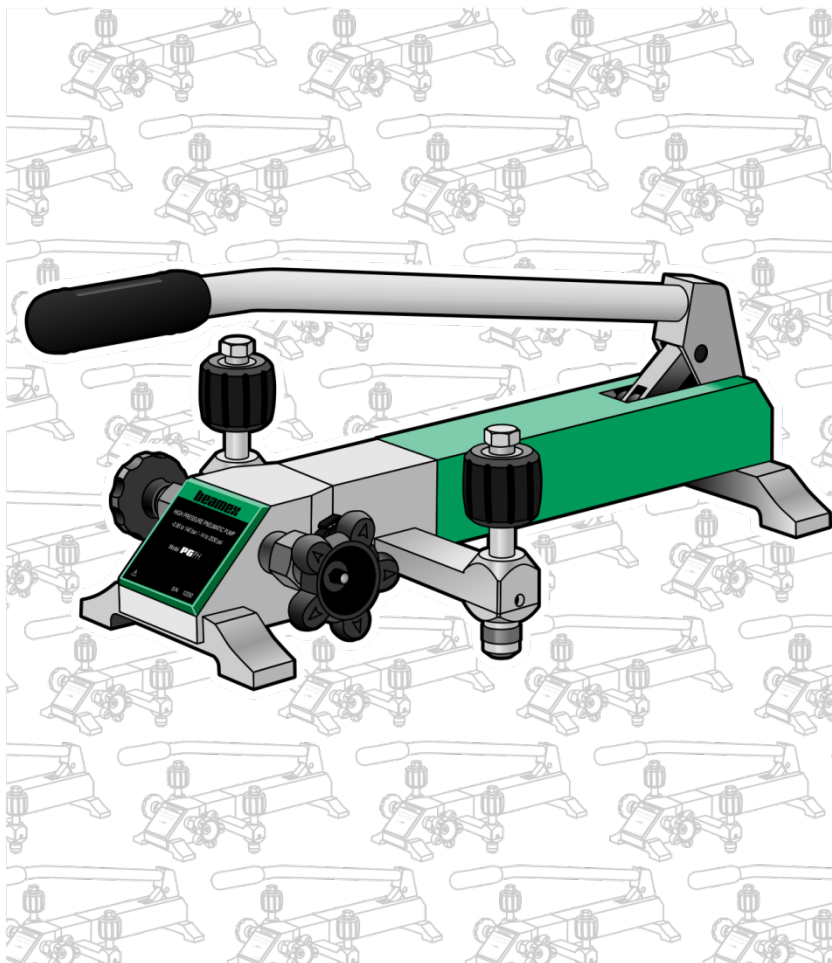


INSTRUCTION MANUAL

HIGH PRESSURE PNEUMATIC PUMP MODEL PGPH



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.

For more detailed technical data about the Instruction manual for Beamex® PGPH High Pressure Pneumatic Pump, please contact the manufacturer.

