

# Product catalogue 2020

## Metering Technology

ProMinent®



2020



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Heidelberg, January 2020

## Metering Pumps, Components and Metering Systems



### Metering technology for professionals

The heart of metering technology is quite clearly the pump.

With its optimum capacity range and functionality adapted to the feed chemical, it is responsible for smooth-running metering processes.

### Chapter 1

**Low-pressure metering pumps**, which cover all metering tasks, ranging from micro-metering up to 75 l/h at a maximum back pressure of 60 bar, and our new **peristaltic metering pumps**.

Universally applicable **motor-driven metering pumps** in the low-pressure range up to a capacity of 1,000 l/h, to ensure that your processes operate safely even when meeting maximum requirements.

Durable and easy-to-operate **transfer and peristaltic pumps** for pure pump capacities, as well as the matching components, like sturdy storage tanks and collecting pans.

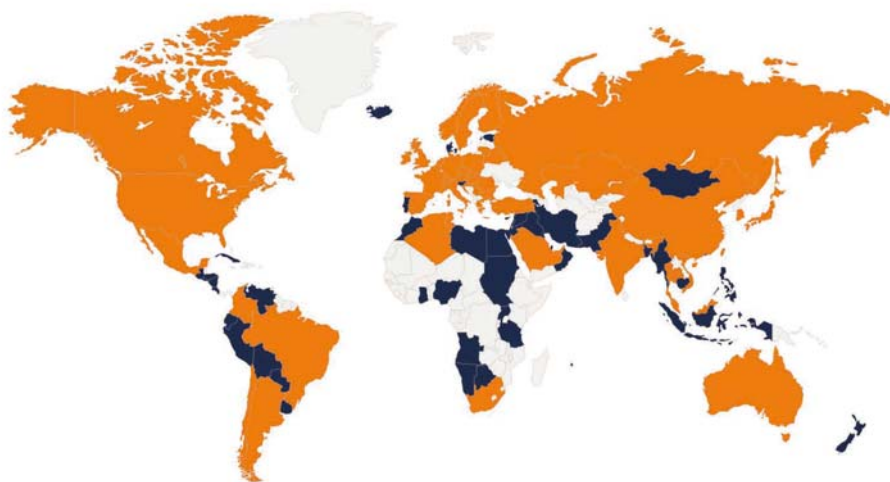
Completely ready mounted **metering systems**, standard or made-to-measure – thanks to their perfect interaction, the precisely coordinated components ensure a safe and immediately ready-to-use complete solution.

### Chapter 2

**Process metering pumps** for hazardous production processes in the petrochemical industry or in the oil and gas industry, tailored specifically to high-end applications. They are tried and tested, including under very high pressure and extreme temperatures, and will just carry on metering, even toxic, corrosive and inflammable liquids.

### Ready for you. Anytime, anywhere.

ProMinent is close to hand no matter where you are: 55 dedicated sales, production and service companies guarantee service and availability in close proximity to our customers. For many years this has meant a local presence for our customers in over 100 countries.



Our sales team will be happy to be of assistance should you have any questions about metering technology or water treatment. You will find the contact details of your local contact at

[www.prominent.com/en/locations](http://www.prominent.com/en/locations).

### Pump Guide

You can also find information online. The ProMinent pump selection guide is available on our website. Just enter the required pump capacity and back pressure, and the Pump Guide will show you a list of suitable metering pumps. This is the quick and easy way to track down precisely the right pump for your needs.

[www.pump-guide.com](http://www.pump-guide.com)

# Step by Step to the Right Product

Metering tasks come in all shapes and sizes! Provide us with your data - we'll deliver the optimum solution!

The following data sheet will help in solving your metering problem. Please enter your requirements and conditions and return it to [info@prominent.com](mailto:info@prominent.com). Our Service Centre will use your data to reach the optimum result - the optimum metering pump and matching accessories for your application.

## Required Data for Designing Metering Pumps and Accessories

Min./max. required feed rate	l/h _____
Available power supply	_____ V, _____ Hz
Min./max. operating temperature	°C _____
Properties of process chemical	_____
Name, concentration %	_____
Solids content %	_____
Dynamic viscosity mPa (= cP)	_____
Vapour pressure at operating temperature	bar _____
Remarks, e.g. abrasive,	_____
gaseous, flammable,	_____
corrosive towards	_____
<b>Suction conditions:</b>	
Min./max. suction lift	m _____
Min./max. positive suction head	m _____
Pressure in chemical tank	bar _____
Suction line length	m _____
Suction line diameter	mm _____
<b>Discharge conditions:</b>	
Min./max. back pressure	bar _____
Min./max. discharge head	m _____
Min./max. negative discharge head	m _____
Discharge line length	m _____
Discharge line diameter	mm _____
Number of valves and fittings in suction and discharge line	_____
<b>Data required for proportional dosing:</b>	
Water flow Q min./max.	m³/h _____
Required final concentration	g/m³, ppm _____

### Example:

A required dose in mg/l = g/m³ = ppm

(Water flow Q max. 50 m³/h)

Pulse spacing (flow volume per pulse) of water meter 5 l.

Process fluid = sodium hypochlorite solution Na OCl with 12 % chlorine (by weight) = 120 g/kg = 150 g/l = 150 mg/ml

Selected dosing pump GMXa 1604NPT2 NPB2 with 0.3 ml/per stroke volume, at max. 10800 strokes/h.

Variables: pump type, pulse spacing and concentration. The stroke rate (max. throughput l/h: pulse spacing l/pulse = 50,000 l/h : 5 l/pulse = 10000 pulses/h) must not exceed the max. stroke frequency (10800 strokes/h) of the dosing pump.

$$\text{Feed quantity} = \frac{\text{water throughput Q max. (l/h)} \times \text{stroke volume (l)}}{\text{pulse spacing (l)}} = \frac{50,000 \text{ l} \times 0.0003 \text{ l}}{\text{h} \times 5 \text{ l}} = 3 \text{ l/h}$$

$$\begin{aligned} \text{Final dose} &= \frac{\text{concentration (mg/ml)} \times \text{stroke volume (l)}}{\text{pulse spacing (l)}} = \frac{150 \text{ mg} \times 0.3 \text{ ml}}{\text{ml} \times 5 \text{ l}} = 9 \text{ mg/l} \\ &= 9 \text{ g/m}^3 \\ &= 9 \text{ ppm chlorine Cl}_2 \end{aligned}$$



## Free Choice with the Identity Code

Use the identity code to determine the properties and features of your low-pressure metering pump. Simply select, enter the code in the bottom row and you've configured your product!

You've opted for a pump product range. It's now up to you to configure the pump exactly to meet your individual needs.

First determine the **pump type (1)**. This is based on the pump capacity you require and the back pressure present. Enter the result at the very bottom, in the grey row of the identity code.

The medium to be metered is crucial when it comes to the **material of the dosing head (2)** and the **seals (3)**. Once again enter the selected code in the bottom row.

You can now select the features and properties of your product with a few restrictions.

Work through column by column, generating the identity code for your own individual metering pump.

BT4b	Type	Capacity
	bar l/h	
	1000 10	0.74
	1601 16	1.10
	1602 16	2.20
	1604 16	3.60
	0708 7	7.10
	0413 4	12.30
	0220 2	19.00
1 → BT5b		
	2504 25	2.90
	1008 10	6.80
2 → 0713	7	11.00
	0420 4	17.10
	0232 2	32.00
	Liquid end/valve material	
	PP Polypropylene/PVDF, for version self-degassing Polypropylene/Polypropylene	
3 → NP	Acrylic glass/PVDF, for version self-degassing Acrylic glass/PVC	
	PV PVDF/PVDF	
	TT PTFE/PTFE	
	SS Stainless steel 1.4404/1.4404	
	Seal/diaphragm material	
	T PTFE/PTFE coated	
4 → S	Diaphragm additionally with FKM coating for siliceous media	
	Liquid end version	
	0 Non-bleed version, no valve spring, for TT, SS and type 0232 only	
	1 Non-bleed version, with valve spring, for TT, SS and type 0232 only	
	2 With deaerator, no valve spring, PP, PV, NP only, not type 0232	
	3 With deaerator, with valve spring, PP, PV, NP only, not type 0232	
	4 version for highly viscous media, only PVT, types 1604, 0708, 1008, 0413, 0713, 0220, 0420	
	7 self-bleeding without bypass (SER), only for NP and PV, not for types 1000, 1601 and 0232	
	Hydraulic connections	
	0 Standard according to technical data	
	5 Connector for 12/6 hose, delivery side only, only with materials PP, NP and PV	
	9 Connector for 10/4 hose, delivery side only, only with materials PP, NP and PV	
	Version	
	0 Standard	
	Logo	
	0 with ProMinent * logo	
	Power supply	
	U 100-230 V ± 10 %, 50/60 Hz	
	M 12-24 V DC, only for BT4	
	N 24 V DC, only for BT5	
	Cable and plug	
	A 2 m European	
	B 2 m Swiss	
	C 2 m Australian	
	D 2 m USA	
	I 2 m, open-ended	
	Relay	
	0 No relay	
	1 Fault indicating relay, normally energised, 1 x changeover contact 230 V - 2 A	
	3 Fault indicating relay, normally de-energised, 1 x changeover contact 230 V - 2 A	
	4 as 1 + pacing relay 2 x normally open contacts 24 V - 100 mA	
	5 as 3 + pacing relay 2 x normally open contacts 24 V - 100 mA	
	Accessories	
	0 No accessories	
	1 With foot and dosing valve, 2 m PVC suction tubing, 5 m PE discharge tubing	
	Control type	
	0 No lock	
	1 With lock: manual operation locked when external cable plugged in	
	Control Variants	
	0 Standard	
	Options on request	
	0 0 No options	
BT5b	0713	NP
	S	

**We will be happy to advise you on your metering application.**

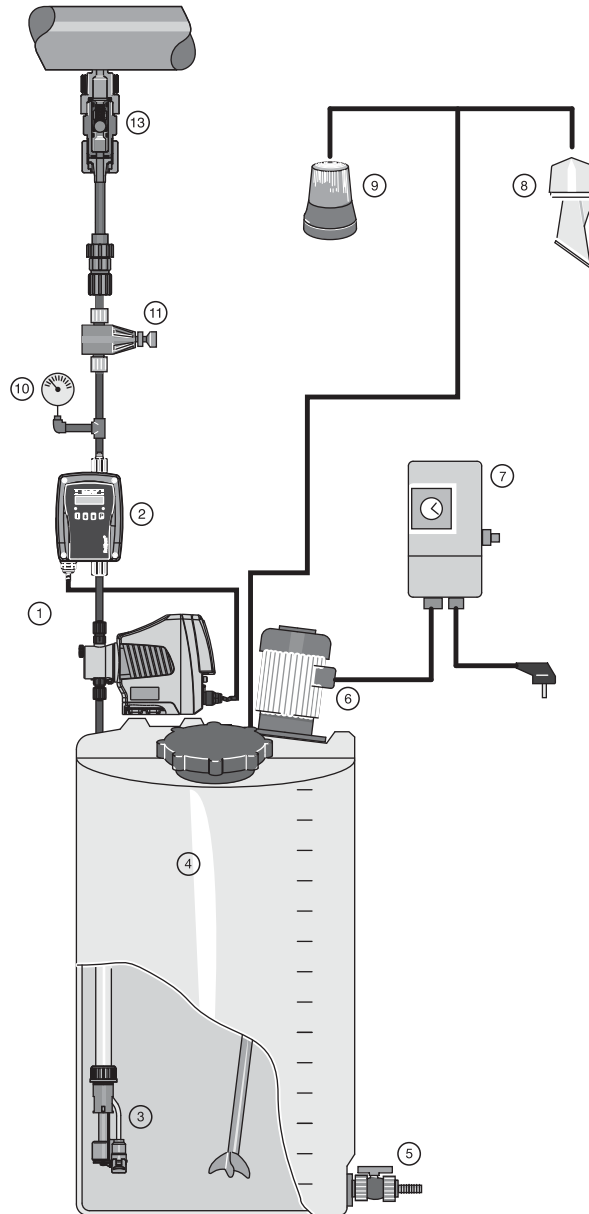
**Give us a call should you still have any questions!**

# Metering Pumps also Need Accessories

Examples of metering tasks illustrate which components and accessories can be used for different metering processes.

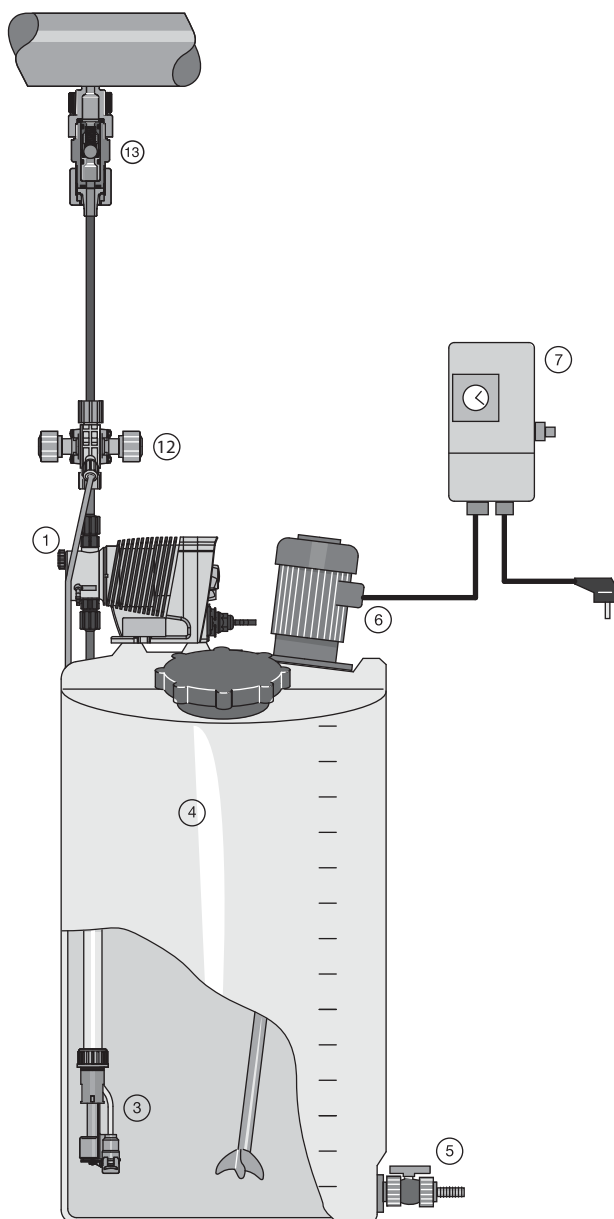
A pump alone is often simply not enough. A metering process requires further **components and accessories**. ProMinent provides all the products you need to guarantee **optimum process flows** for the metering of liquid media. Expertise and advice are, of course, included!

- 1 Metering pump
- 2 DFMA flow meter with single stroke monitor and feedback to the metering pump
- 3 Suction assembly with level switch
- 4 Chemical tank
- 5 Drain cock
- 6 Stirrer
- 7 Timer for stirrer
- 8 Signal horn
- 9 Display lamp
- 10 Manometer for precise adjustment of the back pressure valve
- 11 Back pressure valve



# Metering Pumps also Need Accessories

- 1 Metering pump
- 3 Suction assembly with level switch
- 4 Chemical tank
- 5 Drain cock
- 6 Stirrer
- 7 Timer for stirrer
- 12 Multifunctional valve
- 13 Injection valve



AP\_0016\_SW





## Peristaltic pump DULCO flex Control – DFXa

### Feed rate of 10 ml/h to 30 l/h at up to 7 bar back pressure

The new DULCO flex Control meters reliably and is simple to operate. It enhances the ProMinent product range with an intelligent peristaltic metering pump. ProMinent is making use of its decades-long experience in the metering pump sector to bring together the best of two worlds. Valve-free metering with the accuracy of a diaphragm metering pump, with full use of the properties of a peristaltic pump. The applications of this metering pump include strongly gaseous, high-viscosity, abrasive, shear-sensitive or chemically aggressive fluids.

The liquid end developed and patented by ProMinent makes quick and straightforward hose replacement possible with a unique exchange technique. The display provides the fitter with precise instructions about the steps to be completed when replacing the hose. The high-performance hoses used guarantee exceptional chemical resistance and a long service life.

The order information required for replacement of the hose can be found on the pump's operating menu.

The intuitive user interface with click wheel ensures the simple operation of the peristaltic pump.

A brushless direct current motor forms the heart of the DULCO flex Control. Its ingenious control provides for precise metering and reduced pump capacity with continuous metering up to 10 ml/h. Moreover, the new peristaltic metering pump is IoT-enabled, meaning that it is fully networkable and can be connected to the DULCOneX platform especially developed by ProMinent, which enables it to work even smarter.

- Adjustment of the metering rate directly in l/h or gph
- Simple hose change
- No problems with very gaseous media or air locks
- Suitable for viscosities of up to 10,000 mPas
- Sole contact with media in the hose
- Many different control options, such as using an analogue 0/4-20 mA signal, contact controller, timer or via process control systems

For more information see page → 1-25



# Metering technology product innovations



## Peristaltic pump DULCO flex Control – DFYa

### Feed rate of 5.5 l/h to 410 l/h at up to 8 bar back pressure

The new metering pump DFYa, the big brother of the DFXa, adds an intelligent peristaltic pump to the top capacity range of the ProMinent portfolio.

The new generation of peristaltic metering pumps is now controlled electronically. It meters without the need for a valve, with precision hitherto impossible. All the benefits of a peristaltic pump are retained, which is why seriously gaseous, high-viscosity, abrasive or shear-sensitive fluids, sometimes containing particles, can also be perfectly metered with the DFYa.

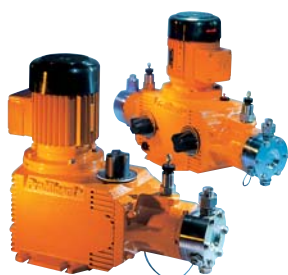
As with the DFXa, hose replacement on the DFYa is also assisted by the pump. When the hose needs to be changed, the pump displays exact instructions for the steps to be followed and automatically moves into the correct positions for hose replacement. The different hose materials (NR, NBR, NBR-A, EPDM Hypalon) enable the DFYa to work with a very wide range of media to be metered.

The peristaltic pump DFYa is simple to operate from the intuitive user interface with 4 keys and the click wheel. The DFYa thus joins the remaining ProMinent product range of intelligent metering pumps, which all share the same menu structure and user interface.

The new peristaltic metering pump is even IoT-capable. This means that it is fully connectible and can be connected to ProMinent's in-house developed DULCOneX platform, which enables it to work even smarter.

- Operation by contact, batch, manual, analogue or BUS control
- Adjustment of the metering rate directly in l/h or gph
- Connection to process control systems via a BUS interface, such as PROFIBUS®, Profinet or CANbus
- No problems with very gaseous media or air locks
- Simple, menu-guided hose change
- Reversible direction of rotation
- Direct input of the required final concentration in concentration mode with volume-proportional metering tasks
- Automatic mode – volume settings only (l/h, ml/contact etc.)
- Pump can run dry
- Suitable for viscosities of up to 40,000 mPas
- Sole contact with media in the hose

For more information see page → 1-29



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## Extensions to the Hydro range – Hydro/ 2 and Hydro/ 3 for 40 bar and in an API 675 version

There are new additions to the successful Hydro range: the new product ranges Hydro/ 2 API 675 and Hydro/ 3 API 675 complement the existing models. New technical solutions, such as “Full-motion Drive” and automatic bleeding deliver improved performance over the traditional product ranges. This excellent value-for-money hydraulic diaphragm metering pump thus now also meets the requirements of API 675. Its possible applications are thereby significantly enhanced.

The 40 bar extension to the product ranges Hydro/ 2 and Hydro/ 3 represents another addition to the range. These versatile pumps can therefore be adapted even more easily to the respective applications.

## Hydraulic diaphragm metering pump Hydro/ 2 API 675

For more information see page → 2-36

## Hydraulic diaphragm metering pump Hydro/ 3 API 675

For more information see page → 2-39





# Metering technology product innovations



## Hydraulic diaphragm metering pump Evolution mikro

### Capacity range 0.01 – 18 l/h, 400 – 16 bar

With a capacity range of 0.01 – 18 l/h at pressures of up to 400 bar, the hydraulic diaphragm metering pumps Evolution mikro EMFa and EMHa are extremely suitable for ultra-precise micro-metering in gas metering and filling processes of all kinds. They are also used for additive metering in oil, gas and chemical applications, etc.

Typical applications include the metering of additives in gas metering and filling processes.

The Evolution mikro is the first of its kind with an electronically regulated direct power end. It can be ideally adapted to the respective application, thanks to an adjustment range of 1:200 and the combination of individually independent metering profiles with 3-parameter control.

Maximum process reliability:

- Precise micro-metering at high pressures
- Hermetically sealed by PTFE multi-layer safety diaphragm or metal diaphragm
- Long service life thanks to its sturdy construction with low-wear, contact-less power end
- High positional accuracy guarantees reproducibility of better than  $\pm 1\%$

Excellent flexibility:

- Seriously extended adjustment range of up to 1:200
- Universally controllable with electronically integrated overload protection
- Individually process-dependent metering profiles combined with 3-parameter control are possible
- Space-saving, easy-to-fit solution

For more information see page → 2-57



## DULCOnneX – the total solution for your digital fluid management

ProMinent's DULCOnneX is the smart overall solution for digitally networking your system components. The DULCOnneX is based on robustly networked products that can be individually adapted to operating conditions. As all the components of a system are networked, metering pumps, disinfection systems, controllers and sensors can interact in an optimised manner – increasing process reliability and system efficiency.

### Location-independent system monitoring in real time

You always have all the key data and measured values about your pump installations in sight at all times with DULCOnneX. Monitor the status of your system in real time and benefit from continuous documentation. Check your unit data safely and reliably when you're out and about. Simply use the terminal device of your choice: smartphone, tablet or PC. Configurable alarms and messages inform you of relevant events 24/7.

Be in a position to act promptly at all times with DULCOnneX. Whether industrial and process water, cooling water, potable water or swimming pool water – DULCOnneX supports you in ensuring the reliable treatment of your fluids.



## Metering technology product innovations

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## Data Required for Specification of Metering Pump and Accessories

### ProMinent® Chemical Resistance List







# DULCOnneX – the total solution for your digital fluid management

## Smart process monitoring – any time, anywhere



Improved process safety, reliability and transparency due to real-time monitoring, individual alarms and automated reports.



ProMinent's DULCOnneX is the smart overall solution for digitally networking your system components. The DULCOnneX is based on robustly networked products that can be individually adapted to operating conditions. As all the components of a system are networked, metering pumps, disinfection systems, controllers and sensors can interact in an optimised manner – increasing process reliability and system efficiency.

### Location-independent system monitoring in real time

You always have all the key data and measured values about your pump installations in sight at all times with DULCOnneX. Monitor the status of your system in real time and benefit from continuous documentation. Check your unit data safely and reliably when you're out and about. Simply use the terminal device of your choice: smartphone, tablet or PC. Configurable alarms and messages inform you of relevant events 24/7.

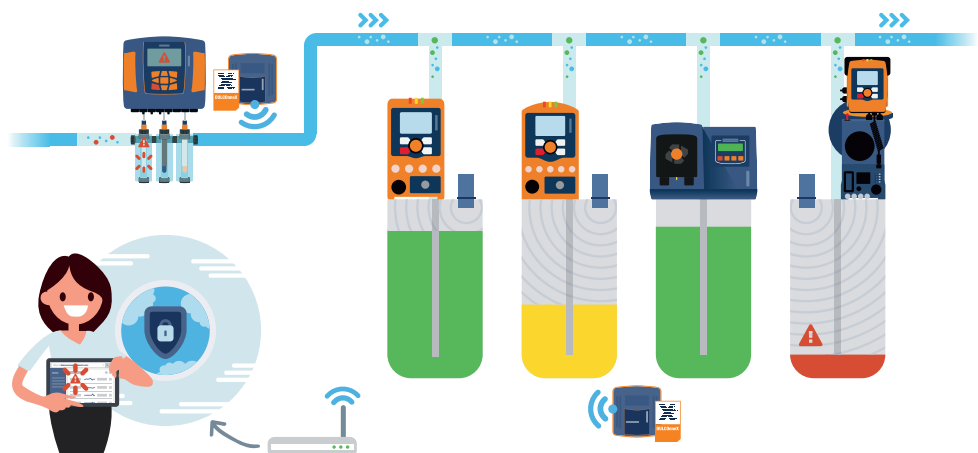
Be in a position to act promptly at all times with DULCOnneX. Whether industrial and process water, cooling water, potable water or swimming pool water – DULCOnneX supports you in ensuring the reliable treatment of your fluids.

## Reference - chemical metering

Whether you are concerned about conformity with regulatory requirements governing the metering of chemicals, or about guaranteeing efficient and effective metering: DULCOnneX continuously provides you with automatic evidence of the metering performed by the connected metering pumps.

Using individually configurable alarms, DULCOnneX monitors a series of pump parameters on your behalf, from the metering volume to any error and warning messages that occur. E-mail notifications allow you to react immediately to potential faults, thereby guaranteeing seamless processes. By networking the liquid level measurement to the metering stations you can avoid shortages in the metering of hydrogen peroxide, sulfuric acid, chloride dioxide, flocculants or corrosion inhibitors, among others.

DULCOnneX also continuously logs the operating parameters of all connected components and makes them available to you in the form of value diagrams and summarised reports to ensure that you always retain an overview of your processes.



# DULCO<sup>®</sup>neX – the total solution for your digital fluid management

## The benefits with DULCO<sup>®</sup>neX



- **Complete overview of all your devices and installations** – any time and from anywhere.
- **Reliable saving of your complete value history** including alarms and warnings that occur.
- **Individual alarms by e-mail** – Keep up to date at all times.
- **Continuous logging and automatic reports** – Documentation and evidence of correct operation.
- **Clear visualisation** – Graphic display of value and parameter combinations.
- **Access via the web** – Simply use any of your smart devices with an installed browser. You do not need an additional app nor a permanent link to the connected device.



The DULCO<sup>®</sup>neX platform can be accessed at <https://dulconnex.prominent.com>. Please contact us for a demonstration and e-mail your questions directly to us at [dulconnex@prominent.com](mailto:dulconnex@prominent.com). We'd be delighted to help you further.

## Privacy and data security



The architecture of DULCO<sup>®</sup>neX is already designed to achieve maximum safety and reliably protect your data. For example, there is a systematic separation of user-specific data and measured values. In addition, all measured values are anonymised internally and the entire system is regularly inspected by professional IT safety service providers for possible safety gaps.

### Examples of relevant safety measures:

- Encryption in accordance with the latest state of the art
- Multiple redundant data memories
- Systematic control of the equipment ownership

## Constantly growing portfolio of supported devices

We are continuously working at full throttle to extend our range of solutions. Below are just some of the devices and systems supported as standard to date. We also support the connection of additional components via flexibly combinable modules with digital or analogue inputs. This enables older devices to be connected (such as the chlorine dioxide system Bello Zon<sup>®</sup> CDLb) or other manufacturers' components (e.g., liquid level gauges, water meters, gas detectors).

- **Pumps**
  - gamma/ X
  - gamma/ XL
  - DULCO flex Control – DFXa
  - DULCO flex Control – DFYa
  - Sigma X
  - DULCO<sup>®</sup>flex DF4a
  - delta<sup>®</sup>
- **Controllers**
  - AEGIS II / SlimFLEX 5a
  - DULCOMETER<sup>®</sup> diaLog DACb
- **Disinfection systems**
  - UV systems Dulcodes LP/MP
  - Chlorine dioxide system Bello Zon<sup>®</sup> CDKd and CDVd
- **Standard signals via dedicated modules**
  - Digital inputs (relays, also with counter)
  - Analogue inputs (4...20 mA)



# DULCOnneX – the total solution for your digital fluid management

## DULCOnneX gateway

Our DULCOnneX gateway enables all smart products to be connected to our web-based fluid management platform.

The prerequisite for the correct operation of DULCOnneX is a “DULCOnneX gateway” compatible with the relevant product, which communicates with the “DULCOnneX platform” via a Wi-Fi internet connection provided by the customer.



	Devices	Order no.
<b>DULCOnneX gateway AGIb</b>	AEGIS II	1098723
<b>DULCOnneX gateway DACb</b>	DULCOMETER® diaLog DACb	1098756
<b>DULCOnneX gateway DLT, GMX, GXL</b>	gamma/ X, gamma/ XL, delta®, DULCO®flex DF4a, DULCO flex Control DFXa, DULCO flex Control DFYa, I- und M-Modul (DULCOMARIN® II), Frenzel+Berg Module (CIO50, CIO57, CIO58, CIO60, CIO300), Sigma X	1098754
<b>DULCOnneX gateway DF4, SXCB</b>	gamma/ X, Sigma X, DULCO®flex DF4a	1098755
<b>DULCOnneX gateway UVCb</b>	Dulcodes LP/MP, gamma/ X, Sigma X	1098757



# **DULCOnneX – the total solution for your digital fluid management**

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# 1.1 Solenoid-Driven Metering Pumps

## 1.1.1

### How to Find the Right Pump Type?

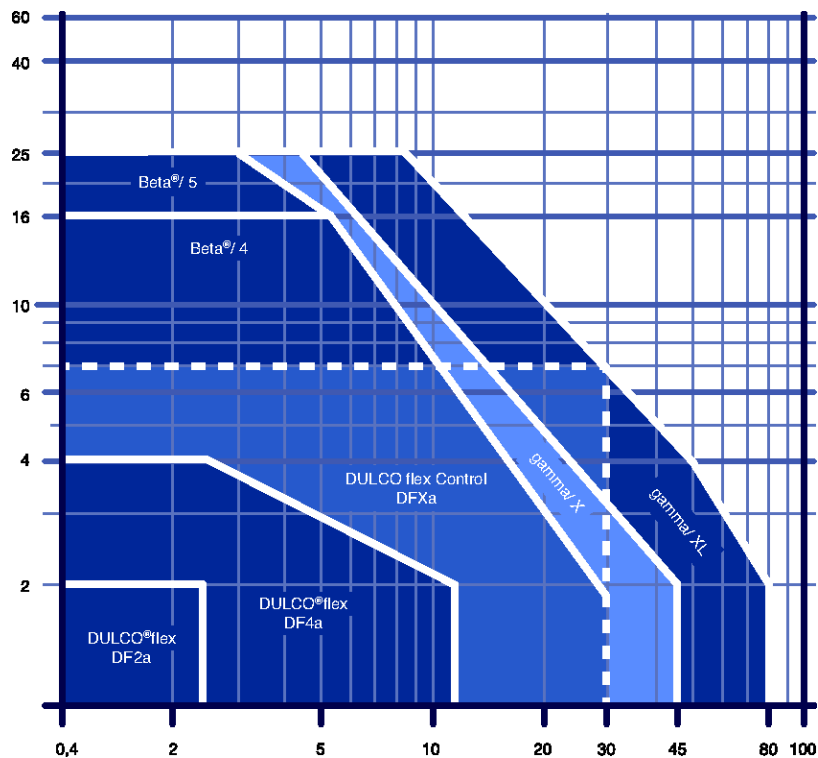
Low-pressure metering pumps for practically all liquid chemicals:

The wide range of materials and extremely reliable function make these pumps veritable all-rounders – even under the toughest conditions. You will find the optimum metering pump for your application in the broad product range in a capacity range from **0.74 to 80 l/h** at a **back pressure of 25 to 2 bar**.

#### Tip

The performance overview will assist you with rapid pre-selection. Determine the right product range of metering pumps based on a given back pressure (bar) and pump capacity (l/h).

All our low-pressure metering pumps are self-priming!



SG\_0040\_SW3

Pressure [bar] depending on the feed rate [l/h]

#### Important note

ProMinent metering pumps in the capacity range of **over 80 l/h** or **over 25 bar** as well as metering pumps approved for use in premises at risk of gas explosions are included in **chapter 2 "Process metering technology"**.

Please use our Pump Guide for assistance in making a quick selection; [www.pump-guide.com](http://www.pump-guide.com).



# 1.1 Solenoid-Driven Metering Pumps

## 1.1.2

## Solenoid-Driven Metering Pump Beta®

Equipped with all the features and properties for superior process management.

Capacity range 0.74 – 32 l/h, 25 – 2 bar

All-purpose solenoid-driven metering pump for metering liquid media in water treatment and chemical processes: Solenoid-driven metering pump Beta®. Cost-effective, overload-proof, adaptable to existing signal transducers.

A range of different pump types and material combinations are available for virtually all metering applications. The virtually wear-free solenoid drive guarantees an exceptionally long service life even under maximum load.

### Your benefits

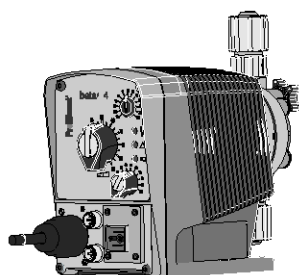
- Optional external control via 0/4 – 20 mA and potential-free contacts with pulse step-up and step-down of 32:1 to 1:32
- Simple adjustment of metering capacity via stroke rate and stroke length
- Adaptation to existing signal transducers by external control via potential-free contacts with pulse step-up and step-down
- Suitable for use with almost all liquid chemicals thanks to the available material combinations: PP, PVDF, clear acrylic, PTFE and stainless steel
- Self-bleeding dosing head design in clear acrylic/PVC and PP
- Virtually wear-free solenoid drive: economical and overload-proof
- Economical operation with up to 50% energy-savings, thanks to higher pump efficiency
- Everything in sight and under control: 3 LED display for operating, warning and error messages

### Technical Details

- External control via potential-free contacts with pulse step-up and step-down to adapt to existing signal transducers of 64:1 to 1:64
- Optional external control via 0/4 – 20 mA and potential-free contacts with pulse step-up and step-down of 32:1 to 1:32
- Stroke rate adjustment in 10% increments of 10 – 100% corresponds to 18 – 180 strokes/minute
- Continuous stroke length adjustment of 0 – 100% (recommended 30 – 100%)
- Connector for 2-stage level switch
- Wide-range electrical connection: 100 – 230 V, 50/60 Hz
- Optional relay module, can also be retrofitted easily and securely
- Low voltage design 12 – 24 V DC

### Field of application

- Metering liquid media in water treatment and chemical processes



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Beta® b

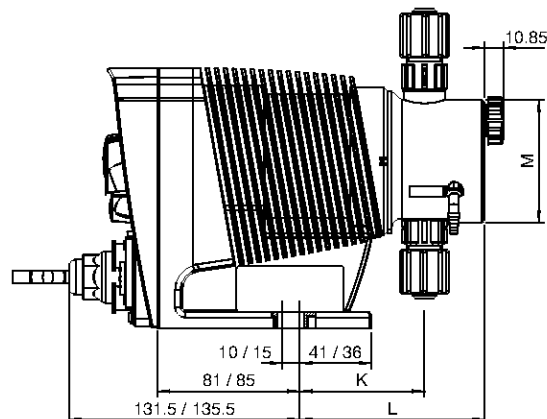
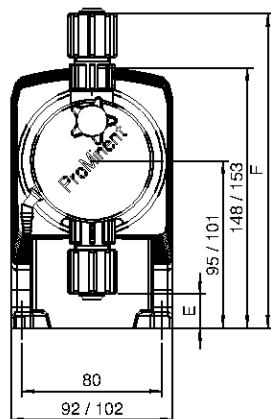


# 1.1 Solenoid-Driven Metering Pumps

Dimensional drawing of Beta®  
Material design PP

Type	E	F
1000-1604	19.5	179
0708-0220	7	186.5
1008-0420	14	191.5
0232	1.5	200.5

Type	K	L	M
1000-1604	71	105.5	Ø 70
0708-0220	77.5	111	Ø 90
1008-0232	74	107.5	Ø 90
0232	77.5	94.5	Ø 110



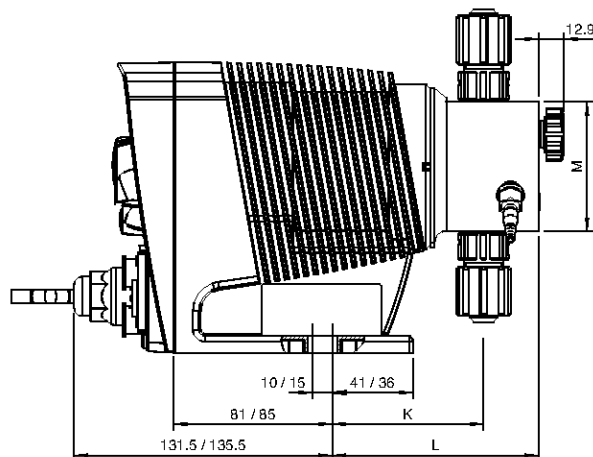
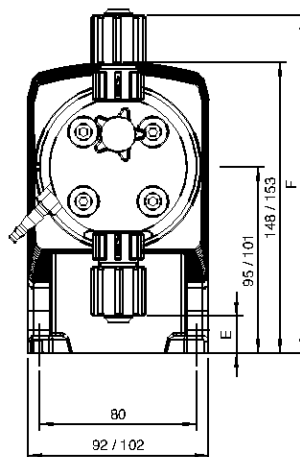
P\_BE\_0069\_SW3

Dimensional drawing of Beta®, Material version PP - dimensions in mm

Dimensional drawing of Beta®  
Material design NP

Type	E	F
1000-1604	19	172
0708-0220	7.2	183
2504	24.5	178.5
1008-0420	14	188
0232	3.2	199

Type	K	L	M
1000-1604	77	105	Ø 70
0708-0220	77.5	105.5	Ø 90
2504	77	105	Ø 70
1008-0420	74	102	Ø 90
0232	76	104.5	Ø 110



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Dimensional drawing of Beta®, Material version NP - dimensions in mm

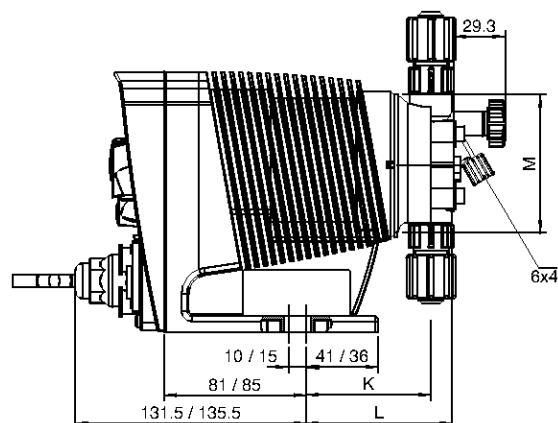
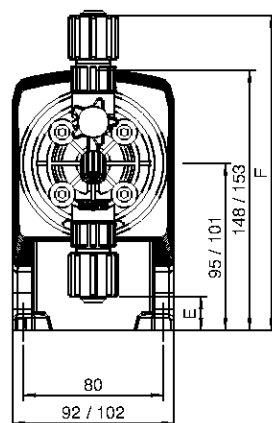


## 1.1 Solenoid-Driven Metering Pumps

Dimensional drawing of Beta®  
Material design PV

Type	E	F
1604	19	179
0708-0220	8	185.5
1008-0420	14	191.5
0232	3.2	199

Type	K	L	M
1604	71	83	Ø 70
0708-0220	73	90	Ø 90
1008-0420	73	90	Ø 90
0232	76	93	Ø 110



P\_BE\_0071\_SW3

Dimensional drawing of Beta®, Material version PV - dimensions in mm

# 1.1 Solenoid-Driven Metering Pumps

## Technical Data

Pump type	Delivery rate at max. back pressure			Delivery rate at medium back pressure			Stroke rate	Connection size o Ø x i Ø	Suction lift	Average power consumption	Shipping weight		
	bar	l/h	ml/stroke	bar	l/h	ml/stroke					Strokes /min	mm	m WC
Beta® b													
BT4b 1000***	10	0.74	0.07	5.0	0.82	0.08	180	6 x 4	6.0**	7,2		2.9	3.6
BT4b 1601***	16	1.1	0.10	8.0	1.4	0.13	180	6 x 4	6.0**	9,6		2.9	3.6
BT4b 1602***	16	2.2	0.20	8.0	2.5	0.24	180	6 x 4	6.0**	11,2		2.9	3.6
BT4b 1604***	16	3.6	0.33	8.0	4.3	0.40	180	6 x 4	6.0**	15,2		3.1	3.9
BT4b 0708***	7	7.1	0.66	3.5	8.4	0.78	180	8 x 5	6.0**	15,2		3.1	3.9
BT4b 0413	4	12.3	1.14	2.0	14.2	1.31	180	8 x 5	3.0**	15,2		3.1	3.9
BT4b 0220	2	19	1.76	1.0	20.9	1.94	180	12 x 9	2.0**	15,2		3.3	4.4
BT5b 2504	25	2.9	0.27	10.0	5	0.46	180	8 x 4****	6.0**	19,2		4.5	5.3
BT5b 1008	10	6.8	0.63	5.0	8.3	0.76	180	8 x 5	6.0**	19,2		4.5	5.3
BT5b 0713	7	11	1.02	3.5	13.1	1.21	180	8 x 5	4.0**	19,2		4.5	5.3
BT5b 0420	4	17.1	1.58	2.0	19.1	1.77	180	12 x 9	3.0**	19,2		4.7	5.8
BT5b 0232	2	32	2.96	1.0	36.2	3.35	180	12 x 9	2.0**	19,2		5.1	6.6
Beta® b metering pumps with self-bleeding dosing head without bypass													
BT4b 1602	10	1.4	0.13	8.0	1.7	0.16	180	6 x 4	1.8**	11,2		2.9	–
BT4b 1604	10	2.7	0.25	8.0	3.6	0.33	180	6 x 4	1.8**	15,2		3.1	–
BT4b 0708	7	6.6	0.61	3.5	7.5	0.69	180	8 x 5	1.8**	15,2		3.1	–
BT4b 0413	4	10.8	1.00	2.0	12.6	1.17	180	8 x 5	1.8**	15,2		3.1	–
BT4b 0220	2	16.2	1.50	1.0	18	1.67	180	12 x 9	2.0**	15,2		3.3	–
BT5b 1008	10	6.3	0.58	5.0	7.5	0.69	180	8 x 5	1.8**	19,2		4.5	–
BT5b 0713	7	10.5	0.97	3.5	12.3	1.14	180	8 x 5	1.8**	19,2		4.5	–
BT5b 0420	4	15.6	1.44	2.0	17.4	1.61	180	12 x 9	1.8**	19,2		4.7	–

! Beta® b metering pumps with dosing heads for higher-viscosity media have a 10-20% lower capacity and are not self-priming. G 3/4-DN 10 connector with d 16-DN 10 hose nozzle.

- \* The given performance data constitutes guaranteed minimum values, calculated using water as the medium at room temperature.
  - \*\* Suction lift with a filled dosing head and filled suction line, with a self-bleeding dosing head with air in the suction line.
  - \*\*\* Pressure-reduced pump types are available in the pressure ratings 4, 7 and 10 bar for special applications, for example in the swimming pool sector. More detailed information is available upon request.
  - \*\*\*\* With stainless steel design 6 mm connector width.
- All data refers to water at 20 °C.

## Materials in Contact With the Medium

	Dosing head	Suction/pressure connector	Ball seat	Seals	Balls
PPT	Polypropylene	PVDF	PVDF	PTFE	Ceramic
NPT	Clear acrylic	PVDF	PVDF	PTFE	Ceramic
PVT	PVDF	PVDF	PVDF	PTFE	Ceramic
TTT	PTFE with carbon	PTFE with carbon	Ceramic	PTFE	Ceramic
SST	Stainless steel material no. 1.4404	Stainless steel material no. 1.4404	Ceramic	PTFE	Ceramic

Metering reproducibility: ± 2% when used according to the operating instructions.

Permissible ambient temperature –10 °C to +45 °C.

Degree of protection: IP 66, insulation class F

## Scope of supply

✓ Metering pump with mains cable, connector kit for hose/tube connector as per table.



# 1.1 Solenoid-Driven Metering Pumps

## Identity Code Ordering System for Product Range Beta®, Version b

BT4b	Type	Capacity
BT5b	1000	10 0.74
	1601	16 1.10
	1602	16 2.20
	1604	16 3.60
	0708	7 7.10
	0413	4 12.30
	0220	2 19.00
	2504	25 2.90
	1008	10 6.80
	0713	7 11.00
0420	4 17.10	
0232	2 32.00	
Liquid end/valve material		
PP	Polypropylene/PVDF	
NP	Acrylic glass/PVDF	
PV	PVDF/PVDF	
TT	PTFE with carbon, PTFE	
SS	Stainless steel 1.4404/1.4404	
Seal/diaphragm material		
T	PTFE/PTFE coated	
F	FDA-compliant design, only for PV and SS	
Liquid end version		
0	Non-bleed version, no valve spring, for TT, SS and type 0232 only	
1	Non-bleed version, with valve spring, for TT, SS and type 0232 only	
2	With deaerator, no valve spring, PP, PV, NP only, not type 0232	
3	With deaerator, with valve spring, PP, PV, NP only, not type 0232	
4	version for highly viscous media, only PVT, types 1604, 0708, 1008, 0413, 0713, 0220, 0420	
7	self-bleeding without bypass, only for NPT and PVT, not for types 1000, 1601 and 0232	
Hydraulic connections		
0	Standard according to technical data	
5	Connector for 12/6 hose, delivery side only	
9	Connector for 10/4 hose, delivery side only	
Version		
0	Standard	
Logo		
0	with ProMinent® logo	
Power supply		
U	100-230 V ± 10%, 50/60 Hz	
M	12 – 24 V DC, only with BT4b	
N	24 V DC, only for BT5b	
Cable and plug		
A	2 m European	
B	2 m Swiss	
C	2 m Australian	
D	2 m USA	
1	2 m, open-ended	
Relay		
0	No relay	
1	Fault indicating relay, normally energised, 1 x changeover contact 230 V - 2 A	
3	Fault indicating relay, normally de-energised, 1 x changeover contact 230 V - 2 A	
4	as 1 + pacing relay 2 x normally open contacts 24 V - 100 m	
5	as 3 + pacing relay 2 x normally open contacts 24 V - 100 mA	
Accessories		
0	No accessories	
1	With foot and dosing valve, 2 m PVC suction tubing, 5 m PE discharge tubing	
Control type		
0	No lock	
1	With lock: manual operation locked when external cable plugged in	
Control Variants		
0	without analogue control	
A	with analogue control 0/4 – 20 mA	
Options on request		
0 0	No options	



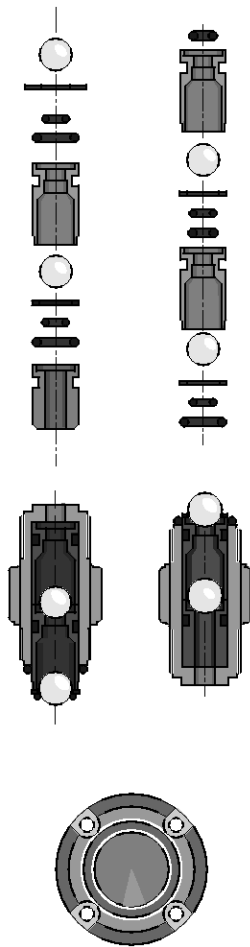
# 1.1 Solenoid-Driven Metering Pumps

## Spare Parts Kits for Solenoid-Driven Metering Pump Beta®

Spare parts kits for Beta® b, consisting of:

- 1 diaphragm
- 1 suction valve assembly
- 1 discharge valve assembly
- 1 connector kit

Stainless steel version without suction valve assembly and without discharge valve assembly, with valve seats, seals and valve balls



pk\_1\_008

Type	Wetted materials	Order no.
<b>Type 1000</b>	PPE	1001644
	PPB	1001652
	NPE	1001713
	NPB	1001721
	PPT, NPT, PVT	1023107
	PVF	1083549
	TTT	1001737
	SST	1001729
<b>Type 1601</b>	PPE	1001645
	PPB	1001653
	NPE	1001714
	NPB	1001722
	PPT, NPT, PVT	1023108
	PVF	1083547
	TTT	1001738
	SST	1001730
<b>Type 1602</b>	PPE	1001646
	PPB	1001654
	NPE	1001715
	NPB	1001723
	PVT, PPT, NPT	1023109
	PVF	1083550
	TTT	1001739
	SST	1001731
<b>Type 1604 and type 2504</b>	PPE	1039989
	PPB	1039987
	NPE	1039988
	NPB	1039986
	PVT, PPT, NPT	1035332
	PVF	1083548
	PVT HV	1035342
	TTT	1035330
<b>Type 0708 and type 1008</b>	PPE	1001648
	PPB	1001656
	NPE	1001717
	NPB	1001725
	PVT, PPT, NPT	1023111
	PVF	1083564
	PVT4	1019067
	TTT	1001741
<b>Type 0413 and type 0713</b>	PPE	1001649
	PPB	1001657
	NPE	1001718
	NPB	1001726
	PVT, PPT, NPT	1023112
	PVF	1083551
	PVT4	1019069
	TTT	1001742
	SST	1001734



# 1.1 Solenoid-Driven Metering Pumps

Type	Wetted materials	Order no.
Type 0220 and type 0420	PPE	1001650
	PPB	1001658
	NPE	1001719
	NPB	1001727
	PVT, PPT, NPT	1023113
	PVF	1083552
	PVT4	1019070
	TTT	1001754
Type 0232	SST	1001735
	PPE	1001651
	PPB	1001659
	NPE	1001720
	NPB	1001728
	PVT, PPT, NPT	1023124
	PVF	1083553
	TTT	1001755
	SST	1001736

## Spare Parts Kits for Solenoid-Driven Metering Pump Beta® with Self-Bleeding Dosing Head

Spare parts kits for Beta® with self-bleeding dosing head, consisting of:

- 1 diaphragm
- 1 suction valve assembly
- 1 discharge valve assembly
- 1 connector kit

Type	Wetted materials	Order no.
Type 1602	PVT7, NPT7	1047830
Type 1604	PVT7, NPT7	1047858
Type 0708 and type 1008	PVT7, NPT7	1047832
Type 0413 and type 0713	PVT7, NPT7	1047833
Type 0220 and type 0420	PVT7, NPT7	1047837

## Spare Diaphragms for Solenoid-Driven Metering Pump Beta®

Type	Materials in contact with the medium	Order no.
Type 1000	all materials	1000244
Type 1601	all materials	1000245
Type 1602	all materials	1000246
Type 1604 and type 2504	all materials	1034612
Type 0708 and type 1008	all materials	1000248
Type 0413 and type 0713	all materials	1000249
Type 0220 and type 0420	all materials	1000250
Type 0232	all materials	1000251

## Accessories

- Foot Valves for Low-Pressure Metering Pumps see page → 1-139
- Injection Valve for Low-Pressure Metering Pumps see page → 1-144
- Hoses and pipework for low-pressure metering pumps see page → 1-169
- Suction Lances, Suction Kit Without Level Switch see page → 1-187
- Connectors, Fittings, Connector Kits, Seals see page → 1-172

## Spare Parts

- Custom Valve Balls/Valve Springs See page → 1-204





# 1.1 Solenoid-Driven Metering Pumps

## 1.1.3

### Solenoid-Driven Metering Pump gamma/ X

**gamma/ X – the proven best-seller intelligently extended**

**Capacity range 2.3 – 45 l/h, 25 – 2 bar**



The solenoid-driven diaphragm metering pump gamma incorporates a wealth of eXcellent ingenuity! With integrated pressure measurement, it ensures the smooth running of your metering process. The gamma/ X is ideal for all metering work involving liquid media.

The new solenoid-driven diaphragm metering pump gamma/ X is user-friendly and has an outstandingly long service life, just like its predecessor. An ingenious solenoid control measures the back pressure and protects the system from overload. This technology makes a pressure sensor superfluous, meaning that operating safety can be significantly increased: no additional parts come into contact with the feed chemical, there are no additional sealing surfaces and no electronic components come into contact with the feed chemical. Whether the metering volume fluctuates or hydraulic failures affect the metering process – the gamma/ X keeps everything at your fingertips.

It independently ensures a trouble-free metering process and should the pump ever need maintenance its service module draws attention to this.

#### Your benefits

- Simple adjustment of the capacity directly in l/h
- Direct input of the required final concentration in concentration mode for volume-proportional metering tasks
- Integrated pressure measurement and display for greater safety during commissioning and in the process
- Capacity adjustment range 1:40,000
- Virtually wear-free solenoid drive, overload-proof and economical
- Suitable for continuous micro-metering from approx. 1 ml/h, thanks to the regulated solenoid drive
- Detection of hydraulic malfunctions, such as gas in the dosing head, and no or too high back pressure, ensures smooth processes
- Bluetooth interface for simple parameter configuration and access to diagnostic data using the Android gamma/ X app (optional)
- Adaptation to existing signal transducers by external control via potential-free contacts with pulse step-up and step-down
- External control via 0/4-20 mA standard signal with adjustable assignment of signal value to stroke rate (optional)
- Integrated 1-month timer for timed metering tasks
- Guaranteed metering by means of automatic bleeding
- Connection to process control systems via bus interfaces, such as PROFIBUS®, PROFINET, CAN Bus and others on request

#### Technical Details

- Illuminated LC display and 3-LED display for operating, warning and error messages, visible from all sides.
- Factor with external contact control 99:1 - 1:99.
- Batch operation with max. 99,999 strokes/start pulse.
- Stroke rate adjustment in 1 stroke/h increments from 1 – 12,000 strokes/h.
- Continuous electronic stroke length adjustment from 1 - 100 % (recommended 30 - 100 %).
- Connector for 2-stage level switch.
- Available material combinations: PP, PVDF, clear acrylic, PTFE and stainless steel.
- Special dosing head designs for gaseous and high-viscosity media.
- Degree of protection IP 66 and/or NEMA 4X indoor.
- Optional 4-20 mA output for remote transmission of stroke length and stroke rate.
- Universal power supply unit 100 - 230 V, 50/60 Hz.
- Optional 230 V relay module, can also be retrofitted easily and securely.
- Optional 24 V combined relay, can also be retrofitted easily and securely.

#### Field of application

- Can be integrated into automated processes and used in all industries.
- The pump can work as a control unit with the timer, for example in cooling water treatment.



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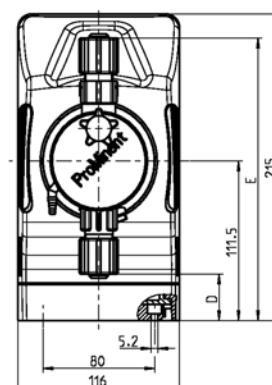
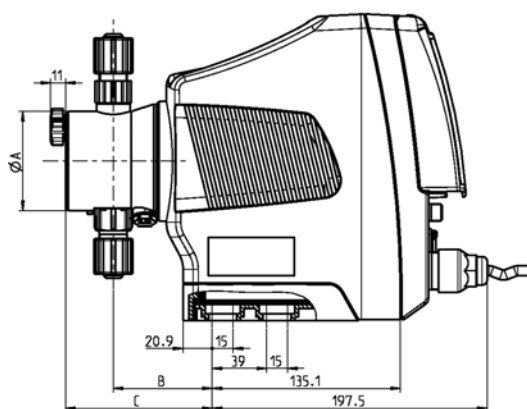


# 1.1 Solenoid-Driven Metering Pumps

**Dimensional drawing of gamma/ X  
Material version PPT2**

Type	Ø A	B
0245	110	76
0424, 0220	90	76
0715, 0414	90	74
1009, 0708	90	74
1604	70	71
1602	70	71

Type	C	D	E
0245	-	14	209
0424, 0220	110	24	202
0715, 0414	107	24	202
1009, 0708	108	24	202
1604	106	32	198
1602	106	32	198



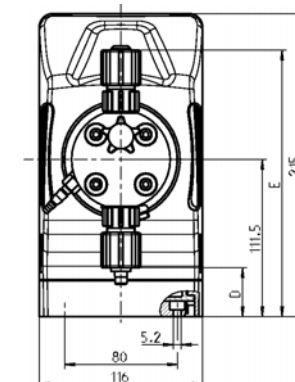
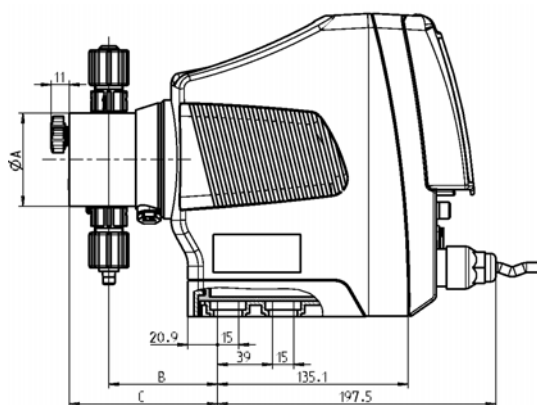
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Dimensional drawing of gamma/ X, Material design PPT – dimensions in mm

**Dimensional drawing of gamma/ X  
Material version NPT2**

Type	Ø A	B
0245	110	76
0424, 0220	90	76
0715, 0414	90	76
1009, 0708	90	74
1604, 2504	70	77
1602	70	77

Type	C	D	E
0245	105	14	210
0424, 0220	104	23	200
0715, 0414	104	23	200
1009, 0708	102	23	200
1604, 2504	105	33	191
1602	105	33	191



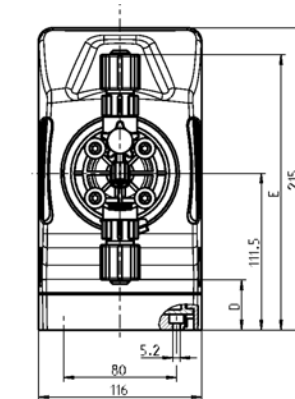
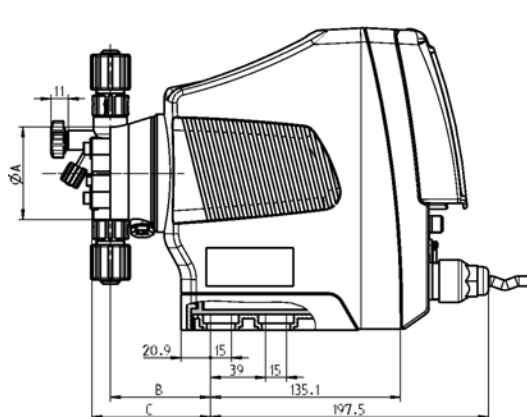
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Dimensional drawing of gamma/ X, Material design NPT – dimensions in mm

**Dimensional drawing of gamma/ X  
Material version PVT2**

Type	Ø A	B
0245	110	76
0424, 0220	90	79
0715, 0414	90	73
1009, 0708	90	75
1604	70	71
1602	70	71

Type	C	D	E
0245	-	14	209
0424, 0220	90	25	203
0715, 0414	90	25	203
1009, 0708	92	25	203
1604	84	36	196
1602	84	36	196



P\_G\_0057\_SW3

Dimensional drawing of gamma/ X, Material design PVT – dimensions in mm

# 1.1 Solenoid-Driven Metering Pumps

## Technical Data

Pump type	Delivery rate at max. back pressure			Stroke rate	Connection size o Ø x i Ø	Suction lift	Shipping weight	
	bar	l/h	ml/stroke				PP, NP, PV, TT kg	SS kg
gamma/ X								
GMXa 1602	16	2.3	0.19	200	6 x 4	6.0**	3.6	4.1
GMXa 1604	16	3.6	0.30	200	6 x 4	5.0**	3.6	4.1
GMXa 0708	7	7.6	0.63	200	8 x 5	4.0**	3.7	5.0
GMXa 0414	4	13.5	1.13	200	8 x 5****	3.0**	3.7	5.0
GMXa 0220	2	19.7	1.64	200	12 x 9	2.0**	3.7	5.0
GMXa 2504	25	3.8	0.32	200	8 x 4***	4.0**	4.9	5.5
GMXa 1009	10	9.0	0.75	200	8 x 5	3.0**	5.1	6.5
GMXa 0715	7	14.5	1.21	200	8 x 5****	3.0**	5.1	6.5
GMXa 0424	4	24.0	2.00	200	12 x 9	3.0**	5.1	6.5
GMXa 0245	2	45.0	3.70	200	12 x 9*****	2.0**	5.2	7.0
gamma/ X metering pumps with self-bleeding dosing head without bypass								
GMXa 1602	10	0.9	0.08	200	6 x 4	1.8**	3.6	–
GMXa 1604	10	1.6	0.13	200	6 x 4	1.8**	3.6	–
GMXa 0708	7	5.7	0.48	200	8 x 5	1.8**	3.7	–
GMXa 0414	4	12.0	1.00	200	8 x 5	1.8**	3.7	–
GMXa 0220	2	17.4	1.45	200	12 x 9	1.8**	3.7	–
GMXa 1009	10	6.0	0.50	200	8 x 5	1.8**	5.1	–
GMXa 0715	7	12.9	1.08	200	8 x 5	1.8**	5.1	–
GMXa 0424	4	19.2	1.60	200	12 x 9	1.8**	5.1	–



gamma/ X metering pumps with dosing heads for high-viscosity media have a 10 – 20% lower capacity and are not self-priming. G 3/4-DN 10 connector with d 16-DN 10 hose nozzle.

- \* The given performance data represents guaranteed minimum values, calculated using water as the medium at room temperature.
  - \*\* Suction lift with a filled dosing head and filled suction line, with a self-bleeding dosing head with air in the suction line
  - \*\*\* with stainless steel design 6 mm connector width
  - \*\*\*\* with stainless steel design 12 mm connector width
  - \*\*\*\*\* with stainless steel design DN 10
- All data refers to water at 20 °C.

## Materials in Contact With the Medium

	Dosing head	Suction/pressure connector	Ball seat	Seals	Balls
PPT	Polypropylene	PVDF	PVDF	PTFE	Ceramic
NPT	Clear acrylic	PVDF	PVDF	PTFE	Ceramic
PVT	PVDF	PVDF	PVDF	PTFE	Ceramic
TTT	PTFE with carbon	PTFE with carbon	Ceramic	PTFE	Ceramic
SST	Stainless steel material no. 1.4404	Stainless steel material no. 1.4404	Ceramic	PTFE	Ceramic

Metering reproducibility: ±2% when used according to the instructions in the operating instructions

Permissible ambient temperature: -10 °C to +45 °C

Mean power consumption: 25/30 W

Degree of protection: IP 66, NEMA 4X, insulation class F



### Scope of supply

Metering pump with mains cable, connector kit for hose/tube connector as per table.



# 1.1 Solenoid-Driven Metering Pumps

## Identity Code Ordering System for Product Range gamma/ X, version a

GMXa	Type	Capacity			
		bar	l/h	bar	l/h
	1602	16	2.3	2504	25 3.8
	1604	16	3.6	1009	10 9.0
	0708	7	7.6	0715	7 14.5
	0414	4	13.5	0424	4 24.0
	0220	2	19.7	0245	2 45.0
Liquid end/valve material					
	PP	Polypropylene/PVDF			
	NP	Clear acrylic/PVDF			
	PV	PVDF/PVDF			
	TT	PTFE/PTFE			
	SS	Stainless steel 1.4404/1.4404			
Seal/diaphragm material					
	T	PTFE/PFTE coated			
	F	FDA-compliant design, only for PV and SS			
Liquid end version					
	0	Non-bleed version, no valve springonly with NP, TT and SS and type 0245			
	1	Non-bleed version, with valve springonly with NP, TT and SS and type 0245			
	2	Bleed function, no valve springsonly with PP, PV, NP not for type 0245			
	3	Bleed function, with valve springonly with PP, PV, NP not for type 0245			
	4	Version for highly viscous mediaonly with PV, types 1604, 0708, 0414, 1009, 0715, 0424			
	7	self-bleeding without bypass, only for NPT and PVT, not for type 0245			
Hydraulic connections					
	0	Standard according to technical data			
	5	Discharge side connection for hose 12/6, suction side standard, only with materials PP, NP and PV			
	9	Discharge side connection for hose 10/4, suction side standard , only with materials PP, NP and PV			
Diaphragm rupture indicator					
	0	Without diaphragm rupture indicator			
	1	with diaphragm rupture indicator, optical sensor, not for type 0245			
Version					
	0	Standard			
Logo					
	0	with ProMinent® logo			
Power supply					
	U	100-230 V, ±10%, 50/60 Hz			
Cable and plug					
	A	2 m European			
	B	2 m Swiss			
	C	2 m Australian			
	D	2 m USA			
	E	2 m Great Britain			
	1	2 m, open-ended			
Relay, pre-set to					
	0	No relay			
	1	1 x changeover contact 230 V – 8 A, fault indicating relay N/C			
	4	2 x N/O 24 V – 100 mA, fault indicating relay N/C + pacing relay			
	C	1 x N/O 24 V – 100 mA, fault indicating relay N/C 1 + 4 – 20 mA output			
	F	with automatic bleed valve 230 V AC, not for pump type 0245			
	G	with automatic bleed valve 24 V DC and relay output, not for pump type 0245			
Accessories					
	0	No accessories			
	1	With foot valve and discharge valve, 2 m PVC suction tubing, 5 m PE delivery tubeonly with PP, PV and NP, not with PVT4			
Control version					
	0	Manual + external with pulse control			
	3	Manual + external with pulse control + analogue 0/4 - 20 mA			
	C	as 3 + CANopen*			
	D	as 3 + CAN open DULCOMARIN® II			
	E	as 3 + Profinet*			
	R	as 3 + PROFIBUS® DP interface M12			
	M	as 3 + Modbus*			
	–	*No relay can be selected with these options.			
Metering monitor					
	0	Pulse signal input			
Remote stop					
	0	without Bluetooth			
	B	with Bluetooth			
Language					
	DE	German			
	EN	English			
	FR	French			
	ES	Spanish			



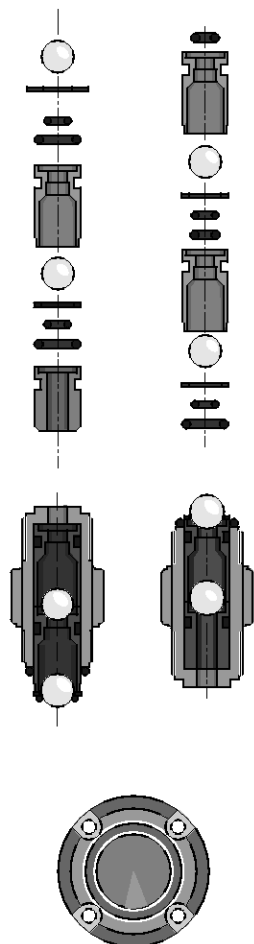
# 1.1 Solenoid-Driven Metering Pumps

## Spare Parts Kit for gamma/ X

Spare parts kits for gamma/ X, consisting of:

- 1 diaphragm
- 1 suction valve assembly
- 1 discharge valve assembly
- 1 connector kit

Stainless steel version without suction valve assembly and without discharge valve assembly, with valve seats, seals and valve balls



pk\_1\_008

Type	Wetted materials	Order no.
<b>Type 1602</b>	PVT, PPT, NPT	1023109
	PVF	1083550
	TTT	1001739
	SST	1001731
<b>Type 1604 and Type 2504</b>	PVT, PPT, NPT	1035332
	PVF	1083548
	PVT HV	1035342
	TTT	1035330
	SST	1035331
<b>Type 0708 and Type 1009</b>	PVT, PPT, NPT	1023111
	PVF	1083564
	PVT HV	1019067
	TTT	1001741
	SST	1001733
<b>Type 0414 and Type 0715</b>	PVT, PPT, NPT	1023112
	PVF	1083551
	PVT4	1019069
	TTT	1001742
	SST	1001734
<b>Type 0220 and Type 0424</b>	PVT, PPT, NPT	1051129
	PVF	1083566
	PVT HV	1051134
	TTT	1051151
	SST	1051139
<b>Type 0245</b>	PVT, PPT, NPT	1051130
	PVF	1083567
	TTT	1051152
	SST	1074650
	SSF	1098649



# 1.1 Solenoid-Driven Metering Pumps

## Spare Parts Kits for Solenoid-Driven Metering Pump gamma/ X with Self-Bleeding Dosing Head

Spare parts kits for gamma/ X with self-bleeding dosing head, without bypass, consisting of:

- 1 diaphragm
- 1 suction valve assembly
- 1 discharge valve assembly
- 1 connector kit

Type	Wetted materials	Order no.
<b>Type 1602</b>	PVT7, NPT7	1047830
<b>Type 1604</b>	PVT7, NPT7	1047858
<b>Type 0708 and Type 1009</b>	PVT7, NPT7	1047832
<b>Type 0414 and Type 0715</b>	PVT7, NPT7	1047833
<b>Type 0220 and Type 0424</b>	PVT7, NPT7	1051111

## Spare Diaphragms for Solenoid-Driven Metering Pump gamma/ X

Type	Materials in contact with the medium	Order no.
<b>Type 1602</b>	all materials	1000246
<b>Type 0708 and Type 1009</b>	all materials	1000248
<b>Type 0414 and Type 0715</b>	all materials	1000249
<b>Type 0220 and Type 0424</b>	all materials	1045456
<b>Type 0245</b>	all materials	1045443

## Accessories

- Foot Valves for Low-Pressure Metering Pumps see page → 1-139
- Injection Valve for Low-Pressure Metering Pumps see page → 1-144
- Hoses and pipework for low-pressure metering pumps see page → 1-169
- Suction Lances, Suction Kit Without Level Switch see page → 1-187
- Connectors, Fittings, Connector Kits, Seals see page → 1-172

## Spare Parts

- Custom Valve Balls/Valve Springs See page → 1-204



# 1.1 Solenoid-Driven Metering Pumps

## 1.1.4

### Solenoid-Driven Metering Pump gamma/ XL

**gamma/ XL – large output, great features**

**Capacity range 8 – 80 l/h, 25 – 2 bar**

The gamma/ XL is a smart, connectible solenoid-driven metering pump that is setting new standards in terms of productivity, reliability and cost-effectiveness.



The new solenoid-driven metering pump gamma/ XL is the enhancement to our proven gamma/ X and covers a capacity range from 8 – 80 l/h at 25 – 2 bar. The gamma/ XL also has other interfaces, for example CAN bus and Wi-Fi connections. This allows the gamma/ XL to network with all systems, devices and platforms. Like the gamma/ X, the gamma/ XL has an intuitive operating concept. The pump is adjusted using a click wheel and 4 additional operating keys. Pressure detection without wetted parts ensures maximum operational safety. Hydraulic error statuses, like “Gas in the dosing head”, “Overpressure” and “No pressure” can be detected.

Pressure fluctuations in the system are detected and compensated for, achieving a high level of dosing precision and reducing chemical consumption to the required level.

The last 300 events are retrospectively saved in the integral log book, which permits rapid analysis of the cause and troubleshooting.

Deviations from the metering volume or hydraulic fault statuses are immediately detected and corrected by the gamma/ XL. The pump's operating menu includes ordering information for the wear parts required.

Designed as a smart product, it can also be connected to our web-based DULCOnneX fluid management platform. The user can use this to monitor his metering process in real time, avoid downtimes and generate reports fully automatically.

**NEW**

#### Your benefits

- Simple adjustment of the capacity directly in l/h or in gph
- Integrated pressure measurement and display for greater safety during commissioning and in the process
- Bluetooth and Wi-Fi connection for the simple configuration and call-up of process data (optional)
- Capacity adjustment range 1:40,000
- Direct input of the required final concentration with volume-proportional metering tasks in concentration mode
- Virtually wear-free solenoid drive, overload-proof and economical
- Suitable for continuous micro-metering from approx. 5 ml/h, thanks to the regulated solenoid drive
- Detection of hydraulic malfunctions, such as gas in the dosing head, and no or too high back pressure, ensures smooth processes
- External control via potential-free contacts with pulse step-up and step-down
- External control via 0/4-20 mA standard signal, scalable
- Integrated 1-week/1-month timer
- Guaranteed metering by means of automatic bleeding
- Connection to process control systems via a BUS interface, such as PROFIBUS®, PROFINET®, CAN bus or Wi-Fi
- Automatic mode – volume settings only (l/h, ml/contact etc.)
- Non-automatic mode – settings via stroke length and stroke rate

#### Technical Details

- Illuminated 3" LCD and 3-LED display for operating, warning and error messages, visible from all sides
- In non-automatic mode, stroke rate setting 1 stroke/h – 12,000 strokes/h, stroke length electronically continuously variable 0 – 100%, recommended 30 – 100%
- Factor with external contact control 99:1 – 1:99
- Batch operation with max. 99.99 or 99,999 strokes/start pulse
- Connector for 2-stage level switch
- 3 additional ports, switched as digital inputs or outputs
- Optional 0/4 – 20 mA output for remote transmission of stroke length, stroke rate and error messages
- Optional relay module with 1 x switchover contact, 230 V – 8 A
- Optional relay module with 2 x On, 24 V – 100 mA





# 1.1 Solenoid-Driven Metering Pumps

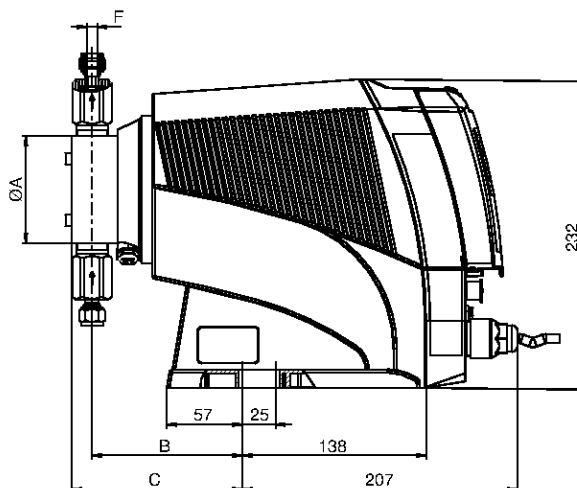
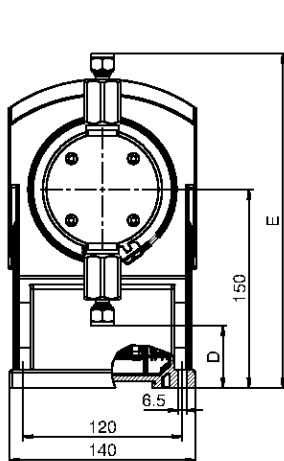
## Field of application

- Chemical distributors
- Systems engineering
- Food and beverage industry
- Potable water
- Waste water
- Chemical industry
- Electroplating
- Bottling processes, e.g. ink cartridges or highlighter pens
- With an integrated process timer, suitable as a control unit for simple processes, e.g. biocide metering in cooling water
- All industrial applications, either as a stand-alone unit or integrated in a complete system

## Dimensional drawing of gamma/ XL material version SST

Type	Ø A	B
0280	100	115
0450	100	115
0730	90	112
1020	90	110
1612	90	110
1608	90	108

Type	C	D	E
0280	135	29	281
0450	135	29	281
0730	132	63	240
1020	130	63	240
1612	130	63	240
1608	128	63	240



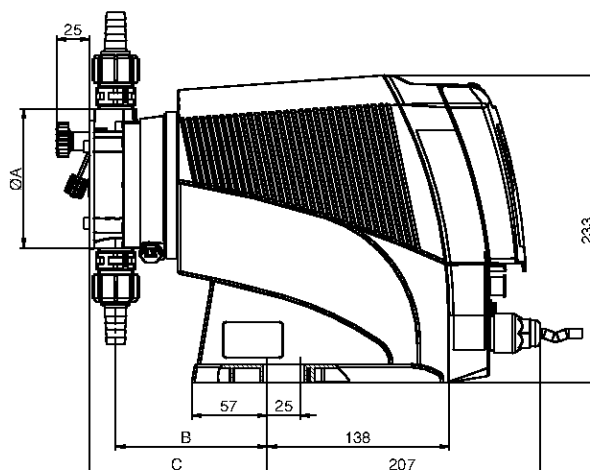
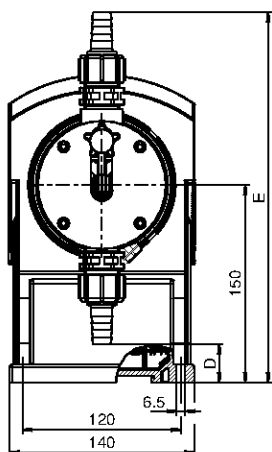
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Dimensional drawing of gamma/ XL, material version SST – dimensions in mm

## Dimensional drawing of gamma/ XL material version PV DN10

Type	Ø A	B
0280	100	115
0450	100	115

Type	C	D	E
0280	135	29	281
0450	135	29	281



P\_G\_0130\_SW3

Dimensional drawing of gamma/ XL, material version PV DN 10 – dimensions in mm



# 1.1 Solenoid-Driven Metering Pumps

## Technical Data

Pump type	Max. pressure bar	Delivery rate l/h	Theor. stroke volume ml/stroke	Max. stroke rate Strokes/min	Nominal diameter	Suction lift m WC	Shipping weight NPE, NPB, PVT / SST kg
<b>gamma/ XL</b>							
GXL a 2508	25	8	0.67	200	8 x 4** mm	5*	10/11
GXL a 1608	16	8	0.67	200	8 x 5** mm	5*	10/11
GXL a 1612	16	12	1	200	8 x 5 mm	6*	10/11
GXL a 1020	10	20	1.7	200	12 x 9 mm	5*	10/11
GXL a 0730	7	30	2.5	200	12 x 9 mm	5*	10/11
GXL a 0450	4	50	4.2	200	G 3/4 - DN 10	3*	10/11
GXL a 0280	2	80	6.7	200	G 3/4 - DN 10	2*	10/11
<b>gamma/ XL metering pumps with self-bleeding dosing head without bypass*</b>							
GXL a 1608	10	7	0.6	200	8 x 5 mm	1.8	10
GXL a 1612	10	10	0.8	200	8 x 5 mm	1.8	10
GXL a 1020	10	15	1.25	200	12 x 9 mm	1.8	10
GXL a 0730	7	27.5	2.3	200	12 x 9 mm	1.8	10



gamma/ XL metering pumps with dosing heads for higher-viscosity media have a 10 – 20 % lower capacity and are not self-priming. G 3/4 - DN 10 connector with d 16 - DN 10 hose nozzle.

\* Suction lift (m WC) = Suction lift with filled dosing head and filled suction line

\*\* With stainless steel design 6 mm connector width

All data refers to water at 20 °C.

## Materials in Contact With the Medium

Design	Dosing head	Suction/pressure connector	Ball seat	Seals	Valve balls
NPT	Clear acrylic	PVDF	PVDF	PTFE	Ceramic
PVT	PVDF	PVDF	PVDF	PTFE	Ceramic
SST (8 – 12 mm)	stainless steel 1.4404	stainless steel 1.4404	Ceramic	PTFE	Ceramic
SST (DN 10)	stainless steel 1.4404	stainless steel 1.4404	PTFE with carbon	PTFE	Ceramic

## Design of connectors

<b>Plastic</b>	8 – 12 mm	Hose squeeze connector
	DN 10	d16 DN 10 hose nozzle
<b>Stainless steel</b>	6 – 12 mm	Swagelok system
	DN 10	Rp 3/8 insert

Diaphragm with PTFE coating.

Repeatability of metering  $\pm 2\%$  when used in accordance with the operating instructions.

Permissible ambient temperature  $-10\text{ °C}$  to  $45\text{ °C}$ .

Mean power consumption 78 W.

Degree of protection IP 66, insulation class F.



## Scope of supply

Metering pump with mains cable, connector kit for hose/tube connector as per table.



# 1.1 Solenoid-Driven Metering Pumps

## Identity Code Ordering System for Product Range gamma/ XL

GXLa		Regional design									
EU	US	Europe									
		USA									
Type		Capacity									
		bar	l/h		bar	l/h					
2508	25	8		0730	7	30					
1608	16	8		0450	4	50					
1612	16	12		0280	2	80					
1020	10	20									
Material of dosing head/valves											
PV	PVDF/PVDF, not for pump type 2508										
NP	Clear acrylic/PVC, only for pump types 2508, 1608, 1612, 1020 and 0730										
SS	stainless steel/stainless steel										
Material of seals/diaphragm											
T	only with PV and SS										
F	FDA-compliant design, only for PV and SS										
Dosing head design											
0	without bleed valve, without valve spring, only with material TT and SS										
1	without bleed valve, with valve spring, only with material TT and SS										
2	with bleed valve, without valve spring, only with material NP and PV										
3	with bleed valve, with valve spring, only with material NP and PV										
4	HV design for higher-viscosity media, only for types 1608, 1612, 1020 and 0730										
7	self-bleeding without bypass, only for types 1608, 1612, 1020 and 0730, only for material NP and PV										
Hydraulic connector											
0	Standard connection in line with technical data										
5	Connector on discharge side for 12/6 hose, standard on suction side, only with material NP and PV										
F	Connector on discharge side for 8/4 hose, standard on suction side, only with material NP										
Diaphragm rupture indicator											
0	without diaphragm rupture indicator										
1	with diaphragm rupture indicator, optical sensor										
Design											
0	Housing RAL 5003, cover RAL 2003										
Logo											
0	with ProMinent® logo										
2	without ProMinent® Logo										
Electrical connection											
U	100 - 230 V ±10%, 50/60 Hz										
Cable and plug											
A	2 m European			D	2 m USA/115 V						
B	2 m Swiss			1	2 m open end						
C	2 m Australian										
Relay, pre-set to											
0	no relay										
1	1 x changeover contact 230 V – 8 A, fault indicating relay N/C										
4	2 x N/O 24 V – 100 mA, fault indicating relay N/C + pacing relay										
C	1 x N/O 24 V – 100 mA, fault indicating relay N/C + 4 – 20 mA output										
F	with automatic bleed valve, 230 V AC, not for pump type 2508										
G	with automatic bleed valve 24 V DC and relay output, not for pump type 2508										
Accessories											
0	no accessories										
1	with foot and injection valve, 2 m suction line, 5 m discharge line										
2	as 0 + measuring cup, only for types 2508, 1608, 1612, 1020 and 0730										
3	as 1 + measuring cup, only for types 2508, 1608, 1612, 1020 and 0730										
Control version											
0	Manual + external contact with pulse control										
3	Manual + external contact with pulse control + analogue 0/4 – 20 mA										
C	as 3 + CANopen										
E	as 3 + PROFINET® interface, M12										
R	as 3 + PROFIBUS® interface, M12										
M	as 3 + Modbus										
Communication											
0	without interface										
B	with Bluetooth										
W	with Wi-Fi module										
Operating menu language											
DE	German										
EN	English										
FR	French										
ES	Spanish										
Certification											
01	CE										
03	CE + EAC										
07	MET (USA)										
Documentation language											
DE	German										
EN	English										
FR	French										
ES	Spanish										



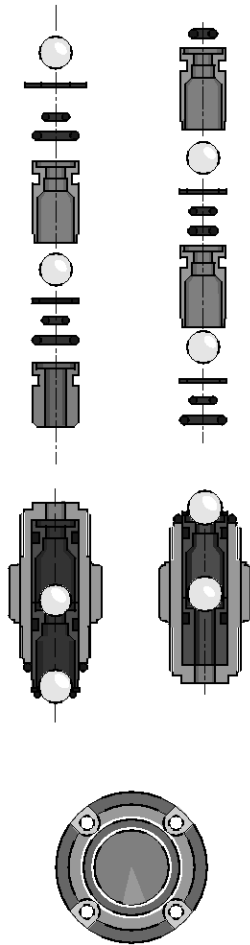
# 1.1 Solenoid-Driven Metering Pumps

## Spare Parts Kits for Solenoid-Driven Metering Pump gamma/ XL

Spare parts kits for gamma/ XL, consisting of:

- 1 diaphragm
- 1 suction valve assembly
- 1 discharge valve assembly
- 1 connector kit

Stainless steel version without suction valve assembly and without discharge valve assembly, with valve seats, seals and valve balls



pk\_1\_008

Type	Wetted materials	Order no.
<b>Type 2508</b>	NPT2	1095912
	SST0	1030226
	NPE	1033172
	NPB	1033171
<b>Type 1608</b>	PVT2/NPT2	1030225
	PVF2	1083565
	PVT7	1047831
	SST0	1030226
	NPE	1030620
	NPB	1030611
<b>Type 1612</b>	PVT2/NPT2	1027081
	PVF2	1083569
	PVT4	1019067
	PVT7	1047832
	SST0	1027086
	NPE	1030536
	NPB	1030525
	PVT2/NPT2	1027082
<b>Type 1020</b>	PVF2	1083570
	PVT4	1019069
	PVT7	1047833
	SST0	1027087
	NPE	1030537
	NPB	1030526
	PVT2/NPT2	1095626
<b>Type 0730</b>	PVF2	1096089
	PVT4	1095499
	PVT7	1095503
	SST0	1095501
	NPE	1095701
	NPB	1095700
	PVT2	1095502
<b>Type 0450</b>	PVF2	1096090
	SST0	1095625
	SSF0	1098651
	PVT2	1095500
<b>Type 0280</b>	PVF2	1096088
	SST0	1095624
	SSF0	1098648

## Spare Diaphragms for Solenoid-Driven Metering Pump gamma/ XL

Type	Materials in contact with the medium	Order no.
<b>Type 2508/1608</b>	all materials	1030353
<b>Type 1612</b>	all materials	1000248
<b>Type 1020</b>	all materials	1000249
<b>Type 0730</b>	all materials	1045456
<b>Type 0450</b>	all materials	1045443
<b>Type 0280</b>	all materials	1059691



## 1.1 Solenoid-Driven Metering Pumps

### Accessories

- Foot Valves for Low-Pressure Metering Pumps see page → 1-139
- Injection Valve for Low-Pressure Metering Pumps see page → 1-144
- Hoses and pipework for low-pressure metering pumps see page → 1-169
- Suction Lances, Suction Kit Without Level Switch see page → 1-187
- Connectors, Fittings, Connector Kits, Seals see page → 1-172

### Spare Parts

- Custom Valve Balls/Valve Springs See page → 1-204



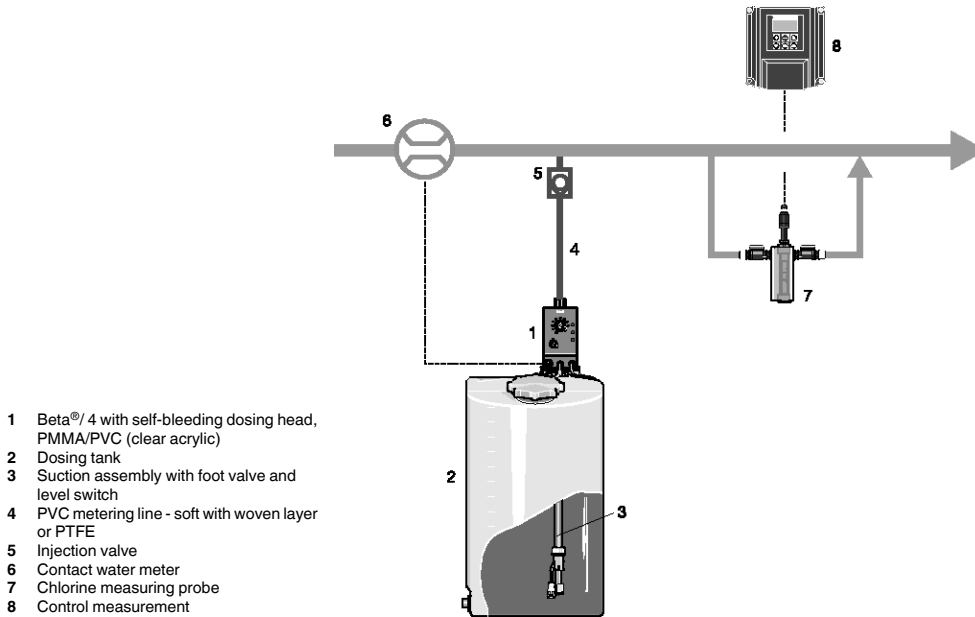
# 1.1 Solenoid-Driven Metering Pumps

## 1.1.5

### Application Examples

#### Volume-proportional Metering of Chlorine Bleach Solution in Potable Water

Product: **Beta®**  
 Metered medium: **NaOCl**  
 Sector: **Potable water**  
 Application: **Disinfection**



pk\_1\_132

#### Task and requirements

- Volume-proportional feed of chlorine bleach solution into the main water flow
- Monitoring of chlorine content after metering

#### Operating conditions

- Variable flow
- Installation in closed buildings

#### Application information

- The metered medium emits gas, therefore after a relatively long period of pump idleness, an air (gas) bubble may have formed in the metering line causing an interruption in metering operation.
- Metering is to be fully automatic and without malfunctions as operating personnel are not always present in the waterworks or water supply.

#### Solution

- Beta® solenoid-driven metering pump with self-bleeding liquid end
- Contact water meter in main line for pump activation
- DULCOMETER® measuring and control technology for final inspection

#### Benefits

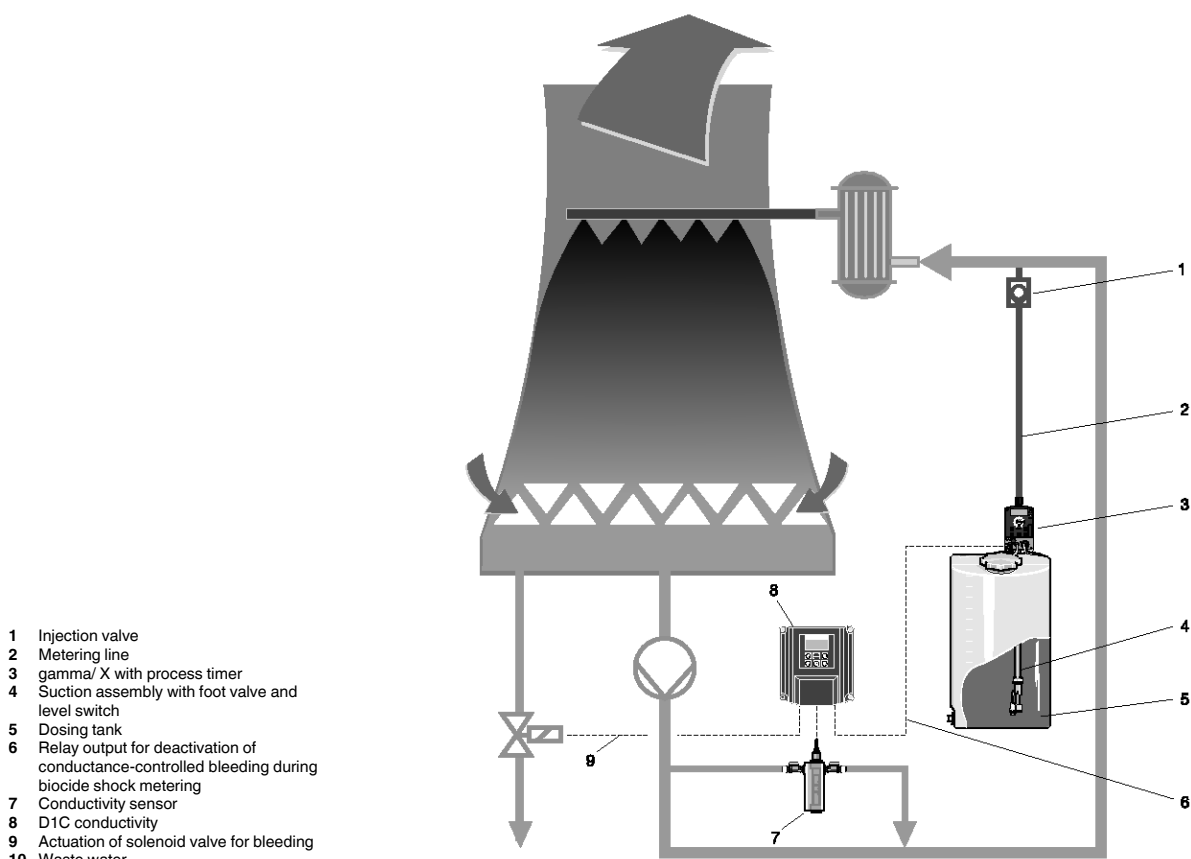
- High degree of reliability provided by self-bleeding liquid end
- Reliable protection against overmetering and undermetering with downstream final inspection



# 1.1 Solenoid-Driven Metering Pumps

## Shock Metering of Biocide in Cooling Water Circuit

Product: **gamma/ X**  
 Metering medium: **biocide**  
 Industry: **cooling water treatment**  
 Application: **disinfection**



pk\_1\_133

### Problems and requirements

- Increasing the biocide content, possibly in a weekly cycle, leads to the destruction of all biology in the cooling water.
- However, this can lead to local increased concentration, which can result in conductance-controlled bleeding. They disappear again following complete distribution in the cooling water.
- Therefore, conductance-controlled bleeding needs to be disabled during shock metering and for a reasonable time thereafter.

### Operating conditions

- Aggressive chemicals (oxidising)
- Installation of the metering pump in the building

### Notes on use

- Shock metering is done at periodic intervals, e.g. weekly.
- In smaller cooling circuits, the metering pump with the integral process timer replaces the PLC Programmable Logic Controller.
- Conductance-controlled bleeding needs to be disabled via a potential-free contact regardless of the metering times set.
- In many cases, bleeding is performed before each shock metering. This bleeding needs to be controlled by a second relay contact in the pump.

## 1.1 Solenoid-Driven Metering Pumps

### Solution

- gamma/ X with process timer and the corresponding relay outputs
- The relays can be assigned to the process timer, if required, and perform the necessary switching functions.
- The pump itself meters at the required metering times.
- Dosing head made of PVDF for high levels of chemical resistance

### Benefits

- Integration of the process timer into the pump results in a high degree of protection of IP65 for the control
- Cost-saving for a PLC Programmable Logic Controller
- Saving of installation costs due to contact construction



## 1.1 Solenoid-Driven Metering Pumps

### 1.1.6

### DULCOnneX – digital fluid management

#### Location-independent system monitoring in real time

You always have all the key data and measured values in sight at all times with DULCOnneX. Monitor and document the status of your system in real time. Check your unit data, regardless of where you are, safely and reliably when you're out and about. Simply use the terminal device of your choice: smartphone, tablet or PC.

Refer to our catalogue or website for more information and references.





## 1.2 Peristaltic Metering Pumps

### 1.2.1

#### Peristaltic pump DULCO flex Control - DFXa

A peristaltic pump that brings together the best qualities of ProMinent metering pumps.

Feed rate of 10 ml/h to 30 l/h at up to 7 bar back pressure



DULCO flex Control meters gaseous, viscous, abrasive or shear-sensitive media and sets new standards in metering. Linear and reproducible metering is guaranteed with this peristaltic pump under all process conditions. With its painted design, the tube is easily replaced preventing losses in valuable production down time.



DULCOflex-Control-DFXa

The new DULCO flex Control meters reliably and is simple to operate. It enhances the ProMinent product range with an intelligent peristaltic metering pump. ProMinent is making use of its decades-long experience in the metering pump sector to bring together the best of two worlds. Valve-free metering with the accuracy of a diaphragm metering pump, with full use of the properties of a peristaltic pump. The applications of this metering pump include strongly gaseous, high-viscosity, abrasive, shear-sensitive or chemically aggressive fluids.

The liquid end developed and patented by ProMinent makes quick and straightforward hose replacement possible with a unique exchange technique. The display provides the fitter with precise instructions about the steps to be completed when replacing the hose. The high-performance hoses used guarantee exceptional chemical resistance and a long service life.

The order information required for replacement of the hose can be found on the pump's operating menu.

The intuitive user interface with click wheel ensures the simple operation of the peristaltic pump.

A brushless direct current motor forms the heart of the DULCO flex Control. Its ingenious control provides for precise metering and reduced pump capacity with continuous metering up to 10 ml/h. Moreover, the new peristaltic metering pump is IoT-enabled, meaning that it is fully networkable and can be connected to the DULCOneX platform especially developed by ProMinent, which enables it to work even smarter.

#### Your benefits

- Adjustment of the metering rate directly in l/h or gph
- Simple hose change
- No problems with very gaseous media or air locks
- Suitable for viscosities of up to 10,000 mPas
- Sole contact with media in the hose
- Many different control options, such as using an analogue 0/4-20 mA signal, contact controller, timer or via process control systems

NEW



#### Technical Details

- Illuminated 3" LCD and 3-LED display for operating, warning and error messages, visible from all sides
- Adjustable feed rate between 30 l/h and 10 ml/h
- Connector for 2-stage level switch or continuous level measurement
- 3 additional freely configurable inputs and outputs on a port
- Optional relay module with 1 x switch-over contact, 230 V – 8 A
- Optional relay module with 2 x On, 24 V – 100 mA
- Pump is available as an FDA design
- DULCOneX-compatible
- Connection to process control systems via a BUS interface, such as PROFIBUS®, Profinet or CAN bus
- CIP (cleaning in place)-enabled system
- Reverse flow is possible

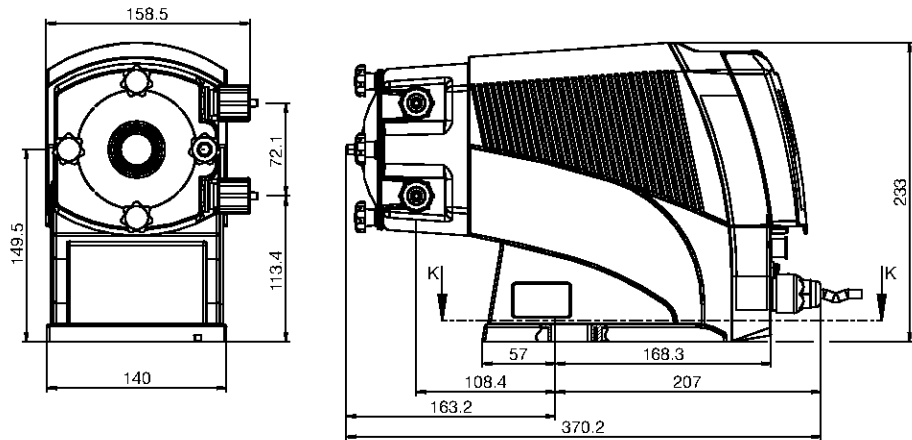
#### Field of application

- Potable water and waste water treatment
- Food and beverage industry
- Paper industry
- Chemical industry
- Chemical distributors
- Electroplating
- Swimming pools
- All industrial applications, either as a stand-alone unit or integrated in a complete system



## 1.2 Peristaltic Metering Pumps

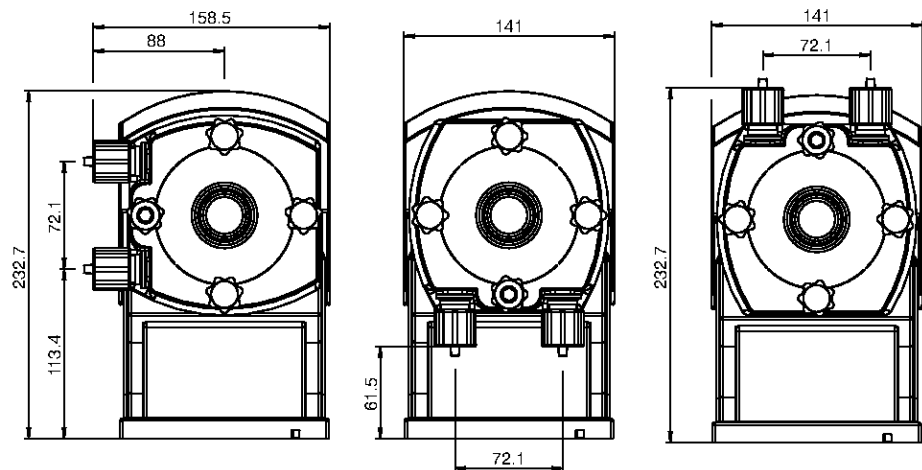
Dimensional drawing of DULCO flex Control DFXa without hose rupture alarm



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Dimensional drawing of DFXa, dosing head orientation on the right, dimensions in mm

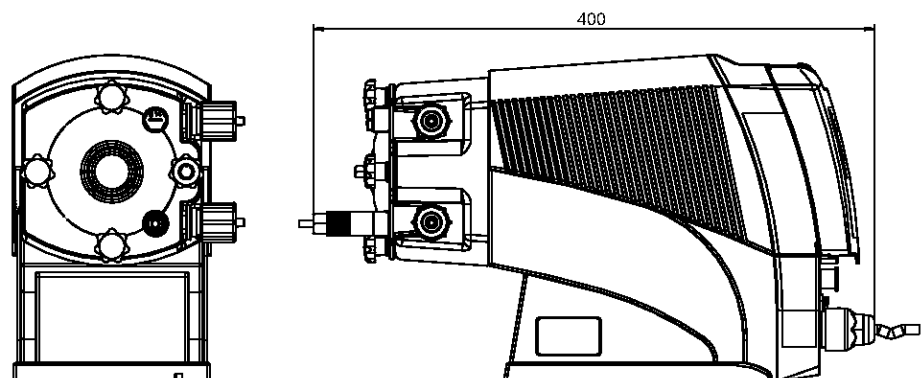
Dimensional drawing of DULCO flex Control DFXa without hose rupture alarm



P\_DX\_0077\_SW3

Dimensional drawing of DFXa, dosing head orientation (from left to right) left/bottom/top, dimensions in mm

Dimensional drawing of DULCO flex Control DFXa with hose rupture alarm



P\_DX\_0078\_SW3

Dimensional drawing of DFXa, dimensions in mm



## 1.2 Peristaltic Metering Pumps

### Identity code ordering system for product range DULCO flex Control - DFXa

DFXa	Type	Capacity										
		bar l/h										
	0730	7 30										
	0530	5 30										
Regional design												
	EU	Europe										
	US	USA										
	CN	China										
Tube material												
	SP	Thermoplastic vulcanisate (TPV/PVDF)										
	VP	Polyurethane (PUR/PVDF)										
Seal material												
	T	PTFE										
	F	FDA-compliant (PTFE)										
Dosing head orientation												
	R	right (view from behind)										
	L	left (view from behind)										
	U	top										
	D	bottom										
Hydraulic connector												
	0	Standard connector (12x9)										
	2	Connector 8x5										
	5	Connector 12x6 discharge side										
	7	no connector kit										
	8	Connector 9x5										
	E	Connector DN 10 with nozzle										
Tube rupture alarm												
	0	none										
	1	with hose rupture alarm										
Design												
	0	Housing RAL 5003 / cover RAL 2003										
Logo												
	0	with ProMinent logo										
	2	without ProMinent logo										
Power unit version												
	U	universal 100-240 V										
Cable and plug												
	A	2 m Europe								D	2 m USA 115 V	
	B	2 m Swiss								E	2 m Great Britain	
	C	2 m Australian								1	2 m European, open end	
Relay												
	0	no relay										
	1	1 x changeover contact 230 V – 8 A, fault indicating relay N/C										
	4	2 x N/O 24 V – 100 mA, fault indicating relay N/C + pacing relay										
	C	1 x N/O 24 V – 100 mA, fault indicating relay N/C + 4 – 20 mA output										
Accessories												
	0	no accessories										
	1	Injection valve 1/2" and foot valve										
Control version												
	0	Manual + external with pulse control										
	3	Manual + external with pulse control + analogue 0/4 - 20 mA										
	C	as 3 + CANopen*										
	D	as 3 + CAN open DULCOMARIN® II										
	E	as 3 + Profinet*										
	R	as 3 + PROFIBUS® DP interface M12										
	M	as 3 + Modbus*										
	–	*No relay can be selected with these options.										
Communication interface												
	0	none										
Language												
	DE	German										
	EN	English										
	ES	Spanish										
	FR	French										
Certification												
	01	CE										
Documentation language												
	DE	German										
	EN	English										
	ES	Spanish										
	FR	French										

## 1.2 Peristaltic Metering Pumps

### Technical Data

Type	Maximum back pressure bar	Pump capacity	Max. speed rpm	Connector size o Ø x i Ø	Suction lift m WC	Intake head m WC	Shipping weight kg
0730	7	10 ml/h – 30 l/h	100	12 x 9	9	9	5.8
0530	5	10 ml/h – 30 l/h	100	12 x 9	9	9	5.8

<b>Hose material:</b>	Thermoplastic vulcanisate (TPV), polyurethane (PUR)
<b>Hose connectors:</b>	PVDF/PTFE
<b>Metering reproducibility:</b>	±2% with retracted hose (after approx. 200 revolutions)
<b>Electrical connection:</b>	100 - 230 V ±10%, 50/60 Hz
<b>Nominal power:</b>	approx. 45 W
<b>Degree of protection:</b>	IP 66, NEMA 4X Indoor
<b>Permissible ambient temperature:</b>	0 ... 45 °C

All data refers to water at 20 °C.

### Spare parts kits for DULCO flex Control - DFXa

	Order no.
Spare parts kit for DFXa 0730 SPF	1103099
Spare parts kit for DFXa 0730 SPT	1103102
Spare parts kit for DFXa 0530 SPF	1103101
Spare parts kit for DFXa 0530 SPT	1103100
Spare parts kit for DFXa rotor, assembled	1103249
Spare parts kit for DFXa 0530 VPT	1104954
Retrofit kit hose rupture alarm for DFXa	1104953
Spare screw kit for DFXa	1104952
Dosing head cover for DFXa	1104961
Star screw knob DIN 6336 L M 5x15xd25 A2	1102764

## 1.2 Peristaltic Metering Pumps

### 1.2.2

#### Peristaltic metering pump DULCO flex Control - DFYa

The peristaltic pump DULCO flex Control - DFYa combines the properties of top products from the ProMinent product range

Feed rate of 5.5 l/h to 410 l/h at up to 8 bar back pressure



The valveless peristaltic pump DULCO flex Control - DFYa guarantees precise, linear and reproducible metering in all process conditions. It meters gaseous, viscous, shear-sensitive media, possibly containing particles, with ease – ProMinent is therefore setting new standards in metering with peristaltic pumps.

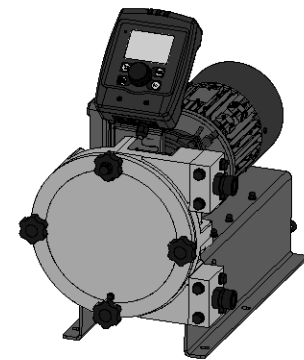
The new metering pump DFYa, the big brother of the DFXa, adds an intelligent peristaltic pump to the top capacity range of the ProMinent portfolio.

The new generation of peristaltic metering pumps is now controlled electronically. It meters without the need for a valve, with precision hitherto impossible. All the benefits of a peristaltic pump are retained, which is why seriously gaseous, high-viscosity, abrasive or shear-sensitive fluids, sometimes containing particles, can also be perfectly metered with the DFYa.

As with the DFXa, hose replacement on the DFYa is also assisted by the pump. When the hose needs to be changed, the pump displays exact instructions for the steps to be followed and automatically moves into the correct positions for hose replacement. The different hose materials (NR, NBR, NBR-A, EPDM Hypalon) enable the DFYa to work with a very wide range of media to be metered.

The peristaltic pump DFYa is simple to operate from the intuitive user interface with 4 keys and the click wheel. The DFYa thus joins the remaining ProMinent product range of intelligent metering pumps, which all share the same menu structure and user interface.

The new peristaltic metering pump is even IoT-capable. This means that it is fully connectible and can be connected to ProMinent's in-house developed DULCOnneX platform, which enables it to work even smarter.



P\_DX\_0073\_SW1

**NEW**

#### Your benefits

- Operation by contact, batch, manual, analogue or BUS control
- Adjustment of the metering rate directly in l/h or gph
- Connection to process control systems via a BUS interface, such as PROFIBUS®, Profinet or CANbus
- No problems with very gaseous media or air locks
- Simple, menu-guided hose change
- Reversible direction of rotation
- Direct input of the required final concentration in concentration mode with volume-proportional metering tasks
- Automatic mode – volume settings only (l/h, ml/contact etc.)
- Pump can run dry
- Suitable for viscosities of up to 40,000 mPas
- Sole contact with media in the hose

#### Technical Details

- Illuminated 3" LCD and 3-LED display for operating, warning and error messages, visible from all sides
- Adjustable feed rate between 5.5 l/h and 410 l/h
- Batch operation with max. 999.9 l/h
- Connector for 2-stage level switch
- Optional relay module with 1 x switch-over contact, 230 V – 8 A
- Optional relay module with 2 x On, 24 V – 100 mA
- DULCOnneX-compatible

#### Field of application

- Mining
- Potable water and waste water industry
- Chemical industry
- Paper industry
- Food and beverage industry

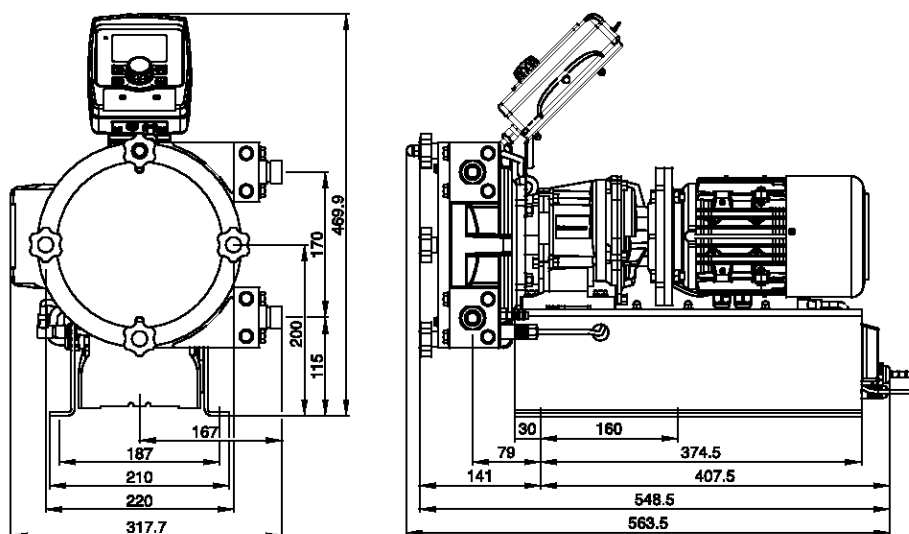
All industrial applications, either as a stand-alone unit or integrated in a complete system

A Resistance List of hose materials can be found at [www.prominent.com](http://www.prominent.com).



## 1.2 Peristaltic Metering Pumps

Dimensional drawing of DULCO flex Control - DFYa



P\_DX\_0079-0080\_SW3

Dimensional drawing of DFYa, dimensions in mm

### Technical Data

Type	Maximum back pressure bar	Pump capacity	Max. speed rpm	Suction lift m WC	Intake head m WC
08410	8	410 l/h $\pm$ 10 %	80	8	8
04410	4	410 l/h $\pm$ 10 %	80	8	8
02410	2	410 l/h $\pm$ 10 %	80	8	8

<b>Hose material:</b>	NR, NBR, EPDM, NBR-A, Hypalon
<b>Self-priming:</b>	Up to 8 m
<b>Rollers/shoes:</b>	Rollers
<b>Metering reproducibility:</b>	$\pm$ 2% with retracted hose after 500 revolutions
<b>Electrical connection:</b>	100 – 230 VAC $\pm$ 10 % 50/60 Hz
<b>Electrical power consumption:</b>	Max. 400 W
<b>Degree of protection:</b>	IP 55
<b>Weight:</b>	30 kg
<b>Permissible ambient temperature:</b>	0 ... 45 °C

All data refers to water at 20 °C.

### Spare parts for DULCO flex Control - DFYa

	Order no.
Hose NR	1037164
Hose NBR	1037165
Hose EPDM	1037166
Hose NBR-A	1037168
Hose HYPALON	1037171



## 1.2 Peristaltic Metering Pumps

Identity code ordering system for product range DULCO flex Control - DFYa

DFYa	Type	Capacity										
		bar l/h										
	08410	8 410										
	04410	4 410										
	02410	2 410										
Hose material												
	0	NR										
	B	NBR										
	E	EPDM										
	A	NBR-A (food-safe)										
	H	Hypalon										
Dosing head orientation												
	R	right										
	L	left										
Hydraulic connector												
	A	VA BSP 3/4"										
	B	VA NPT 3/4"										
	C	PP BPS 3/4"										
	D	PVDF BSP 3/4"										
	E	PVDF NPT 3/4"										
	F	PVC NPT 3/4"										
	G	Tri-Clamp, VA, 1"										
	H	DIN 11851,VA, NW20										
Hose rupture alarm												
	0	without hose rupture alarm										
	1	with hose rupture alarm										
Design												
	P	ProMinent design										
	B	Boyser design										
	M	modified										
Logo												
	0	with logo										
	1	without logo										
	M	modified										
Power unit version												
	U	universal 100–230 V ± 10 %, 50/60 Hz										
Cable and plug												
	A	2 m Europe										
	B	2 m Swiss										
	C	2 m Australia										
	D	2 m USA 115V										
	E	2 m Great Britain										
Relay function												
	0	no relay										
	1	Fault indicating relay (230 V, 8 A)										
	3	Fault indicating relay (24 V, 100 mA) + pacing relay (24 V, 100 mA)										
	8	0/4-20 mA analogue current output + fault indicating / pacing relay 0/4-20 mA										
Accessories												
	0	no accessories										
Control version												
	0	Manual + External contact with Pulse control										
	1	Manual + External contact with Pulse control + Analogue										
	6	Profibus M12 plug										
	7	CANopen										
Operating unit												
	0	HMI with Click Wheel 0.5 m										
	4	HMI with Click Wheel 2 m										
	5	HMI with Click Wheel 5 m										
	6	HMI with Click Wheel 10 m										
Access code												
	0	without access control										
	1	with access control										
Communication												
	0	none										
Language												
	DE	German										
	EN	English										
Certification												
	01	CE										
Documentation language												
	DE	German										
	EN	English										



## 1.2 Peristaltic Metering Pumps

### 1.2.3

### DULCOnneX – digital fluid management

#### Location-independent system monitoring in real time

You always have all the key data and measured values in sight at all times with DULCOnneX. Monitor and document the status of your system in real time. Check your unit data, regardless of where you are, safely and reliably when you're out and about. Simply use the terminal device of your choice: smartphone, tablet or PC.

Refer to our catalogue or website for more information and references.





## 1.3 Motor-Driven Metering Pumps

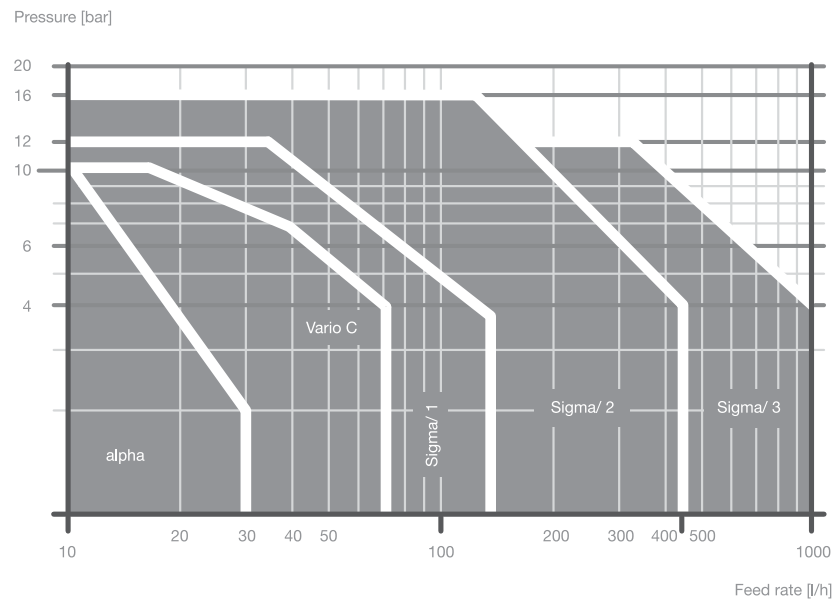
### 1.3.1 How to find the right pump type

Low-pressure metering pumps for almost all liquid and low-viscosity chemicals.

ProMinent motor-driven metering pumps offer a wide range of drive versions, including 3-phase AC and ATEX motors or 1-phase AC motors or intelligent motor-driven metering pumps with integrated microprocessor control and wide-range voltage power unit.

Simple to operate and universally applicable, thanks to the many control options and broad adjustment range. Reliable, thanks to their excellent process reliability and maintenance-friendly due to the small number of versions.

In the capacity range of 1.0 to 1040 l/h at a back pressure of 10 to 4 bar



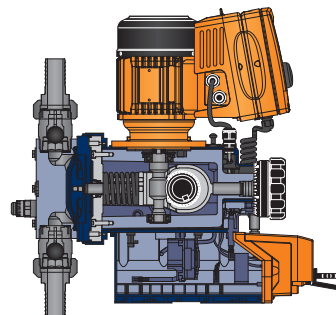
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Pressure [bar] depending on the feed rate [l/h]

ProMinent offers an extensive range of metering pumps with a capacity rating of up to 1,000 l/h. All oscillating positive-displacement pumps feature a leak-free, hermetically sealed metering chamber and an identical operating structure.

#### Applications

- General: Chemical metering up to 1,000 l/h
- Potable water treatment: Metering of disinfectants
- Cooling circuits: Metering of disinfectants
- Waste water treatment: Metering of flocculants
- Paper industry: Metering of additives
- Plastics production: Metering of additives
- Textile industry: Metering of dyeing additives
- Electroplating: Metering of acids/lyes
- Automotive industry: Metering of cleaning agents
- Food industry: Metering of solids, concentrates, CIP cleaning agents
- Pool & Wellness: Metering of disinfectants



Sigma-bCGHR



## 1.3 Motor-Driven Metering Pumps

### 1.3.2

### Motor-Driven Metering Pump alpha

The cost-effective solution for simple applications in the lower performance range.

Capacity range 1.0 – 30.6 l/h, 10 – 2 bar

The motor-driven metering pump alpha is the metering pump for liquid media and the optimum solution for simple applications. Robust, low-noise, chemical-resistant, with precise metering and good suction capacity.

Various pump types are available as a combination of 2 gears and 4 sizes of dosing head in materials PVDF and clear acrylic/PVC, enabling you to match the pump perfectly to your metering process.

#### Your benefits

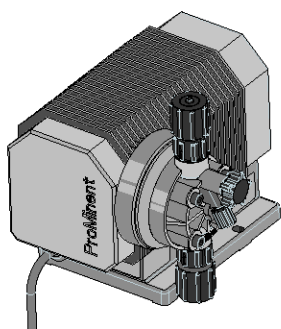
- Precise metering and good suction capacity by soft controlled suction and compression strokes
- Tough plastic housing – shock-proof and chemical-resistant
- Suitable for higher viscosity media, thanks to spring-loaded valves
- Low-noise operation

#### Technical Details

- Stroke length adjustment by changing the eccentricity on the pump drive when the pump is idle
- Stroke length adjustment in 10% steps
- Diaphragm deflection from the centre position
- Soft controlled suction and compression strokes

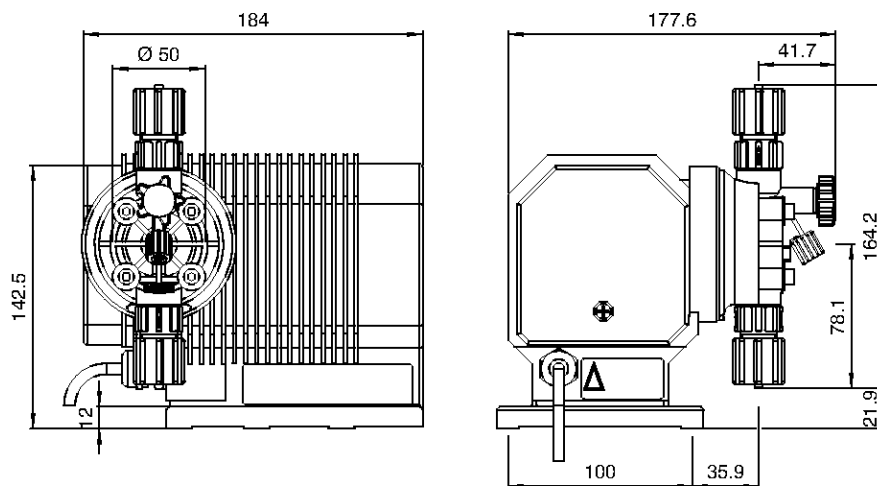
#### Field of application

All low capacity applications where constant metering is required.



P\_ALP\_0004\_SW

#### Dimensional drawing of the alpha



P\_ALP\_0006\_SW3

Dimension drawing of the alpha - dimensions in mm



## 1.3 Motor-Driven Metering Pumps

### Technical Data

Pump type	Delivery rate at max. back pressure			Delivery rate at medium back pressure			Stroke rate	Stroke length	Connection size o Ø x i Ø	Suction lift	Shipping weight
	bar	l/h	ml/stroke	bar	l/h	ml/stroke					
50 Hz version											
ALPc 1001	10	1.0	0.29	5	1.1	0.32	30	2	6 x 4	5.1	3.0
ALPc 1002	10	1.8	0.52	5	2.1	0.60	58	2	6 x 4	5.1	3.0
ALPc 1004	10	3.5	1.01	5	3.9	1.12	58	3	8 x 5	5.1	3.0
ALPc 1008	10	7.7	1.00	5	8.6	1.12	128	3	8 x 5	5.1	3.0
ALPc 0707	7	6.9	1.98	3	7.7	2.21	58	3	8 x 5	4.1	3.0
ALPc 0417	4	17.0	2.51	2	18.3	2.76	128	3	8 x 5	4.1	3.0
ALPc 0230	2	30.6	3.98	1	32.7	4.26	128	3	12 x 9	3.1	3.0
60 Hz version											
ALPc 1001	10	1.2	0.29	5	1.3	0.31	36	2	6 x 4	5.1	3.0
ALPc 1002	10	2.2	0.53	5	2.6	0.63	69	2	6 x 4	5.1	3.0
ALPc 1004	10	4.1	0.99	5	4.7	1.14	69	3	8 x 5	5.1	3.0
ALPc 1008	10	8.9	0.96	5	10.4	1.13	154	3	8 x 5	5.1	3.0
ALPc 0707	7	8.3	2.00	3	9.2	2.22	69	3	8 x 5	4.1	3.0
ALPc 0417	4	20.6	2.45	2	21.9	2.75	154	3	8 x 5	4.1	3.0
ALPc 0230	2	34.4	3.72	1	39.2	4.24	154	3	12 x 9	3.1	3.0

All data refers to water at 20 °C.

### Materials in Contact With the Medium

	Liquid end	Suction/discharge connector	Ball seal	Seals	Balls
PPE	Polypropylene	Polypropylene	EPDM	EPDM	Ceramic
PPB	Polypropylene	Polypropylene	FKM	FKM	Ceramic
NPE	Acrylic glass	PVC	EPDM	EPDM	Ceramic
NPB	Acrylic glass	PVC	FKM	FKM	Ceramic
PVT	PVDF	PVDF	PVDF	PTFE	Ceramic

Metering diaphragm with PTFE coating for all types.

FKM = Fluorine Rubber

### Motor Data

Type	Split pole motor with integrated thermal overload protection
Electrical connection	220-240 V, 50/60 Hz (version A)
Power	50 W (at 230 V/50 Hz)
Power consumption	0.4 A (at 230 V/50 Hz)



**Warranty:** The warranties listed under "General Terms and Conditions of Sale" apply, although there is a warranty period of 12 months for the alpha pump drive

# 1.3 Motor-Driven Metering Pumps

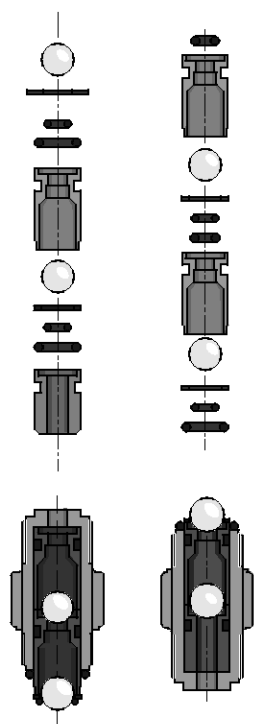
## Identity Code Ordering System for Product Range alpha, version c

ALPc	Type	Capacity (50 Hz / 60 Hz)			
		l/h	bar	l/h	bar
	1001	1.0	10	1.2	10
	1002	1.8	10	2.2	10
	1004	3.5	10	4.1	10
	1008	7.7	10	8.9	10
	0707	6.9	7	8.3	7
	0417	17.0	4	20.6	4
	0230	30.6	2	34.4	2
		<b>Liquid end material</b>			
	PPE	Polypropylene/polypropylene/EPDM			
	PPB	Polypropylene/polypropylene/FKM			
	NPE	Acrylic/PVC/EPDM			
	NPB	Acrylic/PVC/FKM			
	PVT	PVDF/PVDF/PTFE			
		<b>Valve springs</b>			
	2	without valve spring, with bleeding			
	3	with 2 valve springs approx. 0.1 bar, material 1.4571, with bleeding			
		<b>Hydraulic connectors</b>			
	0	Standard according to technical data			
		<b>Version</b>			
	0	With ProMinent® logo			
		<b>Electrical connection</b>			
	A	230 V, 50/60 Hz, 2 m, Euro. plug			
	B	230 V, 50/60 Hz, 2 m, Swiss plug			
	C	230 V, 50/60 Hz, 2 m, Austral. plug			
		<b>Accessories</b>			
	0	No ancillary equipment			
	1	with foot and metering valve, 2 m PVC suction line, 5 m PE metering line			

FKM = Fluorine Rubber



## 1.3 Motor-Driven Metering Pumps

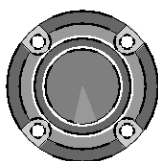


### Spare Parts Kits for Motor-Driven Metering Pump alpha

Spare parts kits for alpha, consisting of:

- 1 diaphragm
- 1 suction valve assembly
- 1 discharge valve assembly
- 1 connector kit

Type	Materials in contact with the medium	Order no.
Type 1001, 1002, 1004, 1008	PPE	1001647
	PPB	1001655
	NPE	1001716
	NPB	1001724
	PVT	1023110
Type 0707 and type 0417	PPE	1001649
	PPB	1001657
	NPE	1001718
	NPB	1001726
	PVT	1023112
Type 0230	PPE	1001650
	PPB	1001658
	NPE	1001719
	NPB	1001727
	PVT	1023113



pk\_1\_008

### Spare Diaphragms for Motor-Driven Metering Pump alpha

Type	Order no.
Type 1001, 1002, 1004, 1008	1000247
Type 0707 and type 0417	1000249
Type 0230	1000250

### Accessories

- Foot Valves for Low-Pressure Metering Pumps see page → 1-139
- Injection Valve for Low-Pressure Metering Pumps see page → 1-144
- Hoses and pipework for low-pressure metering pumps see page → 1-169
- Suction Lances, Suction Kit Without Level Switch see page → 1-187
- Connectors, Fittings, Connector Kits, Seals see page → 1-172

### Spare Parts

- Custom Valve Balls/Valve Springs See page → 1-204



## 1.3 Motor-Driven Metering Pumps

### 1.3.3

### Motor-Driven Metering Pump Vario C

#### The basic pump for simple applications

Capacity range 8 – 76 l/h, 10 – 4 bar

The motor-driven metering pump Vario C delivers a high level of process quality for continuous metering within simple metering tasks. It can be used, for example, in the metering of additives or flocculants in chemical metering.

With 4 gear reduction ratios, 2 dosing head sizes and 2 dosing head materials, the Vario C motor-driven metering pump is well adapted to basic metering tasks. It is available with a three-phase or single-phase AC motor. Its pump capacity is adjusted via the stroke length, in 1% increments, with a self-locking rotary dial.

#### Your benefits

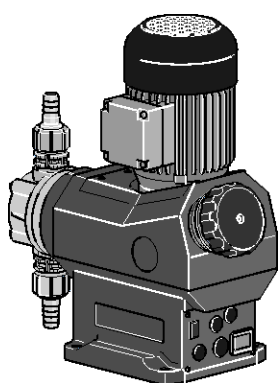
- Excellent suction capacity, gentle metering stroke and consistently precise metering
- Excellent process quality: Metering reproducibility is better than  $\pm 2\%$  within the stroke length adjustment range of 30 to 100%
- Flexible adjustment of the pump capacity by means of the stroke length in 1% increments
- Fibreglass-reinforced plastic housing
- Good adaptation to the specific application, thanks to 4 different gear reduction ratios and 2 sizes of liquid ends in 2 material versions
- Power end optionally available with three-phase or single-phase AC motor
- Customised designs are available on request

#### Technical Details

- Stroke length: 3 mm
- Stroke length adjustment range: 0 – 100 %
- Stroke length adjustment: manually by means of self-locking rotary dial
- Metering reproducibility is better than  $\pm 2\%$  in the 30 – 100% stroke length adjustment range under defined conditions and with correct installation
- Wetted materials: PVDF, stainless steel 1.4571/1.4404
- DEVELOPAN® diaphragm (single diaphragm with PTFE)
- Motor: Three-phase AC motor (0.07 kW, 230/400 V, 50/60 Hz) or single-phase AC motor (0.06 kW, 230 V 50 Hz or 115 V 60 Hz)
- Degree of protection: IP 55
- Fibreglass-reinforced plastic housing
- Provide suitable overload protection in all motor-driven metering pumps during installation for safety reasons.

#### Field of application

- Chemical metering in potable water, cooling and waste water circuits
- Metering of additives, flocculants etc.



pk\_2\_126  
Vario C





## 1.3 Motor-Driven Metering Pumps

### Technical Data

Type VAMc	With 1500 rpm motor at 50 Hz				With 1800 rpm motor at 60 Hz			Suction lift  m WC	Perm. pre- pressure suction side  bar	Connection, suction/discharge side  G-DN
	Delivery rate at max. back pressure		Max. stroke rate  Strokes/min	Delivery rate at max. back pressure		Max. stroke rate  Strokes/min				
	bar	l/h ml/stroke		psi	l/h/gph (US)					
10008	10	8	4	38	145	9.6/2.5	45	7	2.8	3/4-10
10016	10	16	4	77	145	19.2/5.0	92	7	2.8	3/4-10
07026	7	26	4	120	100	31.2/8.2	144	7	2.8	3/4-10
07042	7	42	4	192	100	50.4/13.3	230	7	2.8	3/4-10
07012	7	12	5	38	100	14.4/3.8	45	6	1.7	3/4-10
07024	7	24	5	77	100	28.8/7.6	92	6	1.7	3/4-10
04039	4	40	5	120	58	48.0/12.6	144	6	1.7	3/4-10
04063	4	64	5	192	58	76.8/20.2	230	6	1.7	3/4-10

The shipping weight of all pump types is 6/7.2 kg (PVDF/SS)

### Materials in Contact With the Medium

Material	Dosing head	Suction/pressure connector	Seals	Valve balls	Valve seat
PVT	PVDF	PVDF	PTFE	Ceramic	PTFE
SST	Stainless steel material no. 1.4404	Stainless steel material no. 1.4581	PTFE	Stainless steel material no. 1.4404	PTFE

### Motor Data

Identity code characteristic	Voltage supply				Remarks
S	3 ph, IP 55	220-240 V/380-420 V	50 Hz	0.07 kW	
		250-280 V/440-480 V	60 Hz	0.07 kW	
M	1 ph AC, IP 55	230 V ±5%	50/60 Hz	0.06 kW	
N	1 ph AC, IP 55	115 V ±5%	60 Hz	0.06 kW	

Motor data sheets can be requested for more information. Special motors or special motor flanges are available on request.

Motors less than 0.75 kW and motors designed for speed-controllable operation are not subject to the IE3 standard in compliance with the Ecodesign Directive 2009/125/EC.

## 1.3 Motor-Driven Metering Pumps

### Identity Code Ordering System for Vario Diaphragm Metering Pump

VAMc	Type*	bar	l/h
	10008	10	8
	10016	10	16
	07026	7	26
	07042	7	42
	07012	7	12
	07024	7	24
	04039	4	40
	04063	4	64
Material Liquid end			
	PVT	PVDF, PTFE seal	
	SST	stainless steel, PTFE seal	
Liquid end version			
	0	no valve spring (standard) PVC	
	1	with 2 valve springs. Hastelloy C4	
Hydraulic connection			
	0	standard connection	
	1	PVC union nut and insert	
	2	PP union nut and insert	
	3	PVDF union nut and insert	
	4	Stainless steel union nut and insert	
	5	PP union nut and hose nozzle	
	7	PVDF union nut and hose nozzle	
	8	Stainless steel union nut and hose nozzle	
Version			
	0	with ProMinent® logo (standard)	
	1	without ProMinent® logo	
	M	modified	
Electrical power supply			
	S	3 ph, 230 V / 400 V; 50/60 Hz	
	M	1 ph AC 230 V; AC 50/60 Hz	
	N	1 ph AC 115 V; AC 60 Hz	
Stroke sensor			
	0	no stroke sensor	
	3	with stroke sensor (Namur)	
Stroke length adjustment			
	0	manual (standard)	

\* Digits 1 and 2=back pressure [bar]; digits 3, 4, 5=flow rate [l/h]





## 1.3 Motor-Driven Metering Pumps

### Spare Parts

The spare parts kit generally includes the wear parts for the liquid ends.

#### Scope of delivery with PPE, PCB, PVT material versions:

- 1 diaphragm
- 1 suction valve assembly
- 1 discharge valve assembly
- 2 valve balls
- 1 complete sealing set (O-rings or cover rings with PVT design)

#### Scope of delivery with SST material version:

- 1 diaphragm
- 2 valve balls
- 1 complete sealing set (cover rings, flat seals, ball seat)

### Spare parts kits for motor-driven metering pump Vario C

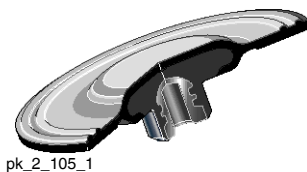
Applicable to Identity code: Type VAMc 10008, 10016, 07026, 07042

Liquid end	Materials in contact with the medium	Order no.
FM 042 - DN 10	PPE	910753
FM 042 - DN 10	PCB	910754
FM 042 - DN 10	PVT	1003641
FM 042 - DN 10	SST	910751

Applicable to Identity code: Type VAMc 07012, 07024, 04039, 04063

Liquid end	Materials in contact with the medium	Order no.
FM 063 - DN 10	PPE	910758
FM 063 - DN 10	PCB	910759
FM 063 - DN 10	PVT	1003642
FM 063 - DN 10	SST	910756

### Spare diaphragms for motor-driven metering pump Vario C



	Order no.
Vario with FM 042 Type VAMc 10008, 10016, 07026, 07042	811458
Vario with FM 063 Type VAMc 07012, 07024, 04039, 04063	811459

### Accessories

- Foot Valves for Low-Pressure Metering Pumps see page → 1-139
- Injection Valve for Low-Pressure Metering Pumps see page → 1-144
- Hoses and pipework for low-pressure metering pumps see page → 1-169
- Suction Lances, Suction Kit Without Level Switch see page → 1-187
- Connectors, Fittings, Connector Kits, Seals see page → 1-172
- Speed Controllers see page → 1-212

### Spare Parts

- Custom Valve Balls/Valve Springs See page → 1-204



## 1.3 Motor-Driven Metering Pumps

### 1.3.4

### Motor-Driven Metering Pump Sigma/ 1 (Basic type)

**The robust pump for safe and reliable use**

**Capacity range 17 – 144 l/h, 12 – 4 bar**

The Sigma/ 1 Basic is an extremely robust motor-driven metering pump with patented multi-layer safety diaphragm for excellent process reliability. It offers a wide range of power end designs, such as three-phase or 1-phase AC motors, also for use in areas at risk from explosion.

The Sigma/ 1 diaphragm metering pump, together with pumps of type Sigma/ 2 and Sigma/ 3, represents an integrated product range. They cover the capacity range from 17 to 1,030 l/h, with a consistent operating concept, control concept and spare parts management. A wide range of power end versions is available, including some for use in areas at risk from explosion.

#### Your benefits

Excellent process reliability:

- In the event of an accident, the feed chemical does not escape to the outside nor into the pump's power end, thanks to the patented multi-layer safety diaphragm with optical (optionally electric) signalling.
- Integrated relief valve to protect the pump from overloading.
- Reliable operation by bleed option during the suction process.

Flexible adaptation to the process:

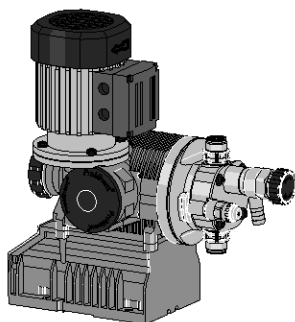
- The entire Sigma product range is available as standard in a "Physiologically safe in respect of wetted materials" design.
- Metering pumps with electro-polished stainless steel metering head enable them to be used in hygienically challenging applications.
- Adaptation to specific installation situations, as the "Liquid end on left" option can be selected as standard.
- Wide range of power end versions, also for use in ATEX areas and different flange designs for the use of customised motors.
- Customised designs are available on request.

#### Technical Details

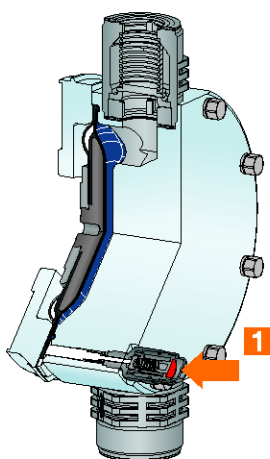
- Stroke length: 4 mm.
- Stroke length adjustment range: 0 – 100%.
- Stroke length adjustment: manually by self-locking rotary dial in 1 % increments (optionally with actuator or control drive).
- Metering reproducibility is better than  $\pm 2\%$  in the 30 – 100% stroke length adjustment range under defined conditions and with correct installation.
- Wetted materials: PVDF, stainless steel 1.4571/1.4404, special materials on request.
- Patented multi-layer safety diaphragm with optical diaphragm rupture display (optionally with diaphragm rupture warning system via a contact).
- Integrated hydraulic relief and bleed valve.
- A wide range of power end versions is available: Three-phase standard motor, 1-phase AC motor, motors for use in areas at risk from explosion and different flange designs for use in customer-specific motors.
- For use in areas at risk from explosion II 2G Ex h IIC T3 Gb X or II 2G Ex h IIC T4 Gb X (optional).
- Degree of protection IP 55.
- Fibreglass-reinforced plastic housing.
- Liquid end on left is available as standard.
- For reasons of safety, provide suitable overload protection mechanisms when installing all mechanically deflected diaphragm metering pumps.

#### Field of application

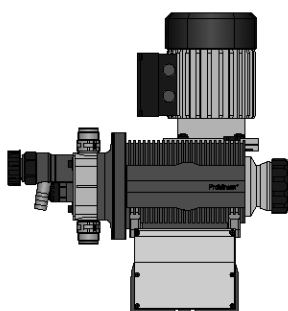
- Volume-proportional addition of chemicals in water treatment, e.g. sodium-calcium hypochlorite for the disinfection of potable water
- Addition of chemicals depending on the measured value, e.g. metering of acid and alkali for pH neutralisation in waste water treatment
- Time-controlled addition of chemicals in the cooling water circuit
- Pulse-controlled metering in the bottling of different volumes e.g. glycerin filling of manometers



P\_SI\_0128\_SW  
Sigma/ 1 Basic version



P\_SI\_0065\_C1  
1: Diaphragm rupture sensor



P\_SI\_0152\_SW  
Sigma / 1 liquid end on left

## 1.3 Motor-Driven Metering Pumps

### Control of Sigma Basic type (S1Ba)

#### Stroke length actuator/controller

**Actuator:** Electronically regulated actuator with contactless position detection for automatic stroke length adjustment, actuating period approx. 1 second for 1% stroke length, return potentiometer 1 k $\Omega$ , degree of protection IP 65.

**Control drive:** Electronically regulated actuator with position detection, with no contact with the media, consisting of an actuator and integral servo controller for stroke length adjustment via a standard signal. Standard current input 0/4-20 mA corresponds to stroke length 0 – 100%, switch-over for manual / automatic operation, stroke adjustment in manual mode, electronic stroke length position display, wide-range voltage power unit 85 - 265 V 50/60 Hz, degree of protection Ip65, actual value output 0/4-20 mA for remote display.

#### Speed controllers with frequency converter (identity code specification Z)

The speed control, assembled, consists of a frequency converter and a variable speed motor with 0.09 kW (Sigma 1 Ba), 0.37 kW (Sigma 2 Ba) or 0.55 kW (Sigma 3 Ba).

### "Physiologically safe" designs in respect to wetted sealing material

#### FDA

The wetted materials in the "FDA" (F) version comply with the FDA Guidelines.

FDA Guidelines: Material PTFE: FDA No. 21 CFR § 177.1550, material PVDF: FDA No. 21 CFR § 177.2510

Available for pump design plastic (PV) and stainless steel (SS)

Identity code example: S1BaH04084PV F S000S000

#### EU Regulation 1935/2004

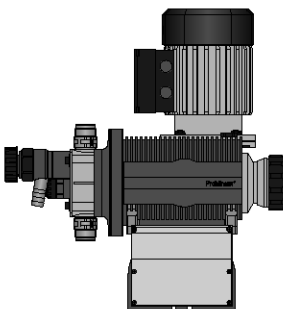
Sealing materials in accordance with Regulation (EC) 1935/2004 are available in the stainless steel material version "Physiologically safe for wetted material in accordance with Regulation (EC) 1935/2004". Available for stainless steel (SS) pump design.

Dosing heads with a hygienic design are available on request for hygienically demanding applications.

### Sigma / 1 Basic Type version "left liquid end "

This version offers additional adaptability to special installation situations, e.g. in combination with storage tanks, brackets, etc.

Identity code example: S1BaH07042PVTS00 5 S000



P\_SI\_0152\_SW  
Sigma / 1 liquid end on left



## 1.3 Motor-Driven Metering Pumps

### Technical Data

Type S1Ba	With 1500 rpm motor at 50 Hz				With 1800 rpm motor at 60 Hz			Suction lift	Perm. pre-pressure suction side	Connection, suction/discharge side	Shipping weight
	Delivery rate at max. back pressure		Max. stroke rate	Delivery rate at max. back pressure		Max. stroke rate					
	bar	l/h		ml/stroke	Strokes/min		psi				
								m WC	bar	G-DN	kg
12017 PVT	10	17	3.8	73	145	20.4/5.3	88	7	1	3/4-10	9
12017 SST	12	17	3.8	73	174	20.4/5.3	88	7	1	3/4-10	12
12035 PVT	10	35	4.0	143	145	42.0/11.0	172	7	1	3/4-10	9
12035 SST	12	35	4.0	143	174	42.0/11.0	172	7	1	3/4-10	12
10050 PVT	10	50	4.0	205	145	60.0/15.8	246	7	1	3/4-10	9
10050 SST	10	50	4.0	205	145	60.0/15.8	246	7	1	3/4-10	12
10022 PVT	10	22	5.0	73	145	26.4/6.9	88	6	1	3/4-10	9
10022 SST	10	22	5.0	73	145	26.4/6.9	88	6	1	3/4-10	12
10044 PVT	10	44	5.1	143	145	52.8/13.9	172	6	1	3/4-10	9
10044 SST	10	44	5.1	143	145	52.8/13.9	172	6	1	3/4-10	12
07065 PVT	7	65	5.2	205	102	78.0/20.6	246	6	1	3/4-10	9
07065 SST	7	65	5.2	205	102	78.0/20.6	246	6	1	3/4-10	12
07042 PVT	7	42	9.5	73	102	50.4/13.3	88	3	1	1-15	10
07042 SST	7	42	9.5	73	102	50.4/13.3	88	3	1	1-15	14
04084 PVT	4	84	9.7	143	58	100.8/26.6	172	3	1	1-15	10
04084 SST	4	84	9.7	143	58	100.8/26.6	172	3	1	1-15	14
04120 PVT	4	120	9.7	205	58	144.0/38.0	246	3	1	1-15	10
04120 SST	4	120	9.7	205	58	144.0/38.0	246	3	1	1-15	14

Performance data for TTT, see type PVT

### Materials in Contact With the Medium

Material	Dosing head	Suction/pressure connector	Seals/ball seat	Balls	Integral relief valve
PVT	PVDF	PVDF	PTFE/PTFE	Ceramic	PVDF/FKM or EPDM
SST	Stainless steel 1.4404	Stainless steel 1.4581	PTFE/PTFE	Stainless steel 1.4404	Stainless steel/FKM or EPDM
TTT*	PTFE + 25% carbon	PTFE + 25% carbon	PTFE/PTFE	Ceramic	–

\* specifically for areas at risk from explosion

Sealing material "F" - "FDA" ball seat version: PVDF

Sealing material "G" - (EC) Regulation 1935/2004" ball seat version: 1.4404

### Motor Data

Identity code specification	Power supply	Δ/Y	Remarks		
S	3-phase, IP 55	220 – 240 V/380 – 420 V	50 Hz	0.09 kW	with PTC, speed control range 1:5
		265 – 280 V/440 – 480 V	60 Hz	0.09 kW	
T	3-phase, IP 55	220 – 240 V/380 – 420 V	50 Hz	0.09 kW	with PTC, speed adjustment range 1:20 with external fan (1-phase 230 V; 50/60 Hz, 20 W)
		265 – 280 V/440 – 480 V	60 Hz	0.09 kW	
R	3-phase, IP 55	220 – 240 V/380 – 420 V	50 Hz	0.09 kW	
M	1-phase AC, IP 55	230 V ± 5 %	50/60 Hz	0.12 kW	
N	1-phase AC, IP 55	115 V ± 5 %	60 Hz	0.12 kW	
L1	3-phase, II2GExellIT3	220 – 240 V/380 – 420 V	50 Hz	0.12 kW	
L2	3-phase, II2GExdlICT4	220 – 240 V/380 – 420 V	50 Hz	0.18 kW	with PTC, speed control range 1:5
P1	3-phase, II2GExellIT3	250 – 280 V/440 – 480 V	60 Hz	0.12 kW	
P2	3-phase, II2GExdlICT4	250 – 280 V/440 – 480 V	60 Hz	0.18 kW	with PTC, speed control range 1:5

Motor data sheets can be requested for more information. Special motors or special motor flanges are available on request.

