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User's Guide



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PPP-20 Calibration Pressure Pump



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The information contained in this document is believed to be correct, but OMEGA Engineering, Inc. accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING: These products are not designed for use in, and should not be used for, human applications.

WARNINGS

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

**Do not generate higher pressures than 20 bar (300 psig).
Higher pressures may damage the pump.**

Only personnel with good experience and knowledge of high pressure 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.

**Ensure that all connections are made correctly and that the hose and the connectors are intact. Do not use faulty hoses or connectors.
Do not connect the pump to a high pressure source.**

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

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.

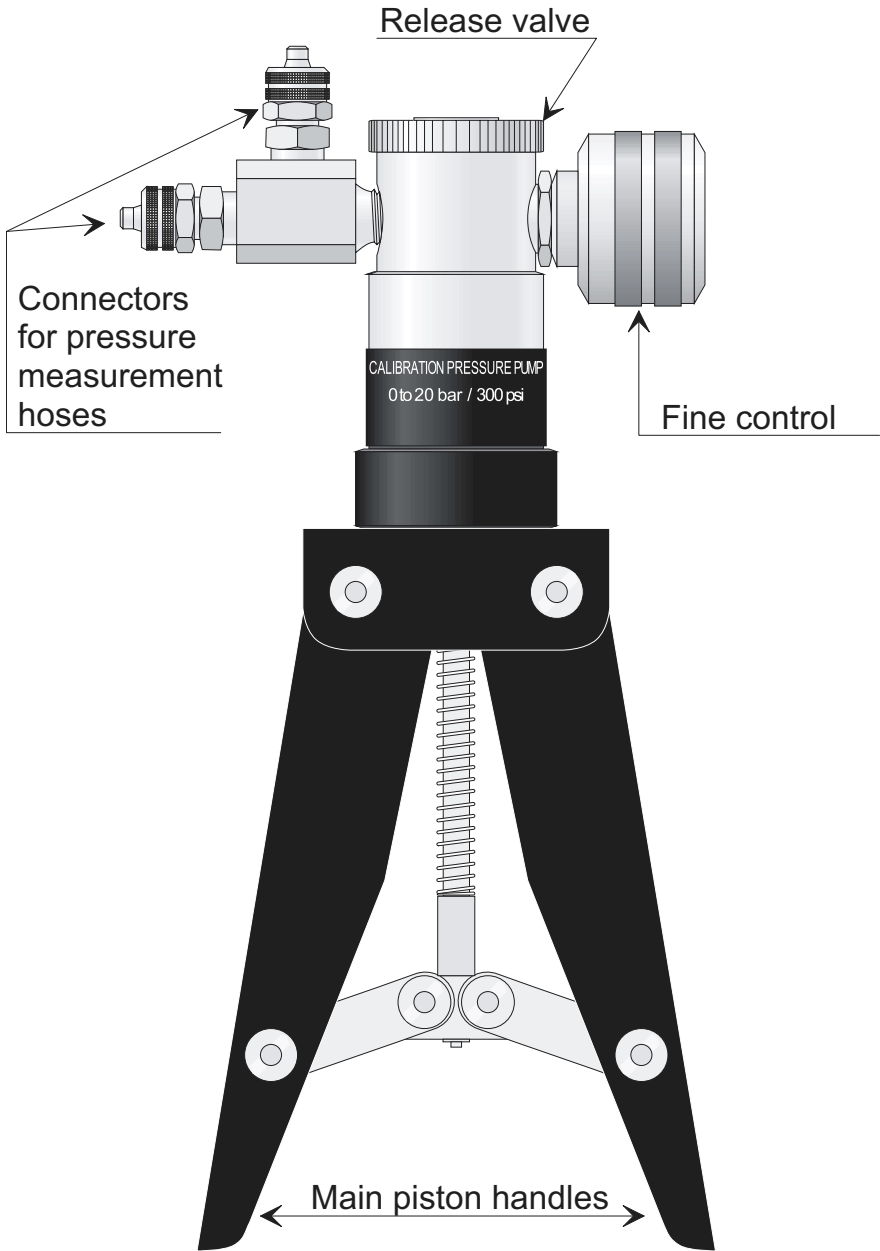
The above notwithstanding, we can assume no responsibility for any errors in this manual or their eventual consequences.

