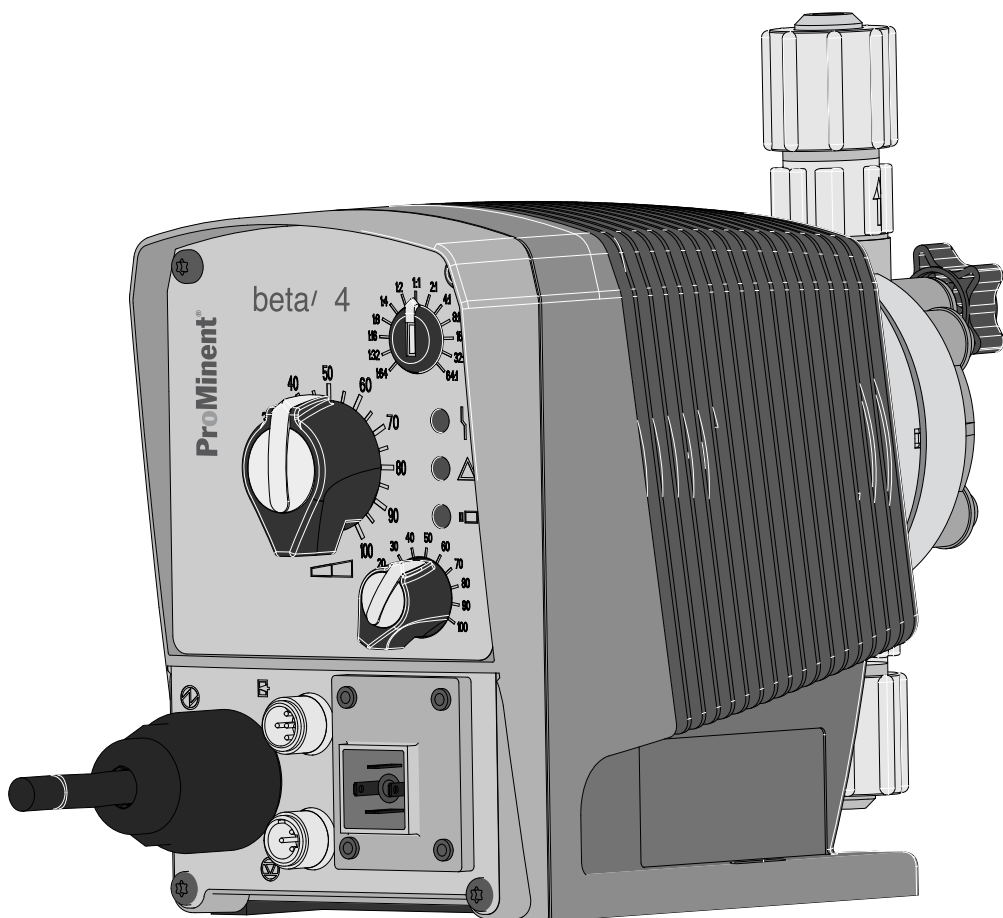


Operating instructions

Solenoid Metering Pump

Beta® b BT4b and BT5b



Two sets of operating instructions are required for the safe, correct and proper operation of the metering pumps: The product-specific operating instructions and the "General Operating Instructions for ProMinent® Solenoid Metering Pumps". Both sets of operating instructions are only valid when read together.

Please carefully read these operating instructions before use! · Do not discard!
The operator shall be liable for any damage caused by installation or operating errors!
 Technical changes reserved.

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986357, 2, en_GB

Supplementary information



Fig. 1: Please read!

Read the following supplementary information in its entirety! Should you already know this information, you have an even greater need of the Operating Instructions.

The following are highlighted separately in the document:

- Enumerated lists



Instructions

⇒ Outcome of the instructions

Information



This provides important information relating to the correct operation of the device or is intended to make your work easier.

Safety information

Safety information is identified by pictograms - see Safety Chapter.

User information

Two sets of operating instructions are required for the safe, correct and proper operation of the metering pumps: The product-specific operating instructions and the "General Operating Instructions for ProMinent® Solenoid Metering Pumps".

Both sets of operating instructions are only valid when read together.

Please read these operating instructions carefully before use! Do not discard!

State the identity code and serial number

Please state identity code and serial number, which you can find on the nameplate when you contact us or order spare parts. This enables the device type and material versions to be clearly identified.

General non-discriminatory approach

In order to make it easier to read, this document uses the male form in grammatical structures but with an implied neutral sense. It is aimed equally at both men and women. We kindly ask female readers for their understanding in this simplification of the text.

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1 Identity code

Product range Beta[®], Version b

BT4 b	Type	Performance	
		bar	l/h
	1000	10	0.74
	1601	16	1.10
	1602	16	2.20
	1604	16	3.60
	0708	7	7.10
	0413	4	12.30
	0220	2	19.00
BT5 b			
	2504	25	2.90
	1008	10	6.80
	0713	7	11.00
	0420	4	17.10
	0232	2	32.00
		Material of dosing head/valves	
	PP	Polypropylene/PVDF. With the self-bleeding version (SEK): polypropylene/polypropylene	
	NP	Clear acrylic/PVDF. With the self-bleeding version (SEK): Clear acrylic/PVC	
	PV	PVDF/PVDF	
	TT	PTFE/PTFE	
	SS	Stainless steel 1.4404/1.4404	
		Material of seals/diaphragm	
	T	PTFE/PTFE coated	
	E	EPDM/PTFE coated, only for PP and NP self-bleeding (SEK)	
	B	FPM-B/PTFE coated, only for PP and NP self-bleeding (SEK)	
	S	Diaphragm additionally with FPM coating for media containing silicate	
		Dosing head version	
	0	without bleed valve, without valve spring only for NP, TT, SS and type 0232	
	1	without bleed valve, with valve spring only for NP, TT, SS and type 0232	
	2	with bleed valve, without valve spring only for PP, PV, NP not for type 0232	
	3	with bleed valve, with valve spring only for PP, PV, NP not for type 0232	
	4	version for higher-viscous media only for PVT, type 1604, 2504, 0708, 1008, 0413, 0713, 0220, 0420	
	9	self-bleeding (SEK) only for PP/NP, not for types 1000 and 0232	
		Hydraulic connection	
	0	Standard connection in line with technical data	
	5	connection for 12/6 tube, discharge side only	
	9	connection for 10/4 tube, discharge side only	

Product range Beta[®], Version b

		Version	
0		Standard	
		Logo	
0		With ProMinent [®] Logo	
		Electrical connection	
U		100-230 V ± 10 %, 50/60 Hz	
		Cable and plug	
A		2 m European	
B		2 m Swiss	
C		2 m Australian	
D		2 m USA	
1		2 m open end	
		Relay	
0		No relay	
1		fault indicating relay (NC) (change-over relay)	
3		fault indicating relay (NO) (change-over relay)	
4		as 1 + pacing relay, (ONE each)	
5		as 3 + pacing relay, (ONE each)	
		Accessories	
0		No accessories	
1		with foot and injection valve, 2 m PVC suction line, 5 m metering line	
		Control type	
0		no lock	
1		with lock: manual operation locked when external cable plugged in	
		Control versions	
0		Standard	
		Options	
00		no options	

2 About this Pump

Properties of the device

This solenoid metering pump is equipped with all adjustment and activation functions for modern water treatment and the dosing of chemicals. It has pulse step-up and pulse step-down compared with the preceding model. This enables it to adapt more precisely to external signal generators. The result is the simpler and more precise adjustment of chemical consumption to the actual need. It also has a 10 % increase in efficiency and energy efficiency over the preceding model. The Beta[®] can be simply adjusted during operation.

3 Safety chapter




Explanation of the safety information

The following signal words are used in these operating instructions to identify different severities of a hazard:

Signal word	Meaning
WARNING	Denotes a possibly hazardous situation. If this is disregarded, you are in a life-threatening situation and this can result in serious injuries.
CAUTION	Denotes a possibly hazardous situation. If this is disregarded, it could result in slight or minor injuries or material damage.

Warning signs denoting different types of danger

The following warning signs are used in these operating instructions to denote different types of danger:

Warning signs	Type of danger
	Warning – automatic start-up.
	Warning – high-voltage.
	Warning – danger zone.

Correct and proper use

- The pump may only be used to dose liquid metering chemicals.
- The pump may only be started up after it has been correctly installed and commissioned in accordance with the technical data and specifications contained in the operating instructions.
- Observe the general limitations with regard to viscosity limits, chemical resistance and density - see also ProMinent resistance list (In the product equipment catalogue or at www.prominent.com)!
- Any other uses or modifications are prohibited.
- The pump is not intended for the dosing of gaseous media or solids.
- The pump is not intended for operation in explosive areas.
- The pump is not intended for exterior applications without use of suitable protective equipment.
- The pump should only be operated by trained and authorised personnel, see the following "Qualifications" table.
- You are obliged to observe the information contained in the operating instructions at the different phases of the device's service life.

Safety information



WARNING!

Warning about personal and material damage

The pump can start to pump, as soon as it is connected to the mains voltage.

- Install an emergency cut-off switch in the pump power supply line or integrate the pump in the emergency cut-off management of the system.



WARNING!

Danger of electric shock

A mains voltage may exist inside the pump housing.

