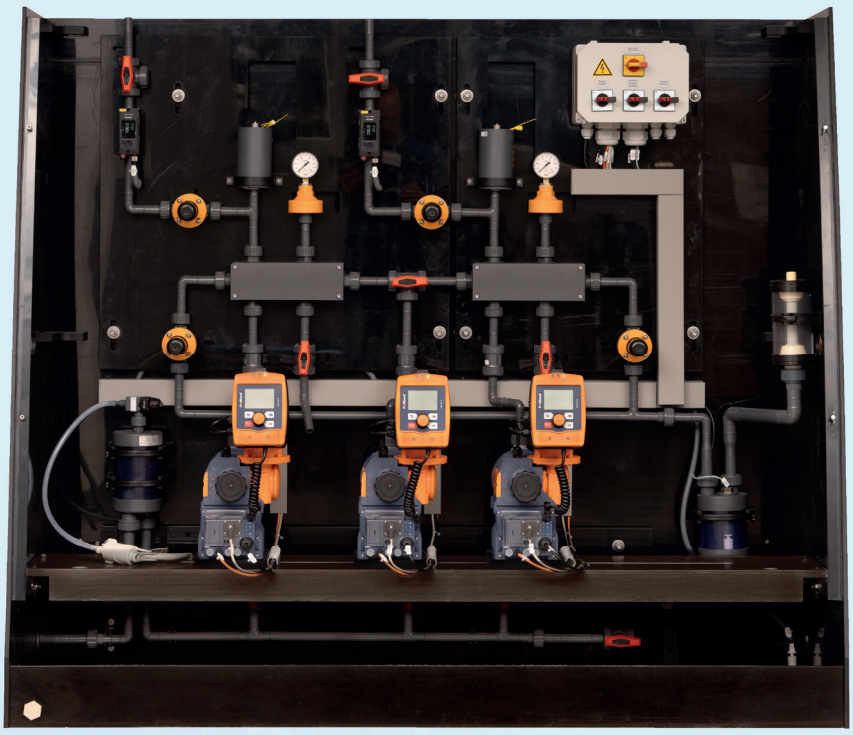
ProMinent®

Metering Technology

Product Catalogue 2026



Product Catalog

Volume 1/3

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All previous catalogues and price lists are superseded with the release of this product catalogue. You can view our general terms and conditions on our homepage.

Heidelberg, January 2026

Product Catalogue Volume 1

ProMinent Product Catalog 2026

You have in your hands the ProMinent 2026 catalogue. It is split into three volumes.

1. Metering technology

2. Measuring, control and sensor technology

3. Water treatment and disinfection

You can download the individual catalogue volumes or browse them online at

www.prominent.com/en/product-catalogue

Technical documents

On our website, you also have access to numerous other documents, such as operating instructions, 3D drawings, brochures etc.

https://www.prominent.co.uk/en/Service/Service/Download-Center/Download-Center.html

Customer services

ProMinent provides an expert service worldwide for all products, solutions and systems over the course of the entire product life-cycle. The services offered by our experts cover everything from commissioning, usage with the relevant maintenance and repairs to product and process optimisation for your application.

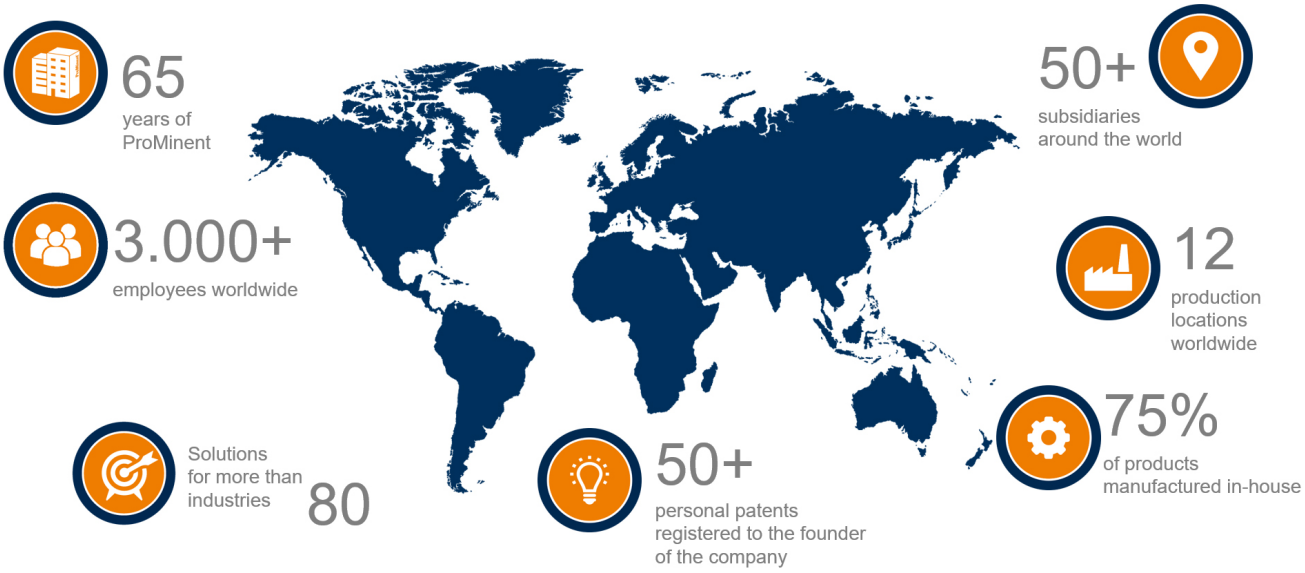
With more than 50 subsidiaries and over 300 service employees, we can provide on-site support just about anywhere in the world. No matter whether you want assistance on-site at your plant, by phone, e-mail or remotely via the new ProMinent Smart-Support – we will quickly and expertly help you find the right solution.

Our experts work tirelessly to improve our services in order to provide rapid and targeted assistance.

We are also happy to provide service agreements tailored to your requirements.

Product Catalogue Volume 1

About ProMinent



Top products developed and manufactured in-house

We develop and produce the high-quality ProMinent products ourselves. The high product quality is based on decades of engineering expertise, sound application knowledge and a continuous willingness to innovate. For this reason, we continuously invest in research and development. ProMinent also has a high level of vertical integration at a total of twelve production sites worldwide, including Heidelberg. This ensures quality and makes us independent of fluctuations in the supplier market.

Protecting the environment and your wallet

ProMinent offers environmentally friendly and economical solutions for your water treatment. With our technology, you can save chemicals in numerous processes. This reduces operating costs and protects the environment. In more than 100 countries, more than 3,000 employees in our own sales, production and service companies work every day to provide our customers with fast and reliable service for every product. Because our leading position on the global market spurs us on to ever new top performances and at the same time obliges us to think and act responsibly.

The right product for your application

The modular ProMinent portfolio enables our customers from a wide range of industries to achieve a high level of safety and efficiency - in the respective production processes at any time and in any place. For us, customer proximity means working with you to find the right solution for your individual requirements. Personal application consulting and smooth project handling are just as much a part of our services as comprehensive service around the globe.

Metering Pumps, Components and Metering Systems

Metering technology for professionals

The pump quite clearly lies at the heart of metering technology. With its optimum capacity range and functionality adapted to the feed chemical, it is responsible for smooth-running metering processes.

Chapter 1

Diaphragm metering pumps are indispensable for metering liquids with a high level of precision. They are used in water treatment, the chemical industry, food production and many other industries. The pumps are renowned for their reliability, longevity and versatility. ProMinent offers two drive technologies – **solenoid metering pumps** and **motor-driven metering pumps** – that provide optimum solutions to suit customers' applications and are individually tailored to their needs.

Peristaltic metering pumps, on the other hand, are ideal for applications with low to medium pressure as well as media that are abrasive, viscose or contain gas. They provide precise and reliable metering for a huge range of requirements.

Durable and easy to operate **chemical transfer and peristaltic pumps** for pure pumping tasks, as well as the matching components, like sturdy tanks and collection pans.

Standardised **metering stations** DULCODOS combine frequently used system configurations, short delivery times and unbeatably priced versions. Having been part of our product range for decades now, the metering systems feature precisely coordinated components and ensure a complete solution which is safe and ready-to-use without delay ("plug and play"). These high-quality and long-lasting products form part of the range showcased in this catalogue. For greater individuality, ProMinent also provides all kinds of customised metering systems, which are specified for your application by the sales team.

When combined with the DULCONNEX IIoT solution, metering pumps deliver further benefits.

Chapter 2

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

Chapter 3

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

Pump Guide

You can also find information online. Try out the ProMinent Pump Selection Guide 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 just the right pump for your needs.

www.pump-guide.com

Focus on you

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.

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Step by Step to the Right Product

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

The following datasheet will help in solving your metering problem. Please enter your requirements and conditions and return it to info@prominent.com. Our Service Centre will use your data to deliver the best 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	_____

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^3/h _____
Required final concentration	g/m^3, ppm _____

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!

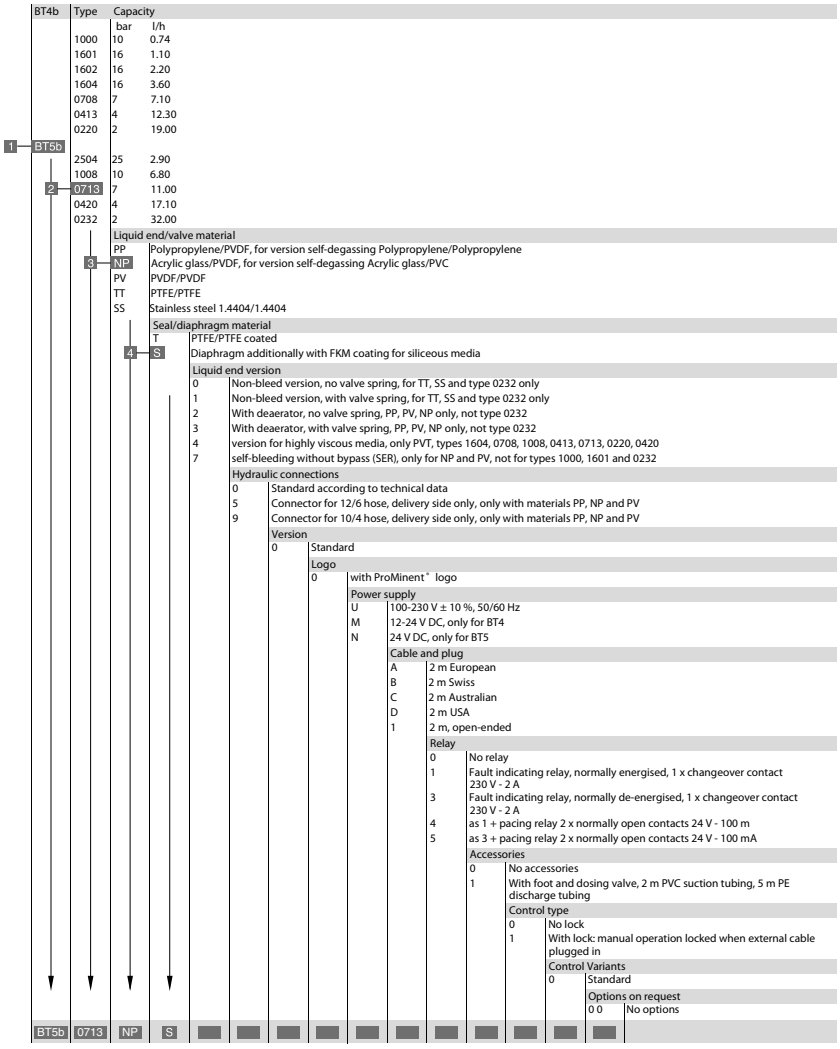
You've opted for a pump product range. It's now up to you to configure the pump exactly to meet your individual needs.

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.

With a few restrictions, the features and properties of the pump can be freely selected.

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

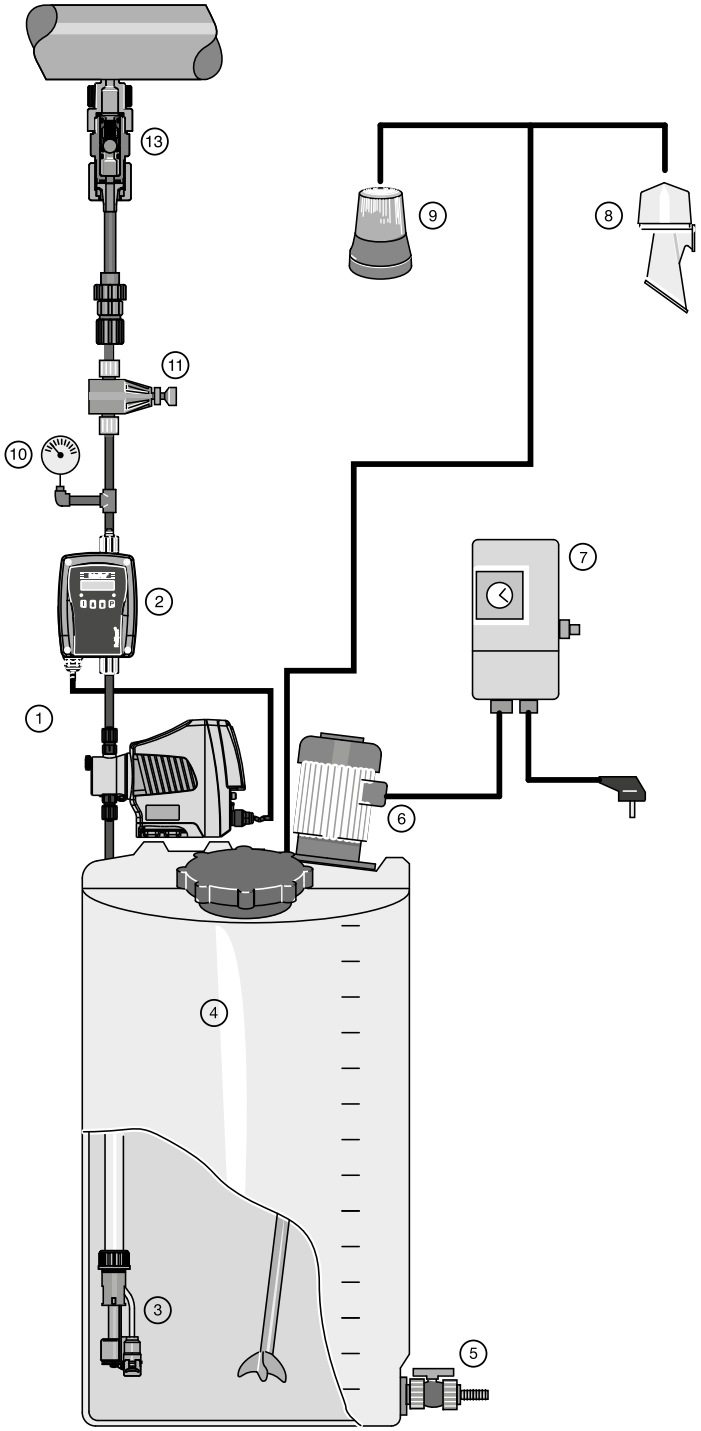


Metering Pumps also Need Accessories

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

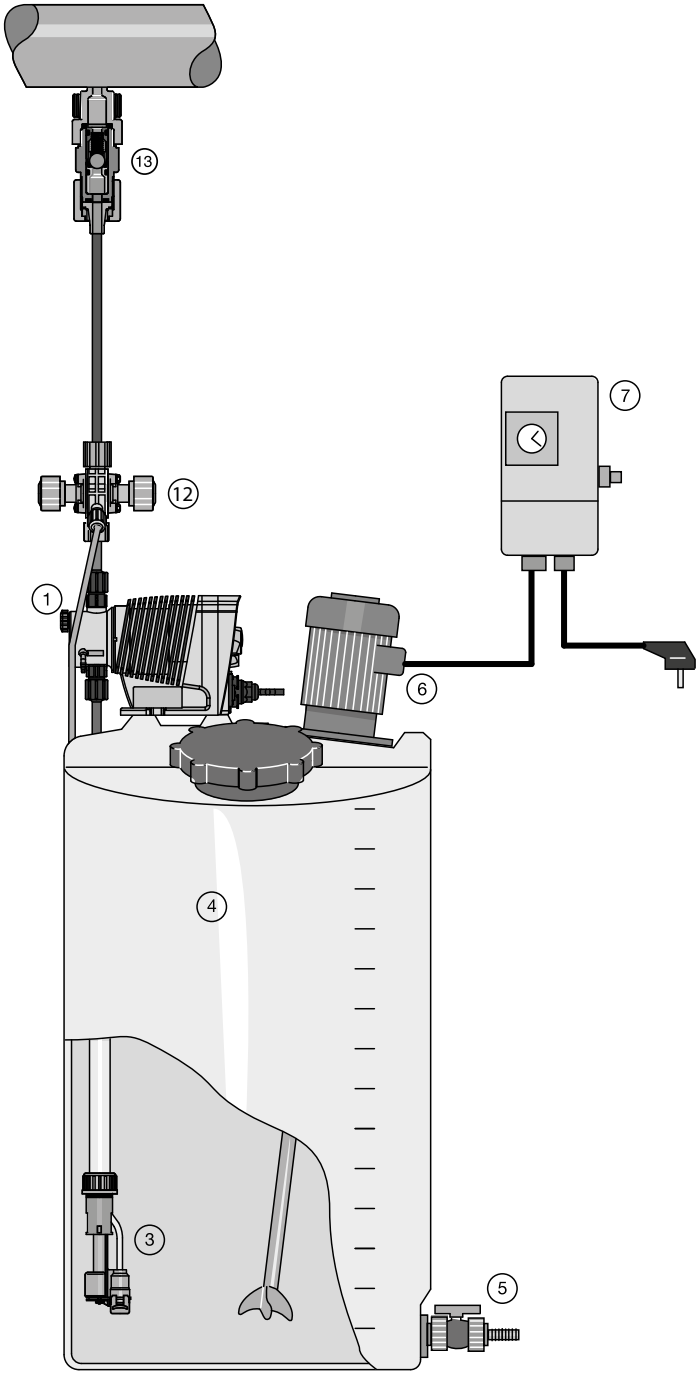
A pump alone is often simply not enough. A metering process requires further **components and accessories**. ProMinent provides all the products you need to guarantee **optimum process flows** for metering liquid media. Expertise and advice are, of course, included!

1 Metering pump
2 Flow meter DFMa with single stroke monitor and feedback to the metering pump
3 Suction assembly with level switch
4 Dosing tank
5 Drain valve
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
13 Injection valve



Metering Pumps also Need Accessories

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



1.1 Diaphragm Metering Pumps

Diaphragm metering pumps - precision and versatility for industrial processes

Why diaphragm metering pumps are the right choice

Diaphragm Metering Pumps are indispensable when it comes to the precise metering of liquids. They are used in water treatment, the chemical industry, food production and many other industries.
The pumps are characterized by their reliability, durability and versatility. Depending on the application, ProMinent offers optimal solutions that are individually tailored to the customer's needs.

Typical applications for diaphragm metering pumps

ProMinent offers effective solutions for a wide range of applications:

- **Water treatment:** dosing of disinfectants, flocculants and pH regulators.
- **Chemical industry:** Precise processing of additives and reagents.
- **Food and beverage industry**: Safety addition of additives in production lines.
- **Paper and pulp industry:** Control of additive supply to optimize material properties.
- **Energy and power plant industry:** Dosing of additives and cooling water.

Our drive technologies offer customized solutions, depending on the requirements of the respective industry and application.

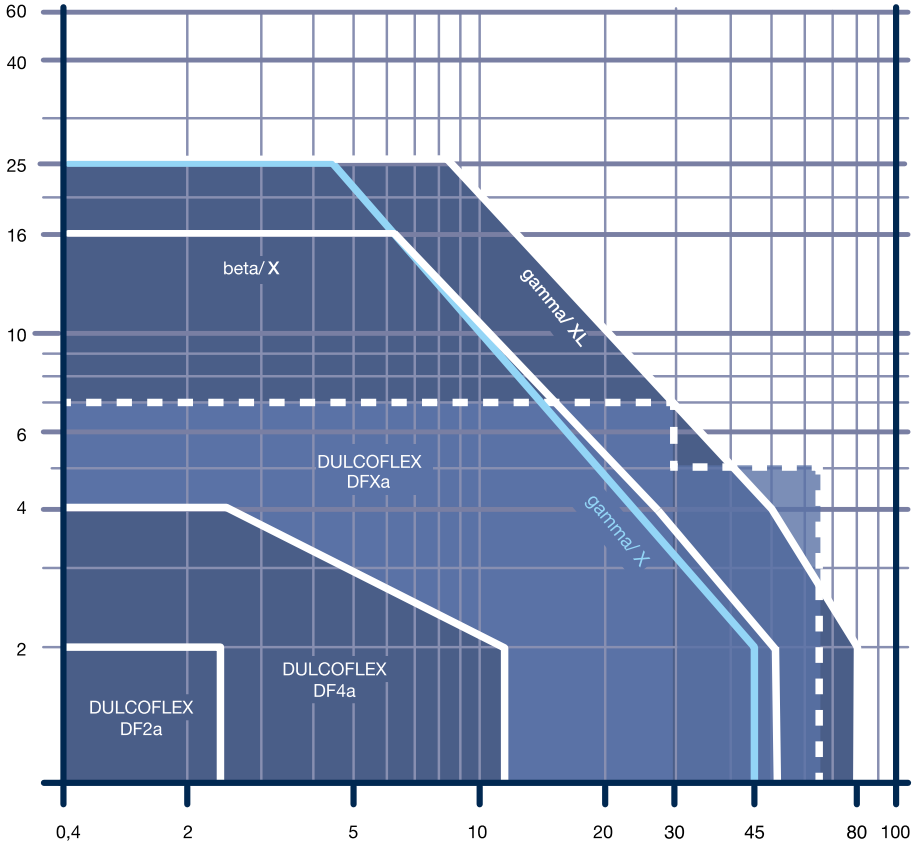
1.1 Diaphragm Metering Pumps

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 is the quick way to shortlist potential products. 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!



Back pressure [bar] as a function of feed rate [l/h]

Note
You will find higher metering rates in the Motor-driven metering pumps chapter or under Process technology.
For help in quickly selecting the right pump, please consult our Pump Guide: www.pump-guide.com.

1.1 Diaphragm Metering Pumps

1.1.2 Diaphragm metering pump beta/ X

The new generation – simply beta/ X

Capacity range 10 ml/h – 50 l/h, 16 – 2 bar

The beta/ X diaphragm metering pump provides simple handling, precise metering and digital networking. With its intuitive operation, robust design and environmentally-friendly PFAS-free variant, it is setting new standards in metering technology.

NEW

The Diaphragm Metering Pump beta/ X is easy to use, meters precisely and is digital.

All aspects of the beta/ X are designed for ease of use. The volume is set directly using an intuitive clickwheel. The volume to be dispensed is set directly on a display. Installation on the floor and on the wall is also quick and easy thanks to the click base.

The reliable metering pump is versatile and robust in use. The special feature of the beta/ X is the digitally controlled drive. This enables continuous dosing and a wide adjustment range. The pump can be used universally thanks to its wide adjustment range, which makes selection much easier and reduces the number of variants.

The dosing heads of the beta/ X are characterized by their good suction properties. The specially shaped head minimizes errors due to air lock. This increases process reliability.

The beta/ X is available in a PFAS-free version, which makes it even more environmentally friendly.

The beta/ X is digitally networkable and can be programmed and read out via smartphone. It has a Bluetooth and NFC interface.

Your Benefits

- Simple operation and mounting save time and effort.
- Precise metering and good priming properties improve process reliability.
- Wide adjustment range and robust design for flexible applications.
- Control via a smartphone using Bluetooth and NFC.
- PFAS-free variant available.

Technical Details

- The desired l/h can be set using a click wheel & display.
- Continuous metering with a wide adjustment range of 1:1000.
- Enhanced process reliability thanks to improved priming and optimised handling of air locks.
- Available in PFAS-free variant.
- Bluetooth and NFC interfaces.
- Energy-efficient: The beta/ X is twice as energy efficient as its comparable predecessor model.

