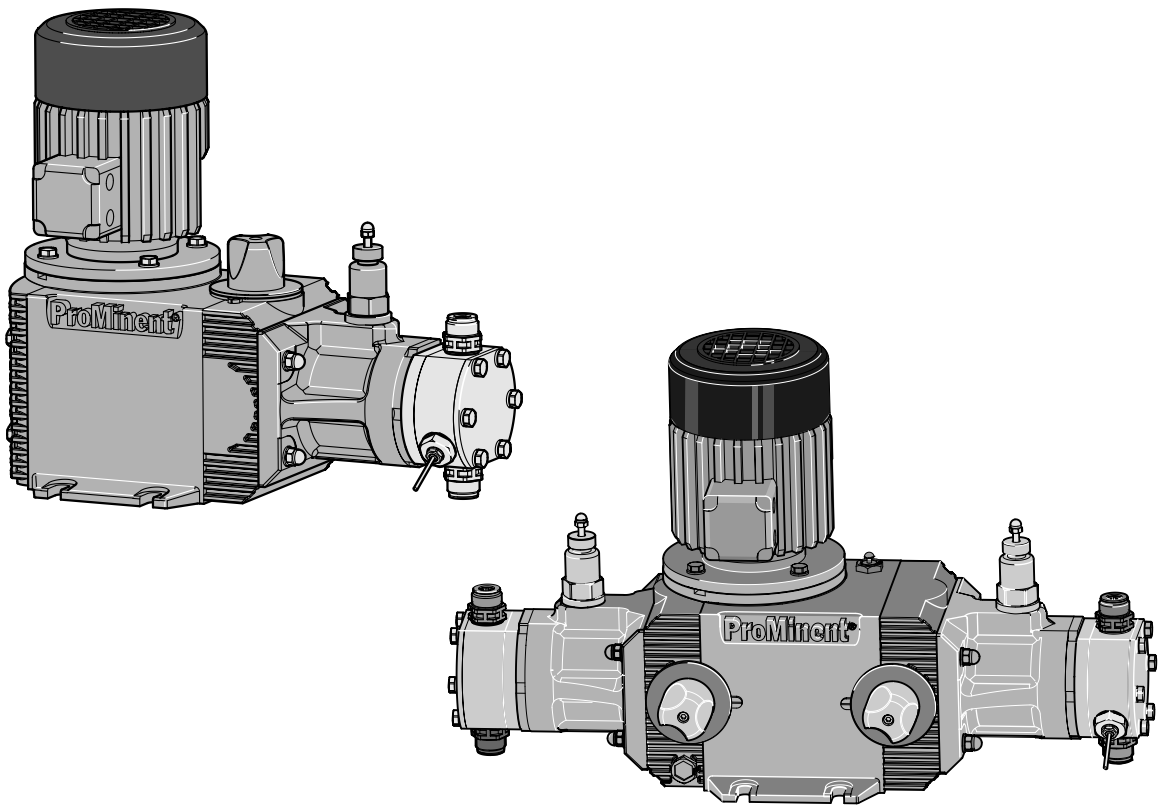


Operating Instructions

Metering Pumps

ProMinent® Hydro/ 2 and Hydro/ 3



HP2a _____

HP3a _____

Please enter identity code of the device here

Two sets of operating instructions are required for the safe and correct operation of ProMinent® Hydro metering pumps:

This product-specific Hydro operating instructions manual and the "General operating instructions ProMinent® motor-driven metering pumps and hydraulic accessories". Each is valid only when used in conjunction with the other.

**Please completely read through these operating instructions first! Do not discard!
The warranty shall be invalidated by damage caused by operating errors!**

Publishing details:

Operating Instructions Metering Pumps
ProMinent® Hydro/ 2 and Hydro/ 3
© ProMinent Dosiertechnik GmbH, 2000

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Subject to technical modifications
Printed in Germany

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Appendix	

Product identification/identity code

Please enter the identity code given on the device label into the grey boxes below.

HP2a	ProMinent® Hydro/ 2												
	H	Main drive											
	D	Main drive, Double-head version											
	E	Main drive for add on drive											
	F	Main drive, Double-head version for add-on drive											
	A	Add-on drive											
	B	Double-head version add-on drive											
		Pump type:											
		100003	100 bar, 3 litre	064007	64 bar, 7 litre	025019	25 bar, 19 litre						
		100006	100 bar, 6 litre	064015	64 bar, 15 litre	025040	25 bar, 40 litre						
		100007	100 bar, 7 litre	064018	64 bar, 18 litre	025048	25 bar, 48 litre						
		100009	100 bar, 9 litre	064022	64 bar, 22 litre	025060	25 bar, 60 litre						
		100010	100 bar, 10 litre	064025	64 bar, 25 litre	025068	25 bar, 68 litre						
		PVT max. 25 bar											
				Liquid end material:									
		SS	Stainless steel										
		PV	PVDF										
		HC	Hastelloy C										
				Seal material:									
			T	PTFE seal									
				Positive displacement element:									
			0	Standard composite diaphragm with rupture indicator									
				Liquid end version:									
			0	No valve springs (standard)									
			1	With valve springs									
			D	Double ball valve									
				Hydraulic connector:									
			0	Standard threaded connector									
			E	With DIN ISO flange									
			F	With ANSI flange									
			H	HV-Version (only for 025019-025060)									
				Version:									
			0	With ProMinent® logo									
			1	Without ProMinent® logo									
			M	Modified*									
				Electrical power supply:									
			S	3 ph, 230 V/400 V, 50/60 Hz, 0.37 kW									
			L	3 ph, 230 V/400 V, 50 Hz (Exe, Exde), 0.37 kW									
			P	3 ph, 265 V/440 V, 60 Hz (Exe, Exde), 0.37 kW									
			R	3 ph, Variable speed motor, 230 V/400 V, 0.37 kW									
			V	Variable speed motor with intrgrated SC 1 pH, 230 V, 50/60 Hz									
			Z	1 ph, Variable speed control set, 230 V, 50/60 Hz									
			3	No motor, with B 5 flange, size 71									
			4	No motor, with C 56 flange, (NEMA)									
			0	Add on drive									
				Enclosure rating:									
			0	IP 55 (standard)									
			1	Exe motor version ATEX-T3									
			2	Exde motor version ATEX-T4									
			A	ATEX power end									
				Stroke sensor:									
			0	No stroke sensor (standard)									
			1	Stroke sensor (for explosion-proof applications)									
				Stroke length adjustment:									
			0	Manual (standard)									
			1	With stroke positioning motor, 230 V/50/60 Hz									
			2	With stroke positioning motor, 115 V/60 Hz									
			A	With stroke control motor									
				0...20 mA 230 V/50/60 Hz									
			B	With stroke control motor									
				4...20 mA 230 V/50/60 Hz									
			C	With stroke control motor									
				0...20 mA 115 V/60 Hz									
			D	With stroke control motor									
				4...20 mA 115 V/60 Hz									
				Hydraulic oil:									
			0	Standard									
			1	Food products grade									
			2	Low temperature to -25 °C									
HP2a													

Product identification/identity code

Please enter the identity code given on the device label into the grey boxes below.

HP3a	ProMinent® Hydro/ 3		
	H	Main drive	
	D	Main drive, Double-head version	
	E	Main drive for add-on drive	
	F	Main drive, Double-head version for add-on drive	
	A	Add-on drive	
	B	Double-head version add-on drive	
	Pump type:		
	100010	100 bar, 10 litre	064019 64 bar, 19 litre
	100021	100 bar, 21 litre	064040 64 bar, 40 litre
	100025	100 bar, 25 litre	064048 64 bar, 48 litre
	100031	100 bar, 31 litre	064060 64 bar, 60 litre
	100035	100 bar, 35 litre	064068 64 bar, 68 litre
			025048 25 bar, 48 litre
			025100 25 bar, 100 litre
			025120 25 bar, 120 litre
			025150 25 bar, 150 litre
			025170 25 bar, 170 litre
		PVT max. 25 bar	
		Liquid end material:	
	SS	Stainless steel	
	PV	PVDF	
	HC	Hastelloy C	
		Seal material:	
	T	PTFE seal	
		Positive displacement element:	
	0	Standard composite diaphragm with rupture indicator	
		Liquid end version:	
	0	No valve springs (standard)	
	1	With valve springs	
	D	Double ball valve (only for 064019-064060)	
		Hydraulic connector:	
	0	Standard threaded connector	
	E	With DIN ISO flange	
	F	With ANSI flange	
	H	HV-Version	
		Version:	
	0	With ProMinent® logo	
	1	Without ProMinent® logo	
	M	Modified*	
		* order-related design, for pump features see paperwork for order	
		Electrical power supply:	
	S	3 ph, 230 V/400 V, 50/60 Hz, 0.75 kW	
	L	3 ph, 230 V/400 V, 50 Hz (Exe, Exde), 0.75 kW	
	P	3 ph, 265 V/440 V, 60 Hz (Exe, Exde), 0.75 kW	
	R	3 ph, variable speed motor, 230 V/400 V, 0.75 kW	
	V	Variable speed motor with integrated SC 1 pH, 230 V, 50/60 Hz	
	Z	1 ph, variable speed control set, 230 V, 50/60 Hz	
	3	No motor, with B 5 flange, size 80	
	4	No motor, with C 56 flange, (NEMA)	
	0	Add on drive	
		Enclosure rating:	
	0	IP 55 (standard)	
	1	Exe motor version ATEX-T3	
	2	Exde motor version ATEX-T4	
	A	ATEX power end	
		Stroke sensor:	
	0	No stroke sensor (standard)	
	1	Stroke sensor (for explosion-proof applications)	
		Stroke length adjustment:	
	0	Manual (Standard)	
	1	With stroke positioning motor, 230 V/50/60 Hz	
	2	With stroke positioning motor, 115 V/60 Hz	
	A	With stroke control motor 0...20 mA 230 V/50/60 Hz	
	B	With stroke control motor 4...20 mA 230 V/50/60 Hz	
	C	With stroke control motor 0...20 mA 115 V/60 Hz	
	D	With stroke control motor 4...20 mA 115 V/60 Hz	
		Hydraulic oil:	
	0	Standard	
	1	Food products grade	
	2	Low temperature to -25 °C	
HP3a			

General user instructions

Please read through the following user instructions! They will enable you to gain the maximum benefit from the operating instructions manual.

The following items are particularly highlighted in the text:

- Enumerated points
- ▶ Highlighted points

Operating instructions:

NOTE

Guidelines are intended to make your work easier.

and safety guidelines:



WARNING

Describes a potentially dangerous situation. If not avoided, could jeopardise life and cause serious injury.



CAUTION

Describes a potentially dangerous situation. If not avoided, could result in lesser injuries or damage to property.



IMPORTANT

Describes a potentially damaging situation. If not avoided, could result in damage to property.

Observe also the instructions in the “General operating instructions manual for ProMinent® motor-driven metering pumps and hydraulic accessories”!

In the event of complaint or a request for spare parts, quote the identity code and the serial number which you will find on the device label. This will enable clear identification of the pump type and material variant.

Only explosion-proof pumps: The device label attached to the title page is identical to that supplied with the pump in order to facilitate selecting the correct operating instructions manual for the pump.

1 About this pump

The ProMinent® Hydro hydraulic diaphragm metering pump HP2/HP3 is a standard sized metering pump driven by a 0.37 / 0.75 kW dual wound three phase motor. The stroke length is adjusted to 1 % reproducibility. The aluminium housing can be combined with one of 5 gear ratios, 3 liquid end sizes and 3 liquid end materials. All pump types are fitted as standard with a pre-set bypass valve integrated into the hydraulics and a multi-layer diaphragm with diaphragm-rupture signalling function. Reproducibility of metering is better than ± 1 % in a stroke length range of 20 % - 100 %.

Double-headed version The double-headed version is fitted with a second liquid end operating in counter sequence (Boxer principle). The stroke length adjustment for each liquid end is independent, allowing a different feed rate for each liquid end.

Add-on pumps The Hydro add-on pumps can be combined with a main power end and can be used either as single or double-headed versions.

2 Safety

Correct use of pump

- The pump may only be used to meter liquids.
- In explosion-threatened workplaces in zone 1, device category II 2G of explosion group II C the pump may not be operated without the corresponding rating plate (and the corresponding EC Declaration of Conformity) for pumps for explosion-threatened workplaces in accordance with guideline 94/9/EC of the European guidelines.
- The pump is not designed for use with gaseous liquids or solids.
- Pumps may never be operated in explosion-threatened workplaces without a corresponding rating plate (and the corresponding EC Declaration of Conformity) for pumps for explosion-threatened workplaces.

Correct use of bypass valve

- Not EX-pumps: The bypass valve is only designed to protect the motor and the gears from inadmissible positive pressure created by the pump.
- The bypass valve may not be used to bypass a metering stoppage while the pump is running. It is a safety component.
- The bypass valve may not be used to protect the system. It cannot protect the system.
- All other applications or modifications are prohibited.
- You must observe the instructions in this operating instructions manual and the “General operating instructions for ProMinent® metering pumps and hydraulic accessories” on assembly, installation and maintenance.
- The pump must be operated by appropriately trained and authorised personnel.

Safety guidelines



WARNING

- **EX pumps only: You must refer to the section entitled “Additional important information for dosing pumps in hazardous locations” in the “General operating instructions manual for ProMinent motor-driven dosing pumps and hydraulic accessories”!**
- **The pump starts to operate as soon as it is connected to the mains.**
Ensure that hazardous chemicals cannot leak out.
- **The pump cannot be switched off.**
In the event of power failure, detach the power cable from the power supply.
- **Detach the power cable from the power supply before working on the pump.**
- **Always depressurise the liquid end before working on the pump.**

- Always empty and rinse the liquid end before working on the pump, if used with hazardous or unknown materials.
- When working on the liquid end, wear appropriate protective equipment when metering hazardous or unknown liquids.
- Pumps must be accessible at all times for operating and maintenance purposes. Do not restrict or block access.
- Do not return pumps to ProMinent which have been used for radioactive chemicals.



CAUTION

- It is not permitted to assemble and install ProMinent® pumps using non-ProMinent parts unless approved and recommended by ProMinent. This could lead to damage or injury.
- When metering corrosive liquids, check the resistance of the pump materials (see ProMinent® resistance list in the product catalogue).
- Observe applicable national directives during installation.

Sound intensity level The sound intensity level is < 70 dB (A) in accordance with DIN EN 12639 (noise measurement of liquid pumps)

3 Storage, transport, unpacking

The pump is delivered in a wooden box. The pump is screwed to the base of the box.



IMPORTANT

The pump is filled with oil if it is supplied with a liquid end.

Ambient conditions for storage and transport:

Temperature: -10 °C to 50 °C
Air humidity: max. 95 % relative humidity, non-condensing

Shipping weight:

	Single-headed Version	Double-headed Version	Single-headed Version with Single-headed externally mounted Drive	Double-headed Version with Double-headed externally mounted Drive	Double-headed Version with Single-headed externally mounted Drive
HP2	31 kg	41 kg	59.5 kg	79.5 kg	69.5 kg
HP3	41 kg	55 kg	80 kg	108 kg	94 kg

- Unpacking*
- ▶ Lever up fixtures over the box lid and remove lid
 - ▶ Lever up eyes on the underside of the box lid
 - ▶ Jerk the walls apart to remove
 - ▶ Remove locking screws attaching pump to the base
 - ▶ Manually lift out the Hydro version with no motor and liquid end.
- Other versions:
- ▶ Check the location of the transport lugs (see diagram below)
 - ▶ Insert a lifting hook in the transport lugs
 - ▶ Lift the pump from the box base and place on an even, stable surface.

