**beamex**

Dear user,

We have made every effort to ensure the accuracy of the contents of this manual. Should any errors be detected, we would greatly appreciate to receive suggestions to improve the quality of the contents of this manual.

The above notwithstanding, we can assume no responsibility for any errors in this manual or their eventual consequences.

We reserve rights to make modifications to this manual without any further notice.

For more detailed technical data about the Instruction manual for PGXH Hydraulic Pressure Pump, please contact the manufacturer.

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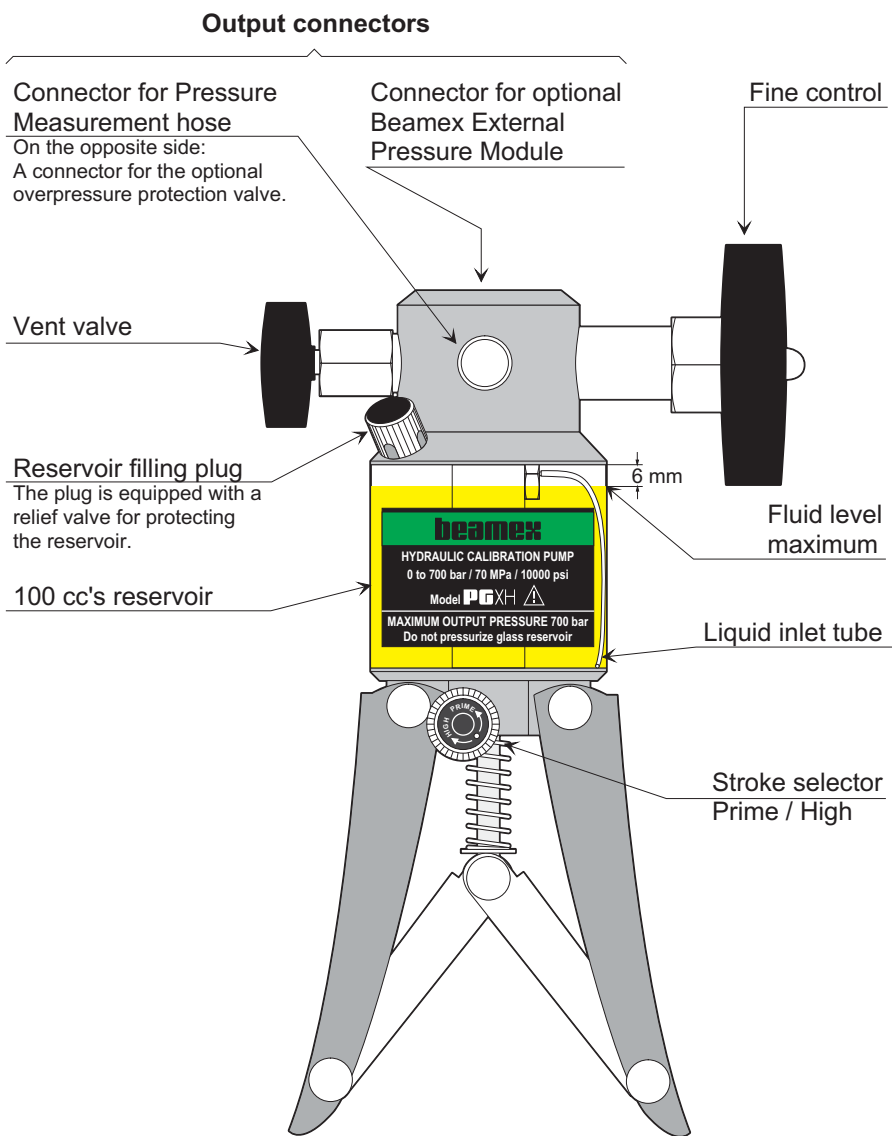
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8801400/UEPGXH/001839

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**Output connectors**

Connector for Pressure Measurement hose  
On the opposite side:  
A connector for the optional overpressure protection valve.

Connector for optional Beamex External Pressure Module

Fine control

Vent valve

Reservoir filling plug  
The plug is equipped with a relief valve for protecting the reservoir.

100 cc's reservoir

6 mm

Fluid level maximum

Liquid inlet tube

Stroke selector  
Prime / High

A more detailed picture of **PGXH's** output connectors is on page 9.

