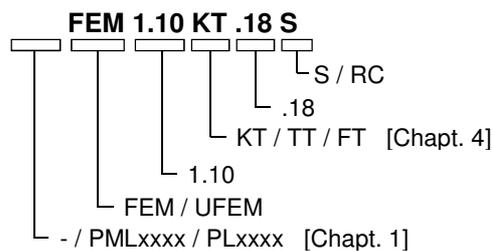




Diaphragm metering pump

SIMDOS®



Operating Manual

It is important to read and comply with all instructions in this operating and installation manual.

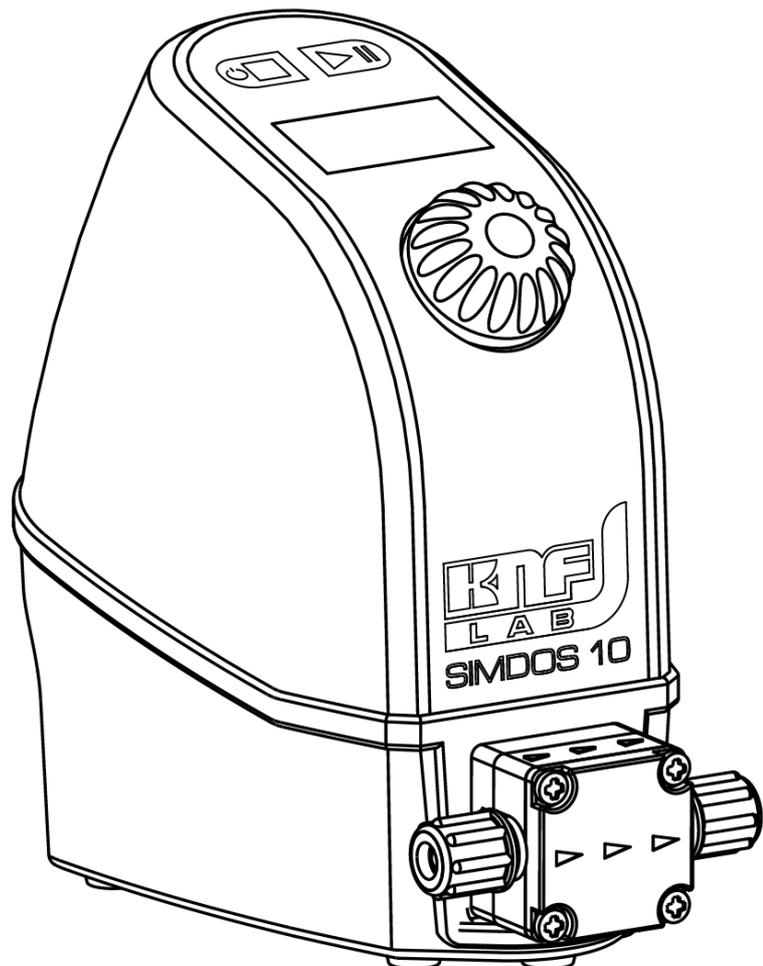
An additional letter before the FEM model code is a country-specific designation, with no technical relevance.



KNF FLODOS AG
Wassermatte 2
6210 Sursee, Switzerland

Tel. +41 (0)41 925 00 25
Fax +41 (0)41 925 00 35

www.knf-flodos.ch
info@knf-flodos.ch





KNF FLODOS AG
 Wassermatte 2
 6210 Sursee, Switzerland
 Tel. +41 (0)41 925 00 25
 Fax +41 (0)41 925 00 35
 www.knf-flodos.ch
 info@knf-flodos.ch

Items included on delivery:

- SIMDOS metering pump
- Mains plug
- RC cable (for RC version only)
- Operating manual
- Brief user guide
- Operating manual CD-ROM
- Connection kit: hose and screw connectors

Safety provisions

The SIMDOS 10 metering pump complies with the safety provisions of the EC low-voltage directive 2006/95/EC and the EC directive on electromagnetic compatibility 2004/108/EG. The following standards are applicable:

- EN 61010-1
- EN 61326-1

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1. About this document

1.1. Use of the operating and installation manual

The operating and installation manual forms an integral part of the pump.

→ Please be sure to pass the manual on to the next owner of the device.

Project pumps

Specifications and instructions for customer-specific project pumps (model numbers beginning with “PL” or “PML”) may differ from those set down in the operating and installation manual.

→ For project pumps, it is also necessary to observe the agreed specifications.

1.2. Symbols and flags

Warning symbol



WARNING

Warning regarding a potential danger.

Possible consequences of failure to comply with the warning. The word used, e.g. “warning”, indicates the level of danger present.

→ Precautions required to prevent the danger and its consequences.

Levels of danger

Word	Meaning	Consequences of non-compliance
DANGER	Warning of an imminent danger	Death or serious injury, or major damage to property
WARNING	Warning of a potential danger	Possible death or serious injury, or major damage to property
CAUTION	Warning of a potentially dangerous situation	Possibility of slight injury or damage to property

Tab. 1: Levels of danger

Other flags and symbols

→ Identifies an action (step) to be carried out.

1. Identifies the first step of an action. Further numbered steps follow.

i Identifies important information.

2. Use

2.1. Intended use

The pump is a fluid pumping and metering device.

Operator's responsibility

Operating parameters and conditions

The pump must be installed and operated only in accordance with the operating parameters and conditions described in Chapter 4, Technical data.

Protect the pump from moisture.

The pump may be operated only when fully assembled.

Requirements for pumped medium

Before use, check that the materials of the pump head, housing, diaphragm and valves are compatible with the pumped medium.

Before starting to pump, check that the medium can be pumped safely in this specific situation.

The temperature of the medium must be within the permitted temperature range (see Chapter 4).

The pumping medium must not contain any solids, since these could impair the pump's operation. If the presence of solids cannot be prevented, a filter of < 50 µm and with a sufficient filter area must be installed upstream from the pump.

2.2. Improper use

The pump must not be operated in a potentially explosive atmosphere.

The party commissioning the pump is responsible for ensuring compliance with relevant standards if the pump is used in the medicine or food sectors.

3. Safety

i Note the safety notes in Chapter 6, Assembly and connection, and Chapter 7, Operation

The pump is constructed according to the generally accepted rules of the technology, and occupational health and safety and accident prevention provisions. Hazardous situations with the possibility of injuries to the user or other persons, or damage to the pump or other property, may, however, occur during use of the device.

The pump must be operated only in technically sound condition and for its intended purpose, with due regard for safety and potential hazards and in accordance with this operating and installation manual.

Personnel	<p>Ensure all persons working with the pump have been appropriately trained and familiarised with its use, or are qualified personnel. This applies particularly to the assembly, connection and maintenance of the equipment.</p> <p>Ensure that relevant personnel have read and understood this operating and installation manual, particularly the chapter on safety.</p>
Safety awareness	<p>Accident prevention and safety rules must be observed at all times while working on or using the pump.</p>
Hazardous media	<p>When pumping a hazardous medium, always observe the safety rules for the medium in question.</p>
Signs	<p>Always comply with instruction signs placed on the pump, such as flow direction arrows and the type plate, and keep these in a clearly legible condition.</p>
Environmental protection	<p>All replacement parts must be stored and disposed of in accordance with the precautions required under environmental protection provisions. It is important to comply with both national and international regulations. This applies particularly to parts that have been contaminated with toxic materials.</p>
Disposal	<p>Dispose of all packaging in an environmentally appropriate manner. The packaging materials are recyclable.</p> <p>Ensure that the pump is disposed of in an environmentally appropriate manner at the end of its useful life. Use appropriate waste collection systems for the disposal of end-of-life equipment. Used pumps contain valuable recyclable materials.</p>



EU directives/standards	<p>The pumps are in accordance with the requirements of the guidelines 2011/65/EU (ROHS2)</p> <p>The pump complies with all relevant provisions of the following directives: the EC machinery directive 2006/42/EC, safety provisions of the EC low-voltage directive 2006/95/EC and the EC directive on electromagnetic compatibility 2004/108/EC.</p> <p>The following harmonised standards are met:</p> <p>EN 61010-1 EN 61326-1</p>
Customer service and repairs	<p>All repairs to the pump must be carried out solely by the accredited KNF customer service entity.</p> <p>Use only KNF original parts for all maintenance work.</p>

4. Technical data

4.1. Pump materials

For **KT** models:

Sub-assembly	Material ¹⁾
Pump head	PP
Valve plate / seals	FFKM
Diaphragm	PTFE-coated
Housing	PP

Tab. 2: KT

1) according to DIN ISO 1629 and 1043.1

For **TT** models:

Sub-assembly	Material ¹⁾
Pump head	PVDF
Valve plate / seals	FFKM
Diaphragm	PTFE-coated
Housing	PP

Tab. 3: TT

1) according to DIN ISO 1629 and 1043.1

For **FT** models:

Sub-assembly	Material ¹⁾
Pump head	PTFE
Valve plate / seals	FFKM
Diaphragm	PTFE-coated
Housing	PP

Tab. 4: FT

1) according to DIN ISO 1629 and 1043.1

4.2. Hydraulic ratings

Parameter	Value
Flow rate [ml/min] ^{1), 2)}	1–100
Max. metering volume [ml]	1–1,000
Metering time [mm:ss] [hh:mm]	1s – 99h59min
Flow rate scale range	1:100
Accuracy ³⁾	+/- 2%
Reproducibility ³⁾	+/- 1%
Permitted pressure [bar above atmospheric]	6
Suction head [m water column]	3
Permitted medium viscosity [cSt] ⁴⁾	150

Tab. 5: Hydraulic ratings

1) Measured with water at 20 °C

2) Flow rates may vary from the values shown according to fluid viscosity, pump head material and the hoses / hose connectors used. Calibration with the pumped medium is required.

3) For calibrated pump and constant environmental conditions (see section 5.5)

4) Lower flow rate for fluid type setting "Visk500cSt" (see section 7.13).

4.3. Accuracy / reproducibility

Accuracy The accuracy of the metering pump is appropriately characterised by the maximum absolute error A and the maximum relative error B.

→ max. inaccuracy $\leq A + B$

Error	Value
Absolute error A	$\leq \pm 1\%$ nominal value
Relative error B	$\leq \pm 1.9\%$ setting value

Tab. 6: Error A and error B

Example:

SIMDOS[®] 10, nominal value of 100 ml/min

For a setting of 20 ml/min, the accuracy should therefore be within the following error limits:

$$\begin{aligned} \text{Inaccuracy} &\leq (\pm 1\% \times 100\text{ml/min}) + (\pm 1.9\% \times 20\text{ml/min}) \\ &\leq (\pm 0.1\text{ml/min}) + (\pm 0.38\text{ml/min}) \\ &\leq \pm 0.48\text{ml/min} \\ &\approx \pm 2\% \text{ of setting value} \end{aligned}$$

Reproducibility In constant environmental conditions and with the same hose connection configuration, the pump achieves a reproducibility of better than $\pm 1\%$.

i Greater inaccuracies may occur for fluids with a viscosity of > 150 cSt or with a tendency to gassing out. Appropriate adjustments may be made during calibration.

Factory calibration The metering pump has been calibrated to its nominal flow rate in the factory. The specified flow rate is for water at 20°C with free discharge flow.

Calibration The flow rate may differ from the calibrated value for some applications, according to the medium, its viscosity, density and temperature, pressure and installation type (e.g. cross-section constrictions). For accurate metering, it is therefore desirable to calibrate the metering pump (see section 7.14).

