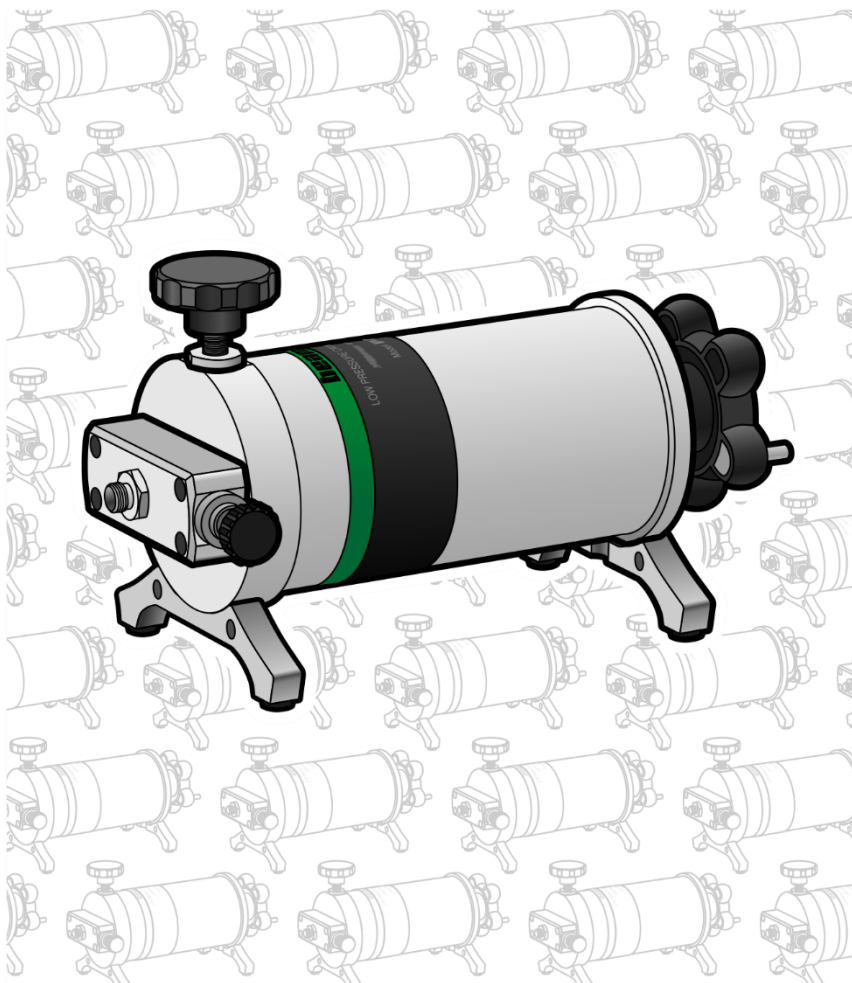


INSTRUCTION MANUAL

LOW PRESSURE CALIBRATION PUMP MODEL PGL



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® PGL Low Pressure Calibration Pump, please contact the manufacturer.

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DESCRIPTION

The **PGL** Low Pressure Calibration Pump is designed to manually generate up to ± 400 mbar (± 6 psi) for quick and accurate calibration of pressure gauges, transducers and other pressure measurement instruments.

Standard Accessories

The standard accessories are as follows:

