PGL

Calibration Pump (±400 mbar)

Dear User,

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

For more detailed technical data about the Beamex PGL Calibration Pump (±400 mbar), please contact the manufacturer.

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Prologue

Thank you for buying the Beamex **PG**L Calibration Pump.

The Beamex **PG**L Calibration Pump can be used to generate accurate and stable reference pressure for low pressure calibrations on range ±400 mbar / ±160 iwc. The innovative design and material choices minimize the impact of environmental temperature changes during calibration. The pressure can be adjusted with screw-operated coarse and fine adjustment. Use it together with the Beamex high-quality 40 bar pressure hoses to ensure accuracy.

Typographical Conventions

The following typographical conventions apply to the **PG**L User Manual:

Bold text is, among others, used in the following situations:

- References to User Manual topics and parts
- **PG**L keywords, i.e. terms shown in the user interface

Note: This is a note. Notes typically inform you of something useful concerning the current topic.

Caution: This is a caution. Whenever you see a caution, read it carefully and take it seriously. By not observing cautions, you may damage the pump.

Warning: This is a warning. Whenever you see a warning, read it carefully and take it seriously. By not observing warnings, you may -at worst- damage the pump and/or get personal injury.

Unpacking and Inspection

At the factory, each new **PG**L Calibration Pump passes a careful inspection. The receiver should, however, inspect the unit for any damage that may have occurred during transportation. If there are signs of obvious mechanical damage and/or the package contents are incomplete, contact the purchasing sales office as soon as possible.

The **PG**L is available in two different configurations with different delivery contents:

PGL **Calibration Pump (±400 mbar / ±160 iwc), pump only** (9010090)

- **PG**L Calibration Pump
- User Manual
- 4 mm Hex Wrench
- Opening Tool for maintenance
- Warranty Terms

PGL **Calibration Pump (±400 mbar / ±160 iwc), complete kit** (9010095)

- **PG**L Calibration Pump
- 40 bar / 600 psi Pressure T-hose
- Hard Case
- User Manual
- 4 mm Hex Wrench
- Opening Tool for maintenance
- Warranty Terms

Options, Accessories and Spare Parts

- Hard Case for **PG**L (8003311)
- **PG**L Seal service kit (8003710)
- **PG**L Coarse Adjust Handwheel (8003715)
- **PG**L Coarse Adjust service kit (8003720)
- **PG**L Fine Adjust service kit (8003725)
- **PG**L Support Leg (8003730)

Up-to-date spare parts are available at https://shop.beamex.com/

Feedback

We constantly want to improve our products and services. Therefore we'd like to know your opinion regarding the product you use. Please spend a moment of your valuable time to give us feedback about the product.

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Safety Precautions and Warnings

Warning: Read the User Manual carefully prior to setting up and using the pressure pump. Do not use the **PG**L in any other way than as described in this User Manual. Do not connect the pump to an external pressure source.

Warning: 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 cause damage to the pump, the instrument connected to the pump and/or personal injury.

Warning: Use eye shields. The use of a relief valve for overpressure protection is recommended. If a relief valve is used, remember to occasionally check its functionality.

Warning: Vent external systems before connecting to the pump. Ensure that all connections are made correctly and that the hoses and connectors are undamaged and free of impurities. 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.

Warning: Always depressurize the **PG**L when it is left on its own. Avoid possible damage when suddenly applying pressure to low pressure and small chamber gauges. Do not exceed the safety pressure limit (4 bar / < 60 psi). The environmental conditions (ambient pressure and temperature) may restrict the allowed maximum pressure to a lower level than the pump and the hose enable.

Warning: Compressed air may cause problem in explosive or corruptive environments. In order to avoid any damage, do not overtighten the connectors.

Warning: Store the pump in a 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.