- If the pump housing has been damaged, you must disconnect it from the mains immediately. It may only be returned to service after an authorised repair.



WARNING!

Fire danger

Combustible media may only be transported using stainless steel dosing heads. In exceptional cases where this is not possible, PTFE with carbon can be used, whereby our TT_ versions are manufactured from this conducting plastic. Here, the operator is urged to take special care due to the low mechanical strength.



WARNING!

Warning of hazardous or unknown feed chemical

Should a hazardous or unknown feed chemical be used, it may escape from the hydraulic components when working on the pump.

- Take appropriate protective measures before working on the pump (protective eyewear, protective gloves, ...). Read the safety data sheet on the feed chemical.
- Drain and flush the liquid end before working on the pump.



CAUTION!

Warning of feed chemical spraying around

Feed chemical can spray out of the hydraulic components if they are manipulated or opened due to pressure in the liquid end and adjacent parts of the system.

- Disconnect the pump from the mains power supply and ensure that it cannot be switched on again by unauthorised persons.
- Depressurise the system before commencing any work on hydraulic parts.

**CAUTION!****Warning of feed chemical spraying around**

An unsuitable feed chemical can damage the parts of the pump contacted by the chemical.

- Take into account the resistance of the material contacted by the chemical when selecting the feed chemical - refer to the ProMinent® resistance list in the product equipment catalogue or at www.prominent.com.

**CAUTION!****Warning of feed chemical spraying around**

The metering pump can generate a multiple of its rated pressure. If a discharge line is blocked, hydraulic parts may burst.

- Correctly install a back pressure valve in the discharge line behind the metering pump.

**CAUTION!****Danger of personal and material damage**

The use of untested third party parts can result in damage to personnel and material damage.

- Only fit parts to dosing pumps, which have been tested and recommended by ProMinent.

**CAUTION!****Danger from incorrectly operated or inadequately maintained pumps**

Danger can arise from a poorly accessible pump due to incorrect operation and poor maintenance.

- Ensure that the pump is accessible at all times.
- Adhere to the maintenance intervals.

**CAUTION!****Danger from incorrect metering**

Should a different liquid end size be fitted, this will change the metering behaviour of the pump.

- Have the pump reprogrammed in the works.

**CAUTION!****Warning of illegal operation**

Observe the regulations that apply where the unit is to be installed.

Fixed separating protective equipment

- Dosing head
- Housing
- Hood (houses the control elements)

The dosing head may only be removed by the customer in accordance with the "Repair" chapter.

The housing and the hood may only be removed by ProMinent's Pro-Maqua customer service department.

Information in the event of an emergency

In an emergency, either pull out the mains plug or press the customer installed emergency-off switch or disconnect the pump according to the emergency-off management for your system!

If feed chemical escapes, also depressurise the hydraulic system around the pump. Adhere to the safety data sheet for the feed chemical.

Qualification of personnel

Activity	Qualification level
Storage, transport, unpacking	Instructed personnel
Installation, installation of hydraulic system	Technical personnel
Installation, electrical	Electrical technician
Operation	Instructed personnel
Maintenance, repair	Technical personnel
Decommissioning, disposal	Technical personnel
Troubleshooting	Technical personnel, electrical technician, instructed personnel

Explanation of the terms:**Technical experts**

A technical expert is deemed to be a person who is able to assess the tasks assigned to him and recognize possible hazards based on his/her technical training and experience, as well as knowledge of applicable regulations.

Note:

A technical qualification is typically proven by the required completion of a technical training course, e.g. as an engineer or craftsman. The assessment of a person's technical training can also be based on several years of work in the relevant field.

Qualified personnel

A qualified employee is deemed to be a person who is able to assess the tasks assigned to him and recognise possible dangers based on his/her technical training, knowledge and experience, as well as knowledge of pertinent regulations.

Note:

A qualification of equal validity to a technical qualification can also be gained by several years employment in the relevant work area.

Instructed personnel

An instructed person is deemed to be a person who has been instructed and, if required, trained in the tasks assigned to him/her and possible dangers that could result from improper behaviour, as well as having been instructed in the required protective equipment and protective measures.

Customer Service department

Customer Service department refers to service technicians, who have received proven training and have been authorised by ProMinent to work on the system.

Sound pressure level

Sound pressure level LpA < 70 dB in accordance with EN ISO 20361:2010-10

at maximum stroke length, maximum stroke rate, maximum back pressure (water)

4 Storage, transport and unpacking

Safety information



WARNING!

The transporting of pumps which have been used with radioactive feed chemicals is forbidden!

They will also not be accepted by ProMinent!



WARNING!

Only return the metering pump for repair in a cleaned state and with a flushed liquid end - refer to the section on decommissioning!

Only send metering pumps with a filled in Decontamination Declaration form. The Decontamination Declaration constitutes an integral part of an inspection / repair order. A unit can only be inspected or repaired if a Decontamination Declaration is submitted that has been completed correctly and in full by an authorised and qualified person on behalf of the pump operator.

The "Decontamination Declaration" form can be found in the General Operating Instructions or under www.prominent.com.



CAUTION!

Danger of material damage

The device can be damaged by incorrect or improper storage or transportation!

- The unit should only be stored or transported in a well packaged state - preferably in its original packaging.
- The packaged unit should also only be stored or transported in accordance with the stipulated storage conditions.
- The packaged unit should be protected from moisture and the ingress of chemicals.

Personnel: Technical personnel

Ambient conditions

Data	Value	Unit
Minimum storage and transport temperature	-20	°C
Maximum storage and transport temperature	+60	°C
Maximum air humidity *	95	% rel. humidity

* non-condensing

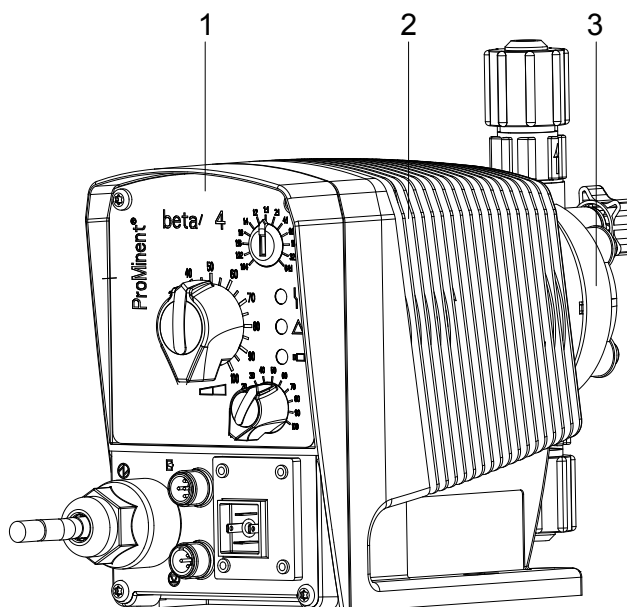
Scope of supply

Compare the delivery note with the scope of supply:

- Metering pump with mains power cable
- Connector kit for hose/pipe connection
- Product-specific operating instructions with EC Declaration of Conformity
- CD with order information, exploded diagrams and data sheets
- Optional accessories if ordered

5 Overview of the Device and Control Elements

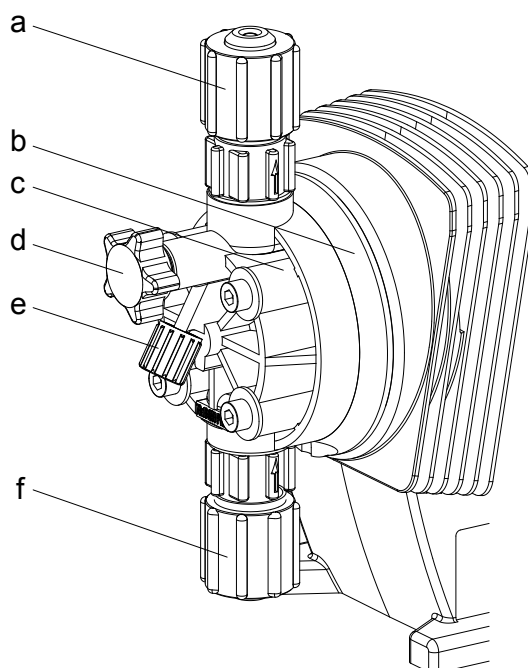
5.1 Overview of the Device



P_BE_0013_SW

Fig. 2: Complete overview

- 1 Control unit
- 2 Drive Unit
- 3 Liquid End

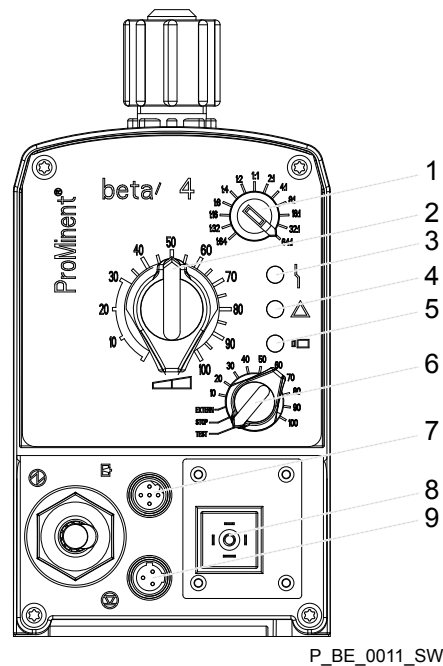


P_BE_0008_SW

Fig. 3: Overview of liquid end (PV)

- a Discharge valve
- b Backplate
- c Dosing head
- d Bleed valve
- e Bypass tube nozzle
- f Suction valve

5.2 Control Elements



P_BE_0011_SW

Fig. 4

- 1 Pulse Control Switch
- 2 Stroke Length Adjustment Knob
- 3 Fault indicator (red)
- 4 Warning indicator (yellow)
- 5 Operating indicator (green)
- 6 Multifunctional Switch
- 7 "External Control" Terminal
- 8 Relay connection (optional)
- 9 "Level Switch" Terminal

5.2.1 Pulse Control Switch

In the Extern Contact operating mode, either a series of strokes can be triggered or an inbound series of contacts can be stepped down via the pulse control switch by a single contact (on the "external control" terminal).