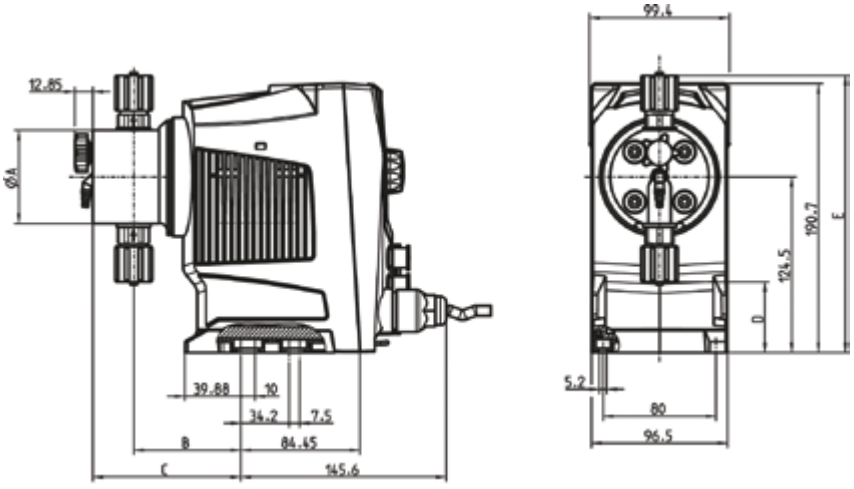
Field of Application

- Disinfection
  - Chlorine dosing
  - H2O2 dosing
  - CLO2
- Biocide
- Antiscalant
- Disinfection of cooling towers
- Metering all kinds of liquids in industrial/chemical applications
- Collection pan with leak sensor
- Fresh water treatment
- Waste water treatment
- Commercial pool & wellness sector - disinfection

Dimension sheet beta/ X, material version PV/PE

Type	Ø A	B
16006	70	76
07018, 04028	90	75
02050	100	75

Type	C	D	E
16006	105	50	196
07018, 04028	105	40	205
02050	105	30	215

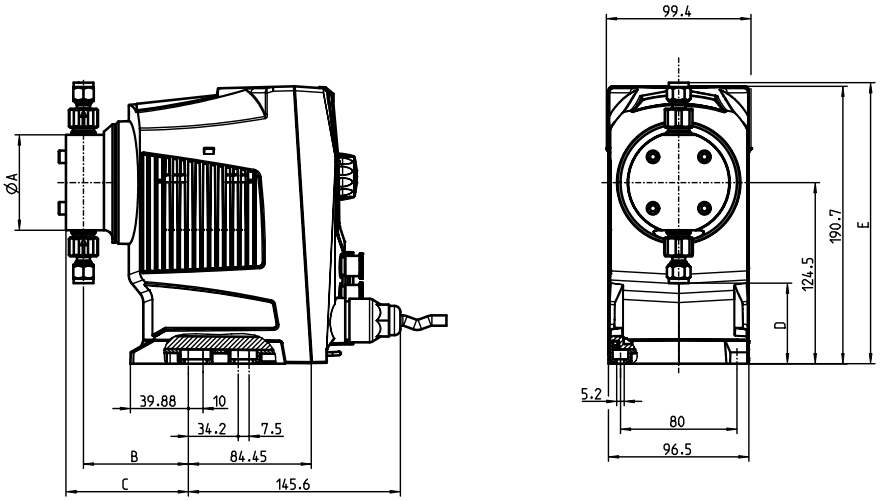


Dimension sheet beta/ X, material version PV/PE - Dimensions in mm

Dimension sheet beta/ X, material version SST

Type	Ø A	B
16006	70	72
07018, 04028	85	77
02050	100	78

Type	C	D	E
16006	84	55.5	193
07018, 04028	92	22	226.5
02050	95	14.25	234.3



Dimension sheet beta/ X, material version SST - Dimensions in mm

1.1 Diaphragm Metering Pumps

Technical Data

Pump type	Pump capacity at max. back pressure			Stroke rate	Connector size o Ø x i Ø	Suction lift	Shipping weight	
	bar	l/h	ml/stroke	Strokes/min	mm	m WC	PV, PE kg	SS kg
BTXb 16006	16	6	0.50	200	6 x 4	5	2.4	2.9
BTXb 07018	7	18	1.5	200	8 x 5	4	2.6	3.9
BTXb 04028	4	27.6	2.30	200	12 x 9	4	2.6	4.0
BTXb 02050	2	50.4	4.20	200	12 x 9	3	2.7	4.5

! The vPTFE diaphragm and vPE diaphragm are limited to a maximum operating pressure of 10 bar. The delivery rates of the dosing pumps with vPTFE diaphragm and vPE diaphragm can deviate by 10-20 % compared to the standard diaphragm.

Materials in Contact with the Medium

Identity code of material	Dosing head	Connection on suction/ discharge side	Ball seat	Seals	Balls
PVT	PVDF	PVDF	PVDF	Standard diaphragm - Wetted PTFE	Ceramic AL203
PVM	PVDF	PVDF	PVDF	Full PTFE membrane	Ceramic AL203
PEP	PE	PE	PEEK	Full PE diaphragm	Ceramic AL203
SST	Stainless steel 1.4404	Stainless steel 1.4404	Ceramic ZrO2	Standard diaphragm - Wetted PTFE	Ceramic AL203

Repeatability of dosing: ±1 % when used in accordance with the instructions in the operating manual

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

Average power consumption: 3.4 ... 16.5 W

Protection class: IP 66, NEMA 4X, insulation class F

1.1 Diaphragm Metering Pumps

Code	Description	
BTXb	**Regional design**	
EU	Europe	
US	USA	
Type	**Capacity**	
16006	16 bar	6 l/h
07018	7 bar	18 l/h
04028	4 bar	27.6 l/h
02050	2 bar	50.4 l/h
	Liquid end/valve material	
PV	PVDF	
PE	PE	
SS	Stainless steel	
	Seal/diaphragm material	
T	Standard diaphragm + PTFE seal	
P	PE diaphragm+ PE seals PE	
M	PTFE diaphragm + PTFE valve seats. Design only for PV and SS heads	
	Liquid end version	
0	Non-bleed, without valve spring	
2	With bleed valve, without valve spring	
	Certificate	
0	No certification	
F	FDA	
G	1935/2004	
P	PFAS free	
	Hydraulic connections	
0	Standard connector	
K	Universal connector (imperial)	
U	Universal connection set metric	
	Version	
0	Housing RAL5003 / hood RAL2003	
	logo	
0	With ProMinent logo and with beta/ X lettering	
	Electrical Connection	
U	Universal control 100 - 240VAC	
K	low voltage 10 - 30 VDC	
	Cable and plug	
A	2m European	
B	2m Swiss	
D	2m USA 120V	
G	2m Brazilian	
E	2m English	
1	2m open end	
2	5m open end	
3	10m open end	
	Modules	
0	no relay	
1	3-pole relay 240V,1xchangeover contact 240V-8A (relay releasing)	
4	4-pole relay 24V, 100mA 2xN/O switch 24V-100mA (like 1 + pacing relay energising)	
A	0-24mA output + 2-pole relay 24V0,1ADC (like 1 + 4-20mA output)	
	Communication	
0	Manual + contact	
3	Manual + contact + analogue input 0/4 – 20mA	
B	Bluetooth	
C	Bluetooth and analogue input 0/4 – 20mA	
	Accessories	
0	no accessories	
1	Injection valve + foot valve, 2m hose, 5m PE hose	
4	Multifunctional valve + accessories	
5	1+uni. control cable	
	Documentation language	
DE	German	
EN	English	
ES	Spanish	
FR	French	
	Approvals	
01	CE	

Low-pressure Metering Technology

Spare parts sets for solenoid diaphragm metering pump beta/ X

Spare parts sets for beta/ X, consisting of:

- 1 dosing diaphragm
- 1 suction valve complete
- 1 pressure valve complete
- 1 connection set

Stainless steel version without complete suction valve and without complete pressure valve, with valve seats, seals and valve balls

Type	Identity code of material	Order no.
Type 16006	PVT	1139938
	PVM	1139939
	PEP	1139941
	SST	1035331
Type 07018	PVT	1139942
	PVM	1139943
	PEP	1139945
	SST	1027087
Type 04028	PVT	1139946
	PVM	1139947
	PEP	1139949
	SST	1051139
Type 02050	PVT	1139950
	PVM	1139951
	PEP	1139953
	SST	1051140

Spare diaphragms - PTFE/EPDM composite diaphragm for beta/ X

1.1.3 Solenoid-Driven Metering Pump gamma/ X

gamma/ X – the proven best-seller intelligently extended

Feed rate of product range 1 ml/h – 45 l/h; 25 – 2 bar

The solenoid-driven diaphragm metering pump gamma incorporates a wealth of e**X** cellent 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 Solenoid-Driven Metering Pump gamma/ X is user-friendly and has a long service life, just like its predecessor model. A sophisticated solenoid control measures the back pressure and protects the system against overload. This technology eliminates the need for a pressure sensor, which significantly increases operational safety: no additional parts come into contact with the feed chemical, there are no additional sealing surfaces and there are no electronics technicians in the vicinity of the chemical.

Whether the dosing quantity deviates or hydraulic malfunctions affect the dosing process - the gamma/ X keeps an eye on everything for you.

It independently ensures a trouble-free dosing process and should the pump ever require maintenance, its service module draws attention to itself.

DULCONNEX

Your Benefits

- Simple adjustment of the metering rate directly in l/h
- In concentration mode, direct input of the required and desired concentration during volume-proportional metering tasks
- Integrated pressure measurement and display for greater safety during commissioning and in the process
- Control range for metering rate 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 a back pressure, ensures smooth processes
- Bluetooth interface for simple parameter configuration and access to diagnostic data using the Android and IOS app - DULCONNEX Blue
- 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 fieldbus interfaces, such as PROFIBUS®, PROFINET, Modbus RTU and CANopen

Technical Details

- Simple and fine adjustments to litre capacity in automatic mode. Can be regulated down to a few ml/h. Alternatively, the pump can also be operated in automatic “OFF” mode via stroke length and stroke rate.
- 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. 99.99 or 99,999 strokes/start pulse
- Connector for 2-stage level switch
- Available material combinations: PP, PVDF, clear acrylic, PTFE and stainless steel
- Special dosing head designs for outgassing and high-viscosity media
- Optional 0/4 – 20 mA output for remote transmission of actual dosing rate and error messages
- Universal power supply unit 100 V - 230 V, 50/60 Hz
- Optional 230 V relay module, can be retrofitted easily and securely
- Optional 24 V combined relay, can be retrofitted easily and securely

Field of Application

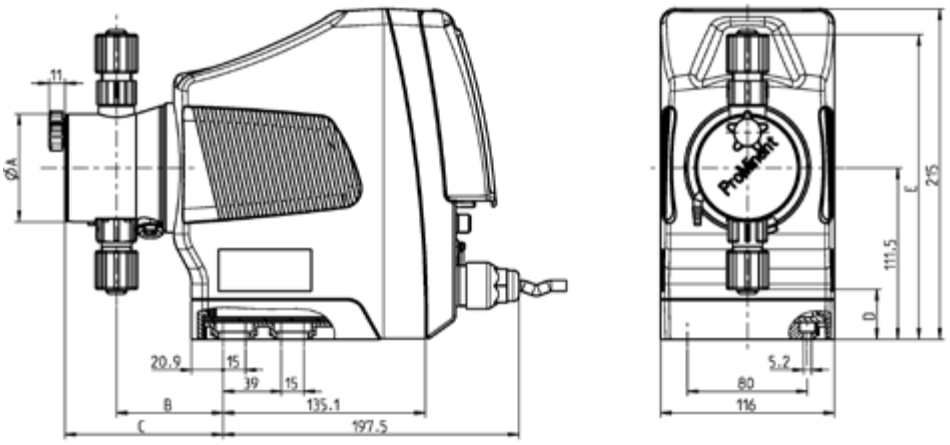
- Can be integrated into automated processes and used in all industries.
- The pump can work as a control unit with the timer, for example in cooling water treatment.

1.1 Diaphragm Metering Pumps

Dimensional drawing of gamma/ X, material version PPT

Type	Ø A	B
1602	70	71
1604	70	71
0708	90	74
0414	90	74
0220	90	76
1009	90	74

Type	C	D	E
1602	106	32	198
1604	106	32	198
0708	108	24	202
0414	107	24	202
0220	110	24	202
1009	108	24	202

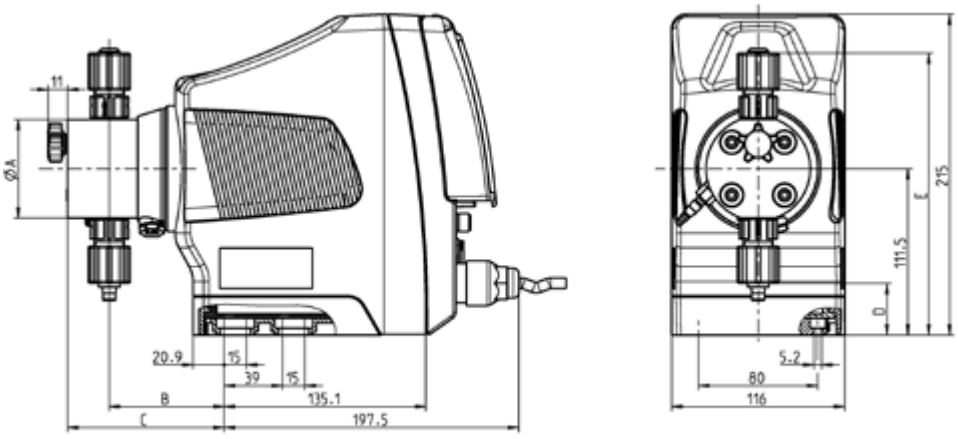


Dimensional drawing of gamma/ X, Material design PPT – dimensions in mm

Dimensional drawing of gamma/ X, material version NPT

Type	Ø A	B
1602	70	77
1604	70	77
0708	90	74
0414	90	76
0220	90	76
2504	70	77

Type	C	D	E
1602	105	33	191
1604	105	33	191
0708	102	23	200
0414	104	23	200
0220	104	23	200
2504	105	33	191

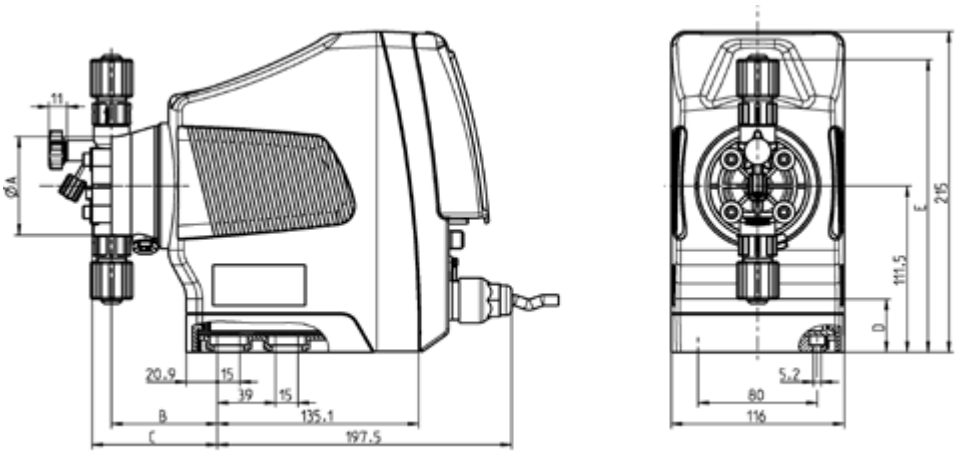


Dimensional drawing of gamma/ X, Material design NPT – dimensions in mm

Dimensional drawing of gamma/ X, material version PVT

Type	Ø A	B
1602	70	71
1604	70	71
0708	90	75
0414	90	73
0220	90	79
1009	90	75

Type	C	D	E
1602	84	36	196
1604	84	36	196
0708	92	25	203
0414	90	25	203
0220	90	25	203
1009	92	25	203



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

1.1 Diaphragm Metering Pumps

Technical Data

Pump type	Pump capacity at max. back pressure			Stroke rate	Connector size o Ø x i Ø	Suction lift*	Shipping weight	
	bar	l/h	ml/stroke	Strokes/min	mm	m WC	PP, NP, PV, TT kg	SS kg
Metering pumps with non-self-bleeding dosing head								
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 2504	25 **	3.8	0.32	200	8 x 4 ***	4.0	4.9	5.5
GMXa 0708	7	7.6	0.63	200	8 x 5	4.0	3.7	5.0
GMXa 1009	10	9.0	0.75	200	8 x 5	3.0	5.1	6.5
GMXa 0414	4	13.5	1.13	200	8 x 5	3.0	3.7	5.0
GMXa 0715	7	14.5	1.21	200	8 x 5	3.0	5.1	6.5
GMXa 0220	2	19.7	1.64	200	12 x 9	2.0	3.7	5.0
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
Metering pumps with self-degassing dosing head (dosing head design 7)								
GMXa 1604	10	2.2	0.18	200	6 x 4	1.8	3.6	-
GMXa 0708	7	5.6	0.47	200	8 x 5	1.8	3.7	-
GMXa 1009	10	6.6	0.55	200	8 x 5	1.8	5.1	-
GMXa 0414	4	12.2	1.01	200	8 x 5	1.8	3.7	-
GMXa 0715	7	13.0	1.08	200	8 x 5	1.8	5.1	-
GMXa 0220	2	18.0	1.50	200	12 x 9	1.8	3.7	-
GMXa 0424	4	22.0	1.83	200	12 x 9	1.8	5.1	-
GMXa 0245	2	40.0	3.33	200	12 x 9	1.8	5.2	-

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

** 25 bar variant only available with a NP or SS dosing head material.

*** With stainless steel design, 6 mm connector width.

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

! The vPTFE diaphragm is limited to a maximum operating pressure of 10 bar. The pump capacities of the metering pumps with vPTFE diaphragm may be 10-20 % lower than those with a standard diaphragm.

All data calculated with water at 20 °C.

Materials in Contact with the Medium

Identity code of material	Dosing head	Connection on suction/ discharge side	Ball seat	Seals	Balls
PVT	PVDF	PVDF	PVDF	PTFE	Ceramic
PPT	Polypropylene	PVDF	PVDF	PTFE	Ceramic
PPE	Polypropylene	Polypropylene	EPDM	EPDM	Ceramic
PPB	Polypropylene	Polypropylene	FKM A	FKM A	Ceramic
NPT	Clear acrylic	PVDF	PVDF	PTFE	Ceramic
NPE	Clear acrylic	PVC	EPDM	EPDM	Ceramic
NPB	Clear acrylic	PVC	FKM A	FKM A	Ceramic
SST	Stainless steel 1.4404	Stainless steel 1.4404	Ceramic	PTFE	Ceramic
TTT	Carbon-filled PTFE	Carbon-filled PTFE	Ceramic	PTFE	Ceramic

Metering reproducibility: ±1% 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 Diaphragm Metering Pumps

Identity code ordering system for gamma/ X product range

GMXa	Type	Capacity	
	1602	16 bar	2.3 l/h
	1604	16 bar	3.6 l/h
	0708	7 bar	7.6 l/h
	0414	4 bar	13.5 l/h
	0220	2 bar	19.7 l/h
	2504	25 bar	3.8 l/h
	1009	10 bar	9.0 l/h
	0715	7 bar	14.5 l/h
	0424	4 bar	24.0 l/h
	0245	2 bar	45.0 l/h

Liquid end/valve material	
PP	Polypropylene/polypropylene
NP	Acrylic/PVC
PV	PVDF/PVDF
TT	PTFE
SS	Stainless steel 1.4404/1.4404

Material of seals/diaphragm	
B	FKM, diaphragm PTFE coated. FKM ball seats, only for PP and NP heads
E	EPDM, diaphragm PTFE coated. EPDM ball seats, only for PP and NP heads
T	PTFE/EPDM, PTFE coated
F	FDA-compliant design, only for PV and SS
G	EC 1935/2004-compliant design, only for SS
M	With vPTFE diaphragm + PTFE valve seats. Design for PV heads only

Liquid end version	
0	Non-bleed, without valve spring, only with NP, TT and SS and type 0245
1	Non-bleed, with valve spring, only with NP, TT and SS and type 0245
2	With bleed valve, without valve spring, only with PP, PV, NP not for type 0245
3	Bleed version, with valve spring, only with PP, PV, NP not for type 0245
4	For higher-viscosity media (10-20 % lower metering rate possible), only with PV, types 1604, 0708, 0414, 1009, 0715, 0424
7	Self-bleeding without bypass, only for NPT and PVT, not for type 1602. With type 0245 without vent screw.

Hydraulic connections	
0	Standard according to technical data

Diaphragm Rupture Indicator	
0	Without diaphragm rupture indicator
1	With diaphragm rupture indicator, Not for type 0245

Version	
0	Standard

Logo	
0	With ProMinent logo

Electrical Connection	
U	100-230 V, ±10%, 50/60 Hz

Cable and plug	
A	2 m European
B	2 m Swiss
D	2 m USA
E	2 m Great Britain
1	2 m, open-ended

Relay, pre-set to	
0	No relay
1	Fault indicating relay (230 V, 6 A)
4	Fault indicating relay (24 V, 100 mA) + pacing relay (24 V, 100 mA)
C	0/4 – 20 mA analogue output + fault indicating / pacing relay (24 V - 100 mA)
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 and metering valve, 2 m PVC suction line, 5 m PE metering line, Only for PP, PV, and NP, not for PVT4
5	1+ universal control cable

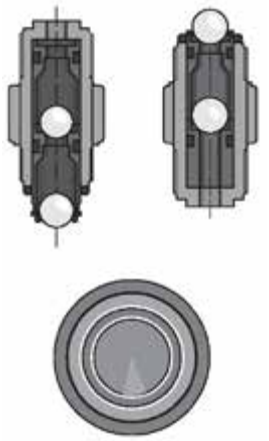
Control Variants	
0	Manual + external with pulse control
3	Manual + external with pulse control + analogue (0/4-20 mA)
C *	As 3 + CANopen
D *	As 3 + CAN open DULCOMARIN II
E *	As 3 + Profinet
G *	as 3 + EtherNet/IP
M *	As 3 + Modbus
R *	As 3 + PROFIBUS® DP interface M12

Metering monitor	
0	Pulse signal input

Remote stop	
0	Without Bluetooth
B	With Bluetooth

Language

* A relay cannot be used with these options.



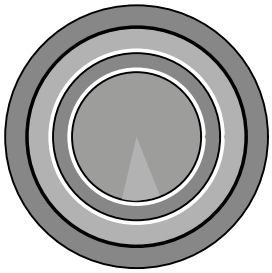
Spare Parts Kit for gamma/ X

Spare parts kits for gamma/ X, consisting of:

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

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

Type	Materials in Contact With the Medium	Order no.
Type 1602	PVT, PPT, NPT	1023109
	PVF	1083550
	PPB	1001654
	PPE	1001646
	NPB2	1001723
	NPE2	1001715
	SST	1001731
	SSF	1107472
	PVT7, NPT7	1047830
Type 1604 and type 2504	PVT, PPT, NPT	1035332
	PVF	1083548
	PVT4	1035342
	PPB	1039987
	PPE	1039989
	NPB2	1039986
	NPE2	1039988
	SST	1035331
	SSF	1107505
Type 1604	PVT7, NPT7	1047858
Type 0708 and Type 1009	PVT, PPT, NPT	1023111
	PVF	1083564
	PVT4	1019067
	PPB	1001656
	PPE	1001648
Type 0414	NPB2	1001725
	NPE2	1001717
Type 0708 and Type 1009	SST	1001733
	SSF	1107493
	PVT7, NPT7	1047832
Type 0414 and Type 0715	PVT, PPT, NPT	1023112
	PVF	1083551
	PVT4	1019069
	PPB	1001657
	PPE	1001649
	NPB2	1001726
	NPE2	1001718
	SST	1027087
	SSF	1107484
	PVT7, NPT7	1047833
Type 0220 and Type 0424	PVT, PPT, NPT	1051129
	PVF	1083566
	PVT4	1051134
	PPB	1051085
	PPE	1051096
	NPB2	1051107
	NPE2	1051118
	SST	1051139
	SSF	1107504
	PVT7, NPT7	1051111
Type 0245	PVT, PPT, NPT	1051130
	PVF	1083567
	PPB	1051086
	PPE	1051097
	NPB2	1051108
	NPE2	1051119
	SST	1074650
	SSF	1098649
	PVT7, NPT7	1114927



Spare Diaphragms for Solenoid-Driven Metering Pump gamma/ X

	Materials in Contact With the Medium	Order no.
Type 1602	all materials	1000246
Type 1604 and type 2504	all materials	1034612
Type 0708 and Type 1009	all materials	1000248
Type 0414 and Type 0715	all materials	1000249
Type 0220 and Type 0424	all materials	1045456
Type 0245	all materials	1045443

Accessories

- Foot valves for low-pressure metering pumps, see page →134
- Injection valves for low-pressure metering pumps, see page →136
- Hoses and pipework for low-pressure metering pumps, see page →195
- Suction lances and suction assemblies for solenoid-driven metering pumps see page →160
- Connectors, fittings, connector kits, seals, see page →199

Spare Parts

- Special valve balls/special valve springs, see page →215

1.1 Diaphragm Metering Pumps

1.1.4 Solenoid-Driven Metering Pump gamma/ XL

gamma/ XL – large output, great features

Feed rate of product range 4 ml/h – 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 Solenoid-Driven Metering Pump gamma/ XL extends the capacity range of the tried and tested gamma/ X to 80 l/h. In addition to the already familiar relays and bus interfaces, the gamma/ XL offers a socket with 3 further configurable inputs and outputs. This means that the gamma/ XL can be networked with all common systems, devices and platforms. Like the gamma/ X, the gamma/ XL has an intuitive operating concept. The pump is adjusted via click-wheel and 4 additional operating buttons. Pressure detection without wetted parts ensures maximum operational safety. Hydraulic faults such as “gas in the dosing head”, “overpressure” and “no pressure” are detected.

