FHP Peristaltic Pump

Operation Manual

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1. Basic information

1.1 Notes on the operating manual

This operating manual has been prepared to meet all product-specific and user-related requirements of the law and of all relevant regulations and rules, technical standards, directives and agreements.

The manual includes important information on the functioning of FHP peristaltic pumps and how to use, install, service and dispose of them. In the following, the peristaltic pumps are referred to as “pump”. Before putting the pump into operation, carefully read the operating manual and make sure that it is always ready at hand to all users of the pump. Complying with all instructions of this operating manual is an essential prerequisite to guarantee the safe operation and maintenance of the pump. Make sure that all operators and service technicians have fully read and understood the manual before they start working at or with the pump.

1.2 Validity of data

All technical data, dimensions and indications of weight etc. were valid at the day when this manual went to press. Specifications listed here may differ from the actual design of the pump but will not modify any relevant information in principle

1.3 Purpose

FHP pumps are designed to function as peristaltic pumps delivering fluids.

1.4 Use to the intended purpose

The pumps of the FHP series may only be used for pumping the liquids described below, which are resistant to the intended hose material.

- Water and aqueous solutions
- Acids, bases
- Sludges
- Solids-bearing or abrasive fluids
- Similar fluids

Do not use the pump to deliver:

- Inflammable or explosive fluids
- Fluids being used to process food because the pump has not been certified according to FDA or EC 1935/2004 standards

1.5 Anticipated misuse

The pump is misused if:

It is used other than to the intended purpose;
It is operated beyond its defined limits;
It is used to deliver inadmissible fluids

1.6 Limits of use

Dimensional limits

Technical data and operating limits can be found in the specific tables and data sheets for the pump.

Technical data: see ↗ appendix.

Other limits

Ambient temperatures:	0 °C - + 50 °C
Fluid temperature:	- 20 °C - + 80 °C : NRH hose
	-10 °C - + 90 °C : EPDM hose
	-10 °C - + 80 °C : NBR hose
Max. pressure:	depending on version
	5 bar in standard version
	10 bar in Heavy-Duty version
Max. viscosity:	20.000 mPas

1.7 Warranty and liability

The pump must only be used to the intended purpose specified by this operating manual. Inappropriate operation or insufficient service and maintenance will cancel the right to all warranty claims.

1.8 Contact details

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Process Pumps & Systems

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51149 Cologne (Porz), Germany

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Info-process@flux-pumpen.de
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2. Safety

2.1 Personnel qualification and training

The personnel for operation, maintenance, inspection and installation must have the appropriate qualifications for this work.

The area of responsibility, competence and supervision of the personnel must be precisely regulated by the operator. If the personnel do not have the necessary knowledge, they must be trained and instructed. If necessary, this can be carried out by the manufacturer / supplier on behalf of the operator of the machine. Furthermore, the operator must ensure that the contents of the operating instructions are fully understood by the personnel.

2.2 Dangers if the safety instructions are not observed

Failure to observe the safety instructions can result in danger to persons, the environment and the machine. Failure to observe the safety instructions may result in the loss of any claims for damages.

In detail, non-observance can result in the following hazards, for example:

- Failure of important functions of the machine / system.
- Failure of prescribed maintenance and servicing methods.
- Danger to persons due to electrical, mechanical, magnetic and chemical effects.
- Danger to the environment due to leakage of hazardous substances.

2.3 Safety-conscious working

The safety instructions listed in these operating instructions, the existing national regulations for accident prevention and any internal work, operating and safety regulations of the operator must be observed.

2.4 Safety instructions for operators / users

Hazards due to electrical energy must be excluded (for details, see e.g. the VDE regulations and the local power supply companies)

2.5 Safety instructions for maintenance, inspection and installation work

The operator must ensure that all maintenance, inspection and installation work is carried out by authorised and qualified specialist personnel who have studied the installation and operating instructions in detail.

Work on the machine should only be carried out when it is at a standstill. The procedure described in the installation and operating instructions for shutting down the machine must be strictly adhered to.

Immediately after completion of the work, all safety and protective devices must be refitted or reactivated.

2.6 Unauthorised conversion and manufacture of spare parts

Conversion or modifications to the machine or appliance are only permitted after consultation with the manufacturer. Original spare parts and accessories authorised by the manufacturer are used for safety reasons. The use of other parts may invalidate liability for the resulting consequences.

2.7 Impermissible modes of operation

The operational safety of the machine or device supplied is only guaranteed if it is used as intended in accordance with section 1 ‘Basic information’ of the operating instructions. The limit values specified in the data sheet must not be exceeded under any circumstances.

2.8 Standards and directives

Name	Content
2006/42/EG	Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/ECG (recast) (1)
2004/108/EG	Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast)

Tab. 1: European Directives

2.9 Depiction of safety instructions

All safety instructions of this document are marked with symbols designed on the basis of the SAFE principle. Each of them describes the kind and source of danger, possible consequences and information on how to avert them.

Danger
The symbol warns you of a potential accident resulting from ignoring safety or other instructions. The accident will cause serious and maybe even mortal injuries or death when touching a high-voltage electrical equipment, for example.

WARNING
The symbol warns you of a potential accident resulting from ignoring safety or other instructions. The accident may cause serious and maybe even mortal injuries or death when touching a high-voltage electrical equipment, for example.

CAUTION
The symbol warns you of a potential accident resulting from ignoring safety or other instructions. The accident may cause slight injuries like burns, injuries of the skin and bruises, for example.

ATTENTION
The symbol warns you of a potential material damage.

NOTE
The symbol indicates an important information.