5.2.2 Stroke Length Adjustment Knob

The stroke length adjustment knob can be used to adjust the stroke length.

5.2.3 Multifunctional Switch

The multifunctional switch can be used to set the following functions, operating modes and stroke rate.

The operating modes that can be set are:

- Test (priming function)
- Stop
- Extern (Contact)
- Manual (setting stroke rate in 10 % increments)

5.2.4 Functional and Fault Indicators

Fault indicator (red)

The fault indicator lights up if the fluid level in the chemical feed container falls below the second switching point of the level switch (20 mm residual filling level in the chemical feed container).

This LED flashes in the event of an undefined operating mode.

Warning indicator (yellow)

The warning indicator lights up if the fluid level in the chemical feed container falls below the first switching point of the level switch.

Operating indicator (green)

The operating indicator lights up if the pump is ready for operation and there are no fault or warning alerts. It goes out quickly as soon as the pump has performed a stroke.

5.2.5 "External Control" Terminal

The "external control" terminal is a five-pole panel terminal.

It enables the following functions and operating modes to be used:

- Pause
- Extern Contact
- Auxiliary frequency (external frequency changeover)



The two- and four-pole cables used to date can continue to be used. The "Auxiliary frequency" function can, however, only be used with a five-pole cable.

5.2.6 "Level Switch" Terminal

A 2-stage level switch with pre-warning and end switch-off can be connected.

6 Functional description

6.1 Liquid End

The dosing process is performed as follows: The diaphragm is pressed into the dosing head; the pressure in the dosing head closes the suction valve and the feed chemical flows through the discharge valve out of the dosing head. The diaphragm is now drawn out of the dosing head; the discharge valve closes due to the negative pressure in the dosing head and fresh feed chemical flows through the suction valve into the dosing head. One cycle is completed.

6.2 Drive Unit

The diaphragm is driven by an electromagnet, which is controlled by an electronic controller.

6.3 Capacity

The capacity is determined by the stroke length and the stroke rate.

The stroke length is adjusted by the stroke length adjustment knob within a range of 0 ... 100 %. A stroke length of between 30 ... 100 % (SEK type: 50 ... 100 %) is recommended to achieve the specified reproducibility!

Data	Value	Unit
Recommended stroke length, standard type	30 ... 100	%
Recommended stroke length, SEK type	50 ... 100	%

The stroke rate can be set within a range of 10 ... 100 % using the multifunctional switch.

6.4 Self-Bleeding

Self-bleeding liquid ends (SEK types) are capable of independent priming when a discharge line is connected and diverting existent air pockets via a bypass. During operation they are also capable of conveying away gases which are produced, independently of the operating pressure in the system. It is also possible to dose precisely in a depressurised state due to the integral back pressure valve.

6.5 Operating Modes

The operating modes are selected by means of the multifunctional switch.

"Manual" operating mode

As soon as the stroke rate has been set by the multifunctional switch, the pump finds itself in "Manual" operating mode. 100 % corresponds to 180 strokes/min.

"Extern" operating mode:

The "Extern" operating mode is described below in the "Operation" chapter.

6.6 Functions

The functions are described below in the "Operation" chapter.

6.7 Relay

The pump has two connecting options.

Fault indicating relay option

The relay can switch a connected power circuit (e.g. for an alarm horn) in the event of warnings or fault messages (e.g. warning levels).

The relay can be retrofitted with the retrofit kit via a knock-out opening in the pump foot - refer to "Retrofitting relays".

Fault indicating and pacing relay option

This combined relay can generate a contact with each stroke via its pacing relay in addition to its function as a fault indicating relay.

The relay can be retrofitted with the retrofit kit via a knock-out opening in the pump foot - refer to "Retrofitting relays".

6.8 Hierarchy of Operating Modes, Functions and Fault Statuses

The different operating modes, functions and fault statuses have a different effect on if and how the pump reacts.

The following list shows the order:

1. - Test (priming)
2. - Fault, Stop, Pause
3. - Auxiliary frequency (external frequency changeover)
4. - Manual, Extern Contact

Comments:

re 1 - "Priming" can take place in any mode of the pump (providing it is functioning).

re 2 - "Fault", "Stop" und "Pause" stop everything apart from "Priming".

re 3 - The stroke rate of "Auxiliary frequency" always has priority over the stroke rate specified by an operating mode in 4.

7 Assembly



WARNING!

Risk of electric shock

If water or other electrically conducting liquids penetrate into the drive housing, an electric shock may occur.

- Position the pump so that drive housing cannot be flooded.



CAUTION!

Danger from incorrectly operated or inadequately maintained pumps

Danger can arise from a poorly accessible pump due to incorrect operation and poor maintenance.

- Ensure that the pump is accessible at all times.
- Adhere to the maintenance intervals.



Capacity too low

The liquid end valves can be disrupted by vibrations.

- *Secure the metering pump so that no vibrations can occur.*



Capacity too low

If the valves of the liquid end do not stand vertically upwards, they cannot close correctly.

- *Suction and discharge valves must stand vertically upwards (for self-bleeding liquid end, the bleed valve).*

- Mount the metering pump with the pump foot on a horizontal, level and load-bearing supporting surface.

8 Installation, hydraulic

Safety information

**CAUTION!****Warning of feed chemical spraying around**

An unsuitable feed chemical can damage the parts of the pump contacted by the chemical.

- Take into account the resistance of the material contacted by the chemical when selecting the feed chemical - refer to the ProMinent® resistance list in the product equipment catalogue or at www.prominent.com.

**CAUTION!****Warning of feed chemical spraying around**

Pumps which are not fully installed hydraulically can eject feed chemicals from the outlet openings of the discharge valves as soon as they are connected to the mains.

- The pump must first be hydraulically installed and then electrically.
- In the event that you have failed to do so, press the *[STOP/START]* button or press the emergency-stop switch.

**CAUTION!****Warning of feed chemical spraying around**

Feed chemical can spray out of the hydraulic components if they are manipulated or opened due to pressure in the liquid end and adjacent parts of the system.

- Disconnect the pump from the mains power supply and ensure that it cannot be switched on again by unauthorised persons.
- Depressurise the system before commencing any work on hydraulic parts.

**CAUTION!****Danger from rupturing hydraulic components**

Peak loads during the dosing stroke can cause the maximum permissible operating pressure of the system and pump to be exceeded.

- The discharge lines are to be properly designed.

**CAUTION!****Danger of personal and material damage**

The use of untested third party parts can result in damage to personnel and material damage.

- Only fit parts to dosing pumps, which have been tested and recommended by ProMinent.

**CAUTION!****Warning of illegal operation**

Observe the regulations that apply where the unit is to be installed.

8.1 Install hose lines

8.1.1 Installation for metering pumps without bleed valve

Safety information



CAUTION!

Warning of feed chemical spraying around

If the pipes are improperly installed, they can come loose or burst.

- Route all hose lines so they are free from mechanical stresses and kinks.
- Only use original hoses with the specified hose dimensions and wall thicknesses.
- To ensure high durability of the connections, only use clamp rings and hose nozzles that are intended for the hose diameter in question.



CAUTION!

Danger resulting from rupturing hydraulic components

Hydraulic components can rupture if the maximum permissible operating pressure is exceeded.

- Always maintain the maximum permissible operating pressure of all hydraulic components - please refer to the product specific operating instructions and system documentation.
- Never allow the metering pump to run against a closed shut-off device.
- Install a relief valve.



CAUTION!

Hazardous feed chemicals can escape

Hazardous or extremely aggressive feed chemicals can leak out during conventional bleeding procedures.

- Install a bleed line with recirculation into the storage tank.



CAUTION!

Hazardous feed chemicals can escape

Hazardous or extremely aggressive feed chemicals can leak out in the event that the metering pump is removed from the installation.

- Shut-off valves must be installed on the metering pump's pressure and discharge sides.



CAUTION!

Uncontrolled flowing feed chemicals

Feed chemicals can leak through a stopped metering pump in the event of back pressure.

- For this purpose, use an injection valve or vacuum breaker.

**CAUTION!****Uncontrolled flowing feed chemicals**

Feed chemicals can leak through the metering pump in an uncontrolled manner in the event of excessive priming pressure.

