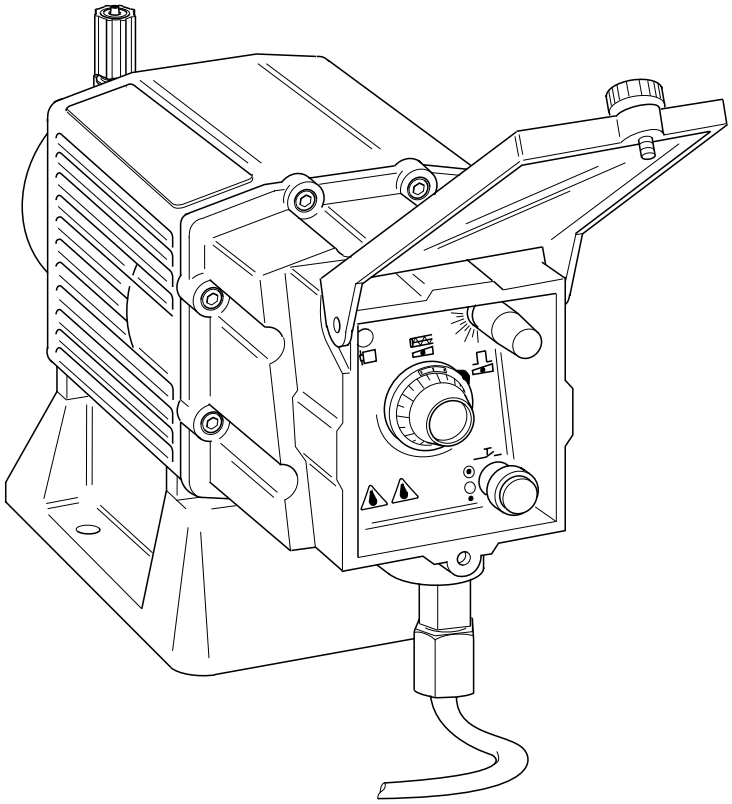
Operating instructions

Metering Pump

ProMinent EXtronic® EXBb FM



EXBb _ _ _ _ _ _ _ _ _

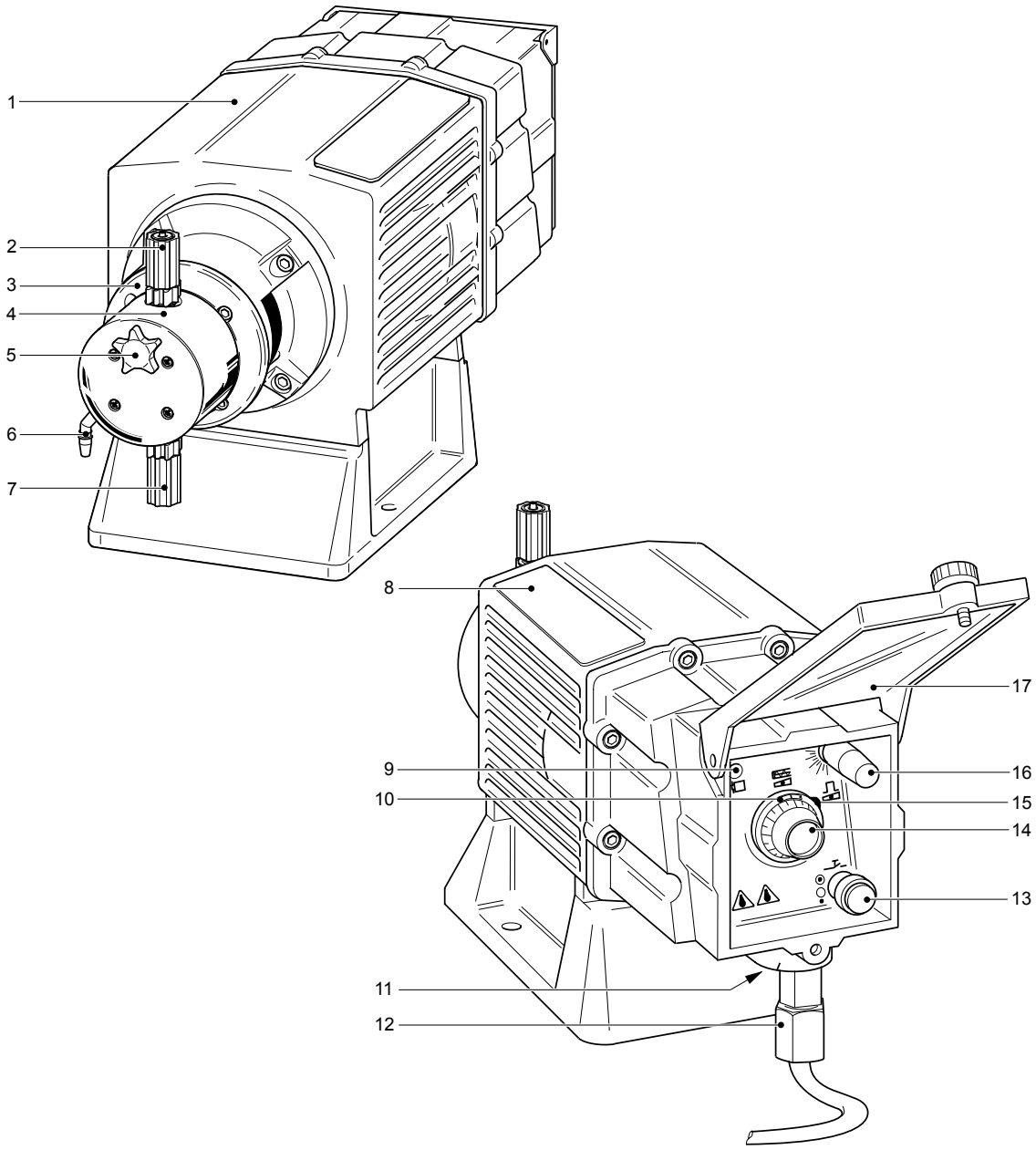
Please enter identcode of the device here!

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.

Part No. 985143

BA EX 002 08/13 US

View of Metering Pump



Description of Functional Elements

1 - Drive unit with electronic control and solenoid

2 - Delivery connection

3 - End ring

4 - Liquid end

5 - Vent valve (only on types 1000 - 0417 NP and PP, refer to identity code)

6 - Socket for bypass hose (only on types 1000 - 0417 NP and PP, refer to identity code)

7 - Intake connection

8 - Type identification plate

9 - Operating / impulse display

10 - Inspection window

11 - External connection

12 - Power connection

13 - Mains switch (not for 500 V version)

14 - Control for stroke length

15 - Locking lever

16 - Control knob for stroke rate or pushbutton/pushbutton switch for priming

17 - Transparent cover

Table of contents

1 Notes for User

Please read the following instructions carefully. They will help you make the best use of this manual.

The following are highlighted in the text:

- Numbered points

→ Instructions

Operating guidelines:

Notes are intended to make your work easier.

and safety instructions:

⚠ WARNING

Describes a potentially hazardous situation. If not avoided may result in fatal or severe injury.

⚠ CAUTION

Describes a potentially hazardous situation. If not avoided, could result in slight or minor injury or damage to property.

2 Identity code

Series ProMinent EXtronic®, Version b								
EXBb	Type of enclosure							
	G	Gas-explosion protection, in Class I, Division 1, Groups B, C and D, Temperature Class T6						
		Pumpe type	**bar**	**l/h**				
				see chapter "Capacity data"				
			Liquid end material					
			NP1	Acrylic with vent, Viton®-A O-Ring				
			NP3	Acrylic with vent, Viton®-B O-Ring				
			NS3	Acrylic self-degassing, Viton®-B O-Ring				
			PP1	PP with vent, EPDM O-Ring				
			PP4	PP without vent/HV, EPDM O-Ring				
			PS3	PVC self-degassing, Viton®-B O-Ring				
			SB1	Stainless steel* with internal thread, Rp 1/4 bzw. 1/2, *) Material No. 1.4571				
			SS1	Stainless steel* with clamping rings PTFE-gasket, *) Material No. 1.4571				
			SS2	Stainless steel* w. internal thread. 1/4"-NPT, PTFE-gasket *) Material No. 1.4571				
			TT1	PTFE +25 % carbon, PTFE-gasket				
				Valve spring				
				0	no valve spring			
				1	with 2 valve springs (1.4571) 0,1 bar			
					Electrical connection			
					A	230 V, 50/60 Hz, open end		
					B	115 V, 50/60 Hz, open end		
					E	500 V, 50/60 Hz, open end		
						Control type		
						0	internal stroke rate adjustment	
						1	external contact activation	
						2	analogue activation 0–20 mA	
						3	analogue activation 4–20 mA	
						7	internal stroke rate adjustment with pause function	
							Control variant	
							0	with potentiometer
							1	with push-button for ma. frequency
							2	with switch for ma. frequency
								Approval/voltage/language

Series ProMinent EXtronic®, Version b									
								2	FM-USA/100–500 V/English
								3	CSA-Kanada/100–500 V/English

3 Metering Pump Applications

The ProMinent EXtronic® EXBb is an electronically controlled, explosion-proof diaphragm metering pump with a short-stroke solenoid.

Liquid media

The pump is used for metering liquid media:

- in explosion-threatened workplaces in Class I, Division 1, Groups B, C and D, Temperature Class T6 according to FM 3600 and FM 3615 and CSA C22.2 No. 30

Liquid ends made of various materials cover virtually all applications:

- Polypropylene (PP)
- PVC
- Acrylic
- PTFE
- Stainless steel

Gas-emitting media

Self-venting liquid ends made of Acrylic or PVC are available for metering gas-emitting media.

Combustible media

⚠ WARNING

For combustible media only use the "SB" dosing head.

⚠ CAUTION

The pump is not designed to meter gaseous media as well as solids.

Voltages

Versions are available for various voltages and frequencies:

230 V, 115 V, 500 V;

50/60 Hz.

Compatibility

The ProMinent EXtronic® EXBb is a continuation of the former EXBa series:

The external dimensions and securing holes are identical and the hydraulic accessories of these series can be used.

The liquid ends are compatible with the other diaphragm metering pumps, with the exception of versions „SB _“ and „_ _ M“ - see "Identity code".

4 Safety

4.1 Notes on Safety

⚠ WARNING

- Immediately switch off the pump in the case of emergency. Use the pump power switch or an emergency stop switch in your working environment.
- When installing the metering pump also observe the local installation instructions for devices in explosive areas.
- Observe also all relevant standards for installations in explosion-threatened areas and for the installation of electrical equipment in explosion-threatened areas.
- Note all local directives which apply to the installation when installing.
- The pump is not intended for exterior applications without use of suitable protective equipment.

⚠ WARNING

- Do not attempt to open or repair this pump, consult manufacturer.

⚠ WARNING

Risc of electric shock. After switching off, wait two minutes before opening the housing.

⚠ WARNING

Potential Electrostatic Charging Hazard - The enclosure is constructed from plastic. To prevent the risk of electrostatic sparking the plastic surface should only be cleaned only with a damp cloth.

Disconnecting of a supply:

⚠ WARNING

EXPLOSION HAZARD. DO NOT DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

Fuses, lamp holders, and Connectors:

⚠ WARNING

EXPLOSION HAZARD. DO NOT REMOVE OR REPLACE WHILE CIRCUIT IS LIVE WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

Circuit Breakers:

⚠ WARNING

EXPLOSION HAZARD. DO NOT RESET CIRCUIT BREAKER WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT UNLESS POWER HAS BEEN REMOVED FROM THE EQUIPMENT.

⚠ WARNING

- The following adhesive labels must be always present. It must be always legible.