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

Specifications

Specification	PGL
Pressure Range[1]	-400 to +400 mbar / -160 to 160 iwc
Adjusting Sensitivity	< ±0.05 mbar / 0.02 iwc[2]
Pressure change after 1 min waiting time and readjustment[3]	< 0.3 mbar / min / 0.12 iwc / min
Wetted Parts	Stainless steel, nitrile rubber, polyacetal
Dimensions	See technical drawing: Figure 1: Technical Drawing
Weight	~1.8 kg / 4.0 lbs
Pressure Port	G1/8" (ISO228/1) female port with pressure fitting (Bx G1/8" male) for Beamex 40 bar pressure hose
Pressure Media	Air
Storage Temperature	-20 to 60°C / -4 to 140°F
Operating Temperature	0 to 50°C / 32 to 122°F
Humidity	< 95%RH

1 Depending on the volume of the test setup. With smaller volumes (max. 20 ml / 0.68 fl.oz) you can also operate in the following pressure ranges: -0.7 to 3.0 bar / -281 to 1204.4 iwc.

2 Into a volume of max. 20 ml / 0.68 fl.oz.

3 In stable conditions and a volume of max. 20 ml / 0.68 fl.oz.

Note: Please notice that the specifications are only valid with the Beamex 40 bar pressure T-hose.

Note: If the device has been stored in a different environment, it should be stabilized to the new environment before use.

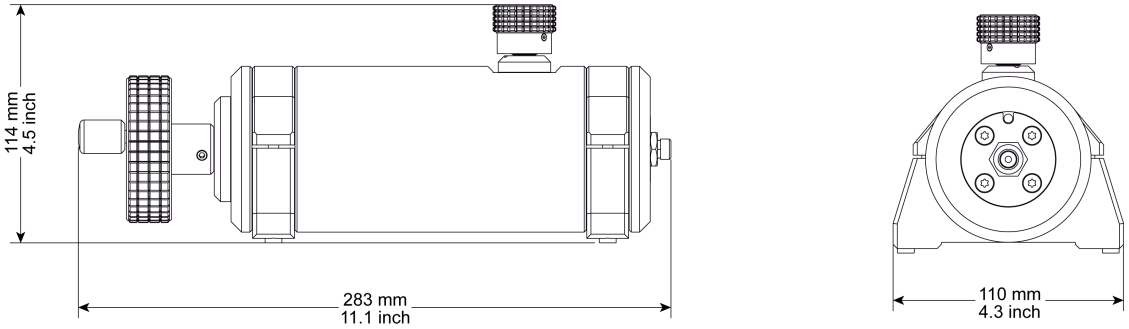

Figure 1: Technical Drawing

About the PGL

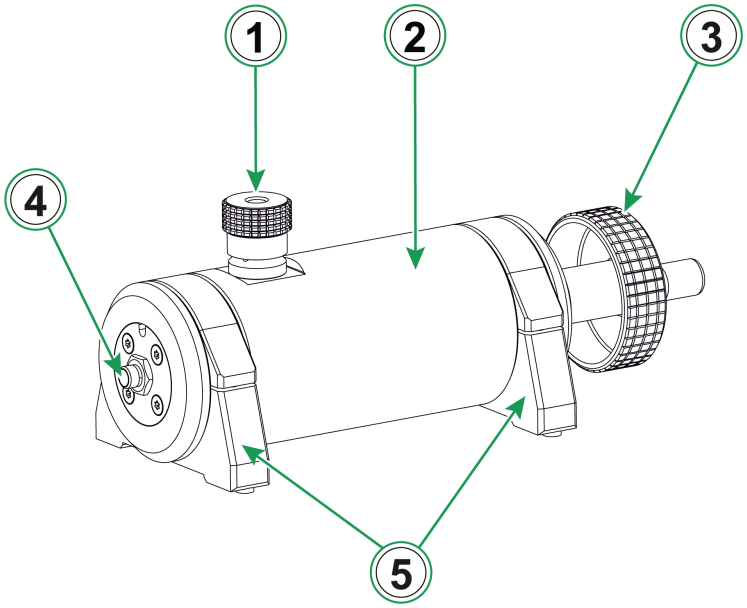

Figure 2: PGL Parts

1. Combined Fine Adjust Knob and Release Valve (clockwise to increase and counterclockwise to decrease pressure and vent)
2. Cylinder
3. Coarse Adjust Handwheel (clockwise to increase pressure)
4. Pressure output fitting. Default: Bx G 1/8" male for the Beamex 40 bar pressure hose
5. Support legs. (By loosening the screws of both legs, it is possible to readjust the cylinder so that the Fine Adjust Knob is located on the left or right side of the pump, whichever feels more convenient in terms of usability)

