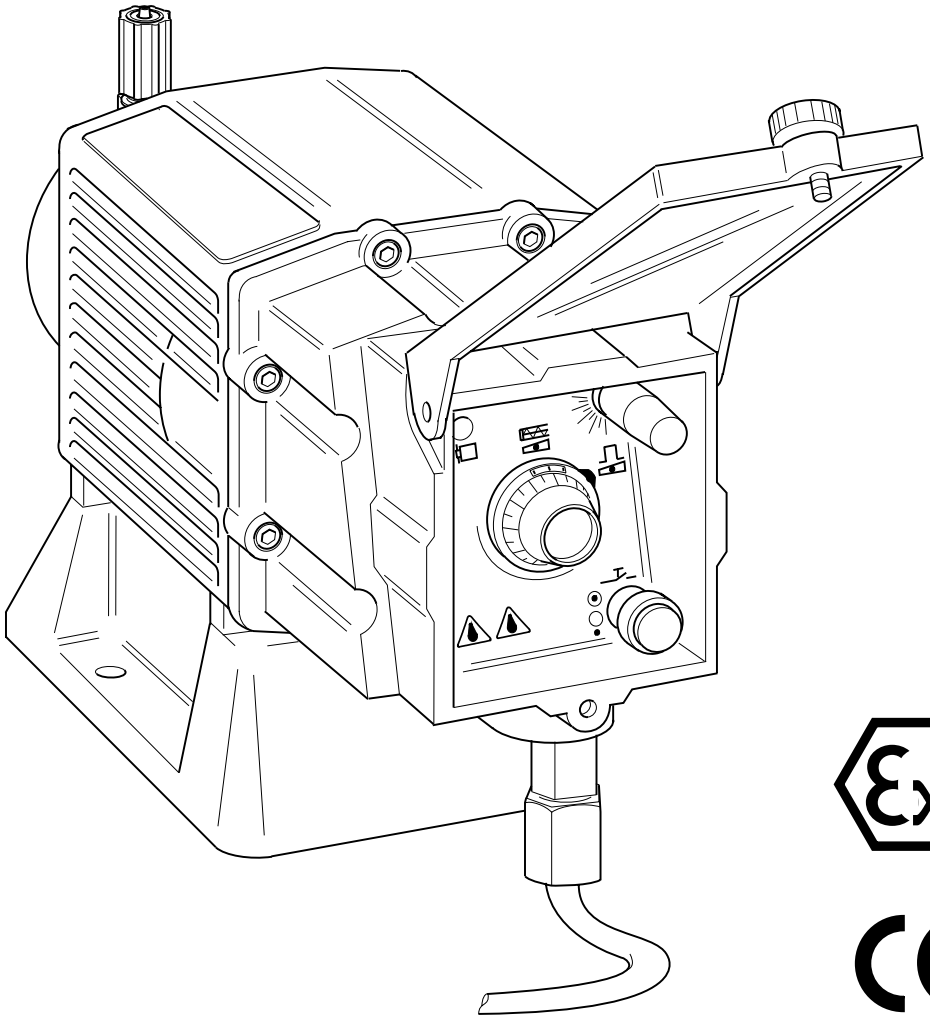
Operating Instructions

Metering Pump ProMinent EXtronic® EXBb



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EXBb _ _ _ _ _ _ _ _

Please enter identcode of the device here!

Please carefully read through these operating instructions in full! Do not discard!
Damaged caused by incorrect operation will invalidate the guarantee!

Publishing details:

Operating Instructions Metering Pump ProMinent EXtronic® EXBb

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Subject to technical modificatios.

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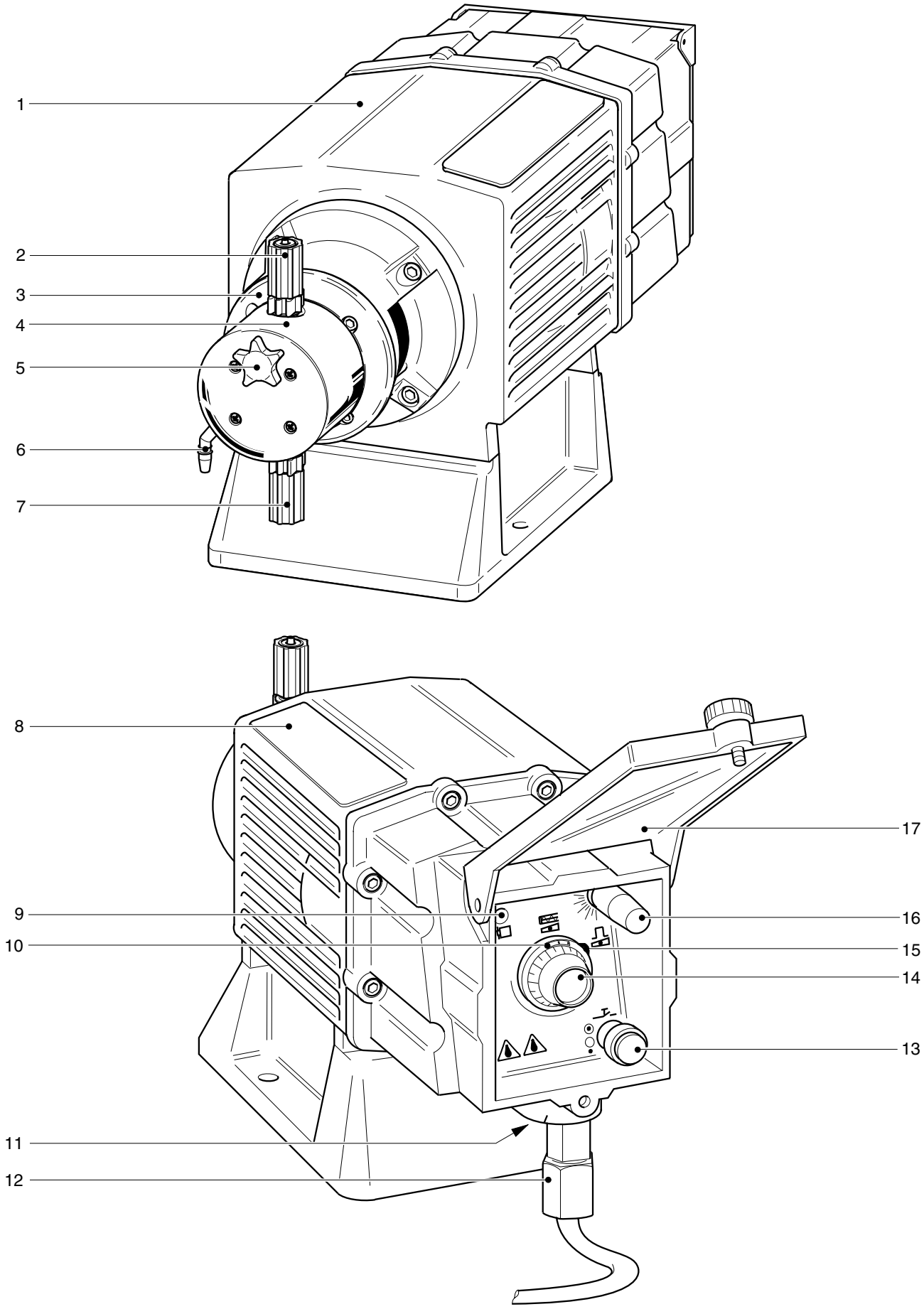
View of Metering Pump



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 identcode on Page 13)

6 Socket for bypass hose
(only on types 1000 - 0417 NP and PP, refer to identcode on Page 13)

7 Intake connection#

8 Type identification plate

9 Lamp for operation/pulse indication

10 Inspection window

11 External connection

12 Power connection

13 Power switch

14 Control for stroke length

15 Locking lever

16 Control for stroke rate

17 Transparent cover

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:

NOTE

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.

IMPORTANT

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

Contents

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 zone 1, device category II 2 G of explosion group II C (EXBbG) according to VDE guidelines
- for firedamp-threatened underground excavations in explosion group I, device category 1 M 2 (EXBbM) according to VDE guidelines
- in explosion-threatened workplaces, class I, div. 1, group B, C and D in accordance with FM and CSA standards (under preparation)

Liquid ends made of various materials cover virtually all applications:

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

Gas-emitting media

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

Combustible media

The ”SB“ version of the liquid end is recommended for combustible media.

IMPORTANT

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, 100 V und 200 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 Identcode page 13).

1 Safety

1.1 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, observe the directives for the installation of devices in explosion-threatened areas, in Europe the European Operator Guideline 99/92/EC (ATEX137), implemented in Germany with the new operating safety directive.**
- **When using the metering pump for metering flammable media, observe (in Europe) the European Operator Guideline 99/92/EC (ATEX 137, previously ATEX118A), implemented in Germany with the new operating safety directive and the German dangerous chemicals directive.**
- **Observe also all relevant standards e.g. DIN EN 60079-10/14 and DIN VDE 50020 for installations in explosion-threatened areas and DIN VDE 0118 for the installation of electrical equipment in explosion-threatened areas by day.**
- **Note all national directives which apply to the installation when installing outside Germany.**

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!**

IMPORTANT

- **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!**

NOTE

- **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!**

1.2 Reference Guidelines/Standards

see EC conformity declaration

1.3 Tests and Approvals

Explosions protection

The conformity certificate of the DMT-Gesellschaft für Forschung und Prüfung mbH, department for the safety of electric resources, exploring drifts, can be found in the appendix.

Device type	Device category	Explosion protection	Approval
EXBbG EXBbG	⟨Ex⟩ II 2G II 2G	EEx d IIC T6 c IIC T6	DMT 03 ATEX E 023 DMT 03 ATEX E 023
EXBbG, intrinsically safe EXBbG, intrinsically safe	⟨Ex⟩ II 2(1)G II 2G	EEx d [ia] IIC T6 c IIC T6	DMT 03 ATEX E 023 DMT 03 ATEX E 023
EXBbM EXBbM	⟨Ex⟩ I M2 I M2	EEx d I c I	DMT 03 ATEX E 023 DMT 03 ATEX E 023
ExBbM, intrinsically safe ExBbM, intrinsically safe	⟨Ex⟩ I M2(1) I M2	EEx d [ia] I c I	DMT 03 ATEX E 023 DMT 03 ATEX E 023
EXBbG		Classl, Div.1, Group B, C and D	FMR*
EXBbG		Classl, Div.1, Group B, C and D	CSA*

* Under preparation

2 Design and Function

You will find the view of the metering pump and the description of the function units on the fold-out page of the cover.

The metering pump ProMinent EXtronic® consists of the main components

Drive unit (1) With electronic control and solenoid,
power connection (10)
and external/analogue connection (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 lamp for operation/pulse indication (9),
power switch (13),
control knob for stroke length (14) with inspection window (10),
locking lever (15),
control knob for stroke frequency (rate) (16) and transparent cover (17).

2.1 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.

2.2 Construction / functional description, diaphragm rupture detector

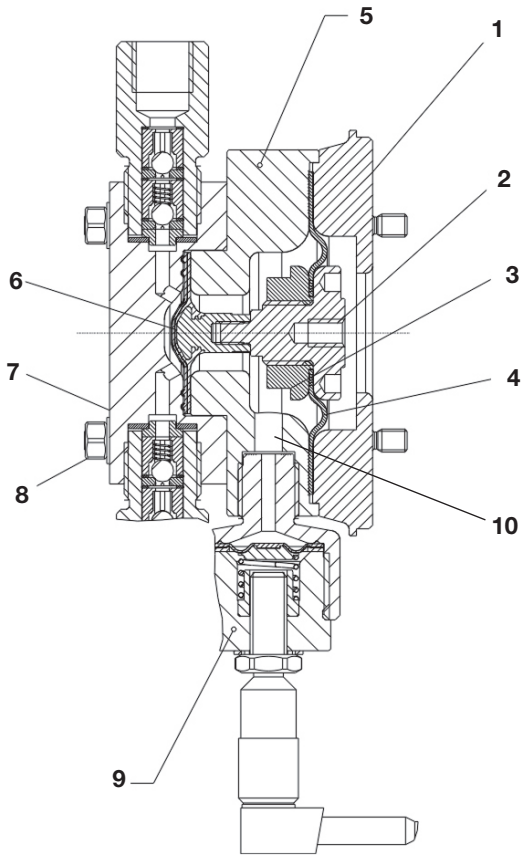
The diaphragm rupture indicator monitors the tightness of the working diaphragm.

Rather than having just one working diaphragm, the EXBb liquid end with diaphragm rupture indicator has an additional diaphragm assembly, comprising the working diaphragm and an additional safety diaphragm, and is fitted with a diaphragm rupture sensor (see Fig.1).

The safety diaphragm is situated between the top plate and the spacer plate and forms a sealed interim chamber with the working diaphragm.

Function It serves to monitor ruptures in the working diaphragm and protects the power end from corrosion and the environment from chemical leaks in the case of diaphragm rupture.

Even after diaphragm rupture, this liquid end can continue to operate in emergency mode at full working pressure and without leaks until the diaphragm is changed.



1 Top plate
2 Adapter
3 Intermediate bush
4 Safety diaphragm (Backup diaphragm)
5 Spacer
6 Working diaphragm
7 Liquid end
8 Locking screw
9 Diaphragm rupture indicator
10 Intake line

fig.: 1

IMPORTANT

If the diaphragm ruptures, an electrical signal is triggered when the system back pressure reaches approx. 2 bar.

IMPORTANT

Precise pump feed cannot be guaranteed after a working diaphragm rupture.

2.3 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.

2.4 Versions

“Internal” version:

The control pulse is generated internally, stroke length and stroke frequency (rate) can be adjusted manually with the control knobs on the operator control unit.

“External” version:

The control pulse is generated externally from potential-free or semiconductor contacts and routed via the external/analog input of the drive unit; examples are contact-type water meters or DULCOMETER® control systems.

“Analog” version:

An external analog signal is supplied via the external/analog input of the drive unit; the stroke frequency changes proportional to the 0-20 mA or 4-20 mA signal.

In the case of “external” and “analogue” versions, the EXBbG series pumps with external/ analogue input are available in “intrinsically safe” [I,A] or “not intrinsically safe” versions, the EXBbM series with external/analogue input, “not intrinsically safe”.