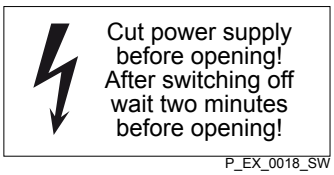


Fig. 1

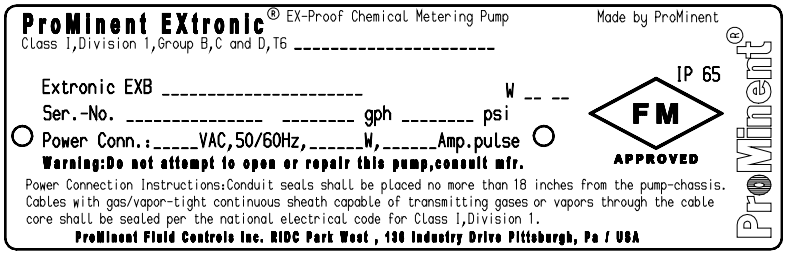


Fig. 2: Type plate

⚠ WARNING

– **Please adhere to the following safety instructions for pumps containing electrically nonconductive components.**

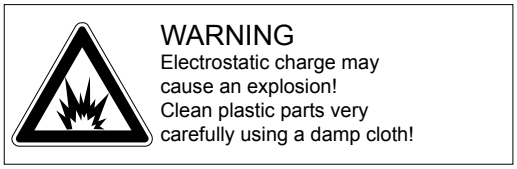


Fig. 3

⚠ CAUTION

– **Pumps must be accessible at all times to facilitate operation and maintenance.**
  Do not obstruct or block access routes.
– **Only specially trained and authorized persons are permitted to maintain and repair metering pumps and their peripheral equipment.**
– **Always depressurize the liquid end first before carrying out any work on the pump.**
– **If hazardous or unknown metering media are used, discharge and flush the liquid end before carrying out any work on the pump.**
– **Observe the safety data sheets of the metering liquids**
– **Always wear protective clothing (goggles, gloves, ...) when handling hazardous or unknown liquids! This applies in particular to working on the liquid end.**
– **Assembly of ProMinent® metering pumps with parts not tested and approved by ProMinent is prohibited and can result in damage to persons and property, for which no liability will be accepted.**

⚠ CAUTION

– **Adjust the stroke length only with the pump running when the load on the stroke length setting pin is relieved temporarily.**
  Release the lock before adjusting the stroke length.
– **Only use clamping rings and hose sockets suitable for the relevant hose diameter as well as genuine ProMinent hoses with the specified hose dimensions and wall thickness, otherwise the stability of the connection cannot be guaranteed.**

– *Avoid reducing the hose sizes.*
– *Use the next higher pipe cross-section or a pulsation damper for long hose lines and media with higher viscosity.*

4.2 Tests and Approvals

Explosions protection

Device type	Identification mark	Approval
EXBbG	Class I, Div.1, Group B, C and D, T6	FM
EXBbG	Class I, Div.1, Group B, C and D, T6	CSA

4.3 Sound intensity level

Sound intensity level

Sound intensity level	≤ 70 dB (A), 1 m distance, according to EN 12639

5 Design and Function

You will find the view of the metering pump and the description of the function units behind the cover sheet.

The metering pump ProMinent EXtronic® consists of the main components:

Drive unit (1)

With electronic control and solenoid,

power connection (10)

Input “external control” (optional) (11);

Delivery unit

End ring (3) with diaphragm which is stabilised by a steel core.

Liquid end (4) with delivery connection (2) and intake connection (7),

on types 1000-0417 NP and PP with bypass hose socket (6) and vent valve (5);

Operator control unit

with operating/pulse display (9),

Mains switch (not for 500 V version) (13),

Stroke length control knob (14) with observation window (10),

Locking lever (15),

Control knob for stroke rate or pushbutton/pushbutton switch for priming (16) and transparent cover (17).

5.1 Functional principle

Metering is based on the pulse burst principle:

A pulse produces a magnetic field around the solenoid,

the solenoid attracts a moving thrust piece,

as a result, the diaphragm displaces the medium in the liquid end via a pressure control valve, the valve closes on the intake side.

The magnetic field decays on completion of the switch-on pulse,

the thrust piece of the solenoid is reset by a reset spring,

the diaphragm returns to its initial position, thus initiating an intake stroke,

which closes the pressure valve and the media is drawn in on the intake side.

5.2 Feed rate

The delivery capacity is determined by the stroke length and the stroke frequency (rate).

The stroke length can be steplessly adjusted with the control knob for stroke length (14) during operation from 100 % to 10 % and then locked. The maximum stroke length is 1.25 mm, 0.63 mm for type EXBb 1000.

A setting of 0 to 110 (120) stroke/min can be set manually with the control knob for stroke frequency (rate) (16).

At a maximum stroke length and rate and a max. backpressure of 1.5 bar to 25 bar, the diaphragm-operated metering pumps deliver at a rate of 0.2 l/h to 60 l/h.

5.3 Control types

Version “Internal stroke rate setting” (identity code characteristic “Control type”: 0):

The controlling pulse is internally generated, stroke length and stroke rate can be manually adjusted using the control buttons on the operating panel.

Versions “External contact control” (identity code characteristic “Control type”: 1):

The controlling pulse is externally generated, from potential-free or semiconductor contacts and fed to the drive unit via the “external control” jack; examples are contact water meter or DULCOMETER® controls.

Versions “Analog control x - 20 mA” (Identity code characteristic “Control type”: 2, 3):

An external, analogue signal is fed to the drive unit via the “External control” jack; the stroke rate changes proportionally according to the 0 .. 20 mA or 4 .. 20 mA signal.

Versions “Internal stroke rate setting with pause function” (Identity code characteristic “Control type”: 7):

As for version “Internal stroke rate setting”, however there is also the possibility of switching the metering on and off via an external semiconductor contact or potential-free contact.

6 Unpacking

1. It is advisable to keep the outside packing complete with the polystyrene parts in order to be able to return the metering pump in the case of repairs and warranty claims.
2. Compare your delivery note with the packed contents.
3. Check whether the data on the type identification plate (8) of the metering pump agree with your order data!
4. Should any problems arise, contact your ProMinent dealer or representative. You will find the addresses on the back page of these operating instructions.
5. Always specify the identity code and the serial number which you will find on the type identification plate when making any inquiries or ordering spare parts. In this way, the pump type and material variants can be clearly identified.

Scope of delivery

- Metering pump with power cable
- Connector kit
- Operating instructions with conformity certificate

7 Mounting and Installation

⚠ WARNING

- When installing the metering pump also observe the local installation instructions for devices in explosive areas.
- Observe valid local regulations when installing.
- Remove all traces of water from the liquid end before starting operation with media which must not come in contact with water! The metering pump may still have water residue in the liquid end from the tests carried out at the factory.

⚠ WARNING

- Position the pump so that it cannot be flooded.

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

7.1 Installing Metering Pump

⚠ CAUTION

- Secure the pump such that no vibrations can occur.
- Ensure free access to facilitate operation and maintenance.
- The valves of the liquid end must be in vertical position.

→ The metering pump must be secured with screws and washers Ø 6 mm on a horizontal, firm base.

7.2 Installing Hose Lines

⚠ CAUTION

- Lay and secure intake and delivery lines such that they cannot chafe.
- Lay intake and delivery lines such that they are free of mechanical stress.
- Arrange all lines such that the pump and liquid end can be removed laterally if required.
- When metering extremely aggressive or hazardous media, a venting facility with return into the supply tank as well as a shut-off valve must be provided on the delivery and intake sides.
- Ensure all connections are tight: only use the clamping rings and hose sockets as specified for the relevant hose diameter, only use original hoses with specified hose dimensions and wall thickness.
- Avoid reductions in hose sizes: use the next higher line cross-section for long hose lines and viscous media or install a compressed air vessel or diaphragm pulsation damper!

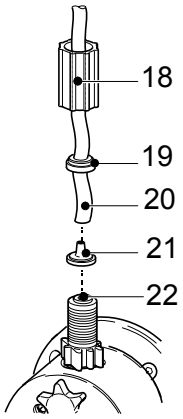
Fitting Hose lines

1. → Remove plug if fitted in the intake/delivery connection.
2. → Cut end of hose (20) straight.
3. → Fit union nut (18) and clamping ring (19) over hose.
4. → Fit end of hose as far as it will go over socket (21) - widen end if necessary.
5. → Fit hose with socket on to valve (22).
6. → Clamp hose connection:

   Firmly tighten union nut while at the same time pressing down hose.

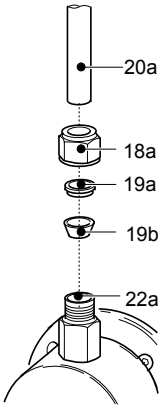
7. Retighten hose connection:

   Pull the hose line secured at the liquid end and then tighten the union nut once again.



Fitting stainless steel pipe connections

1. Fit union nut (18a) and clamping rings (19a + 19b) on to pipe (20a) with a projection of approx. 10 mm.
2. Fit pipe as far as it will go into valve (22).
3. Firmly tighten union nut.



Fitting PE or PTFE lines on stainless steel valves

Additionally fit a stainless steel support sleeve in the plastic sleeve.

7.2.1 Installing the Intake Line

⚠ CAUTION

- The intake line should be as short as possible.
- Fit intake line in upright position in order to avoid air bubbles forming.
- Wherever possible use pipe bends and not elbows for bends in the intake line.
- Select cross section and length such that the vacuum which occurs during intake does not reach the vapour pressure of the medium to be metered. In extreme cases, excessively high vacuum on the intake side is reflected in collapse of the liquid column or by an incomplete return stroke.
- Do not exceed the permissible admission pressure on the intake side.
- Note: Suction lift x medium density ≤ max. suction lift in m water column.
- Refer to the installation examples.

Installing foot valve

→ Cut the free end of the intake line to size such that the foot valve just hangs over the bottom of the tank.

In the case of metered solutions with impurities or bottom deposits, the foot valve should be located at an adequate distance above the tank bottom or bottom deposits.

7.2.2 Installing the Delivery Line

⚠ CAUTION

- A multiple of the maximum operating pressure can build up if the metering pump is operated against a closed shut-off element on the delivery side.This can cause the delivery line to burst!

  An overflow valve should be installed in order to avoid this.
- Install the delivery line such that the pressure peaks during the metering stroke do not exceed the maximum permissible operating pressure. Check length and cross-section. If necessary, install an overflow valve, compressed air vessel or diaphragm pulsation damper.
- Refer to installation examples.

When metering with atmospheric discharge, a metering valve with 0.5 bar response pressure should be mounted at the end of the line. Or a back-pressure valve should be mounted directly onto the liquid end in order to create and maintain a counter-pressure of approximately 1.5 bar.

If the level of the fluid of the supply tank is above the pump in operating condition, the response pressure is on the suction end. In this case the counter-pressure should be sufficiently high such that a minimum differential pressure of 1.5 bar exists. If this is not the case a back-pressure valve or a spring-loaded metering valve with the respective response pressure should be used.

⚠ CAUTION

A back-pressure valve or a spring-loaded metering valve is not an absolutely leakproof shut-off device. On the suction end a stop valve is therefore to be installed which is closed when the metering pump is idle.

7.2.3 Installing the Bypass Vent Line

The liquid end of the pump types 1000 - 0417 NP and PP is equipped with a vent valve (5) with bypass (6).

The admission pressure on the intake side must be at least the same pressure as in the bypass line. Operation is not possible with admission pressure in the bypass and no pressure on the intake side.

1. Fit hose line with $Ø_{internal}$ = 4 mm (max. 6 mm) on to bypass hose socket, PVC-soft 6x4 is recommended.
2. For PE lines, secure against slipping using a quick fastener.
3. Route the free end of the line back into the metering tank.
4. Cut the bypass line to size such that it is not submerged in the metering medium.

7.3 Installation Examples, Mechanical / Hydraulic

7.3.1 Standard installation

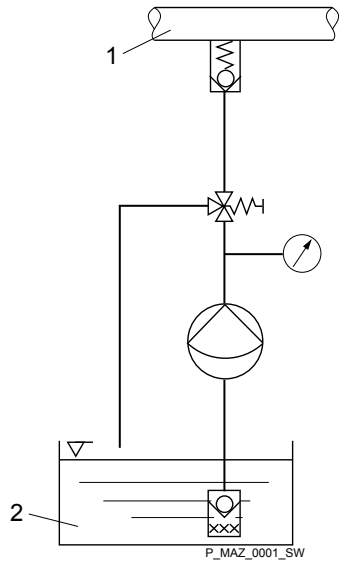


Fig. 4: Standard installation

1 Main line
2 Storage tank

Legend for all hydraulic diagrams

Icon	Explanation	Icon	Explanation
	Metering pump		Foot valve with filter meshes
	Injection valve		Filter insert
	Settable back pressure valve (also used as a relief valve)		Hopper with float valve
	Multifunctional valve		Level switch
	Shut-off valve		Manometer
	Solenoid valve		Filling device
	Ball retaining valve		Siphon device

7.3.2 Information on the discharge-side installation

With return from the main line

- Install a vacuum breaker if the feed chemical may not press through the metering pump. A metering pump is not an absolutely leak-tight shut-off device.
- Install the injection valve at the injection point to prevent unwanted mixing of water and feed chemical in the discharge line.