- The maximum priming pressure for the metering pump may not be exceeded - please refer to the product-specific operating instructions.



The pipes are to be aligned in such a way as the metering pump and the liquid end can be removed from the side, if necessary.

Install hose lines - design PP, NP, PV, TT

1. ➔ Cut off the ends of the hoses straight.
2. ➔ Pull the union nut (2) and clamp ring (3) over the hose (1) - see figure .
3. ➔ Push the hose end (1) up to the stop over the nozzle (4). Widen it, if necessary.



Ensure that the O-ring and flat seal (5) is properly fitted to the valve (6).



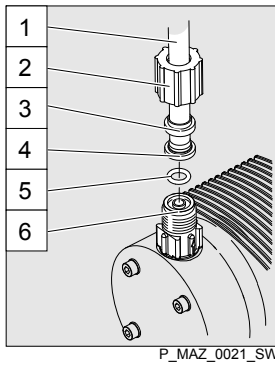
Used PTFE seals may never be re-used. An installation sealed in this way will not be watertight.

The reason for this is that this type of seal is permanently distorted when subjected to pressure.



In order to enable it to be distinguished from the EPDM flat seal, the FPM flat seal design PV has a dot.

4. ➔ Place the hose (1) with the nozzle (4) onto the valve (6).
5. ➔ Clamp the hose connector: Screw the union nut (2) tight while simultaneously pressing on the hose (1).
6. ➔ Re-tighten the hose connector: Pull on the hose (1) briefly, which is fastened to the dosing head, and tighten up the union nut (2) once more.

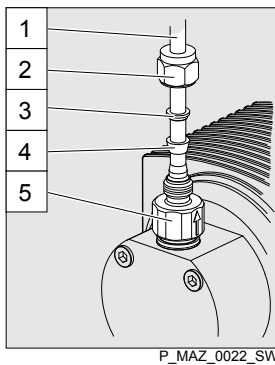


- 1 Hose
- 2 Union nut
- 3 Clamp ring
- 4 Nozzle
- 5 O-ring and flat seal
- 6 Valve

Fig. 5: Designs PP, NP, PV, TT

Installing stainless steel pipe - design SS

1. ➤ Pull the union nut (2) and clamp rings (3, 4) over the pipe (1) with approx. 10 mm overhang - see .
2. ➤ Insert the pipe (1) up to the stop in the valve (5).
3. ➤ Tighten the union nut (2).



- 1 Pipe
- 2 Union nut
- 3 Rear clamp ring
- 4 Front clamp ring
- 5 Valve

Fig. 6: Design SS

Installing hose lines - design SS



CAUTION!

Warning of feed chemical spraying around

Connections can come free in the event that hose lines are installed incorrectly on stainless steel valves.

- Only use PE or PTFE hose lines.
- In addition, insert a stainless steel support insert into the hose line.

8.1.2 Installation for metering pumps with bleed valve

Safety information



CAUTION!

- All of the installation and safety notes for metering pumps without bleed valves also apply.

Installation of the return line

A return line is connected in addition to the suction and discharge lines.

1. ➤ Fasten the hose pipe to the return line tube nozzle or to the liquid end bleed valve. PVC hose, soft, 6x4 mm is recommended for this.
2. ➤ Feed the free end of the return line back to the storage tank.

3. ➔ Shorten the return line hose so that it cannot submerge into the feed chemical in the storage tank.

8.1.3 Installation for metering pumps with self-bleeding (SEK type)

Safety information



CAUTION!

- All of the installation and safety notes for metering pumps without self-bleeding also apply.
- The maximum values for priming lift, priming pressure and the viscosity of the feed chemical may not be exceeded.
- The suction end hose line cross section may not exceed the hose line cross section of the suction valve.



Information about priming pressure

- *The priming pressure on the suction end must be at least equal to the return line pressure.*
- *Priming pressure in the return line restricts the bleeding function.*
- *However, operation with priming pressure in the return line and the suction end at atmospheric pressure is possible.*

Installation of the return line

A return line is connected in addition to the suction and discharge lines.



- *The return line is connected to the vertical valve on the upper side of the liquid end. It is labelled with a red sleeve from factory - see .*
- *The discharge line is connected to the vertical valve.*

1. ➔ Fasten the hose pipe to the return line tube nozzle or to the liquid end bleed valve. PVC hose, soft, 6x4 mm is recommended for this.
2. ➔ Feed the free end of the return line back to the storage tank.
3. ➔ SEK only: Insert the return line into the antikink device on the bleed valve and screw it in place until the antikink device engages.



The antikink device prevents the return line from kinking, thereby avoiding the risk of self-bleeding system failure.

4. ➔ Shorten the return line hose so that it cannot submerge into the feed chemical in the storage tank.

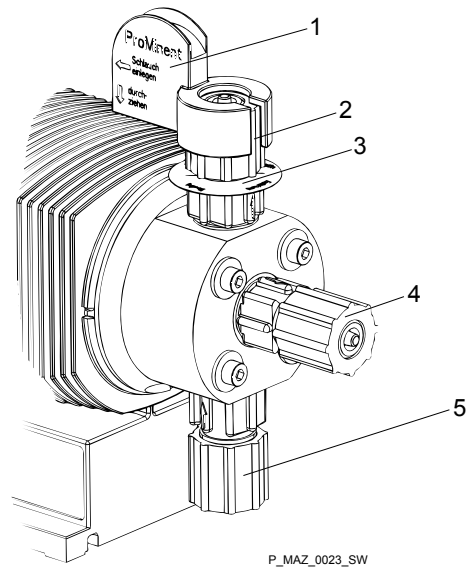


Fig. 7: SEK liquid end

- 1 Antikink device
- 2 Bleed valve for the return line in the storage tank, 6/4 mm
- 3 Red sleeve
- 4 Discharge valve for discharge line to injection point, 6/4 - 12/9 mm
- 5 Suction valve for suction line in storage tank, 6/4 - 12/9 mm

9 Electrical installation

**WARNING!****Danger of electric shock**

A mains voltage may exist inside the device.

- Before any work, disconnect the device's mains cable from the mains.

**WARNING!****Risk of electric shock**

This pump is supplied with a grounding conductor and a grounding-type attachment plug.

- To reduce the risk of electric shock, ensure that it is connected only to a proper grounding-type receptacle.

**WARNING!****Risk of electric shock**

In the event of an electrical accident, the pump must be quickly disconnected from the mains.

- Install an emergency cut-off switch in the pump power supply line or
- Integrate the pump in the emergency cut-off management of the system and inform personnel of the isolating option.

**WARNING!****Danger of electric shock**

A mains voltage may exist inside the pump housing.

- If the pump housing has been damaged, you must disconnect it from the mains immediately. It may only be returned to service after an authorised repair.

**CAUTION!****Material damage possible due to power surges**

Should the pump be connected to the mains power supply in parallel to inductive consumers (such as solenoid valves, motors), inductive power surges can damage the controller when it is switched off.

- Provide the pump with its own contacts and supply with voltage via a contactor relay or relay.

Personnel: Electrician

- > Install the pump technically correctly and in accordance with the operating instructions and applicable regulations.

9.1 Supply voltage connection



WARNING!

Unexpected startup is possible

As soon as the pump is connected to the mains, the pump may start pumping and consequently feed chemical may escape.

- Prevent dangerous feed chemicals from escaping.
- If you have not successfully prevented this, immediately press the *[STOP/START]* key or disconnect the pump from mains, e.g. via an emergency cu-off switch.



CAUTION!

If the pump is integrated into a system: The system must be designed so that potential hazardous situations are avoided by pumps starting up automatically subsequent to unintended power interruptions.

Connect the pump to the mains power supply using the mains cable.

Parallel connection to inductive consumers

Should the pump be connected to the mains in parallel to inductive consumers (e.g. solenoid valves, motor), the pump must be electrically isolated when these consumers are switched off.

- Supply the pumps with voltage via a contactor relay or relay using separate contacts for the pump.
- If this is not possible then connect a varistor (part no. 710912) or an RC member, 0.22 μ F / 220 Ω in parallel.

Interference suppression aids

Product	Part no.
Varistor:	710912
RC Gate, 0.22 μ F / 220 Ω :	710802

9.2 Description of the Terminals

9.2.1 "External Control" Terminal

The "external control" terminal is a five-pole panel terminal. It is compatible with two- and four-pole cables.

The "Auxiliary Frequency" function can only be used with a five-pole cable.

Electrical interface for pin 1 "Pause" - pin 2 "Extern Contact" - pin 5 "Auxiliary frequency"

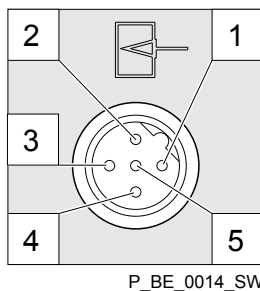


Fig. 8: Assignment on the pump

Data	Value	Unit
Voltage with open contacts	5	V
Input resistance	10	k Ω
Max. pulse frequency	25	pulse/s
Minimum pulse duration	20	ms

Activation via:

- zero volt connection contact (load: 0.5 mA at 5 V) or
- semi-conductor switch (residual voltage < 0.7 V)

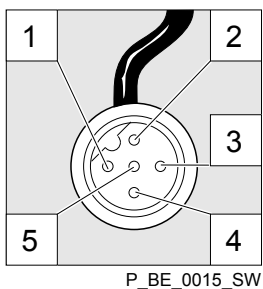


Fig. 9: Assignment on the cable

Pin	Function	5-wire cable	2-wire cable
1	Pause	brown	bridged at pin 4
2	Extern Contact	white	brown
3	-	blue	-
4	Ground mass	black	white
5	Auxiliary Frequency	grey	-

i Refer to the Description of Functions for the hierarchy of functions and operation modes.