4.4. Hydraulic connections

Pump model	Connection type
FEM 1.10 KT, TT	Hose fitting, i.d. 4mm / o.d. 6mm
FEM 1.10 FT	Internal thread NPT 1/8 Hose fitting, i.d. 4mm / o.d. 6mm
UFEM 1.10 KT, TT	Hose fitting, i.d. 1/8", o.d. 1/4"
UFEM 1.10 FT	Internal thread NPT 1/8 Hose fitting, i.d. 1/8", o.d. 1/4"

Tab. 7: Hydraulic connections

4.5. Electrical data

Parameter	Value
Nominal mains voltage [V]	100–240 V AC +/- 10%
Frequency [Hz]	50–60 Hz
Maximum current consumption AC 100 V / 115 V / 240 V [A]	0.1 / 0.09 / 0.05
Max. watt consumption [W]	10
Pump DC voltage [V]	24 V DC
Max. current consumption, DC RMS 24 V [A]	0.4
Max. short-term peak current [A]	1.7
Power supply protection	Electronic overload protection
Pump protection	Electronic overload protection
Pump protection type	IP 65
Power supply protection type	IP 40

Tab. 8: Electrical data

4.6. Other parameters

Parameter	Value
Permitted ambient temperature	+5 to +40 °C
Permitted medium temperature	+5 to +80 °C
Rated speed	200 rpm
Service life	> 10,000 h (100 million strokes)
Noise level	< 40dBA
Pump weight ¹⁾	0.9 kg

Tab. 9: Other parameters

1) Pump weight may differ slightly for some pump versions.

4.7. External drive (RC version only)

Parameter	Value
<i>Analogue input</i>	
Signal range	0–10 V, 4–20 mA, 0–20 mA
Input resistance [Ω]	13.9 k Ω at 0–10 V 470 Ω at 4–20 mA 470 Ω at 0–20 mA
Electric strength [V] TTL	24 V DC
<i>Digital input</i>	
Signal range	Pull up at 24 V
Electric strength [V] TTL	24 V DC
Low level (ON)	< 0.8 V = low
High level (OFF)	> 2.0 V = high
<i>Digital output</i>	
Electric strength, open collector [V] TTL	24 V DC
Load capability, open collector [V] TTL	10 mA

Tab. 10: External drive

- 1 Analogue input
brown
- 2 Digital input 1
white
- 3 Digital input 2
blue
- 4 Open collector output
black
- 5 Ground
grey

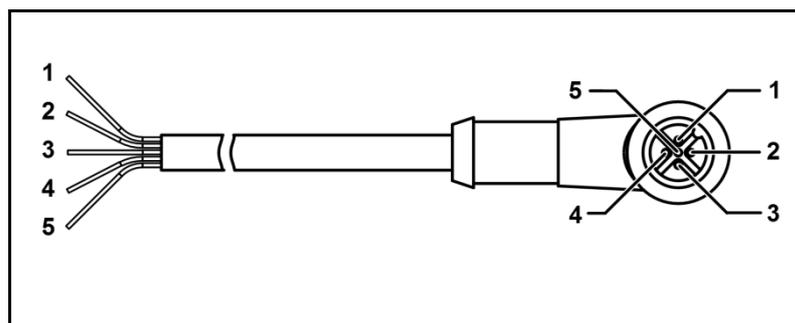


Fig. 1: RC cable pins

Pin No.	Wire colour	Description	Function
1	Brown	Analogue input	0% to 100% up to flow rate
2	White	Digital input 1	Start/stop
3	Blue	Digital input 2	Reset / prime / pedal switch
4	Black	Digital output	Various output signals
5	Grey	Ground	--

Tab. 11: RC cable pins

5. Structure and operation

5.1. Metering pump structure

- 1 STOP button
- 2 START button
- 3 Display
- 4 Control knob
- 5 Inlet
- 6 Pump head
- 7 Outlet
- 8 Power supply plug
- 9 External drive plug (RC version only)

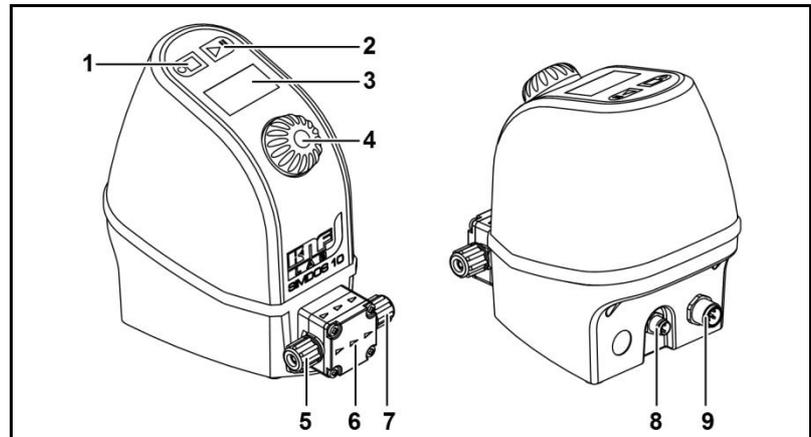


Fig. 2: Diaphragm pump

5.2. Operating principle

- 1 Exhaust valve
- 2 Inlet valve
- 3 Working chamber
- 4 Diaphragm
- 5 Eccentric
- 6 Connecting rod
- 7 Pump drive

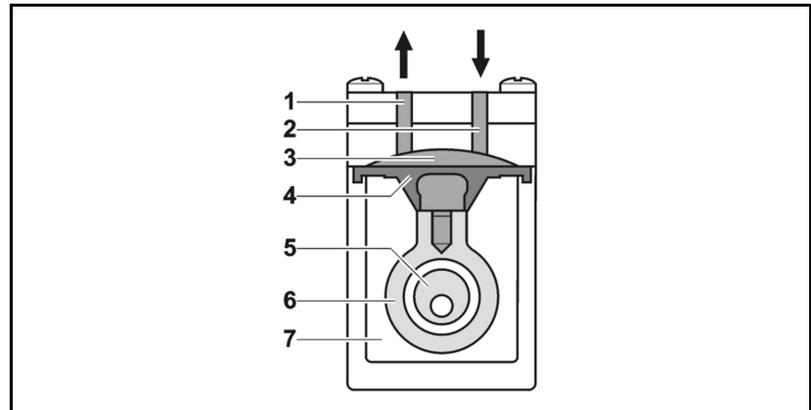


Fig. 3: Pump structure

Diaphragm fluid pumps are based on reciprocating displacement pump technology. An elastic diaphragm (4) is moved up and down by the eccentric (5) and the connecting rod (6). During the down stroke, the diaphragm sucks in the medium through the inlet valve (2). During the up stroke, it forces medium out of the pump head through the exhaust valve (1). The diaphragm hermetically seals off the working chamber (3) from the pump drive (7).

SIMDOS® diaphragm metering pumps are fitted with a patented drive system. The suction stroke is always driven at maximum speed, but the exhaust process is varied according to the selected speed, ensuring maximum possible uniformity of discharge during the entire stroke (see Fig. 4). This results in a low-pulsation, quasi-continuous pumping process. This is the key difference between SIMDOS® metering pumps and diaphragm metering pumps with linear magnet diaphragm drive or with conventional eccentric diaphragm drive.

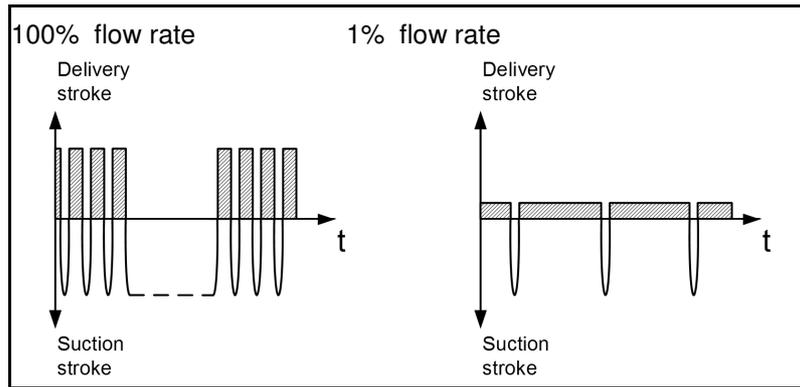


Fig. 4: Low-pulsation operating principle

The characteristic curve for the suction and exhaust strokes can also be adapted to the medium by setting the appropriate fluid type (see section 7.13).

5.3. Metering pump functions

Operating modes

Continuous pumping

In this case, the device pumps at a constant flow rate.

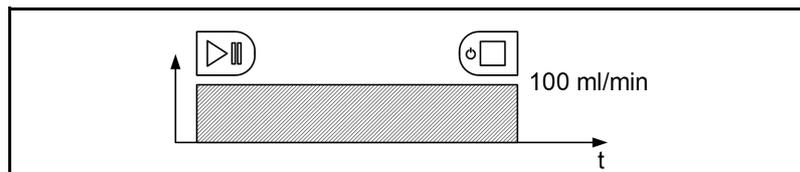


Fig. 5: Continuous pumping

Continuous pumping with timeout

In this case, the device pumps at a constant flow rate, then switches off after a specified time.

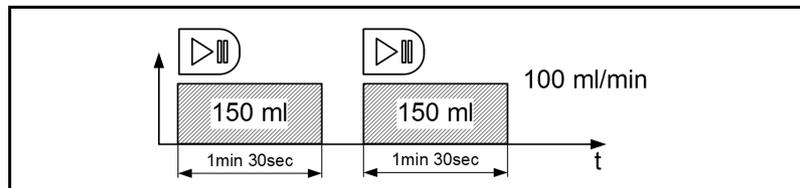


Fig. 6: Continuous pumping with timeout

Metered volume

Pumping of a specified volume in a specified time.

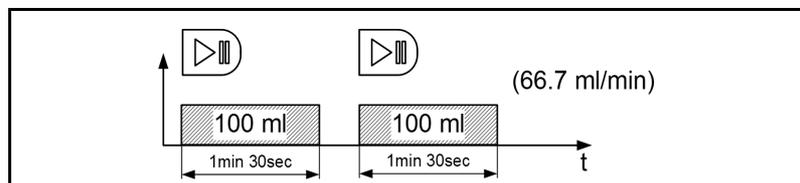


Fig. 7: Metered volume with timeout

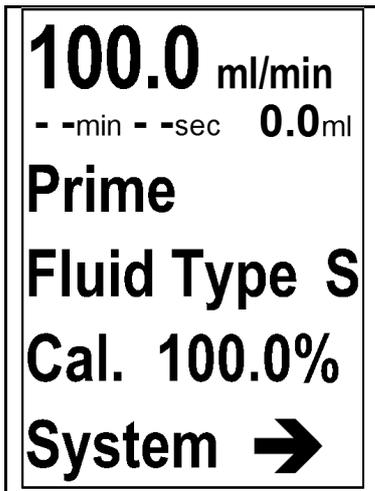


Fig. 8: Main menu

5.4. Functions overview

Main menu

1. Flow rate 1–100 ml/min or metered volume 1–1,000 ml
2. Timeout/metering time
3. High-speed operation for priming or emptying
4. Pump calibration
5. Setting the pump for characteristics of the medium
 - Standard: Aqueous media
 - Degassing: Media with low boiling temperature
 - Visk100cSt: Media up to 100 cSt
 - Visk500cSt: Media up to 500 cSt
6. Go to system menu

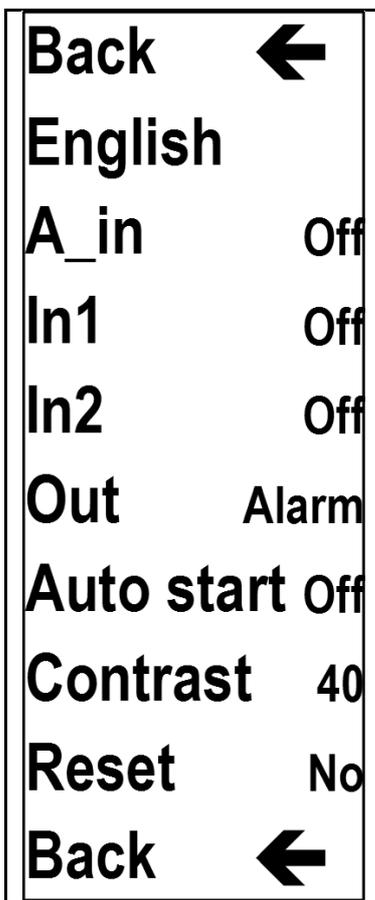


Fig. 9: System menu

System menu

7. Return to main menu
8. Selecting operating menu language
9. Analogue input: 0% to 100% flow rate *
0–10 V / 0–20 mA / 4–20 mA
10. Digital input 1: Start/stop with level or pulse signal via logic input *
11. Digital input 2: Reset or high-speed via logic input *
12. Digital output: User selection of logic signal type: *
 - Error/alarm
 - Motor turns (level)
 - End of metering volume
 - Motor pulses
 - Volume pulses (one pulse per 100 µl)
13. Autostart function (pump starts automatically when power supply switched on)
14. Set display contrast
15. Reset pump to factory settings
16. Return to main menu

i * RC functions are available for RC pumps only. See Chapter 8 for further details of the external drive system.