Motors less than 0.75 kW and motors designed for speed-controllable operation are not subject to the IE3 standard in compliance with the Ecodesign Directive 2009/125/EC.

### Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/EU in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label corresponds to or is better than the conditions prevalent in the intended field of application.





## 1.3 Motor-Driven Metering Pumps

### Identity code ordering system for Sigma/ 1 Basic type (S1Ba)

S1Ba	Drive type
H	Main drive, diaphragm
	<b>Pump type</b>
	bar l/h
12017	12 17
12035	12 35*
10050	10 50
10022	10 22
10044	10 44
07065	7 65
07042	7 42
04084	4 84
04120	4 120
	<b>Material of liquid end</b>
PV	PVDF (max. 10 bar)
SS	Stainless steel
TT	PTFE + 25% carbon (max. 10 bar)
	<b>Seal material</b>
T	PTFE seal
F	FDA-compliant
	<b>Diaphragm</b>
S	Multi-layer safety diaphragm with optical rupture indicator
A	Multi-layer safety diaphragm with rupture signalling (contact)
	<b>Liquid end version</b>
0	No spring
1	With 2 valve springs, Hastelloy C, 0.1 bar
4**	With pressure relief valve, FKM seal, no valve spring, only with PV and SS
5**	With pressure relief valve, FKM seal with valve springs, only with PV and SS
6**	With pressure relief valve, EPDM seal, without valve spring, only with PV and SS
7**	With pressure relief valve, EPDM seal, with valve spring, only with PV and SS
	<b>Hydraulic connection</b>
0	Standard
1	Union nut and PVC insert
2	Union nut and PP insert
3	Union nut and PVDF insert
4	Union nut and SS*** insert
7	Union nut and PVDF hose nozzle
8	Union nut and SS hose nozzle
9	Union nut and stainless steel hose nozzle
	<b>Version</b>
0	With ProMinent® logo (standard)
1	Without ProMinent® logo
M	Modified
5	Left liquid end
	<b>Electrical power supply</b>
S	3 ph, 230 V/400 V 50/60 Hz, 0.09 kW
T	3 ph, 230 V/400 V 50/60 Hz, with PTC
R	Variable speed motor 3 ph, 230/400 V, with PTC, with external fan 1 ph 230 V 50/60 Hz
Z	Speed control compl 1 ph 230 V, 50/60 Hz (variable speed motor + FC)
M	1 ph, AC, 230 V/50/60 Hz, 0.09 kW
N	1 ph, AC 115 V 60 Hz, 0.09 kW
L	3 ph, 230 V/400 V, 50 Hz, (Exe, Exd)
P	3 ph, 265 V/440 V, 60 Hz, (Exe, Exd)
2	No motor, C 42 flange (NEMA)
3	No motor, B 5, size 56 (DIN)
	<b>Enclosure rating</b>
0	IP 55 (standard)
1	Ex-design ATEX-T3
2	Ex-design ATEX-T4
	<b>Stroke sensor</b>
0	No stroke sensor (standard)
2	Pacing relay (reed relay)
3	Stroke sensor (Namur) for hazardous locations
	<b>Stroke length adjustment</b>
0	Manual (standard)
1	with servomotor, 85...265 V AC 50/60 Hz
3	with stroke control motor 0...20 mA 85...265 V AC 50/60 Hz
4	with stroke control motor 4...20 mA 85...265 V AC 50/60 Hz

\* 10 bar with the PVDF and TTT version.

\*\* Standard with tube nozzle in the bypass. Threaded connection on request.

\*\*\* Internal thread of insert SS DN10-Rp 3/8, DN15-Rp 1/2

Dosing heads in an electropolished design ( $\leq$  Ra 0.8  $\mu$ m) are available on request.

Sealing materials in compliance with (EC) Regulation 1935/2004 stainless steel version on request.

## 1.3 Motor-Driven Metering Pumps

### Spare parts for Sigma/ 1 Basic type (S1Ba)

The spare parts kit generally includes the wear parts for the liquid ends.

#### Scope of delivery with PVT material version:

- 1 diaphragm
- 2 valves, complete
- 2 valve balls
- 2 ball seats
- 4 composite seals
- 1 elastomer sealing set (EPDM, FKM-B)

#### Scope of delivery with SST material version:

- 1 diaphragm
- 2 valve balls
- 4 complete sealing sets (cover rings, ball seat discs)
- 4 composite seals

### Spare Parts Kit for Sigma/ 1 for Design With Multi-layer Safety Diaphragm

(For identity code: Type 12017, 12035, 10050)

Liquid end	Materials in contact with the medium		Order no.
FM 50 - DN 10	PVT	–	1035964
FM 50 - DN 10	TTT	with 2 valves cpl.	1077570
FM 50 - DN 10	SST	–	1035966
FM 50 - DN 10	SST	with 2 valves cpl.	1035965

(For identity code: Type 10022, 10044, 07065)

Liquid end	Materials in contact with the medium		Order no.
FM 65 - DN 10	PVT	–	1035967
FM 65 - DN 10	TTT	with 2 valves cpl.	1077571
FM 65 - DN 10	SST	–	1035969
FM 65 - DN 10	SST	with 2 valves cpl.	1035968

(For identity code: Type 07042, 04084, 04120)

Liquid end	Materials in contact with the medium		Order no.
FM 120 - DN 15	PVT	–	1035961
FM 120 - DN 15	TTT	with 2 valves cpl.	1077572
FM 120 - DN 15	SST	–	1035963
FM 120 - DN 15	SST	with 2 valves cpl.	1035962

### Spare Parts Kits for Sigma/ 1 for Design With Old Diaphragm

(For Identity code: Type 12017, 12035, 10050)

Liquid end	Materials in contact with the medium		Order no.
FM 50 - DN 10	PVT	–	1010541
FM 50 - DN 10	SST	–	1010554
FM 50 - DN 10	SST	with 2 valves cpl.	1010555

(For Identity code: Type 10022, 10044, 07065)

Liquid end	Materials in contact with the medium		Order no.
FM 65 - DN 10	PVT	–	1010542
FM 65 - DN 10	SST	–	1010556
FM 65 - DN 10	SST	with 2 valves cpl.	1010557

(For Identity code: Type 07042, 04084, 04120)

Liquid end	Materials in contact with the medium		Order no.
FM 120 - DN 15	PVT	–	1010543
FM 120 - DN 15	SST	–	1010558
FM 120 - DN 15	SST	with 2 valves cpl.	1010559



## 1.3 Motor-Driven Metering Pumps

### Spare parts kit for Sigma/ 1 for FDA and Regulation (EC) 1935/2004 design

(For Identity code: Type 12017, 12035, 10050)

Liquid end	Wetted materials.		Order no.
FM 50 - DN 10	PVT	FDA	1046466
FM 50 - DN 10	SST	FDA without valve	1046468
FM 50 - DN 10	SST	FDA with valve	1046467
FM 50 - DN 10	SST	Regulation (EC) 1935/2004 without valve	1105291
FM 50 - DN 10	SST	Regulation (EC) 1935/2004 with valve	1105286

(For Identity code: Type 10022, 10044, 07065)

Liquid end	Wetted materials.		Order no.
FM 65 - DN 10	PVT	FDA	1046469
FM 65 - DN 10	SST	FDA without valve	1046471
FM 65 - DN 10	SST	FDA with valve	1046470
FM 65 - DN 10	SST	Regulation (EC) 1935/2004 without valve	1105288
FM 65 - DN 10	SST	Regulation (EC) 1935/2004 with valve	1105287

(For Identity code: Type 07042, 04084, 04120)

Liquid end	Wetted materials.		Order no.
FM 120 - DN 15	PVT	FDA	1046453
FM 120 - DN 15	SST	FDA without valve	1046465
FM 120 - DN 15	SST	FDA with valve	1046464
FM 120 - DN 15	SST	Regulation (EC) 1935/2004 without valve	1105290
FM 120 - DN 15	SST	Regulation (EC) 1935/2004 with valve	1105289

### Multi-layer Safety Diaphragm (Standard)

	Order no.
FM 50 (type 12017; 12035; 10050)	1030114
FM 65 (type 10022; 10044; 07065)	1030115
FM 120 (type 07042; 04084; 04120)	1035828

### Metering Diaphragm (Old Version)

	Order no.
Sigma/ 1 FM 50 (12017; 12035; 10050)	1010279
Sigma/ 1 FM 65 (10022; 10044; 07065)	1010282
Sigma/ 1 FM 120 (07042; 04084; 04120)	1010285

### Spare Parts Kits for Integrated Relief Valve

Consisting of two compression springs made from Hastelloy C and four FKM-A and EPDM O-rings each

	For material	Seals	Order no.
Spare parts kits for integrated relief valve 4 bar	PVT/SST	FKM-A/EPDM	1031199
Spare parts kits for integrated relief valve 7 bar	PVT/SST	FKM-A/EPDM	1031200
Spare parts kits for integrated relief valve 10 bar	PVT/SST	FKM-A/EPDM	1031201
Spare parts kits for integrated relief valve 12 bar	PVT/SST	FKM-A/EPDM	1031202

### Accessories

- Foot Valves for Low-Pressure Metering Pumps see page → 1-139
- Injection Valve for Low-Pressure Metering Pumps see page → 1-144
- Hoses and pipework for low-pressure metering pumps see page → 1-169
- Suction Lances, Suction Kit Without Level Switch see page → 1-187
- Connectors, Fittings, Connector Kits, Seals see page → 1-172
- Speed Controllers see page → 1-212
- Metering monitor Flow Control set up for motor-driven metering pumps see page → 1-207

### Spare Parts

- Custom Valve Balls/Valve Springs See page → 1-204





## 1.3 Motor-Driven Metering Pumps

### 1.3.5

### Motor-Driven Metering Pump Sigma X Control Type – Sigma/ 1 - S1Cb

**The new Sigma X range – reliable, smart and connectible**

**Capacity range S1Cb: 21 – 117 l/h, 12 – 4 bar**

The Sigma control type is a smart motor-driven metering pump that is setting new standards in terms of productivity, reliability and safety.

The Sigma X diaphragm metering pump covers a capacity range of 21 to 1,040 l/h in versions S1Cb, S2Cb and S3Cb. Its patented multi-layer safety diaphragm guarantees maximum process reliability. Efficient protection of the power end from overloading by means of an integral frequency converter with microprocessor control(ler).

One highlight is the standardised operating concept with click wheel and 4 additional operating keys on a removable operating unit. A large illuminated LCD and a 3-LED display for operating, warning and error messages, visible from all sides, offers additional operating convenience.

The Sigma, like all smart ProMinent metering pumps, can be flexibly connected to various bus systems.

It has a large adjustment range thanks to a combination of frequency and stroke length adjustment. The pump works with high precision across the entire frequency range. Accurate and complication-free metering of viscous and gaseous media by adjustment of the movement profile.

Operating statuses are simply remotely transmitted via an additional output or relay module. A built-in timer, included as standard, controls time-dependent metering cycles.

Relevant spare parts can be shown in the display. The integral log book significantly improves process management, optimisation and troubleshooting.

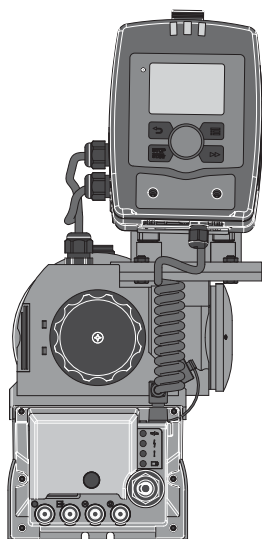
#### Your benefits

- Safe: In the event of an accident, the feed chemical does not escape to the outside nor into the pump's power end, thanks to the patented multi-layer safety diaphragm with optical (optionally electric) signalling.
- Integrated relief valve protects the pump against overloading and reliable operation by means of a bleed option during the metering process.
- External control is scalable via potential-free contacts with pulse step-up and step-down, batch mode or via a 0/4-20 mA standard signal.
- Flexibly connectible: Connection to process management systems via integral PROFIBUS®, CANopen interface.
- Integral log book saves up to 300 events and simplifies troubleshooting and analysis of the cause.

#### Technical Details

- Stroke length: 4 mm
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually using self-locking rotary dial in 1% increments
- Metering reproducibility is better than  $\pm 2\%$  in the 30 – 100% stroke length adjustment range under defined conditions and with correct installation
- Wetted materials: PVDF, stainless steel 1.4571/1.4404 (special materials on request)
- Power supply: 1 pH, 100 – 230 V  $\pm 10\%$ , 240 V  $\pm 6\%$ , 50/60 Hz (220 W)
- Degree of protection IP 65
- Fibreglass-reinforced plastic housing
- The liquid end on the left of the standard version can be selected for special installation situations or in combination with storage tanks, brackets etc.
- Settable manual or external contact mode, factor with external contact control 99:1 – 1:99; batch mode with max. 99,999 strokes/start pulse.
- Metering profiles for optimum metering results.
- Display of wear parts in the Service menu.
- Connector for 2-stage level switch.
- Connection to PROFINET using the ProMinent DULConvert PROFIBUS®-PROFINET converter.
- Time-dependent control of the metering volume via integral timer.
- Relay module with 1 x switchover contact, 230 V – 8 A
- Relay module with 2 x On, 24 V – 100 mA
- Output / relay module: 0/4- 20 mA analogue output for remote transmission of the stroke rate plus relay module with 1 x On, 24 V – 100 mA
- The Sigma product range is available in a "Physiologically safe in respect of wetted materials" design.
- Dosing heads with electro-polished stainless steel for aqueous media are available with hygienically challenging applications.
- Customised designs are available on request.

For reasons of safety, provide suitable overload protection mechanisms when installing all mechanically deflected diaphragm metering pumps.



P\_SI\_0201\_SW  
Sigma/ 1 control type



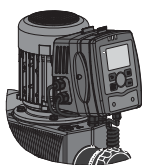


## 1.3 Motor-Driven Metering Pumps

### Field of application

- All industrial applications, either as a stand-alone unit or integrated in a complete system
- Volume-proportional addition of chemicals in water treatment, e.g. sodium-calcium hypochlorite for the disinfection of potable water
- Neutralisation in waste water treatment
- Pulse-controlled metering in the bottling of different volumes e.g. glycerin filling of manometers
- With an integrated timer as a control unit for simple processes, e.g. biocide metering in cooling water

### Operating unit



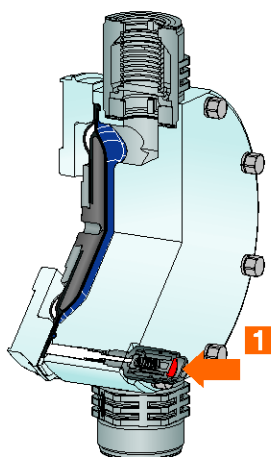
P\_SI\_0200\_SW1

One highlight is the standardised operating concept with gamma and Sigma metering pumps with click wheel and 4 additional operating keys on a removable operating unit. A large illuminated LCD and a 3-LED display for operating, warning and error messages, visible from all sides, offers additional operating convenience.

The Sigma metering pump (control type), like all smart ProMinent metering pumps, can be flexibly connected to various bus systems. Operating statuses are simply remotely transmitted via an additional output or relay module. A built-in timer, included as standard, controls time-dependent metering cycles.

Relevant spare parts can be shown in the display. The integral log book significantly improves process management, optimisation and troubleshooting.

### Multi-layer safety diaphragm



P\_SI\_0065\_C1

1: Diaphragm rupture sensor

The Sigma X represents a durable motor-driven metering pump with integral control and patented multi-layer safety diaphragm, standing out on account of its excellent process reliability. In the event of an accident, the feed chemical does not escape to the outside nor into the pump's power end, thanks to the multi-layer safety diaphragm with optical (optionally electric) signalling.

An additional rear PTFE layer prevents medium from leaking in the event of a diaphragm rupture. In the event of a diaphragm rupture, a simple contact is mechanically triggered by the multi-layer diaphragm. The dosing head remains leak-free during this time, ensuring emergency operation. Simpler technology than the double diaphragm system and independent of the feed chemical, hence a benefit for maintenance / service.

The optical diaphragm rupture warning system is available in the standard scope of delivery.

### Metering profiles

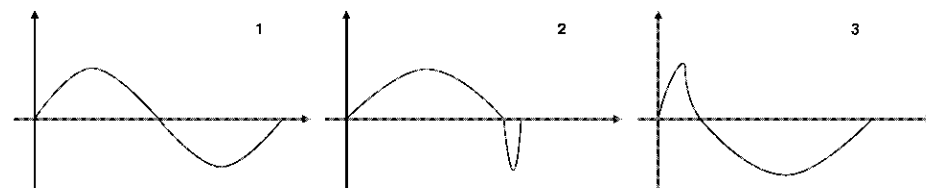
Metering profiles guarantee optimum metering results by adapting the metering behaviour of the metering pump to the application or chemical used.

The combination of frequency and stroke length adjustment permits a large adjustment range, with the pump working with excellent precision over the entire frequency range. Adjustment of the movement profile also guarantees precise and trouble-free metering even with viscous and gaseous media.

The stroke motion of the displacement body is continually recorded and regulated so that the stroke is made in line with the desired metering profile. The pump can be operated in normal mode (Diagram 1), with optimised discharge stroke (Diagram 2) or with optimised suction stroke (Diagram 3).

Three typical metering profiles are shown schematically with progress over time.

- 1 Diagram 1: Discharge stroke, suction stroke equal
- 2 Diagram 2: long discharge stroke, short suction stroke
- 3 Diagram 3: short discharge stroke, long suction stroke



P\_SI\_010x\_SW



## 1.3 Motor-Driven Metering Pumps

### "Physiologically safe" designs in respect to wetted sealing material

#### FDA

Wetted materials in the "FDA" (F) version comply with the FDA Guidelines.

FDA Guidelines: Material PTFE: FDA No. 21 CFR § 177.1550, material PVDF: FDA No. 21 CFR § 177.2510

Available for pump design plastic (PV) and stainless steel (SS)

Identity code example: S1CbH07042PV F S010S0EN

#### EU Regulation 1935/2004

Sealing materials in accordance with Regulation (EC) 1935/2004 are available in the stainless steel material version "Physiologically safe for wetted material in accordance with Regulation (EC) 1935/2004".

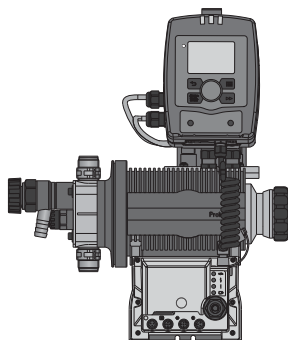
Available for stainless steel (SS) pump design.

Dosing heads with a hygienic design are available on request for hygienically demanding applications.

### Sigma/ X (Control) design "liquid end on left"

This version offers additional adaptability to special installation situations, e.g. in combination with storage tanks, brackets, etc.

Identity code example: S1CbH07042PVTS01 5 UA1000EN



P\_SL\_0199\_SW

Sigma / 1 Control type design, liquid end on left





## 1.3 Motor-Driven Metering Pumps

### Technical Data

Type S1Cb	Delivery rate at max. back pressure			Max. stroke rate	Delivery rate at max. back pressure		Suction lift	Perm. pre-pressure suction side	Connection, suction/discharge side	Shipping weight
	bar	l/h	ml/stroke		psi	gph (US)				
12017 PVT	10	21	3.8	90	145	5.5	7	1	3/4-10	9
12017 SST	12	21	3.8	90	174	5.5	7	1	3/4-10	12
12035 PVT	10	42	4.0	170	145	11.1	7	1	3/4-10	9
12035 SST	12	42	4.0	170	174	11.1	7	1	3/4-10	12
10050 PVT	10	49	4.0	200	145	12.9	7	1	3/4-10	9
10050 SST	10	49	4.0	200	145	12.9	7	1	3/4-10	12
10022 PVT	10	27	5.0	90	145	7.1	6	1	3/4-10	9
10022 SST	10	27	5.0	90	145	7.1	6	1	3/4-10	12
10044 PVT	10	53	5.1	170	145	14.0	6	1	3/4-10	9
10044 SST	10	53	5.1	170	145	14.0	6	1	3/4-10	12
07065 PVT	7	63	5.2	200	102	16.6	6	1	3/4-10	9
07065 SST	7	63	5.2	200	102	16.6	6	1	3/4-10	12
07042 PVT	7	52	9.5	90	102	13.7	3	1	1-15	10
07042 SST	7	52	9.5	90	102	13.7	3	1	1-15	14
04084 SST	4	101	9.7	170	58	26.7	3	1	1-15	14
04084 PVT	4	101	9.7	170	58	26.7	3	1	1-15	10
04120 PVT	4	117	9.7	200	58	30.9	3	1	1-15	10
04120 SST	4	117	9.7	200	58	30.9	3	1	1-15	14

### Materials in Contact With the Medium

Material	Dosing head	Suction/pressure connector	Seals/ball seat	Balls	Integral relief valve
PVT	PVDF	PVDF	PTFE/PTFE	Ceramic	PVDF/FKM or EPDM
SST	Stainless steel 1.4404	Stainless steel 1.4581	PTFE/PTFE	Stainless steel 1.4404	Stainless steel/FKM or EPDM

Sealing material "F" - "FDA" ball seat version: PVDF

Sealing material "G" - (EC) Regulation 1935/2004" ball seat version: 1.4404

### Motor Data

Identity code specification	Power supply			Remarks
U	1-phase, IP 65	100 – 230 V ±10 % / 240 V ±6 %	50/60 Hz	220 W

Motors less than 0.75 kW and motors designed for speed-controllable operation are not subject to the IE3 standard in compliance with the Ecodesign Directive 2009/125/EC.

# 1.3 Motor-Driven Metering Pumps

## Identity Code Ordering System for the Sigma/ 1 Control Type (S1Cb)

S1Cb	Drive type											
	H	Main power end, diaphragm										
	Pump type											
		bar	l/h		bar	l/h						
	12017	12*	21	07065	7	63						
	12035	12*	42	07042	7	52						
	10050	10	49	04084	4	101						
	10022	10	27	04120	4	117						
	10044	10	53									
	Dosing head material											
	PV	PVDF (max. 10 bar)										
	SS	Stainless steel										
	Seal material											
	T	PTFE seal										
	F	FDA-compliant										
	Displacement body											
	S	Multi-layer safety diaphragm with optical rupture indicator										
	A	Multi-layer safety diaphragm with electrical signal										
	Dosing head version											
	0	no valve spring (standard)										
	1	with 2 valve springs, Hastelloy C; 0.1 bar										
	2	with bleed valve, FKM seal, no valve spring										
	3	with bleed valve, FKM seal, with valve spring										
	4**	with relief valve, FPM seal, no valve springs										
	5**	with relief valve, FPM seal, with valve springs										
	6**	with relief valve, EPDM seal, no valve springs										
	7**	with relief valve, EPDM seal, with valve springs										
	8	with bleed valve, EPDM seal, no valve spring										
	9	with bleed valve, EPDM seal, with valve spring										
	Hydraulic connector											
	0	Standard connection			4	Union nut and stainless steel*** insert						
	1	Union nut and PVC insert			7	Union nut and PVDF tube nozzle						
	2	Union nut and PP insert			8	Union nut and stainless steel tube nozzle						
	3	Union nut and PVDF insert			9	Union nut and stainless steel welding sleeve						
	Version											
	0	With ProMinent® Logo										
	1	Without ProMinent® Logo										
	5	Left liquid end										
	Electric power supply											
	U	1 ph, 100 – 230 V ±10%, 240 V ±6%, 50/60 Hz, 110 W										
	Cable and plug											
	A	2 m Europe										
	B	2 m Swiss										
	C	2 m Australia										
	D	2 m USA										
	Relay											
	0	No relay										
	1	Fault indicating relay (230 V, 8 A)										
	3	Fault indicating relay (24 V, 100 mA) + pacing relay (24 V, 100 mA)										
	8	0/4-20 mA analogue output + fault indicating / pacing relay (24 V - 100 mA)										
	Control versions											
	0	Manual + external contact with pulse control										
	1	as 0 + analogue + metering profiles										
	6	as 1 + PROFIBUS® DP interface, M 12										
	7	as 1 + CANopen (CiA 402, M12 plug), pump without operating unit (HMI) ****										
	Overload switch-off											
	0	without overload switch-off										
	Operating unit (HMI)											
	0	Operating unit with Click Wheel (0.5 m cable)										
	4	Operating unit with Click Wheel + 2 m cable										
	5	Operating unit with Click Wheel + 5 m cable										
	6	Operating unit with Click Wheel + 10 m cable										
	X	without operating unit (HMI)										
	Access code											
	0	without access control										
1	with access control											
Language												
DE	German											
EN	English											
ES	Spanish											
FR	French											
IT	Italian											
NL	Dutch											
PL	Polish											
PT	Portuguese											
CS	Czech											
RU	Russian											
ZH	Chinese											
SV	Swedish											

\* 10 bar with PVDF version.

\*\* Standard with tube nozzle in the bypass. Threaded connection on request.

\*\*\* Internal thread of insert SS DN10-Rp 3/8, DN15-Rp 1/2

\*\*\*\* An HMI order no. 1042550 is required for manual operation, e.g. with the failure of the CAN bus

Dosing heads in an electropolished design (≤ Ra 0.8 µm) are available on request.

Sealing materials in compliance with (EC) Regulation 1935/2004 stainless steel version on request.



## 1.3 Motor-Driven Metering Pumps

### Spare parts for Sigma/ 1 Control type (S1Cb)

The spare parts kit generally includes the wear parts for the liquid ends.

#### Scope of delivery with PVT material version:

- 1 diaphragm
- 2 valves, complete
- 2 valve balls
- 2 ball seats
- 4 composite seals
- 1 elastomer sealing set (EPDM, FKM-B)

#### Scope of delivery with SST material version:

- 1 diaphragm
- 2 valve balls
- 4 complete sealing sets (cover rings, ball seat discs)
- 4 composite seals

### Spare Parts Kit for Sigma/ 1 for Design With Multi-layer Safety Diaphragm

(For identity code: Type 12017, 12035, 10050)

Liquid end	Materials in contact with the medium		Order no.
FM 50 - DN 10	PVT	–	1035964
FM 50 - DN 10	TTT	with 2 valves cpl.	1077570
FM 50 - DN 10	SST	–	1035966
FM 50 - DN 10	SST	with 2 valves cpl.	1035965

(For identity code: Type 10022, 10044, 07065)

Liquid end	Materials in contact with the medium		Order no.
FM 65 - DN 10	PVT	–	1035967
FM 65 - DN 10	TTT	with 2 valves cpl.	1077571
FM 65 - DN 10	SST	–	1035969
FM 65 - DN 10	SST	with 2 valves cpl.	1035968

(For identity code: Type 07042, 04084, 04120)

Liquid end	Materials in contact with the medium		Order no.
FM 120 - DN 15	PVT	–	1035961
FM 120 - DN 15	TTT	with 2 valves cpl.	1077572
FM 120 - DN 15	SST	–	1035963
FM 120 - DN 15	SST	with 2 valves cpl.	1035962

### Spare Parts Kits for Sigma/ 1 for Design With Old Diaphragm

(For Identity code: Type 12017, 12035, 10050)

Liquid end	Materials in contact with the medium		Order no.
FM 50 - DN 10	PVT	–	1010541
FM 50 - DN 10	SST	–	1010554
FM 50 - DN 10	SST	with 2 valves cpl.	1010555

(For Identity code: Type 10022, 10044, 07065)

Liquid end	Materials in contact with the medium		Order no.
FM 65 - DN 10	PVT	–	1010542
FM 65 - DN 10	SST	–	1010556
FM 65 - DN 10	SST	with 2 valves cpl.	1010557

(For Identity code: Type 07042, 04084, 04120)

Liquid end	Materials in contact with the medium		Order no.
FM 120 - DN 15	PVT	–	1010543
FM 120 - DN 15	SST	–	1010558
FM 120 - DN 15	SST	with 2 valves cpl.	1010559

## 1.3 Motor-Driven Metering Pumps

### Spare parts kit for Sigma/ 1 for FDA and Regulation (EC) 1935/2004 design

(For Identity code: Type 12017, 12035, 10050)

Liquid end	Wetted materials.			Order no.
FM 50 - DN 10	PVT	FDA	–	1046466
FM 50 - DN 10	SST	FDA	without valve	1046468
FM 50 - DN 10	SST	FDA	with valve	1046467
FM 50 - DN 10	SST	Regulation (EC) 1935/2004	without valve	1105291
FM 50 - DN 10	SST	Regulation (EC) 1935/2004	with valve	1105286

(For Identity code: Type 10022, 10044, 07065)

Liquid end	Wetted materials.			Order no.
FM 65 - DN 10	PVT	FDA	–	1046469
FM 65 - DN 10	SST	FDA	without valve	1046471
FM 65 - DN 10	SST	FDA	with valve	1046470
FM 65 - DN 10	SST	Regulation (EC) 1935/2004	without valve	1105288
FM 65 - DN 10	SST	Regulation (EC) 1935/2004	with valve	1105287

(For Identity code: Type 07042, 04084, 04120)

Liquid end	Wetted materials.			Order no.
FM 120 - DN 15	PVT	FDA	–	1046453
FM 120 - DN 15	SST	FDA	without valve	1046465
FM 120 - DN 15	SST	FDA	with valve	1046464
FM 120 - DN 15	SST	Regulation (EC) 1935/2004	without valve	1105290
FM 120 - DN 15	SST	Regulation (EC) 1935/2004	with valve	1105289

### Spare Parts Kits for Integrated Relief Valve (S1Ca, S1Cb)

Consisting of two compression springs made from Hastelloy C and four FKM-A and EPDM O-rings each

	For material	Seals	Order no.
Spare parts kits for integrated relief valve 4 bar	PVT/SST	FKM-A/EPDM	1031199
Spare parts kits for integrated relief valve 7 bar	PVT/SST	FKM-A/EPDM	1031200
Spare parts kits for integrated relief valve 10 bar	PVT/SST	FKM-A/EPDM	1031201
Spare parts kits for integrated relief valve 12 bar	PVT/SST	FKM-A/EPDM	1031202

### Spare Parts Kits for Integrated Bleed Valve (S1Cb)

Consisting of a compression spring made from Hastelloy C and four FKM-A and EPDM O-rings each

For identity code specification "Dosing head version" with characteristic "2", "3", "8", "9"

	For material	Seals	Order no.
ETS	PVT/SST	FKM-A/EPDM	1043785

### Multi-layer Safety Diaphragm (Standard)

	Order no.
FM 50 (type 12017; 12035; 10050)	1030114
FM 65 (type 10022; 10044; 07065)	1030115
FM 120 (type 07042; 04084; 04120)	1035828

### Metering Diaphragm (Old Version)

	Order no.
Sigma/ 1 FM 50 (12017; 12035; 10050)	1010279
Sigma/ 1 FM 65 (10022; 10044; 07065)	1010282
Sigma/ 1 FM 120 (07042; 04084; 04120)	1010285





## 1.3 Motor-Driven Metering Pumps

### Spare Parts Kits for Integrated Relief Valve

Consisting of two compression springs made from Hastelloy C and four FKM-A and EPDM O-rings each

	For material	Seals	Order no.
Spare parts kits for integrated relief valve 4 bar	PVT/SST	FKM-A/EPDM	1031199
Spare parts kits for integrated relief valve 7 bar	PVT/SST	FKM-A/EPDM	1031200
Spare parts kits for integrated relief valve 10 bar	PVT/SST	FKM-A/EPDM	1031201
Spare parts kits for integrated relief valve 12 bar	PVT/SST	FKM-A/EPDM	1031202

### Protective cowling

Protection of the operating unit (HMI) of Sigma metering pumps against contamination; made from transparent silicone rubber. For Sigma X control types S1Cb, S2Cb and S3Cb.

	Order no.
Protective cowling for operating unit (S1Cb, S2Cb, S3Cb)	1083680

### Wall bracket

Wall bracket with operating lever for wall mounting of the operating unit (HMI) without any fittings. For Sigma control types S1Cb / S2Cb / S3Cb.

	Order no.
Wall bracket for operating unit (S1Cb, S2Cb, S3Cb)	1036683

### Extension cable for operating unit (HMI)

	Order no.
Connecting cable - CAN M12 5-pole 1 m	1022139
Connecting cable - CAN M12 5-pole 2 m	1022140
Connecting cable - CAN M12 5-pole 5 m	1022141
Connecting cable - CAN M12 5-pin. 10 m	1046383

### Accessories of CANopen operation

An operating unit is needed for the manual operation of a CANopen pump.

	Order no.
Operating unit (HMI) Sigma X - S1Cb	1092956
Operating unit (HMI) Sigma X - S1Cb	1092957

### Accessories

- Foot Valves see page → 1-139
- Injection Valves see page → 1-144
- Connector Parts, Seals, Hoses see page → 1-169
- Suction Lances/Suction Assemblies see page → 1-187
- Speed Controllers see page → 1-212
- Metering monitor Flow Control set up for motor-driven metering pumps see page → 1-207

### Spare Parts

- Custom Valve Balls/Valve Springs See page → 1-204

## 1.3 Motor-Driven Metering Pumps

### 1.3.6

### Motor-Driven Metering Pump Sigma/ 2 (Basic Type)

**The robust pump for safe and reliable use.**

**Capacity range 50 – 420 l/h, 16 – 4 bar**

Robust motor-driven metering pumps like the Sigma/ 2 Basic guarantee excellent process reliability with their patented multi-layer safety diaphragm. The diaphragm metering pump offers a number of power end versions, also suitable for use in areas at risk from explosion.

The Sigma/ 2 diaphragm metering pump, together with pumps of type Sigma/ 1 and Sigma/ 3, represents an integrated product range. They cover the capacity range from 17 to 1,030 l/h, with a consistent operating concept, control concept and spare parts management. A wide range of power end versions is available, including some for use in ATEX areas.

#### Your benefits

Excellent process reliability:

- In the event of an accident, the feed chemical does not escape to the outside nor into the pump's power end, thanks to the patented multi-layer safety diaphragm with optical (optionally electric) signalling
- Integrated relief valve protects the pump against overloading
- Reliable operation by bleed option during the suction process

Flexible adaptation to the process:

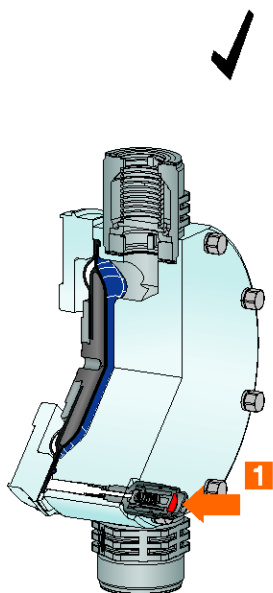
- The Sigma product range is available as standard in the "Physiologically safe in respect of wetted materials" "F" design.
- Metering pumps with electro-polished stainless steel metering head enable them to be used in hygienically challenging applications
- Wide range of power end versions, also for use in areas at risk from explosion, and different flange designs for the use of customised motors
- Customised designs are available on request

#### Technical Details

- Stroke length: 5 mm,
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually by self-locking rotary dial in 1 % increments (optionally with actuator or control drive)
- Metering reproducibility is better than  $\pm 2\%$  in the 30 – 100 % stroke length adjustment range under defined conditions and with correct installation.
- Wetted materials: PVDF, stainless steel 1.4571/1.4404, special materials on request
- Patented multi-layer safety diaphragm with optical diaphragm rupture display (optionally with diaphragm rupture warning system via a contact)
- Integrated hydraulic relief and bleed valve
- A wide range of power end versions is available: Three-phase standard motor, 1-phase AC motor, motors for use in areas at risk from explosion and different flange designs for use in customer-specific motors
- For areas at risk from explosion II 2G Ex h IIC T3 Gb X or II 2G Ex h IIC T4 Gb X (optional)
- Degree of protection IP 55
- Highly rigid fibreglass-reinforced plastic housing with excellent chemical resistance
- For reasons of safety, provide suitable overload protection mechanisms when installing all mechanically deflected diaphragm metering pumps.

#### Field of application

- Volume-proportional addition of chemicals in water treatment, e.g. sodium-calcium hypochlorite for the disinfection of potable water
- Addition of chemicals depending on the measured value, e.g. metering of acid and alkali for pH neutralisation in waste water treatment
- Time-controlled addition of chemicals in the cooling water circuit
- Pulse-controlled metering in the bottling of different volumes e.g. glycerin filling of manometers



P\_SI\_0065\_C1

1: Diaphragm rupture sensor







## 1.3 Motor-Driven Metering Pumps

### Sigma Basic Type Control Functions (S2Ba)

#### Stroke length actuator/controller

**Actuator:** Electronically regulated actuator with contactless position detection for automatic stroke length adjustment, actuating period approx. 1 second for 1% stroke length, return potentiometer 1 k $\Omega$ , degree of protection IP 65.

**Control drive:** Electronically regulated actuator with position detection, with no contact with the media, consisting of an actuator and integral servo controller for stroke length adjustment via a standard signal. Standard current input 0/4-20 mA corresponds to stroke length 0 – 100%, switch-over for manual / automatic operation, stroke adjustment in manual mode, electronic stroke length position display, wide-range voltage power unit 85 - 265 V 50/60 Hz, degree of protection Ip65, actual value output 0/4-20 mA for remote display.

#### Speed controllers with frequency converter (identity code specification Z)

The speed controller assembly consists of a frequency converter and a variable speed motor of 0.37 kW.

### "Physiologically safe" designs in respect to wetted sealing material

#### FDA

Wetted materials in the "FDA" (F) version comply with the FDA Guidelines.

FDA Guidelines: Material PTFE: FDA No. 21 CFR § 177.1550, material PVDF: FDA No. 21 CFR § 177.2510

Available for pump design plastic (PV) and stainless steel (SS)

Identity code example: S2BaHM07220PV F S000S000

#### EU Regulation 1935/2004

Sealing materials in accordance with Regulation (EC) 1935/2004 are available in the stainless steel material version "Physiologically safe for wetted material in accordance with Regulation (EC) 1935/2004".

Available for stainless steel (SS) pump design.

Dosing heads with a hygienic design are available on request for hygienically demanding applications.

## 1.3 Motor-Driven Metering Pumps

### Technical Data

Type S2Ba	With 1500 rpm motor at 50 Hz				With 1800 rpm motor at 60 Hz			Suction lift  m WC	Perm. pre- pressure suction side  bar	Connection suction/ discharge side  G-DN	Shipping weight  kg
	Delivery rate at max. back pressure			Max. stroke rate  Strokes/ min	Delivery rate at max. back pressure		Max. stroke rate  Strokes/ min				
	bar	l/h	ml/ stroke		psi	l/h/gph (US)					
16050 PVT	10	50	11.4	73	145	60.0/15.8	87	7	3	1-15	15
16050 SST	16	47	11.4	73	232	56.0/14.7	87	7	3	1-15	20
16090 PVT	10	88	11.4	132	145	106.0/28.0	158	7	3	1-15	15
16090 SST	16	82	11.4	132	232	98.4/25.9	158	7	3	1-15	20
16130 PVT	10	135	10.9	198	145	156.0/41.2	238	7	3	1-15	15
16130 SST	16	124	10.9	198	232	148.0/39.0	238	7	3	1-15	20
07120 PVT	7	126	27.4	73	102	150.0/39.6	87	5	1	1 1/2-25*	16
07120 SST	7	126	27.4	73	102	150.0/39.6	87	5	1	1 1/2-25*	24
07220 PVT	7	220	27.7	132	102	264.0/69.7	158	5	1	1 1/2-25*	16
07220 SST	7	220	27.7	132	102	264.0/69.7	158	5	1	1 1/2-25*	24
04350 PVT	4	350	29.4	198	58	420.0/110.9	238	5	1	1 1/2-25*	16
04350 SST	4	350	29.4	198	58	420.0/110.9	238	5	1	1 1/2-25*	24

Performance data for TTT, see type PVT

\* With Sigma types 07120, 07220 and 04350, the dosing head is fitted with DN 25 (G 1 1/2) valves. As DN 20 is generally sufficient for these types of pipes (see technical data, suction/discharge side connector), the connector parts that can be ordered under the identity code (e.g. inserts) are already reduced to DN 20, i.e. piping and accessories can be installed in DN 20.

### Materials in Contact With the Medium

Material	Dosing head	Suction/pressure connector	Seals/ball seat	Balls	Integral relief valve
PVT	PVDF	PVDF	PTFE/PTFE	Ceramic/glass*	PVDF/FKM or EPDM
SST	Stainless steel 1.4404	Stainless steel 1.4581	PTFE/PTFE	Stainless steel 1.4404	Stainless steel/FKM or EPDM
TTT**	PTFE + 25% carbon	PTFE + 25% carbon	PTFE/PTFE	Ceramic/glass*	–

\* with 07120, 07220, 04350

\*\* specifically for areas at risk from explosion

Sealing material "F" - "FDA" ball seat version: PVDF

Sealing material "G" - (EC) Regulation 1935/2004" ball seat version: 1.4404

### Motor Data

Identity code specification	Power supply	Δ/Y	Remarks		
S	3-phase, IP 55	220 – 240 V/380 – 420 V	50 Hz	0.25 kW	
		220 – 280 V/440 – 480 V	60 Hz	0.25 kW	
T	3-phase, IP 55	220 – 240 V/380 – 420 V	50 Hz	0.25 kW	with PTC, speed control range 1:5
		220 – 280 V/440 – 480 V	60 Hz		
R	3-phase, IP 55	220 – 240 V/380 – 420 V	50 Hz	0.37 kW	with PTC, speed adjustment range 1:20 with external fan (1-phase 230 V; 50/60Hz, 134 W)
M	1-phase AC, IP 55	230 V ± 5 %	50/60 Hz	0.18 kW	
N	1-phase AC, IP 55	115 V ± 5 %	60 Hz	0.18 kW	
L1	3-phase, II2GExIICT3	220 – 240 V/380 – 420 V	50 Hz	0.18 kW	
L2	3-phase, II2GExIICT4	220 – 240 V/380 – 420 V	50 Hz	0.18 kW	with PTC, speed control range 1:5
P1	3-phase, II2GExIICT3	250 – 280 V/440 – 480 V	60 Hz	0.18 kW	
P2	3-phase, II2GExIICT4	250 – 280 V/440 – 480 V	60 Hz	0.21 kW	with PTC, speed control range 1:5

Motor data sheets can be requested for more information. Special motors or special motor flanges are available on request.

Motors less than 0.75 kW and motors designed for speed-controllable operation are not subject to the IE3 standard in compliance with the Ecodesign Directive 2009/125/EC.

#### Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/EU in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label corresponds to or is better than the conditions prevalent in the intended field of application.



## 1.3 Motor-Driven Metering Pumps

### Identity Code Ordering System for Sigma/ 2 Basic Type (S2Ba)

S2Ba	Drive type	
	HM	Main drive, diaphragm
		<b>Pump type</b>
		bar l/h
		16050 16 47
		16090 16 82
		16130 16 124
		07120 7 126
		07220 7 220
		04350 4 350
		<b>Liquid end material</b>
		PV PVDF (max. 10 bar)
		SS Stainless steel
		TT PTFE + 25% carbon (max. 10 bar)
		<b>Seal material</b>
		T PTFE seal
		F FDA-compliant
		<b>Diaphragm</b>
		S Multi-layer safety diaphragm with optical rupture indicator
		A Multi-layer safety diaphragm with rupture signalling (contact)
		<b>Liquid end version</b>
		0 No spring
		1 With 2 valve springs, Hastelloy C4, 0.1 bar
		4** With pressure relief valve, FKM seal, no valve spring, only with PV and SS
		5** With pressure relief valve, FKM seal with valve springs, only with PV and SS
		6** With pressure relief valve, EPDM seal, without valve spring, only with PV and SS
		7** With pressure relief valve, EPDM seal, with valve spring, only with PV and SS
		<b>Hydraulic connection</b>
		0 Standard
		1 Union nut and PVC insert
		2 Union nut and PP insert
		3 Union nut and PVDF insert
		4 Union nut and SS*** insert
		7 Union nut and PVDF hose nozzle
		8 Union nut and SS hose nozzle
		9 Union nut and stainless steel hose nozzle
		<b>Version</b>
		0 With ProMinent® logo (standard)
		1 Without ProMinent® logo
		M Modified
		<b>Electrical power supply</b>
		S 3 ph, 230 V/400 V 50/60 Hz
		T 3 ph, 230 V/400 V 50/60 Hz, with PTC
		R Variable speed motor 3 ph, 230/400 V, with PTC, with external fan 1 ph 230 V 50/60 Hz
		Z Speed control compl 1 ph 230 V, 50/60 Hz (variable speed motor + FC)
		M 1 ph, AC, 230 V/50/60 Hz
		N 1 ph, AC, 115 V, 60 Hz
		L 3 ph, 230 V/400 V, 50 Hz, (Exe, Exd)
		P 3 ph, 265 V/440 V, 60 Hz, (Exe, Exd)
		1 No motor, with B14 flange, Gr. 71 DIN
		2 No motor, with flange NEMA 56 C
		3 No motor, with B5 flange, Gr. 63 DIN
		<b>Enclosure rating</b>
		0 IP 55 (standard)
		1 Ex-design ATEX-T3
		2 Ex-design ATEX-T4
		<b>Stroke sensor</b>
		0 No stroke sensor (standard)
		2 Pacing relay (reed relay)
		3 Stroke sensor (Namur) for hazardous locations
		<b>Stroke length adjustment</b>
		0 Manual (standard)
		1 with servomotor, 85...265 V AC 50/60 Hz
		3 with stroke control motor 0...20 mA 85...265 V AC 50/60 Hz
		4 with stroke control motor 4...20 mA 85...265 V AC 50/60 Hz

\* 10 bar with the PVDF and TTT version.

\*\* Standard with tube nozzle in the bypass. Threaded connection on request.

\*\*\* Internal thread of the insert SS DN15-Rp 1/2, DN25/20-G 3/4

Dosing heads in an electropolished design ( $\leq Ra\ 0.8\ \mu m$ ) are available on request.

Sealing materials in compliance with (EC) Regulation 1935/2004 stainless steel version on request.

## 1.3 Motor-Driven Metering Pumps

### Spare parts for Sigma/ 2 Basic type (S2Ba)

The spare parts kit generally includes the wear parts for the liquid ends.

#### Scope of delivery with PVT material version:

- 1 diaphragm
- 2 valves, complete
- 2 valve balls
- 2 ball seats
- 4 composite seals
- 1 elastomer sealing set (EPDM, FKM-B)

#### Scope of delivery with SST material version:

- 1 diaphragm
- 2 valve balls
- 2 ball seat discs
- 4 composite seals

### Spare Parts Kit for Sigma/ 2 for Design With Multi-layer Safety Diaphragm

(Applies to identity code types 16050, 16090, 16130, 12050, 12090 and 12130)

Liquid end	Materials in contact with the medium		Order no.
FM 130 - DN 15	PVT	–	1035951
FM 130 - DN 15	TTT	with 2 valves cpl.	1077573
FM 130 - DN 15	SST	–	1035957
FM 130 - DN 15	SST	with 2 valves cpl.	1035954

(Applies to identity code types 07120, 07220 and 04350)

Liquid end	Materials in contact with the medium		Order no.
FM 350 - DN 25	PVT	–	1035953
FM 350 - DN 25	TTT	with 2 valves cpl.	1077574
FM 350 - DN 25	SST	–	1035960
FM 350 - DN 25	SST	with 2 valves cpl.	1035959

### Spare Parts Kits for Sigma/ 2 for Design With Old Diaphragm

(Applies to identity code types 16050, 16090, 16130, 12050, 12090 and 12130)

Liquid end	Materials in contact with the medium		Order no.
FM 130 - DN 15	PVT	–	740324
FM 130 - DN 15	SST	–	740326
FM 130 - DN 15	SST	with 2 valves cpl.	740328

(Applies to identity code types 07120, 07220 and 04350)

Liquid end	Materials in contact with the medium		Order no.
FM 350 - DN 25	PVT	–	740325
FM 350 - DN 25	SST	–	740327
FM 350 - DN 25	SST	with 2 valves cpl.	740329

### Spare parts kit for Sigma/ 2 for FDA and Regulation (EC) 1935/2004 design

(Applies to identity code types 16050, 16090, 16130, 12050, 12090 and 12130)

Liquid end	Wetted materials.		Order no.
FM 130 - DN 15	PVT FDA	–	1046472
FM 130 - DN 15	SST FDA	without valve	1046473
FM 130 - DN 15	SST FDA	with valve	1046474
FM 130 - DN 15	SST Regulation (EC) 1935/2004	without valve	1105335
FM 130 - DN 15	SST Regulation (EC) 1935/2004	with valve	1105332



## 1.3 Motor-Driven Metering Pumps

(Applies to identity code types 07120, 07220 and 04350)

Liquid end	Wetted materials.			Order no.
FM 350 - DN 25	PVT	FDA	–	1046475
FM 350 - DN 25	SST	FDA	without valve	1046476
FM 350 - DN 25	SST	FDA	with valve	1046477
FM 350 - DN 25	SST	Regulation (EC) 1935/2004	without valve	1105334
FM 350 - DN 25	SST	Regulation (EC) 1935/2004	with valve	1105333

### Multi-layer Safety Diaphragm (Standard)

	Order no.
FM 130 (type: 16050, 16090, 16130)	1029771
FM 350 (type: 07120, 07220, 04350)	1033422

### Metering Diaphragm (Old Version)

	Order no.
Sigma with FM 130 identity code: Type 16050, 16090, 16130	792495
Sigma with FM 350 identity code: Type 07120, 07220, 04350	792496

### Spare Parts Kits for Integrated Relief Valve

Consisting of two compression springs made from Hastelloy C and four FKM-A and EPDM O-rings each

	For material	Seals	Order no.
Spare parts kits for integrated relief valve 4 bar	PVT/SST	FKM-A/EPDM	1031199
Spare parts kits for integrated relief valve 7 bar	PVT/SST	FKM-A/EPDM	1031200
Spare parts kits for integrated relief valve 10 bar	PVT	FKM-A/EPDM	1031201
Spare parts kit for relief valve 16 bar	SST	FKM-A/EPDM	1031203

### Gear Oil

	Volume l	Order no.
Mobilgear 634 VG 460 gear oil	1	1004542

### Accessories

- Foot Valves for Low-Pressure Metering Pumps see page → 1-139
- Injection Valve for Low-Pressure Metering Pumps see page → 1-144
- Hoses and pipework for low-pressure metering pumps see page → 1-169
- Suction Lances, Suction Kit Without Level Switch see page → 1-187
- Connectors, Fittings, Connector Kits, Seals see page → 1-172
- Speed Controllers see page → 1-212
- Metering monitor Flow Control set up for motor-driven metering pumps see page → 1-207

### Spare Parts

- Custom Valve Balls/Valve Springs See page → 1-204



## 1.3 Motor-Driven Metering Pumps

### 1.3.7

### Motor-Driven Metering Pump Sigma X Control Type – Sigma/ 2 - S2Cb

**The new Sigma X range – reliable, smart and connectible**

**Capacity range S2Cb: 61 – 353 l/h, 16 – 4 bar**

The Sigma control type is a smart motor-driven metering pump that is setting new standards in terms of productivity, reliability and safety.

The Sigma X diaphragm metering pump covers a capacity range of 21 to 1,040 l/h in versions S1Cb, S2Cb and S3Cb. Its patented multi-layer safety diaphragm guarantees maximum process reliability. Efficient protection of the power end from overloading by means of an integral frequency converter with microprocessor control(ler).

One highlight is the standardised operating concept with click wheel and 4 additional operating keys on a removable operating unit. A large illuminated LCD and a 3-LED display for operating, warning and error messages, visible from all sides, offers additional operating convenience.

The Sigma, like all smart ProMinent metering pumps, can be flexibly connected to various bus systems.

It has a large adjustment range thanks to a combination of frequency and stroke length adjustment. The pump works with high precision across the entire frequency range. Accurate and complication-free metering of viscous and gaseous media by adjustment of the movement profile.

Operating statuses are simply remotely transmitted via an additional output or relay module. A built-in timer, included as standard, controls time-dependent metering cycles.

Relevant spare parts can be shown in the display. The integral log book significantly improves process management, optimisation and troubleshooting.

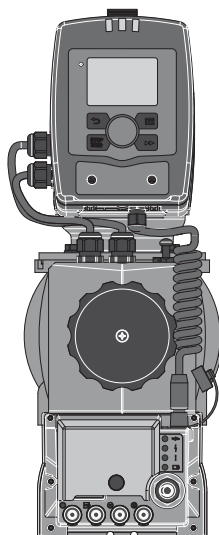
#### Your benefits

- Safe: In the event of an accident, the feed chemical does not escape to the outside nor into the pump's power end, thanks to the patented multi-layer safety diaphragm with optical (optionally electric) signalling.
- Integrated overload shut-down in the pump control to protect the pump from overloading and thus significantly reduce pressure surges caused by blockages.
- External control is scalable via potential-free contacts with pulse step-up and step-down, batch mode or via a 0/4-20 mA standard signal.
- Flexibly connectible: Connection to process management systems via integral PROFIBUS®, CANopen interface.
- Integral log book saves up to 300 events and simplifies troubleshooting and analysis of the cause.

#### Technical Details

- Stroke length: 5 mm
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually using self-locking rotary dial in 1% increments
- Metering reproducibility is better than  $\pm 2\%$  in the 30 – 100% stroke length adjustment range under defined conditions and with correct installation
- Power supply: 1 pH, 100 – 230 V  $\pm 10\%$ , 240 V  $\pm 6\%$ , 50/60 Hz (110 W)
- Degree of protection IP 65
- Fibreglass-reinforced plastic housing
- Settable manual or external contact mode, factor with external contact control 99:1 – 1:99; batch mode with max. 99,999 strokes/start pulse.
- Display of wear parts in the Service menu.
- Connector for 2-stage level switch.
- Connection to PROFINET using the ProMinent DULConvert PROFIBUS®-PROFINET converter.
- Time-dependent control of the metering volume via integral timer.
- Relay module with 1 x switchover contact, 230 V – 8 A
- Relay module with 2 x On, 24 V – 100 mA
- Output / relay module: 0/4- 20 mA analogue output for remote transmission of the stroke rate plus relay module with 1 x On, 24 V – 100 mA
- The Sigma product range is available in a "Physiologically safe in respect of wetted materials" design.
- Wetted materials: PVDF, stainless steel 1.4571/1.4404, special materials on request
- Dosing heads with electro-polished stainless steel are available for aqueous media with hygienically demanding applications.
- Customised designs are available on request.

For reasons of safety, provide suitable overload protection mechanisms when installing all mechanically deflected diaphragm metering pumps.



P\_SI\_0202\_SW  
Sigma/ 2 control type



P\_SI\_0200\_SW1

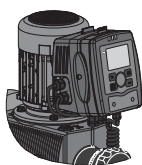


# 1.3 Motor-Driven Metering Pumps

## Field of application

- All industrial applications, either as a stand-alone unit or integrated in a complete system
- Volume-proportional addition of chemicals in water treatment, e.g. sodium-calcium hypochlorite for the disinfection of potable water
- Neutralisation in waste water treatment
- Pulse-controlled metering in the bottling of different volumes e.g. glycerin filling of manometers
- With an integrated timer as a control unit for simple processes, e.g. biocide metering in cooling water

## Operating unit



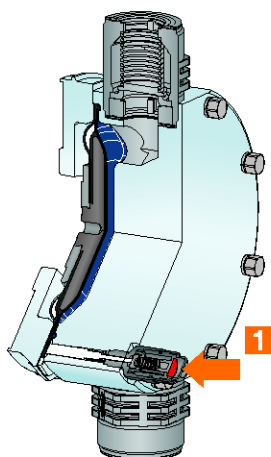
P\_SI\_0200\_SW1

One highlight is the standardised operating concept with gamma and Sigma metering pumps with click wheel and 4 additional operating keys on a removable operating unit. A large illuminated LCD and a 3-LED display for operating, warning and error messages, visible from all sides, offers additional operating convenience.

The Sigma metering pump (control type), like all smart ProMinent metering pumps, can be flexibly connected to various bus systems. Operating statuses are simply remotely transmitted via an additional output or relay module. A built-in timer, included as standard, controls time-dependent metering cycles.

Relevant spare parts can be shown in the display. The integral log book significantly improves process management, optimisation and troubleshooting.

## Multi-layer safety diaphragm



P\_SI\_0065\_C1

1: Diaphragm rupture sensor

The Sigma X represents a durable motor-driven metering pump with integral control and patented multi-layer safety diaphragm, standing out on account of its excellent process reliability. In the event of an accident, the feed chemical does not escape to the outside nor into the pump's power end, thanks to the multi-layer safety diaphragm with optical (optionally electric) signalling.

An additional rear PTFE layer prevents medium from leaking in the event of a diaphragm rupture. In the event of a diaphragm rupture, a simple contact is mechanically triggered by the multi-layer diaphragm. The dosing head remains leak-free during this time, ensuring emergency operation. Simpler technology than the double diaphragm system and independent of the feed chemical, hence a benefit for maintenance / service.

The optical diaphragm rupture warning system is available in the standard scope of delivery.

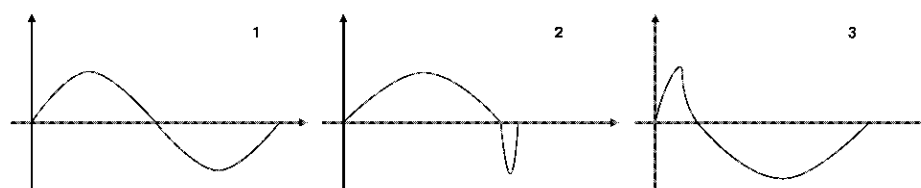
## Metering profiles

Metering profiles guarantee optimum metering results by adapting the metering behaviour of the metering pump to the application or chemical used.

The combination of frequency and stroke length adjustment permits a large adjustment range, with the pump working with excellent precision over the entire frequency range. Adjustment of the movement profile also guarantees precise and trouble-free metering even with viscous and gaseous media.

The stroke motion of the displacement body is continually recorded and regulated so that the stroke is made in line with the desired metering profile. The pump can be operated in normal mode (Diagram 1), with optimised discharge stroke (Diagram 2) or with optimised suction stroke (Diagram 3).

Three typical metering profiles are shown schematically with progress over time.



- 1 Diagram 1: Discharge stroke, suction stroke equal
- 2 Diagram 2: long discharge stroke, short suction stroke
- 3 Diagram 3: short discharge stroke, long suction stroke

P\_SI\_010x\_SW



## 1.3 Motor-Driven Metering Pumps

### "Physiologically safe" designs in respect to wetted sealing material

#### FDA

Wetted materials in the "FDA" (F) version comply with the FDA Guidelines.

FDA Guidelines: Material PTFE: FDA No. 21 CFR § 177.1550, material PVDF: FDA No. 21 CFR § 177.2510

Available for pump design plastic (PV) and stainless steel (SS)

Identity code example: S2CbH16050PV F S010UA1000DE

#### EU Regulation 1935/2004

Sealing materials in accordance with Regulation (EC) 1935/2004 are available in the stainless steel material version "Physiologically safe for wetted material in accordance with Regulation (EC) 1935/2004".

Available for stainless steel (SS) pump design.

Dosing heads with a hygienic design are available on request for hygienically demanding applications.







## 1.3 Motor-Driven Metering Pumps

### Technical Data

Type S2Cb	Delivery rate at max. back pressure			Max. stroke rate	Delivery rate at max. back pressure		Suction lift	Perm. pre-pressure suction side	Connection, suction/discharge side	Shipping weight
	bar	l/h	ml/stroke		psi	gph (US)				
16050 PVT	10	61	11.4	90	145	16.1	7	2	1-15	15
16050 SST	16	56	10.4	90	232	14.8	7	2	1-15	20
16090 PVT	10	109	11.4	160	145	28.8	7	2	1-15	15
16090 SST	16	99	10.3	160	232	26.2	7	2	1-15	20
16130 PVT	10	131	10.9	200	145	34.6	7	2	1-15	15
16130 SST	16	129	10.9	200	232	34.1	7	2	1-15	20
07120 PVT	7	150	27.4	90	102	39.6	5	1	1 1/2-25	16
07120 SST	7	150	27.4	90	102	39.6	5	1	1 1/2-25	24
07220 PVT	7	271	27.7	160	102	71.6	5	1	1 1/2-25	16
07220 SST	7	271	27.7	160	102	71.6	5	1	1 1/2-25	24
04350 PVT	4	353	29.4	200	58	93.3	5	1	1 1/2-25	16
04350 SST	4	353	29.4	200	58	93.3	5	1	1 1/2-25	24

\* With Sigma types 07120, 07220 and 04350, the dosing head is fitted with DN 25 (G 1 1/2) valves. As DN 20 is generally sufficient for these types of pipes (see technical data, suction/discharge side connector), the connector parts that can be ordered under the identity code (e.g. inserts) are already reduced to DN 20, i.e. piping and accessories can be installed in DN 20.

### Materials in Contact With the Medium

Material	Dosing head	Suction/pressure connector	Seals/ball seat	Balls	Integral relief valve
PVT	PVDF	PVDF	PTFE/PTFE	Ceramic/glass*	PVDF/FKM or EPDM
SST	Stainless steel 1.4404	Stainless steel 1.4581	PTFE/PTFE	Stainless steel 1.4404	Stainless steel/FKM or EPDM

\* With 07120, 07220, 04350

Sealing material "F" - "FDA" ball seat version: PVDF

Sealing material "G" - (EC) Regulation 1935/2004" ball seat version: 1.4404

### Motor Data

Identity code specification	Power supply			Remarks
U	1-phase, IP 65	100 – 230 V $\pm 10\%$ / 240 V $\pm 6\%$	50/60 Hz	220 W

Motors less than 0.75 kW and motors designed for speed-controllable operation are not subject to the IE3 standard in compliance with the Ecodesign Directive 2009/125/EC.

# 1.3 Motor-Driven Metering Pumps

## Identity Code Ordering System for the Sigma/ 2 Control Type (S2Cb)

S2Cb		Drive type	
	H	Main power end, diaphragm	
Pump type			
		bar	l/h
16050	16	56*	
16090	16	99	
16130	16	129	
07120	7	150	
07220	7	271	
04350	4	353	
Dosing head material			
PV	PVDF (max. 10 bar)		
SS	Stainless steel		
Seal material			
T	PTFE seal		
F	FDA-compliant		
Displacement body			
S	Multi-layer safety diaphragm with optical rupture indicator		
A	Multi-layer safety diaphragm with electrical signal		
Dosing head version			
0	no valve spring (standard)		
1	with 2 valve springs, Hastelloy C; 0.1 bar		
2	with bleed valve, FKM seal, no valve spring		
3	with bleed valve, FKM seal, with valve spring		
4**	with relief valve, FPM seal, no valve springs		
5**	with relief valve, FPM seal, with valve springs		
6**	with relief valve, EPDM seal, no valve springs		
7**	with relief valve, EPDM seal, with valve springs		
8	with bleed valve, EPDM seal, no valve spring		
9	with bleed valve, EPDM seal, with valve spring		
Hydraulic connector			
0	Standard connection	4	Union nut and stainless steel*** insert
1	Union nut and PVC insert	7	Union nut and PVDF tube nozzle
2	Union nut and PP insert	8	Union nut and stainless steel tube nozzle
3	Union nut and PVDF insert	9	Union nut and stainless steel welding sleeve
Version			
0	With ProMinent® Logo		
1	Without ProMinent® Logo		
Electric power supply			
U	1 ph, 100 – 230 V ±10%, 240 V ±6%, 50/60 Hz, 220 W		
Cable and plug			
A	2 m Europe		
B	2 m Swiss		
C	2 m Australia		
D	2 m USA		
Relay			
0	No relay		
1	Fault indicating relay (230 V, 8 A)		
3	Fault indicating relay (24 V, 100 mA) + pacing relay (24 V, 100 mA)		
8	0/4-20 mA analogue output + fault indicating / pacing relay (24 V - 100 mA)		
Control versions			
0	Manual + external contact with pulse control		
1	as per 0 + analogue		
6	As 1 + PROFIBUS® DP interface, M 12		
7	as 1 + CANopen (CiA 402, M12 plug), pump without operating unit (HMI) ****		
Overload switch-off			
0	without overload switch-off		
Operating unit (HMI)			
0	Operating unit with Click Wheel (0.5 m cable)		
4	Operating unit with Click Wheel + 2 m cable		
5	Operating unit with Click Wheel + 5 m cable		
6	Operating unit with Click Wheel + 10 m cable		
X	without operating unit (HMI)		
Access code			
0	without access control		
1	with access control		
Language			
DE	German		
EN	English		
ES	Spanish		
FR	French		
IT	Italian		
NL	Dutch		
PL	Polish		
PT	Portuguese		
CS	Czech		
RU	Russian		
ZH	Chinese		
SV	Swedish		

\* 10 bar with PVDF version.

\*\* Standard with tube nozzle in the bypass. Threaded connection on request.

\*\*\* Internal thread of the insert SS DN15-Rp 1/2, DN25/20-G 3/4

\*\*\*\* An HMI order no. 1042549 is required for manual operation, e.g. with the failure of the CAN bus

Dosing heads in an electropolished design ( $\leq Ra\ 0.8\ \mu m$ ) are available on request.

Sealing materials in compliance with (EC) Regulation 1935/2004 stainless steel version on request.



## 1.3 Motor-Driven Metering Pumps

### Spare parts for Sigma/ 2 Control type (S2Cb)

The spare parts kit generally includes the wear parts for the liquid ends.

#### Scope of delivery with PVT material version:

- 1 diaphragm
- 2 valves, complete
- 2 valve balls
- 2 ball seats
- 4 composite seals
- 1 elastomer sealing set (EPDM, FKM-B)

#### Scope of delivery with SST material version:

- 1 diaphragm
- 2 valve balls
- 2 ball seat discs
- 4 composite seals

### Spare Parts Kit for Sigma/ 2 for Design With Multi-layer Safety Diaphragm

(Applies to identity code types 16050, 16090, 16130, 12050, 12090 and 12130)

Liquid end	Materials in contact with the medium		Order no.
FM 130 - DN 15	PVT	–	1035951
FM 130 - DN 15	TTT	with 2 valves cpl.	1077573
FM 130 - DN 15	SST	–	1035957
FM 130 - DN 15	SST	with 2 valves cpl.	1035954

(Applies to identity code types 07120, 07220 and 04350)

Liquid end	Materials in contact with the medium		Order no.
FM 350 - DN 25	PVT	–	1035953
FM 350 - DN 25	TTT	with 2 valves cpl.	1077574
FM 350 - DN 25	SST	–	1035960
FM 350 - DN 25	SST	with 2 valves cpl.	1035959

### Spare Parts Kits for Sigma/ 2 for Design With Old Diaphragm

(Applies to identity code types 16050, 16090, 16130, 12050, 12090 and 12130)

Liquid end	Materials in contact with the medium		Order no.
FM 130 - DN 15	PVT	–	740324
FM 130 - DN 15	SST	–	740326
FM 130 - DN 15	SST	with 2 valves cpl.	740328

(Applies to identity code types 07120, 07220 and 04350)

Liquid end	Materials in contact with the medium		Order no.
FM 350 - DN 25	PVT	–	740325
FM 350 - DN 25	SST	–	740327
FM 350 - DN 25	SST	with 2 valves cpl.	740329

### Spare parts kit for Sigma/ 2 for FDA and Regulation (EC) 1935/2004 design

(Applies to identity code types 16050, 16090, 16130, 12050, 12090 and 12130)

Liquid end	Wetted materials.			Order no.
FM 130 - DN 15	PVT	FDA	–	1046472
FM 130 - DN 15	SST	FDA	without valve	1046473
FM 130 - DN 15	SST	FDA	with valve	1046474
FM 130 - DN 15	SST	Regulation (EC) 1935/2004	without valve	1105335
FM 130 - DN 15	SST	Regulation (EC) 1935/2004	with valve	1105332

## 1.3 Motor-Driven Metering Pumps

(Applies to identity code types 07120, 07220 and 04350)

Liquid end	Wetted materials.			Order no.
FM 350 - DN 25	PVT	FDA	–	1046475
FM 350 - DN 25	SST	FDA	without valve	1046476
FM 350 - DN 25	SST	FDA	with valve	1046477
FM 350 - DN 25	SST	Regulation (EC) 1935/2004	without valve	1105334
FM 350 - DN 25	SST	Regulation (EC) 1935/2004	with valve	1105333

### Multi-layer Safety Diaphragm (Standard)

	Order no.
FM 130 (type: 16050, 16090, 16130)	1029771
FM 350 (type: 07120, 07220, 04350)	1033422

### Metering Diaphragm (Old Version)

	Order no.
Sigma with FM 130 identity code: Type 16050, 16090, 16130	792495
Sigma with FM 350 identity code: Type 07120, 07220, 04350	792496

### Spare Parts Kit for Integrated Relief Valve (S2Ca, S2Cb)

Consisting of two compression springs made from Hastelloy C and four FKM-A and EPDM O-rings each

	For material	Seals	Order no.
Spare parts kits for integrated relief valve 4 bar	PVT/SST	FKM-A/EPDM	1031199
Spare parts kits for integrated relief valve 7 bar	PVT/SST	FKM-A/EPDM	1031200
Spare parts kits for integrated relief valve 10 bar	PVT	FKM-A/EPDM	1031201
Spare parts kit for relief valve 16 bar	SST	FKM-A/EPDM	1031203

### Gear Oil

	Volume l	Order no.
Mobilgear 634 VG 460 gear oil	1	1004542

### Spare Parts Kits for Integrated Bleed Valve (S2Cb)

Consisting of a compression spring made from Hastelloy C and four FKM-A and EPDM O-rings each

For identity code specification "Dosing head version" with characteristic "2", "3", "8", "9"

	For material	Seals	Order no.
ETS	PVT/SST	FKM-A/EPDM	1043785

### Protective Cowling for Operating Unit (HMI)

Protection of the operating unit (HMI) of Sigma metering pumps against contamination; made from transparent silicone rubber. For Sigma X control types S1Cb, S2Cb and S3Cb.

	Order no.
Protective cowling for operating unit (S1Cb, S2Cb, S3Cb)	1083680





## 1.3 Motor-Driven Metering Pumps

### Wall Bracket for Operating Unit (HMI)

Wall bracket with operating lever for wall mounting of the operating unit (HMI) without any fittings. For Sigma control types S1Cb / S2Cb / S3Cb.

	Order no.
Wall bracket for operating unit (S1Cb, S2Cb, S3Cb)	1036683

### Extension cable for operating unit (HMI)

	Order no.
Connecting cable - CAN M12 5-pole 1 m	1022139
Connecting cable - CAN M12 5-pole 2 m	1022140
Connecting cable - CAN M12 5-pole 5 m	1022141
Connecting cable - CAN M12 5-pin. 10 m	1046383

### Accessories of CANopen operation

An operating unit is needed for the manual operation of a CANopen pump.

	Order no.
Operating unit (HMI) Sigma X - S1Cb	1092957

### Accessories

- Foot Valves see page → 1-139
- Injection Valves see page → 1-144
- Connector Parts, Seals, Hoses see page → 1-169
- Suction Lances/Suction Assemblies see page → 1-187
- Speed Controllers see page → 1-212
- Metering monitor Flow Control set up for motor-driven metering pumps see page → 1-207

### Spare Parts

- Custom Valve Balls/Valve Springs See page → 1-204

# 1.3 Motor-Driven Metering Pumps

## 1.3.8

## Motor-Driven Metering Pump Sigma/ 3 (Basic Type)

**The robust pump for safe and reliable use**

**Capacity range 146 – 1,030 l/h, 12 – 4 bar**

The patented multi-layer safety diaphragm for excellent process reliability is just one feature of the extremely robust motor-driven metering pump Sigma/3 Basic. It also offers a wide range of power end versions, such as three-phase or 1-phase AC motors, also for use in ATEX areas.

The Sigma/ 3 diaphragm metering pump together with pumps of type Sigma/ 1 and Sigma/ 2 represent an integrated product range. They cover the capacity range from 17 to 1,030 l/h, with a consistent operating concept, control concept and spare parts management. A wide range of power end versions is available, including some for use in areas at risk from explosion.

### Your benefits

Excellent process reliability:

- In the event of an accident, the feed chemical does not escape to the outside nor into the pump's power end, thanks to the patented multi-layer safety diaphragm with optical (optionally electric) signalling
- Integrated relief valve protects the pump against overloading
- Reliable operation by bleed option during the suction process

Flexible adaptation to the process:

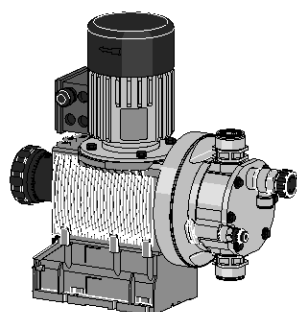
- The entire Sigma product range is available as standard in a "Physiologically safe in respect of wetted materials" design.
- Metering pumps with electro-polished stainless steel metering head enable them to be used in hygienically challenging applications
- Wide range of power end versions, also for use in areas at risk from explosion, and different flange designs for the use of customised motors
- Customised designs are available on request

### Technical Details

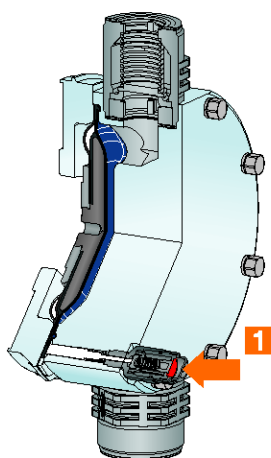
- Stroke length: 6 mm,
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually by self-locking rotary dial in 1 % increments (optionally with actuator or control drive)
- Metering reproducibility is better than  $\pm 2\%$  in the 30 – 100 % stroke length adjustment range under defined conditions and with correct installation.
- Wetted materials: PVDF, stainless steel 1.4571/1.4404, special materials on request
- Patented multi-layer safety diaphragm with optical diaphragm rupture display (optionally with diaphragm rupture warning system via a contact)
- Integrated hydraulic relief and bleed valve
- A wide range of power end versions is available: Three-phase standard motor, 1-phase AC motor, motors for use in Exe and Exde areas and different flange designs for use in customer-specific motors
- For areas at risk from explosion II 2G Ex h IIC T3 Gb X or II 2G Ex h IIC T4 Gb X (optional)
- Degree of protection IP 55
- Highly rigid fibreglass-reinforced plastic housing with excellent chemical resistance
- For reasons of safety, provide suitable overload protection mechanisms when installing all mechanically deflected diaphragm metering pumps.

### Field of application

- Volume-proportional addition of chemicals in water treatment, e.g. sodium-calcium hypochlorite for the disinfection of potable water
- Addition of chemicals depending on the measured value, e.g. metering of acid and alkali for pH neutralisation in waste water treatment
- Time-controlled addition of chemicals in the cooling water circuit
- Pulse-controlled metering in the bottling of different volumes e.g. glycerin filling of manometers



P\_SI\_0132\_SW  
Sigma/ 3



P\_SI\_0065\_C1  
1: Diaphragm rupture sensor



## 1.3 Motor-Driven Metering Pumps

### Sigma Basic Type Control Functions (S3Ba)

#### Stroke length actuator/controller

**Actuator:** Electronically regulated actuator with contactless position detection for automatic stroke length adjustment, actuating period approx. 1 second for 1% stroke length, return potentiometer 1 kOhm, degree of protection IP 65.

**Control drive:** Electronically regulated actuated with position detection, with no contact with the media, consisting of an actuator and integral servo controller for stroke length adjustment via a standard signal. Standard signal current input 0/4-20 mA corresponds to stroke length 0 - 100 %. Switch-over for manual / automatic operation, stroke adjustment in manual mode, electronic position display of stroke length, wide-range voltage power unit 85 - 265 V 50/60 Hz, degree of protection Ip65, actual value output 0/4-20 mA for remote display.

#### Speed controllers in metal housing (identity code characteristic Z)

The speed controller assembly consists of a speed controller and a 0.55 kW variable speed motor.

### "Physiologically safe" designs in respect to wetted sealing material for pump type: DN25 - 120145, 120190, 120270

#### FDA

Wetted materials in the "FDA" (F) version comply with the FDA Guidelines.

FDA Guidelines: Material PTFE: FDA No. 21 CFR § 177.1550, material PVDF: FDA No. 21 CFR § 177.2510

Available for pump design plastic (PV) and stainless steel (SS) and DN 25 ball valve.

Identity code example: S3BaH120330PV F S000S000

#### EU Regulation 1935/2004

Sealing materials in accordance with Regulation (EC) 1935/2004 are available in the stainless steel material version "Physiologically safe for wetted material in accordance with Regulation (EC) 1935/2004".

Available for pump design stainless steel (SS) and DN 25 ball valves.

Dosing heads with a hygienic design are available on request for hygienically demanding applications.

## 1.3 Motor-Driven Metering Pumps

### Technical Data

Type S3Ba	With 1500 rpm motor at 50 Hz				With 1800 rpm motor at 60 Hz			Suction lift	Perm. pre-pressure suction side	Connection, suction/ discharge side	Shipping weight
	Delivery rate at max. back pressure		Max. stroke rate	Delivery rate at max. back pressure		Max. stroke rate					
	bar	l/h		ml/ stroke	Strokes/ min		psi				
120145 PVT	10	146	33.7	72	145	174/45.9	86	5	2	1 1/2-25	22
120145 SST	12	146	33.7	72	174	174/45.9	86	5	2	1 1/2-25	26
120190 PVT	10	208	33.7	103	145	251/66.3	124	5	2	1 1/2-25	22
120190 SST	12	208	33.7	103	174	251/66.3	124	5	2	1 1/2-25	26
120270 PVT	10	292	33.8	144	145	351/92.7	173	5	2	1 1/2-25	22
120270 SST	12	292	33.8	144	174	351/92.7	173	5	2	1 1/2-25	26
120330 PVT*	10	365	33.8	180	—		—	5	2	1 1/2-25	22
120330 SST*	12	365	33.8	180	—		—	5	2	1 1/2-25	26
070410 PVT	7	410	95.1	72	102	492/129.9	86	4	1	2-32-**	24
070410 SST	7	410	95.1	72	102	492/129.9	86	4	1	2-32-**	29
070580 PVT	7	580	95.1	103	102	696/183.8	124	4	1	2-32-**	24
070580 SST	7	580	95.1	103	102	696/183.8	124	4	1	2-32-**	29
040830 PVT	4	830	95.1	144	58	1,000/264.1	173	3	1	2-32-**	24
040830 SST	4	830	95.1	144	58	1,000/264.1	173	3	1	2-32-**	29
041030 PVT*	4	1,030	95.1	180	—		—	3	1	2-32-**	24
041030 SST*	4	1,030	95.1	180	—		—	3	1	2-32-**	29

Performance data for TTT, see type PVT

\* only available for 50 Hz.

\*\* DN32 plate valves with valve spring

### Materials in Contact With the Medium

Material	Seals	DN 25 ball valves			DN 32 plate valves			Integral relief valve
		Suction/pressure connector on dosing head	Valve balls	Valve seats	Suction/pressure connector on dosing head	Valve plates/ valve springs	Valve seats	
PVT	PTFE	PVDF	Glass	PTFE**	PVDF	Ceramic/ Hast C. + CTFE*	PTFE	PVDF/FKM or EPDM
SST	PTFE	Stainless steel 1.4581	Stainless steel 1.4404	PTFE**	Stainless steel 1.4581	Stainless steel 1.4404/ Hast. C	PTFE	Stainless steel/ FKM or EPDM
TTT***	PTFE	PTFE + 25% carbon	Ceramic	PTFE**	PVDF	Ceramic/ Hast C. + CTFE*	PTFE	–

\* The valve spring is coated with CTFE (resistance similar to PTFE)

\*\* On design "F", the ball seat is made of PVDF, only for DN 25 ball valves

\*\*\* Specifically for areas at risk from explosion DN25: PTFE + 25% carbon; DN32 plate valves: PVDF

### Motor Data

Identity code specification	Power supply	Δ/Y	Remarks
S	3-phase, IP 55	220 – 240 V/380 – 420 V 50 Hz 250 – 280 V/440 – 480 V 60 Hz	0.37 kW 0.37 kW
T	3-phase, IP 55	220 – 240 V/380 – 420 V 50 Hz 250 – 280 V/440 – 480 V 60 Hz	0.37 kW with PTC, speed control range 1:5
R	3-phase, IP 55	220 – 240 V/380 – 420 V 50 Hz	0.55 kW with PTC, speed adjustment range 1:20 with external fan (1-phase 230 V; 50/60Hz, 134 W)
M	1-phase AC, IP 55	230 V ± 5 %	50/60 Hz 0.55 kW
N	1-phase AC, IP 55	115 V ± 5 %	60 Hz 0.55 kW
L1	3-phase, II2GExellT3	220 – 240 V/380 – 420 V 50 Hz	0.37 kW
L2	3-phase, II2GExdllCT4	220 – 240 V/380 – 420 V 50 Hz	0.37 kW with PTC, speed control range 1:5
P1	3-phase, II2GExellT3	250 – 280 V/440 – 480 V 60 Hz	0.37 kW
P2	3-phase, II2GExdllCT4	250 – 280 V/440 – 480 V 60 Hz	0.37 kW with PTC, speed control range 1:5
V2	3-phase, II2GExdllCT4	400 V ± 10 %	50/60 Hz 0.55 kW Ex-variable speed motor with integrated frequency converter. Mains feed: 3-phase + neutral + earth, adjustment range 1:10

Motor data sheets can be requested for more information. Special motors or special motor flanges are available on request.

### Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/EU in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label corresponds to or is better than the conditions prevalent in the intended field of application.





# 1.3 Motor-Driven Metering Pumps

## Identity Code Ordering System for Sigma/ 3 Basic Type (S3Ba)

S3Ba	Drive type			
H	Main drive, diaphragm			
Pump type				
	bar	l/h	bar	l/h
120145	12	146*	070410	7 410
120190	12	208	070580	7 580
120270	12	292	040830	4 830
120330	12	365	041030	4 1,030
Liquid end material				
PV	PVDF (max. 10 bar)			
SS	Stainless steel			
TT	PTFE + 25% carbon (max. 10 bar)			
Seals material				
T	PTFE seal			
F	FDA-compliant (only with 12 bar version)			
Diaphragm				
S	Multi-layer safety diaphragm with optical rupture indicator			
A	Multi-layer safety diaphragm with rupture signalling (contact)			
Liquid end version				
0	No valve springs			
1	With 2 valve springs, Hastelloy C 4; 0.1 bar (standard for DN 32)			
4**	With pressure relief valve, FKM seal, no valve springs, only with PV and SS			
5**	With pressure relief valve, FKM seal with valve springs (standard at DN 32), only with PV and SS			
6**	With pressure relief valve, EPDM seal, without valve spring, only with PV and SS			
7**	With pressure relief valve, EPDM seal, with valve springs (standard at DN 32), only with PV and SS			
Hydraulic connection				
0	Standard threaded connector (as technical data)			
1	Union nut and PVC insert			
2	Union nut and PP insert			
3	Union nut and PVDF insert			
4	Union nut and SS insert***			
7	Union nut and PVDF hose nozzle			
8	Union nut and SS hose nozzle			
9	Union nut and stainless steel hose nozzle			
Version				
0	With ProMinent® logo			
1	Without ProMinent® logo			
M	Modified			
Electrical power supply				
S	3 ph, 230 V/400 V			
T	3 ph, 230 V/400 V, with PTC			
R	Variable speed motor 3 ph, 230/400 V, with PTC, with external fan 1 ph 230 V 50/60 Hz			
Z	Speed control compl 1 ph 230 V//400 V (variable speed motor + FC)			
M	1-phase, 230 V, 50/60 Hz			
N	1-phase, 115 V, 60 Hz (not for pump type 041030)			
L	3 ph, 230 V/400 V, 0.37 kW, 50 Hz, (Exe, Exd)			
P	3 ph, 265 V/440 V, 0.37 kW, 60 Hz, (Exe, Exd)			
V (2)	Variable speed motor with integr. FC Exd (delivery with frame)			
1	No motor, with B5 flange, size 80 (DIN)			
2	No motor, with C56 NEMA flange			
3	No motor, with B5 flange, size 71 (DIN)			
Enclosure rating				
0	IP 55			
1	Ex-design ATEX-T3			
2	Ex-design ATEX-T4			
Stroke sensor				
0	No stroke sensor (standard)			
2	Pacing relay (read relay)			
3	Stroke sensor (Namura) for explosion-proof application			
Stroke length adjustment				
0	Manual (standard)			
1	with servomotor, 85...265 V AC 50/60 Hz			
3	with stroke control motor 0...20 mA 85...265 V AC 50/60 Hz			
4	with stroke control motor 4...20 mA 85...265 V AC 50/60 Hz			

\* 10 bar for the PVDF and TTT version

\*\* Standard with threaded connector in the bypass. Hose nozzle on request

\*\*\* Internal thread of the insert SS DN25-Rp 1, DN32-Rp 1 1/4

Dosing heads in an electropolished design ( $\leq Ra\ 0.8\ \mu m$ ) are available on request.

Sealing materials in compliance with (EC) Regulation 1935/2004 stainless steel version on request.

DN 25 to type 120330: Sealing material in compliance with (EC) Regulation 1935/2004 for the stainless steel version is available on request.

We are happy to supply alternative material versions to comply with export conditions for pump capacities > 600 l/h and PVDF.



## 1.3 Motor-Driven Metering Pumps

### Spare parts for Sigma/ 3 Basic type (S3Ba)

The spare parts kit generally includes the wear parts for the liquid ends.

#### Scope of delivery with PVT/ TTT material version:

- 1 diaphragm
- 2 complete valves
- 2 valve balls and/or valve plate with spring for DN 32
- 1 elastomer sealing set (EPDM, FKM-B)
- 2 ball seat housings
- 2 ball seat discs
- 4 composite seals

#### Scope of delivery with SST material version:

- 1 diaphragm
- 2 valve balls and/or valve plate with spring for DN 32
- 2 ball seat discs
- 4 composite seals

### Spare Parts Kits Sigma/ 3 for Design With Multi-layer Safety Diaphragm

(For Identity code: type 120145, 120190, 120270, 120330)

Liquid end	Materials in contact with the medium		Order no.
FM 330 - DN 25	PVT	–	1034678
FM 330 - DN 25	TTT	with 2 valves cpl.	1077575
FM 330 - DN 25	SST	–	1034679
FM 330 - DN 25	SST	with 2 valves cpl.	1034680

(For Identity code: type 070410, 070580, 040830, 041030)

Liquid end	Materials in contact with the medium		Order no.
FM 1000 - DN 32	PVT/PPT/PCT	–	1034681
FM 1000 - DN 32	SST	–	1034682
FM 1000 - DN 32	SST	with 2 valves cpl.	1034683

### Spare Parts Kits for Sigma/ 3 for Design With Old Diaphragm

(Applies to identity code: Type 120145, 120190, 120270, 120330)

Liquid end	Materials in contact with the medium		Order no.
FM 330 - DN 25	PVT	–	1005308
FM 330 - DN 25	SST	–	1005310
FM 330 - DN 25	SST	with 2 valves cpl.	1005312

(Applies to identity code: Type 070410, 070580, 040830, 041030)

Liquid end	Materials in contact with the medium		Order no.
FM 1000 - DN 32	PVT/PPT/PCT	–	1020032
FM 1000 - DN 32	SST	–	1005311
FM 1000 - DN 32	SST	with 2 valves cpl.	1005313

### Spare parts kit for Sigma/ 3 for FDA and Regulation (EC) 1935/2004 (DN 25) version

(For Identity code: type 120145, 120190, 120270, 120330)

Liquid end	Wetted materials.			Order no.
FM 330 - DN 25	PVT	FDA	–	1046478
FM 330 - DN 25	SST	FDA	without valve	1046479
FM 330 - DN 25	SST	FDA	with valve	1046480
FM 330 - DN 25	SST	Regulation (EC) 1935/2004	without valve	1105337
FM 330 - DN 25	SST	Regulation (EC) 1935/2004	with valve	1105336



## 1.3 Motor-Driven Metering Pumps

### Multi-layer Safety Diaphragm (Standard)

	Order no.
FM 330 identity code: type 120145, 120190, 120270, 120330	1029604
FM 1000 identity code: type 070410, 070580, 040830, 041030	1029603

### Metering Diaphragm (Old Version)

	Order no.
FM 330 Identity code: Type 120145, 120190, 120270, 120330	1004604
FM 1000 Identity code: Type 070410, 070580, 040830, 041030	1002835

### Spare Parts Kits for Integrated Relief Valve

Consisting of two compression springs made from Hastelloy C and four FKM-A O-rings each

	For material	Seals	Order no.
Spare parts kit for relief valve 4 bar	PVT/SST	FKM-A/EPDM	1031204
Spare parts kit for relief valve 7 bar	PVT/SST	FKM-A/EPDM	1031205
Spare parts kits for integrated relief valve 10 bar	PVT	FKM-A/EPDM	1031201
Spare parts kits for integrated relief valve 12 bar	SST	FKM-A/EPDM	1031202

### Gear Oil

	Volume l	Order no.
Mobilgear 634 VG 460 gear oil	1	1004542

### Accessories

- Foot Valves for Low-Pressure Metering Pumps see page → 1-139
- Injection Valve for Low-Pressure Metering Pumps see page → 1-144
- Hoses and pipework for low-pressure metering pumps see page → 1-169
- Suction Lances, Suction Kit Without Level Switch see page → 1-187
- Connectors, Fittings, Connector Kits, Seals see page → 1-172
- Speed Controllers see page → 1-212
- Metering monitor Flow Control set up for motor-driven metering pumps see page → 1-207

### Spare Parts

- Custom Valve Balls/Valve Springs See page → 1-204

## 1.3 Motor-Driven Metering Pumps

### 1.3.9

### Motor-Driven Metering Pump Sigma X Control Type – Sigma/ 3 - S3Cb

The new Sigma X range – reliable, smart and connectible

Capacity range S3Cb: 182 – 1,040 l/h, 12 – 4 bar

The Sigma control type is a smart motor-driven metering pump that is setting new standards in terms of productivity, reliability and safety.

The Sigma X diaphragm metering pump covers a capacity range of 21 to 1,040 l/h in versions S1Cb, S2Cb and S3Cb. Its patented multi-layer safety diaphragm guarantees maximum process reliability. Efficient protection of the power end from overloading by means of an integral frequency converter with microprocessor control(ler).

One highlight is the standardised operating concept with click wheel and 4 additional operating keys on a removable operating unit. A large illuminated LCD and a 3-LED display for operating, warning and error messages, visible from all sides, offers additional operating convenience.

The Sigma, like all smart ProMinent metering pumps, can be flexibly connected to various bus systems.

It has a large adjustment range thanks to a combination of frequency and stroke length adjustment. The pump works with high precision across the entire frequency range. Accurate and complication-free metering of viscous and gaseous media by adjustment of the movement profile.

Operating statuses are simply remotely transmitted via an additional output or relay module. A built-in timer, included as standard, controls time-dependent metering cycles.

Relevant spare parts can be shown in the display. The integral log book significantly improves process management, optimisation and troubleshooting.

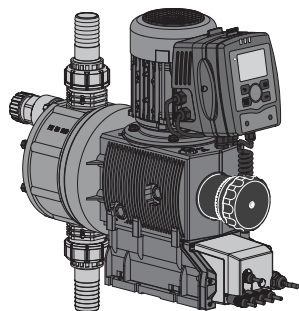
#### Your benefits

- Safe: In the event of an accident, the feed chemical does not escape to the outside nor into the pump's power end, thanks to the patented multi-layer safety diaphragm with optical (optionally electric) signalling.
- Integrated relief valve protects the pump against overloading and reliable operation by means of a bleed option during the metering process.
- External control is scalable via potential-free contacts with pulse step-up and step-down, batch mode or via a 0/4-20 mA standard signal.
- Flexibly connectible: Connection to process management systems via integral PROFIBUS®, CANopen interface.
- Integral log book saves up to 300 events and simplifies troubleshooting and analysis of the cause.

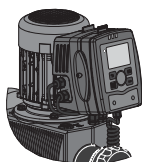
#### Technical Details

- Stroke length: 6 mm
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually using self-locking rotary dial in 1% increments
- Metering reproducibility is better than  $\pm 2\%$  in the 30 – 100% stroke length adjustment range under defined conditions and with correct installation
- Power supply: 1 pH, 100 – 230 V  $\pm 10\%$ , 240 V  $\pm 6\%$ , 50/60 Hz (420 W)
- Degree of protection IP 65
- Fibreglass-reinforced plastic housing
- Settable manual or external contact mode, factor with external contact control 99:1 – 1:99; batch mode with max. 99,999 strokes/start pulse.
- Metering profiles for optimum metering results.
- Display of wear parts in the Service menu.
- Connector for 2-stage level switch.
- Connection to PROFINET using the ProMinent DULConvert PROFIBUS®-PROFINET converter
- Time-dependent control of the metering volume via integral timer.
- Relay module with 1 x switchover contact, 230 V – 8 A
- Relay module with 2 x On, 24 V – 100 mA
- Output / relay module: 0/4- 20 mA analogue output for remote transmission of the stroke rate plus relay module with 1 x On, 24 V – 100 mA
- The Sigma product range is available in a "Physiologically safe in respect of wetted materials" design.
- Wetted materials: PVDF, stainless steel 1.4571/1.4404, special materials on request.
- Dosing heads with electro-polished stainless steel for aqueous media are available with hygienically challenging applications.
- We are happy to supply alternative material versions to comply with export conditions for pump capacities of > 600 l/h and PVDF.
- Customised designs are available on request.

For reasons of safety, provide suitable overload protection mechanisms when installing all mechanically deflected diaphragm metering pumps.



P\_SI\_0203\_SW  
Sigma/ 3 control type



P\_SI\_0200\_SW1

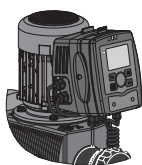


## 1.3 Motor-Driven Metering Pumps

### Field of application

- All industrial applications, either as a stand-alone unit or integrated in a complete system
- Volume-proportional addition of chemicals in water treatment, e.g. sodium-calcium hypochlorite for the disinfection of potable water
- Neutralisation in waste water treatment
- Pulse-controlled metering in the bottling of different volumes e.g. glycerin filling of manometers
- With an integrated timer as a control unit for simple processes, e.g. biocide metering in cooling water

### Operating unit



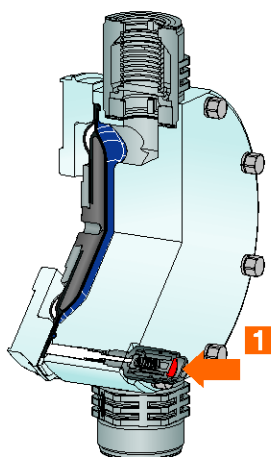
P\_SI\_0200\_SW1

One highlight is the standardised operating concept with gamma and Sigma metering pumps with click wheel and 4 additional operating keys on a removable operating unit. A large illuminated LCD and a 3-LED display for operating, warning and error messages, visible from all sides, offers additional operating convenience.

The Sigma metering pump (control type), like all smart ProMinent metering pumps, can be flexibly connected to various bus systems. Operating statuses are simply remotely transmitted via an additional output or relay module. A built-in timer, included as standard, controls time-dependent metering cycles.

Relevant spare parts can be shown in the display. The integral log book significantly improves process management, optimisation and troubleshooting.

### Multi-layer safety diaphragm



P\_SI\_0065\_C1

1: Diaphragm rupture sensor

The Sigma X represents a durable motor-driven metering pump with integral control and patented multi-layer safety diaphragm, standing out on account of its excellent process reliability. In the event of an accident, the feed chemical does not escape to the outside nor into the pump's power end, thanks to the multi-layer safety diaphragm with optical (optionally electric) signalling.

An additional rear PTFE layer prevents medium from leaking in the event of a diaphragm rupture. In the event of a diaphragm rupture, a simple contact is mechanically triggered by the multi-layer diaphragm. The dosing head remains leak-free during this time, ensuring emergency operation. Simpler technology than the double diaphragm system and independent of the feed chemical, hence a benefit for maintenance / service.

The optical diaphragm rupture warning system is available in the standard scope of delivery.

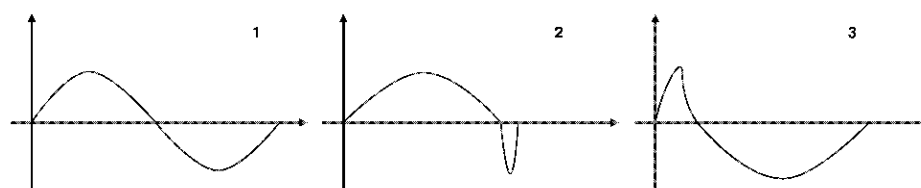
### Metering profiles

Metering profiles guarantee optimum metering results by adapting the metering behaviour of the metering pump to the application or chemical used.

The combination of frequency and stroke length adjustment permits a large adjustment range, with the pump working with excellent precision over the entire frequency range. Adjustment of the movement profile also guarantees precise and trouble-free metering even with viscous and gaseous media.

The stroke motion of the displacement body is continually recorded and regulated so that the stroke is made in line with the desired metering profile. The pump can be operated in normal mode (Diagram 1), with optimised discharge stroke (Diagram 2) or with optimised suction stroke (Diagram 3).

Three typical metering profiles are shown schematically with progress over time.



- 1 Diagram 1: Discharge stroke, suction stroke equal
- 2 Diagram 2: long discharge stroke, short suction stroke
- 3 Diagram 3: short discharge stroke, long suction stroke

P\_SI\_010x\_SW



## 1.3 Motor-Driven Metering Pumps

**"Physiologically safe" designs in respect to wetted sealing material for pump type: DN25 - 120145, 120190, 120270**

### **FDA**

Wetted materials in the "FDA" (F) version comply with the FDA Guidelines.

FDA Guidelines: Material PTFE: FDA No. 21 CFR § 177.1550, material PVDF: FDA No. 21 C, FR § 177.2510

Available for pump design plastic (PV) and stainless steel (SS) and DN 25 ball valve.

Identity code example: S3BaH120330PV F S000S000

### **EU Regulation 1935/2004**

Sealing materials in accordance with Regulation (EC) 1935/2004 are available in the stainless steel material version "Physiologically safe for wetted material in accordance with Regulation (EC) 1935/2004".

Available for pump design stainless steel (SS) and DN 25 ball valves.

Dosing heads with a hygienic design are available on request for hygienically demanding applications.





## 1.3 Motor-Driven Metering Pumps

### Technical Data

Type S3Cb	Delivery rate at max. back pressure			Max. stroke rate	Delivery rate at max. back pressure		Suction lift	Perm. pre-pressure suction side	Connection, suction/discharge side	Shipping weight
	bar	l/h	ml/stroke		psi	gph (US)				
120145 PVT	10	182	33.7	90	145	48.0	5	2	1 1/2-25	22
120145 SST	12	182	33.7	90	174	48.0	5	2	1 1/2-25	26
120190 PVT	10	243	33.7	120	145	64.1	5	2	1 1/2-25	22
120190 SST	12	243	33.7	120	174	64.1	5	2	1 1/2-25	26
120270 PVT	10	365	33.8	180	145	96.4	5	2	1 1/2-25	22
120270 SST	12	365	33.8	180	174	96.4	5	2	1 1/2-25	26
070410 PVT	7	500	95.1	90	102	132.0	4	1	2-32-*	24
070410 SST	7	500	95.1	90	102	132.0	4	1	2-32-*	29
070580 PVT	7	670	95.1	120	102	176.9	4	1	2-32-*	24
070580 SST	7	670	95.1	120	102	176.9	4	1	2-32-*	29
040830 PVT	4	1,040	95.1	180	58	274.7	3	1	2-32-*	24
040830 SST	4	1,040	95.1	180	58	274.7	3	1	2-32-*	29

\* DN32 plate valves with valve spring

### Materials in Contact With the Medium

Material	Suction/pressure connector on dosing head	DN 25 ball valves			DN 32 plate valves			Integral relief valve
		Seals	Valve balls	Valve seats	Seals	Valve plates/ valve springs	Valve seats	
PVT	PVDF	PTFE	Glass	PTFE**	PTFE	Ceramic/ Hast C. + CTFE*	PTFE	PVDF/FKM or EPDM
SST	Stainless steel 1.4581	PTFE	Stainless steel 1.4404	PTFE**	PTFE	Stainless steel 1.4404/ Hast. C	PTFE	Stainless steel/FKM or EPDM

\* The valve spring is coated with CTFE (resistance similar to PTFE)

\*\* The ball seat is made of PVDF with design "F"

### Motor Data

Identity code specification	Power supply		Remarks
U	1-phase, IP 65	100 – 230 V ±10 % / 240 V ±6 %	50/60 Hz 420 W

Motors less than 0.75 kW and motors designed for speed-controllable operation are not subject to the IE3 standard in compliance with the Ecodesign Directive 2009/125/EC.

# 1.3 Motor-Driven Metering Pumps

## Identity Code Ordering System for the Sigma/ 3 Control Type (S3Cb)

S3Cb	Drive type					
	H	Main power end, diaphragm				
	Pump type					
	bar	l/h	bar	l/h	bar	l/h
120145	12*	182	120270	12*	365	070580 7 670
120190	12*	243	070410	7	500	040830 4 1,040
Dosing head material						
PV	PVDF (max. 10 bar)					
SS	Stainless steel					
Seal material						
T	PTFE seal					
F	FDA-compliant (only with 12 bar version)					
Displacement body						
S	Multi-layer safety diaphragm with optical rupture indicator					
A	Multi-layer safety diaphragm with electrical signal					
Dosing head version						
0	no valve spring (standard)					
1	with 2 valve springs, Hastelloy C; 0.1 bar (standard for DN 32)					
2	with bleed valve, FKM seal, no valve spring					
3	with bleed valve, FKM seal, with valve spring					
4**	with relief valve, FPM seal, no valve springs					
5**	with relief valve, FPM seal, with valve springs					
6**	with relief valve, EPDM seal, no valve springs					
7**	with relief valve, EPDM seal, with valve springs					
8	with bleed valve, EPDM seal, no valve spring					
9	with bleed valve, EPDM seal, with valve spring					
Hydraulic connector						
0	Standard connection					
1	Union nut and PVC insert					
2	Union nut and PP insert					
3	Union nut and PVDF insert					
4	Union nut and stainless steel*** insert					
7	Union nut and PVDF tube nozzle					
8	Union nut and stainless steel tube nozzle					
9	Union nut and stainless steel welding sleeve					
Version						
0	With ProMinent® Logo					
1	Without ProMinent® Logo					
Electric power supply						
U	1 ph, 100 – 230 V ±10%, 240 V ±6%, 50/60 Hz, 420 W					
Cable and plug						
A	2 m Europe					
B	2 m Swiss					
C	2 m Australia					
D	2 m USA					
Relay						
0	No relay					
1	Fault indicating relay (230 V, 8 A)					
3	Fault indicating relay (24 V, 100 mA) + pacing relay (24 V, 100 mA)					
8	0/4-20 mA analogue output + fault indicating / pacing relay (24 V - 100 mA)					
Control versions						
0	Manual + external contact with pulse control					
1	As 0 + analogue + metering profiles					
6	As 1 + PROFIBUS® DP interface, M 12					
7	as 1 + CANopen (CiA 402, M12 plug), pump without operating unit (HMI) ****					
Overload switch-off						
0	without overload switch-off					
Operating unit (HMI)						
0	Operating unit with Click Wheel (0.5 m cable)					
4	Operating unit with Click Wheel + 2 m cable					
5	Operating unit with Click Wheel + 5 m cable					
6	Operating unit with Click Wheel + 10 m cable					
X	without operating unit (HMI)					
Access code						
0	without access control					
1	with access control					
Language						
DE	German					
EN	English					
ES	Spanish					
FR	French					
IT	Italian					
NL	Dutch					
PL	Polish					
PT	Portuguese					
CS	Czech					
RU	Russian					
ZH	Chinese					
SV	Swedish					

\* 10 bar with PVDF version.

\*\* Standard with threaded connector in the bypass. Hose nozzle on request

\*\*\* Internal thread of the insert SS DN25-Rp 1, DN32-Rp 1 1/4

\*\*\*\* An HMI order no. 1042549 is required for manual operation, e.g. with the failure of the CAN bus

Dosing heads in an electropolished design ( $\leq R_a 0.8 \mu m$ ) are available on request.

Sealing materials in compliance with (EC) Regulation 1935/2004 stainless steel version on request.

DN 25 to type 120330: Sealing material in compliance with (EC) Regulation 1935/2004 for the stainless steel version is available on request.

We are happy to supply alternative material versions to comply with export conditions for pump capacities > 600 l/h and PVDF.





## 1.3 Motor-Driven Metering Pumps

### Spare parts for Sigma/ 3 Control type (S3Cb)

The spare parts kit generally includes the wear parts for the liquid ends.

#### Scope of delivery with PVT/ TTT material version:

- 1 diaphragm
- 2 complete valves
- 2 valve balls and/or valve plate with spring for DN 32
- 1 elastomer sealing set (EPDM, FKM-B)
- 2 ball seat housings
- 2 ball seat discs
- 4 composite seals

#### Scope of delivery with SST material version:

- 1 diaphragm
- 2 valve balls and/or valve plate with spring for DN 32
- 2 ball seat discs
- 4 composite seals

### Spare Parts Kits Sigma/ 3 for Design With Multi-layer Safety Diaphragm

(For Identity code: type 120145, 120190, 120270, 120330)

Liquid end	Materials in contact with the medium		Order no.
FM 330 - DN 25	PVT	–	1034678
FM 330 - DN 25	TTT	with 2 valves cpl.	1077575
FM 330 - DN 25	SST	–	1034679
FM 330 - DN 25	SST	with 2 valves cpl.	1034680

(For Identity code: type 070410, 070580, 040830, 041030)

Liquid end	Materials in contact with the medium		Order no.
FM 1000 - DN 32	PVT/PPT/PCT	–	1034681
FM 1000 - DN 32	SST	–	1034682
FM 1000 - DN 32	SST	with 2 valves cpl.	1034683

### Spare Parts Kits for Sigma/ 3 for Design With Old Diaphragm

(Applies to identity code: Type 120145, 120190, 120270, 120330)

Liquid end	Materials in contact with the medium		Order no.
FM 330 - DN 25	PVT	–	1005308
FM 330 - DN 25	SST	–	1005310
FM 330 - DN 25	SST	with 2 valves cpl.	1005312

(Applies to identity code: Type 070410, 070580, 040830, 041030)

Liquid end	Materials in contact with the medium		Order no.
FM 1000 - DN 32	PVT/PPT/PCT	–	1020032
FM 1000 - DN 32	SST	–	1005311
FM 1000 - DN 32	SST	with 2 valves cpl.	1005313

### Spare parts kit for Sigma/ 3 for FDA and Regulation (EC) 1935/2004 (DN 25) version

(For Identity code: type 120145, 120190, 120270, 120330)

Liquid end	Wetted materials.			Order no.
FM 330 - DN 25	PVT	FDA	–	1046478
FM 330 - DN 25	SST	FDA	without valve	1046479
FM 330 - DN 25	SST	FDA	with valve	1046480
FM 330 - DN 25	SST	Regulation (EC) 1935/2004	without valve	1105337
FM 330 - DN 25	SST	Regulation (EC) 1935/2004	with valve	1105336

## 1.3 Motor-Driven Metering Pumps

### Multi-layer Safety Diaphragm (Standard)

	Order no.
FM 330 identity code: type 120145, 120190, 120270, 120330	1029604
FM 1000 identity code: type 070410, 070580, 040830, 041030	1029603

### Metering Diaphragm (Old Version)

	Order no.
FM 330 Identity code: Type 120145, 120190, 120270, 120330	1004604
FM 1000 Identity code: Type 070410, 070580, 040830, 041030	1002835

### Spare Parts Kit for Integrated Relief Valve (S3Ca, S3Cb)

Consisting of two compression springs made from Hastelloy C and four FKM-A O-rings each

	For material	Seals	Order no.
Spare parts kit for relief valve 4 bar	PVT/SST	FKM-A/EPDM	1031204
Spare parts kit for relief valve 7 bar	PVT/SST	FKM-A/EPDM	1031205
Spare parts kits for integrated relief valve 10 bar	PVT	FKM-A/EPDM	1031201
Spare parts kits for integrated relief valve 12 bar	SST	FKM-A/EPDM	1031202

### Gear Oil

	Volume l	Order no.
Mobilgear 634 VG 460 gear oil	1	1004542

### Spare Parts Kits for Integrated Bleed Valve (S3Cb)

Consisting of a compression spring made from Hastelloy C and four FKM-A and EPDM O-rings each

For identity code specification "Dosing head version" with characteristic "2", "3", "8", "9"

	Pump type	For material	Seals	Order no.
ETS	120145, 120190, 120270	PVT/SST	FKM-A/EPDM	1043785
ETS	070410, 070580, 040830	PVT/SST	FKM-A/EPDM	1043786

### Protective Cowling for Operating Unit (HMI)

Protection of the operating unit (HMI) of Sigma metering pumps against contamination; made from transparent silicone rubber. For Sigma X control types S1Cb, S2Cb and S3Cb.

	Order no.
Protective cowling for operating unit (S1Cb, S2Cb, S3Cb)	1083680

### Wall Bracket for Operating Unit (HMI)

Wall bracket with operating lever for wall mounting of the operating unit (HMI) without any fittings. For Sigma control types S1Cb / S2Cb / S3Cb.

	Order no.
Wall bracket for operating unit (S1Cb, S2Cb, S3Cb)	1036683



## 1.3 Motor-Driven Metering Pumps

### Extension cable for operating unit (HMI)

	Order no.
Connecting cable - CAN M12 5-pole 1 m	1022139
Connecting cable - CAN M12 5-pole 2 m	1022140
Connecting cable - CAN M12 5-pole 5 m	1022141
Connecting cable - CAN M12 5-pin. 10 m	1046383

### Accessories of CANopen operation

An operating unit is needed for the manual operation of a CANopen pump.

	Order no.
Operating unit (HMI) Sigma X - S1Cb	1092957

### Accessories

- Foot Valves see page → 1-139
- Injection Valves see page → 1-144
- Connector Parts, Seals, Hoses see page → 1-169
- Suction Lances/Suction Assemblies see page → 1-187
- Speed Controllers see page → 1-212
- Metering monitor Flow Control set up for motor-driven metering pumps see page → 1-207

### Spare Parts

- Custom Valve Balls/Valve Springs See page → 1-204



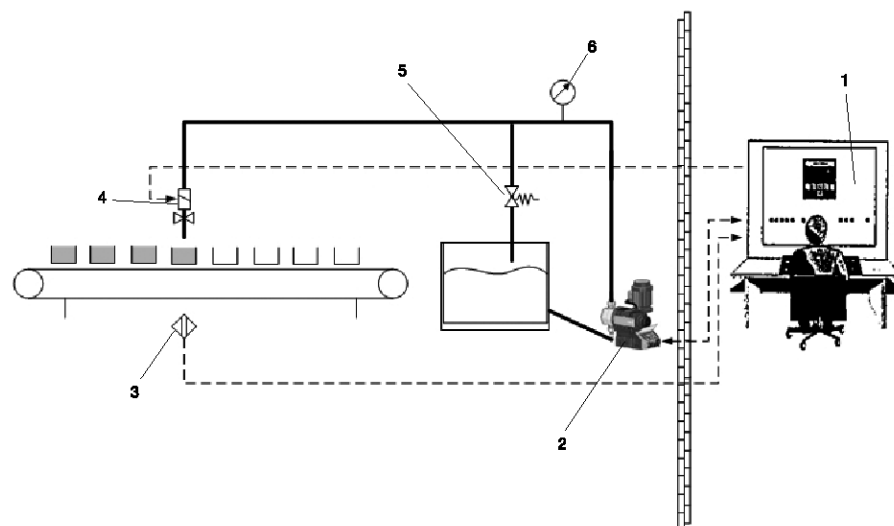
## 1.3 Motor-Driven Metering Pumps

### 1.3.10

### Application Examples

#### Metering of Highly Viscous Substances

Product: **Motor-driven pumps**  
 Metered medium: **Viscous filler**  
 Sector: **Electronics**  
 Application: **Part filling**



- 1 Process control system (master)
- 2 Metering pump, Sigma (field unit)
- 3 Proximity switch
- 4 Solenoid valve
- 5 Overflow valve
- 6 Pressure gauge

pk\_2\_113

#### Problems and requirements

- Metering of a viscous filler into moulds
- Dosing precision  $\pm 2\%$
- Changing filling quantities

#### Operating conditions

- The moulds run on a conveyor belt in "Stop and Go" mode past the point of injection.
- The pump is started by a proximity switch on the conveyor belt (external contact controller).

#### Notes on use

- The process should always start with a compression stroke, i.e. controlled stopping of the diaphragms at the end of the suction stroke.
- If the filling volume varies, select as large a stroke length as possible to improve precision.
- Short and stable suction and metering lines, no pulsation damper - thus reducing the flexible (moving) volume.
- If possible, work with feed, so that the suction line is always filled with liquid even after long periods of idleness.
- A solenoid valve is needed for filling to prevent residual quantities from dripping.

#### Solution

- Metering pump type Sigma X with PROFIBUS® connection
- Relief valve, solenoid valve

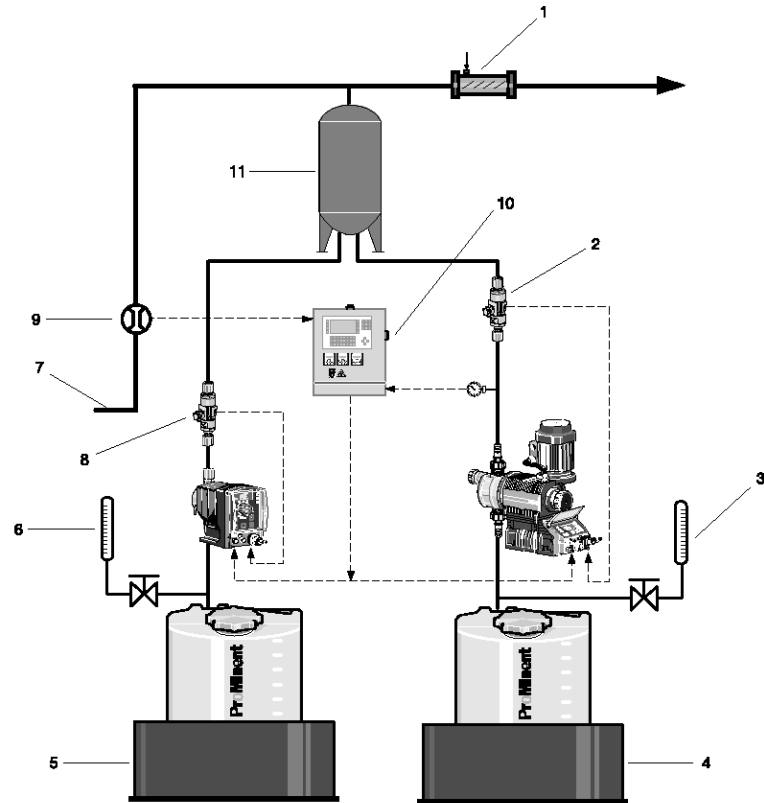
#### Benefits

- Monitoring of the metering pump and adjustment of the metering volume (number of strokes) by PLS in the Control Room
- Lower electrical installation cost
- Integration into the complete process flow thanks to PROFIBUS®
- Safe and precise metering with relief and solenoid valves

## 1.3 Motor-Driven Metering Pumps

### Mixing Two Reagents

Product:	Motor-driven pumps, solenoid-driven pumps
Metered medium:	Chlorine activator, oxidant (NaOCl)
Sector:	Process industry, power stations
Application:	Biocide handling in cooling water systems



- 1 Static mixer
- 2 Flow Control
- 3 Feed measuring unit
- 4 NaOCl solution
- 5 Chlorine activator
- 6 Feed measuring unit
- 7 Motive water
- 8 Flow Control
- 9 Flow rate measurement
- 10 Control cabinet
- 11 Reaction chamber

pk\_2\_114\_1

### Problems and requirements

- Biocide treatment of cooling water systems, used in conjunction with chlorination.
- Chlorine activator is mixed with NaOCl, forming hypobromous acid (HOBr), as an active biocide compound. HOBr is especially effective with pH values within a range of 7.5 to 9.0.
- Provide for a content of 0.5 g/m<sup>3</sup> of active HOBr for 1 hour twice daily for disinfection of the cooling water.

### Operating conditions

- Biologically contaminated water
- Automatic control of the metering pumps

### Notes on use

- Mixing ratio of chlorine activator and NaOCl (12.5%) is 10 l to 26 - 52 l. Undertake tests to determine the precise composition (by the customer).
- Metering pump with timer function controls the second pump and is therefore responsible for batch metering.
- Motor-driven metering pump is protected against overload by a manometer with pressure switch. The manometer is connected to the control system.
- The control system monitors the system and switches it off on receipt of a corresponding signal (error message) from the flow meter.



## 1.3 Motor-Driven Metering Pumps

### Solution

- Metering pump type gamma/ L with timer function (possibly external time switch)
- Metering pump Sigma X - S1Cb
- Metering monitor Flow Control
- Metering equipment
- Manometer with pressure switch

### Benefits

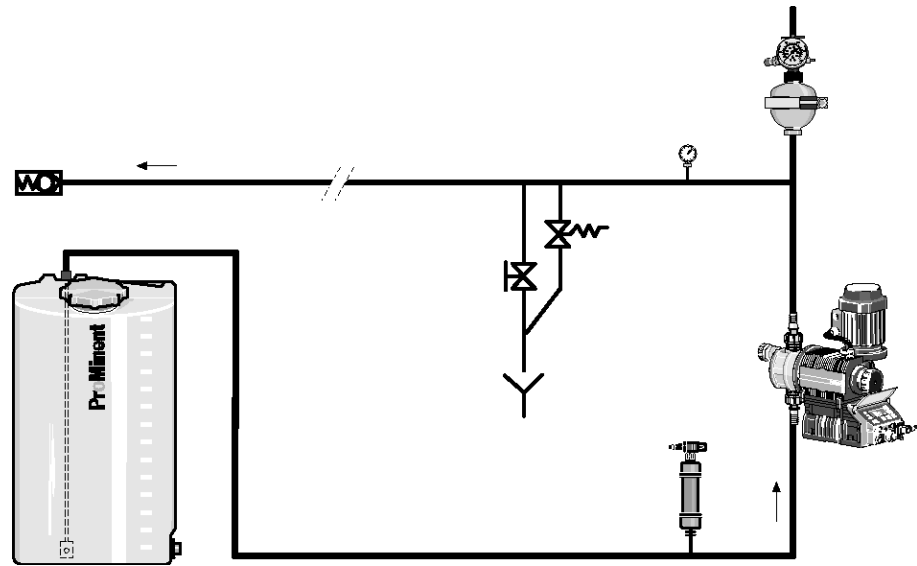
- Good disinfection in alkaline water and water containing ammonia
- Cost-effective raw material base, which is also stable and non-corrosive
- Excellent safety due to flow control
- Simple and effective set-up for optimising the chemical composition through metering equipment.



## 1.3 Motor-Driven Metering Pumps

### Safe and Reliable Chemical Metering with Reduced Pulsation

Product: **Metering pump, accessories**  
 Metered medium: **High viscosity chemicals**  
 Application: **Use of pulsation damper (PD)**



pk\_2\_117

#### Tasks and requirements

- For process-technical reasons, a low-pulsation metering flow is desired.
- Mass accelerating forces during metering, caused by the oscillating movement of the displacement body in connection with the piping geometry need to be reduced.
- Cavitation-free process flow

#### Operating conditions/environment

- Long suction/discharge lines
- Line cross-section with small dimensions
- Metering of high-viscosity, inert media

#### Notes on application

- Pressure surges increase with increasing metering line length and smaller diameter; these may result in impermissible pressure peaks.
- For longer pipes, as well as for higher viscosity media, the need for a PD using a pipe calculation programme is to be evaluated.
- In an oscillating motor-driven metering pump, the maximum flow rate is approx. 3 times greater than the mean, in a solenoid-driven pump approx. 5 times as great. This is to be considered when designing pipings without PD.
- PD should be preloaded with compressed air or nitrogen at approx. 60-80% of the operating pressure to be expected.

#### Solution

- ProMinent® metering pumps
- Pressure-relief/overflow valves
- Pulsation dampers

#### Benefits

- Safe installation preventing damage to pumps and pipes
- Precise metering by avoiding of cavitation
- Compensation of delivery flow fluctuations



## 1.3 Motor-Driven Metering Pumps

### 1.3.11

#### DULCOnneX – digital fluid management

##### Location-independent system monitoring in real time

You always have all the key data and measured values in sight at all times with DULCOnneX. Monitor and document the status of your system in real time. Check your unit data, regardless of where you are, safely and reliably when you're out and about. Simply use the terminal device of your choice: smartphone, tablet or PC.

Refer to our catalogue or website for more information and references.





## 1.4 Peristaltic Pumps DULCO® flex

### 1.4.1

### Peristaltic Pumps DULCO® flex

The virtually universal pump for many applications.

Capacity range up to 15,000 l/h, up to 15 bar



ProMinent® peristaltic pumps operate on a simple functional principle and stand out thanks to their compact and robust design. They are self-priming and operate without seals and valves.

The peristaltic pumps of product range DULCO®flex are ideal for almost all metering and pumping tasks in laboratories and industry. The reason: their extensive pump capacity range and the large number of different hose materials.

This is how they work: The feed chemical is pumped by the rotor clamping the hose in the direction of flow. No valves are needed. Abrasive, viscous and gaseous media can thereby be gently conveyed.

The pumping process is triggered by an elastomer hose, pressed by two rotating rollers or shoes against the pump housing. Once the rollers or shoes have passed by, the hose immediately returns to its original shape and creates a vacuum at the pump inlet. Atmospheric pressure causes the medium to flow in. The feed rate is proportional to the pump speed. A vacuum device can optionally be used to assist the hose to return to its position on product range DFCa and DFDa pumps, improving their suction behaviour and ensuring the even feed of viscous media.

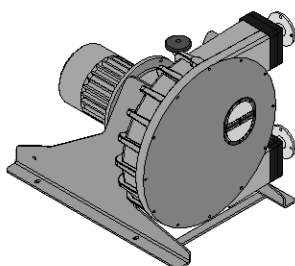
Whereas the pumps are fitted with roller technology for low pressures of up to 8 bar, they have shoes for higher pressures of up to 15 bar.

#### Your benefits

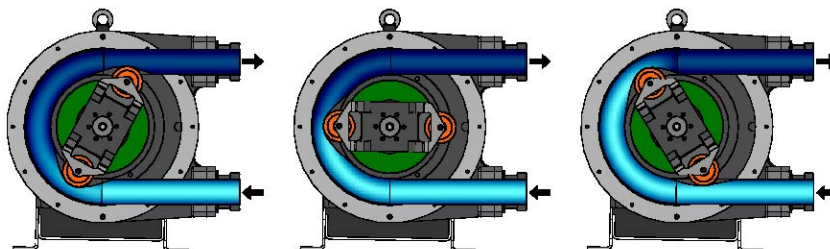
- Simple to operate
- Reversible pumping direction
- Hose materials suitable for various chemicals
- Simple and quick hose change
- Safeguarded against running dry
- Self-priming
- Ideal for pumping pasty, viscous, abrasive and gaseous media

#### Field of application

Chemical industry, clarification plants, mining



P\_DX\_0010\_SW1



P\_DX\_0028\_SW3

DULCO®flex peristaltic pumps can be used to convey media with the following properties:

- pasty and solid-containing
- viscous
- abrasive
- shear-sensitive
- outgassing
- corrosive

The pumps can be selected with the aid of an identity code:

#### Overview:

Type	Application	Feed rate at max. pressure l/h	Max. pressure bar	Rollers/shoes
DFBa	Industry	650	8	Rollers
DFCa	Industry	8,900	8	Rollers
DFDa	Industry	15,000	15	Shoes



## 1.4 Peristaltic Pumps DULCO®flex

### 1.4.2

### Peristaltic Pump DULCO®flex DF2a

The optimum pump product range for use in swimming pools, hot tubs, and spa zones.

Capacity range 0.4 – 2.4 l/h at max. 1.5 bar back pressure

The peristaltic pump DULCO®flex DF2a meters chemicals functionally, cost-effectively and quietly – ideal for use in swimming pools, hot tubs, and in spa and wellness facilities.

The feed chemical is transported by the rotor squeezing the hose in the direction of flow. This explains why there is no need for valves. The feed chemical is thus handled with care. Typical applications: wherever lower pump pressure is sufficient. For example when metering conditioners in private pools.

#### Your benefits

- Smooth inner wall reduces deposits.
- Hose materials: PharMed® or Viton®
- Virtually silent operation
- Simple handling
- Enhanced service life of the hose due to spring-loaded rollers, which keep the rolling pressure constant
- Robust and protected against spray water from all sides: Housing made of impact-resistant and chemical-resistant PPE

#### Technical Details

- Self-priming against max. 1.5 bar
- Control or flow control via ON/OFF power supply
- Degree of protection IP 65
- OEM versions on request

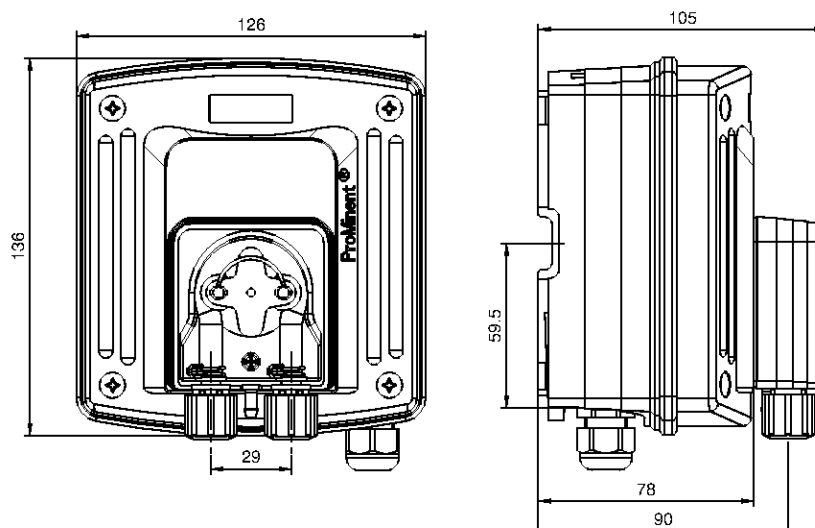
#### Field of application

- Meters conditioners in private pools
- Meters belt lubricants in bottling machines
- Meters cleaning agents in dishwashers



pk\_1\_130

#### Dimensional drawing of DULCO®flex DF2a



P\_DX\_0051\_SW3

Dimensional drawing of DULCO®flex DF2a - dimensions in mm

## 1.4 Peristaltic Pumps DULCO® flex

### Identity Code Ordering System for Product Range DULCO®flex, Version DF2a

DF2a	Type	Capacity	
		bar	l/h
	0204	1.5	0.4
	0208	1.5	0.8
	0216	1.5	1.6
	0224	1.5	2.4
	Hose material		
	P	PharMed®	
	V	Viton® for fragrances (special version)	
	Version		
	0	With ProMinent® logo	
	1	Without ProMinent® logo	
	Hydraulic connectors		
	0	Connector for hose 6/4 mm suction and discharge side	
	9	Connector for hose 10/4 mm discharge side only	
	Power supply		
	A	230 V ± 10%, 50/60 Hz	
	Cable and plug		
	0	No mains lead	
	1	With 2 m mains lead, open ended	
	A	With mains cable, European plug	
	Drive		
	0	Mains ON/OFF	
	Installation		
	W	Wall mounted	
	Accessories		
	0	No accessories	

Viton® and PharMed® are registered trademarks.

### Technical Data

Type	Capacity		Frequency	Connector size	Suction lift	Intake head
	bar	l/h	rpm	o Ø x i Ø	m WC	m WC
0204	1.5	0.4	5	6x4/10x4	4	3
0208	1.5	0.8	10	6x4/10x4	4	3
0216	1.5	1.6	20	6x4/10x4	4	3
0224	1.5	2.4	30	6x4/10x4	4	3

Admissible ambient temperature: 10-45 °C  
 Power consumption approx.: 5 W  
 Switching duration: 100%  
 Enclosure rating: IP 65

All data refers to water at 20 °C.

### Spare Hoses

	Order no.
Spare hose set, complete, PharMed®	1009480
Replacement hose compl. Viton®	1023842



## 1.4 Peristaltic Pumps DULCO®flex

### 1.4.3

### Peristaltic Pump DULCO®flex DF4a

The optimum pump for use in swimming pools, hot tubs and spa and wellness facilities.

Capacity range 1.5 – 12 l/h, 4 – 2 bar

The peristaltic pump DULCO®flex DF4a for metering flocculants and activated charcoal treats water precisely and accurately. It is ideal for use in swimming pools, hot tubs or spa and wellness facilities. An operating pressure up to 4 bar is possible.

There are three designs of DULCO®flex DF4a available.

- 1 Metering chemicals
- 2 Metering activated charcoal
- 3 Metering flocculants

This guarantees that the operating menu, inputs and outputs are always adapted to the respective application.

#### Your benefits

- Language-neutral user navigation
- Continuous adjustment of capacity
- Hose material in PharMed®
- Full control, as the capacity is shown in l/h in the display
- Safe and reliable operation: Flow volume and concentration can be entered reproducibly
- Long service life: Spring-loaded rollers stabilise rolling pressure and reduce wear and tear on the hose
- No irritating noise: low-noise stepper motor with ball bearing drive shaft
- Fast to use: simple installation and retrofitting, even with existing systems
- Guaranteed safety: Hose rupture monitoring system and fault indicating relay register and report all problems.
- Suitable for use around the clock – 100% switch-on time
- Operating hours counter for the peristaltic pump - always stay informed.



P\_DX\_0006\_SW1

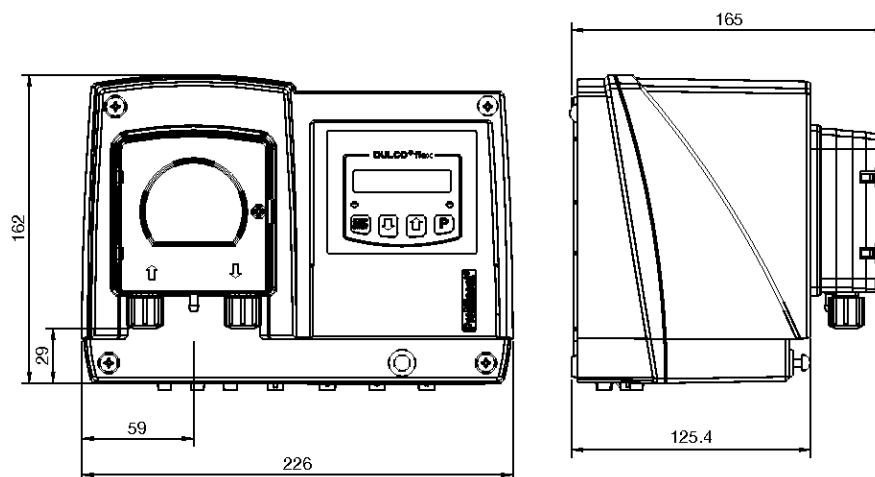
#### Technical Details

- Priming function
- Night setback
- Inputs for contacts and analogue signals
- Housing degree of protection IP 65
- Connector for 2-stage level switch with round plug
- Operating hour counter
- CANopen interface

#### Field of application

Swimming pool water treatment

#### Dimensional drawing of DULCO®flex DF4a



DF4a\_SW3

Dimensional drawing of DULCO®flex DF4a - dimensions in mm



## 1.4 Peristaltic Pumps DULCO® flex

### Identity Code Ordering System for Product Range DULCO®flex, Version DF4a

DF4a	Application									
	0	Chemical pump								
	A	Activated charcoal metering								
	F	Flocculant metering								
	Installation									
	W	Wall mounting								
	Version									
	0	With ProMinent® logo								
	1	Without ProMinent® logo								
	Type		Capacity							
			bar	l/h						
		04004	4.0	0.35						
		04015	3.0	1.50						
		03060	2.0	6.00						
		02120	1.5	12.00						
	Hose material									
	P	PharMed®								
	Hydraulic connectors									
	0	Standard connector 6x4								
	9	Special connector 10x4 discharge side								
	Power supply									
	U	100 - 240 VAC, 50/60 Hz								
	Cable and plug									
	0	Without cable								
	1	With cable 2.0 m; open end								
	A	With cable 2.0 m; Euro connector								
	B	With cable 2.0 m; Swiss connector								
	Accessories									
	0	Without accessories								
	2	With lip-seal metering valve PCB and 10 m PE metering line								
	Hardware extension									
	0	None								
	Language default									
	00	Language-neutral								
Relay										
1	Fault signalling relay, drop-out action									
3	Fault signalling relay, pick-up action									
Control versions										
8	manual + external contact and analogue 0/4 - 20 mA + 0 - 10 V									
C	as "8" and CANopen									
D	such as "8" and CANopen and CAN connector									
Further input										
1	Pause + 2-stage level + AUX1									
2	Pause + 1-stage level + AUX1 + AUX2									
Pause/level										
0	Pause break contact + level break contact									
Approvals										
01	CE-Symbol									

PharMed® is a registered trademark.

### Technical Data

Priming lift	3 m WC	Approx. power consumption:	24 W
Suction lift	4 m WC	Switching duration:	100%
Speed	0 - 85 RPM	Degree of protection:	IP 65
Permissible ambient temperature:	10-45 °C		

All data refers to water at 20 °C.

### Spare Hoses

	Order no.
For type 04004 PharMed®	1034997
For type 04015 PharMed®	1030722
For type 03060 PharMed®	1030723
For type 02120 PharMed®	1030774



## 1.4 Peristaltic Pumps DULCO® flex

### 1.4.4

### Peristaltic Pump DULCO®flex DFBa

#### Low and medium pump capacities

#### Feed rates of up to 649 l/h at 8 bar

The peristaltic pump DULCO®flex DFBa is designed for low and medium pump capacities of up to 649 l/h at 8 bar.

The peristaltic pump DULCO®flex DFBa is equipped with rollers and fabric-reinforced hoses for tough industrial use. Pumps with a Halar-coated pump housing can be produced for use in the chemical industry.

#### Your benefits

- Simple to operate
- Reversible pumping direction
- Hose materials suitable for various chemicals
- Simple and quick hose change
- Ideal for pumping pasty, high-viscosity, abrasive and gaseous media
- Self-priming
- Safeguarded against running dry

#### Technical Details

- Connector sizes 3/8 - 1"
- Feed rates of 0.023 - 0.24 l/rev
- Hose materials NR, NBR, EPDM, NR-A, Norprene, NBR-A, Hypalon, Tygon
- Self-priming up to 8 m
- Back pressure up to 8 bar

#### Options

- Stainless steel base plate
- Available as a mobile unit
- Various connectors, such as BSP, NPT, Tri-Clamp and DIN 11851
- Pulsation damper
- Leakage sensor
- Housing with Halar coating
- Food approval EU 1935/2004

#### Field of application

- Chemical industry
- Waste water
- Mining

#### Technical Data

##### Hose

NR, NBR, EPDM, NR-A, Norprene, NBR-A, Hypalon, Tygon

##### Self-priming

up to 8 m

##### Rollers / shoes

Rollers

Type	Feed rate / revolution	Delivery rate at max. back pressure		Hose diameter (internal)	Max. solids	Weight without drive	Connection DN
	l/rev.	bar	l/h	mm	mm	kg	
DFBa 010	0.02	8	60	10	2.5	6	3/8"
DFBa 013	0.04	8	100	13	3.3	6	3/8"
DFBa 016	0.09	8	188	16	4.0	13	3/4"
DFBa 019	0.12	2	671	19	4.8	13	1"
DFBa 022	0.24	8	649	22	5.5	22	1"

A Resistance List of hose materials can be found at [www.prominent.com](http://www.prominent.com).





## 1.4 Peristaltic Pumps DULCO® flex

### Identity Code Ordering System for Peristaltic Pump DULCO®flex DFBa 010

DFBa	Type	
	010	DFBa 010, 0.023 l/revolution
		<b>Power end/drive*</b>
	000	without drive unit
	A10	0.12 kW, 15 rpm, 21 l/h, 8 bar (Reduction gear system), 3-phase, 230/400 V AC
	A11	0.12 kW, 20 rpm, 28 l/h, 8 bar (Reduction gear system), 3-phase, 230/400 V AC
	A12	0.18 kW, 29 rpm, 40 l/h, 6 bar (Reduction gear system), 3-phase, 230/400 V AC
	A13	0.18 kW, 46 rpm, 63 l/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	A14	0.25 kW, 57 rpm, 79 l/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	A15	0.25 kW, 70 rpm, 97 l/h, 2 bar (Reduction gear system), 3-phase, 230/400 V AC
	A21	0.12 kW, 3 - 16 rpm, 4-22 l/h, 8 bar (Manual adjustment gear), 3-phase, 230/400 V AC
	A22	0.25 kW, 5 - 29 rpm, 7 - 40 l/h, 6 bar (Manual adjustment gear), 3-phase, 230/400 V AC
	A23	0.25 kW, 10 - 53 rpm, 14-73 l/h, 4 bar (Manual adjustment gear), 3-phase, 230/400 V AC
	A24	0.25 kW, 15 - 80 rpm, 21-110 l/h, 2 bar (Manual adjustment gear), 3-phase, 230/400 V AC
	A31	0.37 kW, 9 - 34 rpm, 12 - 47 l/h, 20 - 75 Hz, 6 bar (Gear motor with integrated frequency converter), 1-phase, 230 V AC
	A32	0.37 kW, 16 - 60 rpm, 22-83 l/h, 20-75 Hz, 4 bar (Gear motor with integrated frequency converter), 1-phase, 230 V AC
	A41	0.18 kW, 1 - 34 rpm, 1 - 47 l/h, 3 - 75 Hz, 6 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
	A42	0.18 kW, 2 - 44 rpm, 3 - 60 l/h, 3 - 75 Hz, 4 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
	A43	0.25 kW, 3-69 rpm, 4-95 l/h, 3-75 Hz, 4 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
		<b>Hose material</b>
	0	NR
	B	NBR
	E	EPDM
	N	Norprene (max. 2 bar) (lebensmittelecht)
	A	NBR-A (lebensmittelecht)
	H	Hypalon
		<b>Hydraulic connections</b>
	A	VA BSP 3/8"
	B	VA NPT 3/8"
	C	PP BSP 3/8"
	D	PVDF BSP 3/8"
	E	PVDF NPT 3/8"
	F	PVC NPT 3/8"
	G	Tri-Clamp, VA, 1/2"
	H	DIN 11851, VA, NW10
		<b>Base plate</b>
	0	Base plate, painted steel
	1	Base plate, stainless steel
	2	Portable unit + painted steel base plate
	3	Portable unit + stainless steel base plate
		<b>Leakage sensor</b>
	0	Without leakage sensor
	L	With leakage sensor
	M	as "L" + relay output
		<b>Rotor</b>
	0	Rotor with 2 rollers
		<b>Batch controller</b>
	0	Without controller
		<b>Special version</b>
	0	Standard
	H	Halar-coated housing
		<b>Vacuum system</b>
	0	without
		<b>Approvals</b>
	01	CE
	02	CE+Food approval EU 1935/2004

\* The pumps are factory-set to a maximum back pressure of 4 bar, unless the stated pressure is lower. Please state any deviating pressures when ordering.

# 1.4 Peristaltic Pumps DULCO® flex

## Identity Code Ordering System for Peristaltic Pump DULCO®flex DFBa 013

DFBa	Type	
	013	DFBa 013, 0.038 l/revolution
		<b>Power end/drive*</b>
	000	without drive unit
	B10	0.12 kW, 15 rpm, 34 l/h, 8 bar (Reduction gear system), 3-phase, 230/400 V AC
	B11	0.12 kW, 20 rpm, 46 l/h, 8 bar (Reduction gear system), 3-phase, 230/400 V AC
	B12	0.18 kW, 29 rpm, 66 l/h, 6 bar (Reduction gear system), 3-phase, 230/400 V AC
	B13	0.18 kW, 46 rpm, 105 l/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	B14	0.25 kW, 57 rpm, 130 l/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	B15	0.25 kW, 70 rpm, 160 l/h, 2 bar (Reduction gear system), 3-phase, 230/400 V AC
	B21	0.12 kW, 3 – 16 rpm, 7 – 36 l/h, 8 bar (Manual adjustment gear), 3-phase, 230/400 V AC
	B22	0.25 kW, 5 – 29 rpm, 11 – 66 l/h, 6 bar (Manual adjustment gear), 3-phase, 230/400 V AC
	B23	0.25 kW, 10 – 53 rpm, 23 – 121 l/h, 4 bar (Manual adjustment gear), 3-phase, 230/400 V AC
	B24	0.25 kW, 15 – 80 rpm, 35 – 182 l/h, 2 bar (Manual adjustment gear), 3-phase, 230/400 V AC
	B31	0.37 kW, 9 – 34 rpm, 21 – 78 l/h, 20 – 75 Hz, 6 bar (Gear motor with integrated frequency converter), 1-phase, 230 V AC
	B32	0.37 kW, 16 – 60 rpm, 36 – 137 l/h, 20 – 75 Hz, 4 bar (Gear motor with integrated frequency converter), 1-phase, 230 V AC
	B41	0.18 kW, 1 – 34 rpm, 2 – 78 l/h, 3 – 75 Hz, 6 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
	B42	0.18 kW, 2 – 44 rpm, 5 – 100 l/h, 3 – 75 Hz, 4 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
	B43	0.25 kW, 3-69 rpm, 7-157 l/h, 3-75 Hz, 4 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
		<b>Hose material</b>
	0	NR
	B	NBR
	E	EPDM
	N	Norprene (max. 2 bar)
	A	NBR-A
	H	Hypalon
		<b>Hydraulic connections</b>
	A	VA BSP 3/8"
	B	VA NPT 3/8"
	C	PP BSP 3/8"
	D	PVDF BSP 3/8"
	E	PVDF NPT 3/8"
	F	PVC NPT 3/8"
	G	Tri-Clamp, VA, 3/4"
	H	DIN 11851, VA, NW15
		<b>Base plate</b>
	0	Base plate, painted steel
	1	Base plate, stainless steel
	2	Portable unit + painted steel base plate
	3	Portable unit + stainless steel base plate
		<b>Leakage sensor</b>
	0	Without leakage sensor
	L	With leakage sensor
	M	as "L" + relay output
		<b>Rotor</b>
	0	Rotor with 2 rollers
		<b>Batch controller</b>
	0	Without controller
		<b>Special version</b>
	0	Standard
	H	Halar-coated housing
		<b>Vacuum system</b>
	0	without
		<b>Approvals</b>
	01	CE
	02	CE+Food approval EU 1935/2004

\* The pumps are factory-set to a maximum back pressure of 4 bar, unless the stated pressure is lower. Please state any deviating pressures when ordering.





## 1.4 Peristaltic Pumps DULCO® flex

### Identity Code Ordering System for Peristaltic Pump DULCO®flex DFBa 016

DFBa	Type	
	016	DFBa 016, 0.092 l/revolution
		<b>Power end/drive*</b>
	000	without drive unit
	C10	0.18 kW, 15 rpm, 82 l/h, 8 bar (Reduction gear system), 3-phase, 230/400 V AC
	C11	0.18 kW, 20 rpm, 110 l/h, 8 bar (Reduction gear system), 3-phase, 230/400 V AC
	C12	0.25 kW, 32 rpm, 177 l/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	C13	0.25 kW, 46 rpm, 254 l/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	C14	0.37 kW, 57 rpm, 315 l/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	C15	0.37 kW, 70 rpm, 386 l/h, 2 bar (Reduction gear system), 3-phase, 230/400 V AC
	C21	0.37 kW, 8 - 50 rpm, 44-276 l/h, 4 bar (Manual adjustment gear), 3-phase, 230/400 V AC
	C22	0.37 kW, 10 - 61 rpm, 55 - 337 l/h, 2 bar (Manual adjustment gear), 3-phase, 230/400 V AC
	C23	0.37 kW, 16 - 91 rpm, 88-502 l/h, 1 bar (Manual adjustment gear), 3-phase, 230/400 V AC
	C31	0.37 kW, 9 - 34 rpm, 50 - 188 l/h, 20 - 75 Hz, 4 bar (Gear motor with integrated frequency converter), 1-phase, 230 V AC
	C32	0.37 kW, 16 - 60 rpm, 88-331 l/h, 20-75 Hz, 2 bar (Gear motor with integrated frequency converter), 1-phase, 230 V AC
	C41	0.25 kW, 1 - 34 rpm, 5 - 188 l/h, 3 - 75 Hz, 4 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
	C42	0.25 kW, 2-48 rpm, 11-265 l/h, 3-75 Hz, 4 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
	C43	0.37 kW, 3-69 rpm, 16-381 l/h, 3-75 Hz, 2 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
		<b>Hose material</b>
	0	NR
	B	NBR
	E	EPDM
	N	Norprene (max. 2 bar)
	A	NBR-A
	H	Hypalon
		<b>Hydraulic connections</b>
	A	VA BSP 3/4"
	B	VA NPT 3/4"
	C	PP BSP 3/4"
	D	PVDF BSP 3/4"
	E	PVDF NPT 3/4"
	F	PVC NPT 3/4"
	G	Tri-Clamp, VA, 1"
	H	DIN 11851, VA, NW20
		<b>Base plate</b>
	0	Base plate, painted steel
	1	Base plate, stainless steel
	2	Portable unit + painted steel base plate
	3	Portable unit + stainless steel base plate
		<b>Leakage sensor</b>
	0	Without leakage sensor
	L	With leakage sensor
	M	as "L" + relay output
		<b>Rotor</b>
	0	Rotor with 2 rollers
		<b>Batch controller</b>
	0	Without controller
		<b>Special version</b>
	0	Standard
	H	Halar-coated housing
		<b>Vacuum system</b>
	0	without
		<b>Approvals</b>
	01	CE
	02	CE+Food approval EU 1935/2004

\* The pumps are factory-set to a maximum back pressure of 4 bar, unless the stated pressure is lower. Please state any deviating pressures when ordering.