Location of lifting slings

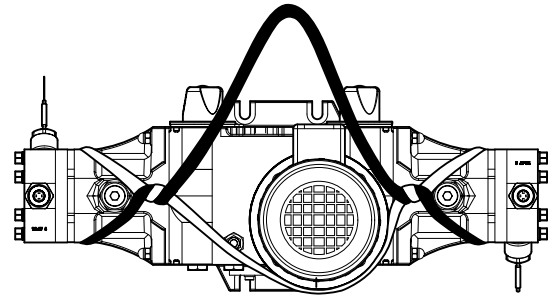
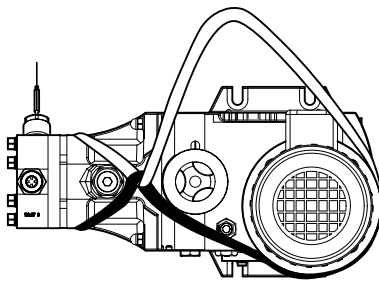
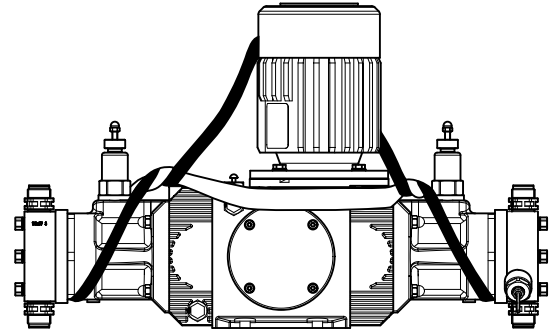
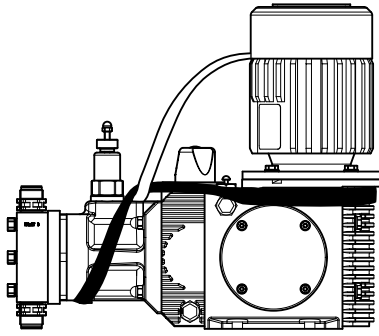


Fig.1 Single-head version with motor

Fig. 2 Double-headed version with motor

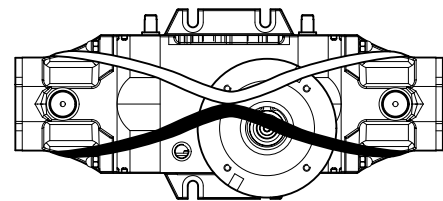
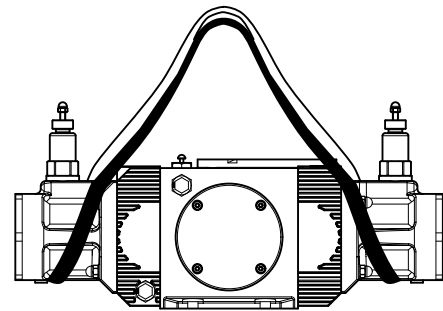


Fig. 3 Double-headed version without motor

4 Device overview/control elements

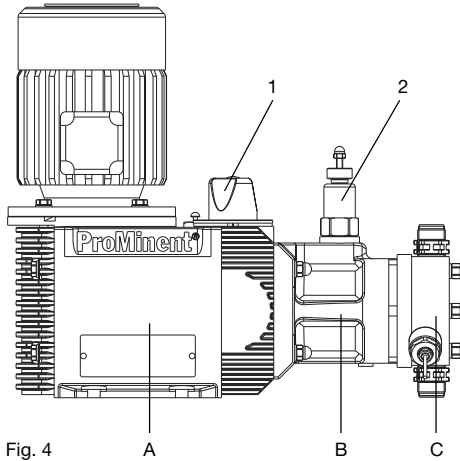


Fig. 4

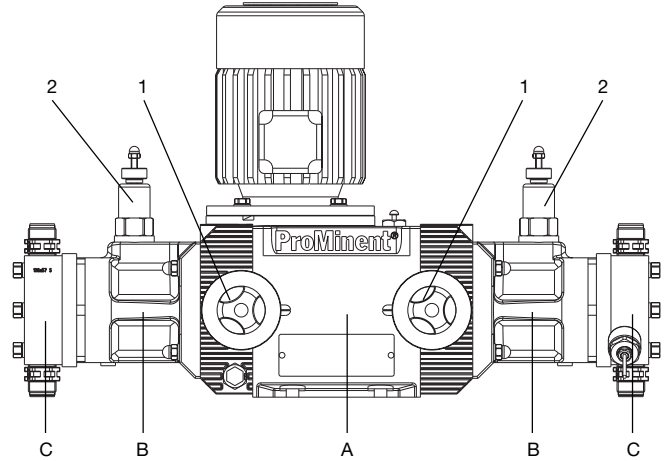


Fig. 6

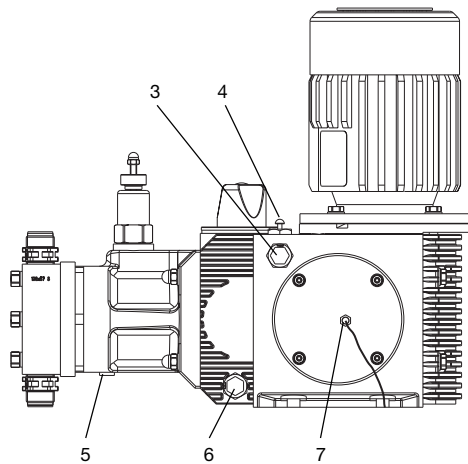


Fig. 5

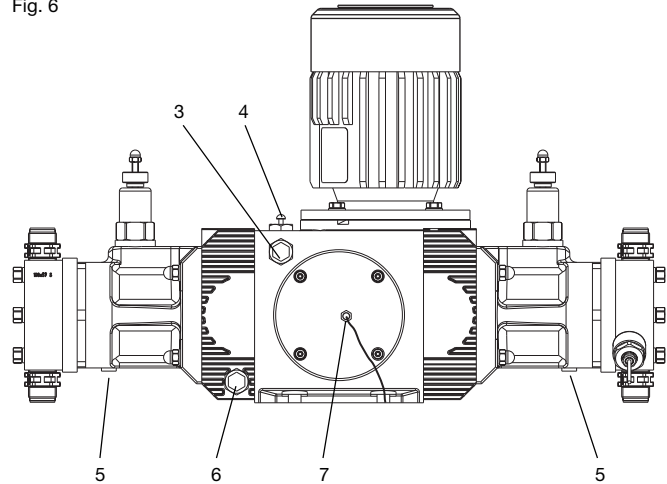


Fig. 7

A Power end
B Hydraulic end
C Liquid end

1 Stroke adjustment knob
2 Bypass valve
3 Oil inspection glass
4 Gearbox vent stopper
5 Oil drainage stopper
6 Oil drainage screw
7 Stroke sensor (optional)

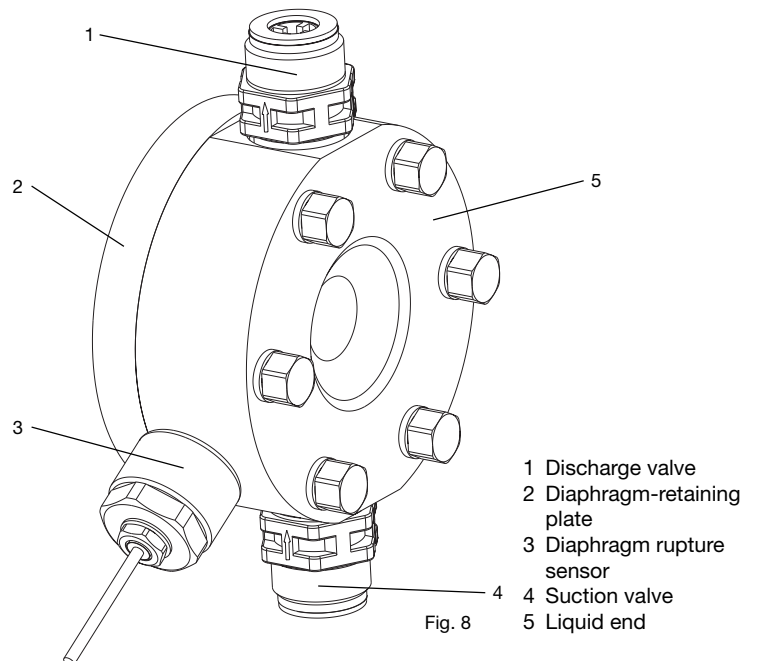


Fig. 8

1 Discharge valve
2 Diaphragm-retaining plate
3 Diaphragm rupture sensor
4 Suction valve
5 Liquid end

5 Function description

Power end function description

The Hydro pump is a motor-driven metering pump with hydraulically operated multi-layer diaphragm (7).

It works in a similar way to a conventional motor-driven pump. The motor moves the piston (4) forward via a worm gear and cam (1). As the piston (4) is not attached to the cam (1), the piston spring (6) is required to push it back into the hydraulic section.

The forward motion pushes the piston (4) into the hydraulic end and creates pressure in the hydraulic oil in the hydraulic end. As a result the hydraulic oil pushes the multi-layer diaphragm (7) into the liquid end.

The hollow bored piston (4) has so-called control borings to adjust the stroke length. The adjustable control sleeve (3) seals these borings at each discharge stroke. Depending upon the control sleeve (3) setting it seals the borings earlier or later. While the control borings are free, a discharge stroke can cause hydraulic oil to escape from the hydraulic end into the power end housing, in which case the multi-layer diaphragm is not forced into the liquid end. If the control borings are then sealed, the piston (4) can create pressure in the hydraulic end and the multi-layer diaphragm (7) is forced into the liquid end. As the hydraulic oil can escape from the hydraulic end (into the power end housing), the multi-layer diaphragm is operated to a lesser degree.

The suction stroke causes the hydraulic oil to flow out of the power end housing through the control borings and back into the hydraulic end.

For pumps with externally mounted drive, both drives work in push-pull mode.

The pump has a fixed bypass valve (5) installed in the hydraulic section. The bypass valve provides protection for the pump power end and the diaphragm if the liquid feed pressure becomes too high. If the discharge side of the liquid end becomes blocked, the bypass valve (5) opens at a pre-set pressure and allows the hydraulic oil to flow into the power end housing. The bypass valve is not guaranteed to protect the system from excess positive pressure! A bypass valve should nevertheless be fitted in the case of the EX-pump.

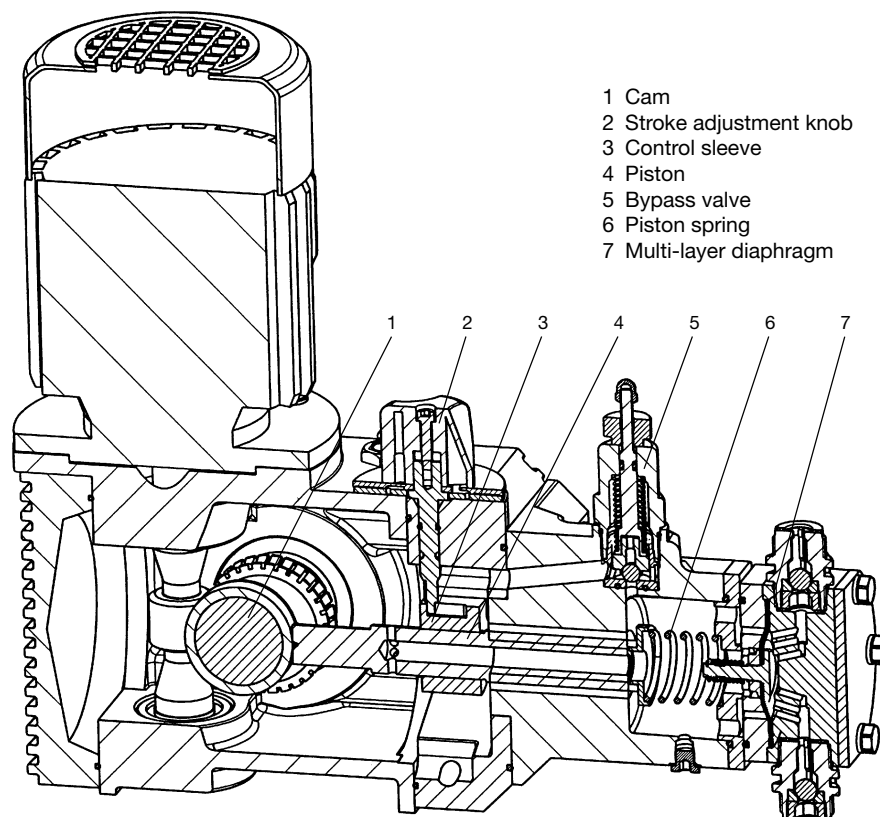


Fig. 9

Liquid end function description

The heart of the liquid end is a highly resistant multi-layer diaphragm (1). It hermetically seals the feed compartment of the metering pump and causes the displacement in the liquid end at each pump stroke. The suction valve (6) and the discharge valve (3) provide the feed in conjunction with the diaphragm action.

The diaphragm (1) is tightly stretched between the liquid end (4) and a diaphragm mounting (2).

As the diaphragm is hydraulically activated - it is not attached to the piston - it always works in balance with the pump and is therefore well suited to high feed pressures. The return to the starting position after a stroke is guaranteed by an in-built diaphragm return spring (7).

The diaphragm (1) is designed as standard as a multi-layer diaphragm. The diaphragm anchors (5) and a film of liquid join the sandwiched diaphragm layers.

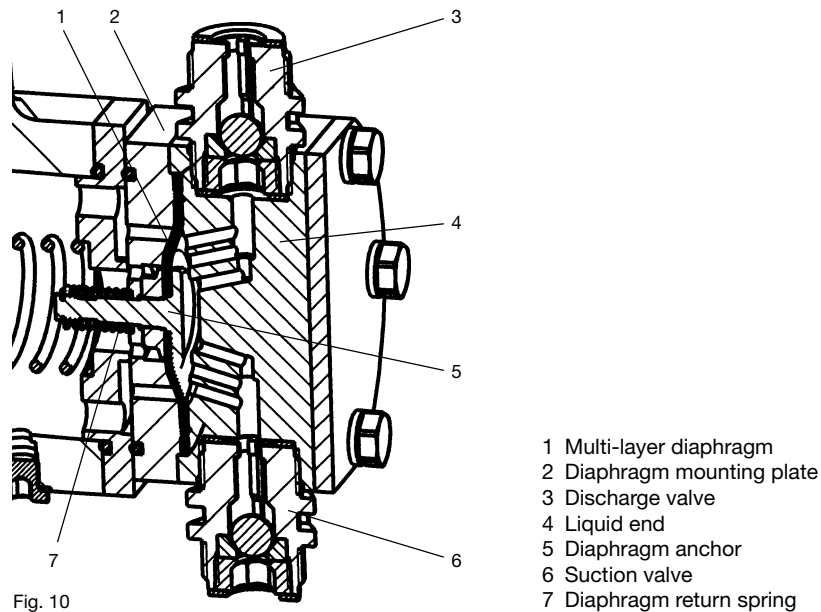


Fig. 10

Diaphragm rupture signal function description

The diaphragm rupture signal function monitors the sealing capacity of the multi-layer diaphragm. The middle diaphragm layer of the multi-layer diaphragm is fitted with slits which connect to a diaphragm rupture signal sensor (2) via a channel in the liquid end (1). If one of the outer diaphragm layers ruptures, metering chemicals or hydraulic oil can pass to the sensor, which produces a signal. The multi-layer diaphragm prevents metering chemicals from mixing with hydraulic oil.

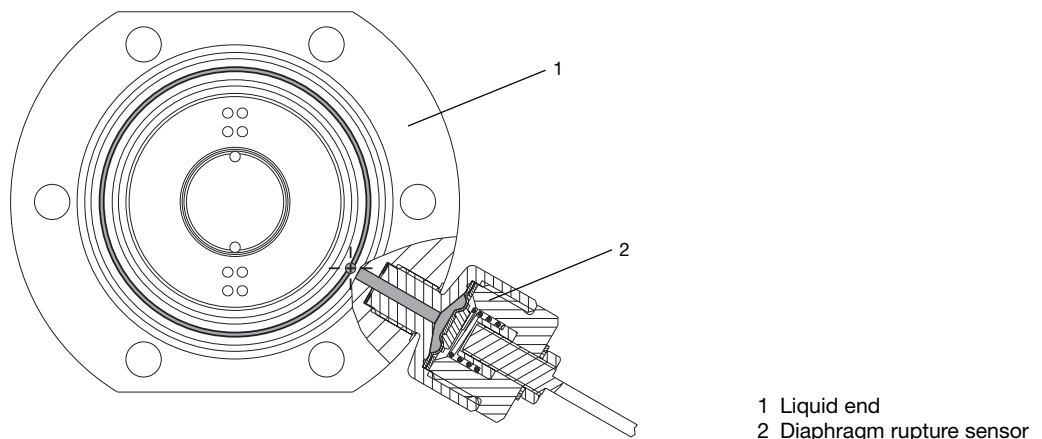


Fig. 11: The path travelled by liquids in the liquid end after diaphragm rupture (grey)

6 Assembly

<i>Ambient temperature</i>	-10 °C to 40 °C
<i>Air humidity</i>	max. 95 % relative humidity, non-condensing

The following assembly work is only necessary on pumps supplied without a liquid end. Attach the liquid end and fill with hydraulic oil (proceed according to “Changing the diaphragm”, “Maintenance” section).