"Pause" function

The pump does not work if:

- the cable is connected and pin 1 and pin 4 are open.

The pump works if:

- the cable is connected and pin 1 and pin 4 are connected.
- no cable is connected.

"Extern Contact" operating mode

The pump performs one or more strokes if:

- Pin 2 and pin 4 are connected to each other for at least 20 ms. Pin 1 and pin 4 then also have to be connected to each other.

"Auxiliary frequency" operating mode:

The pump works at a preset stroke rate if:

- Pin 5 and pin 4 are connected to each other. Pin 1 and pin 4 then also have to be connected to each other. The auxiliary frequency is factory-preset to maximum stroke rate.

9.2.2 "Level Switch" Terminal

A 2-stage level switch with pre-warning and end switch-off can be connected.

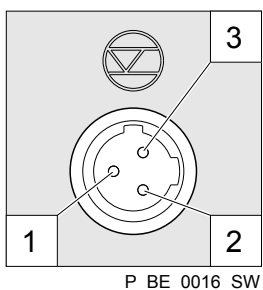


Fig. 10: Assignment on the pump

Electrical interface

Data	Value	Unit
Voltage with open contacts	5	V
Input resistance	10	kΩ

Activation via

- zero volt connection contact (load: 0.5 mA at 5 V) or
- semi-conductor switch (residual voltage < 0.7 V)

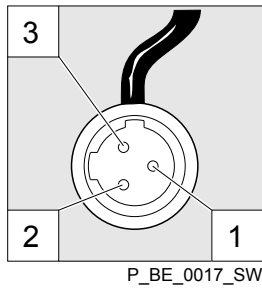


Fig. 11: Assignment on the cable

Pin	Function	3-wire cable
1	Ground mass	black
2	Minimum pre-warning	blue
3	Minimum end switch-off	brown

9.3 Relay

9.3.1 "Fault indicating relay" output (identity code 1 + 3 or 4 + 5)

A fault indicating relay can be ordered as an option - refer to ordering information in the appendix. It is used to emit a signal when there is a fault with the pump and for the "Liquid level low, 1st stage" warning alert and "Liquid level low, 2nd stage".

A cut-off relay works when there are fault alerts from the pump and in the event of the "Liquid level low 2nd stage" alert.

The fault indicating relay can be retrofitted and is operational once attached to the relay board - refer to "Retrofitting Relays" in the Appendix.

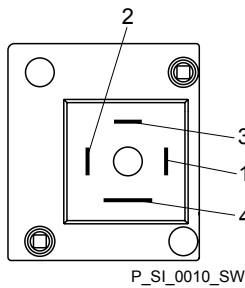


Fig. 12: Pump pin assignments

Electrical interface

Data	Value	Unit
Maximum contact load at 230 V and 50/60 Hz:	8	A
Minimum mechanical lifespan:	200 000	Switching operations

Identity code 1 + 3

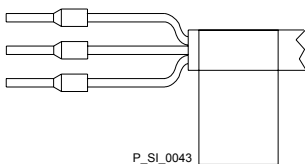


Fig. 13: Cable conductor assignments

Pin assignment

To pin	VDE cable	Contact	CSA cable
1	white	NO (normally open)	white
2	green	NC (normally closed)	red
4	brown	C (common)	black

Identity code 4 + 5

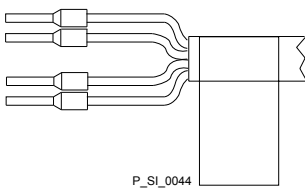


Fig. 14: Cable conductor assignments

Pin assignment

To pin	VDE cable	Contact	Relay
1	yellow	NO (normally open)	Fault indicating relay
4	green	C (common)	Fault indicating relay
3	white	NO (normally open)	Pacing relay
2	brown	C (common)	Pacing relay

9.3.2 Output pacing relay (identity code 4 + 5)

A fault indicating and a pacing relay can optionally be ordered - refer to ordering information in the appendix. The pacing output is electrically-isolated by means of an optocoupler with a semiconductor switch. The second switch is a relay.

The fault indicating/pacing relay can be retrofitted and is operational once attached to the relay board - refer to "Retrofitting Relays" in the Appendix.

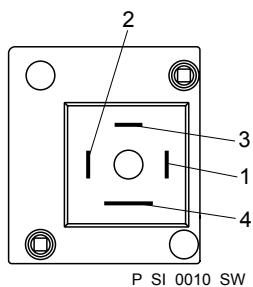


Fig. 15: Pump pin assignments

Identity code 4 + 5

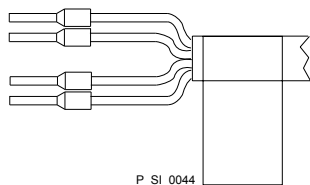


Fig. 16: Cable conductor assignments

Electrical interface

for semiconductor switch pacing relay:

Data	Value	Unit
Residual voltage max. at $I_c = 1 \text{ mA}$	0.4	V
Maximum current	100	mA
Maximum voltage	24	VDC
Pacing pulse duration, approx.	100	ms

Pin assignment

To pin	VDE cable	Contact	Relay
1	yellow	NO (normally open)	Fault indicating relay
4	green	C (common)	Fault indicating relay
3	white	NO (normally open)	Pacing relay
2	brown	C (common)	Pacing relay

10 Operation



WARNING!

Danger of electric shock

Incompletely installed electrical options can allow moisture into the inside of the housing.

- Knock-out openings in the pump housing must be equipped with matching modules or be sealed in a leak-tight manner.



WARNING!

Danger of electric shock

A mains voltage may exist inside the pump housing.

- If the pump housing has been damaged, you must disconnect it from the mains immediately. It may only be returned to service after an authorised repair.

10.1 Manual

Personnel: Instructed personnel

10.1.1 Capacity

The capacity is determined by the stroke length and the stroke rate.

The stroke length is adjusted by the stroke length adjustment knob within a range of 0 ... 100 %. A stroke length of between 30 ... 100 % (SEK type: 50 ... 100 %) is recommended to achieve the specified reproducibility!

Data	Value	Unit
Recommended stroke length, standard type	30 ... 100	%
Recommended stroke length, SEK type	50 ... 100	%

The stroke rate can be set within a range of 10 ... 100 % using the multifunctional switch.

10.1.2 Functions

The pump has the following functions:

"Pause" function

The pump can be remotely stopped via the "External Control" terminal. The "Pause" function only works via the "External Control" terminal.

"Stop" function

The pumps can be stopped by turning the multifunctional switch to "Stop" without disconnecting it from the mains power supply.

"Priming" function

Priming (transient conveyance at maximum frequency) can be provided by turning the multifunctional switch to "Test".

"Level switch" function

Information about the liquid/powder level in the feed chemical container is reported to the pump. To do so, a two-stage level switch must be fitted; it is connected to the "Level switch" terminal.

"Auxiliary rate" function

Enables switching of a stroke rate via the "External control" jack. This auxiliary frequency has priority over the operating mode stroke rate settings. In the standard version, the "Auxiliary frequency" function is programmed to 100 % stroke rate.

10.1.3 External contact

"Extern" operating mode:

In the Extern Contact operating mode, either a series of strokes can be triggered or an inbound series of contacts can be stepped down via the pulse control switch by a single contact on the "External control" terminal. To do so, the multifunctional switch has to be turned to "Extern".

Explanation of the stepped-down values:

Settable values	Incoming contacts	Strokes performed
1:1	1	1
1:2	2	1
1:4	4	1
1:8	8	1
1:16	16	1
1:32	32	1
1:64	64	1

Explanation of stepped-up values:

Settable values	Incoming contacts	Strokes performed
1:1	1	1
2:1	1	2
4:1	1	4
8:1	1	8
16:1	1	16
32:1	1	32
64:1	1	64

10.2 Remote operation

There is an option to control the pump remotely via a signal cable - refer to your system documentation and to "Electrical Installation".

11 Maintenance



WARNING!

It is mandatory that you read the safety information and specifications in the "Storage, Transport and Unpacking" chapter prior to shipping the pump.



CAUTION!

Warning of feed chemical spraying around

Feed chemical can spray out of the hydraulic components if they are manipulated or opened due to pressure in the liquid end and adjacent parts of the system.

- Disconnect the pump from the mains power supply and ensure that it cannot be switched on again by unauthorised persons.
- Depressurise the system before commencing any work on hydraulic parts.



Further data on CD

All product-specific operating instructions include a CD with order details, exploded diagrams and dimensions sheets, if they are not included in the operating instructions.