6. Assembly and connection

All pumps must be installed only in accordance with the operating parameters and conditions described under Technical data (see Chapter 4).

Note the safety instructions in Chapter 3.

6.1. Assembly

- ➔ Store at the assembly location prior to assembly so that the pump is at the same temperature as the surrounding environment.

Dimensions ➔ Pump dimensions (see Fig. 10)

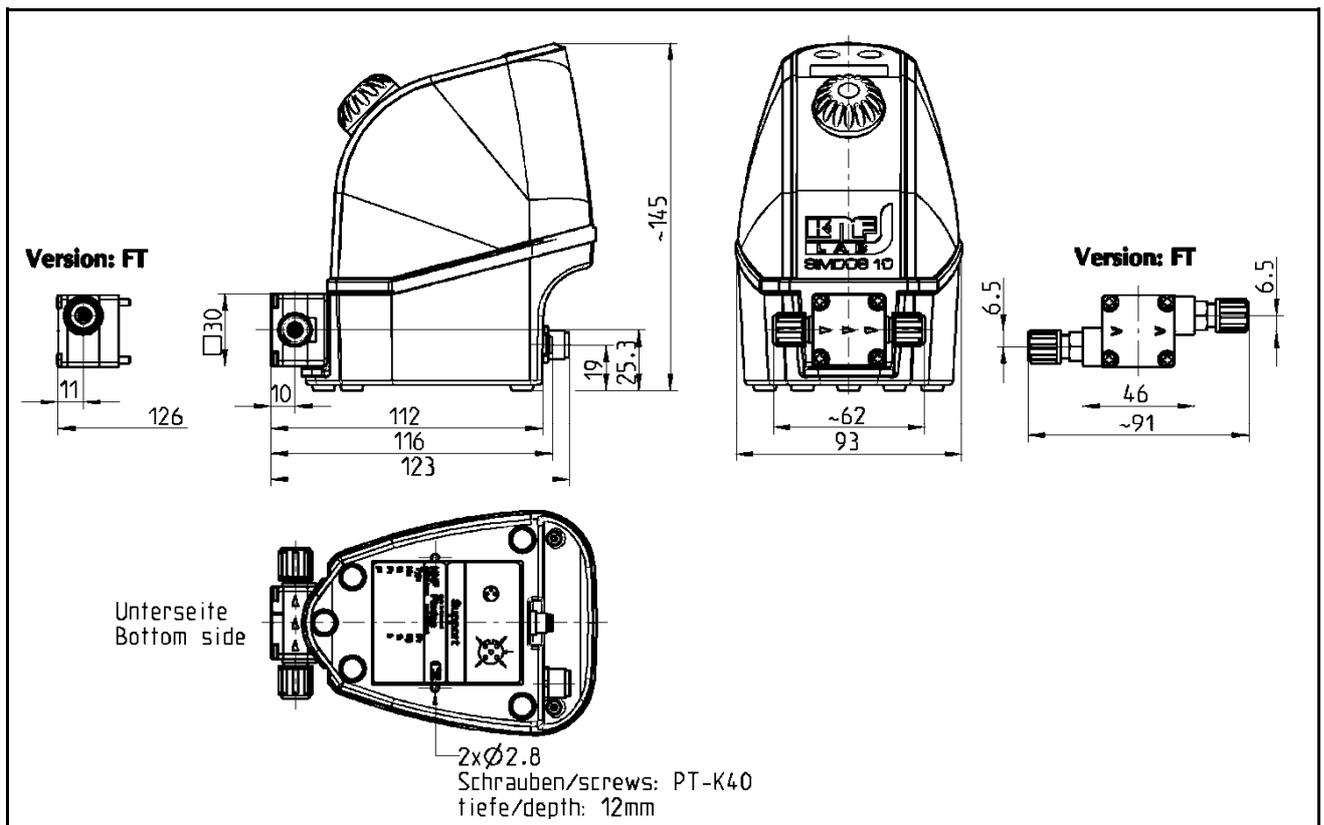


Fig. 10: Mounting measurements (measurement tolerances as per DIN ISO 2768-1, tolerance class V)

- | | |
|-----------------------|--|
| Installation location | <ul style="list-style-type: none"> ➔ Ensure that the installation location is dry, and protected from water in the form of rain, spray, splashes and drips. ➔ Select a level surface that will provide a firm base for the pump. ➔ When choosing the location, ensure that the hose connections can be fitted without strain on the hoses. Do not pull on the hoses, and avoid kinks and bends. ➔ Protect the pump from dust. ➔ Protect the pump from vibrations and impacts. |
| Installation position | <p>The pump is designed to be installed in an upright position.</p> <ul style="list-style-type: none"> ➔ Two additional mounting screws can be inserted from the bottom of the pump base (see Fig. 10). |

6.2. Electrical connection

- ➔ Electrical connections must comply with relevant standards, directives, regulations and industry standards.
1. Connect the mains plug cable to the socket in the pump.
 2. Plug the mains plug into a correctly installed and properly earthed mains socket.

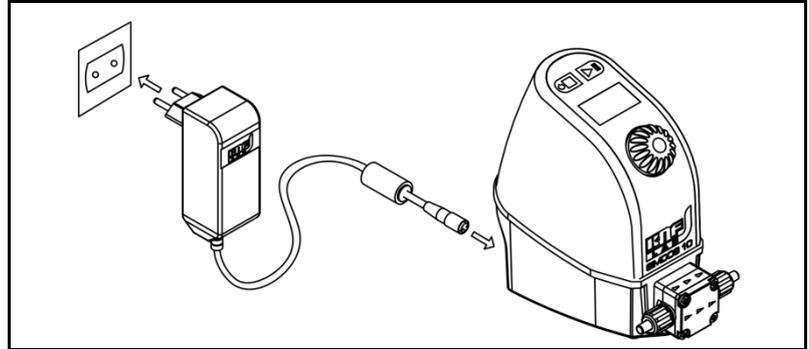


Fig. 11: Electrical connection

- i** The pump must be connected only to a correctly installed and properly earthed mains socket.
- i** Ensure that the mains plug is protected from water splashes.



CAUTION

Safety note

Always remove the mains plug from the socket before carrying out any work on the pump.



6.3. External drive (RC version)

RC cable

1. Fit an appropriate plug on the external drive cable (RC cable) for the control unit to be used. For pin allocations, see section 4.6, Table 10 and Fig. 1).
 2. Remove protective cover from the RC plug.
 3. Connect the RC cable to the pump.
- i** Signals and load capacity (see section 4.6).
 - i** RC functions (see Chapter 8).

6.4. Hydraulic connection

- Connected components → All components connected to the pump must be designed for the hydraulic ratings of the pump (see Chapter 4).
 - Hoses → All hoses used must be designed for the maximum permitted operating pressure of the pump (see Chapter 4).
→ All hoses used must have sufficient chemical resistance to the pumped fluids.
 - Customer-specific pumps (PL, PML) → The connections described below apply to standard products. Different connections may apply for customer-specific projects (PML or PL).
- i** The direction of flow is marked on the pump head.
- i** The suction line should be kept as short as possible, to reduce the priming time.

Clamp ring / hose connection fitting, FEM 1.10KT, FEM 1.10TT, UFEM 1.10KT, UFEM 1.10TT

- 1 Hose
- 2 Union nut
- 3 Clamp ring
- 4 Connector

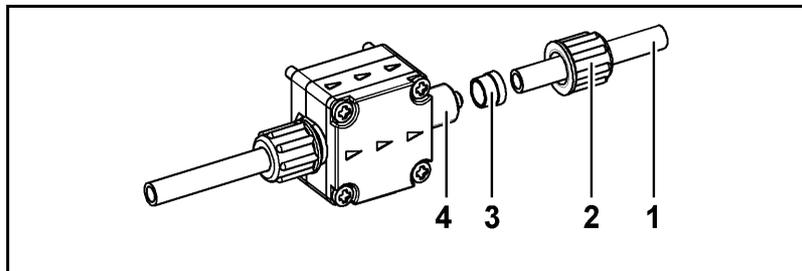


Fig. 12: 4/6 hose / clamp ring connection fitting (FEM)
1/8" / 1/4" hose / clamp ring connection fitting (UFEM)

1. Remove protective covers from the connections.
2. With a sharp knife, cut the suction and pressure lines (FEM: hose with i.d. 4 mm, o.d. 6 mm; UFEM: hose with i.d. 1/8", o.d. 1/4") to the required length, with square straight edges.
3. Push the union nut (2) and clamp ring (3) onto the hose (1).
4. Push the hoses onto the connectors as far as they will go.
5. Hand-tighten the union nut (2).
6. Check that the hoses and hose/connector transitions are correctly and securely attached.
7. Check the tight seal of the installed fittings.

Cutting ring / hose connection fitting with threaded socket FEM 1.10FT, UFEM 1.10FT

- 1 Hose
- 2 Threaded socket
- 3 Teflon sealing tape
- 4 Union nut
- 5 Cutting ring
- 6 Sealing ring
- 7 Connector

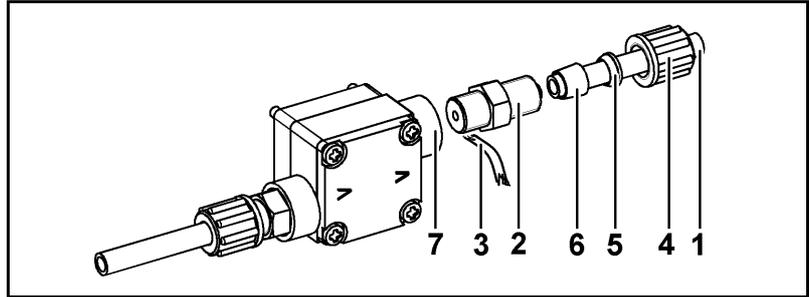


Fig. 13: 4/6 hose / cutting ring FT connection fitting

1. Remove protective covers from the connections.
2. Screw the threaded socket (2) with Teflon sealing tape (3) into the pump head.

i Do not apply excessive torque to the threaded socket. This could damage the thread.