The whole pump must be screwed onto a level, even and stable surface. For this purpose fasten the pump with four screws (M8 or M10) and washers through the 4 recessed apertures on the pump base.

7 Install



WARNING

Observe the guidelines in the operating instructions manual “General operating instructions for ProMinent® metering pumps and hydraulic accessories”, especially EX-pumps.

7.1 Installation, hydraulic



WARNING

- **EX pumps only:** You must refer to the section entitled “Additional important information for dosing pumps in hazardous locations” in the “General operating instructions manual for ProMinent motor-driven dosing pumps and hydraulic accessories”!
- **The liquid end can contain water residues after factory testing.**
If using with chemicals which must not come into contact with water the liquid end must be completely water-free before installation. Remove water by feeding in air compressed to medium-pressure through the suction valve. Rinse the suction valve afterwards using a suitable solution.



IMPORTANT

For chemicals with a particle size greater than 0.3 mm, it is imperative that a filter is installed in the suction tubing.

NOTE

Precise metering is only possible when the back pressure is maintained above 1 bar at all times. If metering at atmospheric pressure, a back pressure valve should be used to create a back pressure of approx. 1.5 bar.

Maximum back pressure for PVDF version liquid ends: 25 bar
Maximum admissible priming pressure (suction side): 5 bar

Viscosity limits when using:

- without valve springs max. 200 mPa s
- with valve springs max. 500 mPa s

7.2 Installation, electrical



WARNING

- **EX pumps only:** You must refer to the section entitled “Additional important information for dosing pumps in hazardous locations” in the “General operating instructions manual for ProMinent motor-driven dosing pumps and hydraulic accessories”!
- **Before working on the motor, switch off and protect from unauthorised reconnection. If external fan, stroke position motor, speed controller or diaphragm rupture sensor present, switch off also. Check that motor is voltage free.**



IMPORTANT

Motor

- **Note the direction of rotation when connecting the motor (see fig.).**

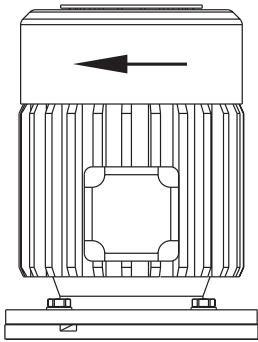


Fig. 12

The nameplate contains important motor data.

The wiring diagram is in the terminal box.

Notes on electrical connection of the motor, of the external fan in the case of variable speed motors with external fan and the temperature monitor can be found in the “General Operating Instructions Manual for ProMinent® Motor Driven Metering Pumps and Hydraulic Accessories”!

External fan for speed controlled motor with external fan and temperature monitor:

Note information in “General operating instructions for ProMinent® metering pumps and hydraulic accessories”.

Hydro 0/4 – 20 mA stroke actuator drive mechanism

230 V ±10 %	50/60 Hz	11.7 W
115 V ±10 %	60 Hz	11.7 W

Cf. “Appendix” for terminal connection diagram.

Stroke adjuster drive mechanism

230 V ±10 %	50/60 Hz	6.5 W
115 V ±10 %	60 Hz	6.5 W

Cf. “Appendix” for terminal connection diagram.

Diaphragm-rupture sensor Standard: 30 V DC/1 A, voltage free contact (closed in rest position).

For safety reasons connect to separated extra low voltage (SELV in accordance with EN 60335-1).
Cable configuration: any

Optional, intrinsically safe: Observe operating instructions supplied with the sensor (EX-pump only)!
5–25 V DC, in accordance with Namur or DIN 19234 standards, potential-free design.

Rated voltage: 8 V DC ($R_i \sim 1 \text{ k}\Omega$)

Power consumption:

Active surface, uncovered > 3 mA

Active surface, covered < 1 mA

Rated switching distance: 1.5 mm

The monitor/feeder must be capable of evaluating current changes in order to indicate diaphragm rupture!

Cable configuration:

	Optional
Blue	-
Brown	+

**IMPORTANT**

- The diaphragm rupture sensor must be electrically connected!

The customer must install an evaluation device for the diaphragm rupture signal / the pump must switch off after a diaphragm rupture signal has been produced.

Stroke sensor Observe operating instructions supplied with the sensor (EX-pump only)!
Operating voltage: 5–25 V DC, in accordance with Namur or DIN 19234 standards, potential-free design.

Rated voltage: 8 V DC ($R_i \sim 1 \text{ k}\Omega$)

Power consumption:

Active surface, uncovered > 3 mA

Active surface, covered < 1 mA

Rated switching distance: 1.5 mm

The monitor/feeder must be capable of evaluating current changes in order to indicate diaphragm rupture!

Cable configuration:

Blue	-
Brown	+

8 Commissioning

**WARNING**

- EX pumps only: You must refer to the section entitled “Additional important information for dosing pumps in hazardous locations” in the “General operating instructions manual for ProMinent motor-driven dosing pumps and hydraulic accessories”!

**IMPORTANT**

- Before commissioning the pump, remove the red gearbox vent stopper (fig. section 4).
- Note restrictions for metering highly viscous or dense chemicals.
- Ensure that the liquid end material is suitably resistant to the metering chemical (see resistance list in our latest product catalogue or at www.prominent.de).
- The pump cannot be operated other than in the way described in the “Technical data” section.
- For chemicals with a particle size greater than 0.3 mm, it is imperative that a filter is installed in the suction tubing.

NOTE

- For viscous media, select the largest possible stroke length!
- For gas-emitting media, select the largest possible stroke length!
- For a good blend, select the highest possible stroke frequency!
- For precise metering with regard to metering in proportion to quantity, do not adjust the stroke length to less than 20%!

Venting the liquid end

Venting the liquid end or suction against pressure:



WARNING

- Always depressurise the suction and discharge tubing before working on the pump!
 - Always wear appropriate protective equipment when metering hazardous or unknown liquids!
- ▶ Detach the discharge tubing
 - ▶ Install a section of transparent tube
 - ▶ Run the pump slowly until chemical appears in the transparent tube section
 - ▶ Detach the transparent tube
 - ▶ Attach the discharge tubing

Adjust the stroke adjuster drive mechanism (optional)

The stroke adjuster drive mechanism is adjusted in the factory to the feed rate. If you wish to adjust the stroke control drive mechanism to a different feed rate, turn to ProMinent.

GUIDELINE on valve installation:

If experiencing priming problems during installation, place the valve on a stable surface and tap the ball seat lightly with a brass rod and an approx. 300 g hammer. Prime valves when damp (see fig. 13).

The pump is now ready to operate.

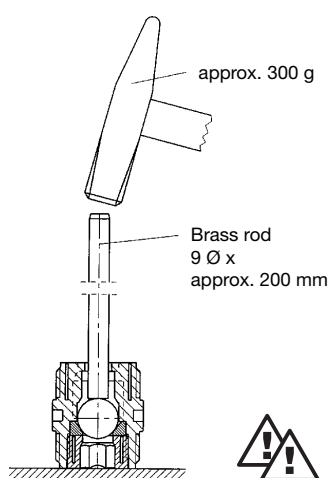


Fig. 13

9 Operation



WARNING

EX pumps only: You must refer to the section entitled “Additional important information for dosing pumps in hazardous locations” in the “General operating instructions manual for ProMinent motor-driven dosing pumps and hydraulic accessories”!

Observe the instructions in “Commissioning” section.



IMPORTANT

In the event of enfault danger of burns from hot power end.

10 Maintenance



WARNING

- **EX pumps only:** You must refer to the section entitled “Additional important information for dosing pumps in hazardous locations” in the “General operating instructions manual for ProMinent motor-driven dosing pumps and hydraulic accessories”!
- Pumps and peripherals are to be maintained and repaired by trained and authorised personnel only!
- Ensure that pumps cannot be switched on by unauthorised personnel during maintenance work!

NOTE

Keep a set of spare parts in stock for maintenance work on each liquid end (cf. Section 15)!

In addition, we recommend:

seals for the oil drainage stopper part number 1004803

Maintenance tasks

- After three months check:*
- EX-pump only: special servicing work, see the warning info for EX-pump!
 - The torque of the metering screws (20 Nm)
 - Correct installation of discharge and suction valves
 - Correct installation of discharge tubing (pressure and suction sides)
 - The oil level
 - Whether the pump is feeding correctly (run for a short period)

If subject to heavy loads (e.g. continuous operation) we recommend shorter maintenance intervals.

*After approx.
5000 operating hours:* Change the hydraulic oil.

**WARNING**

**Risk of burning by hot hydraulic oil!
Avoid contact with draining oil!**

**CAUTION**

If the pump is required to operate with oil that is safe for foodstuffs ensure that the correct type of oil is refilled!

Gear oil: Mobilube 1 SHC 70W - 90, ProMinent part number 1005823.

Oil quantities:

	Oil quantities required		Oil quantities supplied
	Single-headed version	Double-headed version	
HP2	approx. 2.5 l	approx. 2.9 l	3.0 l
HP3	approx. 3.5 l	approx. 4.0 l	4.0 l

Drain hydraulic oil (see fig. 14/15):

(Double-headed version: follow the same steps for each liquid end)

- ▶ Set the stroke position knob (2) to "0"
- ▶ Unscrew the gearbox vent stopper (3)
- ▶ Place an oil container beneath the oil drainage screw (5)
- ▶ Unscrew the oil drainage screw (5) from the power end housing
- ▶ Drain out the hydraulic oil from the power end
- ▶ Place an oil container beneath the hydraulic end
- ▶ Unscrew the oil drainage stopper (4) from the hydraulic end
- ▶ Drain out the hydraulic oil from the hydraulic end
- ▶ Screw in the oil drainage screw (5)
- ▶ Screw in the oil drainage stopper (4) with a new seal.

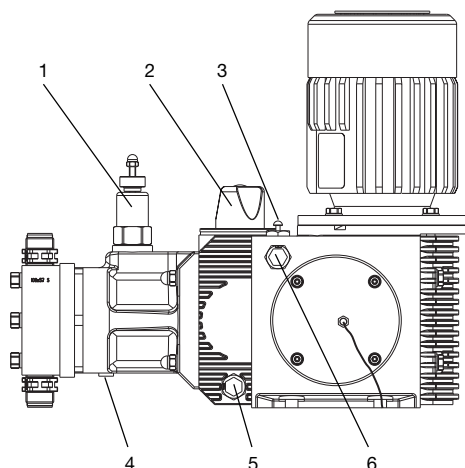


Fig. 14

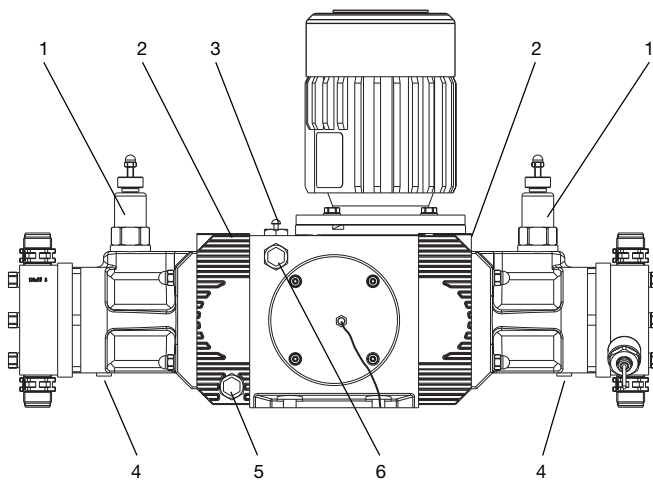


Fig. 15

- 1 Bypass valve
- 2 Stroke adjustment knob
- 3 Gearbox vent stopper
- 4 Oil drainage stopper
- 5 Oil drainage screw
- 6 Oil inspection glass

Refilling hydraulic oil (see fig. 14/15):

(Double-headed version: follow the same steps for each liquid end)

- ▶ Set the stroke positioning knob (2) to "100 %" and open the bypass valve (1) (tighten knurled screw)
- ▶ Slowly pour hydraulic oil through the gearbox vent stopper opening (3) until the oil inspection glass (6) is $\frac{3}{4}$ covered
- ▶ Start the pump
- ▶ Run the pump for 1–2 minutes
- ▶ If necessary, add more hydraulic oil
- ▶ Screw in the gearbox vent stopper (3) (do not close!) and close the bypass valve (1) (slacken the knurled screw).

After approx.
10,000 operating hours: Replace diaphragm:

The diaphragm is a consumable item whose operating life depends upon the following parameters:

- System back pressure
- Operating temperature
- Metering chemical characteristics
- Stroke frequency
- Stroke length

Very unfavourable parameters can shorten the operating life of the diaphragm.

**WARNING**

- Always depressurise the suction and discharge tubing before working on the pump!
- Always empty and rinse the liquid end before working on the pump, if used with hazardous or unknown materials!
- Always wear appropriate protective equipment when metering hazardous or unknown liquids!
- Risk of burning by hot hydraulic oil!
Avoid contact with draining oil!

**IMPORTANT**

- Take the multi-layer diaphragm out of its packing only immediately before installing it!
- Ensure the diaphragm is clean!
- Do not “dismantle” the multi-layer diaphragm!
You may damage the diaphragm rupture sensor!

(Double-headed version and externally mounted drive: follow the same steps for each liquid end)

Draining hydraulic oil out of hydraulic unit (see fig. 14/15):

- ▶ Turn stroke position knob (2) beyond “100 %” to the stop
- ▶ Unscrew the gearbox vent stopper (3)
- ▶ Place an oil container beneath the hydraulic end
- ▶ Unscrew the oil drainage stopper (4) from the hydraulic end
- ▶ Drain out the hydraulic oil from the hydraulic end
- ▶ Screw in the oil drainage stopper (4) with a new seal.

Changing the diaphragm (see fig. 16):

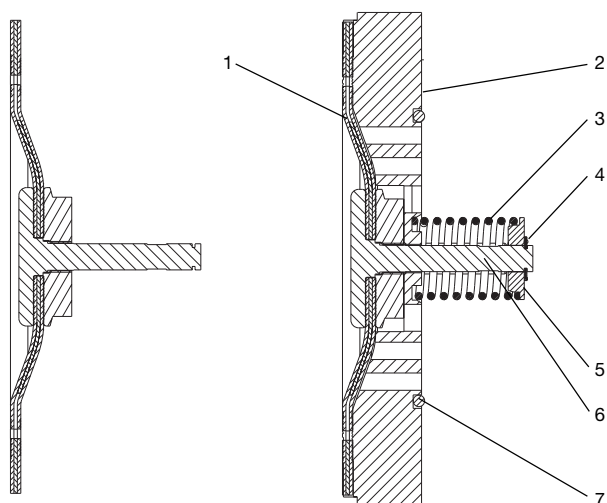
- ▶ De-pressurise the suction and discharge tubing
- ▶ Unscrew the suction and discharge tubing from the liquid end
(has the hydraulic oil been drained out? (see above))
- ▶ Remove the liquid end along with the liquid end screws from the hydraulic end
- ▶ Unfasten the diaphragm mounting plate (2) with the diaphragm (1) from the liquid end.

**WARNING**

The spring (3) and spring collar (5) on the diaphragm anchor (6) can spring back when the safety ring (4) is released!

Protect your eyes with protective glasses!

- ▶ Release the safety ring (4) and the spring (3) with the spring collar (5) from the diaphragm anchor (6)
- ▶ Remove the diaphragm/diaphragm anchor combination from the diaphragm mounting plate (2)
- ▶ Place the new diaphragm/diaphragm anchor combination into the diaphragm mounting plate (2)
- ▶ Place the diaphragm spring (3) with the spring collar (5) onto the diaphragm mounting plate (6) and fasten with the safety ring (4)
- ▶ Replace the O-ring (7) between the diaphragm mounting plate (2) and the hydraulic unit
- ▶ Place the diaphragm (1) with the diaphragm retaining plate (2) inside the hydraulic end
- ▶ Position the liquid end plus screws so that the suction connector is pointing downwards (direction of flow / note arrow markings on the valves).
- ▶ Fasten the liquid end screws lightly at first, then tighten to 20 Nm breakaway torque.
- ▶ Screw the suction and discharge tubing to the liquid end.