# 1 DESCRIPTION

The **PGXH** hydraulic pressure pump is designed to manually generate up to 700 bar (70 MPa, 10 000 psi) for quick and accurate calibration of pressure gauges, transducers and other pressure measurement instruments.

Recommended test fluids to be used with the pump are: Low viscosity mineral based hydraulic oils or distilled water. Do not use solvents or synthetic fluids that will adversely affect the operation of the pump.

## 1.1 Standard Accessories

The standard accessories are as follows:

- \* Carrying case
- \* G 3/8 (3/8" BSP) plug to blank off the connection for an optional Beamex External Pressure Measurement module.
- \* G 3/8 (3/8" BSP) to G 1/4 (1/4" BSP) adapter for connecting the optional Beamex XPM External Pressure Measurement module.
- \* A Pressure Measurement Hose for PGXH with two 1215 Special female connectors.
- \* A G 1/4 (1/4" BSP) male / 1215 Special male connector to connect the Pressure Measurement Hose to the PGXH.
- \* A 1/4" NPT male / 1215 Special male connector to connect the Pressure Measurement Hose to the instrument to be calibrated.
- \* A filling bottle.

## 1.2 Optional Accessories

The optional accessories are as follows:

- \* Service kit containing a set of seals, code 8003200
- \* Relief valves for over-pressure protection

max. pressure	10 to	50 bar, code	7230600
max. pressure	50 to	200 bar, code	7231600
max. pressure	200 to	400 bar, code	7232500
max. pressure	300 to	700 bar, code	7236000

## 2 OPERATION

1. Connect the optional external pressure module (XPM or EXT) to the pump (refer to the picture on page 1) using the appropriate seals. Ensure the measurement range of the connected module is appropriate.
2. Remove filling plug and fill reservoir with the appropriate fluid (don't exceed the maximum level) and replace plug.
3. Connect the instrument to be tested to the Pressure Measurement Hose and attach it to the pump. Be sure that all the output connectors are properly plugged or connected to an instrument to avoid leakage.
4. Adjust the fine control to "fully-out". Make sure the stroke selector is set to **prime**. If not, squeeze handles fully in and turn the selector counterclockwise.
5. Ensure that **PGXH**'s vent valve is open (turn fully clockwise then one turn counterclockwise).
6. Operate handles several times to expel air from the pump (ensure that the liquid inlet tube remains immersed in fluid at all times).
7. Make sure no gas is left in the measurement system during the calibration procedure. Keep for example a valve connected to the measurement system open while priming the system until all gas is removed or temporarily connect a vacuum pump to remove gas from the measurement system. Remember to remove the vacuum pump from the system before increasing the pressure.
8. Close **PGXH**'s vent valve fully clockwise.
9. Prime the system by squeezing handles together and then releasing, allowing the fluid to enter the pump cylinder. Repeat as necessary until system is fully primed and low pressure is indicated on either a calibrator or the test instrument.
10. Test how much pressure increase can be done using the fine control. If it is enough, continue to step 12.
11. With handles fully squeezed in, select the **high** pressure position on the stroke selector and operate handles to generate approximate pressure. The rate of the pressure increase depends on the volume of the measurement system. Carefully follow the reading of the pressure indicator in order to avoid exceeding the maximum pressure of the measurement system. **NOTE:** Smaller handle strokes enable easier pressure generation at high pressures.
12. Adjust pressure to required value using the fine control. Immediately after pressure generation, the pressure may fall slightly due to the stretching of the pressure measurement hose. Thermodynamic effects may also cause pressure variation. In that case, adjust the pressure back to required value using the fine control.

13. The principal tool for releasing pressure from the measurement system is **PGXH's** fine control. Use of **PGXH's** vent valve is also possible, but requires caution in order to avoid pressure shocks to the measurement system.
14. To totally release pressure from the system, turn **PGXH's** vent valve one turn counterclockwise. Return the stroke selector to **prime** position after first squeezing handles fully in.

#### **WARNINGS!**

**Do not exceed the max. operating pressure of the pump and the hose. Also observe the pressure limit set by environmental conditions and the used pressure medium.**

**If there is a strong counterforce while operating the handles, but no pressure increase is indicated, stop pumping and locate the fault. Always keep a reliable indicator connected to the measurement system.**

**The glass reservoir does not withstand high pressure but it is not pressurized when PGXH is used correctly. Do not add fluid to the glass reservoir when increasing pressure. The reservoir may overflow and explode when the pressure is released and all the excess fluid returns from system to the reservoir.**

A full list of warnings is on the inner side of the back cover.