Pressure fluctuations in the system are detected and compensated for. This ensures high dosing precision and reduces chemical consumption to the required amount.

The last 300 events are recorded retrospectively in the integrated log book. This enables quick root cause analysis and troubleshooting if necessary.

Deviations from the dosing quantity or hydraulic faults are immediately detected and corrected by the gamma/ XL. The pump’s operating menu contains ordering information for the required wear parts.

As a smart product, it can also be connected to our web-based IIoT platform. This allows users to monitor their dosing process in real time, avoid downtimes and generate reports fully automatically.

New: gamma/ XL meets hygienic design: a hygienic design liquid end is available for small capacity ranges in the food environment

Your Benefits

- Simple adjustment of the metering rate directly in l/h
- Integrated pressure measurement and display for greater safety during commissioning and in the process
- Control range for metering rate 1:40,000
- Direct input of the required and desired concentration in concentration mode with volume-proportional metering tasks
- Virtually wear-free solenoid drive, overload-proof and economical
- Suitable for continuous micro-metering from approx. 4 ml/h, thanks to the regulated solenoid drive
- Detection of hydraulic malfunctions, such as gas in the dosing head, and no or too high a 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 fieldbus interfaces, such as PROFIBUS®, PROFINET, Modbus RTU and CANopen

DULCONNEX

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
- In automatic mode, an even finer setting in ml
- Batch operation with max. 99.99 l 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 actual dosing rate and error messages
- Optional relay module with 1 x switch-over contact, 230 V – 6 A
- Optional relay module with 2 x On, 24 V – 100 mA

1.1 Diaphragm Metering Pumps

Field of Application

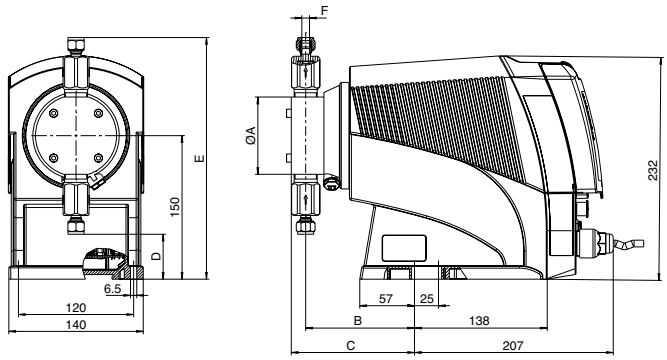
- Chemical distributors
- Systems engineering
- Food and beverage industry
- Potable water
- Wastewater
- Chemical industry
- Electroplating
- Bottling processes, e.g. ink cartridges or highlighter pens
- With an integrated process timer, suitable as a control unit for simple processes, e.g. biocide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

1.1 Diaphragm Metering Pumps

Dimensional drawing of gamma/ XL, material version SST

Type	Ø A	B
2508	90	108
1608	90	108
1612	90	110
1020	90	110
0730	90	112
0450	100	115

Type	C	D	E
2508	128	63	240
1608	128	63	240
1612	130	63	240
1020	130	63	240
0730	132	63	240
0450	135	29	281

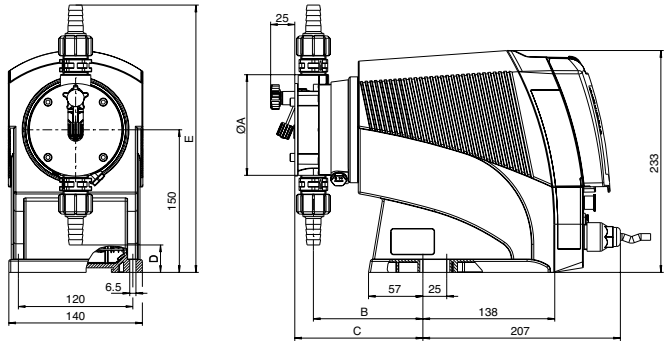


Dimensional drawing of gamma/ XL, material version SST – dimensions in mm

Dimensional drawing of gamma/ XL, material version PV DN 10

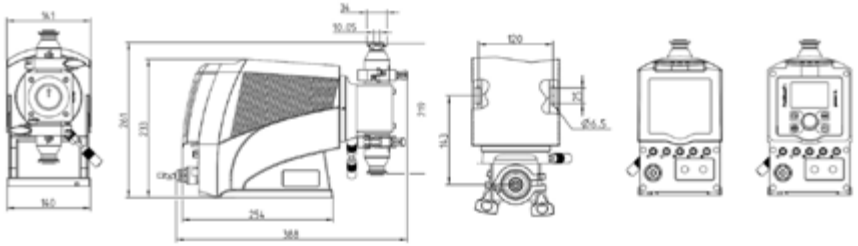
Type	Ø A	B
0450	100	115
0280	100	115

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



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

Dimension sheet gamma/ XL Hygienic, material version SSH DN 10



Dimension sheet gamma/ XL Hygienic, material version SSH DN 10 - Dimensions in mm

1.1 Diaphragm Metering Pumps

Technical Data

Pump type	Pump capacity at max. back pressure		Theor. stroke volume	Max. stroke rate	Nominal diameter	Suction lift*	Shipping weight	
	bar	l/h	ml/stroke	Strokes/min		m WC	NPE, NPB, PVT kg	SS kg
Metering pumps with non-self-bleeding dosing head								
GXLa 2508	25 **	7.5	0.63	200	8 x 4 mm ***	5	10	11
GXLa 1608	16	7.8	0.65	200	8 x 5 mm ***	5	10	11
GXLa 1612	16	12	1	200	8 x 5 mm	6	10	11
GXLa 1020	10	19.6	1.63	200	12 x 9 mm	5	10	11
GXLa 0730	7	29.4	2.4	200	12 x 9 mm	5	10	11
GXLa 0450	4	49	4.08	200	G 3/4 - DN 10	3	10	11
GXLa 0280	2	78.5	6.54	200	G 3/4 - DN 10	2	10	11
Metering pumps with self-degassing dosing head (dosing head design 7)								
GXLa 1608	10	7	0.6	200	8 x 5 mm	1.8	10	-
GXLa 1612	10	10	0.8	200	8 x 5 mm	1.8	10	-
GXLa 1020	10	15	1.25	200	12 x 9 mm	1.8	10	-
GXLa 0730	7	27.5	2.3	200	12 x 9 mm	1.8	10	-

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

** 25 bar variant only available with a NP or SS dosing head material.

*** With stainless steel design, 6 mm connector width.

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

! The vPTFE diaphragm is limited to a maximum operating pressure of 10 bar. The pump capacities of the metering pumps with vPTFE diaphragm may be 10-20 % lower than those with a standard diaphragm.

All data calculated with water at 20 °C.

Materials in Contact with the Medium

Identity code of material	Dosing head	Connection on suction/discharge side	Ball seat	Seals	Balls
NPB	Clear acrylic	PVC	FKM A	FKM A	Ceramic
NPE	Clear acrylic	PVC	EPDM	EPDM	Ceramic
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	Carbon-filled PTFE	PTFE	Ceramic
SSH (C)	Stainless steel 1.4435	Stainless steel 1.4435	Stainless steel 1.4435	EPDM	Ceramic
SSH (D)	Stainless steel 1.4435	Stainless steel 1.4435	Stainless steel 1.4435	FKM A	Ceramic

Connectors

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

Metering diaphragm with PTFE coating.

Repeatability of metering ±1% when used in accordance with the operating instructions.

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

Mean power consumption 78 W.

Degree of protection IP 66, insulation class F.

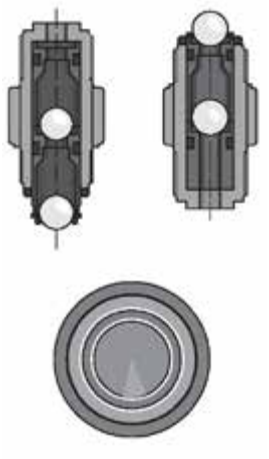
✓ **Scope of supply**
Metering pump with mains cable, connector kit for hose/tube connector as per table.

1.1 Diaphragm Metering Pumps

Identity Code Ordering System for Product Range gamma/ XL

Code	Description
GXLa	**Regional design**
EU	Europe
US	USA
Type	**Capacity**
2508	25 bar, 7.5 l/h
1608	16 bar, 7.8 l/h
1612	16 bar, 12 l/h
1020	10 bar, 19.6 l/h
0730	7 bar, 29.4 l/h
0450	4 bar, 49 l/h
0280	2 bar, 78.5 l/h
	Liquid end/valve material
PV	PVDF/PVDF, not for pump type 2508
NP	Acrylic/PVC, Only for pump types 2508, 1608, 1612, 1020 and 0730
SS	Stainless steel/stainless steel
	Material of seals/diaphragm
T	PTFE/EPDM, PTFE coated
F	FDA-compliant design, only for PV and SS
G	EC 1935/2004-compliant design, only for SS
H	Hygienic Design (only for SS variant 0450)
M	With vPTFE diaphragm + PTFE valve seats. Design for PV heads only
E	EPDM, diaphragm PTFE coated. EPDM ball seats, only for NP heads
B	FKM, diaphragm PTFE coated. FKM ball seats, only for NP heads
	Liquid end version
0	Non-bleed, without valve spring, only with TT and SS materials
1	Non-bleed, with valve spring, only with TT and SS materials
2	With bleed valve, without valve spring, only with NP and PV materials
3	Bleed version, with valve spring, only with NP and PV materials
4	HV version for higher-viscosity media, only for PV 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 connections
0	Standard according to technical data
5	Connector on discharge side for 12/6 hose, standard on suction side, only with NP and PV materials
F	Connector on discharge side for 8/4 hose, standard on suction side, Only with NP material
C	Slotted clamping socket DIN 11846-3 Form A
	Diaphragm Rupture Indicator
0	Without diaphragm rupture indicator
1	With diaphragm rupture indicator
	Version
0	Housing RAL 5003, cover RAL 2003
	Logo
0	With ProMinent logo
	Electrical Connection
U	100 - 230 V ±10%, 50/60 Hz
	Cable and plug
A	2 m European
B	2 m Swiss
C	2 m Australian
D	2 m USA / 115 V
1	2 m, open-ended
	Relay, pre-set to
0	No relay
1	Fault indicating relay (230 V, 6 A)
4	Fault indicating relay (24 V, 100 mA) + pacing relay (24 V, 100 mA)
C	0/4 – 20 mA analogue output + fault indicating / pacing relay (24 V - 100 mA)
F	With automatic bleed valve, 230 V , 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 metering valve, 2m suction line and 5 m discharge line
5	1+ universal control cable
	Control Variants
0	Manual + external contact with pulse control
3	Manual + external contact with pulse control + analogue 0/4-20 mA
C *	As 3 + CANopen
G *	as 3 + EtherNet/IP
M *	As 3 + Modbus RTU
P *	As 3 + PROFINET® interface
R *	As 3 + PROFIBUS® interface, M12
	Communication
0	Without interface
B	With Bluetooth
	Operating menu language

* A relay cannot be used with these options.



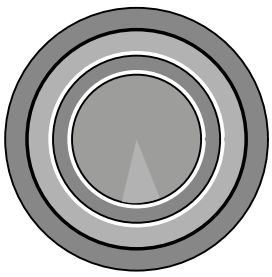
Spare Parts Kits for Solenoid-Driven Metering Pump gamma/ XL

Spare parts kits for gamma/ XL, consisting of:

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

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

Type	Materials in Contact With the Medium	Order no.
Type 2508	NPT2	1095912
	NPE	1033172
	NPB	1033171
	SSF0	1107362
Types 1608 and 2508	SST0	1030226
Type 1608	PVT2/NPT2	1030225
	PVF2	1083565
	NPE	1030620
	NPB	1030611
	PVT7	1047831
Type 1612	PVT2/NPT2	1027081
	PVT4	1019067
	PVF2	1083569
	SST0	1027086
	NPE	1030536
	NPB	1030525
	SSF0	1107471
	PVT7	1047832
Type 1020	PVT2/NPT2	1027082
	PVT4	1019069
	PVF2	1083570
	SST0	1027087
	NPE	1030537
	PVT7	1047833
	NPB	1030526
	SSF0	1107484
Type 0730	PVT2/NPT2	1095626
	PVF2	1096089
	PVT4	1095499
	SST0	1095501
	NPE	1095701
	NPB	1095700
	SSF0	1107473
	PVT7	1095503
Type 0450	PVT2	1095502
	PVF2	1096090
	SST0	1095625
	SSF0	1098651
Type 0280	PVT2	1095500
	PVF2	1096088
	SST0	1095624
	SSF0	1098648



Spare Diaphragms for Solenoid-Driven Metering Pump gamma/ XL

	Materials in Contact With the Medium	Order no.
Types 1608 and 2508	all materials	1030353
Type 1612	all materials	1000248
Type 1020	all materials	1000249
Type 0730	all materials	1045456
Type 0450	all materials	1045443
Type 0280	all materials	1059691

1.1 Diaphragm Metering Pumps

Accessories

- Foot valves for low-pressure metering pumps, see page →134
- Injection valves for low-pressure metering pumps, see page →136
- Hoses and pipework for low-pressure metering pumps, see page →195
- Suction lances and suction assemblies for solenoid-driven metering pumps see page →160
- Connectors, fittings, connector kits, seals, see page →199

Spare Parts

- Special valve balls/special valve springs, see page →215

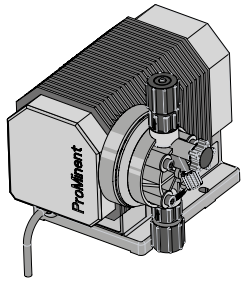
1.1.5 Motor-Driven Metering Pump alpha

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

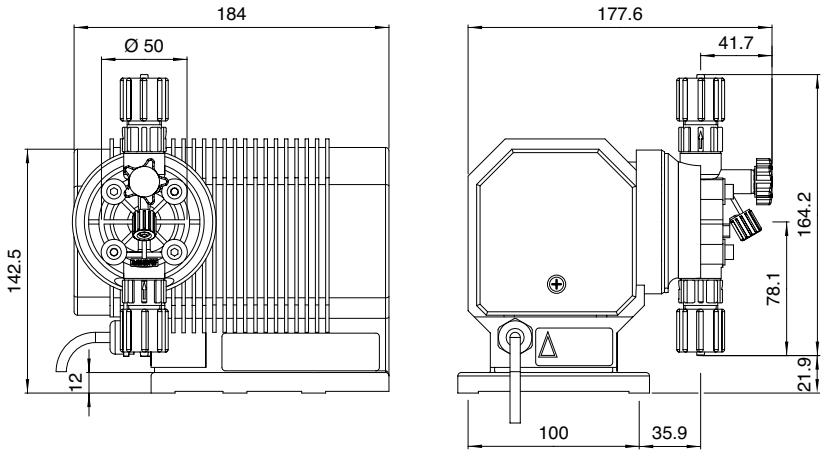
Technical Details

- 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.

Dimensional drawing of the alpha



Dimension drawing of alpha – dimensions in mm

1.1 Diaphragm Metering Pumps

Technical Data

Pump type	Pump capacity at max. back pressure			Delivery rate at medium back pressure			Stroke rate	Stroke length	Connector size Ø x i Ø	Suction lift	Shipping weight
	bar	l/h	ml/stroke	bar	l/h	ml/stroke	Strokes/min	mm	mm	m WC	kg
50 Hz											
ALPc 1001	10	1.0	0.29	5	1.1	0.32	30	2	6 x 4	5.1	3.0
ALPc 0230	2	30.6	3.98	1	32.7	4.26	128	3	12 x 9	3.1	3.0
ALPc 0417	4	17.0	2.51	2	18.3	2.76	128	3	8 x 5	4.1	3.0
ALPc 0707	7	6.9	1.98	3	7.7	2.21	58	3	8 x 5	4.1	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
60 Hz											
ALPc 0230	2	34.4	3.72	1	39.2	4.24	154	3	12 x 9	3.1	3.0
ALPc 0417	4	20.6	2.45	2	21.9	2.75	154	3	8 x 5	4.1	3.0
ALPc 0707	7	8.3	2.00	3	9.2	2.22	69	3	8 x 5	4.1	3.0
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

All data calculated with water at 20 °C.

Materials in Contact with the Medium

Identity code of material	Dosing head	Connection on suction/discharge side	Ball seat	Seals	Balls
PPE	Polypropylene	Polypropylene	EPDM	EPDM	Ceramic
PPB	Polypropylene	Polypropylene	FKM A	FKM A	Ceramic
NPE	Clear acrylic	PVC	EPDM	EPDM	Ceramic
NPB	Clear acrylic	PVC	FKM A	FKM A	Ceramic
PVT	PVDF	PVDF	PVDF	PTFE	Ceramic

Metering diaphragm with PTFE coating for all designs

FKM = fluorine rubber

Motor Data

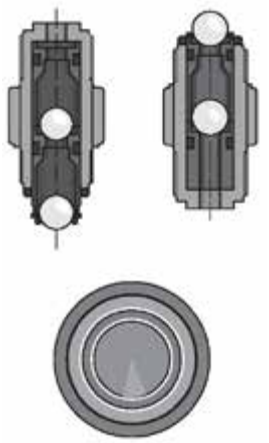
Type	Split pole motor with integrated thermal overload protection
Electrical connection	220 – 240 V, 50/60 Hz (variant A)
Output	50 W (at 230 V/50 Hz)
Power consumption	0.4 A (at 230 V/50 Hz)

! **Warranty:** The warranties listed in the General Terms and Conditions of Sale apply; there is a warranty period of 12 months for the alpha pump drive.

Identity Code Ordering System for Product Range alpha, version c

ALPc	Type	Capacity							
	1001	10 bar	1.0 l/h	10 bar	1.2 l/h				
	1002	10 bar	1.8 l/h	10 bar	2.2 l/h				
	1004	10 bar	3.5 l/h	10 bar	4.1 l/h				
	1008	10 bar	7.7 l/h	10 bar	8.9 l/h				
	0707	7 bar	6.9 l/h	7 bar	8.3 l/h				
	0417	4 bar	17.0 l/h	4 bar	20.6 l/h				
	0230	2 bar	30.6 l/h	2 bar	34.4 l/h				
		Liquid end material							
		PP	Polypropylene/polypropylene						
		NP	Acrylic/PVC						
		PV	PVDF/PVDF						
			Seal material						
			E	EPDM					
			B	FKM A					
			T	PTFE					
				Valve springs					
				2	Without valve spring, with bleeding				
				3	With 2 valve springs approx. 0.1 bar, material 1.4571, with bleeding				
					Hydraulic connections				
					0	Standard according to technical data			
						Version			
						0	With ProMinent logo		
							Electrical Connection		
							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	
								Accessories	
								0	No accessories
								1	With foot and metering valve, 2 m PVC suction line, 5 m PE metering line

FKM = fluorine rubber



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

	Materials in contact with the medium	Order no.
1001, 1002, 1004, 1008	PPE	1001646
	PPB	1001654
	NPE	1001715
	NPB	1001723
	PVT	1023109
0417, 0707	PPE	1001649
	PPB	1001657
	NPE	1001718
	NPB	1001726
	PVT	1023112
0230	PPE	1001650
	PPB	1001658
	NPE	1001719
	NPB	1001727
	PVT	1023113

Spare Diaphragms for Motor-Driven Metering Pump alpha

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

Accessories

- Foot valves for low-pressure metering pumps, see page →134
- Injection valves for low-pressure metering pumps, see page →136
- Hoses and pipework for low-pressure metering pumps, see page →195
- Suction lances and suction assemblies for solenoid-driven metering pumps see page →160
- Connectors, fittings, connector kits, seals, see page →199

Spare Parts

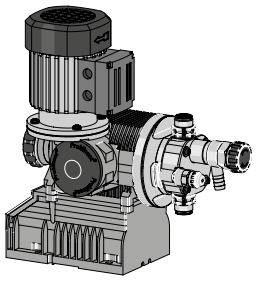
- Special valve balls/special valve springs, see page →215

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

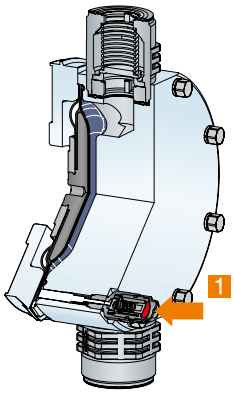
The robust pump for safe and reliable use

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

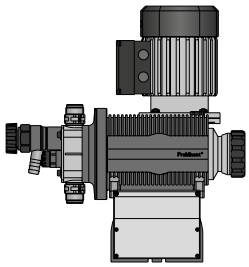
The Sigma/ 1 Basic is an extremely robust motor-driven metering pump with patented multi-layer safety diaphragm for excellent process reliability. It offers a wide range of power end designs, such as three-phase or 1-phase AC motors, also for use in areas at risk from explosion.



Sigma/ 1 Basic version



1: Diaphragm rupture sensor



Sigma / 1 liquid end on left

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

High process reliability:

- In the event of an accident, the feed chemical does not escape to the outside or into the pump drive, thanks to the patented multi-layer safety diaphragm with visual (optional electrical) signaling.
- Integrated relief valve to protect the pump against overload and reliable function thanks to venting option during the suction process.

Flexible adaptation to the process:

- Variants with EU 1935/2004, FDA or Hygienic Design can be selected for food applications.
- Adaptation to special installation situations, as “left-hand liquid end” can be selected as standard.
- Wide selection of drive variants, also for the ATEX range, and various flange designs for the use of customer-specific motors.
- Customized designs are available on request.

Technical Details

- Stroke length: 4 mm
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually using self-locking rotary dial in 1% increments (optionally with actuator or control drive)
- With the right, constant conditions, correct installation and calibration, precision exceeds ±1 %, based on maximum stroke volume.
- Wetted materials: PVDF, stainless steel 1.4571/1.4404, special materials on request
- Patented multi-layer safety diaphragm with optical diaphragm rupture display (as option 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 AC 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)
- IP 55 degree of protection
- Fibreglass-reinforced plastic housing
- Liquid end on left is available as standard
- For reasons of safety, provide suitable overflow devices during installation for 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 wastewater 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

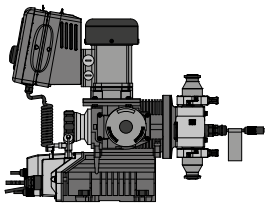
Sigma Basic Type Control Functions (S1Ba)

Stroke length actuator/control drive

Actuator: Electronically controlled actuator with contactless position detection for automatic stroke length adjustment, actuating period approx. 1 second for 1% stroke length, return potentiometer 1 kΩ, wide-range voltage power unit 85 - 265 V AC, 50/60 Hz, degree of protection IP 65.

1.1 Diaphragm Metering Pumps

Control drive: Electronically controlled actuator with contactless position detection 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 AC, 50/60 Hz, degree of protection IP 65, actual value output 0/4-20 mA for remote display.



‘Physiologically safe’ designs

FDA

The wetted materials in the “FDA” (F) design comply with the FDA directive. Material PTFE: FDA no. 21 CFR § 177.1550, material PVDF: FDA no. 21 CFR § 177.2510. Available for pump version plastic (PV) and stainless steel (SS)

Identity code example: S1BaH04084PV F S000S000

EU Regulation 1935/2004

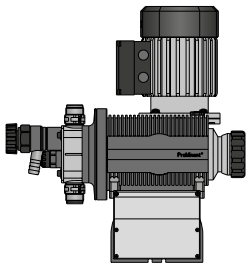
Sealing materials in accordance with Regulation (EC) 1935/2004 are available in the stainless steel material version “Physiologically safe with regard to wetted materials Regulation (EC) 1935/2004". Available for stainless steel (SS) pump design.

Hygienic design

For hygienically demanding applications. Dosing heads comply with the current EHEDG design guidelines for oscillating positive displacement pumps. Simple construction, quick to clean.