Version “internal with pause function”:

As internal but with additional option of switching metering pump on/off via an external (low voltage end) switch.

The “external”, “analogue” and “pause function” versions are available with intrinsically safe (ia) signal cables.

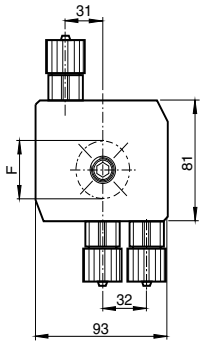
3 Technical Data

3.1 Identcode

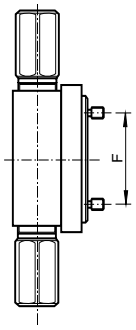
EXBb	Series ProMinent EXtronic® Version b							
	Type of enclosure							
	G	Gas-explosion protection, explosion group IIC, device group/category II 2G;						
	M	Mining/firedamp, and gas-explosion protection, expl. value I/IIC) device size/category I M2 U. II 2G)						
		Pump type						
		1000 **1601** **1201** **0803**	1st and 2nd digit: Backpressure [bar]					
		1002 **0308** **2501***** **2502***	3rd and 4th digit: Capacity [l/h]					
		1006 **0613** **0417** **2505***	**) Type 2502 and 2505 only avaible in versions "SS" and "SB"*					
		1310** **0814** **0430** **0260**	***) Type 1310 only available in versions "NP", "PP4", "SS" and "SB"*					
			****) Type 2501 only available in version "SSM" and "SBM"*					
			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*			
			SSM	as SS1, with diaphragm rupture detector				
			SBM	as SB1, with diaphragm rupture detector				
			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		
					C	200 V 50/60 Hz open End		
					D	100 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	
						4	external contact activation [i,a]	
						5	analogue activation 0–20 mA [i,a]	
						6	analogue activation 4–20 mA [i,a]	
						7	internal stroke rate adjustment with pause function	
						8	external stroke rate adjustment with pause function[i,a]	
							Control variant	
							0	with potentiometer
							1	with push-button for ma. frequency
							2	with switch for ma. frequency
								Approval/voltage/language
								0 BVS-Europa/100–500 V/German
								1 BVS-Europa/100–500 V/English
								2 FM-USA/100–500 V/English
								3 CSA-Kanada/100–500 V/English
EXBb	_	_____	____	_	_	_	_	_

Viton® is a registered trademark of DuPont Dow Elastomers.

3.2 Dimensions and Weights



Version ,,NS, PS“



Version ,,SB“

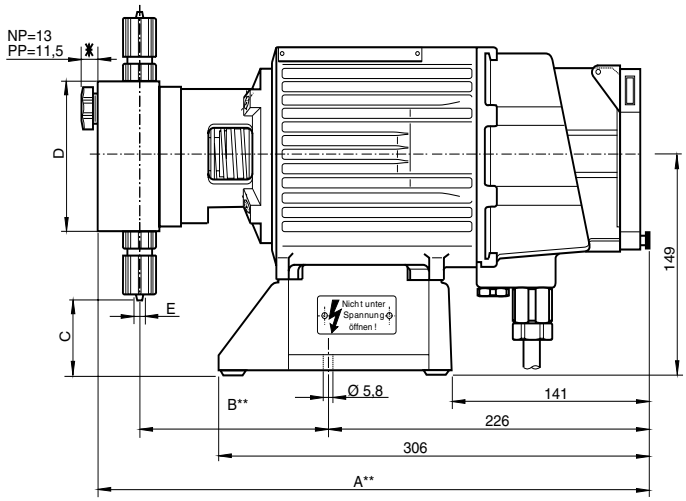
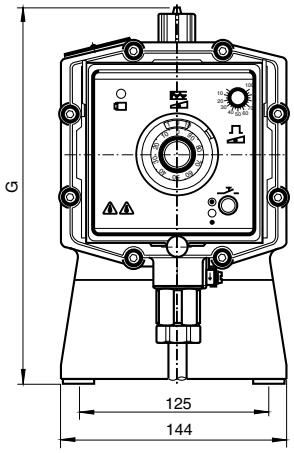


fig.: 2

*) *Vent valve and bypass only on Typs 1000 – 0417 NP and PP*

**) *Dimensions for version „SSM“ and SBM“ + 15 mm on version SS or SB*



ProMinent EXtronic® EXBb		dimensions in mm						
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
0430		381	137	46	135	DN10	117	304
0260		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
0613		393	136	57	90	8x5	66	246
0814, 0417		393	136	57	90	12x9	66	246
0430		381	137	46	135	DN10	117	304
0260		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
0814		398	145	69	100	DN15	66	229
1000, 1601, 1201	**TT1**	378	134	75	60	6x4	38	223
0803		378	134	70	70	6x4	38	228
1002, 0308, 1006		388	138	42	80	8x5	50	256
0613		388	138	32	95	8x5	66	266
0814, 0417		388	138	32	95	12x9	66	266
0430		388	137	35	135	DN10	117	263
0260		398	142	31	135	DN15	117	268
1000, 1601, 1201	**SS1**	376	134	84	60	6x5	38	214
0803		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
0430		386	137	35	135	DN10	117	263
0260		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
0430		381	138	22	145	Rp 1/4	117	275
0260		383	139	27	145	Rp 1/2	117	279
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

*) *see diagram*

Pump type	Material	Weight	
		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

3.3 Capacity data

Pump type	max. Capacity at max. backpressure			max. Capacity at medium backpressure			Stroke rate	Connection-size ä ∅ x i ∅	Suction lift*	Priming lift**	Perm. admission pres. intake side
EXBb	bar	l/h	ml/stroke	bar	l/h	ml/stroke	strokes/min	mm	m Wc	m Wc	bar
1000	10	0.19	0.027	5	0.27	0.038	120	6x4	1.5	0.5	8.0
2501	25	1.14	0.15	16	1.3	0.18	120	6x4	5	1.8	8.0
1601	16	1.00	0.14	8	1.3	0.18	120	6x4	5	1.8	8.0
1201	12	1.70	0.23	6	2.0	0.28	120	6x4	5	2.5	5.5
0803	8	3.70	0.51	4	3.9	0.54	120	6x4	5	2.8	3.0
1002	10	2.30	0.31	5	2.7	0.38	120	8x5	5	1.0	3.0
0308	3	8.60	1.20	1.5	10.3	1.43	120	8x5	5	1.8	1.5
2502	25	2.00	0.28	20	2.2	0.31	120	8x5	5	1.0	8.0
2505	25	4.20	0.64	20	4.8	0.73	110	8x5	5	1.5	3.5
1006	10	6.00	0.83	5	7.2	1.00	120	8x5	5	1.3	3.5
1310	13	10.50	1.59	6	11.9	1.80	110	8x5	5	1.9	2.0
0613	6	13.10	1.82	3	14.9	2.07	120	8x5	5.5	1.9	2.0
0814	8	14.00	2.12	5	15.4	2.33	110	12x9	5	2.0	1.5
0417	3.5	17.40	2.42	2	17.9	2.49	120	12x9	4.5	2.0	1.5
0430	3.5	27.00	4.09	2	29.5	4.47	110	DN10	5	1.8	0.8
0260	1.5	60.00	9.09	-	-	-	110	DN15	1.5	1.5	0.8

Type 1000
Type 2502, 2505, 1310 only in version NP and SS

Metering pumps for high viscosity media "HV"

EXBb	bar	l/h	ml/stroke	bar	l/h	ml/stroke	strokes/min	mm	m Wc	m Wc	bar
1002	10	2.30	0.31	5	2.7	0.38	120	DN10	1	-	3.0
1006	10	6.00	0.83	5	7.2	1.00	120	DN15	1.3	-	3.5
1310	10	10.50	1.59	6	11.9	1.80	110	DN15	1.9	-	2.0
0814	8	14.00	2.12	5	15.4	2.33	110	DN15	2	-	1.5

Metering pumps with self-degassing liquid end***

EXBb	bar	l/h	ml/stroke	bar	l/h	ml/stroke	strokes/min	mm	m Wc	m Wc	bar
1601	16	0.66	0.09	-	-	-	120	6x4	-	1.8	0.2
1201	12	1.0	0.14	-	-	-	120	6x4	-	2.0	0.2
0803	8	2.4	0.33	-	-	-	120	6x4	-	2.8	0.2
1002	10	1.8	0.25	-	-	-	120	6x4	-	2.0	0.2

*) *Suction lift: with intake line filled*
**) *Priming lift: with intake line not filled*
***) *The specified performance data are guaranteed minimum values determined with water at room temperature.*

3.4 Accuracies

-5 % +15 %
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 spring-loaded injection valve with corresponding admission pressure must be used.

NOTE

A pressure retention valve or a spring-loaded injection valve is not an absolutely tight-closing 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.

3.5 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	Duran	Ceramic	—	Duran	—	—	Ceramic	1.4401

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
FPM-A (Viton®-A), FPM-B (Viton®-B) and Duran (laboratory glass) are registered trademarks.

3.6 Electrical Data

3.6.1 Electrical data for “not intrinsically safe” version

Supply circuit

Rated voltage 100,115, 200, 230 und 500 + - 10 % VAC
Maximum* power consumption I_{eff} 1.5 A
Max. peak current at pulse I_{peak} 8 A
Maximum ** power consumption $P_{effeciency}$ 50 W
*$I_{effektiv}$, determined via stroke action, **P_{wirk} determined by stroke action;

Control circuit

voltage max. 6 V
Current max. 30 mA

3.6.2 Electrical data, “intrinsically safe” version

Supply circuit

rated voltage, intrinsically safe: 100, 115, 200, 230 + - 10%, 500 +6 -10% VAC
Maximum power consumption I_{eff} as 3.6.1
Max. peak current at pulse I_{peak} as 3.6.1
Maximum ** power consumption P_{wirk} as 3.6.1

Control circuit

starting values, all versions “(ia)”, trapezoid characteristic

- Maximum output voltage: U_0 = 7.14 V
- Maximum output current: I_0 = 5 mA
- Maximum output power: P_0 = 23.3 mW
- Internal resistance R_i = 4296 Ω

Inductance and capacity, version external, external pause input (passive mode):

- Maximum external inductance: L_0 = 1 H
- Maximum external capacity: C_0 = 13.5 µF

Input values, analogue input (active mode):

- Maximum input current: I_i = 280 mA
- Maximum input voltage: U_i = 30 V
- Maximum input power P_i = 2 W

3.6.3 Electrical data, “intrinsically safe” diaphragm rupture detector

Diaphragm rupture detector

Set voltage U_O	8 V DC
Normal power consumption	≤ 1mA
Power consumption in the event of a diaphragm rupture	≥ 3mA
Effective internal capacity Ci	≤ 30nF[1]
Effective internal conductivity Li	≤ 50µH[1]

[1] with lines up to 10m

3.6.4 Electrical data, details

Pump type	**1000, 2501,1601, 1201, 0803, 1002, 0308**					**2502, 1006, 0613, 0417**					**2505, 1310, 0814, 0430, 0260**				
Power supply (V)	100	115	200	230	500	100	115	200	230	500	100	115	200	230	500
Max. power consumption (A)	1.6	1.4	0.7	0.7	0.3	3.0	2.7	1.8	1.7	0.6	4.1	3.6	2.2	2.0	1.1
Effective power consump. (A)	0.27	0.29	0.14	0.15	0.09	0.70	0.70	0.33	0.36	0.14	0.95	0.84	0.47	0.44	0.25
Average power consump. (W)	13	13	13	13	13.0	26	26	26	26	26	45	45	45	45	45
Fuse F1 value (A)/type*	1.0T	0.63T	0.4T	0.315T	0.2FF	2.5T	2.0T	1.25T	0.8T	0.5T	3.15T	2.5T	1.6T	1.25T	0.8F
*Fuse F2** value(A)/type*	0.16T	0.16T	0.16T	0.16T	-	0.16T	0.16T	0.16T	0.16T	-	0.16T	0.16T	0.16T	0.16T	-

* Special high breaking-capacity fuse, 1.5kA use only original fuse wherever possible,

** Breaking capacity, 35A use only original fuse wherever possible,

Fuse order numbers, see section 11

NOTE

Only the effective power consumption is specified on the rating plate

3.7 Mechanical data, cables

Pump type	Voltage V	Cable	Cable type	Colour	outer Ø mm
EXBbG	to 250	power cable	H 07 RNF 3G1.5	black	10.0
EXBbG	> 250	power cable	NSSHÖU 3x1.5	yellow	12.5
EXBbM	all	power cable	NSSHÖU 3x1.5 +3x1.5/3E	yellow	14.0
EXBbG	< 60	external/analogue cable	Ölflex 110	grey	6.3
EXBbG (ia)	< 60	external/analogue cable	Ölflex EB	blue	5.9
EXBbM	< 60	external/analogue cable	L-YY (zg) Y	grey	11.4
EXBbG, EXBbM	< 60	diaphragm rupture detector		blue	

In “FM”- and “CSA” version H07 RNF up to 500 V, the cable aperture has a 1/2" NPT internal thread for connection to the North American supply system.

3.8 Ambient conditions

Admissible storage temperature	-20 °C to +50 °C
Admissible ambient temperature	-20 °C to +45 °C
Admissible chemical temperature	-10 °C to +35 °C (in accordance with IEC 335-2-41)

Temperature resistance of material versions

	PP	NP	TT	SS
Long term at max. back pressure	50 °C	45 °C	50 °C	50 °C
Max. 15 min at max. 2 bar	100 °C	60 °C	120 °C	120 °C

Climate
admissible humidity 92 % non condensing
Behaviour in damp alternating climate DIN IEC 60068-2-3

Enclosure rating IP 65

Sound intensity level ≤ 70 dB (A), 1 m Abstand

4 Unpacking

NOTE

Polystyrene parts are recyclable. They do not belong in the household waste!