# 1.4 Peristaltic Pumps DULCO® flex

## Identity Code Ordering System for Peristaltic Pump DULCO®flex DFBa 019

DFBa	Type	
	019	DFBa 019, 0.123 l/revolution
		<b>Power end/drive*</b>
	000	without drive unit
	D10	0.18 kW, 15 rpm, 111 l/h, 2 bar (Reduction gear system), 3-phase, 230/400 V AC
	D11	0.18 kW, 20 rpm, 148 l/h, 2 bar (Reduction gear system), 3-phase, 230/400 V AC
	D12	0.25 kW, 32 rpm, 236 l/h, 2 bar (Reduction gear system), 3-phase, 230/400 V AC
	D13	0.25 kW, 46 rpm, 339 l/h, 2 bar (Reduction gear system), 3-phase, 230/400 V AC
	D14	0.37 kW, 57 rpm, 421 l/h, 2 bar (Reduction gear system), 3-phase, 230/400 V AC
	D15	0.37 kW, 70 rpm, 517 l/h, 2 bar (Reduction gear system), 3-phase, 230/400 V AC
	D21	0.37 kW, 8 - 50 rpm, 59-369 l/h, 2 bar (Manual adjustment gear), 3-phase, 230/400 V AC
	D22	0.37 kW, 10 - 61 rpm, 74-450 l/h, 2 bar (Manual adjustment gear), 3-phase, 230/400 V AC
	D23	0.37 kW, 16 - 91 rpm, 118-671 l/h, 2 bar (Manual adjustment gear), 3-phase, 230/400 V AC
	D31	0.37 kW, 9 - 34 rpm, 66-251 l/h, 20-75 Hz, 2 bar (Gear motor with integrated frequency converter), 1-phase, 230 V AC
	D32	0.37 kW, 16 - 60 rpm, 118-443 l/h, 20-75 Hz, 2 bar (Gear motor with integrated frequency converter), 1-phase, 230 V AC
	D41	0.25 kW, 1-34 rpm, 7-251 l/h, 3-75 Hz, 2 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
	D42	0.25 kW, 2-48 rpm, 15-354 l/h, 3-75 Hz, 2 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
	D43	0.37 kW, 3-69 rpm, 22-509 l/h, 3-75 Hz, 2 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
		<b>Hose material</b>
	N	Norprene (max. 2 bar)
	T	TYGON (max. 2 bar)
		<b>Hydraulic connections</b>
	A	VA BSP 1"
	B	VA NPT 1"
	C	PP BSP 1"
	D	PVDF BSP 1"
	E	PVDF NPT 1"
	F	PVC NPT 1"
	G	Tri-Clamp, VA, 1"
	H	DIN 11851, VA, NW25
		<b>Base plate</b>
	0	Base plate, painted steel
	1	Base plate, stainless steel
	2	Portable unit + painted steel base plate
	3	Portable unit + stainless steel base plate
		<b>Leakage sensor</b>
	0	Without leakage sensor
	L	With leakage sensor
	M	as "L" + relay output
		<b>Rotor</b>
	0	Rotor with 2 rollers
		<b>Batch controller</b>
	0	Without controller
		<b>Special version</b>
	0	Standard
	H	Halar-coated housing
		<b>Vacuum system</b>
	0	without
		<b>Approvals</b>
	01	CE
	02	CE+Food approval EU 1935/2004

\* The pumps are factory-set to a maximum back pressure of 4 bar, unless the stated pressure is lower. Please state any deviating pressures when ordering.



# 1.4 Peristaltic Pumps DULCO® flex

## Identity Code Ordering System for Peristaltic Pump DULCO®flex DFBa 022

DFBa	Type	
	022	DFBa 022, 0.246 l/revolution
		<b>Power end/drive*</b>
	000	without drive unit
	E10	0.25 kW, 17 rpm, 251 l/h, 8 bar (Reduction gear system), 3-phase, 230/400 V AC
	E11	0.37 kW, 23 rpm, 339 l/h, 8 bar (Reduction gear system), 3-phase, 230/400 V AC
	E12	0.55 kW, 38 rpm, 561 l/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	E13	0.55 kW, 45 rpm, 664 l/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	E14	0.55 kW, 54 rpm, 797 l/h, 2 bar (Reduction gear system), 3-phase, 230/400 V AC
	E15	0.75 kW, 66 rpm, 974 l/h, 2 bar (Reduction gear system), 3-phase, 230/400 V AC
	E21	0.37 kW, 4-20 rpm, 59-295 l/h, 8 bar (Manual adjustment gear), 3-phase, 230/400 V AC
	E22	0.55 kW, 6-32 rpm, 89-472 l/h, 4 bar (Manual adjustment gear), 3-phase, 230/400 V AC
	E23	0.75 kW, 9-48 rpm, 133-708 l/h, 2 bar (Manual adjustment gear), 3-phase, 230/400 V AC
	E31	0.55 kW, 12-44 rpm, 177-649 l/h, 20-75 Hz, 4 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC
	E32	0.75 kW, 18-67 rpm, 266-989 l/h, 20-75 Hz, 2 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC
	E41	0.55 kW, 2-44 rpm, 30-649 l/h, 3-75 Hz, 4 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
	E42	0.75 kW, 2-57 rpm, 30-841 l/h, 3-75 Hz, 4 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
	E43	1.1 kW, 3-81 rpm, 44-1196 l/h, 3-75 Hz, 2 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
		<b>Hose material</b>
	0	NR (natural rubber)
	B	NBR
	E	EPDM
	N	Norprene (max. 2 bar back pressure)
	A	NBR-A
	H	Hypalon
		<b>Hydraulic connections</b>
	A	VA BSP 1"
	B	VA NPT 1"
	C	PP BSP 1"
	D	PVDF BSP 1"
	E	PVDF NPT 1"
	F	PVC NPT 1"
	G	Tri-Clamp, VA, 1"
	H	DIN 11851, VA, NW25
		<b>Base plate</b>
	0	Base plate, painted steel
	1	Base plate, stainless steel
	2	Portable unit + painted steel base plate
	3	Portable unit + stainless steel base plate
		<b>Leakage sensor</b>
	0	Without leakage sensor
	L	With leakage sensor
	M	as "L" + relay output
		<b>Rotor</b>
	0	Rotor with 2 rollers
		<b>Batch controller</b>
	0	Without controller
		<b>Special version</b>
	0	Standard
	H	Halar-coated housing
		<b>Vacuum system</b>
	0	without
		<b>Approvals</b>
	01	CE
	02	CE+Food approval EU 1935/2004

\* The pumps are factory-set to a maximum back pressure of 4 bar, unless the stated pressure is lower. Please state any deviating pressures when ordering.



## 1.4 Peristaltic Pumps DULCO® flex

### 1.4.5

### Peristaltic Pump DULCO® flex DFCa

#### High pump capacities and long service life

#### Feed rates of up to 8,900 l/h at 8 bar

High pump capacities are not a problem with the peristaltic pump DULCO® flex DFCa. It is equipped with extra rollers and fabric-reinforced hoses for industrial use.

It is ideal for heavy-duty industrial applications and pump capacities of up to 8,900 l/h at 8 bar back pressure.

A ball-bearing mounted rotor ensures extremely smooth running and a long service life.

Pumps with a Halar-coated pump housing can be produced for use in the chemical industry.

A vacuum unit can optionally be used to help the hose to return to its original shape with pumps of the product range DFCa, thereby improving their suction behaviour and ensuring the even feed of high-viscosity media.

#### Your benefits

- Simple to operate
- Reversible pumping direction
- Hose materials suitable for various chemicals
- Simple and quick hose change
- Ideal for pumping pasty, high-viscosity, abrasive and gaseous media
- Self-priming
- Safeguarded against running dry

#### Technical Details

- Connector sizes 1 1/4" - DN 80
- Feed rates of 0.43 - 6.72 l/rev
- Hose materials NR, NBR, EPDM, Norprene, NR-A, NBR-A
- Self-priming up to 8 m
- Back pressure up to 8 bar

#### Options

- Stainless steel base plate
- Available as a mobile unit
- Various connectors, such as BSP, NPT, Tri-Clamp, DIN 11851 and flange
- Pulsation damper
- Leakage sensor
- Housing with Halar coating
- Vacuum system
- Food approval EU 1935/2004

#### Field of application

- Chemical industry
- Waste water
- Mining

#### Technical Data

<b>Hose</b>	NR, NBR, EPDM, NR-A, Norprene, NBR-A
<b>Self-priming</b>	up to 8 m
<b>Rollers / shoes</b>	Rollers

Type	Feed rate / revolution	Delivery rate at max. back pressure		Hose diameter (internal)	Max. solids	Weight without drive	Connection DN
		bar	l/h		mm	kg	
DFCa 030	0.43	8	727	28	7.0	62	DN 32
DFCa 040	0.86	8	1,495	35	8.8	89	DN 40
DFCa 050	1.47	8	1,852	40	10.0	140	DN 40
DFCa 060	3.16	8	5,100	55	13.8	235	DN 50
DFCa 070	6.72	8	8,900	65	16.3	440	DN 65

A Resistance List of hose materials can be found at [www.prominent.com](http://www.prominent.com).



## 1.4 Peristaltic Pumps DULCO® flex

### Identity Code Ordering System for Peristaltic Pump DULCO®flex DFCa 030

DFCa	Type	
	030	DFCa 030, 0.433 l/revolution
		<b>Power end/drive*</b>
	000	without drive unit
	A11	0.25 kW, 18 rpm, 468 l/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	A12	0.37 kW, 29 rpm, 753 l/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	A13	0.55 kW, 38 rpm, 987 l/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	A14	0.55 kW, 55 rpm, 1429 l/h, 2 bar (Reduction gear system), 3-phase, 230/400 V AC
	A31	0.55 kW, 11 - 39 rpm, 286-1,013 l/h, 20-75 Hz, 4 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC
	A32	0.75 kW, 18 - 63 rpm, 468 - 1,637 l/h, 20-75 Hz, 2 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC
	A41	0.37 kW, 2 - 28 rpm, 52 - 727 l/h, 3 - 50 Hz, 4 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
	A42	0.75 kW, 3 - 59 rpm, 78-1,533 l/h, 3-65 Hz, 2 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
		<b>Hose material</b>
	0	NR
	B	NBR
	E	EPDM
	A	NBR-A
	N	Norprene (max. 2 bar)
		<b>Hydraulic connections</b>
	A	VA BSP 1 1/4"
	B	VA NPT 1 1/4"
	C	PP BSP 1 1/4"
	D	PVDF/PTFE BSP 1 1/4"
	F	PVC NPT 1 1/4"
	G	Tri-Clamp, VA, 1 1/2"
	H	DIN 11851, VA, NW32
	I	DIN flange VA DN32
	L	ANSI flange VA, 1 1/4"
	P	ANSI flange PVC, 1 1/4"
		<b>Base plate</b>
	0	Base plate, painted steel
	1	Base plate, stainless steel
	2	Portable unit + painted steel base plate
	3	Portable unit + stainless steel base plate
		<b>Leakage sensor</b>
	0	without leakage sensor
	L	with leakage sensor
	M	as "L" + relay output
		<b>Rotor</b>
	0	Rotor with 2 rollers
		<b>Batch controller</b>
	0	without controller
		<b>Special version</b>
	0	Standard
	H	Halar-coated housing
		<b>Vacuum system</b>
	0	without
	V	with vacuum system
		<b>Approvals</b>
	01	CE
	02	CE+Food approval EU 1935/2004

\* The pumps are factory-set to a maximum back pressure of 4 bar, unless the stated pressure is lower. Please state any deviating pressures when ordering.

# 1.4 Peristaltic Pumps DULCO® flex

## Identity Code Ordering System for Peristaltic Pump DULCO®flex DFCa 040

DFCa	Type	
	040	DFCa 040, 0.86 l/revolution
		<b>Power end/drive*</b>
	000	without drive unit
	B11	0.55 kW, 18 rpm, 928 l/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	B12	0.55 kW, 29 rpm, 1,495 l/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	B13	0.75 kW, 38 rpm, 1,960 l/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	B14	1.1 kW, 54 rpm, 2,786 l/h, 2 bar (Reduction gear system), 3-phase, 230/400 V AC
	B31	1.1 kW, 12 - 36 rpm, 619-1,857 l/h, 20-70 Hz, 4 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC
	B32	1.5 kW, 15 - 53 rpm, 774-2,735 l/h, 20-70 Hz, 2 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC
	B41	1.1 kW, 2 - 49 rpm, 103-2,528 l/h, 3-65 Hz, 2 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
	B42	1.5 kW, 3 - 53 rpm, 154-2,735 l/h, 3-65 Hz, 2 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
		<b>Hose material</b>
	0	NR
	B	NBR
	E	EPDM
	A	NBR-A
	N	Norprene (max. 2 bar)
		<b>Hydraulic connections</b>
	A	VA BSP 1 1/2"
	B	VA NPT 1 1/2"
	C	PP BSP 1 1/2"
	D	PVDF/PTFE BSP 1 1/2"
	G	Tri-Clamp, VA, 1 1/2"
	H	DIN 11851, VA, NW40
	I	DIN flange VA DN40
	L	ANSI flange VA, 1 1/2"
	P	ANSI flange PVC, 1 1/2"
		<b>Base plate</b>
	0	Base plate, painted steel
	1	Base plate, stainless steel
	2	Portable unit + painted steel base plate
	3	Portable unit + stainless steel base plate
		<b>Leakage sensor</b>
	0	without leakage sensor
	L	with leakage sensor
	M	as "L" + relay output
		<b>Rotor</b>
	0	Rotor with 2 rollers
		<b>Batch controller</b>
	0	without controller
		<b>Special version</b>
	0	Standard
	H	Halar-coated housing
		<b>Vacuum system</b>
	0	without
	V	with vacuum system
		<b>Approvals</b>
	01	CE
	02	CE+Food approval EU 1935/2004

\* The pumps are factory-set to a maximum back pressure of 4 bar, unless the stated pressure is lower. Please state any deviating pressures when ordering.

# 1.4 Peristaltic Pumps DULCO® flex

## Identity Code Ordering System for Peristaltic Pump DULCO®flex DFCa 050

DFCa	Type	
	050	DFCa 050, 1.47 l/revolution
		<b>Power end/drive*</b>
	000	without drive unit
	C11	0.55 kW, 14 rpm, 1,235 l/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	C12	0.75 kW, 21 rpm, 1,852 l/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	C13	1.1 kW, 30 rpm, 2,646 l/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	C14	1.5 kW, 38 rpm, 3,352 l/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	C15	1.5 kW, 48 rpm, 4,234 l/h, 2 bar (Reduction gear system), 3-phase, 230/400 V AC
	C16	2.2 kW, 58 rpm, 5,116 l/h, 2 bar (Reduction gear system), 3-phase, 230/400 V AC
	C31	1.5 kW, 8 - 29 rpm, 706-2,558 l/h, 20-70 Hz, 4 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC
	C32	2.2 kW, 17 - 60 rpm, 1,499-5,292 l/h, 20-70 Hz, 2 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC
	C41	1.5 kW, 1 - 27 rpm, 88-2,381 l/h, 3-65 Hz, 4 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
	C42	2.2 kW, 3 - 55 rpm, 265-4,851 l/h, 3-65 Hz, 2 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
		<b>Hose material</b>
	0	NR
	B	NBR
	E	EPDM
	A	NBR-A
	N	Norprene (max. 2 bar)
		<b>Hydraulic connections</b>
	I	DIN flange VA DN40
	G	Tri-Clamp, VA, 2"
	H	DIN 11851, VA, NW50
	J	DIN flange PP DN40
	K	DIN flange PVDF/PTFE DN40
	L	ANSI flange VA, 1 1/2"
	M	ANSI flange PP 1 1/2"
	N	ANSI flange PVDF/PTFE 1 1/2"
		<b>Base plate</b>
	0	Base plate, painted steel
	1	Base plate, stainless steel
	2	Portable unit + painted steel base plate
	3	Portable unit + stainless steel base plate
		<b>Leakage sensor</b>
	0	without leakage sensor
	L	with leakage sensor
	M	as "L" + relay output
		<b>Rotor</b>
	0	Rotor with 2 rollers
		<b>Batch controller</b>
	0	without controller
		<b>Special version</b>
	0	Standard
	H	Halar-coated housing
		<b>Vacuum system</b>
	0	without
	V	with vacuum system
		<b>Approvals</b>
	01	CE
	02	CE+Food approval EU 1935/2004

\* The pumps are factory-set to a maximum back pressure of 4 bar, unless the stated pressure is lower. Please state any deviating pressures when ordering.



# 1.4 Peristaltic Pumps DULCO® flex

## Identity Code Ordering System for Peristaltic Pump DULCO®flex DFCa 060

DFCa	Type	
	060	DFCa 060, 3.16 l/revolution
		<b>Power end/drive*</b>
	000	without drive unit
	D11	2.2 kW, 18 rpm, 3.4 m³/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	D12	2.2 kW, 22 rpm, 4.2 m³/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	D13	3.0 kW, 27 rpm, 5.1 m³/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	D14	3.0 kW, 33 rpm, 6.3 m³/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	D15	3.0 kW, 42 rpm, 8.0 m³/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	D16	3.0 kW, 47 rpm, 8.9 m³/h, 2 bar (Reduction gear system), 3-phase, 230/400 V AC
	D31	3.0 kW, 7 – 25 rpm, 1.3 – 4.7 m³/h, 4 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC
	D32	4.0 kW, 17 – 59 rpm, 3.2–11.2 m³/h, 2 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC
	D41	3.0 kW, 1 – 24 rpm, 0.2 – 4.5 m³/h, 4 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
	D42	4.0 kW, 2 – 55 rpm, 0.4–10.4 m³/h, 2 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
		<b>Hose material</b>
	0	NR
	B	NBR
	E	EPDM
	A	NBR-A
	N	Norprene (max. 2 bar)
		<b>Hydraulic connections</b>
	I	DIN flange VA DN50
	G	Tri-Clamp, VA, 2 1/2"
	H	DIN 11851, VA, NW50
	J	DIN flange PP DN50
	K	DIN flange VA, Halar coated + PVDF inserts DN50
	L	ANSI flange VA 2"
	M	ANSI flange PP 2"
	N	ANSI flange VA, Halar coated + PVDF inserts 2"
		<b>Base plate</b>
	0	Base plate, painted steel
	1	Base plate, stainless steel
	2	Portable unit + painted steel base plate
	3	Portable unit + stainless steel base plate
		<b>Leakage sensor</b>
	0	without leakage sensor
	L	with leakage sensor
	M	as "L" + relay output
		<b>Rotor</b>
	0	Rotor with 2 rollers
		<b>Batch controller</b>
	0	without controller
		<b>Special version</b>
	0	Standard
	H	Halar-coated housing
		<b>Vacuum system</b>
	0	without
	V	with vacuum system
		<b>Approvals</b>
	01	CE
	02	CE+Food approval EU 1935/2004

\* The pumps are factory-set to a maximum back pressure of 4 bar, unless the stated pressure is lower. Please state any deviating pressures when ordering.





## 1.4 Peristaltic Pumps DULCO® flex

### Identity Code Ordering System for Peristaltic Pump DULCO®flex DFCa 070

DFCa	Type	
	070	DFCa 070, 6.72 l/revolution
		<b>Power end/drive*</b>
	000	without drive unit
	E11	2.2 kW, 13 rpm, 5.2 m³/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	E12	3.0 kW, 22 rpm, 8.9 m³/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	E13	4.0 kW, 26 rpm, 10.5 m³/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	E14	4.0 kW, 32 rpm, 12.9 m³/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	E15	5.5 kW, 37 rpm, 14.9 m³/h, 4 bar (Reduction gear system), 3-phase, 230/400 V AC
	E16	5.5 kW, 46 rpm, 18.5 m³/h, 2 bar (Reduction gear system), 3-phase, 230/400 V AC
	E31	5.5 kW, 8 - 27 rpm, 3.2 - 10.9 m³/h, 20-60 Hz, 4 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC
	E32	7.5 kW, 13 - 38 rpm, 5.2 - 15.3 m³/h, 20-60 Hz, 2 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC
	E41	5.5 kW, 1 - 25 rpm, 0.4 - 10.1 m³/h, 3-65 Hz, 4 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
	E42	7.5 kW, 2 - 42 rpm, 0.8 - 16.9 m³/h, 3-65 Hz, 2 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
		<b>Hose material</b>
	0	NR
	B	NBR
	E	EPDM
	A	NBR-A
		<b>Hydraulic connections</b>
	I	DIN flange VA DN65
	G	Tri-Clamp, VA, 3"
	H	DIN 11851, VA, NW65
	J	DIN flange PP DN65
	L	ANSI flange VA, 2 1/2"
	M	ANSI flange PP 2 1/2"
	Q	DIN flange VA Halar coated DN65
	R	ANSI flange VA Halar coated 2 1/2"
		<b>Base plate</b>
	0	Base plate, painted steel
	1	Base plate, stainless steel
	2	Portable unit + painted steel base plate
	3	Portable unit + stainless steel base plate
		<b>Leakage sensor</b>
	0	without leakage sensor
	L	with leakage sensor
	M	as "L" + relay output
		<b>Rotor</b>
	0	Rotor with 2 rollers
		<b>Batch controller</b>
	0	without controller
		<b>Special version</b>
	0	Standard
	H	Halar-coated housing
		<b>Vacuum system</b>
	0	without
	V	with vacuum system
		<b>Approvals</b>
	01	CE
	02	CE+Food approval EU 1935/2004

\* The pumps are factory-set to a maximum back pressure of 4 bar, unless the stated pressure is lower. Please state any deviating pressures when ordering.

## 1.4 Peristaltic Pumps DULCO® flex

### 1.4.6

### Peristaltic Pump DULCO®flex DFDa

#### Maximum pump capacities and high pressures

#### Feed rates of up to 15,000 l/h at 15 bar



The peristaltic pump DFDa is designed for maximum pump capacities and high pressures and is winning customers over with its noiselessness and long service life. It is fitted with shoes and fabric-reinforced hoses – perfect for industrial use.

The pump housing is filled with glycerine to reduce friction. A ball-bearing mounted rotor ensures extremely smooth running and a long service life. In tough industrial use, the DFDa conveys volumes of up to 15,000 l/h with back pressures of up to 15 bar.

A vacuum unit can optionally be used to help the hose to return to its original shape with pumps of the product range DFDa, thereby improving their suction behaviour and ensuring the even feed of high-viscosity media.

#### Your benefits

- Simple to operate
- Reversible pumping direction
- Hose materials suitable for various chemicals
- Simple and quick hose change
- Ideal for pumping pasty, high-viscosity, abrasive and gaseous media
- Self-priming
- Safeguarded against running dry

#### Technical Details

- Connector sizes DN 25 – DN 100
- Feed rates of 0.3 - 20.0 l/rev
- Hose materials NR, NBR, EPDM
- Self-priming up to 8 m
- Back pressure up to 15 bar

#### Options

- Stainless steel base plate
- Available as a mobile unit
- Various connectors, such as Tri-Clamp, DIN 11851 and flange
- Pulsation damper
- Leakage sensor
- Vacuum system

#### Field of application

- Chemical industry
- Waste water
- Mining

#### Technical Data

<b>Hose</b>	NR, NBR, EPDM
<b>Self-priming</b>	up to 8 m
<b>Rollers / shoes</b>	Shoes

Type	Feed rate / revolution	Delivery rate at max. back pressure		Hose diameter (internal)	Max. solids	Weight without drive	Connection DN
	l/rev.	bar	l/h	mm	mm	kg	
DFDa 025	0.30	15	504	25	6.3	57	DN 25
DFDa 032	0.62	15	787	32	8.0	89	DN 32
DFDa 040	1.33	15	2,075	40	10.0	150	DN 40
DFDa 060	2.90	15	3,800	57	14.3	252	DN 50
DFDa 070	6.70	15	7,200	65	16.3	530	DN 65
DFDa 080	11.70	15	8,700	80	20.0	900	DN 80
DFDa 100	20.00	15	14,400	100	25.0	1,100	DN 100

A Resistance List of hose materials can be found at [www.prominent.com](http://www.prominent.com).





## 1.4 Peristaltic Pumps DULCO® flex

### Identity Code Ordering System for Peristaltic Pump DULCO®flex DFDa 025

DFDa	Type										
	025	DFDa 025, 0.3 l/revolution									
Power end/drive*											
	000	without drive unit									
	A11	0.37 kW, 18 rpm, 324 l/h, 15 bar (Reduction gear system), 3-phase, 230/400 V AC									
	A12	0.55 kW, 28 rpm, 504 l/h, 15 bar (Reduction gear system), 3-phase, 230/400 V AC									
	A13	0.75 kW, 39 rpm, 702 l/h, 10 bar (Reduction gear system), 3-phase, 230/400 V AC									
	A14	0.75 kW, 45 rpm, 810 l/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC									
	A15	1.1 kW, 55 rpm, 990 l/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC									
	A31	1.1 kW, 16 - 55 rpm, 288-990 l/h, 20-70 Hz, 5 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC									
	A32	1.5 kW, 18 - 63 rpm, 324-1,134 l/h, 20-70 Hz, 5 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC									
	A41	0.55 kW, 4 - 36 rpm, 72 - 648 l/h, 7 - 65 Hz, 15 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC									
	A42	1.1 kW, 6 - 58 rpm, 108-1,044 l/h, 7-65 Hz, 5 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC									
	A43	1.5 kW, 9 - 86 rpm, 162-1,548 l/h, 7-65 Hz, 5 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC									
Hose material											
	0	NR									
	B	NBR									
	E	EPDM									
Hydraulic connections											
	I	DIN flange VA DN25									
	J	DIN flange PP DN25									
	K	DIN flange PVDF DN25									
	L	ANSI flange VA DN25									
Base plate											
	0	Base plate, painted steel									
	1	Base plate, stainless steel									
	2	Portable unit + painted steel base plate									
	3	Portable unit + stainless steel base plate									
Leakage sensor											
	0	without leakage sensor									
	L	with leakage sensor									
	M	as "L" + relay output									
Rotor											
	0	Rotor with 2 shoes									
Batch controller											
	0	without controller									
Special version											
	0	Standard									
	H	Halar-coated housing									
Vacuum system											
	0	without									
	V	with vacuum system									
Approvals											
	01	CE									

\* The pumps are factory-set to a maximum back pressure of 5 bar. Please specify deviating pressures when ordering.

# 1.4 Peristaltic Pumps DULCO® flex

## Identity Code Ordering System for Peristaltic Pump DULCO®flex DFDa 032

DFDa	Type	
	032	DFDa 032, 0.625 l/revolution
		<b>Power end/drive*</b>
	000	without drive unit
	B11	0.75 kW, 21 rpm, 787 l/h, 10 bar (Reduction gear system), 3-phase, 230/400 V AC
	B12	1.1 kW, 21 rpm, 787 l/h, 15 bar (Reduction gear system), 3-phase, 230/400 V AC
	B13	1.1 kW, 30 rpm, 1,125 l/h, 10 bar (Reduction gear system), 3-phase, 230/400 V AC
	B14	1.1 kW, 38 rpm, 1,425 l/h, 10 bar (Reduction gear system), 3-phase, 230/400 V AC
	B15	1.5 kW, 47 rpm, 1,762 l/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC
	B16	1.5 kW, 58 rpm, 2,175 l/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC
	B31	1.5 kW, 12 - 42 rpm, 450 - 1,575 l/h, 20 - 70 Hz, 7.5 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC
	B32	2.2 kW, 19 - 66 rpm, 712 - 2,475 l/h, 20-70 Hz, 5 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC
	B41	1.1 kW, 4 - 39 rpm, 150 - 1,462 l/h, 7 - 65 Hz, 7.5 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
	B42	1.5 kW, 5 - 49 rpm, 190 - 1,837 l/h, 7 - 65 Hz, 7.5 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
	B43	2.2 kW, 8 - 75 rpm, 300 - 2812 l/h, 7-65 Hz, 5 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
		<b>Hose material</b>
	0	NR
	B	NBR
	E	EPDM
		<b>Hydraulic connections</b>
	I	DIN flange VA DN32
	J	DIN flange PP DN32
	K	DIN flange PVDF/PTFE DN 32
	L	ANSI flange VA, 1 1/4"
		<b>Base plate</b>
	0	Base plate, painted steel
	1	Base plate, stainless steel
	2	Portable unit + painted steel base plate
	3	Portable unit + stainless steel base plate
		<b>Leakage sensor</b>
	0	without leakage sensor
	L	with leakage sensor
	M	as "L" + relay output
		<b>Rotor</b>
	0	Rotor with 2 shoes
		<b>Batch controller</b>
	0	without controller
		<b>Special version</b>
	0	Standard
	H	Halar-coated housing
		<b>Vacuum system</b>
	0	without
	V	with vacuum system
		<b>Approvals</b>
	01	CE

\* The pumps are factory-set to a maximum back pressure of 5 bar. Please specify deviating pressures when ordering.





## 1.4 Peristaltic Pumps DULCO® flex

### Identity Code Ordering System for Peristaltic Pump DULCO®flex DFDa 040

DFDa	Type	
	040	DFDa 040, 1.33 l/revolution
		<b>Power end/drive*</b>
	000	without drive unit
	C11	1.1 kW, 21 rpm, 1,676 l/h, 10 bar (Reduction gear system), 3-phase, 230/400 V AC
	C14	1.5 kW, 26 rpm, 2,075 l/h, 15 bar (Reduction gear system), 3-phase, 230/400 V AC
	C15	1.5 kW, 38 rpm, 3,032 l/h, 7.5 bar (Reduction gear system), 3-phase, 230/400 V AC
	C16	1.5 kW, 43 rpm, 3,431 l/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC
	C17	2.2 kW, 48 rpm, 3,830 l/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC
	C31	2.2 kW, 17 - 60 rpm, 1,356 – 4,788 l/h, 20-70 Hz, 5 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC
	C41	1.5 kW, 4 - 34 rpm, 320 – 2,713 l/h, 7-65 Hz, 5 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
	C43	2.2 kW, 5 – 49 rpm, 400 – 3,910 l/h, 7 – 65 Hz, 5 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
	C44	3.0 kW, 7 - 62 rpm, 558 – 4,948 l/h, 7 – 64 Hz, 5 bar (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
		<b>Hose material</b>
	0	NR
	B	NBR
	E	EPDM
		<b>Hydraulic connections</b>
	I	DIN flange VA DN40
	J	DIN flange PP DN40
	K	DIN flange PVDF DN40
	L	ANSI flange VA, 1 1/2"
	M	ANSI flange PP 1 1/2"
	N	ANSI flange PVDF/PTFE 1 1/2"
		<b>Base plate</b>
	0	Base plate, painted steel
	1	Base plate, stainless steel
	2	Portable unit + painted steel base plate
	3	Portable unit + stainless steel base plate
		<b>Leakage sensor</b>
	0	without leakage sensor
	L	with leakage sensor
	M	as "L" + relay output
		<b>Rotor</b>
	0	Rotor with 2 shoes
		<b>Batch controller</b>
	0	without controller
		<b>Special version</b>
	0	Standard
	H	Halar-coated housing
		<b>Vacuum system</b>
	0	without
	V	with vacuum system
		<b>Approvals</b>
	01	CE

\* The pumps are factory-set to a maximum back pressure of 5 bar. Please specify deviating pressures when ordering.

# 1.4 Peristaltic Pumps DULCO® flex

## Identity Code Ordering System for Peristaltic Pump DULCO®flex DFDa 060

DFDa	Type										
	060	DFDa 060, 2.9 l/revolution									
Power end/drive*											
	000	without drive unit									
	D11	2.2 kW, 22 rpm, 3.8 m³/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC									
	D12	3.0 kW, 26 rpm, 4.5 m³/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC									
	D15	4.0 kW, 32 rpm, 5.6 m³/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC									
	D16	4.0 kW, 37 rpm, 6.4 m³/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC									
	D17	5.5 kW, 47 rpm, 8.2 m³/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC									
	D31	5.5 kW, 10 – 36 rpm, 1.7 – 6.3 m³/h, 20 – 70 Hz, 5 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC									
	D32	7.5 kW, 19 – 66 rpm, 3.3 – 11.5 m³/h, 20 – 70 Hz, 5 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC									
	D41	5.5 kW, 4 – 34 rpm, 0.7 – 5.9 m³/h, 20 – 70 Hz, 5 bar (Gear motor, external frequency converter required), 3-phase, 400/660 V AC									
	D42	7.5 kW, 7 – 61 rpm, 1.2 – 10.6 m³/h, 20 – 70 Hz, 5 bar (Gear motor, external frequency converter required), 3-phase, 400/660 V AC									
Hose material											
	0	NR									
	B	NBR									
	E	EPDM									
Hydraulic connections											
	I	DIN flange VA DN 50									
	L	ANSI flange VA DN 50									
	J	ANSI flange PP DN 50									
	M	ANSI flange PP DN 50									
	U	DIN flange VA, Halar-coated + PVDF inserts DN 50									
	V	ANSI flange VA, Halar coated + PVDF inserts DN 50									
Base plate											
	0	Base plate, painted steel									
	1	Base plate, stainless steel									
	2	Portable unit + painted steel base plate									
Leakage sensor											
	0	without leakage sensor									
	L	with leakage sensor									
	M	as "L" + relay output									
Rotor											
	0	Rotor with 2 shoes									
Batch controller											
	0	without controller									
Special version											
	0	Standard									
	H	Halar-coated housing									
Vacuum system											
	0	without									
	V	with vacuum system									
Approvals											
	01	CE									

\* The pumps are factory-set to a maximum back pressure of 5 bar. Please specify deviating pressures when ordering.



## 1.4 Peristaltic Pumps DULCO® flex

### Identity Code Ordering System for Peristaltic Pump DULCO®flex DFDa 070

DFDa	Type	
	070	DFDa 070, 6.7 l/revolution
		<b>Power end/drive*</b>
	000	without drive unit
	E11	3.0 kW, 13.5 rpm, 5.4 m³/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC
	E12	4.0 kW, 18 rpm, 7.2 m³/h, 7.5 bar (Reduction gear system), 3-phase, 230/400 V AC
	E14	5.5 kW, 26 rpm, 10.4 m³/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC
	E17	7.5 kW, 32 rpm, 12.8 m³/h, 7.5 bar (Reduction gear system), 3-phase, 230/400 V AC
	E18	7.5 kW, 40 rpm, 16 m³/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC
	E31	7.5 kW, 10 - 36 rpm, 4 - 14.4 m³/h, 20-70 Hz, 5 bar (Gear motor with integrated frequency converter), 3-phase, 400 V AC
	E41	7.5 kW, 4 - 34 rpm, 1.6 - 13.7 m³/h, 7-65 Hz, 5 bar (Gear motor, external frequency converter required), 3-phase, 400/660 V AC
		<b>Hose material</b>
	0	NBR
	B	NBR
	E	EPDM
		<b>Hydraulic connections</b>
	I	DIN flange VA DN65
	J	DIN flange PP DN65
	L	ANSI flange VA, 2 1/2"
	M	ANSI flange PP 2 1/2"
	Q	DIN flange VA Halar coated DN65
	R	ANSI flange VA Halar coated 2 1/2"
		<b>Base plate</b>
	0	Base plate, painted steel
	1	Base plate, stainless steel
		<b>Leakage sensor</b>
	0	without leakage sensor
	L	with leakage sensor
	M	as "L" + relay output
		<b>Rotor</b>
	0	Rotor with 2 shoes
		<b>Batch controller</b>
	0	without controller
		<b>Special version</b>
	0	Standard
	H	Halar-coated housing
		<b>Vacuum system</b>
	0	without
	V	with vacuum system
		<b>Approvals</b>
	01	CE

\* The pumps are factory-set to a maximum back pressure of 5 bar. Please specify deviating pressures when ordering.



# 1.4 Peristaltic Pumps DULCO® flex

## Identity Code Ordering System for Peristaltic Pump DULCO®flex DFDa 080

DFDa	Type										
	080	DFDa 080, 11.7 l/revolution									
<b>Power end/drive*</b>											
	000	without drive unit									
	G11	4 kW, 12 rpm, 8.4 m³/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC									
	G12	5.5 kW, 17 rpm, 11.9 m³/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC									
	G15	7.5 kW, 23 rpm, 16.1 m³/h, 7.5 bar (Reduction gear system), 3-phase, 230/400 V AC									
	G16	7.5 kW, 27 rpm, 18.9 m³/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC									
	G17	11 kW, 30 rpm, 21.1 m³/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC									
<b>Hose material</b>											
	0	NR									
	B	NBR									
	E	EPDM									
<b>Hydraulic connections</b>											
	I	DIN flange VA DN80									
	J	DIN flange PP DN80									
	L	ANSI flange VA 3"									
	M	ANSI flange PP 3"									
	Q	DIN flange VA Halar coated DN80									
	R	ANSI flange VA Halar coated 3"									
<b>Base plate</b>											
	0	Base plate, painted steel									
<b>Leakage sensor</b>											
	0	without leakage sensor									
	L	with leakage sensor									
	M	as "L" + relay output									
<b>Rotor</b>											
	0	Rotor with 2 shoes									
<b>Batch controller</b>											
	0	without controller									
<b>Special version</b>											
	0	Standard									
<b>Vacuum system</b>											
	0	without									
	V	with vacuum system									
<b>Approvals</b>											
	01	CE									

\* The pumps are factory-set to a maximum back pressure of 5 bar. Please specify deviating pressures when ordering.







## 1.4 Peristaltic Pumps DULCO® flex

### Identity Code Ordering System for Peristaltic Pump DULCO®flex DFDa 100

DFDa	Type	
	100	DFDa 100, 20.0 l/revolution
		<b>Power end/drive*</b>
	000	without drive unit
	F11	7.5 kW, 12 rpm, 14.4 m³/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC
	F14	15 kW, 18 rpm, 21.6 m³/h, 10 bar (Reduction gear system), 3-phase, 230/400 V AC
	F15	15 kW, 23 rpm, 27.6 m³/h, 7.5 bar (Reduction gear system), 3-phase, 230/400 V AC
	F16	15 kW, 28 rpm, 33.6 m³/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC
	F17	18.5 kW, 30 rpm, 36 m³/h, 5 bar (Reduction gear system), 3-phase, 230/400 V AC
		<b>Hose material</b>
	0	NR
	B	NBR
	E	EPDM
		<b>Hydraulic connections</b>
	I	DIN flange VA DN100
	J	DIN flange PP DN100
	L	ANSI flange VA 4"
	M	ANSI flange PP 4"
	Q	DIN flange VA Halar coated DN100
	R	ANSI flange VA Halar coated 4"
		<b>Base plate</b>
	0	Base plate, painted steel
		<b>Leakage sensor</b>
	0	without leakage sensor
	L	with leakage sensor
	M	as "L" + relay output
		<b>Rotor</b>
	0	Rotor with 2 shoes
		<b>Batch controller</b>
	0	without controller
		<b>Special version</b>
	0	Standard
		<b>Vacuum system</b>
	0	without
	V	with vacuum system
		<b>Approvals</b>
	01	CE

\* The pumps are factory-set to a maximum back pressure of 5 bar. Please specify deviating pressures when ordering.

## 1.4 Peristaltic Pumps DULCO® flex

### 1.4.7

### Spare Parts

#### Spare Parts for DFAa 003

	Order no.
DFAa 003 silicone tube	1037107
DFAa 003 Norprene tube A-60-F	1037144
DFAa 003 Solva tube	1037145

#### Spare Parts for DFAa 008

	Order no.
DFAa 008 silicone tube	1037146
DFAa 008 Norprene tube A-60-G	1037147
DFAa 008 silicone tube	1037148
DFAa 008 Solva tube	1037149

#### Spare Parts for DFBa 010

	Order no.
DFBa 010 NR tube	1037150
DFBa 010 NBR tube	1037151
DFBa 010 EPDM tube	1037152
DFBa 010 NBR-A tube	1037154
DFBa 010 NORPRENE tube	1037155
DFBa 010 HYPALON tube	1037156

#### Spare Parts for DFBa 013

	Order no.
DFBa 013 NR tube	1037157
DFBa 013 NBR tube	1037158
DFBa 013 EPDM tube	1037159
DFBa 013 NBR-A tube	1037161
DFBa 013 NORPRENE tube	1037162
DFBa 013 HYPALON tube	1037163

#### Spare Parts for DFBa 016

	Order no.
DFBa 016 NR tube	1037164
DFBa 016 NBR tube	1037165
DFBa 016 EPDM tube	1037166
DFBa 016 NBR-A tube	1037168
DFBa 016 NORPRENE tube	1037169
DFBa 016 HYPALON tube	1037171

#### Spare Parts for DFBa 019

	Order no.
DFBa 019 TYGON tube	1037172
DFBa 019 NORPRENE tube	1037173





## 1.4 Peristaltic Pumps DULCO® flex

### Spare Parts for DFBa 022

	Order no.
DFBa 022 NR tube	1037175
DFBa 022 NBR tube	1037176
DFBa 022 EPDM tube	1037178
DFBa 022 NBR-A tube	1037180
DFBa 022 NORPRENE tube	1037181
DFBa 022 HYPALON tube	1037182

### Spare Parts for DFCa 030

	Order no.
DFCa 030 NR tube	1037183
DFCa 030 NBR tube	1037184
DFCa 030 EPDM tube	1037185
DFCa 030 NBR-A tube	1037187
DFCa 030 NORPRENE tube	1045073

### Spare Parts for DFCa 040

	Order no.
DFCa 040 NR tube	1037192
DFCa 040 NBR tube	1037193
DFCa 040 EPDM tube	1037194
DFCa 040 NBR-A tube	1037196
DFCa 040 NORPRENE tube	1037198

### Spare Parts for DFCa 050

	Order no.
DFDa 040/DFCa 050 NR tube	1037199
DFDa 040/DFCa 050 NBR tube	1037201
DFDa 040/DFCa 050 EPDM tube	1037202
DFCa 050 NBR-A tube	1037204
DFCa 050 NORPRENE tube	1045084

### Spare Parts for DFCa 060

	Order no.
DFCa 060 NR tube	1037206
DFCa 060 NBR tube	1037208
DFCa 060 EPDM tube	1037209
DFCa 060 NBR-A tube	1037211
DFCa 060 NORPRENE tube	1045085

## 1.4 Peristaltic Pumps DULCO® flex

### Spare Parts for DFCa 070

	Order no.
DFDa 070/DFCa 070 NR tube	1037213
DFDa 070/DFCa 070 NBR tube	1037214
DFDa 070/DFCa 070 EPDM tube	1037215
DFCa 070 NBR-A tube	1037217

### Spare Parts for DFDa 025

	Order no.
DFDa 025 NR tube	1037219
DFCa 025 NBR tube	1037220
DFDa 025 EPDM tube	1037221

### Spare Parts for DFDa 032

	Order no.
DFDa 032 NR tube	1037225
DFCa 032 NBR tube	1037226
DFDa 032 EPDM tube	1037227

### Spare Parts for DFDa 040

	Order no.
DFDa 040/DFCa 050 NR tube	1037199
DFDa 040/DFCa 050 NBR tube	1037201
DFDa 040/DFCa 050 EPDM tube	1037202

### Spare Parts for DFDa 060

	Order no.
DFDa 060 NR tube	1037236
DFCa 060 NBR tube	1037237
DFDa 060 EPDM tube	1037238

### Spare Parts for DFDa 070

	Order no.
DFDa 070/DFCa 070 NR tube	1037213
DFDa 070/DFCa 070 NBR tube	1037214
DFDa 070/DFCa 070 EPDM tube	1037215

### Spare Parts DFDa 080

	Order no.
DFDa 080 NR tube	1041677
DFDa 080 NBR tube	1041678
DFDa 080 EPDM tube	1041679

### Spare Parts for DFDa 100

	Order no.
DFDa 100 NR tube	1037247
DFCa 100 NBR tube	1037248
DFDa 100 EPDM tube	1037249





## 1.5 Chemical Transfer Pumps

### 1.5.1

### Selection Guide

The right accessories offer even more: they increase the performance range, application options or the feed rates.

This chapter includes chemical transfer pumps, which enable you to define the pump capacity precisely. The table will assist with quick selection. It is sorted by relevant key figures and details.



#### Selection Guide - Transfer Pumps:

	Capacity range	see page
<b>Eccentric Screw Pump Spectra</b>	to 12,000 l/h	→ 1-118
<b>Centrifugal Pump von Taine®</b>	to 22,500 l/h	→ 1-121
<b>Air-Operated Diaphragm Pump Duodos</b>	to 12,000 l/h, 7 bar	→ 1-125
<b>Barrel Pump DULCO®Trans</b>	to 6,600 l/h	→ 1-128
<b>Rotary Lobe Pump ROTADOS</b>	25 – 100 m³/h	→ 1-130

# 1.5 Chemical Transfer Pumps

## 1.5.2

## Eccentric Screw Pump Spectra

Pump ultra-gently, meter precisely and with a wealth of applications.

Capacity range 2.4 – 12,000 l/h, 12 – 3 bar

The eccentric screw pump Spectra meters liquid polyelectrolytes in concentrated and dilute form. It can be used, for example, in waste water treatment or sludge dewatering.

The eccentric screw pump Spectra has been designed for the transport of polymer solutions with a viscosity of up to 5,000 mPas. It is low-maintenance and can even be used if polymer solutions containing oil are to be metered.

The pumps are equipped with gear motors and external fans and can be operated via an external frequency converter. Protect the pump from running dry.

### Your benefits

- Low-pulsation pumping
- Feed rate is proportional to the speed
- Reversible pumping direction

### Technical Details

- FKM stator
- Stainless steel (Cr-Ni-Mo 17-12-2) rotor
- Stainless steel housing for 12/2 - 12/100
- Grey cast iron housing for 6/300 - 3/12000
- Axial face seal
- Voltage: 3-phase, 230/400 VAC
- Degree of protection: IP55

### Field of application

Waste water treatment, sludge dewatering

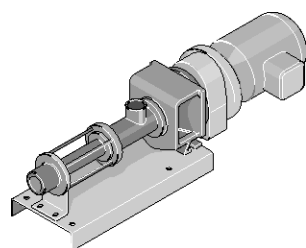
The frequency converters do not form part of the Spectra scope of supply.

### Without base plate

	Delivery rate at 3 bar	Maximum back pressure bar	Power uptake kW	Order no.
Spectra 12/2 F	0.24...2.4 l/h	12	0.37	1025284
Spectra 12/13 F	1.3...13.2 l/h	12	0.37	1025285
Spectra 12/33 F	3.3...33 l/h	12	0.37	1025286
Spectra 12/100 F	10...100 l/h	12	0.37	1025287
Spectra 6/300 F	30...300 l/h	6	0.37	1025288
Spectra 6/650 F	65...650 l/h	6	0.55	1025289
Spectra 5/1400 F	140...1,400 l/h	5	0.75	1025290
Spectra 3/3000 F	300...3,000 l/h	3	0.75	1025291
Spectra 3/6500 F	650...6,500 l/h	3	1.50	1025292
Spectra 3/12000 F	1,200...12,000 l/h	3	2.20	1025293

### With base plate

	Delivery rate at 3 bar	Maximum back pressure bar	Power uptake kW	Order no.
Spectra 12/2 FB	0.24...2.4 l/h	12	0.37	1025294
Spectra 12/13 FB	1.3...13.2 l/h	12	0.37	1025295
Spectra 12/33 FB	3.3...33 l/h	12	0.37	1025296
Spectra 12/100 FB	10...100 l/h	12	0.37	1025297
Spectra 6/300 FB	30...300 l/h	6	0.37	1025298
Spectra 6/650 FB	65...650 l/h	6	0.55	1025299
Spectra 5/1400 FB	140...1,400 l/h	5	0.75	1025300
Spectra 3/3000 FB	300...3,000 l/h	3	0.75	1025301
Spectra 3/6500 FB	650...6,500 l/h	3	1.50	1025302
Spectra 3/12000 FB	1,200...12,000 l/h	3	2.20	1025303



pk\_3\_032

## 1.5 Chemical Transfer Pumps

### Frequency Converters for Spectra

		Recom-mended for pumps up to	Order no.
SK500E – 550	0.55 kW, 1 ph, 230 V, incl. control panel	0.37 kW	1010980
SK500E – 750	0.75 kW, 1 ph, 230 V, incl. control panel	0.55 kW	1010981
SK500E – 111	1.10 kW, 1 ph, 230 V, incl. control panel	0.75 kW	1025304
SK500E – 151	1.50 kW, 1 ph, 230 V, incl. control panel	1.10 kW	1010982
SK500E – 221	2.20 kW, 3 ph, 400 V, incl. control panel	2.20 kW	1025305

The frequency converters do not form part of the Spectra scope of supply.

### Motor Data

Electrical connection	Frequency	Enclosure rating	Overheating protection	Cooling
230/400 VAC, 3 ph	4 - 89 Hz	IP 55	3 PTC thermistors in winding	external fan 1~, 230 VAC, 50 Hz

### Technical Data

	Weight	Dimensions L x W x H (mm)	Housing material	Material rot. parts	Suction/discharge connection
	kg				
Spectra 12/2 F	24	739 x 200 x 182	Cr Ni Mo 17 – 12 – 2	Cr Ni Mo 17 – 12 – 2	1/2", female
Spectra 12/13 F	24	739 x 200 x 182	Cr Ni Mo 17 – 12 – 2	Cr Ni Mo 17 – 12 – 2	1/2", female
Spectra 12/33 F	24	739 x 200 x 182	Cr Ni Mo 17 – 12 – 2	Cr Ni Mo 17 – 12 – 2	1/2", female
Spectra 12/100 F	24	739 x 200 x 182	Cr Ni Mo 17 – 12 – 2	Cr Ni Mo 17 – 12 – 2	1/2", female
Spectra 6/300 F	26	874 x 223 x 192	Grey cast iron	Cr Ni Mo 17 – 12 – 2	1 1/4", female
Spectra 6/650 F	26	874 x 223 x 192	Grey cast iron	Cr Ni Mo 17 – 12 – 2	1 1/4", female
Spectra 5/1400 F	26	874 x 223 x 192	Grey cast iron	Cr Ni Mo 17 – 12 – 2	1 1/4", female
Spectra 3/3000 F	36	950 x 223 x 193	Grey cast iron	Cr Ni Mo 17 – 12 – 2	1 1/4", female
Spectra 3/6500 F	56	1,172 x 237 x 224	Grey cast iron	Cr Ni Mo 17 – 12 – 2	DN 50, flange
Spectra 3/12000 F	81	1,487 x 264 x 244	Grey cast iron	Cr Ni Mo 17 – 12 – 2	DN 65, flange
Spectra 12/2 FB	28	739 x 220 x 232	Cr Ni Mo 17 – 12 – 2	Cr Ni Mo 17 – 12 – 2	1/2", female
Spectra 12/13 FB	28	739 x 220 x 232	Cr Ni Mo 17 – 12 – 2	Cr Ni Mo 17 – 12 – 2	1/2", female
Spectra 12/33 FB	28	739 x 220 x 232	Cr Ni Mo 17 – 12 – 2	Cr Ni Mo 17 – 12 – 2	1/2", female
Spectra 12/100 FB	28	739 x 220 x 232	Cr Ni Mo 17 – 12 – 2	Cr Ni Mo 17 – 12 – 2	1/2", female
Spectra 6/300 FB	33	874 x 230 x 242	Grey cast iron	Cr Ni Mo 17 – 12 – 2	1 1/4", female
Spectra 6/650 FB	33	874 x 230 x 242	Grey cast iron	Cr Ni Mo 17 – 12 – 2	1 1/4", female
Spectra 5/1400 FB	33	874 x 230 x 242	Grey cast iron	Cr Ni Mo 17 – 12 – 2	1 1/4", female
Spectra 3/3000 FB	44	950 x 230 x 242	Grey cast iron	Cr Ni Mo 17 – 12 – 2	1 1/4", female
Spectra 3/6500 FB	67	1,172 x 237 x 274	Grey cast iron	Cr Ni Mo 17 – 12 – 2	DN 50, flange
Spectra 3/12000 FB	96	1,487 x 265 x 294	Grey cast iron	Cr Ni Mo 17 – 12 – 2	DN 65, flange



## 1.5 Chemical Transfer Pumps

### Spare Parts

	Order no.
Stator FKM for Spectra 12/2	1025306
Stator FKM for Spectra 12/13	1025307
Stator FKM for Spectra 12/30, 12/33	1025308
Stator made of FKM for Spectra 12/100	1025309
Stator FKM for Spectra 6/300, 6/650	1025310
Stator FKM for Spectra 5/1400	1025312
Stator FKM for Spectra 3/3000	1025313
Stator made of FKM for Spectra 3/6500	1025314
Stator FKM for Spectra 3/12000	1025315
Rotor Cr Ni Mo 17-12-2 for Spectra 12/2	1025316
Rotor Cr Ni Mo 17-12-2 for Spectra 12/13	1025317
Rotor Cr Ni Mo 17-12-2 for Spectra 12/30, 12/33	1025318
Rotor made of Cr Ni Mo 17-12-2 for Spectra 12/100	1025319
Rotor Cr Ni Mo 17-12-2 for Spectra 6/300, 6/650	1025320
Rotor Cr Ni Mo 17-12-2 for Spectra 5/1400	1025322
Rotor Cr Ni Mo 17-12-2 for Spectra 3/3000	1025323
Rotor made of Cr Ni Mo 17-12-2 for Spectra 3/6500	1025324
Rotor Cr Ni Mo 17-12-2 for Spectra 3/12000	1025325
Spare parts kit for axial face seal for Spectra 12/2 - 12/100	1025326
Spare parts kit for mech. seal for Spectra 6/300 - 5/1400	1025330
Spare parts kit for mech. seal for Spectra 3/3000	1025333
Spare parts kit for axial face seal for Spectra 3/6500	1025334
Spare parts kit for mech. seal for Spectra 3/12000	1025335
Spare parts kit for pin joint for Spectra 12/2 - 12/100	1025346
Pin joints spare parts kit for Spectra 6/300 - 5/1400	1025350
Pin joints spare parts kit for Spectra 3/3000	1025353
Spare parts kit for pin joint for Spectra 3/6500	1025354
Pin joints spare parts kit for Spectra 3/12000	1025355





# 1.5 Chemical Transfer Pumps

## 1.5.3

### Centrifugal Pump von Taine®

The safe and high-quality solution when liquid media need to be pumped leak-free.

Capacity range up to 22,500 l/h, discharge lift up to 23.5 m WC



The solenoid-coupled centrifugal pump von Taine® for the pumping of liquid media works safely and reliably: liquid media are pumped leak-free.

The von Taine® pump is a solenoid-coupled centrifugal pump. Thanks to the solenoid coupling, the pump transports the liquid medium from storage tank to storage tank without any leaks or even from a tank to a discharge line. The von Taine® centrifugal pump transports media at up to 22,500 l/h and up to a discharge lift of 23.5 metres. As the pump capacity is highly dependent on the back pressure, always observe the performance curve.

#### Important note

Check the material tolerability when selecting your pump. Take into consideration the density, viscosity and temperature of the medium to be transported. Please also note: The transported media should not contain any solid fractions. The pump is not self-priming and requires a feed.

#### Your benefits

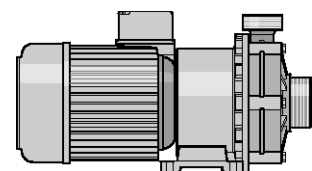
- Safe and reliable: Leak-free pumping of liquid chemicals
- Coupling between motor and impeller via magnetic coupling

#### Technical Details

- Pump head made of PP or PVDF
- FKM or EPDM seal
- The pump is not self-priming and requires a feed
- Protect the pump from running dry
- Hydraulic connectors with pipe threading as per DIN ISO 228-1

#### Field of application

Leak-free pumping of liquid chemicals



pk\_3\_026

#### von Taine®, PP/FKM Version

	Feed rate at max. pressure l/h	Feed lift max. m	Power uptake kW	Voltage/ frequency	Weight kg	Order no.
von Taine® 0502 PP/FKM	1,800	4.5	0.06	1~/230 V/50 Hz	2.7	1023089
von Taine® 0807 PP/FKM	6,600	7.9	0.25	3~/400 V/50 Hz	5.0	1023090
von Taine® 1010 PP/FKM	9,600	10.0	0.37	3~/400 V/50 Hz	7.6	1023091
von Taine® 1313 PP/FKM	13,200	13.2	0.65	3~/400 V/50 Hz	8.7	1023092
von Taine® 1820 PP/FKM	19,500	18.1	1.10	3~/400 V/50 Hz	16.0	1023093
von Taine® 2323 PP/FKM	22,500	23.5	1.50	3~/400 V/50 Hz	17.0	1023094

#### von Taine®, PVDF/FKM Version

	Feed rate at max. pressure l/h	Feed lift max. m	Power uptake kW	Voltage/ frequency	Weight kg	Order no.
von Taine® 0502 PVDF/FKM	1,800	4.5	0.06	1~/230 V/50 Hz	2.8	1023095
von Taine® 0807 PVDF/FKM	6,600	7.9	0.25	3~/400 V/50 Hz	5.2	1023096
von Taine® 1010 PVDF/FKM	9,600	10.0	0.37	3~/400 V/50 Hz	8.0	1023097
von Taine® 1313 PVDF/FKM	13,200	13.2	0.65	3~/400 V/50 Hz	9.0	1023098
von Taine® 1820 PVDF/FKM	19,500	18.1	1.10	3~/400 V/50 Hz	16.7	1023099
von Taine® 2323 PVDF/FKM	22,500	23.5	1.50	3~/400 V/50 Hz	17.7	1023100



# 1.5 Chemical Transfer Pumps

## von Taine®, PP/EPDM Version

	Feed rate at max. pressure l/h	Feed lift max. m	Power uptake kW	Voltage/ frequency	Weight kg	Order no.
von Taine® 0502 PP/EPDM	1,800	4.5	0.06	1~/230 V/50 Hz	2.7	1028551
von Taine® 0807 PP/EPDM	6,600	7.9	0.25	3~/400 V/50 Hz	5.0	1028552
von Taine® 1010 PP/EPDM	9,600	10.0	0.37	3~/400 V/50 Hz	7.6	1028553
von Taine® 1313 PP/EPDM	13,200	13.2	0.65	3~/400 V/50 Hz	8.7	1028564
von Taine® 1820 PP/EPDM	19,500	18.1	1.10	3~/400 V/50 Hz	16.0	1028565
von Taine® 2323 PP/EPDM	22,500	23.5	1.50	3~/400 V/50 Hz	17.0	1028566

## von Taine®, PVDF/EPDM Version

	Feed rate at max. pressure l/h	Feed lift max. m	Power uptake kW	Voltage/ frequency	Weight kg	Order no.
von Taine® 0502 PVDF/EPDM	1,800	4.5	0.06	1~/230 V/50 Hz	2.8	1028567
von Taine® 0807 PVDF/EPDM	6,600	7.9	0.25	3~/400 V/50 Hz	5.2	1028568
von Taine® 1010 PVDF/EPDM	9,600	10.0	0.37	3~/400 V/50 Hz	8.0	1028569
von Taine® 1313 PVDF/EPDM	13,200	13.2	0.65	3~/400 V/50 Hz	9.0	1028570
von Taine® 1820 PVDF/EPDM	19,500	18.1	1.10	3~/400 V/50 Hz	16.7	1028571
von Taine® 2323 PVDF/EPDM	22,500	23.5	1.50	3~/400 V/50 Hz	17.7	1028572

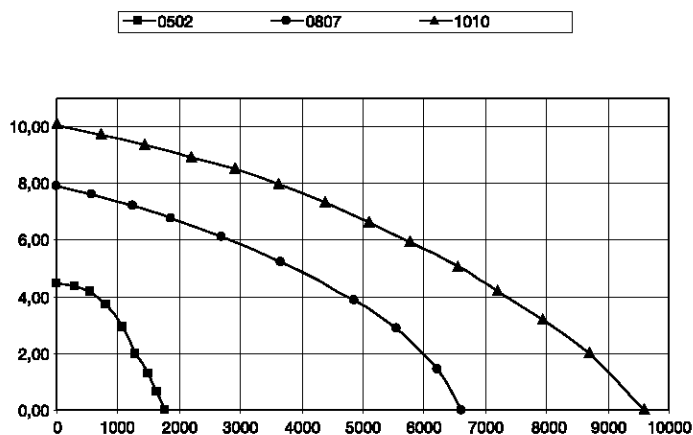
## Parameters For Use

	Medium temperature max. °C	Maximum density kg/dm³	Max. viscosity mPas	Max. system pressure at 20° C bar
von Taine® 0502 PP	80	1.25...1.35	20	1.0
von Taine® 0807 PP	80	1.20...1.80	20	2.5
von Taine® 1010 PP	80	1.60...2.00	20	2.5
von Taine® 1313 PP	80	1.60...1.90	20	2.5
von Taine® 1820 PP	80	1.10...1.80	20	5.0
von Taine® 2323 PP	80	1.00...2.00	20	5.0
von Taine® 0502 PVDF	95	1.25...1.35	20	1.0
von Taine® 0807 PVDF	95	1.20...1.80	20	2.5
von Taine® 1010 PVDF	95	1.60...2.00	20	2.5
von Taine® 1313 PVDF	95	1.60...1.90	20	2.5
von Taine® 1820 PVDF	95	1.10...1.80	20	5.0
von Taine® 2323 PVDF	95	1.00...2.00	20	5.0



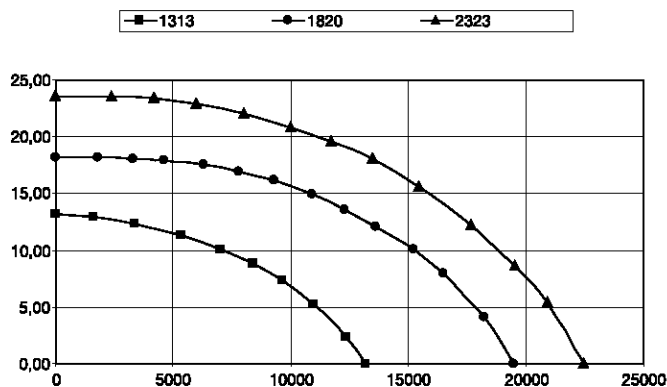
# 1.5 Chemical Transfer Pumps

## Characteristic Curves



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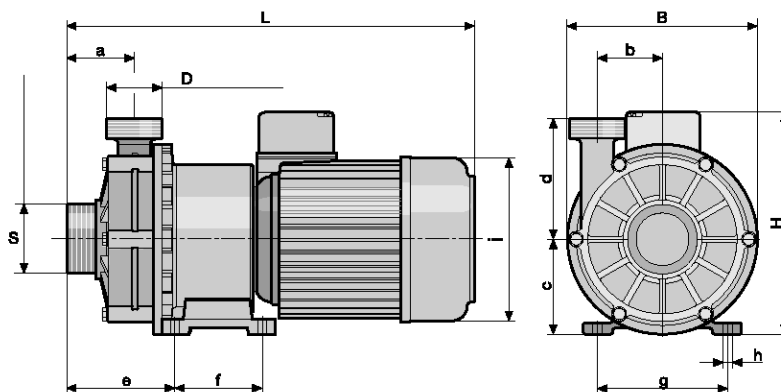
Delivered quantity [l/h] as a function of the delivery head [m WC]



pk\_2\_115

Delivered quantity [l/h] as a function of the delivery head [m WC]

## Dimensions



pk\_3\_027



# 1.5 Chemical Transfer Pumps

		von Taine® 0502 PVDF	von Taine® 0807 PVDF	von Taine® 1010 PVDF	von Taine® 1313 PVDF	von Taine® 1820 PVDF	von Taine® 2323 PVDF
Discharge connector (D)		G 1"	G 1 1/4"	G 1 1/2"	G 1 1/2"	G 2"	G 2"
Suction connector (S)		G 1 1/4"	G 1 1/4"	G 2"	G 2"	G 2 1/4"	G 2 1/4"
L	mm	240	283	346	350	455	455
B	mm	120	138	163	163	205	205
H	mm	145	185	181	191	216	216
a	mm	37.0	45.0	58.5	58.5	70.0	70.0
b	mm	29.5	29.5	56.0	56.0	70.0	70.0
c	mm	60.0	70.0	82.0	82.0	104.5	104.5
d	mm	65.5	86.0	104.0	104.0	134.5	134.5
e	mm	129	50	106	106	115	115
f	mm	78	71	74	74	100	100
g	mm	91	91	114	114	130	130
h	mm	6.5	8.5	8.5	8.5	10.0	10.0
i	mm	92	135	136.5	135	160	160
Enclosure rating		IP 55	IP 55	IP 55	IP 55	IP 55	IP 55
Min. flow	l/h	30	60	60	60	90	120

## Spare Parts Kits

	Order no.
PP/FKM liquid end for von Taine® 0502	1023978
PP/FKM liquid end for von Taine® 0807	1023979
PP/FKM liquid end for von Taine® 1010	1023980
PP/FKM liquid end for von Taine® 1313	1023981
PP/FKM liquid end for von Taine® 1820	1023982
PP/FKM liquid end for von Taine® 2323	1023983
PVDF/FKM liquid end for von Taine® 0502	1023994
PVDF/FKM liquid end for von Taine® 0807	1023995
PVDF/FKM liquid end for von Taine® 1010	1023996
PVDF/FKM liquid end for von Taine® 1313	1023997
PVDF/FKM liquid end for von Taine® 1820	1023998
PVDF/FKM liquid end for von Taine® 2323	1023999

	Order no.
PP/EPDM liquid end for von Taine® 0502	1028573
PP/EPDM liquid end for von Taine® 0807	1028574
PP/EPDM liquid end for von Taine® 1010	1028575
PP/EPDM liquid end for von Taine® 1313	1028576
PP/EPDM liquid end for von Taine® 1820	1028577
PP/EPDM liquid end for von Taine® 2323	1028578
PVDF/EPDM liquid end for von Taine® 0502	1028579
PVDF/EPDM liquid end for von Taine® 0807	1028580
PVDF/EPDM liquid end for von Taine® 1010	1028581
PVDF/EPDM liquid end for von Taine® 1313	1028582
PVDF/EPDM liquid end for von Taine® 1820	1028583
PVDF/EPDM liquid end for von Taine® 2323	1028584

	Order no.
Motor for von Taine® 0502	1024000
Motor for von Taine® 0807	1024001
Motor for von Taine® 1010	1024002
Motor for von Taine® 1313	1024003
Motor for von Taine® 1820	1024004
Motor for von Taine® 2323	1024005

## 1.5 Chemical Transfer Pumps

### 1.5.4

#### Air-Operated Diaphragm Pump Duodos

Duodos pumps are air-driven double diaphragm transfer pumps. No electrical components are required.

Capacity range up to 6,700 l/h, discharge lift up to 70 m WC

Air-operated Diaphragm Pump Duodos for pumping liquid media.

The pump capacity of the pump can be controlled by changing the pressure in the air supply. The air control is designed for oil-free operation. Duodos pumps are ideally suited for the transport of liquid chemicals. Duodos pumps transport media at up to 6,700 l/h and up to a discharge lift of 70 m. As the pump capacity is highly dependent on the back pressure, the performance curve must always be observed. At the same time, the differential pressure between the hydraulic and pneumatic sides should not exceed 2 bar. Higher values reduce the service life of the pump. When selecting pumps, check the material compatibility. In addition, consider the density, viscosity and temperature of the transported medium.

##### Your benefits

- No electrical components are required because the pumps are air-operated
- Duodos pumps are run-dry safe and self-priming

##### Technical Details

- Maximum air pressure 7 bar
- The air control is designed for oil-free operation
- If the back pressure is greater than the air pressure in the pump, the pump remains stationary

##### Field of application

- Pumping of liquid chemicals

The following materials are available:

- PP pump chambers with Santoprene® diaphragms and valves
- PVDF pump chambers with PTFE diaphragms and valves

##### Duodos PP

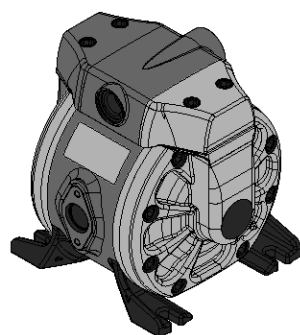
	Housing material	Diaphragms/ valves	Delivery rate (2 bar differential pressure) l/h	Order no.
<b>Duodos 20 PPS</b>	PP	Santoprene®	0...1,200	1103381
<b>Duodos 50 PPS</b>	PP	Santoprene®	0...3,000	1103384
<b>Duodos 100 PPS</b>	PP	Santoprene®	0...6,000	1103383
<b>Duodos 200 PPS</b>	PP	Santoprene®	0...12,000	1103377

##### Duodos PVDF

	Housing material	Diaphragms/ valves	Delivery rate (2 bar differential pressure) l/h	Order no.
<b>Duodos 20 PVT</b>	PVDF	PTFE	0...1,200	1103378
<b>Duodos 50 PVT</b>	PVDF	PTFE	0...3,000	1103382
<b>Duodos 100 PVT</b>	PVDF	PTFE	0...6,000	1103379
<b>Duodos 200 PVT</b>	PVDF	PTFE	0...12,000	1103380

##### Parameters For Use

	Min. temperature °C	Max. temperature °C	Max. viscosity mPas
<b>Duodos 100 PPS</b>	10	80	200
<b>Duodos 100 PVT</b>	-13	93	200
<b>Duodos 20 PPS</b>	10	80	200
<b>Duodos 20 PVT</b>	-13	93	200
<b>Duodos 200 PPS</b>	10	80	200
<b>Duodos 200 PVT</b>	-13	93	200
<b>Duodos 50 PPS</b>	10	80	200
<b>Duodos 50 PVT</b>	-13	93	200

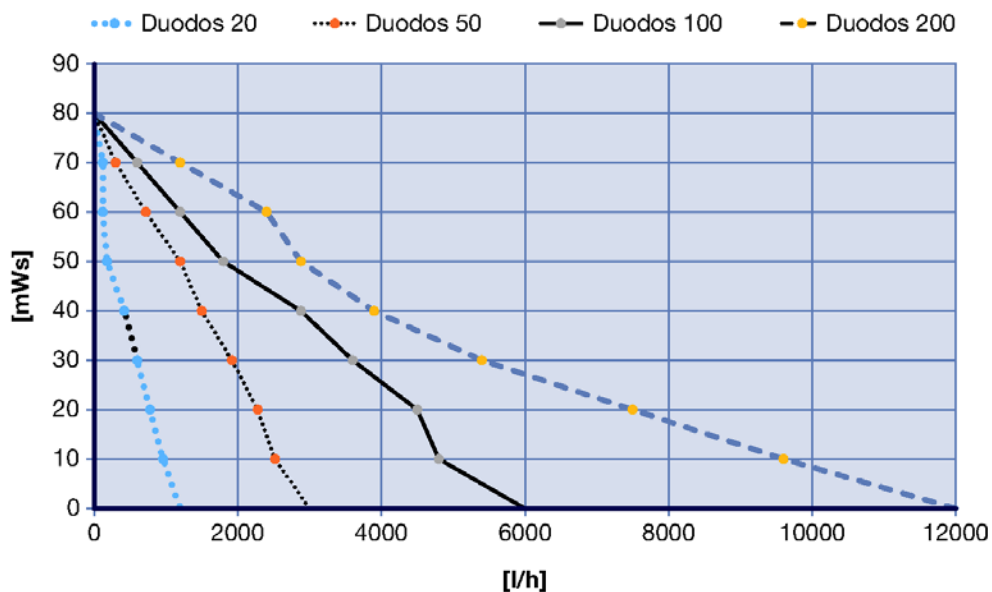


P\_DUO\_0015\_SW1



# 1.5 Chemical Transfer Pumps

## Characteristic Curves



P\_DUO\_0018\_SW

Feed lift [m WC] over feed rate [l/h] at 7 bar air supply

## Spare Parts Kits

### Spare part kits for pneumatics comprising

- Seals
- O-rings
- Clamp collars
- Air control valve

	Order no.
Spare parts kit, pneumatics for Duodos 20 PPS/PVT	1103386
Spare parts kit, pneumatics for Duodos 50 PPS/PVT	1103387
Spare parts kit, pneumatics for Duodos 100 PPS/PVT	1103388
Spare parts kit, pneumatics for Duodos 200 PPS/PVT	1103389

### Spare part kits for the liquid end comprising

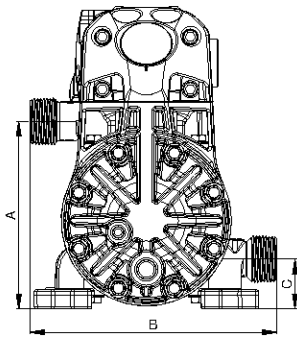
- Diaphragms
- Valve balls
- Seals

	Order no.
Spare parts kit, liquid end for Duodos 20 PPS	1103391
Spare parts kit, liquid end for Duodos 50 PPS	1103390
Spare parts kit, liquid end for Duodos 100 PPS	1103393
Spare parts kit, liquid end for Duodos 200 PPS	1103392
Spare parts kit, liquid end for Duodos 20 PVT	1103394
Spare parts kit, liquid end for Duodos 50 PVT	1103396
Spare parts kit, liquid end for Duodos 100 PVT	1103395
Spare parts kit, liquid end for Duodos 200 PVT	1103397

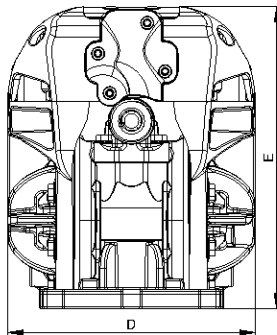
## 1.5 Chemical Transfer Pumps

### Dimensions

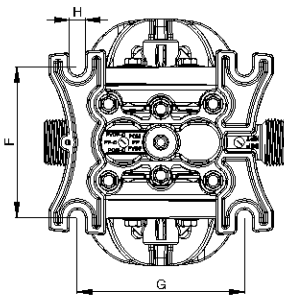
		Duodos 20	Duodos 50	Duodos 100	Duodos 200
<b>A</b>	mm	108	156	216	311
<b>B</b>	mm	142	160	218	320
<b>C</b>	mm	29	185	230	60
<b>D</b>	mm	142	105	175	295
<b>E</b>	mm	173	122	154	364
<b>F</b>	mm	86	8	8	9
<b>G</b>	mm	96	141	184	-
<b>H</b>	mm	9	70	95	-
<b>K</b>	mm	-	166	212	-
<b>M</b>	mm	-	24	62	-
<b>Discharge connector</b>		1/4" NPT (F)	1/2" BSP	1" BSP	DN 25
<b>Suction connector</b>		3/4" NPT (M)	1/2" BSP	1" BSP	DN 25
<b>Air consumption</b>	m³/h	0.6...18	1.2...24	1.8...30	3.0...78
<b>Differential pressure</b>	bar	2	2	2	2
<b>Air connection</b>		3/8" NPSM (F)	3/8" NPSM (F)	3/8" NPSM (F)	3/8" NPSM (F)
<b>Weight (PP)</b>	kg	1.2	2.2	5.1	10.5
<b>Weight (PVDF)</b>	kg	1.7	2.7	5.6	11



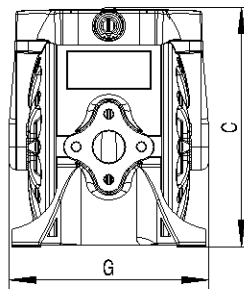
P\_DUO\_0007\_SW1



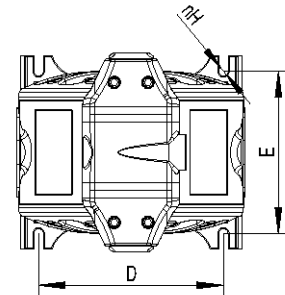
P\_DUO\_0008\_SW1



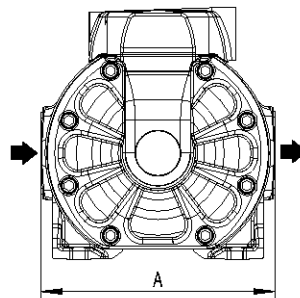
P\_DUO\_0009\_SW1  
Duodos 20



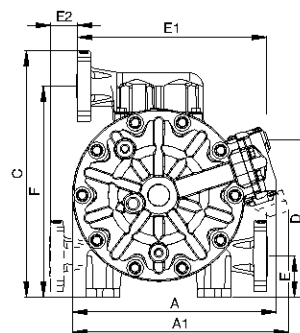
P\_DUO\_0013\_SW1



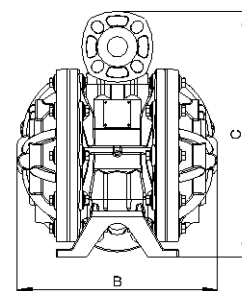
P\_DUO\_0014\_SW1



P\_DUO\_0016\_SW1  
Duodos 50, 100



P\_DUO\_0010\_SW1  
Duodos 200



P\_DUO\_0011\_SW1



## 1.5 Chemical Transfer Pumps

### 1.5.5 Barrel Pump DULCO®Trans

Barrel pumps are the ideal solution for moving liquids.

Pump capacity according to size from 2,800 – 6,600 l/h

The application range of the DULCO®Trans depends on the chemical resistance of the materials used.

DULCO®Trans is used for bottling, draining and transferring liquids from canisters, hobboscks, drums, storage tanks and containers.

Included in the scope of supply: Metering hose with pump nozzle.

#### Your benefits

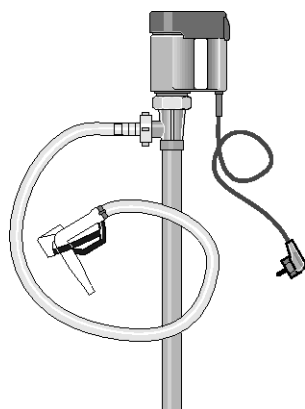
- Reliable pumping of liquid chemicals
- Pump sets available for different delivery containers
- Pump nozzle for convenient filling of liquids
- Undervoltage trigger prevents unintentional start-up after an interruption to the operating voltage.
- The overcurrent safety switch prevents overloading of the motor.

#### Technical Details

- Pump available in PP or PVDF
- PVC hose or multi-purpose chemical hose
- PP or PVDF pump nozzle
- Protect the pump from running dry
- Pumps cannot be remotely controlled

#### Field of application

Barrel pump for bottling, emptying and transferring liquids from canisters, drums and containers.



pk\_3\_029

#### Materials in Contact With the Medium

The following materials come into contact with the liquids:

	PP version	PVDF version
External and internal pipe, pump nozzle	Polypropylene	PVDF
Drive shaft	Hastelloy C	Hastelloy C
Rotor	PP	PVDF
Axial face seal	PTFE	PTFE
O-rings	FKM	FKM
Metering hose	PVC	Multi-purpose chemical hose

#### DULCO®Trans PP Version

	Feed rate max. l/h	Feed lift max. m	Order no.
DULCO®Trans 32/700 PP	2,800 *	10	1098490
DULCO®Trans 41/1000 PP	5,400 *	11	1098491
DULCO®Trans 41/1200 PP	6,600 *	16	1098489

#### DULCO®Trans PVDF Version

	Feed rate max. l/h	Feed lift max. m	Order no.
DULCO®Trans 32/700 PVDF	2,800 l/h *	10	1098492
DULCO®Trans 41/1000 PVDF	5,400 l/h *	11	1098493
DULCO®Trans 41/1200 PVDF	6,600 l/h *	16	1098494

\* The pump capacity is understood as including the hose and pump nozzle, using water at room temperature as the medium.



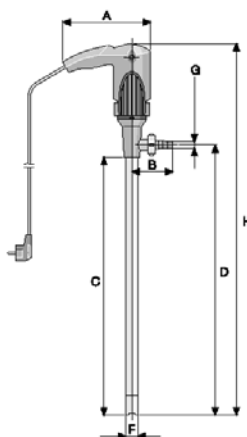
## 1.5 Chemical Transfer Pumps

### Technical Data

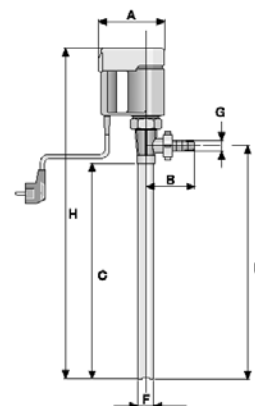
Type		DULCO®Trans 32/700	DULCO®Trans 41/1000	DULCO®Trans 41/1200
Max. density	kg/dm <sup>3</sup>	1.3	1.5	1.9
Max. viscosity	mPas	400	600	1000
Media temperature PP	°C	50	50	50
Media temperature PVDF	°C	90	90	90
Suction pipe outer diameter	mm	32	41	41
Hose connection		d19	d25	d25
Discharge hose		2 m, DN 19	2 m, DN 25	2 m, DN 25
Motor rating	W	450	640	825
Enclosure rating		IP 24	IP 24	IP 24
Voltage/frequency		230 V/1~/50/60 Hz	230 V/1~/50/60 Hz	230 V/1~/50/60 Hz
Under-voltage cut-out		with	with	with
Overvoltage safety switch		with	with	with
Temperature monitoring		none	none	none
Speed control		none	none	none
Connection cable		5 m, EUR plug	5 m, EUR plug	5 m, EUR plug
Drum adapter		G 2"	G 2"	G 2"
Weight PP/PVDF	kg	5.9/7.9	7.6/9.2	8.3/9.7
Dimensions H x W x D	mm	986 x 170 x 90	1,315 x 220 x 90	1,515 x 220 x 90

### Dimensions

Type		DULCO®Trans 32/700	DULCO®Trans 41/1000	DULCO®Trans 41/1200
A	mm	170	220	220
B	mm	90	90	90
C	mm	656	996	1,016
D	mm	700	1,000	1,200
F	mm	32	41	41
G	d	19	25	25
H	mm	986	1,315	1,515



pk\_3\_028



pk\_3\_029\_1

### Spare parts kits for the barrel pump DULCO®Trans

	Order no.
Spare parts kit for DULCO®Trans 32/700 PP	1098502
Spare parts kit for DULCO®Trans 32/700 PVDF	1098503
Spare parts kit for DULCO®Trans 41/1000 PP	1098500
Spare parts kit for DULCO®Trans 41/1000 PVDF	1098498
Spare parts kit for DULCO®Trans 41/1200 PP	1098501
Spare parts kit for DULCO®Trans 41/1200 PVDF	1098499



## 1.5 Chemical Transfer Pumps

### 1.5.6

### Rotary Lobe Pump ROTADOS

**The robust solution for the pumping of viscose media and media containing solids**

**Capacity range 25–100 m³/h, 10–4 bar**



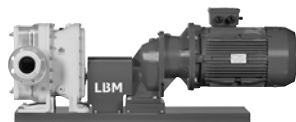
The compact rotary lobe pump pumps viscose and even abrasive media at up to 100 m³/h and also with reversible pumping direction thanks to its valveless construction. Housing, plunger and seals are available in different materials to match the medium.

The rotary lobe pump is robust and surprisingly powerful given its compact dimensions: depending on the model it can pump up to 100 m³/h viscose media and media containing solids, even containing larger particles of solids. It can be used with ease as a self-priming pump with reversible pumping direction. And naturally it is absolutely safe to operate as an intermediate chamber reliably separating the pumped medium from the gear oil.

The carefully selected materials, high-grade workmanship and maintenance-friendly construction make the rotary lobe pump into a low-wear endurance pump. A three-phase motor drives the two rotary pistons via a precision gear perfectly synchronised and thus also quietly. Corresponding drive versions enable the pump to be connected to bus systems and thus integrated into modern production environments.

#### Your benefits

- Compact pump with good pump capacity
- Ideal for viscous, abrasive and shear-sensitive media containing solids
- High-grade seals and the reliable separation of gears and medium enhance the pump's operational safety
- Feed rate can be controlled via motor speed
- Connection to bus system is possible
- Low-wear and maintenance-friendly



P\_PM\_TRF\_0003\_SW1

#### Technical Details

- Pump complete with drive motor, reduction gear system, clutch and base plate
- Housing material AISI-316 or AISI 420, rotary piston and shaft seals made of NBR, EPDM or FKM
- Constant i.e. non-pulsing feed rates
- Valveless construction enables reversed pump direction
- Different versions of power end/drive via three-phase motor (On/Off mode, adjustable motor with integrated frequency converter or external fan)
- Connection to bus system is possible (integrated frequency converter needed)
- Hydraulic connection as standard by means of DIN flange (DN 50, 65, 80, 100, 125), other connectors available
- Simple replacement of wear discs thanks to maintenance-friendly construction

#### Field of application

- Waste water and sludge pumping
- Food and beverage industry

#### Rotary lobe pump ROTADOS

	Flange	Max. pump volume m³/h	Max. pressure bar	Weight kg	Order no.
<b>Type 070</b>	DN 65	25	10	80	on request
<b>Type 090</b>	DN 80	35	6	85	on request
<b>Type 100</b>	DN 100	80	8	185	on request
<b>Type 125</b>	DN 125	100	4	195	on request



## 1.5 Chemical Transfer Pumps

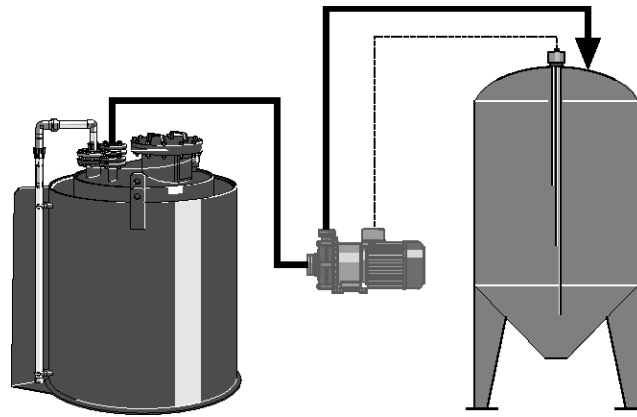
### 1.5.7

### Application Examples

#### Filling a Day Tank

Product:	von Taine® centrifugal pump
Metered medium:	32% hydrochloric acid solution
Sector:	Food
Application:	Chemical transfer

The von Taine® centrifugal pump is switched on and off automatically by the level control facility in the day tank.



pk\_3\_050

#### Task and requirements

- Automatically filling service tanks with 32 % hydrochloric acid solution

#### Operating conditions

- Indoor operation
- Automatic activation of pump

#### Application information

- Centrifugal pump controlled by level control facility in metering tank
- The centrifugal pump is not self-priming and requires feed
- Hydrochloric acid compatibility of materials must be ensured (PP, PVDF; EPDM)
- Provide dry-running protection facility for centrifugal pump

#### Solution

- vonTaine® 1820 PP centrifugal pump
- Service tank with level control

#### Benefits

- Safe handling of hydrochloric acid
- Fully automatic operation with minimum personnel and maintenance requirements

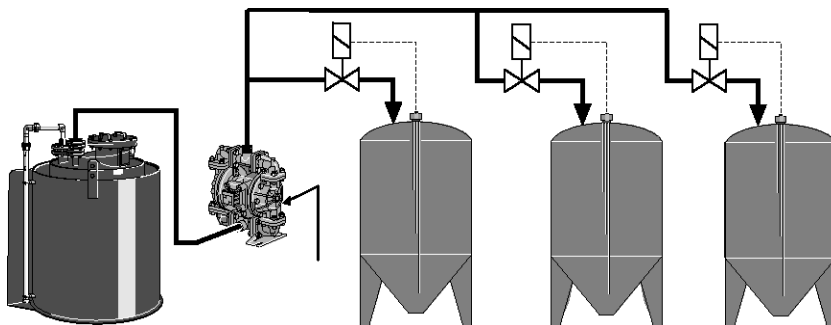


# 1.5 Chemical Transfer Pumps

## Filling Day Tanks

Product:	<b>Duodos air-operated diaphragm pump</b>
Metered medium:	<b>Detergent</b>
Sector:	<b>Laundry</b>
Application:	<b>Chemical transfer</b>

The level control facility for the day tanks opens the solenoid valves when the level drops below minimum. With decreasing back pressure, the Duodos pump automatically begins to pump medium into the metering line and switches off when the maximum level in the tank is reached and the solenoid valve is switched off.



pk\_3\_051

### Task and requirements

- Automatic filling of day tanks with detergent

### Operating conditions

- Compressed air necessary for operating compressed air diaphragm pump
- Automatic filling of day tanks

### Application information

- Compressed air diaphragm-type pump controlled by level control facility in metering tank
- The compressed air diaphragm pump is self-priming
- Also suitable for viscous media
- The level control facility for the day tanks opens the solenoid valves when the level drops below minimum. With decreasing back pressure, the compressed air diaphragm-type pump automatically begins to pump medium into the metering line and switches off when the maximum level in the tank is reached and the solenoid valve is switched off

### Solution

- Duodos air-operated diaphragm pump
- Day tank with level control

### Benefits

- Simplified logistics through central storage
- Fully automatic operation with minimum personnel and maintenance requirements

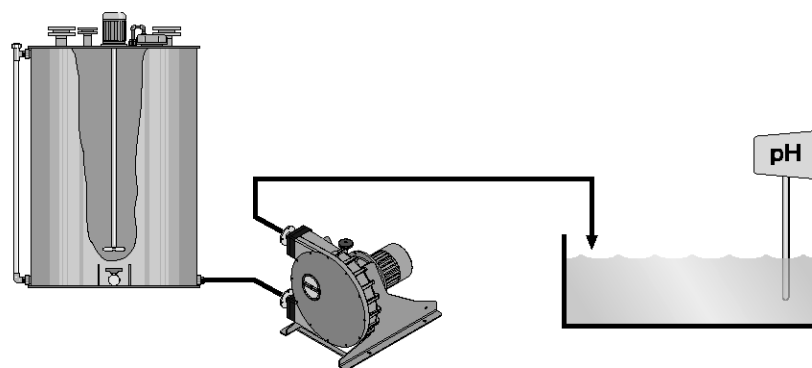




## 1.5 Chemical Transfer Pumps

### Deacidification of Potable Water

Product	DULCO®flex peristaltic pump
Feed chemical	Lime milk 10%
Sector:	Potable water
Application	Feed of abrasive chemicals



AP\_PTW\_0001\_SW

#### Problems and requirements

- Feed of abrasive lime milk into potable water tanks
- Deacidification of the potable water

#### Operating conditions

- The lime milk comes as a 10% suspension
- The pH in the application tank is continuously measured

#### Notes on use

- The peristaltic pump is self-priming
- The pump is controlled by a pH measuring unit
- Speed reduction to extend the service life of the hose

#### Solution

- DULCO®flex DFCa 040 type peristaltic pump
- Hose material: NR (natural rubber)

#### Benefits

- Reliable feed of lime milk
- Fully automatic operation with minimum personnel and maintenance requirements

## 1.5 Chemical Transfer Pumps

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# 1.6 Accessories for low-pressure metering pumps

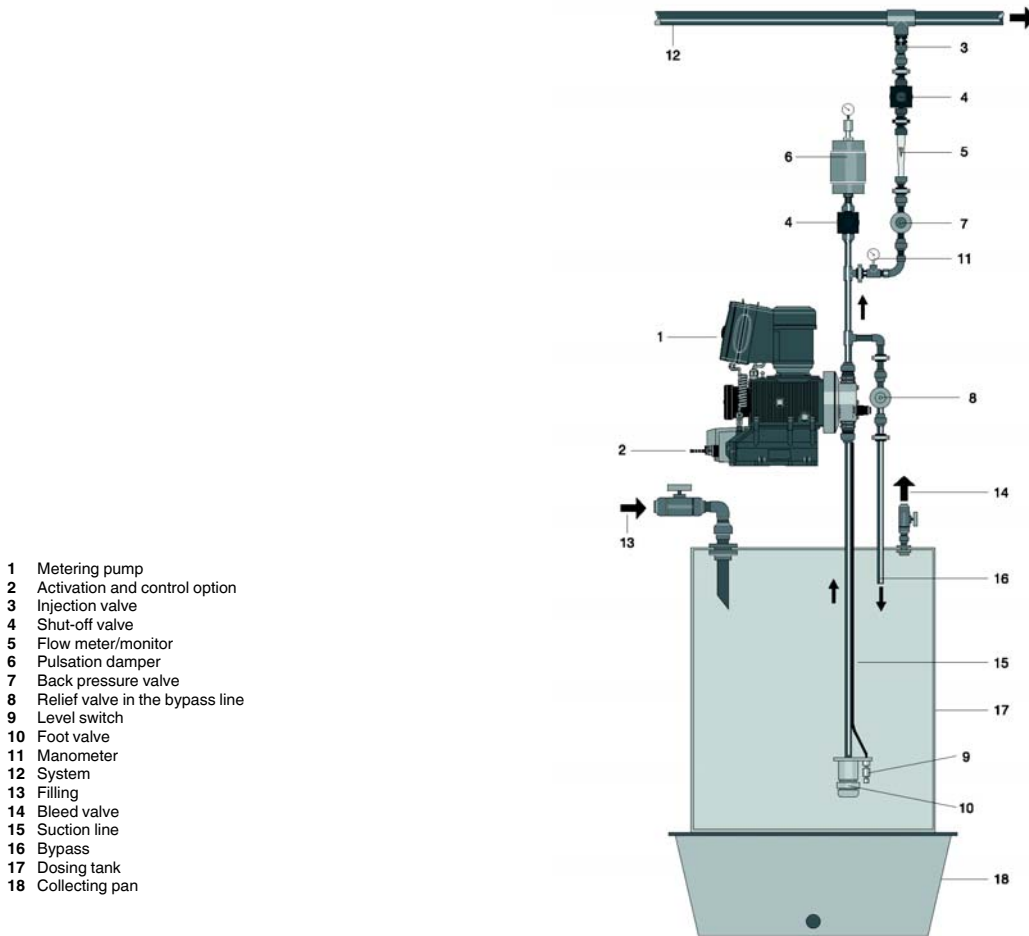
## 1.6.1

### How to find the right accessories

Apart from a correctly selected metering pump, individually combined accessories, installed in accordance with all pertinent regulations, are needed for the perfect operation of metering systems. This drawing below shows a number of accessories. Not all of them are of course always needed but the drawing provides a brief overview of what is possible and may be useful.

The tips provide initial orientation guidelines and a simple option for selection of the right accessories.

We would be happy to assist with the selection of the correct accessories for your metering task and also to provide ongoing plant engineering advice (e.g. pipework calculations).



- 1 Metering pump
- 2 Activation and control option
- 3 Injection valve
- 4 Shut-off valve
- 5 Flow meter/monitor
- 6 Pulsation damper
- 7 Back pressure valve
- 8 Relief valve in the bypass line
- 9 Level switch
- 10 Foot valve
- 11 Manometer
- 12 System
- 13 Filling
- 14 Bleed valve
- 15 Suction line
- 16 Bypass
- 17 Dosing tank
- 18 Collecting pan

AP\_DOC\_0006\_SW3

#### Tips

- **No. 2 Activation and control option** intelligent motor-driven metering pumps: Direct control, e.g. via analogue signal or potential-free contacts, external Pause or via universal control cable.
- **No. 3 Injection valves** are used to connect the metering line at the point of injection. They protect against backflow and generate a defined back pressure.
- **No. 6 Pulsation dampers:** To lower the flow resistance with long lines and for low-pulsation metering.
- **No. 7 Back pressure valve:** With fluctuating back pressure or to generate a constant back pressure to protect against over-metering or to improve dosing precision with a free outlet and priming pressure on the suction side.
- **No. 8 Relief valves:** For reasons of safety, provide suitable overload protection mechanisms when installing all mechanically deflected motor-driven metering pumps.
- **No. 9 Level switches** are used in conjunction with foot valves or suction lances for level monitoring in dosing tanks. There is no need for re-priming of the chemical as the suction line remains filled.
- **No. 17/18 Dosing tanks and collecting pans:** PR storage tanks for feed chemicals, simple and reliable installation with sintered threaded sockets and matching collecting pans. Combinable with suction assemblies and stirrers from 35 to 1,500 l.



## 1.6 Accessories for low-pressure metering pumps

### 1.6.2

### Flow Meter DulcoFlow®

**Your reliable control unit: unobtrusively measures, monitors and detects faults.**

**For the measurement of pulsating volumetric flows within the range of 0.03 ml/stroke to 10 ml/stroke**

The flow meter DulcoFlow® reliably measures pulsating flows in the range above 0.03 ml/stroke based on the ultrasound measuring principle. The flow meter achieves maximum chemical resistance, as all wetted parts are made of PVDF and PTFE.

The device works on the ultrasound measuring principle. It was developed specifically for measuring small pulsating volumetric flows. It is installed around 30 cm downstream of the metering pump, so that there is still sufficient pulsation in the flow. All liquids that conduct ultrasound waves can be measured.

#### Your benefits

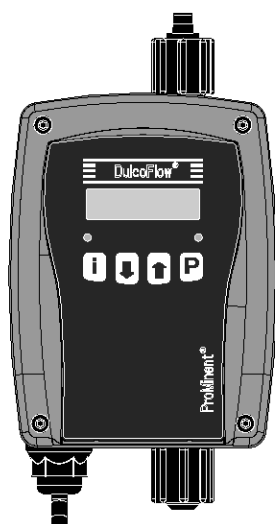
- Maximum chemical resistance by the use of PVDF and PTFE
- No electrical conductivity of the medium is needed
- Measurement above stroke volumes of approx. 30 µl
- Detection of gas bubbles in the feed chemical
- No bottlenecks in the measuring tube. Media with small undissolved particles or with increased viscosity can be measured
- A 0/4 -20 mA current output and a frequency output are available for remote transmission of the measured values.
- Use as a single stroke monitor with feedback to the pump. This ensures that the metering stroke is performed within an adjustable lower and upper limit
- Summation of the metering volume measured with stroke counter
- Intuitive user guidance and simple programming

#### Technical Details

- 2 LEDs for status display and stroke feedback
- 2-line graphic display
- 0/4-20 mA standard signal and 0 – 10 kHz frequency output for remote transmission of the measured value
- Compact, chemically-resistant plastic housing
- Measuring accuracy  $\pm 2\%$  if the device has been calibrated to the chemical to be measured. Max. operating pressure 16 bar.

#### Field of application

- Measurement of the chemical consumption, for example in surface treatment.
- Guaranteed metering, for example in the paper industry.
- Measured value transmission and pump control by the central control system.
- Measurement of aggressive chemicals.
- Not suitable for liquids, which have minimal acoustic conductivity, e.g. sodium hydroxide (NaOH) with a concentration of greater than around approx. 20%.
- **We recommend first testing the measurability with emulsions and suspensions.**
- **Media like chlorine dioxide liquids, which can penetrate through PVDF, can lead to shorter lifetime of the transducers.**



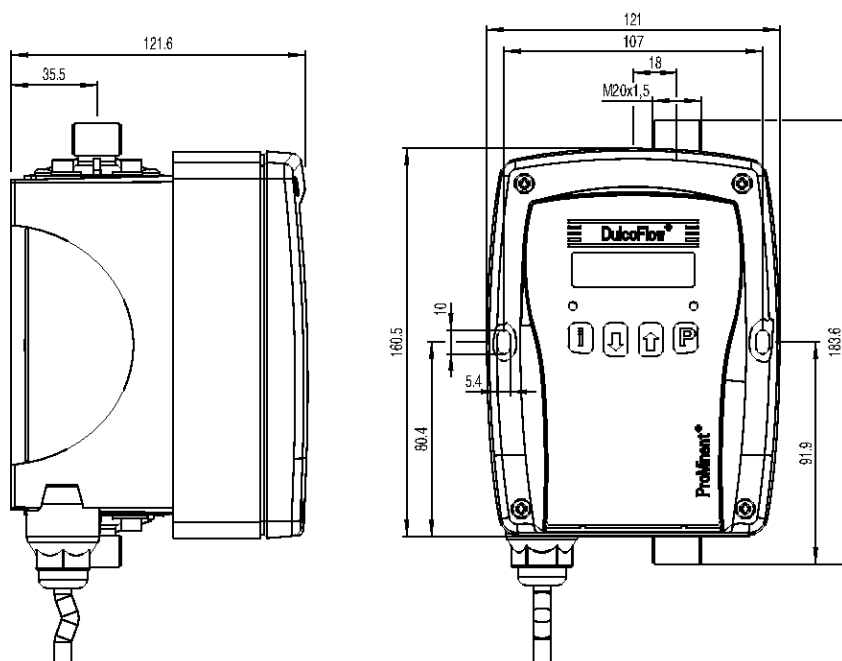
P\_DFL\_0002\_SW1





## 1.6 Accessories for low-pressure metering pumps

Dimensional drawing of DulcoFlow®



P\_DFI\_0003\_SW\_Dulcoflow\_SW3

Dimensional drawing of DulcoFlow® - dimensions in mm

### Technical Data

	Type 05	Type 08
<b>Max. operating pressure</b>	16 bar	16 bar
<b>Smallest measurable stroke volume</b>	Approx. 0.03 ml/stroke pulsing	Approx. 0.05 ml/stroke pulsing
<b>Contact output with individual stroke detection</b>	Open collector, 1 contact per stroke	Open collector, 1 contact per stroke
<b>Frequency output</b>	Open collector, up to 10 kHz at maximum flow (parametrisable)	Open collector, up to 10 kHz at maximum flow (parametrisable)
<b>Analogue output for series</b>	Parametrisable, max. load 400 Ω Beta® 1000 – 0413/0713, gamma/ X 1602 – 0414/0715, gamma/ XL 1608 – 1612	Parametrisable, max. load 400 Ω Beta® 1604 – 0420, gamma/ X 1604 – 0424, gamma/ XL 1020 – 0450, Sigma/ 1



## 1.6 Accessories for low-pressure metering pumps

### Identity Code Ordering System for DulcoFlow® Ultrasound Flow Meter

DFMa	Type (for pump series)		
05	Beta® 1000 – 0413/0713, gamma/ X 1602 – 0414/0715, gamma/ XL 1608 – 1612		
08	Beta® 1604 – 0420, gamma/ X 1604 – 0424, gamma/ XL 1020 – 0450, Sigma/ 1		
	Sealant material		
	E	EPDM	
	V	FKM	
	T	PTFE	
	F	FDA-compliant	
	Hydraulic connection		
	1	6/4 mm	
	2	8/5 mm	
	3	12/9 mm	
	4	with G 3/4 external thread for DN 10 connector	
	Electrical connection, cable		
	A	100 - 230 V AC, 2 m European	
	B	100 - 230 V AC, 2 m Swiss	
	C	100 - 230 V AC, 2 m Australian	
	D	100 – 230 V AC, 2 m USA	
	Signal output		
	0	No output	
	1	Current output	
	2	Contact output	
	3	Current output and contact output	
	4	Current output for delta® with control module	
	Version		
	0	With ProMinent® logo	
	Accessories		
	0	Without accessories	



## 1.6 Accessories for low-pressure metering pumps

### 1.6.3 Hydraulic/mechanical accessories

#### 1.6.3.1 Foot Valves for Low-Pressure Metering Pumps

Foot valves are fitted at the end of the suction line to prevent contamination and backflow.

Foot valves include filter mesh and ball check – ceramic weight with connectors 6/4, 8/5, 12/6, 12/9.

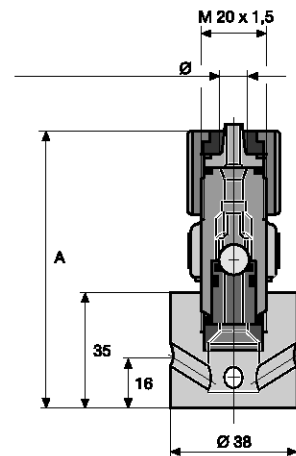
During installation, ensure that there is a sufficient gap between the foot valve and the pump foot and between the foot valve and the lowest suction water level.

Union nuts and inserts/hose nozzles are included in the scope of delivery with DN 10 and DN 15 foot valve sizes

**Important:** Foot valves are not completely sealed shut-off devices!

##### PPE Foot Valve

Housing made of PP, seals made of EPDM.



pk\_1\_038

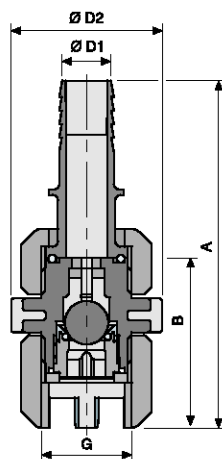
Connector	oØ x iØ mm	A mm	Fig.	Order no.
6/4 for hose	6 x 4	84	pk_1_038	924558
8/5 for hose	8 x 5	84	pk_1_038	809468
12/9 for hose	12 x 9	87	pk_1_038	809470
10/4 for hose	10 x 4	87	pk_1_038	1002916
12/6 for hose	12 x 6	87	pk_1_038	809469
6/4 for hose	6 x 4	57	P_AC_0207_SW	914554

##### PPE Foot Valve

Housing made of PP, seals made of EPDM, with filter meshes and ball check (glass).

DN 10, DN 15 with union nut and PP tube nozzle

DN 20 to DN 40 no connection parts



P\_AC\_0206\_SW

	G	B mm	Ø D2 mm	A mm	Ø D1 mm	Order no.
DN 10	3/4	59	40	101	16	809465
DN 15	1	66	47	142	20	924516
DN 20	1 1/4	77	55	–	–	803721
DN 25	1 1/2	84	60	–	–	803722
DN 32*	2	98	74	–	–	1006434
DN 40	2 1/4	113	90	–	–	1004204

\* PVDF/Teflon version

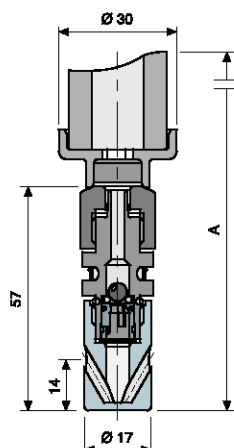
##### PPB Foot Valve

Housing made of PP, seals made of FKM.

Connector	oØ x iØ mm	A mm	Fig.	Order no.
6/4 for hose	6 x 4	84	pk_1_038	924559
8/5 for hose	8 x 5	84	pk_1_038	924683
12/9 for hose	12 x 9	87	pk_1_038	924684
10/4 for hose	10 x 4	87	pk_1_038	1002915
12/6 for hose	12 x 6	87	pk_1_038	924685



## 1.6 Accessories for low-pressure metering pumps

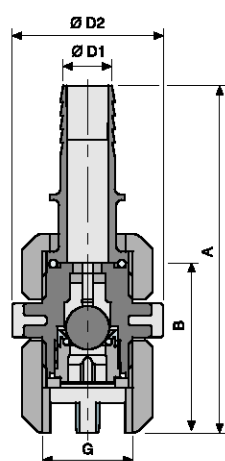


P\_AC\_0207\_SW

### PCB Foot Valve

Housing made of PVC, seals made of FKM.

Connector	oØ x iØ mm	A mm	Fig.	Order no.
6/4 for hose	6 x 4	84	pk_1_038	924557
8/5 for hose	8 x 5	84	pk_1_038	924562
12/9 for hose	12 x 9	87	pk_1_038	924564
10/4 for hose	10 x 4	87	pk_1_038	1002917
12/6 for hose	12 x 6	87	pk_1_038	924563
6/4 for hose	6 x 4	57	P_AC_0207_SW	914505



P\_AC\_0206\_SW

### PCB Foot Valve

Housing made of PP, seals made of FKM, with filter meshes and ball check (glass).

DN 10, DN 15 with union nut and PP tube nozzle

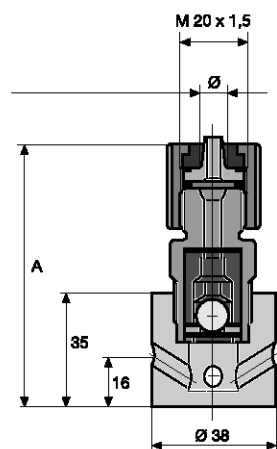
DN 20 to DN 40 no connection parts

	G	B mm	Ø D2 mm	A mm	Ø D1 mm	Order no.
DN 10	3/4	59	40	101	16	809464
DN 15	1	66	47	142	20	924515
DN 20	1 1/4	77	55	–	–	803723
DN 25	1 1/2	84	60	–	–	803724
DN 32*	2	98	74	–	–	1006434
DN 40*	2 1/4	108	83	–	–	1029475

\* PVDF/Teflon version

### PVT Foot Valve

Housing made of PVDF, seals made of PTFE.



pk\_1\_040

Connector	oØ x iØ mm	A mm	Fig.	Order no.
6/4 for hose	6 x 4	79	pk_1_040	1024705
8/5 for hose	8 x 5	79	pk_1_040	1024706
12/9 for hose	12 x 9	82	pk_1_040	1024707
Universal, FDA-compliant	6 x 4 - 12 x 9	79 – 82	pk_1_040	1081422

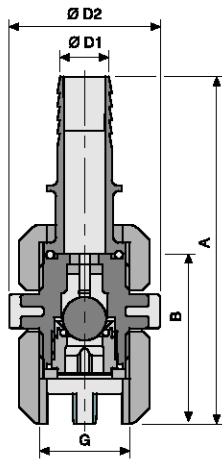
## 1.6 Accessories for low-pressure metering pumps

### PVT Foot Valve

Housing made of PVDF, ball seat made of PTFE + 25% carbon, PTFE seals, with filter mesh and ball check (ceramic DN 10 - 20, glass DN 25 - 40).

DN 10, DN 15 with union nut and PP tube nozzle

DN 20 to DN 40 no connection parts



P\_AC\_0206\_SW

	G	B mm	Ø D2 mm	A mm	Ø D1 mm	Order no.
DN 10	3/4	58	36	92	16	1029471
DN 15	1	64	48	131	20	1029472
DN 20	1 1/4	78	58	–	–	1029473
DN 25	1 1/2	81	65	–	–	1029474
DN 32	2	98	74	–	–	1006434
DN 40	2 1/4	108	83	–	–	1029475

### Foot valve PVT-FDA

"Physiologically safe (FDA) in respect of wetted materials" design.

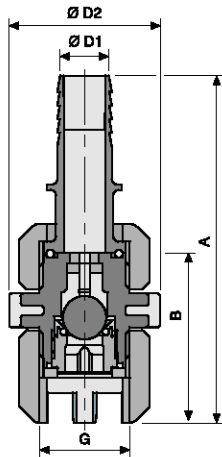
All wetted materials in the "Physiologically safe (FDA) in respect of wetted materials" design comply with the FDA guidelines:

- Material PTFE: FDA No. 21 CFR § 177.1550
- Material PVDF: FDA No. 21 CFR § 177.2510

Housing made of PVDF, seals made of PTFE, with filter mesh and ball check (ceramic DN 10 - 20, glass DN 25).

DN 10, DN 15 with union nut and hose nozzle

DN 20, DN 25 no connection parts

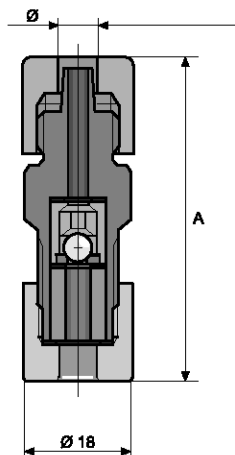


P\_AC\_0206\_SW

	G	B mm	Ø D2 mm	A mm	Ø D1 mm	Order no.
DN 10	3/4	58	36	92	16	1078269
DN 15	1	64	48	131	20	1078270
DN 20	1 1/4	78	58	–	–	1078271
DN 25	1 1/2	81	65	–	–	1078272

### Foot Valve TTT

Housing made of PTFE, seals made of PTFE. With 6/4, 8/5, 12/6, 12/9 connectors with ceramic weight.

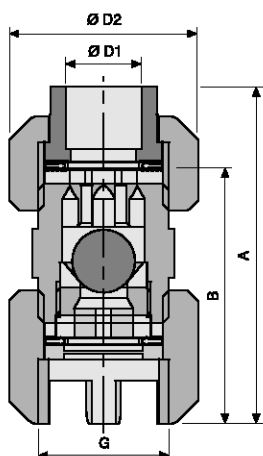


pk\_1\_039

Connector	oØ x iØ mm	A mm	Fig.	Order no.
6/4 for hose	6 x 4	79	pk_1_040	809455
8/5 for hose	8 x 5	79	pk_1_040	809471
12/9 for hose	12 x 9	82	pk_1_040	809473
12/6 for hose	12 x 6	82	pk_1_040	809472
6/4 for hose	6 x 4	52	pk_1_039	914349



## 1.6 Accessories for low-pressure metering pumps



P\_AC\_0202\_SW

### Foot Valve TTT

Housing made of PTFE, seals made of PTFE, with filter meshes and ball check (ceramic).

DN 10, DN 15 with union nut and insert

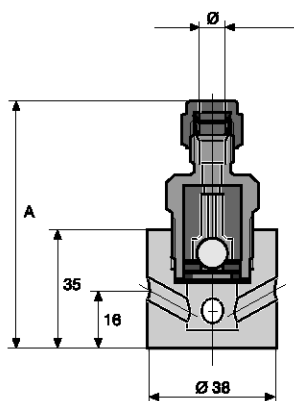
DN 20 to DN 40 no connection parts

	G	B mm	Ø D2 mm	A mm	Ø D1 mm	Order no.
DN 10	3/4	59	40	101	16	809466
DN 15	1	66	47	142	20	924517
DN 20	1 1/4	81	57	–	–	803725
DN 25	1 1/2	86	64	–	–	803726
DN 32*	2	98	74	–	–	1006434
DN 40	2 1/4	116	89	–	–	1004205

\* PVDF/Teflon version

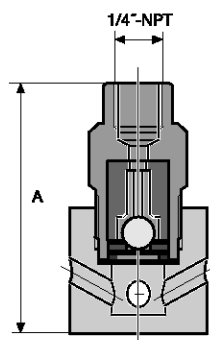
### Foot Valve SST

Housing made of stainless steel no. 1.4404, seals made of PTFE. 6/4, 8/5, 12/9 hose connectors require a support insert.



P\_AC\_0229\_SW1

Connector	oØ x iØ mm	A mm	Fig.	Order no.
6/4 for pipe 6 x 5 mm / hose	6 x 4	74	P_AC_0229_SW1	924568
8/5 for pipe 8 x 7 mm / hose	8 x 5	74	P_AC_0229_SW1	809474
12/9 for pipe 12 x 10 mm / hose	12 x 9	77	P_AC_0229_SW1	809475
1/4" NPT for SS2		70	pk_1_031_SW1	924567
6/4 FDA-compliant	6 x 5, 6 x 4	74	P_AC_0229_SW1	1081505
8/5 FDA-compliant	8 x 7, 8 x 5	74	P_AC_0229_SW1	1081506
12/9 FDA-compliant	12 x 10, 12 x 9	77	P_AC_0229_SW1	1081507



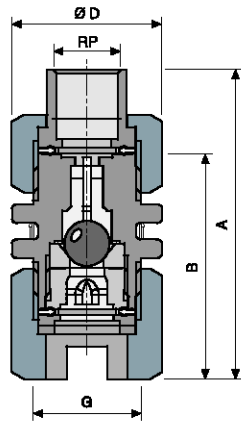
pk\_1\_031\_SW1

## 1.6 Accessories for low-pressure metering pumps

### Foot Valve SST

Housing made of SS, PTFE + 25% ball seat, PTFE seals, with filter meshes and ball check (1.4571/1.4581).

DN 10, DN 15 with union nut and insert  
DN 20 to DN 40 no connection parts



P\_AC\_0204\_SW

	G	A mm	B mm	Rp	Ø D mm	Order no.
DN 10	3/4	75	56	3/8	37	809467
DN 15	1	83	59	1/2	48	924518
DN 20	1 1/4	–	73	–	55	803727
DN 25	1 1/2	–	82	–	63	803728
DN 32	2	–	92	–	75	1006435
DN 40	2 1/4	–	109	–	90	1004206

### Foot valve SST-FDA

"Physiologically safe (FDA) in respect of wetted materials" design

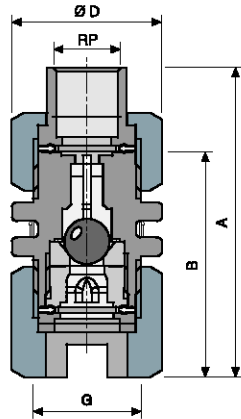
All wetted materials in the "Physiologically safe (FDA) in respect of wetted materials" design comply with the FDA guidelines.

FDA guidelines:

- Material PTFE: FDA No. 21 CFR § 177.1550
- Material PVDF: FDA No. 21 CFR § 177.2510

Housing made of SS, PVDF ball seat, PTFE seals, with filter meshes and non-return valve (1/4571/1.4581).

DN 10, DN 15 with union nut and insert  
DN 20 to DN 40 no connection parts



P\_AC\_0204\_SW

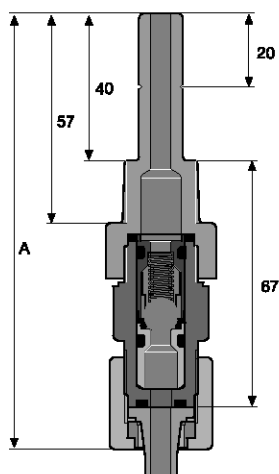
	G	A mm	B mm	Rp	Ø D mm	Order no.
DN 10	3/4	75	56	3/8	37	1078275
DN 15	1	83	59	1/2	48	1078289
DN 20	1 1/4	–	73	–	55	1078290
DN 25	1 1/2	–	82	–	63	1078291



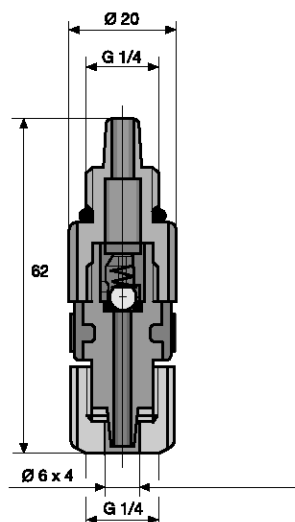
## 1.6 Accessories for low-pressure metering pumps

### 1.6.3.2

### Injection Valve for Low-Pressure Metering Pumps



pk\_1\_105



pk\_1\_042

Injection valves are mounted at the point of injection to connect the metering line. They protect against backflow and generate a defined back pressure.

With the PP, PVC, PVDF and stainless steel version, the injection valve with ball check is spring-loaded with a Hastelloy C spring, priming pressure approx. 0.5 bar (with R1/4 connector, spring made of stainless steel no. 1.4571, priming pressure approx. 1 bar). They may be fitted in any position.

The TT version without a spring is suitable for vertical installation from below. Valve springs can be retrofitted.

Injection valve sizes DN 10 and 15 have union nuts and inserts / hose nozzles in the scope of delivery.

**Important:** Injection valves are not absolutely leak-tight shut-off devices!

#### PPE Injection Valve

PP housing, EPDM seals with non-return ball, spring-loaded with Hastelloy C spring, prepressure approx. 0.5 bar with extended screwed socket.

#### Applications when using appropriate metering lines

25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 9 bar

Connection	oØ x iØ mm	A mm	Fig.	Order no.
6/4 - R 1/2 for PE/PTFE pipe	6 x 4	119	pk_1_105	924681
8/5 - R 1/2 for PE/PTFE pipe	8 x 5	119	pk_1_105	809476
12/9 - R 1/2 for PE/PTFE pipe	12 x 9	119	pk_1_105	809478
10/4 - R 1/2 for PVC hose	10 x 4	119	pk_1_105	1002920
12/6 - R 1/2 for PVC hose	12 x 6	119	pk_1_105	809477
6/4 - G 1/4 for PE/PTFE pipe*	6 x 4	62	pk_1_042	914184

\* Valve spring from stainless steel 1.4571, priming pressure approx. 0.8 bar

#### PPE Injection Valve

PP housing, EPDM seals with spring-loaded ball check (glass), priming pressure approx. 0.5 bar.

DN 10, DN 15 with union nut and PP tube nozzle

DN 20 to DN 40 no connection parts

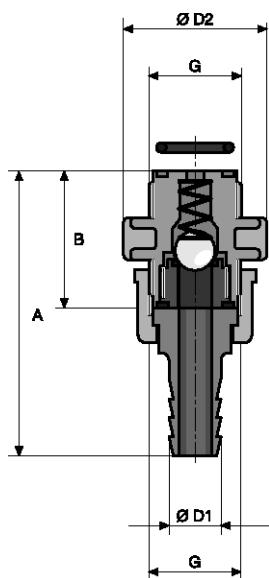
#### Operating range

25 °C - max. operating pressure 16 bar

50 °C - max. operating pressure 9 bar

	G	B mm	Ø D2 mm	A mm	Ø D1 mm	Order no.
DN 10	3/4	41	40	83	16	809461
DN 15	1	43	47	108	20	924521
DN 20	1 1/4	55	55	–	–	803710
DN 25	1 1/2	60	58	–	–	803711
DN 32*	2	68	70	–	–	1002783
DN 40	2 1/4	85	84	–	–	804761

\* PVDF/Teflon version



pk\_2\_029



## 1.6 Accessories for low-pressure metering pumps

### PPB Injection Valve

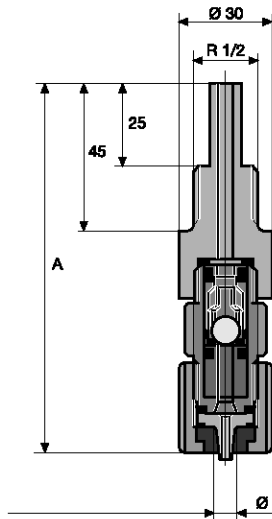
PP housing, FKM seals with spring-loaded non-return ball, prepressure approx. 0.5 bar.

#### Applications when using appropriate metering lines

25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 9 bar

Connection	oØ x iØ mm	A mm	Fig.	Order no.
6/4 - R 1/2 for PE/PTFE pipe	6 x 4	119	pk_1_105	924682
8/5 - R 1/2 for PE/PTFE pipe	8 x 5	119	pk_1_105	924687
12/9 - R 1/2 for PE/PTFE pipe	12 x 9	119	pk_1_105	924688
10/4 - R 1/2 for PVC hose	10 x 4	119	pk_1_105	1002921
12/6 - R 1/2 for PVC hose	12 x 6	119	pk_1_105	924689



pk\_1\_046

### PP/PTFE Injection Valve

For prevention of chemical deposits. PP body, PTFE mounting insert, EPDM seals with ball check and Hastelloy C spring approx. 0.5 bar priming pressure (Fig. pk\_1\_046).

#### Applications when using appropriate metering lines

25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 9 bar

Connection	oØ x iØ mm	A mm	Fig.	Order no.
6/4 - R 1/2 for PE/PTFE pipe	6 x 4	103	pk_1_046	924588
8/5 - R 1/2 for PE/PTFE pipe	8 x 5	103	pk_1_046	924589
12/9 - R 1/2 for PE/PTFE pipe	12 x 9	106	pk_1_046	924590
10/4 - R 1/2 for PVC hose	10 x 4	106	pk_1_046	1002923
12/6 - R 1/2 for PVC hose	12 x 6	106	pk_1_046	924591

### PVC/PTFE Injection Valve

PVC body, PTFE mounting insert, FKM-B seals, spring loaded ball check with Hastelloy C spring, approx. 0.5 bar priming pressure.

#### Applications when using appropriate metering lines

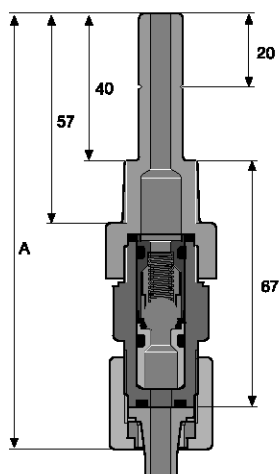
25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 7 bar

Connector	oØ x iØ mm	Fig.	Order no.
6/4 - R 1/2 for PE/PTFE pipe	6 x 4	pk_1_046	809450
8/5 - R 1/2 for PE/PTFE pipe	8 x 5	pk_1_046	809451
12/9 - R 1/2 for PE/PTFE pipe	12 x 9	pk_1_046	809452
10/4 - R 1/2 for PVC hose	10 x 4	pk_1_046	1002924
12/6 - R 1/2 for PVC hose	12 x 6	pk_1_046	809453



## 1.6 Accessories for low-pressure metering pumps



pk\_1\_105

### PCB Injection Valve

PVC housing, FKM seals, with Hastelloy C spring-loaded check ball, priming pressure approx. 0.5 bar, with extra-long screw-in fitting.

#### Application when using appropriate metering line

25 °C – max. operating pressure 25 bar for design 8/4

25 °C – max. operating pressure 16 bar

45 °C – max. operating pressure 7 bar

Connection	oØ x iØ mm	A mm	Fig.	Order no.
6/4 - R 1/2 for PE/PTFE pipe	6 x 4	119	pk_1_105	924680
8/4 - R 1/2 for PTFE line	8 x 4	119	pk_1_105	1034621
8/5 - R 1/2 for PE/PTFE pipe	8 x 5	119	pk_1_105	924592
12/9 - R 1/2 for PE/PTFE pipe	12 x 9	119	pk_1_105	924594
10/4 - R 1/2 for PVC hose	10 x 4	119	pk_1_105	1002919
12/6 - R 1/2 for PVC hose	12 x 6	119	pk_1_105	924593
6/4 - G 1/4 for PE/PTFE pipe*	6 x 4	62	–	914559

\* Spring made of 1.4571, approx. 0.8 bar priming pressure.

### PCB Injection Valve

PVC housing, FKM seals with spring-loaded ball check (glass), priming pressure approx. 0.5 bar.

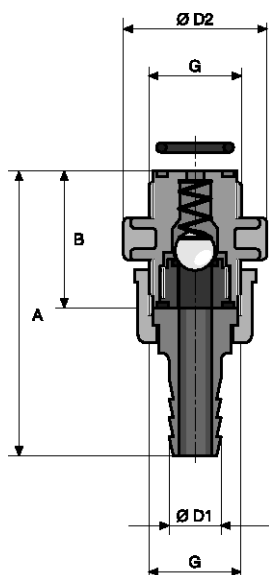
DN 10, DN 15 with union nut and PP tube nozzle

DN 20 to DN 40 no connection parts

#### Operating range

25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 7 bar



pk\_2\_029

	G	B mm	Ø D2 mm	A mm	Ø D1 mm	Order no.
DN 10	3/4	41	40	83	16	809460
DN 15	1	43	47	108	20	924520
DN 20	1 1/4	55	55	–	–	803712
DN 25	1 1/2	60	58	–	–	803713
DN 32*	2	68	70	–	–	1002783
DN 40	2 1/4	85	84	–	–	804760

\* PVDF/Teflon version

### PVT Injection Valve

PVDF housing, PTFE seals, with Hastelloy C spring-loaded check ball, priming pressure approx. 0.5 bar, with extra-long screw-in fitting. 1.4571 spring with FDA-compliant design.

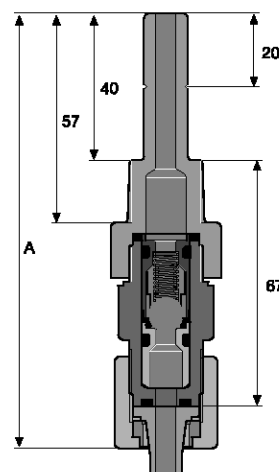
#### Application when using appropriate metering line

25 °C – max. operating pressure 25 bar for design 8/4

25 °C – max. operating pressure 20 bar for design 6/3

25 °C – max. operating pressure 16 bar

45 °C – max. operating pressure 12 bar



pk\_1\_105

Connection	oØ x iØ mm	A mm	Fig.	Order no.
6/3 - R 1/2 for PTFE pipe	6 x 3	119	pk_1_105	1024713
6/4 - R 1/2 for PE/PTFE pipe	6 x 4	119	pk_1_105	1024708
8/4 - R 1/2 for PTFE line	8 x 4	119	pk_1_105	1034619
8/5 - R 1/2 for PE/PTFE pipe	8 x 5	119	pk_1_105	1024710
12/9 - R 1/2 for PE/PTFE pipe	12 x 9	119	pk_1_105	1024711

## 1.6 Accessories for low-pressure metering pumps

Connection	oØ x iØ mm	A mm	Fig.	Order no.
10/4 - R 1/2 for PVC hose	10 x 4	119	pk_1_105	1024709
12/6 - R 1/2 for PVC hose	12 x 6	119	pk_1_105	1024712
Universal – R 1/2 FDA-compliant	6 x 4 - 12 x 9	119	pk_1_105	1081423

### Injection valve PVT

PVDF housing, PTFE + 25% carbon ball seat, PTFE seals, with spring-loaded ball check (ceramic DN 10 - 20, glass DN 25 - 40), priming pressure approx. 0.5 bar.

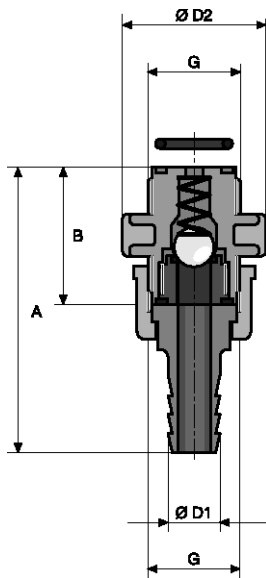
DN 10, DN 15 with union nut and PP tube nozzle

DN 20 to DN 40 no connection parts

#### Operating range

25 °C - max. operating pressure 16 bar

65 °C - max. operating pressure 10 bar



pk\_2\_029

	G	B mm	Ø D2 mm	A mm	Ø D1 mm	Order no.
DN 10	3/4	40	36	84	16	1029476
DN 15	1	43	48	110	20	1029477
DN 20	1 1/4	55	52	–	–	1029478
DN 25	1 1/2	61	56	–	–	1029479
DN 32	2	68	70	–	–	1002783
DN 40	2 1/4	85	81	–	–	1029480

### Injection valve PVT-FDA

"Physiologically safe (FDA) in respect of wetted materials" design.

All wetted materials in the "Physiologically safe (FDA) in respect of wetted materials" design comply with the FDA guidelines.

FDA guidelines:

- Material PTFE: FDA-No. 21 CFR § 177.1550
- Material PVDF: FDA-No. 21 CFR § 177.2510

PVDF housing, PTFE seals, with spring-loaded ball check (ceramic), priming pressure approx. 0.5 bar.

DN 10, DN 15 with union nut and PP tube nozzle

DN 20 to DN 40 no connection parts

#### Operating range

25 °C - max. operating pressure 16 bar

65 °C - max. operating pressure 10 bar

	G	B mm	Ø D2 mm	A mm	Ø D1 mm	Order no.
DN 10	3/4	40	36	84	16	1078237
DN 15	1	43	48	110	20	1078238
DN 20	1 1/4	55	52	–	–	1078239
DN 25	1 1/2	61	56	–	–	1078240



## 1.6 Accessories for low-pressure metering pumps

### PVT Injection Valve with Tantalum Spring

Injection valve specially designed for metering sodium-calcium hypochlorite, with universal hose connector kit 6 x 4, 8 x 4, 8 x 5, 12 x 9, 10 x 4 and 12 x 6 mm.

PVDF housing, PTFE seals, with tantalum spring-loaded check ball, priming pressure approx. 0.5 bar, with extra-long screw-in fitting.

#### Application when using appropriate metering line

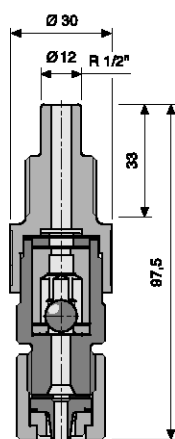
25 °C – max. operating pressure 25 bar for design 8/4

25 °C – max. operating pressure 20 bar for design 6/3

25 °C – max. operating pressure 16 bar

45 °C – max. operating pressure 12 bar

Connection	A mm	Fig.	Order no.
Universal connector, R 1/2	119	pk_1_105	1044653



P\_AC\_0184\_SW

### TTT Injection Valve

Vertical installation from below. With ball check, without spring. Valve spring (Order No. 469404) can be retrofitted. Body and seals made of PTFE.

#### Applications when using appropriate metering lines

25 °C - max. operating pressure 10 bar

45 °C - max. operating pressure 5 bar

Connection	oØ x iØ mm	A mm	Fig.	Order no.
6/4 - R 1/2 for PE/PTFE pipe	6 x 4	98	P_AC_0184_SW	809488
8/5 - R 1/2 for PE/PTFE pipe	8 x 5	98	P_AC_0184_SW	809479
12/9 - R 1/2 for PE/PTFE pipe	12 x 9	101	P_AC_0184_SW	809481
12/6 - R 1/2 for PVC hose	12 x 6	101	P_AC_0184_SW	809480

### TTT Injection Valve

PTFE housing and seals with spring-loaded ball check (ceramic, glass DN 25), priming pressure approx. 0.5 bar.

DN 10, DN 15 with union nut and insert

DN 20 to DN 40 no connection parts

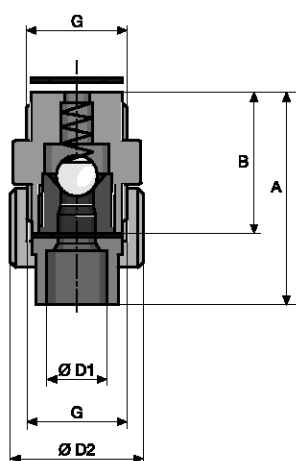
#### Operating range

25 °C - max. operating pressure 10 bar

90 °C - max. operating pressure 5 bar

	G	B mm	Ø D2 mm	A mm	Ø D1 mm	Order no.
DN 10	3/4	38	36	57	16	809462
DN 15	1	43	48	63	20	924522
DN 20	1 1/4	55	50	–	–	803714
DN 25	1 1/2	60	58	–	–	803715
DN 32*	2	68	70	–	–	1002783
DN 40	2 1/4	85	84	–	–	804762

\* PVDF/Teflon version



pk\_2\_030

## 1.6 Accessories for low-pressure metering pumps

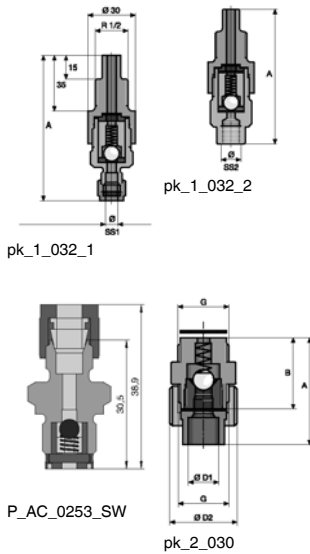
### SST Injection Valve

Housing made of stainless steel no. 1.4404, PTFE seals, with Hastelloy C spring-loaded check ball, priming pressure approx. 0.5 bar, with R 1/4 spring made of stainless steel no. 1.4571, priming pressure approx. 1 bar. A support insert is required to connect PE / PTFE lines. 1.4571 spring with FDA-compliant design.

#### Applications when using appropriate metering lines

25 °C - max. operating pressure 30 bar

45 °C - max. operating pressure 30 bar



Connection	oØ x iØ mm	A mm	Fig.	Order no.
6 mm - R 1/2 for pipe	6 x 5	93	pk_1_032_1	809489
8 mm - R 1/2 for pipe	8 x 7	93	pk_1_032_1	809482
12 mm - R 1/2 for pipe	12 x 10	96	pk_1_032_1	809483
1/4" NPT - R 1/2 for pipe	R 1/4" NPT	89	pk_1_032_2	924597
6 mm - R 1/4 for pipe		–	P_AC_0253_SW	914588
6 mm - R 1/2 for pipe, FDA-compliant	6 x 5	93	pk_1_032_1	1081482
8 mm - R 1/2 for pipe, FDA-compliant	8 x 7	93	pk_1_032_1	1081483
12 mm - R 1/2 for pipe, FDA-compliant	12 x 10	96	pk_1_032_1	1081504

### SST Injection Valve

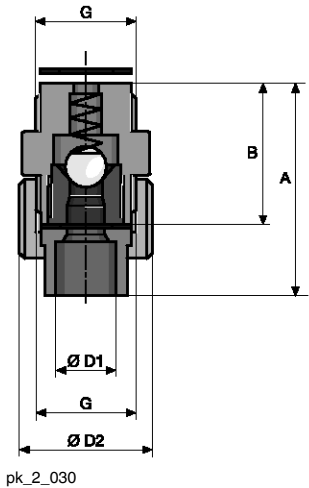
Housing made of stainless steel, PTFE + 25% carbon ball seat, PTFE seals non-return sphere (stainless steel material no. 1.4571 / stainless steel no. 1.4581) spring-loaded, priming pressure approx. 0.5 bar.

DN 10, DN 15 with union nut and insert

DN 20 to DN 40 no connection parts

#### Applications

90 °C - max. operating pressure, see table



	G	Max. pressure bar	B mm	Ø D2 mm	A mm	Ø D1	Order no.
DN 10	3/4	320	38	36	55	3/8	809463
DN 15	1	240	43	48	63	1/2	924523
DN 20	1 1/4	130	55	55	–	–	803716
DN 25	1 1/2	70	60	58	–	–	803717
DN 32	2	45	69	68	–	–	1002801
DN 40	2 1/4	25	85	84	–	–	804763

pk\_2\_030



## 1.6 Accessories for low-pressure metering pumps

### Injection valve SST - FDA

"Physiologically safe (FDA) in respect of wetted materials" design.

All wetted materials in the "Physiologically safe (FDA) in respect of wetted materials" design comply with the FDA guidelines.

FDA guidelines:

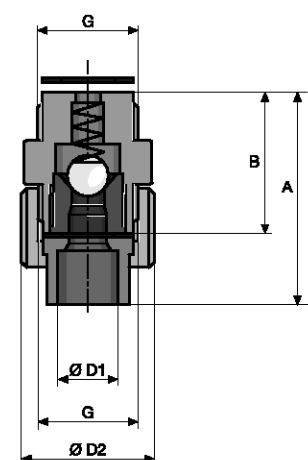
- Material PTFE: FDA No. 21 CFR § 177.1550
- Material PVDF: FDA No. 21 CFR § 177.2510

Housing made of stainless steel, PVDF ball seat, PTFE seals with non-return sphere (stainless steel material no. 1.4571 / stainless steel no. 1.4581) spring-loaded, priming pressure approx. 0.5 bar.

DN 10, DN 15 with union nut and insert  
DN 20 to DN 40 no connection parts

#### Applications

90 °C - max. operating pressure, see table



pk\_2\_030

	G	Max. pressure bar	B mm	Ø D2 mm	A mm	Ø D1	Order no.
DN 10	3/4	320	38	36	55	3/8	1078251
DN 15	1	240	43	48	63	1/2	1078252
DN 20	1 1/4	130	55	55	—	—	1078266
DN 25	1 1/2	70	60	58	—	—	1078267

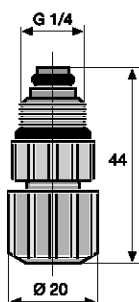
### PPB Injection Valve O-Ring Loaded

PP body, FKM seals. Priming pressure approx. 0.5 bar.

#### Applications when using appropriate metering lines

25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 9 bar



P\_AC\_0008\_SW

Connector	oØ x iØ mm	Fig.	Order no.
6/4 - G 1/4 short	6 x 4	P_AC_0008_SW	914754
6/4 - G 1/4 long	6 x 4	P_AC_0009_SW	741193

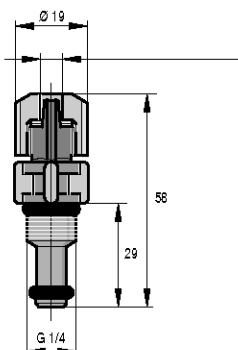
### PCB Injection Valve O-Ring Loaded

PVC body, FKM seals, priming pressure approx. 0.5 bar.

#### Applications when using appropriate metering lines

25 °C - max. operating pressure 16 bar

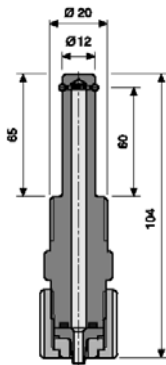
45 °C - max. operating pressure 7 bar



P\_AC\_0009\_SW

Connector	oØ x iØ mm	Fig.	Order no.
6/4 - G 1/4 short	6 x 4	P_AC_0008_SW	914558
6/4 - G 1/4 long	6 x 4	P_AC_0009_SW	915091

## 1.6 Accessories for low-pressure metering pumps



P\_AC\_0183\_SW

### PTFE Injection Valve O-Ring Loaded

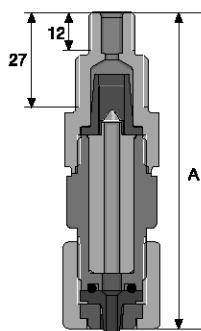
PTFE housing, FKM seals.

#### Applications when using appropriate metering lines

25 °C - max. operating pressure 10 bar

45 °C - max. operating pressure 6 bar

Connection	oØ x iØ mm	A mm	Fig.	Order no.
6/4 – for PE/PTFE line	6 x 4	104	P_AC_0183_SW	809484
8/5 – for PE/PTFE line	8 x 5	104	P_AC_0183_SW	809485
10/4 – for PVC hose	10 x 4	104	P_AC_0183_SW	1002925
12/6 – for PVC hose	12 x 6	104	P_AC_0183_SW	809487
12/9 – for PE/PTFE line	12 x 9	104	P_AC_0183_SW	809486



pk\_1\_070

### Lip Seal Injection Valve PCB

Body PVC, seals FKM, inlet pressure approx. 0.05 bar. For metering sodium hypochlorite and for use in conjunction with the peristaltic pump DF2a.

#### Applications when using appropriate metering lines

25 °C - max. operating pressure 2 bar

45 °C - max. operating pressure 2 bar

Connection	oØ x iØ mm	A mm	Fig.	Order no.
6/4 - R 1/2 - 1/4 for PE/PTFE pipe	6 x 4	90	pk_1_070	1019953
10/4 - R 1/2 - 1/4 for PE/PTFE pipe	10 x 4	90	pk_1_070	1024697



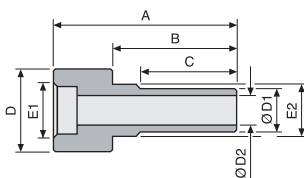
pk\_1\_049

### Metering Connector for Warm Water up to 200 °C

Consists of stainless steel 1.4404 injection valve, 1 m stainless steel 1.4571 discharge line and threaded connector with reinforcing sleeve for connection of PE/PTFE pipe to stainless steel pipe.

Max. operating pressure 30 bar

Connection	Fig.	Order no.
Warm water 6 mm - R 1/4	pk_1_049	913166
Warm water 6 mm - R 1/2	pk_1_049	913167
Warm water 8 mm - R 1/2	pk_1_049	913177
Warm water 12 mm - R 1/2	pk_1_049	913188



P\_AC\_0275\_SW

### PVDF Metering Valve Adapter

For the installation of injection valves into pipework with straight unions.

The adapter projects into the pipework or storage tanks and can be adjusted (shortened) at different cross-sections.

Direct contact of the chemical to be metered with the wall can be avoided by installation of the adapter. Metering into the centre of the pipework improves, among other things, the mixing through of the metering solution.

Material: PVDF

#### Applications

25 °C - max. operating pressure 16 bar

65 °C - max. operating pressure 10 bar

E1	E2	A mm	B mm	C mm	D mm	Ø D1 mm	Ø D2 mm	Order no.
Rp 3/4	R 3/4	93	63	49	32	22	15	1022052
Rp 1	R 1	95	65	50	41	27	18	1022053
G 1 1/4	G 1 1/4 A*	150	119	104	50	27	18	1040722
G 1 1/2	G 1 1/2 A*	171	135	118	60	31	20	1040723

D = Width across flats

\* In set with 1 x FKM and 1 x EPDM O-ring.



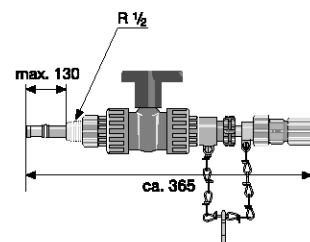
## 1.6 Accessories for low-pressure metering pumps

### 1.6.3.3

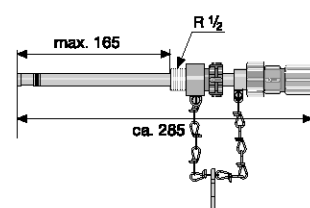
### Injection Lances, Non-Return Valves for Low-Pressure Metering Pumps

#### PPE Injection Lance

For immersion depths of 20 - 165 mm, in large diameter pipe to prevent chemical deposition at the point of injection. Consists of spring-loaded metering valve, Hastelloy C spring, ceramic ball, adjustable immersion rod and hose valve. With connectors for all hose sizes used with solenoid-driven metering pumps: 6/4, 8/5, 12/9, 10/4 and 12/6.



pk\_1\_007



pk\_1\_062

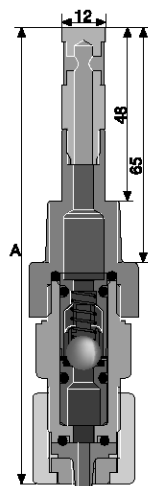
Type	Seal material	Max. pressure at 25 °C bar	Fig.	Order no.
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PPE without stopcock	EPDM/silicone	6	pk_1_062	1021530
PPE with stopcock	EPDM/silicone	6	pk_1_007	1021531
PCB without stopcock	FKM/silicone*	6	pk_1_062	1021528
PCB with stopcock	FKM/silicone*	6	pk_1_007	1021529

\* Please note: The product contains connections bonded with Tangit. Always note the durability of Tangit adhesive.

