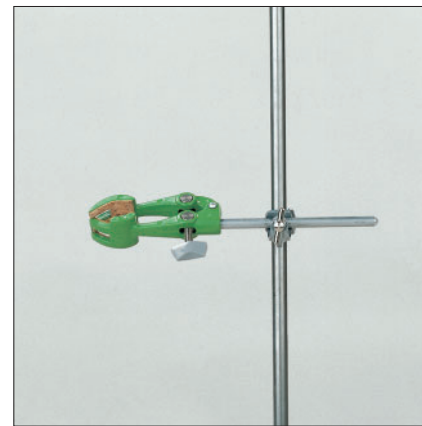


OPERATING INSTRUCTIONS

12.23 HAND OPERATED PERISTALTIC PUMP



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On these operating instructions



If the text follows a mark (as shown on the left), this means that an important instruction follows.



If the text follows a mark (as shown on the left), this means that an important warning follows relating to danger to the user or damage to the apparatus.

1. Short description

This hand-operated peristaltic pump, suitable for use in the field, can be applied safely and without problems. It has been designed for lasting and professional use under adverse conditions. High quality components were used.

The pump is a simple but durable peristaltic pump with three pressure rollers (1; see drawing on page 4) and stand (8). The bearings of the drive shaft and the pressure rollers are waterproof. The pump is suitable for elastic pump tubes of which the overall thickness of wall may vary between 3.9 and 4.1 mm. The rigidity of the flexible tube should be about 55 degrees Shore. The pump can deliver a pump pressure of 3 bar and an underpressure maximum of 1 bar.

2. Using the peristaltic pump

The peristaltic pump can be used for fluids as well as for gasses. It is a self-priming pump. Even when the pump is out of use the pump tube (4) is completely pressed to a close by at least one roller. Fluid and gas can not flow back. Tubes with various diameters and chemical properties can be applied. The rollers press the gas or the fluid in the tube forward and from the tube. Behind the roller the tube regains its shape and sucks-up gas or fluid again. The stronger its ability to regain structure, the stronger the suction. For this reason the thinnest pump tube has the strongest suction (perfect vacuum).

The relatively expensive flexible rubber tube is only used inside the pump. For the **transport** tube polyethylene is used or sometimes the expensive but inert teflon is applied. If the pump is required to deliver high pressure (for example for in-line filtration) the pump tube should be secured against slipping or leaking applying a clamp, strap or a short coupling sleeve of a wider sized PE tube. This is not required on the suction-side.

After cutting off between 28 and 30 cm of the pump tube, this can be placed by removing the transparent cover plate (2) from the pump and by removing the pressure clamp (3), after unscrewing the knurled nuts (6 + 7). By **slowly** turning the pressure rollers manually you can bring the tube in its place.



The tube should be secured by the pressure clamp. The tube is otherwise slowly pulled into the pump and may block the pump causing it to stall or the tubes are pulled apart.



Pump housing, rollers and tube should remain dry during operation. This prevents that the tube is pushed aside by the rollers during operation. This would only leave a small part of the original suction- and pressure force.



If you use the pump in rainy weather then you should cover it completely.



The transparent cover plate must always be on the pump to prevent damage of the bearings by dirt and moisture. Think about safety: the pump is very powerfull. The cover plate prevents shifting of the tube (loss of pressure and suction power).

The thinnest tube to be applied in the pump has a diameter of 4 x 8 mm, with a suction force of 9.5 meter water column (mwc). The pressure force is up to 32 mwc, the flow rate is maximal 1 l/min at 400 rpm. The widest tube measures 8 x 12 mm with a suction force of 2.5 mwc, pressure force of 20 mwc and a flow rate of 2.2 l/min. The normally used tube measures 6 x 10 with a suction force of 5 mwc, a pressure force of 30 mwc and a flow rate of 2.3 l/min.

The indicated values may vary due to tolerances in thickness and rigidity of the tube. They apply for a silicone rubber tube only.



The often used 6 x 10 silicone tube is applied preferably in combination with the 6 x 8 PE tube.

The PE or teflon tube measuring 8 x 10 mm can also be slid **into** this silicone tube.

The PE or teflon tube measuring 10 x 12 mm may be slid **over** this silicone tube.

The 4 x 8 mm silicone tube can be used **in** combination with the same 6 x 8 mm PE tube.