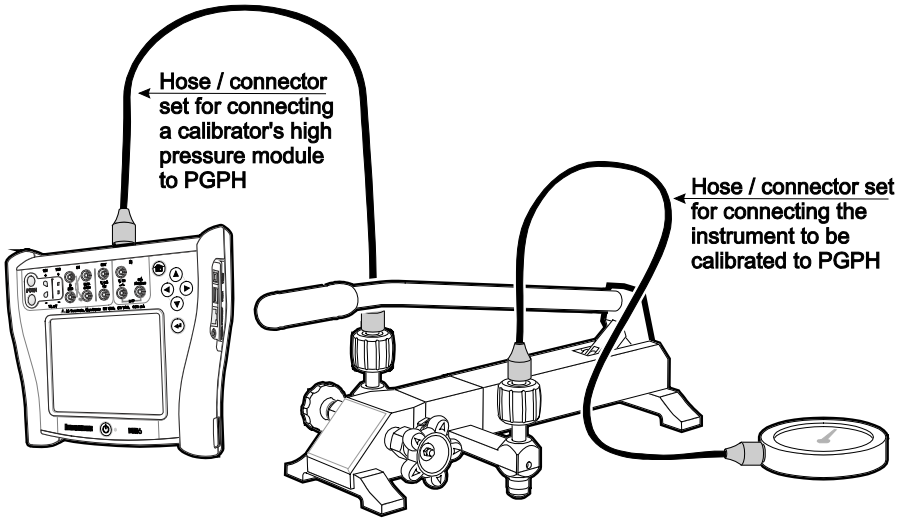
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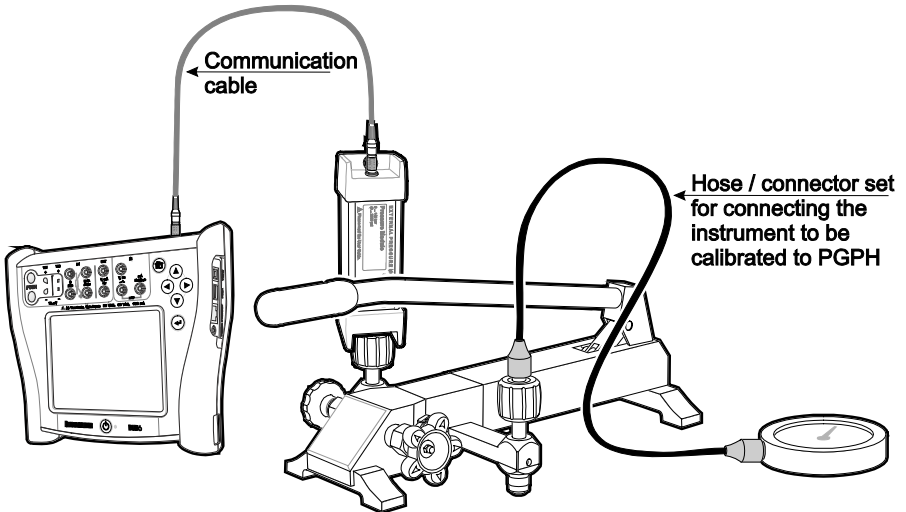
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Connections when calibrating a transmitter using an internal pressure module.



Connections when calibrating a transmitter using an external pressure module.

DESCRIPTION

The **PGPH** High Pressure Pneumatic Pump is designed to manually generate up to 140 bar (2000 psi) gauge pressure or up to -0.95 bar (-14 psi) vacuum for quick and accurate calibration of pressure gauges, transducers and other pressure measurement instruments.

Standard Accessories

The standard accessories are as follows:

- One G ¼" (male) plug for Pressure connectors
- A set of seals (o-rings), type: NBR70 for Pressure connectors (size 6 × 2).
- Guarantee leaflet
- This Instruction Manual