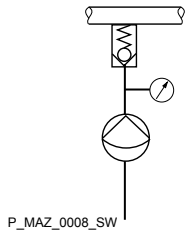


Fig. 5

Avoid exceeding maximum permissible operating pressure

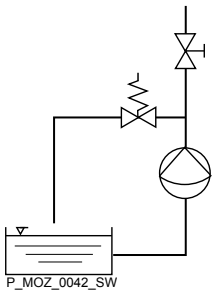


Fig. 6

- A relief valve with a return into the storage tank is useful as overload protection for the discharge line.
- Dampen pressure peaks with a metering stroke with long discharge lines with a pulsation dampener or increase the pipe cross-section.

7.3.3 How not to install

Fault description	Cause	Remedy
The suction line cannot be bled.	A pocket of air (arrow) is in the suction line.	Prevent the air pocket or install as shown in ↳ *"With high suction-side pressure 1" on page 22*.

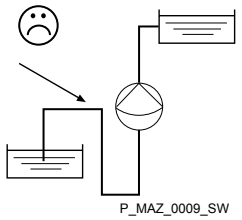


Fig. 7

Fault description	Cause	Remedy
Feed chemical flows uncontrolled when the line is filled.	Siphon effect by discharge line falling too deeply.	Interrupt the discharge line, as in ↳ *"With high suction-side pressure 2" on page 22*

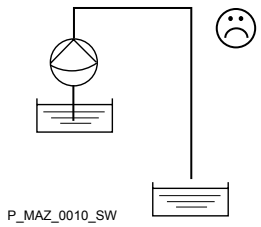


Fig. 8

Fault description	Cause	Remedy
feed chemical presses through the liquid end.	The suction-side priming pressure is too high caused by the negative pressure difference between the discharge and suction side.	Install as shown in ↳ *"With high suction-side pressure 3" on page 23* or ↳ *"With high suction-side pressure 2" on page 22*.

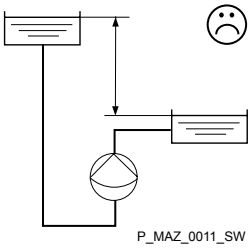


Fig. 9

Fault description	Cause	Remedy
The suction line can pull off.	The overflow line is routed back to the suction line, which is secured with a foot valve or can be blocked.	Install as in Fig. 4.
The metering pump meters the feed chemical in a cycle.	The overflow line is routed back to the suction line, whereby the multifunctional valve possibly no longer closes after being opened.	Install as in *on page 19*.

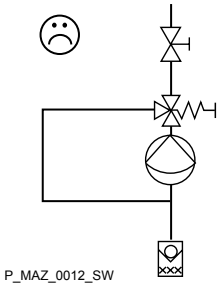


Fig. 10

7.3.4 Special installation instructions

With high suction-side pressure 1

- Position the end of the discharge line higher than the fluid level in the storage tank to avoid overstraining.

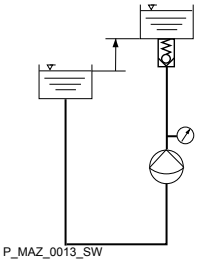


Fig. 11

With high suction-side pressure 2

- Position the outlet of the discharge line higher than the fluid level in the storage tank to avoid overstraining.

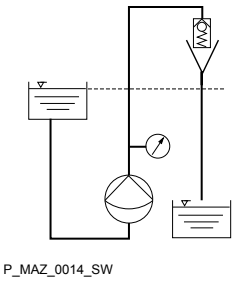


Fig. 12

With high suction-side pressure 3

- Install an adjustable back pressure valve in the discharge line and install a shut-off valve in the suction line, which has to be closed when the pump is at a standstill (preferably a solenoid valve).

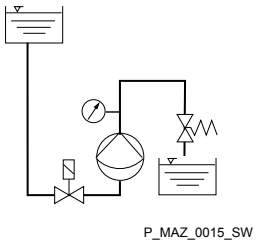


Fig. 13

With high suction-side pressure 1

- If the system is primed from lines with fluctuating pressure, use a hopper with a float valve to ensure a regular discharge flow.

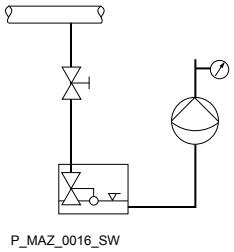


Fig. 14

With fluctuating suction-side pressure 2

- If the system is primed from a high feed level with fluctuating pressure, use a hopper with a float valve to ensure a regular discharge flow.

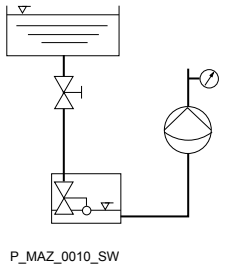


Fig. 15

With negative pressure in the main line

- When metering into a main line, in which there is negative pressure, install a multifunctional valve, a back pressure valve (DHV-RM) or an injection valve in the discharge line to ensure that the feed chemical is not sucked through.

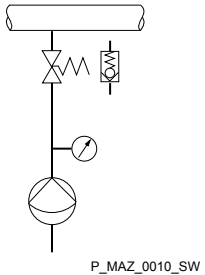


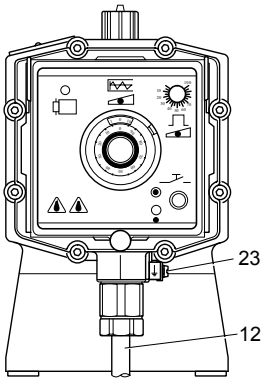
Fig. 16

7.4 Electrical installation

⚠ WARNING

- **The metering pump must be electrically installed by authorised, “skilled” personnel only.**
- **When installing the metering pump also observe the local installation instructions for devices in explosive areas.**
- **Observe also all relevant standards for installations in explosion-threatened areas and for the installation of electrical equipment in explosion-threatened areas.**
- **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.**
- **Do not connect mains power supply to the external terminal (11).**
- **The internally used fusible link has a breaking capacity of 1,500A. If the short-circuit current in the supply network may be larger than 1,500A, the pump is to be protected with a suitable back-up fuse with a higher breaking capacity (rated current smaller than 1,500A).**

Power connection



Electrical data - see chapter "Technical Data"

The connection terminal (23) for the equipotential bonding conductor is located on the housing next to the power supply terminal (12).

EXBbG

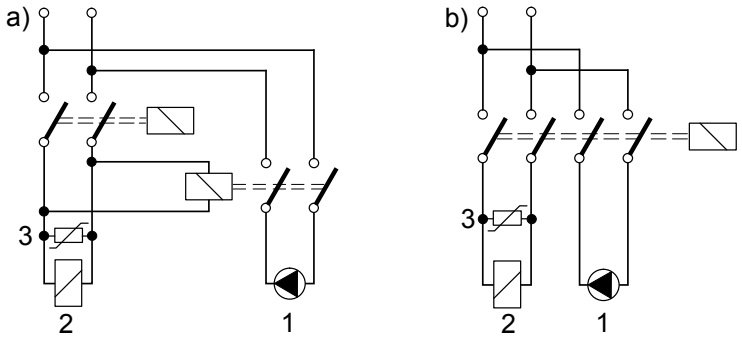
L1:	Phase	brown
N:	Zero wire	blue
PE:	Earth lead	green / yellow

* Internally insulated, connect to a free terminal on the outside.

** Twist the three single coaxial earth leads together, fit yellow/green sleeve and attach to the earth lead terminal.

Induction voltage

If the pump is connected to the power supply parallel to inductive loads (e.g. solenoid valve, motor), it must be electrically isolated from these loads in order to avoid damage caused by induction voltages when switching off.



1 EXtronic
2 Inductive load
3 Varistor

1. Use several contacts for power supply via auxiliary contactor or relay.
2. In the 115-V- to 230-V-versions, connect a varistor (U_N = 275 V) or RC-element (0,22 µF/220 Ohm) in parallel.

Switching on

With power switch (13), a power switch must be provided by the customer for the 500 V version.

External, contact, analogue and pause input, not intrinsically safe

EXBbG	Input (+)	black (1)
	Input (-)	black (2)

8 Operation

8.1 Start-Up

⚠ WARNING

- **Always wear protective goggles and protective clothing when handling hazardous media.**
- **The metering pump may still contain water residue in the liquid end from the tests carried out at the factory. All water must be removed from the liquid end before startup in the case of media which must not come in contact with water.**

⚠ WARNING

The following applies to all dosing pumps when metering combustible media: Start up and drain only under the supervision of an appropriately qualified person.

- *Carry out all settings only with the pump in operation.*
  Release the lock before adjusting the stroke length.
- *The intake head with the liquid end empty is dependent on the stroke volume:*
  The pump intake should be set at stroke length = 100 %. Select the intake head correspondingly smaller if the pump is to be discharged at a lower setting without changing the stroke length and is to be placed into operation again self-priming.
- *Pump intake is not possible against backpressure.*
- *Absolutely reliable metering cannot be guaranteed after a pump down period. Regular monitoring is necessary.*

Before start-up

1. Check function of pressure relief valves.
2. Check pump connections and pipe connections for leaks.

Remove water from liquid end

... when handling media which must not come in contact with water:

1. Turn pump through 180°.
2. Empty liquid end.
3. Flush with a suitable medium from above through the intake connection.

Filling liquid end without vent valve:

1. Connect intake line but do not yet connect the delivery line to the liquid end.
2. Switch on pump with power switch (13) and operate at max. stroke length and stroke rate until liquid end is filled completely and free of bubbles.
3. Switch off pump with power switch (13).
4. Connect delivery line to liquid end.

   ⇨ The pump is now ready for operation.

Filling liquid end - Rough venting

With liquid end with vent valve and bypass

1. Connect intake and delivery line to liquid end.
2. Connect bypass line.
3. Open vent valve (5) by one turn of the star knob in counterclockwise direction; the routes for rough venting via the bypass (6) is now clear.
4. Switch on pump with power switch (13) and operate at max. stroke length and stroke rate until liquid end is filled completely and free of bubbles (when the medium is visible in the venting or metering line).
5. Close vent valve.
6. Switch off pump with power switch (13).
   ⇨ The pump is now ready for operation.

Setting fine vent metering gas-emitting media

- *A part of the metered quantity is constantly routed back into the supply tank.*
  The return quantity should be approx. 20 % of the metered quantity.
- *The media must be low-viscous (thin-bodied) and without solids.*
- *If the return flow line ends above the liquid level, the precision vent valve acts as a vacuum breaker and prevents discharge of the supply tank if a vacuum builds up in the metering line.*
- *Retighten the screws in the liquid end after 24 hours of operation.*

1. Remove star knob from vent valve (5).
2. Using a screwdriver, turn screw in vent valve approx. 1 turn in counterclockwise direction.
3. Fit star knob on vent valve (5).

Venting liquid end HV version

Initial intake and venting is impaired to a certain extent by the valves and valve springs which are still dry. Therefore select the shortest possible intake head or vent the liquid end with inlet or admission pressure on the intake side.

If not successful, shortly operate pump without valve spring in the pressure valve:

1. Unscrew delivery connection and press away ball from O-ring.
2. Fill liquid end with water or suitable liquid.
3. Fit delivery connection without valve spring.
4. Fit short piece of PVC hose (100 mm) on to hose socket, half fill with water.
5. Operate pump at max. stroke length until metering is visible in the hose.
6. Re-install valve spring – avoid twisting by fitting an approx. 4 mm Ø drift through the pressure valve in order to hold the spring in the centre position.
7. Reconnect delivery line.

