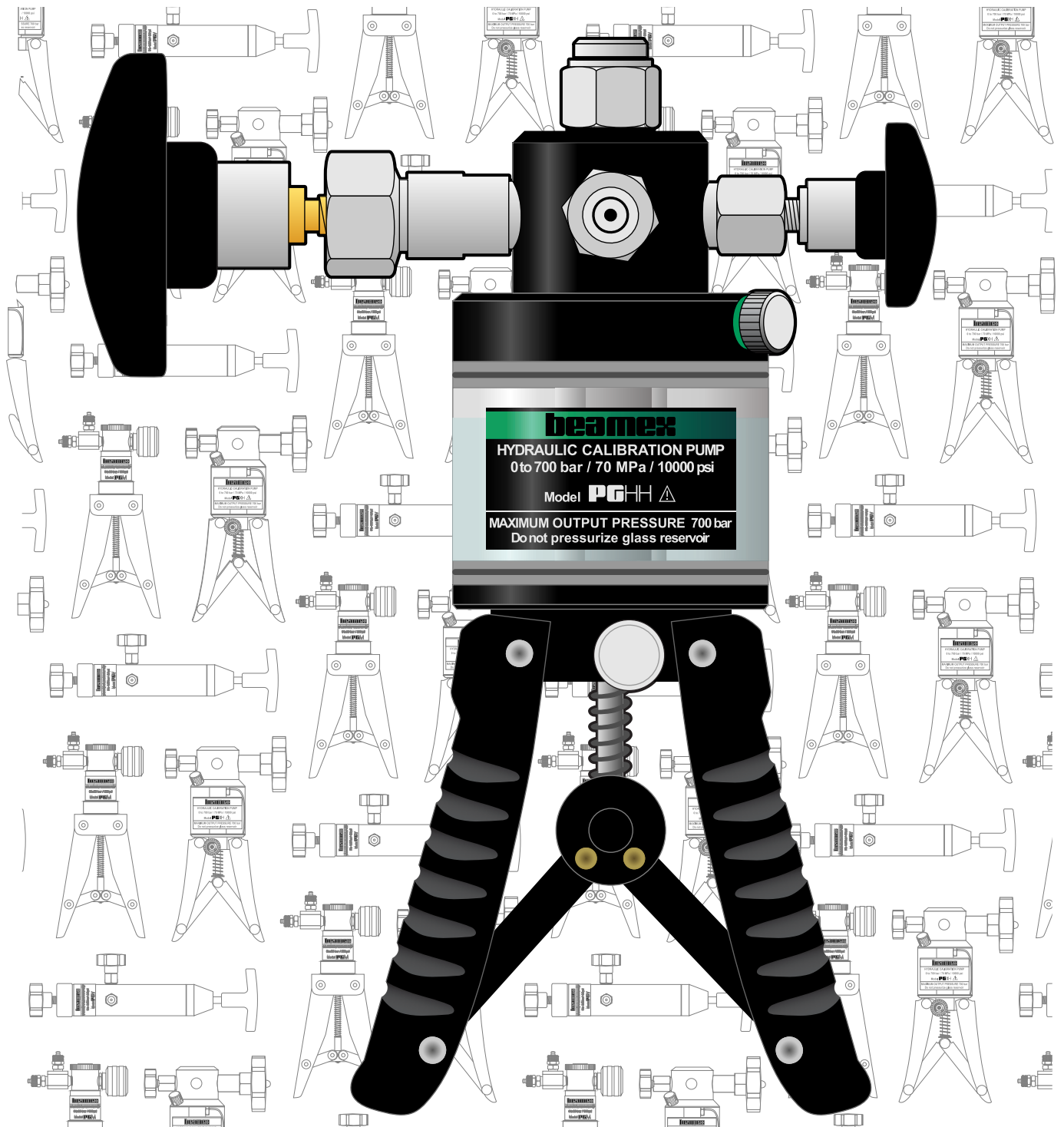


# HYDRAULIC CALIBRATION PUMP MODEL PGHH

## OPERATING INSTRUCTIONS



version 1.0a

**beamex**

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# General information

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 PGHH Hydraulic Pressure Pump, please contact the manufacturer.