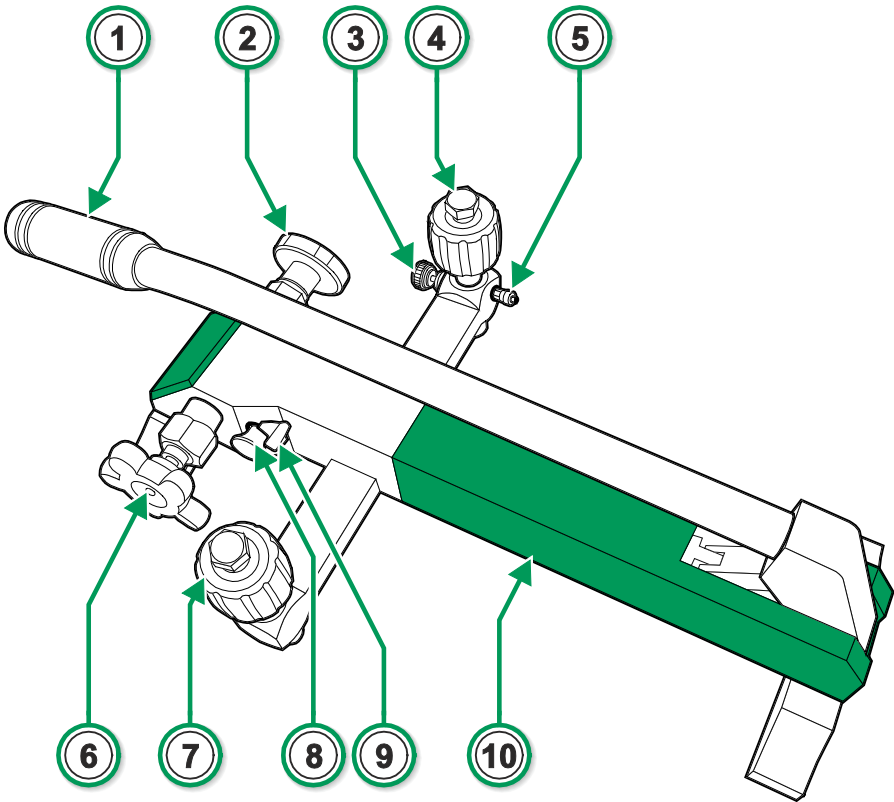
Optional Accessories

The optional accessories are as follows:

<u>ITEM</u>	<u>ORDER CODE</u>
• Carrying case	8003315
• Service kit containing the following items, including instructions: <ul style="list-style-type: none">○ 2 High Pressure Check Valve Gaskets○ 2 Check Valves○ 2 pressure/vacuum selector locks○ 7 o-rings○ 2 x-rings	8003180
• Tube of grease for the Fine Adjust stem	0005180
• 400 bar hose/connector set for connecting the instrument to be calibrated to PGPH	8003380
• 400 bar hose/connector set for connecting a calibrator's high pressure module to PGPH (*)	8003365

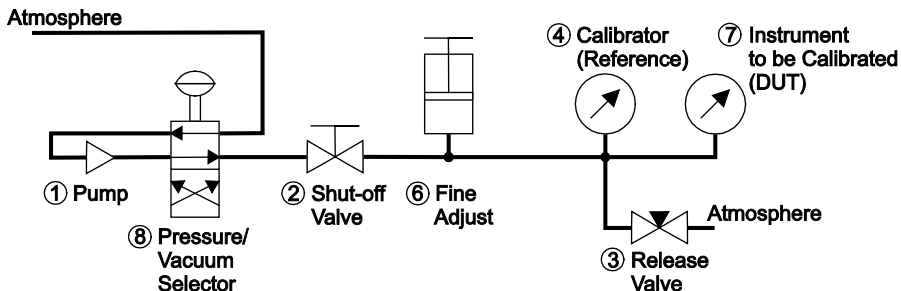
*) Not needed when used high pressure module is an External Pressure Module (EXT).

Connections and Parts



- ① Pump lever
- ② Shut-off valve. Isolates the pump from the measurement circuit.
- ③ Release valve. Clockwise to close, anticlockwise to open.
- ④ Pressure connector, G ¼", for instrument / calibrator. Hand tightened.
- ⑤ Vent connection/hole
- ⑥ Fine Adjust handwheel. Rotating clockwise increases pressure.
- ⑦ Pressure connector, G ¼", for instrument / calibrator. Hand tightened. Equivalent with Pressure connector ④
- ⑧ Pressure/Vacuum selector. Pull out for pressure and push in for vacuum. **Do not change when pressurized!**
- ⑨ Selector lock
- ⑩ Pump body

Connection Diagram



OPERATION

Preparation

1. Select Pressure Mode ⑧.
2. Open Shut-off valve ② (counterclockwise) and Release ③ valve.
3. Rotate Fine Adjust ⑥ to mid position
4. Close Release ③ valve
5. Connect instrument to be calibrated (Device Under Test, DUT) to Pressure connector ⑦ and the calibrator (pressure module, reference) to Pressure connector ④. The location of the instrument and the calibrator may also be interchanged. Pressure connectors ⑦ and ④ are equivalent. See also **Leak Tests** on page 6.