Order variant: S1BAH07065SSHAHC0S000

Materials:	1.4435, PTFE multi-layer safety diaphragm, ceramic balls, EPDM and/or FKM seals
Surfaces:	Ra ≤ 0.8 µ (wetted)
Cleaning:	CIP max. 120 °C (15 min), ATEX max. 115 °C
Connection types:	Groove clamp spigot DIN 11864-3 (TriClamp) standard Groove clamp spigot DIN 11864-2 (flange)



Sigma / 1 liquid end on left

Sigma / 1 Basic Type ‘liquid end on left’ design

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

Identity code example: S1BaH07042PVTS00 **5** S000

1.1 Diaphragm Metering Pumps

Technical Data

Type	Capacity at max. back pressure with 1500 rpm motor at 50 Hz				Pump capacity at max. back pressure with 1800 rpm motor at 60 Hz			Suction lift	Perm. pre-pressure suction side	Connector Suction/ Discharge Side	Shipping weight
S1Ba	l/h	bar	ml/stroke	Max. stroke rate Strokes/ min	l/h / gph (US)	psi	Max. stroke rate Strokes/ min	m WC	bar	G-DN	kg
12017 PVT	17	10	3.8	73	20.4/5.3	145	88	7	1	3/4–10	9
12017 SST	17	12	3.8	73	20.4/5.3	145	88	7	1	3/4–10	12
12035 PVT	35	10	4.0	143	42.0/11.0	145	172	7	1	3/4–10	9
12035 SST	35	12	4.0	143	42.0/11.0	174	172	7	1	3/4–10	12
10050 PVT	50	10	4.0	205	60.0/15.8	145	246	7	1	3/4–10	9
10050 SST	50	10	4.0	205	60.0/15.8	145	246	7	1	3/4–10	12
10022 PVT	22	10	5.0	73	26.4/6.9	145	88	6	1	3/4–10	9
10022 SST	22	10	5.0	73	26.4/6.9	145	88	6	1	3/4–10	12
10044 PVT	44	10	5.1	143	52.8/13.9	145	172	6	1	3/4–10	9
10044 SST	44	10	5.1	143	52.8/13.9	145	172	6	1	3/4–10	12
07065 PVT	65	7	5.2	205	78.0/20.6	102	246	6	1	3/4–10	9
07065 SST	65	7	5.2	205	78.0/20.6	102	246	6	1	3/4–10	12
07042 PVT	42	7	9.5	73	50.4/13.3	102	88	3	1	1–15	10
07042 SST	42	7	9.5	73	50.4/13.3	102	88	3	1	1–15	14
04084 PVT	84	4	9.7	143	100.8/26.6	58	172	3	1	1–15	10
04084 SST	84	4	9.7	143	100.8/26.6	58	172	3	1	1–15	14
04120 PVT	120	4	9.7	205	144.0/38.0	58	246	3	1	1–15	10
04120 SST	120	4	9.7	205	144.0/38.0	58	246	3	1	1–15	14
10022 SSH	25	10	5.7	73	30.1/7.9	145	88	5	1	3/4–10	12
10044 SSH	49	10	5.7	143	58.6/15.5	145	172	5	1	3/4–10	12
07065 SSH	70	7	5.7	205	84.4/22.3	102	246	5	1	3/4–10	12

Performance data for TTT, see type PVT

Integrated relief valve, connector for DN 10 pressure hose sleeve

Materials in Contact with the Medium

Identity code of material	Dosing head	Connection on suction/ discharge side	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	Carbon-filled PTFE	PTFE/PTFE	Ceramic	-
PVF	PVDF	PVDF	PTFE/PTFE	Ceramic	PVDF/FKM or EPDM
SSF	Stainless steel 1.4404	Stainless steel 1.4581	PTFE/PTFE	Stainless steel 1.4404	Stainless steel/FKM or EPDM
SSG	Stainless steel 1.4404	Stainless steel 1.4581	PTFE/stainless steel 1.4404	Stainless steel 1.4404	-
SSH	Stainless steel 1.4435	Stainless steel 1.4435	EPDM or FKM/stainless steel 1.4435	Ceramic	-

* Specifically for areas at risk from explosion

1.1 Diaphragm Metering Pumps

Motor Data

Identity code specification	Power supply	Δ/Y			Remarks
S	3-phase, IP 55*	230 V/400 V	50 Hz	0.09 kW	
T	3-phase, IP 55*	230 V/400 V 265 V/460 V	50 Hz 60 Hz	0.09 kW 0.09 kW	With PTC, speed control range 1:5
R	3-phase, IP 55*	230 V/400 V	50 Hz	0.09 kW	With PTC, speed control range 1:20 with external fan (1-phase 230 V; 50/60 Hz, 20 W)
M	1-phase AC, IP 55	230 V ± 5 %	50 Hz	0.12 kW	
N	1-phase AC, IP 55	120 V ± 5 %	60 Hz	0.12 kW	
L1	3-phase, II2GExellT3	220 – 240 V/380 – 420 V	50 Hz	0.12 kW	
L2	3-phase, II2GExdIICT4	220 – 240 V/380 – 420 V	50 Hz	0.18 kW	With PTC, speed control range 1:5

* Three-phase motor according to IEC 60034-1

Motor data sheets can be requested for more information. Versions 265/460V - 60Hz, 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/EC in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label correspond to or are superior to the conditions prevalent in the intended application.

1.1 Diaphragm Metering Pumps

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

S1Ba	Drive type												
	H	Main drive, diaphragm											
		Type		Capacity									
		12017 *		12 bar	17 l/h								
		12035 *		12 bar	35 l/h								
		10050		10 bar	50 l/h								
		10022		10 bar	22 l/h								
		10044		10 bar	44 l/h								
		07065		7 bar	65 l/h								
		07042		7 bar	42 l/h								
		04084		4 bar	84 l/h								
		04120		4 bar	120 l/h								
			Liquid end material										
			PV	PVDF (max. 10 bar)									
			SS	Stainless steel									
			TT	PTFE + 25% carbon (max. 10 bar)									
				Seal material									
				T	PTFE seal (standard)								
				F	FDA-compliant								
				G	1935/2004-compliant								
				H	Hygienic Design, only for 10022, 10044 and 07065								
					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 (standard)						
						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						
						H	Hygienic Design						
							Hydraulic connections						
							0	Standard threaded connector (according to technical data)					
							1	PVC union nut and insert					
							2	Union nut and insert PP					
							3	PVDF union nut and insert					
							4 ***	SS union nut and insert					
							7	Union nut and PVDF hose nozzle					
							8	Union nut and SS hose nozzle					
							9	Union nut and stainless steel hose nozzle					
							C	DIN 11864-3 form A (hygienic design), others on request					
								Version					
								0	With ProMinent logo (standard)				
								M	Modified				
								5	Left liquid end				
									Electrical power supply				
									S	3 ph, 230 V/400 V 50 Hz			
									T	3-phase, 230 V/400 V 50 Hz, with PTC			
									R	Variable speed motor 3 ph, 230/400 V, with PTC, with external fan 1 ph 230 V 50/60 Hz			
									M	1-phase AC, 230 V 50 Hz			
									N	1-phase AC, 120 V 60 Hz			
									L	3 ph, 230 V/400 V, 0.37 kW, 50 Hz, (Exe, Exd)			
									3	No motor, B 5, size 56 (DIN)			
										Enclosure rating			
										0	IP 55 (standard)		
										1	Ex-design ATEX-T3		
										2	Ex-design ATEX-T4		
											Stroke sensor		
											0	No stroke sensor (standard)	
											2	Pacing relay (reed relay)	
											3	Stroke sensor (Namur) for hazardous locations	
												Stroke length adjustment	
												0	Manual (Standard)
												1	With servomotor, 85…265 V AC 50/60 Hz
												4	With stroke control motor 0/4...20 mA 85…265 V AC 50/60Hz

* 10 bar for PVDF and TTT version.

** With hose sleeve (DN 10 for 24x16 mm hose) in the bypass as standard. Threaded connection on request.

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

As a result of the stringent requirements placed on wetted materials in the food environment, not all product variants are available. We are happy to assist with any questions you may have relating to your selection.

Spare parts for Sigma/ 1 Basic type (S1Ba)

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

Scope of delivery for PVT material version:

- 1 diaphragm (multi-layer safety diaphragm)
- 2 valve assemblies
- 2 valve balls
- 2 ball seats
- 4 composite seals
- 1 elastomer sealing set (EPDM, FKM-B)

Scope of delivery for SST material version:

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

Spare parts kit for Sigma/ 1

(applies to identity code for types 12017, 12035 and 10050)

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

(applies to identity code for types 10022, 10044 and 07065)

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

(applies to identity code for types 07042, 04084 and 04120)

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

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

(applies to identity code for types 12017, 12035 and 10050)

Liquid end	Materials in contact with the medium		Valve	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	Reg. (EC) 1935/2004	without valve	1105291
FM 50 - DN 10	SST	Reg. (EC) 1935/2004	with valve	1105286

(applies to identity code for types 10022, 10044 and 07065)

Liquid end	Materials in contact with the medium		Valve	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	Reg. (EC) 1935/2004	without valve	1105288
FM 65 - DN 10	SST	Reg. (EC) 1935/2004	with valve	1105287

(applies to identity code for types 07042, 04084 and 04120)

Liquid end	Materials in contact with the medium		Valve	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	Reg. (EC) 1935/2004	without valve	1105290
FM 120 - DN 15	SST	Reg. (EC) 1935/2004	with valve	1105289

Spare parts kit for Sigma/ 1 for hygienic design version

(applies to identity code for types 10022, 10044 and 07065)

Liquid end	Materials in contact with the medium		Valve	Order no.
FM 65 - DN 10	SSH/EPDM	Hygienic design	without valve	1119725
FM 65 - DN 10	SSH/FKM	Hygienic design	without valve	1126469

Multi-layer safety diaphragm

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

Spare parts kit for integrated overflow 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 kits for integrated relief valve 12 bar	PVT/SST	FKM-A/ EPDM	1031202

Accessories

- Foot valves for motor-driven metering pumps, see page →156
- Injection valves for motor-driven metering pumps, see page →170
- Hoses and pipework for motor-driven metering pumps, see page →195
- Suction lances and suction assemblies for motor-driven metering pumps see page →163
- Connectors, fittings, connector kits, seals, see page →199
- Speed controllers, see page →PL
- Metering monitor Flow Control, can be set for motor-driven metering pumps, see page →209

Spare Parts

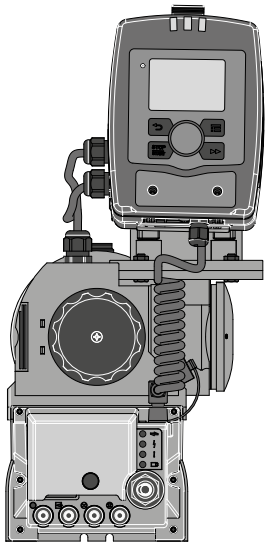
- Special valve balls/special valve springs, see page →215

1.1.7 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.



Sigma/ 1 control type

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 logbook significantly improves process management, optimisation and troubleshooting.

DULCONNEX

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 signalling (electrical as an option).
- 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.
- Can be flexibly networked: Connection to process management systems via integral PROFIBUS®.
- 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 by means of self-locking rotary dial in 1 % increments
- Under correct, constant conditions, correct installation and calibration, the precision is better than ±1 %, based on maximum stroke volume.
- Wetted materials: PVDF, stainless steel 1.4571/1.4404 (special materials on request)
- Power supply: 1 pH, 100 - 230 V ±10 %, 240 V ±6 %, 50/60 Hz (110 W)
- Degree of protection IP 65
- Glass fiber reinforced plastic housing
- Liquid end on the left can be selected as standard for special installation situations or in combination with tanks, brackets, etc.
- Programmable mA input
- Manual or external contact operation adjustable, factor for external contact control 99:1 - 1:99; batch operation with max. 99,999 strokes/start pulse.
- Dosing profiles for optimum dosing results.
- Display of wear parts in the service menu.
- Connector for level switch 2-stage.
- Connection to PROFINET via ProMinent DULCOnvert PROFIBUS®- PROFINET converter.
- Various relay modules available
- Variants with EU 1935/2004, FDA or Hygienic Design are available for food applications.
- Customized designs are available on request.

1.1 Diaphragm Metering Pumps

For safety reasons, suitable overflow devices must be provided for all mechanically actuated Diaphragm Metering Pumps during installation.

Field of Application

- Any industrial applications as stand-alone or integrated into a complete system
- Proportionate addition of chemicals in water treatment, e.g. sodium hypochlorite for disinfection of drinking water
- Neutralization in waste water treatment
- Pulse-controlled dosing when bottling different volumes, e.g. glycerine filling of manometers
- Precise dosing of flavors and vitamins in food production

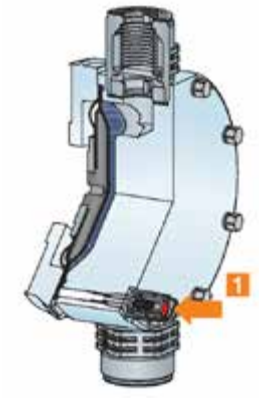
Operating unit

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 logbook significantly improves process management, optimisation and troubleshooting.

Multi-layer safety diaphragm



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.

1.1 Diaphragm Metering Pumps

Metering profiles

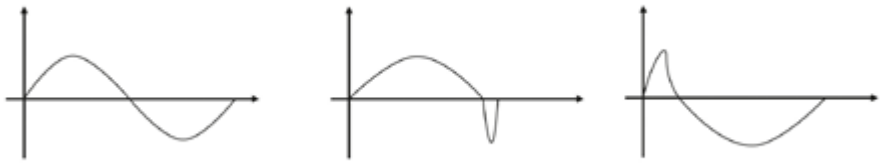
Metering profiles guarantee optimum metering results by adapting the metering behaviour of the metering pump to the application or chemical used.

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 Discharge stroke, suction stroke equal
2 Long discharge stroke, short suction stroke
3 Short discharge stroke, long suction stroke



‘Physiologically safe’ designs

FDA

The wetted materials in the “FDA” (F) design comply with the FDA directive. Material PTFE: FDA no. 21 CFR § 177.1550, material PVDF: FDA no. 21 CFR § 177.2510. Available for pump version plastic (PV) and stainless steel (SS)

Identity code example: S1CBH07042PV F S010S0DE

EU Regulation 1935/2004

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

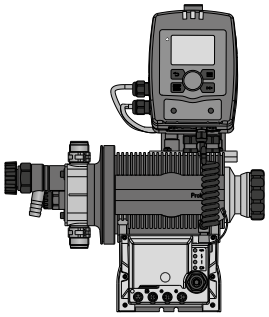
Hygienic design

For hygienically demanding applications. Dosing heads comply with the current EHEDG design guidelines for oscillating positive displacement pumps. Simple construction, quick to clean.

Bestellvariante: S1CBH10022SSHAHC0UA00000

Materials:	1.4435, PTFE multi-layer safety diaphragm, ceramic balls, EPDM and/or FKM seals
Surfaces:	Ra ≤ 0.8 µ (wetted)
Cleaning:	CIP max. 120 °C (15 min), ATEX max. 115 °C
Connection types:	Groove clamp spigot DIN 11864-3 (TriClamp) standard Groove clamp spigot DIN 11864-2 (flange)

Sigma/ X (Control) ‘liquid end on left’ design



Sigma / 1 Control type 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

1.1 Diaphragm Metering Pumps

Technical Data

Type	Capacity at max. back pressure			Max. stroke rate	Pump capacity at max. back pressure		Suction lift	Perm. pre-pressure suction side	Connector Suction/ Discharge Side	Shipping weight
S1Cb	l/h	bar	ml/stroke	Strokes/ min	gph (US)	psi	m WC	bar	G-DN	kg
12017 PVT	21	10	3.8	90	5.5	145	7	1	3/4–10	9
12017 SST	21	12	3.8	90	5.5	174	7	1	3/4–10	12
12035 PVT	42	10	4.0	170	11.1	145	7	1	3/4–10	9
12035 SST	42	12	4.0	170	11.1	174	7	1	3/4–10	12
10050 PVT	49	10	4.0	200	12.9	145	7	1	3/4–10	9
10050 SST	49	10	4.0	200	12.9	145	7	1	3/4–10	12
10022 PVT	27	10	5.0	90	7.1	145	6	1	3/4–10	9
10022 SST	27	10	5.0	90	7.1	145	6	1	3/4–10	12
10044 PVT	53	10	5.1	170	14.0	145	6	1	3/4–10	9
10044 SST	53	10	5.1	170	14.0	145	6	1	3/4–10	12
07065 PVT	63	7	5.2	200	16.6	102	6	1	3/4–10	9
07065 SST	63	7	5.2	200	16.6	102	6	1	3/4–10	12
07042 PVT	52	7	9.5	90	13.7	102	3	1	1–15	10
07042 SST	52	7	9.5	90	13.7	102	3	1	1–15	14
04084 PVT	101	4	9.7	170	26.7	58	3	1	1–15	10
04084 SST	101	4	9.7	170	26.7	58	3	1	1–15	14
04120 PVT	117	4	9.7	200	30.9	58	3	1	1–15	10
04120 SST	117	4	9.7	200	30.9	58	3	1	1–15	14
10022 SSH	31	10	5.7	170	15.3	145	5	1	3/4–10	12
10044 SSH	58	10	5.7	90	8.1	145	5	1	3/4–10	12
07065 SSH	69	7	5.7	200	18.2	102	5	1	3/4–10	12

Integrated relief valve, connector for DN 10 pressure hose sleeve

Materials in Contact with the Medium

Identity code of material	Dosing head	Connection on suction/discharge side	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
PVF	PVDF	PVDF	PTFE/PTFE	Ceramic	PVDF/FKM or EPDM
SSF	Stainless steel 1.4404	Stainless steel 1.4581	PTFE/PTFE	Stainless steel 1.4404	Stainless steel/FKM or EPDM
SSG	Stainless steel 1.4404	Stainless steel 1.4581	PTFE/stainless steel 1.4404	Stainless steel 1.4404	-
SSH	Stainless steel 1.4435	Stainless steel 1.4435	EPDM or FKM/stainless steel 1.4435	Ceramic	-

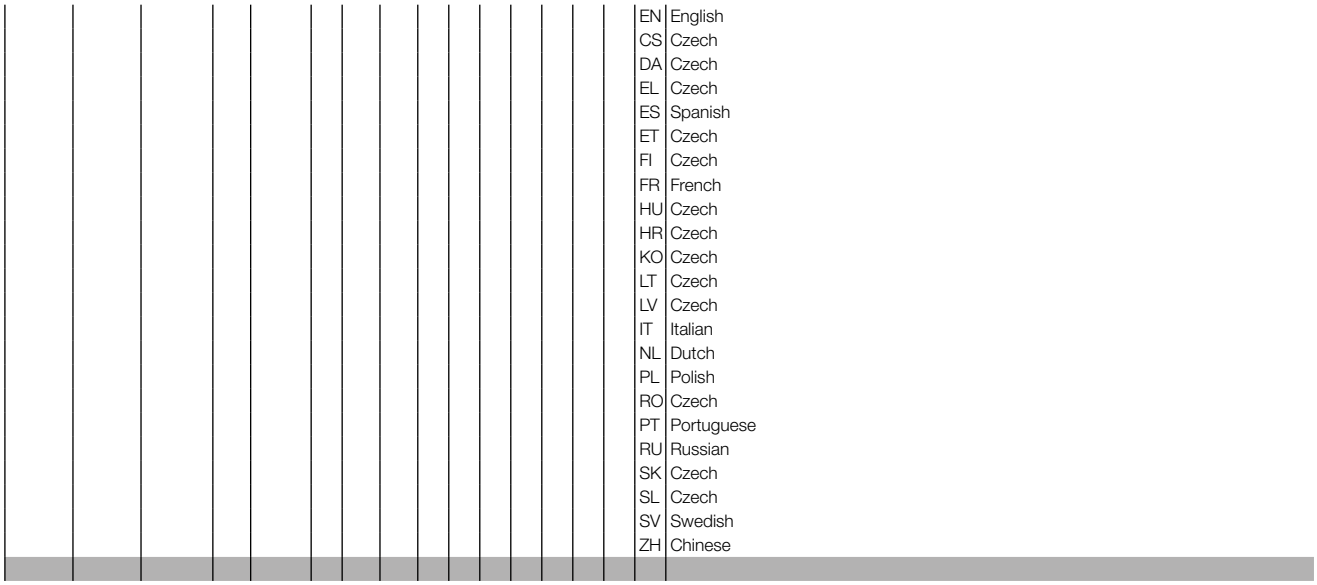
Motor Data

Identity code specification		Power supply			Remarks
U	1-phase, IP 65	100 – 230 V ±10 % / 240 V ±6 %	50/60 Hz	110 W	Wide-range voltage power unit

1.1 Diaphragm Metering Pumps

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

S1Cb	Drive type																
	H	Main drive, diaphragm															
		Type		Capacity													
		12017 *		12 bar	21 l/h												
		12035 *		12 bar	42 l/h												
		10050		10 bar	49 l/h												
		10022		10 bar	27 l/h												
		10044		10 bar	53 l/h												
		07065		7 bar	63 l/h												
		07042		7 bar	52 l/h												
		04084		4 bar	101 l/h												
		04120		4 bar	117 l/h												
			Liquid end material														
			PV	PVDF (max. 10 bar)													
			SS	Stainless steel													
				Seal material													
				T	PTFE seal (standard)												
				F	FDA-compliant												
				G	1935/2004-compliant												
				H	Hygienic Design, only for 10022, 10044 and 07065												
					Diaphragm												
					S	Multi-layer safety diaphragm with optical rupture indicator											
					A	Multi-layer safety diaphragm with electrical signal											
						Liquid end version											
						0	No valve springs (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 pressure relief valve, FKM seal, no valve spring										
						5 **	With relief valve, FPM seal, with valve springs										
						6 **	With pressure relief valve, EPDM seal, without valve spring										
						7 **	With pressure relief valve, EPDM seal, with valve spring										
						8	With bleed valve, EPDM seal, no valve spring										
						9	With bleed valve, EPDM seal, with valve spring										
						H	Hygienic Design										
							Hydraulic connections										
							0	Standard threaded connector (according to technical data)									
							1	PVC union nut and insert									
							2	Union nut and insert PP									
							3	PVDF union nut and insert									
							4 ***	Stainless steel union nut and insert									
							7	Union nut and PVDF hose nozzle									
							8	Stainless steel union nut and hose nozzle									
							9	Union nut and stainless steel welding sleeve									
							C	DIN 11864-3 form A (hygienic design), others on request									
								Version									
								0	With ProMinent® logo (standard)								
								5	Left liquid end								
									Electrical power supply								
									U	1 ph, 100 – 230 V ±10%, 240 V ±6%, 50/60 Hz, 110 W							
										Cable and plug							
										A	2 m European						
										B	2 m Swiss						
										C	2 m Australian						
										D	2 m USA						
											Relay						
											0	No relay					
											1	Fault indicating relay (230 V, 6 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 Variants					
												0	Manual + External contact with Pulse control				
												1	As 0 + analogue + metering profiles				
												6	As 1 + PROFIBUS® DP interface, M 12				
													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
CS	Czech
DA	Czech
EL	Czech
ES	Spanish
ET	Czech
FI	Czech
FR	French
HU	Czech
HR	Czech
KO	Czech
LT	Czech
LV	Czech
IT	Italian
NL	Dutch
PL	Polish
RO	Czech
PT	Portuguese
RU	Russian
SK	Czech
SL	Czech
SV	Swedish
ZH	Chinese

* 10 bar for PVDF version.

** With hose sleeve (DN 10 for 24x16 mm hose) in the bypass as standard. Threaded connection on request.

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

As a result of the stringent requirements placed on wetted materials in the food environment, not all product variants are available. We are happy to assist with any questions you may have relating to your selection.

Spare parts for Sigma/ 1 Control type (S1Cb)

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

Scope of delivery for PVT material version:

- 1 diaphragm (multi-layer safety diaphragm)
- 2 valve assemblies
- 2 valve balls
- 2 ball seats
- 4 composite seals
- 1 elastomer sealing set (EPDM, FKM-B)

Scope of delivery for SST material version:

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

Spare parts kit for Sigma/ 1

(applies to identity code for types 12017, 12035 and 10050)

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

(applies to identity code for types 10022, 10044 and 07065)

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

(applies to identity code for types 07042, 04084 and 04120)

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

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

(applies to identity code for types 12017, 12035 and 10050)

Liquid end	Materials in contact with the medium		Valve	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	Reg. (EC) 1935/2004	without valve	1105291
FM 50 - DN 10	SST	Reg. (EC) 1935/2004	with valve	1105286

(applies to identity code for types 10022, 10044 and 07065)

Liquid end	Materials in contact with the medium		Valve	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	Reg. (EC) 1935/2004	without valve	1105288
FM 65 - DN 10	SST	Reg. (EC) 1935/2004	with valve	1105287

(applies to identity code for types 07042, 04084 and 04120)

Liquid end	Materials in contact with the medium		Valve	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	Reg. (EC) 1935/2004	without valve	1105290
FM 120 - DN 15	SST	Reg. (EC) 1935/2004	with valve	1105289

Spare parts kit for Sigma/ 1 for hygienic design version

(applies to identity code for types 10022, 10044 and 07065)

Liquid end	Materials in contact with the medium		Valve	Order no.
FM 65 - DN 10	SSH/EPDM	Hygienic design	without valve	1119725
FM 65 - DN 10	SSH/FKM	Hygienic design	without valve	1126469

Spare parts kits for integrated relief valve (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	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’

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

Multi-layer safety diaphragm

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

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.