2.10 Symbols used

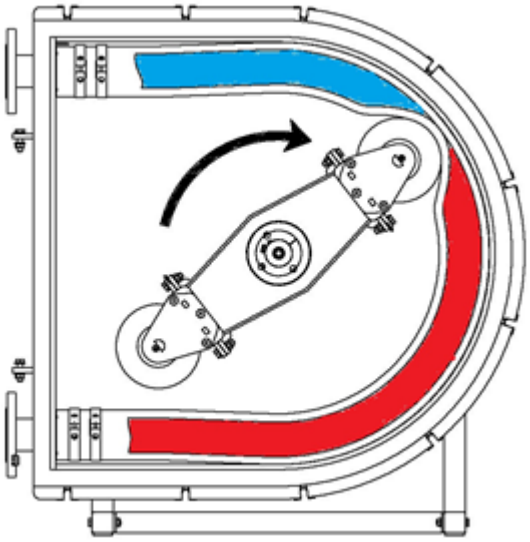
Symbol	Bedeutung
↗	Cross-reference such as “see chapter xx”, see “page yy”

Tab. 2: Symbols used

3. Technical information

3.1 General description

FHP peristaltic pumps are self-priming rotary positive displacement pumps. This means that the medium to be pumped is primed through the hose and then pressed in the pump housing in the direction of the outlet.



The function is based on a rotating rotor with opposing rollers that squeeze and relax a flexible hose. The hose is guided along the housing. The mechanical pressure separates the medium from the suction and discharge sides and creates a specific conveying space, which is displaced by the rollers rolling along the hose.

The FHP peristaltic pump is bidirectional. This means that the direction of rotation of the rotor can be either clockwise or anti-clockwise. For media containing solids, it is recommended to use the upper nozzle as the suction side and the lower nozzle as the discharge side. Thanks to this gentle and low-shear pumping action, abrasive, solid-containing and viscous media pose no problem for the FHP peristaltic pump.

The flow rate can be controlled easily and precisely using a frequency converter. An optional hose rupture sensor uses a capacitive sensor to detect the fluid level in the housing. In the event of a hose rupture, medium escapes and is detected by the sensor. The sensor then sends a signal that can trigger an alarm or a machine shutdown to prevent damage.

WARNING

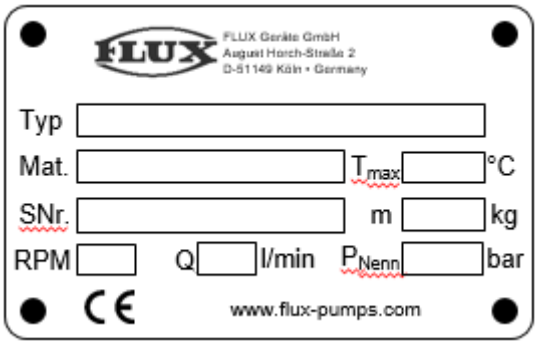
Danger of chemical non-resistance of components

Make sure that the materials used for making the pump are resistant to the fluid(s) delivered.
Chemical non-resistance may result in leakage of fluid.
Potential danger to the environment and health.
In case of doubt, please contact the pump's manufacturer.

NOTE
For the chemical resistance of materials, please request the material resistance list of the pump's manufacturer.

3.2 Nameplate

The nameplate on the pump contains important information on the model, type and serial number of the pump.



Typ: Type code

Mat.: Material of the hose

SNr.: Serial number

RPM: Revolutions per minute

T_{max}: max. Fluid temperature

m: Weight

Q: Volume flow

P_{Nenn}: Rated pressure

Data of the electric motor are given on the motors nameplate.

3.3 Type codes and materials

The exact specifications and materials used for the pump can be found on the rating plate and in the technical data sheets.

Type									
Model	Size		Housing	Hose	Connection	Motor power	Phase	Frequency	RPM
FHP	10	65	PP = PP	NRH = Natural Rubber Hose	GL = Thread left (BSP)	0,37 = 0,37 kW	3 = 3 Phase	5 = 50 Hz	10
	15	80	ST = Carbon Steel	NBR = NBR	GR = Thread right (BSP)	to		6 = 60 Hz	to
	25	100	VA = Stainless Steel	EPD = EPDM	FL = Flange left (DIN)	90,0 = 90 kW			50
	32	125		NBF = NBR FDA	FR = Flange right (DIN)				
	40	150		EPF = EPDM FDA					
	50	200							
FHP -	25 -		ST -	NRH -	GL -	0,37 -	3	5 -	29

Overview of possible wetted materials:

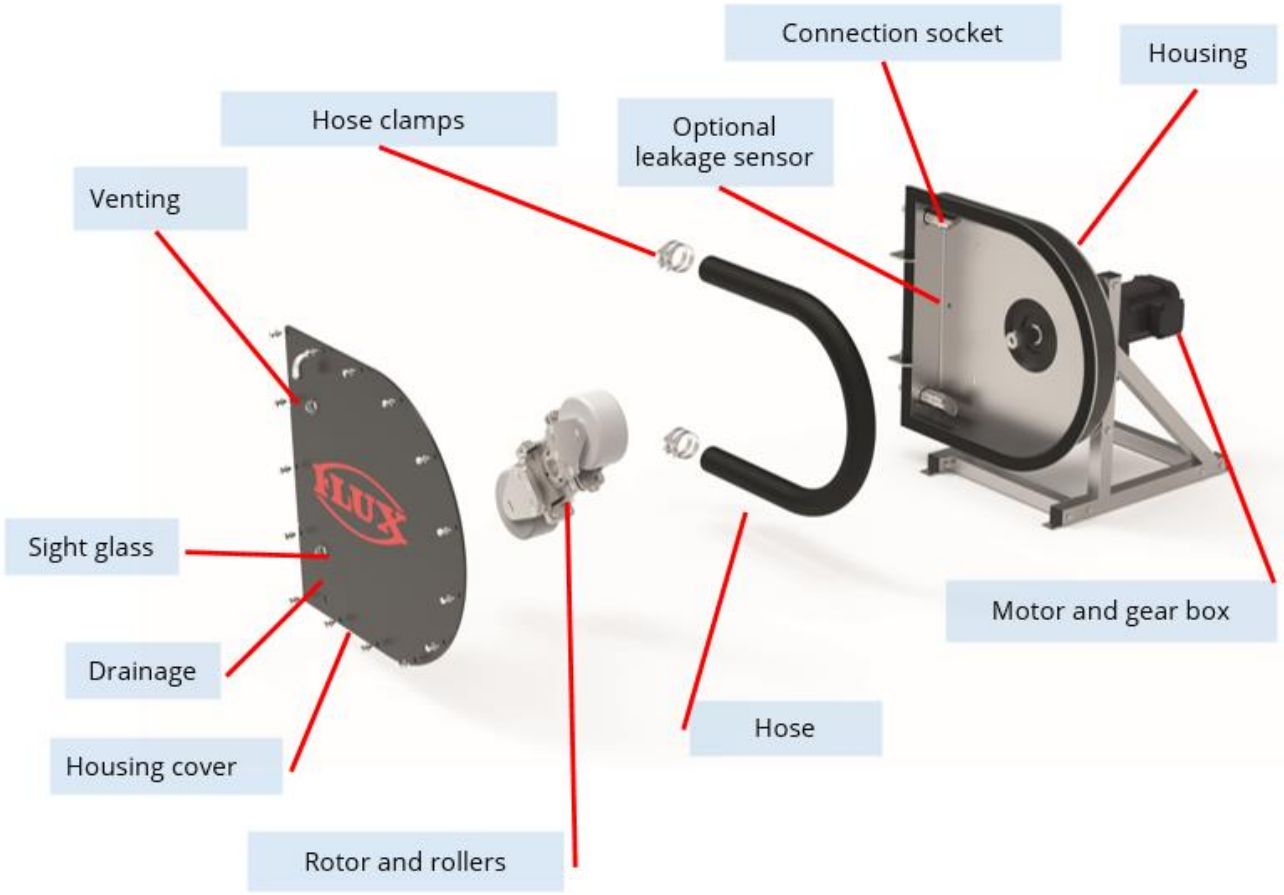
Part	Code	Material	Temperature
Hose material	NRH	Natural Rubber Hose	-20 bis +80 °C
	EPDM	Ethylene-Propylene-Diene-Rubber	-10 bis +90 °C
	NBR	Acrylnitrile-Butadiene-Rubber	-10 bis +80°C
Connection	VA	Stainless Steel (1.4301)	< 100 °C

WARNING

Danger of chemical non-resistance of components

Make sure that the materials used for making the pump are resistant to the fluid(s) delivered.
Chemical non-resistance may result in leakage of fluid.
Potential danger to the environment and health.
In case of doubt, please contact the pump's manufacturer.

3.4 Structure



4. Transport and temporary storage

4.1 Safety instruction

WARNING

Danger of getting jammed or bruised during transport of the pump

Make sure to use lifting devices suitable to the weight of the pump.
Do not remove the lifting device before you have put down the pump safely.

4.2 Transport

Unpack the pump on receipt and check for transport damage. In the event of transport damage, a report must be made by the carrier.

Ensure that the nameplate details match the order/design data.

Dispose of packaging material in accordance with local regulations.

4.3 Temporary storage

Intermediate storage must be dry and frost-free.

Temperature: -0 °C to 50 °C

Humidity: max. 95 % rel. humidity, non-condensing

5. Installation

5.1 Safety precautions

WARNING

Danger of getting jammed or bruised during installation of the pump

If necessary, use lifting and holding devices suitable to the size and weight of the pump.
Make sure that all installation work is done by component and qualified personnel only.

WARNING

Danger of being hit by falling components

If necessary, use lifting and holding devices suitable to the size and weight of the pump.
Make sure that all installation work is done by component and qualified personnel only.

5.2 Installation requirements

Before installing the pump, make sure that the access to the pump is clear. Please also note the space required in front of the pump to open the housing cover.

Make sure that the foundation on which the pump is to be mounted can support the weight of the pump. Provide the appropriate safe lifting equipment or forklift with approved equipment for positioning the pump.

The normal tools for installation are required, if necessary impact drills/screwdrivers and spanners, etc.

Do not forget the necessary safety equipment such as safety goggles, helmet, footwear and work gloves.

5.3 Installation

5.3.1 Setting up the pump

The pump must be firmly and securely bolted to the foundation. If the pump is mounted on a rubber base, it is particularly important to connect the connecting lines via an expansion joint or hose section.

5.3.2 Hose / Piping

Make sure that the line widths are sufficiently large. The line widths must be at least as large as the internal hose diameter of the pump.
Connect the suction and pressure lines to the pump without tension.
It is recommended to use the upper connection piece for the suction side and the lower connection piece for the discharge side.
When connecting to fixed raw power systems, it is recommended to use an elastic intermediate piece (compensator or hose) between the pump and the piping so that the transmission of vibrations to the system is reduced.

Avoid sudden cross-sectional changes in the pipework

Prevent the valves in the suction and discharge lines from being closed while the pump is running.

#

ATTENTION

Ensure that the suction line has a vacuum-tight screw connection!

If the suction line is not vacuum-tight, the pump will prime poorly or not at all.

NOTE

A shut-off valve in the suction line must not be used to regulate the flow rate.

5.3.3 Electrical connection

NOTE

Qualified personnel only are allowed to connect the pump to the electrical mains.
All electrical connections and the installation of additional protection devices has to be done in accordance with the regulations of your local power supplier and the VDE Association of German Electrical Engineers.

The electrical connection of the pump may only be carried out by a qualified electrician.