## Typographic conventions

### **DANGER**

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

### **WARNING**

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

### **CAUTION**

Indicates a hazardous situation, which if not avoided, could result in minor or moderate injury.

### **NOTICE**

Points out tips and recommendations for efficient and trouble-free operation. Indicates a non-immediate or potential hazardous situation, which if not avoided, could result in damage of property and equipment.

# 1 Introduction

## 1.1 Description

The PGHH hydraulic calibration 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.

### **WARNING**



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.

### **WARNING**

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

### **NOTICE**

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

If used with distilled water:

- After each usage, the instrument has to be emptied and let dry out (drain screw at the bottom of the reservoir);
- As soon as first cloudiness, particles or dirt become visible: change the fluid.

## 1.2 Standard delivery

The standard delivery includes:

- Carrying case;
- G 1/4 (1/4" BSP) plug to blank off the connection for an optional Beamex EXT External Pressure Measurement module;
- G 1/4 (1/4" BSP) adapter (on the top) for connecting the optional Beamex EXT External Pressure Measurement module;
- A Pressure Measurement Hose for PGHH 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 PGHH;
- A 1/4" NPT male / 1215 special male connector to connect the Pressure Measurement Hose to the instrument to be calibrated;
- A filling bottle;
- User manual;
- Copper seals;
- 1 x bonded seal under the plug.

## 1.3 Optional accessories

The optional accessories include:

- Maintenance kit 8003190
- Copper seal kit for EXT modules, code 8072700
- EXT bonded seal kit, code 8003545
- Mineral oil (Aral Vitam DE22), for more information ask Beamex

## 2 Operation

### **DANGER**



Wear protective glasses.

### **WARNING**

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

### **CAUTION**

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

### **CAUTION**

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

### **NOTICE**

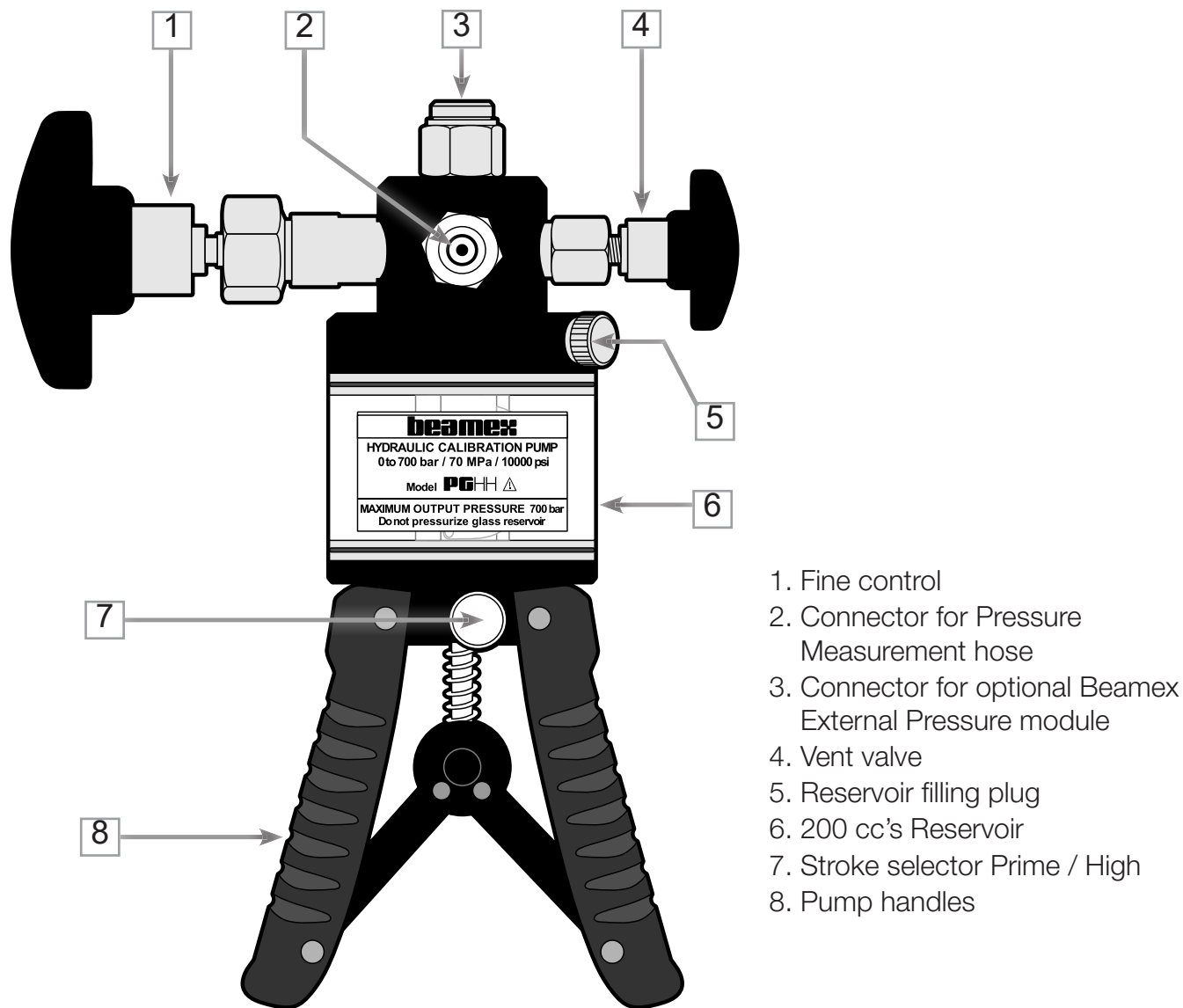
The pump is tested using water. Small amounts of water may still be inside the pump when you receive it. Flush the pump with the pressure media to be used before connecting any instruments to it.