1.1 Diaphragm Metering Pumps

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

Wall Mounting

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)

	Length m	Order no.
Connecting cable - CAN M12 5-pin.	1.0	1022139
Connecting cable - CAN M12 5-pin.	2.0	1022140
Connecting cable - CAN M12 5-pin.	5.0	1022141
Connecting cable - CAN M12 5-pin.	10	1046383

Sigma X operating panel

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

Accessories

- Foot valves for motor-driven metering pumps, see page →156
- Injection valves for motor-driven metering pumps, see page →170
- Hoses and pipework for motor-driven metering pumps, see page →195
- Suction lances and suction assemblies for motor-driven metering pumps see page →163
- Connectors, fittings, connector kits, seals, see page →199
- Speed controllers, see page →PL
- Metering monitor Flow Control, can be set for motor-driven metering pumps, see page →209

Spare Parts

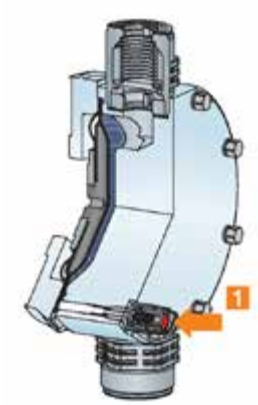
- Special valve balls/special valve springs, see page →215

1.1.8 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.



1: Diaphragm rupture sensor

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

High process reliability:

- In the event of an accident, the feed chemical does not escape to the outside or into the pump drive, thanks to the patented multi-layer safety diaphragm with optical (optional electrical) signaling
- Integrated relief valve to protect the pump against overload
- Reliable function thanks to venting option during the suction process

Flexible adaptation to the process:

- Variants with EU 1935/2004, FDA or Hygienic Design can be selected for food applications.
- Adaptation to special installation situations, as “liquid end left” can be selected as standard.
- Wide selection of drive variants, also for the ATEX range, and various flange designs for the use of customer-specific motors.
- Customized designs are available on request.

Technical Details

- Stroke length: 5 mm,
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually using self-locking rotary dial in 1% increments (optionally with actuator or control drive)
- With the right, constant conditions, correct installation and calibration, precision exceeds ±1 %, based on maximum stroke volume.
- Wetted materials: PVDF, stainless steel 1.4571/1.4404, special materials on request
- Patented multi-layer safety diaphragm with optical diaphragm rupture display (an option 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 AC 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)
- IP 55 degree of protection
- High-strength fibreglass-reinforced plastic housing with excellent chemical resistance
- For reasons of safety, provide suitable overflow devices during installation for all mechanically deflected diaphragm metering pumps.

Field of Application

- Quantity-proportional addition of chemicals in water treatment, e.g. sodium hypochlorite for disinfection of drinking water
- Measured value-dependent addition of chemicals, e.g. acid and alkali dosing for pH neutralization in waste water treatment
- Time-controlled addition of chemicals in the cooling water circuit
- Pulse-controlled dosing when bottling different volumes, e.g. glycerine filling of manometers
- Precise dosing of flavors and vitamins in food production

Sigma Basic Type Control Functions (S2Ba)

Stroke length actuator/control drive

Actuator: Electronically controlled actuator with contactless position detection for automatic stroke length adjustment, actuating period approx. 1 second for 1% stroke length, return potentiometer 1 kΩ, wide-range voltage power unit 85 - 265 V AC, 50/60 Hz, degree of protection IP 65.

1.1 Diaphragm Metering Pumps

Control drive: Electronically controlled actuator with contactless position detection 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 AC, 50/60 Hz, degree of protection IP 65, actual value output 0/4-20 mA for remote display.

'Physiologically safe' designs

FDA

The wetted materials in the "FDA" (F) design comply with the FDA directive. Material PTFE: FDA no. 21 CFR § 177.1550, material PVDF: FDA no. 21 CFR § 177.2510. Available for pump version plastic (PV) and stainless steel (SS)

Identity code example: S2BAHM07220PV F S000S000

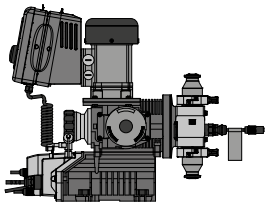
EU Regulation 1935/2004

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

Hygienic design

For hygienically demanding applications. Dosing heads comply with the current EHEDG design guidelines for oscillating positive displacement pumps. Simple construction, quick to clean.

Order variant: S2BAHM07220SSHAHC0S000



Materials:	1.4435, PTFE multi-layer safety diaphragm, ceramic balls, EPDM and/or FKM seals
Surfaces:	Ra ≤ 0.8 µ (wetted)
Cleaning:	CIP max. 120 °C (15 min), ATEX max. 115 °C
Connection types:	Groove clamp spigot DIN 11864-3 (TriClamp) standard Groove clamp spigot DIN 11864-2 (flange)

1.1 Diaphragm Metering Pumps

Technical Data

Type	Capacity at max. back pressure with 1500 rpm motor at 50 Hz				Pump capacity at max. back pressure with 1800 rpm motor at 60 Hz			Suction lift	Perm. pre-pressure suction side	Connector Suction/Discharge Side	Shipping weight
S2Ba	l/h	bar	ml/stroke	Max. stroke rate Strokes/min	l/h / gph (US)	psi	Max. stroke rate Strokes/min	m WC	bar	G-DN	kg
16050 PVT	50	10	11.4	73	60.0/15.8	145	87	7	3	1–15	15
16050 SST	47	16	11.4	73	56.0/14.7	232	87	7	3	1–15	20
16090 PVT	88	10	11.4	132	106.0/28.0	145	158	7	3	1–15	15
16090 SST	82	16	11.4	132	98.4/25.9	232	158	7	3	1–15	20
16130 PVT	135	10	10.9	198	162.0/42.8	145	238	7	3	1–15	15
16130 SST	124	16	10.9	198	148.0/39.0	232	238	7	3	1–15	20
07120 PVT *	126	7	27.4	73	150.0/39.6	102	87	5	1	1 1/2–25	16
07120 SST *	126	7	27.4	73	150.0/39.6	102	87	5	1	1 1/2–25	24
07220 PVT *	220	7	27.7	132	264.0/69.7	102	158	5	1	1 1/2–25	16
07220 SST *	220	7	27.7	132	264.0/69.7	102	158	5	1	1 1/2–25	24
04350 PVT *	350	4	29.4	198	420.0/110.9	58	238	5	1	1 1/2–25	16
04350 SST *	350	4	29.4	198	420.0/110.9	58	238	5	1	1 1/2–25	24
16050 SSH	49	10	11.1	73	59/15.5	145	87	7	3	1–15	15
16090 SSH	88	10	11.1	132	106/28.0	145	158	7	3	1–15	15
16130 SSH	133	10	11.1	198	160/42.2	145	238	7	3	1–15	15
07120 SSH	123	7	28.1	73	147/38.8	102	87	5	1	1–25	25
07220 SSH	223	7	28.1	132	267/70.5	102	158	5	1	1–25	25
04350 SSH	358	4	30.1	198	431/113.8	58	238	5	1	1–25	25

* For the 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 the pipework for these types (see technical data, suction/discharge side connector), the connector parts that can be ordered with the identity code (e.g. inserts) are already reduced to DN 20, i.e. DN 20 pipework and accessories can be installed.

Performance data for TTT, see type PVT

Integrated relief valve, connector for DN 10 pressure hose sleeve

Materials in Contact with the Medium

Identity code of material	Dosing head	Connection on suction/discharge side	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	Carbon-filled PTFE	PTFE/PTFE	Ceramic/glass *	-
PVF	PVDF	PVDF	PTFE/PTFE	Ceramic/glass *	PVDF/FKM or EPDM
SSF	Stainless steel 1.4404	Stainless steel 1.4581	PTFE/PTFE	Stainless steel 1.4404	Stainless steel/FKM or EPDM
SSG	Stainless steel 1.4404	Stainless steel 1.4581	PTFE/stainless steel 1.4404	Stainless steel 1.4404	-
SSH ***	Stainless steel 1.4435	Stainless steel 1.4435	EPDM or FKM/stainless steel 1.4435	Ceramic	-

* With 07120, 07220, 04350
** Specifically for areas at risk from explosion
*** DN 25 and DN 32 designed as ball non-return valve

1.1 Diaphragm Metering Pumps

Motor Data

Identity code specification	Power supply	Δ/Y			Remarks
S	3-phase, IP 55*	230 V/400 V	50 Hz	0.25 kW	
T	3-phase, IP 55*	230 V/400 V	50 Hz	0.25 kW	With PTC, speed control range 1:4
		265 V/460 V	60 Hz	0.25 kW	
R	3-phase, IP 55*	230 V/400 V	50 Hz	0.37 kW	With PTC, speed control range 1:20 with external fan (1-phase 230 V; 50/60 Hz, 134 W)
M	1-phase AC, IP 55	230 V ± 5 %	50 Hz	0.18 kW	
N	1-phase AC, IP 55	120 V ± 5 %	60 Hz	0.18 kW	
L1	3-phase, II2GExellT3	220 – 240 V/380 – 420 V	50 Hz	0.18 kW	
L2	3-phase, II2GExdIICT4	220 – 240 V/380 – 420 V	50 Hz	0.18 kW	With PTC, speed control range 1:5

* Three-phase motor according to IEC 60034-1

Motor data sheets can be requested for more information. Versions 265/460V - 60Hz, 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/EC in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label correspond to or are superior to the conditions prevalent in the intended application.

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

S2Ba	Drive type											
	HM	Main drive, diaphragm										
		Type	Capacity									
		16050 *	16 bar	47 l/h								
		16090 *	16 bar	82 l/h								
		16130 *	16 bar	124 l/h								
		07120	7 bar	126 l/h								
		07220	7 bar	220 l/h								
		04350	4 bar	350 l/h								
			Liquid end material									
			PV	PVDF (max. 10 bar)								
			SS	Stainless steel								
			TT	PTFE + 25% carbon (max. 10 bar)								
				Seal material								
				T	PTFE seal (standard)							
				F	FDA-compliant							
				G	1935/2004-compliant							
				H	Hygienic Design							
					Diaphragm							
					S	Multi-layer safety diaphragm with optical rupture indicator						
					A	Multi-layer safety diaphragm with rupture signalling (contact)						
						Liquid end version						
						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					
						H	Hygienic Design					
							Hydraulic connections					
							0	Standard threaded connector (according to technical data)				
							1	PVC union nut and insert				
							2	Union nut and insert PP				
							3	PVDF union nut and insert				
							4 ***	SS union nut and insert				
							7	Union nut and PVDF hose nozzle				
							8	Union nut and SS hose nozzle				
							9	Union nut and stainless steel hose nozzle				
							C	DIN 11864-3 form A (hygienic design), others on request				
								Version				
								0	With ProMinent logo (standard)			
								M	Modified			
									Electrical power supply			
									S	3 ph, 230 V/400 V 50 Hz		
									T	3-phase, 230 V/400 V 50 Hz, with PTC		
									R	Variable speed motor 3 ph, 230/400 V, with PTC, with external fan 1 ph 230 V 50/60 Hz		
									M	1-phase AC, 230 V 50 Hz		
									N	1-phase AC, 120 V 60 Hz		
									L	3 ph, 230 V/400 V, 0.37 kW, 50 Hz, (Exe, Exd)		
									1	No motor, with B14 flange, Gr. 71 DIN		
									3	No motor, with B5 flange, Gr. 63 DIN		
										Enclosure rating		
										0	IP 55 (standard)	
										1	Ex-design ATEX-T3	
										2	Ex-design ATEX-T4	
											Stroke sensor	
											0	No stroke sensor (standard)
											2	Pacing relay (reed relay)
											3	Stroke sensor (Namur) for hazardous locations
												Stroke length adjustment
												0 Manual (Standard)
												1 With servomotor, 85…265 V AC 50/60 Hz
												4 With stroke control motor 0/4...20 mA 85…265 V AC 50/60Hz

* 10 bar for PVDF and TTT version.

** With hose sleeve (DN 10 for 24x16 mm hose) in the bypass as standard. Threaded connection on request.

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

As a result of the stringent requirements placed on wetted materials in the food environment, not all product variants are available. We are happy to assist with any questions you may have relating to your selection.

1.1 Diaphragm 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 for PVT material version:

- 1 diaphragm (multi-layer safety diaphragm)
- 2 valve assemblies
- 2 valve balls
- 2 ball seats
- 4 composite seals
- 1 elastomer sealing set (EPDM, FKM-B)

Scope of delivery for SST material version:

- 1 diaphragm (multi-layer safety diaphragm)
- 2 valve balls
- 2 ball seat discs
- 4 composite seals

Spare parts kit for Sigma/ 2

(applies to identity code for types 16050, 16090 and 16130)

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

(applies to identity code for types 07120, 07220 and 04350)

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

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

(applies to identity code for types 16050, 16090 and 16130)

Liquid end	Materials in contact with the medium		Valve	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	Reg. (EC) 1935/2004	without valve	1105335
FM 130 - DN 15	SST	Reg. (EC) 1935/2004	with valve	1105332

(applies to identity code for types 07120, 07220 and 04350)

Liquid end	Materials in contact with the medium		Valve	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	Reg. (EC) 1935/2004	without valve	1105334
FM 350 - DN 25	SST	Reg. (EC) 1935/2004	with valve	1105333

Multi-layer safety diaphragm

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

Spare parts kit for integrated overflow 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

Spare parts kit for Sigma/ 2 for hygienic design version

(applies to identity code for types 16050, 16090 and 16130)

Liquid end	Materials in contact with the medium		Valve	Order no.
FM 130 - DN 15	SSH/EPDM	Hygienic design	without valve	1119727
FM 130 - DN 15	SSH/FKM	Hygienic design	without valve	1126471

(applies to identity code for types 07120, 07220 and 04350)

Liquid end	Materials in contact with the medium		Valve	Order no.
FM 350 - DN 25	SSH/EPDM	Hygienic design	without valve	1119729
FM 350 - DN 25	SSH/FKM	Hygienic design	without valve	1126473

Gear Oil

	Required quantity	Order no.
Mobilgear 600 XP 460 gear oil, 1 litre	0.5 l	1004542

Accessories

- Foot valves for motor-driven metering pumps, see page →156
- Injection valves for motor-driven metering pumps, see page →170
- Hoses and pipework for motor-driven metering pumps, see page →195
- Suction lances and suction assemblies for motor-driven metering pumps see page →163
- Connectors, fittings, connector kits, seals, see page →199
- Speed controllers, see page →PL
- Metering monitor Flow Control, can be set for motor-driven metering pumps, see page →209

Spare Parts

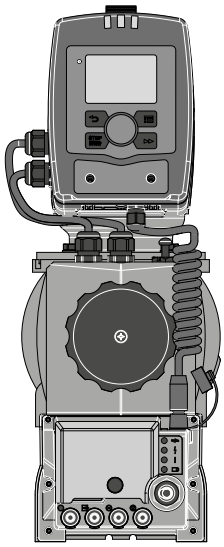
- Special valve balls/special valve springs, see page →215

1.1 Diaphragm Metering Pumps

1.1.9 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



Sigma/ 2 control type

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 logbook 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 signalling (electrical as an option).
- 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.
- Can be flexibly networked: Connection to process management systems via integral PROFIBUS®.
- Integral log book saves up to 300 events and simplifies troubleshooting and analysis of the cause.

DULCONNEX

Technical Details

- Stroke length: 5 mm
- Stroke length adjustment range: 0 - 100
- Stroke length adjustment: manually by means of self-locking rotary dial in 1 % increments
- Under correct, constant conditions, correct installation and calibration, the precision is better than ±1 %, based on maximum stroke volume.
- Power supply: 1 pH, 100 - 230 V ±10 %, 240 V ±6 %, 50/60 Hz (220 W)
- Degree of protection IP 65
- Glass fiber reinforced plastic housing
- Manual or external contact operation adjustable, factor for external contact control 99:1 - 1:99; batch operation with max. 99,999 strokes/start pulse.
- Display of wear parts in the service menu.
- Connector for level switch 2-stage.
- Variants with EU 1935/2004, FDA or Hygienic Design can be selected for food applications.
- Various relay modules can be selected.
- Wetted materials: PVDF, stainless steel 1.4571/1.4404, special materials on request
- Customized designs are possible on request.

For safety reasons, suitable overflow devices must be provided for all mechanically deflected Diaphragm Metering Pumps during installation.

1.1 Diaphragm Metering Pumps

Field of Application

- Any industrial applications as stand-alone or integrated into a complete system
- Proportionate addition of chemicals in water treatment, e.g. sodium hypochlorite for disinfection of drinking water
- Neutralization in waste water treatment
- Pulse-controlled dosing when bottling different volumes, e.g. glycerine filling of manometers
- Precise dosing of flavors and vitamins in food production

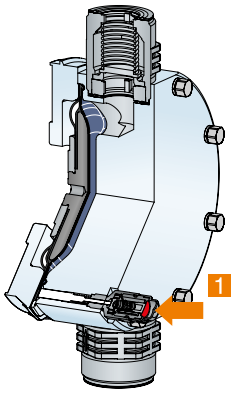
Operating unit

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 logbook significantly improves process management, optimisation and troubleshooting.

Multi-layer safety diaphragm



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

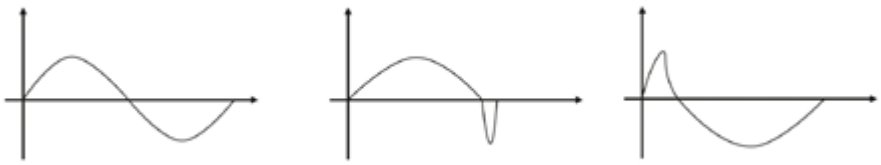
Metering profiles guarantee optimum metering results by adapting the metering behaviour of the metering pump to the application or chemical used.

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 Discharge stroke, suction stroke equal
2 Long discharge stroke, short suction stroke
3 Short discharge stroke, long suction stroke



'Physiologically safe' designs

FDA

The wetted materials in the "FDA" (F) design comply with the FDA directive. Material PTFE: FDA no. 21 CFR § 177.1550, material PVDF: FDA no. 21 CFR § 177.2510. Available for pump version plastic (PV) and stainless steel (SS)

Identity code example: S2CBH16050PV F S010UA1000DE

EU Regulation 1935/2004

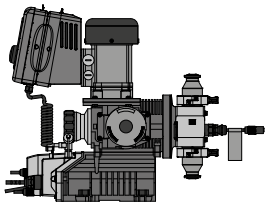
1.1 Diaphragm Metering Pumps

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

Hygienic design

For hygienically demanding applications. Dosing heads comply with the current EHEDG design guidelines for oscillating positive displacement pumps. Simple construction, quick to clean.

Order variant: S2BAHM07220SSHAHC0S000



Materials:	1.4435, PTFE multi-layer safety diaphragm, ceramic balls, EPDM and/or FKM seals
Surfaces:	Ra ≤ 0.8 µ (wetted)
Cleaning:	CIP max. 120 °C (15 min), ATEX max. 115 °C
Connection types:	Groove clamp spigot DIN 11864-3 (TriClamp) standard Groove clamp spigot DIN 11864-2 (flange)

1.1 Diaphragm Metering Pumps

Technical Data

Type	Capacity at max. back pressure			Max. stroke rate	Pump capacity at max. back pressure		Suction lift	Perm. pre-pressure suction side	Connector Suction/ Discharge Side	Shipping weight
S2Cb	l/h	bar	ml/stroke	Strokes/ min	gph (US)	psi	m WC	bar	G-DN	kg
16050 PVT	61	10	11.4	90	16.1	145	7	2	1–15	15
16050 SST	56	16	10.4	90	14.8	232	7	2	1–15	20
16090 PVT	109	10	11.4	160	28.8	145	7	2	1–15	15
16090 SST	99	16	10.3	160	26.2	232	7	2	1–15	20
16130 PVT	131	10	10.9	200	34.6	145	7	2	1–15	15
16130 SST	129	16	10.9	200	34.1	232	7	2	1–15	20
07120 PVT *	150	7	27.4	90	39.6	102	5	1	1 1/2–25	16
07120 SST *	150	7	27.4	90	39.6	102	5	1	1 1/2–25	24
07220 PVT *	271	7	27.7	160	71.6	102	5	1	1 1/2–25	16
07220 SST *	271	7	27.7	160	71.6	102	5	1	1 1/2–25	24
04350 PVT *	353	4	29.4	200	93.3	58	5	1	1 1/2–25	16
04350 SST *	353	4	29.4	200	93.3	58	5	1	1 1/2–25	24
16050 SSH	61	10	11.3	90	16.1	145	7	3	1–15	15
16090 SSH	107	10	11.1	160	28.2	145	7	3	1–15	15
16130 SSH	134	10	11.1	200	35.4	145	7	3	1–15	15
07120 SSH	152	7	28.1	90	40.1	102	5	1	1–15	25
07220 SSH	270	7	28.1	160	71.3	102	5	1	1–15	25
04350 SSH	362	4	30.1	200	95.6	58	5	1	1–15	25

* For the 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 the pipework for these types (see technical data, suction/discharge side connector), the connector parts that can be ordered with the identity code (e.g. inserts) are already reduced to DN 20, i.e. DN 20 pipework and accessories can be installed.

Integrated relief valve, connector for DN 10 pressure hose sleeve

Materials in Contact with the Medium

Identity code of material	Dosing head	Connection on suction/discharge side	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
PVF	PVDF	PVDF	PTFE/PTFE	Ceramic/glass *	PVDF/FKM or EPDM
SSF	Stainless steel 1.4404	Stainless steel 1.4581	PTFE/PTFE	Stainless steel 1.4404	Stainless steel/FKM or EPDM
SSG	Stainless steel 1.4404	Stainless steel 1.4581	PTFE/stainless steel 1.4404	Stainless steel 1.4404	-
SSH	Stainless steel 1.4435	Stainless steel 1.4435	EPDM or FKM/stainless steel 1.4435	Ceramic	-

* With 07120, 07220, 04350

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	Wide-range voltage power unit

1.1 Diaphragm Metering Pumps

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

S2Cb	Drive type
H	Main drive, diaphragm

Type	Capacity	
16050 *	16 bar	56 l/h
16090 *	16 bar	99 l/h
16130 *	16 bar	129 l/h
07120	7 bar	150 l/h
07220	7 bar	271 l/h
04350	4 bar	353 l/h

	Liquid end material
PV	PVDF (max. 10 bar)
SS	Stainless steel

	Seal material
T	PTFE seal (standard)
F	FDA-compliant
G	1935/2004-compliant
H	Hygienic Design

	Diaphragm
S	Multi-layer safety diaphragm with optical rupture indicator
A	Multi-layer safety diaphragm with electrical signal

	Liquid end version
0	No valve springs (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 pressure relief valve, FKM seal, no valve spring
5 **	With relief valve, FPM seal, with valve springs
6 **	With pressure relief valve, EPDM seal, without valve spring
7 **	With pressure relief valve, EPDM seal, with valve spring
8	With bleed valve, EPDM seal, no valve spring
9	With bleed valve, EPDM seal, with valve spring
H	Hygienic Design

	Hydraulic connections
0	Standard threaded connector (according to technical data)
1	PVC union nut and insert
2	Union nut and insert PP
3	PVDF union nut and insert
4 ***	Stainless steel union nut and insert
7	Union nut and PVDF hose nozzle
8	Stainless steel union nut and hose nozzle
9	Union nut and stainless steel welding sleeve
C	DIN 11864-3 form A (standard), others on request

	Version
0	With ProMinent logo (standard)

	Electrical power supply
U	1 ph, 100 – 230 V ±10%, 240 V ±6%, 50/60 Hz, 220 W

	Cable and plug
A	2 m European
B	2 m Swiss
C	2 m Australian
D	2 m USA

	Relay
0	No relay
1	Fault indicating relay (230 V, 6 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)

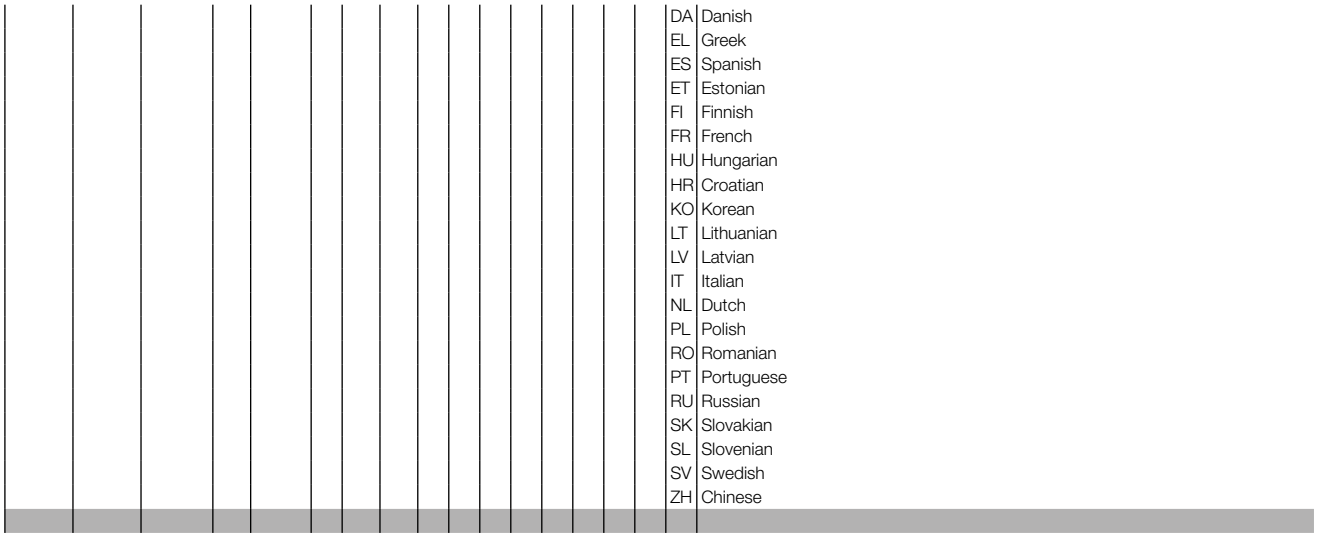
	Control Variants
0	Manual + External contact with Pulse control
1	As per 0 + analogue
6	As 1 + PROFIBUS® DP interface, M 12

	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
CS	Czech



DA	Danish
EL	Greek
ES	Spanish
ET	Estonian
FI	Finnish
FR	French
HU	Hungarian
HR	Croatian
KO	Korean
LT	Lithuanian
LV	Latvian
IT	Italian
NL	Dutch
PL	Polish
RO	Romanian
PT	Portuguese
RU	Russian
SK	Slovakian
SL	Slovenian
SV	Swedish
ZH	Chinese

* 10 bar for PVDF version.