The motor requires thermal protection against overload with an overload fuse, correctly dimensioned according to the performance values of the pump, in accordance with the regionally applicable legal requirements and regulations.

Important:

The motor must be earthed with the appropriate cable cross-section!

For details on the electrical connection of the motor, please refer to the motor manufacturer's data sheet.

Check the direction of rotation of the motor by switching it on briefly. Correct direction of rotation when viewed from the fan side: When connecting the pump with suction connection at the top, discharge connection at the bottom: left, anti-clockwise. When connecting the pump with suction connection at the bottom, discharge connection at the top: clockwise to the right

It is recommended to install a lockable repair switch. The repair switch must have the ability to start electric motors directly (AC3).

If a hose rupture sensor is present, it must be connected to an evaluation unit / switchgear so that the pump switches off when the hose rupture sensor is activated

6. Commissioning

6.1 Safety precautions

WARNING

Danger of breaking during operation

Regularly check the pump for damages.

If there is a damage, the pump must not be operated!
Replace wear parts at regular intervals.
Do not operate the pump to other than the intended purpose.

WARNING

Risk of electrical hazards when touching parts carrying voltage by fault

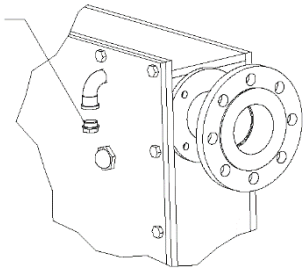
Fasten all loose connections. Immediately replace defective cables.
Always disconnect the power supply before doing any electrical work.
Cables must neither be jammed nor squeezed. When laying cables and connections make sure you cannot trip over them and they won't be damaged.
Check all electrical equipment at regular intervals according to the locally valid regulations (like the German DGUV accident prevention regulation 3, for example).
Only qualified and authorised personnel are allowed to do any work at the electrical equipment.

6.2 Preparatory work

Check the glycerine level and top it up if necessary before commissioning. The glycerine must be topped up at least to the centre of the lower sight glass on the front of the pump. Glycerine can be reordered in 1 litre or 5 litre containers.

ATTENTION

Transport safety device! Please remove the dummy plug from the venting before starting installation. This is only for transport protection only.



6.3 Start-up

Open any existing shut-off valves in the suction and pressure line.
Switch on the motor.
Check the direction of rotation of the pump.
Check all screw connections in the pipes for leaks.
Compare the performance of the pump with the specifications.

Check the pump for vibrations and noise. Strong vibrations indicate cavitation or difficult suction in the pipework.

7. Decommissioning

Switch off the motor.

Close the shut-off valves.

If the medium remains in the system, secure the fittings against accidental opening.

Flush the pump thoroughly with clean and neutral medium before longer shutdown periods so that no liquid residue can settle in the pump.

If the decommissioning is to carry out work on the pump, secure the drive so that the pump cannot be switched on. Block the suction and discharge lines before dismantling the pump.

NOTE
Secure the fittings against accidental opening!
Wear personal protective equipment!

8. Service and maintenance

WARNING

Risk of electrical hazards when touching parts carrying voltage by fault

Only qualified and authorised personnel are allowed to work on motors at a standstill. The motors have to be disconnected and secured against any accidental start.
Strictly follow the instructions of the motor manufacturer.
Comply with the safety rules for working on electrical equipment.

WARNING

Risk of electrical hazards when touching parts carrying voltage by fault.

Fasten all loose connections. Immediately replace defective cables.
Always disconnect the power supply before doing any electrical work.
Cables must not neither be jammed nor squeezed. When laying cables and connections make sure you cannot trip over them and they won't be damaged
Only qualified and authorised personnel are allowed to do any work at the electrical equipment.
Check all electrical equipment at regular intervals according to the locally valid regulations (like the German DGUV accident prevention regulation 3, for example).

WARNING

Danger of faulty installation and use of wrong or inadmissible spare parts

Components should be only replaced with genuine parts or spare parts authorized by the manufacturer.

8.1 General information

The FHP peristaltic pump is designed for minimal service and maintenance requirements. A manageable number of simple preventive maintenance tasks are necessary to ensure safe, low-maintenance, and continuous operation.

Important: Please follow the maintenance schedule outlined below.

Never start the pump with the cover/housing open! Risk of crushing and danger to life!

Caution: Never clean or repair the pump while it is powered on. Always disconnect the pump from the power supply before any maintenance, cleaning, or repair!

8.2 Preventive maintenance

8.2.1 Oil change / Greasing

The pump housing is filled with glycerine to minimise friction between the hose and rollers. The fill level should be checked weekly. You can easily check this through the sight glass on the front of the pump. If the fill level is low, add glycerine until a medium fill level is reached in the lower sight glass.

Gearbox:

Pump size 10 ... 50

The gear oil should be changed every 6000 operating hours or after 2 years at the latest (whichever comes first). In clean and absolutely congestion-free environments, the interval can be doubled.

Pump size 65 ... 200

The sizes are normally equipped with a planetary gear. The following interval sequence is required here:

Change the oil after the first 100 hours of operation. After the first oil change, the oil is changed every 2500 operating hours or once a year.

This interval can be extended to up to 8,000 hours if synthetic oil is used.

Gearbox with variable speed:

NOTE
ONLY change the speed when the pump is running.

Planetary gear: If the pump is equipped with a planetary gear, a first oil change is prescribed after 400 operating hours. Thereafter, a continuous oil change interval of 1000 operating hours is recommended. Change the oil after 2000 operating hours at the latest; however, a doubled interval can reduce the service life of your pump.

V-belt gearbox: This type of gearbox is practically maintenance-free. Within the first 400 operating hours, it is recommended to carry out an even changeover repeatedly at all speed ranges to ensure a good running-in period.

Motor:

For most motors over 30kW, the bearings must be greased after 500 operating hours. This can be recognised by the grease nipples. We recommend synthetic greases for high pressures.