### **NOTICE**

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

### 2.1 Operating instructions

1. Connect the optional external pressure module (EXT) to the pump (see 3 in figure 1) using the appropriate seals (it is strongly recommended that the bonded seal under the plug is used under 600 bar and copper seal above 600 bars). Ensure that the measurement range of the connected module is appropriate.
2. Remove filling plug and fill reservoir (for 2/3 to max. 3/4) with the appropriate fluid (don't exceed the maximum level) and replace plug.



- 1. Fine control
- 2. Connector for Pressure Measurement hose
- 3. Connector for optional Beamex External Pressure module
- 4. Vent valve
- 5. Reservoir filling plug
- 6. 200 cc's Reservoir
- 7. Stroke selector Prime / High
- 8. Pump handles

Figure 1. Detailed picture of PGHH Hydraulic Pressure Pump (For connectors see figure 4).

## NOTICE

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.

## NOTICE

The maximum total volume of the measurement system may not exceed 200 cc (12.2 cubic inches). The volume inside PGHH 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.

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 (see figure 2).

**! DANGER**

Do not connect the pump to the external pressure source.

**! DANGER**

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

**! WARNING**

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 in chapter 4.

**! CAUTION**

The pump is made out of anodized aluminium - avoid too much strength while tightening the connectors. The maximum torque is 15 Nm.