3. Using a sharp knife, cut the suction and pressure lines (FEM: hose with i.d. 4 mm, o.d. 6 mm; UFEM: hose with i.d. 1/8", o.d. 1/4") to the required length, with straight square edges.

4. Push the union nut (4), cutting ring (5) and sealing ring (6) onto the hose (1).

i Push the cutting ring and sealing ring over the hose only far enough for the hose end to protrude around 1 mm.

5. Push the hoses onto the connectors as far as they will go.

6. Hand-tighten the union nut (4).

7. Check that the hoses and hose/connector transitions are correctly and securely attached.

8. Check the tight seal of the installed fittings.

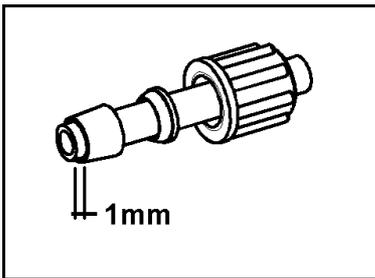


Fig. 14: Position of cutting ring and sealing ring on hose

6.5. Shutdown

- On completion of the pumping operation, flush the entire system and the pump with a neutral fluid, then pump it empty.
- i** To ensure satisfactory start-up when the unit is again required, it is important to ensure that the pump is free of any crystallising, adhesive or curing media.
- Press the STOP button to end the pumping operation.
- Unplug the pump from the power supply.

6.6. Transport and interim storage

When packing the unit, ensure that the consignment will not be able to move within the packing.

Choose sufficiently robust packing so that the entire consignment will withstand unfavourable transport conditions.

- Use the original packaging.

7. Operation

7.1. Initial start-up

Before switching on the pump, check the following points:

Prerequisites for start-up
<ul style="list-style-type: none"> ▪ All hoses must be correctly attached. ▪ Specifications of the power supply must correspond with the data on the pump type plate and the mains plug. ▪ The pump outlet must be clear of any obstruction. ▪ All cables must be correctly connected.

Tab. 12: Prerequisites for start-up

- Operate the pump only in accordance with the operating parameters and conditions described under Technical data (see Chapter 4).
- Ensure the pump is being used for its intended purpose (see section 2.1).
- Avoid any improper use of the pump (see section 2.2).
- Note the safety instructions in Chapter 3.
- i** If the lines are blocked lines a diaphragm pump can build up higher pressures than the maximum allowed limits which can either damage the pump or system.

i If it is possible that pressures in excess to the limits can occur it is important to take the necessary measures, e.g. a pressure relief valve or pressure sensor.

For further assistance contact your local KNF specialist.

i Never apply positive pressure to the suction side of the pump. A small positive pressure of less than 0.5 m water column will cause the pump to block flow in the pumping direction. On the application of any higher pressures than this, the pump will allow the fluid to pass through in the pumping direction. This can be prevented by using a suitable check / pressure valve* on the outlet side of the pump.

* e.g. Pressure Control Valve FDV30 from KNF Flodos

7.2. Operating controls

- 1 STOP button
- 2 START button
- 3 Display
- 4 Control knob

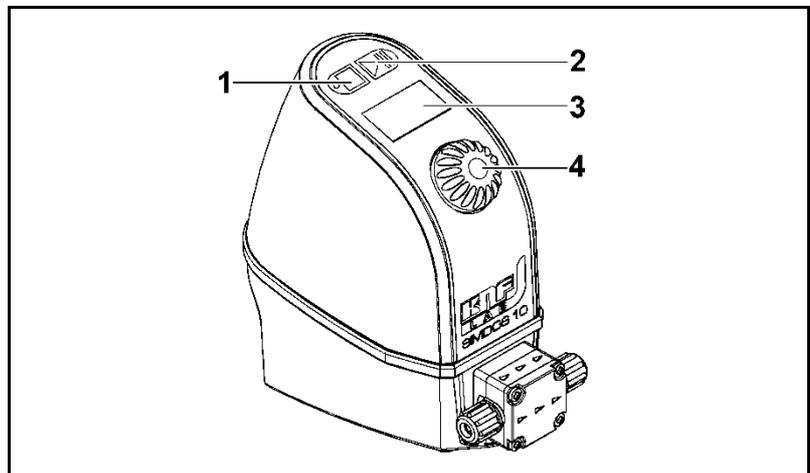


Fig. 15: Operating controls

7.3. Main display

The main display shows the principal pump settings.

- 1 Specified flow
- 2 Flow unit
- 3 Time counter
- 4 Volumeter
- 5 External drive
- 6 Autostart
- 7 Analogue input
- 8 Digital input 1
- 9 Digital input 2
- 10 Operating condition display

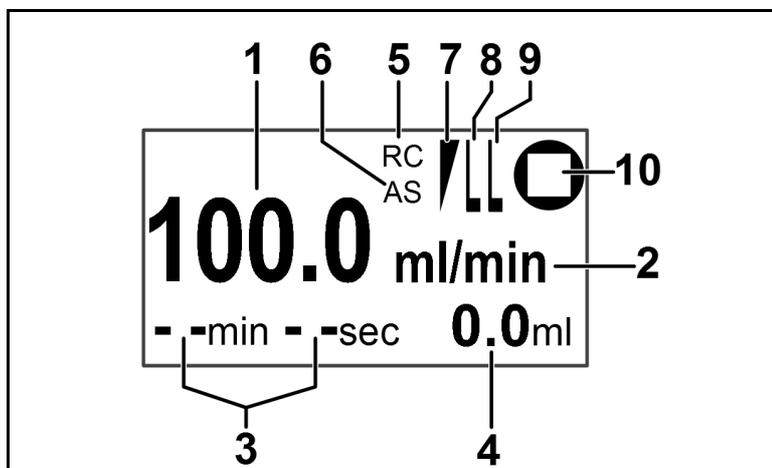


Fig. 16: Main display

Specified flow and unit	Displays the set flow rate (1) if the unit (2) has been set on "ml/min". Displays the metering volume (1) if the unit (2) has been set on "ml".
Time counter	Displays the pump running time. <ul style="list-style-type: none"> ▪ Upward count (3) if no timeout has been programmed. Elapsed time display. ▪ Downward count (3) if a timeout (metering) has been programmed. Time remaining display.
Volume meter	Display of delivery volume (4) since last pump start-up.
External drive	Displays whether pump external drive has been activated, and the external drive condition (5, 7, 8, 9).
Auto start	Displays whether pump has been set on Autostart (6).
Operating condition	Displays whether the pump is operating, stopped or paused (10).

7.4. Switching the pump on and off

The default setting is for the pump to remain off when the mains power supply is switched on.

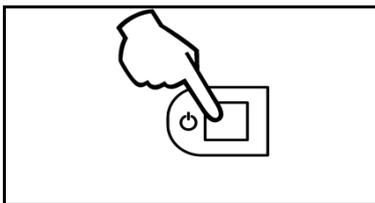


Fig. 17: Switching the pump on

Switch on

- ➔ Briefly press the "STOP" button – the pump will switch on.
The display lights up, and the pump is ready for use.

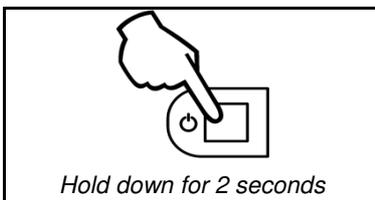


Fig. 18: Switching the pump off

Switch off

- ➔ Hold the "STOP" button down for at least 2 seconds.
The pump will now switch off completely.

Standby

- i** When the pump is stopped, after ten minutes without any user input the device switches into standby condition (display goes dark).
However, the pump is still ready for use immediately when required.
- ➔ Press "STOP" or any other key to reactivate the pump from standby condition.
- ➔ The external drive reactivates the pump from standby as soon as a control signal is present.

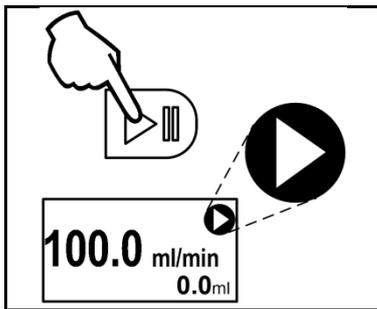


Fig. 19: Starting the pump

7.5. Starting the pump

➔ Press the “START” button.

The unit will begin pumping. The triangle symbol will appear in the display.

i An externally driven pump will start only if the external pump signals allow a pump start-up (see Chapter 8).

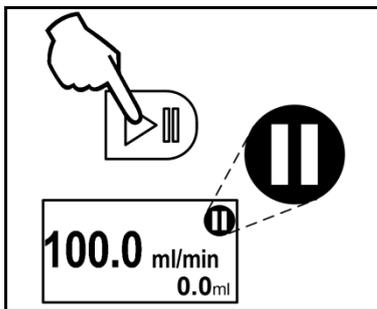


Fig. 20: Interrupting a pumping operation

7.6. Interrupting a pumping operation

➔ Press the “START” button.

The pumping operation is interrupted. The pause symbol will appear in the display.

i When the pump is restarted from “Pause” condition, the interrupted pumping operation is continued.

i When in “Pause” condition, the pump responds to external control signals.

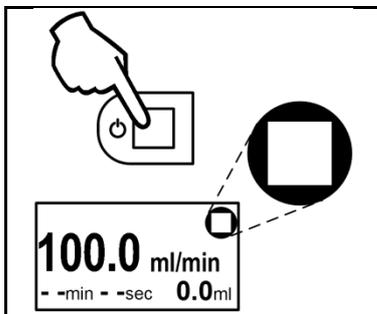


Fig. 21: Stopping the pumping operation

7.7. Stopping the pumping operation

➔ Press the “STOP” button,

The pumping operation is interrupted. The pause symbol will appear in the display.

➔ Press the “STOP” button again.

The pump will now switch to “Stop” condition, and reset the time counter and volumeter.

i The first time the user presses the “STOP” button puts the working pump into Pause condition.

The pump goes into “Stop” condition only when the “STOP” button is pressed for the second time.

Master Stop

Stopping the pump with the “STOP” button is called a “master stop”. The pump can then only be restarted manually.

i For a pump operated by external signals, the master stop first has to be manually cancelled by pressing the “START” button.

i A reset at digital input 2 cancels the master stop, and the pump can then be started externally.

7.8. Entering settings

- ➔ Turn the control knob to move the display up or down.

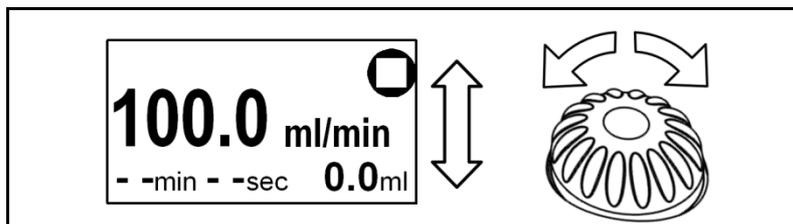


Fig. 22: Moving the operating menu up/down

- ➔ The lines in the middle of the display are enclosed in a frame, and can now be selected with the control knob.

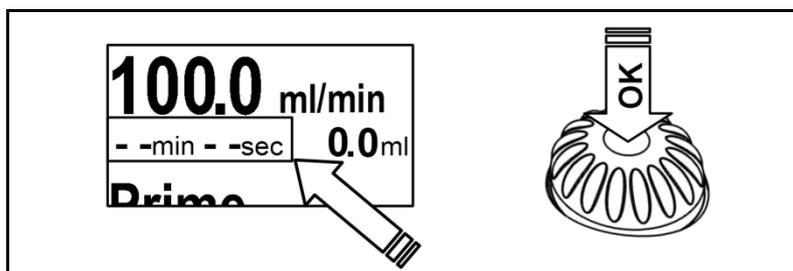


Fig. 23: Select the framed lines by pressing the control knob.