Standard liquid ends:

Interval	Maintenance work	Personnel
Quarterly*	<ul style="list-style-type: none"> ■ Check the metering diaphragm for damage** - refer to "Repair". ■ Check that the hydraulic lines are fixed firmly to the liquid end. ■ Check that the suction valve and discharge valve are correctly seated. ■ Check the tightness of the entire liquid end - particularly around the leakage hole - please refer to Fig. 17! ■ Check that the flow is correct: Allow the pump to prime briefly - turn the multifunctional switch briefly to "Test" ■ Check that the electrical connections are intact ■ Check the integrity of the housing. ■ Check that the dosing head screws are tight 	Technical personnel

* Under normal loading (approx. 30 % of continuous operation)

Under heavy loading (e.g. continuous operation): Shorter intervals.

** For feed chemicals which particularly load the diaphragm, e.g. those containing abrasive additives, check the diaphragm frequently.

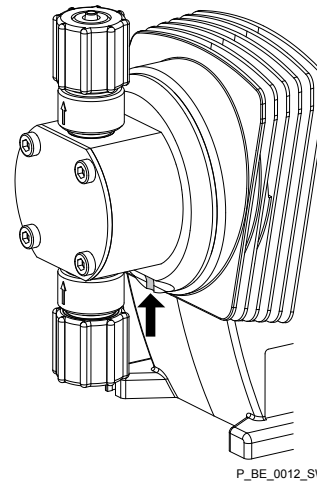


Fig. 17: Leakage hole

Liquid ends with bleed valve:

Interval	Maintenance work	Personnel
Quarterly*	In addition: <ul style="list-style-type: none"> ■ Check that the bypass line is fixed firmly to the liquid end ■ Check that the bleed valve is tight. ■ Check the discharge and bypass line for kinks ■ Check that the bleed valve is operating correctly. 	Technical personnel

* Under normal loading (approx. 30 % of continuous operation)

Under heavy loading (e.g. continuous operation): Shorter intervals.

Tightening torque

Data	Value	Unit
Tightening torque for screws:	4.5 ... 5.0	Nm

12 Repairs

Safety information



WARNING!

Danger of an electric shock

Unauthorised repairs inside the pump can result in an electric shock.

For this reason repairs inside the pump may only be performed by a ProMinent subsidiary or representative, in particular the following:

- Replacement of damaged mains connection lines
- Replacement of fuses
- Replacement of electronic control



WARNING!

It is mandatory that you read the safety information and specifications in the "Storage, Transport and Unpacking" chapter prior to shipping the pump.



WARNING!

Contact with the feed chemical

Parts that come into contact with the feed chemical are uncovered and handled during overhaul work.

- Protect yourself against the feed chemical in case it is hazardous. Read the safety data sheet on the feed chemical.



CAUTION!

Warning of feed chemical spraying around

Feed chemical can spray out of the hydraulic components if they are manipulated or opened due to pressure in the liquid end and adjacent parts of the system.

- Disconnect the pump from the mains power supply and ensure that it cannot be switched on again by unauthorised persons.
- Depressurise the system before commencing any work on hydraulic parts.

12.1 Cleaning valves

Personnel: Technical personnel



Warning of faulty operation

The exploded views in the Appendix should be referred to when working on the unit.

Cleaning a discharge valve or a suction valve on types (PP, PV, NP) 1000, 1601, 1602, 1604, 2504



Warning of faulty operation

- *Discharge and suction valves differ from each other! Only take them apart one after each other, so that you do not confuse the components!*
- *Only use new components which fit your valve - both in terms of shape and chemical resistance!*
- *Recalibrate the pump after replacing a valve!*
- *Using an Allen key or similar, insert it into the smaller hole of the discharge connector and push the valve inserts out of it.*

A suction valve is constructed in almost the same way as a discharge valve.

Please note, however, that:

- the two valve inserts are identical here
- There is an additional spacer between the valve inserts.
- There is a shaped seal in the dosing head instead of an O-ring.
- The flow direction of the suction connector is the opposite of that of the discharge connector.

Cleaning a discharge valve or a suction valve on types (PP, PV, NP) 0708, 1008, 0220, 0420, 0413, 0713, 0232



Warning of faulty operation

- *Discharge and suction valves differ from each other! Only take them apart one after each other, so that you do not confuse the components!*
- *Only use new components which fit your valve - both in terms of shape and chemical resistance!*
- *On the PVT material version, the ball seat is integrated in the dosing head and so has to be cleaned separately!*
- *On the PVT material version, the discharge valve is a double ball valve!*
- *Using an Allen key or similar, insert it into the smaller hole of the discharge connector and push the valve inserts out of it.*

A suction valve is constructed in almost the same way as a discharge valve.

Please note, however, that:

- The flow direction of the suction connector is the opposite of that of the discharge connector.

12.2 Replacing the metering diaphragm



WARNING!

A few cubic centimetres of feed chemical may have accumulated behind the metering diaphragm in the backplate following a leak - depending on the design!

- Take this feed chemical into consideration when you are planning a repair - especially if it is hazardous!

Personnel: ■ Technical personnel

- If necessary take protective measures.
 - Observe the safety data sheet for the feed chemical.
 - Depressurise the system.
1. ▶ Empty the liquid end (turn the liquid end upside down and allow the feed chemical to run out; flush out with a suitable medium; flush the liquid end thoroughly when using hazardous feed chemicals!)
 2. ▶ Turn the stroke adjustment dial until it can go no further at 0 % stroke length if the pump is running (the drive shaft is then difficult to turn).
 3. ▶ Switch off the pump.
 4. ▶ Unscrew the hydraulic connectors on the discharge and suction side.
 5. ▶ With PP types with bleed valve: Firstly remove the bleed valve (star handle), then lift off the cover of the liquid end with a screw driver.
 6. ▶ Remove the screws (1).
 7. ▶ Loosen the dosing head (2) and the backplate (4) from the pump housing (6) - but only loosen!
 8. ▶ Hold the pump housing (6) with one hand and clamp the diaphragm (3) with the other hand between the dosing head (2) and the backplate (4).
 9. ▶ Loosen the diaphragm (3) from the drive axle with a gentle backwards turn of the dosing head (2), diaphragm (3) and backplate (4) in an anticlockwise direction.
 10. ▶ Unscrew the diaphragm (3) completely from the drive shaft.
 11. ▶ Remove the backplate (4) from the pump housing (6).
 12. ▶ Check the condition of the safety diaphragm (5) and replace if necessary.
 13. ▶ Push the safety diaphragm (5) onto the drive axle only until it lies flush with the pump housing (6) and no further!
 14. ▶ Tentatively screw the new diaphragm (3) onto the drive shaft until its stop position.
 - ⇒ The diaphragm (3) is now sitting at the end position of the thread.
 15. ▶ Should this not work, remove dirt or swarf out of the threads and screw the diaphragm (3) onto the drive shaft correctly this time.



The diaphragm must be screwed exactly onto the drive shaft otherwise the pump will subsequently not dose correctly!

16. ▶ Unscrew the diaphragm (3) again.
17. ▶ Place the backplate (4) onto the pump housing (6).

**CAUTION!****Leakage may become apparent at a later stage.**

- The leakage hole must point downwards when the pump is installed later - please refer to Fig. 18!
- Place the backplate (4) immediately into the correct position on the pump housing (6)! Do not twist the backplate on the pump housing so that the safety diaphragm (5) becomes warped!

- 18.** Place the diaphragm (3) into the backplate (4).

**CAUTION!****Leakage may become apparent at a later stage.**

- Do not overtighten the diaphragm (3) in the following step!
- The backplate (4) must remain in its position so that the safety diaphragm does not become warped!

- 19.** Hold the backplate (4) firmly and screw the diaphragm (3) in a clockwise direction until it is sitting tightly (the twisting resistance of the return spring can be felt).
- 20.** Set the stroke length to 100 %.
- 21.** Place the dosing head (2) with the screws (1) onto the diaphragm (3) and the backplate (4) - the suction connector must be pointing downwards when the pump is later installed.
- 22.** Gently tighten the screws (1) and then tighten in a diagonal pattern. See below for tightening torque.
- 23.** With PP types with bleed valve: Allow the cover of the liquid end to rest in the dosing head, then press the knob on the bleed valve into the dosing head.

**CAUTION!****Leakage possible**

- Check the tightening torque of the screws after 24-hours of operation!
- With PP dosing heads, recheck the tightening torque again after three months!