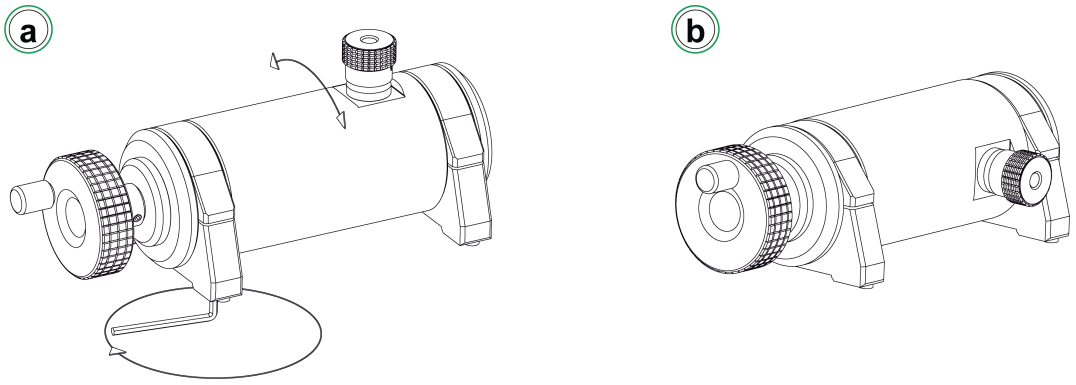

Figure 3: Readjust the Cylinder to Achieve a More Ergonomic Way of Working

Note: Vent the pump by turning the Fine Adjust Knob counterclockwise until the threads become visible and then rotate 1-3 rounds more.

Operating Instructions

Positive Pressure Calibration

1. Open the Release Valve by turning the Fine Adjust Knob **counterclockwise** to the maximum or until 2-3 threads are visible. Rotate the Coarse Adjust Handwheel **counterclockwise** to the maximum.
2. Close the Release Valve by turning the Fine Adjust Knob **clockwise** to the middle position.
3. Connect the calibrator (pressure measurement module) and the instrument to be calibrated (device to be tested) to the pressure output fitting using the Beamex 40 bar pressure T-hose or similar. If needed, compensate the small pressure offset by turning the Fine Adjust Knob **counterclockwise** until the output pressure is 0 barg / 0 iwcg.
4. Increase the pressure close to the next calibration point by rotating the Coarse Adjust Handwheel **clockwise**.
5. Advance to the calibration point by turning the Fine Adjust Knob. Wait for a while (about 1 minute) and fine-tune the output pressure back to the set point.
6. Continue to the next calibration point by repeating steps 4 and 5 in this instruction 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 **counterclockwise**. Alternatively, open the release valve if it was your final set point.
8. Advance to the calibration point by turning the Fine Adjust Knob. Wait for a while (about 1 minute) and fine-tune the output pressure back to the set point.
9. Continue to the next calibration point by repeating steps 7 and 8 in this instruction until all calibration points are done.
10. Begin another calibration run by starting from step 4 in this instruction or end calibration by opening the Release Valve.

Negative Pressure (Vacuum) Calibration

1. Open the Release Valve. Rotate the Coarse Adjust Handwheel **clockwise** to the maximum.
2. Close the Release Valve and set the Fine Adjust Knob to the middle position.
3. Connect the calibrator (pressure module, reference) and the instrument to be calibrated (device to be tested) to the pressure output fitting using the Beamex low pressure hose (max 40 bar) or similar. If needed, compensate the small pressure offset by turning the Fine Adjust Knob **counterclockwise** until the output pressure is 0 barg / 0 iwcg.
4. Decrease the pressure close to the next calibration point by rotating the Coarse Adjust Handwheel **counterclockwise**.
5. Advance to the calibration point by turning the Fine Adjust Knob. Wait for a while (about 1 minute) and fine-tune the output pressure back to the set point.
6. Continue to the next calibration point by repeating steps 4 and 5 in this instruction until you reach the calibration point with the deepest vacuum.
7. Increase the pressure close to the next calibration point by rotating the Coarse Adjust Handwheel **clockwise**. Alternatively, open the release valve if it was your final set point.
8. Advance to the calibration point by turning the Fine Adjust Knob. Wait for a while (about 1 minute) and fine-tune the output pressure back to the set point.
9. Continue to the next calibration point by repeating steps 7 and 8 in this instruction until all calibration points are done.
10. Begin another calibration run by starting from step 4 in this instruction or end calibration by opening the Release Valve.