- ➔ The selected settings are marked with an inverted display. Now turn the control knob to change the value as required.

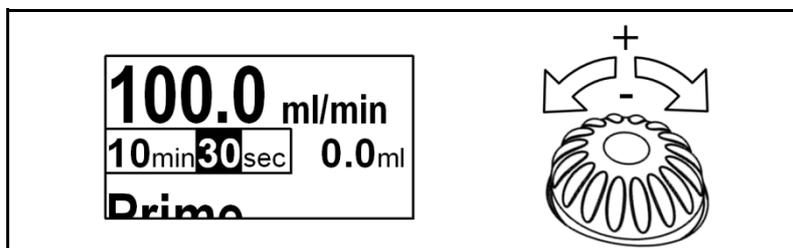


Fig. 24: Inverted display of editable values

- ➔ Press on the control knob to confirm your input, and move to the next value in the same line, if any.

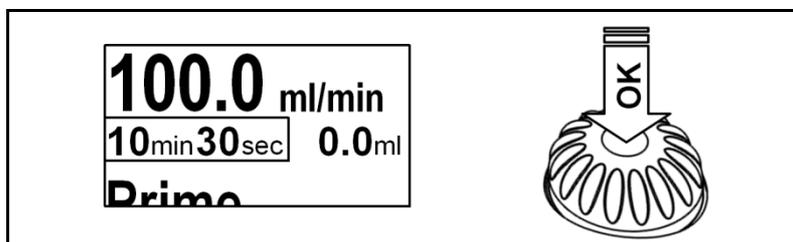


Fig. 25: Confirming the setting value by pressing the control knob

Ending the setting operation:

- ➔ Keep pressing the control knob until no values are selected (values marked with inverted display). Then turn the control knob until the main display can be seen at the top of the operating menu.
- ➔ Press the "STOP" button: this ends the input operation, and the display switches back to the main display.
- i** The pump will stop when this operation is carried out.
- ➔ Press the "START" button: this ends the input operation, and the display switches back to the main display.
- i** The pump starts when this operation is carried out.
- ➔ After a period of 10 seconds with no settings entered, the pump terminates the input operation and automatically returns to the main display.
- i** The input value is now accepted.

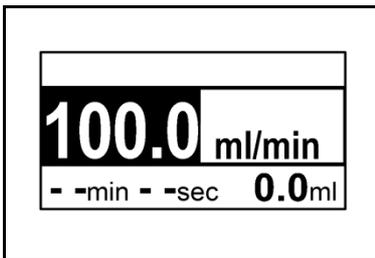


Fig. 26: Specified flow

7.9. Specified flow

The specified flow function is used to set the desired flow rate or metering volume.

Input	Unit	Setting range
Flow rate	Millilitres per minute [ml/min]	1.0–100.0
Metering volume	Millilitres [ml]	1.0–1,000.0

Tab. 13: Specified flow

- i** To ensure precise results, it is necessary to calibrate the pump (see section 7.14).
- i** The “Visk100cSt” and “Visk500cSt” fluid type settings reduce the flow rate values available for selection (see section 7.14).

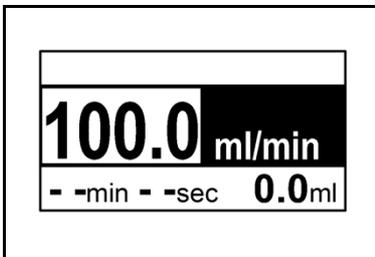


Fig. 27: Flow unit

7.10. Flow unit

Switch from a specified flow rate [ml/min] to a specified metering volume [ml] by changing the unit.

- i** When millilitres [ml] are set as the unit for a metered volume, it is also necessary to program the time counter. The system automatically sets the shortest possible time with the maximum flow rate.

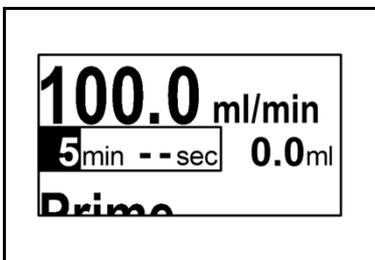


Fig. 28: Time setting in minutes

7.11. Timeout with time counter

Use the time counter to terminate flow after the time shown on the counter.

The metering operation is automatically calculated so that the required metering volume will have been reached on expiry of the time entered on the time counter.

Input	Meaning	Setting range
- - min - - sec	Timeout not active	- -
mm min ss sec	Timeout active	1sec – 99h 59min

Tab. 14: Timeout

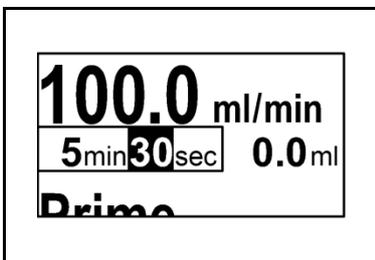


Fig. 29: Time setting in seconds

- i** When millilitres [ml] are entered for the metering of a given volume, the permitted setting range for the time counter is restricted so that the flow rate will not be below or above the permitted flow rate for the pump.
- i** If millilitres [ml] have been entered, the time counter cannot be deactivated. The setting [- - min - - sec] is not possible.
- i** If millilitres per minute [ml/min] have been set, the time counter can be switched to the hours and minutes area. To do this, set the minute setting to more than 59 min.

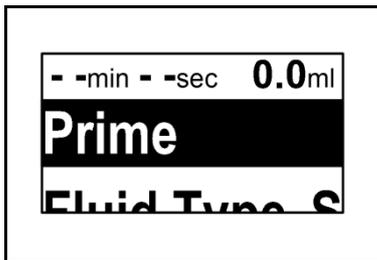


Fig. 30: Priming

7.12. Priming

This function is for rapidly priming and emptying the pump head and lines.

- ➔ Press the control knob and hold in place for the duration of the priming/emptying operation. The pump will run at a higher speed during this time.



- i** The priming function interrupts a metering operation that is currently in progress.

7.13. Fluid type

The fluid type setting is used to adjust the pump characteristic curve for different types of fluid.

- ➔ Select "Fluid Type" to enter the selection menu.
- ➔ The letter at the right end of the line identifies the currently active characteristic curve.
- ➔ The following settings are available for selection:

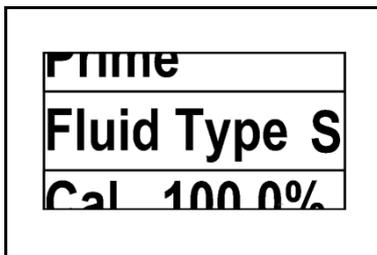


Fig. 31: Fluid type

Standard

Symbol: S

This is the optimum setting for all media with a viscosity similar to that of water. A uniform flow characteristic curve is obtained with short suction times and appropriate linearisation.

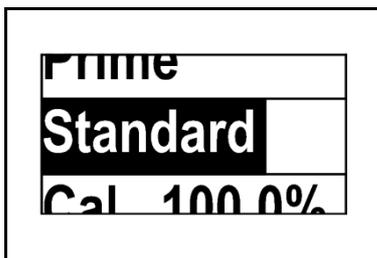


Fig. 32: "Standard" fluid type

Degassing

Symbol: D

This is the appropriate setting for media with a low boiling temperature, since these media are sensitive to any pressure drop and deceleration phenomena.

- i** The pump suction rate is reduced.
- i** The pumping characteristic curve limits fluid acceleration and deceleration to the maximum extent possible.

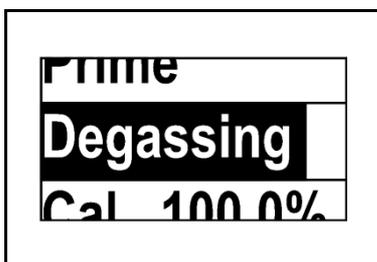


Fig. 33: "Gas-forming" fluid type

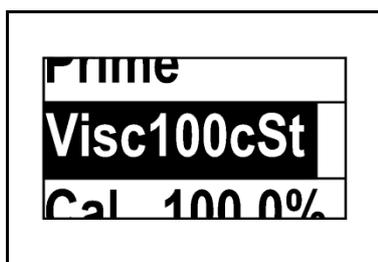


Fig. 34: "Visk100cSt" fluid type

Viscosity up to 100 cSt

Symbol: V

This setting is for media with a viscosity up to approx. 100 cSt.

- i** The pump suction rate is reduced.
- i** The maximum flow rate is limited to 50 ml/min.

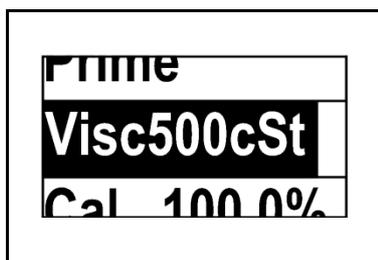


Fig. 35: "Visk500cSt" fluid type

Viscosity up to 500 cSt

Symbol: H

This setting is for media with a viscosity up to approx. 500 cSt.

- i** The pump suction rate is significantly reduced.
- i** The maximum flow rate is limited to 20 ml/min.

7.14. Calibration

The pump has already been precisely adjusted in the factory (see section 4.3).

However, the device can operate even more accurately if it is properly calibrated. Calibration eliminates any variances caused by supply lines, back-pressure and viscosity.

- i** The calibration function uses the specified flow setting as the target value. This means the pump can always be calibrated for the current operating point.

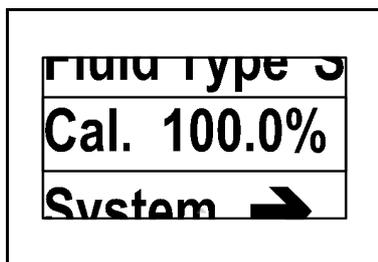


Fig. 36: Calibration

To calibrate the pump

1. Take an accurate measurement of the flow rate or metering volume.
2. Use the control knob to make the required menu selection [Cal. 100.0%].
3. Input the measured actual value with the control knob and confirm.
4. Check the calibration with a repeat measurement.

- i** If the target flow rate is still not achieved after several calibration attempts (see Chapter 10).
- i** Calibration can be used to increase or decrease the pump flow rate by up to 20%.

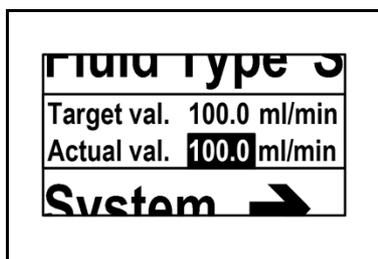


Fig. 37: Inputting the calibration actual value

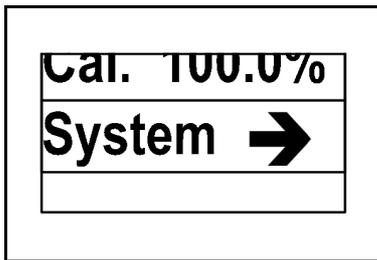


Fig. 38: System menu

7.15. System settings

Select "System" to bring up a second menu list for the entry of further pump settings.