Venting liquid end

pump delivers in a pressure system and has drawn in air

1. Set venting on delivery side: Release metering line or open vent valve.
2. Switch on pump and vent at stroke length 100 %.

8.2 Determining the Delivery Capacity

The actual delivery capacity is dependent on the stroke length, stroke frequency (rate) and backpressure in the metering line. The relationship between capacity/stroke length/stroke frequency (rate) is illustrated in the nomogram for each type of pump. A correction factor can be read off from the diagram which shows the change in capacity referred to backpressure.

The measurements for determining the nomograms were conducted with water and the correction factor was determined at a stroke length of 70 %. The capacity scatter over all material versions is -5 % (for max. value: not specified).

1. Select the required capacity within the value range of the pump type - see capacity data at end of operating instructions.
2. Select the nomogram and diagram of the pump type.
3. Mark the backpressure in the metering system on the abscissa and read off the corresponding correction factor on the ordinate.
4. Divide the required capacity by the correction factor.
5. Using a ruler, mark the determined capacity on the middle scale of the nomogram.
6. Draw a line across all three scales – as horizontal as possible, however, such that the line intersects at least one of the two outer scales; where possible, select a graduation with a large value on the stroke length scale.

The point of intersection of the line with the right-hand scale shows the stroke frequency (rate) to be set - the point of intersection of the line with the left-hand scale shows the stroke length to be set.

Example

Input data

Capacity with mean back-pressure:	11.9 l/h (see capacity data)
Required capacity:	6 l/h
Backpressure:	8 bar

Calculation and results

Correction factor as per diagram:	0.9
Capacity to be set:	6 l/h / 0.9 = 6,66 l/h
Stroke length as per nomogram:	80 %
Stroke rate as per nomogram:	80 strokes / min

- *Select large stroke length and low stroke rate for highly viscous and gas-emitting media.*
- *Use self-venting liquid end for gas-emitting media with viscosity ≤ 20 mPa s.*
- *Select a shorter stroke length and high stroke rate for effective mixing.*
- *For a precise dosing, choose metering-stroke of not less than 30 %.*

  the stroke length can be reduced further at lower pressure.at max. pressure stroke length:
  - *≥ 60 % for type 1601,*
  - *≥ 40 % for type 1201 and 1002,*
  - *≥ 20 % for type 0803;*
- *Set the stroke length greater for pumps with the precision vent open.*

8.3 Setting the Delivery Capacity

Adjust the stroke length only with the pump running. The adjustment of the stroke length control knob will be varied if the stroke length control knob (14) is turned without previously releasing the lock (15). Defective metering is possible if the notes on setting are disregarded.

Requirements:

Installation and commissioning of the pump are concluded.

The setting values have been determined by means of nomograms.

Switching on

1. Open transparent cover (17).
2. Switch on pump with power swich (13).

Setting stroke length

1. Release the lock before setting the stroke length:

   Press up the locking lever (15).

2. Adjust determined stroke length with the control knob (14) the ring scale on the control knob (14) has a graduation of 0.01 mm, the stroke length is indicated in mm in the inspection window (10). The total setting range for the stroke length is 0 to 1.25 mm (0.63 mm for pump type 1000), i.e. only the settings 0 and 1 are possible in the inspection window (10).

3. Lock stroke length control knob (14): Press down locking lever (15).

Setting stroke rate

→ Adjust determined stroke rate with the control knob (16);

on graduation line corresponds to 1 stroke/min.

Correction for accurate metering

1. Determine delivery capacity on the intake side of the metering pump with a measuring cylinder or by weighing.

2. Correct pump setting.

9 Maintenance

⚠ WARNING

Always wear protective goggles and protective clothing when handling hazardous media.

⚠ WARNING

The following applies to all dosing pumps when metering combustible media: Start up and drain only under the supervision of an appropriately qualified person.

⚠ WARNING

EXPLOSION HAZARD. DO NOT DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

⚠ CAUTION

Only authorized persons are permitted to carry out maintenance on EXtronic®-metering pumps.

Maintenance jobs

1. Check firm fit of liquid end screws; retighten screws in liquid end after 24 hours of operation.
2. Check firm fit of metering lines.
3. Check firm fit of pressure valve and intake valve.
4. Check entire delivery unit for leaks.
5. Check correct pump delivery capacity: Briefly operate pump in intake mode.

For self-venting liquid end:

1. Check firm fit of bypass line and of connection.
2. Check firm fit of pressure valve.
3. Check vent function.

Maintenance intervals

Whole pump	Every 3 months *

* Shorter intervals for operation under heavy load (e.g. permanent operation)

10 Repairs

⚠ WARNING Always wear protective goggles and protective clothing when handling hazardous media.

⚠ WARNING The following applies to all dosing pumps when metering combustible media: Start up and drain only under the supervision of an appropriately qualified person.

⚠ WARNING EXPLOSION HAZARD. DO NOT DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

⚠ WARNING Only return metering pumps 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 when a Declaration of Decontamination Form is submitted that has been completed correctly and in full by an authorised and qualified person on behalf of the pump operator. You can find the "Decontamination Declaration" form under *www.prominent.com*.

⚠ WARNING EXPLOSION HAZARD. DO NOT REMOVE OR REPLACE LAMPS OR FUSES UNLESS POWER HAS BEEN DISCONNECTED OR WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

⚠ WARNING The following repair measures on EXtronic®-metering pumps can be carried out by qualified persons. All other repair measures on EXtronic®-metering pumps must only be carried out by from ProMinent authorised persons or by the manufacturer. Conversion to different capacities, material or type of control are only possible at the manufacturer's factory. Please contact your ProMinent dealer or representative. You will find the addresses under *www.prominent.com*.

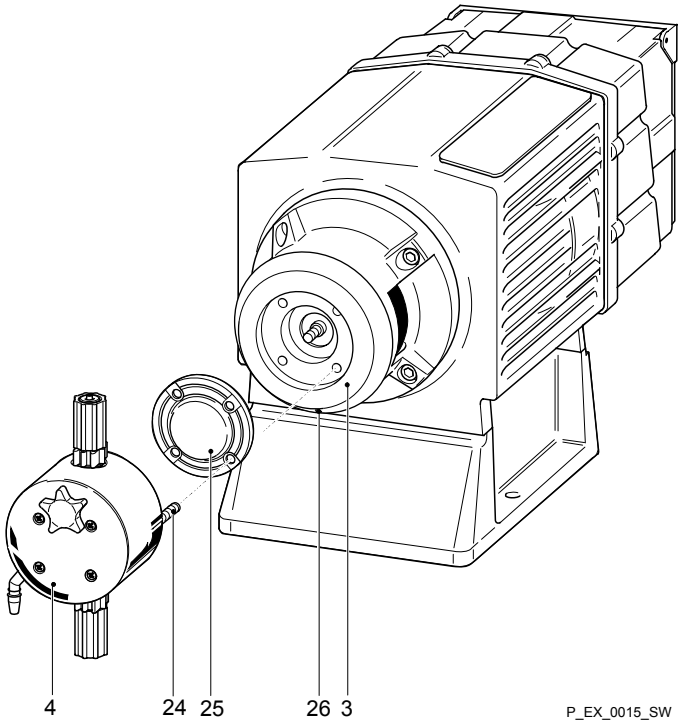
⚠ CAUTION The transporting of pumps which have been used with radioactive feed chemicals is forbidden!

⚠ CAUTION Use only genuine spare parts.

10.1 Replacing working diaphragm

1. Flush liquid end of hazardous media:

   For this purpose force water or suitable flushing agent with a spray bottle through the intake connection of the liquid end.
2. With pump running, set stroke length with control knob (14) to ”0“.
3. Switch off pump.
4. Release screws (24).
5. Pull liquid end (4) with screws (24) out of end ring (3) and pump housing by approx. 5 mm until resistance can no longer be felt through screws (24) when turning the liquid end (4).
6. Hold housing and end ring (3) in left hand and turn liquid end (4) in counterclockwise direction so that the diaphragm (25) is released from the drive shaft.
7. Pull liquid end (4) with screws (24) out of diaphragm (25).
8. Completely unscrew diaphragm (25) from drive shaft.



1. Check condition of thread by screwing the new diaphragm on to the drive shaft as far as it will go and then screwing it off again.
2. Re-install end ring (3) in housing.
3. Fit diaphragm (25) in end ring (3) and screw on by 2 thread turns.

   Turn diaphragm (25) such that the 4 holes of the diaphragm (25) and end ring (3) are precisely aligned! The outlet opening (26) of the end ring (3) must face downward.
4. Fit liquid end (4) with screws (24) on diaphragm (25) and end ring (3) such that the parts can still turn (approx. 5 mm spacing between liquid end and end ring); the intake connection must face downwards.
5. Now slowly turn parts in clockwise direction until the torsional resistance of the return spring can be felt and the diaphragm is fitted firmly.

   ⚠ CAUTION! Do not turn diaphragm too far.
6. Switch on pump.
7. Set stroke length with control knob (14) to 100 % and turn the complete delivery unit in clockwise direction until the intake connection faces vertically downward.
8. Switch off pump.
9. Now tighten the 4 screws (24) crosswise.

Tightening torques

For M4 screw	2.5 ... 3 Nm
For M5 screw	4.5 ... 5 Nm

⚠ CAUTION

- Observe tightening torques.
- Check tightening torques after 24 hours of operation.
- Additionally check tightening torques every 3 months for PP version.

11 Malfunctions

⚠ WARNING

- Always wear protective goggles and protective clothing when handling hazardous media.
- Observe the safety data sheets of the metering liquids.

⚠ WARNING

The following applies to all dosing pumps when metering combustible media: Start up and drain only under the supervision of an appropriately qualified person.

⚠ WARNING

EXPLOSION HAZARD. DO NOT DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

⚠ CAUTION

- Discharge liquid end and, if necessary, flush with a neutral agent.
- First decompressurize the metering line before carrying out any work on the pump.

Fault description	Cause	Remedy
Operation/pulse indicator does not light, no stroke movement	Incorrect or no mains voltage available	Apply the mains voltage as specified on the name-plate.
	Fuse is defective	Contact your ProMinent dealer or representative. You will find the addresses on the back page of these operating instructions.
Operation/pulse indicator does not light, no stroke movement	Crystalline deposits on ball seat caused by valves drying out	■ Remove intake hose from metering tank. ■ Open vent valve. ■ Flush liquid end well through. ■ If not successful, remove and clean valves.
Pump no longer meters, although operation / pulse indicator lights	Medium level in tank too low.	Top up.
	Stroke length set too small	Increase stroke length with control knob (14).
	Air trapped in liquid end	■ Liquid end without vent: – Set venting on delivery side via overflow or pressure relief valve or release metering line at injection valve or pressure connection. – Switch on pump and vent at stroke length of 100 % ■ Liquid end with vent: – Open vent valve (5) by max. 1 turn in counter-clockwise direction. – Pump intake until intake line and liquid end are filled free of bubbles. – Close vent valve (5).
Pump does not reach high pressures or no suction despite max. stroke action	The working diaphragm has ruptured without setting off the alarm.	Replace working diaphragm immediately - see chapter "Repairs".
Liquid emerges from end ring	Delivery unit leaking at diaphragm	Retighten screws (24) crosswise in liquid end. Observe tightening torques below.

Tightening torques

For M4 screw	2.5 ... 3 Nm
For M5 screw	4.5 ... 5 Nm

⚠ CAUTION

Check tightening torques every 3 months for PP version.

→ If liquid still emerges from liquid end, the diaphragm is torn and must be replaced - see chapter "Repairs".

The service life of the metering diaphragm is dependent on:

- system backpressure
- operating temperature
- properties of medium to be metered

The service life of the diaphragms is restricted in the case of abrasive media.

12 Decommissioning

Decommissioning

⚠ WARNING

The following applies to all dosing pumps when metering combustible media: Start up and drain only under the supervision of an appropriately qualified person.

⚠ WARNING

EXPLOSION HAZARD. DO NOT DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

⚠ WARNING

Danger from chemical residues

- 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.