Note: If the small pressure increase that occurs when the pressure hose is connected needs to be compensated, just turn the Fine Adjust Knob slightly counterclockwise until the pressure reading is 0 mbarg / 0 iwcg.

Important to Consider

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

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

Immediately after a pressure change, the pressure may change slightly due to the thermodynamic effects. In that case, adjust the pressure back to required value using the Fine Adjust Knob.

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

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

If the pump fails to indicate a pressure change, make sure that the connections between the pump, the hose end and the attached instrument(s) are tight and then retry pumping. Also check 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.

Avoid making calibrations in direct sunlight as it may heat up the setup and cause pressure fluctuation and unstable pressure readings.

Do not use the pump if the functionality of the pump is not normal. Locate the error before you continue using the pump.

A full list of warnings is included in this User Manual.

Troubleshooting

The System is not Holding the Set Pressure.	
Indication	**Solution**
The calibrator or the external pressure measuring device indicates that there is a leak in the system.	Check that all pressure connections are tight and that they are not leaking.

Difficulties Operating the Coarse Adjust	
Indication	**Solution**
The Release Valve is not closed.	Close the Release Valve.
The Coarse Adjust piston's seals are broken.	Replace the seals.

Difficulties Operating the Fine Adjust	
Indication	**Solution**
The connections are not tightened.	Tighten all connections.
The fitting types do not match.	Use the correct fitting.

Maintenance

Cleaning Instructions

If any parts of the **PG**L require cleaning, use a cloth damped with an alcohol-based solvent. Alternatively, use a low concentration of hydrogen peroxide or a mild solution of soapy water. Never use strong detergents.

Replacing the Seals

PGL **Seal service kit** (8003710)

Seals are located in the Coarse (1) and Fine Adjust pistons (2), under the output fitting (4) and under the end flange of the output fitting (3).

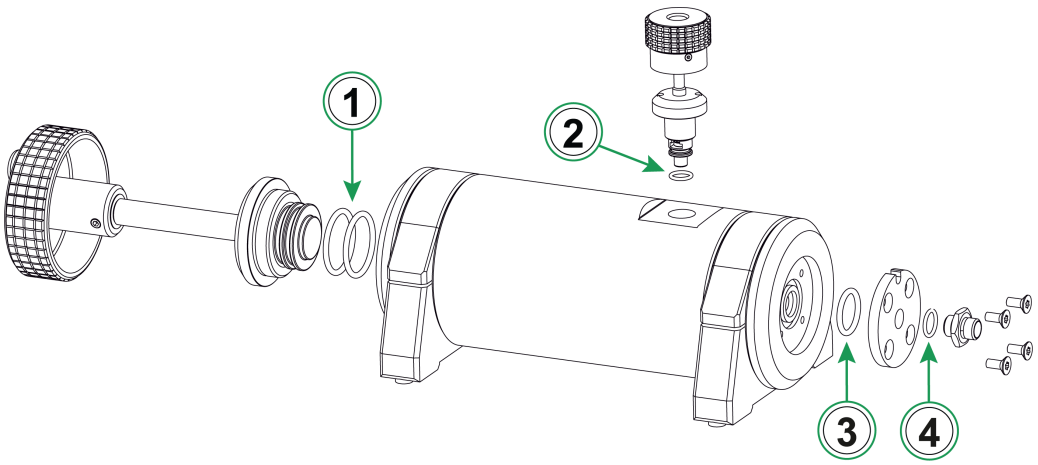

Figure 4: Seals

How to replace the seals of the Coarse Adjust piston is described in chapter Service Related to Coarse Adjust.