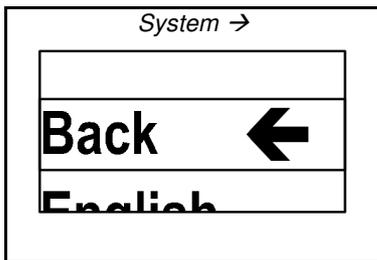


Fig. 39: Back to main menu

7.16. Back to main menu

Click on "Back" to return to the main menu for entering pump default settings.

Other options for returning to the main display are as follows:

➔ Press the "STOP" button: this ends the input operation, and the display switches back to the main display.

i The pump will stop when this operation is carried out.

➔ Press the "START" button: this ends the input operation, and the display switches back to the main display.

i The pump starts when this operation is carried out.

➔ Wait for 10 seconds without entering any inputs. This ends the input operation, and the pump switches back to the main display.

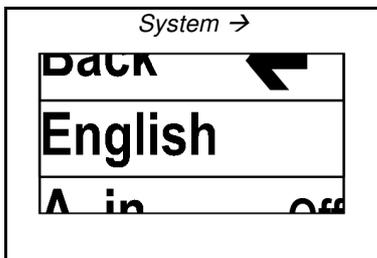


Fig. 40: Language selection

7.17. Language setting

The language setting operation selects the required language for the operating menu.

7.18. Auto start

The “Auto start” setting defines the process for switching on the pump.

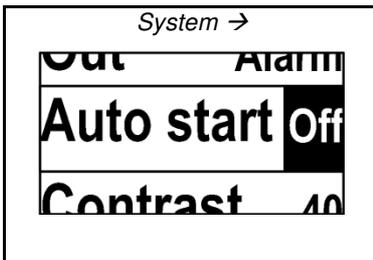


Fig. 41: Autostart

Input	Meaning
Off	Pump does not start automatically when the power supply to the pump is switched on.
On	Pump starts automatically when the power supply to the pump is switched on.

Tab. 15: Autostart

When the “Autostart” option is on, this is indicated in the main display with the “AS” symbol (see Fig. 43).



Fig. 42: Autostart symbol in display



CAUTION

If Autostart is on, the pump will start operating as soon as the power supply is switched on.

There is a potential risk of injuries or damage to equipment from media spillages if the pump is activated without warning.

- ➔ Activate the Autostart option only when equipment is ready for use.
- ➔ Clearly identify the fact that the Autostart option for the pump has been activated.
- ➔ Before start-up, check that hoses and equipment are tight-sealed and correctly connected.

Autostart and external drive

If you want the pump to respond automatically to external signals as soon as the power supply is switched on, you may activate the Autostart option.

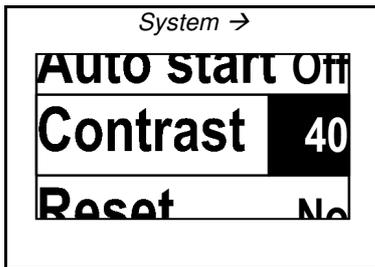


Fig. 43: Contrast

7.19. Contrast

This refers to the contrast setting for the display. Adjust the contrast if the display is poorly legible.

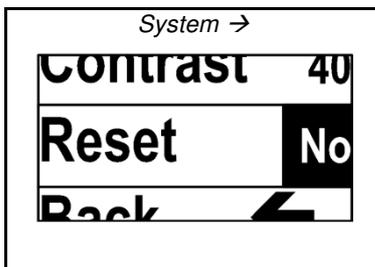


Fig. 44: Reset

7.20. Reset

The "Reset" function is used to reset the pump to its factory settings.

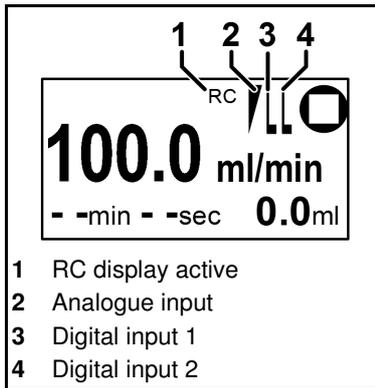
Input	Meaning
No	No reset
Yes	Pump is reset to its factory settings
Code	No function

Tab. 16: Reset

i The reset function will restore the following settings:

Value	Setting = factory setting
Flow rate [ml/min]	10.0
Unit	ml/min
Time counter	Off --min -- sec
Fluid type	Standard
Calibration	100%
Language	English
Analogue input	Off
Digital input 1	Off
Digital input 2	Off
Digital output	Alarm
Autostart	Off
Contrast	40

Tab. 17: Reset factory settings



- 1 RC display active
- 2 Analogue input
- 3 Digital input 1
- 4 Digital input 2

Fig. 45: RC main display

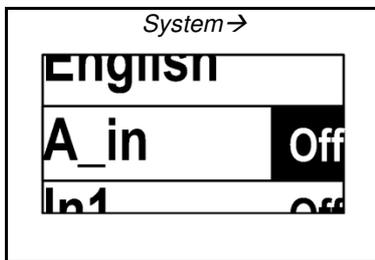


Fig. 46: Analogue input

8. RC version – external drive

i External drive functions are available only in the RC version. Connection details and technical data are provided in sections 4.7 and 6.3.

When external drive is activated, this is indicated in the main display with the “RC” (1) symbol (see Fig. 46).

According to the inputs activated, the display also shows symbols for analogue input (2), digital input 1 (3) and digital input 2 (4).

8.1. External drive analogue input

The analogue input can be used to externally specify a pump flow rate from 1% to 100%.

- ➔ When the analogue input is active, the pump can be started only if a valid analogue signal is present.
- i** The analogue input can be activated only if the pump has been set to ml/min.
- i** The time counter is deactivated. Manual time counter inputs are blocked.
- i** Manual flow metering volume inputs are blocked.

Control signals

Input	Meaning	Signal
Off	Analogue input not active	- -
0–10 V	Voltage control [V]	0.1–10
4–20 mA	Current control [mA]	4–20
0–20 mA	Current control [mA]	0.2–20

Tab. 18: Analogue input options

On/off thresholds

Input	On threshold	Off threshold
0–10 V	0.1 V	0.09 V
4–20 mA	4 mA	3.9 mA
0–20 mA	0.2 mA	0.18 mA

Tab. 19: On/off thresholds

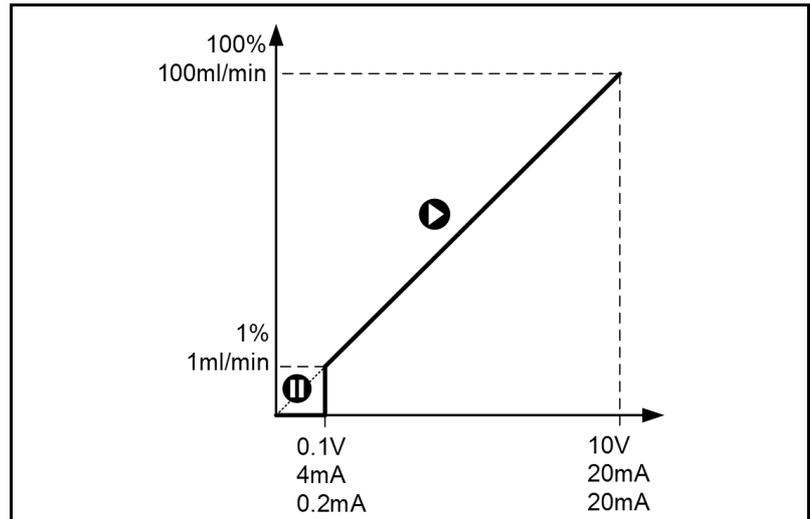


Fig. 47: Analogue input

START/STOP analogue signal

Starting and stopping the pump with an analogue signal

1. Set the analogue input to the correct signal type.
2. Press “START” – the pump goes into “Pause” mode.
3. Apply analogue signal. The pump now starts operating, and goes into “Run” condition.
4. Reduce analogue signal to below off threshold – the pump stops and goes into “Pause” condition.

i After the pump has been stopped, there is a pause time of 0.2 seconds before it can be restarted.

Master Stop

Stopping the pump with the “STOP” button is called a “master stop”. The pump can then only be restarted manually (see section 7.7).

i Master Stop is activated on the pump when supplied. For initial start-up with external drive, it is therefore essential to press “START” once to cancel the Master Stop condition.

i For an external restart after a power cut, use Autostart (see section 7.18) or Reset on digital input 2 (see section 8.3).

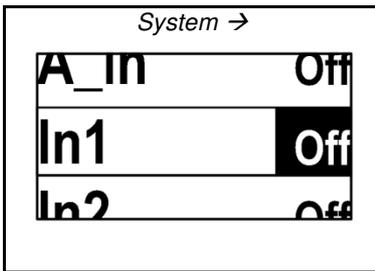


Fig. 48: Digital input 1

8.2. Digital input 1, Start/Stop

The pump can be externally started and stopped via digital input 1.

➔ If digital input 1 is active, the pump can be started only via the digital input.

➔ If analogue control is also set, a valid analogue signal must be present.

Control signals

Input	Meaning	Signal
Off	Digital input 1 not active	- -
Level	Start/Stop according to signal level	< 0.8 V = On > 2.0 V = Off
Pulse	Start/Stop on signal pulse	< 0.8 V = On > 2.0 V = Off

Tab. 20: Digital input 1 options

i After the pump has been stopped, there is a pause time of 0.2 seconds before it can be restarted.

i No pulses with a pulse duration of less than 0.1 seconds may be used.

i The use of debounced switches is recommended.

START/STOP in “Pump ml/min without timeout” condition

Start/Stop level

1. Set digital input 1 “In_1” to Level.
2. Press “START” – the pump goes into “Pause” condition.
3. Apply signal 1. The pump will start to operate if the level is below 0.8 V, and stop if it is above 2.0 V.

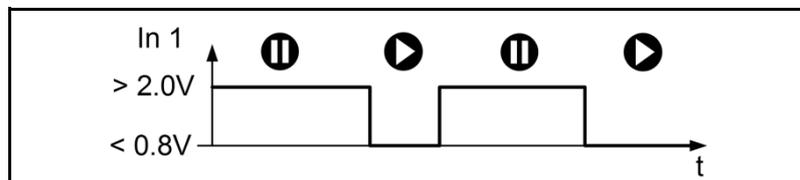


Fig. 49: Level-based Start/Stop control

Start/Stop pulse

1. Set digital input 1 “In_1” to Pulse.
2. Press “START” – the pump goes into “Pause” condition.
3. Apply signal 1. The pump will start to operate when a pulse of less than 0.8 V is generated, and stop on the next pulse of more than 2.0 V.

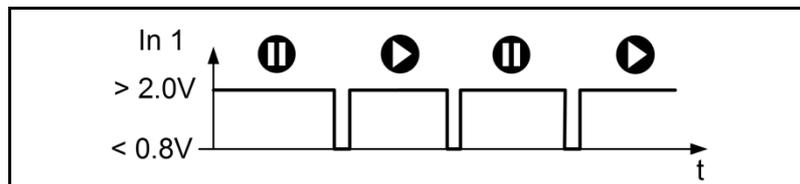


Fig. 50: Pulse-based Start/Stop control

Start/Stop level with timeout

Start/Stop level with timeout

1. Set digital input 1 “In_1” to Level.
2. Press “START” – the pump goes into “Pause” condition.
3. Apply signal 1. The pump will start to operate when the level is connected to ground, and stop when the set time has expired.

i If the pump time counter has been activated, the pump cannot then be stopped with digital input 1. This input functions only for starting the pump.

i To stop the pump, use digital input 2, “Reset” (see section 7.20).