Calibration

6. Pump pressure/vacuum ①.
7. Close Shut-off valve ② (clockwise). See also notes further on.
8. Adjust pressure by rotating the Fine Adjust ⑥ handwheel.
9. Repeat stages 6 to 8 until instrument's maximum pressure / deepest vacuum is reached

When maximum pressure / deepest vacuum is reached continue as follows:

10. Gently open Release valve ③ to release pressure/vacuum and close when approaching next calibration point.
11. Adjust pressure by rotating the Fine Adjust ⑥ handwheel.
12. Repeat stages 10 and 11 until atmospheric pressure (or the instrument's measurement span's pressure closest to atmospheric pressure) is reached.

End by opening Shut-off ② and Release ③ valves. If you want to do several repeats, restart from stage 3.

Keep in Mind

Immediately after a pressure change, the pressure may change slightly due to the stretching/shrinking 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 Adjust Ⓒ handwheel.

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

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

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

If the pump fails to indicate a pressure change after considerable pumping action of the handle, check to assure that the connections between the pump, the hose end and the attached instrument(s) are tight and retry pumping. Also 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.

A full list of warnings is at the end of this manual.

TROUBLESHOOTING/MAINTENANCE

Hard to Pressurize Using Pressure Lever ①

CAUSES	SOLUTIONS
The Shut-off valve ② is not open.	Open the Shut-off valve ②.
Release valve ③ is not closed.	Close the release valve ③.
The o-ring in Pressure connectors ④ or ⑦ is missing, misplaced, or broken.	Replace the o-ring.
Pressure / Vacuum selector ⑧ is in wrong position.	Pressure: pull it out; Vacuum: push it in.
Pipeline jammed with impurity.	Open the clean-out bolt at the bottom of the pump and clean.

Hard to Fine Adjust Using Fine Adjust Valve ⑥

CAUSES	SOLUTIONS
The Shut-off valve ② is not closed.	Close the Shut-off valve ②.
Calibrator or instrument to be calibrated is not connected tightly.	Check Pressure connectors ④ and ⑦. Re-tighten if necessary. Hand-tightening should be sufficient.
The o-ring in Pressure connectors ④ or ⑦ is missing, misplaced, or broken.	Replace the o-ring.
The end surface of the instrument's connection thread is not smooth.	Use a PTFE washer in Pressure connector.
The instrument's, calibrator's or hose's thread does not match the thread on PGPH's Pressure connectors ④ or ⑦.	Use proper adapter.
Impurities inside the Fine Adjust volume or connection.	Repeat pressurizing several times and then release it suddenly, make airflow bring the impurity out.

Hard to Turn the Valves or Handles

CAUSES	SOLUTIONS
Valve closed too tight after the previous calibration.	Do not close shut off valves and handles too tightly.
The new pump does not run smooth.	The new pump needs time to run in.
Lack of lubrication in threads.	Lubricate the thread.

Seal Replacement

Depending on the frequency of use, the main piston seals (and others) will eventually need replacing. The replacement seals are part of an optional Service kit and the kit includes instructions for replacing/fitting the seals.

Cleaning the Pump

PGPH has a plugged clean-out hole at the bottom of the pump. Open the plug and remove any possible impurities inside the pump.

Leak Tests

If you want to test the pump and the connected measurement system, do as follows:

If you do not already have a calibration measurement system connected to the pump, connect an accurate enough pressure measurement instrument, e.g. a Beamex EXT250 pressure module to the pump. Plug any open connections.

You'll also need a clock to measure time.

Leak Test for Positive Pressure

Increase pressure using constant change rate up to pump's full scale positive pressure (140 bar / 2000 psi). Start your clock.

After five minutes, record the pressure indication, p_5 .

After ten minutes, record the pressure indication, p_{10} .

Calculate the leak, L_p , using this equation:

$$L_p = \frac{p_5 - p_{10}}{p_5}$$

If L_p is less than 0.01 (1 %), the system is leak free.