Tightening torque

Data	Value	Unit
Tightening torque for screws:	4.5 ... 5.0	Nm

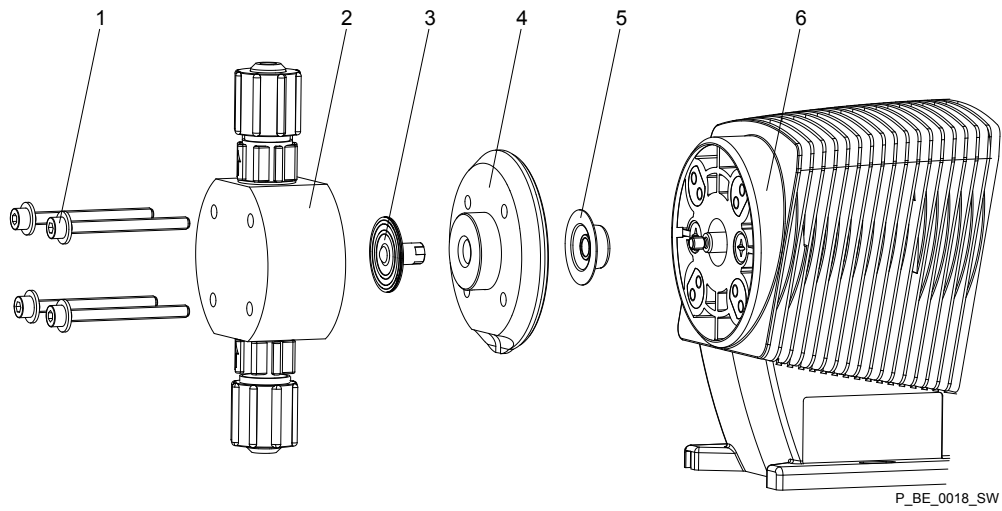


Fig. 18: Partial exploded view of liquid end

13 Troubleshooting

Safety information



WARNING!

Warning of hazardous or unknown feed chemical

Should a hazardous or unknown feed chemical be used, it may escape from the hydraulic components when working on the pump.

- Take appropriate protective measures before working on the pump (protective eyewear, protective gloves, ...). Read the safety data sheet on the feed chemical.
- Drain and flush the liquid end before working on the pump.



CAUTION!

Warning of feed chemical spraying around

Feed chemical can spray out of the hydraulic components if they are manipulated or opened due to pressure in the liquid end and adjacent parts of the system.

- Disconnect the pump from the mains power supply and ensure that it cannot be switched on again by unauthorised persons.
- Depressurise the system before commencing any work on hydraulic parts.

13.1 Faults without a fault alert

Fault description	Cause	Remedy	Personnel
Pump does not prime in spite of full stroke motion and bleeding	Minor crystalline deposits on the ball seat due to the valves drying out	Take suction hose out of the storage tank and thoroughly flush out the liquid end	Technical personnel
	Major crystalline deposits on the ball seat due to the valves drying out	Dismantle the valves and clean them - refer to "Repair"	Technical personnel
Fluid is escaping from the backplate	The screws in the dosing head are too loose	Tighten the screws in the dosing head crosswise - refer to "Repair" for tightening torque.	Instructed personnel
	The diaphragm is not tight	Replace the diaphragm - refer to "Repair".	Technical personnel
Green LED indicator (operating indicator) does not light up	The wrong mains voltage or no mains voltage is connected	Connect the pump correctly to the specified mains voltage - according to the specification on the nameplate	Electrician

13.2 Fault alerts

Fault description	Cause	Remedy	Personnel
Red LED indicator (fault indicator) lights up and the pump stops	The liquid level in the storage tank has reached "liquid level low 2nd stage".	Fill the storage tank	Instructed personnel
	The multifunctional switch is not turned to "Extern" but an external cable is connected and the pump has the identcode feature "Control type" - "1" "with lock".	Either turn the multifunctional switch to "Extern" or remove the Extern cable from the pump	Technical personnel

13.3 Warning Alerts

Fault description	Cause	Remedy	Personnel
Yellow LED indicator (warning indicator) lights up	The liquid level in the storage tank has reached "liquid level low 1st stage".	Fill the storage tank	Instructed personnel

13.4 All Other Faults

Please contact the responsible ProMinent subsidiary or representative!

14 Decommissioning

Decommissioning



WARNING!

Danger from chemical residues

There is normally chemical residue in the liquid end and on the housing after operation. This chemical residue could be hazardous to people.

- It is mandatory that the safety information relating to the "Storage, transport and unpacking" chapter is read before shipping or transporting the unit.
- Thoroughly clean the liquid end and the housing of chemicals and dirt. Adhere to the safety data sheet for the feed chemical.



WARNING!

Warning of hazardous or unknown feed chemical

Should a hazardous or unknown feed chemical be used, it may escape from the hydraulic components when working on the pump.

- Take appropriate protective measures before working on the pump (protective eyewear, protective gloves, ...). Read the safety data sheet on the feed chemical.
- Drain and flush the liquid end before working on the pump.



CAUTION!

Warning of feed chemical spraying around

Feed chemical can spray out of the hydraulic components if they are manipulated or opened due to pressure in the liquid end and adjacent parts of the system.

- Disconnect the pump from the mains power supply and ensure that it cannot be switched on again by unauthorised persons.
- Depressurise the system before commencing any work on hydraulic parts.



Danger of damage to the device

Take into account the information in the "Storage, Transport and Unpacking" chapter if the system is decommissioned for a temporary period.

Personnel: Technical personnel

1. ➔ Disconnect the pump from the mains power supply.
2. ➔ Empty the liquid end by turning the pump upside down and allowing the feed chemical to run out.
3. ➔ Flush the liquid end with a suitable medium; flush the dosing head thoroughly when using hazardous feed chemicals!

Disposal



CAUTION!

Warning of feed chemical spraying around

Feed chemical can spray out of the hydraulic components if they are manipulated or opened due to pressure in the liquid end and adjacent parts of the system.

- Disconnect the pump from the mains power supply and ensure that it cannot be switched on again by unauthorised persons.
- Depressurise the system before commencing any work on hydraulic parts.

Personnel:

■ Technical personnel



CAUTION!

Environmental hazard due to electronic waste

There are electronic components in the pump, which can have a toxic effect on the environment.

- Separate the electronic components from the remaining parts.
- Note the pertinent regulations currently applicable in your country!

15 Technical data

15.1 Performance data

Beta® b operating at 180 strokes/minute
and 100 % stroke length

Type	Minimum pump capacity at maximum back pressure			Minimum pump capacity at medium back pressure			Con- nector size external ∅ x internal ∅	Suction lift*	Priming lift**	Max- imum priming pressure on suc- tion side
	bar	l/h	ml/ stroke	bar	l/h	ml/ stroke				
Beta®										
1000	10	0.74	0.069	5.0	0.82	0.076	6x4	6.0	1.8	8
0700	7	0.8	0.074	3.5	0.88	0.074	6x4	6.0	1.8	8
0400	4	0.84	0.078	2.0	0.92	0.078	6x4	6.0	1.8	8
2001	20	0.96	0.089	10	1.5	0.13	6x3	6.0	2.0	8
1601	16	1.1	0.10	8.0	1.40	0.13	6x4	6.0	2.0	8
1001	10	1.3	0.12	5.0	1.5	0.14	6x4	6.0	2.0	8
0701	7	1.4	0.13	3.5	1.7	0.14	6x4	6.0	2.0	8
0401	4	1.5	0.14	2.0	2.0	0.18	6x4	6.0	2.0	8
2002	20	1.7	0.16	10	2.8	0.26	6x3	6.0	2.5	5.5
1602	16	2.2	0.20	8.0	2.5	0.24	6x4	6.0	2.5	5.5
1002	10	2.4	0.22	5.0	2.8	0.26	6x4	6.0	2.5	5.5
0702	7	2.6	0.24	3.5	3.1	0.29	6x4	6.0	2.5	5.5
0402	4	2.8	0.26	2.0	3.6	0.36	6x4	6.0	2.5	5.5
1604	16	3.6	0.33	8.0	4.3	0.40	6x4	5.0	3.0	3
1004	10	3.9	0.36	5.0	4.7	0.44	6x4	5.0	3.0	3
0704	7	4.2	0.39	3.5	5.1	0.47	6x4	5.0	3.0	3
0404	4	4.5	0.42	2.0	5.6	0.52	6x4	5.0	3.0	3
0708	7	7.1	0.66	3.5	8.4	0.78	8x5	4.0	2.0	2
0408	4	8.3	0.77	2	10.0	0.93	8x5	4.0	2.0	2
0413	4	12.3	1.14	2.0	14.2	1.31	8x5	3.0	2.5	1.5
0220	2	19.0	1.76	1.0	20.9	1.94	12x9	2.0	2.0	1
2504	25	2.9	0.27	12.5	3.7	0.34	8x4 ¹	4.0	3.0	3
1008	10	6.8	0.63	5.0	8.3	0.76	8x5	3.0	3.0	2
0713	7	11.0	1.02	3.5	13.1	1.21	8x5	3.0	3.0	1.5
0420	4	17.1	1.58	2.0	19.1	1.77	12x9	3.0	3.0	1
0232	2	32.0	2.96	1.0	36.2	3.35	12x9	2.0	2.0	0.8
Beta® b metering pumps with self-bleeding dosing head SEK***										
1601	16	0.59	0.055	8.0	0.80	0.072	6x4	6.0	2.0	0.5
1001	10	0.72	0.067	5.0	0.60	0.08	6x4	6.0	2.0	0.5
0701	7	0.84	0.078	3.5	1.12	0.10	6x4	6.0	2.0	0.5