- ▶ 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.
- ▶ Compare your delivery note with the packed contents.
- ▶ Check whether the data on the type identification plate (8) of the metering pump agree with your order data!
- ▶ Should any problems arise, contact your ProMinent dealer or representative. You will find the addresses on the back page of these operating instructions.
- ▶ 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
- Operating instructions with conformity certificate

5 Mounting and Installation

WARNING

- **When installing the metering pump, observe the directives for the installation of devices in explosion-threatened areas, in Europe the European Operator Guideline 99/92/EC (ATEX137), implemented in Germany with the new operating safety directive.**
- **When using the metering pump for metering flammable media, observe (in Europe) the European Operator Guideline 99/92/EC (ATEX 137, previously ATEX118A), implemented in Germany with the new operating safety directive and the German dangerous chemicals directive.**
- **Observe valid national regulations when installing the pump abroad!**
- **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.**

5.1 Installing Metering Pump

IMPORTANT

- **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.

5.2 Installing Hose Lines

IMPORTANT

- **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

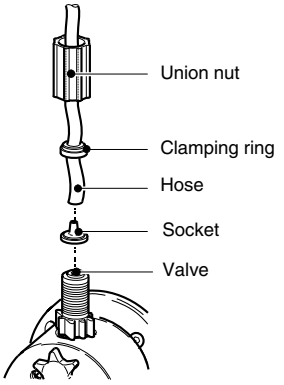


fig.: 3

- ▶ Remove plug if fitted in the intake/delivery connection.
- ▶ Cut end of hose straight.
- ▶ Fit union nut and clamping ring over hose.
- ▶ Fit end of hose as far as it will go over socket widen end if necessary.
- ▶ Fit hose with socket on to valve .
- ▶ Clamp hose connection:
  Firmly tighten union nut while at the same time pressing down hose.
- ▶ 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

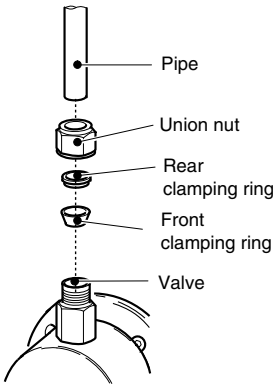


fig.: 4

- ▶ Fit union nut and clamping rings on to pipe with a projection of approx. 10 mm.
- ▶ Fit pipe as far as it will go into valve.
- ▶ Firmly tighten union nut.

Fitting PE or PTFE lines on stainless steel valves

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

5.2.1 Installing the Intake Line

NOTE

- **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.

5.2.2 Installing the Delivery Line

IMPORTANT

- **A multiple of the maximum operating pressure can build up if the metering punp 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, e.g. a ProMinent multi-function valve.
- **Install the delivery line such that the pressure peaks during the metering stroke do not exceed the max. 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 approx. 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.

NOTE

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.

5.2.3 Installing the Bypass Vent Line (see fold-out page)

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

▶ Fit hose line with $Ø_{internal}$ = 4 mm (max. 6 mm) on to bypass hose socket,
PVC-soft 6x4 is recommended.

▶ Secure PE lines with a cable tie to prevent them slipping.

▶ Route the free end of the line back into the metering tank.

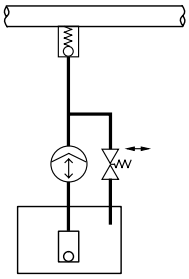
▶ Cut the bypass line to size such that it is not submerged in the metering medium.

5.3 Installation Examples, Mechanical/Hydraulic

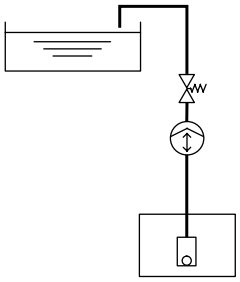
Symbols

- Oscillating diaphragm metering pump
- Foot valve overflow valve
- Shut-off valve
- Pressure gauge
- Solenoid Valve (closed when pump switched off)
- Injection valve
- Pressure retention valve/
- Pressure retention valve (adjustable)
- Compressed air vessel

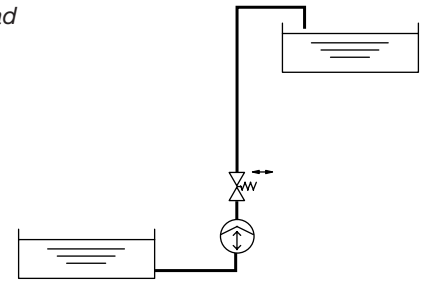
Standard installation



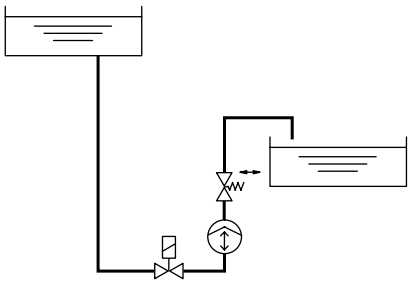
Metering with free outlet and small delivery head



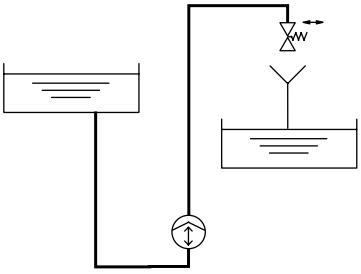
.... and large delivery head

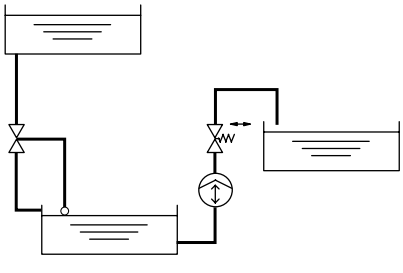


... and admission pressure on intake side



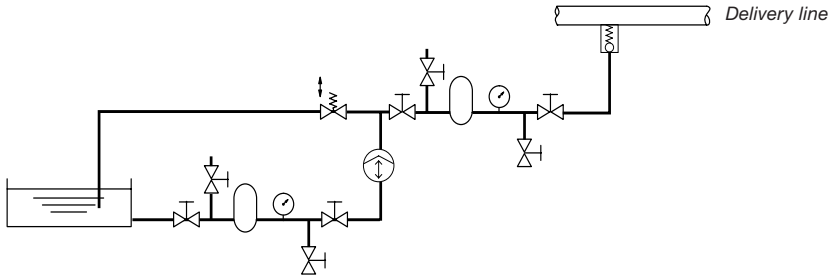
Installation to avoid lift-through of hazardous media



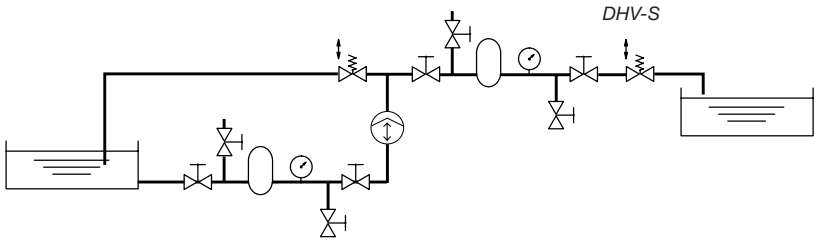


Installation togeher with air vessel with long lines and for low-pulsation metering

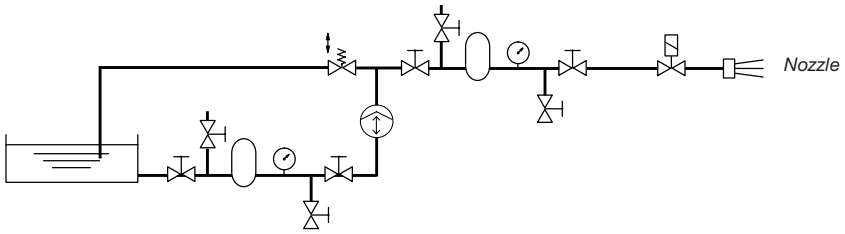
... in a delivery line



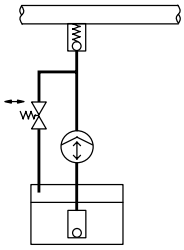
... with free outlet



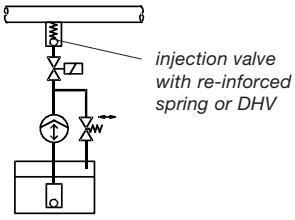
... without after-running



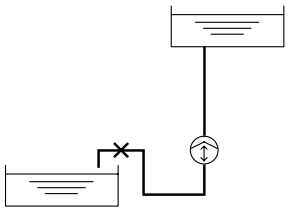
To protect against overpressure



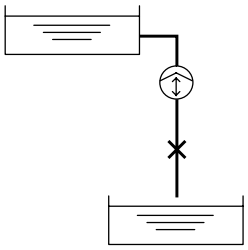
Metering in vacuum or intake line



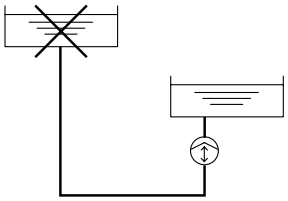
Do not install like this:
Intake line cannot be vented!



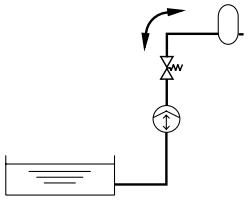
Do not install like this:
Intake line too high!



Do not install like this:
Free flow!



Do not install like this:
Compressed air vessel not effective!



5.4 Electrical Installation

IMPORTANT

- **The metering pump must be electrically installed by authorised, “skilled” personnel only.**
- **When installing the metering pump, observe the directives for installation of devices in explosion-threatened areas, in Europe the European Operator Guideline 99/92/EC (ATEX137), implemented in Germany by the new operating safety directive.**
- **Observe the relevant standards e.g. DIN EN 60079, DIN EN 50020 DIN VDE 0165 and/or 0118 “Erecting electrical equipment in explosion-threatened areas”.**
- **Note all national directives which apply to the installation when installing outside Germany.**
- **Intrinsically safe installations must be checked by persons with “recognised qualifications“.**
- **Do not connect mains power supply to the external terminal (11).**

Power connection

Electrical data see 3.6

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

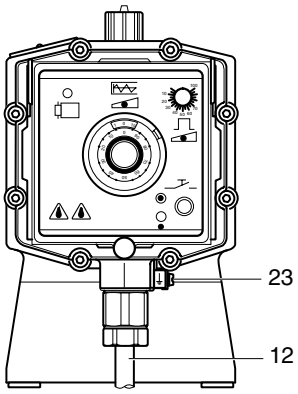


Abb.: 5

12 Power supply
23 Connection terminal for equipotential bonding

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

EXBbM L1: Phase, brown
N: Zero wire, blue
-: free, black*
PE: Earth lead, yellow/green**

* 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.

- ▶ Use several contacts for power supply via auxiliary contactor or relay.
- ▶ In the 100-V- to 230-V-versions, connect a varistor (U_N = 275 V) or RC-element (0,22 mF/220 W) in parallel.

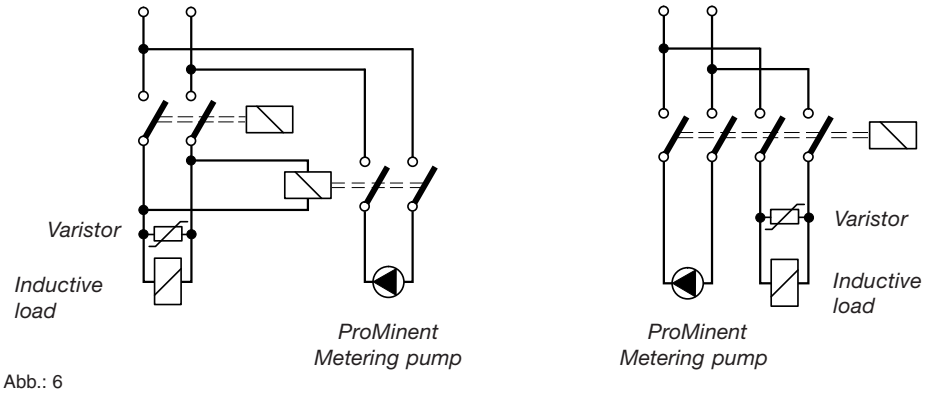


Abb.: 6

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)

EXBbM input+ blue
Input- black

External, contact, analogue and pause input intrinsically safe, sheath colour blue.

EXBbG und EXBbM: Input+ black (1)
Input- black (2)

El. terminal for diaphragm rupture detector, intrinsically safe, sheath colour blue.

ExBbG and EXBbM: Alarm, blue
GND+, brown

6 Operation

6.1 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 start-up in the case of media which must not come in contact with water!**

NOTE

- **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

- ▶ Check function of pressure relief valves.
- ▶ Check pump connections and pipe connections for leaks.

Remove water from liquid end

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

- ▶ Turn pump through 180°.
- ▶ Empty liquid end.
- ▶ Flush with a suitable medium from above through the intake connection.

Filling liquid end

without vent valve:

- ▶ Connect intake line but do not yet connect the delivery line to the liquid end.
- ▶ 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.
- ▶ Switch off pump with power switch (13).
- ▶ Connect delivery line to liquid end.

The pump is now ready for operation.

Filling liquid end
Rough venting

liquid end with vent valve and bypass:

- ▶ Connect intake and delivery line to liquid end.
- ▶ Connect bypass line.
- ▶ 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.
- ▶ 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).
- ▶ Close vent valve.
- ▶ Switch off pump with power switch (13).

The pump is now ready for operation

Setting fine vent

metering gas-emitting media:

NOTE

- **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.**

- ▶ Remove star knob from vent valve (5).
- ▶ Using a screwdriver, turn screw in vent valve approx. 1 turn in counterclockwise direction.
- ▶ 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:

- ▶ Unscrew delivery connection and press away ball from O-ring.
- ▶ Fill liquid end with water or suitable liquid.
- ▶ Fit delivery connection without valve spring.
- ▶ Fit short piece of PVC hose (100 mm) on to hose socket, half fill with water.
- ▶ Operate pump at max. stroke length until metering is visible in the hose.
- ▶ 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.
- ▶ Reconnect delivery line.

Venting liquid end

when pump delivers in a pressure system and has drawn in air:

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

6.2 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 % to +15 %.

- ▶ Select the required capacity within the value range of the pump type (see capacity data).
- ▶ Select the nomogram and diagram of the pump type.
- ▶ Mark the backpressure in the metering system on the abscissa and read off the corresponding correction factor on the ordinate.
- ▶ Divide the required capacity by the correction factor.
- ▶ Using a ruler, mark the determined capacity on the middle scale of the nomogram.
- ▶ 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.