#### Short Injection Lance

Metering lance with universal connection kit, enabling the connection of different hose sizes of from 6/4 to 12/9. Hastelloy C spring, ceramic ball and silicone hose. Material of screwed socket: PVDF.



P\_AC\_0020\_SW

Type	Material, valve body	Max. pressure at 25 °C bar	Seals	A mm	Fig.	Order no.
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PPE	PP	16	EPDM	126	P_AC_0020_SW	1028383
PCB	PVC	16	FKM-B	126	P_AC_0020_SW	1028363
PVT	PVDF	16	PTFE	126	P_AC_0020_SW	1028081

#### PVDF Non-Return Valve for Hose Installation

With connection kit on both sides for fitting in hose line.

With non-return ball, spring-loaded with Hastelloy C spring, prepressure approx. 0.5 bar.

PVDF housing, PTFE seals.

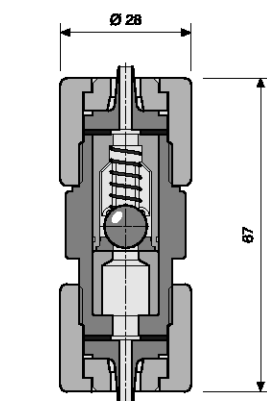
Different hose sizes from 6/4 to 12/9 can be joined using different connection kits.

#### Applications when using appropriate metering lines

25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 12 bar

Connection	ø x i Ø mm	A mm	Fig.	Order no.
6/4 for PE/PTFE line	6 x 4	67	P_AC_0181_SW	1030463
8/5 for PE/PTFE line	8 x 5	67	P_AC_0181_SW	1030975
10/4 for PE/PTFE line	10 x 4	67	P_AC_0181_SW	1030977
12/6 for PVC hose	12 x 6	67	P_AC_0181_SW	1030978
12/9 for PE/PTFE line	12 x 9	67	P_AC_0181_SW	1030976



P\_AC\_0181\_SW



## 1.6 Accessories for low-pressure metering pumps

### 1.6.3.4

#### Back Pressure Valves / Relief Valves for Low-Pressure Metering Pumps

Back pressure valves are used to generate a constant back pressure to ensure precise metering and protect against over-metering or metering imprecision through a free outlet and priming pressure on the suction side. They are also used in conjunction with pulsation dampers to generate low-pulsation metering. We recommend back pressure valves type DHV-U with fluctuating back pressure.

The DHV listed below are designed for different applications. Please note the relevant notes for the different mountings.



**Important:** Back pressure valves cannot be used as absolutely leak-tight shut-off devices. Take appropriate precautions when handling hazardous media.

Relief valves are used to protect pumps, pipes and fittings from over pressure, in the event of incorrect operation or blockages in the bypass. In the event of a malfunction, the pump pumps back into the storage tank.

#### Multifunctional Valve Type MFV-DK, PVDF

Back pressure valve / relief valve for fitting directly on the pump's dosing head with the functions:

- Back pressure valve, opening pressure approx. 1.5 bar with free outlet or priming pressure at the suction end (black rotary dial)
- Relief valve, opening pressure approx. 6, 10 or 16 bar (red rotary dial)
- Priming aid for pending back pressure, no need to release discharge line
- Discharge line relief, e.g. prior to service work

The multifunctional valve is operated by free-moving rotary dials that automatically return to their original position when released by the operator. This means operation is possible even when access is difficult. The multifunctional valve is made of PVDF and can be used to meter almost any chemical.

**Caution:** Back pressure valves are not absolutely leak-tight shut-off devices! It is essential that you observe the installation notes in the operating instructions!

**Caution:** The bypass line should always be connected.

For hoses see page → 1-169.

Valve body      PVDF  
Diaphragm      PTFE- coated  
Seal              FKM and EPDM (enclosed)

Type	Relief opening pressure*	Connection	Bypass connector	Order no.
Size I	16 bar	6-12	6 x 4	792011
Size I	10 bar	6-12	6 x 4	791715
Size I	6 bar	6-12	6 x 4	1005745
Size II	10 bar	6-12	12 x 9	792203
Size II	6 bar	6-12	12 x 9	740427
Size III	10 bar	DN 10	12 x 9	792215

\* The relief opening pressure given above is the pressure at which the valve begins to open. The pressure can be up to 50% higher until the valve is fully open depending on the type of pump.

#### Application: multifunctional valves

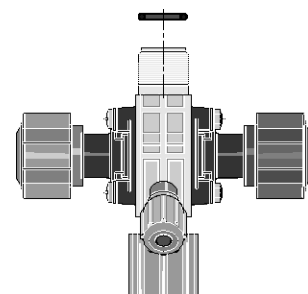
Size I      ALPc 1001, 1002, 1004, 1008, 0708  
Beta®, type 1000, 1601, 1602, 1604, 1605, 1005, 1008, 0708, 0413, 0220  
gamma/ X type 1602, 1604, 1009, 0708, 0414, 0220  
gamma/ XL type 1608, 1612

Size II      ALPc 0417, 0230  
Beta®, type 1605, 1008, 0713, 0420, 0232  
gamma/ X type 1009, 0715, 0424, 0245  
gamma/XL type 1020, 0730

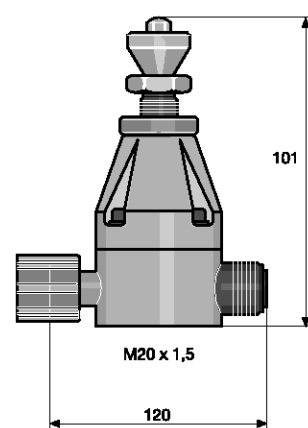
Size III      gamma/ XL type 0450, 0280

For material version PP, PV, NP, TT

pk\_1\_053



## 1.6 Accessories for low-pressure metering pumps



### Back Pressure Valve Type DHV-S-DK, 0-10 bar Adjustable

Adjustable back pressure valve for fitting directly onto the dosing head to generate a constant back pressure. For accurate metering with a free outlet and with priming pressure on the suction side.

**Caution:** Back pressure valves are not absolutely leak-tight shut-off devices! It is essential that you observe the installation notes in the operating instructions!

**Applications:** Metering pump alpha, Beta®, gamma/ X, gamma/ XL, Pneumados b, EXtronic®

Type	Adjustable pressure	Connection	Material	Order no.
		DIN / ANSI		
DHV-S-DK	0 – 10 bar	6 to 12 mm	PP/EPDM	302320
DHV-S-DK	0 – 10 bar	6 to 12 mm	PC/FKM*	302321
DHV-S-DK	0 – 10 bar	6 to 12 mm	TT/PTFE	302322
DHV-S-DK	0 – 10 bar	6 mm	SS	1003793
DHV-S-DK	0 – 10 bar	8 mm	SS	1003795
DHV-S-DK	0 – 10 bar	12 mm	SS	1003797

\* **Caution:** The product contains adhesive joints with Tangit. Please note the resistance of Tangit adhesive.

### Back Pressure Valve / Relief Valve Type DHV-S-DL, 0-10 bar Adjustable

Adjustable back pressure valve for installation in the metering line to generate a constant back pressure for precise metering with a free outlet and with priming pressure on the suction side

When used as a back pressure valve in long lines to avoid resonance vibrations: Install at the end of the metering line or select a set pressure greater than the line pressure loss

Only use in conjunction with pulsation damper with a free outlet and short metering line. Use type DHV-U for use with a pulsation damper at back pressure or long lines.

**Caution:** Back pressure valves are not absolutely leak-tight shut-off devices! It is essential that you observe the installation notes in the operating instructions!

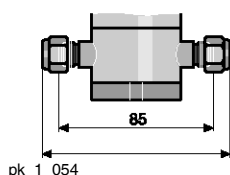
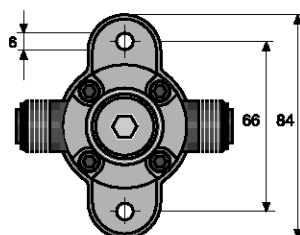
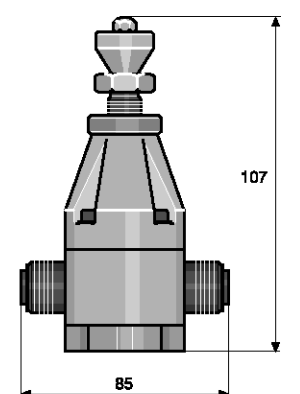
**Applications:** Metering pumps alpha, Beta®, gamma/ X, gamma/XL, Pneumados b, EXtronic®

Type	Adjustable pressure	Connection	Material	Order no.
		DIN / ANSI		
DHV-S-DL	0 – 10 bar	6 to 12 mm	PP	302323
DHV-S-DL	0 – 10 bar	6 to 12 mm	PC/FKM*	302324
DHV-S-DL	0 – 10 bar	6 to 12 mm	TT	302325
DHV-S-DL	0 – 10 bar	6 mm	SS	302326
DHV-S-DL	0 – 10 bar	8 mm	SS	302327
DHV-S-DL	0 – 10 bar	12 mm	SS	302328

Order 2 connecting kits in the required hose size separately for the connection.

\* **Please note:** The product contains connections bonded with Tangit. Always note the durability of Tangit adhesive.

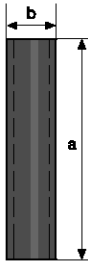
(Single Connector Kit see page → 1-175)



## 1.6 Accessories for low-pressure metering pumps

### Pipe Nipples

For the direct connection of the pressure maintenance valve DHV-S-DL in stainless steel (SS) to the liquid end.



pk\_1\_017

Type	A mm	B mm	Fig.	Order no.
1.4571 pipe nipple	6	40	pk_1_017	818537
	8	40	pk_1_017	818538
	12	40	pk_1_017	818539

### Back Pressure Valve / Relief Valve Type DHV-U

**Universal back pressure valves of the DHV-U product range are back pressure-free plunger diaphragm valves with an internal flow. They are used to generate a constant back pressure and also as relief valves. They can be installed at any location in the pipework system.**

Back pressure valves are used to generate a constant back pressure for precise pumping and to protect against over-metering where there is a free outlet or fluctuating back pressure or priming pressure on the suction side. They are also used in conjunction with pulsation dampers to generate low-pulsation metering.

Relief valves are used to protect pumps, pipes and fittings from overpressure, in the event of incorrect operation or blockages in the bypass. In the event of a malfunction, the pump pumps around the circuit or back into the storage tank.

**Important:** Back pressure valves cannot be used as absolutely leak-tight shut-off devices. Take appropriate safety precautions when handling hazardous media. Relief valves are not safety valves by their definition as per DIN EN ISO 4126-1.

**Important:** Take appropriate safety measures (e.g. flushing after possible response) when using as relief valves in conjunction with viscous media (e.g. lime milk).

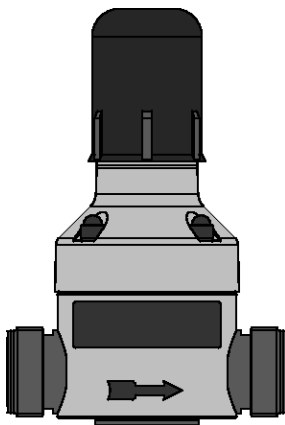
**Adjustable pressure** 0.5 – 10 bar

#### Application of PPE/PPB/PCE/PCB:

20 °C - max. operating pressure 10 bar

#### Application of PVT/SST:

30 °C - max. operating pressure 10 bar



P\_AC\_0256\_SW

Type	Nominal diameter	G	Order no.
PPE	DN 10	3/4	1037285
PPB	DN 10	3/4	1038133
PCE	DN 10	3/4	1038144
PCB	DN 10	3/4	1037765
PVT	DN 10	3/4	1037767
SST	DN 10	3/4	1043194
PPE	DN 15	1	1036816
PPB	DN 15	1	1038145
PCE	DN 15	1	1038146
PCB	DN 15	1	1037764
PVT	DN 15	1	1037766
SST	DN 15	1	1043193
PPE	DN 20	1 1/4	1037284
PPB	DN 20	1 1/4	1038147
PCE	DN 20	1 1/4	1038148
PCB	DN 20	1 1/4	1037775
PVT	DN 20	1 1/4	1037777
SST	DN 20	1 1/4	1043192
PPE	DN 25	1 1/2	1036633
PPB	DN 25	1 1/2	1038149
PCE	DN 25	1 1/2	1038150
PCB	DN 25	1 1/2	1037774
PVT	DN 25	1 1/2	1037776
SST	DN 25	1 1/2	1043191
PPE	DN 32	2	1051517
PPB	DN 32	2	1051522
PCE	DN 32	2	1051514



## 1.6 Accessories for low-pressure metering pumps

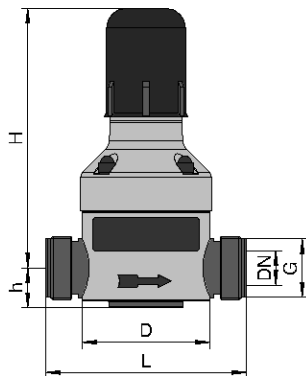
Type	Nominal diameter	G	Order no.
PCB	DN 32	2	1051520
PVT	DN 32	2	1051503
SST	DN 32	2	1051516
PPE	DN 40	2 1/4	1051518
PPB	DN 40	2 1/4	1051521
PCE	DN 40	2 1/4	1051501
PCB	DN 40	2 1/4	1051519
PVT	DN 40	2 1/4	1051502
SST	DN 40	2 1/4	1051515

### Materials

Type	Housing/Connectors	Plungers	Plunger Seal	Seal/Connectors
PPE	PP	PVDF	EPDM	EPDM
PPB	PP	PVDF	FKM	FKM
PCE	PVC	PVDF	EPDM	EPDM
PCB	PVC	PVDF	FKM	FKM
PVT	PVDF	PVDF	PTFE*	FKM
SST	1.4404	PTFE	PTFE*	PTFE

\* Cover ring made of PTFE/FKM

### Dimensions of DHV-U (PP, PVC, PVDF design)

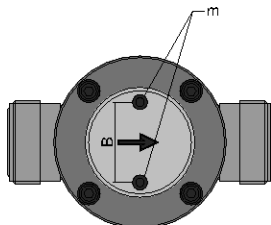


P\_AC\_0256\_m

DN	G	H mm	L mm	h mm	D mm	m	B mm
10	3/4	144*	118	24	79	M6	40
15	1	144*	118	24	79	M8	40
20	1 1/4	196*	150	37	99	M8	46
25	1 1/2	196*	150	37	99	M6	46
32	2	252	200	54	139.5	M8	65
40	2 1/4	252	200	54	139.5	M8	65

\* Approximate values

### Dimensions of DHV-U (SS version)



P\_MOZ\_0005\_SW

DN	G	H mm	L mm	h mm	D mm	m	B mm
10	3/4	144*	118	20	79	M6	40
15	1	144*	118	20	79	M6	40
20	1 1/4	196*	150	30	99	M6	46
25	1 1/2	196*	150	30	99	M6	46
32	2	252	200	37	139.5	M8	65
40	2 1/4	252	200	37	139.5	M8	65

\* Approximate values

## 1.6 Accessories for low-pressure metering pumps

### Back pressure valve/relief valve type DHV-U M configured for a manometer

The relief valves DHV-U M are configured with a plug for manometer installation.

Manometers with threaded socket G 1/4" (ISO 228) can be fitted by the customer directly to the relief valve via the additional housing opening. Standard manometers with part number are available for neutral media. This also enables savings in terms of installation.

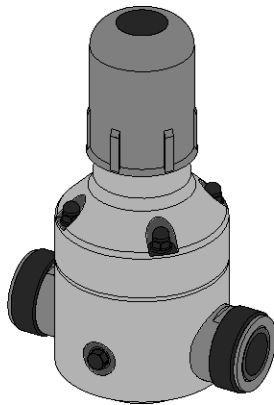
**Adjustable pressure** 0.5 – 10 bar

#### Application of PPE/PPB/PCE/PCB

20 °C - max. operating pressure 10 bar

#### Application of PVT/SST

30 °C - max. operating pressure 10 bar



P\_AC\_0292\_SW1

Type	Nominal diameter	G	Order no.
PPE	DN 10	3/4	1077866
PPB	DN 10	3/4	1077878
PCE	DN 10	3/4	1077872
PCB	DN 10	3/4	1077884
PVT	DN 10	3/4	1077890
PPE	DN 15	1	1077865
PPB	DN 15	1	1077877
PCE	DN 15	1	1077871
PCB	DN 15	1	1077883
PVT	DN 15	1	1077889
PPE	DN 20	1 1/4	1077864
PPB	DN 20	1 1/4	1077876
PCE	DN 20	1 1/4	1077870
PCB	DN 20	1 1/4	1077882
PVT	DN 20	1 1/4	1077888
PPE	DN 25	1 1/2	1077863
PPB	DN 25	1 1/2	1077875
PCE	DN 25	1 1/2	1077869
PCB	DN 25	1 1/2	1077881
PVT	DN 25	1 1/2	1077887
PPE	DN 32	2	1077862
PPB	DN 32	2	1077874
PCE	DN 32	2	1077868
PCB	DN 32	2	1077880
PVT	DN 32	2	1077886
PPE	DN 40	2 1/4	1077861
PPB	DN 40	2 1/4	1077873
PCE	DN 40	2 1/4	1077867
PCB	DN 40	2 1/4	1077879
PVT	DN 40	2 1/4	1077885

### Materials

Type	Housing/ Connectors	Plungers	Plunger Seal	Seal/Connectors
PPE	PP	PVDF	EPDM	EPDM
PPB	PP	PVDF	FKM	FKM
PCE	PVC	PVDF	EPDM	EPDM
PCB	PVC	PVDF	FKM	FKM
PVT	PVDF	PVDF	PTFE*	FKM

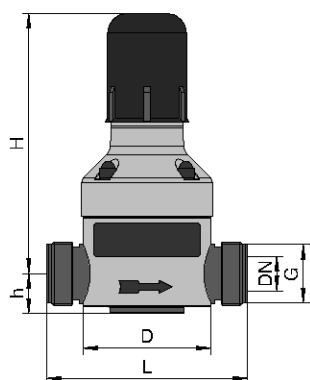
\* Cover ring made of PTFE/FKM

FDA design (21CFR177...)

We are happy to supply physiologically harmless (FDA) material designs of wetted materials for PPE, PVT and SST.



## 1.6 Accessories for low-pressure metering pumps

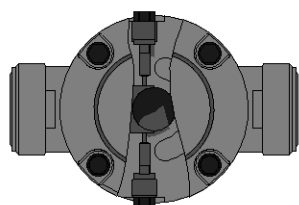


P\_AC\_0256\_m

### Dimensions of DHV-U M (PP, PVC, PVDF design)

DN	G	H mm	L mm	h mm	D mm	m	B mm
10	3/4	144*	118	24	79	M6	40
15	1	144*	118	24	79	M8	40
20	1 1/4	196*	150	37	99	M8	46
25	1 1/2	196*	150	37	99	M6	46
32	2	252	200	54	139.5	M8	65
40	2 1/4	252	200	54	139.5	M8	65

\* Approximate values



P\_AC\_0291\_SW1

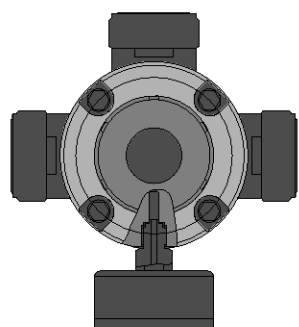
### Dimensions of DHV-U M (SS design)

DN	G	H mm	L mm	h mm	D mm	m	B mm
10	3/4	144*	118	24	79	M6	40
15	1	144*	118	24	79	M8	40
20	1 1/4	196*	150	37	99	M8	46
25	1 1/2	196*	150	37	99	M6	46
32	2	252	200	54	139.5	M8	65
40	2 1/4	252	200	54	139.5	M8	65

\* Approximate values

### Pipe spring manometer

Pipe spring manometers in accordance with DIN EN 837-1 for neutral media for use with relief valves DHV-UR design M. When ordered, the manometer is supplied with the relief valve.



P\_AC\_0269

<b>Nominal diameter</b>	63 mm
<b>Display range</b>	0 – 16 bar
<b>Housing material</b>	1.4571
<b>Material connector</b>	Brass
<b>Connector</b>	Threaded assembly G 1/4" (ISO 228)
<b>Connector position</b>	radial at bottom
<b>Filling liquid</b>	Glycerine

Order no.

Pipe spring manometer

792726

## 1.6 Accessories for low-pressure metering pumps

### Back Pressure Valve / Relief Valve Type DHV-U in physiologically safe design (FDA)

Back pressure valves for motor-driven metering pumps are designed for different applications. Please refer to the relevant notes for the different designs.

Relief valves are used in the bypass to protect pumps, pipes and fittings from overpressure in the event of incorrect operation or blockages. In the event of a malfunction, the pump pumps back into the storage tank.

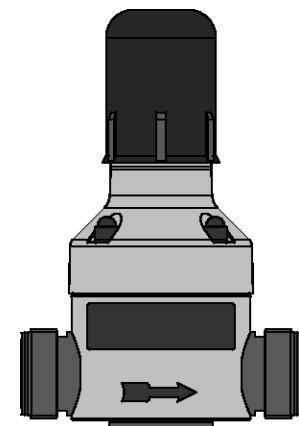
**Adjustable pressure** 0.5 – 10 bar

#### Application of PPE/PPB/PCE/PCB

20 °C - max. operating pressure 10 bar

#### Application of PVT/SST

30 °C - max. operating pressure 10 bar



P\_AC\_0256\_SW

Type	Nominal diameter	G	Order no.
PPE	DN 10	3/4	1076578
PVT	DN 10	3/4	1076579
SST	DN 10	3/4	1076532
PPE	DN 15	1	1076580
PVT	DN 15	1	1076581
SST	DN 15	1	1076531
PPE	DN 20	1 1/4	1076582
PVT	DN 20	1 1/4	1076583
SST	DN 20	1 1/4	1076597
PPE	DN 25	1 1/2	1076585
PVT	DN 25	1 1/2	1076586
SST	DN 25	1 1/2	1076584
PPE	DN 32	2	1076587
PVT	DN 32	2	1076588
SST	DN 32	2	1076589
PPE	DN 40	2 1/4	1076590
PVT	DN 40	2 1/4	1076591
SST	DN 40	2 1/4	1076592

### Materials

Type	Housing/Connectors	Plungers	Plunger Seal	Seal/Connectors
PPE	PP	PVDF	EPDM	EPDM
PVT	PVDF	PVDF	PTFE*	FKM
SST	1.4404	PTFE	PTFE*	PTFE

\* Cover ring made of PTFE/FKM

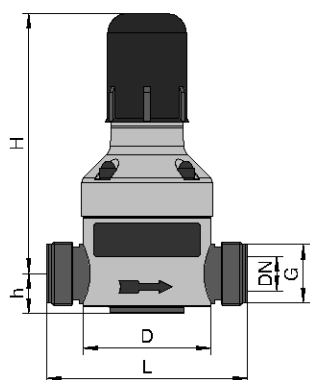
All wetted materials in the "Physiologically safe (FDA) in respect of wetted materials" design comply with the following FDA guidelines:

Material	Guideline
PTFE	21CFR177.1510
PVDF	21CFR177.2510
PP	21CFR177.1520
EPDM/FKM	21CFR177.2600

We are happy to supply back pressure valves and relief valves DHV-U/DHV-UR in stainless steel and wetted EC 1935/2004 on request.



## 1.6 Accessories for low-pressure metering pumps

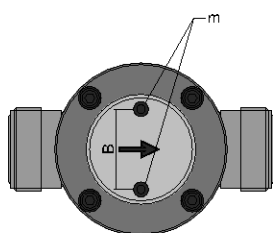


P\_AC\_0256\_m

**Dimensions of DHV-U (FDA) (PP, PVC, PVDF design)**

DN	G	H mm	L mm	h mm	D mm	m	B mm
10	3/4	144*	118	24	79	M6	40
15	1	144*	118	24	79	M6	40
20	1 1/4	196*	150	37	99	M6	46
25	1 1/2	196*	150	37	99	M6	46
32	2	252*	200	54	139.5	M8	65
40	2 1/4	252*	200	54	139.5	M8	65

\* Approximate values



P\_MOZ\_0005\_SW

**Dimensions of DHV-U (FDA) (SS design)**

DN	G	H mm	L mm	h mm	D mm	m	B mm
10	3/4	144*	118	20	79	M6	40
15	1	144*	118	20	79	M6	40
20	1 1/4	196*	150	30	99	M6	46
25	1 1/2	196*	150	30	99	M6	46
32	2	252*	200	37	139.5	M8	65
40	2 1/4	252*	200	37	139.5	M8	65

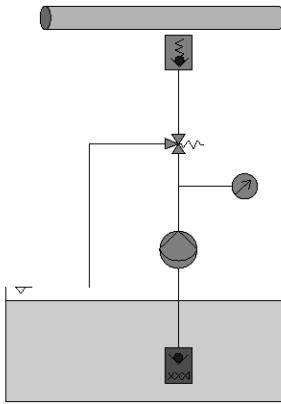
\* Approximate values





## 1.6 Accessories for low-pressure metering pumps

### Relief valve type DHV-UR



AP\_0003

The universal relief valves type DHV-UR, like all valves of the DHV-U product range, are infinitely adjustable piston diaphragm valves with internal flow. In the event of impermissible overpressure, the internal piston diaphragm opens the second outlet line, the relief outlet. It can be installed at any location in the pipework system. Very low pressure losses with a closed relief valve due to virtually free pipe cross-section. Simple spare parts management, the wear parts (pressure spring, diaphragms, plunger seal, seal connection set) correspond to the DHV-U range of valves.

The benefits of the new relief valves DHV-UR include simpler assembly due to the saving of installation material/connection parts etc. and a reduction of adhesion points. The new installation method permits a slimmer design of metering stations.

#### Relief valves for fitting directly into the discharge line of the motor-driven metering pump with the functions:

- Installation at any location in the pipework system.
- Very low pressure losses with a closed relief valve due to virtually free pipe cross-section

**Adjustable pressure** 0.5 – 10 bar

#### Application of PP and PVC (PPE/PPB/PCE/PCB)

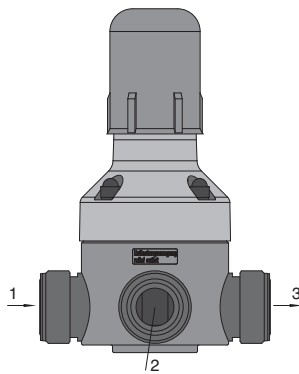
20 °C - maximum operating pressure 10 bar

#### Application of PVDF and stainless steel (PVT/SST)

30 °C - maximum operating pressure 10 bar

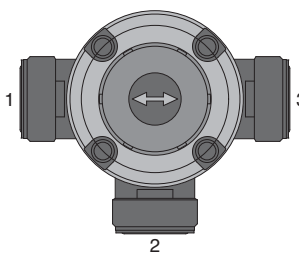
#### The benefits for you:

- Simpler installation due to saving of installation material/connecting parts
- Reduced adhesion points.
- Slimmer mounting of metering stations.
- Simple spare parts management, wear parts conform to the DHV-U valve product range.



P\_AC\_0267

- 1 Input
- 2 Bleeder output
- 3 Output



P\_AC\_0268

- 1 Input
- 2 Bleeder output
- 3 Output

Type	Nominal diameter	G	Order no.
PPE	DN 10	3/4	1061337
PPB	DN 10	3/4	1061341
PCE	DN 10	3/4	1061339
PCB	DN 10	3/4	1061343
PVT	DN 10	3/4	1061365
SST	DN 10	3/4	1061550
PPE	DN 15	1	1061336
PPB	DN 15	1	1061340
PCE	DN 15	1	1061338
PCB	DN 15	1	1061342
PVT	DN 15	1	1061364
SST	DN 15	1	1061551
PPE	DN 20	1 1/4	1061367
PPB	DN 20	1 1/4	1061371
PCE	DN 20	1 1/4	1061369
PCB	DN 20	1 1/4	1061373
PVT	DN 20	1 1/4	1061375
SST	DN 20	1 1/4	1061569
PPE	DN 25	1 1/2	1061366
PPB	DN 25	1 1/2	1061370
PCE	DN 25	1 1/2	1061368
PCB	DN 25	1 1/2	1061372
PVT	DN 25	1 1/2	1061374
SST	DN 25	1 1/2	1061570



## 1.6 Accessories for low-pressure metering pumps

### Materials used

Type	Housing/Connectors	Plungers	Plunger Seal	Seal/Connectors
PPE	PP	PVDF	EPDM	EPDM
PPB	PP	PVDF	FKM	FKM
PCE	PVC	PVDF	EPDM	EPDM
PCB	PVC	PVDF	FKM	FKM
PVT	PVDF	PVDF	PTFE*	FKM
SST	1.4404	1.4404	PTFE*	PTFE

\* Cover ring made of PTFE/FKM

### Dimensions of DHV-UR (PP, PVC, PVDF design)

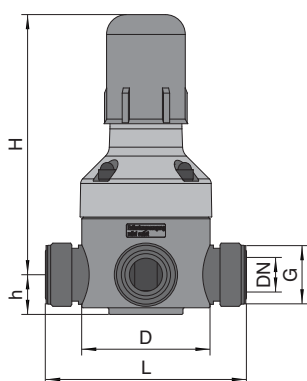
DN	G	H mm	L mm	h mm	D mm	m	B mm
10	3/4	144*	118	24	79	M6	35
15	1	144*	118	24	79	M6	35
20	1 1/4	196*	150	37	99	M6	46
25	1 1/2	196*	150	37	99	M6	46

\* Approximate values

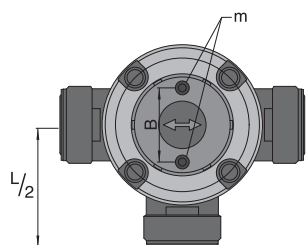
### Dimensions of DHV-UR (SS design)

DN	G	H mm	L mm	h mm	D mm	m	B mm
10	3/4	144*	118	20	79	M6	35
15	1	144*	118	20	79	M6	35
20	1 1/4	196*	150	30	99	M6	46
25	1 1/2	196*	150	30	99	M6	46

\* Approximate values



P\_AC\_0267\_V2



P\_AC\_0268\_V2

## 1.6 Accessories for low-pressure metering pumps

### Relief valve type DHV-UR, FDA design

Back pressure valves for motor-driven metering pumps are designed for different applications. Please refer to the relevant notes for the different designs.

Relief valves are used in the bypass to protect pumps, pipes and fittings from overpressure in the event of incorrect operation or blockages. In the event of a malfunction, the pump pumps back into the storage tank.

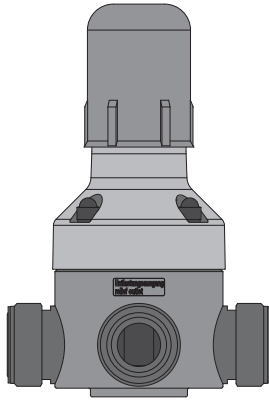
**Adjustable pressure** 0.5 – 10 bar

#### Application of PPE/PPB/PCE/PCB

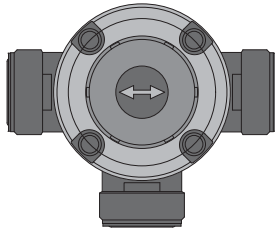
20 °C - max. operating pressure 10 bar

#### Application of PVT/SST

30 °C - max. operating pressure 10 bar



P\_AC\_0267



P\_AC\_0268\_V3

Type	Nominal diameter	G	Order no.
PPE	DN 10	3/4	1075828
PVT	DN 10	3/4	1075830
SST	DN 10	3/4	1075847
PPE	DN 15	1	1075827
PVT	DN 15	1	1075829
SST	DN 15	1	1075846
PPE	DN 20	1 1/4	1075833
PVT	DN 20	1 1/4	1075845
SST	DN 20	1 1/4	1075849
PPE	DN 25	1 1/2	1075832
PVT	DN 25	1 1/2	1075844
SST	DN 25	1 1/2	1075848

### Materials used

Type	Housing/Connectors	Plungers	Plunger Seal	Seal/Connectors
PPE	PP	PVDF	EPDM	EPDM
PVT	PVDF	PVDF	PTFE*	FKM
SST	1.4404	1.4404	PTFE*	PTFE

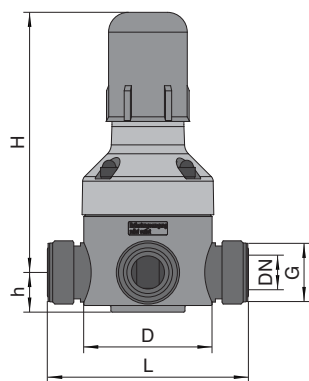
\* Cover ring made of PTFE/FKM

All wetted materials in the "Physiologically safe (FDA) in respect of wetted materials" design comply with the following FDA guidelines:

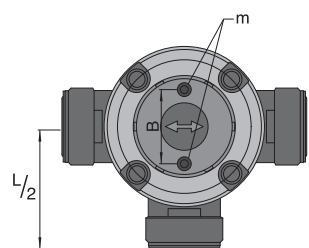
Material	Guideline
PTFE	21CFR177.1510
PVDF	21CFR177.2510
PP	21CFR177.1520
EPDM/FKM	21CFR177.2600



## 1.6 Accessories for low-pressure metering pumps



P\_AC\_0267\_V2



P\_AC\_0268\_V2

**Dimensions of DHV-UR (FDA) (PP, PVC, PVDF design)**

DN	G	H mm	L mm	h mm	D mm	m	B mm
10	3/4	144*	118	24	79	M6	35
15	1	144*	118	24	79	M6	35
20	1 1/4	196*	150	37	99	M6	46
25	1 1/2	196*	150	37	99	M6	46

\* Approximate values

**Dimensions of DHV-UR (FDA) (SS design)**

DN	G	H mm	L mm	h mm	D mm	m	B mm
10	3/4	144*	118	20	79	M6	35
15	1	144*	118	20	79	M6	35
20	1 1/4	196*	150	30	99	M6	46
25	1 1/2	196*	150	30	99	M6	46

\* Approximate values

We are happy to supply back pressure valves and relief valves DHV-U/DHV-UR in stainless steel and wetted EC 1935/2004 on request.

## 1.6 Accessories for low-pressure metering pumps

### Relief valve type DHV-UR M configured for manometer

The relief valves DHV-UR with M designs are configured with a plug for manometer installation. Manometers with threaded socket G 1/4" (ISO 228) can be fitted by the customer directly to the relief valve via the additional housing opening. Standard manometers with part number are available for neutral media. This also enables savings in terms of installation.

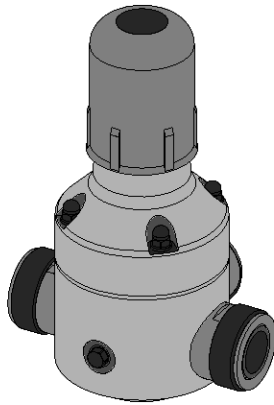
**Adjustable pressure** 0.5 – 10 bar

#### Application of PPE/PPB/PCE/PCB:

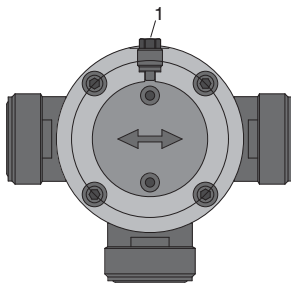
20 °C - max. operating pressure 10 bar

#### Application of PVT/SST:

30 °C - max. operating pressure 10 bar



P\_AC\_0272



P\_AC\_0271\_V2

1: Plug for manometer installation

Type	Nominal diameter	G	Order no.
PPE	DN 10	3/4	1077221
PPB	DN 10	3/4	1077259
PCE	DN 10	3/4	1077255
PCB	DN 10	3/4	1077263
PVT	DN 10	3/4	1077267
PPE	DN 15	1	1077220
PPB	DN 15	1	1077258
PCE	DN 15	1	1077254
PCB	DN 15	1	1077262
PVT	DN 15	1	1077266
PPE	DN 20	1 1/4	1077219
PPB	DN 20	1 1/4	1077257
PCE	DN 20	1 1/4	1077223
PCB	DN 20	1 1/4	1077261
PVT	DN 20	1 1/4	1077265
PPE	DN 25	1 1/2	1077218
PPB	DN 25	1 1/2	1077256
PCE	DN 25	1 1/2	1077222
PCB	DN 25	1 1/2	1077260
PVT	DN 25	1 1/2	1077264

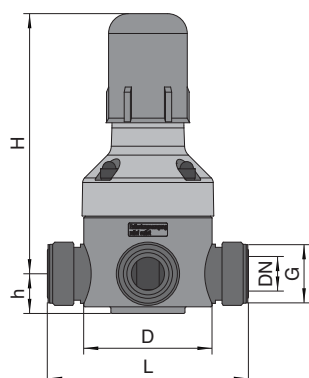
### Materials used

Type	Housing/Connectors	Plungers	Plunger Seal	Seal/Connectors
PPE	PP	PVDF	EPDM	EPDM
PPB	PP	PVDF	FKM	FKM
PCE	PVC	PVDF	EPDM	EPDM
PCB	PVC	PVDF	FKM	FKM
PVT	PVDF	PVDF	PTFE*	FKM

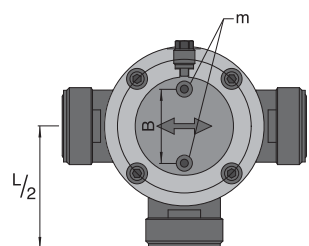
\* Cover ring made of PTFE/FKM



## 1.6 Accessories for low-pressure metering pumps



P\_AC\_0267\_V2

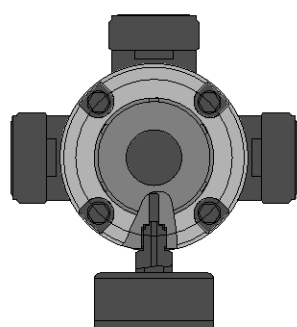


P\_AC\_0271\_V2

### Dimensions of DHV-UR M (PP, PVC, PVDF design)

DN	G	H mm	L mm	h mm	D mm	m	B mm
10	3/4	144*	118	24	79	M6	35
15	1	144*	118	24	79	M6	35
20	1 1/4	196*	150	37	99	M6	46
25	1 1/2	196*	150	37	99	M6	46

\* Approximate values



P\_AC\_0269

### Pipe spring manometer

Pipe spring manometers in accordance with DIN EN 837-1 for neutral media for use with relief valves DHV-UR design M. When ordered, the manometer is supplied with the relief valve.

Nominal diameter	63 mm
Display range	0 – 16 bar
Housing material	1.4571
Material connector	Brass
Connector	Threaded assembly G 1/4" (ISO 228)
Connector position	radial at bottom
Filling liquid	Glycerine

#### Order no.

Pipe spring manometer

792726

### Back Pressure Valve / Relief Valve Type DHV 712-R

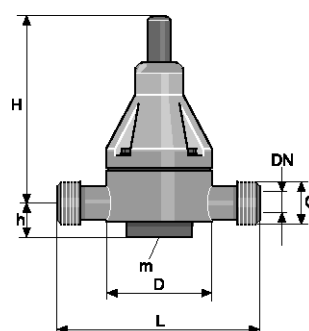
Adjustable pressure 0.5 – 10 bar

#### Applications of PPE / PCB

20 °C - max. operating pressure 10 bar

#### Applications of PVT / TT / SS

30 °C - max. operating pressure 10 bar

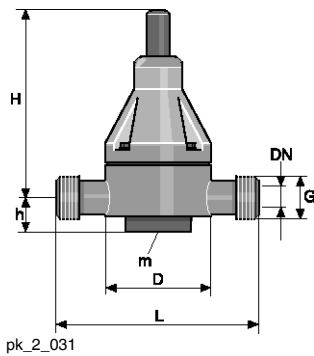


pk\_2\_031

Type	G	Nominal diameter	Order no.
TT	3/4	DN 10	1000059
TT	1	DN 15	1000060
TT	1 1/4	DN 20	1000061
TT	1 1/2	DN 25	1000062
TT	2	DN 32	1000063
TT	2 1/4	DN 40	1000064

\* **Caution:** The product contains adhesive joints with Tangit. Please note the resistance of Tangit adhesive.

## 1.6 Accessories for low-pressure metering pumps



Dimensions of DHV 712-R

DN	G	H mm	L mm	h mm	D mm	m
32	2	260	205	59** / 37***	147	M8
40	2 1/4	260	205	59** / 37***	147	M8

\* = Approx. values;

\*\* = PP, PVC, PVDF;

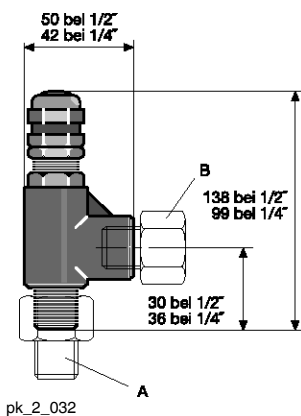
\*\*\* = TT, SS

### Materials

Type	Housing/Connectors	Plungers	Plunger Seal	Seal/Connectors
TT	PTFE with carbon	PTFE <sup>2</sup>	PTFE <sup>3</sup>	PTFE <sup>3</sup>

<sup>2</sup> PTFE (white)

<sup>3</sup> Packing ring PTFE/FKM



### Back Pressure Valve / Relief Valve for High-Pressure Systems

Use as a pressure relief valve (adjustable) and as a back pressure valve. Overflow valve and corresponding spring must be ordered separately.

Material: stainless steel 316/FKM

Temperature range: -18 °C to 120 °C

### Recommended Use up to 200 l/h

	Connection	Order no.
Overflow valve	1/4" NPT inner and outer thread	202505
Spring for pressure range	Spring colour	Order no.
3.4 – 24 bar	blue	202519
24.0 – 52 bar	yellow	202520
52.0 – 103 bar	violet	202525
103.0 – 155 bar	orange	202524
155.0 – 207 bar	brown	202523
207.0 – 276 bar	white	202522
276.0 – 345 bar	red	202521

### Recommended Use up to 300 l/h

	Connection	Order no.
Overflow valve	1/2" NPT inner and outer thread	1005499
Spring for pressure range	Spring colour	Order no.
3.4 – 24 bar	blue	1005500
24.0 – 50 bar	yellow	1005501
50.0 – 100 bar	violet	1005502

### Reducing Pipe Nipple

Connection	Order no.
1/4" NPT internal – 1/4" NPT external (A)	359378
1/4" NPT external – 1/4" Rp internal (B)	359379
1/2" NPT internal – 1/2" NPT external (A)	1005503
1/2" NPT external – 1/2" Rp internal (B)	1005504

For use as an adjustable safety relief valve and as a back pressure valve. Relief valve and corresponding spring must be ordered separately



## 1.6 Accessories for low-pressure metering pumps

### 1.6.3.5

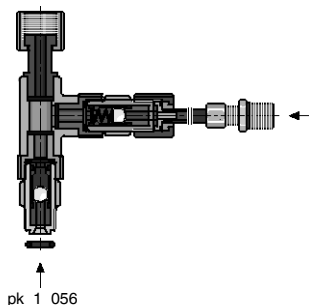
### Flushing Assemblies and Overload Protection Assemblies for Low-Pressure Metering Pumps

#### Flushing Assembly

For flushing and cleaning dosing heads, metering lines and injection valves.

As a manual or automatic, time-controlled design. Installation, even retrospectively, on the suction connector of the metering pump. Supplied with 2 m flushing pipe and R 3/8 connection nipple.

Automatic flushing equipment for the fully automatic flushing of the pump head is possible on request.



#### PPE Flushing Assembly

PP material, EPDM seal.

	Fig.	Order no.
For 6/4, 8/5, 12/6, 12/9 connectors	pk_1_056	809909
For G 3/4 -DN 10 connector	pk_1_057	809917
For G 1 -DN 15 connector	pk_1_057	809919

#### PCB Flushing Assembly

Material: PVC, FKM seals

	Fig.	Order no.
for 6/4, 8/5, 12/6, 12/9 connectors	pk_1_056	809925
for G 3/4 - DN 10 connectors	pk_1_057	809926
for G 1 - DN 15 connectors	pk_1_057	803960

\* **Caution:** The product contains adhesive joints with Tangit. Please note the resistance of Tangit adhesive.

#### Relief Valve Assembly

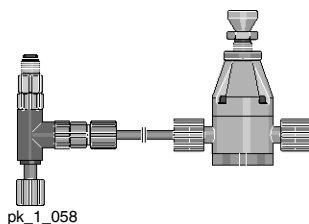
Consisting of a back pressure valve, which can be set from 1 - 10 bar, type DL, complete with connecting parts, installation directly on the dosing head.

Connector size 6 - 12 mm, depending on the pressure connector on the metering pump.

#### PPE Relief Valve Assembly

Material: PP, EPDM seals.

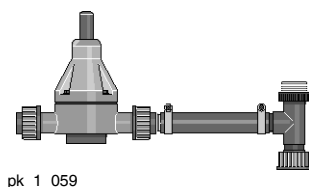
	Fig.	Order no.
For 6/4, 8/5, 12/6, 12/9 connectors	pk_1_058	809990
G 3/4 - DN 10 connector	pk_1_059	809991
G 1 - DN 15 connector	pk_1_059	809992



#### PCB Relief Valve Assembly

Material: PVC, FKM seals.

	Fig.	Order no.
for 6/4, 8/5, 12/6, 12/9 connectors	pk_1_058	809989
for G 3/4 - DN 10 connectors	pk_1_059	809993
for G 1 - DN 15 connectors	pk_1_059	914745



\* **Caution:** The product contains adhesive joints with Tangit. Please note the resistance of Tangit adhesive.



## 1.6 Accessories for low-pressure metering pumps

### 1.6.3.6

#### Hoses and pipework for low-pressure metering pumps

For metering pumps and accessories

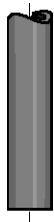
We recommend that only original lines are used so that the mechanical connection of the compression fitting and the pressure rating and chemical resistance can be ensured.



#### Soft PVC Suction Line

For metering pumps and accessories. We recommend that only original tubing is used so that the mechanical connection of the compression fitting and the pressure rating and chemical resistance are ensured.

Supply with food-use certification is available upon request.



pk\_1\_013

Material	Length m	oØ x iØ mm	Permissible pressure bar	Order no.
PVC flexible	5	6 x 4	0.5*	1004520
	5	8 x 5	0.5*	1004521
	5	12 x 9	0.5*	1004522
	10	6 x 4	0.5*	1004523
	10	8 x 5	0.5*	1004524
	10	12 x 9	0.5*	1004525
	25	6 x 4	0.5*	1004526
	25	8 x 5	0.5*	1004527
	25	12 x 9	0.5*	1004528
	50	6 x 4	0.5*	1004529
	50	8 x 5	0.5*	1004530
	50	12 x 9	0.5*	1004531
	Sold in metres	19 x 15	0.5*	037020
	Sold by the metre	22 x 18	0.5*	037022

\* Admissible operating pressure at 20 °C in accordance with DIN EN ISO 7751, subject to chemical resistance and correct assembly

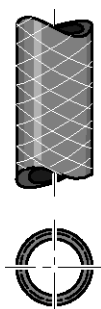
#### Caution:

The resistance of soft PVC hoses is not identical to that of hard PVC. Please observe the resistance for soft PVC as well as the cleaning instructions when using the equipment for food applications (see homepage).

\* Permissible operating pressure at 20 °C, chemical resistance and proper connection assumed.



## 1.6 Accessories for low-pressure metering pumps



pk\_1\_060

### Soft PVC Suction and Discharge Line with Woven Fabric Core

Supply with food-use certification is available upon request.

Material	Length		oØ x iØ	Permissible pressure	Order no.
	m	mm			
Fabric-reinforced flexible PVC	5	10 x 4	–	18*	1004533
	5	12 x 6	–	17*	1004538
	10	10 x 4	–	18*	1004534
	10	12 x 6	–	17*	1004539
	25	10 x 4	–	18*	1004535
	25	12 x 6	–	17*	1004540
	50	10 x 4	–	18*	1004536
	50	12 x 6	–	17*	1004541
	Sold in metres	24 x 16	for DN 10	15*	037040
	Sold in metres	27 x 19	for DN 15	15*	037041
	Sold by the metre	34 x 25	for DN 20	12*	037043
	Sold by the metre	40 x 30	for DN 25	10*	1000527
	Sold by the metre	52 x 40	for DN 32	7*	1005508

\* Admissible operating pressure at 20 °C in accordance with DIN EN ISO 7751, subject to chemical resistance and correct assembly

#### Caution:

The resistance of soft PVC hoses is not identical to that of hard PVC. Please observe the resistance for soft PVC as well as the cleaning instructions when using the equipment for food applications (see homepage).

For socket welded and PVC cemented rigid PP and PVDF pipe, pipes and fittings with a pressure rating of PN 16 or PN 10 bar are to be used.

### Soft PVC Suction and Metering Line with Woven Inner Layer Approved for Food Use

Material	Length		oØ x iØ	Permissible pressure	Order no.
	m	mm			
Soft PVC with woven inner layer approved for food use	5	10 x 4		10*	1037556
	5	12 x 6		10*	1037561
	10	10 x 4		10*	1037557
	10	12 x 6		10*	1037562
	25	10 x 4		10*	1037558
	25	12 x 6		10*	1037563
	50	10 x 4		10*	1037559
	50	12 x 6		10*	1037564

\* Permissible operating pressure at 20 °C as per DIN EN ISO 7751, 1/4 of burst pressure, subject to chemical resistance and correct connection

#### Important:

Soft PVC hoses do not offer the identical resistance to rigid PVC. Always note the resistance of soft PVC hoses and the cleaning instructions for use in food applications.



## 1.6 Accessories for low-pressure metering pumps

### PE Suction and Discharge Line

Material	Length	oØ x iØ	Permissible pressure	Order no.
	m	mm	bar	
Polyethylene	5	6 x 4	10*	1004492
	5	8 x 5	10*	1004493
	5	12 x 9	7*	1004504
	10	6 x 4	10*	1004505
	10	8 x 5	10*	1004506
	10	12 x 9	7*	1004507
	25	6 x 4	10*	1004508
	25	8 x 5	10*	1004509
	25	12 x 9	7*	1004510
	50	6 x 4	10*	1004511
	50	8 x 5	10*	1004512
	50	12 x 9	7*	1004513

\* Admissible operating pressure at 20 °C in accordance with DIN EN ISO 7751, subject to chemical resistance and correct assembly

### PTFE Suction and Discharge Lines

Material	Length	oØ x iØ	Permissible pressure	Order no.
	m	mm	bar	
PTFE	Sold in metres	1.75 x 1.15	12*	037414
	Sold in metres	3.2 x 2.4	8*	037415
	Sold in metres	6 x 3	20*	1021353
	Sold in metres	6 x 4	14*	037426
	Sold in metres	8 x 4	25*	1033166
	Sold in metres	8 x 5	16*	037427
	Sold in metres	12 x 9	10*	037428

\* Admissible operating pressure at 20 °C in accordance with DIN EN ISO 7751, subject to chemical resistance and correct assembly

### Stainless Steel Pipes

Material	Length	oØ x iØ	Permissible pressure	Order no.
	m	mm	bar	
Stainless steel pipe 1.4435	Sold in metres	1.58 x 0.9	400*	1020774
	Sold in metres	3.175 x 1.5	400*	1020775
	Sold in metres	6 x 5	175*	015738
	Sold in metres	6 x 4	185*	015739
	Sold in metres	8 x 7	160*	015740
	Sold in metres	12 x 10	200*	015743

\* Admissible operating pressure at 20 °C in accordance with DIN EN ISO 7751, subject to chemical resistance and correct assembly

### Hose Cutting Kit

Hose Cutting Set for Plastic Pipes up to a Diameter of 25 mm. Manufacturer: Gedore.

	Order no.
Hose Cutting Kit	1038571

# 1.6 Accessories for low-pressure metering pumps

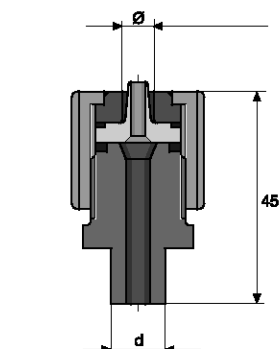
## 1.6.3.7

## Connectors, Fittings, Connector Kits, Seals

### Hose adhesive nipple

With union nut to connect PVC, PE and PTFE hose to PVC fittings, for creation of own connection systems.

<b>Material</b>	<b>PCB</b>	<b>PCE</b>
<b>Housing PVC</b>	PVC	PVC
<b>Seals</b>	FKM	EPDM



pk\_1\_107

	<b>Material</b>	<b>d mm</b>	<b>Hose oØ x iØ mm</b>	<b>Order no.</b>
<b>Hose adhesive nipple</b>	PCB	12	6 x 4	817088
	PCB	12	8 x 5	817089
	PCB	12	12 x 9	817090
	PCB	12	12 x 6	817091
	PCB	16	6 x 4	817092
	PCB	16	8 x 5	817093
	PCB	16	12 x 9	817094
	PCB	16	12 x 6	817095
	PCE	12	6 x 4	1077673
	PCE	12	8 x 5	1077674
	PCE	12	12 x 9	1077675
	PCE	12	12 x 6	1077676
	PCE	16	6 x 4	1077677
	PCE	16	8 x 5	1077678
	PCE	16	12 x 9	1077679
	PCE	16	12 x 6	1077680

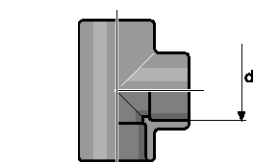
### PVC straight solvent union



pk\_1\_109

	<b>Material</b>	<b>d mm</b>	<b>Order no.</b>
<b>PVC straight solvent union</b>	PVC	12 DN 8	356608
	PVC	16 DN 10	356609
	PVC	20 DN 15	356610
	PVC	25 DN 20	356611

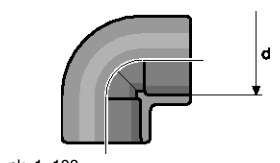
### PVC T-joint



pk\_1\_113

	<b>Material</b>	<b>d mm</b>	<b>Order no.</b>
<b>PVC T-joint</b>	PVC	12 DN 8	356406
	PVC	16 DN 10	356407
	PVC	20 DN 15	356408
	PVC	25 DN 20	356409

### 90° PVC elbow joint

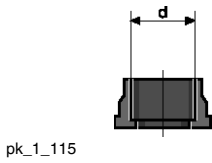


pk\_1\_108

	<b>Material</b>	<b>d mm</b>	<b>Order no.</b>
<b>90° PVC elbow joint</b>	PVC	12 DN 8	356315
	PVC	16 DN 10	356316
	PVC	20 DN 15	356317
	PVC	25 DN 20	356318

## 1.6 Accessories for low-pressure metering pumps

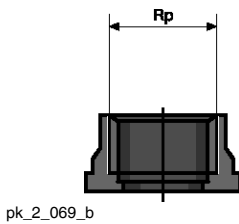
### PVC insert (straight solvent union)



	Material	d mm		Order no.
PVC insert (straight solvent union)	PVC	12	DN 8	356571
	PVC	16	DN 10	356572
	PVC	20	DN 15	356573
	PVC	25	DN 20	356574
	PVC	32	DN 25	356575
	PVC	40	DN 32	356576
	PVC	50	DN 40	356577
	PVC	63	DN 50	356578

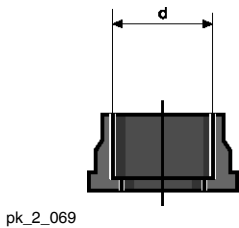
	Material	Connection	Order no.
Adhesive coupler, grooved*	PVC	d 16 – DN 10	1001784
	PVC	d 20 – DN 15	1001394
	PVC	d 25 – DN 20	1036257
	PVC	d 32 – DN 25	1001786
	PVC	d 40 – DN 32	1005104
	PVC	d 50 – DN 40	1025961
	PVC	d 63 – DN 50	1019206

\* To be used together with ProMinent® PTFE formed composite seals.



	Material	Connection	Order no.
Threaded pipe socket	1.4404	Rp 3/8 – DN 10	805285
	1.4404	Rp 1/2 – DN 15	805286
	1.4404	Rp 3/4 – DN 20	805287
	1.4404	Rp 1 – DN 25	805288
	1.4404	Rp 1 1/4 – DN 32	805289
	1.4404	Rp 1 1/2 – DN 40	805290
	1.4404	Rp 2 – DN 50	805291

### Inserts (welding sleeves)



	Material	Connection	Order no.
Fusion socket	PP	d 12 – DN 8	800666
	PP	d 16 – DN 10	358603
	PP	d 20 – DN 15	358604
	PP	d 25 – DN 20	358605
	PP	d 32 – DN 25	358606
	PP	d 40 – DN 32	358607
	PP	d 50 – DN 40	358608
	PP	d 63 – DN 50	358609
	PVDF	d 16 – DN 10	358803
	PVDF	d 20 – DN 15	358804
	PVDF	d 25 – DN 20	358805
	PVDF	d 32 – DN 25	358806
	PVDF	d 40 – DN 32	1003640
	PVDF	d 50 – DN 40	358808
	PVDF	d 63 – DN 50	358809

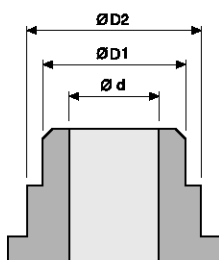


## 1.6 Accessories for low-pressure metering pumps

	Material	Connection	Order no.
Fusion coupler, grooved*	PP	d 16 – DN 10	1001785
	PP	d 20 – DN 15	1001395
	PP	d 25 – DN 20	1036258
	PP	d 32 – DN 25	1001787
	PP	d 40 – DN 32	1005105
	PP	d 50 – DN 40	1025960
	PP	d 63 – DN 50	1019207
	PVDF	d 16 – DN 10	358803
	PVDF	d 20 – DN 15	358804
	PVDF	d 25 – DN 20	1036259
	PVDF	d 32 – DN 25	1001788
	PVDF	d 40 – DN 32	1003640
	PVDF	d 50 – DN 40	1025959
	PVDF	d 63 – DN 50	1019208

\* To be used together with ProMinent® PTFE formed composite seals.

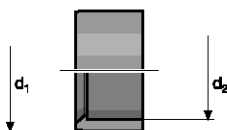
	Material	Ø D1 mm	Ø D2 mm	Connection	Order no.
SS fusion coupler, grooved	1.4404	15.0	19.5	d 12 – DN 10	1006011
	1.4404	21.0	25.6	d 16 – DN 15	1006001
	1.4404	26.7	33.6	d 22 – DN 20	1031457
	1.4404	33.4	39.6	d 28 – DN 25	1031458
	1.4404	42.2	49.6	d 36 – DN 32	1031459
	1.4404	48.3	57.5	d 40 – DN 40	1023643
	1.4404	71.6	60.3	d 54 – DN 50	1031460



P\_AC\_0210\_SW

### PVC short reducing union

	Material	d1 mm	d2 mm	Order no.
PVC short reducing union	PVC	12	8	357025
	PVC	16	12	357026
	PVC	20	16	357027
	PVC	25	20	357028



pk\_1\_110

### PVC hose connection nozzle

	Material	d mm	Order no.
PVC hose connection nozzle	PVC	12 DN 8	356655
	PVC	16 DN 10	356656
	PVC	20 DN 15	356657
	PVC	25 DN 20	356658



pk\_1\_111

## 1.6 Accessories for low-pressure metering pumps

### Pressure hose nozzles with seal



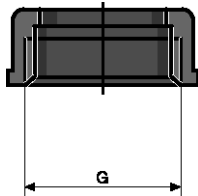
pk\_2\_046

	Material	Connection	Order no.
Pressure hose nozzle	PP	d 16 – DN 10	800657
	PP	d 20 – DN 15	800655
	PP	d 25 – DN 20	800656
	PP	d 32 – DN 25	811418
	PVC	d 16 – DN 10	800554
	PVC	d 20 – DN 15	811407
	PVC	d 25 – DN 20	811408
	PVC	d 32 – DN 25	811409
	PTFE	d 16 – DN 10	811572
	PTFE	d 20 – DN 15	811424
	PTFE	d 25 – DN 20	811425
	PTFE	d 32 – DN 25	811426
	PVDF	d 40 – DN 32	1005106
	1.4571	d 16 – DN 10	810536
	1.4571	d 20 – DN 15	810567
	1.4571	d 25 – DN 20	810568
	1.4571	d 32 – DN 25	810569
	1.4571	d 40 – DN 32	1005360

	Material	Connection	Order no.
Hose nozzle, grooved	PVDF	d 16 – DN 10	1002288
	PVDF	d 20 – DN 15	740632
	PVDF	d 25 – DN 20	1006014
	PVDF	d 32 – DN 25	1005560
	PVDF	d 40 – DN 32	1005106

To be used together with ProMinent® PTFE formed composite seals.

### Union nuts

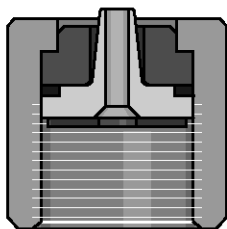


pk\_2\_069\_a

	Material	Connection	Order no.
Union nut	PP	G 5/8 – DN 8	800665
	PP	G 3/4 – DN 10	358613
	PP	G 1 – DN 15	358614
	PP	G 1 1/4 – DN 20	358615
	PP	G 1 1/2 – DN 25	358616
	PP	G 2 – DN 32	358617
	PP	G 2 1/4 – DN 40	358618
	1.4571	G 2 1/4 – DN 40	805275
	1.4571	G 2 3/4 – DN 50	805276

### Single Connector Kit

Connection kit for fitting hoses of different sizes to the suction and pressure connector of the dosing head of alpha, Beta, gamma, delta®, Pneumados b and accessories, consisting of hose nozzle, clamp ring, union nut and seal for one or two connectors.



pk\_1\_089

Material		oØ x iØ mm	Order no.
PP/EPDM (PPE)	for hose	6 x 4	817160
PP/EPDM (PPE)	for hose	8 x 5	817161
PP/EPDM (PPE)	for hose	12 x 9	817162
PP/EPDM (PPE)	for hose	10 x 4	1002587
PP/EPDM (PPE)	for hose	12 x 6	817163
PP/EPDM (PPE)	for hose	6 x 4 – 12 x 6	1021475
PP/FKM (PPB)	for hose	6 x 4	817173
PP/FKM (PPB)	for hose	8 x 5	817174
PP/FKM (PPB)	for hose	12 x 9	817175
PP/FKM (PPB)	for hose	10 x 4	1002588
PP/FKM (PPB)	for hose	12 x 6	817176



## 1.6 Accessories for low-pressure metering pumps

Material		oØ x iØ mm	Order no.
PVC/EPDM (PCE)	for hose	6 x 4	791161
PVC/EPDM (PCE)	for hose	8 x 5	792058
PVC/EPDM (PCE)	for hose	12 x 9	790577
PVC/EPDM (PCE)	for hose	10 x 4	1002590
PVC/EPDM (PCE)	for hose	12 x 6	792062
PVC/FKM (PCB)	for hose	6 x 4	817065
PVC/FKM (PCB)	for hose	8 x 5	817066
PVC/FKM (PCB)	for hose	12 x 9	817067
PVC/FKM (PCB)	for hose	10 x 4	1002589
PVC/FKM (PCB)	for hose	12 x 6	817068
PVC/FKM (PCB)	for hose	6 x 4 – 12 x 6	1021476
PVDF (PVT)	for hose	6 x 3	1024583
PVDF (PVT)	for hose	6 x 4	1024619
PVDF (PVT)	for hose	8 x 4	1033148
PVDF (PVT)	for hose	8 x 5	1024620
PVDF (PVT)	for hose	12 x 9	1024618
PVDF (PVT)	for hose	10 x 4	1024585
PVDF (PVT)	for hose	12 x 6	1024617
PVDF (PVT)	for hose	6 x 4 – 12 x 6	1028082
PVDF (PVF) FDA-konform	for hose	6 x 4 – 12 x 6	1080391
PTFE (TTT)	for hose	6 x 4	817205
PTFE (TTT)	for hose	8 x 5	817206
PTFE (TTT)	for hose	12 x 9	817207
PTFE (TTT)	for hose	12 x 6	817208

### Double Connector Kit

Material		oØ x iØ mm	Order no.
PP/EPDM (PPE)	for hose	6 x 4	817150
PP/EPDM (PPE)	for hose	8 x 5	817153
PP/EPDM (PPE)	for hose	12 x 9	817151
PP/EPDM (PPE)	for hose	12 x 6	817152
PP/FKM (PPB)	for hose	6 x 4	817166
PP/FKM (PPB)	for hose	8 x 5	817167
PP/FKM (PPB)	for hose	12 x 9	817168
PP/FKM (PPB)	for hose	12 x 6	817169
PVC/EPDM (PCE)	for hose	6 x 4	817060
PVC/EPDM (PCE)	for hose	8 x 5	817048
PVC/EPDM (PCE)	for hose	12 x 9	817049
PVC/EPDM (PCE)	for hose	12 x 6	791040
PVC/FKM (PCB)	for hose	6 x 4	817050
PVC/FKM (PCB)	for hose	8 x 5	817053
PVC/FKM (PCB)	for hose	12 x 9	817051
PVC/FKM (PCB)	for hose	12 x 6	817052
PVDF (PVT)	for hose	6 x 4	1023246
PVDF (PVT)	for hose	8 x 5	1023247
PVDF (PVT)	for hose	12 x 9	1023248
PVDF (PVT)	for hose	12 x 6	1024586
PTFE (TTT)	for hose	6 x 4	817201
PTFE (TTT)	for hose	8 x 5	817204
PTFE (TTT)	for hose	12 x 9	817202
PTFE (TTT)	for hose	12 x 6	817203

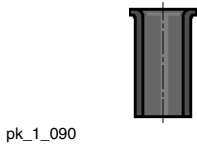




## 1.6 Accessories for low-pressure metering pumps

### Support Insert Made of Stainless Steel No. 1.4571

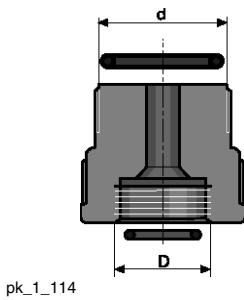
For connection of PE or PTFE pipe to stainless steel connectors using Swagelock and Serto systems.



	oØ x iØ mm	Order no.
for hose	6 x 4	359365
for hose	8 x 5	359366
for hose	12 x 9	359368
for hose	8 x 6	359362
for hose	12 x 10	359363

### Single adapter kit

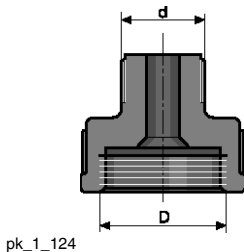
For connection of system + GF+ threaded connectors to metering pumps and accessories.



Material	Size for threaded connector	Internal thread D	External thread d	Order no.
PP/EPDM	DN 8	M20 x 1,5	G 5/8	817164
PP/FKM	DN 8	M20 x 1,5	G 5/8	740604
PVC/EPDM	DN 8	M20 x 1,5	G 5/8	740583
PVC/FKM	DN 8	M20 x 1,5	G 5/8	817069
PVDF/PTFE	DN 8	M20 x 1,5	G 5/8	1031073
PP/EPDM	DN 10	M20 x 1,5	G 3/4	817165
PP/FKM	DN 10	M20 x 1,5	G 3/4	817178
PVC/EPDM	DN 10	M20 x 1,5	G 3/4	740585
PVC/FKM	DN 10	M20 x 1,5	G 3/4	740601
PVDF/PTFE	DN 10	M20 x 1,5	G 3/4	1028409

### Single adapter kit

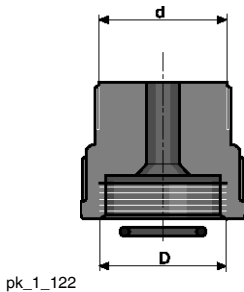
For fitting series A, B, C and E accessories to current metric M20 x 1.5 connectors.



Material	Size	Internal thread D	External thread d	Order no.
PP	6-8 mm connector	M20 x 1.5	G 1/4	811904
PVC	6-8 mm connector	M20 x 1.5	G 1/4	811902

### Single adapter kit

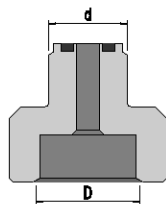
For fittings of current accessories with metric M20 x 1.5 connectors to series A, B, C and E.



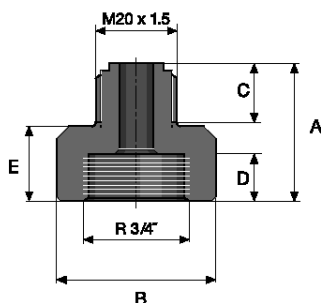
Material	Size	Internal thread D	External thread d	Order no.
PVC/FKM	6-8 mm connector	G 1/4	M20 x 1.5	741087
PP/EPDM	12 mm connector	G 3/8	M20 x 1.5	741090
PVC/FKM	12 mm connector	G 3/8	M20 x 1.5	741089
PTFE	12 mm connector	G 3/8	M20 x 1.5	741092



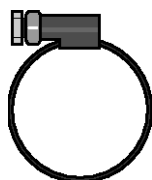
## 1.6 Accessories for low-pressure metering pumps



P\_AC\_0255\_SW



pk\_2\_058



pk\_1\_068



pk\_1\_028



pk\_1\_117

### Adapter

Fits connector set for 12 x 9 hose.

Material	Internal thread D	External thread d	Order no.
PP	DN 10, G 3/4	M20 x 1.5	800815
PVC	DN 10, G 3/4	M20 x 1.5	800816
PVDF	DN 10, G 3/4	M20 x 1.5	1017406
PVDF	DN 15, G 1	M20 x 1.5	1028530
PVDF, FDA-konform	DN 10, G 3/4	M20 x 1.5	1080408

### Stainless Steel Threaded Clip

For connecting intake and metering line to pressure hose nozzle.

	bandwidth mm	Clamping range mm	Order no.
DN 10 clamping ring	9	16 – 25	359703
DN 15 clamping ring	9	20 – 32	359705
DN 20 clamping ring	9	25 – 40	359706
DN 25 clamping ring	9	32 – 50	359707
DN 32 clamping ring	9	40 – 60	1002777
Jubilee clip	18	21 – 23	1042885
Jubilee clip	18	25 – 27	1042886
Jubilee clip	18	31 – 34	1042887
Jubilee clip	18	37 – 40	1042888
Jubilee clip	20	51 – 55	1042889

### Stainless steel straight threaded male adapter

Swagelock system, stainless steel SS 316 (1.4401) for fitting tubing to dosing heads and valves with inner threads and for SB versions.

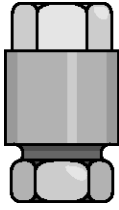
	Order no.
6 mm - ISO 7 R 1/4	359526
8 mm - ISO 7 R 1/4	359527
12 mm - ISO 7 R 1/4	359528
12 mm - ISO 7 R 3/8	359520
16 mm - ISO 7 R 3/8	359521
16 mm - ISO 7 R 1/2	359529

### Stainless steel clamping ring sets

For use with stainless steel threaded connectors for metering pumps and Swagelock accessories. Both parts must be replaced at the same time. Set consists of back and front clamping rings.

	oØ mm	Order no.
Set of rings Ø 6 for pipe	6	104232
Set of rings Ø 8 for pipe	8	104236
Set of rings Ø 12 for pipe	12	104244

## 1.6 Accessories for low-pressure metering pumps

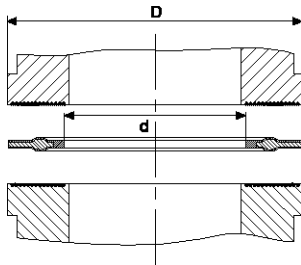


pk\_1\_118

### Stainless steel threaded connector

Serto system for connecting PE or PTFE discharge line to stainless steel pipe, made from stainless steel with clamping ring, but without support insert (parts in contact with chemicals stainless steel 1.4571).

	Order no.
6 mm outer diameter to 6 mm outer diameter stainless steel pipe	359317
8 mm outer diameter to 8 mm outer diameter stainless steel pipe	359318
12 mm outer diameter to 12 mm outer diameter stainless steel pipe	359320

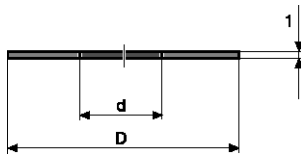


pk\_2\_130

### PTFE Formed Composite Seals

Formed composite seals to be used on grooved sealing surfaces (e.g. pump valve and grooved inserts from ProMinent).

DN DIN / ANSI	Material	D mm	d mm	Order no.
DN 10	PTFE	23.8	14.0	1019364
DN 15	PTFE	29.5	18.0	1019365
DN 20	PTFE	38.0	22.6	1019366
DN 25	PTFE	44.0	27.6	1019367
DN 32	PTFE	56.0	34.6	1019353
DN 40	PTFE	62.0	40.6	1019368



pk\_2\_048

### Set of elastomer flat packing seals

Comprising two EPDM and two FKM seals. An elastomer flat seal should be used with non-grooved sealing surfaces. Leaks may occur at the connection if a PTFE shaped composite seal is used.

DN		D mm	d mm	Order no.
DN 10	(EPDM/FKM)	23.5	14.0	1024159
DN 15	(EPDM/FKM)	29.5	18.0	1024160
DN 20	(EPDM/FKM)	38.0	22.6	1036254
DN 25	(EPDM/FKM)	44.0	28.0	1024161
DN 32	(EPDM/FKM)	56.0	36.0	1024162
DN 40	(EPDM/FKM)	62.0	41.0	1029508

comprising two EPDM seals, physiologically safe (FDA). An elastomer flat seal must be used with smooth sealing surfaces. If a PTFE shaped composite seal is used, leakage may occur at the connection.

DN		D mm	d mm	Order no.
DN 10	EPDM	23.5	14.0	1045440
DN 15	EPDM	29.5	18.0	1045441
DN 25	EPDM	44.0	28.0	1045442

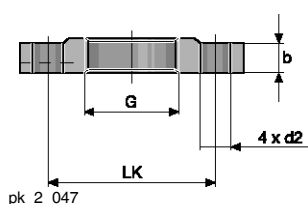
### Flat seals for stainless steel liquid ends

consisting of two PTFE flat seals Gylon Style 3504, physiologically safe (EU Regulation 1935/2004).

DN		D mm	d mm	Order no.
DN 10	PTFE	23.8	14.0	1107282
DN 15	PTFE	29.5	18.0	1107281
DN 20	PTFE	38.0	22.6	1107299
DN 25	PTFE	44.0	27.6	1107280
DN 32	PTFE	56.0	34.6	1107300
DN 40	PTFE	62.0	40.6	1107301



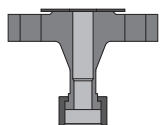
# 1.6 Accessories for low-pressure metering pumps



P\_AC\_0263\_1\_SW1  
PVDF with collar



P\_AC\_0264\_SW1  
1.4571/1.4404 with collar



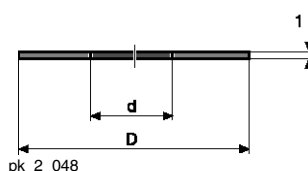
## Flange Mountings

Flange connection in line with DIN 2566 for ProMinent® valve sizes.

Material		G/DN	Pressure rating	b	Ø LK	d2	Order no.
		DIN / ANSI	PN	mm	mm	mm	
PVDF	–	G 3/4 - DN 10	PN 16	12.4	60	14	1036274
PVDF	–	G 1 - DN 15	PN 16	13.0	65	14	1036275
PVDF	–	G 1 1/4 - DN 20	PN 16	15.0	75	14	1036276
PVDF	–	G 1 1/2 - DN 25	PN 16	16.0	85	14	1036277
PVDF	–	G 2 - DN 32	PN 16	18.0	100	18	1036278
PVDF	–	G 2 1/4 - DN 40	PN 16	20.0	100	18	1039037
1.4404	–	G 3/4 - DN 15	PN 40	12.0	65	14	803946
1.4404	–	G 1 - DN 15	PN 40	12.0	65	14	803940
1.4404	–	G 1 1/4 - DN 20	PN 40	15.0	75	14	803941
1.4404	–	G 1 1/2 - DN 25	PN 40	15.0	85	14	803942
1.4404	–	G 2 - DN 32	PN 40	18.0	100	18	1036283
1.4404	–	G 2 1/4 - DN 40	PN 40	20.0	110	18	803943
1.4404	–	G 2 3/4 - DN 50	PN 40	25.0	125	18	1020453
1.4404	–	G 2 1/2 - DN 65	PN 40	20.0	145	18	1010700
PVDF	with collar*	G 3/4 - DN 10	PN 16	12.5	60	14	1036279
PVDF	with collar*	G 1 - DN 15	PN 16	13.5	65	14	1036280
PVDF	with collar*	G 1 1/2 - DN 25	PN 16	16.0	85	14	1036281
PVDF	with collar*	G 2 - DN 32	PN 16	18.0	100	18	1036282
1.4571	with collar*	G 3/4 - DN 10 (DIN 2637)	PN 100	20.0	70	14	1006005
1.4571	with collar*	G 1 - DN 15 (DIN 2637)	PN 40	16.0	65	14	1006006
1.4404	with collar*	G 1 1/2 - DN 25 (DIN 1092-1)	PN 40	18.0	85	14	1041796
1.4404	with collar*	G 2 - DN 32 (DIN 1092-1)	PN 40	18.0	100	18	1041797

\* Use flange mountings with a collar for pumps Sigma/ 1, Sigma/ 2 with DN 15 connector and Sigma/ 3 pumps with DN 25 connector. Sigma/ 3-DN25 1" EN 1092-11.4404 part no: 1041796

Further material versions and details available on request.



## Flat Seals for Threaded Flange to DIN 2566

Material	G/DN	D mm	d mm	Order no.
	DIN / ANSI			
PTFE	G 3/4 - DN 15	52	12	483938
PTFE	G 1 - DN 15	52	17	483924
PTFE	G 1 1/4 - DN 20	62	22	483925
PTFE	G 1 1/2 - DN 25	72	27	483926
PTFE	G 2 - DN 32	83	33	1007541
PTFE	G 2 1/4 - DN 40	92	40	483928
PTFE	G 2 3/4 - DN 50	108	50	483929
PTFE	G 3 - DN 65	130	60	1020466
FKM	G 3/4 - DN 15	52	12	483939
FKM	G 1 - DN 15	52	17	483942
FKM	G 1 1/4 - DN 20	62	22	483943
FKM	G 1 1/2 - DN 25	72	27	483944
FKM	G 1 1/2 - DN 32	83	33	1007542
FKM	G 2 1/4 - DN 40	92	40	483946
FKM	G 2 3/4 - DN 50	108	50	483947
FKM	G 3 - DN 65	130	60	1020467

Flange mountings as DIN 2629. To order for Meta HK and Makro TZ HK plunger metering pumps.

FKM = Fluorine Rubber

## 1.6 Accessories for low-pressure metering pumps

### 1.6.3.8

#### Pulsation Damper / Diaphragm Accumulator for Low Pressure Metering Pumps

Pulsation dampers are available in different versions: as in-line dampers and as accumulators.

Pulsation dampers are used for low-pulsation metering and to reduce the flow resistance with long metering lines. They are also ideally suited to viscous media. The gas cushion between the housing and hose is compressed when the metering pump has a pressure stroke, at the same time as a partial volume of the medium is metered into the metering line. The overpressure that forms in the gas cushion causes the compressed volume to be transported on at the following suction stroke and the original, relaxed volume of gas is present again.



#### Important:

Protect the pulsation dampers in principle with a relief valve.

#### PP In-Line Damper

**Please note:** Only use pulsation dampers in conjunction with an overflow device with adjustable back pressure / relief valve.

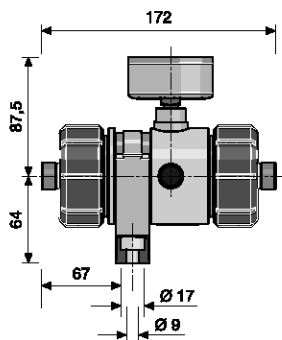
With this: Dummy plugs to seal the output side of the damper in installations with a T-piece.

#### Operating conditions

5 - 30 °C - max. operating pressure 10 bar

40 °C - max. operating pressure 8 bar

60 °C - max. operating pressure 4 bar



P\_AC\_0180\_SW

	Volume l	Damper diaphragm	Seal material	Connection	Order no.
PPE in-line damper	0.05	CSM*	EPDM	M 20 x 1,5	1026768
PPB in-line damper	0.05	FKM	FKM	M 20 x 1,5	1026771

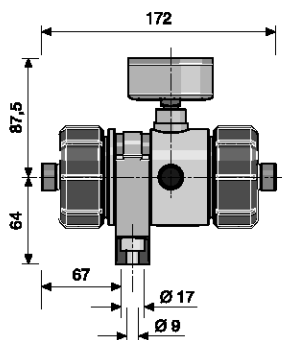
\* Chlorosulfonated polyethylene

#### PP In-Line Damper

Damper diaphragm is replaceable, seals made of EPDM.

Medium temperature max. 50 °C

Pre-pressure is approx. 0.6 x operating pressure.



P\_AC\_0180\_SW

	Volume l	Max. pressure bar	Damper diaphragm	Connection	Order no.
PPE in-line damper	0.05	10	CSM*	G 3/4 - DN 10	1026769
PPB in-line damper	0.05	10	FKM	G 3/4 - DN 10	1026772
PDS 2.5	2.50	10	Hypalon	G 2 - DN 32	1001344
PDS 2.5	2.50	10	FKM	G 2 - DN 32	1001345

\* Chlorosulfonated polyethylene

For other sizes (0.2 l and 0.5 l) see in-line pulsation damper PVDF.

#### Blanking threaded connector PP

Material	Connection	Order no.
PP	M 20 x 1,5	1030200
PP	G 3/4 - DN 10	1001352



## 1.6 Accessories for low-pressure metering pumps

### PVC In-Line Damper

**Please note:** Only use pulsation dampers in conjunction with an overflow device with adjustable back pressure / relief valve.

With this: Dummy plugs to seal the output side of the damper in installations with a T-piece.

**Operating conditions**

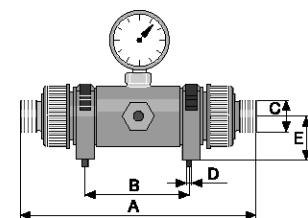
5 - 20 °C - max. operating pressure 10 bar
40 °C - max. operating pressure 6 bar
60 °C - max. operating pressure 2 bar

	Volume l	Damper diaphragm	Seal material	Connection	Order no.
<b>PCE in-line damper</b>	0.05	CSM*	EPDM	M 20 x 1,5	1026774
<b>PCB in-line damper</b>	0.05	FKM	FKM	M 20 x 1,5	1026777

\* Chlorosulfonated polyethylene

### PVC In-Line Damper

Removable hose, FKM seals.



pk\_2\_041

Type	Dimensions				
	A	B	C	D	E
PDS 2.5	541	525	G2	11	99.5

	Volume l	Max. pressure bar	Damper diaphragm	Seal material	Connection	Order no.
<b>PCE in-line damper</b>	0.05	10	CSM*	EPDM	G 3/4 – DN 10	1026775
<b>PCB in-line damper</b>	0.05	10	FKM	FKM	G 3/4 – DN 10	1026778
<b>PDS 2.5</b>	2.50	10	Hypalon	FKM	G 2 – DN 32	1001342
<b>PDS 2.5</b>	2.50	10	FKM	FKM	G 2 – DN 32	1001343

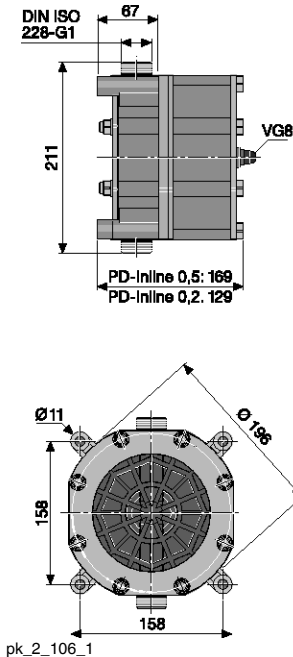
\* Chlorosulfonated polyethylene

For other sizes (0.2 l and 0.5 l) see in-line pulsation damper PVDF.

### Blanking threaded connector PP

Material	Connection	Order no.
<b>PVC</b>	M 20 x 1,5	1030458
<b>PVC</b>	G 3/4 – DN 10	1001349

## 1.6 Accessories for low-pressure metering pumps



### PVDF In-Line Pulsation Damper

**Function:** Hydropneumatic accumulator with baffle

The PVDF accumulator with PTFE diaphragm offers outstanding resistance to chemicals and can therefore be used in connection with a large number of different liquids. The pulsation damper has two liquid connections and can therefore be installed directly in the piping system or be installed diagonally using a blanking plug kit. The baffle in the liquid valve directs the volume flow straight at the diaphragm. This ensures direct contact of the volume flow with the diaphragm. Fluctuations in volume flow are thus optimally balanced out by the enclosed gas volume.

**Important:** Pulsation dampers should be protected by an overflow valve.

Type	Volume l	Max. pressure bar	Connection	Order no.
PD In-line	0.2	10	G 1 – DN 15	1026252
PD In-line	0.5	10	G 1 – DN 15	1026736
PD-Inline	0.2	16	G 1 – DN 15	1033446
PD-Inline	0.5	16	G 1 – DN 15	1033447
PD-Inline	0.2	25	G 1 – DN 15	1036154
PD In-line	0.5	25	G 1 – DN 15	1036155

The priming pressure is approximately 0.6 x the operating pressure. Maximum medium temperature, 65 °C. Connection parts must be ordered separately.

Filling of the reservoir with nitrogen takes place via the VG8 gas filling connector or with compressed air using a standard filling valve (e.g. a car tyre valve).

**Attention:** If using combustible liquids, nitrogen must be used as a filling gas. Do not use oxygen under any circumstances!

**Configuration:** DGRL97/23/EC, other acceptances / countries upon request

**Fluid group:** 1 and 2

**Certificates:** Manufacturer's test certificate M DIN55350-18

Wetted materials - FDA physiologically safe

**Manufacturer:** HYDAC Technology

### Connection/Adapter Kits

Consisting of PTFE-formed composite seal, insert/adapter and union nut.

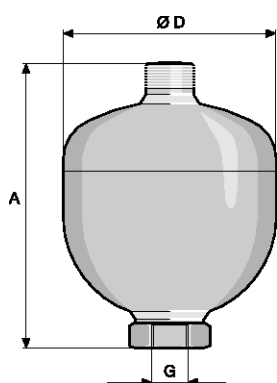
Connection PD In-line	Connection Piping	Material	Order no.
G 1 – DN 15	DN 10	PP	1029424
G 1 – DN 15	DN 10	PVC	1029425
G 1 – DN 15	DN 10	PVDF	1029426
G 1 – DN 15	DN 15	PP	1029443
G 1 – DN 15	DN 15	PVC	1029444
G 1 – DN 15	DN 15	PVDF	1029445
G 1 – DN 15	DN 20	PP	1029427
G 1 – DN 15	DN 20	PVC	1029428
G 1 – DN 15	DN 20	PVDF	1029429
G 1 – DN 15	DN 25	PP	1029430
G 1 – DN 15	DN 25	PVC	1029431
G 1 – DN 15	DN 25	PVDF	1029432

### Accessories/Spare Parts

	Material	Order no.
Set of plugs	PVDF/PTFE	1029446
Valve tool for gas valve insert	Steel	1029661
Separating diaphragm	PTFE/NBR	1025235
Gas valve assembly	1.4571/FKM/PTFE/MS	1029513
Gas valve insert	FKM/PTFE /MS	1029514
Gas valve insert	FKM/PTFE /NIRO	1029515
Manometer with connection adapter	–	1031556
Charging hose with connector for compressed air system, 25 bar; 2.5 m	–	1036156
Charging hose with connector for nitrogen bottle or pressure reducer	–	1036157



## 1.6 Accessories for low-pressure metering pumps



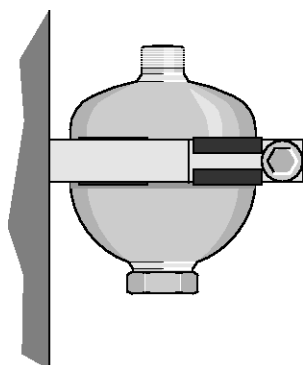
pk\_2\_101

Admissible operating temperature: -10 to +80 °C. Response pressure: 2 bar (nitrogen). Other accumulator/diaphragm materials available on request.

### Stainless Steel Pulsation Damper

Volume l	Max. pressure bar	Diaphragm material	Connector G	A mm	Ø D mm	Order no.
0.16	180	NBR	Rp 1/2	124	74	1008609
0.16	180	Butyl	Rp 1/2	124	74	1008610
0.16	180	FKM	Rp 1/2	124	74	1008611
0.32	160	NBR	Rp 1/2	137	93	1008612
0.32	160	Butyl	Rp 1/2	137	93	1008613
0.32	160	FKM	Rp 1/2	137	93	1008644
0.75	140	NBR	Rp 1/2	168	121	1008645
0.75	140	Butyl	Rp 1/2	168	121	1008646
0.75	140	FKM	Rp 1/2	168	121	1008647
2.00	100	NBR	Rp 3/4	224	167	1008648
2.00	100	Butyl	Rp 3/4	224	167	1008649
2.00	100	FKM	Rp 3/4	224	167	1008650
4.00	50	NBR	Rp 3/4	360	170	1008651
4.00	50	Butyl	Rp 3/4	360	170	1008652
4.00	50	FKM	Rp 3/4	360	170	1008653
0.75	140	NBR	Rp 1	168	121	1027617
0.75	140	Butyl	Rp 1	168	121	1027618
0.75	140	FKM	Rp 1	168	121	1027619
2.00	100	NBR	Rp 1 1/2	224	167	1027620
2.00	100	Butyl	Rp 1 1/2	224	167	1027621
2.00	100	FKM	Rp 1 1/2	224	167	1027622
4.00	50	NBR	Rp 1 1/2	360	170	1027623
4.00	50	Butyl	Rp 1 1/2	360	170	1027624
4.00	50	FKM	Rp 1 1/2	360	170	1027625

### Mounting Clamp for Stainless Steel Pulsation Damper



pk\_2\_102

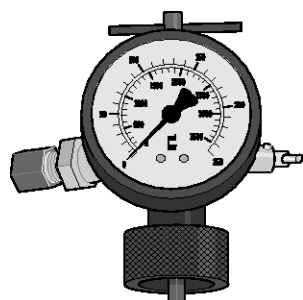
Volume l	Number of Clamps	Ø D mm	Order no.
0.16	1	74	1008664
0.32	1	93	1008665
0.75	1	121	1008666
2.00	1	167	1008667
4.00	2	170	1008668

### Inflation and testing unit for pulsation damper

The inflation and testing unit is used to recharge accumulators with nitrogen and check or alter the existing pre-filling pressure.

#### It contains:

- Checking and filling system with pressure gauge, non-return valve on the inlet, integrated bleed valve, valve stem to open gas inlet valve on accumulator.
- Charging hose, Length 2 m



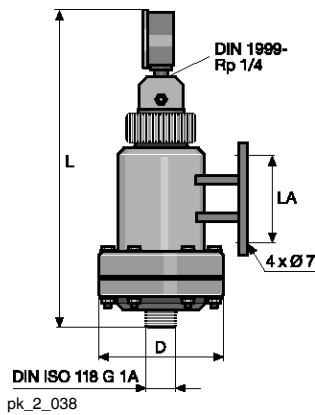
pk\_2\_116

Adjustment range	Order no.
Up to 25 bar	1008769
Up to 100 bar	1008669
Up to 250 bar	1008670



## 1.6 Accessories for low-pressure metering pumps

### 1.6.3.9 Accumulators



Pulsation dampers with separating bubble for providing separation between the gas cushion and metered chemical are used for low-pulsation metering as well as for reducing the flow resistance in long metering lines and in connection with viscous media. The response pressure of the gas cushion should be approx. 60-80 % of the operating pressure.

**Important:** When using a pulsation damper, the pressure relief valve should be fitted with an adjustable back pressure valve.

#### PVC Accumulators

Accumulator removable, FKM seals.

##### Operating range (0.5 / 1 l)

25 °C - max. operating pressure 10 bar

40 °C - max. operating pressure 6 bar

##### Operating range (2.5 / 5 l)

25 °C - max. operating pressure 6 bar

40 °C - max. operating pressure 4 bar

Volume l	Diaphragm material	Connection	L mm	Ø D mm	LA mm	Order no.
0.5	Butyl	G 1 - DN 15	361	145	100	791691
0.5	FKM	G 1 - DN 15	361	145	100	791695
1.0	Butyl	G 1 1/4 - DN 20	411	170	100	791692
1.0	FKM	G 1 1/4 - DN 20	411	170	100	791696
2.5*	Butyl	G 1 1/2 - DN 25	571	170	190	791693
2.5*	FKM	G 1 1/2 - DN 25	571	170	190	791697

\* **Caution:** The product contains adhesive joints with Tangit. Please note the resistance of Tangit adhesive.

#### PP Accumulators

Accumulator removable, FKM seals.

##### Operating range (0.5 / 1 l)

25 °C - max. operating pressure 10 bar

40 °C - max. operating pressure 6 bar

##### Operating range (2.5 / 5 l)

25 °C - max. operating pressure 6 bar

40 °C - max. operating pressure 4 bar

Volume l	Diaphragm material	Connection	L mm	Ø D mm	LA mm	Order no.
0.5	Butyl	G 1 - DN 15	361	145	100	792128
0.5	FKM	G 1 - DN 15	361	145	100	792132
1.0	Butyl	G 1 1/4 - DN 20	411	170	100	792129
1.0	FKM	G 1 1/4 - DN 20	411	170	100	792133
2.5	Butyl	G 1 1/2 - DN 25	571	170	190	792130
2.5	FKM	G 1 1/2 - DN 25	571	170	190	792134



## 1.6 Accessories for low-pressure metering pumps

### 1.6.3.10

#### Vacuum Cylinder

Pulsation dampers with no diaphragm separating the gas cushion and the chemical are used to produce minimal pulsation metering and to reduce flow resistance in long pipes and when metering viscous liquids.

**Important:** When using accumulators or pulsation dampers it is imperative that a relief valve with an adjustable back pressure valve is fitted.

#### PVC Vacuum Cylinder

Vacuum cylinder as priming aid for long suction line and viscous media. Housing – with transparent middle section. With connector for vacuum pump.

Max. operating pressure: 2 bar at 40 °C operating temperature.

Max. permitted vacuum pressure 300 mbar absolute

With this: Vacuum pump assembly

Volume l	Connection	Seal material	L mm	D mm	Order no.
0.5	G 1 – DN 15	FKM	380*	78	243591
0.5	G 1 – DN 15	EPDM	380*	78	1025699
1.0	G 1 1/4 – DN 20	FKM	440*	86	243592
1.0	G 1 1/4 – DN 20	EPDM	440*	86	1025701
2.5	G 1 1/2 – DN 25	FKM	520*	133	243593
2.5	G 1 1/2 – DN 25	EPDM	520*	133	1025702
5.0	G 2 1/4 – DN 40	FKM	630*	155	243594
5.0	G 2 1/4 – DN 40	EPDM	630*	155	1025703

\* Approximate values

\* **Caution:** The product contains adhesive joints with Tangit. Please note the resistance of Tangit adhesive.

#### Vacuum Pump Assembly / Priming Aid

For pulsation dampers, suction side (vacuum cylinder accumulator).

Material	Seals	Order no.
PVC	EPDM	790019

\* **Caution:** The product contains adhesive joints with Tangit. Please note the resistance of Tangit adhesive.

#### Suction pressure regulator

The suction pressure regulator is a spring-loaded diaphragm valve (max. 50 l/h) which opens as a result of the pump suction pressure. This ensures that chemicals cannot flow when the pump is not running, nor can a vacuum be created as a result of tube rupture.

A ball check valve should be fitted to prevent undesirable suction action at the pump outlet (e.g. siphon effect).

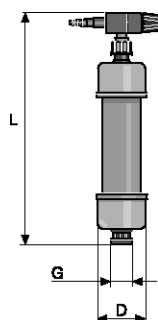
An adjustable spring is used to set the maximum required negative pressure for each operating situation up to 400 mbar. For pumps with positive inlet pressure a minimal vacuum of approx. 50 mbar is sufficient. The pump should produce this vacuum in any case, even for an atmospheric pressure inlet.

Max. flow rate	50 l/h
Max. feed pressure	4 bar
Max. intake pressure	0.3 bar
Max. temperature	40 °C
Housing material	PVC
Diaphragm material	FKM
Seals	FKM
Ball material	Glass
Spring material	Hastelloy C

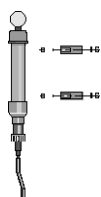
Type	Connection	Order no.
SDR 50 For solenoid-driven pumps	M 20 x 1,5	1005505
SDR 50 For motor-driven pumps up to 50 l/h	G 3/4 - DN 10	1005506

Connection parts to be ordered separately.

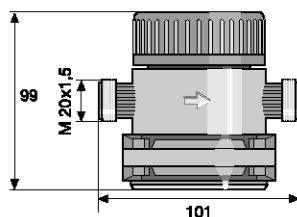
\* **Caution:** The product contains adhesive joints with Tangit. Please note the resistance of Tangit adhesive.



pk\_2\_044



pk\_2\_045



pk\_2\_079

## 1.6 Accessories for low-pressure metering pumps

### 1.6.3.11

#### Suction Lances, Suction Kit Without Level Switch

##### Level Switch Kit Complete, PVDF, Two-Stage with Round Connector or Lead

The level switch kit can be ordered together with the suction fittings DN 10 - DN 32.

For level monitoring in the storage tank, two-phase with pre-alarm signalling and deactivation of the metering pump after a further level decrease of 30 mm.

##### Technical data:

Max. switching voltage: 100 V

Switching current: 0.5 A

Switching capacity: 5 W/5 VA

Temperature range: - 10 °C to 65 °C

IP rating: IP 67

**Switching mode:** for level shortage 2 x NC

##### Material:

Body level switch PVDF, float PE, mounting strap PVDF, cable bracket PE, anti-kink device PE, cable PE.

##### Technical data:

max. switching voltage: 24 V

Switching current: 0.5 A

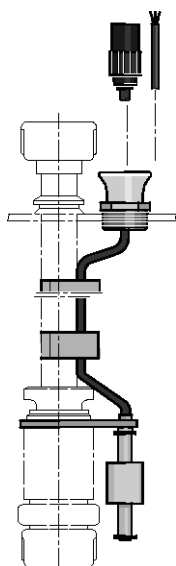
Switching power: 5 W/5 VA

Temperature range: -10 °C to 65 °C

Degree of protection: IP 67

##### Material:

Body of level switch PVDF, float PE, fastening lug PVDF, cable holder PE, anti-kink protection PE, cable PE.

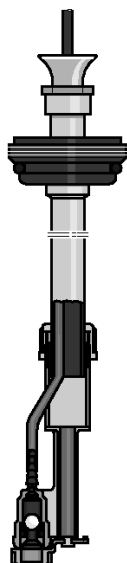


pk\_2\_035

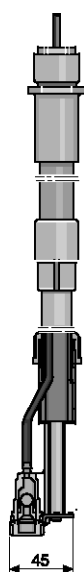
Connection	Type	Cable length m	Order no.
DN10/15	with 3-pin round plug	3	1034879
DN 20	with 3-pin round plug	3	1034880
DN 25	with 3-pin round plug	3	1034881
DN 32	with 3-pin round plug	3	1034882
DN 10/DN 15	with lead	5	1034883
DN 20	with lead	5	1034884
DN 25	with lead	5	1034885
DN 32	with lead	5	1034886



## 1.6 Accessories for low-pressure metering pumps



pk\_1\_125



pk\_1\_069

### Variable suction lance without level switch for 200-litre barrel

Variable suction lance without level switch for connection to 200 litre barrel, comprising a support pipe, foot valve, height-adjustable 2" screw plug (DIN S70x6) and 3 m long suction line. Length 1,000 mm.

**Note:** Adapters for other threads are available on request.

To fit metering pumps of the alpha and Pneumados product ranges.

<b>Material</b>	PPE	PCB
<b>Support pipe and foot valve</b>	PP	PVC
<b>Seals and valve ball</b>	EPDM/ceramic	FKM/ceramic
<b>Hose</b>	PE	Soft PVC

Material	Length mm	Hose oØ x iØ mm	For tank	Order no.
PPE	1000	6 x 4	200 l / 2"	790545
PPE	1000	8 x 5	200 l / 2"	790546
PPE	1000	12 x 9	200 l / 2"	790547
PCB	1000	6 x 4	200 l / 2"	790542
PCB	1000	8 x 5	200 l / 2"	790543
PCB	1000	12 x 9	200 l / 2"	790544

### Variable suction assembly without level switch for PE 35 dosing tank up to 1,500 litres

Variable suction assembly without level switch for connection to 35 – 1,500 litre storage tanks, comprising a support pipe, foot valve, threaded connector and 2 m suction line. Adjustable length.

For 1,500-litre storage tanks, fixed length with 3-metre suction line.

To fit metering pumps of the alpha and Pneumados product ranges.

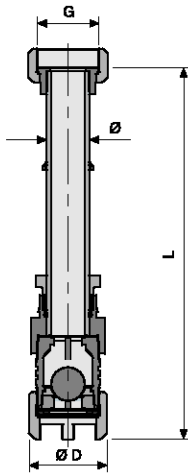
<b>Material</b>	PPE	PCB
<b>Support pipe and foot valve</b>	PP	PVC
<b>Seals and valve ball</b>	EPDM/ceramic	FKM/ceramic
<b>Hose</b>	PE	Soft PVC

Material	Long support pipe mm	Hose oØ x iØ mm	For tank	Order no.
PPE	375 – 550	6 x 4	35, 60 l	790333
PPE	375 – 550	8 x 5	35, 60 l	790334
PPE	375 – 550	12 x 9	35, 60 l	790335
PPE	655 – 1,060	6 x 4	100, 140, 250, 500 l	790336
PPE	655 – 1,060	8 x 5	100, 140, 250, 500 l	790337
PPE	655 – 1,060	12 x 9	100, 140, 250, 500 l	790338
PPE	1,085 – 1,425	6 x 4	1000 l	790453
PPE	1,085 – 1,425	8 x 5	1000 l	790454
PPE	1,085 – 1,425	12 x 9	1000 l	790455
PPE	fixed length	6 x 4	1500 l	1078653
PPE	fixed length	8 x 5	1500 l	1078685
PPE	fixed length	12 x 9	1500 l	1078687
PCB	375 – 550	6 x 4	35, 60 l	790327
PCB	375 – 550	8 x 5	35, 60 l	790328
PCB	375 – 550	12 x 9	35, 60 l	790329
PCB	655 – 1,060	6 x 4	100, 140, 250, 500 l	790330
PCB	655 – 1,060	8 x 5	100, 140, 250, 500 l	790331
PCB	655 – 1,060	12 x 9	100, 140, 250, 500 l	790332
PCB	1,085 – 1,425	6 x 4	1000 l	790450
PCB	1,085 – 1,425	8 x 5	1000 l	790451
PCB	1,085 – 1,425	12 x 9	1000 l	790452
PCB	fixed length	6 x 4	1500 l	1078652
PCB	fixed length	8 x 5	1500 l	1078684
PCB	fixed length	12 x 9	1500 l	1078686

For more information see page → 1-2

## 1.6 Accessories for low-pressure metering pumps

### Suction assembly PPE for tanks up to 1,500 litres



P\_AC\_0203\_SW

Connection	G	Tank volume l	Ø mm	Ø D mm	L mm	Order no.
DN 10	3/4	1,000	20	47	1,340	790389
DN 15	1	1,000	20	47	1,320	790394
DN 20	1 1/4	1,000	25	55	1,345	790395
DN 25	1 1/2	1,000	32	60	1,315	790396
DN 32	2	1,000	40	74	1,170	1005524
DN 10	3/4	1,500	20	47	1,830	1077554

Suction assembly without level switch comprising a support pipe, foot valve and threaded connector. The length L of the support pipe can be adjusted (shortened) by the customer.

**Note:** In applications with a hose, the suction assembly/hose connector kit, consisting of a PVDF screw-in nozzle and a PTFE composite seal, can be used.

### Suction assembly PCB for tanks up to 1,500 litres

Connection	G	Tank volume l	Ø mm	Ø D mm	L mm	Order no.
DN 10	3/4	1,000	20	47	1,340	790387
DN 15	1	1,000	20	47	1,320	790391
DN 20	1 1/4	1,000	25	55	1,345	790392
DN 25	1 1/2	1,000	32	60	1,315	790393
DN 32	2	1,000	40	74	1,170	1005525
DN 10	3/4	1,500	20	47	1,830	1077555

Suction assembly without level switch comprising a support pipe, foot valve and threaded connector. The length L of the support pipe can be adjusted (shortened) by the customer.

**Note:** In applications with a hose, the suction assembly/hose connector kit, consisting of a PVDF screw-in nozzle and a PTFE composite seal, can be used.

**Important:** The product contains connections bonded with Tangit. Always note the durability of Tangit adhesive.



## 1.6 Accessories for low-pressure metering pumps

### 1.6.3.12

#### Suction Lances, Suction Assemblies with Two-Stage Level Switch

##### Variable suction lance with two-stage level switch

Variable suction lance with two-stage level switch for connection to 5 - 60 litre disposable tanks, comprising a support pipe, foot valve, level switch with round plug, height-adjustable Ø 50 mm screw cap and 2 m long suction line. Length 640 mm.

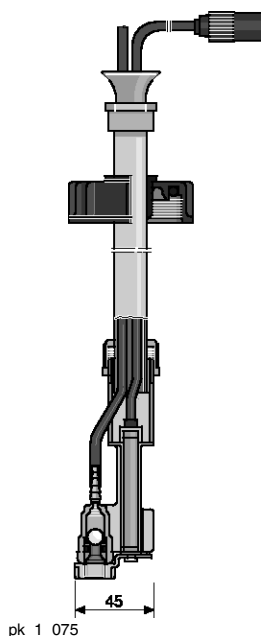
##### Switch mode when liquid level low: 2 x N/C

Suitable for metering pumps of the Beta®, gamma/ X, delta® and DULCO®flex DF4a (6 x 4) product ranges.

**Note:** The required screw cap Ø 44 is available as a spare part for storage tank opening Ø 44 and can be swapped by the customer for the screw cap Ø 50.

Material	PPE	PCB
Support pipe and foot valve	PP	PVC
Seals	EPDM	FKM
Hose	PE	Soft PVC

Material	Length mm	Hose oØ x iØ mm	For tank	Order no.
PPE	640	6 x 4	5-60 l / 50 mm	802277
PPE	640	8 x 5	5-60 l / 50 mm	802278
PPE	640	12 x 9	5-60 l / 50 mm	790372
PCB	640	6 x 4	5-60 l / 50 mm	802077
PCB	640	8 x 5	5-60 l / 50 mm	802078
PCB	640	12 x 9	5-60 l / 50 mm	790371



##### Variable suction lance with two-stage level switch for 200-litre barrel

Variable suction lance with two-stage level switch for connection to 200 litre barrel, comprising a support pipe, foot valve, level switch with round connector, height-adjustable sealing plug and 3 m long suction line. Length 1000 mm.

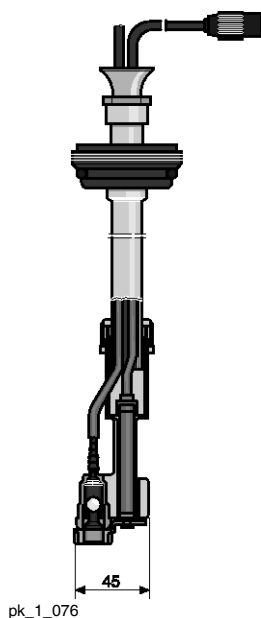
##### Switch mode when liquid level low: 2 x N/C

Suitable for metering pumps of the Beta®, gamma/ X and delta® product ranges.

**Note:** Adapters for other threads are available on request

Material	PPE	PCB
Support pipe and foot valve	PP	PVC
Seals	EPDM	FKM
Hose	PE	Soft PVC

Material	Length mm	Hose oØ x iØ mm	For tank	Order no.
PPE	1000	6 x 4	200 l	802279
PPE	1000	8 x 5	200 l	802280
PPE	1000	12 x 9	200 l	790374
PCB	1000	6 x 4	200 l	802079
PCB	1000	8 x 5	200 l	802080
PCB	1000	12 x 9	200 l	790373



## 1.6 Accessories for low-pressure metering pumps

### Suction lance with two-stage level switch for 60-litre canister, fixed length, gas-tight

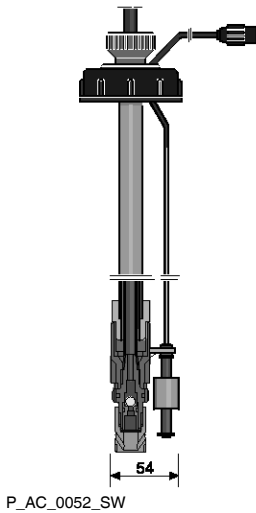
Variable suction lance with 2-stage level switch for connection to 60 litre canister, gas-tight, comprising a support pipe, foot valve, level switch with round plug, Ø 55 mm screw cap and 2 m long suction line. Length 560 mm. Design with vent valve and bleed valve.

#### Switch mode when liquid level low: 2 x N/C

Suitable for metering pumps of the Beta®, gamma/ X and delta® product ranges.

Material	PPE	PCB
Support pipe and foot valve	PP	PVC
Seals	EPDM	FKM
Hose	PE	Soft PVC

Material	Length mm	Hose oØ x iØ mm	For tank	Order no.
PPE	560	6 x 4	60 l / 55 mm	802285
PPE	560	8 x 5	60 l / 55 mm	802286
PPE	560	12 x 9	60 l / 55 mm	802287
PCB	560	6 x 4	60 l / 55 mm	802081
PCB	560	8 x 5	60 l / 55 mm	802082
PCB	560	12 x 9	60 l / 55 mm	802083



### Suction lance with two-stage level switch

Fixed length suction lance made of PVDF with two-stage level switch, consisting of PVDF support pipe, foot valve, two-stage level switch with open end and PTFE suction line 8 x 6 mm.

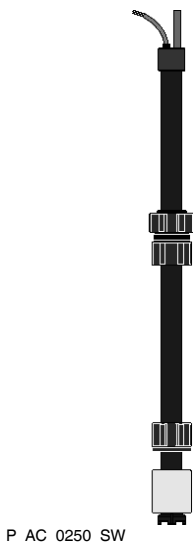
**Note:** A matching connector kit for hose 8/6 to standard 6/4, 8/5 and 12/9 connectors is included in the scope of delivery.

#### Switch mode when liquid level low: 2 x N/C

Suitable for metering pumps of the Beta®, gamma/ X and delta® product ranges using a 2 m level sensor cable, order no. 707715.

Material	PVT
Support pipe and foot valve	PVDF
Seals	PTFE
Hose	PTFE

Material	Length mm	Hose oØ x iØ mm	For tank	Order no.
PVT	350	8 x 6	10–30 l	1038304
PVT	650	8 x 6	50–60 l	1038305



## 1.6 Accessories for low-pressure metering pumps



P\_AC\_0280\_SW1

### Suction lances with continuous level measurement

Suction lance with continuous level measurement for connection via the 3-pin float switch input to metering pumps of the product range gamma/ X and gamma/ XL. For precise consumption detection, prediction of chemical range and planning of subsequent deliveries web-based via Dulconnex.

The scope of delivery includes a 3 m connecting cable with plug-in connectors for the suction lance and the metering pump as well as a 3 m suction line

With adjustable screw cap 50 mm, length of suction lance to fit tank size 30 l.

Wetted materials PE, ceramic valve ball.

<b>Material</b>	PET
<b>Support pipe and foot valve</b>	PE/PVDF
<b>Seals and valve ball</b>	PTFE/ceramic
<b>Hose</b>	PE

Material	Length mm	Hose oØ x iØ mm	For tank	Order no.
PET	480	6 x 4	30 l	1094379
PET	480	8 x 5	30 l	1094382
PET	480	12 x 9	30 l	1094380





## 1.6 Accessories for low-pressure metering pumps

### Suction assembly with two-stage level switch for PE 35 dosing tanks up to 1,500 litres

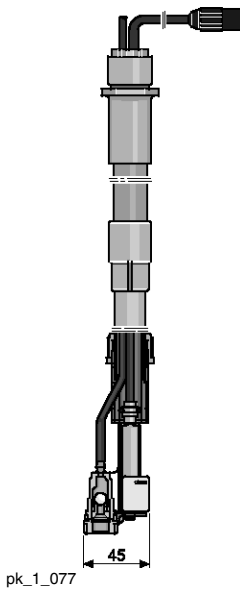
Variable suction assembly with two-stage level switch for connection to 35 to 1,500 litre tanks, comprising a support pipe, foot valve, level switch with 3-pin round connector and 2 m long suction line, or 3 m with 1,000 litre tanks. Adjustable length.

For 1,500-litre storage tanks, fixed length with 3-metre suction line.

#### Switch mode when liquid level low: 2 x N/C

Suitable for metering pumps of the Beta®, gamma/ X and delta® product ranges.

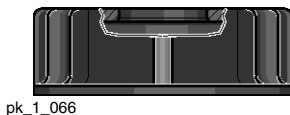
Material	PPE	PCB
<b>Support pipe and foot valve</b>	PP	PVC
<b>Seals</b>	EPDM	FKM
<b>Hose</b>	PE	Soft PVC



Material	Long support pipe mm	Hose oØ x iØ mm	For tank	Order no.
PPE	375 – 550	6 x 4	35, 60 l	790365
PPE	375 – 550	8 x 5	35, 60 l	790366
PPE	375 – 550	12 x 9	35, 60 l	790367
PPE	655 – 1,060	6 x 4	100–500 l	790368
PPE	655 – 1,060	8 x 5	100–500 l	790369
PPE	655 – 1,060	12 x 9	100–500 l	790370
PPE	1,085 – 1,425	6 x 4	1000 l	790465
PPE	1,085 – 1,425	8 x 5	1000 l	790466
PPE	1,085 – 1,425	12 x 9	1000 l	790467
PPE	fixed length	6 x 4	1500 l	1077558
PPE	fixed length	8 x 5	1500 l	1077519
PPE	fixed length	12 x 9	1500 l	1077560
PCB	375 – 550	6 x 4	35, 60 l	790359
PCB	375 – 550	8 x 5	35, 60 l	790360
PCB	375 – 550	12 x 9	35, 60 l	790361
PCB	655 – 1,060	6 x 4	100–500 l	790362
PCB	655 – 1,060	8 x 5	100–500 l	790363
PCB	655 – 1,060	12 x 9	100–500 l	790364
PCB	1,085 – 1,425	6 x 4	1000 l	790462
PCB	1,085 – 1,425	8 x 5	1000 l	790463
PCB	1,085 – 1,425	12 x 9	1000 l	790464
PCB	fixed length	6 x 4	1500 l	1077559
PCB	fixed length	8 x 5	1500 l	1077520
PCB	fixed length	12 x 9	1500 l	1077561

### Screw Cap

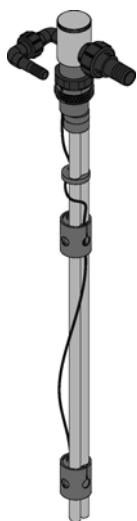
For tanks with opening Ø 44, customers need to order the Ø 44 screw cap as a spare part to replace Ø 50 screw cap.



	Order no.
<b>Ø 44 screw cap</b>	811626



## 1.6 Accessories for low-pressure metering pumps



P\_AC\_0252\_SW

- A Overall length
- B Immersion depth
- C Diameter of the immersion tube
- D Threaded connector adjustment range
- E Warning level adjustment range
- F Switch-off level adjustment range

### PPE Universal Suction Lance

Universal suction lance made of PP in 4 sizes for use in canisters, barrels or containers. The suction lance is configured as standard with return, ventilation function and 2-stage level monitoring. The height-adjustable level switch and tank threaded connectors ensure flexible adaptation to the process or storage tank height. In addition, the suction tube length can easily be shortened by the customer. A PTFE check ball is incorporated and prevents the suction line from running dry. With IBC container suction lances (1039399, 1046672), the screw lid DN150 can be installed by the customer onto other G2" vent openings.

The suction lance is supplied with all additional parts in cardboard packaging.

**Material version:** PP with EPDM seals.

**Suction connector** is not supplied ready mounted. Fittings and pressure hose nozzles in DN 10, DN 15, DN 20, DN 25 (not for canisters) plus FKM seal do not form part of the scope of delivery.

**Return connector** is not supplied ready mounted. Fittings and pressure hose nozzles in DN 10, DN 15, plus an FKM blanking plug and seal form part of the scope of delivery. Max. flow 130 l/h, 2 bar.

**Level:** Level switches are protected by tube sections in drum and container lances. The lance level output is in the form of an M12 plug. Please order the level signal cable for connection to ProMinent metering pumps or a PLC or terminal box separately.

**Storage tank connector:**

20 l and 20-60 l canisters: Ø 50 screw lid

200 l drum: 70x6 opening in plastic bung drum

IBC container: DN150 IBC cap

Electrical Accessories → 1-206

Universal suction lance	A mm	B mm	C mm	Total adjustment range			Order no.
				D mm	E mm	F mm	
For canister 20 l	542	405	41	100	250	200	1039206
For canister 20 -60 l	584	447	41	100	300	200	1038817
For drum 200 l	1,072	935	51	50	700	700	1039397
For container IBC	1,162	1,025	51	50	800	800	1039399

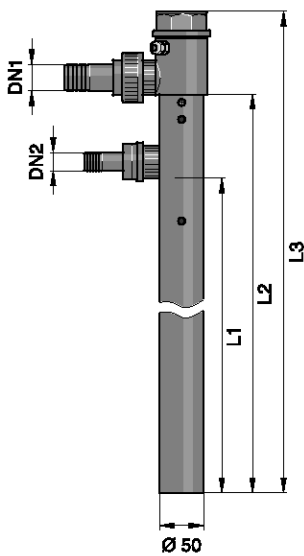
### PPE Universal Suction Lance, "Physiologically Safe" Design

The universal suction lance is also available as a "Physiologically safe (FDA) in respect of wetted materials" design.

Universal suction lance	A mm	B mm	C mm	Total adjustment range			Order no.
				D mm	E mm	F mm	
For 20-litre canister	542	405	41	100	250	200	1046668
For 20 – 60-litre canister	584	447	41	100	300	200	1046670
For 200-litre drum	1,072	935	51	50	700	700	1046671
for IBC containers*	1,162	1,025	51	50	800	800	1046672

\*Replace the screw lid when using FDA containers.

## 1.6 Accessories for low-pressure metering pumps



P\_AC\_0277

### Suction Lance with Two-Stage Level Switch

Suction lance with 2-stage level switch in Ø 50 PVC protection tube with check valve for DN 10-DN 25, clack valve in DN 32 (valve is not removable).

For sizes DN 10/15 and DN 20/25, the connection parts in both sizes and a blanking plate for the return form part of the scope of supply. For the DN 32 suction lance a return line is not possible. Drum suction lances are equipped with a drum lid.

2-stage level switch is wired to a terminal in the head.

The level sensor cable must be ordered separately.

Special designs (materials, functions, Dytex adhesive etc.) are available on request.

Reed cable with 3-pin round plug, PE → 1-208

**\* Caution:** The product contains adhesive joints with Tangit. Please note the resistance of Tangit adhesive.

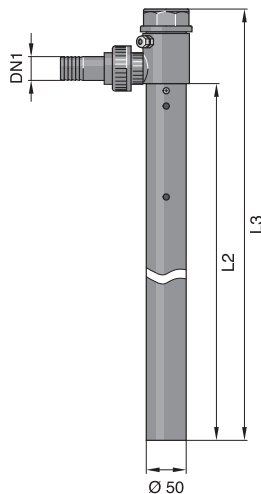
### Suction Lance for 200/600 l Drum

Type	Suction connector DN 1	Return DN 2	Seals	L1 mm	L2 mm	L3 mm	Order no.
PCB	10/15	10/15	FKM	1000	1100	1200	1037748
PCE	10/15	10/15	EPDM	1000	1100	1200	1037749
PCB	20/25	20/25	FKM	1000	1100	1200	1037750
PCE	20/25	20/25	EPDM	1000	1100	1200	1037751
PCB	32	–	FKM	–	1100	1200	1037752
PCE	32	–	EPDM	–	1100	1200	1037753

L1: Length up to return

L2: Length up to suction connector

L3: Overall length



P\_AC\_0276

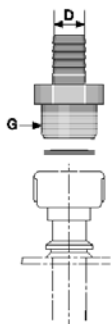
### Suction Lance for 1000 l Tank

Type	Suction connector DN 1	Return DN 2	Seals	L1 mm	L2 mm	L3 mm	Order no.
PCB	10/15	10/15	FKM	1200	1300	1400	1037722
PCE	10/15	10/15	EPDM	1200	1300	1400	1037723
PCB	20/25	20/25	FKM	1200	1300	1400	1037744
PCE	20/25	20/25	EPDM	1200	1300	1400	1037745
PCB	32	–	FKM	–	1300	1400	1037746
PCE	32	–	EPDM	–	1300	1400	1037747

L1: Length up to return

L2: Length up to suction connector

L3: Overall length



pk\_2\_140

### Intake Fitting – Hose Connection Kit

Consisting of PVDF threaded socket and a PTFE-formed composite seal.

Suitable for PPE Suction assembly for 1,000 l tank → 1-189

Connection	G	Material	Ø D mm	Order no.
DN 10	3/4	PVDF	16	1029486
DN 15	1	PVDF	20	1029487
DN 20	1 1/4	PVDF	25	1029488
DN 25	1 1/2	PVDF	32	1029489
DN 32	2	PVDF	40	1029490



## 1.6 Accessories for low-pressure metering pumps

### 1.6.3.13

#### Level Switch, Ceramic Weight, Extension Cable

##### Level Switch Kit Complete, PVDF, Two-Stage with Round Connector or Lead

The level switch kit can be ordered together with the suction fittings DN 10 - DN 32.

For level monitoring in the storage tank, two-phase with pre-alarm signalling and deactivation of the metering pump after a further level decrease of 30 mm.

##### Technical data:

Max. switching voltage: 100 V

Switching current: 0.5 A

Switching capacity: 5 W/5 VA

Temperature range: -10 °C to 65 °C

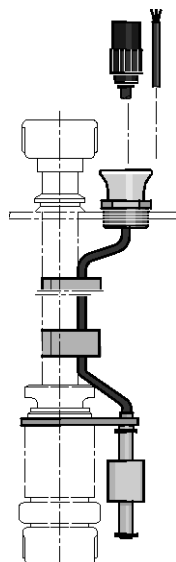
IP rating: IP 67

Switching mode: for level shortage 2 x NC

##### Material:

Body of level switch PVDF, float PE, fastening lug PVDF, cable holder PE, anti-kink protection PE, cable PE.

Connection	Type	Cable length m	Order no.
DN10/15	with 3-pin round plug	3	1034879
DN 20	with 3-pin round plug	3	1034880
DN 25	with 3-pin round plug	3	1034881
DN 32	with 3-pin round plug	3	1034882
DN 10/DN 15	with lead	5	1034883
DN 20	with lead	5	1034884
DN 25	with lead	5	1034885
DN 32	with lead	5	1034886



pk\_2\_035

##### Level switch, single-stage with flat plug

Single-stage level switch with flat plug for level monitoring in the storage tank.

Suitable for metering pumps of the D\_4a product range.

##### Technical data

max. switching voltage 24 V,

Switching current 0.5 A,

Switching power 5 W/5 VA,

Temperature range -10 °C to 65 °C, degree of protection IP 67.

Switching mode: at liquid level low 1 x N/O.

Material	PVDF/PE	PVDF/PVDF
Level switch	PVDF	PVDF
Float	PE foamed	PVDF
Cable	PE	PE

Material	Lead length	Order no.
PVDF/PE	2 m	1031588
PVDF/PE	5 m	1031590
PVDF/PVDF	2 m	1034695
PVDF/PVDF	5 m	1034696



pk\_1\_080

## 1.6 Accessories for low-pressure metering pumps

### Two-Stage Float Switch

Two-stage level switch for level monitoring in the storage tank with pre-warning alarm message and switch-off of the metering pump after a further 30 mm reduction in level.

With a 3-pin round connector for direct connection to metering pump or with 3 leads, e.g. in conjunction with relay control, order no. 914768.

**Switch mode when liquid level low: 2 x N/C**

Suitable for metering pumps of the Beta®, gamma/ X and delta® product ranges.

#### Technical data

Max. switching voltage: 24 V DC, switching current: 0.5 A, Switching power: 5 W/5 VA,

Temperature range: - 10 °C to 65 °C, degree of protection IP 67.

Material	PVDF/PE	PVDF/PVDF
Level switch	PVDF	PVDF
Float	PE foamed	PVDF
Cable	PE	PE

Material	Connection cable	Lead length	Order no.
PVDF/PE	Round plug	2 m	1031604
PVDF/PE	Round plug	5 m	1031606
PVDF/PE	Open end	2 m	1031607
PVDF/PE	Open end	5 m	1031609
PVDF/PVDF	Round plug	2 m	1034697
PVDF/PVDF	Round plug	5 m	1034698
PVDF/PVDF	Open end	2 m	1034699
PVDF/PVDF	Open end	5 m	1034700

#### Cable assignment on 3-wire cable:

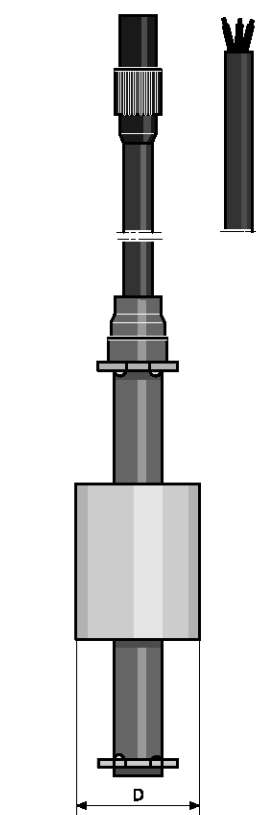
Colour	Function
black	Earth
blue	Minimum pre-warning
brown	Minimum limit stop

### Ceramic Weight for Vertical Fixing of Float Switch

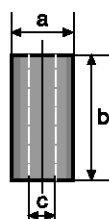
	Ø A mm	B mm	Ø C mm	Weight g	Type	Order no.
Size 1	25	50	10	60	For round and latch plug	1019244
Size 2	39	32	*	65	For round plug/flat connector	404004
Size 3	40	50	24	70	For round plug/flat connector	1030189

\* Slot 13 x 27 mm

With the two stage float switch with round plug, the weight is pushed up when float is attached.



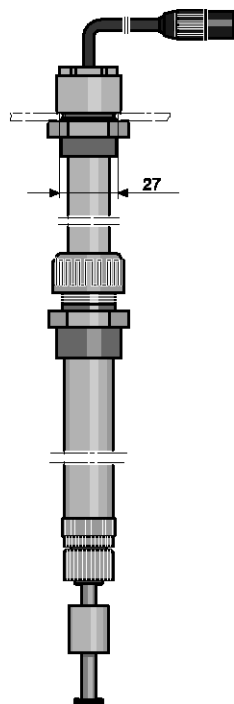
pk\_1\_081



pk\_1\_082



## 1.6 Accessories for low-pressure metering pumps



pk\_1\_084

### Level switch with support pipe

Level switch for use in media which attack the PE cable of the level switch and/or for stable attachment in conjunction with electric stirrer, FKM seal. Adjustable length.

**2-stage switch mode when liquid level low: 2 x N/C**

**1-stage switch mode when liquid level low: 1 x N/O**

Material	PCB
Support pipe	PVC
Seals	FKM
Level switch	PVDF
Cable	PE

Material	Long support pipe mm	Level switch	Order no.
PCB	350 – 550	two-stage with round connector	802010
PCB	660 – 1160	two-stage with round connector	802011
PCB	350 – 550	single-stage with flat plug	801727
PCB	660 – 1160	single-stage with flat plug	801728



pk\_1\_126

### Extension Lead, 3-Core

Extension cable for level switch with 3-pin round plugs, comprising 3 m cable, plug and coupling.

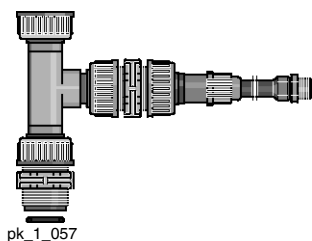
	Order no.
Extension cable, 3-pin, 3 m length	1005559



## 1.6 Accessories for low-pressure metering pumps

### 1.6.3.14

#### Fittings



#### Flushing Assemblies for Motor-Driven Metering Pumps

Flushing assemblies for flushing and cleaning liquid end, metering line and metering valve as well as for preventing deposits.

#### PPE Flushing Device

Connection	G	Order no.
DN 10	3/4	809917
DN 15	1	809919
DN 20	1 1/4	809921
DN 25	1 1/2	809923

#### PCB Flushing Assembly

Connection	G	Order no.
DN 10	3/4	809926
DN 15	1	803960
DN 20	1 1/4	803961
DN 25	1 1/2	803962
DN 40	2 1/4	803963

**\* Caution:** The product contains adhesive joints with Tangit. Please note the resistance of Tangit adhesive. Automatic flushing equipment for the fully automatic flushing of the pump head is possible on request.

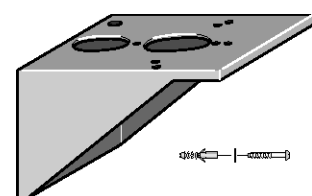


## 1.6 Accessories for low-pressure metering pumps

### 1.6.3.15

### Wall Brackets for Metering Pumps

#### PPE Wall Mounting Bracket



pk\_1\_092

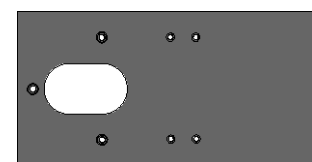
Wall bracket made of fibreglass-reinforced PPE to hold metering pumps, including attachment fittings. Dimensions (L x W x H): 208 x 120 x 140 mm.

To fit all metering pumps of the alpha, Beta® and gamma/ X product ranges.

The metering pumps of the Beta®/ 4 and gamma/ X product ranges can either be mounted parallel or crosswise to each other.

	Fig.	Order no.
for BT4, BT5, gamma/ X, G/ 4, G/ 5, D_4a	pk_1_092	810164

#### PP Adapter Plate

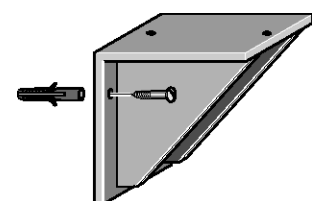


pk\_1\_121

With fixing materials for vertical wall-mounting of Beta® or gamma pumps with self-degassing liquid ends. Used with PPE wall bracket.

	Fig.	Order no.
for BT4, BT5, gamma/ X	pk_1_121	1003030

#### PP Wall Bracket



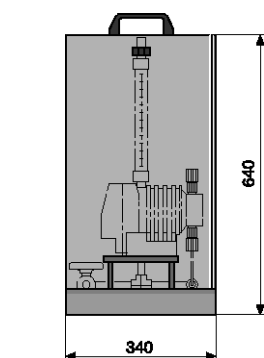
pk\_2\_036

PP wall mounting, holds pump parallel to the wall, includes fixings.

Measurements: L x W x H, 230 x 220 x 220 mm

	Order no.
for gamma/ XL, Vario and Sigma	1001906

#### Portable Plastic Pump Stand



pk\_1\_093

To accommodate a metering pump of the product range beta® or gamma/ X. The pump stand can either be designed in PP or black PE. It is prepared for accommodating a fixed pipe and has collector equipment for escaping feed chemical, e.g. in the event of a leakage on the suction line or a rupture of the diaphragm.

Supplied with carrying handle, but without pump and pipework

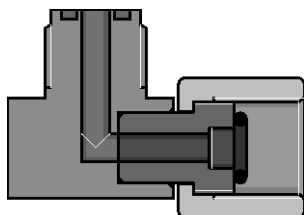
	Fig.	Order no.
Light grey PP	pk_1_093	1000180
Black PE	pk_1_093	1000181



## 1.6 Accessories for low-pressure metering pumps

### PVC Right-Angled Threaded Connector

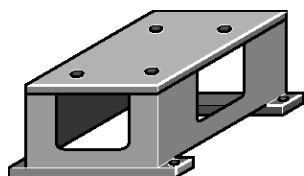
For mounting multifunctional valve onto Beta® or gamma/ L models, self-degassing liquid end version.



pk\_1\_083

	Material	Fig.	Order no.
<b>PCE Version</b>	PVC/EPDM	pk_1_083	1003472
<b>PCB Version</b>	PVC/FKM	pk_1_083	1003318

\* **Caution:** The product contains adhesive joints with Tangit. Please note the resistance of Tangit adhesive.



pk\_2\_037

### PP Foot Bracket

For mounting metering pump, includes fixings. Material PP.

Measurements: L x W x H 250 x 160 x 150 mm

	Order no.
<b>Foot bracket</b>	809910



## 1.6 Accessories for low-pressure metering pumps

### 1.6.4 Mechanical/Hydraulic Special Accessories

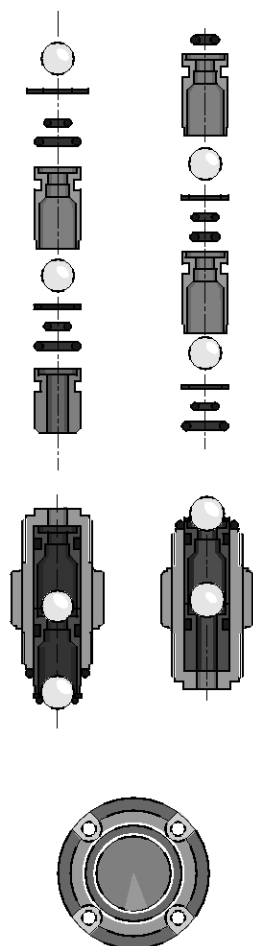
#### 1.6.4.1 Spare Parts Kits

#### Spare Parts Kits for Solenoid-Driven Metering Pump Beta® a and gamma/ L

Spare parts kits for Beta® a und gamma/ L, consisting of:

- 1 diaphragm
- 1 suction valve assembly
- 1 discharge valve assembly
- 2 valve balls
- 1 connector kit

Stainless steel version without suction valve assembly and without discharge valve assembly



pk\_1\_008

Type	Wetted materials	Order no.
Type 1000	PPE	1001644
	PPB	1001652
	NPE	1001713
	NPB	1001721
	PPT, NPT, PVT	1023107
	TTT	1001737
	SST	1001729
Type 1601	PPE	1001645
	PPB	1001653
	NPE	1001714
	NPB	1001722
	PPT, NPT, PVT	1023108
	TTT	1001738
Type 1602	SST	1001730
	PPE	1001646
	PPB	1001654
	NPE	1001715
	NPB	1001723
	PVT, PPT, NPT	1023109
	TTT	1001739
Type 1005 and Type 1605	SST	1001731
	PPE	1001647
	PPB	1001655
	NPE	1001716
	NPB	1001724
	PVT, PPT, NPT	1023110
	PVT HV	1019066
Type 0708 and Type 1008	TTT	1001740
	SST	1001732
	PPE	1001648
	PPB	1001656
	NPE	1001717
	NPB	1001725
	PVT, PPT, NPT	1023111
Type 0413 and Type 0713	PVT HV	1019067
	TTT	1001741
	SST	1001733
	PPE	1001649
	PPB	1001657
	NPE	1001718
	NPB	1001726
Type 0220 and Type 0420	PPE	1001650
	PPB	1001658
	NPE	1001719
	NPB	1001727
	PVT, PPT, NPT	1023113
	PVT HV	1019070



## 1.6 Accessories for low-pressure metering pumps

Type	Wetted materials	Order no.
	TTT	1001754
	SST	1001735
Type 0232	PPE	1001651
	PPB	1001659
	NPE	1001720
	NPB	1001728
	PVT, PPT, NPT	1023124
	TTT	1001755
	SST	1001736

### Spare Parts Kits for Solenoid-Driven Metering Pump Beta® a and gamma/ L with Self-bleeding Dosing Head with Bypass (SEK)

Spare parts kits for Beta® a and gamma/ L with self-bleeding dosing head, consisting of:

- 1 diaphragm
- 1 suction valve assembly
- 1 discharge valve assembly
- 1 bleed valve assembly
- 2 valve balls
- 1 connector kit

Type	Materials in contact with the medium	Order no.
Type 1601	PPE9	1001756
	PPB9	1001762
	NPE9	1001660
	NPB9	1001666
Type 1602	PPE9	1001757
	PPB9	1001763
	NPE9	1001661
	NPB9	1001667
Type 1005 and Type 1605	PPE9	1001758
	PPB9	1001764
	NPE	1001662
	NPB9	1001668
Type 0708 and Type 1008	PPE9	1001759
	PPB9	1001765
	NPE9	1001663
	NPB9	1001669
Type 0413 and Type 0713	PPE9	1001760
	PPB9	1001766
	NPE9	1001664
	NPB9	1001670
Type 0220 and Type 0420	PPE9	1001761
	PPB9	1001767
	NPE9	1001665
	NPB9	1001671

### 1.6.4.2

#### Pump Diaphragms

### Replacement Diaphragms for Solenoid-Driven Metering Pump Beta® a and gamma/ L

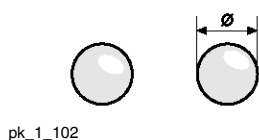
Type	Materials in contact with the medium	Order no.
Type 1000	all materials	1000244
Type 1601	all materials	1000245
Type 1602	all materials	1000246
Type 1005 and Type 1605	all materials	1000247
Type 0708 and Type 1008	all materials	1000248
Type 0413 and Type 0713	all materials	1000249
Type 0220 and Type 0420	all materials	1000250
Type 0232	all materials	1000251

## 1.6 Accessories for low-pressure metering pumps

### 1.6.4.3 Custom Valve Balls/Valve Springs

For on-site retrofitting of metering pumps and accessories, for applications where standard materials are unsuitable. Supplied loose only, not fitted.

#### Valve balls



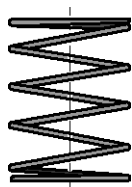
pk\_1\_102

Material	Ø mm		Order no.
PTFE	4.7	for valve Ø 6 mm	404255
PTFE	9.5	for valve Ø 8 and 12 mm	404258
PTFE	11.0	for valve DN 10	404260
PTFE	16.0	to valve DN 15*	404259
ceramic	4.7	for valve Ø 6 mm	404201
ceramic	9.2	for valve Ø 8 and 12 mm	404281
ceramic	11.0	for valve DN 10	404277
ceramic	16.0	to valve DN 15*	404275
stainless steel 1.4404	4.7	for valve Ø 6 mm	404233
stainless steel 1.4404	9.5	for valve Ø 8 and 12 mm	404240
PTFE	20.0	to valve DN 20	404256
PTFE	25.0	to valve DN 25	404257
PTFE	38.1	to valve DN 40	404261
Keramik	20.0	to valve DN 20	404273
ceramic	25.0	to valve DN 25	404274
ceramic	38.1	to valve DN 40	404278

\* not suitable PVT valve material.

#### Valve springs for liquid ends

With approx. 0.1 bar priming pressure for spring loading of the valve balls in the liquid end. Recommended to improve the valve function and increase metering accuracy, in particular for viscous metering media above 50 mPas.



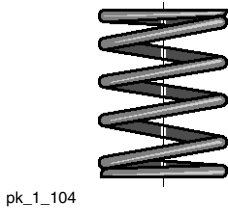
pk\_1\_103

Material	Priming pressure bar		Order no.
1.4571	0.1	for valve 4.7	469406
1.4571	0.1	for valve 9.2	469403
1.4571	0.1	for mikro g/ 5	469437
1.4571	0.1	for mikro g/ 5	469438
1.4571	0.1	for mikro g/ 5	469439
Hast. C	0.1	for valve DN 10	469114
Hast. C	0.1	for valve DN 15	469107
Hast. C	0.1	for valve DN 20	469451
1.4571	0.1	for valve DN 25	469452
1.4571	0.1	for connector R 1/4" Meta/Makro TZ HK	469461
1.4571	0.1	for R 3/8" connector Makro TZ HK	469462

## 1.6 Accessories for low-pressure metering pumps

### Valve springs for injection valves

Approx. 0.5/1/2 bar prepressure for increasing metering accuracy and preventing suction and siphoning effect.



Material	Priming pressure bar		Order no.
Hast. C	0.5	for DN 20	469409
Hast. C	1.0	for DN 20	469135
Hast. C	0.5	for DN 25	469414
Hast. C	1.0	for DN 25	469136
Hast. C	0.5	for DN 40	469104
Hast. C	0.5	for DN 32	1002799
Hast. C	1.0	for DN 32	1002805
1.4568	0.5	for DN 10	1079882
1.4568	0.5	for DN 15	1079883
1.4568	0.5	for DN 20	1079894
1.4568	0.5	for DN 25	1079895
1.4568	1.5	for DN 25	1080071
1.4568	2.0	for DN 25	1080070

### Valve spring made of Hastelloy C with FEP coating

Material	Priming pressure bar		Order no.
Hast. C/FEP	0.5	for R 1/2" - Ø 6, 8 and 12 mm connector	818590
Hast. C/FEP	1.0	for R 1/2" - Ø 6, 8 and 12 mm connector	818536
Hast. C/FEP	0.5	for DN 10	818515
Hast. C/FEP	0.5	for DN 15	818516
Hast. C/PVDF	0.5	for DN 20	818517
Hast. C/PVDF	0.5	for DN 25	818518

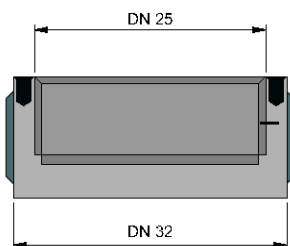
#### 1.6.4.4 Adapter (complete) from M20 x 1.5 to G3/4 DN10

Consisting of an adapter and a PTFE, EPDM/P, FPM-A flat seal and PTFE shaped composite seal.  
Suitable for connection of the flow meter DulcoFlow® to a Sigma/ 1.

	Material	Order no.
Adapter (complete) from M20 x 1.5 to G3/4 DN10	PVT	1028409

#### 1.6.4.5 Valve adapter DN 32 - DN 25

Suitable for the liquid end of the Sigma/ 3 metering pump FM 1000 up to 600 l/h.



P\_AC\_0244\_SW

	Material version	Material	Order no.
Adapter DN 32 - DN 25	SST	1.4404	1035729
	PVT	PVDF	1035732
	TT	PTFE	1040414



## 1.6 Accessories for low-pressure metering pumps

### 1.6.5 Electrical Accessories

#### 1.6.5.1 Metering Monitor, Signal Cable

##### Flow Control Dosing Monitor for Discharge Side Installation

Metering monitor complete with connector cable for assembly directly on the dosing head to monitor individual strokes using the float principle. The adjustment screw is used to match the partial flow flowing past the float to the set stroke volume so that an alarm is emitted if the level falls approx. 20 % below the required level. The permitted number of incompletely performed strokes can be selected between 1 to 127 on the gamma/ X and delta® metering pumps to ensure optimum adaptation to process requirements.

Suitable for metering pumps of the product ranges gamma/ X and gamma/ XL in material versions PP, NP, PV and TT.

**Important:** It is essential that you observe the minimum values for the stroke length. The design of the pressure stroke must be set to "fast".

Suitable for the gamma/ X product range in material designs PP, PC, NP and TT. Complete with connector cable for assembly directly on the dosing head.

For monitoring the individual strokes based on the floating body principle. The adjustment screw is used to match the partial flow flowing past the float to the respective stroke volume so that an alarm is emitted if the level is transgressed by approx. 20%. The gamma/ L enables the permitted number of incompletely performed strokes to be selected between 1 to 127, ensuring optimum adaptation to process requirements.

##### Materials

Housing:	PVDF
Float:	PTFE-coated
Seals:	FKM/EPDM

##### Flow Control for Discharge Side Installation

Flow Control	For pump type	Material	Order no.
Size I	GMXa 1602	PVDF/EPDM	1009229
	GMXa 1602	PVDF/FKM	1009335
Size II	GMXa 1604 – 0424 and GXL a 1608 – 0730 – 0245	PVDF/EPDM	1009336
	GMXa 1604 – 0424 and GXL a 1608 – 0730 – 0245	PVDF/FKM	1009338

Note the minimum values for the stroke length.

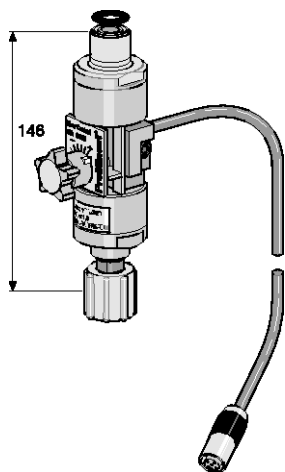
Pump type	Medium operating pressure	Stroke length (scale division)	Max. permissible operating pressure	Stroke length (scale division)
1602	8 bar	> 50 %	16 bar	> 60 %
1604	5 bar	> 30 %	16 bar	> 50%
0708	4 bar	> 30 %	7 bar	> 40%
1009	5 bar	> 30 %	10 bar	> 40%
0414	2 bar	> 30 %	4 bar	> 30%
0715	4 bar	> 30 %	7 bar	> 30%
0220	1 bar	> 30 %	2 bar	> 30%
0424	2 bar	> 30 %	4 bar	> 30%

##### Flow Control for Suction Side Installation

Individual strokes are detected on the suction side, because the flow velocity is sufficiently high here. With water as the medium, the minimum stroke length is 30 % and the suction stroke is normal, HV1 or HV2.