Check the wiring for damage or cable breakage every 6 months. Remove dust and other dirt from the motor and the motor's ventilation slots to ensure smooth operation.

Please also read the motor documentation for further information.

Hose

The hose must be checked for signs of wear or breakage every 1,500 operating hours and replaced if there are any signs.

CAUTION
Never carry out cleaning / maintenance or repairs during operation! Always disconnect the pump from power supply!

The motor must always be de-energised during cleaning, maintenance or repair. A lockable switch must be used to prevent accidental switching on.

In the case of hazardous or harmful media, the prescribed safety measures must be taken before repair, maintenance or cleaning. The hose must be flushed with a neutralising or cleaning liquid before it can be dismantled!

Please also note that there is a noticeable difference in pressure between the upper and lower hose connection. This can even mean that while there is a vacuum at one connection, a high overpressure may already have built up at the other end of the hose connection.

For this reason, please always empty the hose completely, including the lines upstream and downstream of the pump, before dismantling the hose.

8.3 Replacing the hose

Before changing the hose, we recommend flushing the pump with a medium that is neutral and harmless to people and the environment.
Empty the hoses/pipes upstream and downstream of the pump.
Switch off the pump! Use a lockable repair switch to prevent accidental switching on. Disconnect the pump from the mains!
Drain the glycerine through the outlet on the lower side at the front of the pump.
Open the housing cover.
Make sure that the hose is really depressurised.
A. Loosen the hose clamps, starting with those on the lower side. Pull off the hose at both ends. Remove the motorised fan housing and turn the fan by hand to rotate the rotor to remove the hose out of the housing. Or
B. Remove the lose roller from the rotor. Close the front cover. Rotate for half revolution so the hose is not pressed by a roller. Loosen the hose clamps, starting with those on the lower side. Pull off the hose at both ends.
Check mechanical parts such as bearings, rollers, bushes or shafts for signs of wear.
Check the diameter, wall thickness and length of the hose before installation.
Measure the exact wall thickness and make a note of it. This information is required to adjust the rollers.
The rollers are adjusted for the correct contact pressure. The instructions for this follow in the next chapter.
The rotor can be turned manually using the motor fan. Turn to the 3 and 9 o'clock position.
The hose gets attached to the connection pieces with hose clamps.
The rotor is then manually turned again so that the hose can be pressed into place against the rear wall of the housing.
The seal of the pump housing must be checked and replaced if necessary.

Remount the front cover.
Remount the nipple for the lubricant.
Fill the pump housing with glycerine again. Fill to the centre of the sight glass.
Check the pump housing for leaks.
Check the pump for abnormal vibrations or other irregular behaviour, e.g. increased volume, noise.
Check the pump's ability to generate vacuum.

8.4 Adjusting the rollers

The distance between the inner housing surface of the pump on which the hose runs and the roller surface that presses on the hose:

A = 2 * t - t1

(for pressure of 0-5 bar)

If the pressure exceeds 5 bar, subtract 0,1*t1*Pd.

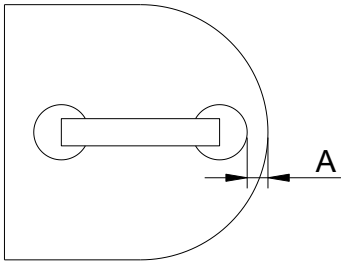


Abb. 1 : Distance from roller to pump housing

Variable	Meaning
A	Distance from roller to pump housing, Abb. 1
t	Wall thickness of the hose, Abb. 2
t1	Material-dependent coefficient, siehe Tab. 1
Pd	Nominal working pressure of the pump

Tabelle 1 Abbreviations

Hose material	Coefficient: t1
Natural Rubber Hose	1,0 mm
NBR	0,5 mm
EPDM	0,5 mm

Tabelle 2 Material coefficient

Example:

Hose wall thickness: t = 20,3 mm

Hose material NBR ⇒ t1 = 0,5 mm

Working pressure Pd= 9 bar

A = 2*20,3 - 0,5 = 40,1 mm

Deduction, as working pressure is over 5 bar:

0,1*0,5*9 = 0,45 mm

Results: A = 40,1 mm - 0,45 = 39,65 mm

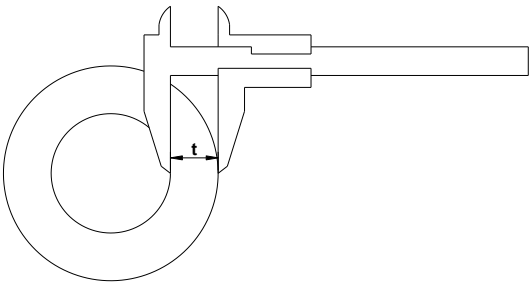
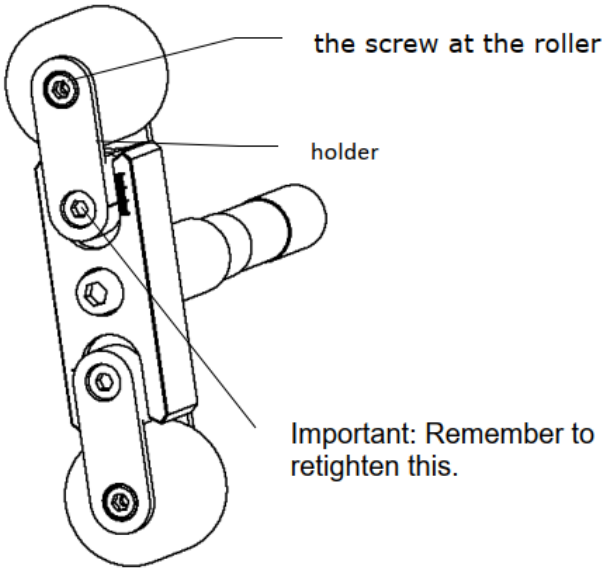