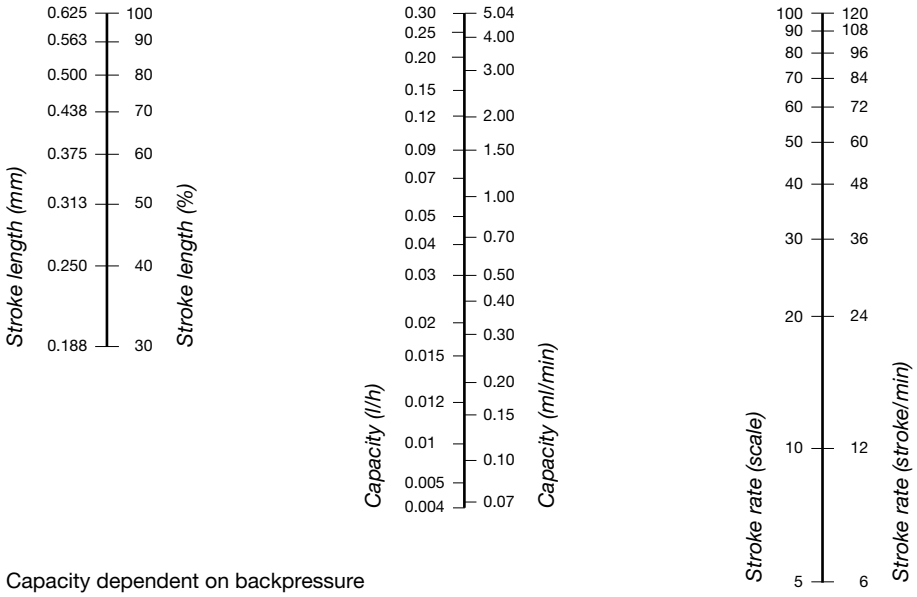
Capacity with mean backpressure:		11.9 l/h (see capacity data)
Required capacity:		6 l/h
Backpressure:		8 bar
→	Correction factor as per diagram:	0.9
→	Capacity to be set:	$\frac{6\ \text{l/h}}{0.9} = 6{,}66\ \text{l/h}$
→	Stroke length as per nomogram:	80 %
→	Stroke rate as per nomogram:	80 stroke/min

NOTE

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

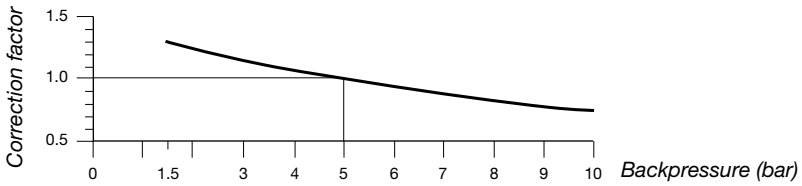
6.3 Nomograms

EXBb_1000

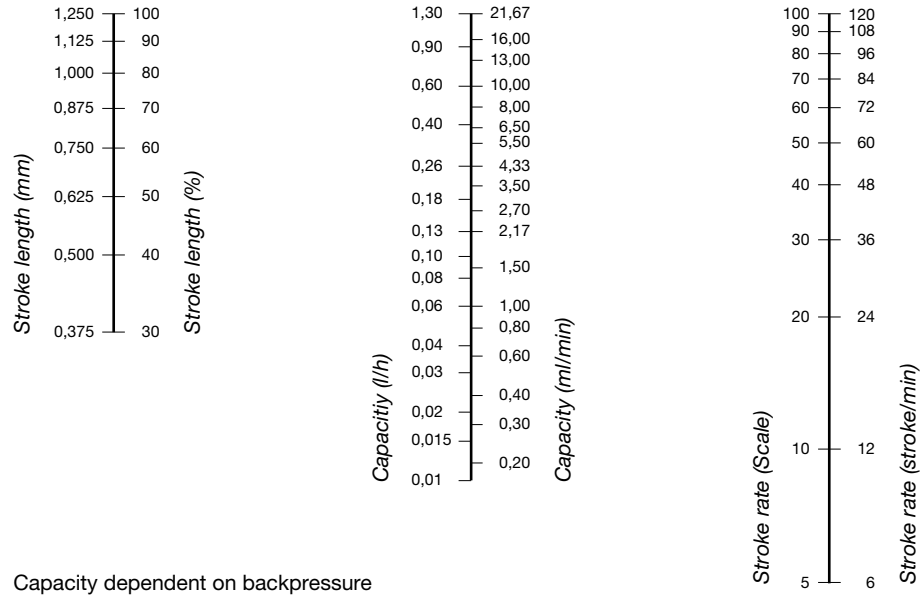


Capacity dependent on backpressure

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

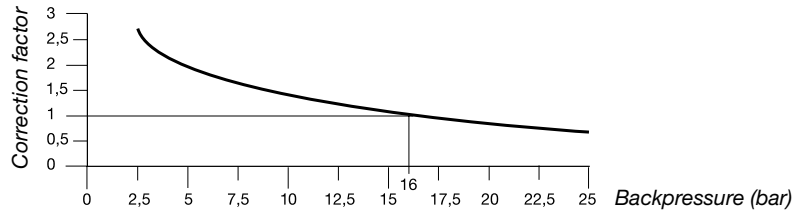


EXBb_2501



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



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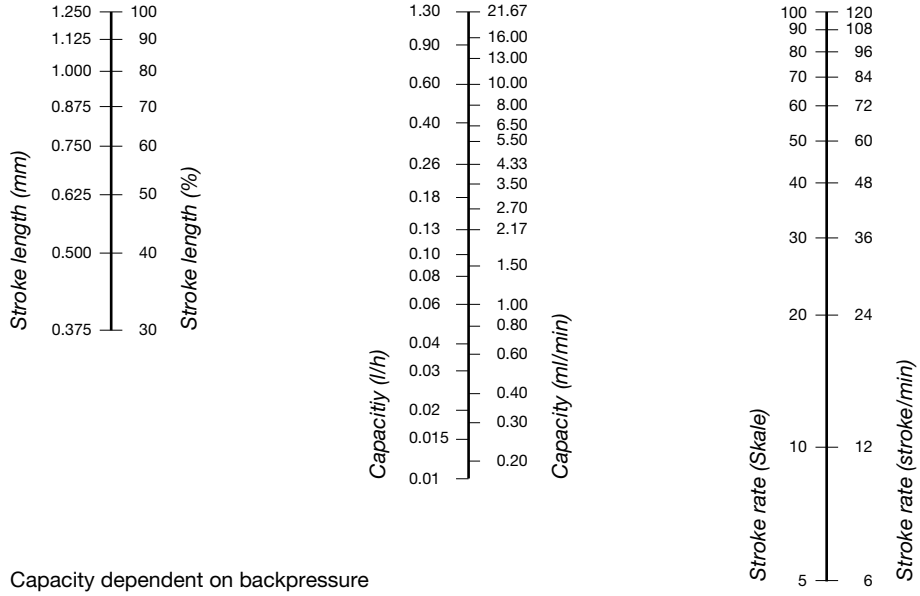
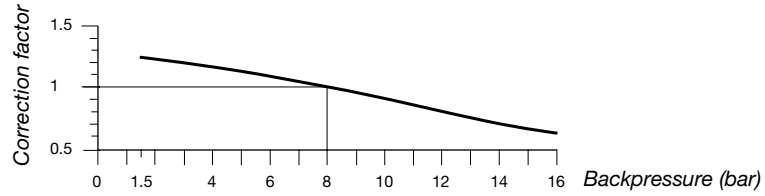


Capacity dependent on backpressure

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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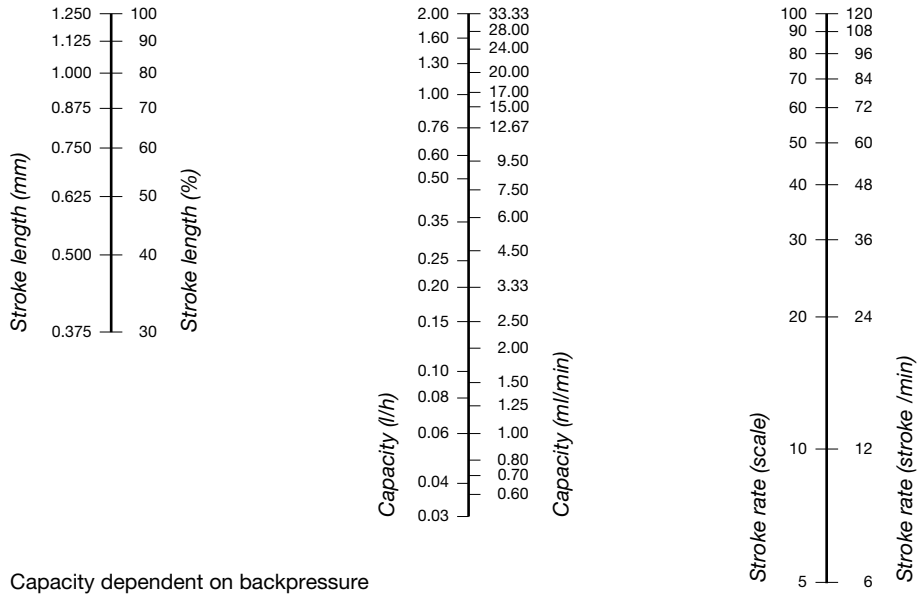
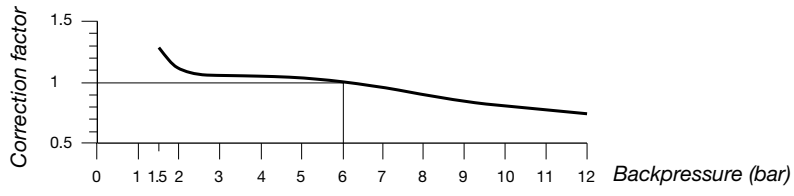


Capacity dependent on backpressure

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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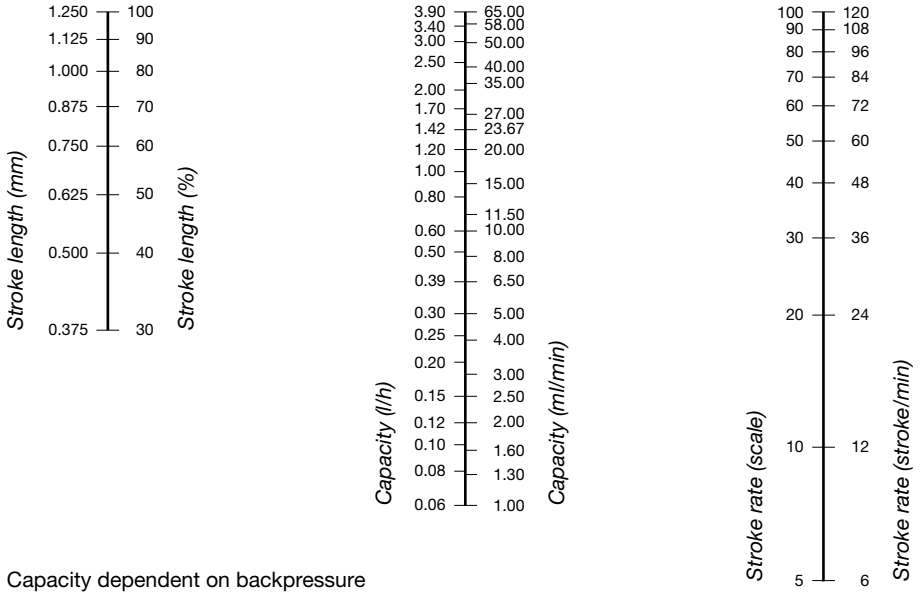
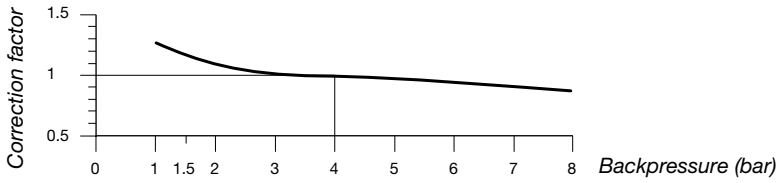
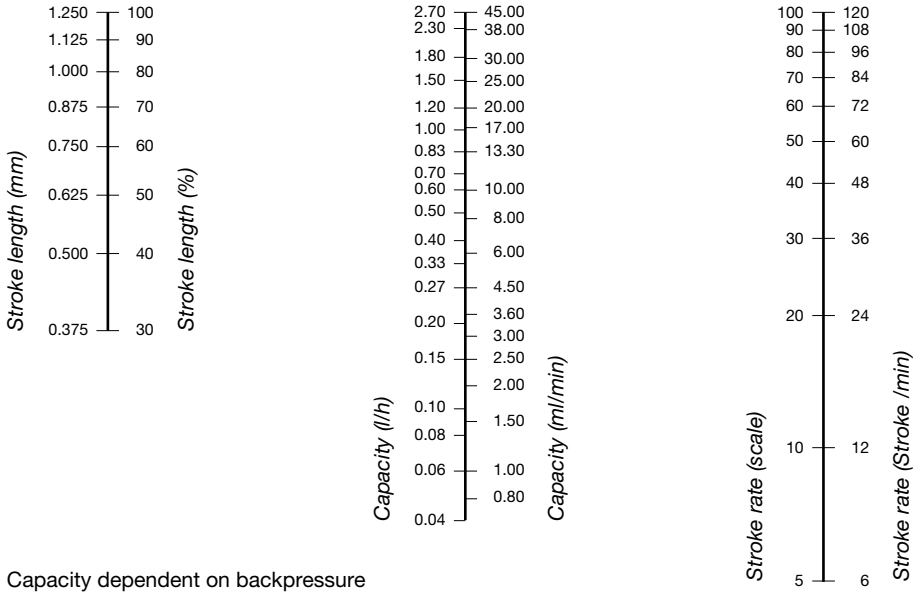