Fif. 16

- 1 Multi-layer diaphragm
- 2 Diaphragm mounting plate
- 3 Spring
- 4 Safety ring
- 5 Spring collar
- 6 Diaphragm anchor
- 7 O-ring

Filling hydraulic end with hydraulic oil (see fig. 14/15):

(Double-headed version: follow the same steps for each liquid end)

- ▶ Set stroke adjustment knob (1) to "100 %" and open bypass valve (2) (tighten knurled screw)
- ▶ Slowly pour hydraulic oil through the opening for the gearbox venting stopper (4) until the oil inspection glass (3) is $\frac{3}{4}$ covered
- ▶ Start the pump
- ▶ Run the pump for 1–2 min
- ▶ Screw in the gearbox vent stopper (4) (do not close!) and close the bypass valve (2) (slacken the knurled screw).
- ▶ Run the pump at maximum back pressure and check seals.



IMPORTANT

Check the torque of the liquid end screws after 24 operating hours (20 Nm)!

11 Repair



WARNING

- **EX pumps only:** You must refer to the section entitled “Additional important information for dosing pumps in hazardous locations” in the “General operating instructions manual for ProMinent motor-driven dosing pumps and hydraulic accessories”!
- Pumps and peripherals are to be maintained and repaired by trained and authorised personnel only!
- Always depressurise the suction and discharge tubing before working on the pump!
- Always empty and rinse the liquid end before maintenance and repair work, if used with hazardous or unknown materials!
- When working on the liquid end, wear appropriate protective equipment when metering hazardous or unknown liquids!
- Before working on the motor, switch off and protect from unauthorised reconnection!
If external fan, stroke position motor, speed controller or diaphragm rupture sensor present, switch off also!
Check that motor is voltage free!
- Only send the equipment for repair or maintenance in a cleaned condition and with the liquid end flushed. However, should any safety precautions be necessary even after careful draining and cleaning of the equipment, the required information must be listed in the Safety Declaration!
The Safety Declaration forms part of the inspection/repair contract.
Maintenance or repair work will only be carried out if a Safety Declaration - correctly and fully completed by an authorised and qualified member of the Operator's staff - is available.
A copy of the form is included in the “General operating instructions for ProMinent motor-driven dosing pumps and hydraulic accessories” or can be downloaded at www.prominent.com .



IMPORTANT

Each time the liquid end screw is unfastened it should be realigned and tightened to a crosswise torque of 20 Nm.

Overhaul single ball valve

- ▶ Disassemble valve
- ▶ Replace worn parts
- ▶ Clean the remaining parts
- ▶ Assemble the valve.



IMPORTANT

Check the arrows for discharge and suction connectors, these give the direction of flow.

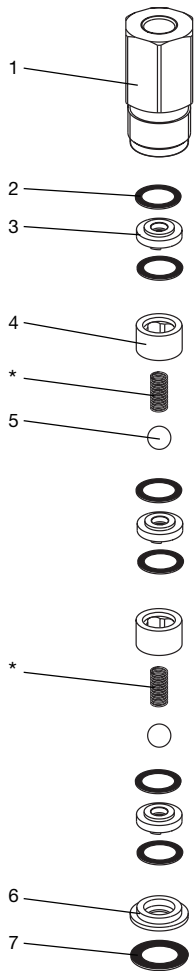
Cleaning a Discharge Valve (Double Ball)

NOTE

- Clean discharge and suction valves one by one, as they can not be differentiated by means of arrow markings!
As a guide, when looking at a dismantled liquid end, the suction valve is on the same side as the diaphragm rupture sensor!
- Use only new parts suitable for your valve! (with regard to shape and resistance to chemicals!).

To dismantle a discharge valve:

- ▶ Detach discharge line
- ▶ Unscrew discharge valve from dosing head and rinse out
- ▶ Take the remaining parts out of the liquid end
- ▶ Allow the remaining components to drop out of the valve body (1) if possible
- ▶ Insert a key/spanner of Imbus or similar type into the hole in the valve body (1) and press out the remaining components
- ▶ Remove the last seal (2) and the last ball seat (3) from the valve body (1) with a small screwdriver
- ▶ Rinse and clean all components
- ▶ Replace worn components as well as the seals.



To assemble a discharge valve

NOTE

When assembling the discharge valve carefully note the direction of alignment of the valve seats (3). The valve seats (3) act as the ball seat on the fine-machined side and as the ball cage and spring guide on the other side. In all valve seats the fine-machined side must point in the direction of flow!

For assembling these valves follow the sequence:
teflon – metal – teflon – metal ...

- ▶ Slide the following components one after the other into the valve body (1):
 - One seal (2) and one valve seat (3 – N.B: pay attention to the direction!)
 - One seal (2) and one valve housing (4)
 - (if a spring is supplied, slide one spring (*) into the valve seat spring guide (3)).
 - Slide one ball (5) into the valve body (1)
 - One seal (2) and the second valve seat (3 – N.B: pay attention to the direction!)
 - One seal (2) and the second valve housing (4)
 - (if a second spring (*) is supplied,, slide it into the valve seal spring guide (3)).
 - Slide the second ball (5) into the valve body (1).
 - One seal (2), the third valve seat (3 – N.B: pay attention to the direction!) and one more seal (2)
- ▶ Place the disk insert (6) with the bead on the packing.

NOTE

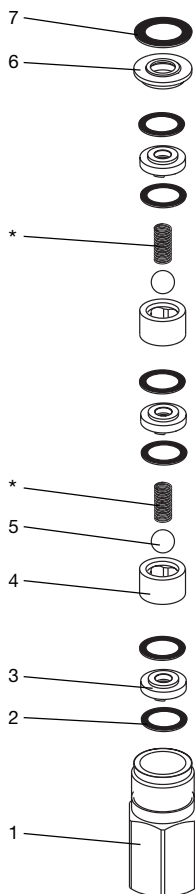
The distance between the edge of the valve body and the disk insert depends on the type of design!

- ▶ Fit the large seal (7) between the disk insert (6) and the dosing head.
- ▶ Screw the valve in as far as the stop
- ▶ Attach the discharge line.

Cleaning the suction valve

Dismantling, cleaning and reassembling of a suction valve is carried out in exactly the same way as for a discharge valve.

But, when assembling the valve seats (3) do not forget that the valve seats (3) should be aligned in the opposite direction. The fine-machined side for all valve seats (3) must point in the direction of flow!



Overhaul diaphragm rupture sensor

The diaphragm rupture sensor should be checked each time the diaphragm ruptures and if necessary the separating diaphragm should be replaced (e.g. if the metering chemical can crystallise or introduce dirt and particles).

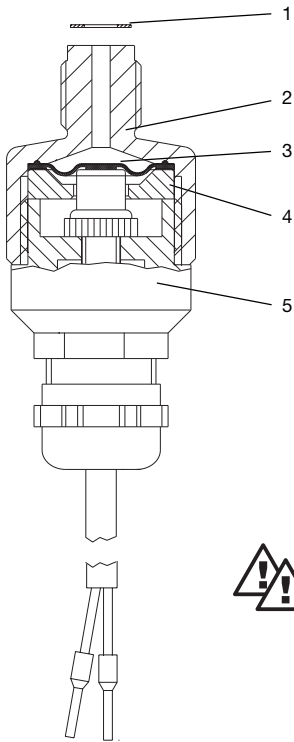


Fig. 17

- 1 Seal
- 2 Upper section
- 3 Separating diaphragm
- 4 Plate
- 5 Body

Check diaphragm rupture sensor (30 V version):

- ▶ When changing the diaphragm, unscrew the diaphragm rupture sensor from the liquid end
- ▶ Check that electrical continuity is present
- ▶ Press a blunt insulating probe (\varnothing 2–3 mm, no sharp edges) into the channel of the diaphragm rupture sensor
- ▶ Check that the electrical continuity is not present
- ▶ Remove the probe
- ▶ Check that electrical continuity is present
- ▶ If everything is working correctly, screw the diaphragm rupture sensor into the liquid end with a new seal (1)
- ▶ If not, go to the next step.

Replace separating diaphragm of the diaphragm rupture sensor (30 V version):

WARNING

- Disconnect diaphragm rupture sensor from power supply!
- If using hazardous or unknown chemicals, protect yourself accordingly!
- After diaphragm rupture, metering chemical will be present in the diaphragm rupture sensor and the inlet channel in the liquid end! (fig. 11)

- ▶ When changing the diaphragm, unscrew the diaphragm rupture sensor from the liquid end
- ▶ Grasp the upper section (2) of the diaphragm rupture sensor
- ▶ Hold the body (5) in place with an open-ended spanner
- ▶ Take off the top of the diaphragm rupture sensor
- ▶ Clean the soiled parts
- ▶ Lay the new separating diaphragm (3) with the light side (PTFE) down into the upper section (2)
- ▶ Lay the plate (4) with the uneven side down into the upper section (2)
- ▶ Screw the body (5) into the upper section and tighten
- ▶ Check the diaphragm rupture sensor as described in “Check diaphragm rupture sensor (30 V version)”.

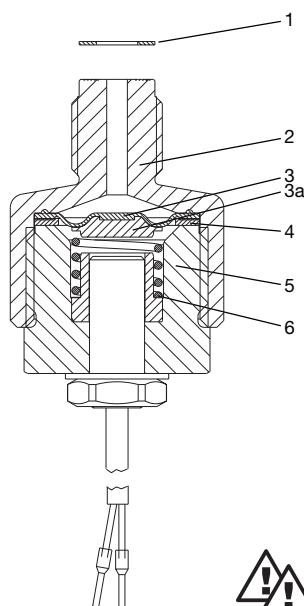


Fig. 18

- 1 Seal
- 2 Upper section
- 3 Separating diaphragm
- 3a Spring seat
- 4 Disc
- 5 Body
- 6 Spring



Check diaphragm rupture sensor (EX-version):

- ▶ When changing the diaphragm, unscrew the diaphragm rupture sensor from the liquid end
- ▶ Check that electrical continuity is present
- ▶ Press a blunt insulating probe (Ø 2–3 mm, no sharp edges) into the channel of the diaphragm rupture sensor
- ▶ Check that the electrical continuity is not present
- ▶ Remove the probe
- ▶ Check that electrical continuity is present
- ▶ If everything is working correctly, screw the diaphragm rupture sensor into the liquid end with a new seal (1)
- ▶ If not, go to the next step.

Replace separating diaphragm of the diaphragm rupture sensor (EX-version):

WARNING

- If using hazardous or unknown chemicals, protect yourself accordingly!
- After diaphragm rupture, metering chemical will be present in the diaphragm rupture sensor and the inlet channel in the liquid end!

- ▶ When changing the diaphragm, unscrew the diaphragm rupture sensor from the liquid end
- ▶ Grasp the upper section (2) of the diaphragm rupture sensor
- ▶ Hold the body (5) in place with an open-ended spanner - not the lacquer-protected nut!
- ▶ Take off the top of the diaphragm rupture sensor
- ▶ Clean the soiled parts
- ▶ Lay the new separating diaphragm (3) with the light side (PTFE) down into the upper section (2)
- ▶ Lay the disc (4) into the upper section (2)
- ▶ Place the spring inside the body (5)
- ▶ Bring the body (5) close to the upper section (2)
- ▶ Check that the spring (6) is sitting correctly on the spring seat (3a)
- ▶ Screw the body (5) into the upper section and tighten
- ▶ Check the diaphragm rupture sensor as described in “Check diaphragm rupture sensor (EX-version)”.

Calibrate feed rate The pumps are calibrated on the factory premises to the maximum operating pressure (see pressure level on the indicating dial or bypass valve). The plant or production facility can calibrate each pump to a back pressure that is lower than the nominal pressure. Possible pressure ratings are 10, 16, 25, 40, 64 and 100 bar.

To a minimal extent the feed rate of the hydraulic diaphragm pump is dependent upon back pressure.

It is only worth re-calibrating if you wish to carry out particularly precise feeds at a completely different back pressure.



WARNING

EX-pump only: take suitable precautions in explosive areas regarding the feed chemical in the open measuring cylinder (see handling instructions below)!



IMPORTANT

The feed rate can only be calibrated when discharge tubing is connected and under normal operating conditions!

The feed rate is dependent upon the actual back pressure!

1. Switch off the pump
2. Set the stroke adjustment knob to maximum (beyond 100 % to the stop)
3. Remove the cover (4) from the stroke adjustment knob and slacken off the screw (3) beneath slightly
4. Feed the suction tubing into a measuring container (fig. 20)
5. Fill the measuring container with metering chemical
6. Start the pump
7. When the system back pressure has been reached, determine the fill level Q_1 and start a stopwatch at the same time
8. Run the pump for a while
9. Determine the fill level Q_2 and stop the stopwatch at the same time
10. Calculate the feed rate value
11. Reduce the feed rate using the stroke adjustment knob and repeat steps 7–10 until the required value is reached
12. Turn the indicating dial (1) only until the 100 % marking is precisely above the indicating slit (2).
13. Carefully tighten the screw (3) in the stroke adjustment knob and replace the cover (4).

NOTE

Make a note of the feed rate and the back pressure!

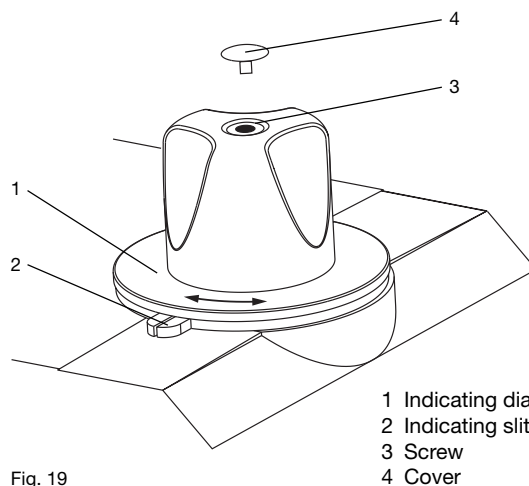


Fig. 19

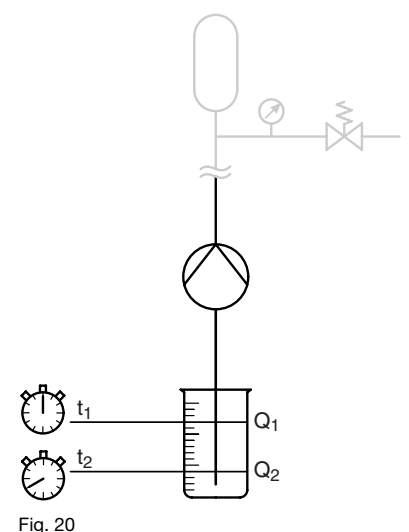


Fig. 20

12 Troubleshooting



WARNING

- **EX pumps only:** You must refer to the section entitled “Additional important information for dosing pumps in hazardous locations” in the “General operating instructions manual for ProMinent motor-driven dosing pumps and hydraulic accessories”!
- **Pumps and peripherals are to be maintained and repaired by trained and authorised personnel only!**
- **Always depressurise the suction and discharge tubing before working on the pump!**
- **Always empty and rinse the liquid end before maintenance and repair work, if used with hazardous or unknown materials!**
- **When working on the liquid end, wear appropriate protective equipment when metering hazardous or unknown liquids!**
- **Before working on the motor, switch off and protect from unauthorised reconnection!**
If external fan, stroke position motor, speed controller or diaphragm rupture sensor present, switch off also!
Check that motor is voltage free!



IMPORTANT

Each time the liquid end screw is unfastened it should be realigned and tightened to a crosswise torque of 20 Nm.