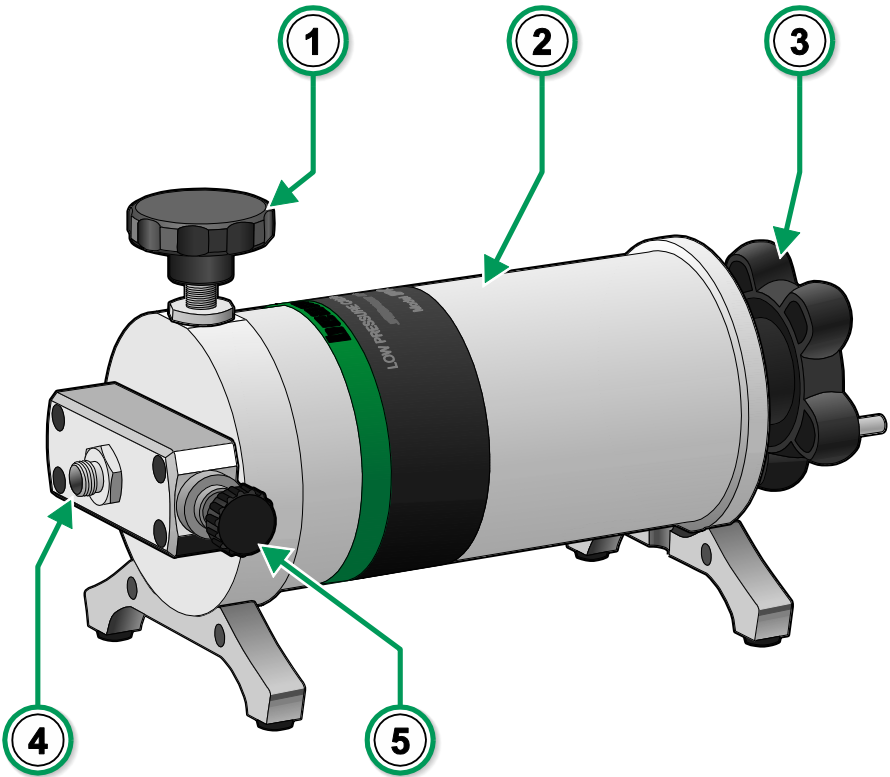
- Pressure connectors:
 - G 1/8" male with 60° internal cone to G1/8" including an o-ring (10.1 mm x 1.6 mm NBR 70).
Pre-installed in **PGL**.
 - G 6/4" nipple to G 1/8" including an o-ring (10.1 mm x 1.6 mm NBR 70).
Delivered as a replacement for the pre-installed connector
- A set of seals (o-rings), type: 10.1 mm x 1.6 mm NBR 70 (Nitrile Butadiene Rubber, Shore A70, black)
- Guarantee leaflet
- This Instruction Manual

Optional Accessories

The optional accessories are as follows:

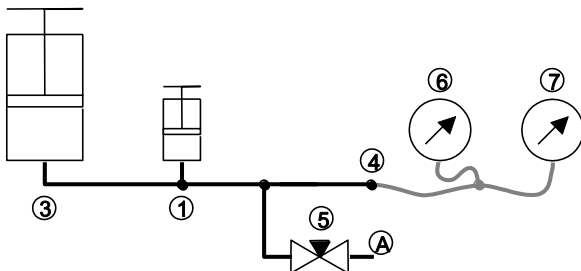
<u>ITEM</u>	<u>ORDER CODE</u>
• Carrying case	8003310
• Service Seal kit	8003085
• Bag of additional connectors: <ul style="list-style-type: none">○ G 1/8" male with 60° internal cone to G1/8" incl. an o-ring (10.1 mm x 1.6 mm NBR 70).○ G 6/4" nipple to G 1/8" incl. an o-ring (10.1 mm x 1.6 mm NBR 70).	8003090
• Tube of grease	0005180

Connections and Parts



- ① Fine Adjust handwheel (clockwise to increase pressure).
- ② Cylinder
- ③ Coarse Adjust handwheel (clockwise to increase pressure).
- ④ Pressure connector. Default: G 1/8" male with 60° internal cone.
- ⑤ Release valve (clockwise to close/ counterclockwise to open).

Connection Diagram



- Ⓐ Atmosphere
- ① Fine Adjust
- ③ Coarse Adjust
- ④ Pressure connector
- ⑤ Release Valve
- ⑥ Calibrator (reference)

⑦ Instrument to be calibrated (DUT)

OPERATION

Positive Pressure Calibration

1. Open Release valve ⑤.
Rotate the the Fine Adjust handwheel ① to mid position.
Rotate the Coarse Adjust handwheel ③ **counterclockwise** to maximum
2. Connect the calibrator (pressure module, reference) and the instrument to be calibrated (Device Under Test, DUT) to Pressure connector ④ using a Beamex Pressure Measurement Hose or similar.
3. Close Release valve ⑤ and check that the measurement system is not leaking. See **Leak Tests** on page 7.
4. Increase the pressure close to the next calibration point by rotating the Coarse Adjust handwheel ③ clockwise.
5. Advance to calibration point by rotating the Fine Adjust handwheel ①.
6. Continue to next calibration point by repeating stages 4 and 5 until you reach the calibration point with the highest pressure.
7. Decrease the pressure close to the next calibration point by rotating the Coarse Adjust handwheel ③ counterclockwise.
8. Advance to calibration point by rotating the Fine Adjust handwheel ①.
9. Continue to next calibration point by repeating stages 7 and 8 until all calibration points are done.
10. Start another calibration run from stage 4 onwards or end calibration by opening Release valve ⑤.