Capacity dependent on backpressure

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

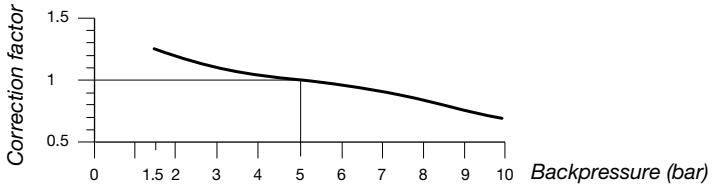


EXBb_1002



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



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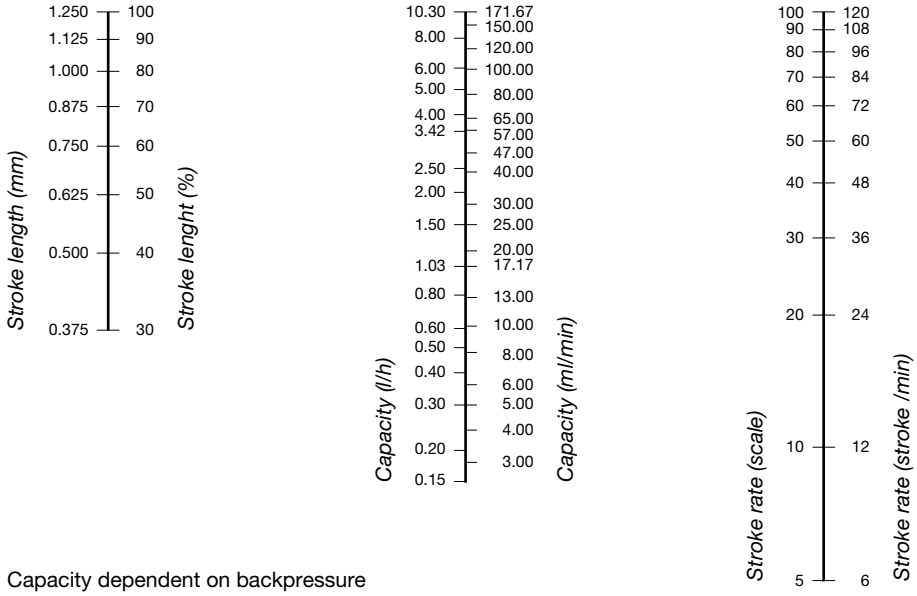
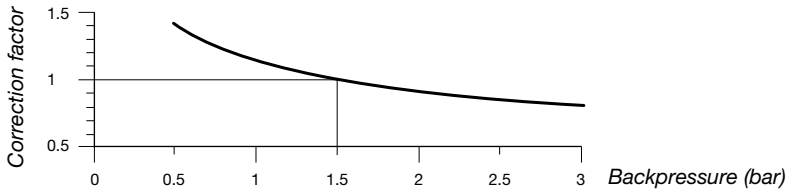


Capacity dependent on backpressure

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



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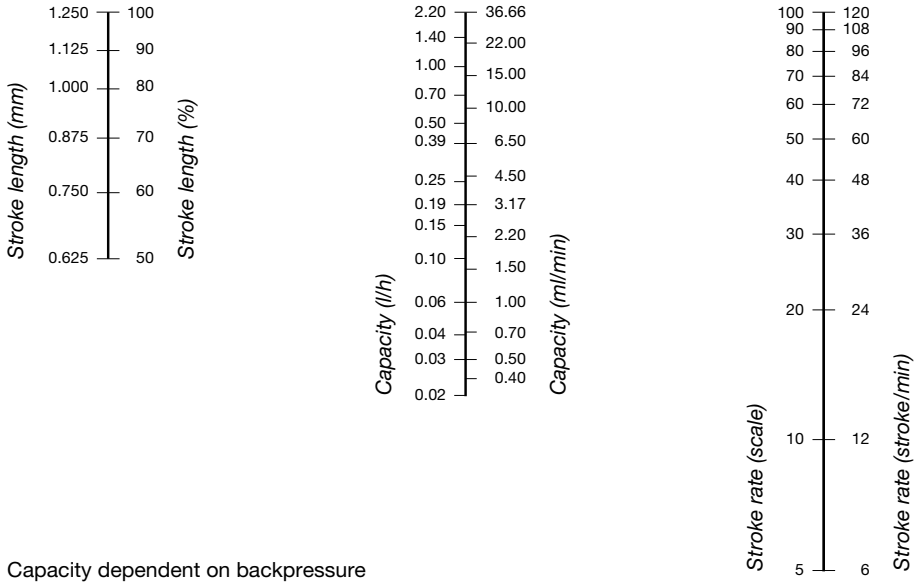
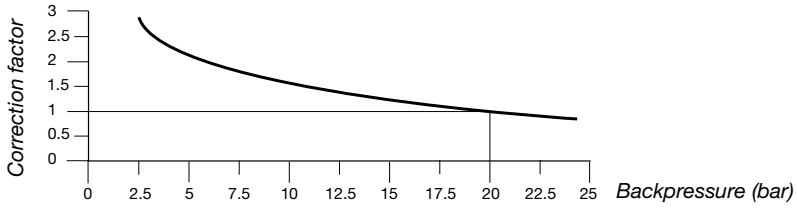


Capacity dependent on backpressure

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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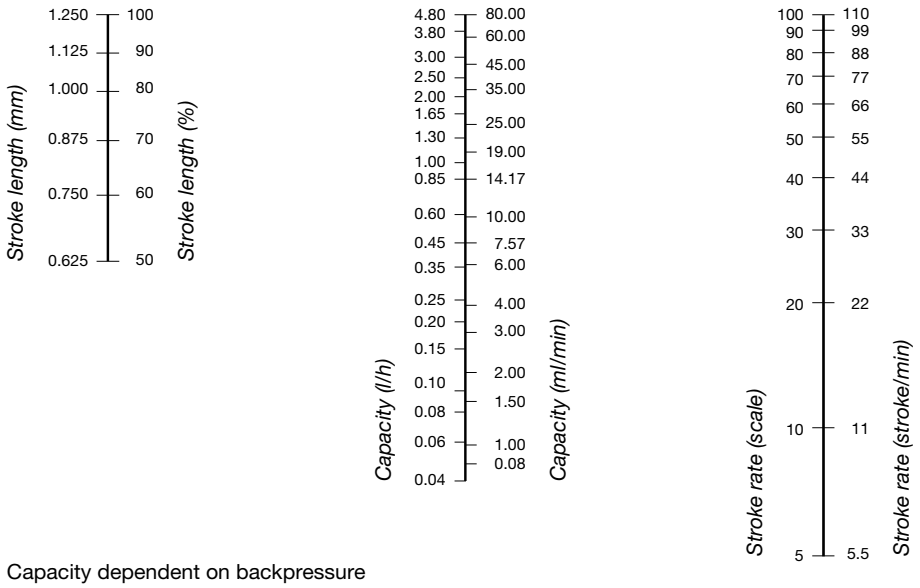
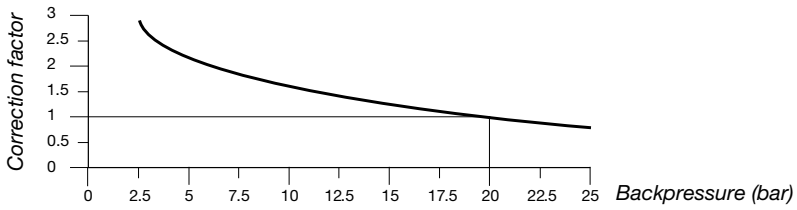


Capacity dependent on backpressure

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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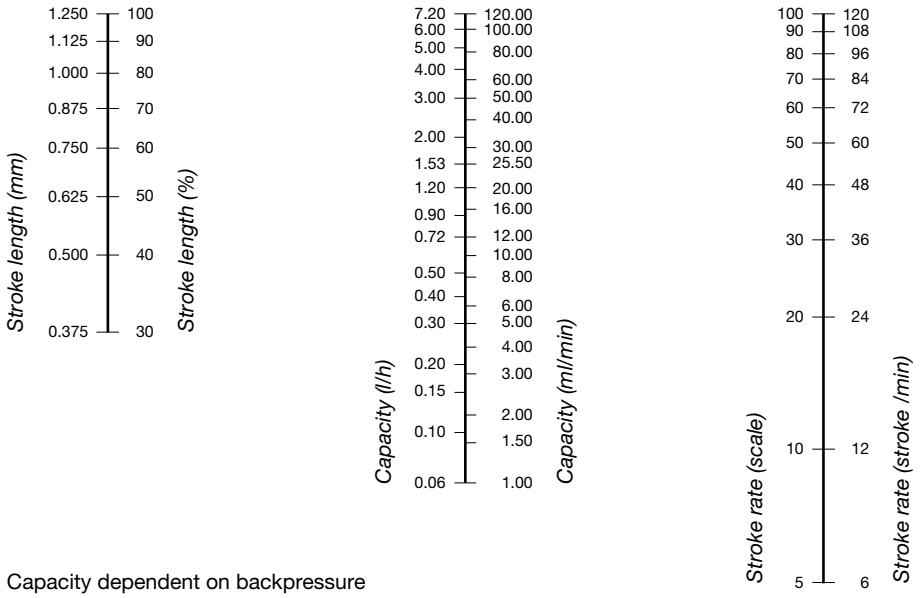
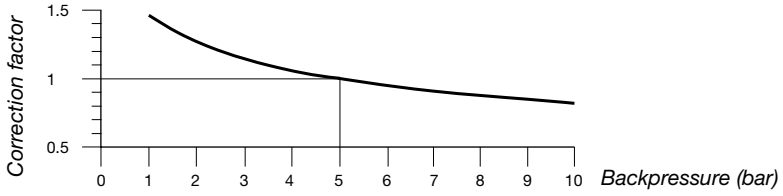
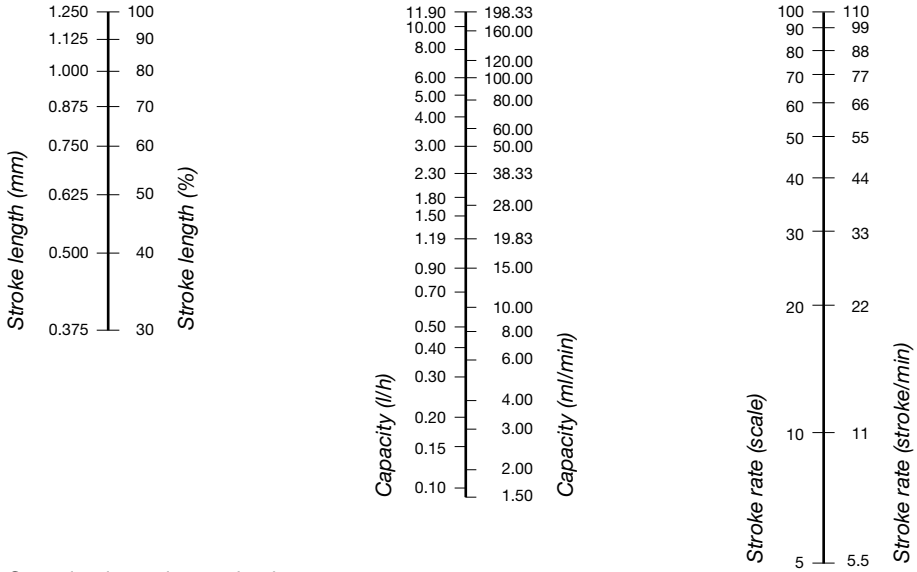


Capacity dependent on backpressure

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

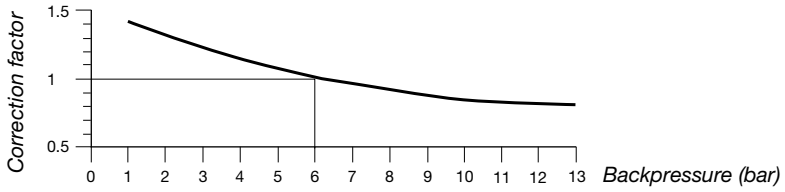


EXBb_1310



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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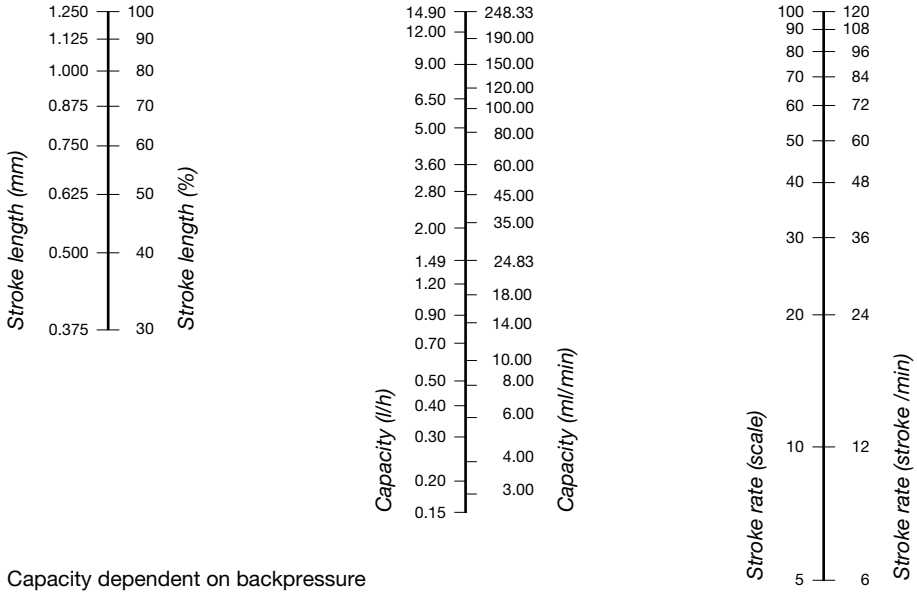
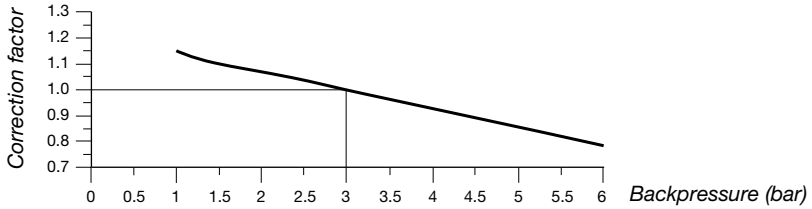