Pump fails to pressurise

or

Pump does not prime despite full stroke action and venting

Cause: Valves dirty/torn

Remedy: Overhaul valves (see “Overhaul valves”, “Repair” section)

Cause: Bypass valve open

Remedy: Unscrew knurled screw in bypass valve

Cause: Bypass valve heavily worn as discharge tubing greatly constricted

Remedy: Replace bypass valve and remove blockage from discharge tubing

Cause: Too little hydraulic oil

Remedy: Replenish hydraulic oil until oil inspection glass is $\frac{3}{4}$ covered (see “Replace diaphragm”, “Maintenance” section)

Cause: Indicating scale incorrectly set

Remedy: Set indicating dial (see “Calibrate feed rate”, “Repair” section)

Cause: Motor connected incorrectly

Remedy: 1. Check direction of rotation, voltage and frequency
2. Connect motor correctly

Cause: Mains voltage failure

Remedy: Identify cause and remedy

Cause: Multi-layer diaphragm ruptured and alarm has not sounded

Remedy: 1. Replace multi-layer diaphragm immediately (see “Replace diaphragm”, “Maintenance” section)
2. Replace diaphragm rupture sensor separating diaphragm (see “Replace separating diaphragm of the diaphragm rupture sensor”, “Repair” section)

Diaphragm rupture signal triggers alarm

Cause: Multi-layer diaphragm ruptured

Remedy: 1. Replace multi-layer diaphragm immediately (see “Replace diaphragm“, “Maintenance” section)
 2. Replace diaphragm rupture sensor separating diaphragm (see “Replace separating diaphragm of the diaphragm rupture sensor“, “Repair” section)

Power end motor very hot

Cause: Discharge tubing greatly constricted

Remedy: 1. Remove blockage from discharge tubing
 2. Check bypass valve

13 Decommissioning and disposal

Decommissioning



WARNING

- **EX pumps only:** You must refer to the section entitled “Additional important information for dosing pumps in hazardous locations” in the “General operating instructions manual for ProMinent motor-driven dosing pumps and hydraulic accessories”!
- **Pumps and peripherals are to be maintained and repaired by trained and authorised personnel only!**
- **When decommissioning pump, the housing and particularly the liquid end should be cleaned thoroughly to remove all dirt and chemicals!**
- **Always depressurise the suction and discharge tubing before working on the pump!**
- **Always empty and rinse the liquid end before maintenance and repair work, if used with hazardous or unknown materials!**
- **When working on the liquid end, wear appropriate protective equipment when metering hazardous or unknown liquids!**
- **Before working on the motor, switch off and protect from unauthorised reconnection!**
 If external fan, stroke position motor, speed controller or diaphragm rupture sensor present, switch off also!
Check that motor is voltage free!
- **Ensure that pumps cannot be switched on by unauthorised personnel during maintenance work!**
- **Risk of burning by hot hydraulic oil. Avoid contact with draining oil!**

- Final decommissioning*
- ▶ Disconnect pump from power supply
 - ▶ Rinse the liquid end with a suitable cleaning agent, clean thoroughly if used with hazardous materials
 - ▶ Drain off hydraulic oil!

- Temporary decommissioning*
- Additionally:
- ▶ Place valve covers on valves
 - ▶ Place the pump on a pallet if possible
 - ▶ Cover the pump with a tarpaulin (allow ventilation!).

Store the pump in a dry enclosed area at:

Storage temperature: -10 °C to 50 °C

Air humidity: max. 95 %, non-condensing

Disposal

IMPORTANT



Observe all currently local and national applicable directives (particularly with regards to oils and electronic waste).

14 Technical data

Performance data and weights

Pump type	Feed rate at maximum back pressure		Gear ratio	Dia-phragm diameter	Priming lift*	Suction lift**	Stroke rate	Admissible priming pressure	Connector size	Shipping weight*** (single/double head)
Pump type	bar	l/h	ml/Stroke	mm	m	m	Strokes/min	bar	G"-DN	kg
HP2 50 Hz										
100010	100	10	0.8	"7:1	42	2	3	212	5	G3/4A-DN10 31/41
100009	100	9	0.8	"8:1	42	2	3	187	5	G3/4A-DN10 31/41
100007	100	7	0.8	"10:1	42	2	3	150	5	G3/4A-DN10 31/41
100006	100	6	0.8	"12:1	42	2	3	125	5	G3/4A-DN10 31/41
100003	100	3	0.8	"25:1	42	2	3	60	5	G3/4A-DN10 31/41
064025	64	25	2	"7:1	42	2	3	212	5	G3/4A-DN10 31/41
064022	64	22	2	8:1	42	2	3	187	1	G3/4A-DN10 31/41
064018	64	18	2	10:1	42	2	3	150	1	G3/4A-DN10 31/41
064015	64	15	2	12:1	42	2	3	125	1	G3/4A-DN10 31/41
064007	64	7	2	25:1	42	2	3	60	1	G3/4A-DN10 31/41
025068	25	68	5.3	"7:1	57	2	3	212	5	G3/4A-DN10 31/41
025060	25	60	5.3	8:1	57	2	3	187	1	G3/4A-DN10 31/41
025048	25	48	5.3	10:1	57	2	3	150	1	G3/4A-DN10 31/41
025040	25	40	5.3	12:1	57	2	3	125	1	G3/4A-DN10 31/41
025019	25	19	5.3	25:1	57	2	3	60	1	G3/4A-DN10 31/41
HP3 50 Hz										
100035	100	35	2.8	"7:1	57	2	3	212	5	G3/4A-DN10 41/55
100031	100	31	2.8	"8:1	57	2	3	187	5	G3/4A-DN10 41/55
100025	100	25	2.8	"10:1	57	2	3	150	5	G3/4A-DN10 41/55
100021	100	21	2.8	"12:1	57	2	3	125	5	G3/4A-DN10 41/55
100010	100	10	2.8	"25:1	57	2	3	60	5	G3/4A-DN10 41/55
064068	64	68	5.3	"7:1	57	2	3	212	5	G3/4A-DN10 41/55
064060	64	60	5.3	8:1	57	2	3	187	1	G3/4A-DN10 41/55
064048	64	48	5.3	10:1	57	2	3	150	1	G3/4A-DN10 41/55
064040	64	40	5.3	12:1	57	2	3	125	1	G3/4A-DN10 41/55
064019	64	19	5.3	25:1	57	2	3	60	1	G3/4A-DN10 41/55
025170	25	170	13.4	"7:1	76	2	3	212	5	G1A-DN15 41/55
025150	25	150	13.4	8:1	76	2	3	187	1	G1A-DN15 41/55
025120	25	120	13.4	10:1	76	2	3	150	1	G1A-DN15 41/55
025100	25	100	13.4	12:1	76	2	3	125	1	G1A-DN15 41/55
025048	25	48	13.4	25:1	76	2	3	60	1	G1A-DN15 41/55
HP2 60 Hz										
100009	100	11	0.8	"8:1	42	2	3	224	5	G3/4A-DN10 31/41
100007	100	8	0.8	"10:1	42	2	3	180	5	G3/4A-DN10 31/41
100006	100	7	0.8	"12:1	42	2	3	150	5	G3/4A-DN10 31/41
100003	100	3.6	0.8	"25:1	42	2	3	72	5	G3/4A-DN10 31/41
064022	64	26	2	"8:1	42	2	3	224	5	G3/4A-DN10 31/41
064018	64	21	2	10:1	42	2	3	180	1	G3/4A-DN10 31/41
064015	64	18	2	12:1	42	2	3	150	1	G3/4A-DN10 31/41
064007	64	8.4	2	25:1	42	2	3	72	1	G3/4A-DN10 31/41
025060	25	72	5.3	"8:1	57	2	3	224	5	G3/4A-DN10 31/41
025048	25	58	5.3	10:1	57	2	3	180	1	G3/4A-DN10 31/41
025040	25	48	5.3	12:1	57	2	3	150	1	G3/4A-DN10 31/41
025019	25	23	5.3	25:1	57	2	3	72	1	G3/4A-DN10 31/41

Pump type	Feed rate at maximum back pressure			Gear ratio	Dia-phragm diameter	Priming lift*	Suction lift**	Stroke rate	Admissible priming pressure	Connector size	Shipping weight*** (single/double head)
Pump type	bar	l/h	ml/Stroke		mm	m	m	Strokes/min	bar	G"-DN	kg
HP3 60 Hz											
100031	100	37	2.8	"8:1	57	2	3	224	5	G3/4A-DN10	41/55
100025	100	30	2.8	"10:1	57	2	3	180	5	G3/4A-DN10	41/55
100021	100	25	2.8	"12:1	57	2	3	150	5	G3/4A-DN10	41/55
100010	100	12	2.8	"25:1	57	2	3	72	5	G3/4A-DN10	41/55
064060	64	72	5.3	"8:1	57	2	3	224	5	G3/4A-DN10	41/55
064048	64	58	5.3	10:1	57	2	3	180	1	G3/4A-DN10	41/55
064040	64	48	5.3	12:1	57	2	3	150	1	G3/4A-DN10	41/55
064019	64	23	5.3	25:1	57	2	3	72	1	G3/4A-DN10	41/55
025150	25	180	13.4	"8:1	76	2	3	224	5	G1A-DN15	41/55
025120	25	144	13.4	10:1	76	2	3	180	1	G1A-DN15	41/55
025100	25	120	13.4	12:1	76	2	3	150	1	G1A-DN15	41/55
025048	25	58	13.4	25:1	76	2	3	72	1	G1A-DN15	41/55

* Priming lift / priming pressure (dry) determined for water with empty liquid end and empty suction line as well as clean, moistened valves (the figures are lower with valve springs).

** Suction lift / suction pressure determined for water with filled liquid end and filled suction line – based on the requirement that the suction lines are of adequate cross-section.

*** Cf. section 3 for pumps with externally mounted drive mechanism.

Maximum back pressure for PVT: 25 bar liquid ends

Accuracy

- If installed correctly, reproducibility is better than ± 1 % (for measurements taken under constant conditions, minimum 20 % stroke rate and water at 20 °C).
- Metering accuracy is ± 5 % at maximum stroke length and maximum back pressure.

Viscosity

Viscosity limit when used:

- without valve springs max. 200 mPa s
- with valve springs max. 500 mPa s

Liquid end materials information

Description	Liquid end	Connector	Seals	Balls
SST	Steel 1.4571	Steel 1.4571	PTFE	1.4401
PVT	PVDF	PVDF	PTFE	ceramic
HCT	Hast. C	Hast. C	PTFE	ceramic

Electrical data

	Identcode feature	power supply		
<i>Motor data</i>	S 3 ph, IP 55	220-240 V/380-420 V 250-280 V/440-480 V	50 Hz 60 Hz	HP2: 0,37 kW / HP3: 0,75 kW
	L1 3 ph, II2GEEXellIT3	220-240 V/380-420 V	50 Hz	HP2: 0,37 kW / HP3: 0,75 kW
	L2 3 ph, II2GEEXdIICT4	220-240 V/380-420 V	50 Hz	HP2: 0,37 kW / HP3: 0,75 kW
	P1 3 ph, II2GEEXellIT3	250-280 V/440-480 V	60 Hz	HP2: 0,37 kW / HP3: 0,75 kW
	P2 3 ph, II2GEEXdIICT4	250-280 V/440-480 V	60 Hz	HP2: 0,37 kW / HP3: 0,75 kW
	R 3 ph, IP 55	230 V/400 V	50/60 Hz	HP2: 0,37 kW / HP3: 0,75 kW Design with external fan 1 ph 230 V; 50/60 Hz und PTC
	V 1 ph, IP 55	230 V ±5 %	50/60 Hz	HP2: 0,37 kW / HP3: 0,75 kW Variable speed stroke control motor with integrated speed controller

Motor data sheets are available for further information. Non-standard motors or non-standard motor flanges are available on request.

Insulation class: F

Stroke actuator drive mechanism

230 V ±10 %	50/60 Hz	11.7 W
115 V ±10 %	60 Hz	11.7 W

Protection class: IP 65

Stroke adjuster drive mechanism

230 V ±10 %	50/60 Hz	6.5 W
115 V ±10 %	60 Hz	6.5 W

Protection class: IP 65

Diaphragm rupture sensor

Standard: 30 V DC/1 A, voltage free contact (closed in rest position).

For safety reasons connect to separated extra low voltage (SELV in accordance with EN 60335-1).

Cable configuration: any

Optional, intrinsically safe: Observe operating instructions supplied with the sensor (EX-pumps only)! 5–25 V DC, in accordance with Namur or DIN 19234 standards, potential-free design.

Rated voltage: 8 V DC ($R_i \sim 1 \text{ k}\Omega$)

Power consumption:

Active surface, uncovered > 3 mA

Active surface, covered < 1 mA

Rated switching distance: 1.5 mm

The monitor/feeder must be capable of evaluating current changes in order to indicate diaphragm rupture!

Cable configuration:

	Optional
Blue	-
Brown	+

Stroke sensor, intrinsically safe Observe operating instructions supplied with the sensor (EX-pumps only)!
 Operating voltage: 5–25 V DC, in accordance with Namur or DIN 19234 standards, potential-free design.

Rated voltage: 8 V DC ($R_i \sim 1 \text{ k}\Omega$)

Power consumption:

Active surface, uncovered > 3 mA

Active surface, covered < 1 mA

Rated switching distance: 1.5 mm

The monitor/feeder must be capable of evaluating current changes in order to indicate diaphragm rupture.

Cable configuration:

Blue	-
Brown	+

Ambient conditions

Storage temperature -10 °C to 50 °C

Ambient temperature -10 °C to 40 °C

Air humidity max. 95 % relative humidity, non-condensing

Maximum metering chemical temperatures for the liquid end depend upon material type:

	PVT	SST
Long term at max. back pressure	65 °C	90 °C
Short term at max. 2 bar (15 mm)	100 °C	120 °C

Housing enclosure rating

Contact and moisture protection: IP 55 in accordance with DIN VDE 470 (EN IEC 60529)

Bypass valve

Opening pressure at corresponding pressure levels

Pressure level*	10 bar	16 bar	25 bar	40 bar	64 bar	100 bar
Opening pressure**	14 bar	25 bar	36 bar	49 bar	80 bar	120 bar

* Indicated on indicating dial or valve housing

** Back pressure created by pump if discharge side is blocked $\pm 3 \text{ bar}$

Hydraulic oil

Mobilube 1 SHC 70W - 90, ProMinent part number 1005823

Oil quantity:

	Oil quantities required		Oil quantities supplied
	Single-headed version	Double-headed version	
HP2	approx. 2.5 l	approx. 2.9 l	3.0 l
HP3	approx. 3.5 l	approx. 4.0 l	4.0 l

Compatibility

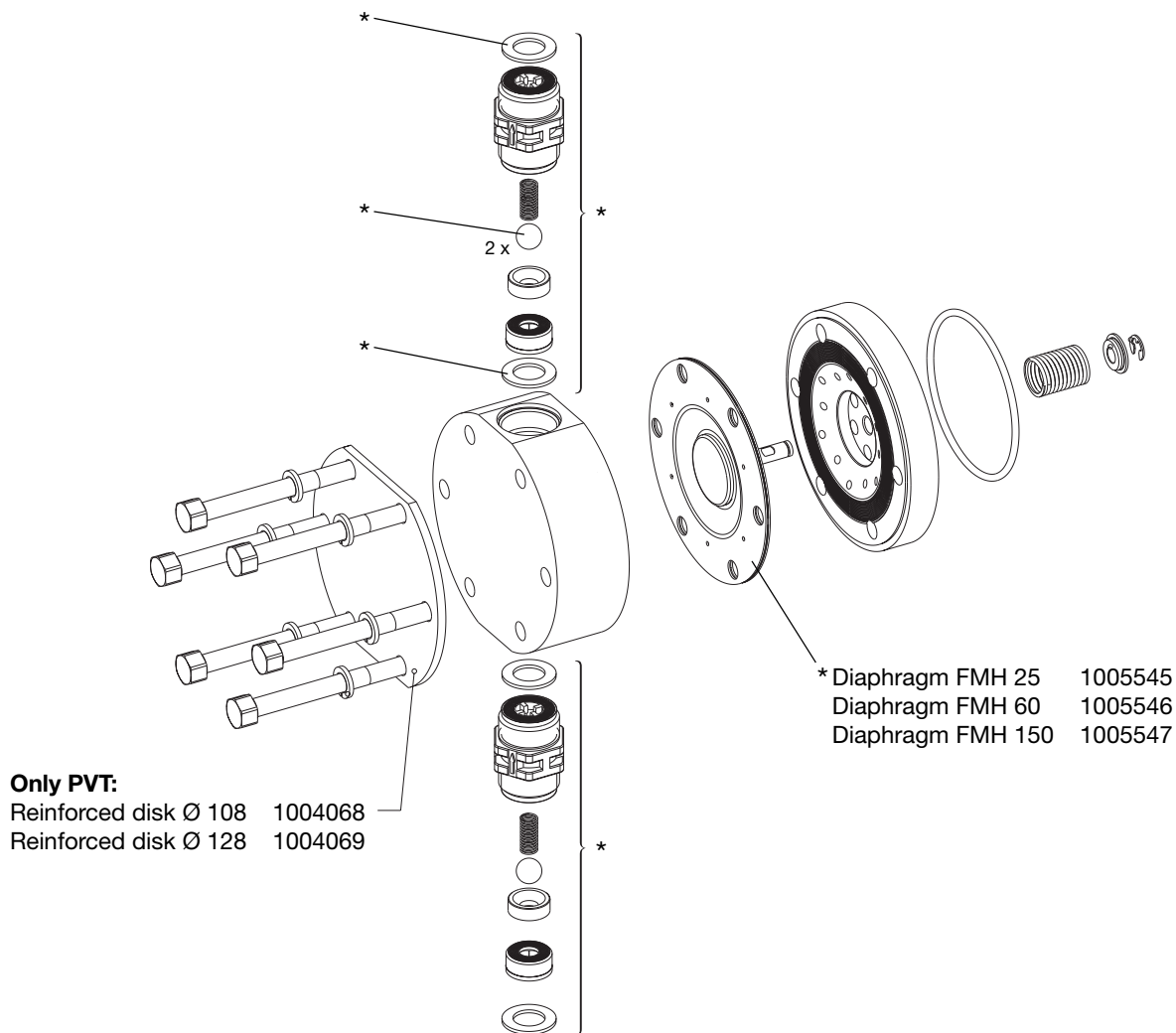
The hydraulic accessories for the Hydro hydraulic diaphragm metering pumps are compatible with those for the Sigma and Meta piston pumps.