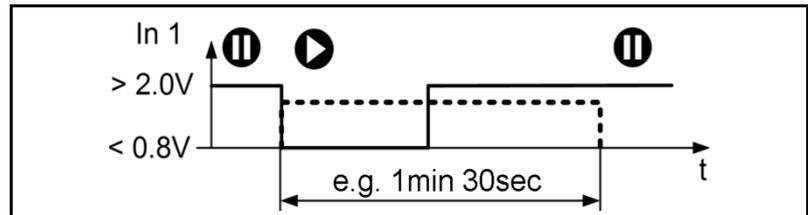


Fig. 51: Start ml/min with time counter level control

Start/Stop pulse with timeout

1. Set digital input 1 “In_1” to Pulse.
2. Press “START” – the pump goes into “Pause” condition.
3. Apply signal 1. The pump will start to operate when a pulse to ground is generated, and stop when the set time has expired.

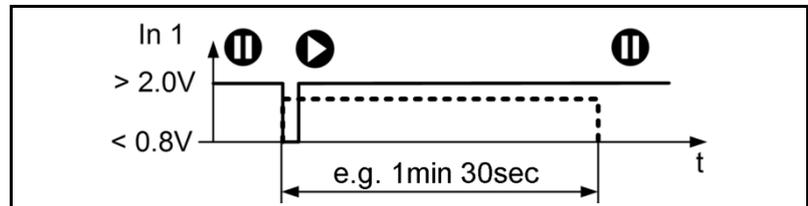


Fig. 52: Start ml/min with time counter pulse control

i If the pump time counter has been activated, the pump cannot then be stopped with digital input 1. This input functions only for starting the pump.

i To stop the pump, use digital input 2, “Reset” (see section 7.20).

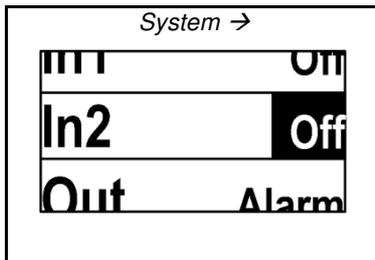


Fig. 53: Digital input 2

8.3. Digital input 2, Reset/Prime/Pedal switch

Digital input 2 can be used for an externally activated error reset or fluid system priming operation.

The option Level and Impulse have the same function as the „Digital Input 1“ which is mainly for use with the footswitch # 155872.

Control signals

Input	Meaning	Signal
Off	Digital input 2 not active	- -
Reset	Reset of pump errors and cancel metering with time counter	< 0.8 V = Reset
Priming	Rapid priming of pump head and lines (see section 7.12)	< 0.8 V = Prime
Combined	Reset of pump errors and cancel metering with time counter, then prime	< 0.8 V reset for falling signal edge Prime after 1 second < 0.8 V
Level	Start/Stop according to signal level	< 0.8 V = On > 2.0 V = Off
Pulse	Start/Stop on signal pulse	< 0.8 V = On > 2.0 V = Off

Tab. 21: Digital input 2 options

Digital input 2, Reset

Reset The “Reset” setting activates the following functions on application of a signal to digital input 2:

- ➔ Interrupt a metering process
- ➔ Reset pump errors
- ➔ Deletion of an active Master Stop (see section 7.7), pump is now in “Pause” operation condition, and responds to external control signals.

Digital input 2, Prime

Priming The “Prime” setting activates the following functions on application of a signal to digital input 2:

- ➔ Interrupt a metering process
- ➔ Reset pump errors
- ➔ Pump runs in high-speed “Prime” mode for the duration of the signal.
- ➔ Deletion of an active Master Stop (see section 7.7), pump is now in “Pause” operation condition, and responds to external control signals.

Digital input 2, Combined

Combined

The “Combined” setting activates the following functions on application of a signal to digital input 2:

- ➔ Interrupt a metering process
- ➔ Reset of pump errors on signal edge
- ➔ If the signal is applied for longer than 1 second, the pump will operate in “Prime” at high speed for the duration of the signal.
- ➔ Deletion of an active Master Stop (see section 7.7), pump is now in “Pause” operation condition, and responds to external control signals.

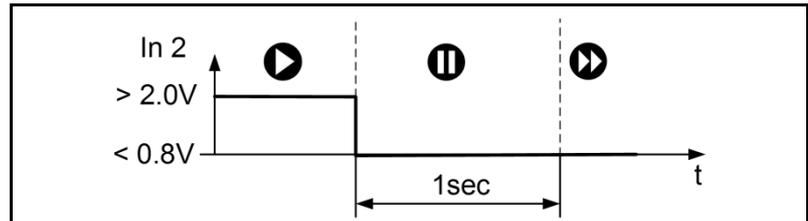


Fig. 54: Combined function sequence

Start/Stop level

START / STOP with footswitch via Level

4. Adjust Digital Input 2 „In_2“ to Level.
 5. Connect the footswitch to the pump.
 6. Press the „START“ button - pump changes status to „Pause“.
- ➔ As long as the footswitch is pressed the pump will run.

i When the Timer is switched on the pump will complete an entire dosing cycle.

Start/Stop pulse

START / STOP with footswitch via Impulse

7. Adjust Digital Input 2 „In_2“ to Impulse.
 8. Connect the footswitch to the pump.
 9. Press the „START“ button - pump changes status to “Pause“.
- ➔ Every time the footswitch is activated the pump turns on or off.

i When the Timer is switched on the pump will complete an entire dosing cycle.

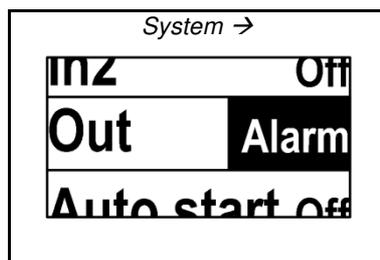


Fig. 55: Digital output

8.4. Digital output

The digital output can be used to feed back a number of messages to the control system.

The output is an open collector output (see section 4.6).

Output signals

Input	Meaning	Signal
Alarm	Pump error signal	Level
Motor	Signal when pump motor running	Level
Vol.End	Signal when volume metering ends	Level
Mot.Pul.	10 pulses per revolution of the pump motor	Pulse
Vol.Pul.	One pulse per 100 µl of pumped fluid	Pulse

Tab. 22: Digital output options

9. Maintenance

9.1. Maintenance plan

Component	Maintenance interval
Pump	Regular inspections for external damage or leaks.
Pump head	Clean if flow rate deteriorates, pump fails to create vacuum or will not run. Replace parts if necessary (see Chapter 11).
Pump diaphragm	<ul style="list-style-type: none"> - Change the diaphragm after 1000 hours of use. - Change the diaphragm if the flow rate changes or the pump leaks. - After changing the head parts several times it is advisable to replace the diaphragm.
Intake filter (accessory)	Change if soiled.

Tab. 23: Maintenance plan

9.2. Cleaning

Flushing the pump

- ➔ When pumping aggressive media, KNF recommends flushing the pump with a neutral fluid under atmospheric conditions for a few minutes before switching off, to extend the service life of valves and diaphragm.

Cleaning the pump

- ➔ Wipe the outside of the pump with a soft dry cloth. Ensure that any cleaning solvents used will not damage the materials of the pump head and crankcase housing (check material resistance properties).

Cleaning the pump head

- i** The pump head should be cleaned only if the pump is no longer working properly (no suction, inadequate flow rate or reverse suction of the pumped medium), or if the pump head cannot be cleaned satisfactorily by flushing.
- ➔ Remove pump head, clean and reinstall (see section 8.3).

9.3. Cleaning/replacing valve plates and pump diaphragm

- Prior requirements
- Pump must be switched off and mains plug removed from the socket.
 - The pump must be free of any hazardous substances.
 - Hoses must be disconnected from the pump head.

Qty.	Tool/material
1	Phillips screwdriver No. 1
1	Spare parts kit (see Chapter 11)

Tab. 24: Tools/materials

- Instructions
- ➔ Always replace valve disks, valve seats and seals at the same time, to maintain satisfactory flow rate performance.



WARNING

Health risk from hazardous substances in the pump
Some pumped media involve the possibility of corrosion damage or intoxication.

➔ Use protective equipment if necessary, e.g. protective gloves, goggles.

➔ Flush pump with a neutral fluid and then pump empty.

Removing the pump head

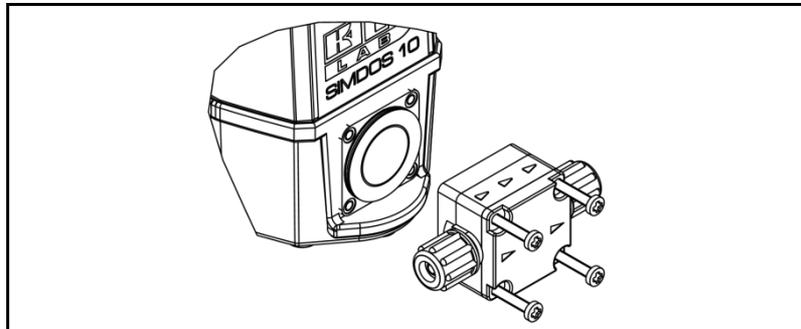


Fig. 56: Removing the pump head

- 1 Head bolt
- 2 Cover plate
- 3 Connecting plate
- 4 Sealing washer
- 5 Valve seat
- 6 O ring
- 7 Valve disk
- 8 Spacer plate

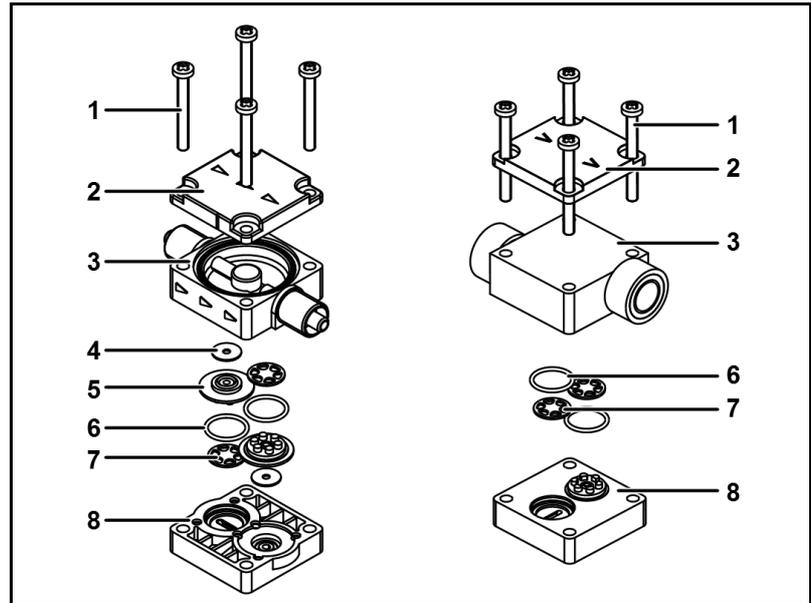


Fig. 57: Head, KT, TT

Head, FT

1. Loosen four head bolts (1) and remove pump head as a complete unit.
The pump diaphragm (12, Fig. 59) is now visible.
2. Pull apart the cover plate (2), connecting plate (3) and spacer plate (8).
3. Carefully remove the valve seats (5), remove sealing washers (4) (not present in FT head, see Fig. 57 at right), O rings (6) and valve disk (7).