Leak Test for Negative Pressure (Vacuum)

Decrease pressure using constant change rate down to pump's full scale negative pressure (-0.95 bar / 95 kPa / -14.0 psi). Start your clock.

After five minutes, record the pressure indication, p_{v5} .

After ten minutes, record the pressure indication, p_{v10} .

Calculate the leak, L_v , using this equation:

$$L_v = p_{v5} - p_{v10} \quad [\text{kPa}].$$

If L_v is less than 1 kPa (approx. 0.14 psi), the system is leak free.

SPECIFICATIONS

The Pump Unit

Dimensions		<u>Pump lever down</u>	<u>Pump lever up</u>
	Height	178 mm / ~7"	506 mm / ~20"
	Length	540 mm / ~21¼"	450 mm / ~17¾"
	Width	270 mm / ~10½"	
Weight	7.1 kg / 15.7 lb		
Pressure range ^(*)	-0.95 bar / -14 psi to 140 bar / 2000 psi		
Safety Pressure	180 bar / < 2600 psi		
Relief Valve	PGPH includes a built-in relief valve.		
Pressure media	Clean air		
Temperature	0 ... 50 °C		
Humidity	< 85 %RH		
Pressure resolution	0.1 mbar / 0.002 psi		

Output connectors

- Two G ¼" female connectors. One for the instrument to be calibrated and another for the calibrator.
- Clean-out connection: G ¼" female (plugged)

*) If local atmosphere pressure is 1 bar / 14.5 psi, the vacuum can reach to -0.95 bar / -14psi.
If local atmosphere pressure is **P**, the vacuum can reach to -0.95×**P**.

Pressure Measurement Hoses (Optional Accessories)

Length	1 m / 3 ft 3.3"			
Internal diameter	2 mm / 0.08"			
External diameter	5 mm / 0.2"			
Operating pressure*	@ 0°C (+32°F):	768 bar	76.8 MPa	11148 psi
	@ 30°C (+86°F):	693 bar	69.3 MPa	10051 psi
	@ 50°C (+122°F):	630 bar	63.0 MPa	9137 psi
	@ 80°C (+176°F):	535 bar	53.5 MPa	7767 psi
	@ 100°C (+212°F):	485 bar	48.5 MPa	7036 psi
	@ 120°C (+248°F):	428 bar	42.8 MPa	6213 psi
Bursting pressure	@ 20°C (68°F)	1950 bar	195.0 MPa	28200 psi
Operable temperature range	-20 °C to +100 °C / -4 °F to +212 °F			
Smallest bending radius	20 mm / 0.78"			
	• below -20°C (-4°F)	30 mm / 1.18"		

Connections

End connectors in 400 bar hose/connector set for connecting the instrument to be calibrated to PGPH (Code 8003380):

- PGPH end: G1/4" male
- Instrument end: G 1/4" NPT male

End connectors in 400 bar hose/connector set for connecting a calibrator's high pressure module to PGPH (Code 8003365):

- PGPH end: G1/4" male
- Calibrator / pressure module end: G1/8" male

Beamex reserves the right to make modifications to the specifications and this manual without any further notice.

WARNINGS AND CAUTIONS

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 built-in relief valve may blow nearby particles in random directions.

Do not connect the pump to an external pressure source.

Vent external systems before connecting to the pump.

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

Use only measuring hoses provided by Beamex or other reliable suppliers. Observe the effect of the operational conditions to the maximum pressure allowed in the hose. The specifications of Beamex hoses can be found on page 7 of this manual.

The environmental conditions 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 PGPH when it is left on its own.

Avoid possible damage when suddenly apply pressure to low pressure and small chamber gauges.

Do not exceed the safety pressure limit (180 bar / < 2600 psi).

Compressed air may cause problem in explosive or corruptive environment.

Do not shift the pressure/vacuum selector ® to vacuum mode under pressure. Do not over tighten connectors to avoid any damage.

Store the pump in the dry and non-corruptive environment.

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

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

Any safety problems or damages caused by incorrect operation, are beyond Beamex's responsibility.

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