The connector sizes of valves and liquid ends of the same sizes, but with different materials, are the same. (Does not apply to different diaphragm materials).

15 Spare parts and accessories

Spare parts

Exploded view of Hydro liquid end



* Set of spare parts - range for supply

61_05-104_00_50-03_2

Subject to technical modifications.

Spare parts kits

The spare parts kits generally contain the consumable components for the liquid ends.

Included in standard delivery for SST component materials

- 1 pump diaphragm
- 2 ball valves
- 1 set of seals

Included in standard delivery for PVT component materials

- 1 dosing diaphragm
- 1 suction connector set
- 1 discharge connector set
- 2 valve balls
- 1 seal set

Spare parts kits Hydro/ 2

(Applies to identity code: Type

100010, 100009, 100007, 100006, 100003,
064025, 064022, 064018, 064015, 064007) **Order No.**

FMH 25 - DN 10	PVT	1005548
	SST (without valves)	1005549
	SST	1005550
	SST (for double ball valves)	1005551

(Applies to identity code: Type

025068, 025060, 025048, 025040, 025019) **Order No.**

FMH 60 - DN 10	PVT	1005552
	SST (without valves)	1005553
	SST	1005554
	SST (for double ball valves)	1005555

Spare parts kits Hydro/ 3

(Applies to identity code: Type

100035, 100031, 100025, 100021, 100010,
064068, 064060, 064048, 064040, 064019) **Order No.**

FMH 60 - DN 10	PVT	1005552
	SST (without valves)	1005553
	SST	1005554
	SST (for double ball valves)	1005555

(Applies to identity code: Type

025170, 025150, 025120, 025100, 025048) **Order No.**

FMH 150 - DN 15	PVT	1005556
	SST (without valves)	1005557
	SST	1005558

PTFE dosing diaphragms

	Order No.
FMH 25 applies to identity code: 064025, 064022, 064018, 064015, 064007 100010, 100009, 100007, 100006, 100003	1005545
FMH 60 applies to identity code: 026068, 025060, 025048, 025040, 025019, 064068, 064060, 064048, 064040, 064019, 100035, 100031, 100025, 100021, 100010	1005546
FMH 150 applies to identity code: 025170, 025150, 025120, 025100, 025048	1005547

Pump diaphragm PTFE/Hast. C coated with PTFE

	Order No.
FMH 25 applies to identcode: 064025, 064022, 064018, 064015, 064007	1006481
FMH 60 applies to identcode: 025068, 025060, 025048, 025040, 025019, 064068, 064060, 064048, 064040, 064019	1006482
FMH 150 applies to identcode: 025170, 025150, 025120, 025100, 025048	1006483

Seals for the oil drainage stopper 1004803

Accessories

Hydro stroke actuator drive mechanism,
0/4 – 20 mA, 230 V, 50/60 Hz 1006405

Hydro stroke actuator drive mechanism,
0/4 – 20 mA, 115 V, 60 Hz 1006404

Stroke adjuster drive mechanism, 230 V, 50/60 Hz 1006407

Stroke adjuster drive mechanism, 115 V, 60 Hz 1006406

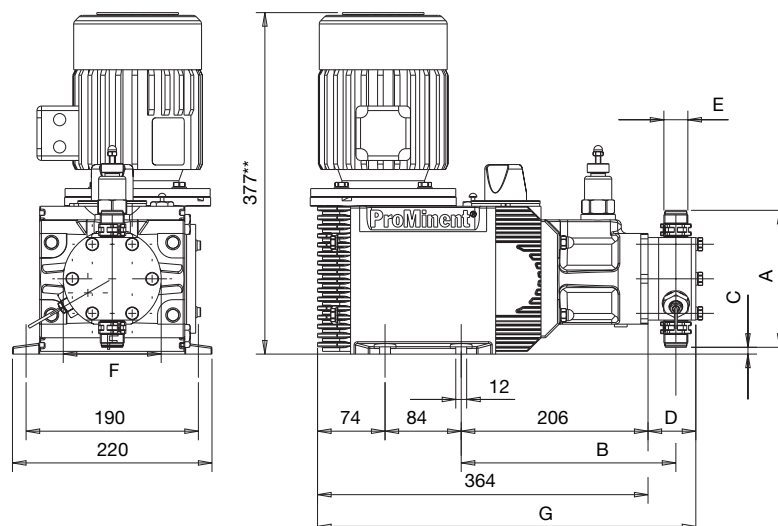
Variable speed motor, 3-phase, 230/400 V identified by Electric Voltage
Supply identicode "R"

Variable speed voltage control unit complete,
single phase, 230 V, 50/60 Hz identified by Electric Voltage
Supply identicode "Z"

Hydro HP2 base for externally mounted drive mechanism 1005660

Hydro HP3 base for externally mounted drive mechanism 1005661

Hydro HP2 measurement data sheet (HP2a H)



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Dimensions of Hydro HP2 (in mm)

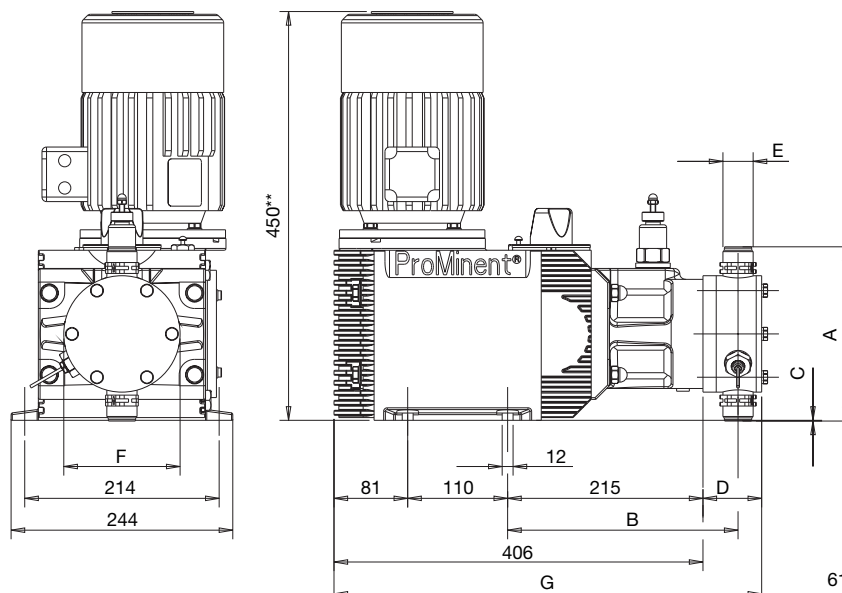
	A	A*	B	B*	C	C*	D	D*	E	E*	F	G	G*
HM 25 SST, HCT	152	180	239	241	7	-7	50	54	DN10G3/4A	DN10R3/8"	108	414	418
HM 60 SST, HCT	165	195	240	242	0.5	20.5	51	55	DN10G3/4A	DN10R3/8"	108	415	419
HM 60 SST-HV	165		243.5		0.5		57		DN15G1A		108	421	
HM 25 PVT	152		239		7		54		DN10G3/4A		108	418	
HM 60 PVT	165		240		0,5		55		DN10G3/4A		108	419	

HM 25 for Hydro 064007, 064015, 064018, 064022, 064025, 100003, 100006, 100007, 100009, 100010
 HM 60 for Hydro 025019, 025040, 025048, 025060, 025068

* Double ball valve

** with standard motor

Hydro HP3 measurement data sheet (HP3a H)



61_02-101_00_02-73

Dimensions of Hydro HP3 (in mm)

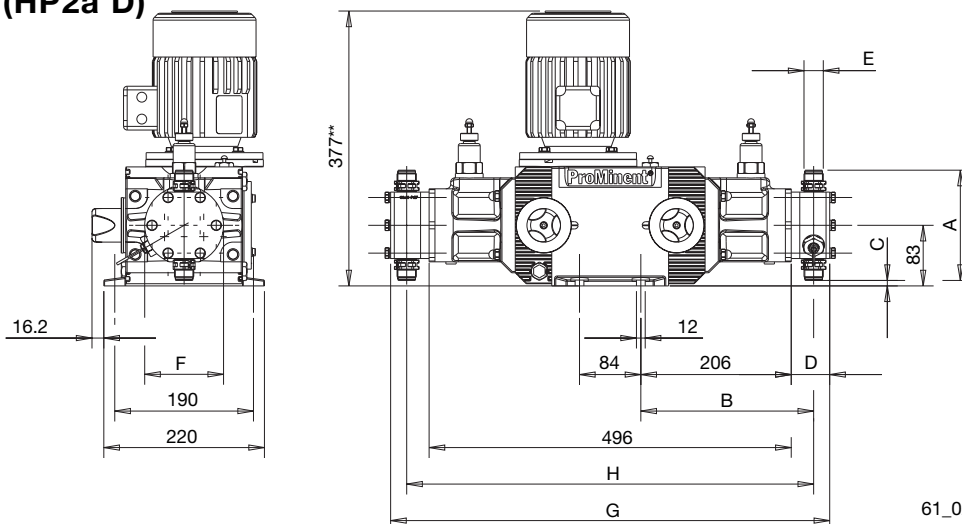
	A	A*	B	B*	C	C*	D	D*	E	E*	F	G	G*
HM 60 SST, HCT	165	195	240	242	12.5	-2.5	51	55	DN10G3/4A	DN10R3/8"	108	457	461
HM 150 SST, HCT	191		247		-0.5		65		DN15G1A		128	471	
HM 60 SST-HV	165		243.5		12.5		57		DN15G1A		108	463	
HM 150 SST-HV	203		251		-6.5		75		DN20G1 1/4A		128	481	
HM 60 PVT	165		240		12.5		55		DN10G3/4A		108	461	
HM 150 PVT	191		247		-0.5		61		DN15G1A		128	467	

HM 60: 064019, 064040, 064048, 064060, 064068, 100010, 100021, 100025, 100031, 100035
 HM 150: 025048, 025100, 025120, 025150, 025170

* Double ball valve

** with standard motor

Hydro HP2, double-headed version, measurement data sheet (HP2a D)



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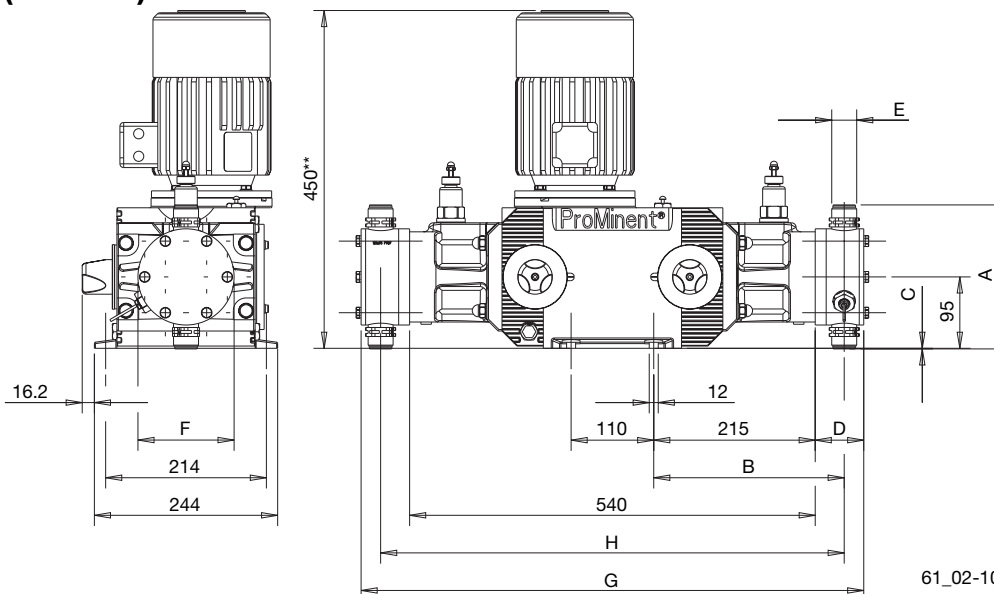
Dimensions of Hydro HP2, double head (in mm)

	A	A*	B	B*	C	C*	D	D*	E	E*	F	G	G*	H	H*
HM 25 SST, HCT	152	180	239	241	7	-7	50	54	DN10G3/4A	DN10R3/8"	108	596	604	562	566
HM 60 SST, HCT	165	195	240	242	0.5	20.5	51	55	DN10G3/4A	DN10R3/8"	108	598	606	564	568
HM 60 SST-HV	165		243.5		0.5		57		DN15G1A		108	610		571	
HM 25 PVT	152		239		7		54		DN10G3/4A		108	604		562	
HM 60 PVT	165		240		0.5		55		DN10G3/4A		108	606		564	

HM 25: 064007, 064015, 064018, 064022, 064025, 100003, 100006, 100007, 100009, 100010
 HM 60: 025019, 025040, 025048, 025060, 025068

* Double ball valve
 ** with standard motor

Hydro HP3, double-headed version, measurement data sheet (HP3a D)



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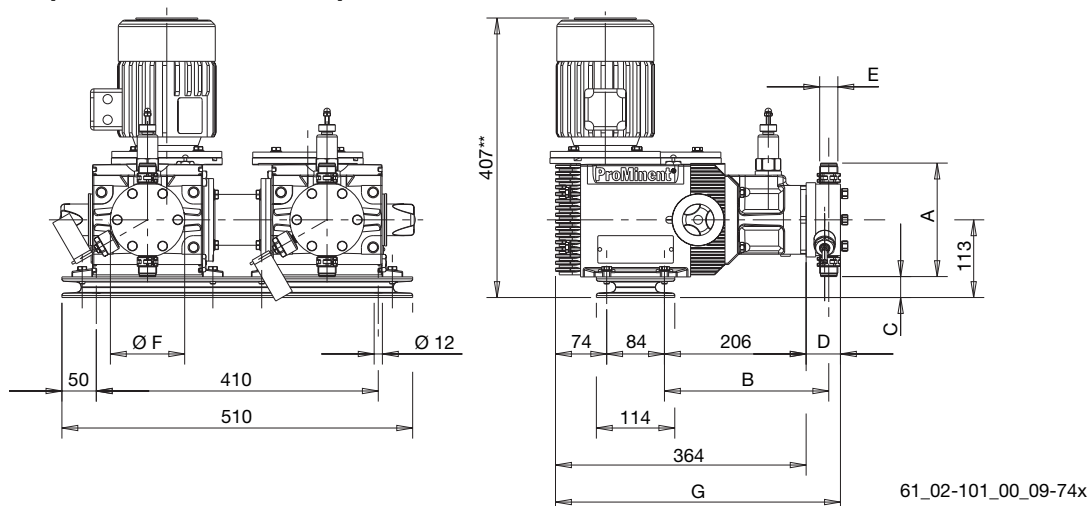
Dimensions of Hydro HP3, double head (in mm)

	A	A*	B	B*	C	C*	D	D*	E	E*	F	G	G*	H	H*
HM 60 SST, HCT	165	195	240	242	12.5	-2.5	51	55	DN10G3/4A	DN10R3/8"	108	641	650	590	594
HM 150 SST, HCT	191		247		-0.5		65		DN15G1A		128	670		604	
HM 60 SST-HV	165		243.5		12.5		57		DN15G1A		108	653		597	
HM 150 SST-HV	203		251		-6.5		75		DN20G1 1/4A		128	690		612	
HM 60 PVT	165		240		12.5		55		DN10G3/4A		108	650		590	
HM 150 PVT	191		247		-0.5		61		DN15G1A		128	661		604	