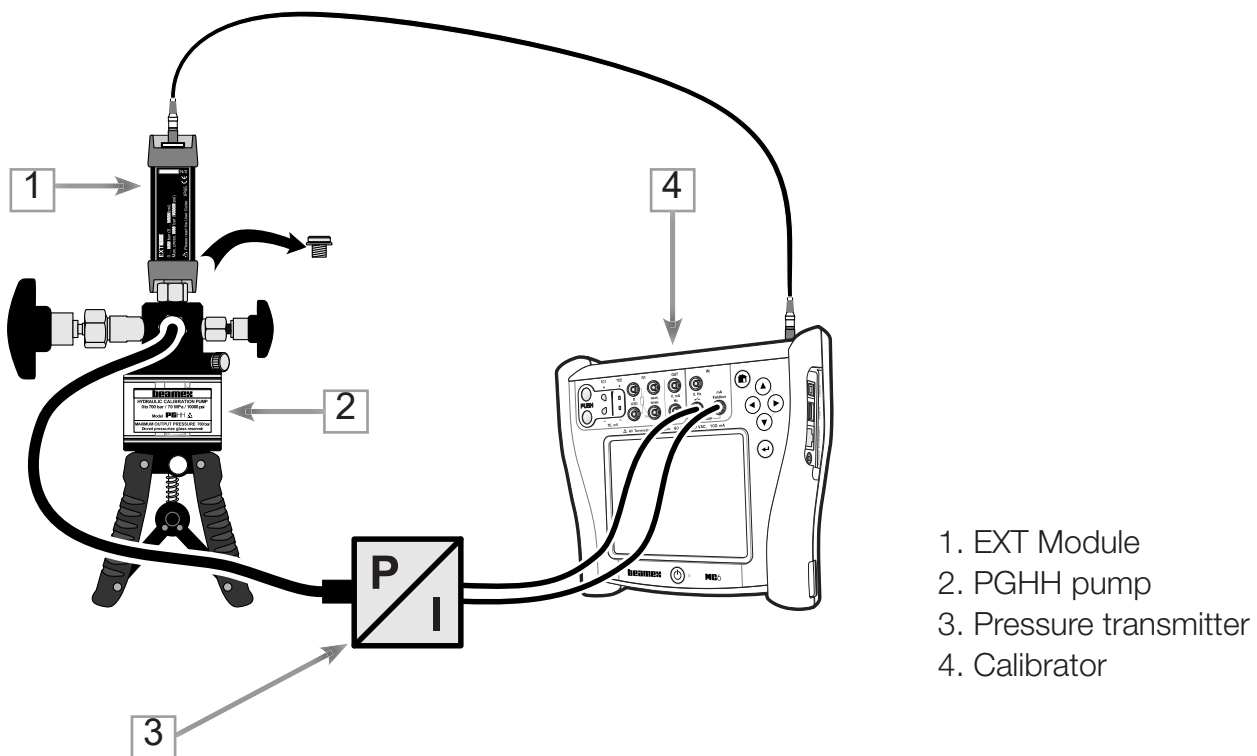


Figure 2. An example of the connections.



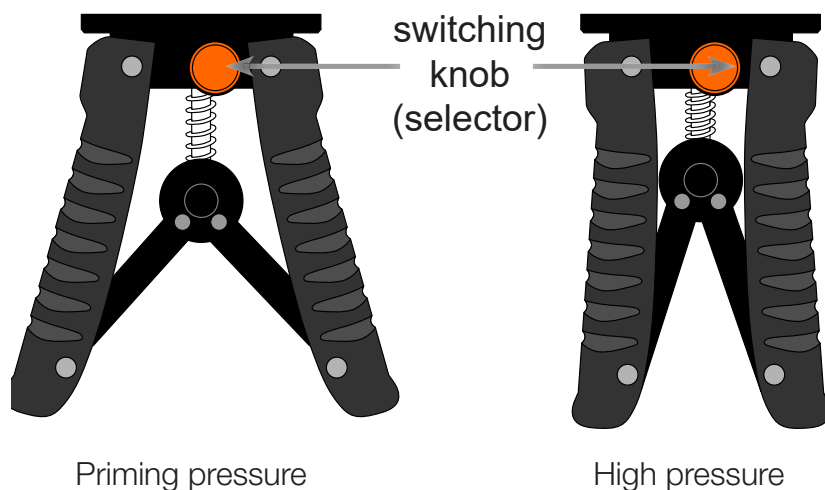


Figure 3. Selecting prime versus high pressure mode with switching knob.

4. Adjust the fine control (1 in figure 1) to “the middle”. Make sure the stroke selector /switching knob (7 in figure 1) is set to prime fully out. If not, squeeze handles fully in and press the selector (see figure 3).

**To expel the air from the pump:**

close the vent valve, increase the pressure (for example up to 50 bar) and after that, open the vent valve.

or optionally

connect the hose to PGHH but not the instrument to be calibrated. Pump until drops of water/oil come out of the end of the hose. Then connect the instrument and raise pressure as described in the previous paragraph.

5. 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.

**⚠ WARNING**

Vent external systems before connecting to the pump.