** With hose sleeve (DN 10 for 24x16 mm hose) in the bypass as standard. Threaded connection on request.

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

As a result of the stringent requirements placed on wetted materials in the food environment, not all product variants are available. We are happy to assist with any questions you may have relating to your selection.

Spare parts for Sigma/ 2 Control type (S2Cb)

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

Scope of delivery for PVT material version:

- 1 diaphragm (multi-layer safety diaphragm)
- 2 valve assemblies
- 2 valve balls
- 2 ball seats
- 4 composite seals
- 1 elastomer sealing set (EPDM, FKM-B)

Scope of delivery for SST material version:

- 1 diaphragm (multi-layer safety diaphragm)
- 2 valve balls
- 2 ball seat discs
- 4 composite seals

Spare parts kit for Sigma/ 2

(applies to identity code for types 16050, 16090 and 16130)

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

(applies to identity code for types 07120, 07220 and 04350)

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

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

(applies to identity code for types 16050, 16090 and 16130)

Liquid end	Materials in contact with the medium		Valve	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	Reg. (EC) 1935/2004	without valve	1105335
FM 130 - DN 15	SST	Reg. (EC) 1935/2004	with valve	1105332

(applies to identity code for types 07120, 07220 and 04350)

Liquid end	Materials in contact with the medium		Valve	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	Reg. (EC) 1935/2004	without valve	1105334
FM 350 - DN 25	SST	Reg. (EC) 1935/2004	with valve	1105333

Spare parts kit for Sigma/ 2 for hygienic design version

(applies to identity code for types 16050, 16090 and 16130)

Liquid end	Materials in contact with the medium		Valve	Order no.
FM 130 - DN 15	SSH/EPDM	Hygienic design	without valve	1119727
FM 130 - DN 15	SSH/FKM	Hygienic design	without valve	1126471

(applies to identity code for types 07120, 07220 and 04350)

Liquid end	Materials in contact with the medium		Valve	Order no.
FM 350 - DN 25	SSH/EPDM	Hygienic design	without valve	1119729
FM 350 - DN 25	SSH/FKM	Hygienic design	without valve	1126473

Multi-layer safety diaphragm

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

Gear Oil

	Required quantity	Order no.
Mobilgear 600 XP 460 gear oil, 1 litre	0.5 l	1004542

Spare parts kits for integrated relief valve (S2Cb)

	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

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 design’ with characteristic ‘2’, ‘3’, ‘8’, ‘9’

	Description	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

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

1.1 Diaphragm Metering Pumps

Extension cable for operating unit (HMI)

	Length m	Order no.
Connecting cable - CAN M12 5-pin.	1.0	1022139
Connecting cable - CAN M12 5-pin.	2.0	1022140
Connecting cable - CAN M12 5-pin.	5.0	1022141
Connecting cable - CAN M12 5-pin.	10	1046383

Sigma X operating panel

	Order no.
Operating unit (HMI) Sigma X - S2Cb, S3Cb	1092957

Accessories

- Foot valves for motor-driven metering pumps, see page →156
- Injection valves for motor-driven metering pumps, see page →170
- Hoses and pipework for motor-driven metering pumps, see page →195
- Suction lances and suction assemblies for motor-driven metering pumps see page →163
- Connectors, fittings, connector kits, seals, see page →199
- Speed controllers, see page →PL
- Metering monitor Flow Control, can be set for motor-driven metering pumps, see page →209

Spare Parts

- Special valve balls/special valve springs, see page →215

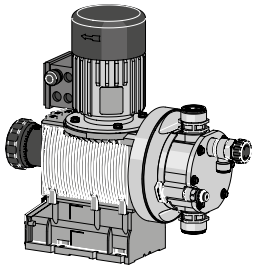
1.1 Diaphragm Metering Pumps

1.1.10 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.



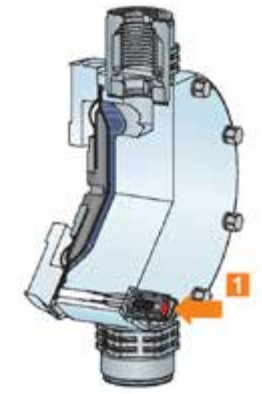
sigma/ 3

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

High process reliability:

- In the event of an accident, the feed chemical does not escape to the outside or into the pump drive, thanks to the patented multi-layer safety diaphragm with optical (optional electrical) signaling
- Integrated relief valve to protect the pump against overload
- Reliable function due to venting option during the suction process



1: Diaphragm rupture sensor

Flexible adaptation to the process:

- Variants with EU 1935/2004, FDA or Hygienic Design can be selected for food applications.
- Adaptation to special installation situations, as “liquid end left” can be selected as standard.
- Wide selection of drive variants, also for the ATEX range, and various flange designs for the use of customer-specific motors.
- Customized designs are available on request.

Technical Details

- Stroke length: 6 mm,
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually using self-locking rotary dial in 1% increments (optionally with actuator or control drive)
- With the right, constant conditions, correct installation and calibration, precision exceeds ±1 %, based on maximum stroke volume.
- Wetted materials: PVDF, stainless steel 1.4571/1.4404, special materials on request
- Patented multi-layer safety diaphragm with optical diaphragm rupture display (as option with diaphragm rupture warning system via a contact)
- Integrated hydraulic relief and bleed valve
- A wide range of power end versions are available: Three-phase standard AC 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)
- IP 55 degree of protection
- High-strength fibreglass-reinforced plastic housing with excellent chemical resistance

For reasons of safety, provide suitable overflow devices during installation for 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 wastewater 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

1.1 Diaphragm Metering Pumps

Sigma Basic Type Control Functions (S3Ba)

Stroke length actuator/control drive

Actuator: Electronically controlled actuator with contactless position detection for automatic stroke length adjustment, actuating period approx. 1 second for 1% stroke length, return potentiometer 1 kΩ, wide-range voltage power unit 85 - 265 V AC, 50/60 Hz, degree of protection IP 65.

Control drive: Electronically controlled actuator with contactless position detection 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 AC, 50/60 Hz, degree of protection IP 65, actual value output 0/4-20 mA for remote display.

'Physiologically safe' designs

FDA

The wetted materials in the "FDA" (F) design comply with the FDA directive. Material PTFE: FDA no. 21 CFR § 177.1550, material PVDF: FDA no. 21 CFR § 177.2510. Available for pump version plastic (PV) and stainless steel (SS) and DN 25 ball valve (type 120145, 120190, 120270, 120330).

Identity code example: S3BAH120330PV F S000S000

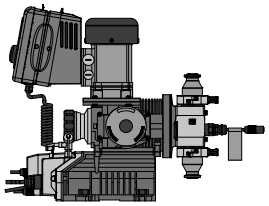
EU Regulation 1935/2004

Sealing materials in accordance with Regulation (EC) 1935/2004 are available in the stainless steel "Physiologically safe with regard to wetted materials Regulation (EC) 1935/2004" material version. Available for pump version stainless steel (SS) and DN 25 ball valve (type 120145, 120190, 120270, 120330).

Hygienic design

For hygienically demanding applications. Dosing heads comply with the current EHEDG design guidelines for oscillating positive displacement pumps. Simple construction, quick to clean.

Bestellvariante: S3BAH070410SSHAHC0S000



Materials:	1.4435, PTFE multi-layer safety diaphragm, ceramic balls, EPDM and/or FKM seals
Surfaces:	Ra ≤ 0.8 µ (wetted)
Cleaning:	CIP max. 120 °C (15 min), ATEX max. 115 °C
Connection types:	Groove clamp spigot DIN 11864-3 (TriClamp) standard Groove clamp spigot DIN 11864-2 (flange)

1.1 Diaphragm Metering Pumps

Technical Data

Type	Capacity at max. back pressure with 1500 rpm motor at 50 Hz				Capacity at max. back pressure at 60 Hz			Suction lift	Perm. pre-pressure suction side	Connector Suction/ Discharge Side	Shipping weight
S3Ba	l/h	bar	ml/ stroke	Max. stroke rate Strokes/min	psi	l/h / gph (US)	Max. stroke rate Strokes/min	m WC	bar	G-DN	kg
120145 PVT	146	10	33.7	72	145	174/45.9	86	5	2	1 1/2–25	22
120145 SST	146	12	33.7	72	174	174/45.9	86	5	2	1 1/2–25	26
120190 PVT	208	10	33.7	103	145	251/66.3	124	5	2	1 1/2–25	22
120190 SST	208	12	33.7	103	174	251/66.3	124	5	2	1 1/2–25	26
120270 PVT	292	10	33.8	144	145	351/92.7	173	5	2	1 1/2–25	22
120270 SST	292	12	33.8	144	174	351/92.7	173	5	2	1 1/2–25	26
120330 PVT *	365	10	33.8	180	-	-	-	5	2	1 1/2–25	22
120330 SST *	365	12	33.8	180	-	-	-	5	2	1 1/2–25	26
070410 PVT	410	7	95.1	72	102	492/129.9	86	4	1	2–32 **	24
070410 SST	410	7	95.1	72	102	492/129.9	86	4	1	2–32 **	29
070580 PVT	580	7	95.1	103	102	696/183.8	124	4	1	2–32 **	24
070580 SST	580	7	95.1	103	102	696/183.8	124	4	1	2–32 **	29
040830 PVT	830	4	95.1	144	58	1,000/264.1	173	3	1	2–32 **	24
040830 SST	830	4	95.1	144	58	1,000/264.1	173	3	1	2–32 **	29
041030 PVT *	1,030	4	95.1	180	-	-	-	3	1	2–32 **	24
041030 SST *	1,030	4	95.1	180	-	-	-	3	1	2–32 **	29
120145 SSH	151	10	34.8	72	145	180/47.5	86	5	2	1 1/2–25	36
120190 SSH	215	10	34.8	103	145	258/68.1	124	5	2	1 1/2–25	36
120270 SSH	301	10	34.8	144	145	362/95.6	173	5	2	1 1/2–25	36
120330 SSH	376	10	34.8	180	-	-	-	5	2	1 1/2–25	36
070410 SSH	380	7	87.9	72	102	453/119.6	86	4	1	2–32	56
070580 SSH	549	7	88.7	103	102	660/174.3	124	4	1	2–32	56
040830 SSH	810	4	93.7	144	58	973/257.0	173	3	1	2–32	56
041030 SSH	1,013	4	93.7	180	-	-	-	3	1	2–32	56

* Only available for 50 Hz.

** DN32 plate valves with valve spring

Performance data for TTT, see type PVT

Materials in Contact with the Medium

Identity code of material	Seals	DN 25 ball valves			DN 32 plate valves			Integral relief valve
		Suction / discharge connection on dosing head DN 25	Valve balls	Valve seats	Suction / discharge connection on dosing head DN 32	Valve plates/ valve springs	Valve seats	
PVT	PTFE	PVDF	Glass	PTFE *	PVDF	Ceramic/ Hastelloy 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/Hastelloy C	PTFE	Stainless steel/ FKM or EPDM
TTT ***	PTFE	PTFE + 25% carbon	Ceramic	PTFE *	PVDF	Ceramic/ Hastelloy C + CTFE **	PTFE	-
PVF	PTFE	PVDF	Glass	PVDF	-	-	-	-
SSF	PTFE	Stainless steel 1.4581/1.4404	Stainless steel 1.4404	PVDF	-	-	-	-
SSG	PTFE	Stainless steel 1.4581/1.4404	Stainless steel 1.4404	Stainless steel 1.4404	-	-	-	-
SSH ****	EPDM or FKM	Stainless steel 1.4435	Ceramic	Stainless steel 1.4404	Stainless steel 1.4581	Ceramic/E-CTFE	Stainless steel 1.4404	-

* With design 'F', the ball seat is made of PVDF, only for DN 25 ball valves

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

*** Specifically for areas at risk from explosion

**** DN 25 and DN 32 designed as ball non-return valve

1.1 Diaphragm Metering Pumps

Motor Data

Identity code specification	Power supply	Δ/Y			Remarks
S	3-phase, IP 55*	230 V/400 V	50 Hz	0.37 kW	
T	3-phase, IP 55*	230 V/400 V	50 Hz	0.37 kW	With PTC, speed control range 1:5
		265 V/460 V	60 Hz	0.37 kW	
R	3-phase, IP 55*	230 V/400 V	50 Hz	0.55 kW	With PTC, speed control range 1:20 with external fan (1-phase 230 V; 50/60 Hz, 134 W)
M	1-phase AC, IP 55	230 V ± 5 %	50 Hz	0.55 kW	
L1	3-phase, II2GExellT3	220 – 240 V/380 – 420 V	50 Hz	0.37 kW	
L2	3-phase, II2GExdIICT4	220 – 240 V/380 – 420 V	50 Hz	0.37 kW	With PTC, speed control range 1:5

* Three-phase motor according to IEC 60034-1

Motor data sheets can be requested for more information. Versions 265/460V - 60Hz, 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/EC in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label correspond to or are superior to the conditions prevalent in the intended application.

1.1 Diaphragm Metering Pumps

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

S3Ba	Drive type											
	H	Main drive, diaphragm										
		Type	Capacity									
		120145 *	12 bar	146 l/h								
		120190 *	12 bar	208 l/h								
		120270 *	12 bar	292 l/h								
		120330 *	12 bar	365 l/h								
		070410	7 bar	410 l/h								
		070580	7 bar	580 l/h								
		040830	4 bar	830 l/h								
		041030	4 bar	1,030 l/h								
			Liquid end material									
			PV	PVDF (max. 10 bar)								
			SS	Stainless steel								
			TT	PTFE + 25% carbon (max. 10 bar)								
				Seal material								
				T	PTFE seal (standard)							
				F	FDA-compliant, only for 12 bar version							
				G	1935/2004-compliant, only for 12 bar version							
				H	Hygienic Design							
					Diaphragm							
					S	Multi-layer safety diaphragm with optical rupture indicator						
					A	Multi-layer safety diaphragm with rupture signalling (contact)						
						Liquid end version						
						0	No spring					
						1	With 2 valve springs, Hastelloy C 4; 0.1 bar (standard for DN 32)					
						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 (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					
						H	Hygienic Design					
							Hydraulic connections					
							0	Standard threaded connector (according to technical data)				
							1	PVC union nut and insert				
							2	Union nut and insert PP				
							3	PVDF union nut and insert				
							4 ***	SS union nut and insert				
							7	Union nut and PVDF hose nozzle				
							8	Union nut and SS hose nozzle				
							9	Union nut and stainless steel hose nozzle				
							C	DIN 11864-3 form A (hygienic design), others on request				
								Version				
								0	With ProMinent logo (standard)			
								M	Modified			
									Electrical power supply			
									S	3 ph, 230 V/400 V, 50 Hz		
									T	3-phase, 230 V/400 V, 50 Hz, with PTC		
									R	Variable speed motor 3 ph, 230/400 V, with PTC, with external fan 1 ph 230 V 50/60 Hz		
									M	1 ph, 230 V, 50 Hz		
									L	3 ph, 230 V/400 V, 0.37 kW, 50 Hz, (Exe, Exd)		
									1	No motor, with B14 flange, size 80 (DIN)		
									3	No motor, with B5 flange, size 71 (DIN)		
										Enclosure rating		
										0	IP 55 (standard)	
										1	Ex-design ATEX-T3	
										2	Ex-design ATEX-T4	
											Stroke sensor	
											0	No stroke sensor (standard)
											2	Pacing relay (reed relay)
											3	Stroke sensor (Namur) for hazardous locations
												Stroke length adjustment
												0 Manual (Standard)
												1 With servomotor, 85…265 V AC 50/60 Hz
												4 With stroke control motor 0/4...20 mA 85…265 V AC 50/60Hz

* 10 bar for PVDF and TTT version.

** Connector (type 120145, 120190, 120270) for DN 10 hose sleeve in the bypass; connector (type 070410, 070580, 040830) for DN 20 threaded connector in the bypass, hose sleeve on request

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

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

As a result of the stringent requirements placed on wetted materials in the food environment, not all product variants are available. We are happy to assist with any questions you may have relating to your selection.

Spare parts for Sigma/ 3 Basic type (S3Ba)

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

Scope of delivery for PVT/TTT material version:

- 1 diaphragm (multi-layer safety diaphragm)
- 2 valve assemblies
- 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 for SST material version:

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

Spare parts kit for Sigma/ 3

(valid for identity code: types 120145, 120190, 120270, 120330)

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

(valid for identity code: types 070410, 070580, 040830, 041030)

Liquid end	Materials in contact with the medium	Valve	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 kit for Sigma/ 3 for FDA and Regulation (EC) 1935/2004 version

(valid for identity code: types 120145, 120190, 120270, 120330)

Liquid end	Materials in contact with the medium		Valve	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	Reg. (EC) 1935/2004	without valve	1105337
FM 330 - DN 25	SST	Reg. (EC) 1935/2004	with valve	1105336

Spare parts kit for Sigma/ 3 for hygienic design version

(applies to identity code for types 120145, 120190, 120270 and 120330)

Liquid end	Materials in contact with the medium		Valve	Order no.
FM 330 - DN 25	SSH/EPDM	Hygienic design	without valve	1119731
FM 330 - DN 25	SSH/FKM	Hygienic design	without valve	1126474

(applies to identity code for types 070410, 070580, 040830 and 041030)

Liquid end	Materials in contact with the medium		Valve	Order no.
FM 1030 - DN 32	SSH/EPDM	Hygienic design	without valve	1119733
FM 1030 - DN 32	SSH/FKM	Hygienic design	without valve	1126476

1.1 Diaphragm Metering Pumps

Multi-layer safety diaphragm

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

Spare parts kit for integrated overflow 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	PVT/SST	FKM-A/ EPDM	1031202

Gear Oil

	Required quantity	Order no.
Mobilgear 600 XP 460 gear oil, 1 litre	0.7 l	1004542

Accessories

- Foot valves for motor-driven metering pumps, see page →156
- Injection valves for motor-driven metering pumps, see page →170
- Hoses and pipework for motor-driven metering pumps, see page →195
- Suction lances and suction assemblies for motor-driven metering pumps see page →163
- Connectors, fittings, connector kits, seals, see page →199
- Speed controllers, see page →PL
- Metering monitor Flow Control, can be set for motor-driven metering pumps, see page →209

Spare Parts

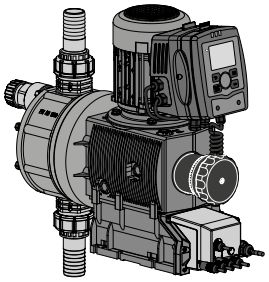
- Special valve balls/special valve springs, see page →215

1.1.11 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.



Sigma/ 3 control type

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 logbook significantly improves process management, optimisation and troubleshooting.

DULCONNEX

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 signalling (electrical as an option).
- 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.
- Can be flexibly networked: Connection to process management systems via integral PROFIBUS®.
- 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 by means of self-locking rotary dial in 1 % increments
- Under correct, constant conditions, correct installation and calibration, the precision is better than ±1 %, based on maximum stroke volume.
- Power supply: 1 pH, 100 - 230 V ±10 %, 240 V ±6 %, 50/60 Hz (420 W)
- Degree of protection IP 65
- Glass fiber reinforced plastic housing
- Manual or external contact operation adjustable, factor for external contact control 99:1 - 1:99; batch operation with max. 99,999 strokes/start pulse.
- Dosing profiles for optimum dosing results.
- Display of wear parts in the service menu.
- Connector for level switch 2-stage.
- Connection to PROFINET via ProMinent DULCOnvert PROFIBUS®- PROFINET Converter
- Various relay modules available.
- Variants with EU 1935/2004, FDA or Hygienic Design are available for food applications.
- Wetted materials: PVDF, stainless steel 1.4571/1.4404, special materials on request.
- Dosing heads with electropolished stainless steel are available on request for aqueous media in hygienically demanding applications.
- We are happy to provide alternative material versions for compliance with export regulations for pump capacities >600 l/h and PVDF.
- Customized designs are available on request.

For safety reasons, suitable overflow devices must be provided for all mechanically deflected Diaphragm Metering Pumps during installation.

1.1 Diaphragm 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 hypochlorite for the disinfection of potable water
- Neutralisation in wastewater treatment
- Pulse-controlled metering in the bottling of different volumes e.g. glycerine filling of manometers
- With an integrated timer as a control unit for simple processes, e.g. biocide metering in cooling water

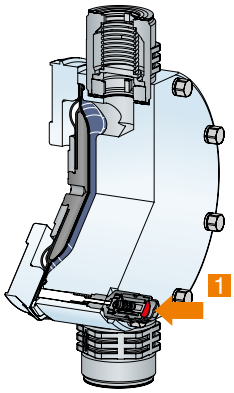
Operating unit

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 logbook significantly improves process management, optimisation and troubleshooting.

Multi-layer safety diaphragm



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

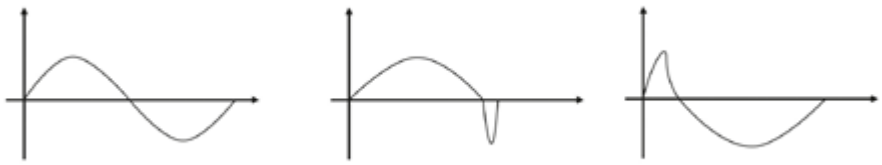
Metering profiles guarantee optimum metering results by adapting the metering behaviour of the metering pump to the application or chemical used.

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 Discharge stroke, suction stroke equal
2 Long discharge stroke, short suction stroke
3 Short discharge stroke, long suction stroke



'Physiologically safe' designs

FDA

The wetted materials in the "FDA" (F) design comply with the FDA directive. Material PTFE: FDA no. 21 CFR § 177.1550, material PVDF: FDA no. 21 CFR § 177.2510. Available for pump version plastic (PV) and stainless steel (SS) and DN 25 ball valve (type 120145, 120190, 120270, 120330).

Identity code example: S3CBH120270PV F S070UA01000DE

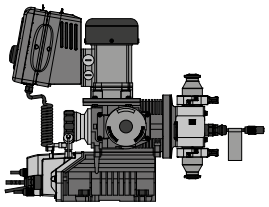
EU Regulation 1935/2004

Sealing materials in accordance with Regulation (EC) 1935/2004 are available in the stainless steel “Physiologically safe with regard to wetted materials Regulation (EC) 1935/2004" material version. Available for pump version stainless steel (SS) and DN 25 ball valve (type 120145, 120190, 120270, 120330).

Hygienic design

For hygienically demanding applications. Dosing heads comply with the current EHEDG design guidelines for oscillating positive displacement pumps. Simple construction, quick to clean.