Suitable for metering pumps of the gamma/ X and delta® product range with slow compression stroke.

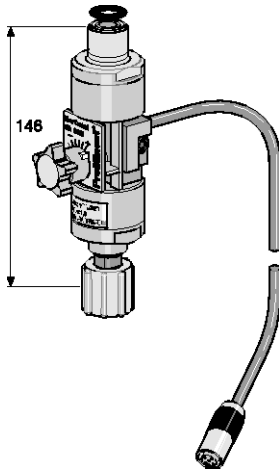
Flow Control	For pump type	Material	Order no.
Size II	GMXa 1604 – 0224 and GXL a 1608 – 0730	PVDF/EPDM	1036407
	GMXa 1604 – 0224 and GXL a 1608 – 0730	PVDF/FKM	1036409
Size III	GXL a 0450 – 0280	PVDF/EPDM	1036439
	GXL a 0450 – 0280	PVDF/FKM	1036440



pk\_1\_086\_2



## 1.6 Accessories for low-pressure metering pumps



pk\_1\_086\_2

### Metering monitor Flow Control set up for motor-driven metering pumps

Suitable for product range Sigma/1/2/3 in material versions PVT and SST. Complete with connector cable for assembly directly on the dosing head.

For monitoring the individual strokes based on the floating body principle. The adjustment screw is used to match the partial flow flowing past the float to the set stroke volume so that an alarm is emitted if the level falls significantly below the required level. The permitted number of incompletely performed strokes can be selected between 1-150 on the Sigma Control (S1Cb/S2Cb/S3Cb), ensuring optimum adaptation to process requirements.

#### Materials

Flow meter: PVDF  
Float: PTFE-coated  
Seals: FKM/EPDM

	For pump type	Material	NW	Order no.
Size III	Sigma/ 1	PVDF/EPDM	DN 10	1021168
	Sigma/ 1	PVDF/FKM	DN 10	1021169
	Sigma/1/2	PVDF/EPDM	DN 15	1021170
	Sigma/1/2	PVDF/FKM	DN 15	1021171
Size IV	Sigma/2/3	PVDF/EPDM	DN 25	1021164
	Sigma/2/3	PVDF/FKM	DN 25	1021165
Size V	Sigma/ 3	PVDF/EPDM	DN 32	1021166
	Sigma/ 3	PVDF/FKM	DN 32	1021167

### Universal Signal Cable



pk\_1\_085

For controlling the metering pump via contacts - external control, standard signals - analog control and for potential-free ON/OFF connection - connection function.

For Beta®, gamma and delta® with 5-pin round plastic plug and 5-wire open-ended cable.

	Lead length	Order no.
5-core universal cable, 5-pin round plug	2 m	1001300
5-core universal cable, 5-pin round plug	5 m	1001301
5-core universal cable, 5-pin round plug	10 m	1001302

### External Signal Cable

External control cable with 5-pin round plug, internally bridged, and 2-wire cable with open end.

Only for external control of metering pumps of the Beta®, gamma/ X and delta® product ranges via contacts.

	Lead length	Order no.
2-core external cable, 5-pin round plug	2 m	707702
2-core external cable, 5-pin round plug	5 m	707703
2-core external cable, 5-pin round plug	10 m	707707

### Control cable for configurable inputs and outputs

Control cable and round plug for configurable inputs and outputs for the control of the process timer or for additional alarm messages.

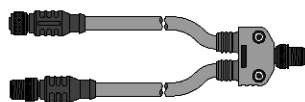
Fits metering pumps of product range gamma/ XL.

	Lead length	Order no.
Control cable for configurable inputs and outputs, 4-wire	2 m	1094091
Control cable for configurable inputs and outputs, 4-wire	5 m	1094093
Control cable for configurable inputs and outputs, 4-wire	10 m	1094092

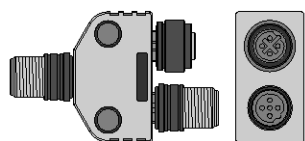


## 1.6 Accessories for low-pressure metering pumps

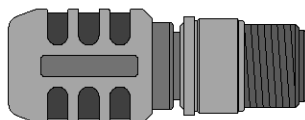
### PROFIBUS® Adapter, Enclosure Rating IP 65



P\_AC\_0245\_SW



P\_AC\_0230\_SW\_1



P\_AC\_0239\_SW

		Fig.	Order no.
Y-adapter 2 x M12 x 1 male/female	M12 x 1 male	P_AC_0245_SW	1040956
PROFIBUS® termination assembly, comprising a Y-plug and terminating resistance	M12	–	1040955
PROFIBUS® Y-adapter	M 12 x 1	P_AC_0230_SW	1036621
PROFIBUS® termination resistor, plug-in	M 12 x 1	P_AC_0239_SW	1036622

### Reed cable with 3-pin round plug, PE



P\_AC\_0243\_SW

For Sigma metering pumps with 3-pin round plugs and a 3-core cable with an open end for level control.  
Suitable for Suction lance for motor-driven metering pumps\* → 1-195

Cable length m	Order no.
2	1030334
3	1030335
5	1030336

### Level sensor cable for connection of a universal suction lance and a motor-driven metering pump

For connection of the level switch of the universal suction lance for Sigma metering pumps or the higher-level control system (e.g. PLS).

Suitable for PPE universal suction lance for motor-driven metering pumps → 1-194



pk\_1\_126



P\_AC\_0243\_SW

	Cable length m	Fig.	Order no.
Round plug coupling for M12 3-pin round plug	2	pk_1_126	1040962
Round plug coupling for M12 3-pin round plug	5	pk_1_126	1040963
Round plug coupling for M12 open end	1.1	P_AC_0243_SW	1009873
Round plug coupling for M12 open end	5	P_AC_0243_SW	1022537

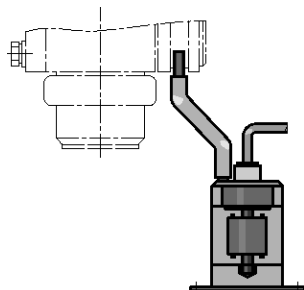


## 1.6 Accessories for low-pressure metering pumps

### 1.6.5.2

#### Safety Equipment

##### Diaphragm rupture indicator



pk\_1\_087

To trigger an alarm and switch off the metering pump in the event of diaphragm rupture. Consisting of PVC/PE level switch, clear acrylic storage tank, connecting sockets and connecting hose. Potential-free N/O switch, max. contact load 60 V AC, 300 mA, 18 W.

**Fits all types of Beta® and gamma/ L, Meta, Makro TZ and Makro/5**

Retrofitting is also possible

	Order no.
Diaphragm rupture indicator Beta, gamma/ L, Meta, Makro TZ	803640
Diaphragm rupture indicator Makro/ 5	1019528

##### Diaphragm rupture indicator with optical sensor

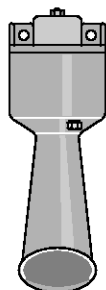
To trigger an alarm and switch off the metering pump in the event of diaphragm rupture. Consisting of an optical sensor, which defines the changes to the refractive index when wetted with liquid. With connecting cable for connection to the pump.

**Fits pumps of the gamma/ X and gamma/ XL product range**

It can also be retrofitted in the backplate.

	Order no.
Diaphragm rupture indicator, assembled	1044477

##### Horn



pk\_1\_088

HUW 55, 230 V, 50-60 Hz, 165 x 60 x 65, 85 phon, for use indoors  
(e.g. in connection with fault signalling relay)

	Order no.
HUW 55 Horn	705002

##### Indicator lamp

Red for wall mounting 230 V, 50-60 Hz (e.g. in connection with fault signalling relay, relay control or clock generator relay)

	Order no.
Indicator lamp, red	914780

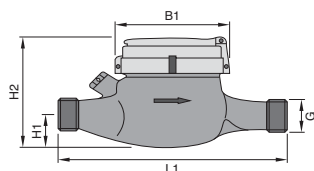


## 1.6 Accessories for low-pressure metering pumps

### 1.6.5.3

### Contact Water Meters for Use in Potable Water and Accessories

#### Contact water meter for cold water



P\_PNM\_0033\_SW

Multi-jet dry water meter, max. water temperature 50 °C.

Horizontal fitting position, laterally tilted up to 90° and vertically rising and falling. With reed switch and 2 m cable with injection-moulded round coupling for direct connection to the external contact input of the metering pump.

Pulse weight: 1/l

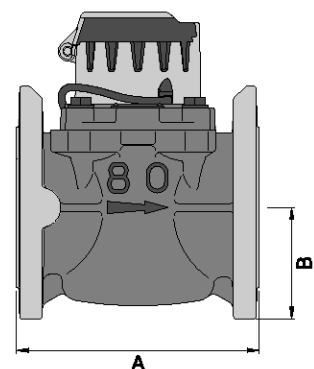
Fits product ranges beta, gamma, delta and Sigma control.

Threaded connector width	Connector thread G	Continuous flow Q3 m³/h	Overload flow Q4 m³/h	Minimum flow Q1 l/h	Installed length L1 mm	Weight kg	Order no.
R 3/4 - DN 20	1	4	5	50	190	1.3	1093919
R 1 - DN 25	1 1/4	10	12.5	125	260	2.1	1093921
R 1 1/2 - DN 40	2	16	20	200	300	4.0	1093922
R 2 - DN 50	2 1/2	25	31	310	300	4.0	1093923

#### Woltmann hybrid counter for cold water

Max. water temperature 50°C, ambient temperature -25°C to +55°C, battery life 15 years, degree of protection IP 68

- Large measuring range
- Installation in every fitting position
- No calming sections needed
- Electronic counter with flow display
- Two electronic pulse outputs
- Issue of consumption and service data via M-bus

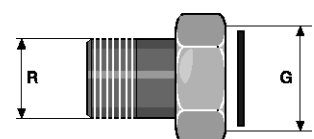


P\_AC\_00273\_SW

#### Performance data

Overload flow	200 m³/h
Continuous flow	160 m³/h
Transition flow	0.2 m³/h
Minimum flow	0.13 m³/h
Start-up value	0.05 m³/h
Pressure loss at Q <sub>3</sub>	0.3 – 0.4 bar
Channel 3	Direction flag
Max. contact rating	30 V DC, 30 mA

Nominal width mm	Construction length WS form	Flange Ø mm	Weight kg	Pulse weight channel 1 l/imp.	Pulse weight channel 2 l/imp.	Pulse width channel 1 ms	Pulse width channel 2 ms	Order no.
DN 80	300	201	16.0	1	100	5	100	1078183
DN 100	360	228	21.3	1	100	5	100	1078184
DN 150	500	286	43.5	10	1000	60	100	1078185



pk\_1\_098

#### Union assembly set with seal

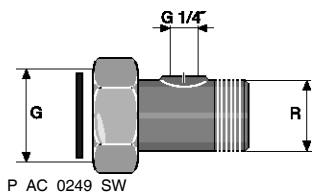
For threaded water meter, brass.

		Order no.
R 3/4	G 1	359029
R 1	G 1 1/4	801322
R 1 1/4	G 1 1/2 – (turboDOS®)	359034
R 1 1/2	G 2	359037
R 2	G 2 1/2	359039

## 1.6 Accessories for low-pressure metering pumps

### Complete threaded connector with seal and connector for injection valve

For threaded water meter with G 1/4 connector for injection valve, brass.



		Order no.
R 3/4	G 1 – 1/4	359030
R 1	G 1 1/4 – 1/4	359032
R 1 1/2	G 2 – 1/4	359038
R 2	G 2 1/2 – 1/4	801321

### O-ring loaded injection valve

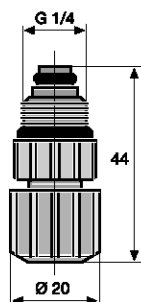
For use with threaded connectors on water meters.

Short design for R 3/4 and R 1 threaded connectors, long design for R 1 1/2 and R 2 threaded connectors.

#### Applications when using appropriate metering lines

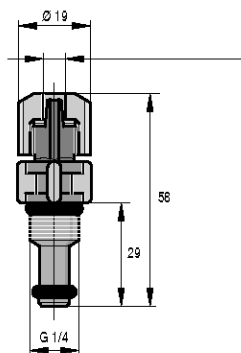
25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 9 bar



Connector		Material	oØ x iØ mm	Fig.	Order no.
6/4 - G 1/4 short	for hose	PP/FKM	6 x 4	P_AC_0008_SW	914754
6/4 - G 1/4 long	for hose	PP/FKM	6 x 4	P_AC_0009_SW	741193
6/4 - G 1/4 short	for hose	PVC/FKM	6 x 4	P_AC_0008_SW	914558
6/4 - G 1/4 long	for hose	PVC/FKM	6 x 4	P_AC_0009_SW	915091

P\_AC\_0008\_SW



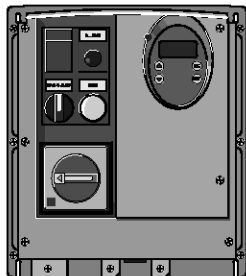
P\_AC\_0009\_SW



## 1.6 Accessories for low-pressure metering pumps

### 1.6.5.4 Speed Controllers

#### Frequency Converters for Speed Control



P\_AC\_0185\_SW

Frequency converters are installed in the IP 55 protective enclosure and are suitable for the motor output ratings listed below.

Integrated control unit with various functions optimally matched to ProMinent metering pumps: Selectable external/internal control, internal/external reset, temperature monitoring and control via PTC sensor, separate motor fan control as well as evaluation of diaphragm rupture monitoring.

Internal control: via potentiometer

External control: 0/4-20 mA corresponding to 0-50 (60) Hz output frequency

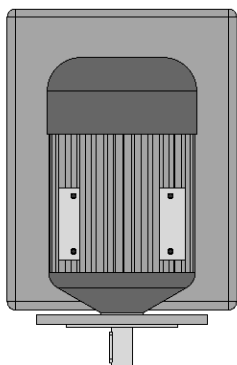
Frequency converters can be used in the range of -10 °C to 40 °C.

Max. motor output kW	For pump type	Voltage supply	Voltage supply, external fan	Control range	Order no.
0.37	Sigma/ 1, Sigma/ 2, Meta, Hydro/ 2, MF1a, DR15	1 ph 200 – 240 V	230 V 50/60 Hz	1:10	1030684
0.75	Sigma/ 3, Hydro/ 3, MF2a	1 ph 200 – 240 V	230 V 50/60 Hz	1:10	1030685
1.50	Makro TZ, MF2a, MF3a, DR150	1 ph 200 – 240 V	230 V 50/60 Hz	1:10	1030686
2.20	Makro TZ, MF3a, DR150	1 ph 200 – 240 V	230 V 50/60 Hz	1:10	1030687
4.00	MF3a, MF4a	3 ph 380 – 500 V	3 ph 380 V	1:5	1030688

#### Dimensions and weight

Order no.	B mm	H mm	C mm	Weight kg
1030684	210	240	163	6.3
1030685	210	240	163	6.3
1030686	215	297	192	8.8
1030687	230	340	222	10.7
1030688	230	340	222	10.7

#### Explosion-protected compact drive with integrated frequency converter Protection class II 2G Eexde II C T4



P\_AC\_0211\_SW

Voltage supply:	400 V, 50/60 Hz
Mains feed:	3 ph + neutral + earth
Model:	IM B5
Inputs:	2 x analogue 0/4...20 mA 4 x digital (includes frequency input 0...100 kHz)
Outputs:	2 x analogue 4...20 mA 4 x digital 0/+20 V, 10 mA 1 x frequency output 0...10 kHz, 0/18...24 V, max. 5 mA
Terminal strip connectors:	ON/OFF Self-locking RESET

Winding and temperature monitoring by PTC resistor with integral evaluation.

External control circuit: 230 V with internal fuse.

#### Note:

Delivery on request

Max. motor output kW	For pump	Control range	Flange Ø mm
0.55	Hydro/ 2, Sigma/ 3, Orlita MF	1:10	80
0.75	Hydro/ 3, Orlita MF	1:10	80
1.50	Makro TZ, Orlita MF	1:10	200
2.20	Makro TZ, Orlita MF	1:10	200
4.00	Makro/ 5, Orlita MF	1:10	250

Pumps with compact drive are always delivered on a frame.

Motor data sheets can be requested for more information.

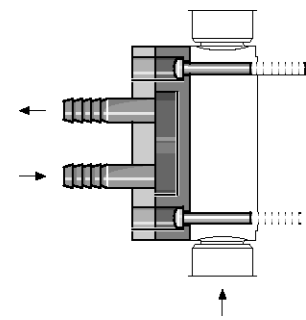
Special motors or special motor flanges and other control ranges are available on request.

Motors less than 0.75 kW and motors designed for speed-controllable operation are not subject to the IE3 standard in compliance with the Ecodesign Directive 2009/125/EC.

## 1.6 Accessories for low-pressure metering pumps

### 1.6.5.5

#### Cooling/Heating Device for Diaphragm Metering Pumps



pk\_2\_059

For stainless steel liquid end. For assembly, including retrofitting, onto the liquid end. 10 mm diameter connectors for hot/cold chemicals with locking screws. Dimensions in mm. Outer diameter A, pitch circle diameter LK.

Temperature -10 ... 80 °C

For pump	Ø A mm	Ø LK mm	Order no.
Sigma/ 1 FM 50/65*	–	–	1025500
Sigma/ 1 FM 120*	–	–	1025501
Sigma/ 2 FM 130*	–	–	1002178
Sigma/ 2 FM 350*	–	–	1002179
Sigma/ 3 FM 330*	–	–	1006455
Sigma/ 3 FM 1000*	–	–	1006456
Hydro/ 2/3 FMH 025/060	–	–	1024743
Hydro/ 3 FMH 150	–	–	1040112
Hydro/ 4 FMH 400	–	–	1047700
Meta, Makro TZ FM 130, FM 260	145	127	803751
Meta, Makro TZ FM 530	180	164	803752
Makro TZ FM 1500/2100	248	219	806005
Makro/ 5 FM 4000	–	–	1020683
Makro TZ FMH 70/20	–	–	1041263
Makro/ 5 FMH 85/50	–	–	1041261
Makro/ 5 FMH 60/50	–	–	1041260
Makro/ 5 FMH 130/50	–	–	1041262

\* Adapted to the design with the new multi-layer safety diaphragm.



## 1.6 Accessories for low-pressure metering pumps

### 1.6.6 PE Metering Tanks and Collecting Pans

#### 1.6.6.1 Dosing Tanks

Anyone who works with chemicals, needs to store them safely. ProMinent® dosing tanks are tough and ideal for working with metering pumps.

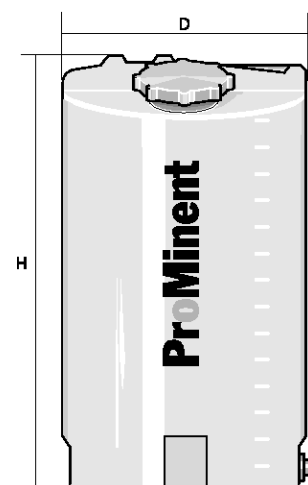
Useful capacity 35 – 1,500 l

PE storage tanks produced in a rotation process. They can be enhanced with ProMinent® metering pumps, suction lances and stirrers. The stackable PE collection pans are available in matching sizes.

##### Your benefits

- Environmentally-friendly storage of liquid chemicals
- Robust and durable: stable design in UV-stabilised PE (polyethylene)
- Scale for litres and US gallons
- Simple to install: sintered threaded sockets for fixing ProMinent metering pumps and stirrers on storage tanks
- Safe storage: A screw cover closes safely (push-on lid for 35-litre storage tank)
- Flat sides to secure the storage tank.
- Standard colours: natural, black, blue, yellow and red.

##### Natural Coloured/Transparent PE Dosing Tank



pk\_3\_0001\_1a

Usable capacity l	D mm	H mm	Threaded bush for metering pumps	Weight kg	Order no.
35	350	485	without threaded sockets	3.5	791993
60	410	590	gamma/ X, Beta®	5.0	791994
100	500	760	alpha, Beta®, gamma/ X	7.0	1001490
140	500	860	alpha, Beta®, gamma/ X	9.5	791995
250	650	1,100	alpha, Beta®, gamma/ X, Sigma/ 1/ 2/ 3, gamma/ XL	17.5	1023175
500	820	1,215	2 x gamma/ X, 2 x Sigma/ 1, 2, 3, 2 x gamma/ XL, 2 x Beta®	33.0	791997
1,000	1,070	1,260	2 x gamma/ X, 2 x Sigma/ 1, 2, 3, 2 x gamma/ XL, 2 x Beta®	51.0	1010909
1,500	1,150	1,735	2 x gamma/ X, 2 x Sigma/ 1, 2, 3, 2 x gamma/ XL, 2 x Beta®	80.0	1060975

##### Natural Coloured/Transparent PE Dosing Tank

Designed for the installation of a manually operated or electric stirrer.

Usable capacity l	with an opening for	Order no.
60	manually operated stirrer	792104
60	electric stirrer	792105
100	manually operated stirrer	1002034
100	electric stirrer	1002033
140	manually operated stirrer	792106
140	electric stirrer	792107
250	manually operated stirrer	792108
250	electric stirrer	792109
500	manually operated stirrer	792110
500	electric stirrer	792111
1,000	manually operated stirrer	1010910
1,000	electric stirrer	1010911

## 1.6 Accessories for low-pressure metering pumps

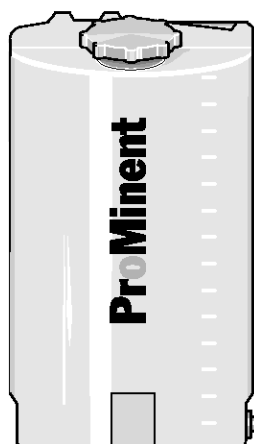


The 35 – 1,000-litre storage tank have an R 3/4" threaded sleeve (1,500 l: R 1 1/4") for drainage that can be drilled to Ø 10 mm on site if required. A PE R 3/4" sealing stopper (1,500 l: R 1 1/4") with a seal is screwed in.

Dosing tanks without ProMinent logo are available on request.

### Black PE Dosing Tank

For light sensitive media.



pk\_3\_001\_1

Usable capacity l	Order no.
35	791998
60	791999
100	1001322
140	792000
250	1023176
500	792002
1,000	1010912
1,500	1060976

### Blue PE Dosing Tank

Usable capacity l	Order no.
35	1003812
60	1003813
100	1003814
140	1003815
250	1023177
500	1003817
1,000	1010913
1,500	1060977

### Yellow PE Dosing Tank

Usable capacity l	Order no.
35	1003818
60	1003819
100	1003820
140	1003821
250	1023178
500	1003823
1,000	1010914
1,500	1060978

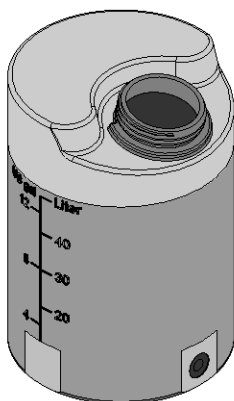
### Red PE Dosing Tank

Usable capacity l	Order no.
35	1003824
60	1003825
100	1003826
140	1003827
250	1023179
500	1003829
1,000	1010915
1,500	1060979

Dosing tanks without ProMinent® logo are available on request.



## 1.6 Accessories for low-pressure metering pumps



P\_DO\_0022\_SW1

### Natural/transparent PE dosing tank with flat mounting surface

Usable capacity l	D mm	H mm	Threaded bush for metering pumps	Weight kg	Order no.
35	350	485	without threaded sockets	3.5	791993
60	410	590	without threaded sockets	5.0	1061060
100	500	760	without threaded sockets	7.0	1008599
250	650	1,100	without threaded sockets	17.5	1061061

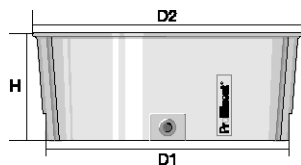
#### Your benefits

- "Natural/transparent PE dosing tank" design without sintered threaded socket
- Level mounting surface for the installation of metering pumps on the storage tank
- Additional installation of a manual or electric stirrer is possible

### 1.6.6.2

### PE Stackable Collecting Pans for Dosing Tanks

Made of UV-stabilised polyethylene in a stackable design with ProMinent® logo. 2 flat sides for fixing the collecting pan.



pk\_3\_019

### Colourless/Transparent PE Stackable Collecting Pans

Usable capacity l	D2 mm	D1 mm	H mm	Weight kg	Order no.
35	565	507	220	3.0	1010879
60	680	607	270	4.3	1010880
100	802	727	320	6.5	1010881
140	811	727	370	7.0	1010882
250	917	807	520	11.0	1010883
500	1,155	1,009	670	16.0	1010884

### Black PE Stackable Collecting Pans

Usable capacity l	D2 mm	D1 mm	H mm	Weight kg	Order no.
35	565	507	220	3.0	1010885
60	680	607	270	4.3	1010886
100	802	727	320	6.5	1010887
140	811	727	370	7.0	1010888
250	917	807	520	11.0	1010889
500	1,155	1,009	670	16.0	1010890

### Blue PE Stackable Collecting Pans

Usable capacity l	D2 mm	D1 mm	H mm	Weight kg	Order no.
35	565	507	220	3.0	1010891
60	680	607	270	4.3	1010892
100	802	727	320	6.5	1010893
140	811	727	370	7.0	1010894
250	917	807	520	11.0	1010895
500	1,155	1,009	670	16.0	1010896





## 1.6 Accessories for low-pressure metering pumps

### Yellow PE Stackable Collecting Pans

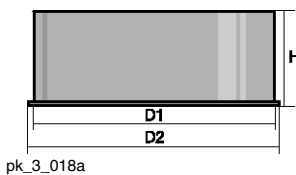
Usable capacity l	D2 mm	D1 mm	H mm	Weight kg	Order no.
35	565	507	220	3.0	1010897
60	680	607	270	4.3	1010898
100	802	727	320	6.5	1010899
140	811	727	370	7.0	1010900
250	917	807	520	11.0	1010901
500	1,155	1,009	670	16.0	1010902

### Red PE Stackable Collecting Pans

Usable capacity l	D2 mm	D1 mm	H mm	Weight kg	Order no.
35	565	507	220	3.0	1010903
60	680	607	270	4.3	1010904
100	802	727	320	6.5	1010905
140	811	727	370	7.0	1010906
250	917	807	520	11.0	1010907
500	1,155	1,009	670	16.0	1010908



An R 3/4" threaded sleeve is moulded on 35-500 litre collecting pans for drainage, which requires drilling (Ø 10 mm) on site if necessary. An R 3/4" PE sealing stopper with a seal is screwed in (Accessory part no. 200692).



### Natural PE Collecting Pan

Usable capacity l	D2 mm	D1 mm	H mm	Weight kg	Order no.
1,000	1,280	1,200	980	34.0	740719
1,500	1,410	1,350	1,280	42.0	1060980

### Black PE Collecting Pan

Usable capacity l	D2 mm	D1 mm	H mm	Weight kg	Order no.
1,000	1,280	1,200	980	34.0	740726
1,500	1,410	1,350	1,280	42.0	1060981

#### 1.6.6.3

#### Spare Parts

	Order no.
Push cap for 35 l tank	740708
Screw cap with seal for 60/100/140/250	1031429
Screw cap with seal for 500/1000	1030910
Sealing stopper with 3/4" PE seal	200692
Sealing stopper with 1 1/4" PE seal	1061779



# 1.6 Accessories for low-pressure metering pumps

## 1.6.6.4

## Fittings and Attachments for Dosing Tanks

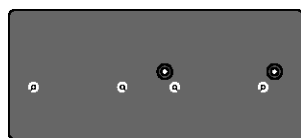
### Suction assemblies with and without level switch

The correct suction assemblies for installation in our PE dosing tanks can be found in the following chapter:  
For more information see page → 1-2

### Attachment of pumps to dosing tanks

#### PP mounting plate

For mounting metering pumps onto metering tanks (including screws for attachment of mounting plates to the metering tank).



pk\_3\_003

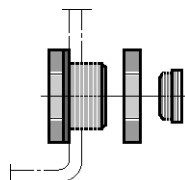
	Order no.
Mounting plate, Sigma/ 1/ 2/ 3	740476
Mounting plate, alpha	790850
Mounting plate for Beta®, gamma/ X	801575
Mounting plate 3 x gamma/ X, 3 x Beta®	801580
Mounting plate 2 x gamma/ X, 2 x Beta®	801583
Installation panel for gamma/ XL	801569

Please refer to the following table for the order numbers for the mounting plates.

Metering pumps	Dosing tank						
	35 l	60 l	100 l	140 l	250 l	500 l	1000 l/1500 l
alpha	790850	790850	x	x	x	2x790850	2x790850
Beta®, gamma/ X	801575	x	x	x	x	2x	2x
gamma/ XL	-	801569	801569	801569	x	2x	2x
Sigma/ 1	-	801569	740476	740476	x	2x	2x
Sigma/ 2, Sigma/ 3	-	-	-	-	x	2x	2x
2x Beta® or 2x gamma/ X	-	801583	801583	801583	801583	2x801583	2x801583
3x Beta® or 3x gamma/ X	-	-	801580	801580	801580	2x801580	2x801580

- x = Direct installation of one pump on a storage tank
- 2x = Direct installation of 2 pumps on a storage tank
- - = Pump cannot be installed on the storage tank

### Tank connectors with PE plugs

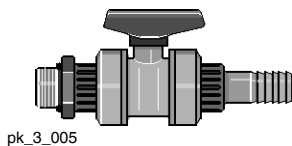


pk\_3\_004

	Order no.
R 1/2" as an additional connection for PE metering tanks 35-1,000 l	809755
R 3/4" as an additional connection for PE metering tanks 35-1,000 l	809756

## 1.6 Accessories for low-pressure metering pumps

### PP discharge tap



	Order no.
For metering tanks with d 20, Ø 20 mm hose nozzle and 3/4" nipple for direct connection to the threaded connector on the tank.	809714

### PVC discharge tap

	Order no.
For metering tanks with d 16, Ø 16 mm hose nozzle and 3/4" nipple for direct connection to the threaded connector on the tank.	809745

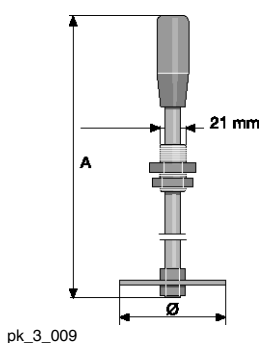
### Screw cap lock

	Order no.
Lock with key for screw cap	200683

### Stirrers

#### PP Hand mixer

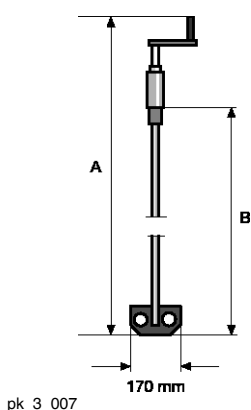
Fully assembled.



	A mm	Ø mm	Order no.
for 35 and 60 l tanks	515	90	741118
for 100 and 140 l tanks	715	90	741119
for 250 and 500 l tanks	1,040	130	741120

#### PP Hand stirrer

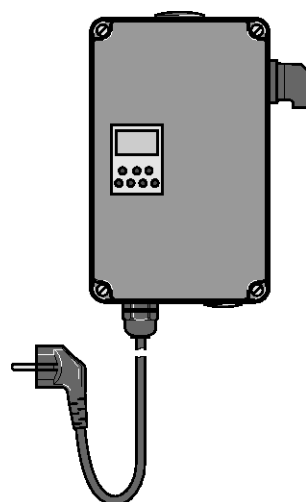
With crank, fully assembled



	A mm	B mm	Order no.
for 60 l tanks	670	465	914701
for 100 l tanks	855	650	914738
for 140 l tanks	965	765	914702
for 250 and 500 l tanks	1,175	965	914703
for 1000 l tanks	1,240	1,040	914705



## 1.6 Accessories for low-pressure metering pumps



pk\_3\_010\_1

### Timer with digital clock

Order no.

In plastic housing for the control of a stirrer or a metering pump, 230 V, 50 Hz, max. 6A, IP 65. Day and week programs, shortest switching time 1 min. with 2 m power cable and euro plug.

1005561

Stirrers should only be operated via the motor protection switch!

### Electric stirrers for dosing tanks

For the batching and mixing of liquids up to max. 500 mPas viscosity. Intermittent operation using timer recommended.

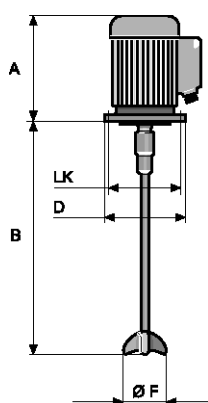
- Wide-range motor with insulation class F, insulated for use in hot climates
- Stainless steel or plastic-coated shaft
- Polypropylene propeller
- Provide a motor protection switch for all stirrers.
- Not suitable for gaseous media

### Stainless steel electric stirrer

For tank	Power uptake W	Shaft	Propeller	Weight kg	Order no.
60 l	20	1.4571	PP	2.9	818576
100 l	180	1.4571	PP	3.0	1001566
140 l	180	1.4571	PP	7.3	791502
250 l	180	1.4571	PP	7.3	791503
500 l	250	1.4571	PP	8.5	791504
1000 l	750	1.4571	PVDF	18.0	791458
1500 l	550	1.4535	PVDF	22.0	1078647

### Chemical resistant electric stirrer

For tank	Power uptake W	Shaft	Propeller	Weight kg	Order no.
60 l	20	1.4571/PVDF	PP	2.9	818577
100 l	180	1.4571/PVDF	PP	3.0	1002035
140 l	180	1.4571/PVDF	PP	7.3	791454
250 l	180	1.4571/PVDF	PP	7.3	791455
500 l	250	1.4571/PVDF	PP	8.5	791456
1000 l	750	1.4571/PVDF	PVDF	18.0	791457
1500 l	550	Steel/PE	PVDF	22.0	1078646



pk\_3\_008

Size	A	B	Ø D	Ø LK	Ø F
60	195	490	115	100	70
100	200	675	160	130	70
140	200	780	160	130	70
250	200	950	160	130	70
500	200	950	160	130	70
1000	230	1190	200	165	130
1500	282	1400	200	165	175

### Technical Data

For tank	Power uptake W	Voltage (50 Hz)	Nominal current (50 Hz)	Speed (50 Hz)	Enclosure rating
60 l	20	1 pH, 230 V	0,38 A	1400	IP55
100 l	180	1 pH, 230 V	1,9 A	1440	IP55
140 l	180	1 pH, 230 V	1,9 A	1440	IP55
250 l	180	1 pH, 230 V	1,9 A	1440	IP55
500 l	250	1 pH, 230 V	1,8 A	1440	IP55
1000 l	750	3 pH, 230/400 V	2,96/1,71 A	1440	IP55
1500 l	550	3 pH, 230/400 V	4,1/2,3 A	750	IP55



## 1.7 Metering Systems

### 1.7.1

#### Overview of Metering Systems DULCODOS®

Metering systems are ready mounted complete solutions, which are immediately available and ready for use for the most important applications. Whether standard or customised – you'll find the right solution here.

**Tip:** The table provides a good overview.



#### Selection Guide for DULCODOS® Metering Systems

	Function	Capacity range	see page
Metering System DULCODOS® eco (DSBa)	Storage, Metering	35 – 1,000 litres	→ 1-222
Metering system DULCODOS® universal	Metering	to 75 l/h	→ 1-231
Metering System DULCODOS® panel (DSWb)	Metering	0.74 – 1,000 l/h	→ 1-240
Metering system DULCODOS® modular (DSKa)	Metering	40 – 1.000 l/h	→ 1-252

# 1.7 Metering Systems

## 1.7.2

## Metering System DULCODOS® eco (DSBa)

Choose from a range of different components and adapt the metering system to your requirements.

For storing and metering liquid chemicals Use a selection guide (identity code) to quickly and flexibly adapt your metering system to your metering task.

Two hydraulic connection points guarantee simple installation of the metering system. The ready mounted system consists of components that have been perfectly matched to each other to ensure problem-free operation. You obtain a complete system. Individually configure your metering system at the time of ordering. A simple selection system makes ordering easy and guarantees maximum efficiency even at the time of ordering.

### Your benefits

- One to three metering pumps mounted on a storage tank, ready for connection with all the necessary accessories
- Short delivery time
- Outstanding value for money
- Compact construction
- Fast commissioning
- Versatile use
- All the components are perfectly matched to each other and fit precisely
- Environmentally-friendly handling of chemicals

### Technical Details

- Dosing tanks: PE, various colours, 35 – 1,500 litres
- Collecting pan: PE, various colours, 35 – 1,500 litres
- Lock for screw top
- Hand mixer / stirrer: PP, PVDF or stainless steel, various outputs
- Suction assembly: PP, PVC, various connectors
- Level switch for suction assembly: 2-stage
- Drain tap: PP, PVC, with ball valve
- Metering pump: alpha, Beta®, gamma/ X, Sigma/ 1, Sigma/ 2, Sigma/ 3, gamma/ XL

### Field of application

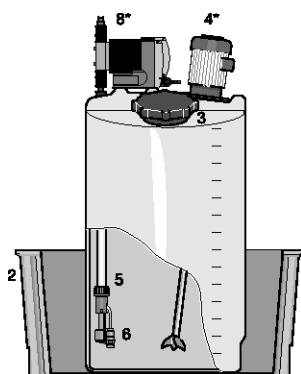
Treatment of cooling, process and swimming pool water

ProMinent metering systems with PE storage tanks can be selected and ordered with the help of an identity code system. First select the metering pump using the separate pump identity code.

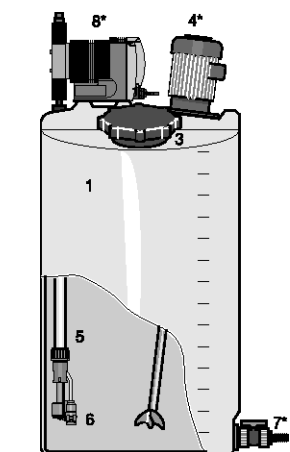
### Selectable components

1. PE dosing tank (35 – 1,500 litres)
2. Stackable collecting pans (35 – 1,500 litres)
3. Lock for tank screw top
4. Hand mixer/stirrer (\*)
5. Suction assembly
6. Level switch for suction assembly
7. Drain tap for storage tank (\*)
8. Order metering pump (\*) separately  
(Order the pump separately due to the large number of possible pumps that can be installed on storage tanks. Use the identity code for the pump you require.)

\* These components are ready for subsequent installation, but are supplied separately to avoid damage in transit. Customers should fully install the system on site.



pk\_3\_033



pk\_3\_034

## 1.7 Metering Systems

### Identity Code Ordering System for Metering System with Storage Tank, 35 litres

DSBa	PE tank
0035N	35 l PE metering tank, neutral colour
0035S	35 l PE metering tank, black
0035B	35 l PE metering tank, blue
0035G	35 l PE metering tank, yellow
0035R	35 l PE metering tank, red
<b>Collecting pan</b>	
0	without collecting pan
1	with collecting pan, neutral colour
2	with collecting pan, coloured (the same colour as the tank)
<b>Version</b>	
0	with ProMinent® Logo
<b>Lock for tank screw top</b>	
0	without lock
<b>Hand mixer, stirrer</b>	
0	none
A	with PP hand mixer
<b>Metering pump mounting</b>	
0	without pump
D	for alpha
E	for Beta®, gamma/ X
<b>Suction assembly selection</b>	
0	without suction assembly
1	suction assembly with 6x4 suction hose
2	suction assembly with 8x5 suction hose
3	suction assembly with 12x9 suction hose
<b>Suction assembly material</b>	
0	none
1	PVC
2	PP
<b>Suction assembly float switch</b>	
0	without float switch
1	2-stage, round plug, (6 x 4, 8 x 5, 12 x 9) for Beta®, gamma/ X/ XL
<b>Accessories - discharge tap for tank</b>	
0	without accessories
1	with ball valve PVC, hose grommet d16 **
2	with ball valve PP, hose grommet d20 **
<b>Calibration assembly</b>	
0	none
<b>Info - pump*</b>	
	e.g. GMXa 0414 PVT

\* Please enter the Identity code of the selected pump

\*\* Ball valve can only be selected if the metering station is ordered without drip pan.

\*\*\* Metering gauge can only be selected if the metering station is ordered without drip pan and without suction fitting.



# 1.7 Metering Systems

## Identity Code Ordering System for Metering System with Storage Tank, 60 litres

DSBa	PE tank
0060N	60 l PE metering tank, neutral colour
0060S	60 l PE metering tank, black
0060B	60 l PE metering tank, blue
0060G	60 l PE metering tank, yellow
0060R	60 l PE metering tank, red
<b>Collecting pan</b>	
0	without collecting pan
1	with collecting pan, neutral colour
2	with collecting pan, coloured (the same colour as the tank)
<b>Version</b>	
0	with ProMinent® Logo
<b>Lock for tank screw top</b>	
1	with lock
<b>Hand mixer, stirrer</b>	
0	none
A	with PP hand mixer
B	with PP hand stirrer
H	with stainless steel 0.02 kW electric stirrer
P	with PVDF 0.02 kW electric stirrer
<b>Metering pump mounting</b>	
0	without pump
A	for Beta®, gamma/ X
D	for alpha
F	for Sigma/ 1
P	for gamma/ XL
<b>Suction assembly selection</b>	
0	without suction assembly
1	suction assembly with 6x4 suction hose
2	suction assembly with 8x5 suction hose
3	suction assembly with 12x9 suction hose
4	suction assembly DN 10
5	suction assembly DN 15
<b>Suction assembly material</b>	
0	none
1	PVC
2	PP
<b>Suction assembly float switch</b>	
0	without float switch
1	2-stage, round plug, (6 x 4, 8 x 5, 12 x 9) for Beta®, gamma/ X/ XL
2	2-stage, round plug, (DN 10-32) for Sigma/ 1/ 2/ 3, delta®
<b>Accessories - discharge tap for tank</b>	
0	without accessories
1	with ball valve PVC, hose grommet d16 **
2	with ball valve PP, hose grommet d20 **
<b>Calibration assembly</b>	
0	none
<b>Info - pump*</b>	
	e.g. GMXa 0414 PVT

\* Please enter the Identity code of the selected pump

\*\* Ball valve can only be selected if the metering station is ordered without drip pan.

\*\*\* Metering gauge can only be selected if the metering station is ordered without drip pan and without suction fitting.





## 1.7 Metering Systems

### Identity Code Ordering System for Metering System with Storage Tank, 100 litres

DSBa	PE tank
0100N	100 l PE metering tank, neutral colour
0100S	100 l PE metering tank, black
0100B	100 l PE metering tank, blue
0100G	100 l PE metering tank, yellow
0100R	100 l PE metering tank, red
<b>Collecting pan</b>	
0	without collecting pan
1	with collecting pan, neutral colour
2	with collecting pan, coloured (the same colour as the tank)
<b>Version</b>	
0	with ProMinent® Logo
<b>Lock for tank screw top</b>	
1	with lock
<b>Hand mixer, stirrer</b>	
0	none
A	with PP hand mixer
C	with PP hand stirrer
I	with stainless steel 0.18 kW electric stirrer
R	with PVDF 0.18 kW electric stirrer
<b>Metering pump mounting</b>	
0	without pump
A	for Beta®, gamma/ X
L	for Sigma/ 1
N	for alpha
P	for gamma/ XL
<b>Suction assembly selection</b>	
0	without suction assembly
1	suction assembly with 6x4 suction hose
2	suction assembly with 8x5 suction hose
3	suction assembly with 12x9 suction hose
4	suction assembly DN 10
5	suction assembly DN 15
<b>Suction assembly material</b>	
0	none
1	PVC
2	PP
<b>Suction assembly float switch</b>	
0	without float switch
1	2-stage, round plug, (6 x 4, 8 x 5, 12 x 9) for Beta®, gamma/ X/ XL, delta®
2	2-stage, round plug, (DN 10-32) for Sigma/ 1/ 2/ 3, delta®
<b>Accessories - discharge tap for tank</b>	
0	without accessories
1	with ball valve PVC, hose grommet d16 **
2	with ball valve PP, hose grommet d20 **
<b>Calibration assembly</b>	
0	none
<b>Info - pump*</b>	
e.g. GMXa 0414 PVT	

\* Please enter the Identity code of the selected pump

\*\* Ball valve can only be selected if the metering station is ordered without drip pan.

\*\*\* Metering gauge can only be selected if the metering station is ordered without drip pan and without suction fitting.



## 1.7 Metering Systems

### Identity Code Ordering System for Metering System with Storage Tank, 140 litres

DSBa	PE tank
0140N	140 l PE metering tank, neutral colour
0140S	140 l PE metering tank, black
0140B	140 l PE metering tank, blue
0140G	140 l PE metering tank, yellow
0140R	140 l PE metering tank, red
<b>Collecting pan</b>	
0	without collecting pan
1	with collecting pan, neutral colour
2	with collecting pan, coloured (the same colour as the tank)
<b>Version</b>	
0	with ProMinent® Logo
<b>Lock for tank screw top</b>	
1	with lock
<b>Hand mixer, stirrer</b>	
0	none
A	with PP hand mixer
D	with PP hand stirrer
K	with stainless steel 0.18 kW electric stirrer
S	with PVDF 0.18 kW electric stirrer
<b>Metering pump mounting</b>	
0	without pump
A	for Beta®, gamma/ X
D	for alpha
H	for Sigma/ 1
P	for gamma/ XL
<b>Suction assembly selection</b>	
0	without suction assembly
1	suction assembly with 6x4 suction hose
2	suction assembly with 8x5 suction hose
3	suction assembly with 12x9 suction hose
4	suction assembly DN 10
5	suction assembly DN 15
<b>Suction assembly material</b>	
0	none
1	PVC
2	PP
<b>Suction assembly float switch</b>	
0	without float switch
1	2-stage, round plug, (6 x 4, 8 x 5, 12 x 9) for Beta®, gamma/ X/ XL
2	2-stage, round plug, (DN 10-32) for Sigma/ 1/ 2/ 3, delta®
<b>Accessories - discharge tap for tank</b>	
0	without accessories
1	with ball valve PVC, hose grommet d16 **
2	with ball valve PP, hose grommet d20 **
<b>Calibration assembly</b>	
0	none
<b>Info - pump*</b>	
	e.g. GMXa 0414 PVT

\* Please enter the Identity code of the selected pump

\*\* Ball valve can only be selected if the metering station is ordered without drip pan.

\*\*\* Metering gauge can only be selected if the metering station is ordered without drip pan and without suction fitting.



# 1.7 Metering Systems

## Identity Code Ordering System for Metering System with Storage Tank, 250 litres

DSBa	PE tank
0250N	250 l PE metering tank, neutral colour
0250S	250 l PE metering tank, black
0250B	250 l PE metering tank, blue
0250G	250 l PE metering tank, yellow
0250R	250 l PE metering tank, red
<b>Collecting pan</b>	
0	without collecting pan
1	with collecting pan, neutral colour
2	with collecting pan, coloured (the same colour as the tank)
<b>Version</b>	
0	with ProMinent® Logo
<b>Lock for tank screw top</b>	
1	with lock
<b>Hand mixer, stirrer</b>	
0	none
A	with PP hand mixer
E	with PP hand stirrer
L	with stainless steel 0.18 kW electric stirrer
T	with electric stirrer PVDF 0.18 kW
<b>Metering pump mounting</b>	
0	without pump
A	for Beta®, gamma/ X
B	for Sigma/ 2/ 3
C	for Sigma/ 1
N	for alpha
P	for gamma/ XL
<b>Suction assembly selection</b>	
0	without suction assembly
1	suction assembly with 6x4 suction hose
2	suction assembly with 8x5 suction hose
3	suction assembly with 12x9 suction hose
4	suction assembly DN 10
5	suction assembly DN 15
7	suction assembly DN 25
8	suction assembly DN 32
<b>Suction assembly material</b>	
0	none
1	PVC
2	PP
<b>Suction assembly float switch</b>	
0	without float switch
1	2-stage, round plug, (6 x 4, 8 x 5, 12 x 9) for Beta®, gamma/ X/ XL
2	2-stage, round plug, (DN 10-32) for Sigma/ 1/ 2/ 3, delta®
<b>Accessories - discharge tap for tank</b>	
0	without accessories
1	with ball valve PVC, hose grommet d16 **
2	with ball valve PP, hose grommet d20 **
<b>Calibration assembly</b>	
0	none
<b>Info - pump*</b>	
e.g. GMXa 0414 PVT	

\* Please enter the Identity code of the selected pump

\*\* Ball valve can only be selected if the metering station is ordered without drip pan.

\*\*\* Metering gauge can only be selected if the metering station is ordered without drip pan and without suction fitting.



# 1.7 Metering Systems

## Identity Code Ordering System for Metering System with Storage Tank, 500 litres

DSBa	PE tank
0500N	500 l PE metering tank, neutral colour
0500S	500 l PE metering tank, black
0500B	500 l PE metering tank, blue
0500G	500 l PE metering tank, yellow
0500R	500 l PE metering tank, red
<b>Collecting pan</b>	
0	without collecting pan
1	with collecting pan, neutral colour
2	with collecting pan, coloured (the same colour as the tank)
<b>Version</b>	
0	with ProMinent® Logo
<b>Lock for tank screw top</b>	
1	with lock
<b>Hand mixer, stirrer</b>	
0	none
A	with PP hand mixer
F	with PP hand stirrer
M	with stainless steel 0.25 kW electric stirrer
U	with PVDF 0.25 kW electric stirrer
<b>Metering pump mounting</b>	
0	without pump
A	for Beta®, gamma/ X
C	for Sigma/ 1
D	for alpha
J	for Sigma/ 2/ 3
P	for gamma/ XL
<b>Suction assembly selection</b>	
0	without suction assembly
1	suction assembly with 6x4 suction hose
2	suction assembly with 8x5 suction hose
3	suction assembly with 12x9 suction hose
4	suction assembly DN 10
5	suction assembly DN 15
7	suction assembly DN 25
8	suction assembly DN 32
<b>Suction assembly material</b>	
0	none
1	PVC
2	PP
<b>Suction assembly float switch</b>	
0	without float switch
1	2-stage, round plug, (6 x 4, 8 x 5, 12 x 9) for Beta®, gamma/ X/ XL
2	2-stage, round plug, (DN 10-32) for Sigma/ 1/ 2/ 3, delta®
<b>Accessories - discharge tap for tank</b>	
0	without accessories
1	with ball valve PVC, hose grommet d16 **
2	with ball valve PP, hose grommet d20 **
<b>Calibration assembly</b>	
0	none
<b>Info - pump*</b>	
e.g. GMXa 0414 PVT	

\* Please enter the Identity code of the selected pump

\*\* Ball valve can only be selected if the metering station is ordered without drip pan.

\*\*\* Metering gauge can only be selected if the metering station is ordered without drip pan and without suction fitting.



## 1.7 Metering Systems

### Identity Code Ordering System for Metering System with Storage Tank, 1000 litres

DSBa	PE tank
1000N	1000 I PE metering tank, neutral colour
1000S	1000 I PE metering tank, black
1000B	1000 I PE metering tank, blue
1000G	1000 I PE metering tank, yellow
1000R	1000 I PE metering tank, red
<b>Collecting pan</b>	
0	without collecting pan
1	with collecting pan, neutral colour
2	with collecting pan, black
<b>Version</b>	
0	with ProMinent® Logo
<b>Lock for tank screw top</b>	
1	with lock
<b>Hand mixer, stirrer</b>	
0	none
G	with hand mixer PP
N	with stainless steel 0.75 kW electric stirrer
W	with PVDF 0.75 kW electric stirrer
<b>Metering pump mounting</b>	
0	without pump
A	for Beta®, gamma/ X
B	for Sigma/ 2/ 3
C	for Sigma/ 1
D	for alpha
P	for gamma/ XL
<b>Suction assembly selection</b>	
0	without suction assembly
1	suction assembly with 6x4 suction hose
2	suction assembly with 8x5 suction hose
3	suction assembly with 12x9 suction hose
4	suction assembly DN 10
5	suction assembly DN 15
7	suction assembly DN 25
8	suction assembly DN 32
<b>Suction assembly material</b>	
0	none
1	PVC
2	PP
<b>Suction assembly float switch</b>	
0	without float switch
1	2-stage, round plug, (6x4, 8x5, 12x9) for Beta®, gamma/ X/ XL
2	2-stage, round plug, (DN 10-32) for Sigma/ 1/ 2/ 3, delta®
<b>Accessories - discharge tap for tank</b>	
0	without accessories
1	with ball valve PVC, hose grommet d16 **
2	with ball valve PP, hose grommet d20 **
<b>Calibration assembly</b>	
0	none
<b>Info - pump*</b>	
e.g. GMXa 0414 PVT	

\* Please enter the Identity code of the selected pump

\*\* Ball valve can only be selected if the metering station is ordered without drip pan.

\*\*\* Metering gauge can only be selected if the metering station is ordered without drip pan and without suction fitting.

# 1.7 Metering Systems

## Identity code ordering system for metering system with storage tank, 1500 litres

DSBa	PE tank
1500N	1500 l dosing tank, PE natural
1500S	1500 l dosing tank, PE black
1500B	1500 l dosing tank, PE blue
1500G	1500 l dosing tank, PE yellow
1500R	1500 l dosing tank, PE red
<b>Collecting pan</b>	
0	without collecting pan
1	with collecting pan, natural version
2	with collecting pan, black version
<b>Version</b>	
0	with ProMinent logo
<b>Lock for tank screw top</b>	
1	with lock
<b>Hand mixer, stirrer</b>	
0	none
O	with stainless steel electric stirrer 0.55 kW
X	with electric stirrer ST./PE 0.55 kW
<b>Metering pump mounting</b>	
0	no pump
A	for Beta®, gamma/ X
B	for Sigma/ 2/ 3
C	for Sigma/ 1
D	for alpha
P	for gamma/ XL
<b>Suction assembly selection</b>	
0	without suction assembly
1	Suction assembly with suction hose 6 x 4
2	Suction assembly with suction hose 8 x 5
3	Suction assembly with suction hose 12 x 9
4	DN 10 suction assembly
5	DN 15 suction assembly
7	DN 25 suction assembly
8	DN 32 suction assembly
<b>Suction assembly material</b>	
0	none
1	PVC
2	PP
<b>Suction assembly float switch</b>	
0	without level switch
1	2-stage, round plug, (6 x 4, 8 x 5, 12 x 9) for Beta®, gamma/ X/ XL
2	2-stage, round plug, (DN 10 - 32) for Sigma/ 1/ 2/ 3, gamma/ XL
<b>Accessories - discharge tap for tank</b>	
0	no accessories
<b>Calibration assembly</b>	
0	none
<b>Info - pump*</b>	
	e.g. GMXa 0414 PVT

\* Please enter the Identity code of the selected pump

\*\* Ball valve can only be selected if the metering station is ordered without drip pan.

\*\*\* Metering gauge can only be selected if the metering station is ordered without drip pan and without suction fitting.



# 1.7 Metering Systems

## 1.7.3

### Metering system DULCODOS® universal

Liquid chemicals are metered conveniently, cost-effectively and reliably

Pump volume depending on the selected pump up to 75 l/h, back pressure 10 – 2 bar



The metering system DULCODOS® universal combines carefully selected standard components with the solenoid-driven metering pump you have selected. This is your convenient method for the reliable metering of liquid chemicals – and is available cost-effectively and extremely quickly thanks to the preconfigured modules.

Metering is dependent on the metering pump. Components, such as pipes, relief valves and electrics – indispensable, but scarcely variable – ensure the reliable operation of the system. That is why we have pre-configured the new metering system DULCODOS® universal with these standards. The benefits for you: low costs, fast delivery, simple commissioning.

Naturally you have a choice here as well: Should it be the solenoid driven metering pump Beta® 4 or 5, gamma/ X or gamma/ XL? Should the pipes and seals be made of PP/FKM or PVC/EPDM? And do you need one or two points of injection with one or two pumps?

The novel valve block gives every metering system a clearly arranged structure. Every system features two relief valves, a collecting pan with leak sensor and a calibration tank for controlled metering for complete operational safety.

#### Your benefits

- Reliable and precise metering of liquid chemicals with proven solenoid-driven metering pumps
- Safe operation, thanks to relief valves and collecting pan
- Stable installation frame rotationally sintered from a single piece
- Systems with 1 or 2 pumps and 1 or 2 points of injection
- Calibration unit with priming function for controlled metering
- Optional: Pulsation damper, spray guard
- Optional: DULCOnneX connection (Wi-Fi)

#### Technical Details

- ProMinent solenoid driven metering pumps Beta® 4/5, gamma/ X or gamma/ XL
- Dimensions: 1,700 x 1,200 x 635 mm (H x W x D)
- Material combinations: PP/FKM or PVC/EPDM (note compatibility with the feed chemical)
- Relief valves to protect the pipework
- Manometer
- Collecting pan with leak sensor
- Flushing connectors
- Terminal box with master switch
- Assembly frame available in 4 standard colours

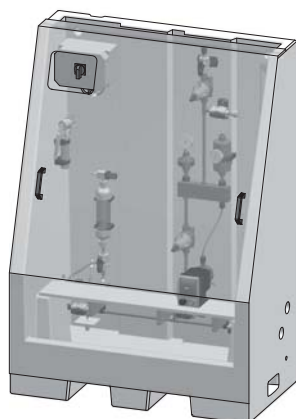
#### Field of application

Metering of liquid chemicals, e.g.

- cooling water treatment
- Waste water and process water treatment
- Paper industry

#### Type selection

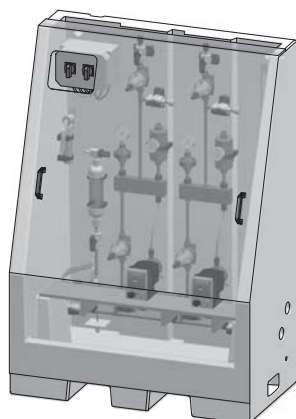
	Metering pumps	Points of injection	Material combinations	Hose materials
Type 1	1	1	PVC/EPDM or PP/FKM	PTFE
Type 2	2	1	PVC/EPDM or PP/FKM	PTFE
Type 3	2	2	PVC/EPDM or PP/FKM	PTFE



P\_DST\_0004\_SW\_3D  
DULCODOS® Universal, type 1



P\_DST\_0006\_SW\_3D  
DULCODOS® Universal, type 2



P\_DST\_0005\_SW\_3D  
DULCODOS® Universal, type 3



# 1.7 Metering Systems

## Identity Code Ordering System for DULCODOS®universal

DSUa	Pipework / Seal / Function
1	PVC, EPDM, for 1 pump and 1 point of injection
2	PVC, EPDM, for 2 pumps and 1 point of injection
3	PVC, EPDM, for 2 pumps and 2 points of injection
4	PP, FKM, for 1 pump and 1 point of injection
5	PP, FKM, for 2 pumps and 1 point of injection
6	PP, FKM, for 2 pumps and 2 points of injection
<b>Mounting frame (900 x 660 x 440 mm – H x W x D)</b>	
0	Natural
1	PE Orange: 1.700 x 1.200 x 635 mm (HxBxT)
2	Yellow
3	Blue
<b>Design</b>	
00	with ProMinent logo
01	without ProMinent logo
<b>Pulsation damper</b>	
0	none
1	1 x pulsation damper PVC/ EPDM
2	1 x pulsation damper PP/FKM
3	2 x pulsation dampers PVC/ EPDM
4	2 x pulsation damper PP/FKM
<b>Hydraulic connectors</b>	
0	Insert
1	Hose nipple 6 x 4
2	Hose nipple 8 x 5
3	Hose nipple 12 x 9
4	Pressure hose nozzle DN10
<b>Flushing connectors</b>	
0	closed
1	Pressure hose nozzle DN10
2	Gardena
<b>Splash guard</b>	
0	none
1	with splash guard
<b>Stainless steel bracket</b>	
0	Floor bracket (2 x brackets)
1	Machine feet
2	Stainless steel bracket + machine feet
3	Wall installation
<b>Pump 1</b>	
00	without pump
41	10 bar / 0.74 l/h, BT4b 1000 PVT2000U1100000, 6 x 4
42	16 bar / 2.2 l/h, BT4b 1602 PVT2000U1100000, 6 x 4
43	16 bar / 3.60 l/h, BT4b 1604 PVT2000U1100000, 6 x 4
44	7 bar / 7.10 l/h, BT4b 0708 PVT2000U1100000, 8 x 5
45	4 bar / 12.30 l/h, BT4b 0413 PVT2000U1100000, 8 x 5
46	2 bar / 19.00 l/h, BT4b 0220 PVT2000U1100000, 12 x 9
51	10 bar / 6.80 l/h, BT5b 1008 PVT2000U1100000, 8 x 5
52	7 bar / 11.0 l/h, BT5b 0713 PVT2000U1100000, 8 x 5
53	4 bar / 17.10 l/h, BT5b 0420 PVT2000U1100000, 12 x 9
54	2 bar / 32.00 l/h, BT5b 0232 NPE2000U1100000, 12 x 9
D1	16 bar / 11.3 l/h, DLTa 1612 PVT2000U11030EN0, 8 x 5
D2	10 bar / 19.1 l/h, DLTa 1020 PVT2000U11030EN0, 12 x 9
D3	7 bar / 29.2 l/h, DLTa 0730 PVT2000U11030EN0, 12 x 9
D4	4 bar / 49.0 l/h, DLTa 0450 PVT2000U11030EN0, DN10
D5	2 bar / 75.0 l/h, DLTa 0280 PVT2000U11030EN0, DN10
X1	16 bar / 3.6 l/h, GMXa 1604 PVT2000U110300EN, 6 x 4
X2	7 bar / 7.6 l/h, GMXa 0708 PVT2000U110300EN, 8 x 5
X3	10 bar / 9.0 l/h, GMXa 1009 PVT2000U110300EN, 8 x 5
X4	4 bar / 13.5 l/h, GMXa 0414 PVT2000U110300EN, 8 x 5
X5	7 bar / 14.5 l/h, GMXa 0715 PVT2000U110300EN, 8 x 5
X6	2 bar / 19.7 l/h, GMXa 0220 PVT2000U110300EN, 12 x 9
X7	4 bar / 24.0 l/h, GMXa 0424 PVT2000U110300EN, 12 x 9
X8	2 bar / 45.0 l/h, GMXa 0245 PVT00000U110300EN, 12 x 9



## ProMinent®

## Low-pressure metering technology

## 1.7 Metering Systems

### 1.7.4

#### Metering system DULCODOS® universal mini PE

**Compact metering system meters liquid chemicals cost-effectively and reliably  
up to 75 l/h (10 – 2 bar) pump volume depending on the pump selected**

The metering system DULCODOS® universal mini PE combines reliable standard components, tailored precisely to your needs, in the most compact space.

The metering system DULCODOS® universal mini PE is supplied ready connected and its small footprint enables it to be easily integrated into the process. The construction is exceptionally well laid out with the new valve block.

The compact metering system DULCODOS® universal mini PE is optionally available with a solenoid-driven metering pump of the Beta® 4 or 5, delta®, gamma/ X and gamma/ XL product ranges. It is also easy to operate. The system is cost-effective and can be delivered extremely quickly.

##### Your benefits

- Compact and clearly laid out construction
- Reliable and precise metering of liquid chemicals with proven solenoid-driven metering pumps
- Systems with 1 pump and 1 point of injection
- Calibration unit with priming function for controlled metering
- Optional: Pulsation damper, spray guard
- Optional: DULCOnneX connection (Wi-Fi)

##### Technical Details

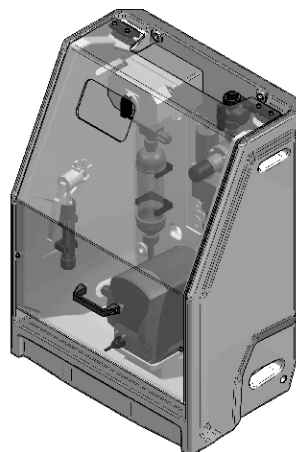
- ProMinent solenoid-driven metering pumps Beta® 4/5, gamma/ X or gamma/ XL
- Dimensions of the metering frames:  
type 1: 900 x 660 x 440 mm (H x W x D)
- Collecting pan with leak sensor
- Flushing connectors
- Terminal box with master switch
- Range of spray guards
- Mounting frame material: PE

##### Field of application

- Cooling water treatment
- Waste water and process water treatment
- Paper industry
- Food industry
- Beverage industry

##### Type selection

	Metering pumps	Points of injection	Material combinations	Hose materials
Type 1	1	1	PVC/EPDM or PP/FKM	PTFE



P\_DD\_0055\_SW

**NEW**

# 1.7 Metering Systems

## Identity code ordering system, DULCODOS® universal mini PE

DSUa	Pipework / Seal / Function	
M	PVC, EPDM, for 1 pump and 1 point of injection	
N	PP, FKM, for 1 pump and 1 point of injection	
	<b>Mounting frame (900 x 660 x 440 mm – H x W x D)</b>	
	5	PE Natural
	6	PE Orange
	7	PE Yellow
	8	PE Blue
	<b>Design</b>	
	00	with ProMinent® logo
	01	without ProMinent logo
	<b>Pulsation damper</b>	
	0	none
	1	1 x pulsation damper PVC/EPDM
	2	1 x pulsation damper PP/FKM
	<b>Hydraulic connectors</b>	
	0	Insert
	1	Hose nipple 6x4
	2	Hose nipple 8x5
	3	Hose nipple 12x9
	4	Pressure hose nozzle DN10
	5	Pressure hose nozzle 1/2" NPT
	<b>Flushing connectors</b>	
	0	closed
	1	Pressure hose nozzle DN10
	2	Gardena
	3	Pressure hose nozzle 1/2" NPT
	<b>Splash guard</b>	
	0	none
	2	with splash guard
	<b>Stainless steel bracket</b>	
	5	Floor installation (without brackets)
	6	Machine feet (4 no.)
	8	Wall installation
	<b>Pump 1</b>	
	00	no pump
	–	<b>Beta 4</b>
	41	10 bar / 0.74 l/h, BT4b 1000 PVT2000U1100000, 6x4
	42	16 bar / 2.2 l/h, BT4b 1602 PVT2000U1100000, 6x4
	43	16 bar / 3.60 l/h, BT4b 1604 PVT2000U1100000, 6x4
	44	7 bar / 7.10 l/h, BT4b 0708 PVT2000U1100000, 8x5
	45	4 bar / 12.30 l/h, BT4b 0413 PVT2000U1100000, 8x5
	46	2 bar / 19.00 l/h, BT4b 0220 PVT2000U1100000, 12x9
	–	<b>Beta 5</b>
	51	10 bar / 6.80 l/h, BT5b 1008 PVT2000U1100000, 8x5
	52	7 bar / 11.0 l/h, BT5b 0713 PVT2000U1100000, 8x5
	53	4 bar / 17.10 l/h, BT5b 0420 PVT2000U1100000, 12x9
	54	2 bar / 32.00 l/h, BT5b 0232 NPE2000U1100000, 12x9
	–	<b>gamma/ XL</b>
	D1	16 bar / 12 l/h, GXLAEU1612PVT2000U11030DE, 8x5
	D2	10 bar / 19.6 l/h, GXLAEU1020PVT2000U11030DE, 12x9
	D3	7 bar / 29.4 l/h, GXLAEU0730PVT2000U11030DE, 12x9
	D4	4 bar / 49.0 l/h, GXLAEU0450PVT2000U11030DE, DN10
	D5	2 bar / 78.5 l/h, GXLAEU0280PVT2000U11030DE, DN10
	–	<b>gamma/ X:</b>
	X1	16 bar / 3.6 l/h, GMXa 1604 PVT2000U110300DE, 6x4
	X2	7 bar / 7.6 l/h, GMXa 0708 PVT2000U110300DE, 8x5
	X3	10 bar / 9.0 l/h, GMXa 1009 PVT2000U110300DE, 8x5
	X4	4 bar / 13.5 l/h, GMXa 0414 PVT2000U110300DE, 8x5
	X5	7 bar / 14.5 l/h, GMXa 0715 PVT2000U110300DE, 8x5
	X6	2 bar / 19.7 l/h, GMXa 0220 PVT2000U110300DE, 12x9
	X7	4 bar / 24.0 l/h, GMXa 0424 PVT2000U110300DE, 12x9
	X8	2 bar / 45.0 l/h, GMXa 0245 PVT0000U110300DE, 12x9



## 1.7 Metering Systems

[illegible]

## 1.7 Metering Systems

### 1.7.5

#### Metering system DULCODOS® universal mini PP

**Compact metering system meters liquid chemicals cost-effectively and reliably  
up to 75 l/h (10 – 2 bar) pump volume depending on the pump selected**

The metering system DULCODOS® universal mini PP combines reliable standard components, tailored precisely to your needs, in the most compact space.



The metering system DULCODOS® universal mini PP is supplied ready connected and its small footprint enables it to be integrated simply into the process. The construction is exceptionally well arranged with the new valve block.

The compact metering system is optionally available with up to two solenoid-driven metering pumps of the product range Beta® 4 or 5, gamma/ X and gamma/ XL. It is also unbelievably simple. The system is cost-effective and can be delivered extremely quickly.

##### Your benefits

- Compact and clearly laid out construction
- Reliable and precise metering of liquid chemicals with proven solenoid-driven metering pumps
- Systems with 1 or 2 pumps and 1 or 2 points of injection
- Calibration unit with priming function for controlled metering
- Optional: Pulsation damper, spray guard
- Optional: DULCOnneX connection (Wi-Fi)

##### Technical Details

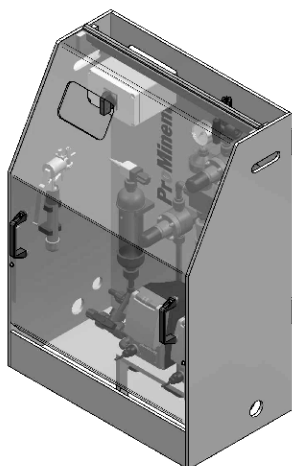
- ProMinent solenoid-driven metering pumps Beta® 4/5, gamma/ X or gamma/ XL
- Dimensions of the metering frames:
  - type 1: 850 x 600 x 520 mm (H x W x D)
  - type 2: 1,000 x 700 x 520 mm (H x W x D)
  - type 3: 850 x 900 x 520 mm (H x W x D)
- Collecting pan with leak sensor
- Flushing connectors
- Terminal box with master switch
- Range of spray guards
- Mounting frame material: PP

##### Field of application

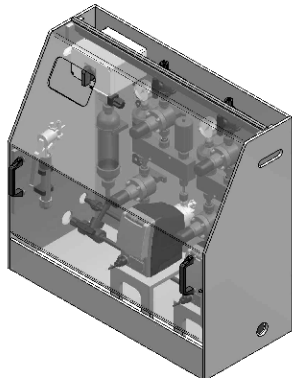
- Cooling water treatment
- Waste water and process water treatment
- Paper industry
- Food industry
- Beverage industry

##### Type selection

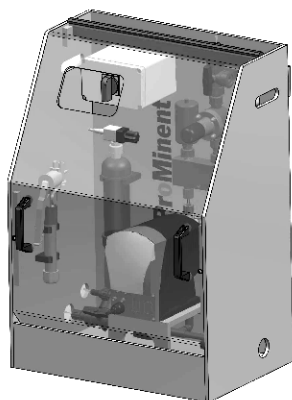
	Metering pumps	Points of injection	Material combinations	Hose materials
Type 1	1	1	PVC/EPDM or PP/FKM	PTFE
Type 2	2	1	PVC/EPDM or PP/FKM	PTFE
Type 3	2	2	PVC/EPDM or PP/FKM	PTFE



P\_DD\_0056\_SW  
DULCODOS® universal mini PP, type 1



P\_DD\_0057\_SW  
DULCODOS® universal mini PP, type 2



P\_DD\_0058\_SW  
DULCODOS® universal mini PP, type 3



# 1.7 Metering Systems

## Identity code ordering system, DULCODOS®universal mini PP

DSUa	Pipework / Seal / Function
A	PVC, EPDM, for 1 pump and 1 point of injection
B	PVC, EPDM, for 2 pumps and 1 point of injection
C	PVC, EPDM, for 2 pumps and 2 points of injection
D	PP, FKM, for 1 pump and 1 point of injection
E	PP, FKM, for 2 pumps and 1 point of injection
F	PP, FKM, for 2 pumps and 2 points of injection
<b>Mounting frame (900 x 660 x 440 mm – H x W x D)</b>	
A	Assembly frame, PP white, 850 x 600 x 520 mm (H x W x D)
B	Assembly frame, PP white, 1000 x 700 x 520 mm (H x W x D)
C	Assembly frame, PP white, 850 x 900 x 520 mm (H x W x D)
<b>Design</b>	
00	with ProMinent® logo
01	without ProMinent logo
<b>Pulsation damper</b>	
0	none
1	1 x pulsation damper PVC/EPDM
2	1 x pulsation damper PP/FKM
3	2 x pulsation dampers PVC/EPDM
4	2 x pulsation dampers PP/FKM
<b>Hydraulic connectors</b>	
0	Insert
1	Hose nipple 6x4
2	Hose nipple 8x5
3	Hose nipple 12x9
4	Pressure hose nozzle DN10
<b>Flushing connectors</b>	
0	closed
1	Pressure hose nozzle DN10
2	Gardena
<b>Splash guard</b>	
0	none
A	with splash guard, W= 600 mm
B	with splash guard, W= 700 mm
C	with splash guard, W= 900 mm
<b>Stainless steel bracket</b>	
D	none
A	Stainless steel bracket (H= 150 mm) + machine feet
B	Stainless steel bracket (H= 150 mm) + machine feet
C	Stainless steel bracket (H= 150 mm) + machine feet
<b>Pump 1</b>	
00	no pump
–	<b>Beta 4</b>
41	10 bar / 0.74 l/h, BT4b 1000 PVT2000U1100000, 6x4
42	16 bar / 2.2 l/h, BT4b 1602 PVT2000U1100000, 6x4
43	16 bar / 3.60 l/h, BT4b 1604 PVT2000U1100000, 6x4
44	7 bar / 7.10 l/h, BT4b 0708 PVT2000U1100000, 8x5
45	4 bar / 12.30 l/h, BT4b 0413 PVT2000U1100000, 8x5
46	2 bar / 19.00 l/h, BT4b 0220 PVT2000U1100000, 12x9
–	<b>Beta 5</b>
51	10 bar / 6.80 l/h, BT5b 1008 PVT2000U1100000, 8x5
52	7 bar / 11.0 l/h, BT5b 0713 PVT2000U1100000, 8x5
53	4 bar / 17.10 l/h, BT5b 0420 PVT2000U1100000, 12x9
54	2 bar/32.00 l/h, BT5b 0232 NPE2000U1100000, 12x9
–	<b>gamma/ XL</b>
D1	16 bar / 12 l/h, GXLAEU1612PVT2000U11030DE, 8x5
D2	10 bar / 19.6 l/h, GXLAEU1020PVT2000U11030DE, 12x9
D3	7 bar / 29.4 l/h, GXLAEU0730PVT2000U11030DE, 12x9
D4	4 bar / 49.0 l/h, GXLAEU0450PVT2000U11030DE, DN10
D5	2 bar / 78.5 l/h, GXLAEU0280PVT2000U11030DE, DN10
–	<b>gamma/ X</b>
X1	16 bar / 3.6 l/h, GMXa 1604 PVT2000U110300DE, 6x4
X2	7 bar / 7.6 l/h, GMXa 0708 PVT2000U110300DE, 8x5
X3	10 bar / 9.0 l/h, GMXa 1009 PVT2000U110300DE, 8x5
X4	4 bar / 13.5 l/h, GMXa 0414 PVT2000U110300DE, 8x5
X5	7 bar / 14.5 l/h, GMXa 0715 PVT2000U110300DE, 8x5
X6	2 bar / 19.7 l/h, GMXa 0220 PVT2000U110300DE, 12x9
X7	4 bar / 24.0 l/h, GMXa 0424 PVT2000U110300DE, 12x9
X8	2 bar / 45.0 l/h, GMXa 0245 PVT0000U110300DE, 12x9

## ProMinent®

1

## Low-pressure metering technology



## 1.7 Metering Systems

### 1.7.6

### Metering System DULCODOS® panel (DSWb)

Our quickly available solution for your metering task.

**Pump capacity depending on the selected pump up to 1,000 l/h, back pressure 10 – 2 bar**

DULCODOS® panel is a complete metering system for reliable chemical metering. It is now even more space-saving and quickly available – our new standards ensure this. You can select perfectly coordinated components, depending on material resistance, pump capacity and function.

The metering system DULCODOS® panel is your convenient method for reliably metering liquid chemicals – and is available cost-effectively and extremely quickly, thanks to the preconfigured modules.

The metering pump is the heart of the metering system. The number of points of injection and metering pumps must be defined. There are several models to choose from. The right components, such as mounting plate, pipework, hydraulic and electric accessories, come from this.

The new valve block for solenoid metering pumps gives the metering systems a well arranged structure. Every system features two relief valves, a collecting pan with leak sensor and a calibration tank for controlled metering for complete operational safety. An inductive flow meter can also be selected. This simple configuration enables fast delivery and seamless commissioning.

#### Your benefits

- Reliable and precise metering of liquid chemicals with proven diaphragm metering pumps
- Safe operation, thanks to relief valves and integrated collecting pan
- Stable assembly frame and assembly cabinets
- Systems with 1 or 2 pumps and 1 or 2 points of injection
- Material selection in PVC or PP with FKM or EPDM seals
- Selected adhesive for PVC: Tangit or DTX
- Calibration unit with priming function for controlled metering
- Optional: pulsation damper, spray guard, inductive flow meter, angled seat filter

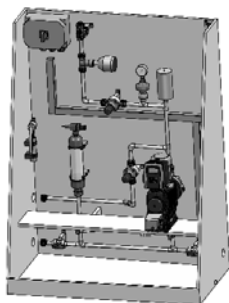
#### Technical Details

- ProMinent diaphragm metering pumps of the product range Beta®, gamma/ X, gamma/ XL or Sigma
- Dimensions: 1,200 x 800 x 450 mm to 2,000 x 1,600 x 650 mm (H x W x D)
- Material combinations: PP/FKM, PP/EPDM or PVC/FKM, PVC/EPDM (note compatibility with the feed chemical)
- PVC adhesive selection: Tangit or DTX
- Relief valves to protect the pipework
- Manometer
- Collecting pan with leak sensor
- Flushing connectors
- Terminal box with master switch
- Assembly frame with spray guard or metering cabinet with sliding doors

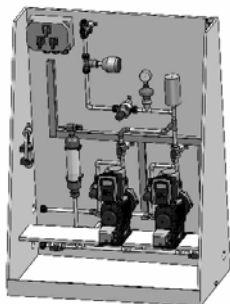
#### Field of application

Metering of liquid chemicals, e.g.

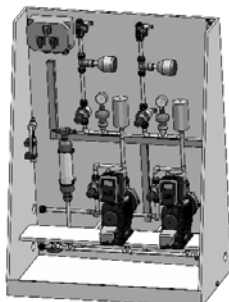
- cooling water treatment
- Waste water and process water treatment
- Paper industry



P\_DST\_0011\_SW



P\_DST\_0012\_SW



P\_DST\_0013\_SW





## 1.7 Metering Systems

### Identity code ordering system, plate-mounted metering systems for Beta® and gamma/ X, DN 10

DSWb	Metering pump / nominal width of pipework
SP10	Solenoid metering pump (Beta® 4b/ Beta® 5b/ gamma/ X/ gamma/ XL), DN10
	<b>Pipework / Function</b>
1	PVC / 1 pump, 1 point of injection
2	PVC / 2 pumps, 1 point of injection
3	PVC / 2 pumps, 2 points of injection
4	PP / 1 pump, 1 point of injection
5	PP / 2 pumps, 1 point of injection
6	PP / 2 pumps, 2 points of injection
	<b>Seal</b>
E	EPDM
B	FKM
	<b>Adhesive</b>
0	none (PP)
T	Tangit
D	DTX
	<b>Assembly frame</b>
0	Assembly frame without spray guard 1200x800x450 mm (HxWxD); 1 pump
1	Assembly frame without spray guard 1400x1000x450 mm (HxWxD); 2 pumps
4	Assembly frame with spray guard 1200x800x450 mm (HxWxD); 1 pump
5	Assembly frame with spray guard 1400x1000x450 mm (HxWxD); 2 pumps
	<b>Design</b>
0	with ProMinent logo
1	without ProMinent logo
	<b>Pulsation damper</b>
0	none
1	1x pulsation damper (type: SP10)
A	2x pulsation damper (type: SP10); 2P-2D
	<b>Inductive flow meter</b>
0	none
	<b>Hydraulic connectors</b>
0	Insert
1	Hose nipple 6 x 4, 8 x 5, 12 x 9, DN10
	<b>Flushing connectors</b>
0	closed
1	Pressure hose nozzle DN10-DN32
A	Gardena
	<b>Fixing / Stainless steel bracket</b>
0	none
1	4 x PP floor clamps
2	Stainless steel bracket 100x800x450 mm (HxWxD) + 4 machine feet; 1 pump
3	Stainless steel bracket 100x1000x450 mm (HxWxD) + 4 machine feet; 2 pumps
	<b>Filter</b>
0	without filter
1	with filter DN 10
	<b>Terminal box</b>
0	No terminal box / no pumps
1	230 V, 1 pump (solenoid and Sigma Control); 1 pump
2	230 V, 2 pumps (solenoid and Sigma Control); 2 pumps
	<b>Pump 1</b>
00	without pump
41	10 bar / 0.74 l/h, BT4b 1000PVT2000U1100000, 6x4
42	16 bar / 2.2 l/h, BT4b 1602PVT2000U1100000, 6x4
43	16 bar / 3.60 l/h, BT4b 1604PVT2000U1100000, 6x4
44	7 bar / 7.10 l/h, BT4b 0708PVT2000U1100000, 8x5
45	4 bar / 12.30 l/h, BT4b 0413PVT2000U1100000, 8x5
46	2 bar / 19.00 l/h, BT4b 0220PVT2000U1100000, 12x9
51	10 bar / 6.80 l/h, BT5b 1008PVT2000U1100000, 8x5
52	7 bar / 11.0 l/h, BT5b 0713PVT2000U1100000, 8x5
53	4 bar / 17.10 l/h, BT5b 0420PVT2000U1100000, 12x9
54	2 bar / 32.00 l/h, BT5b 0232NPE2000U1100000, 12x9
D1	16 bar / 12 l/h, GXLAEU1612PVT2000U11030DE, 8x5
D2	10 bar / 19.6 l/h, GXLAEU1020PVT2000U11030DE, 12x9
D3	7 bar / 29.4 l/h, GXLAEU0730PVT2000U11030DE, 12x9
D4	4 bar / 49.0 l/h, GXLAEU0450PVT2000U11030DE, DN10
D5	2 bar / 78.5 l/h, GXLAEU0280PVT2000U11030DE, DN10
X1	16 bar / 3.6 l/h, GMXa 1604PVT2000U110300DE, 6x4
X2	7 bar / 7.6 l/h, GMXa 0708PVT2000U110300DE, 8x5
X3	10 bar / 9.0 l/h, GMXa 1009PVT2000U110300DE, 8x5
X4	4 bar / 13.5 l/h, GMXa 0414PVT2000U110300DE, 8x5
X5	7 bar / 14.5 l/h, GMXa 0715PVT2000U110300DE, 8x5
X6	2 bar / 19.7 l/h, GMXa 0220PVT2000U110300DE, 12x9
X7	4 bar / 24.0 l/h, GMXa 0424PVT2000U110300DE, 12x9
X8	2 bar / 45.0 l/h, GMXa 0245PVT0000U110300DE, 12x9

## 1.7 Metering Systems

[illegible]



## 1.7 Metering Systems

### Identity Code Ordering System for Plate-Mounted Metering Systems for Sigma/ 1, DN 10

DSWb	Metering pump / nominal width of pipework
S110	Sigma/ 1, DN 10 (S1Cb/S1Ba 12017 - 07065: 20 - 65 l/h)
	<b>Pipework / Function</b>
1	PVC / 1 pump, 1 point of injection
2	PVC / 2 pumps, 1 point of injection
3	PVC / 2 pumps, 2 points of injection
4	PP / 1 pump, 1 point of injection
5	PP / 2 pumps, 1 point of injection
6	PP / 2 pumps, 2 points of injection
	<b>Seal</b>
E	EPDM
B	FKM
	<b>Adhesive</b>
0	none (PP)
T	with extension for standby pump (same type as metering pump)
D	DTX
	<b>Assembly frame</b>
2	Assembly frame without spray guard 1600x1200x650 mm (HxWxD)
6	Assembly frame with spray guard 1600x1200x650 mm (HxWxD)
	<b>Design</b>
0	with ProMinent logo
1	without ProMinent logo
	<b>Pulsation damper</b>
0	none
2	1x pulsation damper (type: S110)
B	2x pulsation damper (type: S110); 2 pumps - 2 points of injection
	<b>Inductive flow meter</b>
0	none
	<b>Hydraulic connectors</b>
0	Insert
2	Hose nozzles DN10
	<b>Flushing connectors</b>
0	closed
1	Pressure hose nozzle
A	Gardena
	<b>Fixing / Stainless steel bracket</b>
0	none
1	4 x PP floor clamps
2	Stainless steel bracket 100x1200x650 mm (HxWxD) + machine feet
	<b>Filter</b>
0	without filter
1	with filter
	<b>Terminal box</b>
0	No terminal box / no pumps
1	230 V, 1 pump (solenoid/Sigma Control)
2	230 V, 2 pumps (solenoid and Sigma Control)
3	400 V, 1 pump (Sigma Basic)
4	400 V, 2 pumps (Sigma Basic)
	<b>Pump 1</b>
00	without pump
11	12 bar / 17 l/h, S1BaH 12017PVTS000T000, 3/4-10
12	10 bar / 22 l/h, S1BaH 10022PVTS000T000, 3/4-10
13	12 bar / 35 l/h, S1BaH 12035PVTS000T000, 3/4-10
15	10 bar / 44 l/h, S1BaH 10044PVTS000T000, 3/4-10
16	10 bar / 50 l/h, S1BaH 10050PVTS000T000, 3/4-10
17	7 bar / 65 l/h, S1BaH 07065PVTS000T000, 3/4-10
1A	12 bar / 21 l/h, S1CbH 12017PVTS000U111000DE, 3/4-10
1B	10 bar / 27 l/h, S1CbH 10022PVTS000U111000DE, 3/4-10
1C	12 bar / 42 l/h, S1CbH 12035PVTS000U111000DE, 3/4-10
1D	10 bar / 49 l/h, S1CbH 10050PVTS000U111000DE, 3/4-10
1F	10 bar / 53 l/h, S1CbH 10044PVTS000U111000DE, 3/4-10
1G	7 bar / 63 l/h, S1CbH 07065PVTS000U111000DE, 3/4-10
	<b>Pump 2</b>
00	without pump
11	12 bar / 17 l/h, S1BaH 12017PVTS000T000, 3/4-10
12	10 bar / 22 l/h, S1BaH 10022PVTS000T000, 3/4-10
13	12 bar / 35 l/h, S1BaH 12035PVTS000T000, 3/4-10
15	10 bar / 44 l/h, S1BaH 10044PVTS000T000, 3/4-10
16	10 bar / 50 l/h, S1BaH 10050PVTS000T000, 3/4-10
17	7 bar / 65 l/h, S1BaH 07065PVTS000T000, 3/4-10
1A	12 bar / 21 l/h, S1CbH 12017PVTS000U111000DE, 3/4-10
1B	10 bar / 27 l/h, S1CbH 10022PVTS000U111000DE, 3/4-10
1C	12 bar / 42 l/h, S1CbH 12035PVTS000U111000DE, 3/4-10
1D	10 bar / 49 l/h, S1CbH 10050PVTS000U111000DE, 3/4-10
1F	10 bar / 53 l/h, S1CbH 10044PVTS000U111000DE, 3/4-10





## 1.7 Metering Systems

### Identity Code Ordering System for Plate-Mounted Metering Systems for Sigma/ 1, DN 15

DSWb	Metering pump / nominal width of pipework
S115	Sigma/ 1, DN 15 (S1Cb/S1Ba 07042 - 04120: 50 - 120 l/h)
	<b>Pipework / Function</b>
1	PVC / 1 pump, 1 point of injection
2	PVC / 2 pumps, 1 point of injection
3	PVC / 2 pumps, 2 points of injection
4	PP / 1 pump, 1 point of injection
5	PP / 2 pumps, 1 point of injection
6	PP / 2 pumps, 2 points of injection
	<b>Seal</b>
E	EPDM
B	FKM
	<b>Adhesive</b>
0	none (PP)
T	with extension for standby pump (same type as metering pump)
D	DTX
	<b>Assembly frame</b>
2	Assembly frame without spray guard 1600x1200x650 mm (HxWxD)
6	Assembly frame with spray guard 1600x1200x650 mm (HxWxD)
	<b>Design</b>
0	with ProMinent logo
1	without ProMinent logo
	<b>Pulsation damper</b>
0	none
3	1x pulsation damper (type: S115/S215)
C	2x pulsation damper (type: S115/S215); 2 pumps - 2 points of injection
	<b>Inductive flow meter</b>
0	none
	<b>Hydraulic connectors</b>
0	Insert
3	Hose nozzles DN15
	<b>Flushing connectors</b>
0	closed
1	Pressure hose nozzle DN15
A	Gardena
	<b>Fixing / Stainless steel bracket</b>
0	none
1	4 x PP floor clamps
4	Stainless steel bracket 100x1200x650 mm (HxWxD) + 4 machine feet
	<b>Filter</b>
0	without filter
1	with filter DN 15
	<b>Terminal box</b>
0	No terminal box / no pumps
1	230 V, 1 pump (solenoid/Sigma Control)
2	230 V, 2 pumps (solenoid and Sigma Control)
3	400 V, 1 pump (Sigma Basic)
4	400 V, 2 pumps (Sigma Basic)
	<b>Pump 1</b>
00	without pump
14	7 bar / 42 l/h, S1BaH 07042PVTS000T000, 1-15
18	4 bar / 84 l/h, S1BaH 04084PVTS000T000, 1-15
19	4 bar / 120 l/h, S1BaH 04120PVTS000T000, 1-15
1E	7 bar / 52 l/h, S1CbH 07042PVTS000U111000DE, 1-15
1H	4 bar / 101 l/h, S1CbH 04084PVTS000U111000DE, 1-15
1J	4 bar / 117 l/h, S1CbH 04120PVTS000U111000DE, 1-15
	<b>Pump 2</b>
00	without pump
14	7 bar / 42 l/h, S1BaH 07042PVTS000T000, 1-15
18	4 bar / 84 l/h, S1BaH 04084PVTS000T000, 1-15
19	4 bar / 120 l/h, S1BaH 04120PVTS000T000, 1-15
1E	7 bar / 52 l/h, S1CbH 07042PVTS000U111000DE, 1-15
1H	4 bar / 101 l/h, S1CbH 04084PVTS000U111000DE, 1-15
1J	4 bar / 117 l/h, S1CbH 04120PVTS000U111000DE, 1-15
	<b>Operating instructions</b>
DE	German
EN	English
ES	Spanish
FR	French
PT	Portuguese
	<b>Certification</b>
01	CE certification

# 1.7 Metering Systems

## Identity Code Ordering System for Plate-Mounted Metering Systems for Sigma/ 2, DN 15

DSWb	Metering pump / nominal width of pipework
S215	Sigma 2 / DN15
<b>Pipework / Function</b>	
1	PVC / 1 pump, 1 point of injection
2	PVC / 2 pumps, 1 point of injection
3	PVC / 2 pumps, 2 points of injection
4	PP / 1 pump, 1 point of injection
5	PP / 2 pumps, 1 point of injection
6	PP / 2 pumps, 2 points of injection
<b>Seal</b>	
E	EPDM
B	FKM
<b>Adhesive</b>	
0	none (PP)
T	with extension for standby pump (same type as metering pump)
D	DTX
<b>Assembly frame</b>	
2	Assembly frame without spray guard 1600x1200x650 mm (HxWxD)
7	Assembly frame with spray guard 1600x1200x650 mm (HxWxD)
<b>Design</b>	
0	with ProMinent logo
1	without ProMinent logo
<b>Pulsation damper</b>	
0	none
3	1x pulsation damper (type: S115/S215)
C	2x pulsation damper (type: S115/S215); 2 pumps - 2 points of injection
<b>Inductive flow meter</b>	
0	none
<b>Hydraulic connectors</b>	
0	Insert
3	Hose nozzles DN15
<b>Flushing connectors</b>	
0	closed
1	Pressure hose nozzle DN15
A	Gardena
<b>Fixing / Stainless steel bracket</b>	
0	none
1	4 x PP floor clamps
2	Stainless steel bracket 100x1200x650 mm (HxWxD) + 4 machine feet
<b>Filter</b>	
0	without filter
1	with filter
<b>Terminal box</b>	
0	No terminal box / no pumps
1	230 V, 1 pump (solenoid/Sigma Control)
2	230 V, 2 pumps (solenoid and Sigma Control)
3	400 V, 1 pump (Sigma Basic)
4	400 V, 2 pumps (Sigma Basic)
<b>Pump 1</b>	
00	without pump
21	10 bar / 50 l/h, S2BaHM 16050PVTS000T000, 1-15
22	10 bar / 88 l/h, S2BaHM 16090PVTS000T000, 1-15
24	10 bar / 135 l/h, S2BaHM 16130PVTS000T000, 1-15
2A	10 bar / 61 l/h, S2CbH 16050PVTS000U1110S0EN, 1-15
2B	10 bar / 109 l/h, S2CbH 16090PVTS000U1110S0EN, 1-15
2C	10 bar / 131 l/h, S2CbH 16130PVTS000U1110S0EN, 1-15
<b>Pump 2</b>	
00	without pump
21	10 bar / 50 l/h, S2BaHM 16050PVTS000T000, 1-15
22	10 bar / 88 l/h, S2BaHM 16090PVTS000T000, 1-15
24	10 bar / 135 l/h, S2BaHM 16130PVTS000T000, 1-15
2A	10 bar / 61 l/h, S2CbH 16050PVTS000U111000DE, 1-15
2B	10 bar / 109 l/h, S2CbH 16090PVTS000U111000DE, 1-15
2C	10 bar / 131 l/h, S2CbH 16130PVTS000U111000DE, 1-15
<b>Operating instructions</b>	
DE	German
EN	English
ES	Spanish
FR	French
PT	Portuguese
<b>Certification</b>	
01	CE certification

# 1.7 Metering Systems

## Identity Code Ordering System for Plate-Mounted Metering Systems for Sigma/ 2, DN 20

DSWb	Metering pump / nominal width of pipework
S220	Sigma 2 / DN20
<b>Pipework / Function</b>	
1	PVC / 1 pump, 1 point of injection
2	PVC / 2 pumps, 1 point of injection
3	PVC / 2 pumps, 2 points of injection
4	PP / 1 pump, 1 point of injection
5	PP / 2 pumps, 1 point of injection
6	PP / 2 pumps, 2 points of injection
<b>Seal</b>	
E	EPDM
B	FKM
<b>Adhesive</b>	
0	none
T	with extension for standby pump (same type as metering pump)
D	DTX
<b>Assembly frame</b>	
2	Assembly frame without spray guard 1600x1200x650 mm (HxWxD); 1 pump
3	Assembly frame without spray guard 2000x1600x650 mm (HxWxD); 2 pumps
7	Assembly frame without spray guard 1600x1200x650 mm (HxWxD); 1 pump
8	Assembly of cabinet 2000x1600x650 mm (HxWxD); 2 pumps
<b>Design</b>	
0	with ProMinent logo
1	without ProMinent logo
<b>Pulsation damper</b>	
0	none
4	1x pulsation damper (type: S220)
D	2x pulsation damper (type: S220); 2 pumps - 2 points of injection
<b>Inductive flow meter</b>	
0	none
1	1x Inductive flow meter, Hast. C/PVDF, 4-20 mA, with display, min. flow=60 l/h
2	2x inductive flow meters, Hast.C/PVDF, 4-20 mA, with display, 2 pumps - 2 points of injection, min. flow = 60 l/h
<b>Hydraulic connectors</b>	
0	Insert
4	Hose nozzles DN20
<b>Flushing connectors</b>	
0	closed
1	Pressure hose nozzle DN20
A	Gardena
<b>Fixing / Stainless steel bracket</b>	
0	none
1	4 x PP floor clamps
4	Stainless steel bracket 100x1200x650 mm (HxWxD) + 4 machine feet; 1 pump
5	Stainless steel bracket 100x1600x650 mm (HxWxD) + 4 machine feet; 2 pumps
<b>Filter</b>	
0	without filter
3	with filter DN20
<b>Terminal box</b>	
0	No terminal box / no pumps
1	230 V, 1 pump (solenoid/Sigma Control)
2	230 V, 2 pumps (solenoid and Sigma Control)
3	400 V, 1 pump (Sigma Basic)
4	400 V, 2 pumps (Sigma Basic)
<b>Pump 1</b>	
00	without pump
23	7 bar / 126 l/h, S2BaHM 07120PVTS000T000, 1 1/2-25
25	7 bar / 220 l/h, S2BaHM 07220PVTS000T000, 1 1/2-25
26	4 bar / 350 l/h, S2BaHM 04350PVTS000T000, 1 1/2-25
2D	7 bar / 150 l/h, S2CbH 07120PVTS000U111000DE, 1 1/2-25
2E	7 bar / 271 l/h, S2CbH 07220PVTS000U111000DE, 1 1/2-25
2F	4 bar / 353 l/h, S2CbH 04350PVTS000U111000DE, 1 1/2-25
<b>Pump 2</b>	
00	without pump
23	7 bar / 126 l/h, S2BaHM 07120PVTS000T000, 1 1/2-25
25	7 bar / 220 l/h, S2BaHM 07220PVTS000T000, 1 1/2-25
26	4 bar / 350 l/h, S2BaHM 04350PVTS000T000, 1 1/2-25
2D	7 bar / 150 l/h, S2CbH 07120PVTS000U111000DE, 1 1/2-25
2E	7 bar / 271 l/h, S2CbH 07220PVTS000U111000DE, 1 1/2-25
2F	4 bar / 353 l/h, S2CbH 04350PVTS000U111000DE, 1 1/2-25
<b>Operating instructions</b>	
DE	German
EN	English
ES	Spanish
<b>Certification</b>	
01	CE certification



# 1.7 Metering Systems

## Identity Code Ordering System for Plate-Mounted Metering Systems for Sigma/ 3, DN 25

DSWb	Metering pump / nominal width of pipework
S325	Sigma/ 3, DN 25 (S3Cb 120145 - 120330: 174 - 324 l/h)
	<b>Pipework / Function</b>
1	PVC / 1 pump, 1 point of injection
2	PVC / 2 pumps, 1 point of injection
3	PVC / 2 pumps, 2 points of injection
4	PP / 1 pump, 1 point of injection
5	PP / 2 pumps, 1 point of injection
6	PP / 2 pumps, 2 points of injection
	<b>Seal</b>
E	EPDM
B	FKM
	<b>Adhesive</b>
0	none
T	with extension for standby pump (same type as metering pump)
D	DTX
	<b>Assembly frame</b>
2	Assembly frame without spray guard 1600x1200x650 mm (HxWxD); 1 pump
3	Assembly frame without spray guard 2000x1600x650 mm (HxWxD); 2 pumps
7	Assembly frame without spray guard 1600x1200x650 mm (HxWxD); 1 pump
8	Assembly of cabinet 2000x1600x650 mm (HxWxD); 2 pumps
	<b>Design</b>
0	with ProMinent logo
1	without ProMinent logo
	<b>Pulsation damper</b>
0	none
5	1x pulsation damper (type: S325)
E	2x pulsation damper (type: S325); 2 pumps - 2 points of injection
	<b>Inductive flow meter</b>
0	none
1	1x Inductive flow meter, Hast. C/PVDF, 4-20 mA, with display, min. flow=90 l/h
2	2x inductive flow meters, Hast.C/PVDF, 4-20 mA, with display, 2 pumps - 2 points of injection, min. flow = 90 l/h
	<b>Hydraulic connectors</b>
0	Insert
5	Hose nozzles DN25
	<b>Flushing connectors</b>
0	closed
4	Pressure hose nozzle DN25
A	Gardena
	<b>Fixing / Stainless steel bracket</b>
0	none
1	4 x PP floor clamps
4	Stainless steel bracket 100x1200x650 mm (HxWxD) + 4 machine feet; 1 pump
5	Stainless steel bracket 100x1600x650 mm (HxWxD) + 4 machine feet; 2 pumps
	<b>Filter</b>
0	without filter
4	with filter DN25
	<b>Terminal box</b>
0	No terminal box / no pumps
1	230 V, 1 pump (solenoid/Sigma Control)
2	230 V, 2 pumps (solenoid and Sigma Control)
3	400 V, 1 pump (Sigma Basic)
4	400 V, 2 pumps (Sigma Basic)
	<b>Pump 1</b>
00	without pump
31	10 bar / 146 l/h, S3BaH 120145PVTS000T000, 1 1/2-25
31	10 bar / 208 l/h, S3BaH 120190PVTS000T000, 1 1/2-25
33	10 bar / 292 l/h, S3BaH 120270PVTS000T000, 1 1/2-25
34	10 bar / 365 l/h, S3BaH 120330PVTS000T000, 1 1/2-25
3A	10 bar / 182 l/h, S3CbH 120145PVTS000U111000DE, 1 1/2-25
3B	10 bar / 243 l/h, S3CbH 120190PVTS000U111000DE, 1 1/2-25
3C	10 bar / 365 l/h, S3CbH 120270PVTS000U111000DE, 1 1/2-25



## Low-pressure metering technology



# 1.7 Metering Systems

## Identity Code Ordering System for Plate-Mounted Metering Systems for Sigma/ 3, DN 32

DSWb	Metering pump / nominal width of pipework
S332	Sigma/ 3, DN 32 (S3Cb 070410 - 041030: 492 - 1000 l/h)
Pipework / Function	
1	PVC / 1 pump, 1 point of injection
2	PVC / 2 pumps, 1 point of injection
3	PVC / 2 pumps, 2 points of injection
4	PP / 1 pump, 1 point of injection
5	PP / 2 pumps, 1 point of injection
6	PP / 2 pumps, 2 points of injection
Seal	
E	EPDM
B	FKM
Adhesive	
0	none
T	with extension for standby pump (same type as metering pump)
D	DTX
Assembly frame	
2	Assembly frame without spray guard 1600x1200x650 mm (HxWxD); 1 pump
3	Assembly frame without spray guard 2000x1600x650 mm (HxWxD); 2 pumps
7	Assembly frame without spray guard 1600x1200x650 mm (HxWxD); 1 pump
8	Assembly of cabinet 2000x1600x650 mm (HxWxD); 2 pumps
Design	
0	with ProMinent logo
1	without ProMinent logo
Pulsation damper	
0	none
6	1x pulsation damper (type: S332)
F	2x pulsation damper (type: S332); 2 pumps - 2 points of injection
Inductive flow meter	
0	none
1	1x Inductive flow meter, Hast. C/PVDF, 4-20 mA, with display, min. flow=150 l/h
2	2x inductive flow meters, Hast.C/PVDF, 4-20 mA, with display, 2 pumps - 2 points of injection, min. flow = 150 l/h
Hydraulic connectors	
0	Insert
6	Hose nozzles DN32
Flushing connectors	
0	closed
1	Pressure hose nozzle DN32
A	Gardena
Fixing / Stainless steel bracket	
0	none
1	4 x PP floor clamps
4	Stainless steel bracket 100x1200x650 mm (HxWxD) + 4 machine feet; 1 pump
5	Stainless steel bracket 100x1600x650 mm (HxWxD) + 4 machine feet; 2 pumps
Filter	
0	without filter
5	with filter DN32
Terminal box	
0	No terminal box / no pumps
1	230 V, 1 pump (solenoid/Sigma Control)
2	230 V, 2 pumps (solenoid and Sigma Control)
3	400 V, 1 pump (Sigma Basic)
4	400 V, 2 pumps (Sigma Basic)
Pump 1	
00	without pump
35	7 bar / 410 l/h, S3BaH 070410PVTS100T000, 2-32
36	7 bar / 580 l/h, S3BaH 070580PVTS100T000, 2-32
37	4 bar / 830 l/h, S3BaH 040830PVTS100T000, 2-32
38	4 bar / 1030 l/h, S3BaH 041030PVTS100T000, 2-32
3D	7 bar / 500 l/h, S3CbH 070410PVTS100U111000DE, 2-32
3E	7 bar / 670 l/h, S3CbH 070580PVTS100U111000DE, 2-32
3F	4 bar / 1040 l/h, S3CbH 040830PVTS100U111000DE, 2-32

**ProMinent®**

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## 1.7 Metering Systems

### 1.7.7

### Metering system DULCODOS® modular (DSKa)

**Modular and flexible for precise metering**

**Capacity: 40 – 1,000 l/h**

The ready-wired modular metering system DULCODOS® is used for the ultra-precise metering of chemicals. It has a modular design and can be flexibly integrated into the most varied applications.

The construction of the DULCODOS® modular enables them to be flexibly tailored to your processes. The system is configured via an identity code. The metering systems are delivered ready mounted and can be quickly and easily installed.

#### Your benefits

- Simple and fast installation, thanks to its ready-wired design
- Flexible, practical process integration with the identity code "DSKa"
- Minimal space requirement, thanks to compact construction
- Short delivery times due to the use of standard components
- Minimal stock of spare parts

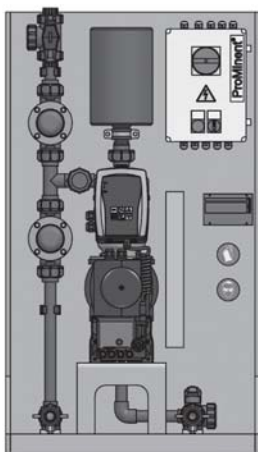
#### Technical Details

##### Selectable via the identity code:

- Metering system for the integration of a Sigma product range motor-driven metering pump
- Plastic or stainless steel brackets
- Splash guard
- PP, PVC or PVDF pipework
- EPDM or FPM seals
- VA base with machine feet
- Manometer for commissioning of the back pressure valves
- Hydraulic connectors, (d25 hose nozzles, welding/straight solvent unions, stainless steel sleeves)
- Electrical connectors
- Motor-driven metering pump Sigma

##### Included in the standard scope of delivery:

- Leak sensor (contained in the standard scope of delivery)
- Flushing connectors with 3-way ball valve
- Pulsation damper with back pressure valve
- Relief valve with return line
- Hose nozzles on suction side and return in d 25



P\_DD\_053\_SW1



# 1.7 Metering Systems

## Identity Code Ordering System, DULCODOS® Modular, (DSKa)

DSKa	DULCODOS modular DSKa	
S	DULCODOS modular for the installation of a Sigma motor-driven metering pump	
	<b>Assembly frame</b>	
0	PP assembly frame	
1	Stainless steel assembly frame	
	<b>Splash guard</b>	
0	without splash guard	
1	with splash guard	
	<b>Design</b>	
0	with ProMinent logo	
1	without ProMinent logo	
	<b>Stainless steel base frame</b>	
0	none	
1	with stainless steel base including 4 machine feet	
	<b>Pipework</b>	
PCEH	PVC / EPDM - with pulsation damper (Hidracar)	
PCBH	PVC / FKM - with pulsation damper (Hidracar)	
PPEH	PP / EPDM - with pulsation damper (Hidracar)	
PVBH	PVDF / FKM - with pulsation damper (Hidracar)	
	<b>Options</b>	
0	Floor installation (2 x brackets)	
1	Test and filling device for diaphragm damper + gas filling adapter G14"-VGB	
	<b>Manometer with diaphragm seal (for commissioning)</b>	
0	Floor installation (2 x brackets)	
1	PVC	
2	PP	
3	PVDF	
	<b>Hydraulic connectors discharge side</b>	
0	none (ball valve with straight union)	
	<b>Hose nozzle</b>	
1	Nozzle d25 PVC, for hose 25x34	
2	Nozzle d25 PP, for hose 25x34	
3	Nozzle d25 PVDF, for hose 25x34 (1041960)	
	<b>Straight solvent union/welding sleeve (for follow-on pipework)</b>	
4	Straight solvent union d25, PVC-U (1030214)	
5	Straight solvent union d25, PVC-C (1040280)	
6	Welding sleeve d25 PP-H (1035825)	
7	Welding sleeve d25 PVDF (1027466)	
	<b>Insert for stainless steel pipework (DIN 11850)</b>	
A	Insert for stainless steel pipe 19x1.5 (1040734)	
B	Insert for stainless steel pipe 23x1.5 (1039507)	
C	Insert for stainless steel pipe 29x1.5 (1039549)	
	<b>Electrical connection</b>	
K	Terminal box	
H	Master switch	
R	Repair switch	
	<b>Pump</b>	
00	no pump, no adapter	
01	no pump, with adapter set Sigma 1 to 65 l/h	
02	no pump, with adapter set Sigma 1 to 120 l/h	
03	no pump, with adapter set Sigma 2, Basic to 135 l/h	
04	no pump, with adapter set Sigma 2, Basic to 350 l/h	
05	no pump, with adapter set Sigma 2, Control to 131 l/h	
06	no pump, with adapter set Sigma 2, Control to 353 l/h	
07	no pump, with adapter set Sigma 3, to 365 l/h	
08	no pump, with adapter set Sigma 3, to 670 l/h	
09	no pump, with adapter set Sigma 3, to 1040 l/h	
	<b>Sigma 1 - Basic</b>	
11	12 bar / 17 l/h, S1BaH 12017PVTS000T000, 3/4-10	
12	10 bar / 22 l/h, S1BaH 10022PVTS000T000, 3/4-10	
13	12 bar / 35 l/h, S1BaH 12035PVTS000T000, 3/4-10	
14	10 bar / 44 l/h, S1BaH 10044PVTS000T000, 3/4-10	
15	10 bar / 50 l/h, S1BaH 10050PVTS000T000, 3/4-10	
16	7 bar / 65 l/h, S1BaH 07065PVTS000T000, 3/4-10	
17	7 bar / 42 l/h, S1BaH 07042PVTS000T000, 1-15	
18	4 bar / 84 l/h, S1BaH 04084PVTS000T000, 1-15	
19	4 bar / 120 l/h, S1BaH 04120PVTS000T000, 1-15	



## 1.7 Metering Systems

1

### Sigma 1 - Control

1A	12 bar / 21 l/h, S1CbH 12017PVTS000U1110S0DE, 3/4-10
1B	10 bar / 27 l/h, S1CbH 10022PVTS000U1110S0DE, 3/4-10
1C	12 bar / 42 l/h, S1CbH 12035PVTS000U1110S0DE, 3/4-10
1D	10 bar / 49 l/h, S1CbH 10050PVTS000U1110S0DE, 3/4-10
1E	10 bar / 53 l/h, S1CbH 10044PVTS000U1110S0DE, 3/4-10
1F	7 bar / 63 l/h, S1CbH 07065PVTS000U1110S0DE, 3/4-10
1G	7 bar / 52 l/h, S1CbH 07042PVTS000U1110S0DE, 1-15
1H	4 bar / 101 l/h, S1CbH 04084PVTS000U1110S0DE, 1-15
1J	4 bar / 117 l/h, S1CbH 04120PVTS000U1110S0DE, 1-15

### Sigma 2 - Basic

21	10 bar / 50 l/h, S2BaHM 16050PVTS000T000, 1-15
22	10 bar / 88 l/h, S2BaHM 16090PVTS000T000, 1-15
23	10 bar / 135 l/h, S2BaHM 16130PVTS000T000, 1-15
24	7 bar / 126 l/h, S2BaHM 07120PVTS000T000, 1 1/2-25
25	7 bar / 220 l/h, S2BaHM 07220PVTS000T000, 1 1/2-25
26	4 bar / 350 l/h, S2BaHM 04350PVTS000T000, 1 1/2-25

### Sigma 2 - Control

2A	10 bar / 61 l/h, S2CbH 16050PVTS000U1110S0DE, 1-15
2B	10 bar / 109 l/h, S2CbH 16090PVTS000U1110S0DE, 1-15
2C	10 bar / 131 l/h, S2CbH 16130PVTS000U1110S0DE, 1-15
2D	7 bar / 150 l/h, S2CbH 07120PVTS000U1110S0DE, 1 1/2-25
2E	7 bar / 271 l/h, S2CbH 07220PVTS000U1110S0DE, 1 1/2-25
2F	4 bar / 353 l/h, S2CbH 04350PVTS000U1110S0DE, 1 1/2-25

### Sigma 3 - Basic

31	10 bar / 146 l/h, S3BaH 120145PVTS000T000, 1 1/2-25
32	10 bar / 208 l/h, S3BaH 120190PVTS000T000, 1 1/2-25
33	10 bar / 292 l/h, S3BaH 120270PVTS000T000, 1 1/2-25
34	10 bar / 365 l/h, S3BaH 120330PVTS000T000, 1 1/2-25
35	7 bar / 410 l/h, S3BaH 070410PVTS100T000, 2-32
36	7 bar / 580 l/h, S3BaH 070580PVTS100T000, 2-32
37	4 bar / 830 l/h, S3BaH 040830PVTS100T000, 2-32
38	4 bar / 130 l/h, S3BaH 041030PVTS100T000, 2-32

### Sigma 3 - Control

3A	10 bar / 182 l/h, S3CbH 120145PVTS000U1110S0DE, 1 1/2-25
3B	10 bar / 243 l/h, S3CbH 120190PVTS000U1110S0DE, 1 1/2-25
3C	10 bar / 365 l/h, S3CbH 120270PVTS000U1110S0DE, 1 1/2-25
3D	7 bar / 500 l/h, S3CbH 070410PVTS100U1110S0DE, 2-32
3E	7 bar / 670 l/h, S3CbH 070580PVTS100U1110S0DE, 2-32
3F	4 bar / 140 l/h, S3CbH 040830PVTS100U1110S0DE, 2-32

### Operating instructions

DE	German
EN	English
ES	Spanish
FR	French
PT	Portuguese

### Certification

01	CE certification
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# 1.7 Metering Systems

## 1.7.8

## Metering System DULCODOS® Hydrazine

**Corrosion is the last thing you need with the majority of applications. That is why hydrazine protects.**

**Chemical tank ranging from 140 to 250 litres**



DULCODOS® Hydrazine batching and metering systems are used for manual batching and automatic metering of diluted hydrazine solutions. And, of course, they also comply with all environmental and safety requirements.

Hydrazine acts as an oxygen binding agent, is volatile in steam and prevents corrosion. As it is carcinogenic, the dispensing and metering systems need to be gas-tight so that no hydrazine vapours can escape. Our systems comply with these requirements.

### Your benefits

- Gas-tight design
- Precise metering
- Protects the environment

### Field of application

- Steam circuits
- Power plants

**Hydrazine is used as an oxygen binding agent in the process water sector, predominantly with steam generation. It is a carcinogenic agent and special care is therefore needed when handling it.**

It therefore has to be ensured that the activation threshold for hydrazine is not exceeded with correct and proper use of closed and gas-tight systems.

### Design

Ready-to-use assembled metering system essentially consisting of:

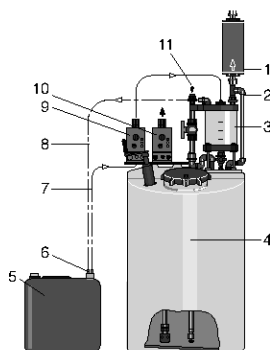
- Gas-tight chemical tank made of PE with a litre scale, with lockable screw lid and manual stirrer
- Each with a dispensing and metering pump with suction assembly, level switch, as well as complete rigid PVC pipework with two ball valves, the measuring tank and activated charcoal filter

### Accessories

5 m metering line 8/12 mm Ø and stainless steel metering valve 8 mm Ø/1/2"

Electrical connection 230 V ±10%, 50...60 Hz

The metering system is supplied with a hose connection, which fits on a conventional drain system. This drain system is produced by MicroMatic, Gräfelfing/Munich.



pk\_7\_078

- 1 Activated charcoal filter
- 2 Bleed/vent line
- 3 Apportioning unit
- 4 Metering tank
- 5 Hydrazin 15 returnable canister
- 6 Quick release coupling
- 7 Metering line
- 8 Gas shuttle line
- 9 Refilling pump
- 10 Metering pump
- 11 Fill water

## Hydrazine Dispensing and Metering System, Completely Ready Mounted

Metering Tank Contents	Metering pump Capacity	Metering pump Feed Rate	Transfer Pump Discharge Flow	Order no.
130 l	7.1 l/h	7.0 bar	17 l/h	913018
250 l	11.0 l/h	7.0 bar	32 l/h	913019

### Accessories

	Order no.
Sampling set, stainless steel	1003964



## 1.7 Metering Systems

### 1.7.9

### Metering System DULCODOS® Ammonia

The metering system for the targeted dilution and metering of ammonia solution to prevent corrosion in the steam boiler.

Metering system DULCODOS® Ammonia for the low-odour and safe handling of ammonia solution. For a stable pH value and reduced corrosion in the vapour system.

Thousands of steam generators operate in industry. Corrosion in systems equates to idleness, which needs to be prevented. The DULCODOS® Ammonia metering system produces a usable solution of 0.1 to 2.5% from the maximum 25% commercial ammonia product. The transfer pump, measuring tank and mixing tank are important for production of the required solution. The Beta® metering pump meters the solution precisely into the steam system to be protected.

#### Your benefits

- Compact metering system
- Gas-tight application, no escape of ammonia vapours
- Operationally safe thanks to level switch in the measuring tanks, intrinsically safe design

#### Technical Details

Ready-to-use assembled metering system, essentially consisting of:

- PE dosing tank with a litre scale, with lockable screw lid and manual stirrer.
- Each with a dispensing and metering pump with suction assembly, level switch, as well as complete rigid PVC pipework with two ball valves, the measuring tank and active carbon filter.
- Terminal box for control of the metering pumps.
- Injection valve VA, ½", 5 m PE hose, 12x9 mm.

The container with concentrated ammonia solution is not included in the scope of delivery.

#### Field of application

- Steam circuits
- Power plants
- Max. 25% commercial ammonia can be used
- Solution: 0.1 to 2.5%

#### Design

Ready-to-use assembled metering system, essentially consisting of:

- Dosing tank made of PE with a litre scale, with lockable screw lid and manual stirrer.
- Each with a dispensing and metering pump with suction assembly, level switch, as well as complete rigid PVC-U, pipework with two ball valves, the measuring tank and active carbon filter.
- Terminal box for control of the metering pumps.
- Injection valve VA, ½", 5 m PE hose, 12x9 mm
- The container with the commercial product is not included in the scope of delivery

Metering Tank Contents	Metering pump Capacity	Metering pump Feed Rate	Transfer Pump Discharge Flow	Order no.
l	l/h	bar	l/h	
130	7.1	7	17.1	1039192
250	11.0	7	32	1039193

#### Accessories

	Order no.
Gas-tight suction lance for the delivery container	on request

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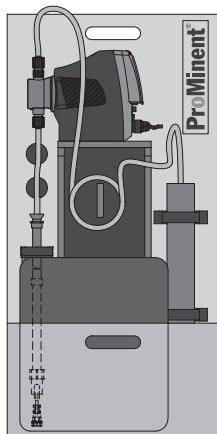
# 1.7 Metering Systems

## 1.7.10

## Metering System DULCODOS® Emergency Potable Water Disinfection

### Fast and precise disinfection of potable water

Handy metering system for emergency potable water disinfection. For fast use against micro-organisms.



P\_DD\_0051\_SW1

Water supply companies ensure high quality of potable water in accordance with the applicable Drinking Water Ordinance (TrinkwV 2001). In spite of this, emergency situations can nevertheless arise that require rapid disinfection.

ProMinent supplies a compact metering station, which is immediately ready for use and performs emergency disinfection, for instance after flooding or pipe ruptures, in compliance with the regulations.

All disinfectants permitted in accordance with the Drinking Water Ordinance 2001 and the List of Permitted Substances (§ 11) can be used. Emergency potable water disinfection can also be used when commissioning new pipes, after repairs or after long downtimes.

### Your benefits

- Connection-ready handy metering system (0.02 – 1.55 l/h, 10 bar)
- Integrated metering and pressure monitoring
- Low-pulsation metering by guided discharge strokes via intelligent profile suction/discharge pumping
- Volume-proportional metering if customer has a flow water meter fitted
- adequate for treatment of up to 372 m³/h when adding 0.5 mg/l to 155 m³/h of chlorine with the addition of 1.2 mg/l (when using sodium-calcium hypochlorite 12%)

### Technical Details

Ready-to-use assembled metering system, essentially consisting of:

- Assembly frame for installation of a container for disinfectant (e.g. sodium-calcium hypochlorite, 12 %). 500x500x1000 mm (LxWxH).
- Metering pump gamma/ X, GMXa 1604, 1.55 l/h, 10 bar.
- Injection lance, ½", 10 m PVC hose, 6x12 mm

### Field of application

- Emergency disinfection of potable water
- Disinfection after downtimes
- Disinfection during commissioning

	Metering pump Capacity l/h	Order no.
Potable water disinfection with GMXa 1604	1.6	1081318



# 1.7 Metering Systems

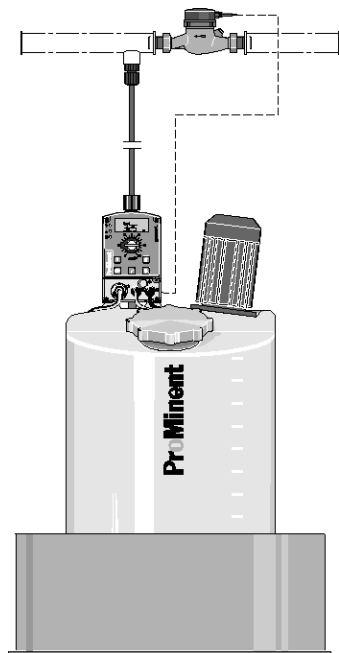
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## Application Examples

### Proportional Metering of Phosphate

Product: **DULCODOS® eco**  
 Feed chemical: **Phosphate**  
 Industry: **Potable water**  
 Application: **Potable water conditioning**

The liquid phosphate is added to the potable water proportional to the volume. The flow meter sends pulses to the gamma/ L pump. The metering volume is adjusted by increasing or decreasing the incoming pulses.



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#### Tasks and requirements

Metering of phosphate to potable water to prevent lime deposits and corrosion in the piping

#### Operating conditions

- Treatment of potable water
- Fluctuating water demand
- Water temperature between 4 – 30 °C

#### Application information

- Proportional metering of phosphate depending on the water supply
- Control of the metering pump by a contact water meter
- Measurement of the metering pump capacity during commissioning

#### Solution

- DULCODOS® eco with 140-litre metering tank and drip pan
- gamma/ L with contact input and pulse control
- Contact water meter

#### Benefits

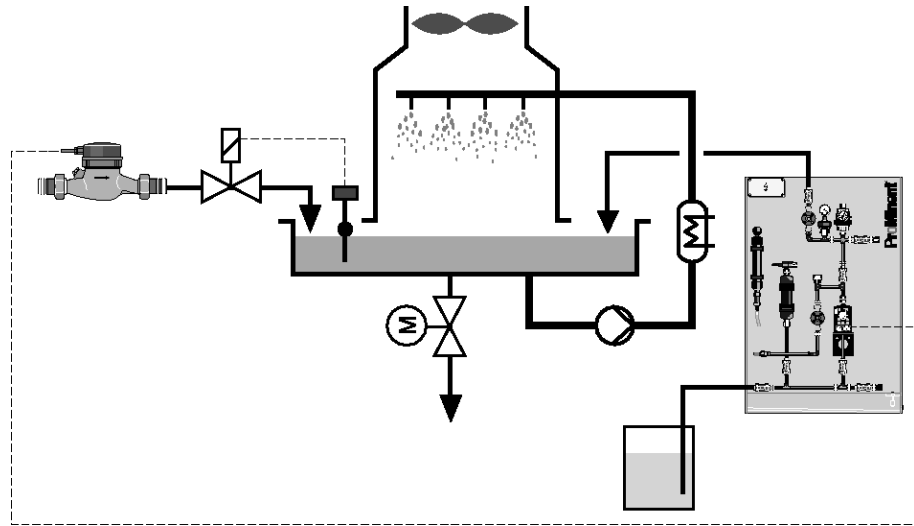
- Constant solution concentration even minimal fluctuating water supply
- Fully-automatic operation with minimal staff and maintenance
- Flexible process design thanks to adaptation of the pump to various concentration demands

## 1.7 Metering Systems

### Inhibitor Metering in Cooling Water

Product: **DULCODOS® panel / DULCODOS® universal**  
 Feed chemical: **Corrosion inhibitor**  
 Industry: **Process industry, Power plants**  
 Application: **cooling water treatment**

The corrosion inhibitor is metered proportionally to the fresh water. The water meter detects the volume of feed water and transmits the pulses to the gamma/ L pump.



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#### Tasks and requirements

Metering of corrosion inhibitors to supply water to prevent lime deposits and corrosion in the cooling water circuit.

#### Operating conditions

- Treatment of flow water
- Fluctuating water demand
- Water temperature between 4 – 20 °C

#### Application information

- Proportional metering of inhibitor depending on the water supply
- Control of the metering pump by a contact water meter
- Calibration of the metering pump capacity during commissioning

#### Solution

- DULCODOS® panel including standby pump
- gamma/ L with contact input and pulse control
- Contact water meter

#### Benefits

- Protection against corrosion in the pipework and heat exchanger
- Constant solution concentration even with fluctuating water supply
- Fully-automatic operation with minimal staff and maintenance
- Flexible process design thanks to adaptation of the pump to various concentration demands



## 1.8 Domestic Water Systems

### 1.8.1

### Systems for Domestic Water Installations

#### Proportional Flow Dosing System for Liquid Dosing

##### Promatik®

Metering systems protect pipework, fittings, and appliances, such as boilers, washing machines and dishwashers, from corrosion and limescale. Active substances, like silicate, phosphate or silicate phosphate mixtures, can be metered here. These active substances form a protective layer in the pipework and reduce aggressiveness and sedimentation in the water.

##### Silicate

As a corrosion inhibitor to prevent rust formation: "brownish water" in galvanised pipework, "pitting": needle-like holes in the pipework. Applications include soft, corrosive types of water with a high percentage of aggressive carbonic acid. The silicate is used to raise the pH value closer to a lime-carbonic acid equilibrium. Hydrolysis produces a silica gel that forms a thin protective layer in the pipework and fittings and thus prevents corrosion.

##### Phosphate

As ortho and polyphosphate to prevent limescale and corrosion in hard water up to max. 20 CH (carbonate hardness). Hard water salts, such as calcium and magnesium ions, responsible for limescale are thereby stabilised, i.e. these ions remain dissolved in the water and do not form limescale on the pipe walls. Growth on the pipes is thus prevented and there are no deposits of limescale on heating coils, dramatically reducing their efficiency. A thin, solid protective layer is formed. Mixtures containing silicate and phosphate act as corrosion and limescale inhibitors for soft and medium-hard water. Continuous top-up of the feed chemical is required to maintain this protective layer, otherwise it will degrade within a few days.

##### EXACTAPHOS®

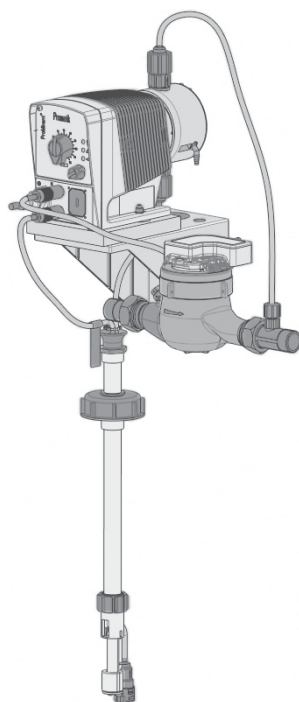
EXACTAPHOS® metering solutions are matched to the capacity of the Promatik® and DULCODOS® units. This ensures that the percentages of max 40 mg/l  $\text{SiO}_2$  of silicate and/or 6.7 mg/l of phosphate  $\text{PO}_4$  (5 mg/l  $\text{P}_2\text{O}_5$ ) are adhered to, as laid down by the "Drinking Water Ordinance".

##### Function of the systems

In a flow of water, the contact water meter transmits pulses with a fixed pulse interval corresponding to the flow to the metering pump. Each of these pulses results in a metering stroke of the metering pump, thereby feeding the metering solution. The metering volume per stroke can thus be adjusted continuously between 100 and 50 % using the stroke adjustment dial. Because of the very low starting limit and the short pulse interval, a constant volume-proportional addition of chemicals can always be maintained, from minimum water flow rate to maximum load, guaranteeing the best process result.

##### Promatik® proportional flow dosing system

Consisting of a Beta® metering pump with sound insulation plate, contact water meter, suction assembly with foot valve and 2-phase level switch with pre-warning, acting as a low flow contact and empty signal, injection valve and metering line. With wall brackets to mount the metering pump. Fitting position of the contact water meter – horizontal and vertical. DVGW-tested in conjunction with the EXACTAPHOS® metering solution. DVGW No. NW-9101 CM 0179.



P\_PNM\_0032\_SW1



## 1.8 Domestic Water Systems

### Metering System Promatik®

Protects pipework, fittings, and appliances from corrosion and limescale.

For flows of 4 – 25 m³/h



The proportional metering system Promatik® is used in the potable water sector for the flow-dependent, adjustable metering of liquid media, like the EXACTAPHOS®. It consists of the metering pump Beta®, a contact water meter, a suction assembly with foot valve, level switch and wall bracket, and an injection valve and metering line.

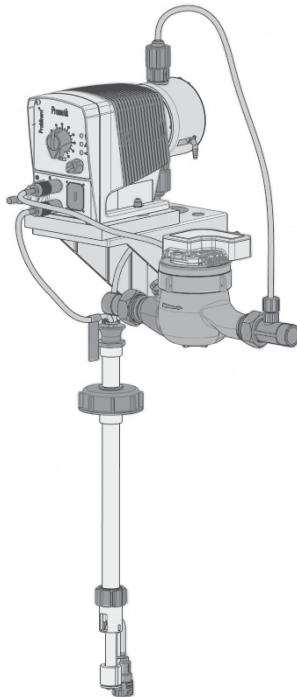
In a flow of water, the contact water meter transmits pulses with a fixed pulse interval corresponding to the pulses to the metering pump in line with the flow. Each of these pulses results in a metering stroke of the metering pump, thereby feeding the metering solution. The metering volume per stroke can thus be adjusted continuously between 100 and 50% using the stroke adjustment dial. Because of the very low starting limit and short pulse interval, a constant volume-proportional addition of chemicals can always be maintained from minimum water flow rate to maximum load, thereby guaranteeing the best process result

#### Your benefits

- DVGW-tested in conjunction with the EXACTAPHOS® metering solution. DVGW No. NW-9101 CM 0179.
- The EXACTAPHOS® metering solutions are matched to the capacity of the Promatik® metering systems.
- Fitting position of the water meter – horizontal and vertical.

#### Field of application

Potable water treatment



P\_PNM\_0032\_SW1

Promatik® type		S 4	S 10	S 16	S 25
Maximum flow Q max.	m³/h	4	10	16	25
Lower operating limit (horizontal)	m³/h	0,025	0,063	0,1	0,16
Metering interval approx.	l/stroke	0.7	1.1	1.8	2.8
Feed rate 50-100 %	ml/m³	50 – 165	50 – 165	50 – 165	50 – 165
Operating pressure	bar	1 – 10	1 – 10	1 – 10	1 – 10
Metering pump type		BT4b 1000	BT4b 1601	BT4b 1602	BT4b 1604
Meter connecting thread		G 1 B	G 1 1/4 B	G 2 B	G 2 1/2 B
Screw connector width		R 3/4	R 1	R 1 1/2	R 2
Length without thread	mm	190	260	300	270

Shipping weight approx.    Order no.  
kg

S 4 split system	6	1078282
S 10 split system	7	1078283
S 16 split system	9	1078284
S 25 split system	11	1078285

#### Materials

- Dosing head/valves: Polypropylene (PP)
- Metering diaphragm EPDM with PTFE insert
- Seals: EPDM
- Valve balls: ceramic
- Float switches: PP
- Suction assembly: flexible PVC
- Discharge tube: PE



## 1.8 Domestic Water Systems

### 1.8.2

### Chemicals

#### EXACTAPHOS® SP 210

Silicate phosphate liquid metering solution. Drinking water treatment for soft water. Promatik® compact metering system.

	Volume l	Order no.
EXACTAPHOS® SP 210	20	950097
EXACTAPHOS® SP 210	200	950043

#### EXACTAPHOS® P 612

Phosphate liquid metering solution. Drinking water treatment for medium hard water. Promatik® compact metering system.

	Volume l	Order no.
EXACTAPHOS® P 612	20	950098
EXACTAPHOS® P 612	200	950048

#### EXACTAPHOS® P 1020

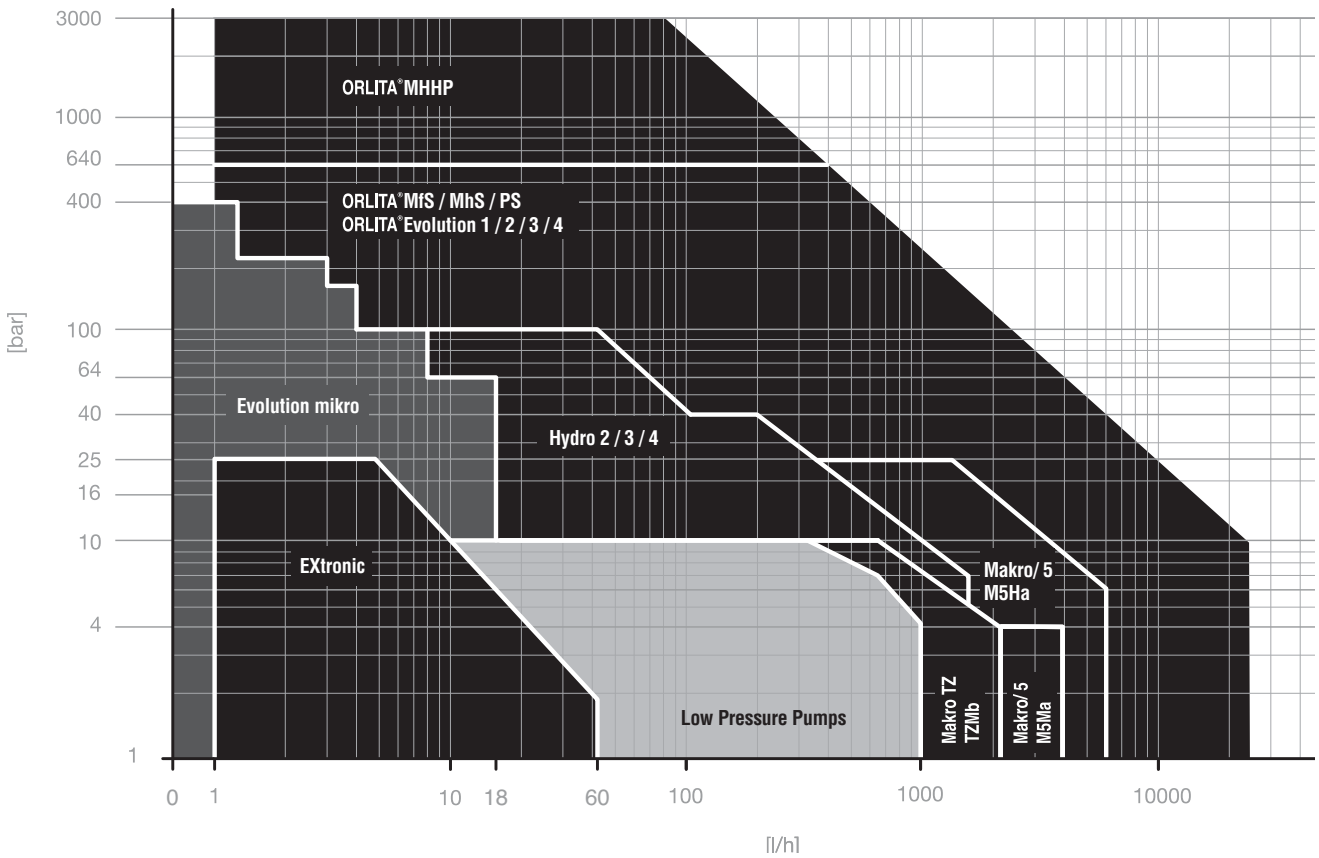
Phosphate liquid metering solution. Drinking water treatment for hard water. Promatik® compact metering system.

	Volume l	Order no.
EXACTAPHOS® P 1020	20	950099
EXACTAPHOS® P 1020	200	950053



## 2.1 Overview of Process Metering Pumps

### 2.1.1 Selection Guide



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### Overview of Process Metering Pumps

Type		EXBb	TZMb	M5Ma	HP2a	HP3a	HP4a	M5Ha	SBKa/ SCKa	MTKa	TZKa	M5Ka
Stroke length	mm	1.25	0 - 10	0 - 20	15	15	20	0 - 50	0 - 15	0 - 15	0 - 20	0 - 50
Connecting rod force	N	2,000	8,000	10,000	2,000	4,200	5,800	10,000	1,700	2,500	8,000	10,000
Type		EF1a	EF2a	EF3a	EF4a	EP1a	EP2a	EF1F	EF2F	EF3F	EF4F	
Stroke length	mm	0 - 15	0 - 15	0 - 25	0 - 40	0 - 15	0 - 15	15	15	25	40	
Connecting rod force	N	2,600	6,200	8,000	18,000	2,600	6,200	2,600	6,200	9,000	18,000	
Type		S 18	S 35	S 80	S 180	S 600	S 1400	Rb 15	Rb 150	Evo mikro		
Stroke length	mm	0 - 15	0 - 20	0 - 20	0 - 40	0 - 40	0 - 60	0 - 15	0 - 32	0 - 60		
Connecting rod force	N	1,750	3,500	14,000	18,000	40,000	60,000	1,800	15,000	-		



## 2.1 Overview of Process Metering Pumps

### 2.1.2 Installation Applications

**A** Oil Industry

**A1** Well

**A2** Platform

**A3** Transportation (tanker, pipeline)

**A4** Refinery

**A5** Petrochemical

**A6** Industry/power plants

**A7** Filling stations

**B** Gas Industry

**B1** Well

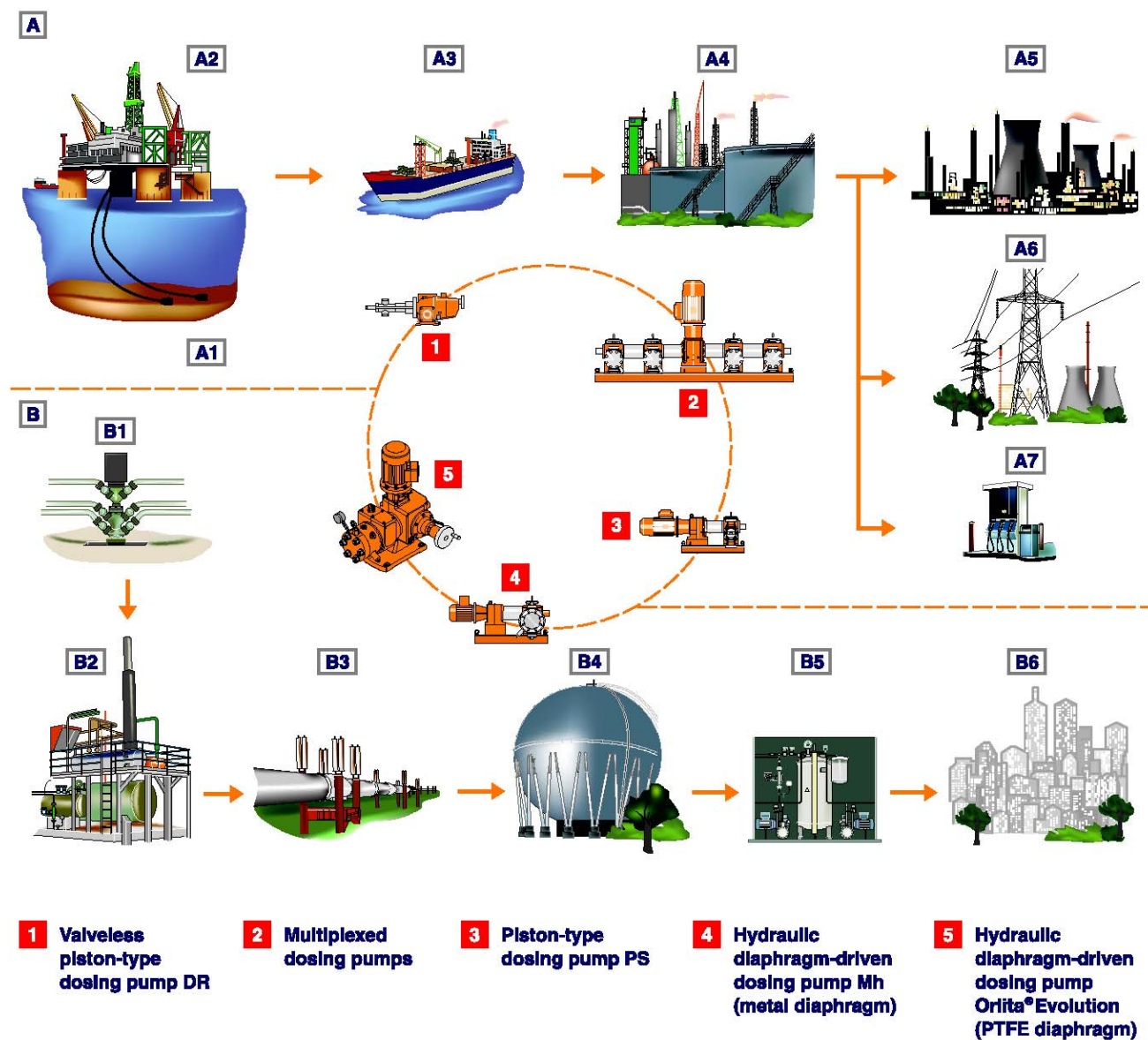
**B2** Gas treatment/gas drying

**B3** Transportation (tanker, pipeline)

**B4** Gas storage tank

**B5** Local distribution/odorization

**B6** Industry/power plants



pk\_3\_07



## 2.2 Diaphragm Process Metering Pumps

### 2.2.1

### Diaphragm Metering Pump ProMinent EXtronic®

#### Precise metering with explosion protection

Capacity range of single head pump: 1 – 60 l/h; 25 – 1 bar



The diaphragm metering pump EXtronic® is perfectly suited for the sensitive use of liquid media in facilities with an explosive gas atmosphere as well as for mines at risk of firedamp, as it is approved in compliance with the EU EX Regulation 2014/34/EU (ATEX).

The ATEX-compliant diaphragm metering pump EXtronic® (EXBb) is tested and approved in line with EN 60079/-1 for the ignition type "compression-resistant enclosures" and thus offers the maximum level of protection. The short-stroke solenoid and the complete pump control are integrated in the pump housing so that, together with the explosion-proof power end, there is IP 65 protection against contact and moisture as per EN 60529 even when the front cover is open.