Negative Pressure (Vacuum) Calibration

11. Open Release valve ⑤.
Rotate the the Fine Adjust handwheel ① to mid position.
Rotate the Coarse Adjust handwheel ③ **clockwise** to maximum
12. Connect the calibrator (pressure module, reference) and the instrument to be calibrated (Device Under Test, DUT) to Pressure connector ④ using a Beamex Pressure Measurement Hose or similar.
13. Close Release valve ⑤ and check that the measurement system is not leaking. See **Leak Tests** on page 7.
14. Decrease the pressure close to the next calibration point by rotating the Coarse Adjust handwheel ③ counterclockwise.
15. Advance to calibration point by rotating the Fine Adjust handwheel ①.
16. Continue to next calibration point by repeating stages 14 and 15 until you reach the calibration point with the deepest vacuum.
17. Increase the pressure close to the next calibration point by rotating the Coarse Adjust handwheel ③ clockwise.
18. Advance to calibration point by rotating the Fine Adjust handwheel ①.
19. Continue to next calibration point by repeating stages 17 and 18 until all calibration points are done.
20. Start another calibration run from stage 14 onwards or end calibration by opening Release valve ⑤.

Keep in Mind

The operating principle of the PGL pump is based on an adjustable volume. When changing the volume in a closed pressure system, it causes the pressure to change. The PGL has certain range in the volume adjustment and the effect of that to the pressure change in the system depends directly on the total volume of the system:

- For a system with very large volume, the PLG can only make small pressure adjustment, and you may not reach the max pressure specified for PGL.
- For a system with very small volume the PGL can adjust the pressure significantly more, even over the max safety pressure. Please take this into account when using PGL and don't exceed the safety pressure 4bar / 60psi in any circumstances.

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 ① 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, but no pressure change is indicated, stop using the pump and locate the fault. Always keep a reliable indicator connected to the measurement system.

If the pump fails to indicate a pressure change, 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 possible unused connectors are properly plugged.

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

Do not use the pump 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 Adjust Using Coarse Adjust Valve ③

CAUSES	SOLUTIONS
Release valve ⑤ is not closed.	Close the release valve ⑤.
The Coarse Adjust Valve's ③ o-ring is broken or loose.	Replace the o-ring.

Hard to Fine Adjust Using Fine Adjust Valve ⑥

CAUSES	SOLUTIONS
The connections are not tightened.	Tighten all connections.
The Fine Adjust Valve's ① O-ring is aged or frayed.	Replace the o-ring.
The thread surface is not smooth.	Apply Teflon® tape.
The connector types do not match.	Use proper adapter.

Hard to Turn the Valves

CAUSES	SOLUTIONS
Release valve ④ closed too tight after the previous calibration.	Do not close release valve 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 seals will eventually need replacing. The replacement seals are part of an optional Service kit and the kit includes instructions for replacing/fitting the seals.

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 400mC pressure module to the pump.

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 (400 mbar / 6 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 (-400 mbar / 40 kPa / -6.0 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:

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

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

SPECIFICATIONS

Weight		1.38 kg	3.04 lb
Dimensions	Height	133 mm	approx. 5.2"
	Width	251 mm	approx. 9.9"
	Depth	117 mm	approx. 4.6"
Pressure range	-400 mbar to +400 mbar / -6 psi to +6 psi		
Safety Pressure	< 4 bar / < 60 psi		
Pressure media	Clean air		
Temperature	0 ... 50 °C		
Humidity	< 95 %RH		
Adjusting sensitivity	1 Pa / 0.01 mbar / ~0.004 inH ₂ O / ~15×10 ⁻⁵ psi		

Output connectors

- G 1/8" male with 60° internal cone, for Beamex pressure measurement hose, pre-installed.
- G 6/4" nipple delivered as an optional connector to replace the one meant for Beamex pressure measurement hose

WARNINGS

Read the instruction manual carefully prior to setting up and using the pressure pump.

Only personnel with good experience and knowledge of pressure media, 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.

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 environmental conditions (ambient pressure and temperature) may restrict the allowable maximum pressure to a lower level than the pump and the hose enable.

Always depressurize PGL 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 (4 bar / < 60 psi) .

Compressed air may cause problem in explosive or corruptive environment.

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 PGL 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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