6. Close PGHH's vent valve fully clockwise.
7. 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.

## NOTICE

The measurement system must only contain the measurement liquid and no gas.

## WARNING

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.

8. Test how much pressure increase can be done using the fine control. If it is enough, continue to step 10.
9. With handles fully squeezed in, select the high pressure position on the stroke selector and operate handles to generate approximate pressure. **Smaller handle strokes enable easier pressure generation at high pressures.** 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.

## WARNING

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

10. 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.
11. The principal tool for releasing pressure from the measurement system is PGHH's fine control. Use of PGHH's vent valve is also possible, but requires caution in order to avoid pressure shocks to the measurement system.
12. To totally release pressure from the system, turn PGHH's vent valve counterclockwise. Return the stroke selector knob to prime position after first squeezing handles fully in.

## CAUTION

Never fully screw out the vent valve. The sealing ball, placed inside the pump, may wear off.

13. If operated with distilled water, the reservoir must be emptied after each use by removing the drain screw from the bottom of the reservoir (see figure 5).

## 2.2 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 (5 in figure 1).

### **DANGER**

Do not overfill the glass reservoir. The glass reservoir does not withstand high pressure but it is not pressurized when PGHH 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.

### **WARNING**

Do not use the pump if the reservoir is damaged.

# 3 Maintenance and troubleshooting

## 3.1 Periodic maintenance

Repairs must only be carried out by the manufacturer.

Cleaning the units and checking the liquid levels and quality is the only periodic maintenance required. With normal use, no further maintenance should be necessary. If required, the system can be returned to the manufacturer for reconditioning.

If used with distilled water, after each work the pump including reservoir must be emptied and made dry.

Working with the maintenance kit is only allowed for skilled personnel (maintenance kit order code 8003545).

### **CAUTION**

Never use chemicals for cleaning the reservoir, just a wet and free of lint cloth.