## **2.1 Reservoir Fluid Level**

If the fluid level in the reservoir falls considerably during use, a partial vacuum can be created in the reservoir which may affect the pump performance. To avoid this, simply allow air to enter reservoir by partly unscrewing the filling plug.

## 3 TROUBLESHOOTING/MAINTENANCE

If the pump assembly fails to indicate a pressure increase after considerable pumping action of the handle, the following items should be examined:

- The pump unit may have been mistakenly opened by rotating the handles counterclockwise. Correction: Squeeze the handles fully in and rotate clockwise to re-tighten the pump unit.
- Check to assure that the connections between the pump, the hose end and the attached instrument(s) are tight and repeat operating instructions items 6 and 7. Check to assure that all the unused output connectors are properly plugged.

If a pressure increase still cannot be obtained, it's possible that one or more of the seals in the Pressure Pump is leaking and needs to be replaced.

**Do not continue pumping if the functionality of the pump is not normal. Locate the fault before you continue using the pump.**

### 3.1 About Bonded Seals

Bonded seals are metallic rings with an elastic material attached to the inner side of the ring. They are used in several places in **PGXH** (for example the XPM connector). When tightening a connection sealed with a bonded seal, keep in mind that firm hand tightening is recommended. Other tightening methods may result in leakage, and possibly broken seals or threads.





## **3.2 Seal Replacement**

Depending on the frequency of use, the Main Piston Seal (and others) will eventually need replacing. Although the replacement seals are an optional accessory, the same instructions for fitting the seals are included in this manual as in the replacement package.

### **3.2.1 Main Piston Seal**

Withdraw handle/piston assembly from cylinder by removing the two M5 socket head screws shown in the picture.

Clean the piston and the cylinder and remove the old piston seal and the backup ring.

Fit the new piston seal (o-ring) and the backup ring. Lightly grease piston seal and the piston using silicone grease. Reassemble.

### **3.2.2 Fine Control Seal**

Place a 19 mm A/F spanner on the flats (see the picture on the adjacent page) and a 27 mm A/F spanner on the large nut and unscrew the piston assembly.

Clean the piston and the cylinder and remove the old piston seal and backup ring.

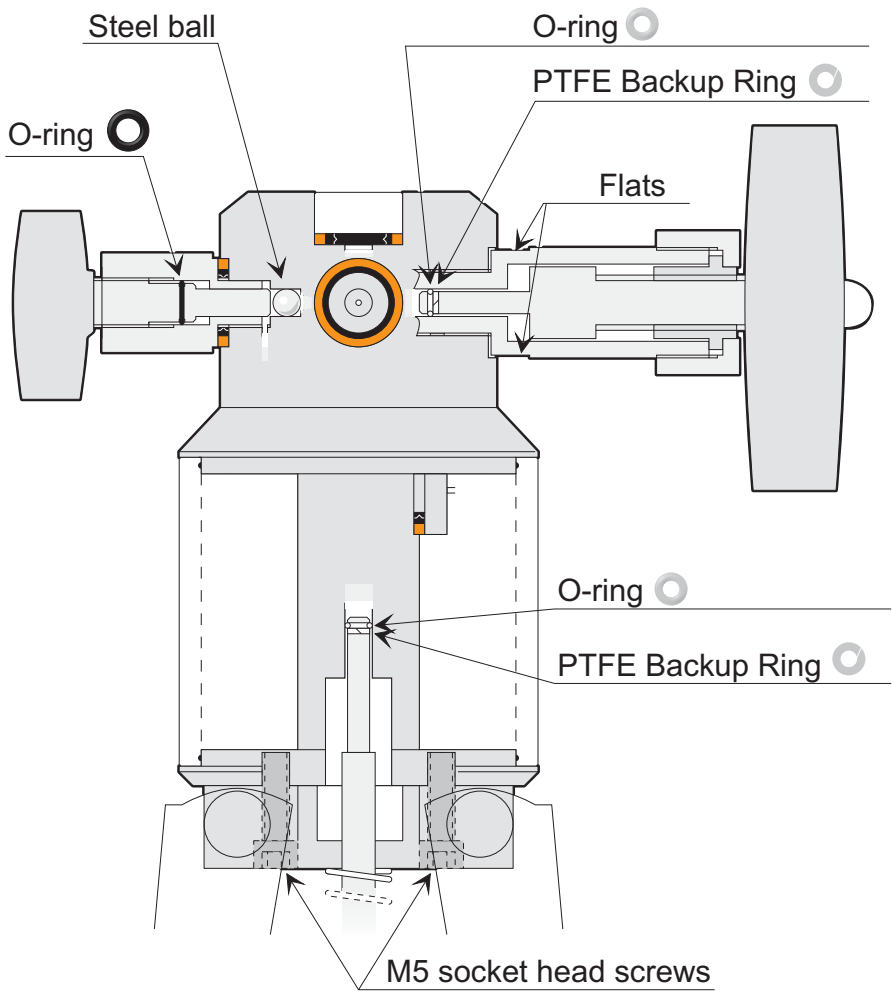
Fit the new piston seal (o-ring) and the backup ring. Lightly grease the piston seal and backup ring using silicone grease. Reassemble.