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

⚠ WARNING

Warning of dangerous or unknown feed chemical

- Take appropriate protective measures before working on the pump (e.g. safety glasses, safety gloves, ...). Observe the safety data sheet for the feed chemical.
- Drain and flush the liquid end before working on the pump.

Should a dangerous or unknown feed chemical be used: It may escape from the hydraulic components when working on the pump.

⚠ CAUTION

Warning of feed chemical spraying around

- 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.

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.

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.

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

- 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.

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.

⚠ CAUTION

Environmental hazard due to electronic waste

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

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

13 Technical Data

13.1 Capacity data

Pump type	max. Capacity at max. backpressure					max. Capacity at medium backpressure				
EXBb	bar	l/h	psi	gph	ml/ stroke	bar	l/h	psi	gph	ml/ stroke
1000	10	0.19	145	0.051	0.27	5	0.27	72.5	0.071	0.038
1601	16	1.00	232	0.265	0.14	8	1.3	116	0.343	0.18
1201	12	1.70	174	0.451	0.24	6	2.0	87	0.528	0.28
0803	8	3.70	116	0.981	0.51	4	3.9	58	1,029	0.54
1002	10	2.30	145	0.610	0.32	5	2.7	72.5	0,713	0.38
0308	3	8.60	44	2.281	1.20	1.5	10. 3	22	2.719	1.43
2502	25	2.00	362.5	0.528	0.28	12	2.4	181	0,633	0.33
2505	25	4.20	362.5	1.110	0.64	12	5.3	181	1.399	0.80
1006	10	6.00	145	1.590	0.83	5	7.2	72.5	1.901	1.00
1310	13	10.50	188.5	2.783	1.59	6	11.9	94	3.141	1.80
0613	6	13.10	87	3.472	1.82	3	14.9	43	3.933	2.07
0814	8	14.00	116	3.710	1.12	4	15.4	58	4.065	2.33
0417	3.5	17.40	50.75	4.611	2.42	2	17.9	25.3	4.725	2.49
0430	3.5	27.00	50.75	7.155	4.09	2	29.5	25.3	7.788	4.7
0260	1.5	60.00	21.75	15.90	9.09	-	-	-	-	-

Type 1000 with ceramic ball seats in all material specifications.

Type 2502, 2505, 1310 only in version NP and SS

1 gal = 3.78 l

Pump type	Stroke rate	Connectionsize ä Ø x i Ø	Suction lift*	Priming lift**	Perm. admis-sion pres.intake side
EXBb	strokes/min	mm	m Wc	m Wc	bar
1000	120	6x4	1.5	0.5	8.0
1601	120	6x4	5	1.8	8.0
1201	120	6x4	5	2.5	5.5
0803	120	6x4	5	2.8	3.0
1002	120	8x5	5	1.0	3.0
0308	120	8x5	5	1.8	1.5
2502	120	8x5	5	1.0	8.0
2505	110	8x5	5	1.5	3.5
1006	120	8x5	5	1.3	3.5

Pump type	Stroke rate	Connectionsize ä Ø x i Ø	Suction lift*	Priming lift**	Perm. admis-sion pres.intake side
EXBb	strokes/min	mm	m Wc	m Wc	bar
1310	110	8x5	5	1.9	2.0
0613	120	8x5	5.5	1.9	2.0
0814	110	12x9	5	2.0	1.5
0417	120	12x9	4.5	2.0	1.5
0430	110	DN10	5	1.8	0.8
0260	110	DN15	1.5	1.5	0.8

* Suction lift: with intake line filled

** Priming lift: with intake line not filled

Metering pumps for high viscosity media “HV”

Pump type	max. Capacity at max. backpressure					max. Capacity at medium backpressure				
EXBb	bar	l/h	psi	gph	ml/ stroke	bar	l/h	psi	gph	ml/ stroke
1002	10	2.30	145	0.607	0.31	5	2.7	72.5	0.713	0.38
1006	10	6.00	145	1.585	0.83	5	7.2	72.5	1.902	1.00
1310	10	10.50	145	2.773	1.59	6	11.9	87	3.143	1.80
0814	8	14.00	116	3.698	2.12	4	15.4	58	4.068	2.33

1 gal = 3.78 l

Pump type	Stroke rate	Connectionsize ä Ø x i Ø	Suction lift*	Priming lift**	Perm. admis-sion pres.intake side
EXBb	strokes/min	mm	m Wc	m Wc	bar
1002	120	DN10	1.0	-	3.0
1006	120	DN15	1.3	-	3.5
1310	110	DN15	1.9	-	2.0
0814	110	DN15	2.0	-	1.5

* Suction lift: with intake line filled

** Priming lift: with intake line not filled

Metering pumps with self-degassing liquid end ***

Pump type	max. Capacity at max. backpressure					max. Capacity at medium backpressure				
EXBb	bar	l/h	psi	gph	ml/ stroke	bar	l/h	psi	gph	ml/ stroke
1601	16	0.66	232	0,174	0.09	-	-	-	-	-
1201	12	1.0	274	0,265	0.14	-	-	-	-	-

Pump type	max. Capacity at max. backpressure					max. Capacity at medium backpressure				
EXBb	bar	l/h	psi	gph	ml/ stroke	bar	l/h	psi	gph	ml/ stroke
0803	8	2.4	116	0,634	0.33	-	-	-	-	-
1002	10	1.8	145	0,476	0.25	-	-	-	-	-

*** The given performance data are guaranteed minimum values determined with water at room temperature

1 gal = 3.78 l

Pump type	Stroke rate	Connectionsize ä Ø x i Ø	Suction lift*	Priming lift**	Perm. admis-sion pres.intake side
EXBb	strokes/min	mm	m Wc	m Wc	bar
1601	120	6x4	-	1.8	0.2
1201	120	6x4	-	2.0	0.2
0803	120	6x4	-	2.8	0.2
1002	120	6x4	-	2.0	0.2

* Suction lift: with intake line filled

** Priming lift: with intake line not filled

13.2 Accuracies

min.: -5 %, max.: not specified

at max. stroke length and max. backpressure, in all material versions.

Better than ± 2 %

under constant conditions and min. 30 % stroke length;

observe following notes:

- All specifications refer to metering measurements with water at 20 °C.
- Constant backpressure, above 1 bar if possible.
- If metering takes place via a free outlet, a pressure retention valve must be used to generate a backpressure of min. 1.5 bar (refer to the installation examples).
- Wherever possible, lay intake and metering lines with a constant rising gradient.
- If the liquid level of the supply tank is above the pump during operation, admission pressure will be applied on the intake side; in this case, the backpressure should be so high that there is a minimum differential pressure of 1.5 bar otherwise a pressure retention valve or a springloaded injection valve with corresponding admission pressure must be used.

A pressure retention valve or a spring-loaded injection valve is not an absolutely tightclosing shut-off element. For this reason, an intake valve which is closed when the metering pump is at a standstill, must be installed if admission pressure is applied on the intake side.

13.3 Material Specifications

	PP1	PP4	PC5	NP1 /NP3	NS3	PS3	TT1	SS
Liquid end	Polypropylene	Polypropylene	PVC	Acrylic	Acrylic	PVC	PTFE with carbon	Stainless steel 1.4404
Intake- / delivery connection	Polypropylene	Polypropylene	PVC	PVC	PVC	PVC	PTFE with carbon	Stainless steel 1.4404
Seals	EPDM	EPDM	FPM-A	FPM-A/B	FPM-B	FPM-B	PTFE	PTFE
Balls Ø 6 ... Ø 12	Ceramic	-	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic
Balls DN10 ... DN15	Glas	Ceramic	-	Glas	-	-	Ceramic	Stainless steel 1.4404

Type 1000: with ceramic seat rings in all material versions

PP4: with Hastelloy C valve springs

DEVELOPAN® metering diaphragm with PTFE base in all versions

13.4 Weights

Pump type	Material	EXBbG	EXBbM
1000, 2501,1601, 1201, 0803, 1002, 0308	NP, PP, TT / SS, SB	approx. 12/16 kg	approx. 26/30 kg
2502, 1006, 0613, 0417	NP, PP, TT / SS, SB	approx. 13/17 kg	approx. 27/31 kg
2505, 1310, 0814, 0430, 0260	NP, PP, TT / SS, SB	approx. 16/20 kg	approx. 30/34 kg

13.5 Electrical Data

13.5.1 Electrical data, control current circuit

13.5.1.1 for “non-intrinsically safe” version

mA input, identity code feature “control type”:	2, 3
Voltage max.:	6 V

Current max.:	30 mA
Input apparent ohmic resistance, approx.:	94 Ω

Contact/pause input, identity code feature “control type”:		1, 7
Voltage with open contact approx.:		5 V
Input resistance approx.:		4.7 kΩ
	Control using potential-free contact or semiconductor switch:	
	Residual current max. (contact open):	70 µA
	Contact resistance (closed) max.:	10 kΩ or
	Voltage drop max.:	3 V
	Pulse frequency max.:	3 V
	Pulse width min.:	10 ms

13.5.2 Electrical data, supply current circuit

13.5.2.1 for “not intrinsically safe” version

Measurement voltage:	115, 230 and 500 ± 10 % VAC
Maximum current consumption I_{eff}*:	1.5 A
Max. peak current during a stroke I_{peak}:	8 A
Maximum power consumption P_{wirk}*:	50 W

* obtained by averaging over several strokes at the maximum stroke rate

13.5.3 Electrical data, details

Pump types 1000, 2501,1601, 1201, 0803, 1002, 0308

Mains connection (V)	115	230	500
Max. current consumption*** (A)	1.4	0.8	0.3
Effective. current consumption*** (A)	0.29	0.17	0.09
Mean power consumption (W)	16	16	16
Fuse item 65* value (A) / Type	0.63T	0.315T	0.319
Fuse item 66** value (A) / Type	0.16T	0.16T	-

* special fuse with high switching capacity: only use original fuse

** use only original fuse

*** effective value during a stroke

**** obtained by averaging over several strokes at the maximum stroke rate

***** with material version PP4

.

Fuse order numbers - see chapter "Ordering informations fuses".

Only the effective power consumption is specified on the rating plate.

13.6 Mechanical data, cables

Pump type	Voltage	Cable	Cable type	Colour	outer Ø
	[V]				[mm]
EXBbG	to 250	power cable	H 07 RNF 3G1.5	black	10.0
EXBbG	> 250	power cable	NSSHÖU 3x1.5	yellow	12.5
EXBbG	< 60	external/ana-logue cable	Ölflex 110	grey	6.3

The cable aperture has a 1/2" NPT internal thread for connection to the North American supply system.