How to replace the seals of the Fine Adjust piston is described in chapter Service Related to Fine Adjust.

To replace the seal under the output fitting, unscrew the fitting with a 16 mm wrench and replace the old seal with a new one. Reassemble in reverse order.

To replace the seal under the end flange of the output fitting, unscrew the screws with a TX20 wrench and replace the old seal with a new one. Reassemble in reverse order.

Note: When reassembling, please make sure the venting hole on the end flange is pointing upwards.

Service Related to Coarse Adjust

Replacing the Piston, Piston Seals or other Parts

PGL Seal service kit (8003710)

PGL Coarse Adjust service kit (8003720)

1. Rotate the Coarse Adjust Handwheel **counterclockwise** to the maximum. It is important that the piston is located as close as possible to the body end cap of the Coarse Adjust not to damage the cylinder when removing the subassembly from the pump.

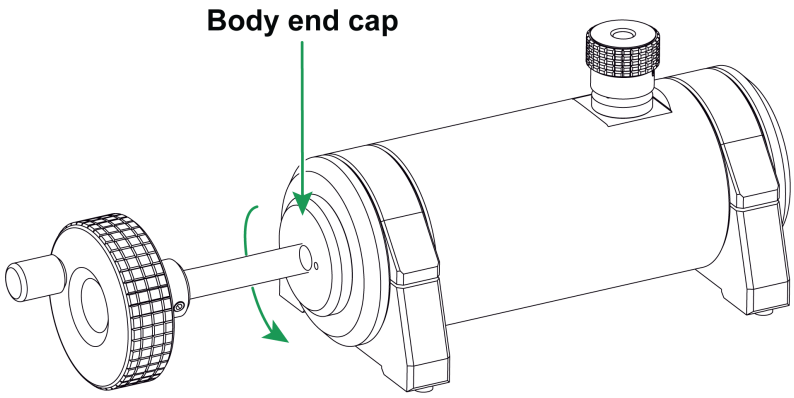

Figure 5: Disassembly of the Coarse Adjust Handwheel

2. Take the opening tool from the service kit and install its tips into the small holes located on the outer surface of the body end cap.
3. Rotate **counterclockwise** to loosen the body end cap.

4. Rotate the body end cap outwards with your hand. When it is fully open, gently pull the Coarse Adjust subassembly out.

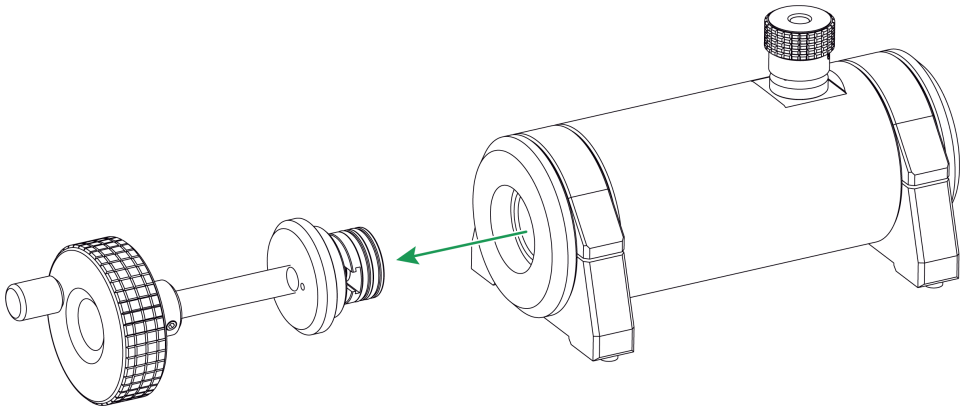

Figure 6: Removal of the Coarse Adjust Subassembly

5. Replace the seals only or replace all parts with new ones included in the service kit. Remove the handwheel and install it on the new adjustment rod.