Abb. 2: Hose wall thickness

8.4.1 FHP-10 and FHP-15

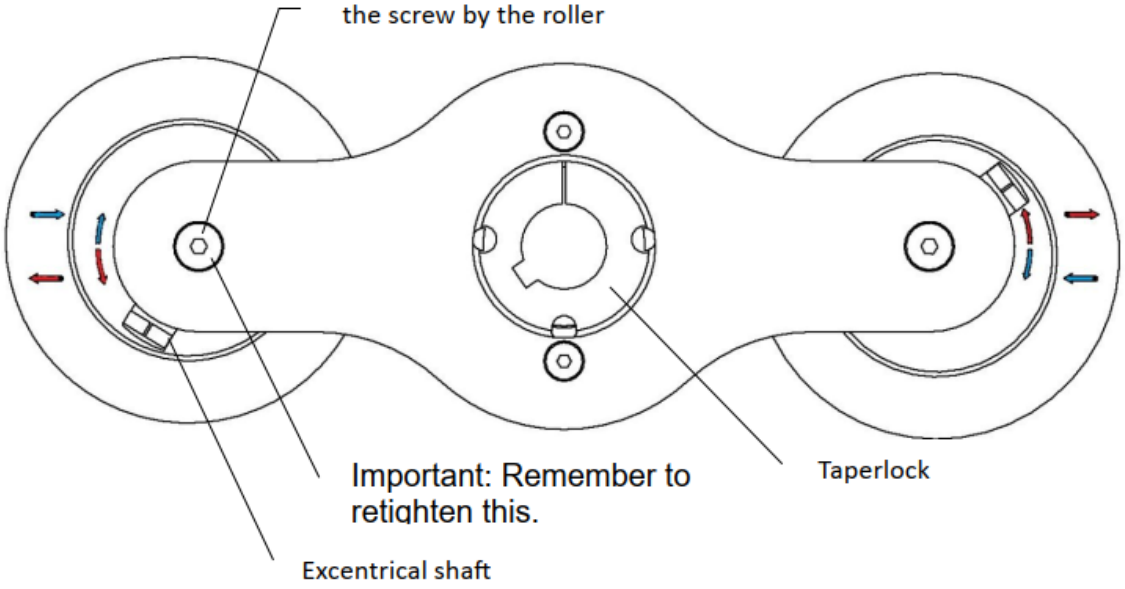
For the smallest rotors, simply loosen the screw on the roller and holder, move the holder to the desired position and tighten the screw again. Take a look at the example below.



8.4.2 FHP-25 to FHP-40

On the smaller rotors (<FHP-50), the rollers are adjusted by loosening the screws on the axis of the rollers, turning the eccentric to the desired position and tightening the

screws again. The following example is for FHP-32:



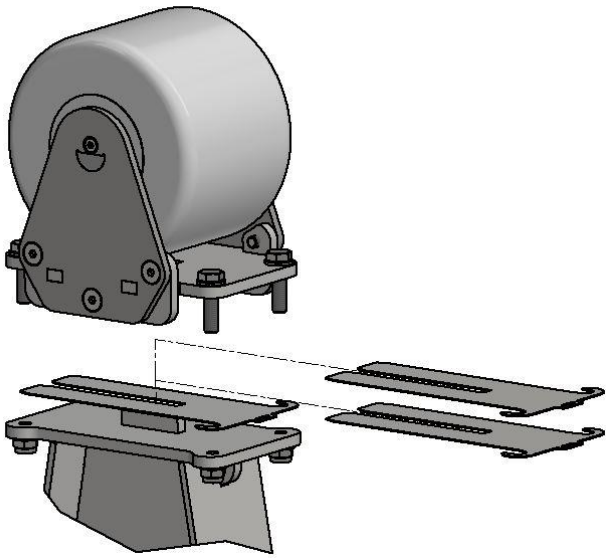
Screw in the eccentric:

- The hose gets compressed in red direction

- The hose gets loosened in the blue direction

8.4.3 FHP-50 to FHP-150

To adjust the roller, remove the upper screws. Place the washers on the provided recesses between the roller and the mounting plate until the distance is correct. Tighten the screws again to secure the mounting plate and washers.



8.5 Dismantling and replacing the motor

Note: When disassembling the motor and gear box, the center of balance of the entire pump is shifted considerably.

Before dismantling the motor and gear box, the pump must be supported and secured so that it cannot fall over.

To be able to remove the gearbox, the rotor must be removed first.

Shaft clamping ring on the rotor

Most of the rotors in FHP pumps have a shaft clamping ring as a connection between the gear shaft and the rotor. To loosen this, follow these instructions.

FHP	Taperlock Tension bush	Torque
125	4040	192.1 Nm
100	4040	192.1 Nm
80	3020	90.4 Nm
65	3020	90.4 Nm
50	2517	48.6 Nm
40	2012	31.6 Nm
32	2012	31.6 Nm
25	1610	19.8 Nm

Tabelle 3 Torque table Taperlock

Assembly

Clean/degrease all contact surfaces. Insert the clamping bush into the rotor hub so that all holes are aligned. Half a threaded hole must be aligned with half a smooth hole of the counterpart.
Oil the fastening screws and screw them loosely into the threads of the component to be fastened. (If a feather key is used, insert the feather key)
Slide the component to be fastened together with the bushing onto the shaft. Without feather key, but keyway present: Align the groove of the bushing offset by 180 degrees to the shaft groove. With feather key: Align keyway and feather key.
Drive the bushing to the desired position with light taps if necessary. Tighten the screws evenly with a torque wrench to the maximum torque (see table).
Drive the bushing in further with light hammer blows, using a wooden block or soft metal bushing as a buffer. Tighten the screws to the maximum torque.