13.7 Ambient conditions

Temperatures

Admissible storage temperature	-20 °C to +50 °C	-4 °F to +122 °F
Admissible ambient temperature	-20 °C to +45 °C	-4 °F to +113 °F

Media temperature resistance of material versions

	PP	NP	TT	SS
Long term at max. back pressure [°C]	50	45	50	50
Long term at max. back pressure [°F]	122	113	122	122

Climate

Admissible humidity	92 % non condensing
Behaviour in damp alternating climate	IEC 60068-2-78

Enclosure rating

Enclosure rating	IP 65 (IEC 60529)

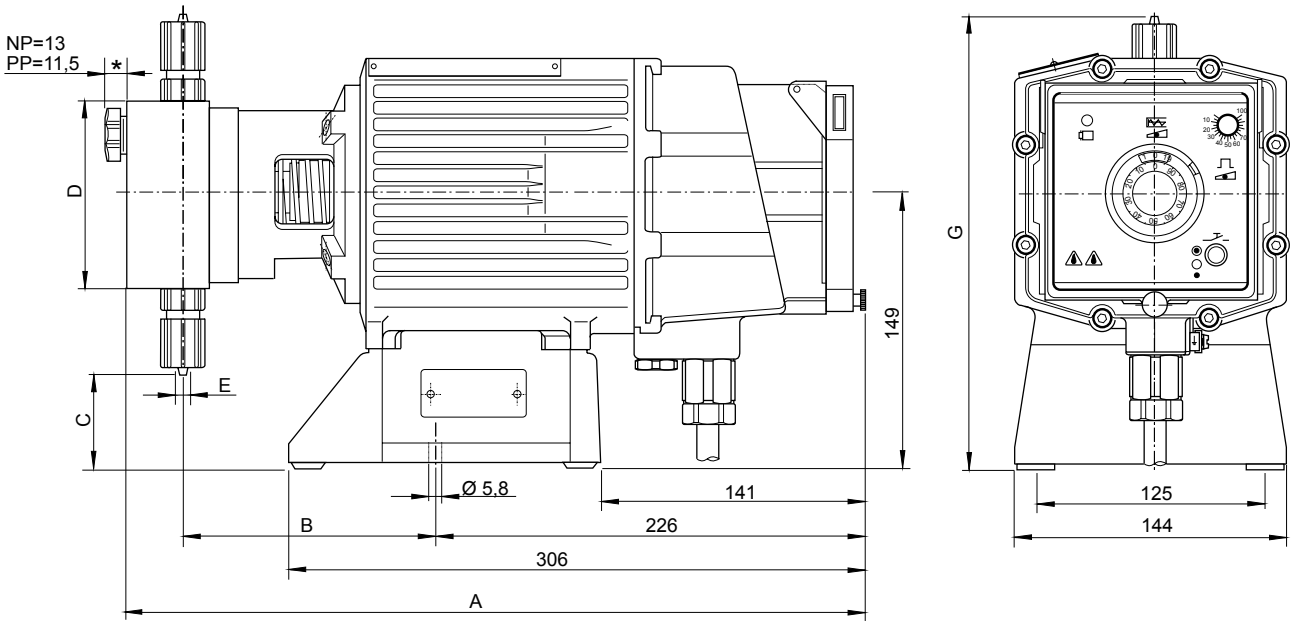
13.8 Sound intensity level

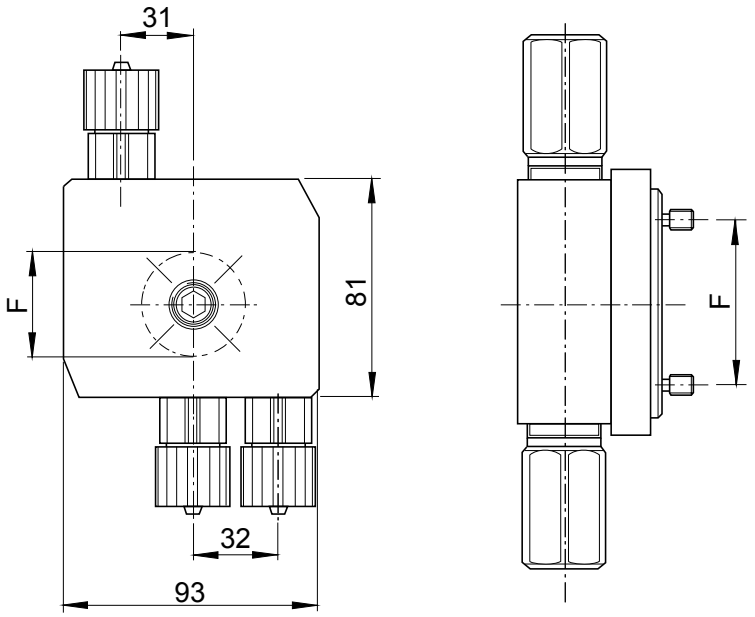
Sound intensity level

Sound intensity level	≤ 70 dB (A), 1 m distance, according to EN 12639

14 Dimensions

ProMinent EXtronic® EXBb dimensions in mm





Version ,,NS, PS“ Version ,,SB“

Pump type	Material	A	B	C	Ø D	E	Ø F	G
1000, 1601, 1201, 0803	**NP1**	391	136	69	70	6x4	38	229
1002, 0308, 2502, 2505, 1006	**NP3**	391	136	61	85	8x5	50	237
1310, 0613		391	136	52	100	8x5	66	244
0814, 0417		391	136	52	100	12x9	66	244
430		381	137	46	135	DN10	117	304

Pump type	Material	A	B	C	Ø D	E	Ø F	G
260		398	142	-16	135	DN15	117	314
1000, 1601, 1201, 0803	PP1	393	136	67	70	6x4	38	236
1002, 0308, 1006		393	136	67	70	8x5	50	236
613		393	136	57	90	8x5	66	246
0814, 0417		393	136	57	90	12x9	66	246
430		381	137	46	135	DN10	117	304
260		398	142	-16	135	DN15	117	314
1002	PP4	389	138	46	85	DN10	50	222
1006		398	145	76	85	DN15	50	222
1310		398	145	76	85	DN15	66	222
814		398	145	69	100	DN15	66	229
1000, 1601, 1201	TT1	378	134	75	60	6x4	38	223
803		378	134	70	70	6x4	38	228
1002, 0308, 1006		388	138	42	80	8x5	50	256
613		388	138	32	95	8x5	66	266
0814, 0417		388	138	32	95	12x9	66	266
430		388	137	35	135	DN10	117	263
260		398	142	31	135	DN15	117	268
1000, 1601, 1201	SS1	376	134	84	60	6x5	38	214
803		376	134	79	70	6x5	38	219
1002, 0308, 2502, 2505, 1006		386	138	48	80	8x7	50	250
1310, 0613		386	138	39	95	8x7	66	259
0814, 0417		386	138	39	95	12x10	66	259
430		386	137	35	135	DN10	117	263
260		390	142	28	135	DN15	117	271
1000	SB1	373	134	87	70	Rp 1/4	38	211
1601, 1201, 0803		373	134	79	85	Rp 1/4	38	219
1002, 0308, 2502, 2505, 1006		381	138	56	80	Rp 1/4	50	242
1310, 0613		381	138	48	95	Rp 1/4	66	250
0814, 0417		381	138	48	95	Rp 1/4	66	250
430		381	138	22	145	Rp 1/4	117	275
260		383	139	27	145	Rp 1/2	117	279

Pump type	Material	A	B	C	Ø D	E	Ø F	G
1601, 1201, 0803	NS3	383	136	67	*	6x4	38	243
1002		383	136	67	*	6x4	50	243
1601, 1201, 0803	PS3	383	136	67	*	6x4	38	243
1002		383	136	67	*	6x4	50	243

15 Ordering informations fuses

Fuses

Keep a number of spare fuses in stock.

Fuse item 65

Voltage	Pump types	Fuse data	Order no
115 V	1000,1601, 1201, 0803, 1002, 0308	5x20 T 630 mA (1.5kA)	732407
115 V	2502,1006,0613,0417,1002HV	5x20 T 2.0 A (1.5kA)	732412
115 V	2505,1310,0814,0430,0260	5x20 T 2.5 A (1.5kA)	732413
230 V	1000,1601, 1201, 0803, 1002, 0308	6.3x32 T 315 mA 500V (1.5kA)	732404
230 V	2502,1006,0613,0417,1002HV	6.3x32 T 800 mA 500V (1.5kA)	732408
230 V	2505,1310,0814,0430,0260	6.3x32 T 1.25 A 500V (1.5kA)	732410
500 V	1000,1601, 1201, 0803, 1002, 0308	6.3x32 T 315 mA 500V (1.5kA)	732371
500 V	2502,1006,0613,0417,1002HV	6.3x32 T 630 mA 500V (1.5kA)	732372
500 V	2505,1310,0814,0430,0260	6.3x32 T 1.25 A 500V (1.5kA)	733150

Fuse item 66

Voltage	Pump types	Fuse data	Order no
100 ... 230 V	All	5x20 T 160 mA (35A)	712048

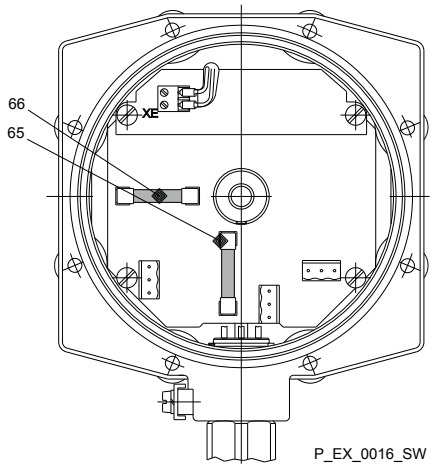


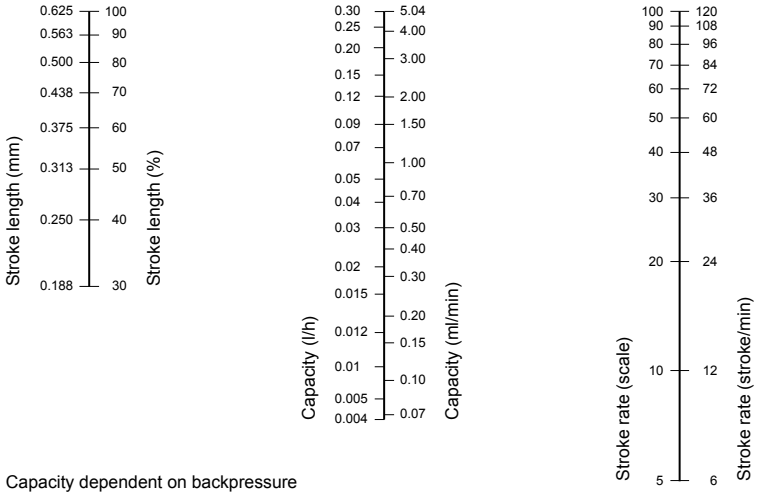
Fig. 17

WARNING

Repairs must be carried out by skilled technicians.

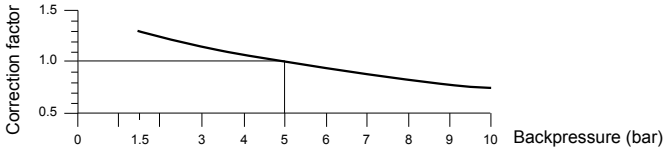
16 Nomograms

EXBb_1000



Capacity dependent on backpressure

Capacity 0.27 l/h at medium backpressure of 5 bar
Capacity 0.19 l/h at max. backpressure of 10 bar



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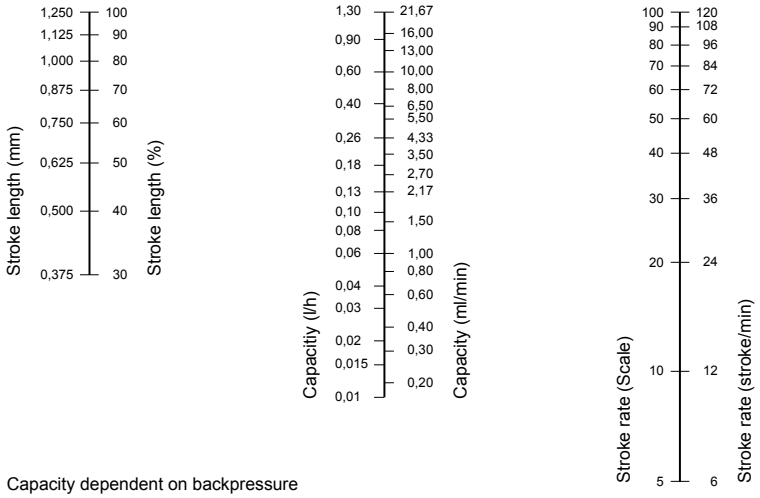
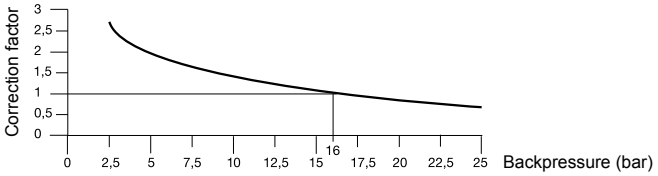
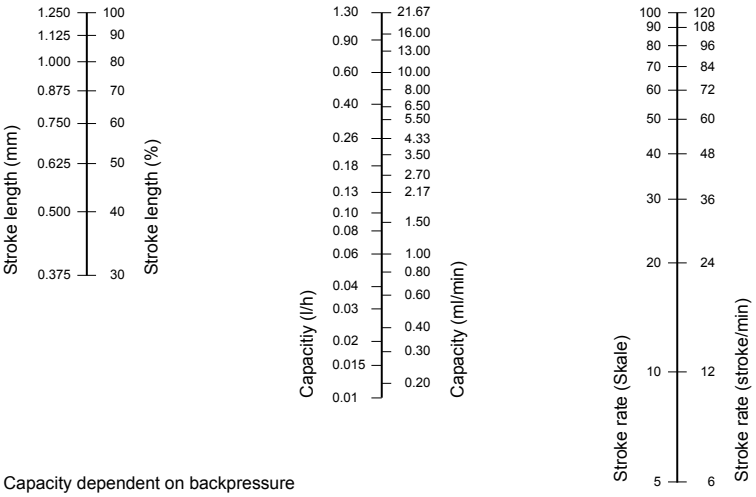