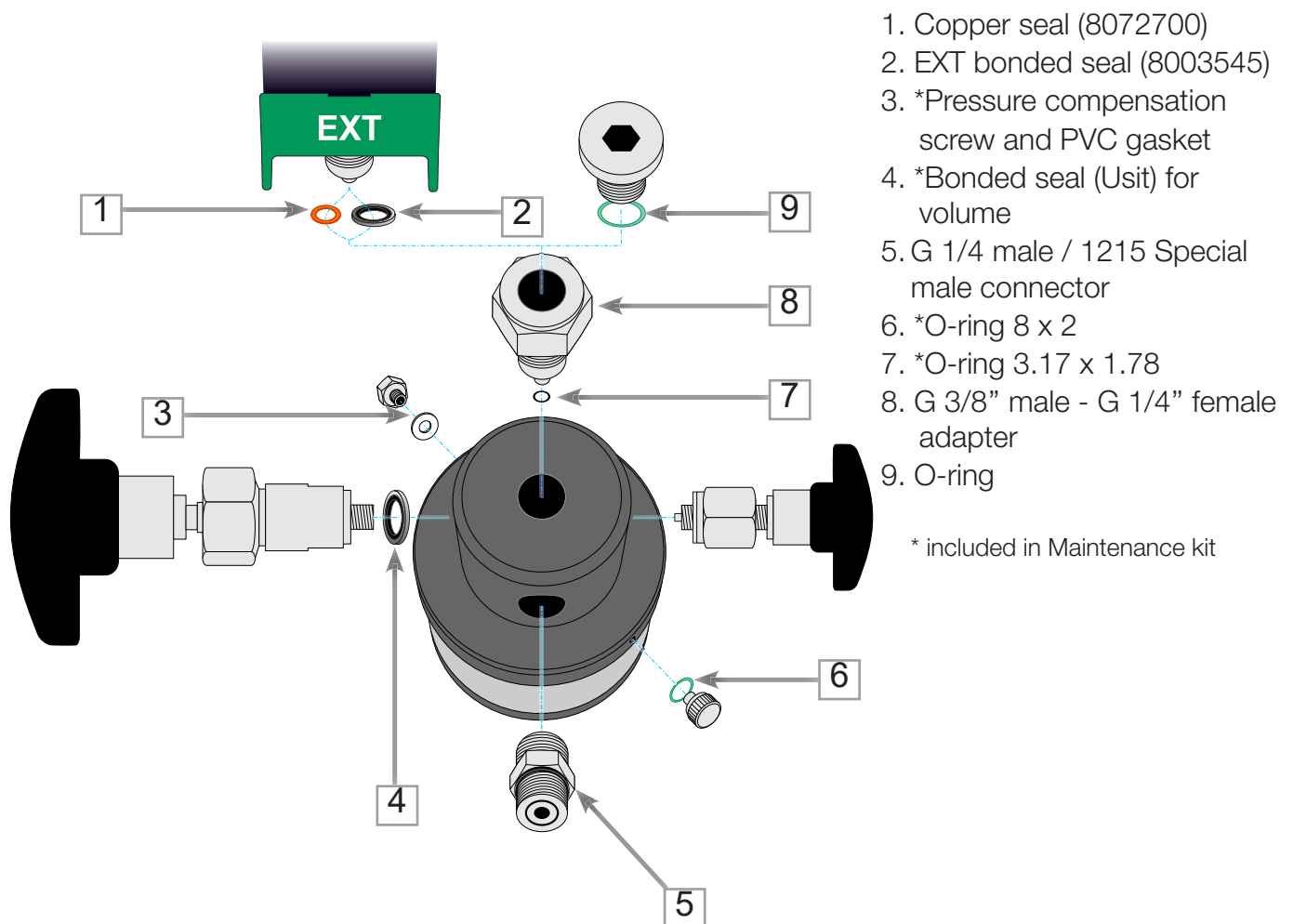


Figure 4. PGHH Maintenance kit seals and connectors.