Bestellvariante: S3CBH040830SSHSHC0UA01000DE



Materials:	1.4435, PTFE multi-layer safety diaphragm, ceramic balls, EPDM and/or FKM seals
Surfaces:	Ra ≤ 0.8 µ (wetted)
Cleaning:	CIP max. 120 °C (15 min), ATEX max. 115 °C
Connection types:	Groove clamp spigot DIN 11864-3 (TriClamp) standard Groove clamp spigot DIN 11864-2 (flange)

1.1 Diaphragm Metering Pumps

Technical Data

Type	Capacity at max. back pressure			Max. stroke rate	Pump capacity at max. back pressure		Suction lift	Perm. pre-pressure suction side	Connector Suction/ Discharge Side	Shipping weight
S3Cb	l/h	bar	ml/stroke	Strokes/ min	gph (US)	psi	m WC	bar	G-DN	kg
040830 PVT	1,040	4	95.1	180	274.7	58	3	1	2–32 *	24
040830 SST	1,040	4	95.1	180	274.7	58	3	1	2–32 *	29
070410 PVT	500	7	95.1	90	132.0	102	4	1	2–32 *	24
070410 SST	500	7	95.1	90	132.0	102	4	1	2–32 *	29
070580 PVT	670	7	95.1	120	176.9	102	4	1	2–32 *	24
070580 SST	670	7	95.1	120	176.9	102	4	1	2–32 *	29
120145 PVT	182	10	33.7	90	48.0	145	5	2	1 1/2–25	22
120145 SST	182	12	33.7	90	48.0	174	5	2	1 1/2–25	26
120190 PVT	243	10	33.7	120	64.1	145	5	2	1 1/2–25	22
120190 SST	243	12	33.7	120	64.1	174	5	2	1 1/2–25	26
120270 PVT	365	10	33.8	180	96.4	145	5	2	1 1/2–25	22
120270 SST	365	12	33.8	180	96.4	174	5	2	1 1/2–25	26
040830 SSH	1,013	4	93.7	180	267.6	58	3	1	1 1/2–25	56
070410 SSH	474	7	87.9	90	125.2	102	4	1	1 1/2–25	56
070580 SSH	639	7	88.7	120	168.8	102	4	1	1 1/2–25	56
120145 SSH	189	10	34.8	90	49.9	145	5	2	1 1/2–25	36
120190 SSH	250	10	34.8	120	66.0	145	5	2	1 1/2–25	36
120270 SSH	376	10	34.8	180	99.3	145	5	2	1 1/2–25	36

* DN32 plate valves with valve spring

Materials in Contact with the Medium

Identity code of material	Seals	DN 25 ball valves			DN 32 plate valves			Integral relief valve
		Suction / discharge connection on dosing head DN 25	Valve balls	Valve seats	Suction / discharge connection on dosing head DN 32	Valve plates/ valve springs	Valve seats	
PVT	PTFE	PVDF	Glass	PTFE *	PVDF	Ceramic/ Hastelloy 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/Hastelloy C	PTFE	Stainless steel/ FKM or EPDM
TTT ***	PTFE	PTFE + 25% carbon	Stainless steel 1.4404	PTFE *	PVDF	Ceramic/ Hastelloy C + CTFE **	PTFE	-
PVF	PTFE	PVDF	Glass	PVDF	-	-	-	-
SSF	PTFE	Stainless steel 1.4581/1.4404	Stainless steel 1.4404	PVDF	-	-	-	-
SSG	PTFE	Stainless steel 1.4581/1.4404	Stainless steel 1.4404	Stainless steel 1.4404	-	-	-	-
SSH ****	EPDM or FKM	Stainless steel 1.4435	Stainless steel 1.4404	Stainless steel 1.4404	Stainless steel 1.4581	Ceramic/E-CTFE	Stainless steel 1.4404	-

* With design 'F', the ball seat is made of PVDF, only for DN 25 ball valves
** The valve spring is coated with CTFE (resistance similar to PTFE)
*** Specifically for areas at risk from explosion
**** DN 25 and DN 32 designed as ball non-return valve

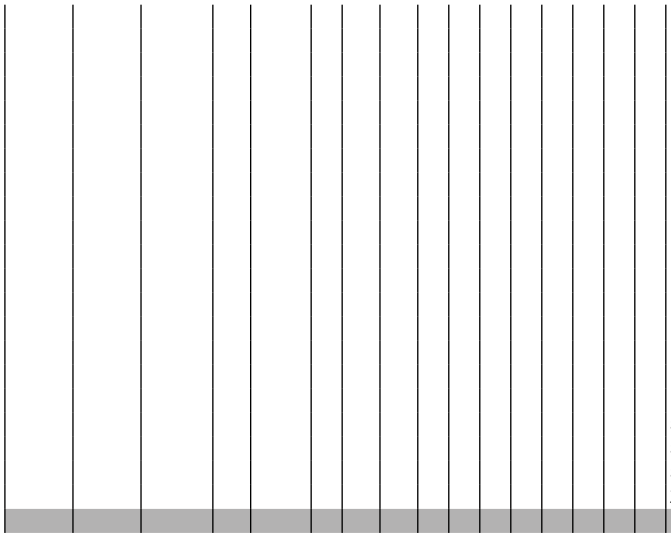
Motor Data

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

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

S3Cb	Drive type																	
	H	Main drive, diaphragm																
		Type	Capacity															
		120145 *	12 bar	182 l/h														
		120190 *	12 bar	243 l/h														
		120270 *	12 bar	365 l/h														
		070410	7 bar	500 l/h														
		070580	7 bar	670 l/h														
		040830	4 bar	1,040 l/h														
			Liquid end material															
			PV	PVDF (max. 10 bar)														
			SS	Stainless steel														
				Seal material														
				T	PTFE seal (standard)													
				F	FDA-compliant, only for 12 bar version													
				G	1935/2004-compliant, only for 12 bar version													
				H	Hygienic Design													
					Diaphragm													
					S	Multi-layer safety diaphragm with optical rupture indicator												
					A	Multi-layer safety diaphragm with electrical signal												
						Liquid end version												
						0	No valve springs (standard)											
						1	With 2 valve springs, Hastelloy C 4; 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 pressure relief valve, FKM seal, no valve spring											
						5 **	With relief valve, FPM seal, with valve springs											
						6 **	With pressure relief valve, EPDM seal, without valve spring											
						7 **	With pressure relief valve, EPDM seal, with valve spring											
						8	With bleed valve, EPDM seal, no valve spring											
						9	With bleed valve, EPDM seal, with valve spring											
						H	Hygienic Design											
							Hydraulic connections											
							0	Standard threaded connector (according to technical data)										
							1	PVC union nut and insert										
							2	Union nut and insert PP										
							3	PVDF union nut and insert										
							4 ***	Stainless steel union nut and insert										
							7	Union nut and PVDF hose nozzle										
							8	Stainless steel union nut and hose nozzle										
							9	Union nut and stainless steel welding sleeve										
							C	DIN 11864-3 form A (hygienic design), others on request										
								Version										
								0	With ProMinent logo (standard)									
									Electrical power supply									
									U	1 ph, 100 – 230 V ±10%, 240 V ±6%, 50/60 Hz, 420 W								
										Cable and plug								
										A	2 m European							
										B	2 m Swiss							
										C	2 m Australian							
										D	2 m USA							
											Relay							
											0	No relay						
											1	Fault indicating relay (230 V, 6 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 Variants						
												0	Manual + External contact with Pulse control					
												1	As 0 + analogue + metering profiles					
												6	As 1 + PROFIBUS® DP interface, M 12					
													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	
																CS	Czech	

1.1 Diaphragm Metering Pumps



DA	Danish
EL	Greek
ES	Spanish
ET	Estonian
FI	Finnish
FR	French
HU	Hungarian
HR	Croatian
KO	Korean
LT	Lithuanian
LV	Latvian
IT	Italian
NL	Dutch
PL	Polish
RO	Romanian
PT	Portuguese
RU	Russian
SK	Slovakian
SL	Slovenian
SV	Swedish
ZH	Chinese

* 10 bar for PVDF version.

** Connector (type 120145, 120190, 120270) for DN 10 hose sleeve in the bypass; connector (type 070410, 070580, 040830) for DN 20 threaded connector in the bypass, hose sleeve on request

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

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

As a result of the stringent requirements placed on wetted materials in the food environment, not all product variants are available. We are happy to assist with any questions you may have relating to your selection.

Spare parts for Sigma/ 3 Control type (S3Cb)

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

Scope of delivery for PVT/TTT material version:

- 1 diaphragm (multi-layer safety diaphragm)
- 2 valve assemblies
- 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 for SST material version:

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

Spare parts kit for Sigma/ 3

(valid for identity code: types 120145, 120190, 120270, 120330)

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

(valid for identity code: types 070410, 070580, 040830, 041030)

Liquid end	Materials in contact with the medium	Valve	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 kit for Sigma/ 3 for FDA and Regulation (EC) 1935/2004 version

(valid for identity code: types 120145, 120190, 120270, 120330)

Liquid end	Materials in contact with the medium		Valve	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	Reg. (EC) 1935/2004	without valve	1105337
FM 330 - DN 25	SST	Reg. (EC) 1935/2004	with valve	1105336

Spare parts kit for Sigma/ 3 for hygienic design version

(applies to identity code for types 120145, 120190, 120270 and 120330)

Liquid end	Materials in contact with the medium		Valve	Order no.
FM 330 - DN 25	SSH/EPDM	Hygienic design	without valve	1119731
FM 330 - DN 25	SSH/FKM	Hygienic design	without valve	1126474

(applies to identity code for types 070410, 070580, 040830 and 041030)

Liquid end	Materials in contact with the medium		Valve	Order no.
FM 1030 - DN 32	SSH/EPDM	Hygienic design	without valve	1119733
FM 1030 - DN 32	SSH/FKM	Hygienic design	without valve	1126476

1.1 Diaphragm Metering Pumps

Multi-layer safety diaphragm

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

Spare parts kits for integrated relief valve (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	PVT/SST	FKM-A/ EPDM	1031202

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 design' with characteristic '2', '3', '8', '9'

	Description	Seals	Order no.
ETS	PVT/SST	FKM-A/EPDM	1043785
ETS	PVT/SST	FKM-A/EPDM	1043786

Gear Oil

	Required quantity	Order no.
Mobilgear 600 XP 460 gear oil, 1 litre	0.7 l	1004542

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

Extension cable for operating unit (HMI)

	Length m	Order no.
Connecting cable - CAN M12 5-pin.	1.0	1022139
Connecting cable - CAN M12 5-pin.	2.0	1022140
Connecting cable - CAN M12 5-pin.	5.0	1022141
Connecting cable - CAN M12 5-pin.	10	1046383

Sigma X operating panel

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

	Order no.
Operating unit (HMI) Sigma X - S2Cb, S3Cb	1092957

Accessories

- Foot valves for motor-driven metering pumps, see page →156
- Injection valves for motor-driven metering pumps, see page →170
- Hoses and pipework for motor-driven metering pumps, see page →195
- Suction lances and suction assemblies for motor-driven metering pumps see page →163
- Connectors, fittings, connector kits, seals, see page →199
- Speed controllers, see page →PL
- Metering monitor Flow Control, can be set for motor-driven metering pumps, see page →209

Spare Parts

- Special valve balls/special valve springs, see page →215

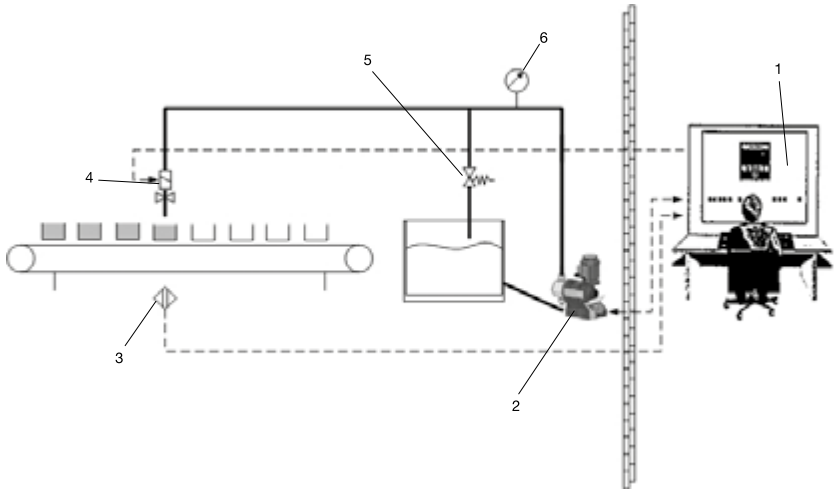
1.1 Diaphragm Metering Pumps

1.1.12 Application Examples

Metering Of Highly Viscous Substances

Product:	**Motor-driven metering pumps**
Feed chemical:	**Viscous filler**
Industry:	**Electronics sector**
Application:	**Filling parts**

1 Process control system PLS (Master)
2 Metering pump, Sigma type (field device)
3 Proximity switch
4 Solenoid valve
5 Relief valve
6 Manometer



Problems and requirements

- Metering of a viscous filler into moulds
- Dosing precision ± 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

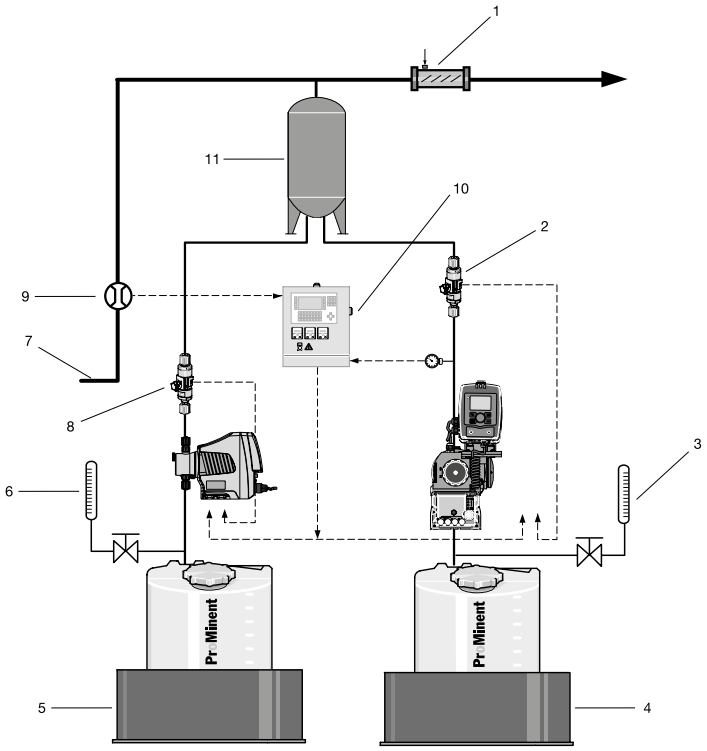
Benefits

- 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

Mixing Two Reagents

Product:	**Motor-driven metering pumps, solenoid-driven metering pumps**
Feed chemical:	**Chlorine activator, oxidant (NaOCl)**
Industry:	**Process industry, power plants**
Application:	**Biocide treatment of cooling water systems**

1 Static mixer
2 Flow Control
3 Metering measuring unit
4 NaOCl solution
5 Chlorine activator
6 Metering measuring unit
7 Process water
8 Flow Control
9 Flow measurement
10 Control cabinet
11 Reaction tank



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 a content of 0.5 g/m³ 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.

1.1 Diaphragm Metering Pumps

Solution

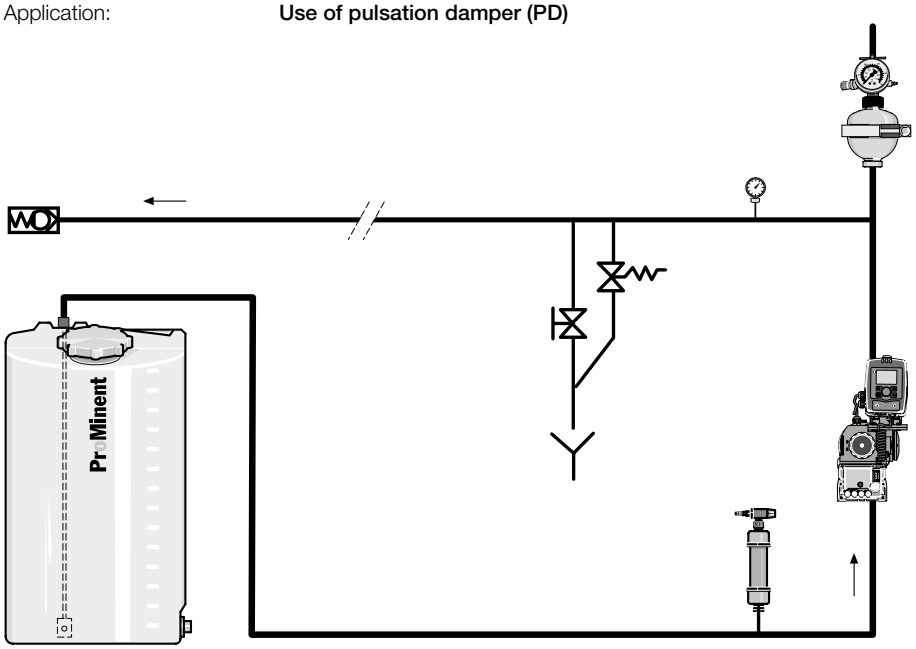
- Metering pump type gamma/ X with timer function (possibly external time switch)
- Metering pump Sigma X - S1Cb
- Metering monitor Flow Control
- Metering equipment
- Manometer with pressure switch

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.

Safe And Reliable Chemical Metering With Reduced Pulsation

Product:	**Metering pumps, accessories**
Feed chemical:	**Chemicals of higher viscosity**
Application:	**Use of pulsation damper (PD)**



Problems and requirements

- Due to the technical procedures involved, customers want a metering flow with very little pulsation.
- Acceleration inertial forces during metering, resulting from the oscillating movement of the displacement body in conjunction with the pipework geometry, need to be reduced.
- Process management without cavitation

Operating condition/environment

- Long suction/discharge lines
- Line cross-sections with tight dimensions
- Metering of inert media of higher viscosity

1.1 Diaphragm Metering Pumps

Notes on use

- Surges increase as the length of the metering line increases and the diameter narrows, leading to impermissible pressure peaks.
- Check whether it is necessary to use a PD when using a pipe calculation program with longer pipework and with more highly viscous media.
- With an oscillating motor-driven metering pump, the maximum flow speed is roughly 3 times that of mean speed, and with a solenoid-driven metering pump, it is approx. 5 times greater. This should be taken into account when configuring lines without a PD.
- PD should be pre-stressed with compressed air or nitrogen to around 60-80 % of the anticipated operating pressure.

Solution

- ProMinent metering pumps
- Back pressure / relief valves
- Pulsation damper

Benefits

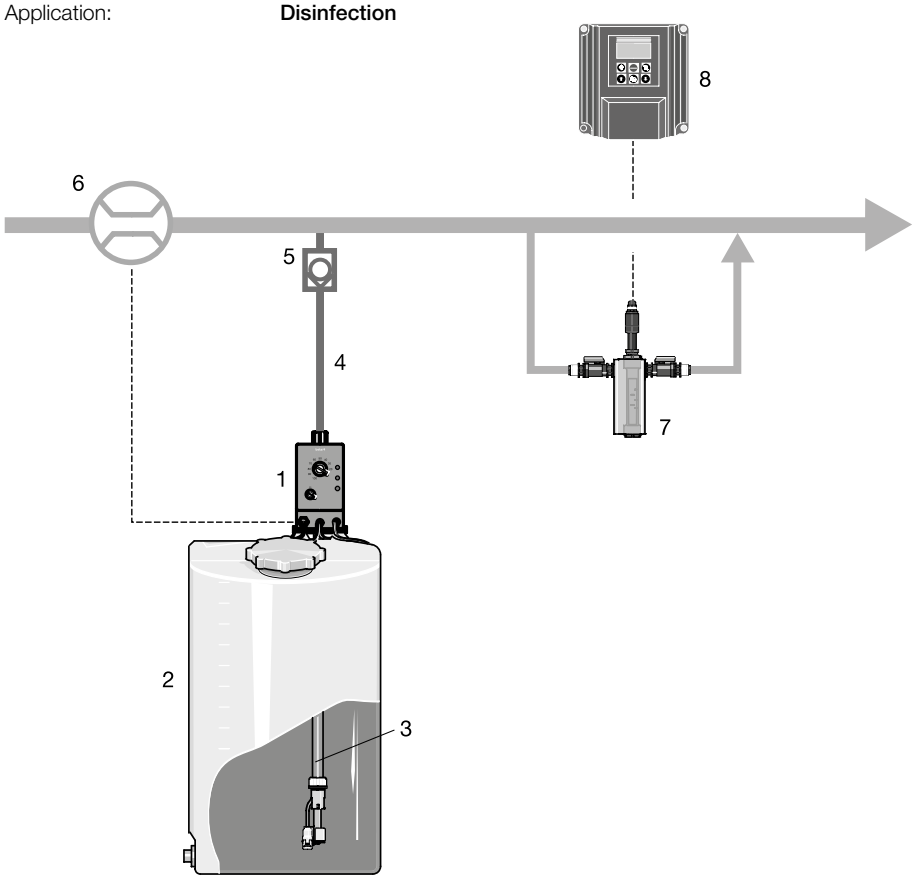
- Reliable installation that prevents damage to pumps and pipework
- Precise metering since cavitation is avoided
- Compensation of fluctuations in the delivery flow

1.1.12 Application Examples

Volume-proportional Metering of Chlorine Bleach Solution in Potable Water

Product:	**beta**
Feed chemical:	**NaOCl**
Industry:	**Potable water**
Application:	**Disinfection**

1 beta/ 4 with self-bleeding dosing head
2 Dosing tank
3 Suction assembly with foot valve and level switch
4 PVC metering line - soft with woven layer or PTFE
5 Injection valve
6 Contact water meter
7 Chlorine measuring probe
8 Control measurement



Problems and requirements

- Volume-proportional addition of sodium hypochlorite to the main water flow
- Monitoring of chlorine content after metering

Operating conditions

- Alternating flow
- Installation in closed buildings

Notes on use

- The feed chemical is outgassing. If the pump has been stationary for long periods, an air bubble may therefore form in the suction line, resulting in an interruption to metering.
- Metering should be fully automatic and trouble-free because operating staff are not always present at waterworks or fountains.

Solution

- Solenoid-driven metering pump beta with self-bleeding dosing head
- Contact water meter in the main line to control the pump
- DULCOMETER measuring and control technology for final check

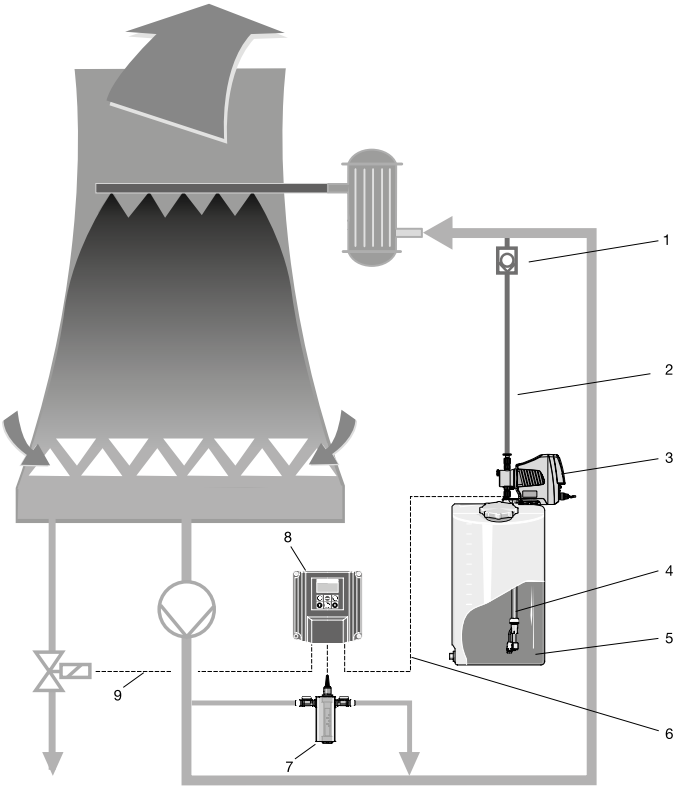
Benefits

- Excellent safety due to self-bleeding dosing head
- Maximum protection from over-metering or under-metering thanks to downstream final check

Shock Metering of Biocide in Cooling Water Circuit

Product: **gamma/ X**
Feed chemical: **Biocide**
Industry: **Cooling water treatment**
Application: **Disinfection**

1 Injection valve
2 Dosing line
3 gamma/ X with process timer
4 Suction assembly with foot valve and level switch
5 Dosing tank
6 Relay output for deactivation of conductance-controlled bleeding during biocide shock metering
7 Conductivity sensor
8 D1C conductivity
9 Control of solenoid valve for bleeding
10 Wastewater



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.
- 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.

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
- Saving of the cost of a PLC
- Saving of installation costs due to compact construction

1.2 Peristaltic Metering Pumps

1.2.1 Peristaltic metering pump DULCOFLEX DFXa

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

Feed rate of 10 ml/h to 65 l/h at up to 7 bar back pressure

DULCOFLEX DFXa meters outgassing, viscous, abrasive or shear-sensitive media and is setting new standards in metering. Linear and reproducible metering (± 1 %) is guaranteed with this peristaltic pump under all process conditions. Hose replacement is a very simple process.

The DULCOFLEX DFXa meters reliably and is easy to operate. It expands the ProMinent portfolio with an intelligent peristaltic metering pump. ProMinent uses its decades of experience in the metering pump industry to combine the best of both worlds. Valve-free metering with the precision of a Diaphragm Metering Pump, while fully utilizing the properties of a Peristaltic Pump. Highly outgassing, highly viscous, abrasive, shear-sensitive or chemically aggressive fluids are the application of this metering pump.

The liquid end developed and patented by ProMinent enables a quick and uncomplicated hose change with a unique change concept. The display gives the operator precise instructions on the steps to be completed when changing the hose. The high-performance hoses used warrant excellent chemical resistance and a long service life.

The order information required for a hose change can be found in the pump's operating menu.

The intuitive user interface with click-wheel enables easy operation of the peristaltic metering pump.