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

For more detailed technical data about the Calibration Pressure Pump, model PPP-20, please contact the manufacturer.

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1 DESCRIPTION

The PPP-20 calibration pressure pump is designed to manually generate pressure up to 20 bar (300 psi) for quick and accurate calibration of pressure gauges, transducers and other pressure measuring instruments.

1.1 Standard Accessories

The standard accessories are as follows:

- * Service seal kit for PPP-20.
- * Opening tool (hex wrench)
- * Output adapters:
 - G 1/8" male 60° int. cone
 - 2 connectors for 1/8" ID hose
 - 2 connectors for 1/8" ID / 1/4" OD hose with nut
 - Plug
- * This Instruction Manual.

1.2 Optional Accessories and Spare Parts

The optional accessories are as follows:

- | | |
|--------------------------|----------|
| * Carrying case | PPP-case |
| * 1.5 meter / 4.9' hose | PPP-TUB |
| * Tubing and fitting kit | PPP-TFK* |

* Includes PPP-TUB

2 OPERATION

READ THE WARNINGS PRESENTED IN THIS MANUAL BEFORE OPERATING THE PRESSURE PUMP.

1. 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.
2. Adjust the fine control to “mid-travel”.
3. Ensure the pressure release valve is closed (turn fully clockwise, but keep in mind that excessive force may damage the seals).
4. Operate the handles several times to raise the pressure close to the required value.
5. Do the final adjustment with the variable volume. If necessary, wait with the adjustment until the temperature has stabilized (see chapter **2.1 Practical notes**).
6. Repeat steps 4 and 5 until the highest calibration point is reached.
7. To decrease the pressure, open the release valve slightly. Follow the decreasing of the pressure e.g. with the help of the calibrator’s display. Close the release valve when the pressure is a little above the required level.
8. Use the variable volume to set the exact pressure. Again, if necessary, wait with the adjustment until the temperature has stabilized.
9. Repeat steps 7 and 8 until all of the decreasing calibration points are done.

Small gauge pressures as well as negative pressures may be generated using only the variable volume. The negative pressure is restricted to approx. 150 mbar (then the force of the vacuum is equal to the force of the volume piston’s spring).

2.1 Practical Notes

When increasing the pressure, the temperature of the air inside the system rises on account of thermodynamic phenomena. When the temperature returns to the level of the environment, the generated pressure may slightly fall.

Respectively, when the pressure decreases, the air cools down. So when the temperature again rises to the level of the environment, a slight increase in the pressure may occur.

The temperature change depends (among other things) on the volume of the system and the pressure change created by the user. Thus the effect of the phenomenon varies for each calibration and even for each calibration step.

3 TROUBLESHOOTING/MAINTENANCE

If the pump assembly fails to indicate a pressure increase after considerable pumping action, the following items 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 3 and 4. 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 and/or the check valve on the main piston is leaking and needs to be replaced.

3.1 Seal Replacement

Depending on the frequency of use, the Main Piston Seals (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.

3.1.1 Main Piston Seals

The main piston is assembled using special methods so it must be changed as one component.

Remove the cylinder block from the main piston handles by opening the three screws hidden under the cylinder collar. Rotate the cylinder unit until the screws are visible one by one in the collar's hole. When all screws are loosened, pull the cylinder unit apart from the handle

Too loosen the piston, open the lock ring (see picture). Replace the piston and reassemble.

3.1.2 Fine Control Seal

The variable volume is disassembled by opening the three 1.5 mm hexagonal screws holding the retaining collar. Open the volume unit by turning the knob counterclockwise.

After replacing the o-ring or after carrying out other reparative actions grease the seal with pressure proof grease (e.g. Esso Nebula EP). When reassembling, use a suitable sealant to avoid leakage (e.g. Loctite 572).

3.1.3 Release Valve Seal

Detach the release valve hand wheel from the release valve stem by opening the 2 mm hexagonal screw. Turn the hand wheel upside down (the stop pin pointing upwards) and fix it back to the release valve stem. Rotate the had wheel counterclockwise to remove the release valve stem. Now the release valve seal is visible.