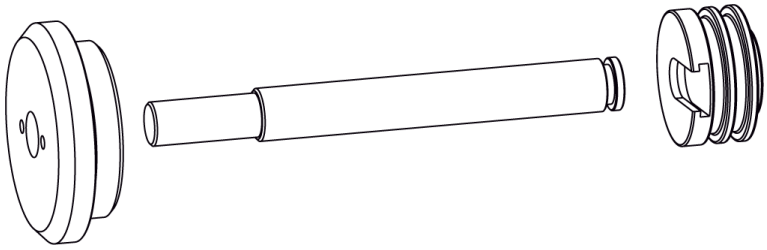

Figure 7: Coarse Adjust Parts

6. When all parts are assembled, rotate the Coarse Adjust Handwheel **counterclockwise** to the maximum until the piston is locked to the body end cap.

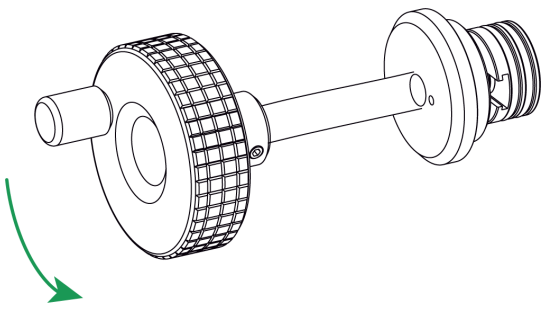

Figure 8: Coarse Adjust Subassembly

7. Install the subassembly and the body end cap in their places on the threads at the end of the cylinder. Gently rotate the body end cap inwards with your hand.

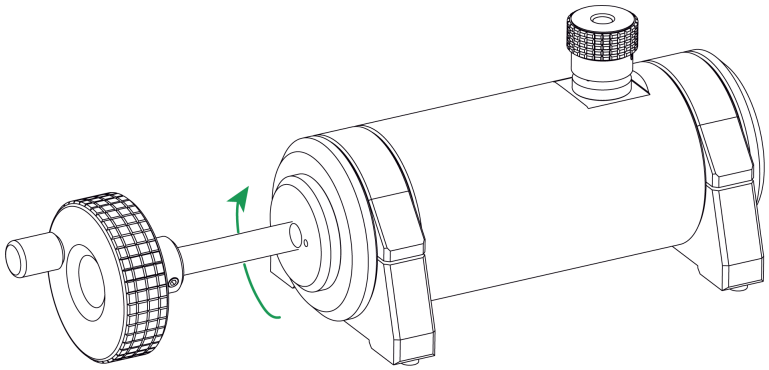

Figure 9: Reassembly of the Coarse Adjust Subassembly

8. Tighten the body end cap with the opening tool.

Replacing the Coarse Adjust Handwheel

PGL Coarse Adjust Handwheel (8003715)

1. Loosen the small hex screw located at the bottom of the handwheel.
2. Replace the old handwheel with a new one and tighten the hex screw.

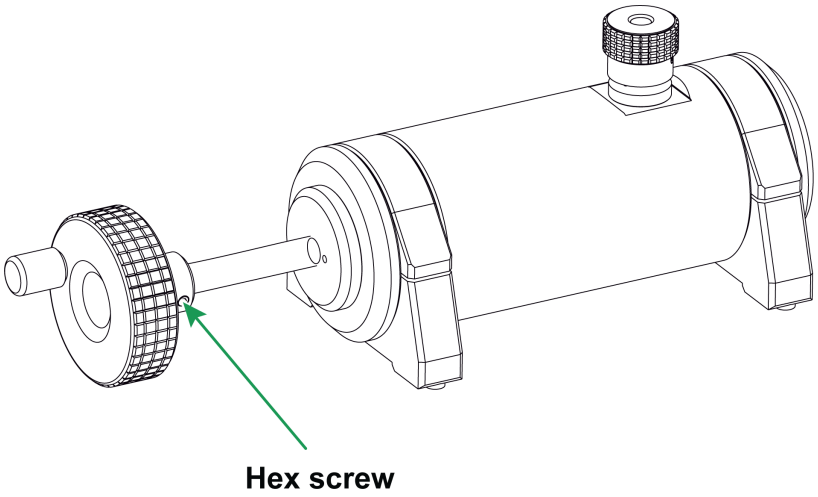

Figure 10: Replacing the Coarse Adjust Handwheel

Service Related to Fine Adjust

PGL **Seal service kit** (8003710)

PGL **Fine Adjust service kit** (8003725)

1. Rotate the Fine Adjust Knob **counterclockwise** to the maximum. It is important that the piston is located as close as possible to the body end cap of the Fine Adjust not to damage the cylinder when removing the subassembly from the pump.