#### Your benefits

Optimum adaptation for use in areas at risk from explosion

- ATEX-compliant in line with EExd IIC T6 and EExd I/IIC T6
- Excellent operating and functional reliability by a microprocessor controller, which compensates for fluctuations in mains voltage and automatically switches from 50 to 60 Hz operation
- Broad range of applications due to operating voltages of 230 V, 115 V, special voltage on request
- Ease of integration into processes, thanks to the range of control types (internal, external contact, analogue)
- Also suitable for use with gaseous media, thanks to the self-bleeding head

#### Technical Details

- Stroke length: 1.25 mm, Rod force: 2,000 N
- Stroke length adjustment range: 0 – 100% in operation and idle
- Stroke length adjustment: manually by scaled rotary dial
- Metering reproducibility is better than  $\pm 2\%$  within the 30 – 100% stroke length range under defined conditions and with correct installation. Observe the information in the operating instructions
- DEVELOPAN® metering diaphragm with PTFE coating with diaphragm rupture control
- Wetted materials: Polypropylene, PVC, PTFE with carbon, clear acrylic, stainless steel, special designs available on request
- Degree of protection: IP 65 (also with open front cover)
- Short stroke solenoid drive and complete pump control integrated in the pump housing
- "Internal", "External contact" and "Analogue" control inputs are available, the latter two also available as intrinsically safe and approved to EN 60079-11
- EXBb G for use in areas at risk from gases and vapours, degree of protection EEx [i,a] d IIC T6

This means:

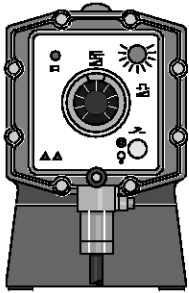
- EEx - Equipment complies with European standards
- [i,a] - Control input is intrinsically safe when 2 independent errors occur
- d - Type of ignition protection, compression-resistant enclosure
- IIC - Explosion group II for all areas at risk from explosion with the exception of mining, sub-group IIC (includes IIA and IIB)
- T6 - Temperature class permissible for gases and vapours with ignition temperature  $> 85^\circ\text{C}$
- EXBb M for use in mines at risk from firedamp, degree of protection EEx [i,a] d I/IIC T6

This means:

- EEx - Equipment complies with European standards
- [i,a] - Control input is intrinsically safe when 2 independent errors occur
- d - Type of ignition protection, compression-resistant enclosure
- IC - Explosion group I for mines at risk from firedamp
- IIC - Explosion group II for all areas at risk from explosion with the exception of mining, sub-group IIC (includes IIA and IIB)
- T6 - Temperature class permissible for gases and vapours with ignition temperature  $> 85^\circ\text{C}$

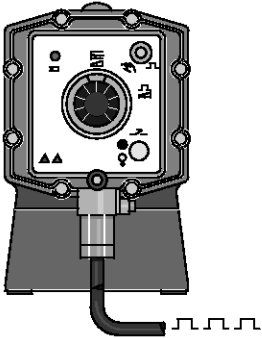
#### Field of application

- Oil, gas and petrochemicals
- Mining
- For use in areas at risk of gases and vapours
- Use in mines at risk from firedamp



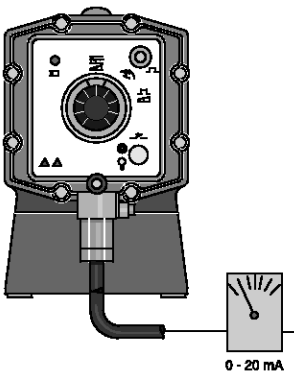
pk\_1\_020

**Control type "Internal"** Stroke length adjustment 1:10, stroke rate adjustment 1:25, total adjustment range 1:250.



pk\_1\_019

**Control type "External Contact"** Stroke length adjustment 1:10, Stroke frequency control 0 - 100% dependant upon external switch contacts. \*)



pk\_1\_018

**Control type "Analogue"** Stroke length adjustment 1:10, Stroke frequency control 0-100 % proportional to analogue signal 0/4-20 mA.

\*) The electrical cables for mains connection, contact or analogue control are already connected to the pump. Observe all instructions concerning connecting and activating electrical systems.



## 2.2 Diaphragm Process Metering Pumps

### Technical Data

Type EXBb	Delivery rate at max. back pressure			Delivery rate at medium back pressure			Stroke rate	øO x iØ	Suction lift	Shipping weight PP,NP,TT-SS
	bar	l/h	ml/stroke	bar	l/h	ml/stroke	Strokes/min	mm	m WC	kg
EXBb										
1000	10	0.19	0.03	5	0.27	0.04	120	6 x 4	1.5	12
2501	25	1.14	0.15	20	1.10	0.17	120	6 x 4	5.0	–
1601	16	1.00	0.15	8	1.30	0.18	120	6 x 4	5.0	12
1201	12	1.70	0.23	6	2.00	0.28	120	6 x 4	5.0	12
0803	8	3.70	0.51	4	3.90	0.54	120	6 x 4	3.0	12
1002	10	2.30	0.31	5	2.70	0.38	120	8 x 5	5.0	12
0308	3	8.60	1.20	1	10.30	1.43	120	8 x 5	5.0	12
2502	25	2.00	0.28	20	2.20	0.31	120	8 x 5	5.0	13
1006	10	6.00	0.83	5	7.20	1.00	120	8 x 5	5.0	13
0613	6	13.10	1.82	3	14.90	2.07	120	8 x 5	5.5	13
0417	3	17.40	2.42	2	17.90	2.49	120	12 x 9	4.5	13
2505	25	4.20	0.64	20	4.80	0.73	110	8 x 5	5.0	16
1310	13	10.50	1.59	6	11.90	1.80	110	8 x 5	5.0	16
0814	8	14.00	2.12	4	15.40	2.33	110	12 x 9	5.0	16
0430	3	27.00	4.09	2	29.50	4.47	110	DN 10	5.0	16
0260	1	60.00	9.09	–	–	–	110	DN 15	1.5	16
EXtronic® metering pumps for high viscosity media										
1002	10	2.30	0.31	5	2.70	0.38	120	DN 10	1.8	–
1006	10	6.00	0.83	5	7.20	1.00	120	DN 10	2.0	–
1310	10	10.50	1.59	5	11.90	1.80	110	DN 15	2.8	–
0814	8	14.00	2.12	4	15.40	2.33	110	DN 15	2.0	–
EXtronic® metering pumps with self-bleeding liquid end										
1601	16	0.66	0.09	–	–	–	120	6 x 4	1.8	–
1201	12	1.00	0.14	–	–	–	120	6 x 4	2.0	–
0803	8	2.40	0.33	–	–	–	120	6 x 4	2.8	–
1002	10	1.80	0.25	–	–	–	120	6 x 4	2.0	–

\* Shipping weight for EXBb M version... additional 14 kg

\*\* The data given here represent guaranteed minimum values, achieved with medium water at room temperature.

### Materials in Contact With the Medium

	Liquid end	Suction/discharge connector	Seals	Balls (connection 6-12 mm)	Balls (connection DN 10 and DN 15)
PP1	Polypropylene	Polypropylene	EPDM	Ceramic	Borosilicate glass
PP4*	Polypropylene	Polypropylene	EPDM	-	Ceramic
NP1	Plexiglass	PVC	FKM A	Ceramic	Borosilicate glass
NP3	Plexiglass	PVC	FKM B	Ceramic	-
NS3**	Plexiglass	PVC	FKM B	Ceramic	-
PS3**	PVC	PVC	FKM B	Ceramic	-
TT1	PTFE with carbon	PTFE with carbon	PTFE	Ceramic	Ceramic
SS ..	Stainless steel mat. no. 1.4404	Stainless steel mat. no. 1.4404	PTFE	Ceramic	Stainless steel mat. no. 1.4404

\* PP4 with valve springs made of Hastelloy C

\*\* NS3 and PS3 with valve springs made of Hastelloy C, valve insert made of PVDF  
FKM = fluorine rubber



## 2.2 Diaphragm Process Metering Pumps

### Identity Code Ordering System for EXBb

EXBb	Enclosure rating		
G	Gas-EX-proof		
M	Fire and explosion protection, permitted liquid end material: stainless steel and PTFE		
Capacity			
	bar	l/h	
1000	10	0.19	
2501	25	1.14	(only available in SS and SB)
1601	16	1.00	
1201	12	1.70	
0803	8	3.70	
1002	10	2.30	
0308	3	8.60	
2502	25	2.00	(available in SS and SB only)
1006	10	6.00	
0613	6	13.10	
0417	4	17.40	
2505	25	4.20	(only available in SS and SB)
1310	13	10.50	(only available in NP, PP4, SS and SB)
0814	8	14.00	
0430	4	27.00	
0260	2	60.00	
Liquid end material			
PP1	Polypropylene with EPDM O-ring		
PP4	HV Polypropylene for high viscosity liquids with EPDM O-ring and Hastelloy C valve springs (Types 1002, 1006, 1310 and 0814 only)		
NP1	Acrylic with FKM A O-ring*		
NP3	Acrylic with FKM B O-ring*		
NS3	Acrylic with FKM B O-ring*, self bleeding (Types 1601, 1201, 0803 and 1002 only)		
PS3	PVC with FKM B O-ring*, self bleeding (Types 1601, 1201, 0803 and 1002 only)		
TT1	PTFE with carbon, PTFE seal		
SS1	Stainless steel, no. 1.4404, with PTFE seal		
SS2	Stainless steel with 1/4" NPT internal thread, PTFE seal		
SB1	Stainless steel with ISO 7 Rp 1/4 internal thread, ISO 7 Rp 1/2 on type 0260, PTFE seal (recommended for flammable materials)		
SSM	as SS1, with diaphragm rupture indicator Type 2501 only		
SBM	as SB1, with diaphragm rupture indicator Type 2501 only		
Valve springs			
0	No springs		
1	With 2 valve springs, 1.4571, 0.1 bar		
Electrical connection			
A	230 V, 50/60 Hz		
B	115 V, 50/60 Hz		
	Special voltage on request		
Control type			
0	Manual stroke rate adjustment via potentiometer		
1	External contact		
2	Analogue 0-20 mA		
3	Analogue 4-20 mA		
4	External contact, intrinsically safe [i,a]		
5	Analogue 0-20 mA, intrinsically safe [i,a]		
6	Analogue 4-20 mA, intrinsically safe [i,a]		
7	Manual with zero volts ON/OFF		
8	Manual with zero volts ON/OFF, intrinsically safe [i,a]		
Control Versions			
0	With potentiometer (control type 0, 7 and 8 only)		
1	With manual auxiliary key for maximum stroke rate (control type 1-6 only)		
2	With manual auxiliary frequency changer key for maximum stroke rate (control type 1-6 only)		
Approved/Language			
0	BVS - Europe, German, 100 V - 500 V		
1	BVS - Europe, English, 100 V - 500 V		
2	FM - USA, English, 115 V		
3	CSA - Canada, English, 115 V, 230 V		

\* FKM = Fluorine rubber

## 2.2 Diaphragm Process Metering Pumps

### Design of connectors

with PP, NP, NS, PS and TT	6, 8 and 12 mm	Hose nozzle with clamping ring
with stainless steel SS1/SSM	6, 8 and 12 mm	Swagelok system threaded connector
with stainless steel SS2	6, 8 and 12 mm	Internal thread 1/4" NPT
with stainless steel SS1/SBM	6, 8 and 12 mm	Internal thread ISO 7 Rp 1/4

with PP and NP	DN 10 and DN 15	Hose nozzle d 16 - DN 10 and d 20 - DN 15
with TT	DN 10 and DN 15	Welding sleeve d 16 - DN 10 and d 20 - DN 15 (PVDF)
with stainless steel SS1	DN 10 and DN 15	Insert with internal thread R 3/80 and R 1/2"
with stainless steel SB1	DN 10 and DN 15	Internal thread ISO 7 Rp 1/4 and 1/2

Repeatability of metering  $\pm 2$  % when performed in line with the information in the operating instructions.

For type 1601 with self-bleeding dosing head  $\pm 5$  %.

Permissible ambient temperature -20 °C to +45 °C.

<b>Electrical connection:</b>	230 V $\pm 10$ %, 50/60 Hz
	115 V $\pm 10$ %, 50/60 Hz
	Special voltage on request

<b>Degree of protection:</b>	IP 65, insulation class F
------------------------------	---------------------------

Average power consumption at max. stroke rate (W)/peak current during metering stroke (A) at 230 V, 50/60 Hz

EXBb	Type 1000, 2501, 1601, 1201, 0803, 1002, 0308	13 W/0,8 A	at 120 strokes/min.
EXBb	Type 2502, 1006, 0613, 0417	35 W/1,8 A	at 120 strokes/min.
EXBb	Type 2505, 1310, 1014, 0430, 0260	45 W/2,2 A	at 110 strokes/min.

Scope of delivery: Metering pump with mains cable (5 m) and connector parts for hose/pipe connection as per the table.

### Spare Parts Kits for Diaphragm Metering Pump ProMinent EXtronic®

#### Scope of delivery with material versions PP and NP:

- 1 Diaphragm
- 1 Suction valve, complete
- 1 Discharge valve, complete
- 2 Valve balls
- 1 Sealing set, complete
- 1 Connector kit

#### Scope of delivery with material versions NS3 and PS3:

- 1 Diaphragm
- 1 Suction valve, complete
- 1 Connector component, complete
- 1 Discharge valve, complete
- 1 Bleed valve, complete
- 1 Connector kit

#### Scope of delivery with material version TT-PTFE:

- 1 Diaphragm
- 1 Suction valve, complete
- 1 Discharge valve, complete
- 2 Valve balls
- 2 Ball seat discs
- 1 Sealing set, complete
- 1 Connector kit

#### Scope of delivery with SS stainless steel material version:

- 1 Diaphragm
- 4 Valve balls
- 4 Ball seat discs
- 1 Sealing set, complete
- 1 Connector kit



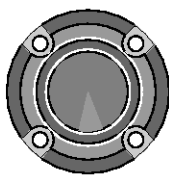


## 2.2 Diaphragm Process Metering Pumps

Pump type	Materials in contact with the medium		Order no.
<b>EXBb 1000</b>	PP1	–	740357
	NP3	–	740354
	TT	–	910776
	SS/SK	–	910777
<b>EXBb 2501</b>	SBM	–	1020281
	SSM	–	1020282
<b>EXBb 1601</b>	PP1	–	740361
	NP3	–	740358
	NS3/PS3	–	792033
	TT	–	910778
<b>EXBb 1201</b>	SS/SK	–	910779
	PP1	–	740380
	NP3	–	740362
	NS3/PS3	–	792034
<b>EXBb 0803</b>	TT	–	910780
	SS/SK	–	910781
	PP1	–	740384
	NP3	–	740381
<b>EXBb 1002/2502</b>	NS3/PS3	–	792035
	TT	–	910782
	SS	–	910783
	PP1	–	740388
<b>EXBb 0308/1006/2505</b>	NP3	–	740385
	NS3/PS3	–	792036
	TT	–	910784
	SS	–	910785
<b>EXBb 0613/1310</b>	HV/PP 4	Type 1002	910743
	PP1	–	740497
	NP1	–	740498
	TT	–	910957
<b>EXBb 0417/0814</b>	SS	–	910959
	HV/PP4	Type 1006	910939
	PP1	–	740504
	NP1	–	740505
<b>EXBb 0430-DN 10</b>	TT	–	910969
	SS	–	910971
	HV/PP4	Type 1310	910941
	PP1	–	740501
<b>EXBb 0430-DN 10</b>	NP1	–	740502
	TT	–	910977
	SS	–	910979
	HV/PP4	Type 0814	910943
<b>EXBb 0430-DN 10</b>	PP1	–	740507
	NP1	–	740508
	TT	–	910993
	SS	–	910995

Replacement parts set as DN 10 with one-way ball valves.

## 2.2 Diaphragm Process Metering Pumps



pk\_1\_008

### Spare Diaphragms for Diaphragm Metering Pump ProMinent EXtronic®

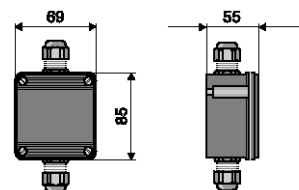
ProMinent® DEVELOPAN® EPDM metering diaphragms with woven inner layer, integrally vulcanised steel core and PTFE Teflon coating on the side in contact with the feed chemical.

For pump type	Description	Order no.
<b>1000</b>	31.0 x 6.0	811452
<b>2501</b>	35.0 x 11.5	1000246
<b>1601</b>	48.0 x 9.5	811453
<b>1201</b>	48.0 x 12.5	811454
<b>0803</b>	48.0 x 18.5	811455
<b>1002, 2502</b>	60.0 x 17.0	811456
<b>0308, 2505, 1006</b>	60.0 x 28.0	811457
<b>1310, 0613</b>	76.0 x 37.0	811458
<b>0814, 0417</b>	76.0 x 45.0	811459
<b>0430, 0230</b>	127.5 x 63.0	811460
<b>0260</b>	127.5 x 91.0	811461

### Ex-Proof Ancillary Equipment

#### Plastic terminal box: Type I

IP 66, EEx e II T 6, max. 380 V for mains connection, e.g. of ProMinent EXtronic® in areas at risk of explosion.

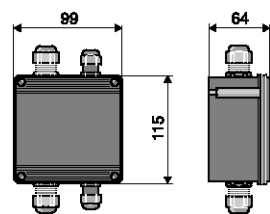


pk\_1\_023

Order no.
<b>1 input, 1 output for power supply cable. 2 terminals + PE and 2 M 20-12 screw glands</b>
1000071

#### Plastic terminal box: Type II

IP 66, EEx e II T 6, max. 380 V. As type I, but with additional connector for control cable (e.g. for contact water meter or DULCOMETER® controller).

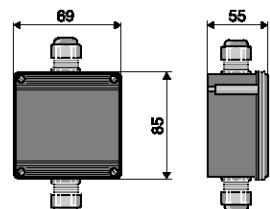


pk\_1\_021

Order no.
<b>2 inputs (mains and controller cable), 2 outputs 2 terminals + PE, 1 partition, 2 terminals and 2 M 20-12 screw glands and 2 M 16-0.8 screw glands</b>
1000072

#### Plastic terminal box: EExi Type I

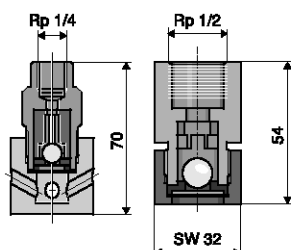
IP 66, EEx ia II T 6 for intrinsically safe control cable



pk\_1\_022

Order no.
<b>1 input, 1 output for control cable, 2 terminals and 2 M 16-0.8, blue screw glands</b>
1000073

## 2.2 Diaphragm Process Metering Pumps

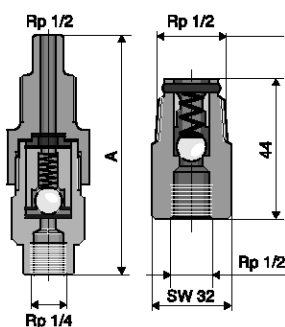


pk\_1\_30 / pk\_1\_031

### Stainless steel foot valve 1.4404 "SB"

With filter and ball check valve, designed for use with flammable materials. Materials: 1.4404/1.4401/PTFE/ceramic

	Order no.
Connector ISO 7 Rp 1/4 SB version for ProMinent EXtronic®	809301
Connector ISO 7 Rp 1/2 SB version for ProMinent EXtronic®	924561

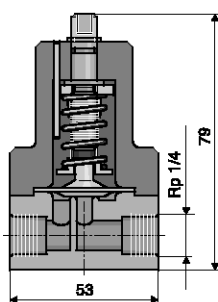


pk\_1\_032\_2 / pk\_1\_027

### Stainless steel 1.4404 "SB" metering valve

Spring-loaded ball check valve designed for use with flammable materials. Materials: 1.4404/1.4401/Hastelloy C/PTFE/ceramic

	Order no.
Connector ISO 7 Rp 1/4 - R 1/2, priming pressure approx. 0.5 bar	809302
Connector ISO 7 Rp 1/2 - R 1/2, priming pressure approx. 0.5 bar	924560



pk\_1\_029

### Adjustable "SB" back pressure valve

	Order no.
Operating range approx. 1-10 bar, closed version, designed for use with flammable materials.	924555

For the generation of a defined back pressure for precise metering, only for use with a free outlet. Also suitable for use as a relief valve.

### PTFE metering pipe

Carbon-filled, surface resistance  $< 10^7 \Omega$

Material	Length	Connection size o Ø x i Ø	Permissible pressure	Order no.
	m	mm	bar	
Carbon-filled PTFE	By the metre	6 x 4	12*	1024831
Carbon-filled PTFE	By the metre	8 x 5	16*	1024830
Carbon-filled PTFE	By the metre	12 x 9	9*	1024832

\* Permissible operating pressure at 20 °C in accordance with EN ISO 7751, 1/4 of the rupture pressure, assuming chemical resistance and correct connection.

**Additional ancillary equipment, i.e. foot valves, metering valves and back pressure valves in the usual material combinations, identical to gamma ancillary equipment and/or for connector DN 15 Vario ancillary equipment.**

(Hydraulic/mechanical accessories see page → 1-139)



## 2.2 Diaphragm Process Metering Pumps



pk\_1\_028

### Stainless steel straight threaded connectors

Swagelok system in stainless steel SS 316 (1.4401) for connection of pipework to liquid ends and valves with internal thread and for SB version.

Normal threaded seal compounds required.

	Order no.
6 mm - ISO 7 R 1/4	359526
8 mm - ISO 7 R 1/4	359527
12 mm - ISO 7 R 1/4	359528
16 mm - ISO 7 R 1/2	359529





## 2.2 Diaphragm Process Metering Pumps

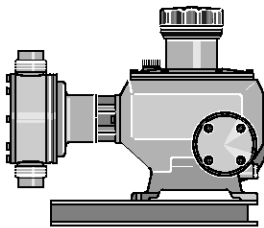
### 2.2.2

### Diaphragm Metering Pump Makro TZ

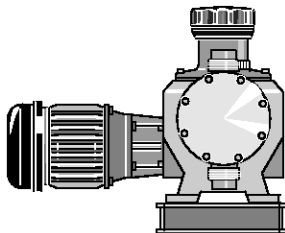
**Greater safety in continuous operation through mechanically deflected multi-layer safety diaphragm.**

**Capacity range of single head pump: 260 – 2,100 l/h, 12 – 4 bar**

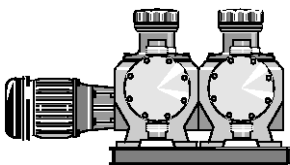
The modular construction of the diaphragm metering pump Makro TZ with adjustable eccentric drive mechanism and mechanically deflected multi-layer safety diaphragm makes it wonderfully adaptable to the capacity requirements of the respective application.



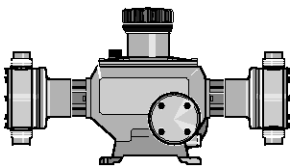
pk\_2\_012  
Makro TZ TZMb



pk\_2\_013  
Makro TZ externally mounted pump



pk\_2\_014  
Makro TZ double head pump



The diaphragm metering pump Makro TZ (TZMb) has an adjustable eccentric drive mechanism and, together with the Makro TZ plunger metering pump, forms a range of drive mechanisms with stroke lengths of 10 and/or 20 mm. A wide range of power end versions is available for use in areas at risk from explosion with ATEX certification.

#### Your benefits

Excellent process safety and reliability:

- Patented multi-layer safety diaphragm with integral diaphragm rupture warning system
- Metering reproducibility is better than  $\pm 2\%$  within the 30 – 100% stroke length range under defined conditions and with correct installation

Excellent flexibility:

- The modular construction with single and double head versions permits a wide range of applications, with the double head designs being operated in push-pull mode
- It is possible to combine up to 4 metering units, even with different pump capacities, in multiple pump systems
- 5 different gear ratios are available
- Customised designs are available on request

#### Technical Details

- Stroke length: 0-10 mm, Rod force: 8,000 N
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually by scaled rotary dial in 0.5% increments (optionally with electric actuator or control drive)
- Metering reproducibility is better than  $\pm 2\%$  within the 30 – 100% stroke length range under defined conditions and with correct installation. Observe the information in the operating instructions
- Patented multi-layer safety diaphragm with optical diaphragm rupture display (optionally with electrical diaphragm rupture warning system / warning via a contact)
- Wetted materials: Polypropylene, PVC, PTFE+25% carbon, stainless steel 1.4571. Special materials are available on request
- A wide range of power end versions is available: Three-phase or 1-phase AC motor, motors for use in areas at risk from explosion, different flange designs for use of customer-specific motors
- Degree of protection: IP 55
- Salt water-resistant, acrylic resin-coated cast aluminium housing
- For reasons of safety, provide suitable overload protection mechanisms during the installation of all mechanically deflected diaphragm metering pumps

#### Field of application

- Volume-proportional metering of chemicals/additives in water treatment
- Metering of reactants and catalysts in the chemical industry
- Level-dependent metering of additives in industrial production engineering



## 2.2 Diaphragm Process Metering Pumps

### Technical Data

Type TZMb	With 1500 rpm motor at 50 Hz				With 1800 rpm motor at 60 Hz				Suction lift	Connection, suction/ discharge side	Shipping weight PP,NP,TT-SS
	Delivery rate at max. back pressure			Max. stroke rate	Delivery rate at max. back pressure			Max. stroke rate			
	bar	l/h	ml/ stroke	Strokes/ min	psi	l/h	gph (US)	Strokes/ min			
120260	12	260	60	72	174	312	82	86	4.0	1 1/2-25	46/54
120340	12	340	60	96	174	408	108	115	4.0	1 1/2-25	46/54
120430	12	430	60	120	174	516	136	144	4.0	1 1/2-25	46/54
120510	12	510	60	144	174	622	164	173	4.0	1 1/2-25	46/54
120650	12	640	60	180	174	—	—	—	4.0	1 1/2-25	46/54
070430	7	430	99	72	100	516	136	86	3.5	2-32	50/64
070570	7	570	99	96	100	684	181	115	3.5	2-32	50/64
070720	7	720	99	120	100	864	228	144	3.5	2-32	50/64
070860	7	860	99	144	100	1,032	273	173	3.5	2-32	50/64
071070	7	1,070	99	180	100	—	—	—	3.5	2-32	50/64
040840	4	840	194	72	58	1,008	266	86	3.0	2 1/4-40	56/80
041100	4	1,100	194	96	58	1,320	349	115	3.0	2 1/4-40	56/80
041400	4	1,400	194	120	58	1,680	444	144	3.0	2 1/4-40	56/80
041670	4	1,670	194	144	58	2,004	529	173	3.0	2 1/4-40	56/80
042100	4	2,100	194	180	58	—	—	—	3.0	2 1/4-40	56/80

Stroke length 10 mm

Plastic material design: max. 10 bar back pressure

The permissible priming pressure on the suction side is approximately 50% of the max. permitted back pressure

### Materials in Contact With the Medium

Liquid end		Suction/ discharge connector	DN 25 ball valves			DN 32/DN 40 plate valves **		
			Seals	Valve balls	Valve seats	Seals	Valve plates/valve spring	Valve seats
PPT	Polypropylene	PVDF	PTFE	Borosilicate glass	PTFE	PTFE	Ceramic/ Hast. C + CTFE**	PTFE
PCT	PVC	PVDF	PTFE	Borosilicate glass	PTFE	PTFE	Ceramic/ Hast. C + CTFE**	PTFE
TTT	PTFE with carbon	PVDF	PTFE	Ceramic	PTFE	PTFE	Ceramic/ Hast. C + CTFE**	PTFE
SST	Stainless steel mat. no. 1.4404	Stainless steel mat. no. 1.4581	PTFE	Stainless steel mat. no. 1.4401	PTFE	PTFE	Stainless steel 1.4404/Hast. C	PTFE

Multi-layer safety diaphragms with PTFE coating.

\*\* The valve spring is coated with CTFE (similar to PTFE)  
Special versions on request.



## 2.2 Diaphragm Process Metering Pumps

### Identity Code Ordering System for Makro TZMb Mechanically Deflected Diaphragm Metering Pump

TZMb	Drive type	
	H	Main drive
	A	Add-on drive
	D	Double main drive
	B	Double add-on drive
	Type*	
	120260	070860
	120340	071070
	120430	040840
	120510	041100
	120650	041400
	070430	041670
	070570	042100
	070720	
	Liquid end material **	
	PC	PVC
	PP	Polypropylene
	SS	Stainless steel
	TT	PTFE + 25% carbon
	Sealing material	
	T	PTFE
	Displacement body	
	1	Multi-layer safety diaphragm with rupture indicator
	Liquid end version	
	0	No valve springs
	1	With valve springs
	Hydraulic connection	
	0	Standard connection
	1	PVC union nut and insert
	2	PP union nut and insert
	3	PVDF union nut and insert
	4	SS union nut and insert
	Version	
	0	with ProMinent® logo
	2	no ProMinent® logo
	A	with ProMinent® logo, with frame, simplex
	B	with ProMinent® logo, with frame, duplex
	C	with ProMinent® logo, with frame, triplex
	M	Modified
	Electrical power supply	
	S	3 ph. 230/400 V 50/60 Hz (WBS)
	R	Variable speed motor, 4-pole, 230/400 V
	V (0)	Variable speed motor with integr. frequency converter
	Z	Speed control kit
	L	3 ph. 230/400 V 50 Hz (Exe, Exd)
	P	3 ph. 230/400 V 60 Hz (Exe, Exd)
	V (2)	variable speed motor with integr. frequency converter (Exd)
	4	no motor, with motor flange 56 C
	7	no motor, with motor flange 120/80
	8	no motor, with motor flange 160/90
	0	No motor, externally mounted drive
	Enclosure rating	
	0	IP 55 (Standard) ISO class F
	1	Exe version ATEX-T3
	2	Exd version ATEX-T4
	A	ATEX power end
	Stroke sensor	
	0	No stroke sensor
	1	With stroke sensor (Namura)
	Stroke length adjustment	
	0	Stroke length adjustment, manual
	1	230 V stroke actuator
	2	115 V stroke actuator
	3	230 V 0-20 mA stroke controller
	4	230 V 4-20 mA stroke controller
	5	115 V 0-20 mA stroke controller
	6	115 V 4-20 mA stroke controller (servo motors for Ex zones on request)
	Application	
	0	Standard

\* Digits 1 + 2=back pressure [bar]; digits 3 - 6=capacity [l/h]

\*\* Material version PCT/PPT/TTT max. 10 bar

## 2.2 Diaphragm Process Metering Pumps

### Motor Data

Identity code specification		Power supply			Remarks
S	3-phase, IP 55	220 – 240 V/380 – 420 V 250 – 280 V/440 – 480 V	50 Hz 60 Hz	0.75 kW	
R	3-phase, IP 55	230 V/400 V	50/60 Hz	1.5 kW	with PTC, speed control range 1:20 with external fan 1-phase 230 V; 50/60 Hz
V0	3-phase, IP 55	230 V $\pm$ 5 %	50/60 Hz	1.5 kW	Variable speed motor with integrated frequency converter
L1	3-phase, II 2G Ex eb IIC T3 Gb	220 – 240 V/380 – 420 V	50 Hz	0.75 kW	
L2	3-phase, II 2G Ex db IIC T4 Gb	220 – 240 V/380 – 420 V	50 Hz	0.75 kW	with PTC, speed control range 1:5
P1	3-phase, II 2G Ex eb IIC T3 Gb	250 – 280 V/440 – 480 V	60 Hz	0.75 kW	
P2	3-phase, II 2G Ex db IIC T4 Gb	250 – 280 V/440 – 480 V	60 Hz	0.75 kW	with PTC, speed control range 1:5
V2	3-phase, II 2G Ex de IIC T4	400 V $\pm$ 10 %	50/60 Hz	1.5 kW	Ex-variable speed motor with integrated frequency converter

Motor data sheets can be requested for more information. Special motors or special motor flanges are available on request.

The motors are designed in compliance with the Ecodesign Directive 2009/125/EC.

#### Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/EU in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label corresponds to or is better than the conditions prevalent in the intended field of application.





## 2.2 Diaphragm Process Metering Pumps

### Spare Parts

The spare parts kit generally includes the wear parts for the liquid ends.

- 1 Metering diaphragm (multi-layer safety diaphragm)
- 1 Suction valve complete
- 1 Discharge valve complete
- 2 Valve balls (DN 32/DN 40 with plate and spring)
- 1 Complete sealing set (O-rings or flat seals, valve seats, valve seat bushings)

### Spare Parts Kits for Diaphragm Metering Pump Makro TZ (TZMb)

**Identity Code: 120260, 120340, 120430, 120510, 120650**

Liquid end	Materials in contact with the medium		Order no.
FM 650 - DN 25	PCT, PPT, TTT	–	1025164
	SST	–	1022896
	SST	without valves cpl.	1022895

**Identity Code: 070430, 070570, 070720, 070860, 071070**

Liquid end	Materials in contact with the medium		Order no.
FM 1100 - DN 32	PCT, PPT, TTT	–	1025167
	SST	–	1022917
	SST	without valves cpl.	1022916

**Identity Code: 040840, 041100, 041400, 041670, 042100**

Liquid end	Materials in contact with the medium		Order no.
FM 2100 - DN 40	PCT, PPT, TTT	–	1025169
	SST	–	1022930
	SST	without valves cpl.	1022929

### Multi-Layer Metering Diaphragm for TZMb

ProMinent multi-layer safety diaphragm with diaphragm rupture warning system and PTFE Teflon coating on the wetted side.

Pump type	Order no.
Identity code: 120260, 120340, 120430, 120510, 120650; Makro TZ FM 650	1022887
Identity code: 070430, 070570, 070720, 070860, 071070; Makro TZ FM 1100	1022900
Identity code: 040840, 041100, 041400, 041670, 042100; Makro TZ FM 2100	1022921

## 2.2 Diaphragm Process Metering Pumps

### Spare Parts Kits for Diaphragm Metering Pump Makro TZ (TZMa)

**Identity Code: 120190, 120254, 120317, 120381**

Liquid end	Materials in contact with the medium		Order no.
FM 260 - DN 20	PP	–	910452
	P	–	910455
	T	–	910458
	S	without valves cpl.	910475
	S	–	910461

**Identity Code: 060397, 060529, 060661, 060793**

Liquid end	Materials in contact with the medium		Order no.
FM 530 - DN 25	PP	–	910453
	P	–	910456
	T	–	910459
	S	without valves cpl.	910476
	S	–	910462

**Identity Code: 030750, 031000, 031250, 031500, 031875, 031050 , 031395, 031740, 032100, 032500**

Liquid end	Materials in contact with the medium		Order no.
FM 1500/2100 - DN 40	PP	–	1001573
	P	–	1001574
	T	–	1001575
	S	without valves cpl.	1001577
	S	–	1001576

### PTFE Metering Diaphragms for TZMa

ProMinent® DEVELOPAN® metering diaphragms with a generously-sized steel core vulcanised into fibre reinforced EPDM, with a PTFE Teflon coating on the process-wetted side.

Pump type	Order no.
Identity code: 100190, 120190, 100254, 100317, 120317, 100381, 120381; Makro TZ FM 260	811471
Identity code: 060397, 060529, 060661, 060793; Makro TZ FM 530	811472
Identity code: 030750, 031000, 031250, 031500, 031050, 031395, 031740, 032100, 032500; Makro TZ FM 1500/FM 2100	811473

### Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/EU in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label corresponds to or is better than the conditions prevalent in the intended field of application.





## 2.2 Diaphragm Process Metering Pumps

### 2.2.3

#### Diaphragm Metering Pump Makro/ 5

**It is not possible to do more with a mechanically deflected diaphragm**

**Capacity range of single head pump: 1,540 – 4,000 l/h; 4 bar**



The diaphragm metering pump Makro/ 5 is used to meter reactants and catalysts in the chemical industry. Thanks to its modular construction, it can adapt outstandingly to the actual requirements of each application.

The diaphragm metering pump Makro/ 5 (M5Ma) with the Makro/ 5 hydraulic diaphragm and plunger metering pumps, form a range of drive mechanisms with stroke lengths of 20 and/or 50 mm. A wide range of power end versions is available for use in areas at risk from explosion with ATEX certification.

#### Your benefits

Process reliability:

- Metering reproducibility is better than  $\pm 2\%$  within the 30-100% stroke length range under defined conditions and with correct installation.

Excellent flexibility:

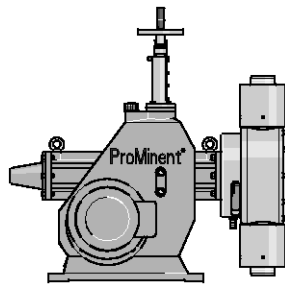
- The modular construction with single and double head versions permits a wide range of applications, with the double head designs being operated in push-pull mode
- It is possible to combine up to 4 metering units, even with different pump capacities, in multiple pump systems
- 5 different gear ratios are available
- Customised designs are available on request

#### Technical Details

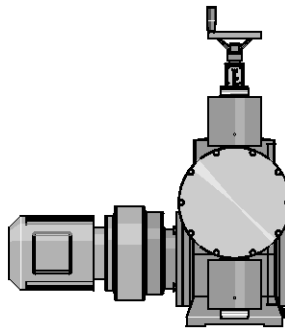
- Stroke length: 0-20 mm, Rod force: 10,000 N
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually by means of a manual adjustment wheel and scaled display in 0.5% increments (optionally with electric actuator or control drive)
- Metering reproducibility is better than  $\pm 2\%$  within the 30 – 100% stroke length range under defined conditions and with correct installation. Observe the information in the operating instructions
- Wetted materials: Polypropylene, PVC, PTFE+25% carbon, stainless steel 1.4571, special materials are available on request
- A wide range of power end versions is available: Three-phase standard motors, motors for use in areas at risk from explosion and different flange designs for use in customer-specific motors
- Degree of protection: IP 55
- Salt water-resistant, acrylic resin-coated cast iron housing
- For reasons of safety, provide suitable overload protection mechanisms during the installation of all mechanically deflected diaphragm metering pumps

#### Field of application

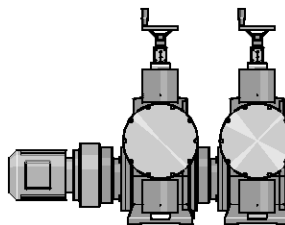
- Volume-proportional metering of chemicals/additives in water treatment
- Metering of reactants and catalysts in the chemical industry
- Level-dependent metering of additives in industrial production engineering



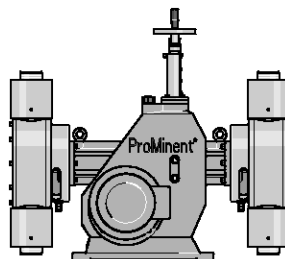
pk\_2\_099  
Makro/ 5 M5Ma



pk\_2\_093



pk\_2\_098  
Makro/ 5 externally mounted pump



pk\_2\_095  
Makro/ 5 double head pump

## 2.2 Diaphragm Process Metering Pumps

### Technical Data

Type M5Ma	With 1500 rpm motor at 50 Hz				With 1800 rpm motor at 60 Hz				Suction lift  m WC	Connection, suction/ discharge side  G-DN	Shipping weight  kg
	Delivery rate at max. back pressure			Max. stroke rate Strokes/ min	Delivery rate at max. back pressure			Max. stroke rate Strokes/ min			
	bar	l/h	ml/ stroke		psi	l/h	gph (US)				
041540	4	1,540	427	60	58	1,822	481	71	3.0	2 3/4-50	320
041900	4	1,900	427	75	58	2,254	595	89	3.0	2 3/4-50	320
042600	4	2,600	427	103	58	3,104	820	123	3.0	2 3/4-50	320
043400	4	3,400	427	133	58	4,064	1,074	159	3.0	2 3/4-50	320
044000	4	4,000	427	156	58	—	—	—	3.0	2 3/4-50	320

Stainless steel version: Shipping weight 340 kg

The permissible admission pressure on the intake side is approx. 50% of the maximum permissible back pressure.

### Materials in Contact With the Medium

DN 50 plate valves					
Liquid end	Suction/discharge valve	Seals	Valve plates/valve spring	Valve seats	
PPT Polypropylene	Polypropylene	PTFE	Ceramic/ Hast. C + CTFE**	PTFE	
PCT PVC	PVC	PTFE	Ceramic/ Hast. C + CTFE**	PTFE	
TTT PTFE with carbon	PTFE with carbon	PTFE	Ceramic/ Hast. C + CTFE**	PTFE	
SST Stainless steel mat. no. 1.4571/1.4404	Stainless steel mat. no. 1.4571/1.4404	PTFE	Stainless steel mat. no. 1.4404/ Hast. C	PTFE	

DEVELOPAN® metering diaphragm with PTFE coating.

\*\* The valve spring is coated with CTFE (similar to PTFE)

Special versions on request.

### Motor Data

Identity code specification		Power supply		Remarks	
S	3-phase, IP 55	220 – 240 V/380 – 420 V	50 Hz	3 kW	
		250 – 280 V/440 – 480 V	60 Hz		
R	3-phase, IP 55	230 V/400 V	50/60 Hz	3 kW	with PTC, speed control range 1:5
L1	3-phase, II 2G Ex e II T3 X	220 – 240 V/380 – 420 V	50 Hz	3.6 kW	
L2	3-phase, II 2G Ex de IIC T4 Gb	220 – 240 V/380 – 420 V	50 Hz	4 kW	with PTC, speed control range 1:5
P1	3-phase, II 2G Ex e IIC T3	250 – 280 V/440 – 480 V	60 Hz	3.6 kW	
P2	3-phase, II 2G Ex de IIC T4	250 – 280 V/440 – 480 V	60 Hz	4 kW	with PTC, speed control range 1:5

Motor data sheets can be requested for more information. Special motors or special motor flanges are available on request.

The motors are designed in compliance with the Ecodesign Directive 2009/125/EC.

#### Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/EU in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label corresponds to or is better than the conditions prevalent in the intended field of application.





## 2.2 Diaphragm Process Metering Pumps

### Identity Code Ordering System for Motor-Driven Metering Pump M5Ma with Mechanically Deflected Diaphragm

M5Ma	Drive type	
	H	Main drive
	D	Double main drive
	A	Add-on drive
	B	Double add-on drive
Type		
	041540	
	041900	
	042600	
	043400	
	044000	
Liquid end material		
	PC	PVC
	PP	Polypropylene
	SS	Stainless steel
	TT	PTFE + 25% carbon
Sealing material		
	T	PTFE
Displacement body		
	T	Pump diaphragm with PTFE coating
Liquid end version		
	1	With valve springs, Hast. C; 0.1 bar
Hydraulic connection		
	0	Standard connection
	1	PVC union nut and insert
	2	PP union nut and insert
	3	PVDF union nut and insert
	4	SS union nut and insert
Version		
	0	with ProMinent® logo, no frame
	2	without ProMinent® logo, no frame
	A	with ProMinent® logo, with frame, simplex
	B	with ProMinent® logo, with frame, duplex
	C	with ProMinent® logo, with frame, triplex
	D	with ProMinent® logo, with frame, quadruplex
	M	Modified
Electrical power supply		
	S	3 ph. 230/400 V 50/60 Hz (WBS)
	R	Variable speed motor 4-pole 230/400 V (R 1:5)
	Z	Speed control complete 230/400 V, 50/60 Hz
	L	3 ph. 230/400 V 50 Hz (Exe, Exd)
	P	3 ph. 460 V 60 Hz (Exe, Exd)
	5	No motor, with IEC 100 gearbox
	6	No motor, with IEC 112 gearbox
	0	No motor, no gearbox
Enclosure rating		
	0	IP 55 (Standard) ISO class F
	1	Exe version ATEX-T3
	2	Exd version ATEX-T4
	A	ATEX power end
Stroke sensor		
	0	No stroke sensor
	1	With stroke sensor (Namus)
Stroke length adjustment		
	0	Stroke length adjustment, manual
	3	230 V 0-20 mA stroke controller
	4	230 V 4-20 mA stroke controller
	5	115 V 0-20 mA stroke controller
	6	Control drive 115 V 4-20 mA
	-	Other designs, such as explosion-proof, on request
Application		
	0	Standard
	3	Temperature up to -20 °C

## 2.2 Diaphragm Process Metering Pumps

### Spare Parts Kits for Diaphragm Metering Pump Makro/ 5 HM

The replacement part kit in general includes wear parts for the liquid ends.

- 1 Metering diaphragm
- 1 Suction valve compl.
- 1 Discharge valve compl.
- 2 Valve plate and Hast. C spring
- 1 Seal kit complete (envelope rings, valve seat/valve seat bushing)

Liquid end		Order no.
FM 4000 PCT	–	1008172
FM 4000 PPT	–	1008171
FM 4000 TTT	–	1008173
FM 4000 SST	without valves cpl.	1008174

### PTFE Metering Diaphragms

DEVELOPAN® diaphragm made of EPDM with woven fabric inlay, large-area, vulcanised aluminium core and PTFE-Teflon layer on the side in contact with the medium.

	Order no.
Metering diaphragm for Makro/ 5 FM 4000	1009023



## 2.3 Hydraulic diaphragm metering pumps

### 2.3.1

#### Hydraulic Diaphragm Metering Pump Hydro/ 2

For flexible metering with excellent process reliability in the medium pressure range.

Capacity range of single head pump: 3 – 72 l/h; 100 – 25 bar



As an extremely robust hydraulic diaphragm metering pump, the Hydro/ 2 meets the most exacting safety requirements. Its modular construction, with either one or two dosing heads, 4 gear ratios, 2 dosing head sizes and 3 dosing head materials, offers a very high degree of flexibility in terms of areas of application.

The Hydro/ 2 hydraulic diaphragm metering pump (HP2a), together with the Hydro/ 3 and Hydro/ 4 pumps, represents an integrated product range with stroke lengths of 15 and/or 20 mm. This covers the capacity range from 3 to 1,450 l/h at 100 – 7 bar. A wide range of power end versions is available for use in areas at risk from explosion with ATEX certification. The Hydro product range is designed to comply with API 675 among others.

#### Your benefits

Excellent process safety and reliability:

- PTFE multi-layer diaphragm with integral diaphragm rupture warning system
- Integral hydraulic relief valve
- Metering reproducibility is better than  $\pm 1\%$  within the 20-100% stroke volume range under defined conditions and with proper installation

Excellent flexibility:

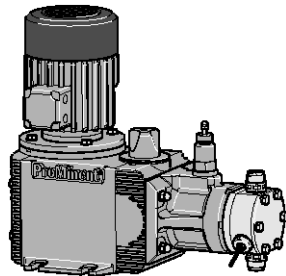
- The modular construction with single and double head versions permits a wide range of applications, with the double head designs being operated in push-pull mode
- It is possible to combine up to 5 metering units, even with different pump capacities, in multiple pump systems
- 5 different gear ratios are available

#### Technical Details

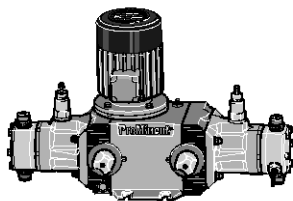
- Stroke length: 15 mm, Rod force: 2,000 N
- Stroke volume adjustment range: 0 – 100 %
- Stroke volume adjustment: manually by scaled rotary dial (optionally with electric actuator or control drive)
- Metering reproducibility is better than  $\pm 1\%$  in the 20 to 100% stroke volume range under defined conditions and with correct installation
- PTFE multi-layer diaphragm with electric diaphragm rupture warning system via a contact
- Integrated hydraulic relief and bleed valve
- Wetted materials: PVDF, PTFE+25% carbon, stainless steel 1.4571, Hastelloy C.
- A wide range of power end versions is available: Three-phase AC or 1-phase AC motor, motors for use in areas at risk from explosion, different flange designs for use of customer-specific motors
- Degree of protection: IP 55
- Design in compliance with API 675  
see chapter 2.3.4

#### Field of application

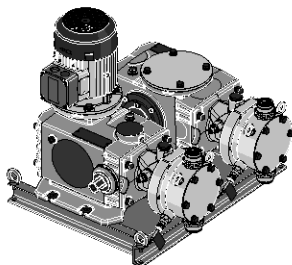
- Oil and gas industry
- Volume-proportional metering of chemicals/additives in the treatment of boiler feed water
- Metering of reactants and catalysts in the chemical industry
- Level-dependent metering of auxiliary agents in industrial production engineering, for instance hot wax metering in the production of adhesive strips



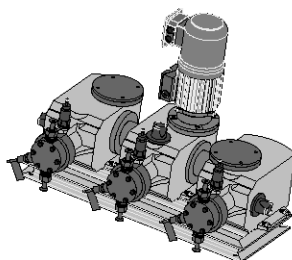
pk\_2\_074  
Hydro



pk\_2\_073  
Hydro double head pump



P\_HY\_0040\_SW1  
Hydro externally mounted pump



P\_PZ\_0001\_SW1  
Hydro triplex pump



## 2.3 Hydraulic diaphragm metering pumps

### Technical Data

Type HP2a	With 1500 rpm motor at 50 Hz				With 1800 rpm motor at 60 Hz			Suction lift	Perm. pre- pressure suction side	Connection on suction/ pressure side	Ship- ping weight	Plung- er Ø
	bar	l/h	ml/ stroke	Max. stroke rate Strokes/ min	psi	l/h/gph (US)	Max. stroke rate Strokes/ min					
100003*	100	3	0.8	60	1,450	3.6/1.0	72	3.0	5	Rp 1/4*	31	16
100006*	100	6	0.8	125	1,450	7.0/1.8	150	3.0	5	Rp 1/4*	31	16
100007*	100	7	0.8	150	1,450	8.0/2.1	180	3.0	5	Rp 1/4*	31	16
100009*	100	9	0.8	187	1,450	11.0/2.9	224	3.0	5	Rp 1/4*	31	16
100010*	100	10	0.8	212	–	–	–	3.0	5	Rp 1/4*	31	16
064007	64	7	2.0	60	928	8.4/2.2	72	3.0	5	G 3/4-10	31	18
064015	64	15	2.0	125	928	18.0/4.8	150	3.0	5	G 3/4-10	31	18
064018	64	18	2.0	150	928	21.0/5.5	180	3.0	5	G 3/4-10	31	18
064022	64	22	2.0	187	928	26.0/6.9	224	3.0	5	G 3/4-10	31	18
064025	64	25	2.0	212	–	–	–	3.0	5	G 3/4-10	31	18
040014	40	14	3.9	60	580	16.8/4.4	72	3.0	5	G 3/4-10	31	22
040029	40	29	3.9	125	580	34.8/9.2	150	3.0	5	G 3/4-10	31	22
040035	40	35	3.9	150	580	42.0/11.1	180	3.0	5	G 3/4-10	31	22
040044	40	44	3.9	187	580	52.8/13.9	224	3.0	5	G 3/4-10	31	22
040050	40	50	3.9	212	580	–	–	3.0	5	G 3/4-10	31	22
025019	25	19	5.3	60	362	23.0/6.1	72	3.0	5	G 3/4-10**	31	26
025040	25	40	5.3	125	362	48.0/12.7	150	3.0	5	G 3/4-10**	31	26
025048	25	48	5.3	150	362	58.0/15.3	180	3.0	5	G 3/4-10**	31	26
025060	25	60	5.3	187	362	72.0/19.0	224	3.0	5	G 3/4-10**	31	26
025068	25	68	5.3	212	–	–	–	3.0	5	G 3/4-10**	31	26

Version PVDF max. 25 bar.

\* Version SST/HCT with double ball valve, valve connector on the suction-pressure with female thread Rp 1/4 and external thread G 3/4 - DN 10

\*\* HV design with G1 - DN 15 connector

### Materials in Contact With the Medium

Material	Dosing head	Suction/pressure connector	Seals/ball seat	Balls
SST	Stainless steel 1.4571/1.4404	Stainless steel 1.4581	PTFE/ZrO <sub>2</sub> (DN 15 – stainless steel 1.4404)	Ceramic
PVT*	PVDF (polyvinylidene fluoride)	PVDF (polyvinylidene fluoride)	PTFE/PTFE	Ceramic
HCT	Hastelloy C	Hastelloy C	PTFE/Hastelloy C	Ceramic
TTT	PTFE + 25 % carbon	PVDF (polyvinylidene fluoride)	PTFE/PTFE	Ceramic

\* not for areas at risk from explosion

### Motor Data

Identity code specification	Power supply	Remarks
S	3-phase, IP 55 220 – 240 V/380 – 420 V 250 – 280 V/440 – 480 V	50 Hz 60 Hz 0.37 kW
T	3-phase, IP 55 220 – 240 V/380 – 420 V 265 – 280 V/440 – 480 V	50 Hz 60 Hz 0.37 kW with PTC, speed control range 1:5
R	3-phase, IP 55 230 V/400 V	50/60 Hz 0.37 kW with PTC, speed control range 1:20 with external fan 1-phase 230 V; 50/60 Hz
V0	1-phase, IP 55 230 V ±10%	50/60 Hz 0.37 kW Variable speed motor with integrated frequency converter
L1	3-phase, II 2G Ex eb IIC T3 Gb	220 – 240 V/380 – 420 V 50 Hz 0.37 kW
L2	3-phase, II 2G Ex de IIC T4 Gb	220 – 240 V/380 – 420 V 50 Hz 0.37 kW with PTC, speed control range 1:5
P1	3-phase, II 2G Ex e II T3	254 – 277 V/440 – 480 V 60 Hz 0.37 kW
P2	3-phase, II 2G Ex de IIC T4	254 – 277 V/440 – 480 V 60 Hz 0.37 kW with PTC, speed control range 1:5
V2	3-phase, II 2G Ex db IIC T3...T6 Gb	400 V ±10% 50/60 Hz 0.55 kW Ex-variable speed motor with integrated frequency converter

Motor data sheets can be requested for more information. Special motors or special motor flanges are available on request.

### Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/EU in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label corresponds to or is better than the conditions prevalent in the intended field of application.



## 2.3 Hydraulic diaphragm metering pumps

### Identity Code Ordering System HP2a

HP2a	Drive type										
H	Main drive										
D	Main drive, double-head version										
E	Main drive for add on drive										
F	Main drive, double-head version for add-on drive										
A	Add-on drive										
B	Double-head version add-on drive										
T	Triplex comprising 3 power ends and 3 identical heads										
Type*											
100003	bar	l/h	064007	bar	l/h	040014	bar	l/h	025019	bar	l/h
100006	100	3	64	7	40	14	25	19			
100007	100	6	64	15	40	29	25	40			
100007	100	7	64	18	40	35	25	48			
100009	100	9	64	22	40	44	25	60			
100010	100	10	64	25	40	50	25	68			
Liquid end material											
SS	Stainless steel										
PV	PVDF (only for 025019 - 025068, 064007 - 064025)										
HC	Hastelloy C										
TT	PTFE + 25% carbon										
Sealing material*											
T	PTFE										
Displacement body*											
0	Standard multi-layer diaphragm with rupture signalling facility										
Liquid end version											
0	No valve springs (standard)										
1	With valve springs										
D	Double ball valve (only for SST and HCT)										
H	HV version (for 025019 – 025060 only, for SST only)										
Hydraulic connection											
0	Standard threaded connector										
E	With DIN ISO flange										
F	With ANSI flange										
Version											
0	with ProMinent® logo										
1	without ProMinent® logo										
M	Modified										
Electrical power supply											
S	3 ph, 230/400 V, 50/60 Hz, 0,37 kW										
T	3 ph, 230/400 V, 50/60 Hz, with PTC										
R	3 ph, Variable speed motor, 230 V/400 V, 0.37 kW										
V (0)	Variable speed motor with integrated frequency converter										
Z	1 ph, Variable speed control set, 230 V, 50/60 Hz										
L	3 ph, 230/400 V, 50 Hz (Exe, Exd), 0.37 kW										
P	3 ph, 265/400 V, 60 Hz (Exe, Exd), 0.37 kW										
V (2)	Variable speed motor with integr. frequency converter (Exd)										
1	no motor, with motor flange B 14, size 200										
3	no motor, with motor flange B5, size 160										
4	no motor, with motor flange NEMA 56 C										
0	Add on drive										
Enclosure rating											
0	IP 55 (standard)										
1	Exe motor version ATEX-T3										
2	Exde motor version ATEX-T4										
A	ATEX power end										
Stroke sensor											
0	No stroke sensor (standard)										
1	Stroke sensor (for explosion-proof applications)										
Stroke length adjustment											
0	Manual (standard)										
1	With stroke positioning motor, 230 V/50/60 Hz										
2	With stroke positioning motor, 115 V/60 Hz										
A	With stroke control motor 0...20 mA 230 V/50/60 Hz										
B	With stroke control motor 4...20 mA 230 V/50/60 Hz										
C	With stroke control motor 0...20 mA 115 V/60 Hz										
D	With stroke control motor 4...20 mA 115 V/60 Hz										
Hydraulic oil											
0	Standard										
1	Food grade										
2	Low temperature to -25 °C										
3	Low temperature Zone 2										

\* PVT max. 25 bar

## 2.3 Hydraulic diaphragm metering pumps

### Spare Parts

The spare parts kit generally includes the wear parts for the liquid ends.

#### Scope of delivery with SST/HCT material version

- 1 Diaphragm
- 2 Valve balls
- 1 Sealing set, complete

#### Scope of delivery with PVT material version

- 1 Diaphragm
- 1 Suction valve, complete
- 1 Discharge valve, complete
- 2 Valve balls
- 1 Sealing set, complete

### Spare parts kits for Hydro/ 2

Applies to identity code: Type 100010, 100009, 100007, 100006, 100003, 064025, 064022, 064018, 064015, 064007

Liquid end	Materials in contact with the medium	Order no.
FMH 25 - DN 10	PVT	1005548
	SST	1005549
	SST for double ball valves	1029260
	HCT	1009571
	SST with valves cpl.	1005550

Applies to identity code: Type 025068, 025060, 025048, 025040, 025019

Liquid end	Materials in contact with the medium	Order no.
FMH 60 - DN 10	PVT	1005552
	SST	1005553
	SST for double ball valves	1005555
	HCT	1009573
	SST with valves cpl.	1005554
	SST (HV design) with valves, complete (DN 15)	1019812

### PTFE/1.4404 Metering Diaphragms for Hydro/ 2

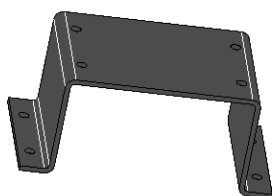
Liquid end	Order no.
FMH 25	Applies to identity code (SST): 100010, 100009, 100007, 100006, 100003, 064025, 064022, 064018, 064015, 064007 1005545
FMH 60	Applies to identity code (SST): 025068, 025060, 025048, 025040, 025019 1005546

### Diaphragms PTFE/Hastelloy C Coated for Hydro/ 2

Liquid end	Order no.
FMH 25	Applies to identity code (PVT/HCT): 064025, 064022, 064018, 064015, 064007 1006481
FMH 60	Applies to identity code: 025068, 025060, 025048, 025040, 025019 1006482

### Base for Hydro hydraulic diaphragm metering pumps

Order no.
Base for Hydro/ 2, dimensions: 300 x 160 x 128 mm (LxWxH) 1005660



P\_PZ\_0010\_SW1



## 2.3 Hydraulic diaphragm metering pumps

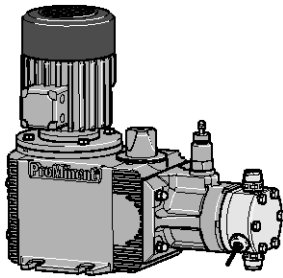
### 2.3.2

### Hydraulic Diaphragm Metering Pump Hydro/ 3

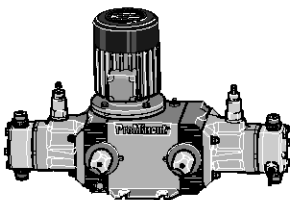
For flexible metering with excellent process reliability in the medium pressure range.

Capacity range of single head pump: 10 – 180 l/h; 100 – 25 bar

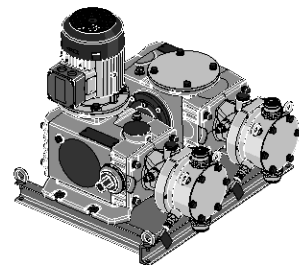
The Hydro/ 3 is an extremely robust hydraulic diaphragm metering pump. It meets the most exacting safety requirements. Its modular construction offers extremely good flexibility in terms of application, for example in the oil and gas industry.



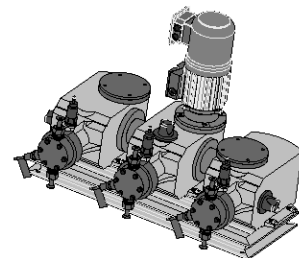
pk\_2\_074  
Hydro



pk\_2\_073  
Hydro double head pump



P\_HY\_0040\_SW1  
Hydro externally mounted pump



P\_PZ\_0001\_SW1  
Hydro triplex pump

The Hydro/ 3 hydraulic diaphragm metering pump (HP3a), together with the Hydro/ 2 and Hydro/ 4 pumps, represents an integrated product range with stroke lengths of 15 and/or 20 mm. This covers the capacity range from 3 to 1,450 l/h at 100 – 7 bar. A wide range of power end versions is available for use in areas at risk from explosion with ATEX certification. The Hydro product range is designed to comply with API 675 among others.

#### Your benefits

Excellent process safety and reliability:

- PTFE multi-layer diaphragm with integral diaphragm rupture warning system
- Integral hydraulic relief valve
- Metering reproducibility is better than  $\pm 1\%$  within the 20-100% stroke volume range under defined conditions and with proper installation

Excellent flexibility:

- The modular construction with single and double head versions permits a wide range of applications, with the double head designs being operated in push-pull mode
- It is possible to combine up to 5 metering units, even with different pump capacities, in multiple pump systems
- 5 different gear ratios are available
- Customised designs are available on request

#### Technical Details

- Stroke length: 15 mm, Rod force: 4,200 N
- Stroke volume adjustment range: 0 – 100 %
- Stroke volume adjustment: manually by scaled rotary dial (optionally with electric actuator or control drive)
- Metering reproducibility is better than  $\pm 1\%$  in the 20 – 100% stroke volume range under defined conditions and with correct installation
- PTFE multi-layer diaphragm with electrical diaphragm rupture warning system via a contact
- Integrated hydraulic relief and bleed valve
- Wetted materials: PVDF, PTFE+25% carbon, stainless steel 1.4571, Hastelloy C.
- A wide range of power end versions is available: Three-phase AC or 1-phase AC motor, motors for use in areas at risk from explosion, different flange designs for use of customer-specific motors
- Degree of protection: IP 55
- Design in compliance with API 675  
see chapter 2.3.5

#### Field of application

- Oil and gas industry.
- Volume-proportional metering of chemicals/additives in the treatment of boiler feed water
- Metering of reactants and catalysts in the chemical industry
- Level-dependent metering of auxiliary agents in industrial production engineering, for instance hot wax metering in the production of adhesive strips



## 2.3 Hydraulic diaphragm metering pumps

### Technical Data

Type HP3a	With 1500 rpm motor at 50 Hz				With 1800 rpm motor at 60 Hz			Suction lift	Perm. pre-pressure suction side	Connection suction/ discharge side	Shipping weight	Plung-er Ø
	Delivery rate at max. back pressure		Max. stroke rate	Delivery rate at max. back pressure		Max. stroke rate						
	bar	l/h		ml/ stroke	Strokes/ min		psi					
	bar	l/h	ml/ stroke	Strokes/ min	psi	l/h/gph (US)	Strokes/ min	m WC	bar	G-DN	kg	mm
100010*	100	10	2.8	60	1,450	12/3.2	72	3.0	5	Rp 3/8-10*	41	22
100021*	100	21	2.8	125	1,450	25/6.6	150	3.0	5	Rp 3/8-10*	41	22
100025*	100	25	2.8	150	1,450	30/7.9	180	3.0	5	Rp 3/8-10*	41	22
100031*	100	31	2.8	187	1,450	37/9.8	224	3.0	5	Rp 3/8-10*	41	22
100035*	100	35	2.8	212	1,450		–	3.0	5	Rp 3/8-10*	41	22
064019	64	19	5.3	60	928	23/6.1	72	3.0	5	G 3/4-10**	41	26
064040	64	40	5.3	125	928	48/12.7	150	3.0	5	G 3/4-10**	41	26
064048	64	48	5.3	150	928	58/15.3	180	3.0	5	G 3/4-10**	41	26
064060	64	60	5.3	187	928	72/19.0	224	3.0	5	G 3/4-10**	41	26
064068	64	68	5.3	212	928		–	3.0	5	G 3/4-10**	41	26
040029	40	29	8.2	60	580	35/9.2	72	3.0	5	G 1-15***	41	32
040062	40	62	8.2	125	580	74/19.7	150	3.0	5	G 1-15***	41	32
040074	40	74	8.2	150	580	89/23.5	180	3.0	5	G 1-15***	41	32
040092	40	92	8.2	187	580	110/29.2	224	3.0	5	G 1-15***	41	32
040105	40	105	8.2	212	580		–	3.0	5	G 1-15***	41	32
025048	25	48	13.4	60	362	58/15.3	72	3.0	5	G 1-15***	41	38
025100	25	100	13.4	125	362	120/31.7	150	3.0	5	G 1-15***	41	38
025120	25	120	13.4	150	362	144/38.0	180	3.0	5	G 1-15***	41	38
025150	25	150	13.4	187	362	180/47.6	224	3.0	5	G 1-15***	41	38
025170	25	170	13.4	212	362		–	3.0	5	G 1-15***	41	38

Version PVDF max. 25 bar.

\* Version SST/HCT with double ball valve, valve connector on the suction/discharge side with female thread Rp 3/8 and external thread G 3/4 - DN 10

\*\* HV design (SST only) with G 1 - DN 15 connector

\*\*\* HV design (SST only) with 1 1/4" DN 20 connector

### Materials in Contact With the Medium

Material	Dosing head	Suction/pressure connector	Seals/ball seat	Balls
SST	Stainless steel 1.4571/1.4404	Stainless steel 1.4581	PTFE/stainless steel 1.4404	Ceramic
PVT*	PVDF (polyvinylidene fluoride)	PVDF (polyvinylidene fluoride)	PTFE/PTFE	Ceramic
HCT	Hastelloy C	Hastelloy C	PTFE/Hastelloy C	Ceramic
TTT	PTFE + 25 % carbon	PVDF (polyvinylidene fluoride)	PTFE/PTFE	Ceramic

\* not for areas at risk from explosion

### Motor Data

Identity code specification	Power supply	Remarks
S 3-phase, IP 55	220 – 240 V/380 – 420 V 50 Hz 250 – 280 V/440 – 480 V 60 Hz	0.75 kW
T 3-phase, IP 55	220 – 240 V/380 – 420 V 50 Hz 265 – 280 V/440 – 480 V 60 Hz	0.75 kW with PTC, speed control range 1:5
R 3-phase, IP 55	230 V/400 V	50/60 Hz 0.75 kW with PTC, speed control range 1:20, with external fan 1-phase 230 V; 50/60 Hz
V0 1-phase, IP 55	230 V ±10 %	50/60 Hz 0.75 kW Variable speed motor with integrated frequency converter
L1 3-phase, II 2G Ex b IIC T3 Gb	220 – 240 V/380 – 420 V 50 Hz	0.75 kW
L2 3-phase, II 2G Ex de IIC T4	220 – 240 V/380 – 420 V 50 Hz	0.75 kW with PTC, speed control range 1:5
P1 3-phase, II 2G Ex e II T3	254 – 277 V/440 – 480 V 60 Hz	0.75 kW
P2 3-phase, II 2G Ex de IIC T4	254 – 277 V/440 – 480 V 60 Hz	0.75 kW with PTC, speed control range 1:5
V2 3-phase, II 2G Ex db IIC T3...T6 Gb	400 V ±10 %	50/60 Hz 0.75 kW Ex-variable speed motor with integrated frequency converter

Motor data sheets can be requested for more information. Special motors or special motor flanges are available on request.

The motors are designed in compliance with the Ecodesign Directive 2009/125/EC.

### Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/EU in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label corresponds to or is better than the conditions prevalent in the intended field of application.





## 2.3 Hydraulic diaphragm metering pumps

### Identity Code Ordering System HP3a

HP3a	Drive type										
H	Main drive										
D	Main drive, double-head version										
E	Main drive for add-on drive										
F	Main drive, double-head version for add-on drive										
A	Add-on drive										
B	Double-head version add-on drive										
T	Triplex comprising 3 power ends and 3 identical heads										
Type*											
100010	bar	l/h	064019	bar	l/h	040029	bar	l/h	025048	bar	l/h
100021	100	10	64	19		40	29		25	48	
100025	100	21	64	40		40	62		25	100	
100025	100	25	64	48		40	74		25	120	
100031	100	31	64	60		40	92		25	150	
100035	100	35	64	68		40	105		25	170	
Liquid end material											
SS	Stainless steel										
PV	PVDF (max. 25 bar, only for 025048 - 025170, 064019 - 064068)										
HC	Hastelloy C										
TT	PTFE + 25% carbon										
Sealing material*											
T	PTFE										
Displacement body*											
0	Standard multi-layer diaphragm with rupture signalling facility										
Liquid end version											
0	No valve springs (standard)										
1	With valve springs										
D	Double ball valve (for 100010-100035, 064019-064060, only for SST and HCT)										
H	HV design(for 064019 - 064060, 25048 - 25170, SST only)										
Hydraulic connection											
0	Standard threaded connector										
E	With DIN ISO flange										
F	With ANSI flange										
Version											
0	with ProMinent® logo										
1	without ProMinent® logo										
M	Modified										
Electrical power supply											
S	3 ph, 230/400 V, 50/60 Hz, 0.75 kW										
T	3 ph, 230/400 V, 50/60 Hz, with PTC										
R	3 ph, variable speed motor, 230 V/400 V, 0.75 kW										
V (0)	Variable speed motor with integrated frequency converter										
Z	1 ph, variable speed control set, 230 V, 50/60 Hz										
L	3 ph, 230/400 V 50 Hz (Exe, Exd), 0.75 kW										
P	3 ph, 265/440 V 60 Hz (Exe, Exd), 0.75 kW										
V (2)	Variable speed motor with integr. frequency converter (Exd)										
1	no motor, with motor flange B 14, size 200										
3	no motor, with motor flange B5, size 160										
4	no motor, with motor flange NEMA 56 C										
0	Add on drive										
Enclosure rating											
0	IP 55 (standard)										
1	Exe motor version ATEX-T3										
2	Exd motor version ATEX-T4										
A	ATEX power end										
Stroke sensor											
0	No stroke sensor (standard)										
1	Stroke sensor (for explosion-proof applications)										
Stroke length adjustment											
0	Manual (Standard)										
1	With stroke positioning motor, 230 V/50/60 Hz										
2	With stroke positioning motor, 115 V/60 Hz										
A	With stroke control motor 0-20 mA 230 V/50/60 Hz										
B	With stroke control motor 4-20 mA 230 V/50/60 Hz										
C	With stroke control motor 0-20 mA 115 V/60 Hz										
D	With stroke control motor 4-20 mA 115 V/60 Hz										
Hydraulic oil											
0	Standard										
1	Food grade										
2	Low temperature to -25 °C										

\* PVT max. 25 bar

## 2.3 Hydraulic diaphragm metering pumps

### Spare Parts

The spare parts kit generally includes the wear parts for the liquid ends.

#### Scope of delivery with SST/HCT material version

- 1 Diaphragm
- 2 Valve balls
- 1 Sealing set, complete

#### Scope of delivery with PVT material version

- 1 Diaphragm
- 1 Suction valve, complete
- 1 Discharge valve, complete
- 2 Valve balls
- 1 Sealing set, complete

### Spare parts kits for Hydro/ 3

Applies to identity code: Type 100035, 100031, 100025, 100021, 100010, 064068, 064060, 064048, 064040, 064019

Liquid end	Materials in contact with the medium	Order no.
FMH 60 - DN 10	PVT	1005552
	SST	1005553
	SST	for double ball valves
	HCT	1009573
	SST	with valves cpl.
	SST (HV design)	with valves, complete (DN 15)

Applies to identity code: Type 025170, 025150, 025120, 025100, 025048

Liquid end	Materials in contact with the medium	Order no.
FMH 150 - DN 15	PVT	1005556
	SST	1005557
	HCT	1009575
	SST	with valves cpl.
	SST (HV design)	with valves, complete (DN 20)

### Metering Diaphragm PTFE/1.4404 for Hydro/ 3

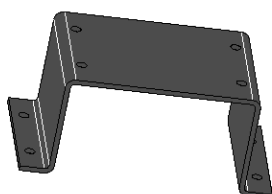
Liquid end	Order no.
FMH 60	Identity code (SST) 064019, 064040, 064048, 064060, 064068, 100010, 100021, 100025, 100031, 100035
FMH 150	Identity code (SST) 025048, 025100, 025120, 025150, 025170

### Diaphragms PTFE/Hastelloy C Coated for Hydro/ 3

Liquid end	Order no.
FMH 60	Identity code (PVT/HCT) 064019, 064040, 064048, 064060, 064068, 100010, 100021, 100025, 100031, 100035
FMH 150	Identity code (PVT/HCT) 025048, 025100, 025120, 025150, 025170

### Base for Hydro hydraulic diaphragm metering pumps

Order no.
Base for Hydro/ 3, dimensions: 324 x 180 x 128 mm (LxWxH)



P\_PZ\_0010\_SW1

## 2.3 Hydraulic diaphragm metering pumps

### 2.3.3

#### Hydraulic Diaphragm Metering Pump Hydro/ 4

For flexible metering with excellent process reliability in the medium pressure range.

Capacity range of single head pump: 76 – 1,450 l/h; 40 – 7 bar



The Hydro/ 4 is an extremely robust hydraulic diaphragm metering pump, which meets the most exacting safety requirements – it is equipped as standard with a pressure relief valve and PTFE multi-layer diaphragm with diaphragm rupture warning system. Its modular construction offers extremely good flexibility in terms of applications.

The Hydro/ 4 hydraulic diaphragm metering pump (HP4a), together with the Hydro/ 2 and Hydro/ 3 pumps, represents an integrated product range with stroke lengths of 15 and/or 20 mm. This covers the capacity range from 3 to 1,450 l/h at 100 – 7 bar. A wide range of power end versions is available for use in areas at risk from explosion with ATEX certification. The Hydro product range is designed to comply with API 675 among others.

##### Your benefits

Excellent process safety and reliability:

- PTFE multi-layer diaphragm with integral diaphragm rupture warning system
- Integral hydraulic relief valve
- Metering reproducibility is better than  $\pm 1\%$  in the 20-100% stroke volume range under defined conditions and with proper installation.

Excellent flexibility:

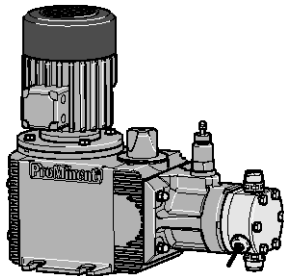
- The modular construction with single and double head versions permits a wide range of applications, with the double head designs being operated in push-pull mode
- It is possible to combine up to 5 metering units, even with different pump capacities, in multiple pump systems
- 5 different gear ratios are available
- Customised designs are available on request

##### Technical Details

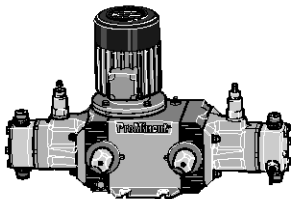
- Stroke length: 20 mm, Rod force: 5,800 N
- Stroke volume adjustment range: 0 – 100%
- Stroke volume adjustment: manually by scaled rotary dial (optionally with electric actuator or control drive).
- Metering reproducibility is better than  $\pm 1\%$  in the 20 – 100% stroke volume range under defined conditions and with correct installation
- PTFE multi-layer diaphragm with electrical diaphragm rupture warning system via a contact
- Integrated hydraulic relief and bleed valve
- Wetted materials: PVDF, PTFE+25% carbon, stainless steel 1.4571, Hastelloy C.
- A wide range of power end versions is available: Three-phase or 1-phase AC motor, motors for use in areas at risk from explosion, different flange designs for use of customer-specific motors
- Degree of protection: IP 55
- Design in compliance with API 675 among others

##### Field of application

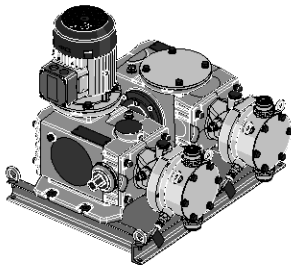
- Oil and gas industry.
- Volume-proportional metering of chemicals/additives in the treatment of boiler feed water
- Metering of reactants and catalysts in the chemical industry
- Level-dependent metering of auxiliary agents in industrial production engineering, for instance hot wax metering in the production of adhesive strips



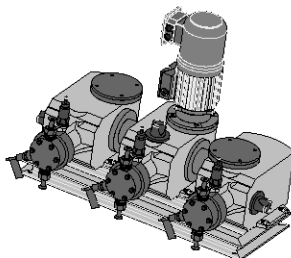
pk\_2\_074  
Hydro



pk\_2\_073  
Hydro double head pump



P\_HY\_0040\_SW1  
Hydro externally mounted pump



P\_PZ\_0001\_SW1  
Hydro triplex pump



## 2.3 Hydraulic diaphragm metering pumps

### Technical Data

Type HP4a	With 1500 rpm motor at 50 Hz				With 1800 rpm motor at 60 Hz			Suc- tion lift	Perm. pre- pressure suction side	Connection suction/ discharge side	Ship- ping weight	Plun- ger Ø
	Delivery rate at max. back pressure		Max. stroke rate	Delivery rate at max. back pres- sure		Max. stroke rate						
	bar	l/h		ml/ stroke	Strokes/ min		psi					
								m WC	bar	G-DN	kg	mm
400075	40	76	17.7	71	580	91/24	86	3	1	G 1 1/2-25	69	40
400109	40	109	17.7	103	580	132/35	124	3	1	G 1 1/2-25	69	40
400145	40	145	17.7	136	580	174/46	164	3	1	G 1 1/2-25	69	40
400200	40	200	17.7	188	580	239/63	225	3	1	G 1 1/2-25	69	40
400227	40	227	17.7	214	—	—	—	3	1	G 1 1/2-25	69	40
250130	25	130	31.0	71	363	155/41	86	3	1	G 1 1/2-25	69	52
250190	25	190	31.0	103	363	230/61	124	3	1	G 1 1/2-25	69	52
250250	25	250	31.0	136	363	300/79	164	3	1	G 1 1/2-25	69	52
250350	25	350	31.0	188	363	420/111	225	3	1	G 1 1/2-25	69	52
250400	25	400	31.0	214	—	—	—	3	1	G 1 1/2-25	69	52
160210	16	210	48.7	71	232	250/66	86	3	1	G 1 1/2-25	76	63
160300	16	300	48.7	103	232	360/95	124	3	1	G 1 1/2-25	76	63
160400	16	400	48.7	136	232	480/127	164	3	1	G 1 1/2-25	76	63
160550	16	550	48.7	188	232	660/174	225	3	1	G 1 1/2-25	76	63
160625	16	625	48.7	214	—	—	—	3	1	G 1 1/2-25	76	63
100330	10	330	78.0	71	145	400/106	86	3	1	G 2-32	87	80
100480	10	480	78.0	103	145	580/153	124	3	1	G 2-32	87	80
100635	10	635	78.0	136	145	760/201	164	3	1	G 2-32	87	80
100880	10	880	78.0	188	145	1,050/277	225	3	1	G 2-32	87	80
101000	10	1,000	78.0	214	—	—	—	3	1	G 2-32	87	80
070465	7	465	109.0	71	102	560/148	86	3	1	G 2 1/4-40	96	94
070670	7	670	109.0	103	102	805/213	124	3	1	G 2 1/4-40	96	94
070890	7	890	109.0	136	102	1,070/283	164	3	1	G 2 1/4-40	96	94
071230	7	1,230	109.0	188	102	1,450/383	225	3	1	G 2 1/4-40	96	94
071400	7	1,400	109.0	214	—	—	—	3	1	G 2 1/4-40	96	94

### Materials in Contact With the Medium

Material	Dosing head	Suction/pressure connector	DN 25 ball valves		DN 32/DN 40 plate valves			
			Seals	Valve balls	Valve seats	Seals	Valve plates/valve springs	Valve seats
<b>SST</b>	Stainless steel 1.4404	Stainless steel 1.4404	PTFE	Stainless steel 1.4404	PTFE	PTFE	Stainless steel 1.4404/ Hast. C	PTFE
<b>PVT*</b>	PVDF (polyvinylidene fluoride)	PVDF (polyvinylidene fluoride)	PTFE	Glass	PTFE	PTFE	Ceramic/E-CTFE	PTFE
<b>HCT</b>	Hastelloy C	Hastelloy C	PTFE	Hastelloy C	PTFE	PTFE	Hast. C / E-CTFE	PTFE
<b>TTT</b>	PTFE + 25 % carbon	PVDF (polyvinylidene fluoride)	PTFE	Glass	PTFE	PTFE	Ceramic/E-CTFE	PTFE

\* not for areas at risk from explosion



## 2.3 Hydraulic diaphragm metering pumps

### Identity Code Ordering System HP4a

HP4a	Drive type										
H	Main drive										
D	Main drive, double-head version										
E	Main drive for add-on drive										
F	Main drive, double-head version for add-on drive										
A	Add-on drive										
B	Double-head version add-on drive										
T	Triplex comprising 3 power ends and 3 identical heads										
Type*											
250130	bar	l/h	160400	bar	l/h	101000	bar	l/h	400109	bar	l/h
250190	25	130	16	400	070465	7	465	400145	40	109	
250250	25	190	160550	16	550	070670	7	670	400200	40	145
250350	25	250	160625	16	625	070890	7	890			200
250400	25	350	100330	10	330	071230	7	1,230			
160210	25	400	100480	10	480	071400	7	1,400			
160210	16	210	100635	10	635	400075	40	76			
160300	16	300	100880	10	880						
Liquid end material											
SS	Stainless steel										
PV	PVDF										
HC	Hastelloy C										
TT	PTFE + 25% carbon										
Sealing material											
T	PTFE										
Displacement body											
0	Standard multilayer diaphragm with rupture signalling facility										
Liquid end version											
0	No valve springs (standard)										
1	With valve springs										
Hydraulic connection											
0	Standard threaded connection										
E	With DIN ISO flange										
F	With ANSI flange										
Version											
0	with ProMinent® logo										
1	without ProMinent® logo										
3	With ProMinent® logo, with electrical overpressure display										
M	Modified										
Electrical power supply											
S	3 ph, 230/400 V, 50/60 Hz, 1.1 kW										
T	3 ph, 230/400 V, 50/60 Hz, with PTC										
R	3 ph, variable speed motor, 230/400 V, 1.5 kW										
V (0)	Variable speed motor with integrated frequency converter										
Z	1 ph, variable speed control set, 230 V, 50/60 Hz										
L	3 ph, 230/400 V 50 Hz (Exe, Exd), 1.1 kW										
P	3 ph, 265/440 V 60 Hz (Exe, Exd), 1.1 kW										
V (2)	Variable speed motor with integr. frequency converter (Exd)										
1	no motor, with motor flange 250										
3	no motor, with motor flange B5, size 200										
4	no motor, with motor flange NEMA 143/145 TC										
0	Add on drive										
Enclosure rating											
0	IP 55 (standard)										
1	Exe motor version ATEX-T3										
2	Exd motor version ATEX-T4										
A	ATEX power end										
Stroke sensor											
0	No stroke sensor (standard)										
1	Stroke sensor (for explosion-proof applications)										
Stroke length adjustment											
0	Manual (Standard)										
K	Manual (outdoor, SS)										
1	With stroke positioning motor, 230 V/50/60 Hz										
2	With stroke positioning motor, 115 V/60 Hz										
A	With stroke control motor 0-20 mA 230 V/50/60 Hz										
B	With stroke control motor 4-20 mA 230 V/50/60 Hz										
C	With stroke control motor 0-20 mA 115 V/60 Hz										
D	With stroke control motor 4-20 mA 115 V/60 Hz										
Hydraulic oil											
0	Standard										
1	Food grade										
2	Low temperature to -25 °C										

\* PVT max. 25 bar

## 2.3 Hydraulic diaphragm metering pumps

### Motor Data

Identity code specification		Power supply		Remarks	
S	3-phase, IP 55	220 – 240 V/380 – 420 V	50 Hz	1.1 kW	
		250 – 280 V/440 – 480 V	60 Hz		
T	3-phase, IP 55	220 – 240 V/380 – 420 V	50 Hz	1.1 kW	with PTC, speed control range 1:5
		265 – 280 V/440 – 480 V	60 Hz		
R	3-phase, IP 55	230 V/400 V	50/60 Hz	1.5 kW	with PTC, speed control range 1:20, with external fan 1-phase 230 V; 50/60 Hz
V0	3-phase, IP 55	400 V	50/60 Hz	1.5 kW	Variable speed motor with integrated frequency converter
L1	3-phase, II 2G Ex e II T3	220 – 240 V/380 – 420 V	50 Hz	1.1 kW	
L2	3-phase, II 2G Ex de IIC T4 Gb	220 – 240 V/380 – 420 V	50 Hz	1.1 kW	with PTC, speed control range 1:5
P1	3-phase, II 2G Ex e II T3	254 – 277 V/440 – 480 V	60 Hz	1.1 kW	
P2	3-phase, II 2G Ex de IIC T4	254 – 277 V/440 – 480 V	60 Hz	1.1 kW	with PTC, speed control range 1:5
V2	3-phase, II 2G Ex de IIC T4	400 V ±10 %	50/60 Hz	1.5 kW	Ex-variable speed motor with integrated frequency converter

Motor data sheets can be requested for more information. Special motors or special motor flanges are available on request.

#### Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/EU in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label corresponds to or is better than the conditions prevalent in the intended field of application.

### Spare Parts

The spare parts kit generally includes the wear parts for the liquid ends.

#### Scope of delivery with SST/HCT material version

- 1 Diaphragm
- 2 Valve balls
- 1 Sealing set, complete

#### Scope of delivery with PVT material version

- 1 Diaphragm
- 1 Suction valve, complete
- 1 Discharge valve, complete
- 2 Valve balls
- 1 Sealing set, complete

### Spare parts kits for Hydro/ 4

Identity code 250130, 250190, 250250, 250350, 250400

Liquid end	Materials in contact with the medium		Order no.
FMH 400 - DN 25	PVT	–	1043763
	PVT	with valve	1023057
	SST	–	1040812
	SST	with valve	1040813
	HCT	–	1040860

Identity code 160210, 160300, 160400, 160550, 160625

Liquid end	Materials in contact with the medium		Order no.
FMH 625 - DN 25	PVT	–	1043775
	PVT	with valve	1040863
	SST	–	1040824
	SST	with valve	1040825
	HCT	–	1040861

## 2.3 Hydraulic diaphragm metering pumps

Identity code 100330, 100480, 100635, 100880, 101000

Liquid end	Materials in contact with the medium		Order no.
FMH 1000 - DN 32	PVT	–	1043776
	PVT	with valve	1040866
	SST	–	1040826
	SST	with valve	1040827
	HCT	–	1040864

Identity code 0704650, 070670, 070890, 071230, 071400

Liquid end	Materials in contact with the medium		Order no.
FMH 1400 - DN 40	PVT	–	1043777
	PVT	with valve	1040869
	SST	–	1040828
	SST	with valve	1040829
	HCT	–	1040867

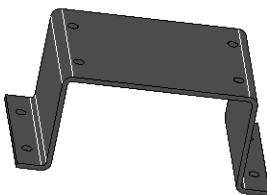
### Metering Diaphragm PTFE/1.4404 for Hydro/ 4

Liquid end		Order no.
FMH 400	Identity code (SST) 250130, 250190, 250250, 250350, 250400	1040808
FMH 625	Identity code (SST) 160210, 160300, 160400, 160550, 160625	1040809
FMH 1000	Identity code (SST) 100330, 100480, 100635, 100880, 101000	1040810
FMH 1400	Identity code (SST) 0704650, 070670, 070890, 071230, 071400	1040811

### Diaphragms PTFE/Hastelloy C Coated for Hydro/ 4

Liquid end		Order no.
FMH 400	Identity code (HCT) 250130, 250190, 250250, 250350, 250400	1040874
FMH 625	Identity code (HCT) 160210, 160300, 160400, 160550, 160625	1040875
FMH 1000	Identity code (HCT) 100330, 100480, 100635, 100880, 101000	1040876
FMH 1400	Identity code (HCT) 0704650, 070670, 070890, 071230, 071400	1040877

### Base for Hydro hydraulic diaphragm metering pumps



P\_PZ\_0010\_SW1

	Order no.
Base for Hydro/ 4, dimensions: 344 x 250 x 120 mm (LxWxH)	1051421



## 2.3 Hydraulic diaphragm metering pumps

### 2.3.4

### Hydraulic diaphragm metering pump Hydro/ 2 API 675

For flexible metering with excellent process reliability in the medium pressure range.

Capacity range of single head pump: 4 – 89 l/h; 100 – 10 bar

The Hydro/ 2 API 675 is designed to comply with API 675 due to its technical features, including full-motion drive, automatic bleeding etc.



As the new member of the Hydro product range, the hydraulic diaphragm metering pump Hydro/ 2 API 675 (HA2a) meets the requirements of API 675. The pumps stand out on account of their full-motion drive and automatic bleeding. There are a variety of drives, including some for use in areas at risk from explosion.

#### Your benefits

Excellent process reliability:

- PTFE multi-layer diaphragm with integral diaphragm rupture warning system
- Integrated hydraulic relief valve with ventilation function
- Metering reproducibility is better than  $\pm 1\%$  in the 10-100% stroke volume range under defined conditions and with proper installation.

Excellent flexibility:

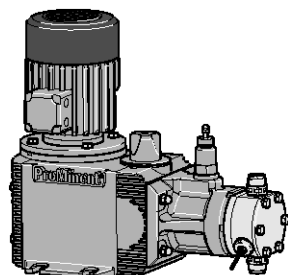
- The modular construction with single and double head versions permits a wide range of applications, with the double head designs (boxer principle) being operated in push-pull mode
- It is possible to combine up to 5 metering units, even with different pump capacities, in multiple pump systems
- 5 different gear ratios are available

#### Technical Details

- Stroke length: 15 mm, Rod force: 2,000 N
- Stroke volume adjustment range: 0 – 100 %
- Stroke volume adjustment: manually by scaled rotary dial (optionally with electric actuator or control drive).
- Metering reproducibility is better than  $\pm 1\%$  within the 10 – 100% stroke volume range under defined conditions and with correct installation (API 675)
- PTFE multi-layer diaphragm with electrical diaphragm rupture warning system via a contact
- Integrated hydraulic relief and bleed valve
- Full-motion drive
- Wetted materials: PVDF, PTFE+25% carbon, stainless steel 1.4571, Hastelloy C.
- A wide range of power end versions is available: Three-phase AC or 1-phase AC motor, motors for use in areas at risk from explosion, different flange designs for use of customer-specific motors
- Degree of protection: IP 55
- Design in compliance with API 675

#### Field of application

- Oil and gas industry.
- Volume-proportional metering of chemicals/additives in the treatment of boiler feed water
- Metering of reactants and catalysts in the chemical industry
- Level-dependent metering of auxiliary agents in industrial production engineering, for instance hot wax metering in the production of adhesive strips



pk\_2\_074  
Hydro

**NEW**





## 2.3 Hydraulic diaphragm metering pumps

### Technical Data

Plunger Ø	Max. pres- sure	Max. pump capacity in l/h at strokes/min (50 Hz)					Theor. stroke volume	Suction lift	Connection on suction/ pressure side	Shipping weight
		60	125	150	187	214				
mm	bar	l/h	l/h	l/h	l/h	l/h	ml/stroke	m WC	G-DN	kg
16	100	(4) – 4	(8) – 8.5	(10) – 10.5	(10) – 13	(12) – 14.5	3.00	3.0	Rp 1/4*	31
16	64	(5) – 5	(10) – 12.5	(10) – 15.5	(12) – 19	(14) – 21	3.00	3.0	Rp 1/4*	31
16	40	(7) – 7	(10) – 15	(12) – 18	(14) – 22.5	(16) – 26	3.00	3.0	Rp 1/4*	31
16	25	(8) – 8	(12) – 17	(14) – 20	(17) – 25.5	(20) – 29	3.00	3.0	Rp 1/4*	31
16	10	(8) – 9	(13) – 19	(15) – 22	(18) – 27	(22) – 32	3.00	3.0	Rp 1/4*	31
18	64	(7) – 8	(12) – 18	(19) – 21.5	(26) – 27	(26) – 29.5	3.80	3.0	G 3/4	31
18	40	(7) – 10	(13) – 21	(22) – 25	(26) – 31	(26) – 35	3.80	3.0	G 3/4	31
18	25	(8) – 11	(16) – 22	(23) – 27	(26) – 33	(28) – 38	3.80	3.0	G 3/4	31
18	10	(8) – 11.5	(16) – 24	(23) – 29	(29) – 36.5	(28) – 40	3.80	3.0	G 3/4	31
22	40	(8) – 9	(20) – 27	(27) – 31	(37) – 45	(44) – 51	5.70	3.0	G 3/4	31
22	25	(7) – 9.5	(20) – 27.5	(25) – 35.5	(35) – 45.5	(40) – 54	5.70	3.0	G 3/4	31
22	10	(8) – 12	(17) – 31	(25) – 39	(30) – 50	(40) – 57.5	5.70	3.0	G 3/4	31
26	25	(20) – 24.5	(35) – 52	(40) – 61.5	(65) – 76	(50) – 86	7.90	3.0	G 3/4**	31
26	10	(20) – 26	(30) – 35	(35) – 46	(40) – 79	(45) – 89	7.90	3.0	G 3/4**	31

The permitted design of the rate flow is possible in the stated range with pump selection in accordance with API 675 (adjustment range 1:10).

**Example:** with plunger 16 mm, pressure 25 bar and stroke rate 150 H/min gives (14) - 20, i.e. the adjustment range of 1:10 is met for a rated flow of between 14 l/h and 20 l/h.

Version PVDF max. 25 bar

\* Version SST/HCT with double ball valve, valve connector on the suction-discharge side with female thread Rp 1/4, male thread G 3/4 - DN 10

\*\* HV design with G1 - DN 15 connector

### Materials in Contact With the Medium

can be found in chapter 2.3.1 Hydro/ 2 see page → 2-22

### Motor Data

can be found in chapter 2.3.1 Hydro/ 2 see page → 2-22

### Spare Parts

can be found in chapter 2.3.1 Hydro/ 2 see page → 2-24

## 2.3 Hydraulic diaphragm metering pumps

### Identity code ordering system for HA2a

HA2a Power end type									
V	Simplex (vertical)	U	Duplex	M	Modified				
D	Simplex double head	T	Triplex						
Plunger									
016	Plunger 16 mm	022	Plunger 22 mm	M00	Modified				
018	Plunger 18 mm	026	Plunger 26 mm						
Stroke rate									
060	60 strokes/min.; 50 Hz	150	150 strokes/min.; 50 Hz	214	214 strokes/min.; 50 Hz				
125	125 strokes/min.; 50 Hz	187	187 strokes/min.; 50 Hz	M00	Modified				
Pressure stage									
A	10 bar	E	40 bar	J	100 bar				
D	25 bar	H	64 bar	M	Modified				
Material									
S1	Standard stainless steel; PTFE			P1	PVDF; PTFE	M0	Modified		
H1	Hastelloy C; PTFE			T1	PTFE + 25% carbon; PTFE				
Valve design									
0	(without valve spring)			D	Double ball valve	M	Modified		
1	with valve spring			F	Double ball valve with spring				
Diaphragm rupture display									
0	Standard (electrical)			M	Modified				
2	visual display								
Hydraulic connector									
0	Standard			E	DIN flange	M	Modified		
1	Swagelok			F	ANSI flange				
Electrical connection									
S	3-phase, 230/400 V, 50/60 Hz, 0.37 kW								
T	3-phase, 230/400 V, 50/60 Hz, 0.37 kW, with PTC								
K	3-phase, 230/400 V, 50 Hz, 0.37 kW, (Exe) T3								
L	3-phase, 230/400 V, 50 Hz, 0.37 kW, (Exde) T4								
P	3-phase, 265/460 V, 60 Hz, 0.37 kW, (Exe) T3								
Q	3-phase, 265/460 V, 60 Hz, 0.37 kW, (Exde) T4								
R	Variable speed motor, 1-phase, 230/400 V, 0.37 kW								
V	Variable speed motor with integr. frequency converter, 1-phase, 230 V, 50/60 Hz, 0.37 kW								
W	Variable speed motor with integr. frequency converter, ATEX, 3-phase, 400 V, 50/60 Hz, 0.55 kW								
1	no motor, with motor flange 200/80								
2	no motor, with motor flange 160/71								
3	without motor, with motor flange 56C								
4	without motor, with motor flange 200/80 ATEX								
5	without motor, with motor flange 160/71 ATEX								
6	without motor, with motor flange 56C								
M	Modified								
Stroke length adjustment									
0	Stroke length adjustment standard								
A	Stroke control motor 0-20 mA, 230 V, 50/60 Hz								
B	Stroke control motor 4-20 mA, 230 V, 50/60 Hz								
C	Stroke control motor 0-20 mA, 115 V, 60 Hz								
D	Stroke control motor 4-20 mA, 115 V, 60 Hz								
M	Modified								
Temperature (ambient / fluid)									
0	-20 °C ... +40 °C / -20 °C ... +90 °C (SS; HC) / +50 °C (PTFE) / +65 °C (PVDF)								
1	-10 °C ... +50 °C / -20 °C ... +90 °C (SS; HC) / +50 °C (PTFE) / +65 °C (PVDF)								
2	-25 °C ... +40 °C / -25 °C ... +90 °C (SS; HC) / +50 °C (PTFE) / +65 °C (PVDF)								
M	Modified								
Paint									
0P	C3 Standard textured paint - RAL 2003								
1P	C3 Standard gloss paint - RAL 2003								
2P	C4 Outdoor - RAL 2003								
3P	C5 - Offshore - RAL 2003								
M0	Modified								
Tests									
S1	Standard performance test								
S2	Standard performance test + 3.1 certificate								
A1	API complete test								
A2	API complete test + NPSH/NPIP								
M0	Modified								
Certification									
0	CE								
1	CE + ATEX								
2	CE + EAC								
3	CE + EAC + ATEX								
M	Modified								
Documentation									
DE	German								
EN	English								
M0	Modified								

## 2.3 Hydraulic diaphragm metering pumps

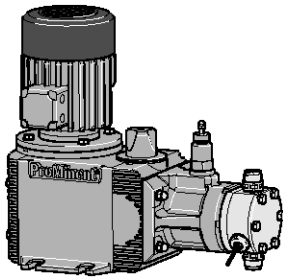
### 2.3.5

#### Hydraulic diaphragm metering pump Hydro/ 3 API 675

For flexible metering with excellent process reliability in the medium pressure range.

Capacity range of single head pump: 11 – 196 l/h; 100 – 10 bar

The Hydro/ 3 API 675 is designed to comply with API 675 due to its technical features, including full-motion drive, automatic bleeding etc.



pk\_2\_074  
Hydro

**NEW**

The hydraulic diaphragm metering pump Hydro/ 3 API 675 (HA3e) meets the requirements of API 675, among other things due to its full-motion drive and automatic bleeding. Some of the many drive options are also approved for use in areas at risk from explosion.

#### Your benefits

Excellent process reliability:

- PTFE multi-layer diaphragm with integral diaphragm rupture warning system
- Integrated hydraulic relief valve with ventilation function
- Metering reproducibility is better than  $\pm 1\%$  in the 10-100% stroke volume range under defined conditions and with proper installation.

Excellent flexibility:

- The modular construction with single and double head versions permits a wide range of applications, with the double head designs (boxer principle) being operated in push-pull mode
- It is possible to combine up to 5 metering units, even with different pump capacities, in multiple pump systems
- 5 different gear ratios are available
- Customised designs are available on request

#### Technical Details

- Stroke length: 15 mm, Rod force: 4,200 N
- Stroke volume adjustment range: 0 – 100 %
- Stroke volume adjustment: manually by scaled rotary dial (optionally with electric actuator or control drive).
- Metering reproducibility is better than  $\pm 1\%$  within the 10 – 100% stroke volume range under defined conditions and with correct installation (API 675)
- PTFE multi-layer diaphragm with electrical diaphragm rupture warning system via a contact
- Integrated hydraulic relief and bleed valve
- Full-motion drive
- Wetted materials: PVDF, PTFE+25% carbon, stainless steel 1.4571, Hastelloy C.
- A wide range of power end versions is available: Three-phase AC or 1-phase AC motor, motors for use in areas at risk from explosion, different flange designs for use of customer-specific motors
- Degree of protection: IP 55
- Design in compliance with API 675

#### Field of application

- Oil and gas industry.
- Volume-proportional metering of chemicals/additives in the treatment of boiler feed water
- Metering of reactants and catalysts in the chemical industry
- Level-dependent metering of auxiliary agents in industrial production engineering, for instance hot wax metering in the production of adhesive strips



## 2.3 Hydraulic diaphragm metering pumps

### Technical Data

Plunger Ø	Max. pres- sure	Max. pump capacity in l/h at strokes/min (50 Hz)					Theor. stroke volume	Suction lift	Connection on suction/ pressure side	Shipping weight
		60 l/h	125 l/h	150 l/h	187 l/h	214 l/h				
mm	bar						ml/stroke	m WC	G-DN	kg
22	100	(11) – 11	(23) – 23	(30) – 30	(35) – 35	(37) – 37	5.70	3.0	Rp 3/8*	41
22	64	(14) – 14	(30) – 31	(37) – 37	(45) – 46	(45) – 52	5.70	3.0	Rp 3/8*	41
22	40	(15) – 16	(30) – 34	(35) – 41	(40) – 51	(35) – 58	5.70	3.0	Rp 3/8*	41
22	25	(15) – 16.5	(30) – 36	(35) – 43	(40) – 53	(35) – 61	5.70	3.0	Rp 3/8*	41
22	10	(15) – 17	(30) – 37.5	(35) – 45	(45) – 56	(40) – 64.5	5.70	3.0	Rp 3/8*	41
26	64	(18) – 22	(35) – 46	(40) – 55	(55) – 65	(65) – 76	7.90	3.0	G 3/4**	41
26	40	(18) – 24	(37) – 49	(40) – 58	(50) – 74	(70) – 83	7.90	3.0	G 3/4**	41
26	25	(15) – 24	(30) – 53	(40) – 62	(55) – 76	(70) – 87	7.90	3.0	G 3/4**	41
26	10	(15) – 25	(30) – 53	(35) – 64	(50) – 79	(80) – 90	7.90	3.0	G 3/4**	41
32	40	(27) – 29	(50) – 68	(70) – 83	(65) – 104	(70) – 120	12.00	3.0	G 1***	41
32	25	(25) – 30	(50) – 72	(65) – 86	(65) – 108	(70) – 125	12.00	3.0	G 1***	41
32	10	(22) – 35	(50) – 77	(70) – 93	(60) – 115	(65) – 132	12.00	3.0	G 1***	41
38	12	(25) – 54	(70) – 114	(80) – 130	(150) – 170	(180) – 192	17.00	3.0	G 1***	41
38	10	(30) – 55	(80) – 115	(90) – 138	(150) – 172	(190) – 196	17.00	3.0	G 1***	41

The permitted design of the rate flow is possible in the stated range with pump selection in accordance with API 675 (adjustment range 1:10).

**Example:** with plunger 26 mm, pressure 25 bar and stroke rate 150 H/min gives (40) - 62, i.e. the adjustment range of 1:10 is met for a rate flow of between 40 l/h and 62 l/h.

Version PVDF max. 25 bar

\* Version SST/HCT with double ball valve, valve connector on the suction-discharge side with female thread Rp 1/4, male thread G 3/4 - DN 10

\*\* HV design (SST only) with G1 - DN 15 connector

\*\*\* HV design (SST only) with G 1 1/4" DN 20 connector

### Materials in Contact With the Medium

can be found in chapter 2.3.2 Hydro/ 3 see page → 2-26

### Motor Data

can be found in chapter 2.3.2 Hydro/ 3 see page → 2-26

### Spare Parts

can be found in chapter 2.3.2 Hydro/ 3 see page → 2-28





## 2.3 Hydraulic diaphragm metering pumps

### Identity code ordering system for HA3a

HA3a	Power end type									
	V	Simplex (vertical)	U	Duplex	M	Modified				
	D	Simplex double head	T	Triplex						
	Plunger									
	022	Plunger 22 mm	032	Plunger 32 mm	M00	Modified				
	026	Plunger 26 mm	038	Plunger 38 mm						
	Stroke rate									
	060	60 strokes/min.; 50 Hz	150	150 strokes/min.; 50 Hz	214	214 strokes/min.; 50 Hz				
	125	125 strokes/min.; 50 Hz	187	187 strokes/min.; 50 Hz	M00	Modified				
	Pressure stage									
	A	10 bar	E	40 bar	J	100 bar				
	D	25 bar	F	64 bar	M	Modified				
	Material									
	S1	Standard stainless steel; PTFE	T1	PTFE + 25% carbon; PTFE						
	H1	Hastelloy C; PTFE	M0	Modified						
	P1	PVDF; PTFE								
	Valve design									
	0	Standard (without valve spring)	F	Double ball valve with valve spring						
	1	with valve spring	M	Modified						
	D	Double ball valve								
	Diaphragm rupture display									
	0	Standard (electrical)	M	Modified						
	2	Visual display								
	Hydraulic connector									
	0	Standard	F	ANSI flange						
	1	Swagelok	M	Modified						
	E	DIN flange								
	Electrical connection									
	S	3-phase, 230/400 V, 50/60 Hz, 0.75 kW								
	T	3-phase, 230/400 V, 50/60 Hz, 0.75 kW, with PTC								
	K	3-phase, 230/400 V, 50 Hz, 0.75 kW, (Exe) T3								
	L	3-phase, 230/400 V, 50 Hz, 0.75 kW, (Exde) T4								
	P	3-phase, 265/460 V, 60 Hz, 0.75 kW, (Exe) T3								
	Q	3-phase, 265/460 V, 60 Hz, 0.75 kW, (Exde) T4								
	R	Variable speed motor, 1-phase, 230/400 V								
	V	Variable speed motor with integr. Frequency converter, 1-phase, 230 V, 50/60 Hz, 0.75kW								
	W	Variable speed motor with integr. Frequency converter, ATEX, 3-phase, 400 V, 50/60 Hz, 0.75 kW								
	1	no motor, with motor flange 200/80								
	2	no motor, with motor flange 160/71								
	3	without motor, with motor flange 56C								
	4	without motor, with motor flange 200/80 ATEX								
	5	without motor, with motor flange 160/71 ATEX								
	6	without motor, with motor flange 56C								
	M	Modified								
	Stroke length adjustment									
	0	Stroke length adjustment standard								
	A	Stroke control motor , 0-20 mA, 230 V, 50/60 Hz								
	B	Stroke control motor , 4-20 mA, 230 V, 50/60 Hz								
	C	Stroke control motor , 0-20 mA, 115 V, 60 Hz								
	D	Stroke control motor , 4-20 mA, 115 V, 60 Hz								
M	Modified									
Temperature (ambient / fluid)										
0	-20 °C ... +40 °C / -20 °C ... +90 °C (SS; HC) / +50 °C (PTFE) / +65 °C (PVDF)									
1	-10 °C ... +50 °C / -20 °C ... +90 °C (SS; HC) / +50 °C (PTFE) / +65 °C (PVDF)									
2	-25 °C ... +40 °C / -25 °C ... +90 °C (SS; HC) / +50 °C (PTFE) / +65 °C (PVDF)									
M	Modified									
Paint										
0P	C3 Standard textured paint - RAL 2003									
1P	C3 Standard gloss paint - RAL 2003									
2P	C4 Outdoor - RAL 2003									
3P	C5 Offshore - RAL 2003									
M0	Modified									
Tests										
S1	Standard performance test									
S2	Standard performance test + 3.1 certificate									
A1	API complete test									
A2	API complete test + NPSH/NPIP									
M	Modified									
Certification										
0	CE									
1	CE + ATEX									
2	CE + EAC									
3	CE + EAC + ATEX									
M	Modified									
Documentation										
DE	German									
EN	English									
M0	Modified									

## 2.3 Hydraulic diaphragm metering pumps

### 2.3.6

### Hydraulic Diaphragm Metering Pump Makro/ 5

**Excellent feed rates in the low pressure range**

**Capacity range of single pump: 450 – 6,108 l/h, 25 – 6 bar**

The robust hydraulic diaphragm metering pump Makro/ 5 guarantees outstanding process reliability. Its modular construction offers extremely good flexibility and a large range of power end versions are available.



The Makro/ 5 hydraulic diaphragm metering pump (M5Ha) together with the Makro/ 5 diaphragm and plunger metering pumps form an integrated product range with stroke lengths of 20 and/or 50 mm. This covers the capacity range from 38 to 6,108 l/h at 320 – 4 bar. A wide range of power end versions is available for use in areas at risk from explosion with ATEX certification. The Makro/ 5 product range is designed to comply with API 675 among others.

#### Your benefits

Excellent process safety and reliability:

- PTFE multi-layer diaphragm with integral diaphragm rupture warning system
- Integral hydraulic relief valve
- Metering reproducibility is better than  $\pm 1\%$  within the 10-100% stroke length range under defined conditions and with correct installation.

Excellent flexibility:

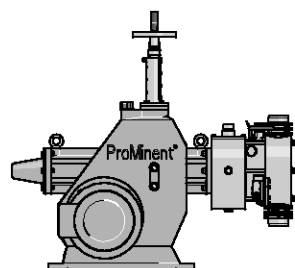
- The modular construction with single and double head versions permits a wide range of applications, with the double head designs being operated in push-pull mode
- It is possible to combine up to 4 metering units, even with different pump capacities, in multiple pump systems
- 5 different gear ratios are available
- Customised designs are available on request

#### Technical Details

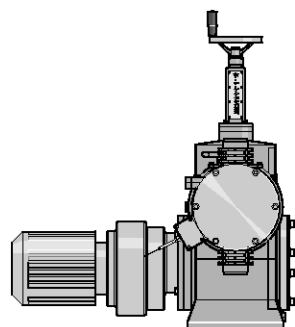
- Stroke length: 0 – 50 mm, Rod force: 10,000 N
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually by means of a manual adjustment wheel and scaled display (optionally with electric actuator or control drive)
- Metering reproducibility is better than  $\pm 1\%$  within the 10 – 100% stroke length range under defined conditions and with correct installation
- PTFE multi-layer diaphragm with electrical diaphragm rupture warning system via a contact
- Integrated hydraulic relief and bleed valve
- Wetted materials: PVDF, PTFE+25% carbon, stainless steel 1.4571, special materials are available on request
- A wide range of power end versions is available: Three-phase standard motors, motors for use in areas at risk from explosion and different flange designs for use in customer-specific motors
- Degree of protection: IP 55
- Design in compliance with API 675 among others

#### Field of application

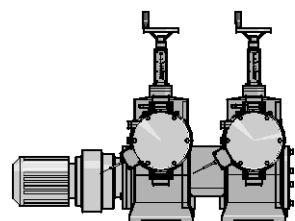
- Oil and gas industry.
- Volume-proportional metering of chemicals/additives in the treatment of boiler feed water
- Metering of reactants and catalysts in the chemical industry
- Level-dependent metering of auxiliary agents in industrial production engineering, for instance hot wax metering in the production of adhesive strips



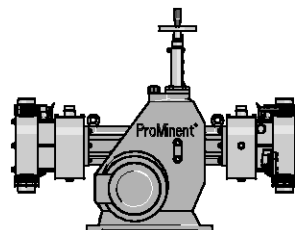
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Makro/ 5 M5Ha



pk\_2\_097  
Makro/ 5 M5Ha



pk\_2\_094  
Makro/ 5 externally mounted pump



pk\_2\_092  
Makro/ 5 double head pump



## 2.3 Hydraulic diaphragm metering pumps

### Control of Makro/5 Hydraulic Diaphragm Metering Pumps

#### Makro/ 5 stroke length controller

Control drive consisting of an actuator with servomotor and integral microprocessor controller for stroke length adjustment via a standard signal. Actuating period approx. 100 sec for 100% stroke length, including 2 limit switches for min./max. position, IP 54 degree of protection. Electrical connection 230 V ( $\pm 10\%$ ), 50/60 Hz, 40 W mechanical stroke length display fitted on the Makro/ 5 power end.

Special voltage/higher degrees of protection/explosion protection on request.

Version with:

Standard signal current input 0/4-20 mA, corresponds to stroke length 0 - 100%; internal switch for manual /automatic operation, key switch for stroke adjustment in manual mode. Actual value output 0/4-20 mA for remote display.

#### Speed controllers with frequency converter (identity code specification Z)

The speed controller (complete) comprises a frequency converter and a variable speed motor (see also identity code specification R). The frequency converter is accommodated in an IP 55 rated protective housing with integral control unit and main switch, suitable for max. motor power 0.37/0.75/1.1 kW.

Externally controllable with 0/4-20 mA or 0-10 V corresponding to 0-50 (60) Hz output frequency.

Frequency Converters for Speed Control See page → 1-212

#### Stroke sensor with Namur signal

Mounting on the crank drive mechanism of the Makro/ 5 gearbox. For precise measurement of each metering stroke, comprising electronic cams and inductive proximity switches, switching signal according to Namur. In combination with electronic pre-selection meters suitable for batch metering or proportional metering in conjunction with proportional control.

Retrospective fitting only possible in the factory.

**Approved for Ex safety operation with degree of protection EEx ia II C T6.**

## 2.3 Hydraulic diaphragm metering pumps

### Technical Data

Type M5Ha	With 1500 rpm motor at 50 Hz				With 1800 rpm motor at 60 Hz				Suction lift	Connection suction/ discharge side	Shipping weight	Plunger Ø
	Delivery rate at max. back pressure			Max. stroke rate	Delivery rate at max. back pressure			Max. stroke rate				
	bar	l/h	ml/ stroke		Strokes/ min	psi	l/h					
									m WC	G-DN	kg	mm
250450	25	450	125.0	60	362	537	142	72	3.0	G 2-32	320	60
250562	25	562	125.0	75	362	671	177	89	3.0	G 2-32	320	60
250772	25	772	125.0	103	362	922	244	123	3.0	G 2-32	320	60
250997	25	997	125.0	133	362	1,191	315	159	3.0	G 2-32	320	60
251170	25	1,170	125.0	156	—	—	—	—	—	G 2-32	320	60
160616	16	616	171.2	60	232	736	194	72	3.0	G 2 1/4-40	320	70
160770	16	770	171.2	75	232	920	243	89	3.0	G 2 1/4-40	320	70
161058	16	1,058	171.2	103	232	1,264	334	123	3.0	G 2 1/4-40	320	70
161366	16	1,366	171.2	133	232	1,633	431	159	3.0	G 2 1/4-40	320	70
161602	16	1,602	171.2	156	—	—	—	—	3.0	G 2 1/4-40	320	70
120716	12	716	199.0	60	174	855	226	72	3.0	G 2 1/4-40	320	75
120895	12	895	199.0	75	174	1,069	282	89	3.0	G 2 1/4-40	320	75
121229	12	1,229	199.0	103	174	1,469	388	123	3.0	G 2 1/4-40	320	75
121588	12	1,588	199.0	133	174	1,898	501	159	3.0	G 2 1/4-40	320	75
121862	12	1,862	199.0	156	—	—	—	—	3.0	G 2 1/4-40	320	75
120919	12	919	255.3	60	174	1,098	290	72	3.0	G 2 1/4-40	320	85
121148	12	1,148	255.3	75	174	1,372	362	89	3.0	G 2 1/4-40	320	85
121577	12	1,577	255.3	103	174	1,885	498	123	3.0	G 2 1/4-40	320	85
122037	12	2,037	255.3	133	174	2,435	643	159	3.0	G 2 1/4-40	320	85
122389	12	2,389	255.3	156	—	2,856	754	—	3.0	G 2 1/4-40	320	85
101345	10	1,345	374.0	60	145	1,607	425	72	3.0	G 2 3/4-50	330	100
101680	10	1,680	374.0	75	145	2,008	530	89	3.0	G 2 3/4-50	330	100
102310	10	2,310	374.0	103	145	2,761	729	123	3.0	G 2 3/4-50	330	100
102980	10	2,980	374.0	133	145	3,562	941	159	3.0	G 2 3/4-50	330	100
103500	10	3,500	374.0	156	—	—	—	—	3.0	G 2 3/4-50	330	100
062305	6	2,305	641.0	60	87	2,755	728	72	3.0	flange-65*	330	130
062880	6	2,880	641.0	75	87	3,443	910	89	3.0	flange-65*	330	130
063960	6	3,960	641.0	103	87	4,734	1,251	123	3.0	flange-65*	330	130
065110	6	5,110	641.0	133	87	6,108	1,614	159	3.0	flange-65*	330	130
066000	6	6,000	641.0	156	—	—	—	—	3.0	flange-65*	330	130

Material Version PPT/PCT/TTT max. 10 bar

\* SST version with G 2 1/2" thread

### Materials in Contact With the Medium

	Dosing head	Suction/discharge valve	DN 32 - DN65 plate valves		
			Seals	Valve plates/ valve springs	Valve seats
PPT	Polypropylene	Polypropylene	PTFE	Hastelloy C	PTFE
PCT	PVC	PVC	PTFE	Hastelloy C	PTFE
TTT	PTFE with carbon	PTFE with carbon	PTFE	Hastelloy C	PTFE
SST	Stainless steel material no. 1.4571/ 1.4404	Stainless steel material no. 1.4571/ 1.4404	PTFE	Hastelloy C	PTFE

Patented multi-layer diaphragm, vacuum-packed

Special designs available on request

Viton® is a registered trademark of DuPont Dow Elastomers





## 2.3 Hydraulic diaphragm metering pumps

### Identity Code Ordering System for M5Ha

M5Ha	Drive type					
H	Main drive					
A	Add-on power end					
D	Double main drive					
B	Double add-on power end					
Type*						
250450	160616	120716	120919	101345	062305	
250562	160770	120895	121148	101680	062880	
250772	161058	121229	121577	102310	063960	
250997	161366	121588	122037	102980	065110	
251170	161602	121862	122389	103500	066000	
Liquid end material						
PC	PVC					
PP	Polypropylene					
SS	Stainless steel					
TT	PTFE + 25% carbon					
Sealing material						
T	PTFE					
Displacement body						
T	Composite diaphragm, PTFE coating, with rupture indicator					
Liquid end version						
1	With valve springs					
Hydraulic connection						
0	Standard connection					
1	PVC union nut and insert					
2	Union nut and insert PP					
3	PVDF union nut and insert					
4	SS union nut and insert					
Version						
0	with ProMinent® logo, no frame					
2	without ProMinent® logo, no frame					
A	with ProMinent® logo, with frame, simplex					
B	with ProMinent® logo, with frame, duplex					
C	with ProMinent® logo, with frame, triplex					
D	with ProMinent® logo, with frame, quadruplex					
M	Modified					
Electrical power supply						
S	3 ph. 230/400 V 50/60 Hz (WBS)					
R	Variable speed motor 4-pole, 230/400 V					
V (0)	Motor with integr. frequency converter					
L	3 ph. 230/400 V 50 Hz (Exe, Exd)					
P	3 ph. 230/400 V 60 Hz (Exe, Exd)					
V (2)	Motor with integr. frequency converter (Exd)					
5	No motor, with gearbox IEC 100					
6	No motor, with gearbox IEC 112					
0	No motor, no gearbox					
Enclosure rating						
0	IP 55 (Standard) ISO class F					
1	Exe version ATEX-T3					
2	Exd version ATEX-T4					
A	ATEX power end					
Stroke sensor						
0	No stroke sensor					
1	With stroke sensor (Namur)					
Stroke length adjustment						
0	Stroke length adjustment, manual					
3	230 V 0-20 mA stroke controller					
4	230 V 4-20 mA stroke controller					
5	115 V 0-20 mA stroke controller					
6	115 V 4-20 mA stroke controller					
Application						
0	Standard					
3	Low temperature -20 °C					

\* Material version PC/PP/TT max. 10 bar

## 2.3 Hydraulic diaphragm metering pumps

### Motor Data

Identity code specification		Power supply			Remarks
S	3-phase, IP 55	220 – 240 V/380 – 420 V 250 – 280 V/440 – 480 V	50 Hz 60 Hz	3 kW	
R	3-phase, IP 55	230 V/400 V	50/60 Hz	3 kW	with PTC, speed control range 1:5
V0	3-phase, IP 55	400 V ±10 %	50/60 Hz	3 kW	Variable speed motor with integrated frequency converter
L1	3-phase, II 2G Ex e II T3	220 – 240 V/380 – 420 V	50 Hz	3.6 kW	
L2	3-phase, II 2G Ex de IIC T4 Gb	220 – 240 V/380 – 420 V	50 Hz	4 kW	with PTC, speed control range 1:5
P1	3-phase, II 2G Ex e IIC T3	250 – 280 V/440 – 480 V	60 Hz	3.6 kW	
P2	3-phase, II 2G Ex de IIC T4	250 – 280 V/440 – 480 V	60 Hz	4 kW	with PTC, speed control range 1:5
V2	3-phase, 2GDc Ex db IIB T4 Gb, IP 67	400 V ±10 %	50/60 Hz	4 kW	Ex-variable speed motor with integrated frequency converter

Motor data sheets can be requested for more information. Special motors or special motor flanges are available on request.

The motors are designed in compliance with the Ecodesign Directive 2009/125/EC.

#### Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/EU in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label corresponds to or is better than the conditions prevalent in the intended field of application.





## 2.3 Hydraulic diaphragm metering pumps

### Spare Parts

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

- 1 metering diaphragm
- 1 suction valve set
- 1 discharge valve set
- 1 seal set (O-rings, packing rings, valve seat, valve seat housings)

### Spare Parts Kits for Makro/ 5 HMH

Identity code: 250450, 250562, 250772, 250997, 251170

Liquid end	Materials in contact with the medium		Order no.
FMH 60–50	S	with 2 valves cpl.	1008170
	S	without valves cpl.	1008169

Identity code: 160616, 160770, 161058, 161366, 161602, 120716, 120895, 121229, 121588, 121862, 120919, 121148, 121577, 122037, 122389

Liquid end	Materials in contact with the medium		Order no.
FMH 70/75/85–50	PPT	–	911904
	PCT	–	911902
	TTT	–	911906
	SST	–	911910
	SST	without valves cpl.	911909

Identity code: 101345, 101680, 102310, 102980, 103500

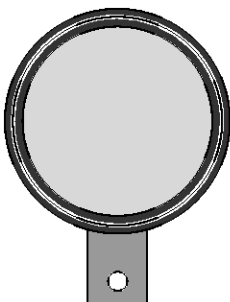
Liquid end	Materials in contact with the medium		Order no.
FMH 100–50	PP	–	1008246
	P	–	1008247
	T	–	1008248
	S	with valves cpl.	1008250
	S	without valves cpl.	1008249

Identity code: 062305, 062880, 063960, 065110, 066000

Liquid end	Materials in contact with the medium		Order no.
FMH 130–50	PP	–	1008251
	P	–	1008252
	T	–	1008253
	S	with valves cpl.	1008265
	S	without valves cpl.	1008264

### Metering Diaphragms for Makro/ 5 HMH

Liquid end	Order no.
FMH 60/70/75/85–50	1007298
FMH 100/130–50	1007852



pk\_2\_024

## 2.3 Hydraulic diaphragm metering pumps

### 2.3.7

### Hydraulic Diaphragm Metering Pump Orlita® Evolution

**Maximum process reliability and flexibility.**

**Capacity range of single head pump: 3 – 7,400 l/h, 400 – 8 bar**



The Orlita® Evolution meets the most exacting safety requirements as an extremely robust hydraulic diaphragm metering pump. It is characterised by its PTFE multi-layer diaphragm with integral diaphragm rupture warning / signalling and unique diaphragm position control.

The Orlita® Evolution hydraulic diaphragm metering pump range of EF1a, EF2a, EF3a and EF4a form an integrated product range with stroke lengths of 15 to 40 mm. This covers the capacity range of 3 to 7,400 l/h at 400 – 10 bar. A wide range of drive versions is available, including some with ATEX certification for use in Zone 1 or Zone 2 areas at risk from explosion. The Orlita® Evolution product range is designed to comply with API 675.

#### Your benefits

Maximum process reliability:

- PTFE multi-layer diaphragm with integral diaphragm rupture warning system
- Integral hydraulic relief valve
- The new diaphragm position control protects against impermissible operating statuses (e.g. no damage in the event of a blockage on the suction or discharge side)
- Metering reproducibility is better than  $\pm 1\%$  within the 10-100% stroke length adjustment range under certain defined conditions and with proper installation
- Continuous bleeding of the oil chamber ensures reliable operation

Excellent flexibility:

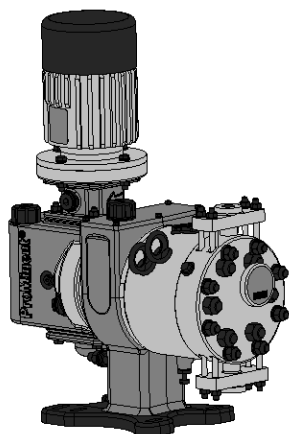
- The modular and compact construction with single and multiple pump versions permits a wide range of applications. In multiple pump systems up to 5 metering units can be combined, including units with different pump capacities
- 7 gear ratios are available
- Power end configuration ideal for installation in any position (vertical or horizontal)
- Customised designs are available on request

#### Technical Details

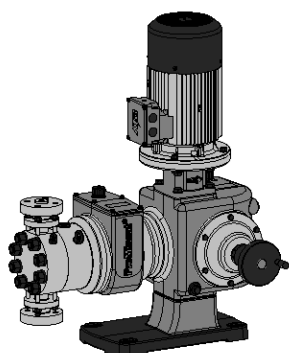
- Stroke length: 0 - 16 mm (Evo 1, Evo 2), 0 - 25 mm (Evo 3), 0 - 40 mm (Evo 4)
- Rod force: 2,300 N (Evo 1), 5,400 N (Evo 2), 8,000 N (Evo 3), 15,700 N (Evo 4)
- Stroke length adjustment range: 0 – 100 %
- Stroke length adjustment: manually by means of a manual adjustment wheel and scaled display (optionally with electric actuator or control drive)
- Metering reproducibility is better than  $\pm 1\%$  within the 10 – 100 % stroke length range under defined conditions and with correct installation
- PTFE multi-layer diaphragm with electrical diaphragm rupture warning system via a contact
- Integrated hydraulic relief and bleed valve
- Wetted materials:
  - Stainless steel 1.4404, special designs available on request
  - plastics PVC, PVDF, special designs available on request
- A wide range of power end versions is available: Three-phase AC standard motors also for use in areas at risk from explosion, different flange designs for use of customer-specific motors
- Degree of protection: IP 55
- Design in compliance with API 675 among others

#### Field of application

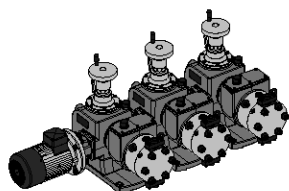
- Oil and gas industry
- Metering of reactants and catalysts in the chemical industry
- Volume-proportional metering of chemicals/additives in the treatment of boiler feed water
- Level-dependent metering of auxiliary agents in industrial production engineering, for instance hot wax metering in the production of adhesive strips



68\_52-101\_00\_01-0a-Evo1\_SW1  
Orlita® Evolution EF1a



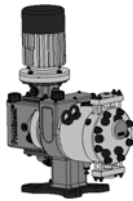
68\_54-101\_00\_03-0a-Evo4\_SW1  
Orlita® Evolution EF4a



P\_PZ\_0008\_SW1  
Orlita® Evolution triplex pump



## 2.3 Hydraulic diaphragm metering pumps



### Orlita® Evolution 1-4 with stainless steel liquid end

The standard version of Orlita® Evolution hydraulic diaphragm metering pumps has a stainless steel dosing head.

#### Technical data for EF1a single head pump 50 Hz SST

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (50 Hz)							Max. pressure bar	Efficiency at		Standard type of valve
		73 [2] l/h	97 [3] l/h	116 [4] l/h	145 [5] l/h	165 [6] l/h	181 [7] l/h	201 [8] l/h		100% pressure	50% pressure	
8	0.80	3.5	4.7	5.6	7.0	8.0	8.7	9.7	400	0.43	0.75	DN 3
10	1.26	5.5	7.3	8.7	10.9	12.4	13.6	15.2	337	0.61	0.79	DN 3
12	1.81	7.9	10.5	12.6	15.7	17.9	19.7	21.8	234	0.77	0.86	DN 6
14	2.46	10.8	14.3	17.1	21.4	24.4	26.7	29.7	172	0.62	0.80	DN 6
17	3.63	15.9	21.1	25.3	31.6	36.0	39.4	43.8	117	0.77	0.88	DN 6
21	5.54	24.3	32.3	38.6	48.2	54.9	60.2	66.8	76	0.85	0.90	DN 10
25	7.85	34.4	45.7	54.7	68.3	77.8	85.3	94.7	54	0.90	0.93	DN 10
29	10.57	46.3	61.5	73.6	91.9	104.6	114.8	127.5	40	0.95	0.96	DN 10
32	12.87	56.4	74.9	89.6	112.0	127.4	139.7	155.2	33	0.89	0.93	DN 16
38	18.15	79.5	105.6	126.3	157.9	179.6	197.1	218.8	23	0.93	0.95	DN 16
44	24.33	106.6	141.6	169.3	211.7	240.9	264.2	293.4	17	0.94	0.96	DN 16
50	31.42	137.6	182.8	218.7	273.3	311.0	341.2	378.9	13	0.95	0.96	DN 16
58	42.27	185.2	246.0	294.2	367.8	418.5	459.1	509.8	10	0.95	0.97	DN 16

#### Technical data for EF1a single head pump 60 Hz SST

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (60 Hz)					Max. pressure bar	Efficiency at		Standard type of valve
		88 [2] l/h	117 [3] l/h	140 [4] l/h	175 [5] l/h	199 [6] l/h		100% pressure	50% pressure	
8	0.80	4.2	5.6	6.8	8.4	9.6	400	0.43	0.69	DN 3
10	1.26	6.6	8.8	10.6	13.2	15.0	337	0.61	0.79	DN 3
12	1.81	9.6	12.7	15.2	19.0	21.6	234	0.77	0.86	DN 6
14	2.46	13.0	17.3	20.7	25.9	29.4	172	0.62	0.80	DN 6
17	3.63	19.2	25.5	30.5	38.1	43.4	117	0.77	0.88	DN 6
21	5.54	29.3	38.9	46.6	58.2	66.2	76	0.85	0.90	DN 10
25	7.85	41.5	55.1	66.0	82.5	93.8	54	0.90	0.93	DN 10
29	10.57	55.8	74.2	88.8	111.0	126.2	40	0.95	0.96	DN 10
32	12.87	67.9	90.3	108.1	135.1	153.6	33	0.89	0.93	DN 16
38	18.15	95.8	127.4	152.4	190.5	216.7	23	0.93	0.95	DN 16
44	24.33	128.5	170.8	204.4	255.4	290.5	15	0.94	0.96	DN 16
50	31.42	165.9	220.5	263.9	329.9	375.1	13	0.95	0.96	DN 16
58	42.27	223.2	296.8	355.1	443.9	504.7	10	0.95	0.97	DN 16

#### Note:

Abridged presentation of our complete product range. Other piston diameters (8–60 mm) on request

#### Materials in Contact With the Medium

##### Dosing head complete

Dosing head	Diaphragm retaining screw	Diaphragm
Stainless steel	Stainless steel 1.4462	PTFE multi-layer diaphragm

##### Ball valve DN 3 – DN 10

	Suction/pressure connector	Valve/head seal	Valve ball	Valve seat	Valve housing	Clamp ring
DN 3 (double ball)	Stainless steel 1.4404	Stainless steel 1.4404	Al <sub>2</sub> O <sub>3</sub> ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4
DN 6 (double ball)	Stainless steel 1.4404	Stainless steel 1.4404	SiN ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4
DN 10 (single ball)	Stainless steel 1.4404	Stainless steel 1.4404	Al <sub>2</sub> O <sub>3</sub> ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4

##### Plate valve DN 16

	Suction/pressure connector	Valve/head seal	Valve plate	Valve seat	Valve housing
DN 16	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404

Further material versions and details available on request.

## 2.3 Hydraulic diaphragm metering pumps

Technical data for EF2a single head pump 50 Hz SST

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (50 Hz)							Max. pressure bar	Efficiency at		Standard type of valve
		73 [2] l/h	97 [3] l/h	116 [4] l/h	145 [5] l/h	165 [6] l/h	181 [7] l/h	201 [8] l/h		100% pressure	50% pressure	
12	1.81	7.9	10.5	12.6	15.7	17.9	20.3	21.8	400	0.69	0.82	DN 6
14	2.46	10.8	14.3	17.1	21.4	24.4	27.6	29.7	400	0.35	0.67	DN 6
17	3.63	15.9	21.1	25.3	31.6	36.0	40.7	43.8	274	0.60	0.79	DN 6
21	5.54	24.3	32.3	38.6	48.2	54.9	62.2	66.8	179	0.75	0.85	DN 10
25	7.85	34.4	45.7	54.7	68.3	77.8	88.1	94.7	127	0.83	0.89	DN 10
29	10.57	46.3	61.5	73.6	91.9	104.6	118.6	127.5	94	0.90	0.93	DN 10
32	12.87	56.4	74.9	89.6	112.0	127.4	144.4	155.2	77	0.76	0.87	DN 16
38	18.15	79.5	105.6	126.3	157.9	179.6	203.6	218.8	55	0.87	0.92	DN 16
44	24.33	106.6	141.6	169.3	211.7	240.9	273.0	293.4	41	0.90	0.94	DN 16
50	31.42	137.6	182.8	218.7	273.3	311.0	352.5	378.9	32	0.91	0.95	DN 16
58	42.27	185.2	246.0	294.2	367.8	418.5	474.3	509.8	24	0.93	0.96	DN 16
70	61.58	269.7	358.4	428.6	535.7	609.6	690.9	742.6	16	0.94	0.96	DN 20

Technical data for EF2a single head pump 60 Hz SST

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (60 Hz)					Max. pressure bar	Efficiency at		Standard type of valve
		88 [2] l/h	117 [3] l/h	140 [4] l/h	175 [5] l/h	199 [6] l/h		100% pressure	50% pressure	
12	1.81	9.6	12.7	15.2	19.0	21.6	400	0.69	0.82	DN 6
14	2.46	13.0	17.3	20.7	25.9	29.4	400	0.35	0.67	DN 6
17	3.63	19.2	25.5	30.5	38.1	43.4	274	0.60	0.79	DN 6
21	5.54	29.3	38.9	46.6	58.2	66.2	179	0.75	0.85	DN 10
25	7.85	41.5	55.1	66.0	82.5	93.8	127	0.83	0.89	DN 10
29	10.57	55.8	74.2	88.8	111.0	126.2	94	0.90	0.93	DN 10
32	12.87	67.9	90.3	108.1	135.1	153.6	77	0.76	0.87	DN 16
38	18.15	95.8	127.4	152.4	190.5	216.7	55	0.87	0.92	DN 16
44	24.33	128.5	170.8	204.4	255.4	290.5	41	0.90	0.94	DN 16
50	31.42	165.9	220.5	263.9	329.9	375.1	32	0.91	0.95	DN 16
58	42.27	223.2	296.8	355.1	443.9	504.7	24	0.93	0.96	DN 16
70	61.58	325.1	432.3	517.2	646.5	735.2	16	0.94	0.96	DN 20

**Note:**

Abridged presentation of our complete product range. Other piston diameters (11 – 80 mm) on request.

### Materials in Contact With the Medium

#### Dosing head complete

Dosing head	Diaphragm retaining screw	Diaphragm
Stainless steel 1.4404	Stainless steel 1.4462	PTFE multi-layer diaphragm

#### Ball valve DN 3 – DN 10

	Suction/pressure connector	Valve/head seal	Valve ball	Valve seat	Valve housing	Clamp ring
DN 3 (double ball)	Stainless steel 1.4404	Stainless steel 1.4404	Al <sub>2</sub> O <sub>3</sub> ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4
DN 6 (double ball)	Stainless steel 1.4404	Stainless steel 1.4404	SiN ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4
DN 10 (double ball)	Stainless steel 1.4404	Stainless steel 1.4404	Al <sub>2</sub> O <sub>3</sub> ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4

#### Plate valve DN 16 – DN 20

	Suction/pressure connector	Valve/head seal	Valve plate	Valve seat	Valve housing
DN 16/DN 20	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404

Further material versions and details available on request.



## 2.3 Hydraulic diaphragm metering pumps

Technical data for EF3a single head pump 50 Hz SST

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (50 Hz)							Max. pressure bar	Efficiency at		Standard type of valve
		73 [2] l/h	97 [3] l/h	116 [4] l/h	145 [5] l/h	165 [6] l/h	181 [7] l/h	201 [8] l/h		100% pressure	50% pressure	
17	5.67	24	33	39	49	56	61	68	397	0.72	0.77	DN 6
22	9.50	41	55	66	82	94	103	114	237	0.83	0.85	DN 6
25	12.27	53	71	85	106	121	133	148	183	0.83	0.85	DN 10
30	17.67	77	102	123	153	174	191	213	127	0.87	0.89	DN 10
34	22.70	99	132	158	197	224	246	273	99	0.88	0.89	DN 16
38	28.35	124	165	197	246	280	307	341	79	0.89	0.90	DN 16
44	38.01	166	221	264	330	376	412	458	59	0.90	0.91	DN 20
50	49.09	215	285	341	427	486	533	592	46	0.91	0.91	DN 20
58	66.05	289	384	459	574	653	717	796	34	0.92	0.92	DN 20
63	77.93	341	453	542	678	771	846	939	29	0.92	0.93	DN 25
70	96.21	421	559	669	837	952	1,044	1,160	23	0.93	0.94	DN 25
75	110.45	483	642	768	960	1,093	1,199	1,332	20	0.94	0.95	DN 25
100	196.35	860	1,142	1,366	1,708	1,943	2,132	2,368	11	0.96	0.96	DN 40

Technical data for EF3a single head pump 60 Hz SST

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (60 Hz)					Max. pressure bar	Efficiency at		Standard type of valve
		88 [2] l/h	117 [3] l/h	140 [4] l/h	175 [5] l/h	199 [6] l/h		100% pressure	50% pressure	
17	5.67	30	39	47	59	67	397	0.72	0.77	DN 6
22	9.50	50	66	79	99	113	237	0.83	0.85	DN 6
25	12.27	64	86	103	128	146	183	0.83	0.85	DN 10
30	17.67	93	124	148	185	211	127	0.87	0.89	DN 10
34	22.70	119	159	190	238	271	99	0.88	0.89	DN 16
38	28.35	149	199	238	297	338	79	0.89	0.90	DN 16
44	38.01	200	266	319	399	453	59	0.90	0.91	DN 20
50	49.09	259	344	412	515	586	46	0.91	0.91	DN 20
58	66.05	348	463	554	693	788	34	0.92	0.92	DN 20
63	77.93	411	547	654	818	930	29	0.92	0.93	DN 25
70	96.21	508	675	808	1,010	1,148	23	0.93	0.94	DN 25
75	110.45	583	775	927	1,159	1,318	20	0.94	0.95	DN 25
100	196.35	1,036	1,378	1,649	2,061	2,344	11	0.96	0.96	DN 40

**Note:**

Abridged presentation of our complete product range. Additional plunger diameters (14-100 mm) on request.

**Materials in Contact With the Medium**

**Dosing head complete**

Dosing head	Diaphragm retaining screw	Diaphragm
Stainless steel 1.4404	Stainless steel 1.4462	PTFE multi-layer diaphragm

**Ball valve DN 6 – DN 10**

	Suction/pressure connector	Valve/head seal	Valve ball	Valve seat	Valve housing	Clamp ring
<b>DN 6 (double ball)</b>	Stainless steel 1.4404	Stainless steel 1.4404	SIN ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4
<b>DN 10 (single ball)</b>	Stainless steel 1.4404	Stainless steel 1.4404	Al <sub>2</sub> O <sub>3</sub> ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4

**Plate valve DN 16 – DN 25**

	Suction/pressure connector	Valve/head seal	Valve plate	Valve seat	Valve housing
<b>DN 16/DN 25</b>	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404

Further material versions and details available on request.



## 2.3 Hydraulic diaphragm metering pumps

Technical data for EF4a single head pump 50 Hz SST

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (50 Hz)							Max. pressure bar	Efficiency at		Standard type of valve
		73 [2] l/h	97 [3] l/h	116 [4] l/h	145 [5] l/h	165 [6] l/h	181 [7] l/h	201 [8] l/h		100% pressure	50% pressure	
22	15.21	66	88	105	132	150	165	183	400	0.64	0.67	DN 16
25	19.63	86	114	136	170	194	213	236	368	0.67	0.74	DN 16
30	28.27	123	164	196	246	279	307	341	255	0.70	0.76	DN 16
34	36.32	159	211	252	316	359	394	438	199	0.81	0.84	DN 16
38	45.36	198	264	315	394	449	492	547	159	0.82	0.84	DN 20
44	60.82	266	354	423	529	602	660	733	119	0.87	0.88	DN 20
50	78.54	344	457	546	683	777	852	947	92	0.90	0.92	DN 25
60	113.10	495	658	787	983	1,119	1,228	1,364	64	0.91	0.93	DN 32
70	153.94	674	895	1,071	1,339	1,524	1,671	1,856	47	0.91	0.93	DN 40
75	176.71	774	1,028	1,229	1,537	1,749	1,919	2,131	41	0.91	0.93	DN 40
86	232.35	1,017	1,352	1,617	2,021	2,300	2,523	2,802	31	0.93	0.94	DN 50
90	254.47	1,114	1,481	1,771	2,213	2,519	2,763	3,068	28	0.93	0.94	DN 50
100	314.16	1,376	1,828	2,186	2,733	3,110	3,411	3,788	23	0.94	0.94	DN 50
110	380.13	1,665	2,212	2,645	3,307	3,763	4,128	4,584	19	0.95	0.95	DN 50
115	415.48	1,819	2,418	2,891	3,614	4,113	4,512	5,010	17	0.93	0.95	DN 65
130	530.93	2,325	3,090	3,695	4,619	5,256	5,765	6,403	14	0.94	0.95	DN 65
140	615.75	2,697	3,583	4,285	5,357	6,095	6,687	7,426	12	0.95	0.96	DN 65

Technical data for EF4a single head pump 60 Hz SST

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (60 Hz)					Max. pressure bar	Efficiency at		Standard type of valve
		88 [2] l/h	117 [3] l/h	140 [4] l/h	175 [5] l/h	199 [6] l/h		100% pressure	50% pressure	
22	15.21	80	106	127	159	181	400	0.67	0.67	DN 16
25	19.63	103	137	164	206	234	368	0.74	0.74	DN 16
30	28.27	149	198	237	269	337	255	0.76	0.76	DN 16
34	36.32	191	254	305	381	433	199	0.84	0.84	DN 16
38	45.36	239	318	381	476	541	159	0.84	0.84	DN 20
44	60.82	321	427	510	638	726	119	0.88	0.88	DN 20
50	78.54	414	551	659	824	937	92	0.92	0.92	DN 25
60	113.10	597	793	950	1,187	1,350	64	0.93	0.93	DN 32
70	153.94	812	1,080	1,293	1,616	1,838	47	0.93	0.93	DN 40
75	176.71	933	1,240	1,484	1,855	2,110	41	0.93	0.93	DN 40
86	232.35	1,226	1,631	1,951	2,439	2,774	31	0.94	0.94	DN 50
90	254.47	1,343	1,786	2,137	2,671	3,038	28	0.94	0.94	DN 50
100	314.16	1,658	2,205	2,638	3,298	3,751	23	0.94	0.94	DN 50
110	380.13	2,007	2,668	3,193	3,991	4,538	19	0.95	0.95	DN 50
115	415.48	2,193	2,916	3,490	4,362	4,960	17	0.95	0.95	DN 65
130	530.93	2,803	3,727	4,459	5,574	6,339	14	0.95	0.95	DN 65
140	615.75	3,251	4,322	5,172	6,465	7,352	12	0.96	0.96	DN 65

**Note:**

Abridged presentation of our complete product range. Additional plunger diameters (22 – 140 mm) on request.

**Materials in Contact With the Medium**

**Dosing head complete**

Dosing head	Diaphragm retaining screw	Diaphragm
Stainless steel 1.4404	Stainless steel 1.4462	PTFE multi-layer diaphragm

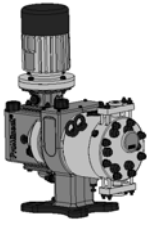
**Plate valve**

	Suction/ pressure connector	Valve/ head seal	Valve plate	Valve seat	Valve housing
DN 16 – DN 65	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404

Further material versions and details available on request.



## 2.3 Hydraulic diaphragm metering pumps



### Orlita® Evolution 1-4 with PVC/PVDF liquid end

The hydraulic diaphragm pump Orlita® Evolution is also available in a "plastic dosing head" version. The chemical resistance of the wetted materials PVC and PVDF to many media enables the even more flexible use of this process-reliable pump in an even greater number of applications.

#### Technical data for EF1a single head pump 50 Hz PVC/PVDF

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (50 Hz)							Max. pressure bar	Efficiency at		Standard type of valve
		73 [2] l/h	97 [3] l/h	116 [4] l/h	145 [5] l/h	165 [6] l/h	181 [7] l/h	201 [8] l/h		100% pressure	50% pressure	
8	0.80	3.5	4.7	5.6	7.0	8.0	8.7	9.7	16	0.67	0.77	DN 3
10	1.26	5.5	7.3	8.7	10.9	12.4	13.6	15.2	16	0.73	0.82	DN 3
12	1.81	7.9	10.5	12.6	15.7	17.9	19.7	21.8	16	0.71	0.77	DN 6
21	5.54	24.3	32.3	38.6	48.2	54.9	60.2	66.8	16	0.78	0.85	DN 10
25	7.85	34.4	45.7	54.7	68.3	77.8	85.3	94.7	16	0.81	0.87	DN 10
29	10.57	46.3	61.5	73.6	91.9	104.6	114.8	127.5	16	0.84	0.89	DN 10
44	24.33	106.6	141.6	169.3	211.7	240.9	264.2	293.4	15	0.94	0.96	DN 16
50	31.42	137.6	182.8	218.7	273.3	311.0	341.2	378.9	12	0.95	0.96	DN 16
58	42.27	185.2	246.0	294.2	367.8	418.5	459.1	509.8	9	0.95	0.96	DN 16

#### Technical data for EF1a single head pump 60 Hz PVC/PVDF

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (60 Hz)					Max. pressure bar	Efficiency at		Standard type of valve
		88 [2] l/h	117 [3] l/h	140 [4] l/h	175 [5] l/h	199 [6] l/h		100% pressure	50% pressure	
8	0.80	4.2	5.6	6.8	8.4	9.6	16	0.67	0.77	DN 3
10	1.26	6.6	8.8	10.6	13.2	15.0	16	0.73	0.82	DN 3
12	1.81	9.6	12.7	15.2	19.0	21.6	16	0.71	0.77	DN 6
21	5.54	29.3	38.9	46.6	58.2	66.2	16	0.78	0.85	DN 10
25	7.85	41.5	55.1	66.0	82.5	93.8	16	0.81	0.87	DN 10
29	10.57	55.8	74.2	88.8	111.0	126.2	16	0.84	0.89	DN 10
44	24.33	128.5	170.8	204.4	255.4	290.5	15	0.94	0.96	DN 16
50	31.42	165.9	220.5	263.9	329.9	375.1	12	0.95	0.96	DN 16
58	42.27	223.2	296.8	355.1	443.9	504.7	9	0.95	0.96	DN 16

#### Note:

Abridged presentation of our complete product range. Other plunger diameters (8 - 60 mm) on request. Other pressures (e.g. 21 bar) on request.