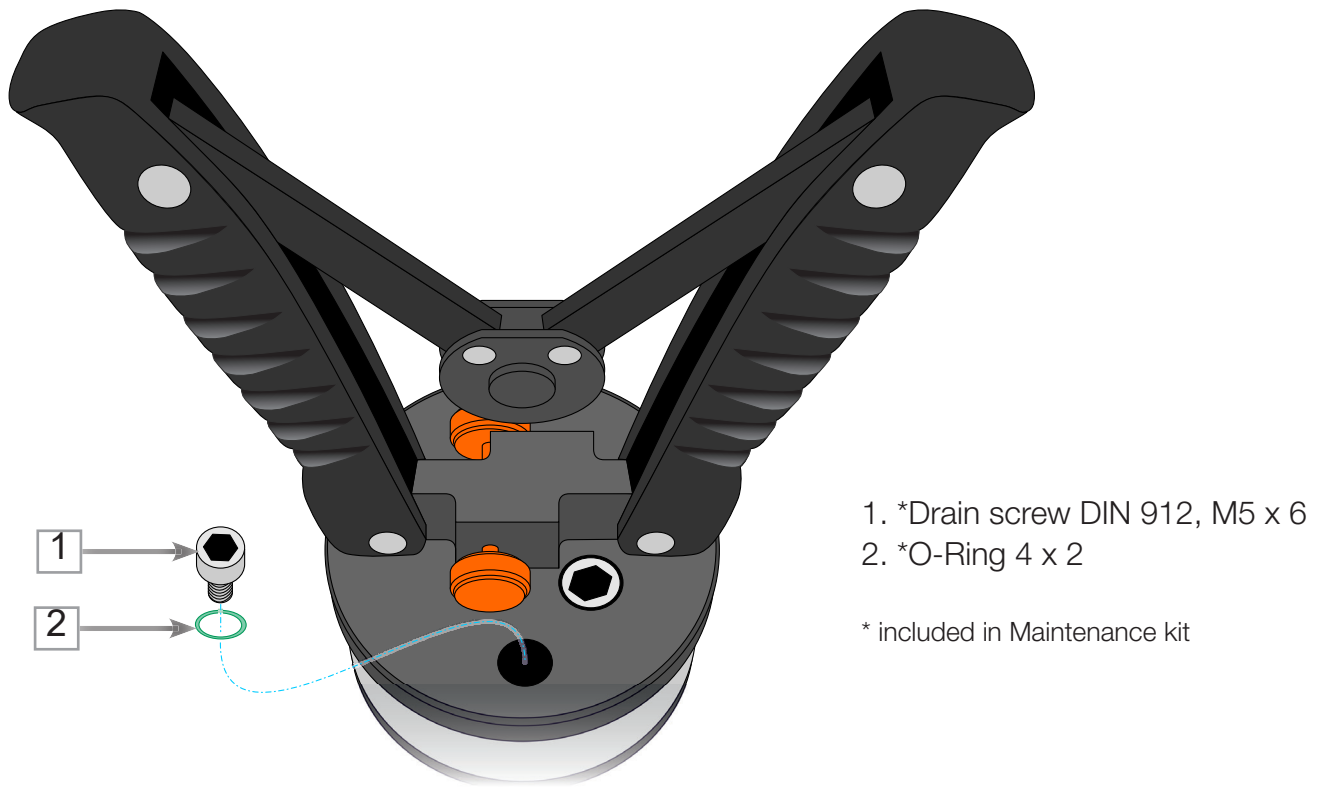


Figure 5. PGHH bottom view - reservoir drain screw.

## NOTICE

- The O-rings must be coated with a very little bit of silicone oil;
- Screwed connections must be fixed with a torque of 25 Nm (Drain screw max. 15 Nm, check correct placement of the o-ring 4 x 2 (2 in figure 5)).

## ⚠ WARNING

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

## ⚠ WARNING

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

## ⚠ CAUTION

Always depressurize PGHH when it is left on its own.

## 3.2 Troubleshooting

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

- 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 is possible that one or more of the seals in the Pressure Pump is leaking and needs to be replaced.

### **NOTICE**

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

## 3.3 Available spare parts

The available spare parts include:

- Fine adjustment valve, complete set, code 8003186
- Pressure vent valve, complete set including the vent valve steel ball, code 8003187
- Vent valve steel ball, code 0500383
- 1/4" BSP female / 3/8" male adapter, code 8003189
- Plug 1/4" BSP male, code 7150120

## 3.4 Disposal

Incorrect disposal can put the environment at risk. Dispose of instrument components and packaging materials in an environmentally compatible way and in accordance with the country-specific waste disposal regulations.

# 4 Specifications

## 4.1 The Pump Unit

<b>Weight</b>		1.3 kg	2.87 lb
<b>Dimensions</b>	<i>Height</i>	265 mm	approx. 10.4"
	<i>Width</i>	160 mm	approx. 6.3"
	<i>Depth</i>	120 mm	approx. 4.7"
<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>	200 cc, not to be pressurized		
<b>Output connectors</b>	<ul style="list-style-type: none"> <li>• G ¼" male / 1215 Special male connector (for Pressure Measurement Hose)</li> </ul>		
	<ul style="list-style-type: none"> <li>• G ¼" female connector (for Beamex External Pressure Measurement Module, XPM or EXT)</li> </ul>		

## 4.2 The Pressure Measurement Hose

<b>Length</b>		1 m	3 ft 3.3"
<b>Connectors (both ends)</b>	1215 Special, female		
<b>Internal diameter</b>		2 mm	0.08"
<b>External diameter</b>		5 mm	0.2"
<b>Max. working pressure</b>	630 bar	63 MPa	9137 psi
<b>Min. bursting pressure</b>	2000 bar	200 MPa	29000 psi
<b>Operable temperature range</b>	-35°C to 100°C		-31°F to 212°F
<b>Smallest bending radius</b>		20 mm	0.78"

## 4.3 Storage

Permissible conditions at the place of storage

<b>Storage temperature</b>	-10...50°C
<b>Humidity</b>	35...85% relative humidity

After each usage, the instrument has to be emptied and let dry out (drain screw at the bottom of the reservoir).

Store the hydraulic calibration pump in its original packaging in a location that fulfills conditions listed below.

### **NOTICE**

Avoid exposure to following factors:

- Direct sunlight or proximity to hot objects
- Mechanical vibration, mechanical shock (putting it down hard)
- Soot, vapour, dust and corrosive gases
- Potentially explosive environments, flammable atmospheres
- Corrosive liquids

### **WARNING**

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.