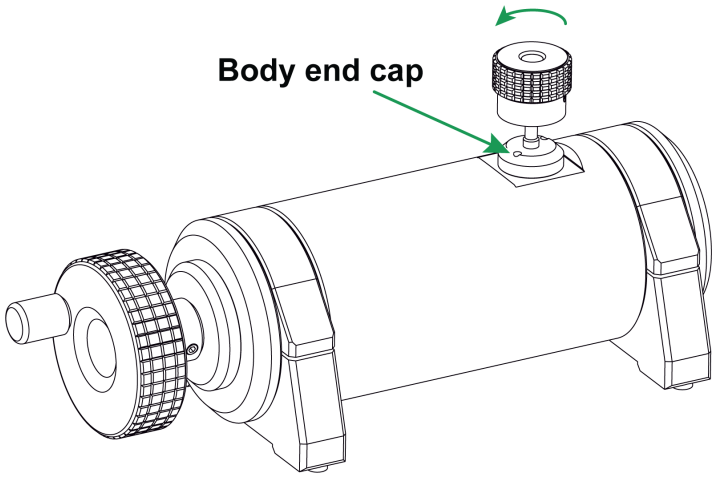

Figure 11: Disassembly of the Fine Adjust Subassembly

2. Take the opening tool from the service kit and install its tips into the small holes located on the outer surface of the body end cap of the Fine Adjust.
3. Rotate **counterclockwise** to loosen the body end cap.

4. Rotate the body end cap outwards with your hand. When it is fully open, gently pull the Fine Adjust subassembly out.

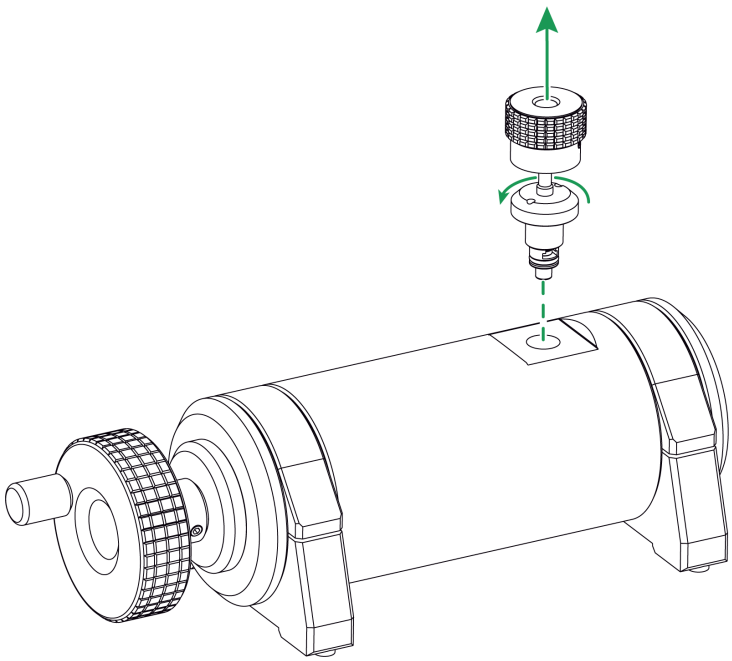

Figure 12: Removal of the Fine Adjust Subassembly

5. Replace the seals only or replace all parts with new ones included in the service kit.

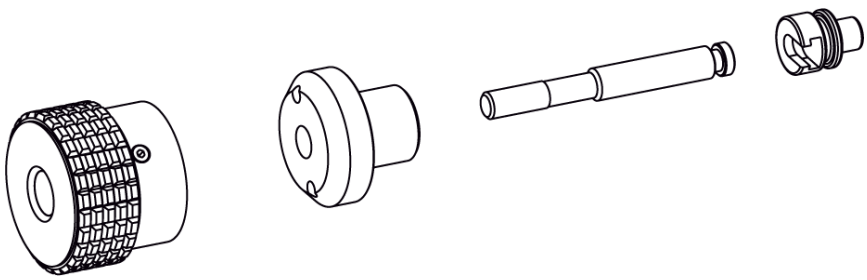

Figure 13: The Fine Adjust Subassembly

6. When the new parts are assembled, turn the Fine Adjust Knob **counterclockwise** to the maximum until the piston is locked to the body end cap.