#### Materials in Contact With the Medium

##### Dosing head complete

Dosing head	Diaphragm retaining screw	Diaphragm
PVC	Hastelloy C	PTFE
PVDF	Hastelloy C	PTFE

##### Ball valve DN 6 – DN 10

	Suction/pressure connector	Valve/head seal	Valve ball	Valve seat	Valve housing	Clamp ring
DN 6 (single ball)	PVDF	PTFE moulded composite	Al <sub>2</sub> O <sub>3</sub> ceramic	PTFE	PVDF	PVDF
DN 10 (single ball)	PVDF	PTFE moulded composite	Al <sub>2</sub> O <sub>3</sub> ceramic	PTFE	PVDF	PVDF

##### Plate valve DN 16

	Suction/pressure connector	Valve/head seal	Valve ball	Valve seat	Valve housing
DN 16	PVDF	PTFE	ZrO <sub>2</sub> ceramic	PTFE	PVDF

Further material versions and details available on request.



## 2.3 Hydraulic diaphragm metering pumps

Technical data for EF2a single head pump 50 Hz PVC/PVDF

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (50 Hz)							Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		73 [2] l/h	97 [3] l/h	116 [4] l/h	145 [5] l/h	165 [6] l/h	181 [7] l/h	201 [8] l/h				
12	1.81	7	10	12	15	17	19	21	16	0.71	0.77	DN 6
21	5.54	24	32	38	48	54	60	66	16	0.78	0.85	DN 10
25	7.85	34	45	54	68	77	85	94	16	0.81	0.87	DN 10
29	10.57	46	61	73	91	104	114	127	16	0.84	0.89	DN 10
44	24.33	106	141	169	211	240	264	293	16	0.94	0.96	DN 16
50	31.42	137	182	218	273	311	341	378	16	0.95	0.96	DN 16
58	42.27	185	246	294	367	418	459	509	16	0.95	0.96	DN 16

Technical data for EF2a single head pump 60 Hz PVC/PVDF

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (60 Hz)					Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		88 [2] l/h	117 [3] l/h	140 [4] l/h	175 [5] l/h	199 [6] l/h				
12	1.81	9	12	15	19	21	16	0.71	0.77	DN 6
21	5.54	29	38	46	58	66	16	0.78	0.85	DN 10
25	7.85	41	55	66	82	93	16	0.81	0.87	DN 10
29	10.57	55	74	88	111	126	16	0.84	0.89	DN 10
44	24.33	128	170	204	255	290	16	0.94	0.96	DN 16
50	31.42	165	220	263	329	375	16	0.95	0.96	DN 16
58	42.27	223	296	355	433	504	16	0.95	0.96	DN 16

**Note:**

Abridged presentation of our complete product range. Other piston diameters on request. Other pressure stages (e.g. 21 bar) on request.

### Materials in Contact With the Medium

#### Dosing head complete

Dosing head	Diaphragm retaining screw	Diaphragm
PVC	Hastelloy C	PTFE
PVDF	Hastelloy C	PTFE

#### Ball valve DN 6 – DN 10

	Suction/pressure connector	Valve/head seal	Valve ball	Valve seat	Valve housing	Clamp ring
DN 6 (single ball)	PVDF	PTFE moulded composite	Al <sub>2</sub> O <sub>3</sub> ceramic	PTFE	PVDF	PVDF
DN 10 (single ball)	PVDF	PTFE moulded composite	Al <sub>2</sub> O <sub>3</sub> ceramic	PTFE	PVDF	PVDF

#### Plate valve DN 16

	Suction/pressure connector	Valve/head seal	Valve plate	Valve seat	Valve housing
DN 16	PVDF	PTFE	ZrO <sub>2</sub> ceramic	PTFE	PVDF

Further material versions and details available on request.



## 2.3 Hydraulic diaphragm metering pumps

Technical data for EF3a single head pump 50 Hz PVC/PVDF

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (50 Hz)							Max. pressure bar	Efficiency at		Standard type of valve
		73 [2] l/h	97 [3] l/h	116 [4] l/h	145 [5] l/h	165 [6] l/h	181 [7] l/h	201 [8] l/h		100% pressure	50% pressure	
63	77.93	341	453	542	678	771	846	939	16	0.92	0.93	DN 32
70	96.21	421	559	669	837	952	1,044	1,160	16	0.93	0.96	DN 50
75	110.45	483	642	768	960	1,096	1,199	1,332	16	0.94	0.94	DN 32
100	196.35	860	1,142	1,366	1,708	1,943	2,132	2,368	11	0.96	0.96	DN 50

Technical data for EF3a single head pump 60 Hz PVC/PVDF

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (60 Hz)					Max. pressure bar	Efficiency at		Standard type of valve
		88 [2] l/h	117 [3] l/h	140 [4] l/h	175 [5] l/h	199 [6] l/h		100% pressure	50% pressure	
63	77.93	411	547	654	818	930	16	0.92	0.93	DN 32
70	96.21	508	675	802	1,010	1,148	16	0.93	0.94	DN 32
75	110.45	583	775	927	1,159	1,318	16	0.94	0.95	DN 32
100	196.35	1,036	1,378	1,649	2,061	2,344	11	0.99	0.99	DN 50

**Note:**

Abridged presentation of our complete product range. Other piston diameters on request. Other pressure stages (e.g. 16 bar) on request.

### Materials in Contact With the Medium

**Dosing head complete**

Dosing head	Diaphragm retaining screw	Diaphragm
PVC	Hastelloy C	PTFE
PVDF	Hastelloy C	PTFE

**Plate valve**

	Suction/pressure connector	Valve/head seal	Valve plate	Valve seat	Valve housing
DN 25	PVDF	PTFE	ZrO <sub>2</sub> ceramic	PTFE	PVDF

Further material versions and details available on request.

## 2.3 Hydraulic diaphragm metering pumps

Technical data for EF4a single head pump 50 Hz PVC/PVDF

Plunger Ø	Theor. stroke volume	Theoretical pump capacity in l/h at strokes/min (50 Hz)							Max. pressure	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		73 [2] l/h	97 [3] l/h	116 [4] l/h	145 [5] l/h	165 [6] l/h	181 [7] l/h	201 [8] l/h				
mm	ml/stroke								bar			
70	153.90	674	895	1,071	1,339	1,524	1,671	1,856	10	0.84	0.85	DN 50
75	176.70	774	1,028	1,229	1,537	1,749	1,919	2,131	10	0.85	0.86	DN 50
115	415.50	1,819	2,418	2,891	3,614	4,113	4,512	5,010	10	0.90	0.91	DN 50
130	530.90	2,325	3,090	3,695	4,619	5,253	5,765	6,403	10	0.93	0.93	DN 65
140	530.90	2,697	3,583	4,285	5,357	6,095	6,687	7,426	10	0.93	0.94	DN 65

Technical data for EF4a single head pump 60 Hz PVC/PVDF

Plunger Ø	Theor. stroke volume	Theoretical pump capacity in l/h at strokes/min (60 Hz)					Max. pressure	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		88 [2] l/h	117 [3] l/h	140 [4] l/h	175 [5] l/h	199 [6] l/h				
mm	ml/stroke						bar			
70	153.90	812	1,080	1,293	1,616	1,838	10	0.84	0.85	DN 50
75	176.70	933	1,240	1,484	1,855	2,110	10	0.86	0.86	DN 50
115	415.50	2,193	2,916	3,490	4,362	4,960	10	0.90	0.91	DN 50
130	530.90	2,803	3,727	4,459	5,574	6,339	10	0.92	0.93	DN 65
140	530.90	3,251	4,322	5,172	6,465	7,352	10	0.93	0.94	DN 65

**Note:**

Abridged presentation of our complete product range. Other piston diameters on request. Other pressure stages (16 and/or 21 bar) on request.

### Materials in Contact With the Medium

#### Dosing head complete

Dosing head	Diaphragm retaining screw	Diaphragm
PVC	Hastelloy C	PTFE
PVDF	Hastelloy C	PTFE

#### Ball valve DN 3 – DN 10

	Suction/pressure connector	Valve/head seal	Valve ball	Valve seat	Valve housing	Clamp ring
DN 25 (single ball)	PVDF	PTFE moulded composite	Al <sub>2</sub> O <sub>3</sub> ceramic	PTFE	PVDF	PVDF

#### Plate valve

	Suction/pressure connector	Valve/head seal	Valve plate	Valve seat	Valve housing
DN 40 – DN 65	PVDF	PTFE	ZrO <sub>2</sub> ceramic	PTFE	PVDF

Further material versions and details available on request.

## 2.3 Hydraulic diaphragm metering pumps

### 2.3.8

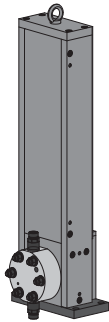
#### Hydraulic Diaphragm Metering Pump Evolution mikro

**For the smallest quantities at the highest pressures**

**Capacity range 0.01 – 18 l/h, 400 – 16 bar**



**NEW**



P\_ORL\_0058\_SW1

The Evolution mikro is an innovative micro-metering pump for high pressures. The hydraulic diaphragm metering pump is the first of its kind with an electronically regulated linear direct power end. The power end has few mechanical functional elements and thus operates with virtually minimal maintenance.

With a capacity range of 0.01 – 18 l/h at pressures of up to 400 bar, the hydraulic diaphragm metering pumps Evolution mikro EMFa and EMHa are extremely suitable for ultra-precise micro-metering in gas metering and filling processes of all kinds. They are also used for additive metering in oil, gas and chemical applications, etc.

Typical applications include the metering of additives in gas metering and filling processes.

The Evolution mikro is the first of its kind with an electronically regulated direct power end. It can be ideally adapted to the respective application, thanks to an adjustment range of 1:200 and the combination of individually independent metering profiles with 3-parameter control.

##### Your benefits

Maximum process reliability:

- Precise micro-metering at high pressures
- Hermetically sealed by PTFE multi-layer safety diaphragm or metal diaphragm
- Long service life thanks to its sturdy construction with low-wear, contact-less power end
- High positional accuracy guarantees reproducibility of better than  $\pm 1\%$

Excellent flexibility:

- Seriously extended adjustment range of up to 1:200
- Universally controllable with electronically integrated overload protection
- Individually process-dependent metering profiles combined with 3-parameter control are possible
- Space-saving, easy-to-fit solution

##### Technical Details

- Stroke length: 0 – 60 mm
- Stroke rate: 0 – 240 strokes/min.
- Precise metering of 0.01 l/h up to a max. of 18 l/h at up to 400 bar
- Stroke length adjustment range 0 – 100%
- Metering reproducibility is better than  $\pm 1\%$  under defined conditions and with proper installation
- PTFE multi-layer safety diaphragm or metal diaphragm with integral diaphragm rupture signalling
- Large real volumetric flow adjustment range: 1:200
- Wetted materials: stainless steel 1.4404, special materials are available on request
- Universal control options, such as analogue, contact, field bus etc.
- Individual process-dependent metering profiles are possible
- Space-saving, easy-to-fit solution
- Degree of protection IP 55
- Designs compliant with API 675 and ATEX (on request)

##### Field of application

- Additive metering in the chemical and petrochemical industry
- General filling processes in industry
- Metering of additives in the food industry
- Universal lab applications
- Gas metering applications



## 2.3 Hydraulic diaphragm metering pumps

### Technical Data

Plunger Ø	Max. pressure	Pump capacity in l/h per head at H/min (50 Hz)					Theor. stroke volume	Suction lift	Connection suction/ discharge side	Shipping weight
mm	bar	60 l/h	90 l/h	120 l/h	160 l/h	200 l/h	ml/stroke	m WC	"	kg
3	400	0.8	1.1	1.6	–	–	0.42	1.0	DN 3	25
3	320	0.9	1.4	1.8	2.4	3.0	0.42	1.0	DN 3	25
3	250	0.9	1.4	1.8	2.4	3.0	0.42	1.0	DN 3	25
3	160	1.1	1.6	2.2	3.0	3.7	0.42	1.0	DN 3	25
3	100	1.2	1.8	2.4	3.2	4.0	0.42	1.0	DN 3	25
3	64	1.2	1.8	2.4	3.2	4.0	0.42	1.0	DN 3	25
3	25	1.2	1.8	2.4	3.2	4.0	0.42	1.0	DN 3	25
6	100	4.7	7.1	9.5	–	–	1.69	1.0	DN 6	25
6	80	5.0	7.6	10.2	–	–	1.69	1.0	DN 6	25
6	64	5.0	7.6	10.2	13.6	17.0	1.69	1.0	DN 6	25
6	40	5.1	7.2	10.3	13.7	17.2	1.69	1.0	DN 6	25
6	25	5.3	8.0	10.7	14.2	17.8	1.69	1.0	DN 6	25
6	16	5.4	8.1	10.8	14.4	18.0	1.69	1.0	DN 6	25

### Wetted materials

#### Dosing head complete

Dosing head	Diaphragm retaining screw	Diaphragm
Stainless steel	Stainless steel 1.4462	PTFE multi-layer diaphragm

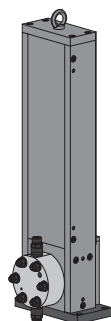
#### Ball valve DN 3 – DN 6

	Suction/pressure connector	Valve/head seal	Valve ball	Valve seat	Valve housing	Clamp ring
DN 3 (double ball)	Stainless steel 1.4404	Stainless steel 1.4404	Al <sub>2</sub> O <sub>3</sub> ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4
DN 6 (double ball)	Stainless steel 1.4404	Stainless steel 1.4404	SIN ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4

Hastelloy C, PVDF and PTFE on request

#### Scope of delivery

- Pump
- Cable
- Drive Control



P\_ ORL\_0058\_SW1  
Pumpe



P\_ AC\_0289\_SW1  
2 m cable



P\_ AC\_0290\_SW1  
Drive Control

#### Options:

- Cable up to 30 m
- Transformer
- Control cabinet

## 2.3 Hydraulic diaphragm metering pumps

### 2.3.9

### Hydraulic Diaphragm Metering Pump Orlita® MF

#### Reliable capacity even at high pressure

Capacity range of single head pump: 0 – 13,000 l/h; 700 – 6 bar

The hydraulic diaphragm metering pump Orlita® MF offers reliable capacities even under high pressure and has a modular construction, therefore has versatile uses. Thanks to its modular design, this pump is tailored to meet your requirements even at very high pump capacities.



ORLITA® MF hydraulic diaphragm metering pumps (MFS 18 to MFS 1400) with a stroke length of 15 to 60 mm provide a capacity ranging from 0 to 13,000 l/h at 700 – 6 bar. A wide range of drive versions is available, including some for use in Zone 1 or Zone 2 areas at risk from explosion with ATEX certification. The Orlita® MF product range is designed to comply with API 675. Its modular construction permits the free combination of drives, power ends and dosing heads, producing a pump for a range of different feed rates and media operating at different working pressures.

#### Your benefits

Excellent process safety and reliability:

- PTFE double diaphragm with integrated diaphragm rupture warning system ensures precise and low-wear operation despite high pressures
- The product chamber is hermetically separated from the hydraulic part
- Integrated hydraulic relief valve and automatic bleed valve for the hydraulic chamber
- Wear-free, valveless enforced anti-cavitation of the hydraulic leakage guarantees optimum dosing precision
- Cone valves for use as suction and/or discharge valves with minimal wear, good self-cleaning and low pressure loss (NPSHR)

Excellent flexibility:

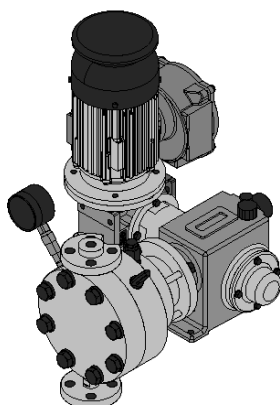
- The modular construction allows a wide range of uses. In multiple pump systems it is possible to combine up to 6 metering units, even with different pump capacities. In single pumps the drive arrangement may be either vertical or horizontal.
- 10 different gear ratios are available
- Temperature range -40 to +150 °C
- Customised designs are available on request

#### Technical Details

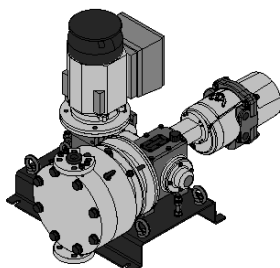
- MfS 18 (MF1a) – Stroke length: 0-15 mm, Rod force: 1,750 N
- MfS 35 (MF2a) – Stroke length: 0-20 mm, Rod force: 3,500 N
- MfS 80 (MF3a) – Stroke length: 0-20 mm, Rod force: 14,000 N
- MfS 180 (MF4a) – Stroke length: 0-40 mm, Rod force: 18,000 N
- MfS 600 (MF5b) – Stroke length: 0-40 mm, Rod force: 40,000 N
- MfS 1400 (MF6a) – Stroke length: 0-60 mm, Rod force: 60,000 N
- Stroke length adjustment range: 0 – 100% in operation and idle
- Stroke length adjustment: manually by means of a manual adjustment wheel and scaled display (optionally with electric actuator or control drive)
- Metering reproducibility is better than  $\pm 1\%$  within the 10 – 100% stroke length range under defined conditions and with correct installation (API 675)
- PTFE multi-layer diaphragm with electrical diaphragm rupture warning system via a contact
- Integrated hydraulic relief and bleed valve
- Wetted materials: Stainless steel, special designs are available on request
- A wide range of power end versions is available: 3-phase AC motors, motors for use in areas at risk from explosion and different flange designs for use in customer-specific motors
- Degree of protection: IP 55
- Temperature range - 40 °C to + 150 °C
- Suction lift up to 8 m
- Design in compliance with API 675 among others

#### Field of application

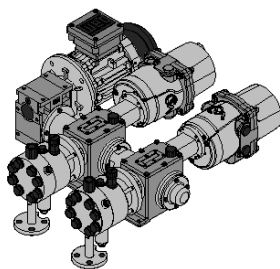
- Oil/ gas production (onshore/offshore)
- Refineries
- Chemical/Petrochemical industry
- Pharmaceuticals & cosmetics
- Food production
- Packaging industry (bottling pumps)



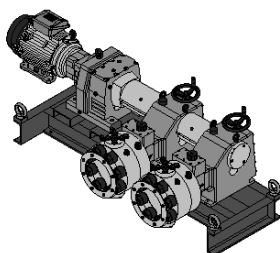
P\_ORL\_068\_SW1  
Orlita® MHS 18-20



P\_ORL\_067\_SW1  
Orlita® MHS 35/45



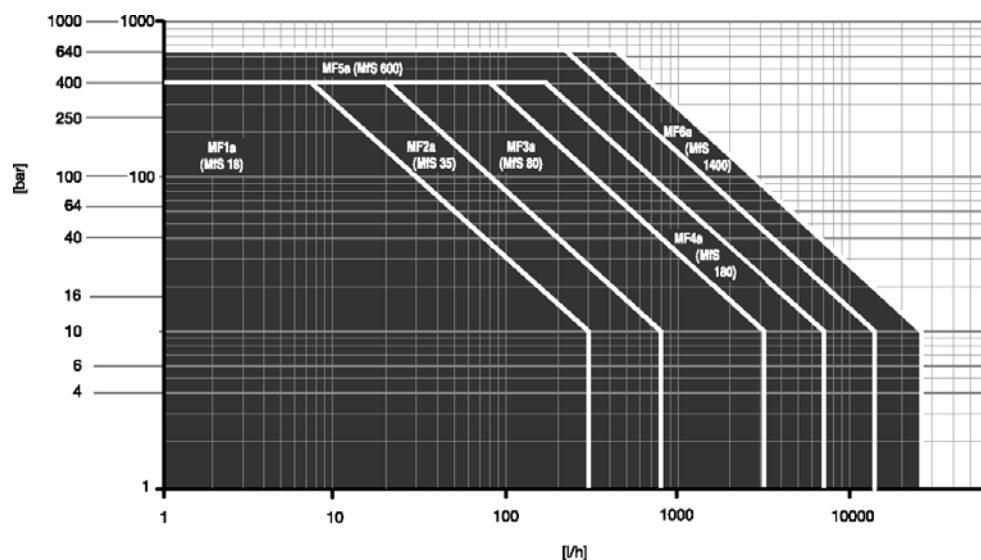
P\_ORL\_069\_SW1  
Orlita® MHS 35-8-8



P\_ORL\_070\_SW1  
Orlita® MHS 600-28-28



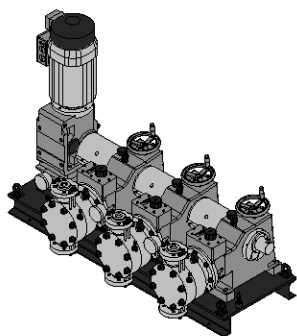
## 2.3 Hydraulic diaphragm metering pumps



Pressure [bar] depending on the metering volume [l/h] at 50 Hz

### Triplex Metering Pumps

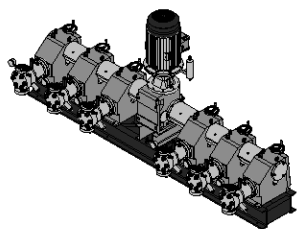
With triplex metering pumps, the pressure stroke of each liquid end occurs through 120° of crank travel. This results in a metering flow free of pulsation without the use of elaborate pulsation dampers. This design of process diaphragm pump is preferred in the chemical and petrochemical industries.



P\_ORL\_056\_SW1  
Orlita® MF3S 180/90-90-90 triplex pump

### Multiplexed Metering Pumps

The Orlita® MF range's modular construction permits a variable combination of drives, motors and liquid ends e.g. quadruple MF metering pumps with central drive.



P\_ORL\_057\_SW1  
Orlita® MF3S 1400/50 multiple pump



## 2.3 Hydraulic diaphragm metering pumps

### Actuation of ORLITA® MF, MH, PS, DR

**Control drive** consisting of an actuator with servo motor and integral servo controller for stroke length adjustment via a standard signal. Standard signal current input 0/4 – 20 mA, corresponds to stroke length 0 – 100%, switch for manual/automatic operation; key switch for stroke adjustment in manual mode, mechanical status display of actual stroke length value output 0/4 – 20 mA for remote display. Control drives can also be designed with bus systems, like HART, PROFIBUS, Fieldbus Foundation ...

### Variable speed motors with integrated frequency converter (identity code specification V)

Power supply 1 ph 230 V, 50/60 Hz (up to 3 kW). Externally controllable with 0/4 - 20 mA.

The following functions are integrated in the terminal box cover:

- Start/stop switch
- Switch for manual/external operation
- Potentiometer for speed control in manual mode

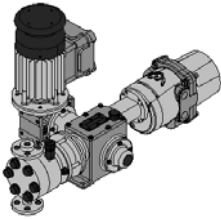
### Speed controllers with frequency converter (identity code specification Z)

The frequency converter is accommodated in an IP 55 rated protective housing with integral control unit and main switch, suitable for max. 0.37/0.75 kW motor capacity.

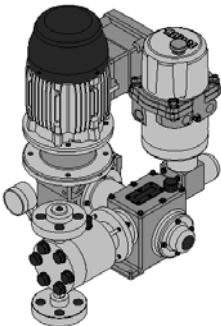
Externally controllable with 0/4 - 20 mA or 0 - 10 V corresponding to 0 - 50 (60) Hz output frequency.

Integrated control unit with versatile functions, such as switching between external/internal control; frequency input using arrow keys with internal control, multilingual fault message display etc. and motor temperature monitoring (thermistor protection).

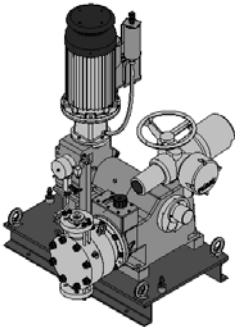
The speed controller assembly consists of a frequency converter and a variable speed motor.



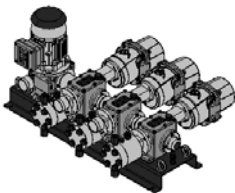
P\_ORL\_058\_SW1  
Orilita® MFS 18 with 1-phase control drive  
115/230 V



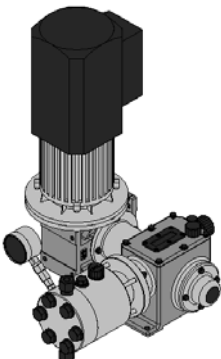
P\_ORL\_059\_SW1  
Orilita® MFS 35 with 1-phase control drive  
115/230 V vertical



P\_ORL\_060\_SW1  
Orilita® MFS 180 with 3-phase control drive



P\_ORL\_061\_SW1  
Orilita® MFS 35/12-12 with control drives

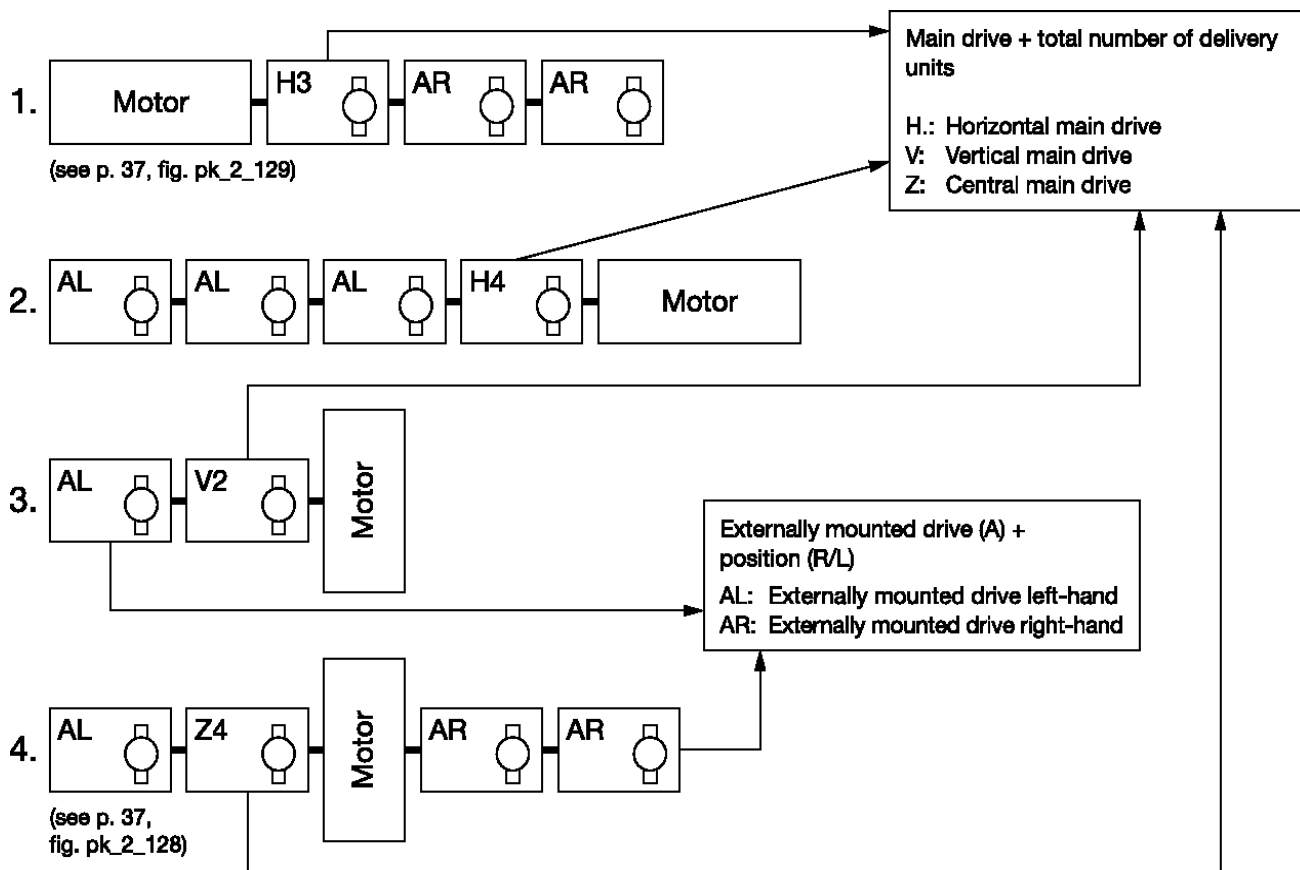


P\_ORL\_062\_SW1  
Orilita® MFS 18/7 with Varicon



## 2.3 Hydraulic diaphragm metering pumps

### Type of drive



When ordering a multiplexed pump, the main and/or all externally mounted pumps require a separate Identity code.

For example a triplex pompe (1.):

MF\_aH3.....  
MF\_aAR.....  
MF\_aAR.....

### Materials in Contact With the Medium

	Liquid end	Suction/discharge valve housing	Valve seals	Valve	Valve seat	Range
S1 (DIN)	1.4404	None	1.4571	Ceramic	1.4404	DN 3
S1 (ANSI)	A 316 L	N/A	A 316 Ti	Ceramic	A 316 L	
S1 (DIN)	1.4404	1.4404	1.4571	1.4462	1.4462	≥ DN6
S1 (ANSI)	A 316 L	A 316 L	A 316 Ti	Duplex SS	Duplex SS	
S2 (DIN)	1.4462	1.4462	1.4571	1.4462	1.4462	≥ DN6
S2 (ANSI)	Duplex SS	Duplex SS	A 316 Ti	Duplex SS	Duplex SS	
S3 (DIN)	1.4539	1.4539	2.4610	1.4539	1.4539	≥ DN6
S3 (ANSI)	A904L	A904L	Hastelloy C	A904L	A904L	

### Motor Data

A	50 Hz	3 ph. 230/400 V	3 ph. 500 V	3 ph. 380/660 V
		3 ph. 400/690 V	3 ph. 415 V	
B (adjustable 1:5)	50 Hz	3 ph. 230/400 V	3 ph. 500 V	3 ph. 380/660 V
		3 ph. 400/690 V	3 ph. 415 V	
H	60 Hz	3 ph. 220/380 V	3 ph. 400 V	
K (adjustable 1:5)	60 Hz	3 ph. 220/380 V	3 ph. 400 V	



## 2.3 Hydraulic diaphragm metering pumps

Technical data for MFS 18 single head pump 50 Hz

Plunger Ø	Theor. stroke volume	Pump capacity $Q_{th}$ in l/h per pump head at H/min [Identity code characteristic 3 to 9]:							Max. pressure	Efficiency at	Efficiency at	Standard type of valve
		45 [3]	58 [4]	73 [5]	91 [6]	112 [7]	145 [8]	207 [9]				
mm	ml/ stroke	l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar	100% pressure	50% pressure	
7	0.58	1.5	2.0	2.5	3.1	3.8	5.0	7.1	400	0.50	0.70	DK DN 3
8	0.75	2.0	2.6	3.2	4.1	5.0	6.5	9.3	348	0.55	0.72	DK DN 3
10	1.18	3.2	4.1	5.1	6.4	7.8	10.2	14.6	222	0.67	0.79	Ke DN 6
11	1.43	3.8	4.9	6.2	7.7	9.5	12.4	17.7	184	0.67	0.79	Ke DN 6
12	1.70	4.6	5.9	7.3	9.2	11.3	14.7	21.0	154	0.84	0.88	Ke DN 6
14	2.31	6.2	8.0	10.0	12.5	15.4	20.0	28.7	113	0.85	0.88	Ke DN 6
16	3.02	8.2	10.5	13.1	16.4	20.1	26.2	37.4	87	0.86	0.88	Ke DN 6
18	3.82	10.3	13.2	16.6	20.7	25.5	33.2	47.4	68	0.87	0.88	Ke DN 6
20	4.71	12.8	16.4	20.5	25.6	31.5	41.0	58.5	55	0.88	0.89	Ke DN 6
22	5.70	15.5	19.8	24.8	31.0	38.1	49.6	70.8	46	0.88	0.89	Ke DN 10/6
25	7.36	20.0	25.6	32.0	40.0	49.2	64.0	91.5	35	0.89	0.89	Ke DN 10
27	8.59	23.3	29.8	37.3	46.7	57.4	74.7	106.7	30	0.89	0.89	Ke DN 10
29	9.91	26.9	34.4	43.1	53.8	66.3	86.2	123.1	26	0.89	0.89	Ke DN 10
30	10.60	28.8	36.9	46.1	57.6	70.9	92.2	131.7	24	0.89	0.89	Ke DN 10
36	15.27	41.5	53.1	66.4	83.0	102.1	132.8	189.7	17	0.89	0.89	Ke DN 16
40	18.85	51.2	65.6	82.0	102.4	126.1	163.9	234.2	13	0.89	0.89	Ke DN 16
44	22.81	62.0	79.3	99.2	124.0	152.6	198.4	283.4	11	0.89	0.90	Ke DN 16
50	29.45	80.0	102.4	128.1	160.1	197.1	256.2	366.0	8	0.89	0.90	Ke DN 16

Technical data for MFS 18 single head pump 60 Hz

Plunger Ø	Theor. stroke volume	Pump capacity $Q_{th}$ in l/h per pump head at H/min [Identity code characteristic 2 to 8]:							Max. pressure	Efficiency at	Efficiency at	Standard type of valve
		44 [2]	55 [3]	70 [4]	88 [5]	110 [6]	135 [7]	176 [8]				
mm	ml/ stroke	l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar	100% pressure	50% pressure	
7	0.58	1.5	1.9	2.4	3.0	3.8	4.6	6.1	400	0.50	0.70	DK DN 3
8	0.75	1.9	2.4	3.1	3.9	4.9	6.1	7.9	348	0.55	0.72	DK DN 3
10	1.18	3.1	3.8	4.9	6.2	7.7	9.5	12.4	222	0.67	0.79	Ke DN 6
11	1.43	3.7	4.7	6.0	7.5	9.4	11.5	15.0	184	0.67	0.79	Ke DN 6
12	1.70	4.4	5.6	7.1	8.9	11.2	13.7	17.9	154	0.84	0.88	Ke DN 6
14	2.31	6.1	7.6	9.7	12.1	15.2	18.7	24.3	113	0.85	0.88	Ke DN 6
16	3.02	7.9	9.9	12.7	15.9	19.9	24.5	31.8	87	0.86	0.88	Ke DN 6
18	3.82	10.0	12.6	16.1	20.1	25.1	31.0	40.3	68	0.87	0.88	Ke DN 6
20	4.71	12.4	15.5	19.9	24.8	31.1	38.2	49.7	55	0.88	0.89	Ke DN 6
22	5.70	15.0	18.8	24.0	30.1	37.6	46.3	60.2	46	0.88	0.89	Ke DN 10/6
25	7.36	19.4	24.3	31.1	38.8	48.6	59.8	77.7	35	0.89	0.89	Ke DN 10
27	8.59	22.6	28.3	36.2	45.3	56.6	69.7	90.6	30	0.89	0.89	Ke DN 10
29	9.91	26.1	32.7	41.8	52.3	65.3	80.4	104.6	26	0.89	0.89	Ke DN 10
30	10.60	27.9	34.9	44.7	55.9	69.9	86.1	111.9	24	0.89	0.89	Ke DN 10
36	15.27	40.3	50.3	64.4	80.6	100.7	124.0	161.2	17	0.89	0.89	Ke DN 16
40	18.85	49.7	62.2	79.6	99.5	124.4	153.1	199.0	13	0.89	0.89	Ke DN 16
44	22.81	60.2	75.2	96.3	120.1	150.5	185.2	240.8	11	0.89	0.90	Ke DN 16
50	29.45	77.7	97.1	124.4	155.5	194.3	239.2	311.0	8	0.89	0.90	Ke DN 16

DK Double ball valve, Ke Conical valve

- Important note:**
- Abridged presentation of our complete product range. Other types on request
  - Allow for a minimum 10% power reserve when designing in accordance with API
  - All hydraulic performance data is based on water at 20 °C

## 2.3 Hydraulic diaphragm metering pumps

### Orlita® MFS18 (MF1a) hydraulic diaphragm metering pump

MF1a	Drive type										
V1	Main drive vertical*				AR	Drive module right-hand					
Z1	Main drive central*				M	Modified **					
AL	Drive module left-hand										
Plunger diameter											
007	7 mm	011	11 mm	016	16 mm	022	22 mm	029	29 mm	040	40 mm
008	8 mm	012	12 mm	018	18 mm	025	25 mm	030	30 mm	044	44 mm
010	10 mm	014	14 mm	020	20 mm	027	27 mm	036	36 mm	050	50 mm
Stroke rate 50 (60) Hz											
2	-/44 strokes/min			4	58 (70) Strokes/min			6	91 (110) Strokes/min		
3	45 (55) strokes/min			5	73 (88) Strokes/min			7	112 (135) Strokes/min		
8				8				9	145 (176) Strokes/min		
									207 (-) Strokes/min		
Liquid end material (including valve materials)											
S1	Stainless steel (see table, sheet 2)										
Temperature of pumped medium											
0	-10 °C to 80 °C				3	10 °C to 115 °C					
1	-25 °C to 60 °C				4	10 °C to 150 °C					
2	-40 °C to 60 °C										
Displacer format											
0	PTFE multi-layer diaphragm										
1	PTFE multi-layer diaphragm with pressure gauge										
Liquid end version											
0	Standard				2	Standard double valve					
1	Standard with spring				3	Standard double valve with spring					
Hydraulic connection suction side											
G	Thread DIN/ISO				A	Flange ANSI					
N	Thread NPT/ANSI				D	Flange DIN/ISO					
Hydraulic connection discharge side											
G	Thread DIN/ISO				A	Flange ANSI					
N	Thread NPT/ANSI				D	Flange DIN/ISO					
Version											
0	no features				2	Liquid end polished					
1	Liquid end heating				3	Special paint finish					
Power connector											
A	Standard voltage 50 Hz										
B	Standard voltage 50 Hz adjustable										
H	Standard voltage 60 Hz										
K	Standard voltage 60 Hz adjustable										
0	Externally mounted pump										
1	without motor with IEC flange										
2	without motor with NEMA flange										
Electrical protection system / explosion protection											
0	IP 55		C	IP 55 EExde							
1	IP 56		D	IP 56 EExn							
A	IP 55 EExn		E	IP 56 EExe							
B	IP 55 EExe		F	IP 56 EExde							
Electrical options											
0	no options										
1	Stroke sensor										
Stroke length adjustment											
0	manual										
1	0/4-20 mA without Ex										
2	0/4-20 mA Ex Zone 2										
3	0/4-20 mA Ex Zone 1										
4	0/4-20 mA without EX offshore										
5	0/4-20 mA Ex Zone 2 offshore										
6	0/4-20 mA Ex Zone 1 offshore										
Environmental conditions											
0	-20 °C to 40 °C										
1	-40 °C to 40 °C										
2	0 °C to 55 °C										
Approvals											
0	CE										
1	API 675										
2	VDMA										
3	ATEX										
4	ATEX / API 675										
5	VDMA / ATEX										

\*For other pump configurations see Type of drive page → 2-60

\*\* Modified version (M) is possible for each ID character of the identity code.





## 2.3 Hydraulic diaphragm metering pumps

Technical data for MFS 35 single head pump 50 Hz

Plunger Ø mm	Theor. stroke volume ml/stroke	Pump capacity Q <sub>th</sub> in l/h per pump head at H/min [Identity code characteristic 3 to 9]:							Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		45 [3] l/h	58 [4] l/h	73 [5] l/h	91 [6] l/h	112 [7] l/h	145 [8] l/h	207 [9] l/h				
7	0.77	2.0	2.6	3.3	4.1	5.1	6.7	9.5	400	0.50	0.70	DK DN 3
8	1.01	2.7	3.5	4.3	5.4	6.7	8.7	12.4	400	0.50	0.70	DK DN 3
10	1.57	4.2	5.4	6.8	8.5	10.5	13.6	19.5	400	0.50	0.70	Ke DN 6
11	1.90	5.1	6.6	8.2	10.3	12.7	16.5	23.6	368	0.79	0.85	Ke DN 6
12	2.26	6.1	7.8	9.8	12.3	15.1	19.6	28.1	309	0.79	0.85	Ke DN 6
14	3.08	8.3	10.7	13.3	16.7	20.6	26.7	38.2	227	0.81	0.85	Ke DN 6
16	4.02	10.9	13.9	17.4	21.8	26.9	34.9	49.9	174	0.83	0.86	Ke DN 6
18	5.09	13.8	17.7	22.1	27.6	34.0	44.2	63.2	137	0.84	0.87	Ke DN 6
20	6.28	17.0	21.8	27.3	34.1	42.0	54.6	78.0	111	0.86	0.88	Ke DN 6
22	7.60	20.6	26.4	33.0	41.3	50.8	66.1	94.4	92	0.86	0.88	Ke DN 10/6
25	9.82	26.6	34.1	42.7	53.3	65.7	85.4	122.0	71	0.87	0.88	Ke DN 10
27	11.45	31.1	39.8	49.8	62.2	76.6	99.6	142.3	61	0.87	0.88	Ke DN 10
30	14.14	38.4	49.2	61.5	76.8	94.6	122.9	175.7	49	0.88	0.89	Ke DN 10
36	20.36	55.3	70.8	88.5	110.6	136.2	177.1	253.0	34	0.88	0.89	Ke DN 16
40	25.13	68.3	87.4	109.3	136.6	168.2	218.6	312.3	27	0.89	0.89	Ke DN 16
44	30.41	82.6	105.8	132.2	165.3	203.5	264.5	377.9	23	0.89	0.89	Ke DN 16
50	39.27	106.7	136.6	170.8	213.5	262.8	341.6	488.0	17	0.89	0.89	Ke DN 16
60	56.55	153.7	196.7	245.9	307.4	378.4	491.9	702.8	12	0.89	0.90	Ke DN 16/25
65	66.37	180.4	230.9	288.6	360.8	444.1	577.3	824.8	10	0.89	0.90	Ke DN 16/25
80	100.53	273.3	349.8	437.3	546.6	672.7	874.6	1,249.4	6	0.89	0.90	Ke DN 25

Technical data for MFS 35 single head pump 60 Hz

Plunger Ø mm	Theor. stroke volume ml/stroke	Pump capacity Q <sub>th</sub> in l/h per pump head at H/min [Identity code characteristic 2 to 8]:							Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		44 [2] l/h	55 [3] l/h	70 [4] l/h	88 [5] l/h	110 [6] l/h	135 [7] l/h	176 [8] l/h				
7	0.77	2.0	2.5	3.2	4.0	5.0	6.2	8.1	400	0.50	0.70	DK DN 3
8	1.01	2.6	3.3	4.2	5.3	6.6	8.1	10.6	400	0.50	0.70	DK DN 3
10	1.57	4.1	5.1	6.6	8.2	10.3	12.7	16.5	400	0.50	0.70	Ke DN 6
11	1.90	5.0	6.2	8.0	10.0	12.5	15.4	20.0	368	0.79	0.85	Ke DN 6
12	2.26	5.9	7.4	9.5	11.9	14.9	18.3	23.8	309	0.79	0.85	Ke DN 6
14	3.08	8.1	10.1	13.0	16.2	20.3	25.0	32.5	227	0.81	0.85	Ke DN 6
16	4.02	10.6	13.2	16.9	21.2	26.5	32.6	42.4	174	0.83	0.86	Ke DN 6
18	5.09	13.4	16.7	21.5	26.8	33.5	41.3	53.7	137	0.84	0.87	Ke DN 6
20	6.28	16.5	20.7	26.5	33.1	41.4	51.0	66.3	111	0.86	0.88	Ke DN 6
22	7.60	20.0	25.0	32.1	40.1	50.1	61.7	80.2	92	0.86	0.88	Ke DN 10/6
25	9.82	25.9	32.4	41.4	51.8	64.8	79.7	103.6	71	0.87	0.88	Ke DN 10
27	11.45	30.2	37.7	48.3	60.4	75.5	93.0	120.9	61	0.87	0.88	Ke DN 10
30	14.14	37.3	46.6	59.7	74.6	93.3	114.8	149.2	49	0.88	0.89	Ke DN 10
36	20.36	53.7	67.1	85.9	107.4	134.3	165.3	214.9	34	0.88	0.89	Ke DN 16
40	25.13	66.3	82.9	106.1	132.7	165.8	204.1	265.4	27	0.89	0.89	Ke DN 16
44	30.41	80.2	100.3	128.4	160.5	200.7	247.0	321.1	23	0.89	0.89	Ke DN 16
50	39.27	103.6	129.5	165.8	207.3	259.1	318.9	414.6	17	0.89	0.89	Ke DN 16
60	56.55	149.2	186.6	238.8	298.5	373.2	459.3	597.1	12	0.89	0.90	Ke DN 16/25
65	66.37	175.2	219.0	280.3	350.4	438.0	539.1	700.8	10	0.89	0.90	Ke DN 16/25
80	100.53	265.4	331.7	424.6	530.8	663.5	816.6	1,061.6	6	0.89	0.90	Ke DN 25

DK Double ball valve, Ke Conical valve

**Important note:**

- Abridged presentation of our complete product range. Other types on request
- Allow for a minimum 10% power reserve when designing in accordance with API
- All hydraulic performance data is based on water at 20 °C

## 2.3 Hydraulic diaphragm metering pumps

### Orlita® MFS35 (MF2a) hydraulic diaphragm metering pump

MF2a Drive type														
V1	Main drive vertical *				AR	Drive module right-hand								
Z1	Main drive central *				M	Modified **								
AL	Drive module left-hand													
Plunger diameter														
007	7 mm	014	14 mm	025	25 mm	044	44 mm							
008	8 mm	016	16 mm	027	27 mm	050	50 mm							
010	10 mm	018	18 mm	030	30 mm	060	60 mm							
011	11 mm	020	20 mm	036	36 mm	065	65 mm							
012	12 mm	022	22 mm	040	40 mm	080	80 mm							
Stroke rate 50 (60) Hz														
2	-/44 strokes/min			4	58 (70) Strokes/min			6	91 (110) Strokes/min			8	145 (176) Strokes/min	
3	45 (55) strokes/min			5	73 (88) Strokes/min			7	112 (135) Strokes/min			9	207 (-) Strokes/min	
Liquid end material (including valve materials)														
S1	Stainless steel (see table, sheet 2)													
Temperature of pumped medium														
0	-10 °C to 80 °C			2	-40 °C to 60 °C			4	10 °C to 150 °C					
1	-25 °C to 60 °C			3	10 °C to 115 °C									
Displacer format														
0	PTFE multi-layer diaphragm													
1	PTFE multi-layer diaphragm with pressure gauge													
Liquid end version														
0	Standard					2	Standard + double valve							
1	Standard with spring					3	Standard + double valve with spring							
Hydraulic connection suction side														
G	Thread DIN/ISO					A	Flange ANSI							
N	Thread NPT/ANSI					D	Flange DIN/ISO							
Hydraulic connection discharge side														
G	Thread DIN/ISO					A	Flange ANSI							
N	Thread NPT/ANSI					D	Flange DIN/ISO							
Version														
0	no features					2	Liquid end polished							
1	Liquid end heating					3	Special paint finish							
Power connector														
A	Standard voltage 50 Hz													
B	Standard voltage 50 Hz adjustable													
H	Standard voltage 60 Hz													
K	Standard voltage 60 Hz adjustable													
0	Externally mounted pump													
1	without motor with IEC flange													
2	without motor with NEMA flange													
Electrical protection system / explosion protection														
0	IP 55				D	IP 56 EExn								
1	IP 56				E	IP 56 EExe								
A	IP 55 EExn				F	IP 56 EExde								
B	IP 55 EExe				K	IP 65 EExde								
C	IP 55 EExde													
Electrical options														
0	no options													
1	Stroke sensor													
Stroke length adjustment														
0	manual													
1	0/4-20 mA without Ex													
2	0/4-20 mA Ex Zone 2													
3	0/4-20 mA Ex Zone 1													
4	0/4-20 mA without EX offshore													
5	0/4-20 mA Ex Zone 2 offshore													
6	0/4-20 mA Ex Zone 1 offshore													
Environmental conditions														
0	-20 °C to 40 °C													
1	-40 °C to 40 °C													
2	0 °C to 55 °C													
Approvals														
0	CE													
1	API 675													
2	VDMA													
3	ATEX													
4	ATEX / API 675													
5	VDMA / ATEX													

\*For further pump configurations see Type of drive page → 2-60

\*\* Modified design (M) is available with every identity code feature



## 2.3 Hydraulic diaphragm metering pumps

Technical data for MFS 80 single head pump 50 Hz

Plunger Ø mm	Theor. stroke volume ml/stroke	Pump capacity $Q_{th}$ in l/h per pump head at H/min [Identity code characteristic 4 to 9; F]:							Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		104 [4] l/h	122 [5] l/h	134 [6] l/h	155 [7] l/h	160 [8] l/h	182 [9] l/h	193 [F] l/h				
16	4.02	25	29	32	37	38	43	46	400	0.75	0.83	Ke DN 6
20	6.28	39	46	50	58	60	68	72	400	0.75	0.83	Ke DN 6
22	7.60	47	55	61	70	73	82	87	360	0.79	0.80	Ke DN 10/6
25	9.82	61	71	79	91	94	107	113	285	0.79	0.85	Ke DN 10
27	11.45	71	83	92	106	109	125	132	244	0.81	0.85	Ke DN 10
29	13.21	82	96	106	122	126	144	152	211	0.82	0.85	Ke DN 10
30	14.14	88	103	113	131	135	154	163	198	0.83	0.86	Ke DN 10
36	20.36	126	149	164	189	195	222	235	137	0.85	0.87	Ke DN 16
40	25.13	156	184	202	233	241	274	290	111	0.86	0.88	Ke DN 16
44	30.41	189	222	245	282	292	331	351	98	0.86	0.88	Ke DN 16
46	33.24	207	243	268	309	319	362	384	84	0.86	0.88	Ke DN 16
50	39.27	244	287	316	365	377	428	453	71	0.87	0.88	Ke DN 16
60	56.55	352	414	455	526	543	617	653	50	0.88	0.89	Ke DN 16/25
65	66.37	413	486	535	617	637	724	766	40	0.88	0.89	Ke DN 16/25
80	100.53	626	736	810	935	965	1,097	1,161	25	0.89	0.89	Ke DN 25
100	157.08	979	1,150	1,266	1,461	1,508	1,714	1,814	17	0.89	0.89	Ke DN 32

Technical data for MFS 80 single head pump 60 Hz

Plunger Ø mm	Theor. stroke volume ml/stroke	Pump capacity $Q_{th}$ in l/h per pump head at H/min [Identity code characteristic 3 to 9]:							Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		119 [3] l/h	126 [4] l/h	148 [5] l/h	163 [6] l/h	188 [7] l/h	194 [8] l/h	221 [9] l/h				
16	4.02	28	30	35	39	45	46	53	400	0.75	0.83	Ke DN 6
20	6.28	44	47	55	61	70	73	83	400	0.75	0.83	Ke DN 6
22	7.60	54	57	67	74	85	88	100	360	0.79	0.80	Ke DN 10/6
25	9.82	70	74	87	96	110	114	130	285	0.79	0.85	Ke DN 10
27	11.45	81	86	101	112	129	133	151	244	0.81	0.85	Ke DN 10
29	13.21	94	100	117	129	149	153	175	211	0.82	0.85	Ke DN 10
30	14.14	101	107	125	138	159	164	187	198	0.83	0.86	Ke DN 10
36	20.36	145	154	180	199	229	237	269	137	0.85	0.87	Ke DN 16
40	25.13	179	190	223	245	283	292	333	111	0.86	0.88	Ke DN 16
44	30.41	217	230	270	297	343	354	402	98	0.86	0.88	Ke DN 16
46	33.24	237	251	295	325	375	387	440	84	0.86	0.88	Ke DN 16
50	39.27	280	297	349	384	443	457	520	71	0.87	0.88	Ke DN 16
60	56.55	404	428	502	553	638	659	749	50	0.88	0.89	Ke DN 16/25
65	66.37	474	502	589	649	749	773	879	40	0.88	0.89	Ke DN 16/25
80	100.53	718	761	893	983	1,134	1,171	1,332	25	0.89	0.89	Ke DN 25
100	157.08	1,123	1,189	1,396	1,537	1,774	1,830	2,081	17	0.89	0.89	Ke DN 32

Ke Conical valve

### Important note:

- Abridged presentation of our complete product range. Other types on request
- Allow for a minimum 10% power reserve when designing in accordance with API
- All hydraulic performance data is based on water at 20 °C



## 2.3 Hydraulic diaphragm metering pumps

### Orlita® MFS 80 (MF3a) hydraulic diaphragm metering pump

MF3a	Drive type										
	H1	Main drive horizontal*			Z1	Main drive central*			AR	Drive module right-hand	
	V1	Main drive vertical*			AL	Drive module left-hand			M	Modified **	
	Plunger diameter										
	016	16 mm	027	27 mm	040	40 mm	060	60 mm			
	020	20 mm	029	29 mm	044	44 mm	065	65 mm			
	022	22 mm	030	30 mm	046	46 mm	080	80 mm			
	025	25 mm	036	36 mm	050	50 mm	100	100 mm			
	Stroke rate 50 (60) Hz										
	3	- (119) Strokes/min			7	155 (188) Strokes/min					
	4	104 (126) strokes/min			8	160 (194) Strokes/min					
	5	122 (148) Strokes/min			9	182 (221) strokes/min					
	6	134 (163) Strokes/min			F	193 (-) Strokes/min					
	Liquid end material (including valve materials)										
	S1	Stainless steel (see table, sheet 2)									
	Temperature of pumped medium										
	0	-10 °C to 80 °C			3	10 °C to 115 °C					
	1	-25 °C to 60 °C			4	10 °C to 150 °C					
	2	-40 °C to 60 °C									
	Displacer format										
	0	PTFE multi-layer diaphragm									
	1	PTFE multi-layer diaphragm with pressure gauge									
	Liquid end version										
	0	Standard			2	Standard + double valve					
	1	Standard with spring			3	Standard + double valve with spring					
	Hydraulic connection suction side										
	G	Thread DIN/ISO			A	Flange ANSI					
	N	Thread NPT/ANSI			D	Flange DIN/ISO					
	Hydraulic connection discharge side										
	G	Thread DIN/ISO			A	Flange ANSI					
	N	Thread NPT/ANSI			D	Flange DIN/ISO					
	Version										
	0	no features			2	Liquid end polished					
	1	Liquid end heating			3	Special paint finish					
	Power connector										
	A	Standard voltage 50 Hz									
	B	Standard voltage 50 Hz adjustable									
	H	Standard voltage 60 Hz									
	K	Standard voltage 60 Hz adjustable									
	0	Externally mounted pump									
	1	without motor with IEC flange									
	2	without motor with NEMA flange									
	Electrical protection system / explosion protection										
	0	IP 55			D	IP 56 EExn					
	1	IP 56			E	IP 56 EExe					
	A	IP 55 EExn			F	IP 56 EExde					
	B	IP 55 EExe			K	IP 65 EExde					
	C	IP 55 EExde									
	Electrical options										
	0	no options									
	1	Stroke sensor									
	Stroke length adjustment										
	0	manual									
	1	0/4-20 mA without Ex									
	2	0/4-20 mA Ex Zone 2									
	3	0/4-20 mA Ex Zone 1									
	4	0/4-20 mA Ex without EX offshore									
	5	0/4-20 mA Ex Zone 2 offshore									
	6	0/4-20 mA Ex Zone 1 offshore									
	Environmental conditions										
	0	-20 °C to 40 °C									
	1	-40 °C to 40 °C									
	2	0 °C to 55 °C									
	Approvals										
	0	CE									
	1	API 675									
	2	VDMA									
	3	ATEX									
	4	ATEX / API 675									
	5	VDMA / ATEX									

\*For further pump configurations see Type of drive page → 2-60

\*\* Modified design (M) is available with every identity code feature





## 2.3 Hydraulic diaphragm metering pumps

Technical data for MFS 180 single head pump 50 Hz

Plunger Ø mm	Theor. stroke volume ml/stroke	Pump capacity $Q_{th}$ in l/h per pump head at H/min [Identity code characteristic 4 to 9; F]:							Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		92 [4] l/h	107 [5] l/h	117 [6] l/h	134 [7] l/h	152 [8] l/h	171 [9] l/h	200 [F] l/h				
25	19.63	107	126	138	157	178	201	235	366	0.77	0.83	Ke DN 16
30	28.27	155	181	199	226	257	290	339	254	0.81	0.85	Ke DN 16
36	40.72	223	262	286	326	370	417	489	176	0.83	0.86	Ke DN 16
40	50.27	276	323	353	403	457	515	604	143	0.85	0.87	Ke DN 25
44	60.82	334	391	428	488	553	623	730	118	0.85	0.87	Ke DN 25
50	78.54	431	505	552	630	714	805	943	91	0.86	0.88	Ke DN 25
55	95.03	521	611	668	762	864	974	1,141	75	0.87	0.88	Ke DN 32
60	113.10	621	727	796	907	1,029	1,160	1,359	63	0.87	0.89	Ke DN 32
65	132.73	729	854	934	1,065	1,207	1,361	1,594	54	0.88	0.89	Ke DN 32
70	153.94	845	990	1,083	1,235	1,400	1,579	1,849	46	0.88	0.89	Ke DN 40
75	176.71	970	1,137	1,243	1,418	1,608	1,812	2,123	40	0.88	0.89	Ke DN 40
80	201.06	1,104	1,293	1,415	1,613	1,829	2,062	2,416	35	0.88	0.89	Ke DN 40
85	226.98	1,246	1,460	1,597	1,821	2,065	2,328	2,727	31	0.88	0.89	Ke DN 40
90	254.47	1,397	1,637	1,791	2,042	2,315	2,610	3,057	28	0.89	0.89	Ke DN 40
95	283.53	1,557	1,824	1,995	2,275	2,590	2,908	3,407	25	0.89	0.89	Pt DN 50
100	314.16	1,725	2,021	2,211	2,521	2,858	3,223	3,775	22	0.89	0.89	Pt DN 50
115	415.48	2,281	2,673	2,924	3,334	3,781	4,262	4,992	17	0.89	0.89	Pt DN 65
125	490.87	2,696	3,158	3,455	3,939	4,467	5,036	–	14	0.89	0.90	Pt DN 65
135	572.56	3,144	3,684	4,030	4,595	5,210	5,874	6,880	12	0.89	0.90	Pt DN 65
142	633.47	3,479	4,076	4,458	5,084	5,764	6,499	7,612	11	0.89	0.90	Pt DN 65

Technical data for MFS 180 single head pump 60 Hz

Plunger Ø mm	Theor. stroke volume ml/stroke	Pump capacity $Q_{th}$ in l/h per pump head at H/min [Identity code characteristic 3 to 9]:							Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		98 [3] l/h	111 [4] l/h	130 [5] l/h	142 [6] l/h	162 [7] l/h	184 [8] l/h	208 [9] l/h				
25	19.63	116	130	153	167	216	244	244	352	0.77	0.83	Ke DN 16
30	28.27	167	188	220	241	275	312	352	254	0.81	0.85	Ke DN 16
36	40.72	240	271	318	347	396	449	507	176	0.83	0.86	Ke DN 16
40	50.27	297	335	392	429	489	555	625	143	0.85	0.87	Ke DN 25
44	60.82	359	405	475	519	592	671	757	118	0.85	0.87	Ke DN 25
50	78.54	464	523	613	671	765	867	978	91	0.86	0.88	Ke DN 25
55	95.03	561	633	742	811	925	1,049	1,183	75	0.87	0.88	Ke DN 32
60	113.10	668	753	883	966	1,101	1,249	1,408	63	0.87	0.89	Ke DN 32
65	132.73	784	884	1,036	1,134	1,293	1,466	1,652	54	0.88	0.89	Ke DN 32
70	153.94	909	1,026	1,202	1,315	1,499	1,700	1,916	46	0.88	0.89	Ke DN 40
75	176.71	1,044	1,178	1,380	1,509	1,721	1,951	2,200	40	0.88	0.89	Ke DN 40
80	201.06	1,188	1,340	1,570	1,717	1,958	2,220	2,503	35	0.88	0.89	Ke DN 40
85	226.98	1,341	1,513	1,772	1,939	2,211	2,507	2,826	31	0.88	0.89	Ke DN 40
90	254.47	1,503	1,696	1,987	2,174	2,478	2,810	3,168	28	0.89	0.89	Ke DN 40
95	283.53	1,675	1,890	2,214	2,422	2,762	3,131	3,530	25	0.89	0.89	Pt DN 50
100	314.16	1,856	2,094	2,453	2,684	3,060	3,470	3,912	22	0.89	0.89	Pt DN 50
115	415.48	2,455	2,769	3,245	3,549	4,047	4,589	5,173	17	0.89	0.89	Pt DN 65
125	490.87	2,900	3,272	3,834	4,193	4,781	5,422	–	14	0.89	0.90	Pt DN 65
135	572.56	3,383	3,817	4,472	4,891	5,577	6,324	–	11	0.89	0.90	Pt DN 65
142	633.47	3,743	4,223	4,947	5,412	6,171	6,997	–	11	0.89	0.90	Pt DN 65

DK Double ball valve, Pt Plate valve

### Important note:

- Abridged presentation of our complete product range. Other types on request
- Allow for a minimum 10% power reserve when designing in accordance with API
- All hydraulic performance data is based on water at 20 °C

## 2.3 Hydraulic diaphragm metering pumps

### Orlita® MFS 180 (MF4a) hydraulic diaphragm metering pump

MF4a	Drive type											
	H1	Main drive horizontal*			Z1	Main drive central *			AR	Drive module right-hand		
	V1	Main drive vertical*			AL	Drive module left-hand			M	Modified **		
	Plunger diameter											
	025	25 mm	044	44 mm	065	65 mm	075	75 mm	095	95 mm	142	142 mm
	030	30 mm	050	50 mm	070	70 mm	080	80 mm	100	100 mm		
	036	36 mm	055	55 mm	065	65 mm	085	85 mm	115	115 mm		
	040	40 mm	060	60 mm	070	70 mm	090	90 mm	125	125 mm		
	Stroke rate 50 (60) Hz											
	3	- (98) Strokes/min			5	107 (130) Strokes/min			7	134 (162) Strokes/min		
	4	92 (111) strokes/min			6	117 (142) Strokes/min			8	152 (184) Strokes/min		
		F								200 (-) Strokes/min		
	Liquid end material (including valve materials)											
	S1	Stainless steel (see table, sheet 2)										
	Temperature of pumped medium											
	0	-10 °C to 80 °C			3	10 °C to 115 °C						
	1	-25 °C to 60 °C			4	10 °C to 150 °C						
	2	-40 °C to 60 °C										
	Displacer format											
	0	PTFE multi-layer diaphragm										
	1	PTFE multi-layer diaphragm with pressure gauge										
	Liquid end version											
	0	Standard										
	1	Standard with spring										
	2	Standard + double valve										
	3	Standard + double valve with spring										
	Hydraulic connection suction side											
	G	Thread DIN/ISO			A	Flange ANSI						
	N	Thread NPT/ANSI			D	Flange DIN/ISO						
	Hydraulic connection discharge side											
G	Thread DIN/ISO			A	Flange ANSI							
N	Thread NPT/ANSI			D	Flange DIN/ISO							
Version												
0	No features			2	Liquid end polished							
1	Liquid end heating			3	Special paint finish							
Power connector												
A	Standard voltage 50Hz											
B	Standard voltage 50Hz adjustable											
H	Standard voltage 60Hz											
K	Standard voltage 60Hz adjustable											
0	Externally mounted pump											
1	without motor with IEC flange											
2	without motor with NEMA flange											
Electrical protection system / explosion protection												
0	IP 55			D	IP 56 EExn							
1	IP 56			E	IP 56 EExe							
A	IP 55 EExn			F	IP 56 EExde							
B	IP 55 EExe			K	IP 65 EExde							
C	IP 55 EExde											
Electrical options												
0	No options											
1	Stroke sensor											
Stroke length adjustment												
0	Manual											
1	0/4-20 mA without Ex											
2	0/4-20 mA Ex Zone 2											
3	0/4-20 mA Ex Zone 1											
4	0/4-20 mA Ex without EX offshore											
5	0/4-20 mA Ex Zone 2 offshore											
6	0/4-20 mA Ex Zone 1 offshore											
Environmental conditions												
0	-20 °C to 40 °C											
1	-40 °C to 40 °C											
2	0 °C to 55 °C											
Approvals												
0	CE											
1	API 675											
2	VDMA											
3	ATEX											
4	ATEX / API 675											
5	VDMA / ATEX											

\*For further pump configurations see Type of drive page → 2-60

\*\* Modified design (M) is available with every identity code feature



## 2.3 Hydraulic diaphragm metering pumps

Technical data for MFS 600 single head pump 50 Hz

Plunger Ø mm	Theor. stroke volume ml/stroke	Pump capacity $Q_{th}$ in l/h per pump head at H/min [Identity code characteristic 4 to 9; F]:							Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		90 [4]	99 [5]	117 [6]	134 [7]	156 [8]	173 [9]	204 [F]				
		l/h	l/h	l/h	l/h	l/h	l/h	l/h				
36	40.72	219	242	285	327	381	422	497	392	0.76	0.83	Ke DN 16
38	45.36	244	269	318	364	424	470	554	352	0.77	0.83	Ke DN 16
40	50.27	270	299	352	404	470	521	614	318	0.78	0.84	Ke DN 16
44	60.82	327	361	427	488	569	630	743	263	0.80	0.85	Ke DN 25
46	66.48	357	395	466	534	622	689	812	240	0.81	0.85	Ke DN 25
50	78.54	422	467	551	631	735	814	959	221	0.83	0.86	Ke DN 25
55	95.03	511	565	667	764	889	985	1,161	168	0.84	0.87	Ke DN 25
60	113.10	608	673	794	909	1,059	1,172	1,381	141	0.85	0.87	Ke DN 25
65	132.73	714	789	932	1,067	1,243	1,376	1,621	120	0.85	0.87	Ke DN 32
70	153.94	828	916	1,080	1,237	1,441	1,596	1,880	100	0.90	0.88	Ke DN 32
75	176.71	950	1,051	1,240	1,420	1,654	1,832	2,159	90	0.86	0.88	Ke DN 32
80	201.06	1,081	1,196	1,411	1,616	1,882	2,084	2,456	79	0.87	0.88	Ke DN 40
85	226.98	1,221	1,350	1,593	1,825	2,125	2,353	2,773	70	0.87	0.88	Ke DN 40
90	254.47	1,369	1,514	1,786	2,046	2,383	2,638	3,109	62	0.87	0.88	Ke DN 40
95	283.53	1,525	1,687	1,990	2,279	2,655	2,940	3,464	56	0.87	0.88	Ke DN 50
100	314.16	1,690	1,869	2,205	2,526	2,942	3,257	3,838	50	0.88	0.89	Ke DN 50
115	415.48	2,235	2,472	2,917	3,340	3,890	4,308	5,076	38	0.88	0.89	Ke DN 65
125	490.87	2,641	2,921	3,446	3,946	4,596	5,090	5,998	32	0.89	0.89	Ke DN 65
135	572.56	3,080	3,407	4,020	4,603	5,361	5,937	6,996	26	0.89	0.89	Ke DN 65
142	633.47	3,408	3,769	4,448	5,093	5,932	6,568	7,740	20	0.89	0.89	Ke DN 65

Technical data for MFS 600 single head pump 60 Hz

Plunger Ø mm	Theor. stroke volume ml/stroke	Pump capacity $Q_{th}$ in l/h per pump head at H/min [Identity code characteristic 3 to 9]:							Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		96 [3]	109 [4]	120 [5]	142 [6]	163 [7]	189 [8]	210 [9]				
		l/h	l/h	l/h	l/h	l/h	l/h	l/h				
36	40.72	235	265	294	347	397	462	512	392	0.76	0.83	Ke DN 16
38	45.36	262	296	327	386	442	515	570	352	0.77	0.83	Ke DN 16
40	50.27	291	328	363	428	490	571	632	318	0.78	0.84	Ke DN 16
44	60.82	352	397	439	518	593	691	765	263	0.80	0.85	Ke DN 25
46	66.48	384	434	480	566	648	755	836	240	0.81	0.85	Ke DN 25
50	78.54	454	512	567	669	765	892	988	200	0.83	0.86	Ke DN 25
55	95.03	550	620	686	809	926	1,080	1,196	168	0.84	0.87	Ke DN 25
60	113.10	654	738	816	963	1,102	1,285	1,423	141	0.85	0.87	Ke DN 25
65	132.73	768	866	958	1,131	1,294	1,508	1,670	120	0.85	0.87	Ke DN 40
70	153.94	891	1,005	1,111	1,312	1,501	1,749	1,937	100	0.90	0.88	Ke DN 32
75	176.71	1,023	1,154	1,276	1,506	1,723	2,008	2,224	90	0.86	0.88	Ke DN 32
80	201.06	1,164	1,313	1,452	1,713	1,960	2,285	2,530	79	0.87	0.88	Ke DN 40
85	226.98	1,314	1,482	1,639	1,934	2,213	2,580	2,856	70	0.87	0.88	Ke DN 40
90	254.47	1,473	1,661	1,838	2,168	2,481	2,892	3,202	62	0.87	0.88	Ke DN 40
95	283.53	1,641	1,851	2,047	2,416	2,767	3,222	3,568	56	0.87	0.88	Ke DN 50
100	314.16	1,818	2,051	2,269	2,677	3,063	3,571	3,954	50	0.88	0.89	Ke DN 50
115	415.48	2,405	2,713	3,000	3,541	4,051	4,722	5,229	38	0.88	0.89	Ke DN 65
125	490.87	2,841	3,205	3,545	4,183	4,786	5,579	–	32	0.89	0.89	Ke DN 65
135	572.56	3,314	3,739	4,135	4,879	5,587	6,508	7,206	26	0.89	0.89	Ke DN 65
142	633.47	3,667	4,136	4,575	5,399	6,182	7,200	7,973	20	0.89	0.89	Ke DN 65

DK Double ball valve, Ke Conical valve

**Important note:**

- Abridged presentation of our complete product range. Other types on request
- Allow for a minimum 10% power reserve when designing in accordance with API
- All hydraulic performance data is based on water at 20 °C

## 2.3 Hydraulic diaphragm metering pumps

### Orlita® MFS 600 (MF5a) hydraulic diaphragm metering pump

MF5b	Drive type												
	H1	Main drive horizontal *				Z1	Main drive central *			AR	Drive module right-hand		
	V1	Main drive vertical *				AL	Drive module left-hand			M	Modified **		
	Plunger diameter												
	036	36 mm	046	46 mm	065	65 mm	085	85 mm	115	115 mm			
	038	38 mm	050	50 mm	070	70 mm	090	90 mm	125	125 mm			
	040	40 mm	055	55 mm	075	75 mm	095	95 mm	135	135 mm			
	044	44 mm	060	60 mm	080	80 mm	100	100 mm	142	142 mm			
	Stroke rate 50 (60) Hz												
	3	- (96) Strokes/min			5	99 (120) Strokes/min		7	134 (163) Strokes/min		9	173 (210) strokes/min	
	4	90 (109) strokes/min			6	117 (142) Strokes/min		8	156 (189) Strokes/min		F	204 (-) Strokes/min	
	Liquid end material (including valve materials)												
	S1	Stainless steel (see table, sheet 2)											
	Temperature of pumped medium												
	0	-10 °C to 80 °C			2	-40 °C to 60 °C			4	10 °C to 150 °C			
	1	-25 °C to 60 °C			3	10 °C to 115 °C							
	Displacer format												
	0	PTFE multi-layer diaphragm											
	1	PTFE multi-layer diaphragm with pressure gauge											
	Liquid end version												
	0	Standard				2	Standard + double valve						
	1	Standard with spring				3	Standard + double valve with spring						
	Hydraulic connection suction side												
	G	Thread DIN/ISO				A	Flange ANSI						
	N	Thread NPT/ANSI				D	Flange DIN/ISO						
	Hydraulic connection discharge side												
	G	Thread DIN/ISO											
	N	Thread NPT/ANSI											
	A	Flange ANSI											
	D	Flange DIN/ISO											
	Version												
	0	No features											
	1	Liquid end heating											
	2	Liquid end polished											
	3	Special paint finish											
	Power connector												
	A	Standard voltage 50Hz											
	B	Standard voltage 50Hz adjustable											
	H	Standard voltage 60Hz											
	K	Standard voltage 60Hz adjustable											
	0	Externally mounted pump											
	1	without motor with IEC flange											
	2	without motor with NEMA flange											
	Electrical protection system / explosion protection												
	0	IP 55				D	IP 56 EExn						
	1	IP 56				E	IP 56 EExe						
	A	IP 55 EExn				F	IP 56 EExde						
	B	IP 55 EExe				K	IP 65 EExde						
	C	IP 55 EExde											
	Electrical options												
	0	no options											
	1	Stroke sensor											
	Stroke length adjustment												
	0	manual											
	1	0/4-20 mA without Ex											
	2	0/4-20 mA Ex Zone 2											
	3	0/4-20 mA Ex Zone 1											
	4	0/4-20 mA Ex without EX offshore											
	5	0/4-20 mA Ex Zone 2 offshore											
	6	0/4-20 mA Ex Zone 1 offshore											
	Environmental conditions												
	0	-20 °C to 40 °C											
	1	-40 °C to 40 °C											
	2	0 °C to 55 °C											
	Approvals												
	0	CE											
	1	API 675											
	2	VDMA											
	3	ATEX											
	4	ATEX / API 675											
	5	VDMA / ATEX											

\*For further pump configurations see Type of drive page → 2-60

\*\* Modified design (M) is available with every identity code feature



## 2.3 Hydraulic diaphragm metering pumps

Technical data for MFS 1400 single head pump 50 Hz

Plunger Ø	Theor. stroke volume	Pump capacity $Q_{th}$ in l/h per pump head at H/min [Identity code characteristic 4 to 9; F]:							Max. pressure	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		80 [4]	93 [5]	106 [6]	125 [7]	143 [8]	169 [9]	191 [F]				
mm	ml/ stroke	l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar			
30	42.41	202	235	270	318	364	431	486	630	0.67	0.78	Ke DN 16
40	75.40	360	419	480	565	647	766	864	435	0.75	0.83	Ke DN 25
42	83.13	397	462	529	623	713	844	952	435	0.76	0.83	Ke DN 25
44	91.23	435	507	581	684	783	927	1,045	394	0.76	0.83	Ke DN 25
46	99.71	476	554	635	748	856	1,013	1,142	361	0.77	0.83	Ke DN 25
50	117.81	562	654	750	884	1,011	1,197	1,350	305	0.79	0.84	Ke DN 25
53	132.37	632	735	843	993	1,136	1,345	1,517	271	0.79	0.84	Ke DN 32
55	142.55	681	792	907	1,070	1,224	1,448	1,633	250	0.81	0.85	Ke DN 25
57	153.11	731	851	975	1,149	1,314	1,556	1,754	235	0.81	0.85	Ke DN 32
60	169.65	810	943	1,080	1,273	1,456	1,724	1,944	212	0.82	0.86	Ke DN 25
65	199.10	951	1,106	1,268	1,494	1,709	2,023	2,282	180	0.83	0.87	Ke DN 32
70	230.91	1,103	1,283	1,470	1,733	1,983	2,346	2,646	155	0.84	0.87	Ke DN 40
75	265.07	1,266	1,473	1,688	1,989	2,276	2,694	3,038	135	0.85	0.87	Ke DN 40
80	301.59	1,440	1,676	1,920	2,263	2,590	3,065	3,456	119	0.85	0.87	Ke DN 40
90	381.70	1,823	2,121	2,431	2,865	3,278	3,879	4,375	94	0.90	0.90	Ke DN 50
100	471.24	2,251	2,619	3,001	3,537	4,047	4,789	5,401	76	0.87	0.88	Ke DN 65
120	678.58	3,242	3,772	4,321	5,093	5,827	6,896	7,778	53	0.88	0.89	Ke DN 65
140	923.63	4,412	5,134	5,882	6,933	7,932	9,387	10,587	38	0.88	0.89	Ke DN 80
160	1,206.37	5,763	6,706	7,683	9,055	10,360	12,261	13,827	29	0.89	0.89	Ke DN 80

Technical data for MFS 1400 single head pump 60 Hz

Plunger Ø	Theor. stroke volume	Pump capacity $Q_{th}$ in l/h per pump head at H/min [Identity code characteristic 3 to 9]:							Max. pressure	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		88 [3]	97 [4]	112 [5]	129 [6]	152 [7]	174 [8]	206 [9]				
mm	ml/ stroke	l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar			
30	42.41	223	245	286	327	386	442	523	630	0.67	0.78	Ke DN 16
40	75.40	396	437	508	582	686	785	930	435	0.75	0.83	Ke DN 25
42	83.13	437	482	560	642	757	866	1,025	435	0.76	0.83	Ke DN 25
44	91.23	480	529	615	705	831	951	1,125	394	0.76	0.83	Ke DN 25
46	99.71	524	578	672	770	908	1,039	1,230	361	0.77	0.83	Ke DN 25
50	117.81	619	683	794	910	1,073	1,228	1,453	305	0.79	0.84	Ke DN 25
53	132.37	696	767	893	1,023	1,206	1,379	1,632	271	0.79	0.84	Ke DN 32
55	142.55	750	826	961	1,102	1,298	1,486	1,758	250	0.81	0.85	Ke DN 25
57	153.11	805	887	1,033	1,183	1,394	1,596	1,888	235	0.81	0.85	Ke DN 32
60	169.65	892	983	1,144	1,311	1,545	1,768	2,092	212	0.82	0.86	Ke DN 25
65	199.10	1,047	1,154	1,343	1,539	1,814	2,075	2,456	180	0.83	0.87	Ke DN 32
70	230.91	1,214	1,339	1,558	1,785	2,103	2,407	2,848	155	0.84	0.87	Ke DN 40
75	265.07	1,394	1,537	1,788	2,049	2,415	2,763	3,270	135	0.85	0.87	Ke DN 40
80	301.59	1,586	1,748	2,035	2,331	2,747	3,143	3,720	119	0.85	0.87	Ke DN 40
90	381.70	2,008	2,213	2,575	2,950	3,477	3,979	4,200	94	0.90	0.90	Ke DN 50
100	471.24	2,479	2,732	3,179	3,642	4,293	4,912	4,708	76	0.87	0.88	Ke DN 65
120	678.58	3,570	3,935	4,578	5,245	6,182	7,073	8,371	53	0.88	0.89	Ke DN 65
140	923.21	4,859	5,356	6,232	7,140	8,415	9,628	–	38	0.88	0.89	Ke DN 80
160	1,206.37	6,347	6,995	8,140	9,325	10,991	12,575	–	29	0.89	0.89	Ke DN 80

DK Double ball valve

Ke Conical valve

**Important note:**

- Abridged presentation of our complete product range. Other types on request
- Allow for a minimum 10% power reserve when designing in accordance with API
- All hydraulic performance data is based on water at 20 °C

## 2.3 Hydraulic diaphragm metering pumps

### Identity code ordering system for hydraulic diaphragm metering pump Orlita® MFS1400 (MF6a)

MF6a	Drive type													
H1	Main drive bare horizontal *				AL	Drive module left-hand								
V1	Main drive bare vertical *				AR	Drive module right-hand								
Z1	Main drive bare central *				M	Modified **								
Plunger diameter														
030	30 mm	046	46 mm	057	57 mm	075	75 mm	120	120 mm					
040	40 mm	050	50 mm	060	60 mm	080	80 mm	140	140 mm					
042	42 mm	053	53 mm	065	65 mm	090	90 mm	160	160 mm					
044	44 mm	055	55 mm	070	70 mm	100	100 mm							
Stroke rate 50 (60) Hz														
3	- (88) Strokes/min			5	93 (112) Strokes/min			7	125 (152) Strokes/min			9	169 (206) strokes/min	
4	80 (97) strokes/min			6	106 (129) Strokes/min			8	143 (174) Strokes/min			F	191 (-)	
Liquid end material (including valve materials)														
S1	Stainless steel (see table, sheet 2)													
Temperature of pumped medium														
0	-10 °C to 80 °C				3	10 °C to 115 °C								
1	-25 °C to 60 °C				4	10 °C to 150 °C								
2	-40 °C to 60 °C													
Displacer format														
0	PTFE multi-layer diaphragm													
1	PTFE multi-layer diaphragm with pressure gauge													
Liquid end version														
0	Standard					2	Standard + double valve							
1	Standard with spring					3	Standard + double valve with spring							
Hydraulic connection suction side														
G	Thread DIN/ISO					A	Flange ANSI							
N	Thread NPT/ANSI					D	Flange DIN/ISO							
Hydraulic connection discharge side														
G	Thread DIN/ISO					A	Flange ANSI							
N	Thread NPT/ANSI					D	Flange DIN/ISO							
Version														
0	no features							2	Liquid end polished					
1	Liquid end heating							3	Special paint finish					
Power connector														
A	Standard voltage 50Hz													
B	Standard voltage 50Hz adjustable													
H	Standard voltage 60Hz													
K	Standard voltage 60Hz adjustable													
0	Externally mounted pump													
1	without motor with IEC flange													
2	without motor with NEMA flange													
Electrical protection system / explosion protection														
0	IP 55				D	IP 56 EExn								
1	IP 56				E	IP 56 EExe								
A	IP 55 EExn				F	IP 56 EExde								
B	IP 55 EExe				K	IP 65 EExde								
C	IP 55 EExde													
Electrical options														
0	no options													
1	Stroke sensor													
Stroke length adjustment														
0	manual													
1	0/4-20 mA without Ex													
2	0/4-20 mA Ex Zone 2													
3	0/4-20 mA Ex Zone 1													
4	0/4-20 mA Ex without EX offshore													
5	0/4-20 mA Ex Zone 2 offshore													
6	0/4-20 mA Ex Zone 1 offshore													
Environmental conditions														
0	-20 °C to 40 °C													
1	-40 °C to 40 °C													
2	0 °C to 55 °C													
Approvals														
0	CE													
1	API 675													
2	VDMA													
3	ATEX													
4	ATEX / API 675													
5	VDMA / ATEX													

\*For further pump configurations see Type of drive page → 2-60

\*\* Modified design (M) is available with every identity code feature



## 2.3 Hydraulic diaphragm metering pumps

### 2.3.10

### Hydraulic Diaphragm Metering Pumps Orlita® MH with Metal Diaphragm

#### Reliable capacity even at very high pressure

#### Capacity range of single pump: up to 800 l/h, up to 700 bar



The diaphragm metering pump Orlita® MH has a robust metal diaphragm, which permits precise pump capacities even at very high pressure. The ORLITA® MH has a modular construction and therefore has a versatile range of uses. A range of power end versions are therefore available and drives, power ends and dosing heads can be freely combined.

ORLITA® MH hydraulic diaphragm metering pumps (MHS 18 to MHS 1400) with a stroke length of 15 to 60 mm provide a capacity range of up to 800 l/h at pressures of up to 7 bar. A wide range of power end versions is available for use in areas at risk from explosion with ATEX certification. The Orlita® MH product range is designed to comply with API 675. Its modular construction permits the free combination of drives, power ends and dosing heads, producing a pump for a range of different feed rates and media operating at different working pressures.

#### Your benefits

Excellent process safety and reliability:

- Metal double diaphragm with integrated diaphragm rupture warning system ensures precise and low-wear operation even at very high pressure
- The product chamber is hermetically separated from the hydraulic part
- Integrated hydraulic relief valve and automatic bleed valve for the hydraulic chamber
- Wear-free, valveless enforced anti-cavitation of the hydraulic leakage guarantees optimum dosing precision
- Cone valves for use as suction and/or discharge valves with minimal wear, good self-cleaning and low pressure loss (NPSHR)

Excellent flexibility:

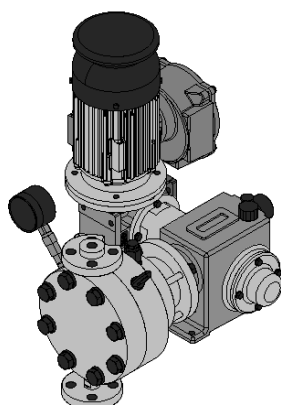
- It is possible to combine up to 6 metering units, even with different pump capacities, in multiple pump systems
- The modular construction ensures a wide range of uses
- 6 different gear ratios are available
- Power end configuration ideal for installation in any position (vertical or horizontal)
- Temperature range -60 °C to +200 °C
- Customised designs are available on request

#### Technical Details

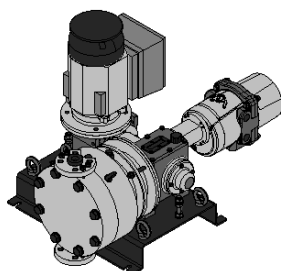
- MHS 18 – Stroke length: 0-15 mm, Rod force: 1,750 N
- MHS 35 – Stroke length: 0-20 mm, Rod force: 3,500 N
- MHS 80 – Stroke length: 0-20 mm, Rod force: 14,000 N
- MHS 180 – Stroke length: 0-40 mm, Rod force: 18,000 N
- MHS 600 – Stroke length: 0-40 mm, Rod force: 40,000 N
- MHS 1400 – Stroke length: 0-60 mm, Rod force: 60,000 N
- Stroke length adjustment range: 0 – 100% in operation and idle.
- Stroke length adjustment: manually by means of a manual adjustment wheel and scaled display (optionally with electric actuator or control drive).
- Metering reproducibility is better than  $\pm 1\%$  within the 10 – 100 % stroke length range under defined conditions and with proper installation (API 675).
- Metal diaphragm with diaphragm rupture monitoring system
- Integrated hydraulic relief and bleed valve
- Wetted materials: Stainless steel, special designs are available on request
- A wide range of power end versions is available: 3-phase AC motors, motors for use in areas at risk from explosion and different flange designs for use in customer-specific motors
- Degree of protection: IP 55
- Temperature range - 60 °C to + 200 °C
- Design in compliance with API 675 among others

#### Field of application

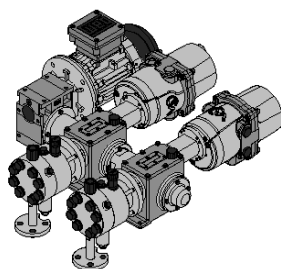
- Oil/ gas production (onshore/offshore)
- Chemical/Petrochemical industry
- Pharmaceuticals & cosmetics
- Food production
- Packaging industry (bottling pumps)



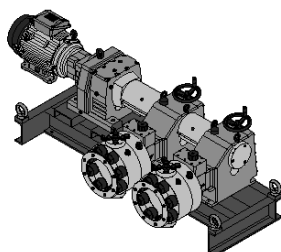
P\_ORL\_068\_SW1  
Orlita® MHS 18-20



P\_ORL\_067\_SW1  
Orlita® MHS 35/45



P\_ORL\_069\_SW1  
Orlita® MHS 35-8-8



P\_ORL\_070\_SW1  
Orlita® MHS 600-28-28



## 2.3 Hydraulic diaphragm metering pumps

### Technical Data

Pump type	Plunger Ø mm	Theor. stroke volume ml/stroke	Max. capacity (theo.) in l/h at strokes/min (50 Hz)						Max. pressure bar
			58 l/h	73 l/h	91 l/h	112 l/h	145 l/h	207 l/h	
MHS 18/	3	0.11	0.37	0.46	0.58	0.71	0.92	1.32	100
MHS 18/	5	0.29	1	1.2	1.6	1.9	2.5	3.6	400
MHS 18/	6	0.42	1.4	1.8	2.3	2.8	3.6	5.2	400
MHS 18/	7	0.58	2	2.5	3.1	3.8	5	7.1	400
MHS 18/	8	0.75	2.6	3.2	4.1	5	6.5	9.3	348
MHS 18/	10	1.18	4.1	5.1	6.4	7.8	10.2	14.6	222
MHS 18/	12	1.70	5.9	7.3	9.2	11.3	14.7	21	154
MHS 18/	16	3.02	10.5	13.1	16.4	20.1	26.2	37.4	87
MHS 18/	20	4.71	16.4	20.5	25.5	31.5	41	58.5	55

Pump type	Plunger Ø mm	Theor. stroke volume ml/stroke	Max. capacity (theo.) in l/h at strokes/min (50 Hz)						Max. pressure bar
			58 l/h	73 l/h	91 l/h	112 l/h	145 l/h	207 l/h	
MHS 35/	7	0.77	2.6	3.3	4.1	5.1	6.7	9.5	900
MHS 35/	8	1.01	3.5	4.3	5.4	6.7	8.7	12.4	630
MHS 35/	10	1.57	5.4	6.8	8.5	10.5	13.6	19.5	445
MHS 35/	12	2.26	7.8	9.8	12.3	15.1	19.6	28.1	309
MHS 35/	14	3.08	10.7	13.3	16.7	20.6	26.7	38.2	227
MHS 35/	16	4.02	13.9	17.4	21.8	26.9	34.9	49.9	174
MHS 35/	18	5.09	17.7	22.1	27.6	34.0	44.2	63.2	137
MHS 35/	20	6.28	21.8	27.3	34.1	42.0	54.6	78.0	111
MHS 35/	22	7.60	26.4	33.0	41.3	50.8	66.1	94.4	92
MHS 35/	25	9.80	34.1	42.7	53.3	65.7	85.4	122.0	71
MHS 35/	36	20.36	70.8	88.5	110.6	136.2	177.1	253.0	34
MHS 35/	40	25.13	87.4	109.3	136.6	168.2	218.6	312.3	27
MHS 35/	45	31.81	110.6	138.3	172.9	212.8	276.7	395.3	22

Pump type	Plunger Ø mm	Theor. stroke volume ml/stroke	Max. capacity (theo.) in l/h at strokes/min (50 Hz)						Max. pressure bar
			98 l/h	104 l/h	122 l/h	134 l/h	160 l/h	182 l/h	
MHS 80/	16	4.02	23.6	25.0	29.4	32.4	38.6	43.9	696
MHS 80/	18	5.09	29.9	31.7	37.2	41.0	48.8	55.5	550
MHS 80/	20	6.28	37.0	39.1	46.0	50.6	60.3	68.5	445
MHS 80/	22	7.60	44.7	47.4	55.6	61.3	73.0	82.9	368
MHS 80/	25	9.82	57.8	61.2	71.9	79.1	94.2	107.1	285

Pump type	Plung- er Ø mm	Theor. stroke volume ml/stroke	Max. capacity (theo.) in l/h at strokes/min (50 Hz)						Max. pressure bar
			99 l/h	117 l/h	134 l/h	156 l/h	173 l/h	204 l/h	
MHS 600/25,5	25.5	20.43	121	143	164	191	211	249	783
MHS 600/28	28	24.63	146	172	198	230	255	300	649
MHS 600/30	29.2	26.79	159	188	215	250	277	327	570
MHS 600/32	32	32.17	191	225	258	301	333	393	497

Pump type	Plunger Ø mm	Theor. stroke volume ml/stroke	Max. capacity (theo.) in l/h at strokes/min (50 Hz)						Max. pressure bar
			93 l/h	106 l/h	125 l/h	143 l/h	169 l/h	191 l/h	
MHS 1400/	30	42.41	235	270	318	364	431	486	848
MHS 1400/	32	48.25	268	307	362	414	490	553	746
MHS 1400/	36	91.07	339	388	458	524	620	700	589
MHS 1400/	40	75.40	419	480	565	647	766	864	477

#### Important note:

Abridged presentation of our complete product range. Other types on request



## 2.3 Hydraulic diaphragm metering pumps

### 2.3.11

#### Hydraulic Metal Diaphragm Metering Pump High-pressure Orlita® MHHP

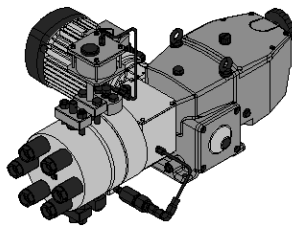
**Reliable capacity even at maximum pressure**

**Capacity range of single pump: 3 – 11 l/h, 3,000 bar**

The metal diaphragm metering pumps Orlita® MHHP are special pumps, which provide precise pump capacities even at maximum pressures of up to 3,000 bar.



The hydraulic metal diaphragm metering pumps ORLITA® MHRH 150 / MSHH 600 have a metal diaphragm, which is designed to meter precisely at maximum pressures of up to 3,000 bar. Only in this way can excellent process reliability be ensured.



P\_ORL\_065\_SW1  
Orlita® MHR 150/7

##### Technical Details

- MSHH: Stroke length: 0 – 40 mm, rod force: 40,000 N
- MHRH: Stroke length: 0 – 32 mm, Rod force: 15,000 N
- Stroke length adjustment range: 0 – 100% in operation and idle
- Stroke length adjustment: manually by means of a manual adjustment wheel and scaled display (optionally with electric actuator or control drive)
- Metering reproducibility is better than  $\pm 0.5\%$  within the 10 – 100% stroke length range under defined conditions and with correct installation
- Metal diaphragm
- Integrated hydraulic relief and bleed valve
- Wetted materials: Stainless steel, special designs are available on request
- A wide range of power end/drive versions is available: Three-phase standard motors, motors for use in areas at risk from explosion, different flange designs for the use of customer-specific motors
- Degree of protection: IP 55
- Temperature range -10 °C to +60 °C

##### Field of application

- Chemical/petrochemical industry
- Maximum pressure applications of up to 3,000 bar

##### Technical Data

Pump type	Plunger Ø mm	Theor. stroke volume ml/stroke	Max. capacity (theo.) in l/h at strokes/min (50 Hz)				Max. pressure bar
			58 l/h	87 l/h	116 l/h	145 l/h	
MHRH 150/	6	0.90	3.1	4.7	6.3	7.8	3,000
MHRH 150/	7	1.23	4.2	6.4	8.5	10.7	3,000

Pump type	Plunger Ø mm	Theor. stroke volume ml/stroke	Max. capacity (theo.) in l/h at strokes/min (50 Hz)						Max. pressure bar
			90 l/h	99 l/h	117 l/h	134 l/h	156 l/h	173 l/h	
MSHH 600/	10.5	3.46	18.6	20.6	24.3	27.8	32.4	35.9	3,000



## 2.4 Plunger Metering Pumps

### 2.4.1

### Plunger Metering Pump Sigma/ 2 (Basic Type)

#### Sigma plunger pump – durable and high-performance

Capacity range 2 – 76 l/h, 320 – 12 bar



The plunger metering pump Sigma/ 2 (Basic Type) is an extremely robust plunger metering pump with high-performance plunger and the option to adjust the pump capacity in 0.2% increments. It offers a wide range of power end versions, such as three-phase or 1-phase AC motors, even for Exe and Exde areas with ATEX certification.

The plunger metering pump Sigma/ 2 (Basic Type) (SBKa) is a metering pump, the pump capacity of which can be precisely adjusted in 0.2% increments, either manually or optionally with an electric actuator or control drive. A wide range of power end versions is available for use in areas at risk from explosion with ATEX certification.

#### Your benefits

Excellent process safety and reliability:

- Metering reproducibility is better than  $\pm 1\%$  within the 10 – 100% stroke length range under defined conditions and with correct installation

Flexible adaptation to the process:

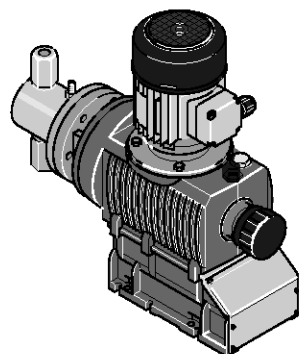
- Wide range of power end versions, also for use in Exe and Exde areas and different flange designs for the use of customised motors
- Customised designs are available on request

#### Technical Details

- Stroke length: 15 mm
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually by self-locking rotary dial in 0.2% increments (optionally with electric actuator or control drive)
- Metering reproducibility is better than  $\pm 1\%$  within the 10-100% stroke volume adjustment range under certain defined conditions and with correct installation
- Wetted materials: Stainless steel 1.4571/1.4404, special materials are available on request
- High-performance oxide ceramic plunger
- A wide range of power end versions is available: Three-phase standard motor, 1-phase AC motor, motors for use in areas at risk from explosion and different flange designs for use in customer-specific motors
- Degree of protection IP 55
- Highly rigid fibreglass-reinforced plastic housing with excellent chemical resistance
- Provide suitable overload protection in all plunger metering pumps during installation for safety reasons

#### Field of application

- Volume-proportional metering of chemicals in the treatment of boiler feed water
- Metering of reactants and catalysts in the chemical industry
- Level-dependent metering of auxiliary agents in industrial production engineering, for instance hot wax metering in the production of adhesive strips



pk\_2\_006

Sigma Basic Type SBKa



## 2.4 Plunger Metering Pumps

### Sigma Basic Type Control Functions

#### Stroke length actuator/controller

**Actuator** for automatic stroke length adjustment, actuating period approx. 1 sec for 1% stroke length, 1 k $\Omega$  response signal potentiometer, enclosure rating IP 54.

**Controller** consists of actuator with servomotor and integrated servo control for stroke length adjustment via a standard signal. Standard signal input 0/4-20 mA corresponds to stroke length 0 - 100%. Automatic/manual operation selection key for manual stroke adjustment. Mechanical status display of actual stroke length value output 0/4-20 mA for remote display.

#### Variable speed motors with integrated speed controller (identity code specification V)

Power supply 1 ph 230 V, 50/60 Hz, 0.37 kW.

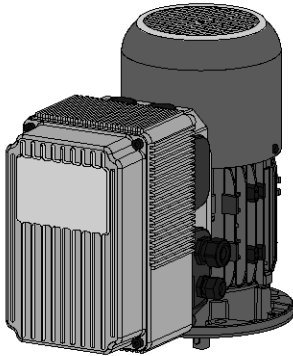
External control with 0/4-20 mA (see pk\_2\_103)

(Speed Controllers see p. → 1-212)

#### Speed controllers in metal housing (identity code specification Z)

The speed controller assembly consists of a frequency converter and a variable speed motor of 0.37 kW.

(Speed Controllers see p. → 1-212)



P\_AC\_0293\_SW1  
Variable speed motor with integrated  
frequency converter



## 2.4 Plunger Metering Pumps

### Technical Data

Type SBKa	With 1500 rpm motor at 50 Hz				With 1800 rpm motor at 60 Hz				Suction lift	Perm. pre- pressure suction side	Connector Suction/ Discharge Side	Ship- ping weight	Plun- ger Ø
	Delivery rate at max. back pressure			Max. stroke rate	Delivery rate at max. back pressure			Max. stroke rate					
	bar	l/h	ml/ stroke		Strokes/ min	psi	l/h						
									m WC	bar	Rp-DN	kg	mm
32002	320	1.9	0.46	71	4,641	2.3	0.61	84	5.0	160	1/4	24	8
23004	230	4.0	0.52	129	3,336	4.8	1.27	154	5.0	115	1/4	24	8
10006	100	6.4	0.55	195	1,450	7.6	2.01	233	5.0	50	1/4	24	8
14006	140	6.1	1.42	71	2,031	7.1	1.88	84	4.0	70	1/4	24	12
10011	100	11.0	1.43	129	1,450	13.1	3.46	153	4.0	50	1/4	24	12
05016	50	16.7	1.43	195	725	20.0	5.28	233	4.0	25	1/4	24	12
07012	70	12.4	2.90	71	1,015	14.8	3.91	85	4.0	35	1/4	24	17
04522	45	22.5	2.91	129	653	26.7	7.05	153	4.0	22.5	1/4	24	17
02534	25	34.1	2.92	195	363	40.8	10.78	233	4.0	12.5	1/4	24	17
04022	40	22.4	5.26	71	580	26.5	7.00	84	4.0	20	3/8	25	23
02541	25	41.5	5.37	129	363	49.2	13.00	153	4.0	12.5	3/8	25	23
01264	12	64.0	5.45	195	174	76.0	20.08	233	4.0	6	3/8	25	23

### Materials in Contact With the Medium

Material	Dosing head	Suction/pressure connector	Seals/ball seat	Balls	Ball seat
SST	Stainless steel 1.4404	Stainless steel 1.4404	PTFE or PTFE +25% carbon	Ceramic	Stainless steel 1.4404

### Motor Data

Identity code specification		Power supply		Remarks	
S	3-phase, IP 55	220 – 240 V/380 – 420 V 250 – 280 V/440 – 480 V	50 Hz 60 Hz	0.25 kW	
R	3-phase, IP 55	230 V/400 V	50/60 Hz	0.37 kW	with PTC, speed control range 1:20 with external fan 1-phase 230 V; 50/60 Hz
V0	1-phase, IP 55	230 V ± 5 %	50/60 Hz	0.37 kW	Variable speed motor with integrated frequency converter
M	1-phase AC, IP 55	230 V ± 5 %	50/60 Hz	0.18 kW	
N	1-phase AC, IP 55	115 V ± 5 %	60 Hz	0.18 kW	
L1	3-phase, II 2G Ex e II T3	220 – 240 V/380 – 420 V	50 Hz	0.18 kW	
L2	3-phase, II 2G Ex de IIC T4	220 – 240 V/380 – 420 V	50 Hz	0.18 kW	with PTC, speed control range 1:5
P1	3-phase, II 2G Ex e II T3	250 – 280 V/440 – 480 V	60 Hz	0.18 kW	
P2	3-phase, II 2G Ex de IIC T4	250 – 280 V/440 – 480 V	60 Hz	0.21 kW	with PTC, speed control range 1:5

Motor data sheets can be requested for more information.

Special motors or special motor flanges are available on request.

The motors are designed in compliance with the Ecodesign Directive 2009/125/EC.

#### Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/EU in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label corresponds to or is better than the conditions prevalent in the intended field of application.



## 2.4 Plunger Metering Pumps

### Identity Code Ordering System for SBKa

SBKa	Drive type		
	HK	Main drive, plunger	
		<b>Type</b>	
		<b>bar</b>	<b>l/h</b>
		32002 320	1.9
		23004 230	4.0
		10006 100	6.4
		14006 140	6.1
		10011 100	11.0
		05016 50	16.7
		07012 70	12.4
		04522 45	22.5
		02534 25	34.1
		04022 40	22.4
		02541 25	41.5
		01264 12	64.0
		<b>Liquid end material</b>	
		SS	Stainless steel
		<b>Sealing material*</b>	
		T	PTFE
		<b>Displacement body*</b>	
		4	Plunger (oxide ceramic)
		<b>Liquid end version</b>	
		0	No spring (standard)
		1	With 2 valve springs, Hastelloy C, 0.1 bar
		<b>Hydraulic connection</b>	
		0	Standard threaded connector (according to technical data)
		<b>Version</b>	
		0	With ProMinent® logo (standard)
		1	Without ProMinent® logo
		M	Modified
		<b>Electrical power supply</b>	
		S	3 ph, 230 V/400 V 50/60 Hz, 0.18 kW
		R	3 ph, variable speed motor, 230/400 V, 0.37 kW
		V (0)	Variable speed motor with integrated SC 1 pH, 230 V, 50/60 Hz
		Z	1 ph, variable speed set 230 V, 50/60 Hz
		M	1 ph, AC, 230 V/ 50/60 Hz, 0.18 kW
		N	1 ph, AC 115 V 60 Hz, 0.18 kW
		L	3 ph, 230 V/400 V, 50 Hz, (EEExe, EEExd), 0.18 kW
		P	3 ph, 230 V/400 V, 60 Hz, (EEExe, EEExd), 0.18 kW
		1	No motor, with B 14 flange (size 71 (DIN))
		2	No motor, C 56 flange (NEMA)
		3	No motor, B 5 size 63 (DIN)
		<b>Enclosure rating</b>	
		0	IP 55 (standard)
		1	Exe motor version ATEX-T3
		2	Exd motor version ATEX-T4
		A	ATEX power end
		<b>Stroke sensor</b>	
		0	No stroke sensor (standard)
		2	Pacing relay (reed relay)
		3	Stroke sensor (Namur) for hazardous locations
		<b>Stroke length adjustment</b>	
		0	Manual (standard)
		1	With stroke positioning motor, 230 V/50/60 Hz
		2	With stroke positioning motor, 115 V/50/60 Hz
		3	With stroke control motor 0...20 mA 230 V/50/60 Hz
		4	With stroke control motor 4...20 mA 230 V/50/60 Hz
		5	With stroke control motor 0...20 mA 115 V/50/60 Hz
		6	With stroke control motor 4...20 mA 115 V/50/60 Hz

### Spare Parts Kits

Consisting of: 1 ceramic metering plunger, 4 valve balls, 4 ball seat discs, 2 PTFE/graphite ball seals, 2 plunger guides, 14 flat seals, 2 O-rings.

	Type	Order no.
<b>Liquid end FK 08</b>	Applies to identity code: 32002, 23004, 10006	1001572
<b>Liquid end FK 12.5</b>	Applies to identity code: 14006, 10011, 05016	910470
<b>Liquid end FK 25</b>	Applies to identity code: 07012, 04522, 02534	910471
<b>Liquid end FK 50</b>	Applies to identity code: 04022, 02541, 01264	910472

## 2.4 Plunger Metering Pumps

### 2.4.2

### Plunger Metering Pump Sigma/ 2 (Control Type)

**Sigma plunger pump – durable, high-performance and intelligent.**

**Capacity range 2 – 76 l/h, 320 – 12 bar**



The plunger metering pump Sigma/2 (Control Type) is an extremely robust metering pump with integral control for analogue and/or contact operation. It offers the option of adjusting the pump capacity in 0.2% increments. It offers a wide range of power end versions, and different flange designs.

The plunger metering pump Sigma/ 2 (Control Type) (SCKa) is a metering pump, the pump capacity of which can be precisely adjusted in 0.2% increments, either manually or optionally with an electric actuator or control drive. The integrated controller allows the pump to adapt quickly and reliably to changing metering tasks.

#### Your benefits

Process reliability:

- Metering reproducibility is better than  $\pm 1\%$  within the 10 – 100% stroke length range under defined conditions and with correct installation

Flexible adaptation to the process:

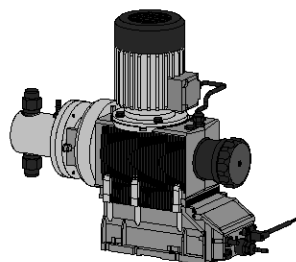
- The integrated controller allows the pump to adapt quickly and reliably to changing metering tasks
- Customised designs are available on request

#### Technical Details

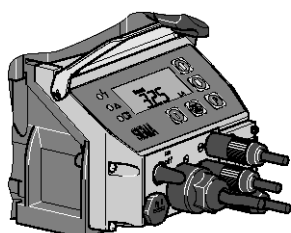
- Stroke length: 15 mm
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually by self-locking rotary dial in 0.2% increments (optionally with electric actuator or control drive)
- Metering reproducibility is better than  $\pm 1\%$  within the 10-100% stroke length adjustment range under certain defined conditions and with proper installation
- Wetted materials: Stainless steel 1.4571/1.4404, special materials are available on request
- High-performance oxide ceramic plunger
- Integrated control for analogue and/or contact operation
- Power supply: 1-phase, 100 – 230 V  $\pm 10\%$ , 240 V  $\pm 6\%$ , 50/60 Hz (220 W)
- Degree of protection IP 55
- Highly rigid fibreglass-reinforced plastic housing with excellent chemical resistance
- Provide suitable overload protection in all plunger metering pumps during installation for safety reasons

#### Field of application

- Volume-proportional metering of chemicals in the treatment of boiler feed water
- Metering of reactants and catalysts in the chemical industry
- Level-dependent metering of auxiliary agents in industrial production engineering, for instance hot wax metering in the production of adhesive strips



P\_ORL\_066\_SW1  
Sigma control type SCKa



pk\_2\_104  
Sigma Controller



## 2.4 Plunger Metering Pumps

### Technical Data

Type	Delivery rate at max. back pressure		With 1800 rpm motor at 60 Hz Delivery rate at max. back pressure				Suction lift  m WC	Perm. pre-pressure suction side  bar	Connector Suction/Discharge Side Rp-DN	Shipping weight  kg	Plunger Ø  mm
	bar	ml/stroke	psi	l/h	gph (US)	Strokes/min					
32002	320	0.46	4,641	2.3	0.61	84	5.0	160	1/4	24	8
23004	230	0.52	3,336	4.8	1.27	154	5.0	115	1/4	24	8
10006	100	0.55	1,450	7.6	2.01	233	5.0	50	1/4	24	8
14006	140	1.42	2,031	7.1	1.88	84	4.0	70	1/4	24	12
10011	100	1.43	1,450	13.1	3.46	153	4.0	50	1/4	24	12
05016	50	1.43	725	20.0	5.28	233	4.0	25	1/4	24	12
07012	70	2.90	1,015	14.8	3.91	85	4.0	35	1/4	24	17
04522	45	2.91	653	26.7	7.05	153	4.0	22.5	1/4	24	17
02534	25	2.92	363	40.8	10.78	233	4.0	12.5	1/4	24	17
04022	40	5.26	580	26.5	7.00	84	4.0	20	3/8	25	23
02541	25	5.37	363	49.2	13.00	153	4.0	12.5	3/8	25	23
01264	12	5.45	174	65.4	17.28	200	4.0	6	3/8	25	23

### Materials in Contact With the Medium

Material	Dosing head	Suction/pressure connector	Seals/ball seat	Balls	Ball seat
SST	Stainless steel 1.4404	Stainless steel 1.4404	PTFE or PTFE +25% carbon	Ceramic	Stainless steel 1.4404

### Motor Data

Identity code specification	Power supply				Remarks
U	1-phase, IP 55	100 – 230 V ±10%, 240 V ±6%,	50/60 Hz	220 W	

The motors are designed in compliance with the Ecodesign Directive 2009/125/EC.

### Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/EU in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label corresponds to or is better than the conditions prevalent in the intended field of application.

## 2.4 Plunger Metering Pumps

### Identity Code Ordering System for SCKa

SCKa	Drive type	
HK	Main drive, plunger	
	<b>Type</b>	
	bar	l/h
32002	320	2.3
23004	230	4.8
10006	100	6.4
14006	140	7.1
10011	100	13.1
05016	50	16.7
07012	70	14.8
04522	45	26.7
02534	25	34.1
04022	40	26.5
02541	25	49.2
01264	12	64.0
	<b>Liquid end material</b>	
SS	Stainless steel	
	<b>Sealing material*</b>	
T	PTFE	
	<b>Displacement body*</b>	
4	Plunger (oxide ceramic)	
	<b>Liquid end version</b>	
0	No spring (standard)	
1	With 2 valve springs, Hastelloy C 4, 0.1 bar	
	<b>Hydraulic connection</b>	
0	Standard threaded connector (according to technical data)	
	<b>Version</b>	
0	With ProMinent® logo	
1	Without ProMinent® logo	
	<b>Electrical power supply</b>	
U	1 ph 100-230 V ±10%, 50/60 Hz	
	<b>Cable and plug</b>	
A	2 m European	
B	2 m Swiss	
C	2 m Australian	
D	2 m USA	
	<b>Relay</b>	
0	No relay	
1	With fault indicating relay 1x changeover 230 V – 2A	
3	With fault indicating relay 1x changeover 230 V – 2A	
4	As 1 + pacing relay 2x normally open 24 V - 100 mA	
5	As 3 with pacing relay 2x normally open 24 V – 100 mA	
A	Shut-off and warning relays normally closed 2x normally open 24 V - 100 mA	
F	Power relay normally closed 1x changeover 230 V - 8 A	
	<b>Control variant</b>	
0	Manual + external with pulse control	
1	Manual + external + pulse control + analogue	
	<b>Access code</b>	
0	No access code	
1	With access code	
	<b>Metering monitor</b>	
0	Input with pulse evaluation	
1	Input with cont. evaluation	
	<b>Stroke length adjustment</b>	
0	Manual	

### Spare Parts Kits

Consisting of: 1 ceramic metering plunger, 4 valve balls, 4 ball seat discs, 2 PTFE/graphite ball seals, 2 plunger guides, 14 flat seals, 2 O-rings.

Type	Order no.
<b>Liquid end FK 08</b>	Applies to identity code: 32002, 23004, 10006 1001572
<b>Liquid end FK 12.5</b>	Applies to identity code: 14006, 10011, 05016 910470
<b>Liquid end FK 25</b>	Applies to identity code: 07012, 04522, 02534 910471
<b>Liquid end FK 50</b>	Applies to identity code: 04022, 02541, 01264 910472





## 2.4 Plunger Metering Pumps

### 2.4.3

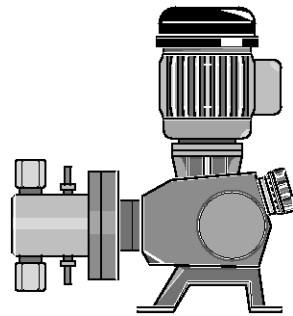
#### Plunger Metering Pump Meta

**Meta plunger pump – durable and high-performance**

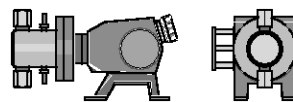
**Capacity range 6 – 59 l/h, 216 – 52 bar**



The extremely high-performance Meta is a plunger metering pump with the option of adjusting the pump capacity in 0.2% increments. It offers a wide range of power end versions, such as three-phase or 1-phase AC motors, even for Exe and Exde areas with ATEX certification.



pk\_2\_010  
Meta plunger metering pump MTKa



pk\_2\_011  
Meta plunger metering pump MTKa

The Meta (MTKa) is a plunger metering pump, the pump capacity of which can be precisely adjusted in 0.2% increments, either manually or optionally with an electric actuator or control drive. A wide range of power end versions is available for use in areas at risk from explosion with ATEX certification.

#### Your benefits

Excellent process safety and reliability:

- Metering reproducibility is better than  $\pm 0.5\%$  within the 10 – 100% stroke length range under defined conditions and with correct installation

Flexible adaptation to the process:

- Wide range of power end versions, also for use in Exe and Exde areas and different flange designs for the use of customised motors
- Customised designs are available on request

#### Technical Details

- Stroke length: 15 mm,
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually by self-locking rotary dial in 0.2% increments (optionally with electric actuator or control drive)
- Metering reproducibility is better than  $\pm 1\%$  within the 10-100% stroke length adjustment range under certain defined conditions and with proper installation
- Wetted materials: Stainless steel 1.4571/1.4404
- High-performance oxide ceramic plunger
- A wide range of power end versions is available: Three-phase standard motor, 1-phase AC motor, motors for use in areas at risk from explosion and different flange designs for use in customer-specific motors
- Degree of protection IP 55
- Fibreglass-reinforced plastic housing
- Provide suitable overload protection in all plunger metering pumps during installation for safety reasons.

#### Field of application

- Volume-proportional metering of chemicals in the treatment of boiler feed water
- Metering of reactants and catalysts in the chemical industry
- Level-dependent metering of auxiliary agents in industrial production engineering, for instance hot wax metering in the production of adhesive strips

#### Control of Meta Plunger Metering Pumps

(Speed Controllers see p. → 1-212)

##### Speed controllers in metal housing (Identity code characteristic Z)

Frequency changer built into IP 54 protective housing and main switch designed for max. 0.37 kW motor output.

Externally controlled with 0/4-20 mA / 0-10 V to correspond to 0-50 (60) Hz output frequency.

Integrated controller with versatile functions e.g. switching between external/internal control. With internal control, frequency input is via arrow keys. Multi lingual fault message display and motor temperature monitoring (thermistor-protection).

The speed controller assembly consists of a speed controller and a variable speed motor (see also identity code characteristic R).

## 2.4 Plunger Metering Pumps

### Technical Data

Type MTKa	With 1500 rpm motor at 50 Hz				With 1800 rpm motor at 60 Hz			Suction lift  m WC	Perm. pre-pres- sure suc- tion side  bar	Connector Suction/ Discharge Side  Rp-DN	Mo- tor rating  W	Ship- ping weight  kg	Plun- ger Ø  mm
	bar	l/h	ml/ stroke	Max. stroke rate Strokes/ min	psi	l/h/gph (US)	Max. stroke rate Strokes/ min						
21606	216	6.1	1.42	72	3,130	7.3/1.9	86	4.0	108	1/4	180	18	12
24006	240	6.1	1.42	72	3,477	7.3/1.9	86	4.0	120	1/4	370	20	12
16208	162	8.1	1.42	96	2,347	9.8/2.6	115	4.0	81	1/4	180	18	12
22508	225	8.1	1.42	96	3,260	9.8/2.6	115	4.0	112.5	1/4	370	20	12
12910	129	10.2	1.42	120	1,878	12.2/3.2	144	4.0	64.5	1/4	180	18	12
21610	216	10.2	1.42	120	3,130	12.2/3.2	144	4.0	108	1/4	370	20	12
10812	108	12.2	1.42	144	1,565	14.7/3.9	173	4.0	54	1/4	180	18	12
21012	210	12.2	1.42	144	3,043	14.7/3.9	173	4.0	105	1/4	370	20	12
10213	102	13.0	3.01	72	1,479	15.6/4.1	86	4.0	51	1/4	180	18	17
11313	113	13.0	3.01	72	1,644	15.6/4.1	86	4.0	56.5	1/4	370	20	17
07617	76	17.3	3.01	96	1,109	20.8/5.5	115	4.0	38	1/4	180	18	17
10617	106	17.3	3.01	96	1,541	20.8/5.5	115	4.0	53	1/4	370	20	17
06122	61	21.7	3.01	120	888	26.0/6.9	144	4.0	30.5	1/4	180	18	17
10222	102	21.7	3.01	120	1,479	26.0/6.9	144	4.0	51	1/4	370	20	17
05126	51	26.0	3.01	144	740	31.2/8.2	173	4.0	25.5	1/4	180	18	17
09926	99	26.0	3.01	144	1,438	31.2/8.2	173	4.0	49.5	1/4	370	20	17
05425	54	24.6	5.71	72	782	29.5/7.8	86	4.0	27	3/8	180	18	23
06025	60	24.6	5.71	72	869	29.5/7.8	86	4.0	30	3/8	370	20	23
04033	40	32.8	5.71	96	587	39.4/10.4	115	4.0	20	3/8	180	18	23
05633	56	32.8	5.71	96	815	39.4/10.4	115	4.0	28	3/8	370	20	23
03241	32	41.1	5.71	120	469	49.3/13.0	144	4.0	16	3/8	180	18	23
05441	54	41.1	5.71	120	782	49.3/13.0	144	4.0	27	3/8	370	20	23
02749	27	49.3	5.71	144	391	59.2/15.6	173	4.0	13.5	3/8	180	18	23
05249	52	49.3	5.71	144	761	59.2/15.6	173	4.0	26	3/8	370	20	23

### Materials in Contact With the Medium

Material	Dosing head	Suction/pressure connector	Seals	Valve balls	Valve seat	Plunger
SST	Stainless steel 1.4404	Stainless steel 1.4404	PTFE or PTFE + 25 % carbon	Ceramic	Stainless steel 1.4404	Ceramic

### Motor Data

Identity code specification	Power supply		Remarks	
S	3-phase, IP 55	220 – 240 V/380 – 420 V 250 – 280 V/440 – 480 V	50 Hz 60 Hz	0.18/0.37 kW 0.18/0.37 kW
R	3-phase, IP 55	230 V/400 V	50/60 Hz	0.37 kW with PTC, speed control range 1:20 with external fan 1-phase 230 V; 50/60 Hz
M	1-phase AC, IP 55	230 V ± 5 %	50/60 Hz	0.37 kW
N	1-phase AC, IP 55	115 V ± 5 %	60 Hz	0.37 kW
L1	3-phase, II 2G Ex e II T3	220 – 240 V/380 – 420 V	50 Hz	0.18/0.37 kW
L2	3-phase, II 2G Ex de IIC T4	220 – 240 V/380 – 420 V	50 Hz	0.18/0.37 kW with PTC, speed control range 1:5
P1	3-phase, II 2G Ex e II T3	250 – 280 V/440 – 480 V	60 Hz	0.18/0.37 kW
P2	3-phase, II 2G Ex de IIC T4	250 – 280 V/440 – 480 V	60 Hz	0.18/0.37 kW with PTC, speed control range 1:5

The motor power is dependent on the pump type (see technical data).

Motor data sheets can be requested for more information.

Special motors or special motor flanges are available on request.

The motors are designed in compliance with the Ecodesign Directive 2009/125/EC.

#### Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/EU in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label corresponds to or is better than the conditions prevalent in the intended field of application.



## 2.4 Plunger Metering Pumps

### Identity Code Ordering System for MTKa

MTKa	Drive type		
	H	Main drive	
	A	Add-on drive	
		<b>Type</b>	
		<b>bar</b>	<b>l/h</b>
		21606 216	6.1
		24006 240	6.1
		16208 162	8.1
		22508 225	8.1
		12910 129	10.2
		21610 216	10.2
		10812 108	12.2
		21012 210	12.2
		10213 102	13.0
		11313 113	13.0
		07617 76	17.3
		10617 106	17.3
		06122 61	21.7
		10222 102	21.7
		05126 51	26.0
		09926 99	26.0
		05425 54	24.6
		06025 60	24.6
		04033 40	32.8
		05633 56	32.8
		03241 32	41.1
		05441 54	41.1
		02749 27	49.3
		05249 52	49.3
		<b>Liquid end material</b>	
		SS	Stainless steel
		<b>Sealing material*</b>	
		T	PTFE
		<b>Displacement body*</b>	
		S	Standard plunger, oxide ceramic
		<b>Liquid end version</b>	
		0	No valve springs
		1	With 2 valve springs, Hastelloy C, 0.1 bar
		<b>Hydraulic connection</b>	
		0	Standard threaded connector (according to technical data)
		<b>Version</b>	
		0	With ProMinent® logo (standard)
		1	Without ProMinent® logo
		M	Modified
		<b>Electrical power supply</b>	
		S	3 ph, 230 V/400 V, 50/60 Hz (WBS)
		R	3 ph, variable speed motor, 230 V/400 V
		Z	1 ph, variable speed set 230 V, 50/60 Hz
		M	1 ph, AC, 230 V, 50/60 Hz
		N	1 ph, AC, 115 V, 60 Hz
		L	3 ph, 230 V/400 V, 50 Hz, (Exe, Exd)
		P	3 ph, 230 V/400 V, 60 Hz, (Exe, Exd)
		1	No motor, with flange 90/63
		2	No motor, with flange 140/71
		3	No motor, with flange 160/71
		4	No motor, with flange 56 C
		0	Add-on pump (no motor)
		<b>Enclosure rating</b>	
		0	IP 55 (standard)
		1	Exe motor version ATEX-T3
		2	Exd motor version ATEX-T4
		A	ATEX power end
		<b>Stroke sensor</b>	
		0	No stroke sensor (standard)
		1	With stroke sensor, Namur signal (Ex)
		<b>Stroke length adjustment</b>	
		0	Manual (standard)
		2	With stroke positioning, 115 V/50/60 Hz
		A	With stroke control motor 0...20 mA 230 V/50/60 Hz
		B	With stroke control motor 4...20 mA 230 V/50/60 Hz
		C	With stroke control motor 0...20 mA 115 V/50/60 Hz
		D	With stroke control motor 4...20 mA 115 V/50/60 Hz

## 2.4 Plunger Metering Pumps

### Spare Parts

#### Spare Parts Kits for Plunger Metering Pump Meta (MTKa)

Consisting of:

- 1 ceramic plunger
- 4 valve balls
- 4 ball seat discs
- 2 PTFE /graphite plunger packing rings
- 2 plunger guide bands
- 14 flat seals
- 2 O-rings

	Order no.
<b>Liquid end FK 12.5 Applies to identity code: 21606, 24006, 16208, 22508, 12910, 21610, 10812, 21012</b>	910470
<b>Liquid end FK 25 applies to identity code: 10213, 11313, 07617, 10617, 06122, 10222, 05126, 09926</b>	910471
<b>Liquid end FK 50 applies to identity code: 05425, 06025, 04033, 05633, 03241, 05441, 02749, 05249</b>	910472

#### Mounting Frame for Meta MTMa and MTKa

A base frame is available for main and add-on pump combinations.

	Order no.
<b>Base frame for main and one add-on pump</b>	803897
<b>Base frame for main and two add-on pumps</b>	803898
<b>Base frame for main and three add-on pumps</b>	803899





## 2.4 Plunger Metering Pumps

### 2.4.4

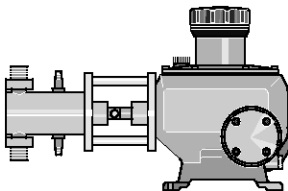
### Plunger Metering Pump Makro TZ

**Powerful, built to last with a plunger**

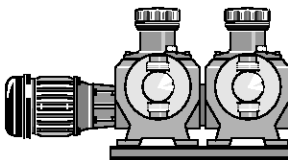
**Capacity range of single head pump: 8 – 1,141 l/h, 320 – 11 bar**



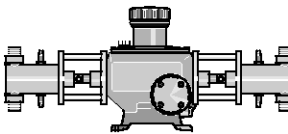
The plunger metering pump Makro TZ impresses with its excellent process reliability, outstanding flexibility and its modular construction enables it to be outstandingly adapted to the performance requirements of the respective application.



pk\_2\_019  
Makro TZ plunger metering pump



pk\_2\_018  
Makro TZ TZKa externally mounted pump



pk\_2\_020  
Makro TZ TZKa double head pump

The plunger metering pump Makro TZ (TZKa) has an adjustable eccentric drive mechanism and, together with the Makro TZ diaphragm metering pump, forms a range of drive mechanisms with stroke lengths of 10 and/or 20 mm. A wide range of drive versions is available, including some for use in Exe and Exde areas with ATEX certification.

#### Your benefits

Process reliability:

- Metering reproducibility is better than  $\pm 0.5\%$  within the 10 – 100% stroke length range under defined conditions and with correct installation

Excellent flexibility:

- The modular construction with single and double head versions permits a wide range of applications, with the double head designs being operated in push-pull mode
- It is possible to combine up to 4 metering units, even with different pump capacities, in multiple pump systems
- 4 different gear ratios are available
- Customised designs are available on request

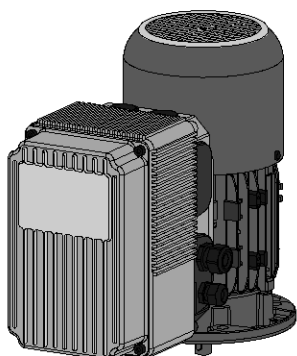
#### Technical Details

- Stroke length: 0-20 mm, Rod force: 8,000 N
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually by means of shift ring in 0.5% increments (optionally with electric actuator or control drive)
- Metering reproducibility is better than  $\pm 0.5\%$  within the 10 – 100% stroke length range under defined conditions and with proper installation. Observe the information in the operating instructions.
- High-performance ceramic-coated stainless steel plunger Wetted materials: Stainless steel 1.4571. Special materials are available on request
- A wide range of power end versions is available: Three-phase standard motors, motors for use in areas at risk from explosion and different flange designs for use in customer-specific motors
- Degree of protection: IP 55
- Salt water-resistant, acrylic resin-coated cast aluminium housing
- Provide suitable overload protection in all plunger metering pumps during installation for safety reasons

#### Field of application

- Volume-proportional metering of chemicals/additives in water treatment
- Metering of reactants and catalysts in the chemical industry
- Level-dependent metering of additives in industrial production engineering

## 2.4 Plunger Metering Pumps



P\_AC\_0293\_SW1  
Variable speed motor with integrated  
frequency converter

### Makro TZ Metering Pump Actuators

#### Makro TZ stroke length actuator/control drive

##### Makro TZ actuator

Servomotor for automatic stroke length adjustment, actuating period approx. 1 sec for 1 % stroke length, including 1 k $\Omega$  feedback potentiometer for stroke position response signal, IP 54 degree of protection. Electrical connection 230 V ( $\pm 10$  %), 50/60 Hz, 40 W mech. stroke length display fitted on the Makro TZ power end.

Special voltage/higher degrees of protection/explosion protection upon request.

##### Makro TZ control drive

Control drive consisting of an actuator with servomotor and integral microprocessor controller for stroke length adjustment via a standard signal. Technical data see actuator.

##### Design:

Standard signal current input 0/4-20 mA corresponds to stroke length 0 -100 %, manual /automatic operation switch, key switch for stroke adjustment in manual mode. Actual value output 0/4-20 mA for remote display.

#### Variable speed motors with integrated frequency converter (identity code specification V)

The following functions are integrated in the terminal box cover:

- Start/Stop switch
- Manual/external operation switch (0/4 - 20 mA)
- Potentiometer for speed control in manual mode
- Onn request externally controllable via PROFIBUS® DP

Variable Speed Motors with Integrated Frequency Converter with IP 55 Protection See page → 2-122

#### Speed controllers with frequency converter (identity code specification Z)

The speed controller (complete) comprises a frequency converter and a variable speed motor (see also identity code specification R). The frequency converter is accommodated in an IP 55 rated protective housing with integral control unit and main switch.

Externally controllable with 0/4 - 20 mA or 0 - 10 V corresponding to 0 - 50 (60) Hz output frequency.

Frequency Converters for Speed Control see page → 1-212



## 2.4 Plunger Metering Pumps

### Technical Data

Type TZKa	With 1500 rpm motor at 50 Hz				With 1800 rpm motor at 60 Hz			Suction lift  m WC	Connection, suction/ discharge side  G-DN	Shipping weight  kg	Plunger Ø  mm
	Delivery rate at max. back pressure		Max. stroke rate		Delivery rate at max. back pressure		Max. stroke rate				
	bar	l/h	ml/ stroke	Strokes/ min	psi	l/h/gph (US)	Strokes/ min				
320009	320	8.7	2.0	72	4,627	10/2.6	86	4.0	Rp 1/4**–8	50	12
320012	320	11.6	2.0	96	4,627	14/3.7	115	4.0	Rp 1/4**–8	50	12
320014	320	14.5	2.0	120	4,627	17/4.5	144	4.0	Rp 1/4**–8	50	12
320017	320	17.4	2.0	144	4,627	21/5.5	173	4.0	Rp 1/4**–8	50	12
320018	320	17.7	4.1	72	4,627	21/5.5	86	4.0	Rp 1/4**–8	50	17
320024	320	23.6	4.1	96	4,627	28/7.4	115	4.0	Rp 1/4**–8	54	17
320030	320	29.5	4.1	120	4,627	35/9.2	144	4.0	Rp 1/4**–8	54	17
313035	313	35.4	4.1	144	4,526	42/11.1	173	4.0	Rp 1/4**–8	54	17
192033	192	32.9	7.6	72	2,776	39/10.3	86	4.0	Rp 3/8**–10	55	23
192044	192	43.9	7.6	96	2,776	59/15.6	115	4.0	Rp 3/8**–10	55	23
192055	192	54.8	7.6	120	2,776	66/17.4	144	4.0	Rp 3/8**–10	55	23
168066	168	65.8	7.6	144	2,437	79/20.9	173	4.0	Rp 3/8**–10	55	23
113057	113	57.5	13.3	72	1,634	69/18.2	86	4.0	Rp 3/8**–10	56	30
113077	113	76.6	13.3	96	1,634	92/24.3	115	4.0	Rp 3/8**–10	56	30
113096	113	95.8	13.3	120	1,634	115/30.4	144	4.0	Rp 3/8**–10	56	30
096115	96	114.9	13.3	144	1,392	138/36.5	173	4.0	Rp 3/8**–10	56	30
063104	63	104.3	24.2	72	911	125/33.0	86	4.0	G 1 1/4–20	58	40
063139	63	139.0	24.2	96	911	167/44.1	115	4.0	G 1 1/4–20	58	40
063174	63	173.8	24.2	120	914	209/55.2	144	4.0	G 1 1/4–20	58	40
052208	52	208.5	24.2	144	754	250/66.0	173	4.0	G 1 1/4–20	58	40
040163	40	162.9	37.7	72	578	195/51.5	86	4.0	G 1 1/4–20	58	50
040217	40	217.2	37.7	96	578	261/68.9	115	4.0	G 1 1/4–20	58	50
040271	40	271.5	37.7	120	580	326/86.1	144	4.0	G 1 1/4–20	58	50
033326	33	325.8	37.7	144	479	391/103.3	173	4.0	G 1 1/4–20	58	50
028237	28	237.0	54.9	72	405	284/75.0	86	4.0	G 1 1/2–25	62	60
028316	28	315.9	54.9	96	405	379/100.1	115	4.0	G 1 1/2–25	62	60
027395	27	394.9	54.9	120	392	474/125.2	144	4.0	G 1 1/2–25	62	60
022474	22	473.9	54.9	144	319	569/150.3	173	4.0	G 1 1/2–25	62	60
020322	20	322.5	74.7	72	289	387/102.2	86	4.0	G 1 1/2–25	62	70
020430	20	430.0	74.7	96	289	516/136.3	115	4.0	G 1 1/2–25	62	70
020538	20	537.6	74.7	120	290	645/170.4	144	4.0	G 1 1/2–25	62	70
016645	16	645.1	74.7	144	232	774/204.5	173	4.0	G 1 1/2–25	62	70
014475	14	475.1	110.0	72	202	571/150.8	86	4.0	G 2 1/4–40	68	85
014634	14	634.1	110.0	96	202	761/201.0	115	4.0	G 2 1/4–40	68	85
013793	13	792.6	110.0	120	189	951/251.2	144	4.0	G 2 1/4–40	68	85
011951	11	951.1	110.0	144	160	1,141/301.4	173	4.0	G 2 1/4–40	68	85

Other gear reduction ratios are available upon request.

**The permissible admission pressure on the suction side is approx. 50% of the max. permissible back pressure.**

\*\* The suction and discharge connectors Rp 1/4 and Rp 3/8 are inner threaded and fitted with double ball valves.

### Materials in Contact With the Medium

Pump type	Hydraulic Ø mm	Dosing head connection	Suction/pressure seals	Ball seat	Valve balls	Plunger
SST	...12 S to 50 S	Stainless steel 1.4571/ 1.4404	1.4571/1.4404	SS/PTFE	Oxide ceramic	Stainless steel/ceramic
SST	...60 S to 70 S	Stainless steel 1.4571/ 1.4404	1.4581	PTFE/PTFE	Stainless steel 1.4404	Stainless steel/ceramic
SST	...85 S	Stainless steel 1.4571/ 1.4404	1.4581	PTFE/PTFE	1.4404 (plate) Hast. C (spring)	Stainless steel/ceramic

## 2.4 Plunger Metering Pumps

### Identity Code Ordering System TZKa

TZKa	Drive type										
	H	Main drive									
	A	Add-on									
	D	Double main drive									
	B	Double add-on									
	Type*										
	320009		320030		113057		063174		028237		020538
	320012		313035		113077		052208		028316		016645
	320014		192033		113096		040163		027395		014475
	320017		192044		096115		040217		022474		014634
	320018		192055		063104		040271		020322		013793
	320024		168066		063139		033326		020430		011951
	Liquid end material										
	SS	Stainless steel									
	Sealing material										
	T	PTFE									
	Displacement body										
	S	Stainless steel plunger, chromium dioxide-coated									
	Liquid end version										
	0	No valve springs									
	1	With valve springs									
	Hydraulic connection										
	0	Standard connection									
	4	SS union nut and insert									
	Version										
	0	With ProMinent® logo, no frame									
	2	Without ProMinent® logo, no frame									
	A	With ProMinent® logo, with frame, simplex									
	B	With ProMinent® logo, with frame, duplex									
	C	With ProMinent® logo, with frame, triplex									
	M	Modified									
	Electrical power supply										
	S	3 ph. 230/400 V 50/60 Hz (WBS)									
	R	Variable speed motor 4-pole 230/400 V									
	V (0)	Variable speed motor with integr. frequency converter									
	Z	1 ph, variable speed control set 1 ph, 230 V, 50/60 Hz									
	P	3 ph. 230/400 V 60 Hz (Exe, Exd)									
	L	3 ph. 230/400 V 50 Hz (Exe, Exd)									
	V (2)	With integrated frequency converter (Exd)									
	4	No motor, with 56 C flange									
	7	No motor, with 120/80 flange									
	8	No motor, with 160/90 flange									
	0	Without motor, externally mounted drive									
	Enclosure rating										
	0	IP 55 (Standard) ISO class F									
	1	Exe version ATEX-T3									
	2	Exd version ATEX-T4									
	A	ATEX power end									
	Stroke sensor										
	0	No stroke sensor									
1	With stroke sensor (Namur)										
Stroke length adjustment											
0	Stroke length adjustment, man.										
1	230 V stroke adjustment motor										
2	115 V stroke adjustment motor										
3	230 V 0-20 mA stroke controller										
4	230 V 4-20 mA stroke controller										
5	115 V 0-20 mA stroke controller										
6	115 V 4-20 mA stroke controller										
Application											
0	Standard										

\* Digits 1 - 3=back pressure [bar]; digits 4 - 6=feed rate [l/h]







## 2.4 Plunger Metering Pumps

### Motor Data

Identity code specification		Power supply		Remarks	
S	3-phase, IP 55	220 – 240 V/380 – 420 V 250 – 280 V/440 – 480 V	50 Hz 60 Hz	1.5 kW	
R	3-phase, IP 55	230 V/400 V	50/60 Hz	2.2 kW	with PTC, speed control range 1:20 with external fan 1-phase 230 V; 50/60 Hz
V0	3-phase, IP 55	400 V ±10 %	50/60 Hz	3.0 kW	Variable speed motor with integrated frequency converter
L1	3-phase, II 2G Ex eb IIC T3 Gb	220 – 240 V/380 – 420 V	50 Hz	1.5 kW	
L2	3-phase, II 2G Ex db IIC T4 Gb	220 – 240 V/380 – 420 V	50 Hz	1.5 kW	with PTC, speed control range 1:5
P1	3-phase, II 2G Ex e IIC T3	250 – 280 V/440 – 480 V	60 Hz	2.0 kW	
P2	3-phase, II 2G Ex de IIC T4	250 – 280 V/440 – 480 V	60 Hz	1.5 kW	with PTC, speed control range 1:5
V2	3-phase, II 2G Ex de IIC T4	400 V ±10 %	50/60 Hz	2.2 kW	Ex-variable speed motor with integrated frequency converter

Motor data sheets can be requested for more information. Special motors or special motor flanges are available on request.

The motors are designed in compliance with the Ecodesign Directive 2009/125/EC.

### Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/EU in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label corresponds to or is better than the conditions prevalent in the intended field of application.

### Spare Parts Kits for Plunger Metering Pump Makro TZ

Comprising:

Valve balls  
Valve plate with spring  
Ball seat discs  
PTFE/graphite plunger packing rings  
Plunger guides  
Flat seals/O rings

	Order no.
Spare parts kit for Makro TZ FK 12/20 S DN 8	1019106
Spare parts kit for Makro TZ FK 17/20 S DN 8	1019107
Spare parts kit for Makro TZ FK 23/20 S DN 10	1019108
Spare parts kit for Makro TZ FK 30/20 S DN 10	1019109
Spare parts kit for Makro TZ FK 40/20 S DN 20	1019110
Spare parts kit for Makro TZ FK 50/20 S DN 20	1019111
Spare parts kit for Makro TZ FK 60/20 S DN 25	1019112
Spare parts kit for Makro TZ FK 70/20 S DN 25	1019113
Spare parts kit for Makro TZ FK 85/20 S DN 40	1019124

## 2.4 Plunger Metering Pumps

### 2.4.5

### Plunger Metering Pump Makro/ 5

**Powerful, built to last with a plunger**

**Capacity range of single head pump: 38 – 6,014 l/h, 320 – 6 bar**

The plunger metering pump Makro/ 5 can virtually be used throughout the low-pressure range and its modular construction enables it to be outstandingly adapted to the performance requirements of the respective application.

The plunger metering pump Makro/ 5 (M5ka) together with the Makro/ 5 hydraulic diaphragm and diaphragm metering pumps, form a range of drive mechanisms with stroke lengths of 20 and/or 50 mm. A wide range of power end versions is available for use in areas at risk from explosion with ATEX certification.

#### Your benefits

Process reliability:

- Metering reproducibility is better than  $\pm 0.5\%$  within the 10 – 100% stroke length range under defined conditions and with correct installation

Excellent flexibility:

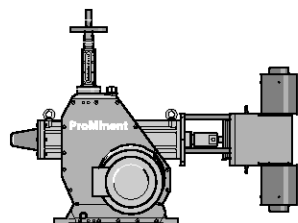
- The modular construction with single and double head versions permits a wide range of applications, with the double head designs being operated in push-pull mode
- It is possible to combine up to 4 metering units, even with different pump capacities, in multiple pump systems
- 5 different gear ratios are available
- Customised designs are available on request

#### Technical Details

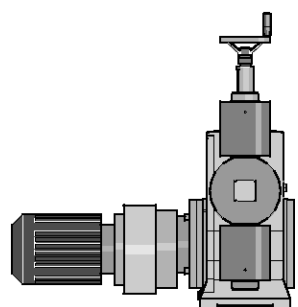
- Stroke length: 0-50 mm, Rod force: 10,000 N
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually by means of a manual adjustment wheel and scaled display in 0.5% increments (optionally with electric control drive)
- Metering reproducibility is better than  $\pm 0.5\%$  within the 10 – 100% stroke length range under defined conditions and with correct installation. Observe the information in the operating instructions
- High-performance ceramic-coated stainless steel plunger
- Wetted materials: Stainless steel 1.4571, special materials are available on request
- A wide range of power end versions is available: Three-phase standard motors, motors for use in areas at risk from explosion and different flange designs for use in customer-specific motors
- Degree of protection: IP 55
- Salt water-resistant, acrylic resin-coated cast aluminium housing
- Provide suitable overload protection in all plunger metering pumps during installation for safety reasons

#### Field of application

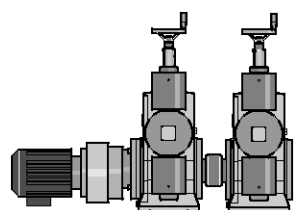
- Volume-proportional metering of chemicals/additives in water treatment
- Metering of reactants and catalysts in the chemical industry
- Level-dependent metering of additives in industrial production engineering



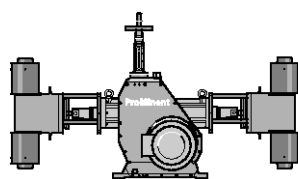
pk\_2\_075  
Makro/ 5 M5Ka



pk\_2\_076  
Makro/ 5 M5Ka



pk\_2\_077  
Makro/ 5 M5Ka externally mounted pump



pk\_2\_078  
Makro/ 5 double head pump



## 2.4 Plunger Metering Pumps

### Makro/ 5 Pump Control

#### Stroke length variable speed drive Makro/ 5

Variable speed drive consisting of actuator with motor actuator and integrated microprocessor controller for stroke length adjustment via a standard signal. Actuating time approx. 100 sec. for 100% stroke length, equipped with 2 limit switches for min./max. position, IP rating: IP 52. Electrical connection 230 V ( $\pm 10\%$ ), 50/60 Hz, approx. 40 W, mech. stroke position indicator present at drive Makro/ 5.

Special voltage/higher IP ratings/Ex protection on request.

Includes:

Standard current input 0/4-20 mA (corresponds to stroke length 0-100%); internal switch for manual/automatic operation, key switch for stroke adjustment in manual operation mode. Actual value output 0/4-20 mA for remote display.

#### Frequency converter for speed control in metal housing, IP rating 54

Frequency converter installed in protective housing IP 54 with integrated control unit and main switch suitable for the motor output stated in the following.

Externally controllable with 0/4-20 mA or 0-10V corresponding to 0-50 (60) Hz output frequency.

Integrated control unit with numerous functions, such as toggling external/internal control. With internal control, frequency setting is via arrow keys, error message on multi lingual display etc.

Including evaluator for temperature monitoring of the motor (thermistor protection).

#### Stroke sensor with namur signal

Mounted on the crank drive of the Makro/5 gearbox. For precise detection of each metering stroke, consisting of actuating cams and inductive proximity switch, switching signal according to Namur. Combined with electronic preselection counters suitable for batch metering or proportional metering in connection with the proportional control.

Retrofitting is only possible on factory premises.