Slightly more comfortable in use is the 2 x 4 mm PE or teflon tube. This fits inside the silicone tube and has a very high flow-through resistance (limited output and a high underpressure in long suction tube). The 2 x 4 mm PE (or teflon) tube is better suited for pumping of small quantities of water or gas.

Art. No.	Description
12.20.02	Polyethylene tube, diameter 2 x 4 mm, roll of 100 m
12.20.03	Polyethylene tube, diameter 4 x 6 mm, roll of 100 m
12.20.04	Polyethylene tube, diameter 6 x 8 mm, roll of 100 m
12.20.05	Polyethylene tube, diameter 6 x 8 mm, roll of 200 m
12.20.08	Polyethylene tube, diameter 8 x 10 mm, roll of 100 m
12.20.13	Polyethylene tube, diameter 10 x 12mm, roll of 75 m
12.20.22	Teflon tube, diameter 2 x 4 mm, roll of 10 m
12.20.28	Teflon tube, diameter 8 x 10 mm, roll of 10 m
12.20.32	Teflon tube, diameter 10 x 12 mm, roll of 10 m
12.20.46	Silicone tube, diameter 4 x 8 mm, roll of 5 m
12.20.48	Silicone tube, diameter 2 x 4 mm, roll of 5 m

When sampling for analysis on micro-parameters the pump tube as well as the polyethylene will be replaced previous to any sampling, to avoid any risk of cross-contamination. An exception can be made for the teflon tube. This expensive but chemical-proof tube usually can be used again after a thorough cleaning.

3. Problems and solutions

3.1 The suction and the flow rate of the pump is bad

Check whether the rollers in the pump housing are wet. Dry the pump housing, rollers and pump tube. Avoid that the pump gets wet again (cover the pump).

The tube is slightly twisted in the pump housing and therefor runs slightly aside of the rollers (specially the 3 x 7 tube is sensitive to this). Relieve the tube by slackening the pressure clamp, and tighten the clamp again.

Are you using the right kind of rubber pump tube?

Check the thickness of the wall of the pump tube. This must be at least 3.75 mm and maximal 4.25 mm.

The thickness can be measured by closing off the tube with a caliper gauge when blowing through the tube. Read the caliper gauge when the tube is closed.

The housing is deformed. Check the distance of the inside of the pump housing till the centre of the black synthetic rollers (= round synthetic plate with hole on the end of the main drive shaft). The distance must be the same everywhere (+/- 0.15 mm). Use a caliper gauge.

The transparent cover plate must always be on the pump to prevent damage of the bearings by dirt and moisture. The cover plate prevents shifting of the tube (loss of pressure and suction power).

3.2 Heavy go of the pump

The pump dragstube is blocked on the output side of the pump tube or an obstacle has been pumped-up and got stuck near the rollers blocking these. Remove the dirt.

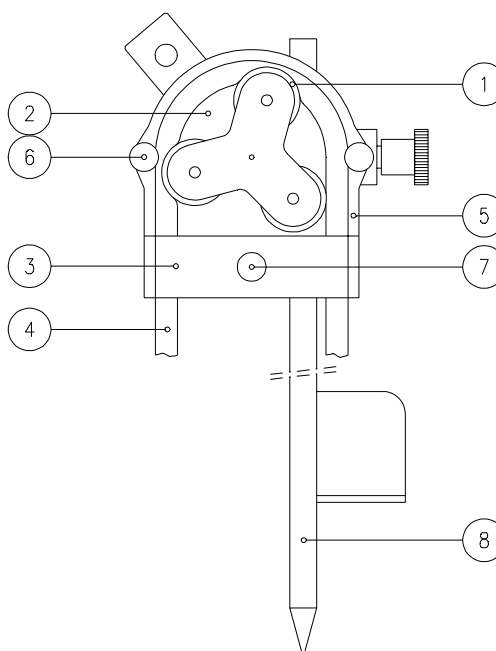
4. Maintenance

The device has been designed to allow sampling under field conditions. The samples have to be used for very accurate and sensitive analysis. A **clean** device stimulates the right mode of operation during the sampling. A well maintained device looks better and lasts longer.

 **Frequently clean the peristaltic pump, cover plate, the rollers and the pressure clamp, using a damp cloth.**

5. Drawing

1. Pressure rollers
2. Cover plate
3. Pressure clamp
4. Pump tube
5. Pump (excl. stand)
6. Knurled nut
7. Bolt with knurled knob for pressure clamp
8. Stand



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