Repeat the process until the screw cannot be tightened any further with the corresponding torque. Check the fit after 30-60 minutes of operation. Fill the empty holes (extraction holes) with grease to prevent contamination.

Disassembly

Remove all screws. Oil the tips of the screws and screw them into the extraction holes.
Tighten the screws until the component and bushing come loose. Be sure to use available washers when removing.
Remove the drive element and bushing from the shaft. The bushing can be carefully spread with a slotted screwdriver. Please do not use force!

9. Troubleshooting

Malfunction	Cause	Elimination
The pump does not start	Motor defective	Check fuses; check motor circuit breaker; check that the voltages of the 3 phases are equal
	Feather key in gear box or rotor is defective	Replace the feather key
	Taperlock clamping connection defective	Ensure that the connection is intact and not dirty or causing friction. Check the torque according to the torque table on S. 23. Tabelle 3 Torque table Taperlock
	Drive shaft defective	Replace the drive shaft
	Hose clogged	Reverse the direction of rotation of the pump and loosen the dirt in the hose. If this is not possible, the hose must be dismantled and cleaned.
The pump runs but does not pump	Pump runs too slowly	Turn up the speed controller. If you do not have a frequency converter on the pump, it can be installed later.
	Pump has a leak	Determine the location of the leak and replace the gaskets / seal this area.
	Hose is blocked on the suction side	Fasten the hose so that it cannot get stuck to a wall or the floor.
	The rollers are not correctly adjusted	Adjust the roller, s. S. 20

Flow rate is lower than expected	Pump runs too slowly	Turn up the speed controller. If you do not have a frequency converter on the pump, it can be installed later.
	Pump sucks air	Determine the location of the leak and replace the gaskets / seal this area.
	Viscosity of the medium is too high	Reduce the speed of the pump or select an appropriately sized pump.
	Rollers are not correctly adjusted	Adjust the rollers, s. S. 20
	Back pressure is too high	Use larger hoses on the pressure side.
Noise	Cavitation	Reduce the speed or use a larger pump. Replace the hoses if necessary.
	Air in the hose	Check the hose and seal if necessary.
	Rotor grinds on the housing	Readjust the rotor.
	Pressure is too high	Use larger hoses and reduce the speed.
	Gear box or bearing wear	Workshop maintenance, pump overhaul recommended.
	Hose is damaged	Replace the hose.

Pump consumes too much power	Pressure is too high	Reduce the speed or use a larger pump. Replace the hoses if necessary.
	Deposition of solids during pump standstill	Empty the pump if it is not used for a longer period of time, rinse with clear water, install a heating element.
	Fluid or particle build-up in the motor	Clean and maintain the motor.
Pump wears out very quickly	The hose has been chemically attacked	Unsuitable hose material or medium.
	Mechanical wear from the outside of the hose due to the rollers	The rollers are pressed on too tightly. Readjustment necessary.
	Mechanical wear from inside the hose	Choose a different hose material.
	Wear on the bearing of the rotor	The rollers are pressed on too tightly. Readjustment necessary.

10. Technical data

		FHP											
TYPE		10	15	25	32	40	50	65	80	100	125	150	200
Motor speed	RPM	50		29	26								
Flow rate	[l/min]	2.5	5.5	16	33	50	100	200	333	666	1066	2000	5000
Working pressure	[bar]	5	5	5	5	5	5	5	5	5	5	5	5
Weight	[Kg]	25	25	65	105	140	180	400	500	700	1300	1800	5200
Max. Power [kW]	Nom .. Max	0.18 .. 0.37	0.18 .. 0.37	0.37 .. 0.75	0.55 .. 0.75	1.1 .. 1.5	1.5 .. 2.2	2.2 .. 4	4 .. 5.5	7.5 .. 11	11 .. 15	18.5 .. 22	37 .. 55
Glycerine	[l]	0.75	0.75	2.5	4	5	8	15	20	30	50	70	200

*abhängig vom verwendetem Saugschlauch und Schnellschlusskupplung

Motor:

The pump is driven by an air-cooled 3-phase asynchronous motor. Calculated and adapted to the required power and flow rate.

The motor must be operated with a motor protection switch!

Hose:

Normally, the hose is made of natural rubber. It can be replaced by a media-resistant hose made of a different material, e.g. chemically resistant, food-safe, etc.

When handling the hose, certain safety instructions (see maintenance instructions) must be observed. These rules must be available to every employee and must be read by everyone who carries out maintenance or replaces hoses on the pump.

Gear box:

The gear box is carefully selected and adapted to specific customer specifications. This enables energy-saving operation and precise speed adjustment. If the pump is equipped with a speed controller, the oil level must be checked at regular intervals.

Standard gear oil content diagram:

Pump:	Gear box type:	Oil content [l]	Oil-type:
FHP-10	Wormgear (RMI 50)	0,16	Shell Omala S4 220
FHP-15	Wormgear (RMI 50)	0,16	Shell Omala S4 220
FHP-25	SEW Helical gear (RF47)	0,65	CLP220 Mineral oil
FHP-32	SEW Helical gear (RF57)	0,8	CLP220 Mineral oil
FHP-40	SEW Helical gear (RF77)	1,2	CLP220 Mineral oil
FHP-50	SEW Helical gear (RF87)	2,4	CLP220 Mineral oil
FHP-65	Brevini Planetary gear (ET3020)	1,6	CLP220 Mineral oil
FHP-80	Brevini Planetary gear (ET3045)	1,6	CLP220 Mineral oil
FHP-100	Brevini Planetary gear (ET3046)	1,8	CLP220 Mineral oil
FHP-125	Brevini Planetary gear (ET3090)	3,3	CLP220 Mineral oil
FHP-150	Brevini Planetary gear (ET3150)	3,5	CLP220 Mineral oil
FHP-200	Brevini Planetary gear (ET3250)	5	CLP220 Mineral oil