**Approved for ex-proof operation with IP rating EEx ia II C T6.**

## 2.4 Plunger Metering Pumps

### Technical Data

Type M5Ka	With 1500 rpm motor at 50 Hz				With 1800 rpm motor at 60 Hz				Suc- tion lift	Connection, suction/ discharge side	Shipping weight	Plun- ger Ø
	Delivery rate at max. back pressure		Max. stroke rate		Delivery rate at max. back pressure		Max. stroke rate					
	bar	l/h	ml/ stroke	Strokes/ min	psi	l/h	gph (US)	Strokes/ min	m WC	G-DN	kg	mm
3200038	320	38	11	60	4,640	44	12	71	3.0	Rp 1/4-8	300	17
3200048	320	48	11	75	4,640	56	15	89	3.0	Rp 1/4-8	300	17
3200066	320	66	11	103	4,640	78	21	123	3.0	Rp 1/4-8	300	17
3200085	320	85	11	133	4,640	101	27	159	3.0	Rp 3/8-10	300	17
3200100	320	100	11	156	—	—	—	—	3.0	Rp 3/8-10	300	17
2400070	240	70	21	60	3,480	82	22	71	3.0	Rp 3/8-10	300	23
2400088	240	88	21	75	3,480	104	27	89	3.0	Rp 3/8-10	300	23
2400121	240	121	21	103	3,480	144	38	123	3.0	Rp 3/8-10	300	23
2160157	216	157	21	133	3,132	187	49	159	3.0	Rp 3/8-10	300	23
1700184	170	184	21	156	—	—	—	—	3.0	G 1-15	300	23
1400120	140	120	35	60	2,030	142	38	71	3.0	G 1-15	302	30
1400151	140	151	35	75	2,030	179	47	89	3.0	G 1-15	302	30
1400207	140	207	35	103	2,030	247	65	123	3.0	G 1-15	302	30
1270267	127	267	35	133	1,842	319	84	159	3.0	G 1 1/4-20	302	30
1000314	100	314	35	156	—	—	—	—	3.0	G 1 1/4-20	302	30
0800214	80	214	63	60	1,160	253	67	71	3.0	G 1 1/4-20	303	40
0800268	80	268	63	75	1,160	318	84	89	3.0	G 1 1/4-20	303	40
0800368	80	368	63	103	1,160	439	116	123	3.0	G 1 1/4-20	303	40
0700476	70	476	63	133	1,015	569	150	159	3.0	G 1 1/2-25	303	40
0560558	56	558	63	156	—	—	—	—	3.0	G 1 1/2-25	303	40
0500335	50	335	98	60	725	396	105	71	3.0	G 1 1/2-25	303	50
0500419	50	419	98	75	725	497	131	89	3.0	G 1 1/2-25	303	50
0500576	50	576	98	103	725	687	181	123	3.0	G 1 1/2-25	303	50
0450744	45	744	98	133	653	889	235	159	3.0	G 2-32	303	50
0350872	35	872	98	156	—	—	—	—	3.0	G 2-32	303	50
0350483	35	483	141	60	508	571	151	71	3.0	G 1 1/2-25	311	60
0350604	35	604	141	75	508	716	189	89	3.0	G 1 1/2-25	311	60
0350829	35	829	141	103	508	989	261	123	3.0	G 2-32	311	60
0301071	30	1,071	141	133	435	1,280	338	159	3.0	G 2-32	311	60
0251257	25	1,257	141	156	—	—	—	—	3.0	G 2-32	311	60
0250658	25	658	192	60	363	778	206	71	3.0	G 2-32	311	70
0250822	25	822	192	75	363	975	258	89	3.0	G 2-32	311	70
0251129	25	1,129	192	103	363	1,348	356	123	3.0	G 2-32	311	70
0231458	23	1,458	192	133	334	1,743	460	159	3.0	G 2 1/4-40	311	70
0181710	18	1,710	192	156	—	—	—	—	3.0	G 2 1/4-40	311	70
0160970	16	970	284	60	232	1,147	303	71	3.0	G 2 1/4-40	317	85
0161212	16	1,212	284	75	232	1,438	380	89	3.0	G 2 1/4-40	317	85
0161665	16	1,665	284	103	232	1,988	525	123	3.0	G 2 1/4-40	317	85
0162150	16	2,150	284	133	232	2,570	679	159	3.0	G 2 3/4-50	317	85
0162522	16	2,522	284	156	—	—	—	—	3.0	G 2 3/4-50	317	85
0121343	12	1,343	393	60	174	1,589	420	71	3.0	G 2 3/4-50	331	100
0121678	12	1,678	393	75	174	1,991	526	89	3.0	G 2 3/4-50	331	100
0122305	12	2,305	393	103	174	2,752	727	123	3.0	G 2 3/4-50	331	100
0122977	12	2,977	393	133	174	3,558	940	159	3.0	G 2 3/4-50	331	100
0103491	10	3,491	393	156	—	—	—	—	3.0	G 2 3/4-50	331	100
0062269	6	2,269	664	60	87	2,684	709	71	3.0	G 2 1/2-65	350	130
0062837	6	2,837	664	75	87	3,366	889	89	3.0	G 2 1/2-65	350	130
0063896	6	3,896	664	103	87	4,652	1,229	123	3.0	G 2 1/2-65	350	130
0065031	6	5,031	664	133	87	6,014	1,589	159	3.0	G 2 1/2-65	350	130
0066000	6	6,000	664	156	—	—	—	—	3.0	G 2 1/2-65	350	130





## 2.4 Plunger Metering Pumps

### Identity Code Ordering System for M5Ka

M5Ka	Drive type									
	H	Main drive								
	A	Add-on power end								
	D	Double main drive								
	B	Double add-on power end								
	Type*									
	3200038	1400120	0500335	0250658	0121343					
	3200048	1400151	0500419	0250822	0121678					
	3200066	1400207	0500576	0251129	0122305					
	3200085	1270267	0450744	0231458	0122977					
	3200100	1000314	0350872	0181710	0103491					
	2400070	0800214	0350483	0160970	0062269					
	2400088	0800268	0350604	0161212	0062837					
	2400121	0800368	0350829	0161665	0063896					
	2160157	0700476	0301071	0162150	0065031					
	1700184	0560558	0251257	0162522	0066000					
	Liquid end material									
	SS	Stainless steel								
	Sealing material*									
	T	PTFE								
	Displacement body									
	S	Stainless steel plunger, chromium dioxide-coated								
	Liquid end version									
	0	No valve springs								
	1	With valve springs								
	Hydraulic connection									
	0	Standard connection								
	4	SS union nut and insert								
	Version									
	0	With ProMinent® logo, no frame								
	2	No ProMinent® logo, no frame								
	A	With ProMinent® logo, with frame, simplex								
	B	With ProMinent® logo, with frame, duplex								
	C	With ProMinent® logo, with frame, triplex								
	D	With ProMinent® logo, with frame, quadruplex								
	M	Modified								
	Electrical power supply									
	S	3 ph. 230/400 V 50/60 Hz (WBS)								
	R	Variable speed motor 4-pole 230/400 V								
	V (0)	Motor with integrated frequency converter								
	P	3 ph. 230/400 V 60 Hz (Exe, Exd)								
	L	3 ph. 230/400 V 50 Hz (Exe, Exd)								
	V (2)	Motor with integrated frequency converter (Exd)								
	5	No motor, with IEC 100 gearbox								
	6	No motor, with IEC 112 gearbox								
	0	No motor, no gearbox								
	Enclosure rating									
	0	IP 55 (Standard) ISO class F								
	1	Exe version ATEX-T3								
	2	Exd version ATEX-T4								
	A	ATEX power end								
	Stroke sensor									
	0	No stroke sensor								
	1	With stroke sensor (Namur)								
	Stroke length adjustment									
	0	Stroke length adjustment, man.								
	3	230 V 0-20 mA stroke controller								
	4	230 V 4-20 mA stroke controller								
	5	115 V 0-20 mA stroke controller								
	6	115 V 4-20 mA stroke controller								
	G	Control drive 230 V 0-20 mA Exde								
	H	Control drive 230 V 4-20 mA Exde								
	Application									
	0	Standard								
	3	Temperature up to -20 °C								

\* Digits 1 - 3=back pressure [bar]; digits 4 - 7=feed rate [l/h]

## 2.4 Plunger Metering Pumps

### Materials in Contact With the Medium

	Liquid end	Suction/ pressure connector	Valve seat/ seals	Valve balls	Plunger
Makro 5/50 HK ...DN 8-DN 10	Stainless steel 1.4571/1.4404	1.4571/1.4404	SS/PTFE	Oxide ceramics	Stainless steel/ ceramic
Makro 5/50 HK ...DN 15-DN 25	Stainless steel 1.4571/1.4404	1.4581	PTFE/PTFE	Stainless steel 1.4401	Stainless steel/ ceramic
Makro 5/50 HK ...DN 32-DN 65	Stainless steel 1.4571/1.4404	1.4581/1.4404	PTFE/PTFE	Stainless steel 1.4404 (plate/spring)	Stainless steel/ ceramic

The permissible priming pressure on the suction side is approx. 50% of the max. permissible back pressure.

### Motor Data

Identity code specification		Power supply			Remarks
S	3-phase, IP 55	220 – 240 V/380 – 420 V 250 – 280 V/440 – 480 V	50 Hz 60 Hz	3 kW	
R	3-phase, IP 55	230 V/400 V	50/60 Hz	3 kW	with PTC, speed control range 1:5
V0	3-phase, IP 55	400 V ±10 %	50/60 Hz	3 kW	Variable speed motor with integrated frequency converter
L1	3-phase, II 2G Ex e IIC T3 Gb	220 – 240 V/380 – 420 V	50 Hz	3.6 kW	
L2	3-phase, II 2G Ex de IIC T4 Gb	220 – 240 V/380 – 420 V	50 Hz	4 kW	with PTC, speed control range 1:5
P1	3-phase, II 2G Ex e IIC T3 Gb	250 – 280 V/440 – 480 V	60 Hz	3.6 kW	
P2	3-phase, II 2G Ex de IIC T4 Gb	250 – 280 V/440 – 480 V	60 Hz	4 kW	with PTC, speed control range 1:5
V2	3-phase, II 2GDc Ex de IIB T4 Gb, IP67	400 V ±10 %	50/60 Hz	4 kW	Ex-variable speed motor with integrated frequency converter

Motor data sheets can be requested for more information. Special motors or special motor flanges are available on request.

The motors are designed in compliance with the Ecodesign Directive 2009/125/EC.

#### Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/EU in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label corresponds to or is better than the conditions prevalent in the intended field of application.





## 2.4 Plunger Metering Pumps

### Spare Parts Kits

Spare parts kit for Makro/ 5, consisting of:

- Valve balls
- Valve plate with spring
- Ball seat discs
- Plunger packings made from PTFE/graphite
- Piston guide bands
- Flat seals / O-rings

	Order no.
Spare parts kit for Makro/ 5 FK 17/50 S DN 8	1005899
Spare parts kit for Makro/ 5 FK 17/50 S DN 10	1005536
Spare parts kit for Makro/ 5 FK 23/50 S DN 10	1005004
Spare parts kit for Makro/ 5 FK 23/50 S DN 15	1005900
Spare parts kit for Makro/ 5 FK 30/50 S DN 15	1005901
Spare parts kit for Makro/ 5 FK 30/50 S DN 20	1005537
Spare parts kit for Makro/ 5 FK 40/50 S DN 20	1005902
Spare parts kit for Makro/ 5 FK 40/50 S DN 25	1005538
Spare parts kit for Makro/ 5 FK 50/50 S DN 25	1005539
Spare parts kit for Makro/ 5 FK 60/50 S DN 25	1005903
Spare parts kit for Makro/ 5 FK 60/50 S DN 32	1005540
Spare parts kit for Makro/ 5 FK 70/50 S DN 32	1005541
Spare parts kit for Makro/ 5 FK 70/50 S DN 40	1005904
Spare parts kit for Makro/ 5 FK 85/50 S DN 40	1005542
Spare parts kit for Makro/ 5 FK 85/50 S DN 50	1005905
Spare parts kit for Makro/ 5 FK 100/50 S DN 50	1005543
Spare parts kit for Makro/ 5 FK 130/50 S DN 65	1005544

## 2.4 Plunger Metering Pumps

### 2.4.6

### Plunger metering pump Orlita® Evolution 1

**Simple and flexible.**

**Capacity range of single head pump: 15 – 545 l/h, 331 – 9 bar**



The high-performance plunger metering pump Orlita® Evolution 1 enables precise pump capacities even at maximum pressure and temperatures of up to +200 °C. The Orlita® Evolution pump has a modular construction and thus versatile uses.

The Orlita® Evolution plunger metering pumps EP1a and EP2a form an integrated product range with stroke lengths of 15 mm. This covers a capacity range from 5 to 511 l/h at 293 – 8 bar. A wide range of drive versions is available, including some for use in Zone 1 or Zone 2 areas at risk from explosion with ATEX certification. The Orlita® Evolution product range is designed to comply with API 675.

#### Your benefits

Flexible adaptation to the process:

- Precise capacity even at maximum pressure
- Metering reproducibility is better than  $\pm 0.5\%$  within the 10 - 100 % stroke length range under defined conditions and with correct installation.
- Excellent hydraulic efficiency

Excellent flexibility:

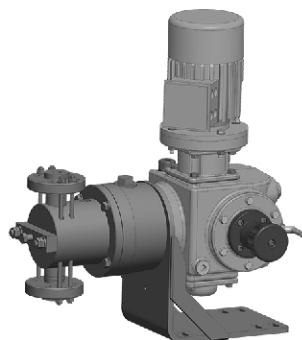
- The modular and compact construction with single and multiple pump versions permits a wide range of applications. In multiple pump systems up to 5 metering units can be combined, including units with different pump capacities
- 7 gear ratios are available
- Power end configuration ideal for installation in any position (vertical or horizontal)
- Customised designs are available on request

#### Technical Details

- Stroke length: 0-16 mm, Rod force: 2,600 N
- Stroke length adjustment: 0 – 100 %
- Stroke length adjustment range: 0 – 100% in operation and idle
- The plunger packing can be tightened by the tensioning screw on the front even during operation
- Metering reproducibility is better than  $\pm 0.5\%$  within the 10 – 100 % stroke length range under defined conditions and with correct installation
- Wetted materials: Stainless steel, special designs are available on request
- A wide range of power end versions is available: 3-phase AC motors, motors for use in areas at risk from explosion and different flange designs for use in customer-specific motors
- Degree of protection: IP 55
- Temperature range - 40 °C to + 200 °C
- Design in compliance with API 675 among others

#### Field of application

- Oil/ gas production (onshore/offshore)
- Refineries
- Chemical / petrochemical industry
- Pharmaceuticals & cosmetics
- Packaging industry (bottling pumps)
- Maximum temperature applications of up to + 200 °C



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Plunger Metering Pump Orlita® Evolution





## 2.4 Plunger Metering Pumps

Technical data for EP1a single pump 50 Hz SST

Plunger Ø  mm	Theor. stroke volume  ml/stroke	Theoretical pump capacity in l/h at strokes/min (50 Hz)							Max. pressure  bar	Efficiency at  100% pressure	Efficiency at  50% pressure	Standard type of valve
		73 [2] l/h	97 [3] l/h	116 [4] l/h	145 [5] l/h	165 [6] l/h	181 [7] l/h	201 [8] l/h				
10	1.26	5.5	7.3	8.7	10.9	12.4	13.6	15.2	331	0.85	0.95	DN 6
19	4.54	19.9	26.4	31.6	39.5	44.9	49.3	54.7	92	0.89	0.95	DN 10
26	8.49	37.2	49.4	59.1	73.9	84.1	92.3	102.4	49	0.92	0.95	DN 10
35	15.39	67.4	89.6	107.1	133.9	152.4	167.2	185.6	27	0.94	0.96	DN 16

Technical data for EP1a single pump 60 Hz SST

Plunger Ø  mm	Theor. stroke volume  ml/stroke	Theoretical pump capacity in l/h at strokes/min (60 Hz)					Max. pressure  bar	Efficiency at  100% pressure	Efficiency at  50% pressure	Standard type of valve
		88 [2] l/h	117 [3] l/h	140 [4] l/h	175 [5] l/h	199 [6] l/h				
10	1.26	6.6	8.8	10.6	13.2	15.0	331	0.85	0.95	DN 6
19	4.54	24.0	31.8	38.1	47.6	54.2	92	0.89	0.95	DN 10
26	8.49	44.9	59.6	71.4	59.2	101.4	49	0.92	0.95	DN 10
35	15.39	81.3	108.1	129.3	161.6	183.8	27	0.94	0.96	DN 16

**Note:**

Abridged presentation of our complete product range. Other piston diameters (8-60 mm) on request.

### Materials in Contact With the Medium

#### Ball valve DN 6 – DN 10

	Suction/ pressure connector	Valve/ head seal	Valve ball	Valve seat	Valve housing	Clamp ring
<b>DN 6 (double ball)</b>	Stainless steel 1.4404	Stainless steel 1.4404	SiN ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4
<b>DN 10 (single ball)</b>	Stainless steel 1.4404	Stainless steel 1.4404	Al <sub>2</sub> O <sub>3</sub> ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4

#### Plate valve DN 16 – DN 20

	Suction/ pressure connector	Valve/ head seal	Valve plate	Valve seat	Valve housing
<b>DN 16/DN 20</b>	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404

Further material versions and details available on request.

## 2.4 Plunger Metering Pumps

### 2.4.7

### Plunger Metering Pump Orlita® Evolution 2

**Simple and flexible.**

**Capacity range of single head pump: 15 – 545 l/h, 520 – 22 bar**



The high-performance plunger metering pump ORLITA® Evolution 2 enables precise pump capacities even at maximum pressure and temperatures of up to + 200 °C. The ORLITA® Evolution pump has a modular construction and thus versatile uses.

The Orlita® Evolution plunger metering pumps EP1a and EP2a form an integrated product range with stroke lengths of 15 mm. This covers a capacity range from 5 to 511 l/h at 520 – 19 bar. A wide range of drive versions is available, including some for use in Zone 1 or Zone 2 areas at risk from explosion with ATEX certification. The Orlita® Evolution product range is designed to comply with API 675.

#### Your benefits

Flexible adaptation to the process:

- Precise capacity even at maximum pressure
- Metering reproducibility is better than  $\pm 0.5\%$  within the 10 - 100 % stroke length range under defined conditions and with correct installation.
- Excellent hydraulic efficiency

Excellent flexibility:

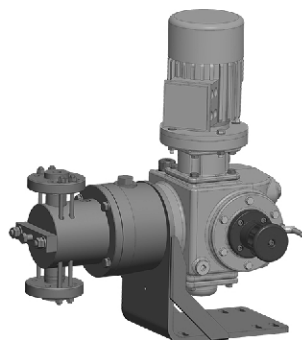
- The modular and compact construction with single and multiple pump versions permits a wide range of applications. In multiple pump systems up to 5 metering units can be combined, including units with different pump capacities
- 7 gear ratios are available
- Power end configuration ideal for installation in any position (vertical or horizontal)
- Customised designs are available on request

#### Technical Details

- Stroke length 0 – 16 mm, rod force: 6,200 N
- Stroke length adjustment range: 0 – 100% in operation and idle
- The plunger packing can be tightened by the tensioning screw on the front even during operation
- Metering reproducibility is better than  $\pm 0.5\%$  within the 10 – 100 % stroke length range under defined conditions and with correct installation
- Wetted materials: Stainless steel, special designs are available on request
- A wide range of power end versions is available: 3-phase AC motors, motors for use in areas at risk from explosion and different flange designs for use in customer-specific motors
- Degree of protection: IP 55
- Temperature range - 40 °C to + 200 °C
- Design in compliance with API 675 among others

#### Field of application

- Oil/ gas production (onshore/offshore)
- Refineries
- Chemical / petrochemical industry
- Pharmaceuticals & cosmetics
- Packaging industry (bottling pumps)
- Maximum temperature applications of up to + 200 °C



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Plunger Metering Pump Orlita® Evolution



## 2.4 Plunger Metering Pumps

Technical data for EP2a single pump 50 Hz SST

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (50 Hz)							Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		73 [2] l/h	97 [3] l/h	116 [4] l/h	145 [5] l/h	165 [6] l/h	181 [7] l/h	201 [8] l/h				
10	1.26	5.5	7.3	8.7	10.9	12.4	13.6	15.2	520	0.82	0.95	DN 6
19	4.54	19.9	26.4	31.6	39.5	44.9	49.3	54.7	219	0.86	0.95	DN 10
26	8.49	37.2	49.4	59.1	73.9	84.1	92.3	102.4	117	0.90	0.96	DN 10
35	15.39	67.4	89.6	107.1	133.9	152.4	167.2	185.6	65	0.92	0.96	DN 16

Technical data for EP2a single pump 60 Hz SST

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (60 Hz)					Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		88 [2] l/h	117 [3] l/h	140 [4] l/h	175 [5] l/h	199 [6] l/h				
10	1.26	6.6	8.8	10.6	13.2	15.0	520	0.82	0.95	DN 6
19	4.54	24.0	31.8	38.1	47.6	54.2	219	0.86	0.95	DN 10
26	8.49	44.9	59.6	71.4	89.2	101.4	117	0.90	0.95	DN 10
35	15.39	81.3	108.1	129.3	161.6	183.8	65	0.92	0.96	DN 16

**Note:**

Abridged presentation of our complete product range. Other types on request. Plunger diameter 11 - 80 mm.

### Materials in Contact With the Medium

#### Ball valve DN 6 – DN 10

	Suction/pressure connector	Valve/ head seal	Valve ball	Valve seat	Valve housing	Clamp ring
<b>DN 6 (double ball)</b>	Stainless steel 1.4404	Stainless steel 1.4404	SiN ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4
<b>DN 10 (single ball)</b>	Stainless steel 1.4404	Stainless steel 1.4404	Al <sub>2</sub> O <sub>3</sub> ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4

#### Plate valve DN 16

	Suction/ pressure connector	Valve/ head seal	Valve plate	Valve seat	Valve housing
<b>DN 16</b>	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404

Further material versions and details available on request.

## 2.4 Plunger Metering Pumps

### 2.4.8

### Plunger Metering Pump Orlita® PS

**Orlita® PS - simple, robust and reliable.**

**Capacity range of single head pump: 0 – 37,000 l/h; 400 – 4 bar**

The high-performance plunger metering pump ORLITA® PS enables precise pump capacities even at maximum pressure and temperatures of up to +400 °C. The ORLITA® PS pump has a modular construction and thus versatile uses.

ORLITA® PS plunger metering pumps (PS 18 to PS 1400) with a stroke length of 15 to 60 mm provide a capacity ranging from 0 to 37,000 l/h at 400 – 4 bar. A wide range of drive versions is available, including some for use in Exe and Exde areas with ATEX certification. The Orlita® PS product range is designed to comply with API 675. Its modular construction permits the free combination of drives, power ends and dosing heads, producing a pump for a range of different feed rates and media operating at different working pressures.

#### Your benefits

Flexible adaptation to the process:

- Precise capacity even at maximum pressure
- Metering reproducibility is better than  $\pm 0.5\%$  within the 10-100% stroke length range under defined conditions and with correct installation.
- Cone valves for use as suction and/or discharge valves with minimal wear, good self-cleaning and low pressure loss (NPSHR)
- Excellent hydraulic efficiency

Excellent flexibility:

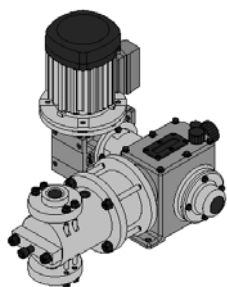
- The modular construction ensures a wide range of uses
- It is possible to combine up to 6 metering units, even with different pump capacities, in multiple pump systems
- 6 different gear ratios are available
- Power end configuration ideal for installation in any position (vertical or horizontal)
- Customised designs are available on request

#### Technical Details

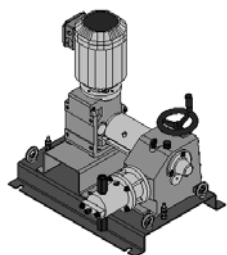
- PS 18 – Stroke length: 0-15 mm, Rod force: 1,750 N
- PS 35 – Stroke length: 0-20 mm, Rod force: 3,500 N
- PS 80 – Stroke length: 0-20 mm, Rod force: 14,000 N
- PS 180 – Stroke length: 0-40 mm, Rod force: 18,000 N
- PS 600 – Stroke length: 0-40 mm, Rod force: 40,000 N
- PS 1400 – Stroke length: 0-60 mm, Rod force: 60,000 N
- Stroke length adjustment range: 0 – 100% in operation and idle
- The plunger packing can be tightened by the tensioning screw on the front even during operation
- Metering reproducibility is better than  $\pm 0.5\%$  within the 10 – 100% stroke length range under defined conditions and with correct installation
- Wetted materials: Stainless steel, special designs are available on request
- A wide range of power end versions is available: Three-phase standard motors, motors for use in Exe and Exde areas and different flange designs for use in customer-specific motors
- Degree of protection: IP 55
- Temperature range - 40 °C to + 400 °C
- Design in compliance with API 675 among others

#### Field of application

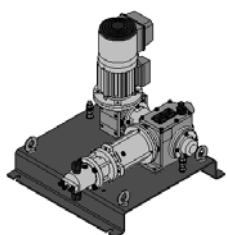
- Oil/ gas production (onshore/offshore)
- Refineries
- Chemical/Petrochemical industry
- Pharmaceuticals & cosmetics
- Packaging industry (bottling pumps)
- Maximum temperature applications of up to +400 °C



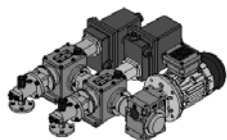
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Orlita® PS 18-36



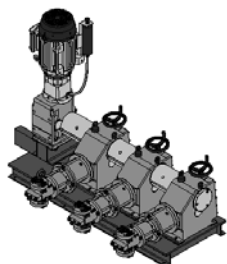
P\_ORL\_072\_SW1  
Orlita® PS 80-30



P\_ORL\_073\_SW1  
Orlita® PS 18-12 high-temperature



P\_ORL\_074\_SW1  
Orlita® PS 35-7-7



P\_ORL\_075\_SW1  
Orlita® PS 600-40-40-40



## 2.4 Plunger Metering Pumps

### Technical Data

Pump type	Plunger Ø	Theor. stroke volume	Max. capacity (theo.) in l/h at strokes/min (50 Hz)						Max. pressure
			58	73	91	112	145	207	
	mm	ml/stroke	l/h	l/h	l/h	l/h	l/h	l/h	bar
PS 18/	5	0.29	1.0	1.2	1.6	1.9	2.5	3.6	250
PS 18/	6	0.42	1.4	1.8	2.3	2.8	3.6	5.2	250
PS 18/	7	0.58	2.0	2.5	3.1	3.8	5.0	7.1	250
PS 18/	8	0.75	2.6	3.2	4.1	5.0	6.5	9.3	250
PS 18/	10	1.18	4.1	5.1	6.4	7.8	10.2	14.6	200
PS 18/	12	1.70	5.9	7.3	9.2	11.3	14.7	21.0	139
PS 18/	16	3.02	10.5	13.1	16.4	20.1	26.2	37.4	78
PS 18/	20	4.71	16.4	20.5	25.6	31.5	41.0	58.5	50
PS 18/	25	7.36	25.6	32.0	40.0	49.2	64.0	91.5	32
PS 18/	30	10.60	36.9	46.1	57.6	70.9	92.2	131.7	16
PS 18/	36	15.27	53.1	66.4	83.0	102.1	132.8	189.7	15
PS 18/	40	18.85	65.6	82.0	102.4	126.1	163.9	234.2	10
PS 18/	50	29.45	102.4	128.1	160.1	197.1	256.2	366.0	8

Pump type	Plunger Ø	Theor. stroke volume	Max. capacity (theo.) in l/h at strokes/min (50 Hz)						Max. pressure
			58	73	91	112	145	207	
	mm	ml/stroke	l/h	l/h	l/h	l/h	l/h	l/h	bar
PS 35/	7	0.77	2.6	3.3	4.1	5.1	6.7	9.5	630
PS 35/	8	1.01	3.5	4.3	5.4	6.7	8.7	12.4	400
PS 35/	10	1.57	5.4	6.8	8.5	10.5	13.6	19.5	400
PS 35/	12	2.26	7.8	9.8	12.3	15.1	19.6	28.1	250
PS 35/	16	4.02	13.9	17.4	21.8	26.9	34.9	49.9	156
PS 35/	20	6.28	21.8	27.3	34.1	42.0	54.6	78.0	100
PS 35/	25	9.82	34.1	42.7	53.3	65.7	85.4	122.0	64
PS 35/	30	14.14	49.2	61.5	76.8	94.6	122.9	175.7	44
PS 35/	36	20.36	70.8	88.5	110.6	136.2	177.1	253.0	30
PS 35/	40	25.13	87.4	109.3	136.6	168.2	218.6	312.3	25
PS 35/	50	39.27	136.6	170.8	213.5	262.8	341.6	488.0	16
PS 35/	65	66.37	230.9	288.6	360.8	444.1	577.3	824.8	9
PS 35/	80	100.53	349.8	437.3	546.6	672.7	874.6	1,249.4	6
PS 35/	100	157.08	546.6	683.3	854.1	1,051.2	1,366.5	1,952.2	4

Pump type	Plunger Ø	Theor. stroke volume	Max. capacity (theo.) in l/h at strokes/min (50 Hz)						Max. pressure
			78	98	122	134	155	182	
	mm	ml/stroke	l/h	l/h	l/h	l/h	l/h	l/h	bar
PS 80/	20	6.28	29	37	46	50	58	68	400
PS 80/	25	9.82	45	57	71	79	91	107	250
PS 80/	30	14.14	66	83	103	113	131	154	178
PS 80/	36	20.36	95	119	149	164	189	222	123
PS 80/	40	25.13	117	148	184	202	233	274	100
PS 80/	50	39.27	183	231	287	316	365	428	64
PS 80/	60	56.55	264	333	414	455	526	617	44
PS 80/	65	66.37	310	390	486	535	617	724	37
PS 80/	80	100.53	470	592	736	810	935	1,097	25
PS 80/	100	157.08	734	925	1,150	1,266	1,461	1,714	16
PS 80/	125	245.44	1,148	1,445	1,797	1,978	2,283	2,679	10
PS 80/	140	307.88	1,440	1,813	2,254	2,482	2,864	3,360	8
PS 80/	160	402.12	1,880	2,368	2,944	3,242	3,741	4,389	6

#### Important note:

All performance data is stated at 50 Hz motor frequency

Abridged presentation of our complete product range. Other types on request

## 2.4 Plunger Metering Pumps

Pump type	Plunger Ø	Theor. stroke volume	Max. capacity (theo.) in l/h at strokes/min (50 Hz)						Max. pressure
			107 l/h	117 l/h	134 l/h	152 l/h	171 l/h	200 l/h	
	mm	ml/stroke							bar
PS 180/	30	28.27	181	199	226	257	290	339	229
PS 180/	36	40.72	262	286	326	370	417	489	159
PS 180/	40	50.27	323	353	403	457	515	604	125
PS 180/	50	78.54	505	552	630	714	805	943	80
PS 180/	54	91.61	589	644	735	833	939	1,100	70
PS 180/	65	132.73	854	934	1,065	1,207	1,361	1,594	48
PS 180/	70	153.94	990	1,083	1,235	1,400	1,579	1,849	40
PS 180/	80	201.06	1,293	1,415	1,613	1,829	2,062	2,416	32
PS 180/	94	277.59	1,786	1,953	2,227	2,526	2,847	3,335	23
PS 180/	125	490.87	3,158	3,455	3,939	4,467	5,036	5,898	13
PS 180/	140	615.75	3,962	4,334	4,941	5,603	6,317	7,399	10
PS 180/	160	804.25	5,175	5,660	6,454	7,318	8,251	9,664	8
PS 180/	200	1,256.64	8,086	8,845	10,085	11,435	12,892	15,100	5

Pump type	Plunger Ø	Theor. stroke volume	Max. capacity (theo.) in l/h at strokes/min (50 Hz)						Max. pressure
			99 l/h	117 l/h	134 l/h	156 l/h	173 l/h	204 l/h	
	mm	ml/stroke							bar
PS 600/	30	28.27	168	198	227	264	293	345	400
PS 600/	36	40.27	242	285	327	381	422	497	353
PS 600/	40	50.27	299	352	403	470	521	614	286
PS 600/	50	78.54	467	551	630	735	814	959	183
PS 600/	54	91.61	545	643	735	857	949	1,119	157
PS 600/	65	132.73	789	932	1,067	1,243	1,376	1,621	100
PS 600/	70	153.94	916	1,080	1,236	1,441	1,596	1,880	93
PS 600/	80	201.06	1,196	1,411	1,616	1,882	2,084	2,456	71
PS 600/	94	277.59	1,651	1,949	2,229	2,599	2,878	3,391	51
PS 600/	125	490.87	2,921	3,446	3,946	4,596	5,090	5,998	29
PS 600/	140	615.75	3,664	4,323	4,951	5,766	6,385	7,523	23
PS 600/	160	804.25	4,785	5,647	6,466	7,531	8,339	9,827	16
PS 600/	200	1,256.64	7,477	8,823	10,104	11,768	13,030	15,354	11

Pump type	Plunger Ø	Theor. stroke volume	Max. capacity (theo.) in l/h at strokes/min (50 Hz)						Max. pressure
			93 l/h	106 l/h	125 l/h	143 l/h	169 l/h	191 l/h	
	mm	ml/stroke							bar
PS 1400/	40	75.40	419	480	565	647	766	864	400
PS 1400/	50	117.81	654	750	884	1,011	1,197	1,350	275
PS 1400/	60	169.65	943	1,080	1,273	1,456	1,724	1,944	190
PS 1400/	70	230.91	1,283	1,470	1,733	1,983	2,346	2,646	140
PS 1400/	80	301.59	1,676	1,920	2,263	2,590	3,065	3,456	107
PS 1400/	94	416.39	2,314	2,651	3,125	3,576	4,231	4,772	77
PS 1400/	125	736.31	4,093	4,689	5,527	6,323	7,483	8,439	44
PS 1400/	140	923.63	5,134	5,882	6,933	7,932	9,387	10,587	35
PS 1400/	160	1,206.37	6,706	7,683	9,055	10,360	12,261	13,827	25
PS 1400/	200	1,884.96	10,478	12,005	14,149	16,188	19,157	21,606	17
PS 1400/	280	3,694.51	20,538	23,530	27,732	31,729	37,549	42,348	8

### Important note:

All performance data is stated at 50 Hz motor frequency

Abridged presentation of our complete product range. Other types on request

## 2.4 Plunger Metering Pumps

### 2.4.9

#### Plunger Metering Pump Orlita® DR

**For the precise metering of high-viscosity and extremely high-viscosity media even containing solid fractions**

**Capacity range of single head pump: 0 – 4,000 l/h; 400 – 4 bar**



The plunger metering pump Orlita® DR does not need valves and can be operated within a broad stroke rate range. It is therefore suitable for use with high-viscosity and extremely high-viscosity media of up to 10<sup>6</sup> mPas within a wide temperature range from -40 °C to 400 °C, for example in the food industry.

Orlita® DR plunger metering pumps (DR 15 to DR 150) are special pumps for high-viscosity and extremely high-viscosity media, which can also contain solids. The pump can be operated within a broad stroke rate range due to its operation without valves.

#### Your benefits

Optimum adaptation to processes with high-viscosity and extremely high-viscosity media, even containing solid fractions:

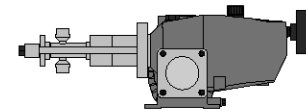
- Low-wear and precise operation even at high pressures, thanks to the rotary plunger with abrasion-resistant / wear-resistant surface coating
- Valve-free operation guarantees a broad stroke rate range
- Wide range of uses: Operating pressure of up to 400 bar, temperature range of - 40 °C to + 400 °C
- Pump direction can be selected depending on the fitting position of the plunger
- A reverse suction effect is continuously adjustable by rotating the pump head around its longitudinal axis
- Power end configuration ideal for installation in any position (vertical or horizontal)
- Excellent hydraulic efficiency
- 4 different gear ratios are available
- Customised designs are available on request

#### Technical Details

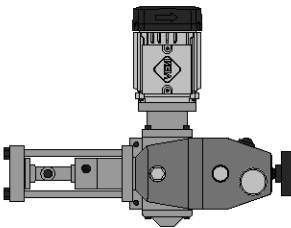
- DR 15 - Stroke length: 0-15 mm, Rod force: 1,800 N
- DR 150 - Stroke length: 0-32 mm, Rod force: 15,000 N
- Stroke length adjustment range: 0 – 100% in operation and idle
- Stroke length adjustment: manually by means of a manual adjustment wheel and scaled display (optionally with electric actuator or control drive)
- Metering reproducibility is better than  $\pm 0.5\%$  within the stroke length adjustment range of 10 to 100% under defined conditions and with proper installation
- Wetted materials: Stainless steel, special designs are available on request
- A wide range of power end versions is available: Three-phase AC motors, motors for use in areas at risk from explosion and different flange designs for use in customer-specific motors
- Degree of protection: IP 55
- Temperature range - 40 °C to + 400 °C
- The interplay between the plunger and cylinder responsible for the sealing effect, is selected depending on the viscosity
- Turret on the rear head end, either designed as a circular collecting vessel for leaks or exposed to a sealing medium
- The turret is sealed by elastomer lip sealing rings

#### Field of application

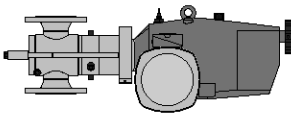
- Metering of high-viscosity and extremely high-viscosity media containing some solid fractions, for example in the food industry.



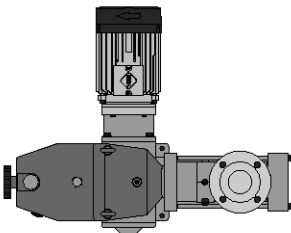
P\_ORL\_0020\_SW  
Orlita® DR



P\_ORL\_0021\_SW  
Orlita® DR 15/12



P\_ORL\_0022\_SW  
Orlita® 150/90



P\_ORL\_0023\_SW  
Orlita® DR 150/90



## 2.4 Plunger Metering Pumps

### Technical Data

Pump type	Plunger Ø	Theor. stroke volume	Capacity max. (theo.) in l/h at strokes/min (50 Hz)			Max. pres- sure
			58 l/h	77 l/h	116 l/h	
	mm	ml/stroke				bar
DR 15/	7	0.58	2.0	2.6	4.0	400
DR 15/	12	1.70	5.9	7.8	11.8	159
DR 15/	18	3.82	13.2	17.7	26.5	70
DR 15/	25	7.36	25.6	34.1	51.2	36
DR 15/	36	15.27	53.1	70.8	106.2	17
DR 15/	50	29.45	102.4	136.6	204.9	9
DR 15/	70	57.73	200.8	267.8	401.7	4

Pump type	Plunger Ø	Theor. stroke volume	Capacity max. (theo.) in l/h at strokes/min (50 Hz)				Max. pres- sure
			58 l/h	77 l/h	116 l/h	145 l/h	
	mm	ml/stroke					bar
DR 150/	12	3.62	12.5	16.7	25.1	31.4	400
DR 150/	18	8.14	28.3	37.7	56.6	70.8	400
DR 150/	25	15.71	54.6	72.8	109.3	136.6	250
DR 150/	36	32.57	113.3	151.1	226.7	283.3	147
DR 150/	50	62.83	218.6	291.5	437.3	546.6	76
DR 150/	70	123.15	428.5	571.4	857.1	1,071.4	38
DR 150/	90	203.58	708.4	944.5	1,416.8	1,771.1	23

#### Important note:

All performance data is stated at 50 Hz motor frequency

Abridged presentation of our complete product range. Other types on request





## 2.5 Process Hydraulic Diaphragm Pumps

### 2.5.1

### Process Hydraulic Diaphragm Metering Pump Orlita® Evolution API 674

Maximum process reliability in accordance with API 674.

Capacity range per pump head: 3 – 7,400 l/h, 400 – 8 bar

The hydraulic diaphragm metering pump Orlita® Evolution API 674 is characterised by a PTFE multilayer diaphragm with integral diaphragm rupture warning and by its unique diaphragm position control. For critical and heavy Industrial applications and when meeting exacting safety requirements.

Orlita® Evolution hydraulic diaphragm metering pumps ER1a, EF2F, EF3F and EF4F form an integrated product range with stroke lengths of 15 to 40 mm. This covers the capacity range from 3 to 7,400 l/h at 400 – 10 bar. A wide range of drive versions is available, including some for use in Zone 1 or Zone 2 areas at risk from explosion with ATEX certification. The Orlita® Evolution product range is designed to comply with API 674.

#### Your benefits

Maximum process reliability:

- PTFE multi-layer diaphragm with integral diaphragm rupture warning system
- Integral hydraulic relief valve
- The new diaphragm position control protects against impermissible operating statuses (e.g. no damage in the event of a blockage on the suction or discharge side)
- Metering reproducibility is better than  $\pm 1\%$  under defined conditions and with proper installation
- Continuous bleeding of the oil chamber ensures reliable operation

Excellent flexibility:

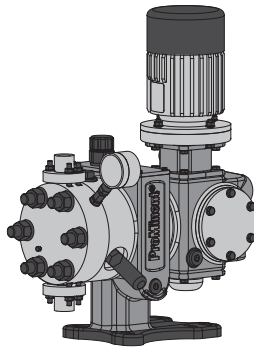
- The modular and compact construction with single and multiple pump versions permits a wide range of applications. In multiple pump systems up to 5 metering units can be combined, including units with different pump capacities
- 7 gear ratios are available
- Power end configuration ideal for installation in any position (vertical or horizontal)
- Customised designs are available on request

#### Technical Details

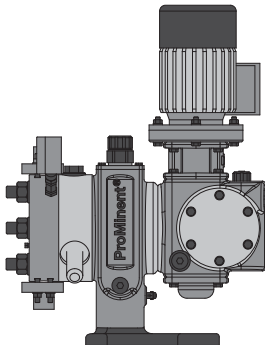
- Stroke length: 16 mm (Evo 1, Evo 2), 25 mm (Evo 3), 40 mm (Evo 4)
- Rod force: 2,600 N (Evo 1), 6,200 N (Evo 2), 9,000 N (Evo 3), 18,000 N (Evo 4)
- Metering reproducibility is better than  $\pm 1\%$  under defined conditions and with proper installation
- PTFE multi-layer diaphragm with electrical diaphragm rupture warning system via a contact
- Integrated hydraulic relief and bleed valve
- Wetted materials:
  - Stainless steel 1.4404, special designs available on request
  - plastics PVC, PVDF, special designs available on request
- A wide range of power end versions is available: Three-phase AC standard motors also for use in areas at risk from explosion, different flange designs for use of customer-specific motors
- Degree of protection: IP 55
- Design in compliance with API 674 among others

#### Field of application

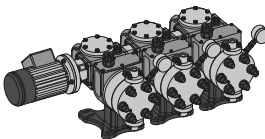
- Oil and gas industry
- Metering of reactants and catalysts in the chemical industry
- Volume-proportional metering of chemicals/additives in the treatment of boiler feed water
- Level-dependent metering of auxiliary agents in industrial production engineering, for instance hot wax metering in the production of adhesive strips



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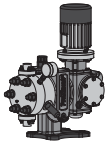


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**NEW**



## 2.5 Process Hydraulic Diaphragm Pumps



### Orlita® Evolution API 674 with stainless steel liquid end

The standard version of Orlita® Evolution hydraulic diaphragm metering pumps has a stainless steel dosing head.

#### Technical data for EF1F single head pump 50 Hz SST

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (50 Hz)							Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		73 [2] l/h	97 [3] l/h	116 [4] l/h	145 [5] l/h	165 [6] l/h	181 [7] l/h	201 [8] l/h				
8	0.80	3.5	4.7	5.6	7.0	8.0	8.7	9.7	400	0.43	0.75	DN 3
10	1.26	5.5	7.3	8.7	10.9	12.4	13.6	15.2	337	0.61	0.79	DN 3
12	1.81	7.9	10.5	12.6	15.7	17.9	19.7	21.8	234	0.77	0.86	DN 6
14	2.46	10.8	14.3	17.1	21.4	24.4	26.7	29.7	172	0.62	0.80	DN 6
17	3.63	15.9	21.1	25.3	31.6	36.0	39.4	43.8	117	0.77	0.88	DN 6
21	5.54	24.3	32.3	38.6	48.2	54.9	60.2	66.8	76	0.85	0.90	DN 10
25	7.85	34.4	45.7	54.7	68.3	77.8	85.3	94.7	54	0.90	0.93	DN 10
29	10.57	46.3	61.5	73.6	91.9	104.6	114.8	127.5	40	0.95	0.96	DN 10
32	12.87	56.4	74.9	89.6	112.0	127.4	139.7	155.2	33	0.89	0.93	DN 16
38	18.15	79.5	105.6	126.3	157.9	179.6	197.1	218.8	23	0.93	0.95	DN 16
44	24.33	106.6	141.6	169.3	211.7	240.9	264.2	293.4	17	0.94	0.96	DN 16
50	31.42	137.6	182.8	218.7	273.3	311.0	341.2	378.9	13	0.95	0.96	DN 16
58	42.27	185.2	246.0	294.2	367.8	418.5	459.1	509.8	10	0.95	0.97	DN 16

#### Technical data for EF1F single head pump 60 Hz SST

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (60 Hz)					Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		88 [2] l/h	117 [3] l/h	140 [4] l/h	175 [5] l/h	199 [6] l/h				
8	0.80	4.2	5.6	6.8	8.4	9.6	400	0.43	0.69	DN 3
10	1.26	6.6	8.8	10.6	13.2	15.0	337	0.61	0.79	DN 3
12	1.81	9.6	12.7	15.2	19.0	21.6	234	0.77	0.86	DN 6
14	2.46	13.0	17.3	20.7	25.9	29.4	172	0.62	0.80	DN 6
17	3.63	19.2	25.5	30.5	38.1	43.4	117	0.77	0.88	DN 6
21	5.54	29.3	38.9	46.6	58.2	66.2	73	0.85	0.90	DN 10
25	7.85	41.5	55.1	62.5	83.8	96.0	54	0.90	0.93	DN 10
29	10.57	55.8	74.2	88.8	111.0	127.5	40	0.95	0.96	DN 10
32	12.87	67.9	90.3	108.1	135.1	153.6	33	0.89	0.93	DN 16
38	18.15	95.8	127.4	152.4	190.5	216.7	23	0.93	0.95	DN 16
44	24.33	128.5	170.8	204.4	255.4	290.5	17	0.94	0.96	DN 16
50	31.42	165.9	220.5	263.9	329.9	375.1	13	0.95	0.96	DN 16
58	42.27	223.2	296.8	355.1	443.9	504.7	10	0.95	0.97	DN 16

#### Note:

Abridged presentation of our complete product range. Other piston diameters (8-60 mm) on request

#### Materials in Contact With the Medium

##### Dosing head complete

Dosing head	Diaphragm retaining screw	Diaphragm
Stainless steel	Stainless steel 1.4462	PTFE multi-layer diaphragm

##### Ball valve DN 3 – DN 10

	Suction/pressure connector	Valve/head seal	Valve ball	Valve seat	Valve housing	Clamp ring
DN 3 (double ball)	Stainless steel 1.4404	Stainless steel 1.4404	Al <sub>2</sub> O <sub>3</sub> ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4
DN 6 (double ball)	Stainless steel 1.4404	Stainless steel 1.4404	SiN ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4
DN 10 (single ball)	Stainless steel 1.4404	Stainless steel 1.4404	Al <sub>2</sub> O <sub>3</sub> ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4

##### Plate valve DN 16

	Suction/pressure connector	Valve/head seal	Valve plate	Valve seat	Valve housing
DN 16	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404

Further material versions and details available on request.



## 2.5 Process Hydraulic Diaphragm Pumps

Technical data for EF2F single head pump 50 Hz SST

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (50 Hz)							Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		73 [2] l/h	97 [3] l/h	116 [4] l/h	145 [5] l/h	165 [6] l/h	181 [7] l/h	201 [8] l/h				
12	1.81	7.9	10.5	12.6	15.7	17.9	20.3	21.8	400	0.69	0.82	DN 6
14	2.46	10.8	14.3	17.1	21.4	24.4	27.6	29.7	400	0.35	0.67	DN 6
17	3.63	15.9	21.1	25.3	31.6	36.0	40.7	43.8	274	0.60	0.79	DN 6
21	5.54	24.3	32.3	38.6	48.2	54.9	62.2	66.8	179	0.75	0.85	DN 10
25	7.85	34.4	45.7	54.7	68.3	77.8	88.1	94.7	127	0.83	0.89	DN 10
29	10.57	46.3	61.5	73.6	91.9	104.6	118.6	127.5	94	0.90	0.93	DN 10
32	12.87	56.4	74.9	89.6	112.0	127.4	144.4	155.2	77	0.76	0.87	DN 16
38	18.15	79.5	105.6	126.3	157.9	179.6	203.6	218.8	55	0.87	0.92	DN 16
44	24.33	106.6	141.6	169.3	211.7	240.9	273.0	293.4	41	0.90	0.94	DN 16
50	31.42	137.6	182.8	218.7	273.3	311.0	352.5	378.9	32	0.91	0.95	DN 16
58	42.27	185.2	246.0	294.2	367.8	418.5	474.3	509.8	24	0.93	0.96	DN 16
70	61.58	269.7	358.4	428.6	535.7	609.6	690.9	742.6	16	0.94	0.96	DN 20

Technical data for EF2F single head pump 60 Hz SST

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (60 Hz)					Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		88 [2] l/h	117 [3] l/h	140 [4] l/h	175 [5] l/h	199 [6] l/h				
12	1.81	9.0	12.0	15.0	19.0	21.0	400	0.69	0.82	DN 6
14	2.46	13.0	17.0	20.0	25.0	29.0	400	0.35	0.67	DN 6
17	3.63	19.0	25.0	30.0	38.0	43.0	274	0.60	0.79	DN 6
21	5.54	29.0	38.0	46.0	58.0	66.0	179	0.75	0.85	DN 10
25	7.85	41.0	55.0	66.0	82.0	93.0	127	0.83	0.89	DN 10
29	10.57	55.0	74.0	88.0	111.0	126.0	94	0.90	0.93	DN 10
32	12.87	67.0	90.0	108.0	135.0	153.0	77	0.76	0.87	DN 16
38	18.15	95.0	127.0	152.0	190.0	216.0	55	0.87	0.92	DN 16
44	24.33	128.0	170.0	204.0	255.0	290.0	41	0.90	0.94	DN 16
50	31.42	165.0	220.0	263.0	329.0	375.0	32	0.91	0.95	DN 16
58	42.27	223.0	296.0	355.0	443.0	504.0	24	0.93	0.96	DN 16
70	61.58	325.0	432.0	517.0	646.0	735.0	16	0.94	0.96	DN 20

**Note:**

Abridged presentation of our complete product range. Other piston diameters (11–80 mm) on request.

**Materials in Contact With the Medium**

**Dosing head complete**

Dosing head	Diaphragm retaining screw	Diaphragm
Stainless steel 1.4404	Stainless steel 1.4462	PTFE multi-layer diaphragm

**Ball valve DN 3 – DN 10**

	Suction/pressure connector	Valve/head seal	Valve ball	Valve seat	Valve housing	Clamp ring
<b>DN 3 (double ball)</b>	Stainless steel 1.4404	Stainless steel 1.4404	Al <sub>2</sub> O <sub>3</sub> ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4
<b>DN 6 (double ball)</b>	Stainless steel 1.4404	Stainless steel 1.4404	SiN ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4
<b>DN 10 (double ball)</b>	Stainless steel 1.4404	Stainless steel 1.4404	Al <sub>2</sub> O <sub>3</sub> ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4

**Plate valve DN 16 – DN 20**

	Suction/pressure connector	Valve/head seal	Valve plate	Valve seat	Valve housing
<b>DN 16/DN 20</b>	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404

Further material versions and details available on request.

## 2.5 Process Hydraulic Diaphragm Pumps

Technical data for EF3F single head pump 50 Hz SST

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (50 Hz)							Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		73 [2] l/h	97 [3] l/h	116 [4] l/h	145 [5] l/h	165 [6] l/h	181 [7] l/h	201 [8] l/h				
17	5.67	24	33	39	49	56	61	68	397	0.72	0.77	DN 6
22	0.95	41	55	66	82	94	103	114	237	0.83	0.85	DN 6
25	12.27	53	71	85	106	121	133	148	183	0.83	0.85	DN 10
30	17.67	77	102	123	153	174	191	213	127	0.87	0.89	DN 10
34	22.70	99	132	158	197	224	246	273	99	0.88	0.89	DN 16
38	28.35	124	165	197	246	280	307	341	79	0.89	0.90	DN 16
44	37.01	166	221	264	330	376	412	458	59	0.90	0.91	DN 20
50	49.09	215	285	341	427	416	533	592	46	0.91	0.91	DN 20
58	66.05	289	384	459	574	653	717	796	34	0.92	0.92	DN 20
63	77.93	341	453	542	678	771	846	939	29	0.92	0.93	DN 25
70	96.21	421	559	669	837	952	1,044	1,160	23	0.93	0.94	DN 25
75	100.45	483	642	768	960	1,093	1,199	1,332	20	0.94	0.95	DN 25
100	196.35	860	1,142	1,366	1,708	1,943	2,132	2,368	11	0.96	0.96	DN 40

Technical data for EF3F single head pump 60 Hz SST

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (60 Hz)					Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		88 [2] l/h	117 [3] l/h	140 [4] l/h	175 [5] l/h	199 [6] l/h				
17	5.67	30	39	47	59	67	397	0.72	0.77	DN 6
22	9.50	50	66	79	99	113	237	0.83	0.85	DN 6
25	12.27	64	86	103	128	146	183	0.83	0.85	DN 10
30	17.67	93	124	148	186	211	127	0.87	0.89	DN 10
34	22.70	119	159	190	238	271	99	0.88	0.89	DN 16
38	28.35	149	199	238	297	338	79	0.89	0.90	DN 16
44	38.01	200	266	319	399	453	59	0.90	0.91	DN 20
50	49.09	259	344	412	515	586	46	0.91	0.91	DN 20
58	66.05	348	463	554	693	788	34	0.92	0.92	DN 20
63	77.93	411	547	654	818	930	29	0.92	0.93	DN 25
70	96.21	508	675	808	1,010	1,148	23	0.93	0.94	DN 25
75	110.45	583	775	927	1,159	1,318	20	0.94	0.95	DN 25
100	196.35	1,036	1,378	1,649	2,061	2,344	11	0.96	0.96	DN 40

**Note:**

Abridged presentation of our complete product range. Additional plunger diameters (14-100 mm) on request.

### Materials in Contact With the Medium

#### Dosing head complete

Dosing head	Diaphragm retaining screw	Diaphragm
Stainless steel 1.4404	Stainless steel 1.4462	PTFE multi-layer diaphragm

#### Ball valve DN 6 – DN 10

	Suction/pressure connector	Valve/head seal	Valve ball	Valve seat	Valve housing	Clamp ring
DN 6 (double ball)	Stainless steel 1.4404	Stainless steel 1.4404	SIN ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4
DN 10 (single ball)	Stainless steel 1.4404	Stainless steel 1.4404	Al <sub>2</sub> O <sub>3</sub> ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4

#### Plate valve DN 16 – DN 25

	Suction/pressure connector	Valve/head seal	Valve plate	Valve seat	Valve housing
DN 16/DN 25	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404

Further material versions and details available on request.



## 2.5 Process Hydraulic Diaphragm Pumps

Technical data for EF4F single head pump 50 Hz SST

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (50 Hz)							Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		73 [2] l/h	97 [3] l/h	116 [4] l/h	145 [5] l/h	165 [6] l/h	181 [7] l/h	201 [8] l/h				
22	15.21	66	88	105	132	150	165	183	400	0.64	0.67	DN 16
25	19.63	86	114	136	170	194	213	236	368	0.67	0.74	DN 16
30	28.27	123	164	196	246	279	307	341	255	0.70	0.76	DN 16
34	36.32	159	211	252	316	359	394	438	199	0.81	0.84	DN 16
38	45.36	198	264	315	394	449	492	547	159	0.82	0.84	DN 20
44	60.82	266	354	423	529	602	660	733	119	0.87	0.88	DN 20
50	78.54	344	457	546	683	777	852	947	92	0.90	0.92	DN 25
60	113.10	495	658	787	983	1,119	1,228	1,364	64	0.91	0.93	DN 32
70	153.94	674	895	1,071	1,339	1,524	1,671	1,856	47	0.91	0.93	DN 40
75	176.71	774	1,028	1,229	1,537	1,749	1,919	2,131	41	0.91	0.93	DN 40
86	232.35	1,017	1,352	1,617	2,021	2,300	2,523	2,802	31	0.93	0.94	DN 50
90	254.47	1,114	1,481	1,771	2,213	2,519	2,763	3,068	28	0.93	0.94	DN 50
100	314.16	1,376	1,828	2,186	2,733	3,110	3,411	3,788	23	0.94	0.94	DN 50
110	380.13	1,665	2,212	2,645	3,307	3,763	4,128	4,584	19	0.95	0.95	DN 50
115	415.48	1,819	2,418	2,891	3,614	4,113	4,512	5,010	17	0.93	0.95	DN 65
130	530.93	2,325	3,090	3,695	4,619	5,256	5,765	6,403	14	0.94	0.95	DN 65
140	615.75	2,697	3,583	4,285	5,357	6,095	6,687	7,426	12	0.95	0.96	DN 65

Technical data for EF4F single head pump 60 Hz SST

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (60 Hz)					Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		88 [2] l/h	117 [3] l/h	140 [4] l/h	175 [5] l/h	199 [6] l/h				
22	15.21	80	106	127	159	181	400	0.64	0.67	DN 16
25	19.63	103	137	164	206	234	368	0.67	0.74	DN 16
30	28.27	149	198	237	269	337	255	0.70	0.76	DN 16
34	36.32	191	254	305	381	433	199	0.81	0.84	DN 16
38	45.36	414	551	659	824	937	159	0.82	0.84	DN 20
44	60.82	239	318	381	476	541	119	0.87	0.88	DN 20
50	78.54	321	427	510	638	726	92	0.90	0.92	DN 25
60	113.10	597	793	950	1,187	1,350	64	0.91	0.93	DN 32
70	153.94	812	1,080	1,293	1,616	1,838	47	0.91	0.93	DN 40
75	176.71	933	1,240	1,484	1,855	2,110	41	0.91	0.93	DN 40
86	232.35	1,226	1,631	1,951	2,439	2,774	31	0.93	0.94	DN 50
90	254.47	1,343	1,786	2,137	2,671	3,038	28	0.93	0.94	DN 50
100	314.16	1,658	2,205	2,368	3,298	3,751	23	0.94	0.94	DN 50
110	380.13	2,007	2,668	3,193	3,991	4,538	19	0.95	0.95	DN 50
115	415.48	2,193	2,916	3,490	4,362	4,960	17	0.93	0.95	DN 65
130	530.93	2,803	3,727	4,459	5,574	6,339	14	0.94	0.95	DN 65
140	615.75	3,251	4,322	5,172	6,465	7,352	12	0.95	0.96	DN 65

**Note:**

Abridged presentation of our complete product range. Additional plunger diameters (22–140 mm) on request.

**Materials in Contact With the Medium**

**Dosing head complete**

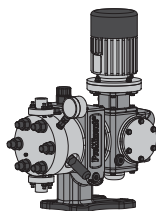
Dosing head	Diaphragm retaining screw	Diaphragm
Stainless steel 1.4404	Stainless steel 1.4462	PTFE multi-layer diaphragm

**Plate valve**

	Suction/pressure connector	Valve/head seal	Valve plate	Valve seat	Valve housing
DN 16 – DN 65	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404

Further material versions and details available on request.

## 2.5 Process Hydraulic Diaphragm Pumps



### Orlita® Evolution API 674 with PVC/PVDF liquid end

The process hydraulic diaphragm metering pump Orlita® Evolution API 674 is also available in a "plastic dosing head" version. The chemical resistance of the wetted materials PVC and PVDF to many media enables the even more flexible use of this process-reliable pump in an even greater number of applications.

### Technical data for EF1F single head pump 50 Hz PVC/PVDF

Plun- ger Ø  mm	Theor. stroke volume ml/ stroke	Theoretical pump capacity in l/h at strokes/min (50 Hz)							Max. pressure  bar	Efficiency at  100% pressure	Efficiency at  50% pressure	Standard type of valve
		73 [2] l/h	97 [3] l/h	116 [4] l/h	145 [5] l/h	165 [6] l/h	181 [7] l/h	201 [8] l/h				
8	0.80	3.5	4.7	5.6	7.0	8.0	8.7	9.7	16	0.67	0.77	DN 3
10	1.26	5.5	7.3	8.7	10.9	12.4	13.6	15.2	16	0.73	0.82	DN 3
12	1.81	7.9	10.5	12.6	15.7	17.9	19.7	21.8	16	0.71	0.77	DN 6
21	5.54	21.3	32.3	38.6	48.2	54.9	60.2	66.8	16	0.78	0.82	DN 10
25	7.85	34.4	45.7	54.7	68.3	77.8	85.3	94.7	16	0.81	0.87	DN 10
29	10.57	46.3	61.5	73.6	91.9	104.6	114.8	127.5	16	0.84	0.89	DN 10
44	24.33	106.6	141.6	169.3	211.7	240.9	264.2	293.4	15	0.94	0.96	DN 16
50	31.42	137.6	182.8	218.7	273.3	311.0	341.2	378.9	12	0.95	0.96	DN 16
60	42.27	185.2	246.0	294.2	367.8	418.5	459.1	509.8	9	0.95	0.96	DN 16

### Technical data for EF1F single head pump 60 Hz PVC/PVDF

Plun- ger Ø  mm	Theor. stroke volume ml/ stroke	Theoretical pump capacity in l/h at strokes/min (60 Hz)					Max. pressure  bar	Efficiency at  100% pressure	Efficiency at  50% pressure	Standard type of valve
		88 [2] l/h	117 [3] l/h	140 [4] l/h	175 [5] l/h	199 [6] l/h				
8	0.80	4.2	5.6	6.8	8.4	9.6	16	0.67	0.77	DN 3
10	1.26	6.6	8.8	10.6	13.2	15.0	16	0.73	0.82	DN 3
12	1.81	9.6	12.7	15.2	19.0	21.6	16	0.71	0.87	DN 6
21	5.54	29.3	38.9	46.6	58.2	66.2	16	0.78	0.85	DN 10
25	7.85	41.5	55.1	66.0	82.5	93.8	16	0.81	0.87	DN 10
29	10.57	55.8	74.2	88.8	111.0	126.2	16	0.84	0.89	DN 10
44	24.33	128.5	170.8	204.4	255.4	290.5	15	0.94	0.96	DN 16
50	31.42	165.9	220.5	263.9	329.9	375.1	12	0.95	0.96	DN 16
60	42.27	223.2	296.8	355.1	443.9	504.7	9	0.95	0.96	DN 16

#### Note:

Abridged presentation of our complete product range. Other plunger diameters (8 - 60 mm) on request.  
Other pressures (e.g. 21 bar) on request.

### Materials in Contact With the Medium

#### Dosing head complete

Dosing head	Diaphragm retaining screw	Diaphragm
Stainless steel	Stainless steel 1.4462	PTFE multi-layer diaphragm

#### Ball valve DN 3 – DN 10

	Suction/pressure connector	Valve/head seal	Valve ball	Valve seat	Valve housing	Clamp ring
DN 3 (double ball)	Stainless steel 1.4404	Stainless steel 1.4404	Al <sub>2</sub> O <sub>3</sub> ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4
DN 6 (double ball)	Stainless steel 1.4404	Stainless steel 1.4404	SiN ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4
DN 10 (single ball)	Stainless steel 1.4404	Stainless steel 1.4404	Al <sub>2</sub> O <sub>3</sub> ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4

#### Plate valve DN 16

	Suction/pressure connector	Valve/head seal	Valve plate	Valve seat	Valve housing
DN 16	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404

Further material versions and details available on request.





## 2.5 Process Hydraulic Diaphragm Pumps

Technical data for EF2F single head pump 50 Hz PVC/PVDF

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (50 Hz)							Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		73 [2] l/h	97 [3] l/h	116 [4] l/h	145 [5] l/h	165 [6] l/h	181 [7] l/h	201 [8] l/h				
12	1.81	7.9	10.5	12.6	15.7	17.9	19.7	21.8	16	0.71	0.77	DN 6
21	5.54	24.3	32.3	38.6	48.2	54.9	60.2	66.8	16	0.78	0.85	DN 10
25	7.85	34.4	45.7	54.7	68.3	77.8	85.8	94.7	16	0.81	0.87	DN 10
29	10.57	46.3	61.5	73.6	91.9	104.6	114.8	127.5	16	0.84	0.89	DN 10
44	24.33	106.6	141.6	169.3	211.7	240.9	264.2	296.4	16	0.94	0.96	DN 16
50	31.42	137.6	182.8	218.7	273.3	311.0	341.2	378.9	16	0.95	0.96	DN 16
58	42.27	185.2	246.0	294.2	367.8	418.5	459.1	509.8	16	0.95	0.96	DN 16

Technical data for EF2F single head pump 60 Hz PVC/PVDF

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (60 Hz)					Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		88 [2] l/h	117 [3] l/h	140 [4] l/h	175 [5] l/h	199 [6] l/h				
12	1.81	9.6	12.7	15.2	19.0	21.6	16	0.71	0.77	DN 6
21	5.54	29.3	38.9	46.6	58.2	66.2	16	0.78	0.85	DN 10
25	7.85	41.5	55.1	66.0	82.5	93.8	16	0.84	0.85	DN 10
29	10.57	55.8	74.2	88.8	111.0	126.2	16	0.84	0.87	DN 10
44	24.33	128.5	170.8	204.4	255.4	290.5	16	0.94	0.96	DN 16
50	31.42	165.9	220.5	263.9	329.9	375.1	16	0.95	0.96	DN 16
58	42.27	223.2	296.8	355.1	433.9	504.7	16	0.95	0.96	DN 16

### Note:

Abridged presentation of our complete product range. Other piston diameters on request. Other pressure stages (e.g. 21 bar) on request.

### Materials in Contact With the Medium

#### Dosing head complete

Dosing head	Diaphragm retaining screw	Diaphragm
Stainless steel 1.4404	Stainless steel 1.4462	PTFE multi-layer diaphragm

#### Ball valve DN 3 – DN 10

	Suction/pressure connector	Valve/head seal	Valve ball	Valve seat	Valve housing	Clamp ring
DN 3 (double ball)	Stainless steel 1.4404	Stainless steel 1.4404	Al <sub>2</sub> O <sub>3</sub> ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4
DN 6 (double ball)	Stainless steel 1.4404	Stainless steel 1.4404	SiN ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4
DN 10 (double ball)	Stainless steel 1.4404	Stainless steel 1.4404	Al <sub>2</sub> O <sub>3</sub> ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4

#### Plate valve DN 16 – DN 20

	Suction/pressure connector	Valve/head seal	Valve plate	Valve seat	Valve housing
DN 16/DN 20	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404

Further material versions and details available on request.

## 2.5 Process Hydraulic Diaphragm Pumps

Technical data for EF3F single head pump 50 Hz PVC/PVDF

Plun- ger Ø	Theor. stroke volume	Theoretical pump capacity in l/h at strokes/min (50 Hz)							Max. pressure	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		73 [2] l/h	97 [3] l/h	116 [4] l/h	145 [5] l/h	165 [6] l/h	181 [7] l/h	201 [8] l/h				
mm	ml/ stroke								bar			
63	77.93	341.0	453.0	542.0	678.0	771.0	846.0	939.0	16	0.92	0.93	DN 32
70	96.21	421.0	559.0	669.0	837.0	952.0	1,044.0	1,160.0	16	0.93	0.94	DN 32
75	110.45	483.0	642.0	768.0	960.0	1,093.0	1,199.0	1,332.0	16	0.94	0.95	DN 32
100	196.35	860.0	1,142.0	1,366.0	1,708.0	1,943.0	2,132.0	2,063.0	11	0.95	0.96	DN 50

Technical data for EF3F single head pump 60 Hz PVC/PVDF

Plun- ger Ø	Theor. stroke volume	Theoretical pump capacity in l/h at strokes/min (60 Hz)					Max. pressure	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		88 [2] l/h	117 [3] l/h	140 [4] l/h	175 [5] l/h	199 [6] l/h				
mm	ml/ stroke						bar			
63	77.93	411.0	547.0	654.0	818.0	930.0	10	0.92	0.93	DN 32
70	96.21	508.0	674.0	802.0	1,010.0	1,148.0	10	0.93	0.94	DN 32
75	110.45	583.0	775.0	927.0	1,159.0	1,318.0	10	0.94	0.95	DN 32
100	196.35	1,036.0	1,378.0	1,649.0	2,061.0	2,344.0	10	0.95	0.96	DN 50

**Note:**

Abridged presentation of our complete product range. Other piston diameters on request. Other pressure stages (e.g. 16 bar) on request.

### Materials in Contact With the Medium

#### Dosing head complete

Dosing head	Diaphragm retaining screw	Diaphragm
Stainless steel 1.4404	Stainless steel 1.4462	PTFE multi-layer diaphragm

#### Ball valve DN 6 – DN 10

	Suction/pressure connector	Valve/head seal	Valve ball	Valve seat	Valve housing	Clamp ring
DN 6 (double ball)	Stainless steel 1.4404	Stainless steel 1.4404	SIN ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4
DN 10 (single ball)	Stainless steel 1.4404	Stainless steel 1.4404	Al <sub>2</sub> O <sub>3</sub> ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C4

#### Plate valve DN 16 – DN 25

	Suction/pressure connector	Valve/head seal	Valve plate	Valve seat	Valve housing
DN 16/DN 25	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404

Further material versions and details available on request.





## 2.5 Process Hydraulic Diaphragm Pumps

Technical data for EF4F single head pump 50 Hz PVC/PVDF

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (50 Hz)							Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		73 [2] l/h	97 [3] l/h	116 [4] l/h	145 [5] l/h	165 [6] l/h	181 [7] l/h	201 [8] l/h				
70	153.90	674	895	1,071	1,339	1,524	1,671	1,856	10	0.84	0.85	DN 50
75	176.70	774	1,028	1,229	1,537	1,749	1,919	2,131	10	0.85	0.86	DN 50
115	415.50	1,819	2,418	2,891	3,614	4,113	4,512	5,010	10	0.90	0.91	DN 50
130	530.90	2,325	3,090	3,695	4,619	5,253	5,765	6,403	10	0.92	0.93	DN 65
140	615.80	2,697	3,583	4,285	5,357	6,095	6,687	7,426	10	0.93	0.94	DN 65

Technical data for EF4F single head pump 60 Hz PVC/PVDF

Plunger Ø mm	Theor. stroke volume ml/stroke	Theoretical pump capacity in l/h at strokes/min (60 Hz)					Max. pressure bar	Efficiency at 100% pressure	Efficiency at 50% pressure	Standard type of valve
		88 [2] l/h	117 [3] l/h	140 [4] l/h	175 [5] l/h	199 [6] l/h				
70	153.90	812	1,080	1,293	1,616	1,838	10	0.84	0.85	DN 50
75	176.70	933	1,240	1,855	2,110	1,484	10	0.85	0.86	DN 50
115	415.50	2,193	2,916	3,490	4,362	4,960	10	0.90	0.91	DN 50
130	615.80	2,803	3,727	4,459	5,574	6,339	10	0.92	0.93	DN 65
140	530.90	3,251	4,322	5,172	6,465	7,352	10	0.93	0.94	DN 65

**Note:**

Abridged presentation of our complete product range. Other piston diameters on request. Other pressure stages (16 and/or 21 bar) on request.

### Materials in Contact With the Medium

#### Dosing head complete

Dosing head	Diaphragm retaining screw	Diaphragm
Stainless steel 1.4404	Stainless steel 1.4462	PTFE multi-layer diaphragm

#### Plate valve

	Suction/pressure connector	Valve/head seal	Valve plate	Valve seat	Valve housing
DN 16 – DN 65	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404

Further material versions and details available on request.

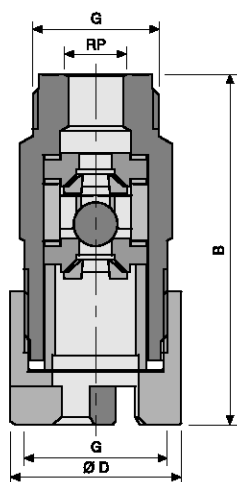
## 2.6 Accessories for Process Metering Pumps

### 2.6.1 Hydraulic/Mechanical Accessories

Hydraulic/mechanical accessories for metering pumps such as injection valves and foot valves, can be found in Chapter 1.4.2, sorted by nominal width DN 8 ... DN 40:

Please observe the permitted pressure stages or material combinations in your selection. Further accessories are available on request.

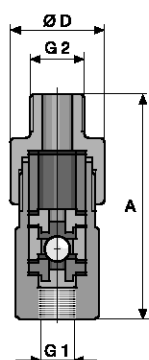
#### 2.6.1.1 Foot Valve SST for High-Pressure Metering Pumps



P\_AC\_0205\_SW

	G	B mm	Rp	Ø D mm	Order no.
DN 10	3/4	70	1/4	41	803730
DN 10	3/4	70	3/8	41	803731

#### 2.6.1.2 Injection Valve SST for High-Pressure Metering Pumps



pk\_2\_028

To fit metering pumps of the product ranges Sigma, Meta and Makro TZ-HK.

Housing and valve spring made of stainless steel no. 1.4571, ball made of stainless steel no. 1.4401, PTFE seals, priming pressure approx. 0.1 bar.

##### Applications

90 °C - max. operating pressure, see table

	Max. pressure bar	G1	G2	Ø D mm	A mm	Order no.
DN 8	320	Rp 1/4	Rp 1/2	42	85	803732
DN 10	190	Rp 3/8	Rp 1/2	42	90	803733



## 2.6 Accessories for Process Metering Pumps

### 2.6.1.3 Return/Pressure Relief Valve, Spring-loaded

Spring-loaded valves, inline version, designed as pump valves, i.e. to cope with a very high number of load cycles. Also suitable for use without pulsation damper.

**Features:**

- Female thread on both sides or with sealing surface
- For bracing between 2 flanges
- PN 200 or PN 400
- Settings factory-set
- Standard design in stainless steel, hastelloy also available on request, as is Inconel

Also available heatable on request.

DN	Adjustable pressure	Construction	Order no.
6	2.0 bar	Ball	1020074
6	4.0 bar	Ball	1019224
6	8.0 – 9.0 bar	Ball	1019097
10	2.0 bar	Cone, fixed	1019649
10	3.0 – 6.0 bar	Cone, adjustable	1023053
10	8.0 – 14.0 bar	Cone, adjustable	1024065
16	2.0 bar	Cone, fixed	1017937
16	3.0 bar	Cone, fixed	1035266
16	4.5 – 5.4 bar	Cone, fixed	1017936
25	1.0 – 2.0 bar	Cone, fixed	1021843

## 2.6 Accessories for Process Metering Pumps

### 2.6.1.4

### Safety Valve

#### Regulations:

Safety valves are designed to comply with the following regulations:

- Pressurised Vessel and Steam Boiler Directive
- TRD 421, 721
- TRB 403
- AD 2000 Bulletins A2 and A4
- DIN EN ISO 4126
- Pressure Equipment Directive 97/23/EC
- ASME Code, Sections II and VIII
- API 526, 520, 527
- Others

The relevant product-specific certificates are available to prove compliance with these regulations and thus also the safety of the products.

Safety valves carry a parts label (specification label) stipulating the following data:

- Order date (serial no.)
- Technical data
- Set pressure
- VdTÜV Parts test number
- CE mark with number of nominated centre
- Further data, e.g. UV stamp with ASME-approved safety valves

#### Inspection / Labelling:

Following adjustment and inspection, every safety valve is sealed by the manufacturer.

Connectors: NPT threaded connectors, threaded sockets, flange mountings comply with DIN / ANSI.  
Other connections are available on request.

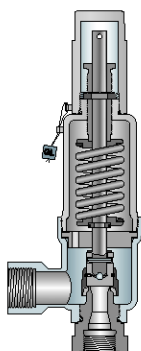
#### Inlet body material

Material description	X 14 CrNiMo 17-12-2
Material no.	1.4404
ASME	316L

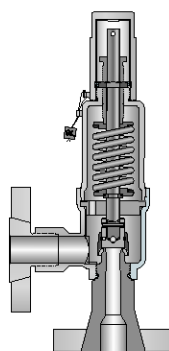
#### Dimensions, pressure ranges, weights

#### Standard 10 mm

Pressure rating at inlet	320 PN
Pressure rating at outlet	160 PN
Min. response pressure	0.1 bar
Max. response pressure (4373 / 4374)	68 bar
Narrowest flow cross-section	78.5 mm <sup>2</sup>
Narrowest flow diameter	10 mm
Leg length (outlet / inlet)	30 mm / 33 mm
Pin length (G 1/2 / G 3/4)	15 mm / 16 mm
Flange design	100 mm
Height (H2 / H4)	137/162 mm
Weight	1.2 kg



P\_AC\_0231\_SW



P\_AC\_0232\_SW

## 2.6 Accessories for Process Metering Pumps

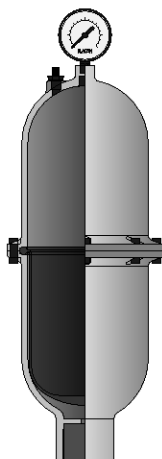
### 2.6.1.5

#### Pulsation Damper

Pulsation dampers with separating membrane / bubble / bellows for providing separation between the gas cushion and metered chemical are used for low-pulsation metering as well as for reducing flow resistance in long metering lines and with viscous media. The response pressure of the gas cushion should be approx. 60-80% of the operating pressure.

**Important:** A pressure relief valve should always be fitted with an adjustable back pressure valve when using a pulsation damper.

##### Bladder dampers, metal

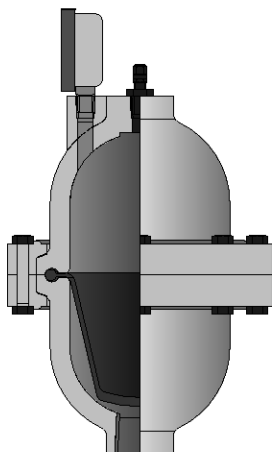


<b>Volume</b>	0.066 - 379 l
<b>Pressure</b>	20.7 bar
<b>Material of bladder/diaphragm</b>	EPDM or FKM
<b>Housing material</b>	316 L stainless steel, Hastelloy C, PTFE

Further material versions and details available on request.

P\_AC\_0258\_SW1

##### Bladder damper, plastic



<b>Volume</b>	0.066 - 19 l
<b>Pressure</b>	17.2 bar
<b>Material of bladder/diaphragm</b>	EPDM or FKM
<b>Housing material</b>	PVDF

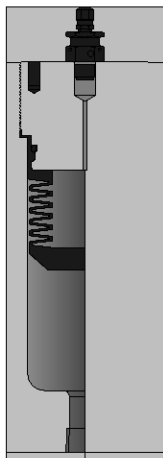
Further material versions and details available on request.

P\_AC\_0259\_SW1



## 2.6 Accessories for Process Metering Pumps

### Bladder damper, high pressure

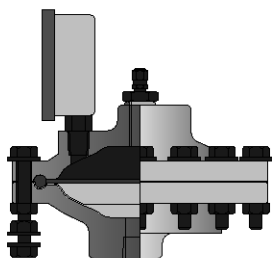


<b>Volume</b>	0.13 - 0.39 l
<b>Pressure</b>	793 bar
<b>Material of bladder/diaphragm</b>	EPDM or FKM
<b>Housing material</b>	316 L stainless steel, Hastelloy C, Alloy 20

Further material versions and details available on request.

P\_AC\_0260\_SW1

### Diaphragm damper with PTFE diaphragm



<b>Volume</b>	0.20
<b>Pressure</b>	137 bar
<b>Material of bladder/diaphragm</b>	PTFE
<b>Housing material</b>	316 L stainless steel, Hastelloy C, Alloy 20

Further material versions and details available on request.

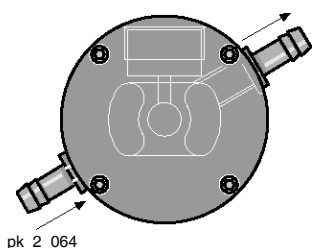
P\_AC\_0261\_SW1

## 2.6 Accessories for Process Metering Pumps

### 2.6.2 Electrical Accessories

Accessories for metering pumps, such as frequency converters etc., can be found in Chapter 1.4.4., depending on the motor capacity DN 8 ... DN 40.

#### 2.6.2.1 Cooling/Heating Equipment, Plunger Metering Pumps



The cooling/heating equipment is installed in the liquid end. 10 mm diameter connectors. Cannot be retrofitted.

For pump	Order no.
<b>Sigma HK - 08 S</b>	1040459
<b>Meta/Sigma HK - 12,5 S</b>	803551
<b>Meta/Sigma HK - 25 S</b>	803552
<b>Meta/Sigma HK - 50 S</b>	803553
<b>Makro TZ FK 30</b>	1036645
<b>Makro TZ FK 50</b>	1036655
<b>Makro TZ FK 85</b>	1024665

Cooling/heating equipment for Makro TZ HK on request.

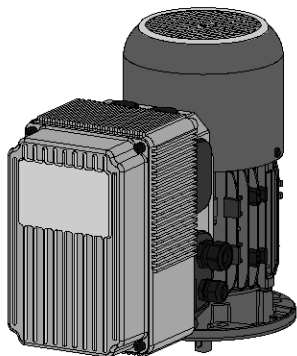


## 2.6 Accessories for Process Metering Pumps

### 2.6.3

### Variable Speed Motors with Integrated Frequency Converter with IP 55 Protection

Externally controllable by 5 digital inputs, 1 analogue output 0 - 20 mA, 1 analogue input 0 - 10 V.



P\_AC\_0293\_SW1

Variable speed motor with integrated frequency converter

Max. motor output kW	Voltage supply	Control range	Flange Ø mm	For pump	Order no.
0.37	1-phase, 230 V, 50/60 Hz	1:20	160	Hydro/ 2	1106898
0.75	1-phase, 230 V, 50/60 Hz	1:20	160	Hydro/ 3	1106900
1.50	3-phase, 400 V, 50/60 Hz	1:20	200	Hydro/ 4, Makro TZ (TZMb)	1106899
3.00	3-phase, 400 V, 50/60 Hz	1:20	200	Makro 5, Makro TZ (TZKa)	1106901

Motor data sheets can be requested for more information. Special motors or special motor flanges are available on request.

Motors less than 0.75 kW and motors designed for speed-controllable operation are not subject to the IE3 standard in compliance with the Ecodesign Directive 2009/125/EC.



# Data Required for Specification of Metering Pump and Accessories

## Pump Specification Data

Min./max. required feed rate l/h \_\_\_\_\_  
 Available power supply \_\_\_\_\_ V, \_\_\_\_\_ Hz  
 Min./max. operating temperature °C \_\_\_\_\_  
 Properties of process chemical \_\_\_\_\_  
 Name, concentration % \_\_\_\_\_  
 Solids content % \_\_\_\_\_  
 Dynamic viscosity mPa (= cP) \_\_\_\_\_  
 Vapour pressure at operating temperature bar \_\_\_\_\_  
 Remarks, e.g. abrasive, \_\_\_\_\_  
 gaseous, flammable, \_\_\_\_\_  
 corrosive towards \_\_\_\_\_

### Suction conditions:

Min./max. suction lift m \_\_\_\_\_  
 Min./max. positive suction head m \_\_\_\_\_  
 Pressure in chemical tank bar \_\_\_\_\_  
 Suction line length m \_\_\_\_\_  
 Suction line diameter mm \_\_\_\_\_

### Discharge conditions:

Min./max. back pressure bar \_\_\_\_\_  
 Min./max. discharge head m \_\_\_\_\_  
 Min./max. negative discharge head m \_\_\_\_\_  
 Discharge line length m \_\_\_\_\_  
 Discharge line diameter mm \_\_\_\_\_  
 Number of valves and fittings in suction and discharge line \_\_\_\_\_

### Data required for proportional dosing:

Water flow Q min./max. m<sup>3</sup>/h \_\_\_\_\_  
 Required final concentration g/m<sup>3</sup>, ppm \_\_\_\_\_

### Example:

A required dose in mg/l = g/m<sup>3</sup> = ppm

(Water flow Q max. 50 m<sup>3</sup>/h)

Pulse spacing (flow volume per pulse) of water meter 5 l.

Process fluid = sodium hypochlorite solution Na OCl with 12 % chlorine (by weight) = 120 g/kg = 150 g/l = 150 mg/ml

Selected dosing pump GMXa 1604NPT2 NPB2 with 0.3 ml/per stroke volume, at max. 10800 strokes/h.

Variables: pump type, pulse spacing and concentration. The stroke rate (max. throughput l/h: pulse spacing l/pulse = 50,000 l/h : 5 l/pulse = 10000 pulses/h) must not exceed the max. stroke frequency (10800 strokes/h) of the dosing pump.

$$\text{Feed quantity} = \frac{\text{water throughput Q max. (l/h)} \times \text{stroke volume (l)}}{\text{pulse spacing (l)}} = \frac{50,000 \text{ l} \times 0.0003 \text{ l}}{5 \text{ l}} = 3 \text{ l/h}$$

$$\begin{aligned} \text{Final dose} &= \frac{\text{concentration (mg/ml)} \times \text{stroke volume (l)}}{\text{pulse spacing (l)}} = \frac{150 \text{ mg} \times 0.3 \text{ ml}}{5 \text{ l}} = 9 \text{ mg/l} \\ &= 9 \text{ g/m}^3 \\ &= 9 \text{ ppm chlorine Cl}_2 \end{aligned}$$





# ProMinent® Chemical Resistance List

## Resistance of Materials Used in Liquid Ends to the Chemicals Most Frequently Used

The data apply to standard conditions (20 °C, 1,013 mbar).

s	=	saturated solution in water
+	=	resistant
+/o	=	largely resistant
o	=	conditionally resistant
-	=	not resistant
n	=	resistance not known
=>	=	see
*	=	for bonded connections, the resistance of the adhesive (e.g. Tangit) is to be considered. (Materials of the types 'o' and '-' are not recommended!)
**	=	does not apply to glass fibre reinforced material

Concentration data are stated in weight percent, relative to aqueous solutions. If percentages are stated for the level of resistance, this level of resistance is only valid up to this concentration.

### NOTE:

The elastomers **CSM (Hypalon®)** and **IIR (butyl rubber)** used as diaphragm materials in pulsation dampers have properties similar to **EPDM**.

**PTFE** is resistant to all chemicals in this list.

**PTFE filled with carbon**, however, is attacked by strong oxidants such as bromine (anhydrous) or concentrated acids (phosphoric acid, sulphuric acid, chromic acid).

The resistance of PVC-U adhesive joints with Tangit deviates from the list below with regard to the following chemicals:

Medium	Concentration range
Sulfochromic acid	≥ 70% H <sub>2</sub> SO <sub>4</sub> + 5% K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> /Na <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>
Chromic acid	≥ 10% CrO <sub>3</sub>
Hydrochloric acid	≥ 25% HCl
Hydrogen peroxide	≥ 5% H <sub>2</sub> O <sub>2</sub>
Hydrofluoric acid	≥ 0% HF

### Explanation of abbreviations used as column headings:

<b>PMMA:</b>	Polymethylmethacrylate (Acrylic resistance)
<b>PVC:</b>	Polyvinylchloride, rigid, (PVC-U) resistance
<b>PP:</b>	Polypropylene resistance
<b>PVDF:</b>	Polyvinylidene fluoride
<b>1.4404:</b>	Stainless steel 1.4404 & 1.4571 resistance
<b>FKM:</b>	Fluorine Rubber (e.g. Viton® A & B) resistance
<b>EPDM:</b>	Ethylene-Propylene-Dien-rubber resistance
<b>PharMed®:</b>	PharMed® resistance
<b>PE:</b>	Polyethylene resistance
<b>2.4819:</b>	Hastelloy C-276 resistance
<b>WGK:</b>	Water endangering class

Viton® is a registered trademark of DuPont Dow Elastomers

### Water endangering classes (WGK):

1	=	slightly hazardous to water
2	=	hazardous to water
3	=	severely hazardous to water
(X)	=	no classification. Classification according to conclusion by analogy. To be used under reserve.

### Safety data sheets

Safety data sheets on our products in a number of different languages are provided on our website.

[www.prominent.com/MSDS](http://www.prominent.com/MSDS)



# ProMinent® Chemical Resistance List

The data is taken from relevant manufacturer's documentation and our own tests. Resistance of materials is also dependant on other factors, e.g. operating conditions, conditions of surfaces etc, and so this list must be treated as an initial guide only. It cannot claim to offer any guarantees. It should be taken into consideration in particular that usual dosing media are compounds, and their corrosiveness cannot be deducted simply by adding the corrosiveness of each single component. In such cases the chemical producers' data of the material compatibility are to be considered as a matter of prime importance for the material choice. A safety data sheet does not give this data and therefore cannot take the place of the technical documentation on the application.

Chemical	Formula	Conc	PMMA	PVC	PP	PVDF	1.4404	FKM	EPDM	PharMed®	PE	2.4819	WPC
Acetaldehyde	CH <sub>3</sub> CHO	100%	-	-	o	-	+	-	+/-	-	+	+	2
Acetamide	CH <sub>3</sub> CONH <sub>2</sub>	s	+	+	+	+	+	o	+	+/-	+	+	1
Acetic Acid	CH <sub>3</sub> COOH	100%	-	50%	+	+	+	-	o	60%	70%	+	1
Acetic Anhydride	(CH <sub>3</sub> CO) <sub>2</sub> O	100%	-	-	o	-	+	-	+/-	+	o	+	1
Acetic Ether => Ethyl Acetate													
Acetone	CH <sub>3</sub> COCH <sub>3</sub>	100%	-	-	+	-	+	-	+	-	+	+	1
Acetophenone	C <sub>6</sub> H <sub>5</sub> COCH <sub>3</sub>	100%	-	n	+	-	+	-	+	n	+	+	1
Acetyl Chloride	CH <sub>3</sub> COCl	100%	-	+	n	-	o	+	-	o	n	+	1
Acetylacetone	CH <sub>3</sub> COCH <sub>2</sub> COCH <sub>3</sub>	100%	-	-	+	-	+	-	+	n	+	+	1
Acetylene Dichloride => Dichloro Ethylene													
Acetylene Tetrachloride => Tetrachloro Ethane													
Acrylonitril	CH <sub>2</sub> =CH-CN	100%	-	-	+	+	+	-	-	-	+	+	3
Adipic Acid	HOOC(CH <sub>2</sub> ) <sub>4</sub> COOH	s	+	+	+	+	+	+	+	+/-	+	+	1
Allyl Alcohol	CH <sub>2</sub> CHCH <sub>2</sub> OH	96%	-	o	+	+	+	-	+	o	+	+/-	2
Aluminium Acetate	Al(CH <sub>3</sub> COO) <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+/-	1
Aluminium Bromide	AlBr <sub>3</sub>	s	+	+	+	+	n	+	+	+	+	+	2
Aluminium Chloride	AlCl <sub>3</sub>	s	+	+	+	+	-	+	+	+	+	+	1
Aluminium Fluoride	AlF <sub>3</sub>	10%	+	+	+	+	-	+	+	+	+	+/-	1
Aluminium Hydroxide	Al(OH) <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Aluminium Nitrate	Al(NO <sub>3</sub> ) <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Aluminium Phosphate	AlPO <sub>4</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Aluminium Sulphate	Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Ammonium Acetate	CH <sub>3</sub> COONH <sub>4</sub>	s	+	+/-	+	+	+	+	+	+	+	+	1
Ammonium Bicarbonate	NH <sub>4</sub> HCO <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Ammonium Carbonate	(NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub>	40%	+	+	+	+	+	+	+	+	+	+	1
Ammonium Chloride	NH <sub>4</sub> Cl	s	+	+	+	+	-	+	+	+	+	+/-	1
Ammonium Fluoride	NH <sub>4</sub> F	s	+	o	+	+	o	+	+	+	+	+	1
Ammonium Hydroxide	"NH <sub>4</sub> OH"	30%	+	+	+	+	(25 °C)	+	-	+	+	+	2
Ammonium Nitrate	NH <sub>4</sub> NO <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Ammonium Oxalate	(COONH <sub>4</sub> ) <sub>2</sub> * H <sub>2</sub> O	s	+	+	+	+	+	+	+	+	+	+	1
Ammonium Perchlorate	NH <sub>4</sub> ClO <sub>4</sub>	10%	+	+	+	+	+	+	+	+	+	+	1
Ammonium Peroxodisulphate	(NH <sub>4</sub> ) <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	s	+	+	+	+	5%	+	+	+	+	5%	2
Ammonium Phosphate	(NH <sub>4</sub> ) <sub>3</sub> PO <sub>4</sub>	s	+	+	+	+	10%	+	+	+	+	10%	1
Ammonium Sulphate	(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	s	+	+	+	+	10%	+	+	+	+	10%	1
Ammonium Sulphide	(NH <sub>4</sub> ) <sub>2</sub> S	s	+	+	+	+	n	+	+	n	+	n	2
Ammoniumaluminium Sulphate	NH <sub>4</sub> Al(SO <sub>4</sub> ) <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Amyl Alcohol	C <sub>5</sub> H <sub>11</sub> OH	100%	+	+	+	+	+	-	+	-	+	+	1
Aniline	C <sub>6</sub> H <sub>5</sub> NH <sub>2</sub>	100%	-	-	+	+	+	-	+/-	o	+	+	2
Aniline Hydrochloride	C <sub>6</sub> H <sub>5</sub> NH <sub>2</sub> * HCl	s	n	+	+	+	-	+/-	+/-	o	+	+	2
Antimony Trichloride	SbCl <sub>3</sub>	s	+	+	+	+	-	+	+	+	+	n	2
Aqua Regia	3 HCl + HNO <sub>3</sub>	100%	-	+	-	+	-	-	o	-	-	-	2
Arsenic Acid	H <sub>3</sub> AsO <sub>4</sub>	s	+	+	+	+	+	+	+	o	+	+	3
Barium Carbonate	BaCO <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Barium Chloride	BaCl <sub>2</sub>	s	+	+	+	+	-	+	+	+	+	+	1
Barium Hydroxide	Ba(OH) <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Barium Nitrate	Ba(NO <sub>3</sub> ) <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Barium Sulphate	BaSO <sub>4</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Barium Sulphide	BaS	s	+	+	+	+	+	+	+	+	+	+	(1)
Benzaldehyde	C <sub>6</sub> H <sub>5</sub> CHO	100%	-	-	+	-	+	+	+	-	o	+	1
Benzene	C <sub>6</sub> H <sub>6</sub>	100%	-	-	o	+	+	o	-	-	o	+	3
Benzene Sulphonic Acid	C <sub>6</sub> H <sub>5</sub> SO <sub>3</sub> H	10%	n	n	+	+	+	+	-	-	n	+	2
Benzoic Acid	C <sub>6</sub> H <sub>5</sub> COOH	s	+	+	+	+	+	+	+	+/-	+	+	1
Benzoyl Chloride	C <sub>6</sub> H <sub>5</sub> COCl	100%	-	n	o	n	o	+	+	n	o	+	2
Benzyl Alcohol	C <sub>6</sub> H <sub>5</sub> CH <sub>2</sub> OH	100%	-	-	+	+	+	+	-	+	+	+	1
Benzyl Benzoate	C <sub>6</sub> H <sub>5</sub> COOC <sub>7</sub> H <sub>7</sub>	100%	-	-	+	o	+	+	-	-	+	+	2
Benzyl Chloride	C <sub>6</sub> H <sub>5</sub> CH <sub>2</sub> Cl	90%	-	n	o	+	+	+	-	-	o	+	2
Bitter Salt => Magnesium Sulphate													
Bleach => Sodium Hypochlorite													
Blue Vitriol => Copper Sulphate													
Borax => Sodium Tetraborate													

# ProMinent® Chemical Resistance List

Chemical	Formula	Conc	PMMA	PVC	PP	PVDF	1.4404	FKM	EPDM	PharMed®	PE	2.4819	WPC
Boric Acid	H <sub>3</sub> BO <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Brine		s	+	+/o	+	+	+/o	+	+	+	+	+	1
Bromine (dry)	Br <sub>2</sub>	100%	-	-	-	+	-	-	-	-	-	+	2
Bromine Water	Br <sub>2</sub> + H <sub>2</sub> O	s	-	+	-	+	-	-	-	n	-	n	(2)
Bromo Benzene	C <sub>6</sub> H <sub>5</sub> Br	100%	n	n	o	+	+	o	-	-	o	+	2
Bromochloro Methane	CH <sub>2</sub> BrCl	100%	-	-	-	+	+	n	+/o	-	o	+	2
Bromochlorotrifluoro Ethane	HCClBrCF <sub>3</sub>	100%	-	-	o	+	+	+	-	+	o	+	(3)
Butanediol	HOC <sub>4</sub> H <sub>8</sub> OH	10%	n	+	+	+	+	o	+	+	+	+	1
Butanetriol	C <sub>4</sub> H <sub>10</sub> O <sub>3</sub>	s	+	+	+	+	+	o	+	+	+	+	1
Butanol	C <sub>4</sub> H <sub>9</sub> OH	100%	-	+	+	+	+	o	+/o	-	+	+	1
Butyl Acetate	C <sub>7</sub> H <sub>13</sub> O <sub>2</sub>	100%	-	-	+	+	+	-	-	+/o	+	+	1
Butyl Acetate	CH <sub>3</sub> COOC <sub>4</sub> H <sub>9</sub>	100%	-	-	o	+	+	-	+/o	+/o	-	+	1
Butyl Alcohol => Butanol													
Butyl Amine	C <sub>4</sub> H <sub>9</sub> NH <sub>2</sub>	100%	n	n	n	-	+	-	-	n	+	+	1
Butyl Benzoate	C <sub>6</sub> H <sub>5</sub> COOC <sub>4</sub> H <sub>9</sub>	100%	-	-	o	n	+	+	+	-	o	+	2
Butyl Mercaptane	C <sub>4</sub> H <sub>9</sub> SH	100%	n	n	n	+	n	+	-	n	n	n	3
Butyl Oleate	C <sub>22</sub> H <sub>42</sub> O <sub>2</sub>	100%	n	n	n	+	+	+	+/o	n	n	+	1
Butyl Stearate	C <sub>22</sub> H <sub>44</sub> O <sub>2</sub>	100%	o	n	n	+	+	+	-	n	n	+	1
Butyraldehyde	C <sub>3</sub> H <sub>7</sub> CHO	100%	-	n	+	n	+	-	+/o	-	+	+	1
Butyric Acid	C <sub>3</sub> H <sub>7</sub> COOH	100%	5%	20%	+	+	+	+	+	+/o	+	+	1
Calcium Acetate	(CH <sub>3</sub> COO) <sub>2</sub> Ca	s	+	+	+	+	+	+	+	+	+	+	1
Calcium Bisulphite	Ca(HSO <sub>3</sub> ) <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	(1)
Calcium Carbonate	CaCO <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Calcium Chloride	CaCl <sub>2</sub>	s	+	+	+	+	-	+	+	+	+	+	1
Calcium Cyanide	Ca(CN) <sub>2</sub>	s	+	+	+	+	n	+	+	+	+	n	3
Calcium Hydroxide	Ca(OH) <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Calcium Hypochlorite	Ca(OCl) <sub>2</sub>	s	+	+	o	+	-	o	+	+	+	+	2
Calcium Nitrate	Ca(NO <sub>3</sub> ) <sub>2</sub>	s	+	50%	50%	+	+	+	+	+	+	+	1
Calcium Phosphate	Ca <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Calcium Sulphate	CaSO <sub>4</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Calcium Sulphide	CaS	s	+	+	+	+	n	+	+	+	+	+	(2)
Calcium Sulphite	CaSO <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	(1)
Calcium Thiosulphate	CaS <sub>2</sub> O <sub>3</sub>	s	+	+	+	+	-	+	+	+	+	+	1
Carbolic Acid => Phenole													
Carbon Disulphide	CS <sub>2</sub>	100%	-	-	o	+	+	+	-	-	o	+	2
Carbon Tetrachloride	CCl <sub>4</sub>	100%	-	-	-	+	+	+	-	-	o	+	3
Carbonic Acid	"H <sub>2</sub> CO <sub>3</sub> "	s	+	+	+	+	+	+	+	+	+	+	1
Caustic Potash => Potassium Hydroxide													
Caustic Soda => Sodium Hydroxide													
Chloric Acid	HClO <sub>3</sub>	20%	+	+	-	+	-	o	o	+	10%	+	2
Chlorinated Lime => Calcium Hypochlorite													
Chlorine Dioxide Solution	ClO <sub>2</sub> + H <sub>2</sub> O	0.5%	o	+	o	+ <sup>1)</sup>	-	o	-	-	o	+	
Chlorine Water	Cl <sub>2</sub> + H <sub>2</sub> O	s	+	+	o	+	-	+	+	-	o	+	
Chloro Benzene	C <sub>6</sub> H <sub>5</sub> Cl	100%	-	-	+	+	+	+	-	-	o	+	2
Chloro Ethanol	ClCH <sub>2</sub> CH <sub>2</sub> OH	100%	-	-	+	o	+	-	o	+	+	+	3
Chloro Ethylbenzene	C <sub>6</sub> H <sub>4</sub> ClC <sub>2</sub> H <sub>5</sub>	100%	-	-	o	n	+	o	-	-	o	+	(2)
Chloro Phenole	C <sub>6</sub> H <sub>4</sub> OHCl	100%	-	n	+	+	+	n	-	-	+	+	2
Chloro Toluene	C <sub>7</sub> H <sub>8</sub> Cl	100%	-	-	n	+	+	+	-	-	n	+	2
Chloroacetone	ClCH <sub>2</sub> COCH <sub>3</sub>	100%	-	-	n	n	+	-	+	-	n	+	3
Chlorobutadiene	C <sub>4</sub> H <sub>5</sub> Cl	100%	-	-	n	n	+	+	-	-	n	+	1
Chloroform	CHCl <sub>3</sub>	100%	-	-	o	+	+	+	-	o	-	+	2
Chlorohydrin	C <sub>3</sub> H <sub>5</sub> OCl	100%	-	n	+	-	+	+	o	+	+	+	3
Chloroprene => Chlorobutadiene													
Chlorosulphonic Acid	SO <sub>2</sub> (OH)Cl	100%	-	o	-	+	-	-	-	-	-	o	1
Chrome-alum => Potassium Chrome Sulphate													
Chromic Acid	H <sub>2</sub> CrO <sub>4</sub>	50%	-	+	o	+	10%	+	-	o	+	10%	3
Chromic-Sulphuric Acid	K <sub>2</sub> CrO <sub>4</sub> + H <sub>2</sub> SO <sub>4</sub>	s	-	+	-	+	n	n	n	-	-	n	3
Chromium Sulphate	Cr <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Citric Acid	C <sub>6</sub> H <sub>8</sub> O <sub>7</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Cobalt Chloride	CoCl <sub>2</sub>	s	+	+	+	+	-	+	+	+	+	+	2
Copper-II-Acetate	Cu(CH <sub>3</sub> COO) <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	3
Copper-II-Arsenite	Cu <sub>3</sub> (AsO <sub>3</sub> ) <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	3
Copper-II-Carbonate	CuCO <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	2
Copper-II-Chloride	CuCl <sub>2</sub>	s	+	+	+	+	1%	+	+	+	+	+	2
Copper-II-Cyanide	Cu(CN) <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	(3)
Copper-II-Fluoride	CuF <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	(2)
Copper-II-Nitrate	Cu(NO <sub>3</sub> ) <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+/o	2
Copper-II-Sulphate	CuSO <sub>4</sub>	s	+	+	+	+	+	+	+	+	+	+	2
Cresols	C <sub>6</sub> H <sub>4</sub> CH <sub>3</sub> OH	100%	o	o	+	+	+	+	-	-	+	+	2



## ProMinent® Chemical Resistance List

Chemical	Formula	Conc	PMMA	PVC	PP	PVDF	1.4404	FKM	EPDM	PharMed®	PE	2.4819	WPC
Crotonaldehyde	$\text{CH}_3\text{C}_2\text{H}_2\text{CHO}$	100%	n	-	+	+	+	-	+	-	+	+	3
Cubic Nitre => Sodium Nitrate													
Cumene => Isopropyl Benzene													
Cyclo Hexane	$\text{C}_6\text{H}_{12}$	100%	+	-	+	+	+	+	-	-	+	o	1
Cyclohexanol	$\text{C}_6\text{H}_{11}\text{OH}$	100%	o	+o	+	+	+	+	-	-	+	+	1
Cyclohexanone	$\text{C}_6\text{H}_{10}\text{O}$	100%	-	-	+	-	+	-	+o	-	+	+	1
Cyclohexyl Alcohol => Cyclohexanol													
Cyclohexylamine	$\text{C}_6\text{H}_{11}\text{NH}_2$	100%	n	n	n	n	+	-	n	n	n	+	2
Decahydronaphthalene	$\text{C}_{10}\text{H}_{18}$	100%	-	+o	o	+	n	o	-	-	o	+	2
Decaline => Decahydronaphthalene													
Dextrose => Glucose													
Diacetonalcohol	$\text{C}_6\text{H}_{12}\text{O}_2$	100%	-	-	+	o	+	-	+	-	+	+	1
Dibromoethane	$\text{C}_2\text{H}_4\text{Br}_2$	100%	-	-	n	+	+	+	-	-	-	+	3
Dibutyl Ether	$\text{C}_4\text{H}_9\text{OC}_4\text{H}_9$	100%	-	-	+	+	+	-	o	-	+	+	2
Dibutyl Phthalate	$\text{C}_{16}\text{H}_{22}\text{O}_4$	100%	-	-	+	+	+	+	+o	+	o	+	2
Dibutylamine	$(\text{C}_4\text{H}_9)_2\text{NH}$	100%	n	n	+	+	+	-	-	n	+	+	1
Dichloro Acetic Acid	$\text{Cl}_2\text{CHCOOH}$	100%	-	+	+	+	+	-	+	o	+	+	1
Dichloro Benzene	$\text{C}_6\text{H}_4\text{Cl}_2$	100%	-	-	o	+	+	+	-	-	o	+	2
Dichloro Butan	$\text{C}_4\text{H}_8\text{Cl}_2$	100%	-	-	o	+	+	+	-	-	o	+	3
Dichloro Butene	$\text{C}_4\text{H}_6\text{Cl}_2$	100%	-	-	o	+	+	o	-	-	o	+	3
Dichloro Ethane	$\text{C}_2\text{H}_4\text{Cl}_2$	100%	-	-	o	+	+	+	-	o	-	+	3
Dichloro Ethylene	$\text{C}_2\text{H}_2\text{Cl}_2$	100%	-	-	o	+	+	o	-	o	-	+	2
Dichloro Methane	$\text{CH}_2\text{Cl}_2$	100%	-	-	o	o	o	+	-	o	-	+	2
Dichloroisopropyl Ether	$(\text{C}_3\text{H}_6\text{Cl})_2\text{O}$	100%	-	-	o	n	+	o	o	-	o	+	(2)
Dicyclohexylamine	$(\text{C}_6\text{H}_{12})_2\text{NH}$	100%	-	-	o	n	+	-	-	-	o	+	2
Diethyleneglycol	$\text{C}_4\text{H}_{10}\text{O}_3$	s	+	+	+	+	+	+	+	+	+	+	1
Diethyleneglycolethyl Ether	$\text{C}_8\text{H}_{18}\text{O}_3$	100%	n	n	+	+	+	n	+o	o	+	+	1
Diethylether	$\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$	100%	-	-	o	+	+	-	-	o	o	+	1
Diglycolic Acid	$\text{C}_4\text{H}_6\text{O}_5$	30%	+	+	+	+	+	+	n	+o	+	+	3
Dihexyl Phthalate	$\text{C}_{20}\text{H}_{26}\text{O}_4$	100%	-	-	+	+	+	-	n	+	+	+	(1)
Diisobutylketone	$\text{C}_9\text{H}_{18}\text{O}$	100%	-	-	+	+	+	-	+	-	+	+	1
Di-iso-nonyl Phthalate	$\text{C}_{26}\text{H}_{42}\text{O}_4$	100%	-	-	+	+	+	n	n	+	+	+	1
Diisopropylketone	$\text{C}_7\text{H}_{14}\text{O}$	100%	-	-	+	+	+	-	+	-	+	+	1
Dimethyl Carbonate	$(\text{CH}_3\text{O})_2\text{CO}$	100%	n	n	+	+	+	+	-	n	+	+	1
Dimethyl Ketone => Acetone													
Dimethyl Phthalate	$\text{C}_{10}\text{H}_{10}\text{O}_4$	100%	-	-	+	+	+	-	+o	+	+	+	1
Dimethylformamide	$\text{HCON}(\text{CH}_3)_2$	100%	-	-	+	-	+	-	+	+o	+	+	1
Dimethylhydrazine	$\text{H}_2\text{NN}(\text{CH}_3)_2$	100%	n	n	+	n	+	-	+	n	+	+	3
Diocetyl Phthalate	$\text{C}_4\text{H}_4(\text{COOC}_8\text{H}_{17})_2$	100%	-	-	+	+	+	-	+o	+	+	+	1
Dioxane	$\text{C}_4\text{H}_8\text{O}_2$	100%	-	-	o	-	+	-	+o	-	+	+	1
Disodium Hydrogenphosphate	$\text{Na}_2\text{HPO}_4$	s	+	+	+	+	+	+	+	+	+	+	1
Disulfur Acid -- Oleum													
Disulphur Dichloride	$\text{S}_2\text{Cl}_2$	100%	n	n	n	+	n	+	-	-	n	n	
DMF => Dimethylformamide													
Engine Oils		100%	n	+o	+	+	+	+	-	-	+	+	2
Epsom salts => Magnesium Sulphate													
Ethanol	$\text{C}_2\text{H}_5\text{OH}$	100%	-	+	+	+	+	-	+	+	+	+	1
Ethanol Amine	$\text{HOC}_2\text{H}_4\text{NH}_2$	100%	o	n	+	-	+	-	+o	o	+	+	1
Ethyl Acetate	$\text{CH}_3\text{COOC}_2\text{H}_5$	100%	-	-	35%	+	+	-	+o	+o	+	+	1
Ethyl Acrylate	$\text{C}_2\text{H}_3\text{COOC}_2\text{H}_5$	100%	-	-	+	o	+	-	+o	-	+	+	2
Ethyl Benzene	$\text{C}_6\text{H}_5\text{-C}_2\text{H}_5$	100%	-	-	o	+	+	o	-	-	o	+	1
Ethyl Benzoate	$\text{C}_6\text{H}_5\text{COOC}_2\text{H}_5$	100%	n	-	+	o	+	+	-	-	+	+	1
Ethyl Bromide	$\text{C}_2\text{H}_5\text{Br}$	100%	-	n	+	+	n	+	-	o	+	+	2
Ethyl Chloroacetate	$\text{ClCH}_2\text{COOC}_2\text{H}_5$	100%	-	o	+	+	+	+	-	-	+	+	2
Ethyl Chlorocarbonate	$\text{ClCO}_2\text{C}_2\text{H}_5$	100%	n	n	n	n	n	+	-	n	n	n	(2)
Ethyl Cyclopentane	$\text{C}_5\text{H}_4\text{C}_2\text{H}_5$	100%	+	+	+	+	+	+	-	-	+	+	(1)
Ethylacetoacetate	$\text{C}_6\text{H}_{10}\text{O}_3$	100%	n	-	+	+	+	+	-o	+o	+	+	1
Ethylacrylic Acid	$\text{C}_4\text{H}_7\text{COOH}$	100%	n	n	+	+	+	n	+o	n	+	+	(1)
Ethylene Diamine	$(\text{CH}_2\text{NH}_2)_2$	100%	o	o	+	-	o	-	+	n	+	o	2
Ethylene Dibromide => Dibromoethane													
Ethylene Dichloride => Dichloro Ethane													
Ethylene Glycol => Glycol													
Ethylenglycol Ethylether	$\text{HOC}_2\text{H}_4\text{OC}_2\text{H}_5$	100%	n	n	+	+	+	n	+o	o	+	+	1
Ethylhexanol	$\text{C}_8\text{H}_{16}\text{O}$	100%	n	+o	+	+	+	+	+	-	+	+	2
Fatty Acids	$\text{R-COOH}$	100%	+	+	+	+	+	+	o	o	+	+	1
Ferric Chloride	$\text{FeCl}_3$	s	+	+	+	+	-	+	+	+	+	+o	1
Ferric Nitrate	$\text{Fe}(\text{NO}_3)_3$	s	+	+	+	+	+	+	+	+	+	+	1
Ferric Phosphate	$\text{FePO}_4$	s	+	+	+	+	+	+	+	+	+	+	1
Ferric Sulphate	$\text{Fe}_2(\text{SO}_4)_3$	s	+	+	+	+	o	+	+	+	+	+	1

# ProMinent® Chemical Resistance List

Chemical	Formula	Conc	PMMA	PVC	PP	PVDF	1.4404	FKM	EPDM	PharMed®	PE	2.4819	WPC
Ferrous Chloride	FeCl <sub>2</sub>	s	+	+	+	+	-	+	+	+	+	+/-	1
Ferrous Sulphate	FeSO <sub>4</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Fixing Salt => Sodium Thiosulphate													
Fluoro Benzene	C <sub>6</sub> H <sub>5</sub> F	100%	-	-	+	+	+	o	-	-	o	+	2
Fluoroboric Acid	HF <sub>4</sub>	35%	+	+	+	+	o	+	+	-	+	+	1
Fluorosilicic Acid	H <sub>2</sub> SiF <sub>6</sub>	100%	+	30%	30%	+	o	+	+	o	40%	+/-	2
Formaldehyde	CH <sub>2</sub> O	40%	+	+	+	+	+	-	+/-	-	+	+	2
Formalin => Formaldehyde													
Formamide	HCONH <sub>2</sub>	100%	+	-	+	+	+	+	+	n	+	+	1
Formic Acid	HCOOH	s	-	+/-	+	+	+	-	-	+/-	+	+	1
Furane	C <sub>4</sub> H <sub>4</sub> O	100%	-	-	+	-	+	-	n	-	+	+	3
Furane Aldehyde	C <sub>5</sub> H <sub>5</sub> O <sub>2</sub>	100%	n	n	n	o	+	-	+/-	-	n	n	2
Furfuryl Alcohol	OC <sub>4</sub> H <sub>3</sub> CH <sub>2</sub> OH	100%	-	-	+	o	+	n	+/-	-	+	+	1
Gallic Acid	C <sub>6</sub> H <sub>2</sub> (OH) <sub>3</sub> COOH	5%	+	+	+	+	+	+	+/-	+	+	+	1
Gasoline		100%	-	-	+	+	+	+	-	-	+	+	2
Glauber's Salt => Sodium Sulphate													
Glucose	C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Glycerol	C <sub>3</sub> H <sub>5</sub> (OH) <sub>3</sub>	100%	+	+	+	+	+	+	+	+	+	+	1
Glycerol Triacetate	C <sub>3</sub> H <sub>5</sub> (CH <sub>3</sub> COO) <sub>3</sub>	100%	n	n	+	+	+	-	+	n	+	+	1
Glycine	NH <sub>2</sub> CH <sub>2</sub> COOH	10%	+	+	+	+	+	+	+	+	+	+	1
Glycol	C <sub>2</sub> H <sub>4</sub> (OH) <sub>2</sub>	100%	+	+	+	+	+	+	+	+	+	+	1
Glycolic Acid	CH <sub>2</sub> OHCOOH	70%	+	37%	+	+	+	+	+	+/-	+	+	1
Gypsum => Calcium Sulphate													
Heptane	C <sub>7</sub> H <sub>16</sub>	100%	+	+	+	+	+	+	-	-	+	+	1
Hexachloroplatinic Acid	H <sub>2</sub> PtCl <sub>6</sub>	s	n	+	+	+	-	n	+	n	+	-	
Hexanal	C <sub>6</sub> H <sub>11</sub> CHO	100%	n	n	+	+	+	-	+/-	-	+	+	1
Hexane	C <sub>6</sub> H <sub>14</sub>	100%	+	+	+	+	+	+	-	-	+	+	1
Hexanol	C <sub>6</sub> H <sub>13</sub> OH	100%	-	-	+	+	+	n	+	o	+	+	1
Hexantriol	C <sub>6</sub> H <sub>5</sub> (OH) <sub>3</sub>	100%	n	n	+	+	+	+	+	n	+	+	1
Hexene	C <sub>6</sub> H <sub>12</sub>	100%	n	+	+	+	+	+	-	-	+	+	1
Hydrazine Hydrate	N <sub>2</sub> H <sub>4</sub> * H <sub>2</sub> O	s	+	+	+	+	+	n	+	o	+	+	3
Hydrobromic Acid	HBr	50%	+	+	+	+	-	-	+	-	+	o	1
Hydrochloric Acid	HCl	38%	32%	+	+	+	-	+	o	o	+	o	1
Hydrofluoric Acid	HF	80%	-	40%*	40%**	+	-	+	o	-	40%	+/-	1
Hydrogen Cyanide	HCN	s	+	+	+	+	+	+	+	+	+	+	3
Hydrogen Peroxide	H <sub>2</sub> O <sub>2</sub>	90%	40%	40%*	30%	+	+	30%	30%	+	+	+	1
Hydroiodic Acid	HI	s	+	+	+	+	-	-	n	-	+	n	1
Hydroquinone	C <sub>6</sub> H <sub>4</sub> (OH) <sub>2</sub>	s	o	+	+	+	+	+	-	+/-	+	+	2
Hydroxylamine Sulphate	(NH <sub>2</sub> OH) <sub>2</sub> * H <sub>2</sub> SO <sub>4</sub>	10%	+	+	+	+	+	+	+	+	+	+	2
Hypochlorous Acid	HOCl	s	+	+	o	+	-	+	+/-	+	o	+	(1)
Iodine	I <sub>2</sub>	s	o	-	+	+	-	+	+/-	+	o	+/-	
Iron Vitriol => Ferrous Sulphate													
Isobutanol => Isobutyl Alcohol													
Isobutyl Alcohol	C <sub>2</sub> H <sub>5</sub> CH(OH)CH <sub>3</sub>	100%	-	+	+	+	+	+	+	o	+	+	1
Isopropanol => Isopropyl Alcohol													
Isopropyl Acetate	CH <sub>3</sub> COOCH(CH <sub>3</sub> ) <sub>2</sub>	100%	-	-	+	+	+	-	+/-	+/-	+	+	1
Isopropyl Alcohol	(CH <sub>3</sub> ) <sub>2</sub> CHOH	100%	-	+/-	+	+	+	+	+	o	+	+	1
Isopropyl Benzene	C <sub>6</sub> H <sub>5</sub> CH(CH <sub>3</sub> ) <sub>2</sub>	100%	-	-	o	+	+	+	-	-	o	+	1
Isopropyl Chloride	CH <sub>3</sub> CHClCH <sub>3</sub>	80%	-	-	o	+	+	+	-	o	o	+/-	2
Isopropyl Ether	C <sub>6</sub> H <sub>14</sub> O	100%	-	-	o	+	+	-	-	o	o	+	1
Kitchen Salt => Sodium Chloride													
Lactic Acid	C <sub>3</sub> H <sub>6</sub> O <sub>3</sub>	100%	-	+	+	+	+/-	+	10%	+/-	+	+	1
Lead Acetate	Pb(CH <sub>3</sub> COO) <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	2
Lead Nitrate	Pb(NO <sub>3</sub> ) <sub>2</sub>	50%	+	+	+	+	+	+	+	+	+	+	2
Lead Sugar => Lead Acetate													
Lead Sulphate	PbSO <sub>4</sub>	s	+	+	+	+	+	+	+	+	+	+	(2)
Lead Tetraethyl	Pb(C <sub>2</sub> H <sub>5</sub> ) <sub>4</sub>	100%	+	+	+	+	+	+	-	n	+	+	3
Lime Milk => Calcium Hydroxide													
Liquid Ammonia => Ammonium Hydroxide													
Lithium Bromide	LiBr	s	+	+	+	+	+	+	+	+	+	+	1
Lithium Chloride	LiCl	s	+	+	+	+	-	+	+	+	+	n	1
Lunar Caustic => Silver Nitrate													
Magnesium Carbonate	MgCO <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+/-	1
Magnesium Chloride	MgCl <sub>2</sub>	s	+	+	+	+	o	+	+	+	+	+	1
Magnesium Hydroxide	Mg(OH) <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Magnesium Nitrate	Mg(NO <sub>3</sub> ) <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Magnesium Sulphate	MgSO <sub>4</sub>	s	+	+	+	+	+	+	+	+	+	+/-	1
Maleic Acid	C <sub>4</sub> H <sub>4</sub> O <sub>4</sub>	s	+	+	+	+	+	+	+	o	+	+	1
Malic Acid	C <sub>4</sub> H <sub>6</sub> O <sub>5</sub>	s	+	+	+	+	+	+	+	+	+	+	1



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Chemical	Formula	Conc	PMMA	PVC	PP	PVDF	1.4404	FKM	EPDM	PharMed®	PE	2.4819	WPC
Manganese-II-Chloride	MnCl <sub>2</sub>	s	+	+	+	+	-	+	+	+	+	+	1
Manganese-II-Sulphate	MnSO <sub>4</sub>	s	+	+	+	+	+	+	+	+	+	+	1
MEK => Methyl Ethyl Ketone													
Mercury	Hg	100%	+	+	+	+	+	+	+	+	+	+	3
Mercury-II-Chloride	HgCl <sub>2</sub>	s	+	+	+	+	-	+	+	+	+	+	3
Mercury-II-Cyanide	Hg(CN) <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	3
Mercury-II-Nitrate	Hg(NO <sub>3</sub> ) <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	3
Mesityl Oxide	C <sub>6</sub> H <sub>10</sub> O	100%	-	-	n	n	+	-	+/-	-	n	+	1
Methacrylic Acid	C <sub>3</sub> H <sub>5</sub> COOH	100%	n	n	+	+	+	o	+/-	+/-	+	+	1
Methanol	CH <sub>3</sub> OH	100%	-	-	+	+	+	o	+	+/-	+	+	1
Methoxybutanol	CH <sub>3</sub> O(CH <sub>2</sub> ) <sub>4</sub> OH	100%	-	-	+	+	+	+	o	o	+	+	(1)
Methyl Acetate	CH <sub>3</sub> COOCH <sub>3</sub>	60%	-	-	+	+	+	-	+/-	+/-	+	+	2
Methyl Acrylate	C <sub>2</sub> H <sub>3</sub> COOCH <sub>3</sub>	100%	-	-	+	+	+	-	+/-	o	+	+	2
Methyl Benzoate	C <sub>6</sub> H <sub>5</sub> COOCH <sub>3</sub>	100%	-	-	+	o	+	+	-	-	+	+	2
Methyl Catechol	C <sub>6</sub> H <sub>3</sub> (OH) <sub>2</sub> CH <sub>3</sub>	s	+	+	+	+	+	+	-	+o	+	+	(1)
Methyl Cellulose		s	+	+	+	+	+	+	+	+	+	+	1
Methyl Chloroacetate	ClCH <sub>2</sub> COOCH <sub>3</sub>	100%	-	o	+	+	+	o	-	-	+	+	2
Methyl Cyclopentane	C <sub>5</sub> H <sub>9</sub> CH <sub>3</sub>	100%	+	+	+	+	+	+	-	-	+	+	(1)
Methyl Dichloroacetate	Cl <sub>2</sub> CHCOOCH <sub>3</sub>	100%	-	-	+	n	+	-	n	-	+	+	2
Methyl Ethyl Ketone	CH <sub>3</sub> COC <sub>2</sub> H <sub>5</sub>	100%	-	-	+	-	+	-	+	-	+	+	1
Methyl Glycol	C <sub>3</sub> H <sub>8</sub> O <sub>2</sub>	100%	+	+	+	+	+	-	+/-	+	+	+	1
Methyl Isobutyl Ketone	CH <sub>3</sub> COC <sub>4</sub> H <sub>9</sub>	100%	-	-	+	-	+	-	o	-	+	+	1
Methyl Isopropyl Ketone	CH <sub>3</sub> COC <sub>3</sub> H <sub>7</sub>	100%	-	-	+	-	+	-	+/-	-	+	+	1
Methyl Methacrylate	C <sub>3</sub> H <sub>5</sub> COOCH <sub>3</sub>	100%	-	-	+	+	+	-	-	-	+	+	1
Methyl Oleate	C <sub>17</sub> H <sub>33</sub> COOCH <sub>3</sub>	100%	n	n	+	+	+	+	+/-	n	+	+	1
Methyl Salicylate	HOC <sub>6</sub> H <sub>4</sub> COOCH <sub>3</sub>	100%	-	-	+	+	+	n	+/-	-	+	+	1
Methylacetyl Acetate	C <sub>5</sub> H <sub>8</sub> O <sub>3</sub>	100%	-	-	+	+	+	-	+/-	o	+	+	2
Methylamine	CH <sub>3</sub> NH <sub>2</sub>	32%	+	o	+	o	+	-	+	+	+	+	2
Methylene Chloride => Dichloro Methane													
Mirabilit => Sodium Sulphate													
Morpholine	C <sub>4</sub> H <sub>9</sub> ON	100%	-	-	+	-	+	n	n	-	+	+	2
Muriatic Acid => Hydrochloric Acid													
Natron => Sodium Bicarbonate													
Nickel-II-Acetate	(CH <sub>3</sub> COO) <sub>2</sub> Ni	s	+	+	+	+	+	-	+	+	+	+	(2)
Nickel-II-Chloride	NiCl <sub>2</sub>	s	+	+	+	+	-	+	+	+	+	+	2
Nickel-II-Nitrate	Ni(NO <sub>3</sub> ) <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+/-	2
Nickel-II-Sulphate	NiSO <sub>4</sub>	s	+	+	+	+	+	+	+	+	+	+/-	2
Nitrate of Lime => Calcium Nitrate													
Nitric Acid	HNO <sub>3</sub>	99%	10%	10%*	50%	65%	50%	65%	10%	35%	50%	65%	1
Nitro Methane	CH <sub>3</sub> NO <sub>2</sub>	100%	-	-	+	o	+	-	+/-	-	+	+	2
Nitro Propane	(CH <sub>3</sub> ) <sub>2</sub> CHNO <sub>2</sub>	100%	-	-	+	n	+	-	+/-	-	+	+	2
Nitro Toluene	C <sub>6</sub> H <sub>4</sub> NO <sub>2</sub> CH <sub>3</sub>	100%	-	-	+	+	+	o	-	-	+	+	2
Octane	C <sub>8</sub> H <sub>18</sub>	100%	o	+	+	+	+	+	-	-	+	+	1
Octanol	C <sub>8</sub> H <sub>17</sub> OH	100%	-	-	+	+	+	+	+	-	+	+	1
Octyl Cresol	C <sub>15</sub> H <sub>24</sub> O	100%	-	-	+	+	+	o	n	-	+	+	(1)
Oil => Engine Oils													
Oleum	H <sub>2</sub> SO <sub>4</sub> + SO <sub>3</sub>	s	n	-	-	-	+	+	-	+	-	+	2
Orthophosphoric Acid => Phosphoric Acid													
Oxalic Acid	(COOH) <sub>2</sub>	s	+	+	+	+	10%	+	+	+/-	+	+/-	1
Pentane	C <sub>5</sub> H <sub>12</sub>	100%	+	+	+	+	+	+	-	-	+	+	1
Pentanol => Amyl Alcohol													
Perchloric Acid	HClO <sub>4</sub>	70%	n	10%	10%	+	-	+	+/-	+	+	n	1
Perchloroethylene => Tetrachloro Ethylene													
Perhydrol => Hydrogen Peroxide													
Petroleum Ether	CnH <sub>2n+2</sub>	100%	+	+/-	+	+	+	+	-	-	+	+	1
Phenole	C <sub>6</sub> H <sub>5</sub> OH	100%	-	-	+	+	+	+	-	+	+	+	2
Phenyl Ethyl Ether	C <sub>6</sub> H <sub>5</sub> OC <sub>2</sub> H <sub>5</sub>	100%	-	-	+	n	+	-	-	-	+	+	2
Phenyl Hydrazine	C <sub>6</sub> H <sub>5</sub> NNH <sub>2</sub>	100%	-	-	o	+	+	o	-	-	o	+	2
Phosphoric Acid	H <sub>3</sub> PO <sub>4</sub>	85%	50%	+	+	+	+	+	+	+	+	+	1
Phosphorous Oxychloride	POCl <sub>3</sub>	100%	-	-	+	+	n	+	+	n	+	+	1
Phosphorous Trichloride	PCl <sub>3</sub>	100%	-	-	+	+	+	o	+	+/-	+	+	1
Phthalic Acid	C <sub>6</sub> H <sub>4</sub> (COOH) <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Picric Acid	C <sub>6</sub> H <sub>2</sub> (NO <sub>3</sub> ) <sub>3</sub> OH	s	+	+	+	+	+	+	+	-	+	+	2
Piperidine	C <sub>5</sub> H <sub>11</sub> N	100%	-	-	n	n	+	-	-	-	n	+	2
Potash Alum => Potassium Aluminium Sulphate													
Potassium Acetate	CH <sub>3</sub> COOK	s	+	+	+	+	+	+	+	+	+	+	1
Potassium Aluminium Sulphate	KAl(SO <sub>4</sub> ) <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Potassium Bicarbonate	KHCO <sub>3</sub>	40%	+	+	+	+	+	+	+	+	+	+/-	1
Potassium Bifluoride	KHF <sub>2</sub>	s	n	+	+	+	+	+	+	+	+	+	1



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Potassium Bisulphate	KHSO <sub>4</sub>	5%	+	+	+	+	+	+	+	+	+	+	1
Potassium Bitartrate	KC <sub>4</sub> H <sub>5</sub> O <sub>6</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Potassium Borate	KBO <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	(1)
Potassium Bromate	KBrO <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	2
Potassium Bromide	KBr	s	+	+	+	+	10%	+	+	+	+	0.1	1
Potassium Carbonate	K <sub>2</sub> CO <sub>3</sub>	s	+	+	+	+	+	+	+	55%	+	+	1
Potassium Chlorate	KClO <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	2
Potassium Chloride	KCl	s	+	+	+	+	-	+	+	+	+	+/-	1
Potassium Chromate	K <sub>2</sub> CrO <sub>4</sub>	10%	+	+	+	+	+	+	+	+	+	+	3
Potassium Chrome Sulphate	KCr(SO <sub>4</sub> ) <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Potassium Cyanate	KOCN	s	+	+	+	+	+	+	+	+	+	+	2
Potassium Cyanide	KCN	s	+	+	+	+	5%	+	+	+	+	5%	3
Potassium Cyanoferate II	K <sub>4</sub> Fe(CN) <sub>6</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Potassium Cyanoferate III	K <sub>3</sub> Fe(CN) <sub>6</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Potassium Dichromate	K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	s	+	+	+	+	25%	+	+	+	+	10%	3
Potassium Fluoride	KF	s	+	+	+	+	+	+	+	+	+	+	1
Potassium Hydroxide	KOH	50%	+	+	+	+	+(25 °C)	-	+	10%	+	+	1
Potassium Iodide	KI	s	+	+	+	+	+	+	+	+	+	+	1
Potassium Nitrate	KNO <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Potassium Perchlorate	KClO <sub>4</sub>	s	+	+	+	+	n	+	+	+	+	+	1
Potassium Permanganate	KMnO <sub>4</sub>	s	+	+	+	+	+	+	+	6%	+	+	2
Potassium Persulphate	K <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Potassium Phosphate	KH <sub>2</sub> PO <sub>4</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Potassium Pyrochromate => Potassium Dichromate													
Potassium Sulphate	K <sub>2</sub> SO <sub>4</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Potassium Sulphite	K <sub>2</sub> SO <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Propionic Acid	C <sub>2</sub> H <sub>5</sub> COOH	100%	o	+	+	+	+	+	+	+/-	+	+	1
Propionitrile	CH <sub>3</sub> CH <sub>2</sub> CN	100%	n	n	+	+	+	+	-	-	+	+	2
Propyl Acetate	CH <sub>3</sub> COOC <sub>3</sub> H <sub>7</sub>	100%	-	-	+	+	+	-	+/-	-	+	+	1
Propylene Glycol	CH <sub>3</sub> CHOHCH <sub>2</sub> OH	100%	+	+	+	+	+	+	+	+	+	+	1
Prussic Acid => Hydrogen Cyanide													
Pyridine	C <sub>5</sub> H <sub>5</sub> N	100%	-	-	o	-	+	-	-	o	+	+	2
Pyrrole	C <sub>4</sub> H <sub>4</sub> NH	100%	n	n	+	n	+	-	-	-	+	+	2
Roman Vitriol => Copper Sulphate													
Salicylic Acid	HOC <sub>6</sub> H <sub>4</sub> COOH	s	+	+	+	+	+	+	+	+	+	+/-	1
Salmiac => Ammonium Chloride													
Saltpeter => Potassium Nitrate													
Silic Acid	SiO <sub>2</sub> * x H <sub>2</sub> O	s	+	+	+	+	+	+	+	+	+	+	1
Silver Bromide	AgBr	s	+	+	+	+	+/-	+	+	+	+	+	1
Silver Chloride	AgCl	s	+	+	+	+	-	+	+	+	+	+/-	1
Silver Nitrate	AgNO <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+/-	3
Slaked Lime => Calcium Hydroxide													
Soda => Sodium Carbonate													
Sodium Acetate	NaCH <sub>3</sub> COO	s	+	+	+	+	+	+	+	+	+	+	1
Sodium Benzoate	C <sub>6</sub> H <sub>5</sub> COONa	s	+	+	+	+	+	+	+	+	+	+	1
Sodium Bicarbonate	NaHCO <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Sodium Bisulphate	NaHSO <sub>4</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Sodium Bisulphite	NaHSO <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Sodium Borate	NaBO <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Sodium Bromate	NaBrO <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	3
Sodium Bromide	NaBr	s	+	+	+	+	+	+	+	+	+	+	1
Sodium Carbonate	Na <sub>2</sub> CO <sub>3</sub>	s	+	+	+	+	+/-	+	+	+	+	+	1
Sodium Chlorate	NaClO <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	2
Sodium Chloride	NaCl	s	+	+	+	+	-	+	+	+	+	+	1
Sodium Chlorite	NaClO <sub>2</sub>	24%	+	+	+	+	10%	+	+	+	+	10%	2
Sodium Chromate	Na <sub>2</sub> CrO <sub>4</sub>	s	+	+	+	+	+	+	+	+	+	+	3
Sodium Cyanide	NaCN	s	+	+	+	+	+	+	+	+	+	+	3
Sodium Dichromate	Na <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	s	+	+	+	+	+	+	+	+	+	+	3
Sodium Dithionite	Na <sub>2</sub> S <sub>2</sub> O <sub>4</sub>	s	+	10%	10%	+	+	n	n	+	10%	+/-	1
Sodium Fluoride	NaF	s	+	+	+	+	10%	+	+	+	+	+	1
Sodium Hydrogen Sulphate => Sodium Bisulphate													
Sodium Hydroxide	NaOH	50%	+	+	+	+	+(60%/25 °C)	-	+	30%	+	+	1
Sodium Hypochlorite	NaOCl + NaCl	12%	+	+	o	+	-	+	+	+	o	> 10%	2
Sodium Iodide	NaI	s	+	+	+	+	+	+	+	+	+	+	1
Sodium Metaphosphate	(NaPO <sub>3</sub> ) <sub>n</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Sodium Nitrate	NaNO <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Sodium Nitrite	NaNO <sub>2</sub>	s	+	+	+	+	+	+	+	+	+	+	2
Sodium Oxalate	Na <sub>2</sub> C <sub>2</sub> O <sub>4</sub>	s	+	+	+	+	+	+	+	+	+	+	1



# ProMinent® Chemical Resistance List

Chemical	Formula	Conc	PMMA	PVC	PP	PVDF	1.4404	FKM	EPDM	PharMed®	PE	2.4819	WPC
Sodium Perborate	NaBO <sub>2</sub> *H <sub>2</sub> O <sub>2</sub>	s	+	+/o	+	+	+	+	+	+	+	+/o	1
Sodium Perchlorate	NaClO <sub>4</sub>	s	+	+	+	+	10%	+	+	+	+	10%	1
Sodium Peroxide	Na <sub>2</sub> O <sub>2</sub>	s	+	+	+	+	+	+	+	n	-	+	1
Sodium Persulphate	Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	s	n	+	+	+	+	+	+	+	+	+	1
Sodium Pyrosulphite	Na <sub>2</sub> S <sub>2</sub> O <sub>5</sub>	s	+	+	+	+	+	n	n	+	+	+	1
Sodium Salicylate	C <sub>6</sub> H <sub>4</sub> (OH)COONa	s	+	+/o	+	+	+	+	+	+	+	+	1
Sodium Silicate	Na <sub>2</sub> SiO <sub>3</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Sodium Sulphate	Na <sub>2</sub> SO <sub>4</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Sodium Sulphide	Na <sub>2</sub> S	s	+	+	+	+	+	+	+	+	+	+	2
Sodium Sulphite	Na <sub>2</sub> SO <sub>3</sub>	s	+	+	+	+	50%	+	+	+	+	50%	1
Sodium Tetraborate	Na <sub>2</sub> B <sub>4</sub> O <sub>7</sub> * 10 H <sub>2</sub> O	s	+	+	+	+	+	+	+	+	+	+	1
Sodium Thiosulphate	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	s	+	+	+	+	25%	+	+	+	+	25%	1
Sodium Tripolyphosphate	Na <sub>5</sub> P <sub>3</sub> O <sub>10</sub>	s	+	+	+	+	+	+/o	+	+	+	+	1
Starch	(C <sub>6</sub> H <sub>10</sub> O <sub>5</sub> ) <sub>n</sub>	s	+	+	+	+	+	+	n	+	+	+	1
Starch Gum		s	+	+	+	+	+	+	+	+	+	+	1
Styrene	C <sub>6</sub> H <sub>5</sub> CHCH <sub>2</sub>	100%	-	-	o	+	+	o	-	-	o	+	2
Sublimate => Mercury-II-Chloride													
Succinic Acid	C <sub>4</sub> H <sub>6</sub> O <sub>4</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Sugar Syrup		s	+	+	+	+	+	+	+	+	+	+	1
Sulphur Chloride => Disulphur Dichloride													
Sulphuric Acid	H <sub>2</sub> SO <sub>4</sub>	98%	30%	50%	85%	+	20%	+	80%	30%	80%	+	1
Sulphuric Acid, fuming --> Oleum													
Sulphurous Acid	H <sub>2</sub> SO <sub>3</sub>	s	+	+	+	+	10%	+	+	+	+	+	(1)
Sulphuryl Chloride	SO <sub>2</sub> Cl <sub>2</sub>	100%	-	-	-	o	n	+	o	-	-	n	1
Tannic Acid	C <sub>76</sub> H <sub>52</sub> O <sub>46</sub>	50%	+	+	+	+	+	+	+	+	+	+	1
Tartaric Acid	C <sub>4</sub> H <sub>6</sub> O <sub>6</sub>	s	50%	+	+	+	+	+	+/o	+	+	+	1
Tetrachloro Ethane	C <sub>2</sub> H <sub>2</sub> Cl <sub>4</sub>	100%	-	-	o	+	+	o	-	o	o	+	3
Tetrachloro Ethylene	C <sub>2</sub> Cl <sub>4</sub>	100%	-	-	o	+	+	o	-	o	o	+	3
Tetrachloromethane => Carbon Tetrachloride													
Tetrahydro Furane	C <sub>4</sub> H <sub>8</sub> O	100%	-	-	o	-	+	-	-	-	o	+	1
Tetrahydro Naphthalene	C <sub>10</sub> H <sub>12</sub>	100%	-	-	-	+	+	+	-	-	o	+	3
Tetralin => Tetrahydro Naphthalene													
THF => Tetrahydrofuran													
Thionyl Chloride	SOCl <sub>2</sub>	100%	-	-	-	+	n	+	+	+	-	n	1
Thiophene	C <sub>4</sub> H <sub>4</sub> S	100%	n	-	o	n	+	-	-	-	o	+	3
Tin-II-Chloride	SnCl <sub>2</sub>	s	+	o	+	+	-	+	+	+	+	+/o	1
Tin-II-Sulphate	SnSO <sub>4</sub>	s	n	+	+	+	+	+	+	+	+	+/o	(1)
Tin-IV-Chloride	SnCl <sub>4</sub>	s	n	+	+	+	-	+	+	+	+	+	1
Titanium Tetrachloride	TiCl <sub>4</sub>	100%	n	n	n	+	n	o	-	n	n	n	1
Toluene	C <sub>6</sub> H <sub>5</sub> CH <sub>3</sub>	100%	-	-	o	+	+	o	-	-	o	+	2
Toluene Diisocyanate	C <sub>7</sub> H <sub>3</sub> (NCO) <sub>2</sub>	100%	n	n	+	+	+	-	+/o	n	+	+	2
Tributyl Phosphate	(C <sub>4</sub> H <sub>9</sub> ) <sub>3</sub> PO <sub>4</sub>	100%	n	-	+	+	+	-	+	+	+	+	1
Trichloro Ethane	CCl <sub>3</sub> CH <sub>3</sub>	100%	-	-	o	+	+	+	-	o	o	+	3
Trichloro Ethylene	C <sub>2</sub> HCl <sub>3</sub>	100%	-	-	o	+	+/o	o	-	o	o	+	3
Trichloro Methane => Chloroform													
Trichloroacetaldehyde Hydrate	CCl <sub>3</sub> CH(OH) <sub>2</sub>	s	-	-	o	-	+	o	o	n	+	+	2
Trichloroacetic Acid	CCl <sub>3</sub> COOH	50%	-	+	+	+	-	-	o	+/o	+	+	1
Tricresyl Phosphate	(C <sub>7</sub> H <sub>7</sub> ) <sub>3</sub> PO <sub>4</sub>	90%	-	-	+	n	+	o	+	+	+	+	2
Triethanol Amine	N(C <sub>2</sub> H <sub>4</sub> OH) <sub>3</sub>	100%	+	o	+	n	+	-	+/o	o	+	+	1
Trilene => Trichloro Ethane													
Trioctyl Phosphate	(C <sub>8</sub> H <sub>17</sub> ) <sub>3</sub> PO <sub>4</sub>	100%	n	-	+	+	+	o	+	+	+	+	2
Trisodium Phosphate	Na <sub>3</sub> PO <sub>4</sub>	s	+	+	+	+	+	+	+	+	+	+	1
Urea	CO(NH <sub>2</sub> ) <sub>2</sub>	s	+	+/o	+	+	+	+	+	20%	+	+	1
Vinyl Acetate	CH <sub>2</sub> =CHOOCCH <sub>3</sub>	100%	-	-	+	+	+	n	n	+/o	+	+	2
Water Glass => Sodium Silicate													
Xylene	C <sub>6</sub> H <sub>4</sub> (CH <sub>3</sub> ) <sub>2</sub>	100%	-	-	-	+	+	o	-	-	o	+	2
Zinc Acetate	(CH <sub>3</sub> COO) <sub>2</sub> Zn	s	+	+	+	+	+	-	+	+	+	+	1
Zinc Chloride	ZnCl <sub>2</sub>	s	+	+	+	+	-	+	+	+	+	n	1
Zinc Sulphate	ZnSO <sub>4</sub>	s	+	+	+	+	+	+	+	+	+	+/o	1

1) Chlorine dioxide is capable of penetrating through PVDF without destroying it. This can lead to damage to PVDF-coated parts.

# ProMinent® Chemical Resistance List

## Overview of the Resistance of Soft PVC Hoses (Guttasyn®) to the Most Common Chemicals

This data applies to standard conditions (20 °C, 1013 mbar).

+	=	resistant
o	=	conditionally resistant
-	=	not resistant

The data is taken from relevant manufacturers' literature and supplemented by our own tests and experience. As the resistance of a material also depends on other factors, especially pressure and operating conditions etc, this list should merely be regarded as an initial guide and does not claim to offer any guarantees. Take into consideration the fact that conventional dosing agents are largely compounds, the corrosiveness of which cannot simply be calculated by adding together the corrosiveness of each individual component. In cases such as these the material compatibility data produced by the chemical manufacturer must be read as a matter of priority when selecting a material. Safety data sheets do not provide this information and cannot therefore replace application-specific documentation.

Corrosive agent	Concentration in %	Evaluation
Acetone	all	-
Acetylene tetrabromide	100	-
Alums of all kinds, aqueous	all	+
Aluminium salts, aqueous	all	+
Ammonium, aqueous	15	-
Ammonium, aqueous	saturated	-
Ammonium salts	all	+
Aniline	100	-
Benzene	100	-
Bisulphite, aqueous	40	+
Borax solution	all	+
Boric acid, aqueous	10	+
Bromine, vaporous and liquid		-
Hydrogen bromide	10	+
Butanol	100	+
Butyric acid, aqueous	20	+
Butyric acid, aqueous	conc.	-
Butyl acetate	100	-
Calcium chloride, aqueous	all	+
Chlorinated hydrocarbons	all	-
Chrome-alum, aqueous	all	+
Chromic acid, aqueous	50	-
Dextrin, aqueous	saturated	+
Diesel oils, compressed oils	100	o
Diethyl ether	100	-
Fertilizing manure salt, aqueous	all	+
Ferric chloride, aqueous	all	+
Glacial acetic acid	100	-
Acetic ester	100	-
Acetic acid, aqueous	10	+
Acetic acid	50	o
Acetic acid (wine vinegar)		o
Acetic acid anhydride	100	-
Ethanol	96	-
Ethyl acetate	100	-
Ethylene glycol	30	+
Formaldehyde, aqueous	30	o
Difluorodichloromethane	100	-
Glycerol	100	-
Glucose, aqueous	saturated	+
Halogens	all	-
Urea, aqueous	all	+
Caustic potash	15	+
Potassium bichromate, aqueous	saturated	+
Potassium persulphate, aqueous	saturated	+



# ProMinent® Chemical Resistance List

Corrosive agent	Concentration in %	Evaluation
Creosote		-
Sodium chloride, aqueous	all	+
Carbonic acid	all	+
Copper sulphate, aqueous	all	+
Magnesium salts, aqueous	all	+
Methyl alcohol	100	+
Methylene chloride	100	-
Sodium hypochlorite	15	+
Sodium salts => sodium chloride		
Sodium hydroxide	aqueous	+
Oils => fats, diesel oil, Lubricating oil and similar		
Perchloric acid	all	o
Phenol, aqueous	all	o
Phosphoric acid, aqueous	100	-
Nitric acid, aqueous	25	+
Hydrochloric acid	15	+
Sulphur dioxide, gaseous	all	+
Carbon disulphide	100	-
Sulphuric acid	30	+
Hydrogen sulphide, gaseous	100	-
Silver nitrate	10	+
Tetrachloromethane	100	-
Ink		+
Toluene	100	-
Trichloroethylene	100	-
Hydrogen peroxide	to 10	+
Xylene	100	-
Zinc salts	all	+





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