Capacity dependent on backpressure

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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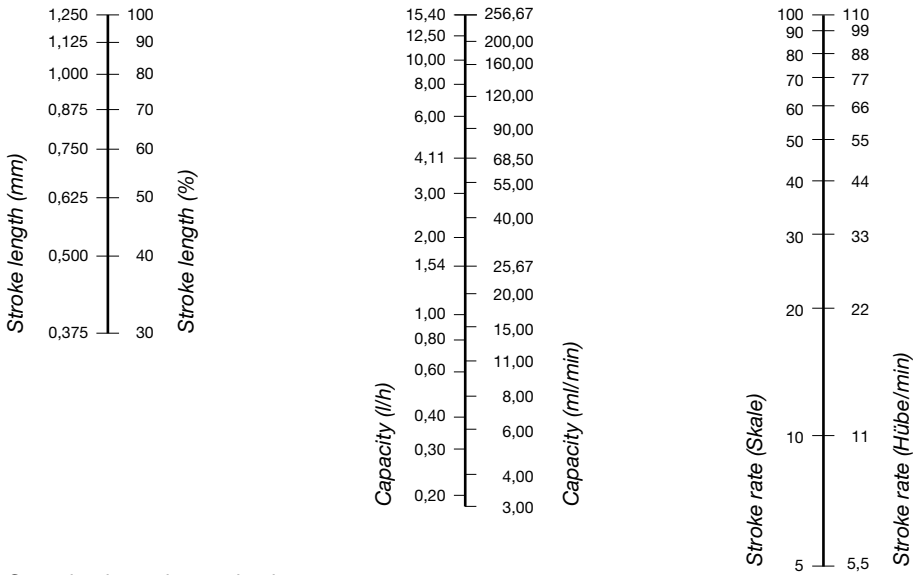
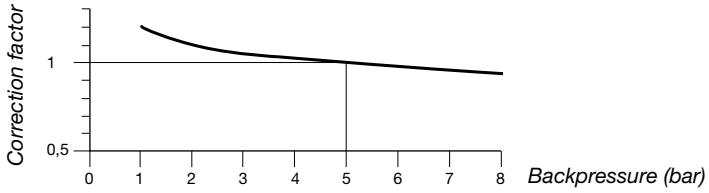
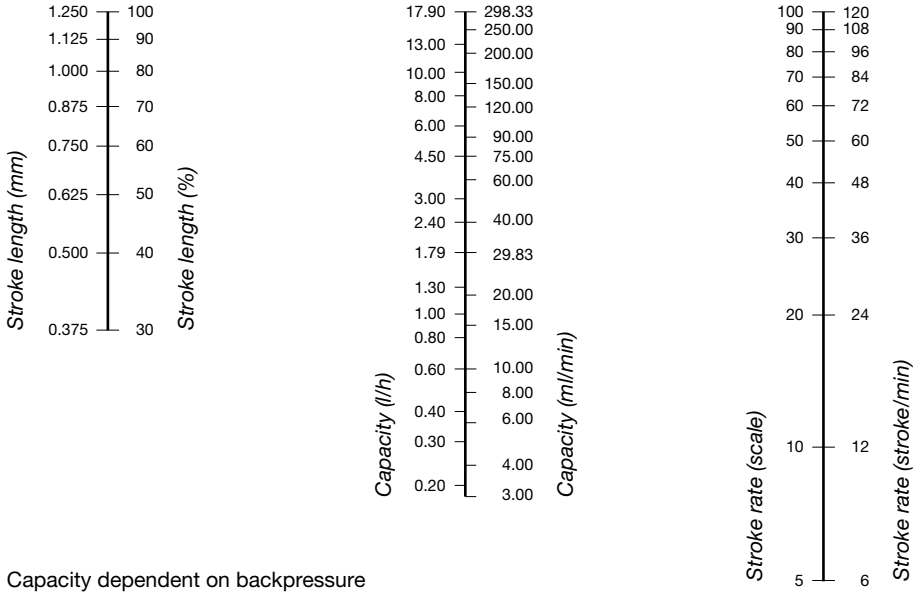


Capacity dependent on backpressure

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

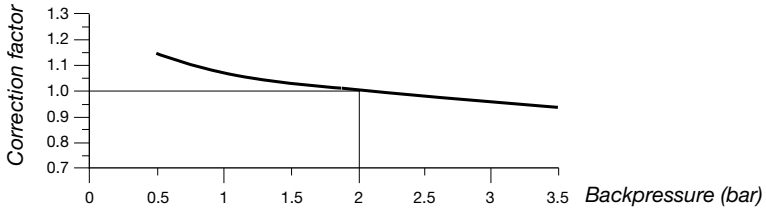


EXBb_0417

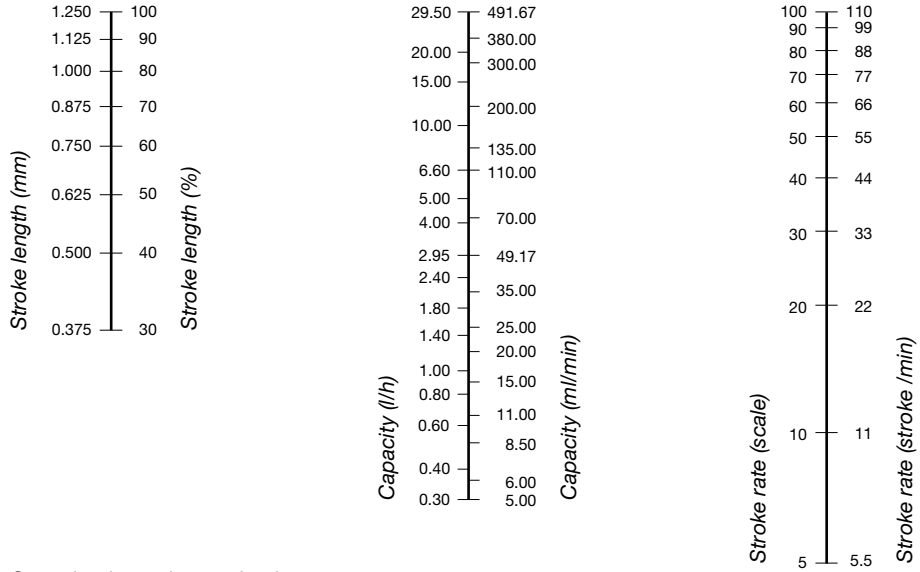


Capacity dependent on backpressure

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

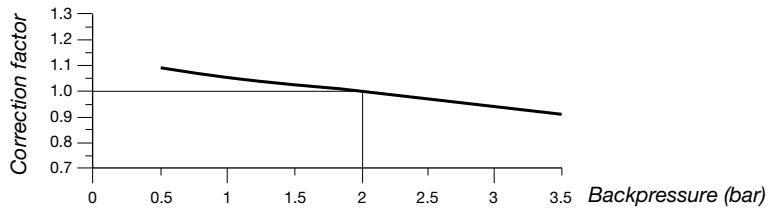


EXBb_0430

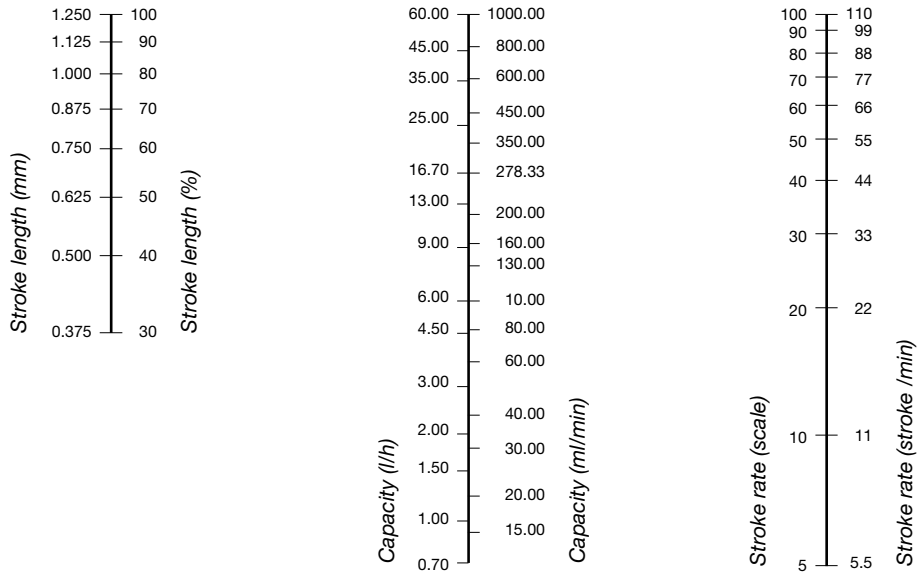


Capacity dependent on backpressure

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



EXBb_0260



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

6.4 Setting the Delivery Capacity

NOTE

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.

Installation and commissioning of the pump are concluded.

The setting values have been determined by means of nomograms.

Switching on

- ▶ Switch on pump with power swich (13).
  Open transparent cover (17)

Setting stroke length

- ▶ Release the lock before setting the stroke length:
  Press up the locking lever (15).
- ▶ 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).
- ▶ 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

- ▶ Determine delivery capacity on the intake side of the metering pump with a measuring cylinder or by weighing.
- ▶ Correct pump setting.

7 Maintenance

IMPORTANT

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

IMPORTANT

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

Maintenance jobs

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

For self-venting liquid end:

- Check firm fit of bypass line and of connection.
- Replace fuses and electronic control.
- Check vent function.

Maintenance intervals

Every 3 months
Shorter intervals for operation under heavy load (e.g. permanent operation)

IMPORTANT

The safety diaphragm is a consumable and must be replaced after the rupture of the second working diaphragm or after 10 000 pump service hours.

The separating diaphragm of the diaphragm rupture detector should be replaced after every working diaphragm rupture.

A visual inspection of the condition of the safety diaphragm should be carried out each time the working diaphragm is replaced.

8 Repairs

IMPORTANT

- **Use only genuine spare parts.**
- **Always wear protective goggles and protective clothing when handling hazardous media.**

WARNING

The following repair measures on EXtronic®-metering pumps must only be carried out by specially trained persons or by the manufacturer:

- **Replace ex-relevant parts.**
- **Replace damaged power connection cable.**
- **Replace fuses and electronic control.**
- **Repairs on metering pumps for combustible media, also in the area of the liquid end.**

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 on the back page of these operating instructions.

Send back the metering pump for repair only in a clean condition and with the liquid end flushed clean!

WARNING

Pumps for radioactive medium must not be shipped!!

NOTE

Legal regulations governing the protection of labour oblige all companies to protect their employees from the damaging effects of handling hazardous substances. Inspection or repair of pumps and their parts can only be carried out if a declaration of complete safety has been submitted completed correctly and in full by an authorized and qualified person of the pump operator!

If, despite careful discharge and cleaning of the pump, safety precautions are still necessary, the necessary information must be stipulated in the declaration of complete safety. The declaration of complete safety is a part of the inspection/repair order.

You will find a form at the end of these operating instructions.

8.1 Replacing working diaphragm / safety diaphragm

WARNING

Rinse the liquid end first if using hazardous metering chemicals. Use water or a suitable rinsing solution in a squeeze bottle and inject it into the suction connector of the liquid end. Protect yourself from unknown or hazardous metering chemicals.

After a diaphragm rupture, there will be chemical in the diaphragm rupture detector and the intake channel in the spacer plate (5).

- Set stroke length to zero when the pump is running. Switch off pump.
- Slacken liquid end screws and remove liquid end fastening screws
- Then slacken and unscrew the working diaphragm (6) (see Fig. 1) by twisting the adapter (2) to the left with both hands.
- Remove the spacer plate (5) and check the condition of the safety diaphragm (4)
- If the safety diaphragm is ruptured, replace it with a new one (see also 8.2).
- Place the spacer plate (5) on the top plate
- Tighten new working diaphragm (6) with both hands until hand-tight.
- Further assembly instructions, see 8.2

8.2 Servicing diaphragm rupture detector

WARNING

- **Disconnect diaphragm rupture detector from mains power supply.**
- **Protect yourself from unknown or hazardous metering chemicals.**
- **After a diaphragm rupture there will be chemical in the diaphragm rupture detector and the intake channel in the spacer plate (5).**
- **Check the diaphragm rupture detector after every diaphragm rupture and replace the separating diaphragm if necessary (e.g. if the chemical is crystallising or is carrying dirt and particles).**

8.3 Replacing separating diaphragm in the diaphragm rupture detector

- ▶ Take hold of the top section (2) of the diaphragm rupture detector (see Fig. 7).
- ▶ Secure the casing (5) with a fork wrench - not the painted nut.
- ▶ Unscrew the diaphragm rupture detector.
- ▶ Clean soiled parts.
- ▶ Place the new separating diaphragm (3) in the top section with the light side (PTFE) up.
- ▶ Place the washer (4) in the top section.
- ▶ Insert the spring (6) into the casing (5).
- ▶ Bring casing (5) towards the top section (2).
- ▶ Check that the spring (6) is seated correctly on the spring mounting (3A).
- ▶ Screw the casing (5) into the top and tighten screws.
- ▶ Check the diaphragm rupture detector.

8.4 Checking diaphragm rupture detector

- ▶ Unscrew the diaphragm rupture detector from the liquid end to carry out check.
- ▶ Check that electrical transmission is present.
- ▶ Push a blunt, insulated rod ∅ 2 - 3 mm, (no sharp edges) into the channel of the diaphragm rupture detector.
- ▶ Check whether electrical transmission ceases.
- ▶ Remove the rod.
- ▶ Check that electrical transmission is present.

If everything is in order, screw the diaphragm rupture detector into the liquid end with a new seal (1)

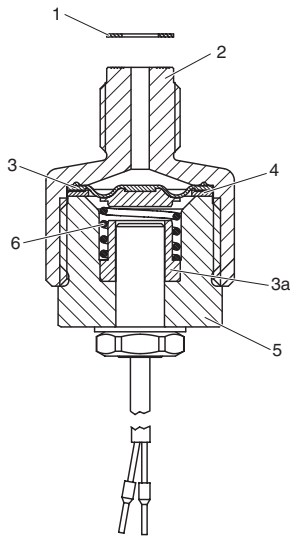


fig.: 7

9 Malfunctions

IMPORTANT

- **Always wear protective goggles and protective clothing when handling hazardous media.**
- **Observe the safety data sheets of the metering liquids.**
- **Discharge liquid end and, if necessary, flush with a neutral agent.**
- **First decompressurize the metering line before carrying out any work on the pump.**

9.1 Operation/pulse indicator does not light, no stroke movement

Cause **Incorrect mains voltage applied**

Remedy
- ▶ Use specified mains voltage in accordance with voltage rating on type identification plate.