Flow rate

Type	10	15	25	32	40	50	65	80	100	125	150	200
RPM	l/h	l/h	m³/h	m³/h	m³/h	m³/h	m³/h	m³/h	m³/h	m³/h	m³/h	m³/h
10	29,5	66,7	0,3	0,7	1,1	2,1	4,3	8,0	15,4	24,6	46,2	111,1
11	32,5	73,3	0,4	0,7	1,2	2,4	4,7	8,8	16,9	27,1	50,8	122,2
12	35,5	80,0	0,4	0,8	1,3	2,6	5,1	9,6	18,5	29,5	55,4	133,3
13	38,4	86,7	0,4	0,9	1,4	2,8	5,6	10,4	20,0	32,0	60,0	144,4
14	41,4	93,3	0,5	0,9	1,5	3,0	6,0	11,2	21,5	34,5	64,6	155,6
15	44,3	100,0	0,5	1,0	1,6	3,2	6,4	12,0	23,1	36,9	69,2	166,7
16	47,3	106,7	0,5	1,1	1,7	3,4	6,9	12,8	24,6	39,4	73,8	177,8
17	50,2	113,3	0,6	1,1	1,8	3,6	7,3	13,6	26,2	41,8	78,5	188,9
18	53,2	120,0	0,6	1,2	1,9	3,9	7,7	14,4	27,7	44,3	83,1	200,0
19	56,1	126,7	0,6	1,3	2,0	4,1	8,1	15,2	29,2	46,8	87,7	211,1
20	59,1	133,3	0,7	1,3	2,1	4,3	8,6	16,0	30,8	49,2	92,3	222,2
21	62,0	140,0	0,7	1,4	2,3	4,5	9,0	16,8	32,3	51,7	96,9	233,3
22	65	146,7	0,7	1,5	2,4	4,7	9,4	17,6	33,8	54,2	101,5	244,4
23	68,0	153,3	0,8	1,5	2,5	4,9	9,9	18,4	35,4	56,6	106,2	255,6
24	70,9	160,0	0,8	1,6	2,6	5,1	10,3	19,2	36,9	59,1	110,8	266,7
25	73,9	166,7	0,8	1,7	2,7	5,4	10,7	20	38,5	61,5	115,4	277,8
26	76,8	173,3	0,9	1,7	2,8	5,6	11,1	20,8	40	64	120	288,9
27	79,8	180,0	0,9	1,8	2,9	5,8	11,6	21,6	41,5	66,5	124,6	300
28	82,7	186,7	0,9	1,9	3	6	12	22,4	43,1	68,9	129,2	311,1
29	85,7	193,3	1,0	1,9	3,1	6,2	12,4	23,2	44,6	71,4	133,8	322,2
30	88,6	200	1	2	3,2	6,4	12,9	24,0	46,2	73,8	138,5	333,3
31	91,6	206,7	1,0	2,1	3,3	6,6	13,3	24,8	47,7			
32	94,5	213,3	1,1	2,1	3,4	6,9	13,7	25,6	49,2			
33	97,5	220,0	1,1	2,2	3,5	7,1	14,1	26,4	50,8			
34	100,5	226,7	1,1	2,3	3,6	7,3	14,6	27,2	52,3			
35	103,4	233,3	1,2	2,3	3,8	7,5	15,0	28,0	53,8			
36	106,4	240,0	1,2	2,4	3,9							
37	109,3	246,7	1,2	2,5	4,0							
38	112,3	253,3	1,3	2,5	4,1							
39	115,2	260,0	1,3	2,6	4,2							
40	118,2	266,7	1,3	2,7	4,3							
41	121,1	273,3										
42	124,1	280,0										
43	127,0	286,7										
44	130,0	293,3										
45	133,0	300,0										
46	135,9	306,7										
47	138,9	313,3										
48	141,8	320,0										
49	144,8	326,7										
50	147,7	333,3										
51	150,7	340,0										
52	153,6	346,7										
53	156,6	353,3										
54	159,5	360,0										
55	162,5	366,7										
56	165,5	373,3										
57	168,4	380,0										

A) Declaration of decontamination

According to various legal regulations on labour protection, including the German Workplace Regulations (ArbStättV), Hazardous Substances Regulations (GefStoffV) and regulations for the prevention of accidents, as well as environmental regulations such as the German Waste Act (AbfG) and the Water Resources Law (WHG), all industrial and commercial enterprises are obliged to protect their employees and other persons as well as the environment from harmful influences and effects when handling hazardous substances.

We therefore ask you to attach a declaration of decontamination to any pump or component you send us for repair, stating that you carefully cleaned and, if necessary, thoroughly rinsed with neutral fluid the pump or component before you shipped it to us. Notwithstanding the receipt of this declaration, we reserve the right to reject its repair for other reasons.

No FLUX product or component of them will be accepted for service or repair unless the declaration of decontamination is enclosed!

Apart from that, we do NOT accept any pump that has been operated with radioactive substances.

When sending in the pump or a component, please inform us if, despite carefully emptying and cleaning the pump, there are still some safety precautions required.

Declaration of Decontamination

The undersigned herewith declare that the following pump and its accessories are harmless and ask you to service and/or repair it or them

Type:

.....

.....

Serial number:

.....

Date of delivery:

.....

Kind of problem:

.....

.....

Declaration:

The pump was not used to deliver harmful or noxious substances

☐ But with the following fluids:

.....

.....

☐ Before being shipped, the pump was carefully emptied and cleaned inside and outside.

☐ There are no special safety precautions required.

☐ It is necessary to take the following safety precautions with regard to residual fluids and waste disposal:

.....

.....

Date: Signature:

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