Capacity dependent on backpressure

Capacity 1,30 l/h at medium backpressure of 16 bar
Capacity 1,10 l/h at max. backpressure of 25 bar

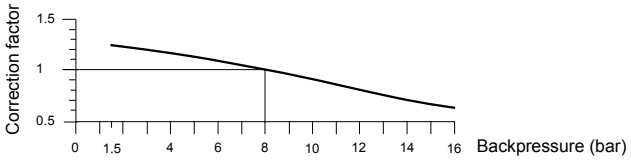


EXBb_1601



Capacity dependent on backpressure

Capacity 1.30 l/h at medium backpressure of 8 bar
Capacity 1.00 l/h at max. backpressure of 16 bar



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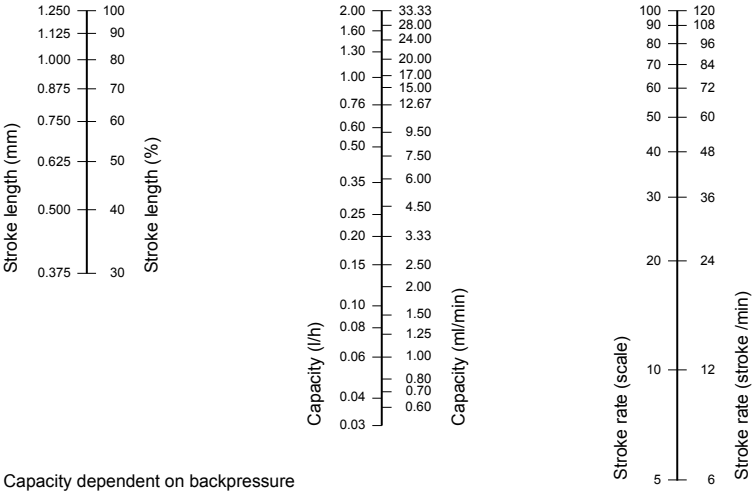
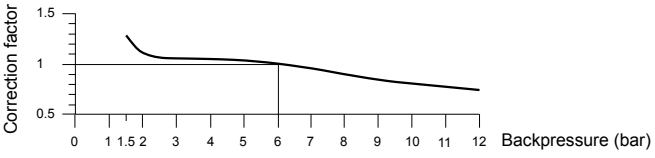


Capacity dependent on backpressure

Capacity 2.00 l/h at medium backpressure of 6 bar
Capacity 1.70 l/h at max. backpressure of 12 bar



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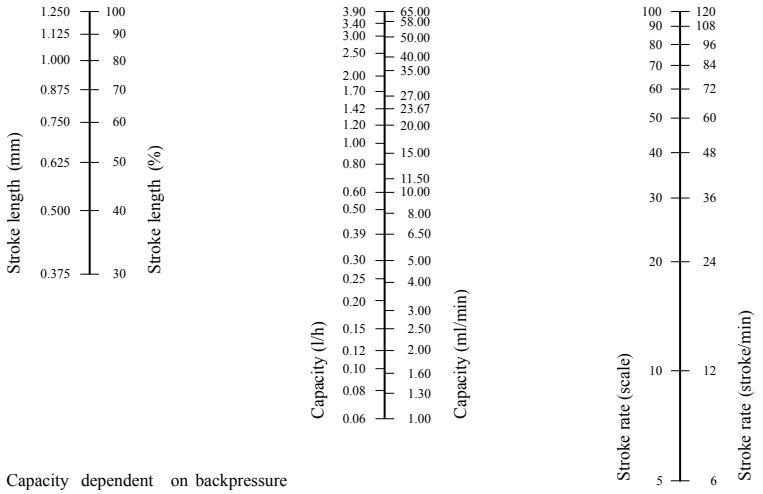
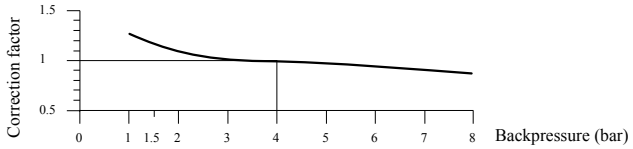


Capacity dependent on backpressure

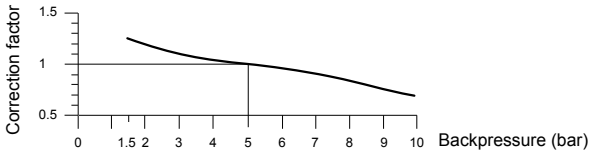
Capacity 3.90 l/h at medium backpressure of 4 bar
Capacity 3.70 l/h at max. backpressure of 8 bar



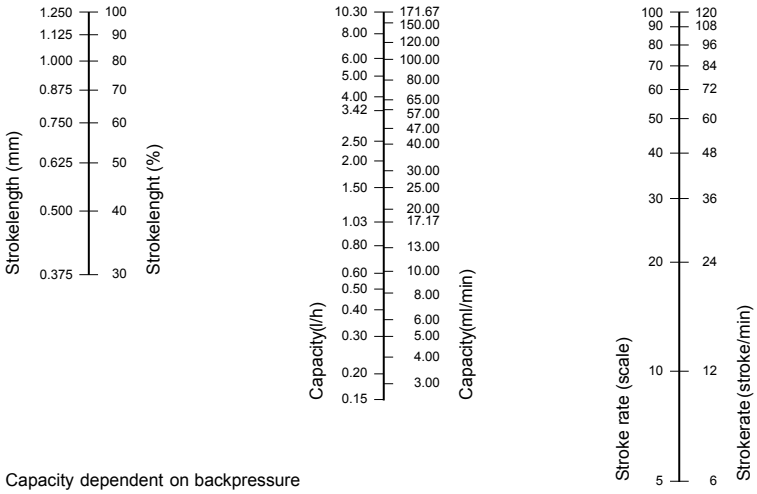
EXBb_1002

Capacity dependent on backpressure

Capacity 2.70 l/h at medium backpressure of 5 bar
Capacity 2.30 l/h at max. backpressure of 10 bar

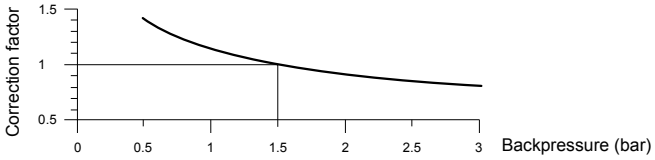


EXBb_0308

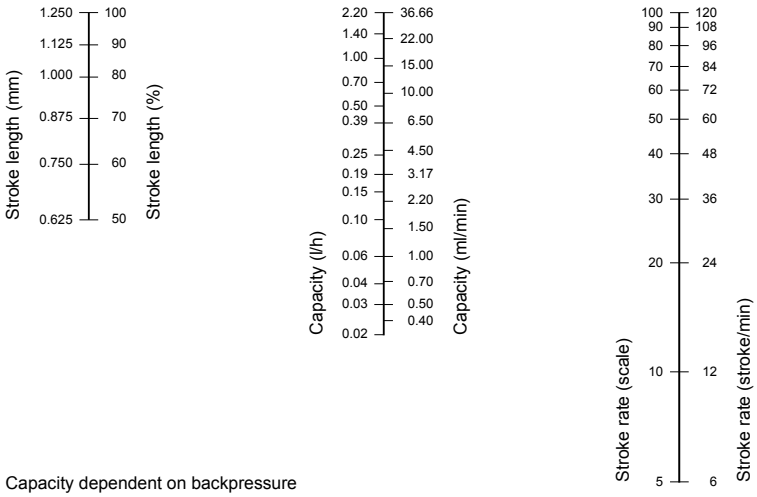


Capacity dependent on backpressure

Capacity 10.30 l/h at medium backpressure of 1.5 bar
Capacity 8.70 l/h at max. backpressure of 3 bar

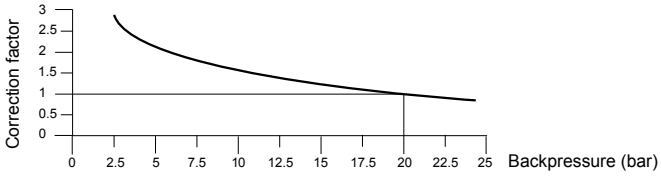


EXBb_2502



Capacity dependent on backpressure

Capacity 2.20 l/h at medium backpressure of 20 bar
Capacity 2.00 l/h at max. backpressure of 25 bar



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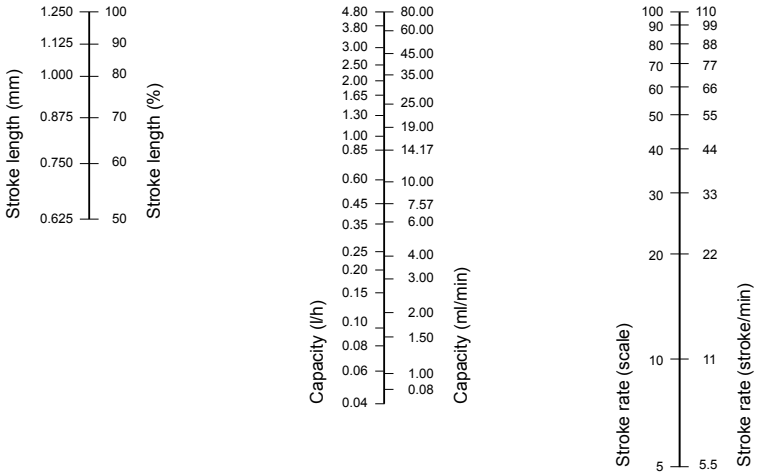
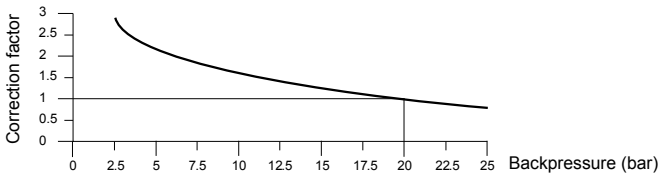


Capacity dependent on backpressure

Capacity 4.80 l/h at medium backpressure of 20 bar
Capacity 4.20 l/h at max. backpressure of 25 bar



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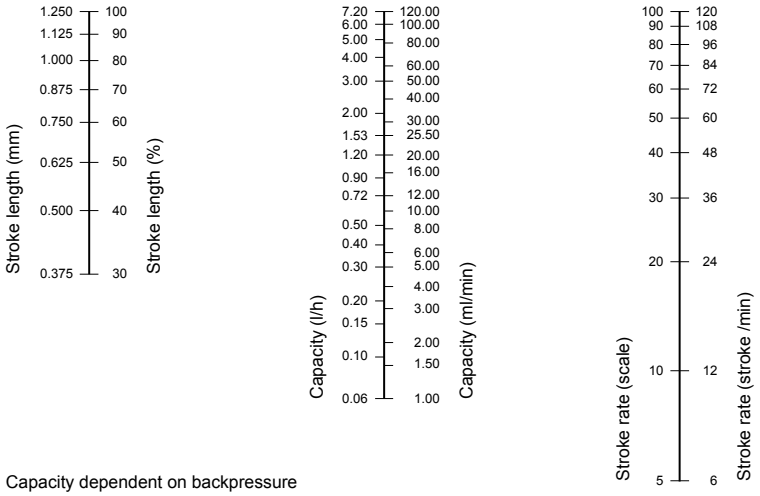
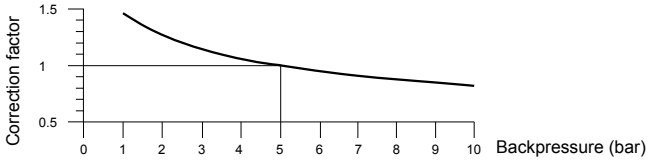