Cause **Fuse is defective**

Remedy
- ▶ Contact your ProMinent dealer or representative.
  You will find the addresses on the back page of these operating instructions.

9.2 Pump intake no longer operable despite full stroke movement and venting

Cause **Crystalline deposits on ball seat caused by valves drying out**

Remedy
- ▶ Remove intake hose from metering tank.
- ▶ Open vent valve.
- ▶ Flush liquid end well through.
- ▶ If not successful, remove and clean valves.

9.3 Pump no longer meters, although operation/pulse indicator lights

Possible Cause **Medium level in tank too low.**

Remedy
- ▶ Top up

Possible Cause **Stroke length set too small**

Remedy
- ▶ Increase stroke length with control knob (14)

Possible Cause **Air trapped in liquid end**

Remedy 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 %

Remedy Liquid end with vent
- ▶ Open vent valve (5) by max. 1 turn in counterclockwise direction.
- ▶ Pump intake until intake line and liquid end are filled free of bubbles.
- ▶ Close vent valve (5).

9.4 Liquid Emerges from end ring

Possible Cause **Delivery unit leaking at diaphragm**

Remedy
- ▶ Retighten screws (24) crosswise in liquid end.

IMPORTANT

Observe tightening torques:
For M4 screw M4 →2.5–3 Nm
For M4 screw M5 → 4.5–5 Nm

Check tightening torques after 24 hours of operation!

Additionally check tightening torques every 3 months for PP version!

If liquid still emerges from liquid end, the diaphragm is torn and must be replaced.

The service life of the metering diaphragm is dependent on

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

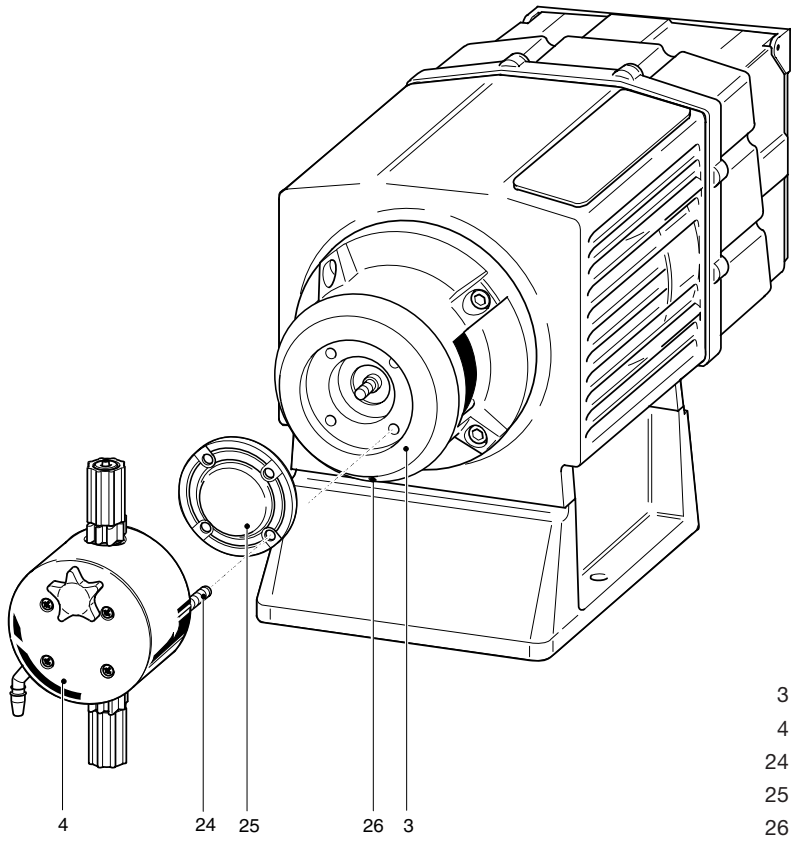
The service life of the diaphragms is restricted in the case of abrasive media.

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.
- ▶ With pump running, set stroke length with control knob (14) to ”0“.
- ▶ Switch off pump.
- ▶ Release screws (24).
- ▶ 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).
- ▶ 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.
- ▶ Pull liquid end (4) with screws (24) out of diaphragm (25).
- ▶ Completely unscrew diaphragm (25) from drive shaft.
- ▶ 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.
- ▶ Re-install end ring (3) in housing.
- ▶ Fit diaphragm (25) in end ring (3) and screw on by 2 thread turns.

IMPORTANT

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.



3 Back plate
4 Liquid end
24 Screws
25 Diaphragm
26 Bypass-connector

fig.: 8

- ▶ 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.
- ▶ Now slowly turn parts in clockwise direction until the torsional resistance of the return spring can be felt and the diaphragm is fitted firmly.

IMPORTANT

Do not turn diaphragm too far!

- ▶ Switch on pump.
- ▶ 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.
- ▶ Switch off pump
- ▶ Now tighten the 4 screws (24) crosswise

IMPORTANT

Observe tightening torques
For M4 screws M4 → 2.5–3 Nm
For M4 screws M5 → 4.5–5 Nm

Check tightening torques after 24 hours of operation.

Additionally check tightening torques every 3 months for PP version!

9.5 Pump does not reach high pressures or no suction despite max. stroke action

Cause The working diaphragm has ruptured without setting off the alarm.

Remedy Replace working diaphragm immediately (see “Changing the diaphragm”, section 8.1), change the separating diaphragm of the diaphragm rupture detector, check electrical connections of the diaphragm rupture detector (see section 8.4).

9.6 Diaphragm rupture indicator triggers alarm

Cause The working diaphragm has ruptured; the diaphragm rupture detector cable is broken.

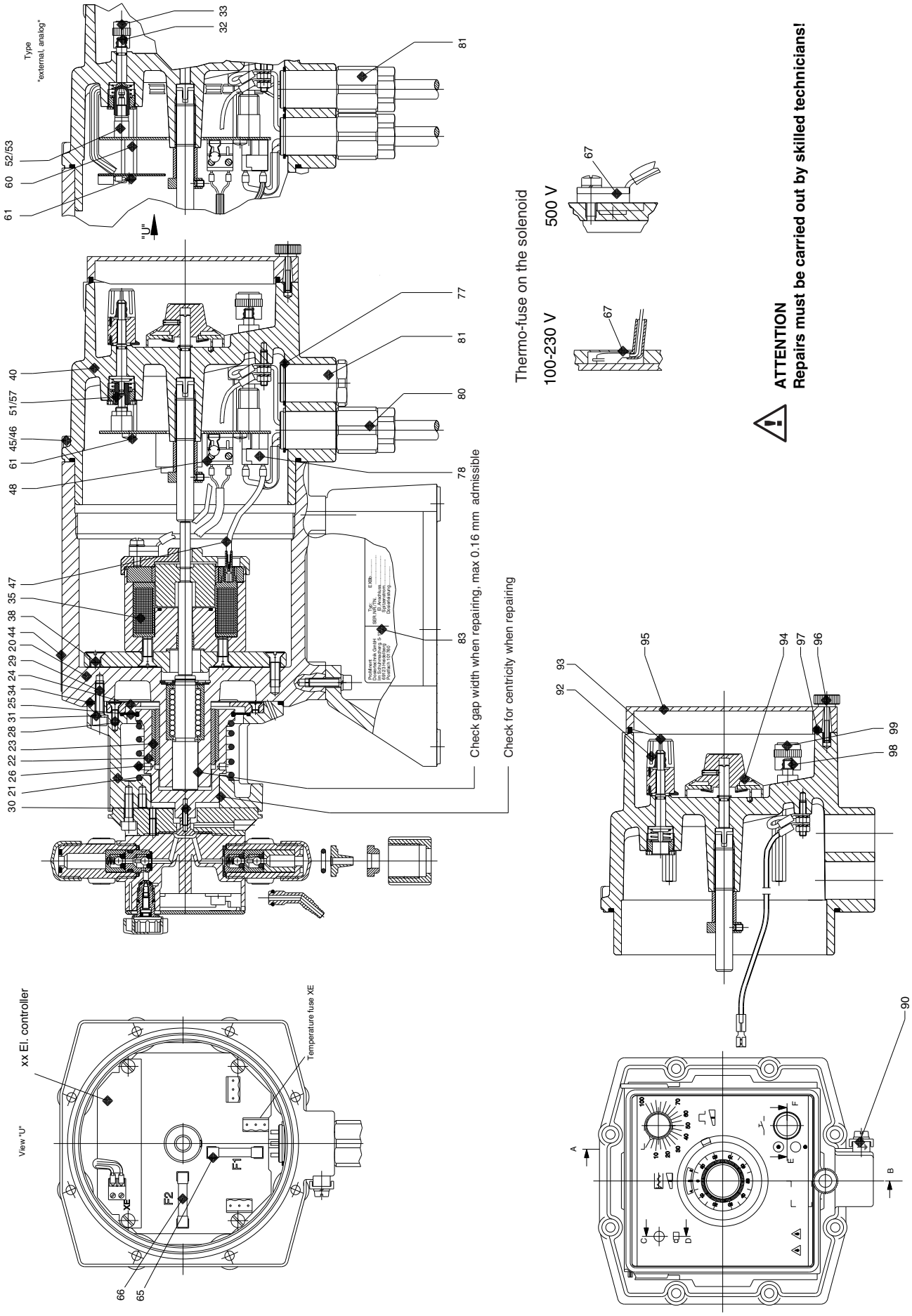
10 Used Part Disposal

NOTE

Metering pumps do not belong in the household waste!
Dispose of used parts in accordance with the law governing the avoidance and disposal of waste (Abfg) or in accordance with the waste and residual material monitoring ordinance governing the re-use of materials.

Your ProMinent dealer or representative will accept all used parts for a small cover charge.
You will find the addresses on the back page of these operating instructions.

11 Spare parts



Spare parts

Item-No.	Quantity	Description	Order number
20	1	housing set. EXB_E/G	814210
20	1	housing set . EXB_S/M	790293
21	1	spring housing “SB” EXB_	103221
21	1	spring housing EXB_	103220
22	1	terminal - M3 EXB_	814123
22	1	terminal - M6 EXB_	814123
23	1	DU terminal MB3530DU	469535
24	1	washer EXB_	814122
25	1	diaphragm EXB_	485146
26	1	compression spring d3.2/Dm54/if5/Lo125	1020671
26	1	compression spring d4.5/Dm56	791061
26	1	compression spring d3.8/Dm55	791060
26	1	compression spring d3.2/Dm54	469427
28	4	countersunk-head screw DIN 963 M 4x12 A2	461307
29	4	cheese head screw DIN 912 M 5x 20 8.8 vern.	468015
30	1	setscrew DIN 551 M 3x10 A2	467431
30	1	setscrew DIN 913 M 6x12 A2	467471
32	1	button d4/ 9 black #4129403	703563
33	1	button d4/15 black #4131403	703561
33	1	O-ring 107.00 - 2.50 NBRO	480283
34	4	spring lock washer DIN 127 B 5 A2	462411
35	1	solenoid 90 EXBb 230V	1019592
35	1	solenoid 90 EXBb 500V	1019593
35	1	solenoid 110 EXBb 100V	1019595
35	1	solenoid 110 EXBb 115V	1019596
35	1	solenoid 110 EXBb 200V	1019597
35	1	solenoid 110 EXBb 230V	1019598
35	1	solenoid 110 EXBb 500V	1019599
35	1	solenoid 90 EXBb 200V	1019591
35	1	solenoid 70 EXBb 100V	1019583
35	1	solenoid 70 EXBb 115V	1019584
35	1	solenoid 70 EXBb 200V	1019585
35	1	solenoid 70 EXBb 230V	1019586
35	1	solenoid 70 EXBb 500V	1019587
35	1	solenoid 90 EXBb 100V	1019589
35	1	solenoid 90 EXBb 115V	1019590
38	4	countersunk-head screw DIN 965 M 6x16 verz	468733
40	1	cap set external/analogue EXB_G-500V	1019959
40	1	cap set external/analogue EXB_M-500V	1019958
40	1	cap set. internal/ext. retainEXB_G-500V	1019957
40	1	cap set. internal/ext. retainEXB_M-500V	1019956
40	1	cap set. internal/ext. retainEXB_M-230V	1019577
40	1	cap set. internal/ext. retainEXB_G-230V	1019578
40	1	cap set external/analogue EXB_M-230V	1019580
40	1	cap set external/analogue EXBbG-230V	1019581
45	8	cheese head screw DIN 912 M 5x 20 8.8 nickel-plated	468015
46	8	spring lock washer DIN 127 B 5 A2	462411
47	1	solenoid cable set. EXB_	808334
48	1	terminal strip, 3-pole special	714133
51	1	coupling terminal EXBb	1019604