HM 60: 064019, 064040, 064048, 064060, 064068, 100010, 100021, 100025, 100031, 100035
 HM 150: 025048, 025100, 025120, 025150, 025170

* Double ball valve
 ** with standard motor

Technical specification of Hydro HP2 with add-on power end (HP2a E + HP2a A)



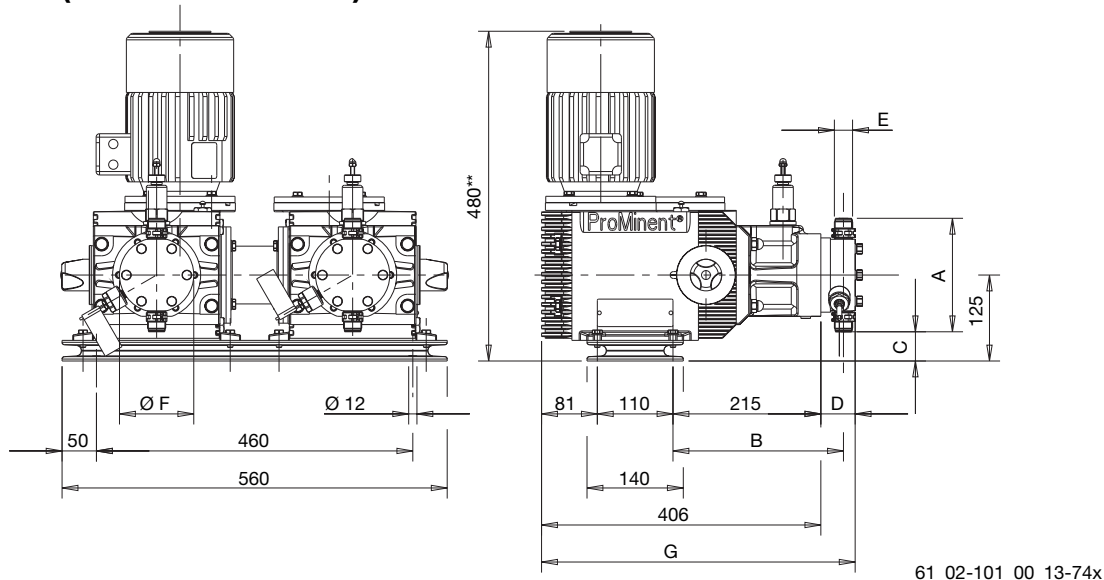
Dimensions of Hydro HP2, add-on power end (in mm)

	A	A*	B	B*	C	C*	D	D*	E	E*	F	G	G*	H	H*
HM 25 SST, HCT	152	180	239	241	37	23	50	54	DN10G3/4A	DN10R3/8"	108	596	604	562	566
HM 60 SST, HCT	165	195	240	242	30.5	15.5	51	55	DN10G3/4A	DN10R3/8"	108	598	606	564	568
HM 60 SST-HV	165		243.5		30.5		57		DN15G1A		108	421			
HM 25 PVT	152		239		37		54		DN10G3/4A		108	604		562	
HM 60 PVT	165		240		30.5		55		DN10G3/4A		108	606		564	

HM 25: 064007, 064015, 064018, 064022, 064025, 100003, 100006, 100007, 100009, 100010
 HM 60: 025019, 025040, 025048, 025060, 025068

* Double ball valve
 ** with standard motor

Technical specification of Hydro HP3 with add-on power end (HP3a E + HP3a A)



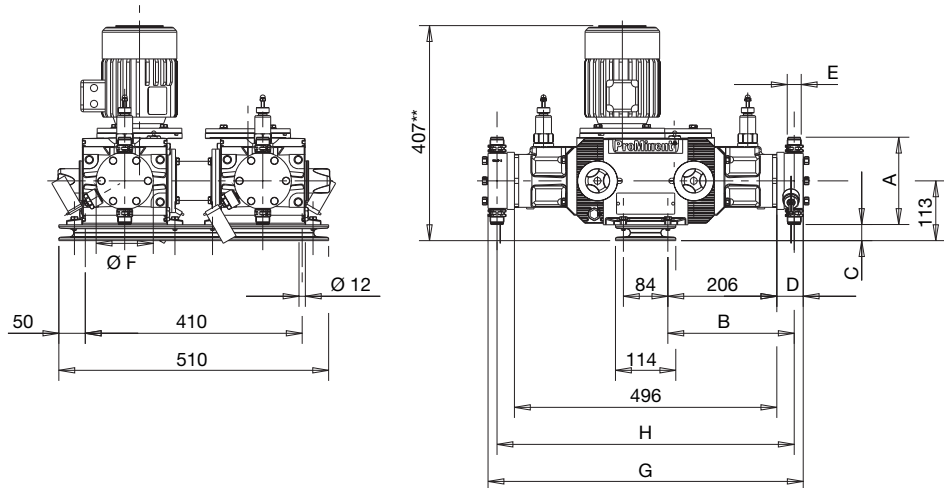
Dimensions of Hydro HP3, add-on power end (in mm)

	A	A*	B	B*	C	C*	D	D*	E	E*	F	G	G*
HM 60 SST, HCT	165	195	240	242	42.5	27.5	51	55	DN10G3/4A	DN10R3/8"	108	457	461
HM 150 SST, HCT	191		247		29.5		65		DN15G1A		128	471	
HM 60 SST-HV	165		243.5		42.5		57		DN15G1A		108	463	
HM 150 SST-HV	191		247		29.5		65		DN20G1 1/4A		128	481	
HM 60 PVT	165		240		42.5		55		DN10G3/4A		108	461	
HM 150 PVT	191		247		29.5		61		DN15G1A		128	467	

HM 60: 064019, 064040, 064048, 064060, 064068, 100010, 100021, 100025, 100031, 100035
 HM 150: 025048, 025100, 025120, 025150, 025170

* Double ball valve
 ** with standard motor

Technical specification of Hydro HP2 with add-on power end, double-headed versions (HP2a F + HP2a B)



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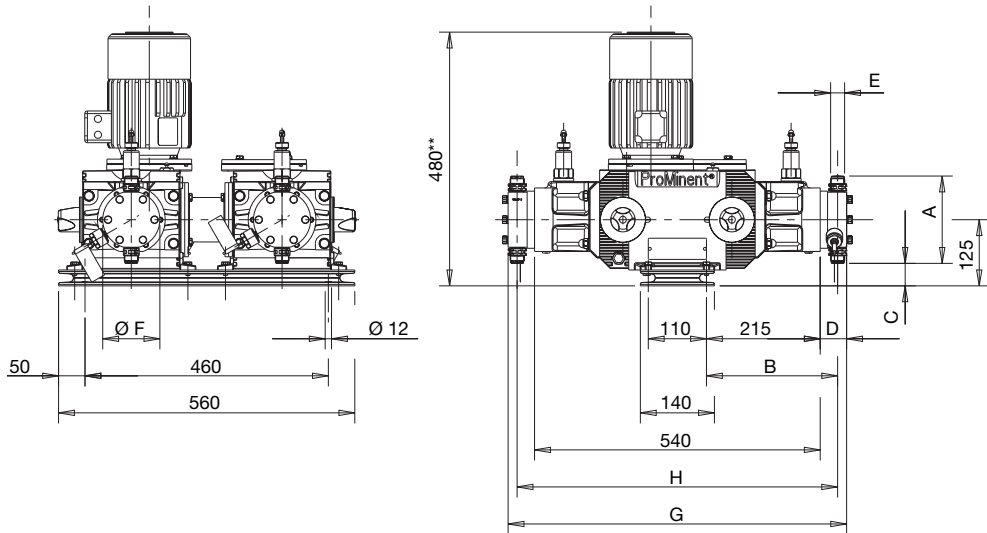
Dimensions of Hydro HP2, add-on power end, double-head (in mm)

	A	A*	B	B*	C	C*	D	D*	E	E*	F	G	G*
HM 25 SST, HCT	152	180	239	241	37	23	50	54	DN10G3/4A	DN10R3/8"	108	414	418
HM 60 SST, HCT	165	195	240	242	30.5	15.5	51	55	DN10G3/4A	DN10R3/8"	108	415	419
HM 60 SST-HV	165		243.5		30.5		57		DN15G1A		108	610	571
HM 25 PVT	152		239		37		54		DN10G3/4A		108	418	
HM 60 PVT	165		240		30.5		55		DN10G3/4A		108	419	

HM 25: 064007, 064015, 064018, 064022, 064025, 100003, 100006, 100007, 100009, 100010
 HM 60: 025019, 025040, 025048, 025060, 025068

* Double ball valve
 ** with standard motor

Technical specification of Hydro HP3 with add-on power end, double-headed versions (HP3a F + HP3a B)



61_02-101_00_14-74x

Dimensions of Hydro HP3, add-on power end, double-head (in mm)

	A	A*	B	B*	C	C*	D	D*	E	E*	F	G	G*	H	H*
HM 60 SST, HCT	165	195	240	242	42.5	27.5	51	55	DN10G3/4A	DN10R3/8"	108	641	650	590	594
HM 150 SST, HCT	191		247		29.5		65		DN15G1A		128	670		604	
HM 60 SST-HV	165		243.5		42.5		57		DN15G1A		108	653		597	
HM 150 SST-HV	203		251		23.5		75		DN20G1 1/4A		128	690		612	
HM 60 PVT	165		240		42.5		55		DN10G3/4A		108	650		590	
HM 150 PVT	191		247		29.5		61		DN15G1A		128	661		604	

HM 60: 064019, 064040, 064048, 064060, 064068, 100010, 100021, 100025, 100031, 100035
 HM 150: 025048, 025100, 025120, 025150, 025170

* Double ball valve
 ** with standard motor

For pumps without EX protection:

EC Declaration of Conformity

We,

ProMinent Dosiertechnik GmbH
Im Schuhmachergewann 5 - 11
D - 69123 Heidelberg

hereby declare that, on the basis of its functional concept and design and in the version brought into circulation by us, the product specified in the following complies with the relevant, fundamental safety and health stipulations laid down by EC regulations.

Any modification to the product not approved by us will invalidate this declaration.

Product description :

Metering pump, Series Hydro

Product type :

HP2a ... / HP3a ...

Serial number :

see type identification plate on device

Relevant EC regulations :

EC - machine regulation (98/37/EEC)
EC - low voltage regulation (73/23/EEC)
EC - EMC - regulation (89/336/EEC
subsequently 92/31/EEC)

Harmonised standards used,
in particular :

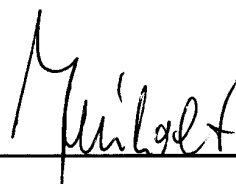
DIN EN 292-1, DIN EN 292-2, DIN EN 809, DIN EN 563, DIN EN 982
DIN EN 60034-1/7/18, DIN EN 63335-1, DIN EN 60335-2-41
DIN EN 60204-1, DIN EN 50081-1/2, DIN EN 50082-1/2
DIN EN 55014-1/2

National standards and other
technical specifications used,
in particular :

DIN VDE 0530 T1/T5/T7/T18
EN 60034-5, IEC 60034-1/5/7/18, IEC 38

Date/manufacturer's signature :

11.05.00



The undersigned :

Manfred Hüholt, factory manager

For pumps with EX protection:

EC Declaration of Conformity

We,

ProMinent Dosiertechnik GmbH
Im Schuhmachergewann 5 - 11
D - 69123 Heidelberg

hereby declare that, on the basis of its functional concept and design and in the version brought into circulation by us, the product specified in the following complies with the relevant, fundamental safety and health stipulations laid down by EC regulations.

Any modification to the product not approved by us will invalidate this declaration.

Product description : **Metering pump, Series Hydro**
Version "explosion-proof" according to "ATEX 95"

Product type : **HP2a ... / HP3a ..., characteristic value "electric connection" = "P" or "L",**
and characteristic value motor version = "1" or "2"
or "electric connection" = "0, 3 or 4" and motor version = "A"

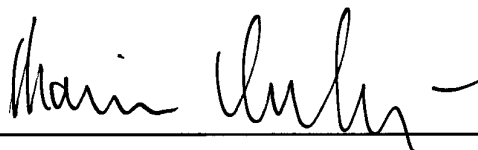
Serial number : **see type identification plate on device**

Relevant EC regulations : **EC - machine regulation (98/37/EC)**
EC - low voltage regulation (73/23/EEC)
EC - EMC - regulation (89/336/EEC subsequently 92/31/EEC)
EC-Ex-regulation (94/9/EEC)

Harmonised standards used, in particular Pump without motor: **DIN EN 292-1, DIN EN 292-2, DIN EN 809, DIN EN 13463-1, prEN 13463-5**
Motor Ex "e": **EN 50014, EN 50019, EN 60334-1/5/6/7/8/9/12/14**
Motor Ex "d": **EN 50014, EN 50018, EN 50019, EN 60034-1/5/6/7/9/12/14**
Stroke sensor: **EN 50014, EN 50020, EN 60947-5-2, EN 60947-5-6**

National standards and other technical specifications used, in particular : **DIN 44081 (thermo-protection Ex "d" - motor)**

Date/manufacture's signature : **20.08.2003**



The undersigned : **Dr. Rainer V. Dulger, Executive Vice President R&D and Production**

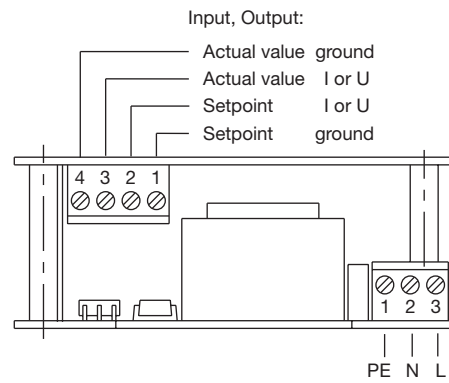
The EC conformity declaration for the pump for explosion-threatened workplaces is supplied with the pump. The EC conformity declarations, the EC series prototype test reports and the operating manuals for the individual components are also supplied with the pump.

Besteller Nr. order no./ no. du	Motor data sheet Motor Datenblatt Fiche technique pour moteur				Hersteller producer/ producteur
1003455/A					ATB
Motor-Typ motor type type du moteur	AF71/4B-7		Leistungsfaktor power factor facteur de puissance	0,70/0,70	
Maschinenart type of machine modèle	3-Ph. Motor		Wirkungsgrad efficiency rendement	70	%
Schutzart degree of protection degré de protection	IP55		Bemessungsfrequenz rated frequency fréquence nominale	50/60	Hz
Bauform mounting construction	IMV1		Bemessungsdrehzahl rated speed vitesse nominale	1420/1720	U/min rpm t/mn
Bemessungsleistung rated output puissance nominale	0,370 kW	kW	Wärmeklasse temperature class classe thermique	F	
Bemessungsspannung rated voltage tension nominale	λ / Δ 400/230	V	Anzugsstrom starting current courant de démarrage	4,4	fach fold fois
Bemessungsstrom rated current courant nominal	1,30/2,30 (50Hz) 1,10/1,90 (60Hz)	A	Anzugsmoment starting torque couple de démarrage	2,4	fach fold fois
Geprüft nach tested in acc. with contrôlé selon	/		Kippmoment pull-out torque couple de décrochage	2,65	fach fold fois
PTB Nr.	/		Umgebungstemperatur ambient temperature température ambiante	40	°C
Anmerkung comments observation	400/230 V 380-420/220-242 V (50Hz) 380-460/220-265 V (60Hz)				
ProMinent Dosiertechnik GmbH · D 69123 Heidelberg · Germany					Nr./No. MD-1003455/A
Pumpentyp:	S3Ba _____ S _____ HP2a _____ S _____				Datum/Date 08.08.2000

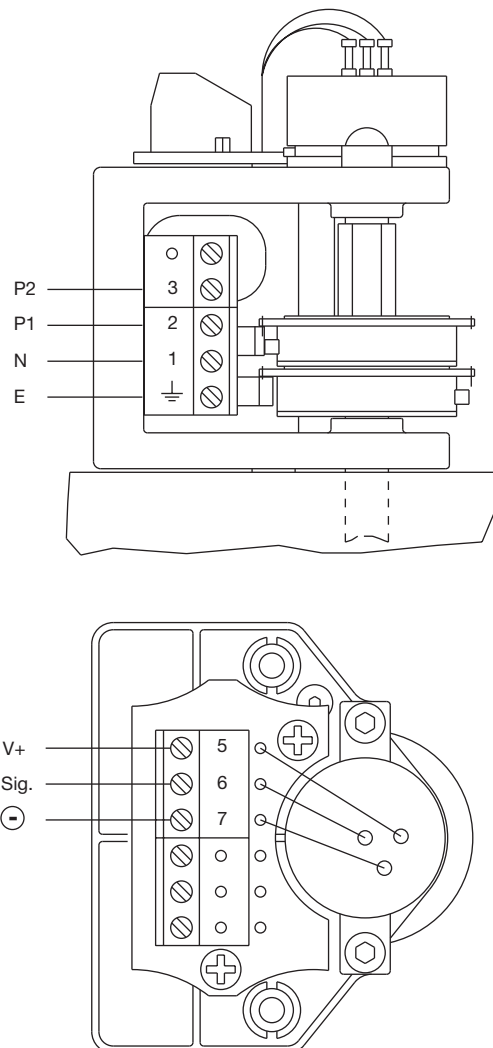
Für weitere Informationen können die Motordatenblätter angefordert werden.
Sondermotoren bzw. Sonder-Motorflansche sind auf Anfrage möglich.
Motor datasheets are available for further information.
Special motors and special motor flanges are possible on request.