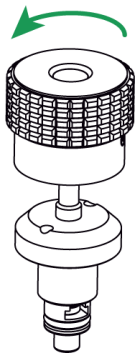

Figure 14: Fine Adjust Subassembly

7. Install the subassembly in its place on the threads at the end of the Fine Adjust cylinder. Gently rotate the body end cap inwards with your hand.

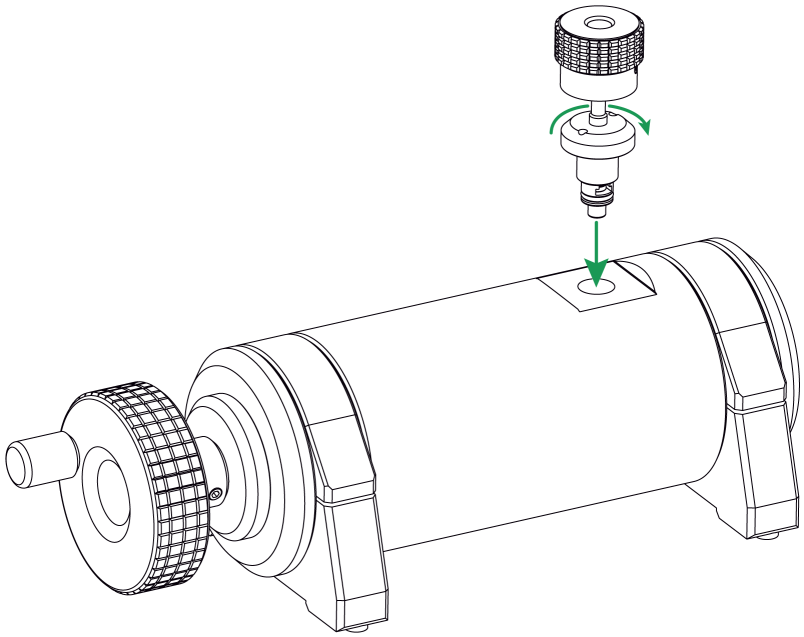

Figure 15: Reassembly of the Fine Adjust Subassembly

8. Tighten the body end cap with the opening tool.

Replacing the Support Leg

PGL **Support Leg** (8003730)

Please notice that this item only includes one installation collar, one support leg and mounting screws. You have to order two **PG**L support legs if you need to replace both legs.

1. Unscrew the 4 mm hex screws located under the leg.

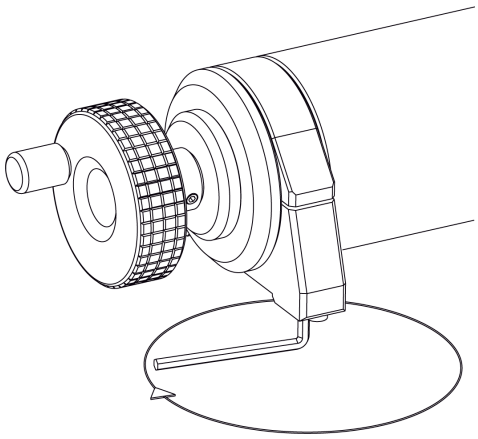

Figure 16: Unscrewing the Screws under the Leg

2. Remove the leg and replace it with a new one.

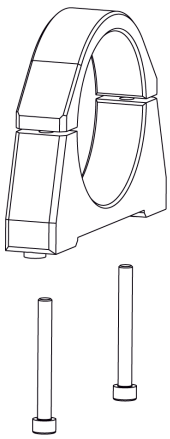

Figure 17: Removal and Replacement of the Leg

3. Reassemble in reverse order.