Technical data

Type	Minimum pump capacity at maximum back pressure			Minimum pump capacity at medium back pressure			Con- nector size external ∅ x internal ∅	Suction lift*	Priming lift**	Max- imum priming pressure on suc- tion side
	bar	l/h	ml/ stroke	bar	l/h	ml/ stroke				
0401	4	0.9	0.083	2.0	1.2	0.11	6x4	6.0	2.0	0.5
2002	20	0.78	0.07	10.0	1.8	0.17	6x4	6.0	2.5	0.5
1602	16	1.40	0.13	8.0	1.74	0.174	6x4	6.0	2.5	0.5
1002	10	1.7	0.16	5.0	2.0	0.18	6x4	6.0	2.5	0.5
0702	7	1.8	0.17	3.5	2.2	0.20	6x4	6.0	2.5	0.5
0402	4	2.1	0.19	2.0	2.5	0.23	6x4	6.0	2.5	0.5
1604	16	2.7	0.25	8.0	3.6	0.33	6x4	5.0	3.0	0.5
1004	10	3.3	0.30	5.0	3.9	0.36	6x4	5.0	3.0	0.5
0704	7	3.6	0.33	3.5	4.0	0.37	6x4	5.0	3.0	0.5
0404	4	3.9	0.36	2.0	4.2	0.39	6x4	5.0	3.0	0.5
0708	7	6.60	0.61	3.5	7.50	0.69	8x5	4.0	2.0	0.5
0408	4	7.5	0.64	2.0	8.1	0.77	8x5	4.0	2.0	0.5
0413	4	10.8	1.0	2.0	12.6	1.17	8x5	3.0	2.5	0.5
0220	2	16.2	1.5	1.0	18.0	1.67	12x9	2.0	2.0	0.5
1008	10	6.3	0.58	5.0	7.5	0.69	8x5	3.0	3.0	0.5
0713	7	10.5	0.97	3.5	12.3	1.14	8x5	2.5	2.5	0.5
0420	4	15.6	1.44	2.0	17.4	1.61	12x9	2.5	2.5	0.5

* - Suction lift with a filled suction line and filled liquid end. With self-bleeding dosing head with air in the suction line.

** - Priming lift with clean and moist valves. Priming lift at 100 % stroke length and free outlet or opened bleed valve.

*** - The given performance data constitutes guaranteed minimum values, calculated using medium water at room temperature. The bypass connection with a self-bleeding dosing head is 6x4 mm.

¹ - The connector width is 6 mm on SST material versions.

Beta® metering pumps with dosing heads for higher-viscosity media have a 10-20 % lower metering capacity and are not self-priming. Connection G 3/4-DN 10 with tube nozzle d16-DN10.

15.2 Accuracy

15.2.1 Standard Liquid End

Data	Value	Unit
Capacity range of the series	-5 ... +10	% *
Reproducibility	±2	% **

- * - at max. stroke length and max. operating pressure for all material versions
- ** - at constant conditions and min. 30 % stroke length

15.2.2 Self-Bleeding Liquid End

As the self-bleeding liquid end is used with outgassing media and when operating with air bubbles, no dosing accuracy or reproducibility can be provided.

The recommended minimum stroke length with self-bleeding dosing pumps is 50 %.

15.3 Viscosity

The liquid ends are suitable for the following viscosity ranges:

Version	Range	Unit
standard	0 ... 200	mPas
With valve springs	200 ... 500	mPas
Self-bleeding (SEK)	0 ... 50	mPas
HV (highly viscous)	500 ... 3000*	mPas

* Only when the installation is correctly adjusted

15.4 Material Data

Standard liquid ends

Version	Dosing head	Suction/Discharge connector	Seals	Valve balls
PPE	Polypropylene	Polypropylene	EPDM	Ceramic
PPB	Polypropylene	Polypropylene	FPM	Ceramic
PPT	Polypropylene	PVDF	PTFE	Ceramic
NPE	Acrylic glass	PVC	EPDM	Ceramic
NPB	Acrylic glass	PVC	FPM	Ceramic
NPT	Acrylic glass	PVDF	PTFE	Ceramic
PVT	PVDF	PVDF	PTFE	Ceramic
TTT	PTFE with carbon	PTFE with carbon	PTFE	Ceramic
SST	Stainless steel 1.4404	Stainless steel 1.4404	PTFE	Ceramic

Only the self-bleeding version in PPE, PPB, NPE and NPB material models with a valve spring made of hastelloy C and a valve insert made of PVDF. Diaphragm with a PTFE coating.

FPM = fluororubber

Pump

Housing parts: polyphenyl ether (PPE with fibreglass)

15.5 Electrical data

Version: 100 - 230 V $\pm 10\%$, 50/60 Hz, Beta®/ 4b

Data	Value	Unit
Nominal power, approx.	6.4 ... 16.5	W
Current I eff	0.65 ... 0.1	A
Peak current	4.2 ... 1.3	A
Switch on peak current, (within approx. 50 ms falling)	15	A
Fuse*	0.8	AT

Version: 100 - 230 V $\pm 10\%$, 50/60 Hz, Beta®/ 5b

Data	Value	Unit
Nominal power, approx.	20 ... 25	W
Current I eff	0.9 ... 0.3	A
Peak current	5.9 ... 2.3	A
Switch on peak current, (within approx. 50 ms falling)	15	A
Fuse*	0.8	AT

* Fuses must have VDE, UL and CSA certification. E.G. type 19195 manufactured by Wickmann in compliance with IEC Publ. 127 - 2/3.

Power consumption

Type	Performance	Type	Performance	Type	Performance
	W		W		W
1000	7.6	1602	12.2	0408	12.7
0700	6.4	1002	10.6	0413	16.5
0400	5.7	0702	9.3	0220	16.5
2001	10.5	0402	7.9	2504	21.2
1601	10.0	1604	16.5	1008	20.3
1001	8.3	1004	12.7	0713	21.2
0701	7.5	0704	11.1	0420	21.2
0401	6.9	0404	9.5	0232	24.9
2002	13.5	0708	16.5		

15.6 Temperatures

Pump, compl.

Data	Value	Unit
Storage and transport temperature	-20 ... +60	°C
Ambient temperature in operation (drive and control):	-10 ... +45	°C

Liquid end, long-term*

Data	Value	Unit
Liquid end temperature	-10 ... +45	°C

* long term at max. operating pressure, dependent on ambient and feed chemical temperatures

Liquid end, short-term*

Material version	Value	Unit
PPT	100	°C
NPT	60	°C
PVT	120	°C
TTT	120	°C
SST	120	°C

* Temp. max., for 15 min at max. 2 bar, dependent on the ambient and feed chemical temperatures

15.7 Climate

Data	Value	Unit
Maximum air humidity *:	95	% rel. humidity

* non-condensing

Exposure in a humid and alternating climate:

FW 24 according to DIN 50016

15.8 Protection class and Safety Requirements

Degree of protection

Protection against contact and humidity:

IP 65 in accordance with IEC 529, EN 60529, DIN VDE 0470 Part 1

Safety requirements

Degree of protection:

1 - mains power connection with protective earth conductor

15.9 Compatibility

Some hydraulic parts of the Beta[®] b are identical to those of the Beta[®] a, gamma/ L and delta[®].

There is most compatibility with pumps of the Beta[®] a, gamma/ L and delta[®] series with the following components and accessories:

- Signal cable gamma/Vario 2-, 4- and 5-wire for the "Extern" function
- Level switch 2-stage (gamma / Vario / Beta[®])
- Dosing line cross-sections
- Standard gamma connector kit
- Chemical feed container
- Overall height (distance between the suction and discharge connector)
- Same use of accessories, such as back pressure valves, multifunctional valves, dosing monitor and flushing equipment

15.10 Sound pressure level

Sound pressure level

Sound pressure level LpA < 70 dB in accordance with EN ISO 20361:2010-10

at maximum stroke length, maximum stroke rate, maximum back pressure (water)

15.11 Shipping Weight

Shipping weight of Beta® b types in kg

Material	BT4b						BT5b		
	1000, 0700, 0400	2001, 1601, 1001, 0701, 0401	2002, 1602, 1002, 0702, 0402	1604, 1004, 0704, 0404	0708, 0408, 0413	0220	2504, 1008, 0713	0420	0232
PP, NP, PV, TT	2.5	2.9	2.9	3.1	3.1	3.3	4.5	4.7	5.1
SS	3.0	3.6	3.6	3.9	3.9	4.4	5.3	5.8	6.6

16 Declaration of Conformity

- Original -
EC Declaration of Conformity for Machinery

We, hereby declare that,

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

the product specified in the following complies with the relevant basic health and safety rules of the EC Directive, on the basis of its functional concept and design and in the version marketed by us. This declaration loses its validity in the event of a modification to the product not agreed with us.

Description of the product:

Metering pump, product range Beta/4 and Beta/5

Product type:

BT4b , BT5b

Serial no.:

Please refer to type plate on the device

Relevant
EC Directives:

EC Machinery Directive (2006/42/EC)
EC EMC Directive (2004/108/EC)
Compliance with the protection targets of the Low Voltage
Directive (2006/95/EC) according to Appendix I, No. 1.5.1 of
the Machinery Directive 2006/42/EC is maintained.

Harmonised standards applied, in
particular:

EN ISO 12100, EN 809,
EN 60335-1, EN 61010-1, EN 60529, EN 55014-1, EN 55014-2,
EN 61000-3-2/3, EN 61000-4-2/3/4/5/6/8/11, EN 61000-6-3

Technical documents have been
compiled by documentation
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Date / manufacturer's signature:

13.07.2011



Details of the signatory:

Joachim Schall, Head of Development

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