### **3.2.3 PGXH Vent Valve Seal**

Turn vent valve knob fully counterclockwise and pull out the valve screw from its body. Take care not to lose the steel ball that lies beneath the screw.

Remove the old seal from its groove in the valve screw and replace with a new one.

Lightly grease the seal with silicone grease and reassemble ensuring the steel ball is correctly in place.



# 4 SPECIFICATIONS

## 4.1 The Pump Unit

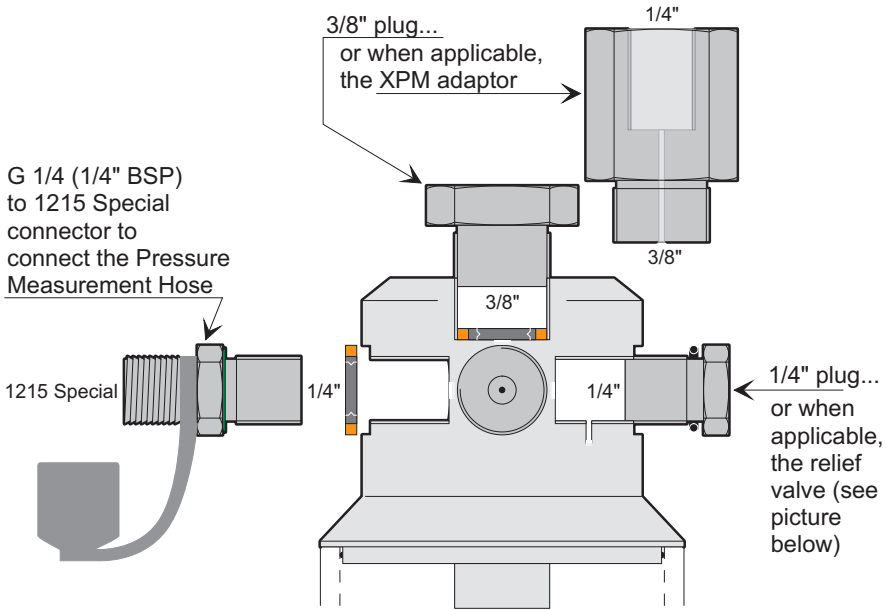
<b>Weight</b>		1.6 kg	3.53 lb
<b>Dimensions</b>	Height	236 mm	approx. 9.3"
	Width	159 mm	approx. 6.3"
	Depth	70 mm	approx. 2.8"
<b>Pressure range*</b>		0 to 700 bar / 0 to 70 MPa /	0 to 10 000 psi
<b>Pressure media</b>		Low viscosity Mineral based Hydraulic Oil or Distilled water	
<b>Glass reservoir for pressure media</b>		100 cc, not to be pressurized	
<b>Output connectors</b>			
		<ul style="list-style-type: none"> <li>• <b>G 1/4</b> (1/4" BSP) female connector for Pressure Measurement Hose</li> <li>• <b>G 3/8</b> (3/8" BSP) female (for Beamex External Pressure Measurement Module, XPM or EXT)</li> <li>• <b>G 1/4</b> (1/4" BSP) female <b>for overpressure protection valve use only.</b> Blanked off unless the optional relief valve is installed.</li> </ul>	