Bestell Nr. order no./ no. de commande	Motor data sheet Motor Datenblatt Fiche technique pour moteur				Hersteller producer/ fabricant
1003974					ATB
Motor-Typ motor type type du moteur	AF80/4B-11		Leistungsfaktor power factor facteur de puissance	0,74/0,78	
Maschinenart type of machine désignation	3-ph. Motor		Wirkungsgrad efficiency rendement	75/78	%
Bauform mounting construction	IMV1		Wärmeklasse temperature class classe d'isolement	F	
Bemessungsleistung rated output puissance nominale	0,75	kW	Anzugsstrom starting current courant de démarrage	5,0/5,5	fach fold fois
Schutzart protection class degré de protection	IP55		Anzugsmoment starting torque couple de démarrage	2,4/2,2	fach fold fois
Bemessungsspannung rated voltage tension nominale	λ / Δ 380-420/220-240 V (50Hz) 380-460/220-265 V (60Hz)		Kippmoment pull-out torque couple de décrochage	2,8/2,8	fach fold fois
Bemessungsstrom rated current courant nominal	2,1/3,6 A (50Hz) 1,8/3,1 A (60Hz)		Umgebungstemperatur ambient temperature température ambiante	max. 40 °C	
Bemessungsfrequenz rated frequency fréquence nominale	50/60 Hz		Schaltung connection branchement	λ / Δ	
Bemessungsdrehzahl rated speed vitesse nominale	1410/1700 U/min	rpm t/mn	Identcode identcode code d'identification HP3a _____ S ____		
Pumpentyp pump type type de pompe					
Anmerkung comment remarque	<p>Die Daten entsprechen den Angaben der Motorenhersteller. Kenndaten funktionsgleicher Motoren anderer Hersteller ändern sich nur unwesentlich. Angaben ohne Gewähr. The data correspond to the details given by the motor manufacturers. Ratings of motors with the same functions made by other producers show insignificant changes only. This information is supplied without liability. Les données techniques correspondent au descriptif du fabricant des moteurs. Les données techniques de moteurs similaires chez d'autres fabricants varient très peu. Ces données sont d'ordre général.</p>				
ProMinent Dosiertechnik GmbH · D 69123 Heidelberg · Germany					Nr./No. MD-1003974 Datum/Date 12.02.2001

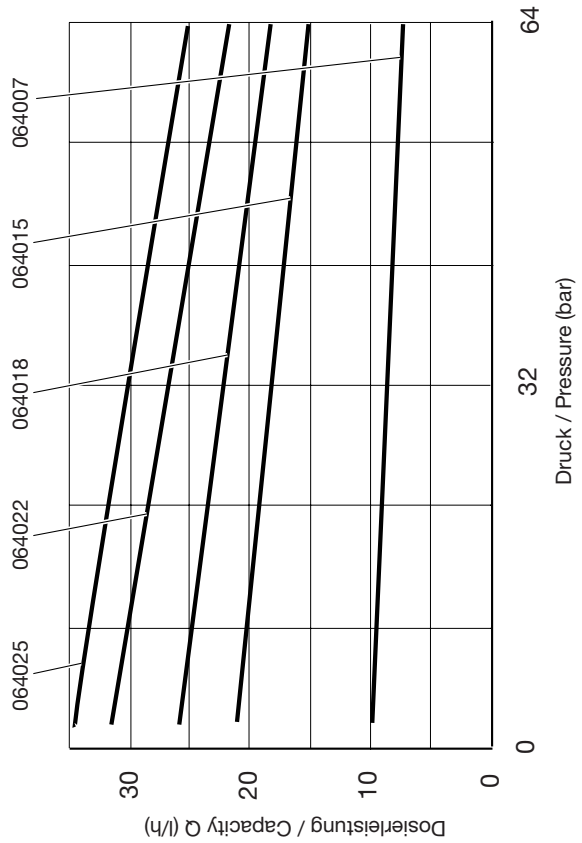
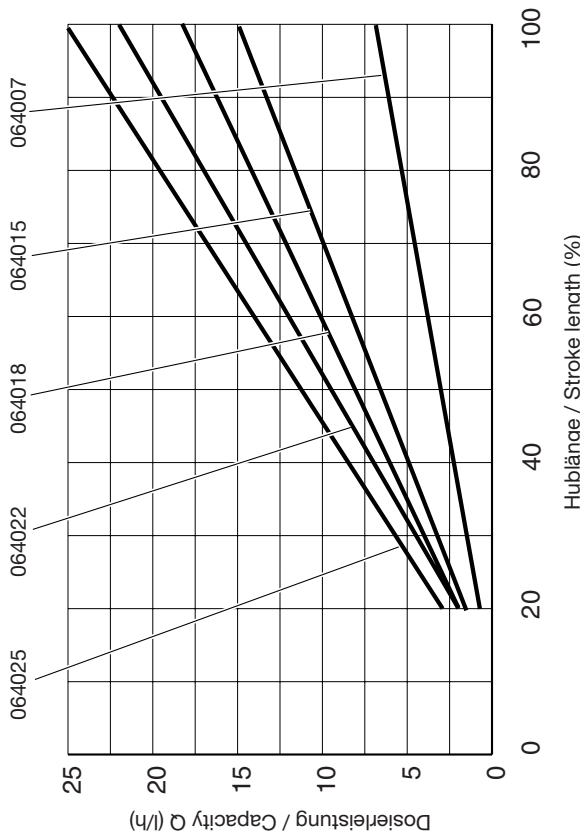
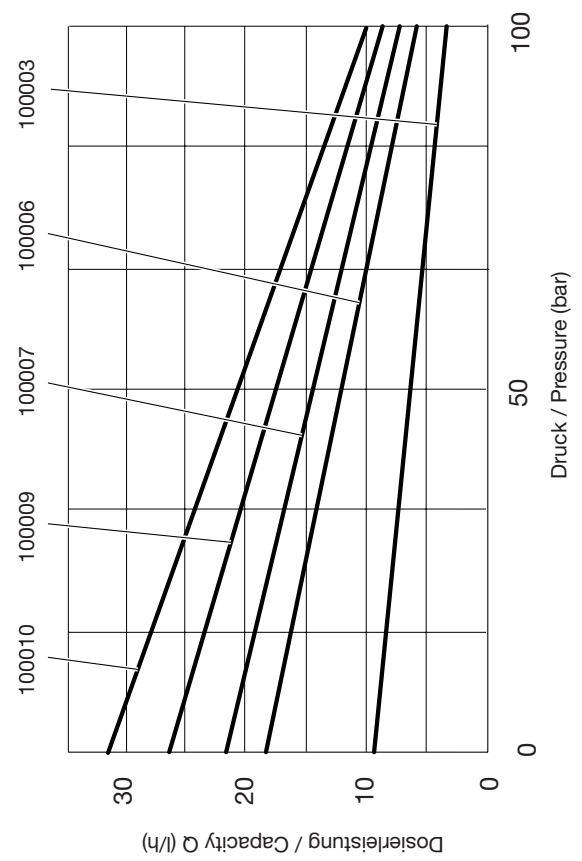
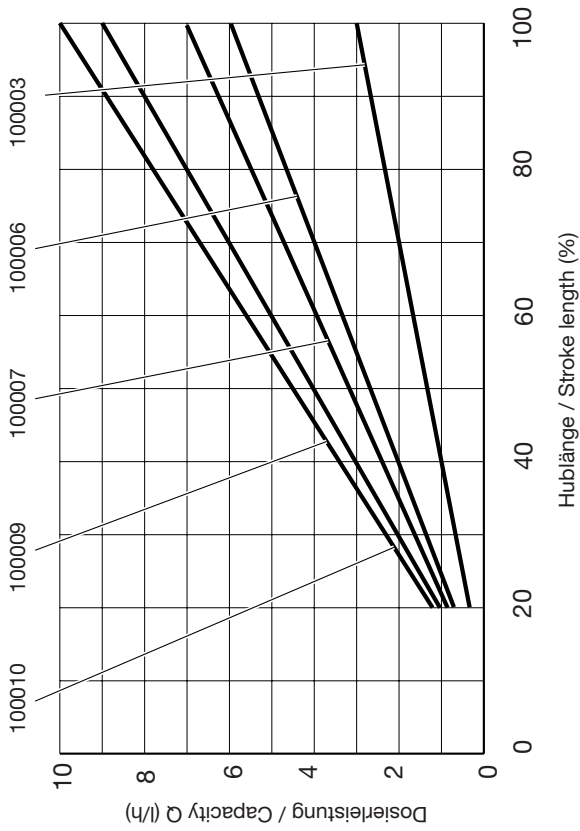
Stroke actuator wiring diagram



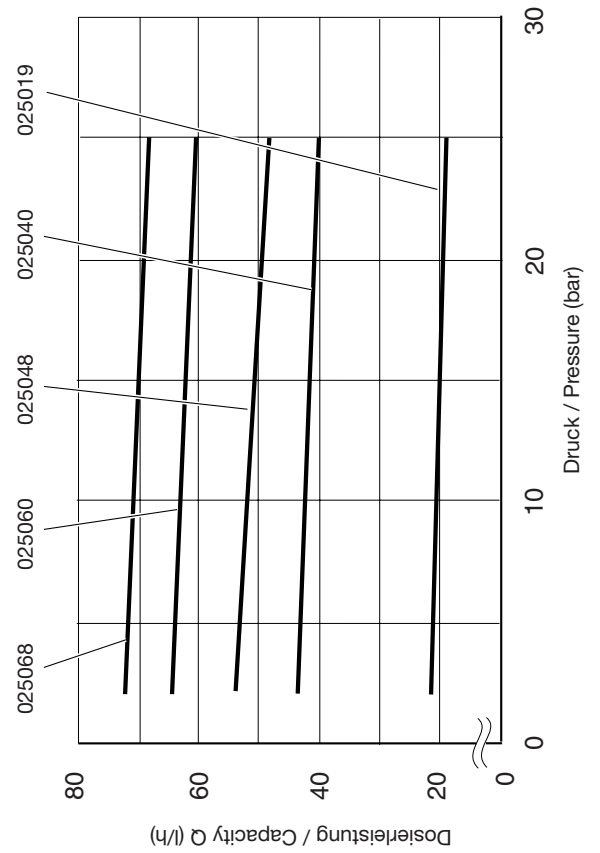
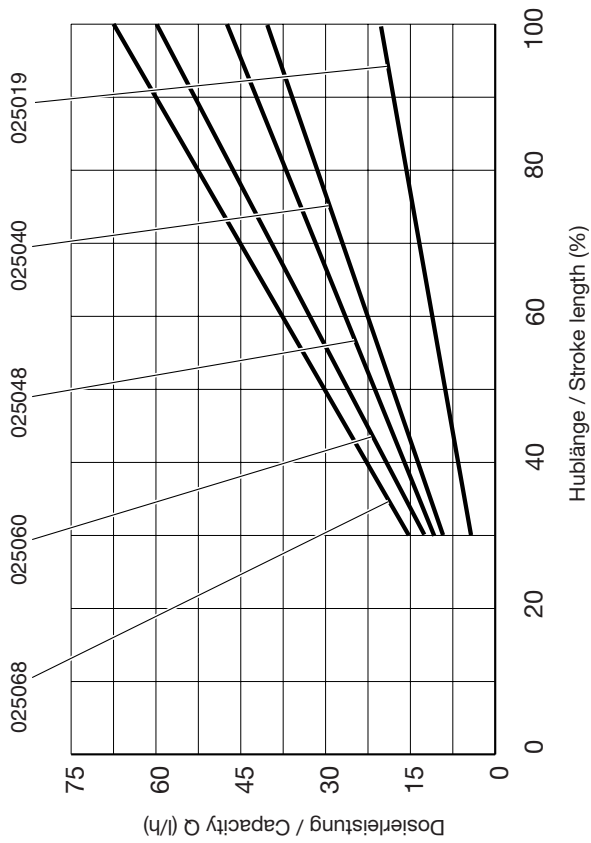
Stroke adjuster wiring diagram



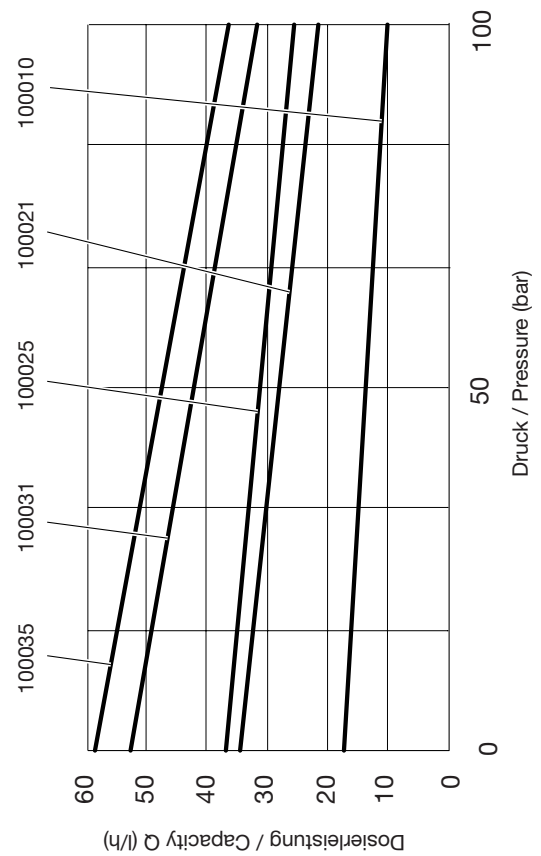
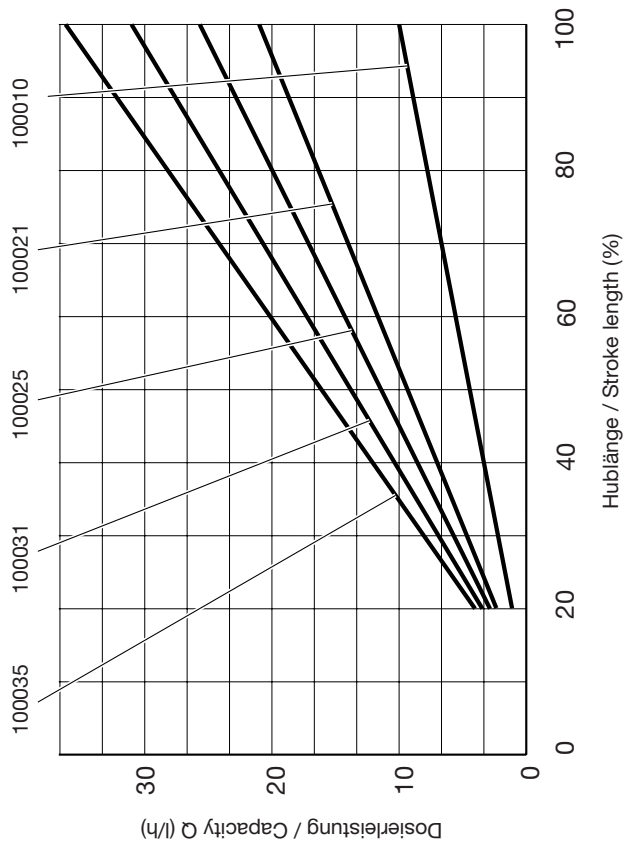
Performance diagram Hydro/ 2 HP2a H



Performance diagram Hydro/ 2 HP2a H



Performance diagram Hydro/ 3 HP3a H



Performance diagram Hydro/ 3 HP3a H