Cleaning the pump head

1. Rinse connecting plate (3) and spacer plate (8) and wipe with a soft cloth. Blow dry.
 - i** Take care not to damage the sealing grooves on the spacer plate (8) at the side of the diaphragm chamber. Do not use any abrasive agents.
 - i** In PTFE pumps (FEM 1.10 FT, UFEM 1.10 FT), the valve seat is combined with the connecting plate and spacer plate. Do not use any hard materials for cleaning, rubbing or brushing the area of the valve seat. This may make the valve seat unusable.
2. Rinse the valve seats (5), blow dry and inspect for any signs of damage.
 - i** Replace any damaged valve seats. The valve seats must be in good condition for the pump to operate reliably.
3. Wash the sealing washer (4), O rings (6) and valve disk (7) with flushing agent and blow dry.
4. Wipe the pump diaphragm with a soft damp cloth.

Replacing pump diaphragm

- 9 Connecting rod
- 10 Shim ring
- 11 Support
- 12 Pump diaphragm

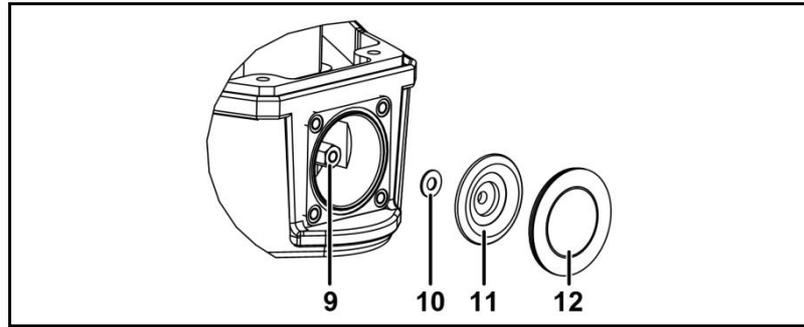


Fig. 58: Replacing the pump diaphragm

1. Grasp both sides of the pump diaphragm (12), lift it up and screw it out anti-clockwise.
2. Remove the support (11) and shim ring (10) from the threaded bolt of the diaphragm, and put aside in a safe place.
3. Inspect all parts for soiling, and clean if necessary.
4. Push the support (11) and shim ring (10), in that order, onto the threaded bolt of the new pump diaphragm (12).
5. Move up the connecting rod (9) as far as it will go.
6. Screw the pump diaphragm (12) with support (11) and shim ring (10) clockwise onto the connecting rod (9), and hand-tighten.

i Ensure that the pump diaphragm is properly screwed into position. If the pump diaphragm is not screwed in right up to the stop point, the pump may be mechanically obstructed and become damaged as a result.

Refitting the pump head

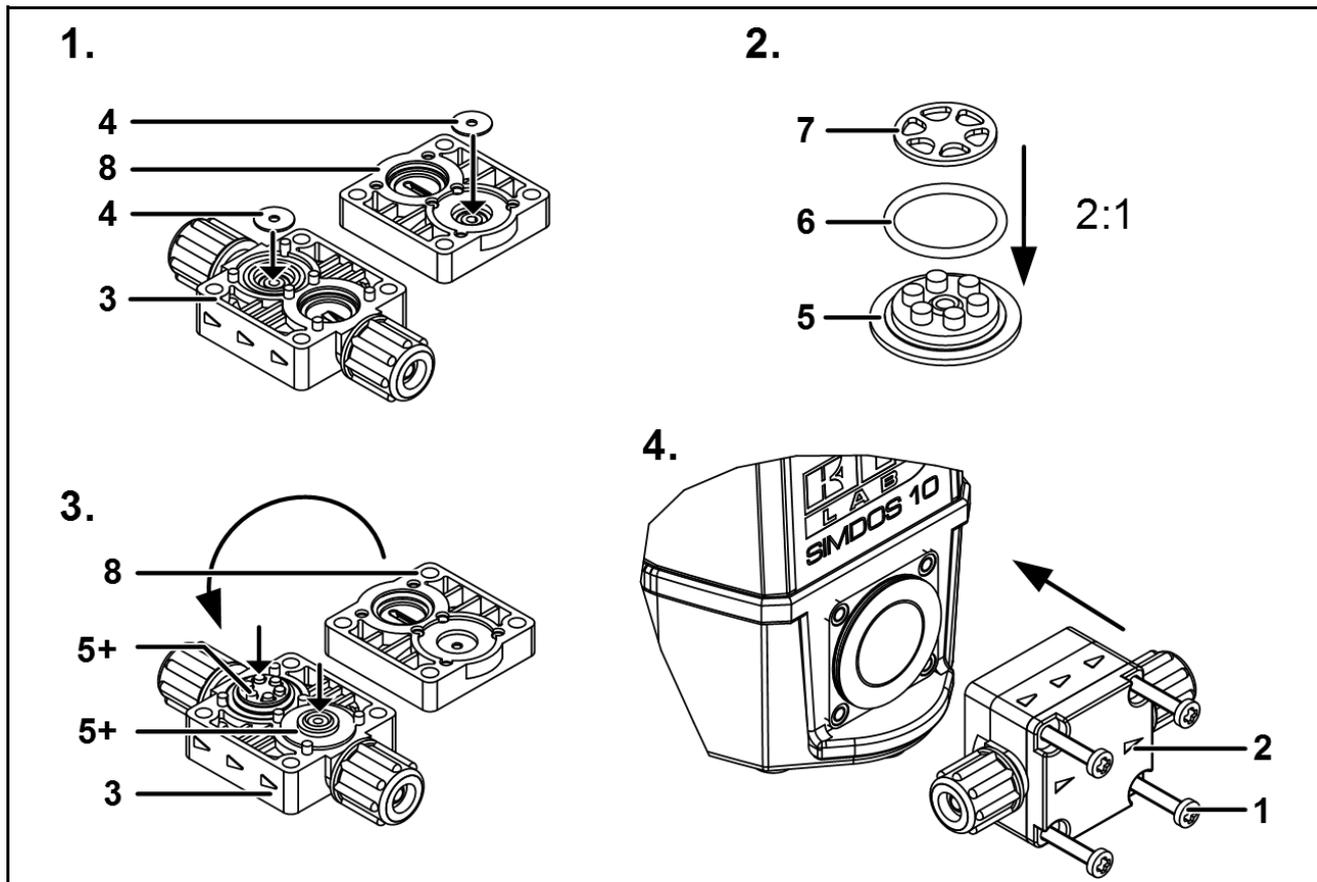


Fig. 59: Refitting the pump head

1. Place the sealing washers (4) in the appropriate recesses of the connecting plate (3) and spacer plate (8).
2. Place the O rings (6) and valve disks (7) on the valve seats (5) (see Fig. 60, middle). Check that the O rings and valve disks are correctly positioned.
3. Place the assembled valve seats (5+) to fit snugly into the connecting plate (3).

i Jammed valve seats may cause the valve to malfunction. Meticulous care is required for this assembly step.

4. Join the connecting plate (3) with the spacer plate (8), place the cover plate (2) in position over them and insert the four head bolts (1) in the threaded holes.
5. Push the assembled components onto the crankcase housing with finger pressure.
6. Fasten the pump head to the housing by tightening the 4 head bolts (1) alternately. Hand-tighten the head bolts.

i Recommended torque: max. 0.55 Nm

10. Troubleshooting

Instructions



CAUTION

Safety note

Always remove the mains plug from the socket before carrying out any work on the pump.



WARNING

Health risk from hazardous substances in the pump.

Some pumped media involve the possibility of corrosion damage or intoxication.

- ➔ Use protective equipment if necessary, e.g. protective gloves, goggles.
- ➔ Flush pump with a neutral fluid and then pump empty.

- ➔ Inspect the pump (see Tab. 25 and 26).

Pump not working	
Possible cause	Corrective action
Pump not connected to mains power supply.	➔ Connect pump to mains supply.
No mains supply.	➔ Check room fuse and switch on if necessary.
Connections or lines obstructed.	➔ Check connections and lines. ➔ Remove obstructions.
External valve closed or filter blocked.	➔ Check external valves and filters.
Worn diaphragm or valve plates / seals.	➔ Replace diaphragm and valve plates / seals (see section 9.3).
Pump overload protection has tripped.	➔ Disconnect pump from mains power supply. ➔ Allow pump to cool. ➔ Identify and eliminate cause of overheating.

Tab. 25: Pump not working

Low flow rate, pressure or vacuum	
Pump output not in accordance with technical data or performance specifications in data sheet.	
Possible cause	Corrective action
Presence of positive pressure on the pressure side with simultaneous vacuum or positive pressure on the suction side.	→ Change pressure conditions.
Cross-section of hydraulic lines or connectors too narrow or constricted.	→ Disconnect the pump from the system and determine output values. → Remove constriction (e.g. valve) if necessary. If applicable, use larger-diameter lines or connectors.
Leaks in connections, lines or pump head.	→ Eliminate leaks.
Connections or lines completely or partially obstructed.	→ Check connections and lines. → Remove any parts or particles causing blockages.
Soiled pump head components.	→ Clean head components.
Worn diaphragm or valve plates / seals.	→ Replace diaphragm and valve plates / seals (see section 9.3).
Materials chemically damaged by pumped media.	→ Select suitable resistant material type (see section 11.1).

Tab. 26: Low flow rate, pressure or vacuum

Fault cannot be rectified

If you are unable to identify any of the above causes, please send the pump to KNF customer services (see address on last page)

1. Flush the pump to clear the pump head of any hazardous or aggressive fluids (see section 9.2.1).
2. Dismantle the pump.
3. Clean the pump (see section 9.2.2).
4. Send the pump, with completed decontamination statement (see Chapter 12), to KNF customer services, stating the nature of the pumped medium.

11. Spare parts and accessories

11.1. Spare parts

Spare part	Order No.
SIMDOS spare parts kit, valves and seals, all versions	160186
SIMDOS spare parts kit, KT head	160187
SIMDOS spare parts kit, TT head	160188
SIMDOS spare parts kit, FT head, FEM	160189
SIMDOS spare parts kit, KT head, UFEM	160190
SIMDOS spare parts kit, TT head, UFEM	160191
SIMDOS spare parts kit, FT head, UFEM	160632

Tab. 27: Spare parts

11.2. Accessories

Hoses	Order No.
Hose, DN 4/6, PA	019490
Hose, DN 4/6, PE	019491
Hose, DN 4/6, PTFE	019241
Hose, DN 4/6, silicone	019238

Tab. 28: Accessories

Connection nipple	Order No.
INTERNAL THREAD FITTING G NPT1/8" – 4/6 – PFA	151977
INTERNAL THREAD FITTING G NPT1/8" – 1/8"/1/4" – PFA	160116
INTERNAL THREAD FITTING G UNF1/4" – 28 – 1/8"/1/4" – PP	157858
INTERNAL THREAD FITTING G UNF1/4" – 28 – 1/8"/1/4" – PVDF	157859

Tab. 29: Filter

Filter	Order No.
FILTER DN4/6 PE WHITE	150724

Tab. 30: Footswitch

Footswitch	Order No.
Footswitch Impulse LIQUIPORT	155872

Tab. 31: Fasteners

Fastener	Order No.
Stand	160474
Mounting plate	160473

12. Decontamination statement

i Provision of a customer declaration identifying the pumped media and certifying that the pump has been properly cleaned (decontamination statement) is a prerequisite for any repair work on a pump carried out by KNF.

→ Take a copy of this page.

Enter the pump model, serial No. and details of pumped media in the form below, sign and return to KNF customer services with the flushed and cleaned pump (see address on last page)

Customer's decontamination statement for repair order

We hereby confirm that the pump has been used for the following media, and that it has been properly flushed and cleaned.

Pump model	
Serial No.	
Pumped media	

There are no aggressive, biological, radioactive, toxic or other hazardous media present in the pump.

Company name

Date/signature