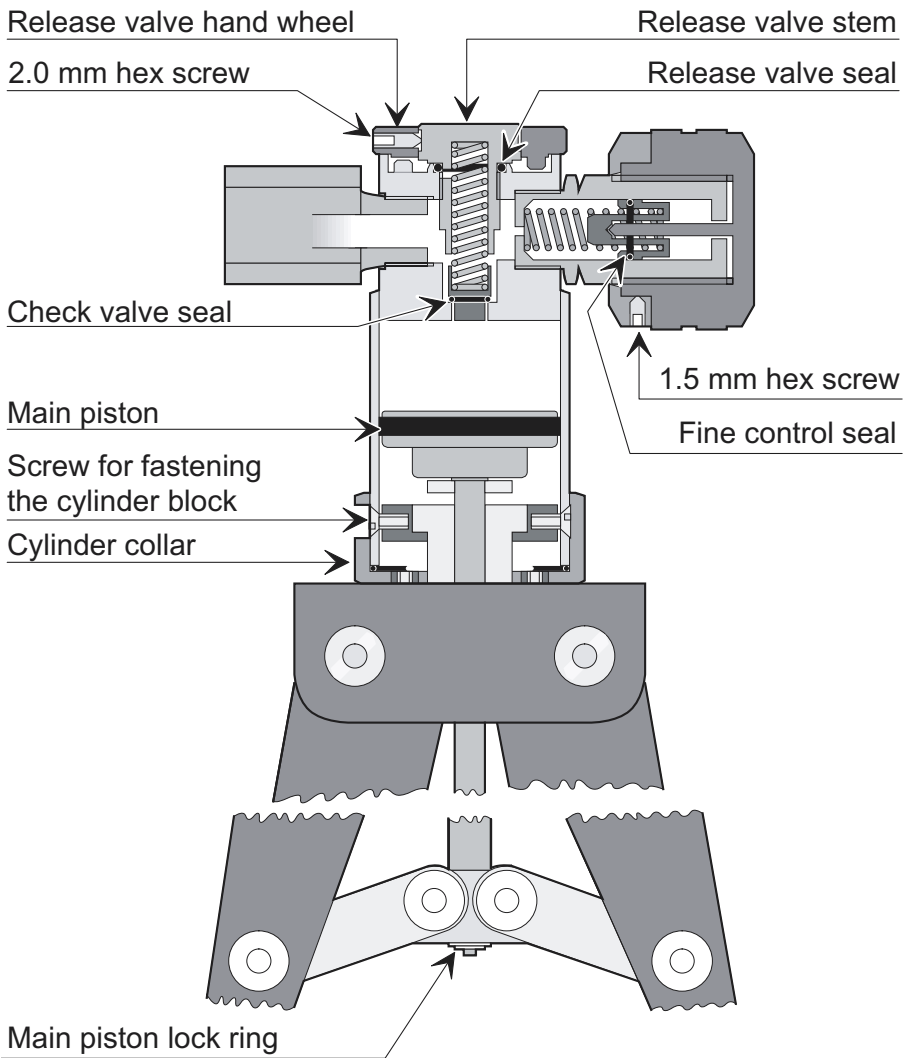
Note that both the check valve spring and the check valve itself are disassembled at the same time. Be careful not to damage or drop them while replacing the release valve seal.

When reassembling, apply silicon oil on the vent valve stem and the release valve seal.

3.1.4 Replacing the Check Valve Seal

The procedure is exactly the same as when replacing the release valve seal (see the description above) but this time you also need to remove the check valve spring and the check valve.