Capacity dependent on backpressure

Capacity 7.20 l/h at medium backpressure of 5 bar
Capacity 6.00 l/h at max. backpressure of 10 bar



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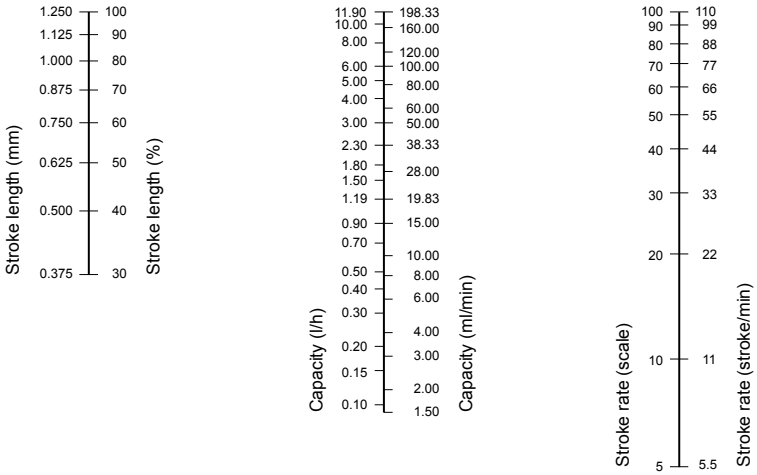
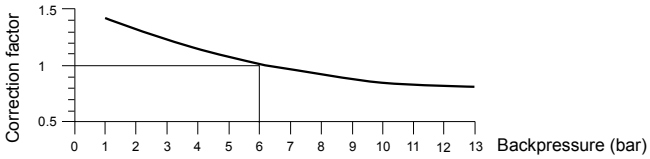


Capacity dependent on backpressure

Capacity 11.90 l/h at medium backpressure of 6 bar
Capacity 10.50 l/h at max. backpressure of 13 bar



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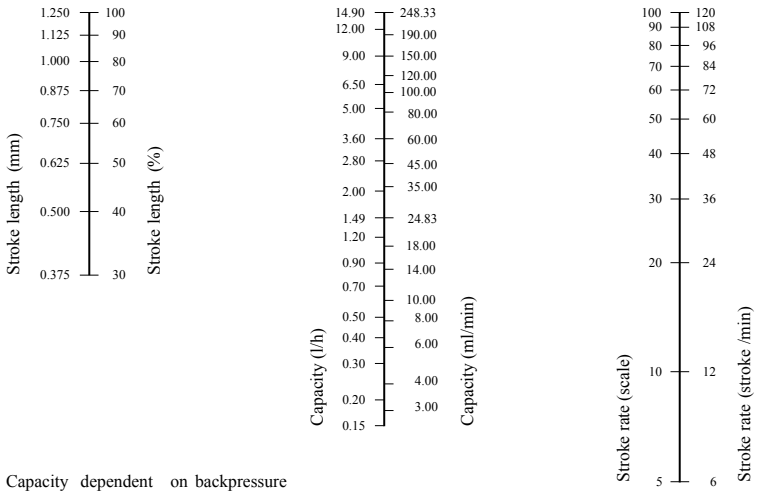
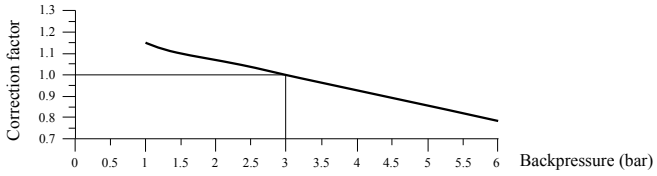


Capacity dependent on backpressure

Capacity 14.90 l/h at medium backpressure of 3 bar
Capacity 13.10 l/h at medium backpressure of 6 bar



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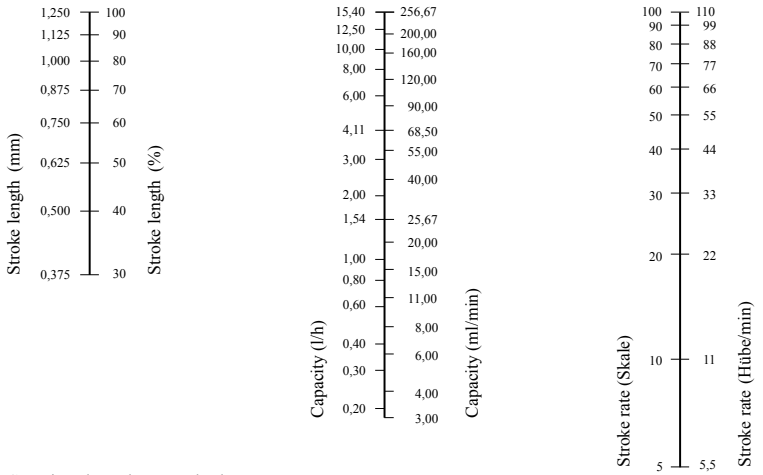
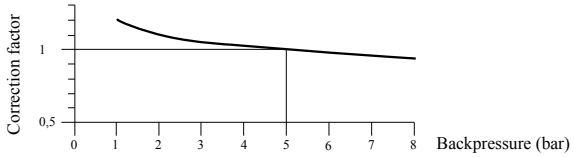


Capacity dependent on backpressure

Capacity 15,40 l/h at medium backpressure of 5 bar
Capacity 14,00 l/h at max. backpressure of 8 bar



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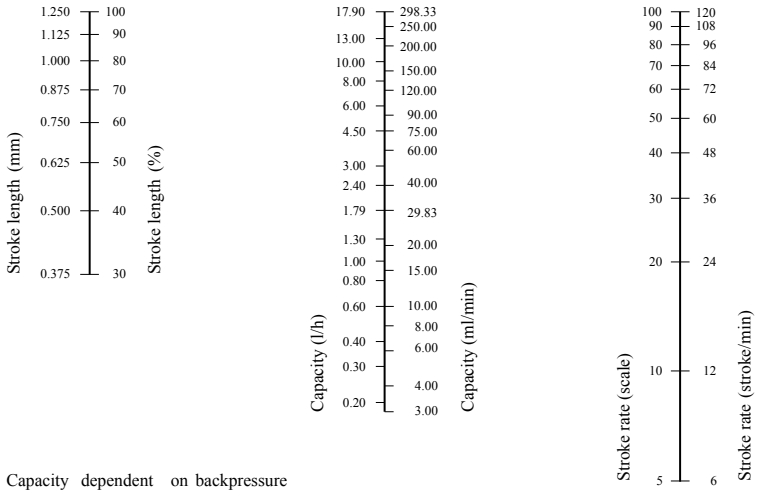
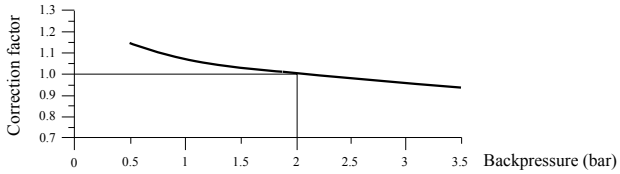


Capacity dependent on backpressure

Capacity 17.90 l/h at medium Backpressure of 2 bar
Capacity 17.40 l/h at medium Backpressure of 3.5 bar



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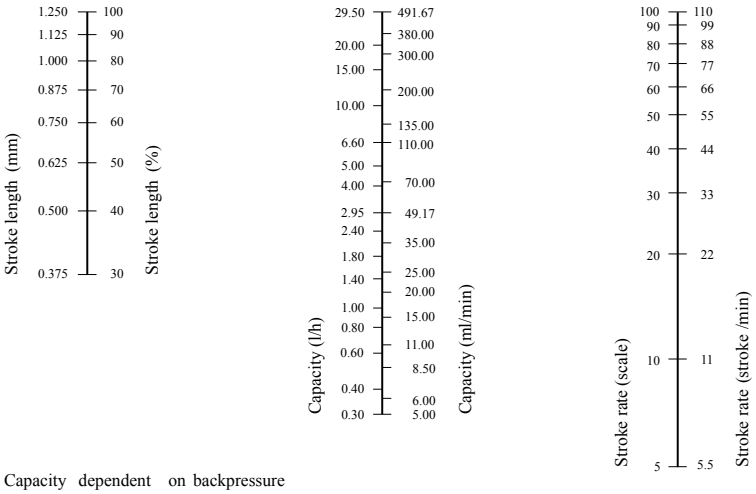
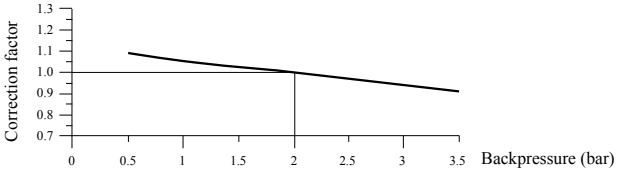


Capacity dependent on backpressure

Capacity 29.50 l/h at medium backpressure of 2 bar
Capacity 27.00 l/h at max. backpressure of 3.5 bar



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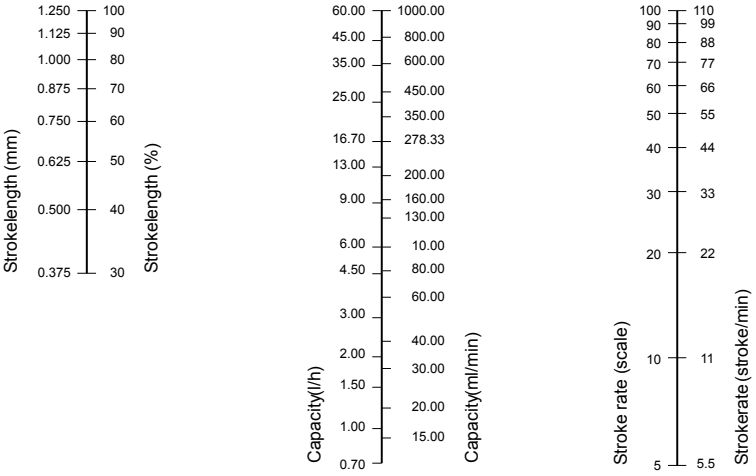

Capacity 60.00 l/h at max. backpressure of 1.5 bar

17 Certificate of Compliance

FM Approvals
1151 Boston Providence Turnpike
P.O. Box 9102 Norwood, MA 02062 USA
T: **781 762 4300** F: 781-762-9375 www.fmapprovals.com

CERTIFICATE OF COMPLIANCE

HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT

This certificate is issued for the following equipment:

EXBbG - bcdefg3. Extronic Chemical Metering Pumps.
XP / I / 1 / BCD / T6 Ta = 45°C;
b = Pump types 02XX, 03XX, 04XX, 06XX, 08XX, 10XX, 12XX, 13XX, 16XX, 25XX (where XX is the flow rate that does not affect explosion proof rating).
c = Material type designate by 3 alpha numeric code (material type does not affect explosionproof rating).
d = Valve spring connections code 0 or 1.
e = Electric connections code A, B, C, D or E.
f = Control system type 0, 1, 2, 3, or 7.
g = Control operation type 0, 1 or 2.

Equipment Ratings:

Explosionproof for Class I, Division 1, Groups B, C, and D hazardous (Classified) locations.
Temperature Class is T6 when Ta=45°C max.

FM Approved for:

ProMinent Dosiertechnik GmbH
D-69123 Heidelberg,
Germany

To assure that this Approval is still valid, please refer to www.approvalguide.com

This certifies that the equipment described has been found to comply with the following Approval Standards and other documents:

Class 3600	2011
Class 3615	2006
Class 3810	2005

Original Project ID: 4D6A0.AX Approval Granted: January 21, 1999

Subsequent Revision Reports / Date Approval Amended

Report Number	Date	Report Number	Date
040504	May 4, 2004		
3022200	January 18, 2005		
3043985	July 19, 2013		

FM Approvals LLC

J.E. Marquedant
Group Manager, Electrical

19 July 2013
Date

To assure that this Approval is still valid, please refer to www.approvalguide.com

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