Item-No.	Quantity	Description	Order number
52	1	Switch MPS 103 F S3Ex	710307
53	1	non-locking switch MPS 103	710310
57	1	setscrew DIN 551 M 3x 3.5 polyamide	1021969
60	2	spacer pin DAK-M4x20	460521
61	4	countersunk head screw DIN 85 M 4x10 Nylon	461535
65	1	fuse 5x20 T 3.15A (1.5kA) Types 100V-2505,1310,0814,0430,0260	732414
65	1	Sicherung 5x20 T 2.5A (1.5kA) Types 100V-2502,1006,0613,0417,1002HV 100V-2505,1310,0814,0430,0260	732413
65	1	fuse 5x20 T 2.0A (1.5kA) Types 115V-2502,1006,0613,0417,1002HV	732412
65	1	fuse 5x20 T 1.6A (1.5kA) Types 100V-2505,1310,0814,0430,0260	732411
65	1	fuse 5x20 T 1.0A (1.5kA) Types 100V-1000,1601, 1201, 0803, 1002, 0308	732409
65	1	fuse 5x20 T 800mA (1.5kA) Types 230V-2502,1006,0613,0417,1002HV	732408
65	1	fuse 5x20 T 630mA (1.5kA) Types 115V-1000,1601, 1201, 0803, 1002, 0308	732407
65	1	fuse 5x20 T 400mA (1.5kA) Types 200V-1000,1601, 1201, 0803, 1002, 0308	732405
65	1	fuse 5X20 T 315mA (1.5kA) Types 230V-1000,1601, 1201, 0803, 1002, 0308	732404
65	1	fuse 6.3x32 FF 800mA 500V Types 500V-2505,1310,0814,0430,0260	732372
65	1	fuse 6.3x32 T 500mA 500V Types 500V-2502,1006,0613,0417,1002HV	732924
65	1	fuse 6.3x32 FF 200mA 500V Types 500V-1000,1601, 1201, 0803, 1002, 0308	732370
65	1	fuse 5x20 T 1.25A (1.5KA) Types 200V-2502,1006,0613,0417,1002HV 230V-2505,1310,0814,0430,0260	732410
66	1	fuse 5x20 T 160mA (35A) F2 alle Typen 100-230V	
67	1	temperature limiter 80°C -230V	732631
67	1	temperature limiter 80°C 500V	732632
77	2	circlip DIN 471 22x1.2	467217
78	1	terminal strip, 3-pole special	
80	1	mains power supply EXBbG 230V,5m	1019545
80	1	mains power supply EXBbG 500V,5m	1019546
80	1	mains power supply EXBbM up to 500V,5m	1019548
80	1	mains power supply EXB_E,G 0.9m	1020429
81	1	mains power supply, external EXBbG 5m	791397
81	1	mains power supply, external EXBbM 5m	791649
81	1	mains power supply, external intrinsically safe „i“ 5m	790134
81	1	mains power supply, external EXB_E,G 0,8m	1020431
81	1	dummy plug -LE d22-SW27 EXB_	791652
90	1	earth clamp M5 05-0012-0001	704907
92	1	control knob d 16 #2516040	703555
93	1	cover, grey #4116008	703502
94	1	adjustment knob CT 46-6M	703523
95	1	transparent cover	140907
96	1	knurled head screw M3x20 Nr68 RAL7001	466213
97	1	profile sealing ring - transparent cover	484017
98	1	cap d 15 black #4131063	703562
99	1	cap d4/15 black #4131403	703561

Installation data

Customer:			
Project No.:	Date:	❑ Drawing enclosed	
Metering pump	Type	–	.....
	Capacity	l/h	.....
	Stroke rate	stroke/min	.....
	Stroke length	%	.....
	Valve spring pressure, intake side	bar	.....
	Valve spring pressure, delivery side	bar	.....
Medium	Description/ Concentration	– / %	..... / .....
	Percentage solids/ grain size	% / mm	..... / .....
	Solid material / hardness	– / (Mohs-Skala)	.....
	Dynamic viscosity	mPa s (cP)	.....
	Density	kg /m³	.....
	Vapour pressure at operating temp.	bar /°C	.....
System, intake side	Pressure in intake tank	bar	.....
	Nominal diameter intake line	DN / mm	..... / .....
	Intake head min /max	m	..... / .....
	Supply head min /max	m	..... / .....
	Intake line length min /max	m	.....
	Number of bracket/valves	–	.....
	Pulsation damper	❑	Diaphragm accumulator ..... ltr.
		❑	Pressure vessel ..... ltr.
System, delivery side	Static system pressure min /max	bar	..... / .....
	Nominal diameter of delivery line	DN / mm	.....
	Delivery line length	m	.....
	Delivery head	m	.....
	Number of brackets/valve	–	.....
	Pulsation damper	❑	Diaphragm accumulator ..... ltr.
		❑	Pressure vessel ..... ltr.

Please copy and send in with the pump

In the case of failure of the metering pump within the guarantee period, please return the metering pump in a cleaned condition with the guarantee claim completed in full.

▼

Please complete in full!

Guarantee claim for metering pumps	**No.**

Company: ..... Tel.-No.: ..... Date: .....

Address: .....

Person responsible (customer): .....

Order No.: ..... Date of delivery: .....

Pump type/ Identy code: ..... Serial No.: .....

Brief description of fault:.....

.....

.....

.....

Type of fault

1 Mechanical fault

- ❑ Abnormal wear
- ❑ Wearing parts
- ❑ Breakage/ other damage
- ❑ Corrosion
- ❑ Damage during transport

2 Electrical fault

- ❑ Connections such as connector or cable loose
- ❑ Operating elements (e.g. switches)
- ❑ Control

3 Leakage

- ❑ Connections
- ❑ Liquid end

4 None or poor delivery capacity

- ❑ Diaphragm defective
- ❑ Others

Operating conditions of ProMinent® -pumps

Place of installation/ system description: .....

Pump accessories used: .....

.....

.....

Commissioning (date): .....

Running period (approx. duty hours): .....

Please specify installation data and enclose system drawing

Please copy and send in with the pump

Declaration of Complete Safety

We hereby guarantee that the enclosed device

Type .....

Serial No.: .....

is free of

- **Chemical**
- **biological or**
- **radioactive Substances**

which are harmful to health.

The device was cleaned thoroughly before despatch.

Date / signature

Company stamp

EC Declaration of Conformity

We,

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

hereby declare that, on the basis of its functional concept and design and in the version brought into circulation by us, the product specified in the following complies with the relevant, fundamental safety and health stipulations laid down by EC regulations.
Any modification to the product not approved by us will invalidate this declaration.

Product description :	***Metering pump, series Extronic / b***
Product type :	***EXBb ...***
Serial number :	***see type identification plate on device***
Relevant EC regulations :	***EC-Ex-regulation 94/9/EEC*** ***EC - machine regulation 98/37/EC*** ***EC - low voltage regulation 73/23/EEC*** ***EC - EMC regulation 89/336/EEC subseq.92/31/EEC***
Harmonised standards used, in particular :	***EN 50014, 50018, 50020, 50284, 50303, 1127-1, 13463-1*** ***EN 292-1, EN 292-2, EN 809*** ***EN 60335-1, EN 60335-2-41*** ***EN 50081-1/2, EN 50082-1/2, EN 55014*** ***EN 61000-3-2, EN 61000-3-3***
National standards and other technical specifications used, in particular :	***DIN VDE 0700 T1, IEC 60335-1*** ***DIN VDE 0700 T41, IEC 60335-2-41*** ***DIN VDE 0700 T500, VDE 0110*** ***IEC 1000-3-2, IEC 1000-3-3***
Date/manufacturer´s signature :	***June 12, 2003***
The undersigned :	*Dr. Rainer V. Dulger, Executive Vice President R&D and Production*

EXAM
BBG Prüf- und Zertifizier GmbH

Translation

(1) # EC-Type Examination Certificate

(2) **- Directive 94/9/EC -**
Equipment and protective systems intended for use in potentially explosive atmospheres

(3) ## DMT 03 ATEX E 023

(4) **Equipment:** **Proportioning pump type EXBb M ... and Typ EXBb G ...**

(5) **Manufacturer:** **ProMinent Dosiertechnik GmbH**

(6) **Address:** **D 69007 Heidelberg**

(7) The design and construction of this equipment and any acceptable variation thereto are specified in the schedule to this type examination certificate.

(8) The certification body of Deutsche Montan Technologie GmbH, notified body no. 0158 in accordance with Article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.
The examination and test results are recorded in the test and assessment report BVS PP 03.2087 EG and PP 2310/108/03 EG.

(9) The Essential Health and Safety Requirements are assured by compliance with:

EN 50014:1997+A1-A2	General requirements
EN 50018:2000 +A1	Flameproof enclosure
EN 50020:1994	Intrinsic safety
EN 50284:1999	Group II Category 1G
EN 50303:2000	Group I Category M1-Apparatus
EN 1127-1:1997	Explosive atmospheres - Explosion prevention and protection – Part 1: Basic concepts and Methodology
EN 13463-1:2001	Non electrical equipment for potentially explosive atmospheres – part 1 Basic methods and requirements

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to Directive 94/9/EC.
Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate

(12) The marking of the equipment shall include the following:

further marking see table on the next page

Deutsche Montan Technologie GmbH
Essen, dated 15. May 2003

Signed: Eickhoff — DTM Certification body

Signed: Schumann — Head of special services unit

Am Technologiepark 1, 45307 Essen, Telefon-Phone 0201/172-1416 Telefax-Fax 0201/172-1716
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(bis 31.05. 2003: Deutsche Montan Technologie GmbH Dinnendahlstrasse 9 44809 Bochum Germany)

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BBG Prüf- und Zertifizier GmbH

(13) Appendix to

(14) # EC-Type Examination Certificate

DMT 03 ATEX E 023

(15) 15.1 Subject and type

Proportioning pump

type		marking
EXBb M ...	Ex	I M2 EEx d I II 2G EEx d IIC T6 I M2 c I II 2G c IIC T6
EXBb M ...	Ex	I M2 (M1) EEx d [ia] I II 2(1)G EEx d [ia] IIC T6 I M2 c I II 2G c IIC T6
EXBb M ...	Ex	I M2 EEx d I I M2 c I
EXBb M ...	Ex	I M2 (M1) EEx d [ia] I I M2 c I
EXBb G ...	Ex	II 2G EEx d IIC T6 II 2G c IIC T6
EXBb G ...	Ex	II 2(1)G EEx d [ia] IIC T6 II 2G c IIC T6

15.2 Description

The enclosure of the drive unit of the proportioning is designed in type of protection Flameproof Enclosure. Electronic assembly and electromagnet with a plunger, which penetrates the enclosure wall, are located inside this enclosure.
The electromagnet is triggert by pushbuttons and shafts or by electric signals, triggering the electronic assembly inside the enclosure. Optionally the type of protection of these triggering circuits is Intrinsic safety.
(Type EXBb * **** *** * * 4 * *, type EXBb * **** *** * * 5 * *; type EXBb * **** *** * * 6 * * and type EXBb * **** *** * * 8 * *).

A diaphragm pump is mounted to the end wall of the flameproof enclosure.

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15.3 Parameters

15.3.1 Supply circuits

15.3.1.1 Supply circuit (triggering circuit not intrinsically safe)

rated voltage	≤	AC 500	V
Maximum current input (I_{eff})		1,5	A
Maximum current		8	A
Maximum power input*		50	W

*averaged over the stroke cycle

15.3.1.2 Supply circuit (triggering circuit intrinsically safe)

Type EXBb * **** *** * E * * *				
rated voltage		AC	500 +6% -10%	V
max. voltage	Um	AC	530	V
Type EXBb * **** *** * A * * *				
rated voltage		AC	230 ±10%	V
max. voltage	Um	AC	253	V
Type EXBb * **** *** * B * * *				
rated voltage		AC	115 ±10%	V
max. voltage	Um	AC	253	V
Type EXBb * **** *** * C * * *				
rated voltage		AC	200 ±10%	V
max. voltage	Um	AC	253	V
Type EXBb * **** *** * D * * *				
rated voltage		AC	100 ±10%	V
max. voltage	Um	AC	253	V

15.3.2 Triggering circuits

15.3.2.1 Triggering circuits (not intrinsically safe)

voltage	≤	6	V
current	≤	30	mA

15.3.2.2 Triggering circuits (intrinsically safe)

Type EXBb * **** *** * * 4 * * and type EXBb * **** *** * * 8 * *				
voltage	Uo	DC	7,14	V
current	Io		5	mA
power	Po		23,3	mW
internal resistance	Ri		4296	Ω
trapezoidal output characteristic				
max. external capacitance	Co		13,5	µF
max. external inductance	Lo		1	mH

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Type EXBb * **** *** * * 5 * * and type EXBb * **** *** * * 6 * *
for connection of an intrinsically safe circuit

Spannung	Ui	DC	30	V
Stromstärke	Ii		280	mA
Leistung	Pi		2	W
effectiv internal inductance	Li	negligible		
effectiv internal capacitance	Ci	negligible		

15.3.3 Ambient temperature range - 20 °C up to + 45 °C

(16) Test and assessment report
BVS PP 03.2087 EG, as of 15.05.2003
BVS PP 2310/108/03 EG, as of 29.04.2003

(17) Special conditions for safe use

None

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

44809 Bochum, 08.07.2003
BVS-Ru/Mi E 1364

EXAM BBG Prüf- und Zertifizier GmbH

Certification body

Special services unit

Am Technologiepark 1, 45307 Essen, Telefon-Phone 0201/172-1416 Telefax-Fax 0201/172-1716
Dinnendahlstrasse 9 44809 Bochum Germany Telefon-Phone +49 201/172-3923 Telefax-Fax +49 201/172-3924
(bis 31.05. 2003: Deutsche Montan Technologie GmbH Dinnendahlstrasse 9 44809 Bochum Germany)

(1) # EC-Type Examination Certificate

(2) - Directive 94/9/EC -

Equipment and protective systems intended for use

in potentially explosive atmospheres

(3) DMT 03 ATEX E 023

(4) **Equipment:** **Metering pump type EXBb M ... Und EXBb G ...**

(5) **Manufacturer:** **ProMinent Dosiertechnik GmbH**

(6) **Address:** **D 69007 Heidelberg**

(7) The design and construction of this equipment and any acceptable variation thereto are specified in the schedule to this type examination certificate.

(8) The certification body of Deutsche Montan Technologie GmbH, notified body no. 0158 in accordance with Article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.
The examination and test results are recorded in the test and assessment report BVS PP 03.2087 EG and PP 2310/108/03 EG.

(9) The Essential Health and Safety Requirements are assured by compliance with:
EN 50014:1997+A1-A2 General requirements
EN ...
EN ...

(10) If the sign “X” is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to Directive 94/9/EC.
Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate

(12) The marking of the equipment shall include the following:

Deutsche Montan Technologie GmbH

Essen, dated 15. May 2003

Signed: Eickhoff

DTM Certification body

Signed: Schumann

Head of special services unit

(13) Appendix to

(14) # EC-Type Examination Certificate

DMT 03 ATEX E 021 X

(15) 15.1 Subject and type

Metering pump type EXBb M ... Und EXBb G ...

15.2 Description

15.3 Parameters

(16) Test and assessment report
BVS PP XX.XXXX EG as of “Datum des Prüfprotokolls”

(17) Special conditions for safe use