## 4.1 The Pressure Measurement Hose

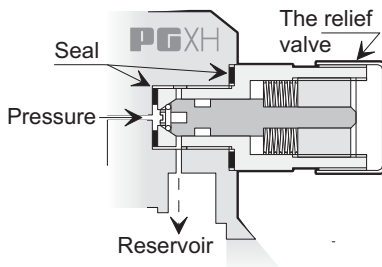
<b>Length</b>		1 m	3 ft 3.3"	
<b>Connectors</b> (both ends)		1215 Special, female		
<b>Internal diameter</b>		2 mm	0.08"	
<b>External diameter</b>		5 mm	0.2"	
<b>Operating pressure*</b>	<ul style="list-style-type: none"> <li>• 0°C (+32°F)</li> <li>• 30°C (+86°F)</li> <li>• 50°C (+122°F)</li> <li>• 80°C (+176°F)</li> <li>• 100°C (+212°F)</li> <li>• 120°C (+248°F)</li> </ul>	768 bar 693 bar 630 bar 535 bar 485 bar 428 bar	76.8 MPa 69.3 MPa 63 MPa 53.5 MPa 48.5 MPa 42.8 MPa	11148 psi 10051 psi 9137 psi 7767 psi 7036 psi 6213 psi
<b>Bursting pressure</b> in	20°C (68°F)	1950 bar	195 MPa	28200 psi
<b>Operable temperature range</b>		-20°C to +100°C		-4°F to +212°F
<b>Smallest bending radius</b>		20 mm	0.78"	
	<ul style="list-style-type: none"> <li>• below -20°C (-4°F)</li> </ul>	30 mm	1.18"	

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\* The environmental conditions and the used pressure medium may restrict the allowable maximum pressure to a lower level than the pump and the hose enables. In that case please consider using a relief valve.



**PGXH's output connectors viewed from the Fine Control side.**



**PGXH with the optional relief valve for over-pressure protection installed**

## **5 NOTES.**

The pump is tested using water. Small amounts of water may still be inside the pump when you receive it. Flush the pump with the pressure media to be used before connecting any instruments to it.

Ensure that the process media is compatible with the pressure media used in the pump. Make sure that impurities are removed from the measurement system. From time to time the pressure media used in the pump should be renewed.

The maximum total volume of the measurement system may not exceed 100 ml (6.1 cubic inches). The volume inside PGXH is less than 1 ml (on the pressurized side, not the reservoir, with maximum volume in the fine control). The volume of the unpressurized Pressure Measurement Hose is 3.5 ml per meter.

Ensure that there always is a reliable pressure indicator connected to the pump when the pump is used.

If the pump is accidentally dropped, it may be damaged. Do not use the pump before it is inspected at Beamex's service.

Please include information on used pressure media when sending the pump for service.

## 6 WARNINGS

Read the instruction manual carefully prior to setting up and using the pressure pump. The pressure built up internally during use can be extremely high.

Only personnel with good experience and knowledge of high pressure media, high pressure instruments and connections are allowed to work with the pressure pump. Incorrect use may result in damage to the pump, the instrument connected to the pump and/or personal injury.

Use eye shields. The use of a relief valve for over-pressure protection is recommended. If a relief valve is used, remember to occasionally check its functionality.

Do not connect the pump to an external pressure source.

The glass reservoir does not withstand high pressure, but it is not pressurized when PGXH is used correctly.

Do not overfill the glass reservoir. Also: do not refill it while increasing pressure. The reservoir may overflow and explode when the pressure is released and all the excess fluid returns from system to the reservoir.

Vent external systems before connecting to the pump.

Do not use pump if the reservoir is damaged.

The measurement system must only contain the measurement liquid and no gas. See chapter 2 OPERATION for guidelines on how to remove the gas from the measurement system.

Ensure that all connections are made correctly and that the hose and the connectors are undamaged. Do not use faulty hoses or connectors.

Use only the measuring hose provided by Beamex. Observe the effect of the operational conditions to the maximum pressure allowed in the hose. The specifications can be found on page 8 in the manual.

The environmental conditions and the used pressure medium may restrict the allowable maximum pressure to a lower level than the pump and the hose enable. In that case please consider using a relief valve.

Always depressurize PGXH when it is left on its own.

If you use water as the pressure medium, make sure that you store PGXH in temperatures above the freezing point.

Use only the connectors provided with the pump. Impurities from wrong materials may plug the pump.

Do not use PGXH in any other way than as described in this manual.



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