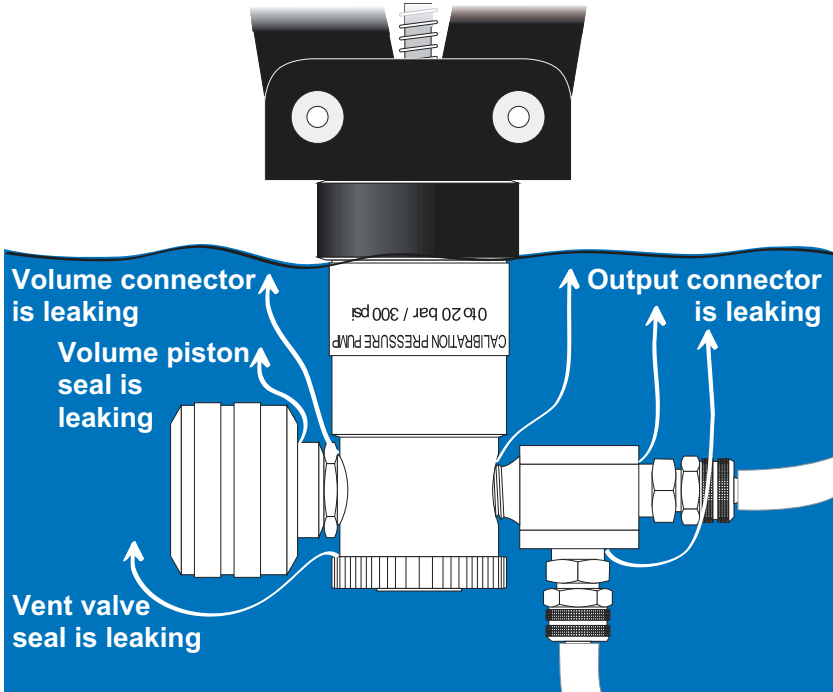
Replace the check valve seal, apply silicon oil and reassemble.



NOTE! Using PPP 20 with seals not supplied by Omega is at your own risk. The warranty is no longer valid when using other seals than the ones supplied by Omega.

3.2 Leak Testing the Pump

If you suspect that the pump is leaking, immerse the top of the pressurized pump in water. The most likely leakage points are shown in the following picture. Where applicable, use sealant glue to stop the leakage.

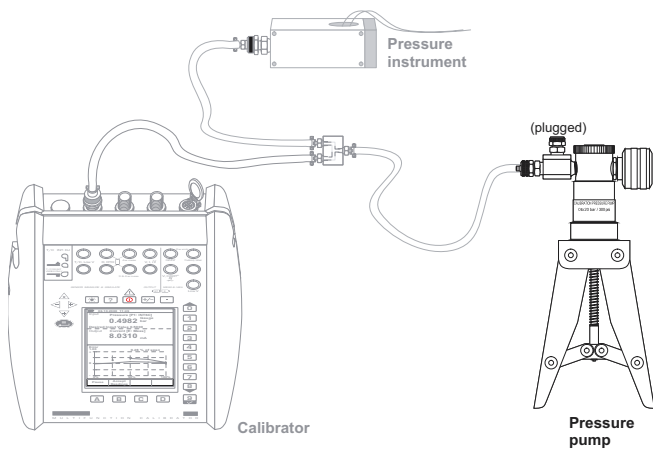
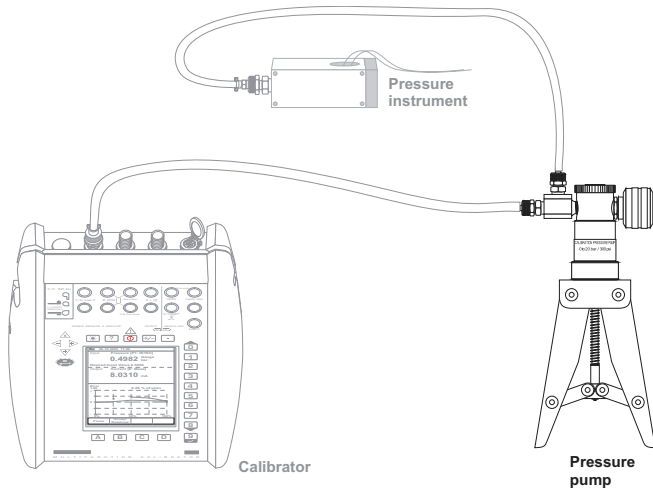


Note. Do not sink PPP 20 any deeper than as shown in the picture. Otherwise you might get water into the pump.

4 SPECIFICATIONS

| | | | |
|--------------------------|--------|--|---|
| Weight | | 0.4 kg | approx. 0.9 lb |
| Dimensions | Height | 223 mm | approx. 8 ³ / ₄ " |
| | Width | 117 mm | approx. 4 ³ / ₄ " |
| | Depth | 38 mm | approx. 1 ¹ / ₄ " |
| Pressure range | | 0 to 20 bar | 0 to 300 psi |
| Pressure media | | Clean air or other gas not harmful for the materials in the measuring system | |
| Outlet connectors | | Two 1/8" NPT female. | |

APPLICATION EXAMPLES



WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's Warranty adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action outside of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

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RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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