At the heart of the DULCOFLEX DFXa is a brushless DC motor. The sophisticated control system enables precise dosing and reduction of the pump capacity with continuous dosing down to 10 ml/h. The new peristaltic metering pump is also IoT-capable. This means that it is fully networkable and can be connected to the DULCONNEX IIoT solution developed by ProMinent.

DULCONNEX

Your Benefits

- Adjustment of the metering rate directly in l/h or ml/h
- Simple hose change
- No problems with very gaseous media or air locks
- Suitable for viscosities of up to 200,000 mPas (with VPT0530/VPT0565)
- 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

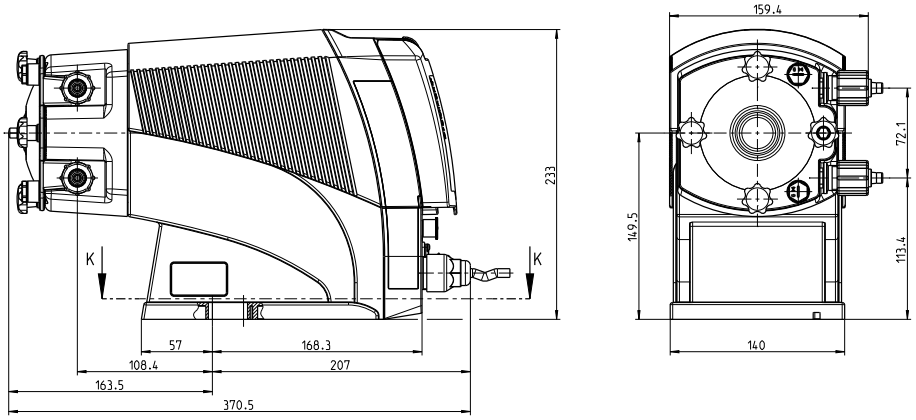
Technical Details

- Illuminated 3" LCD and 3-LED display for operating, warning and error messages, visible from all sides
- Adjustable feed rate of between 65 l/ and 10 ml/h
- Connector for 2-stage level switch or continuous level measurement
- 3 additional freely configurable inputs and outputs on one port
- Optional 0/4–20 mA output for remote transmission of actual dosing rate and error messages
- Optional relay module with 1 x switch-over contact, 230 V – 6 A
- Optional relay module with 2 x On, 24 V – 100 mA
- Pump is available as an FDA design
- DULCONNEX-capable
- Connection to process control systems via fieldbus interfaces, such as PROFIBUS®, PROFINET, CANopen or Modbus RTU
- CIP (cleaning in place)-enabled system
- Reverse flow is possible

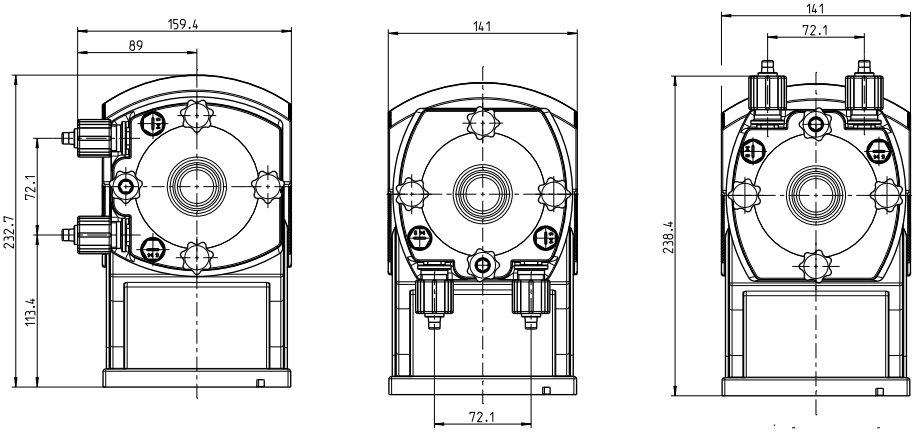
Field of Application

- Drinking water and wastewater treatment
- Food and beverage industry
- Paper industry
- Chemical industry
- All industrial applications, either as a stand-alone unit or integrated in a complete system

Dimensional drawing of DULCOFLEX DFXa without hose rupture alarm

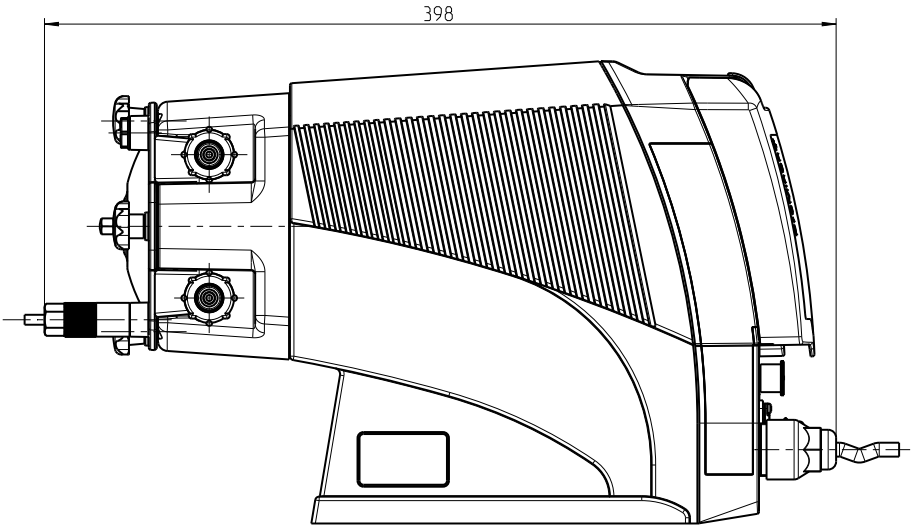


Dimensional drawing of DFXa, dosing head orientation on the right, dimensions in mm



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

Dimensional drawing of DULCOFLEX DFXa with hose rupture alarm



Dimensional drawing of DFXa, dimensions in mm

1.2 Peristaltic Metering Pumps

Identity code ordering system for product range DULCOFLEX DFXa

DFXa	Regional design																		
	EU	Europe																	
	US	USA																	
	CN	China																	
		Type	Capacity																
		0530	5 bar	30 l/h															
		0730	7 bar	30 l/h															
		0365	3 bar	65 l/h															
		0565	5 bar	65 l/h															
			Tube material																
			SP	Thermoplastic vulcanisate (TPV/PVDF), the tube is ideally suited for NaOCl..., Only available for types 0530 and 0730															
			VP	Polyurethane (PUR/PVDF), the tube is ideally suited to oils, fats, polymers..., only available for types 0530 and 0565															
			FP	SEBS (SEBS/PVDF) hose material optimised for NaOCl, H_2O_2, H_2SO_4, only for type 0365															
				Seal material															
				T	PTFE														
				F	FDA-compliant (PTFE)														
				G	EC 1935/2004-compliant design, only for FP hose														
					Dosing head orientation														
					R	Right (view from behind)													
					L	Left (view from behind)													
					U	Top													
					D	Bottom													
						Hydraulic connections													
						0	Standard connector (12x9)												
						2	Connector 8x5												
						E	Connector DN 10 with nozzle												
							Tube rupture alarm												
							0	None											
							1	With tube rupture alarm. Stops the pump and warns the user if a tube has ruptured											
								Version											
								0	Housing RAL 5003 / cover RAL 2003										
									Logo										
									0	With 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							
											E	2 m Great Britain							
											1	2 m European, open end							
												Relay							
												0	No relay						
												1	Fault indicating relay (230 V, 6 A)						
												4	Fault indicating relay (24 V, 100 mA) + pacing relay (24 V, 100 mA)						
												C	0/4 – 20 mA analogue output + fault indicating / pacing relay (24 V - 100 mA)						
													Accessories						
													0	No accessories					
													1	With foot and injection valve, 2 m suction line and 5 m discharge line					
													5	1+ universal control cable					
														Control Variants					
														0	Manual + external with pulse control				
														3	Manual + external with pulse control + analogue 0/4 - 20 mA				
														C *	As 3 + CANopen				
														G **	as 3 + EtherNet/IP				
														P *	As 3 + Profinet				
														R *	As 3 + PROFIBUS® DP interface M12				
														M *	As 3 + Modbus RTU				
															Communication interface				
															0	None			
																Language			
																DE	German		
																EN	English		
																ES	Spanish		
																FR	French		
																IT	Italian		

* No relay can be selected with these options.

** A relay cannot be used with these options.

1.2 Peristaltic Metering Pumps

Technical Data

Type	Maximum back pressure bar	Delivery rate	Frequency rpm	Connector size outer Ø x inner Ø	Suction lift m WC	Shipping weight kg
0530	5	10 ml/h…30 l/h	100	12 x 9	9	5.8
0730	7	10 ml/h…30 l/h	100	12 x 9	9	5.8
0365	3	22 ml/h…65 l/h	100	12 x 9	9	5.8
0565	5	22 ml/h…65 l/h	100	12 x 9	9	5.8

Hose material:	Thermoplastic vulcanisate (TPV), polyurethane (PUR), SEBS
Hose connectors:	PVDF/PTFE
Metering reproducibility:	±1% with retracted hose (after approx. 200 revolutions)
Electrical connection:	100 - 230 V ±10%, 50/60 Hz
Nominal power:	approx. 50 W
Degree of protection:	IP 66, NEMA 4X Indoor
Permissible ambient temperature:	0 … 45 °C
Viscosities:	The DFXa0530VPT and DFXa0565VPT have successfully metered viscosities of up to 200,000 mPas in testing. If metering media with higher viscosities, it is important that you use solid pipework with a large diameter (DN 10). The pipes should also be as short as possible. Also do not allow the pump to run at full output.

All data calculated with water at 20 °C.

Spare parts kits for DULCOFLEX DFXa

	Order no.
Spare parts kit for DFXa 0530 SPT	1103100
Spare parts kit for DFXa 0530 SPF	1103101
Spare parts kit for DFXa 0530 VPF	1108859
Spare parts kit for DFXa 0530 VPT	1104954
Spare parts kit for DFXa 0730 SPT	1103102
Spare parts kit for DFXa 0730 SPF	1103099
Spare parts kit for DFXa 0365 FPT	1123766
Spare parts kit for DFXa 0365 FPF	1126857
Spare parts kit for DFXa 0365 FPG	1121589
Spare parts kit for DFXa 0565 VPT	1112765
Spare parts kit for DFXa 0565 VPF	1112764
Spare parts kit for DFXa 0565, rotor assembled	1116468
Spare parts kit for DFXa 0530/ 0730/0365, rotor assembled	1103249
Star screw knob DIN 6336 L M 5x15xd25 A2	1102764
Spare screw kit for DFXa	1104952
Hose rupture alarm for DFXa	1044477
Dosing head cover	1126683
Dosing head (black plastic)	1115677
DIN 7991 M 5x20 countersunk screw	1027519

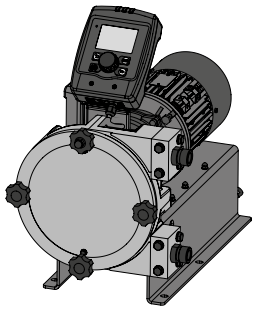
1.2 Peristaltic Metering Pumps

1.2.2 Peristaltic metering pump DULCOFLEX DFYa

The peristaltic metering pump DULCOFLEX DFYa is the only one of its kind that can be controlled totally electronically and features a fibre-reinforced hose and a display

3 variants with maximum flow rates of 200, 410 and 660 l/h at up to 8 bar back pressure

The valveless peristaltic metering pump DULCOFLEX DFYa delivers precise, linear and reproducible metering in all process conditions. It is highly suited to outgassing, viscose, shear-sensitive media, possibly containing particles – ProMinent is therefore setting new standards in metering with peristaltic pumps.



The DFYa metering pump product range adds 3 intelligent peristaltic pumps with a maximum capacity of 200, 410 and 660 l/h to the top capacity range of the ProMinent portfolio.

The DFYa peristaltic metering pumps can be controlled electronically. It meters without the need for a valve and with a level of precision not previously possible. And yet it retains all the benefits of a peristaltic pump, which is why highly outgassing, 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 is therefore a new addition to rest of the ProMinent product range of intelligent metering pumps, which all share the same menu structure and user interface.

The DULCOFLEX DFYa offers various connectivity options and is IoT-capable. It can therefore be connected to the DULCONNEX IIoT solution, developed by ProMinent.

DULCONNEX

Your Benefits

- Operation by contact, batch, manual, analogue or BUS control
- Adjustment of the metering rate directly in l/h
- Connection to process control systems via a BUS interface, such PROFIBUS or CANopen
- No problems with very outgassing media or air locks
- Simple, menu-based hose change
- Reversible direction of rotation

Technical Details

- Illuminated 3” LCD and 3-LED display for operating, warning and error messages, visible from all sides
- Depending on the type selected, the feed rate can be adjusted between 2.5 and 660 l/h
- Batch operation with max. 999.9 l/pulse
- Connector for 2-stage level switch
- Optional relay module with 1 x switch-over contact, 230 V – 6 A
- Optional relay module with 2 x On, 24 V – 100 mA
- DULCONNEX-capable

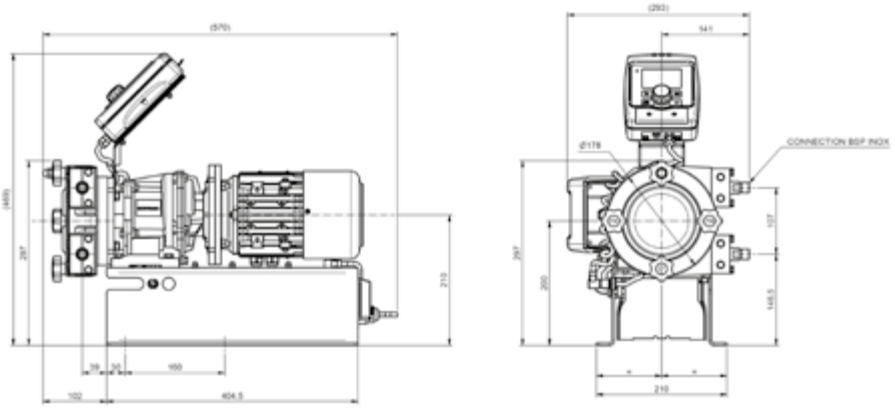
Field of Application

The following list is a general indication of applications suited to this product in principle. Please get in touch with your personal point of contact to discuss use of the product for your individual application.

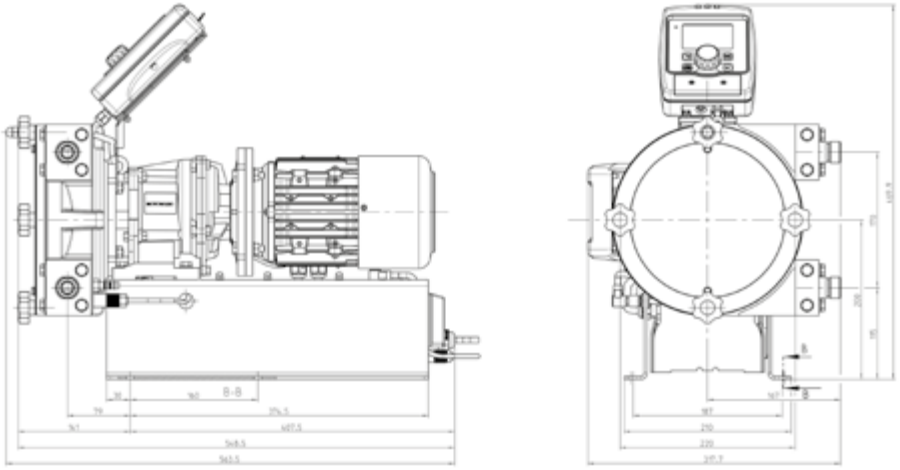
- Mining
- Drinking water and waste water industry
- Chemical industry
- Paper industry
- Food and beverage industry

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

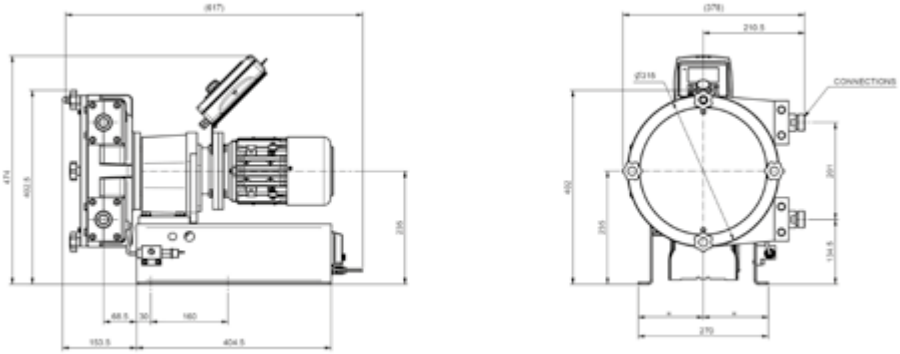
Dimensional drawing of DULCOFLEX DFYa type 200



Dimensional drawing of DULCOFLEX DFYa type 410



Dimensional drawing of DULCOFLEX DFYa type 660



1.2 Peristaltic Metering Pumps

Technical Data

Type	Maximum back pressure bar	Delivery rate	Frequency rpm	Connection size	Suction lift m WC	Shipping weight kg
04200	4	207 l/h ±10 %	100	3/8"	8	25
06200	6	207 l/h ±10 %	100	3/8"	8	25
08200	8	207 l/h ±10 %	100	3/8"	8	25
04410	4	410 l/h ±10 %	80	3/4"	8	30
06410	6	410 l/h ±10 %	80	3/4"	8	30
08410	8	410 l/h ±10 %	80	3/4"	8	30
02660	2	660 l/h ±10 %	50	1"	8	49
04660	4	660 l/h ±10 %	50	1"	8	49

Hose material:	NR, NBR, EPDM, NBR-A, Hypalon
Self-priming:	Up to 8 m
Rollers/shoes:	Rollers
Repeatability of metering (type 200/410/660):	± 2 % ±10/25/55ml with retracted hose after 500 revolutions
Electrical connection:	100 - 230 V ±10%, 50/60 Hz
Electrical power consumption:	Type 200 = 250W; type 410 = 420W; type 660 = 600W
Degree of protection:	IP 55
Permissible ambient temperature:	0 … 45 °C

All data calculated with water at 20 °C.

Spare parts for DULCOFLEX DFYa type 200

	Order no.
NR hose (type DFYa 200)	1037157
NBR hose (type DFYa 200)	1037158
EPDM hose (type DFYa 200)	1037159
NR-A hose (type DFYa 200)	1037160
NBR-A hose (type DFYa 200)	1037161
HYPALON hose (type DFYa 200)	1037163

Spare parts for DULCOFLEX DFYa type 410

	Order no.
NR hose (type DFYa 410)	1037164
NBR hose (type DFYa 410)	1037165
EPDM hose (type DFYa 410)	1037166
NBR-A hose (type DFYa 410)	1037168
HYPALON hose (type DFYa 410)	1037171

Spare parts for DULCOFLEX DFYa type 660

	Order no.
NR hose (type DFYa 660)	1037175
NBR hose (type DFYa 660)	1037176
EPDM hose (type DFYa 660)	1037178
NBR-A hose (type DFYa 660)	1037179
HYPALON hose (type DFYa 660)	1037182

1.2 Peristaltic Metering Pumps

Identity code ordering system for product range DULCOFLEX DFYa

DFYa	Type	Capacity	
	04200	4 bar	207 l/h
	06200	6 bar	207 l/h
	08200	8 bar	207 l/h
	04410	4 bar	410 l/h
	06410	6 bar	410 l/h
	08410	8 bar	410 l/h
	02660	2 bar	660 l/h
	04660	4 bar	660 l/h
		Hose material	
		0	NR
		B	NBR
		C	NBR-A
		E	EPDM
		H	Hypalon
		G	NBR-A (with FDA + EU 1935/2004 certificate), only in combination with G or H connection
			Dosing head orientation
			R Right (view from front)
			L Left (view from front)
			Hydraulic connections
			A SS (stainless steel) BSP
			B SS (stainless steel) NPT
			C PP BPS
			D PVDF BSP
			E PVDF NPT
			F PVC NPT
			G Tri-clamp, SS (stainless steel)
			H DIN 11851, SS (stainless steel)
			Tube rupture alarm
			0 Without hose rupture alarm
			1 With hose rupture alarm
			Version
			P ProMinent design
			M Modified
			Special version
			0 Standard
			H Chemically high-resistance version (Halar-coated)
			Logo
			0 With ProMinent logo
			Electrical Connection
			U 100 – 230 V ± 10 %, 50/60 Hz
			Cable and plug
			A 2 m Europe
			A 2 m Europe
			D 2 m USA 115V
			E 2 m Great Britain
			Relay function
			0 No relay
			1 Fault indicating relay (230 V, 6 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
			Accessories
			0 No accessories
			Control Variants
			0 Manual + External contact with Pulse control
			1 Manual + external contact with pulse control + analogue 0/4-20 mA
			6 Profibus M12 plug + analogue 0/ 4- 20 mA
			7 CANopen + analogue 0/4-20 mA
			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
			IT Italian
			Approvals
			01 CE

1.3 Peristaltic pumps DULCOFLEX

1.3.1 Peristaltic pumps DULCOFLEX

The virtually universal pump for many applications.

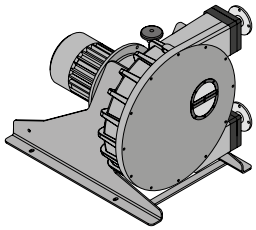
Capacity range up to 15,000 l/h, up to 15 bar

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 in the DULCOFLOW product range are ideal for almost all metering and pumping tasks in laboratories and industry. This is because they have a wide pump capacity range and large number of different hose materials.

How do 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 outgassing 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. As an option, with pumps of the DFCa and DFDa product ranges, a vacuum device can be used to help the hose to return to its original shape, thereby improving its suction behaviour and ensuring the even feed of viscose media.



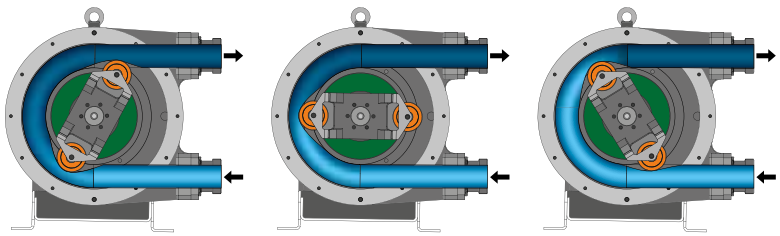
Whereas the pumps are fitted with roller technology for low pressures of up to 8 bar, it has shoes for higher pressures of up to 15 bar.

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



DULCOFLOW peristaltic pumps can be used to convey media with the following properties:

- pasty and containing solids
- viscous
- abrasive
- shear-sensitive
- outgassing
- corrosive

The most suitable pumps can be selected with the aid of an identity code.

1.3 Peristaltic pumps DULCOFLEX

Overview

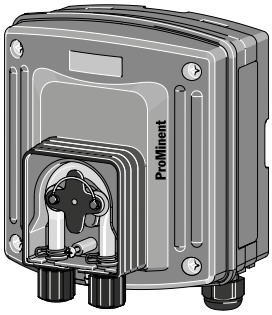
Type	Application	Feed rate at max. pressure	Max. pressure	Rollers/shoes
DFBa	Industry	650	8	Rollers
DFCa	Industry	8,900	8	Rollers
DFDa	Industry	15,000	15	Shoes

1.3.2 Peristaltic Pump DULCOFLEX 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 DULCOFLEX 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

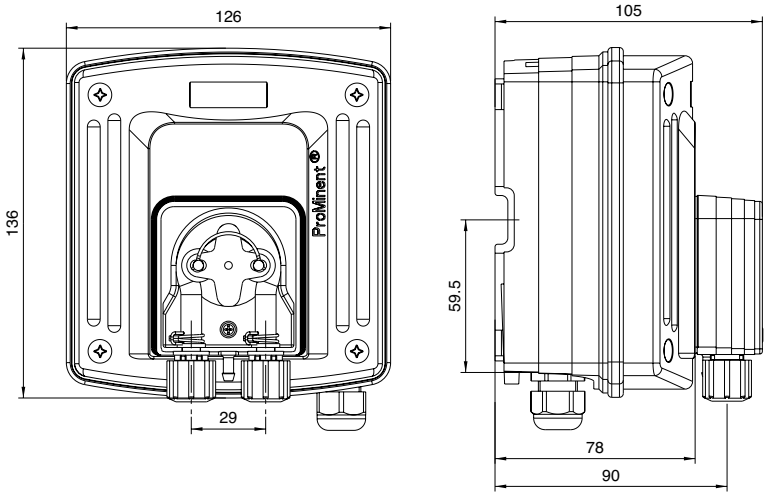
Technical Details

- 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

Dimensional drawing of DULCOFLEX DF2a



Dimensional drawing of DULCOFLEX DF2a - dimensions in mm

1.3 Peristaltic pumps DULCOFLEX

Identity code ordering system for DULCOFLEX DF2a product range

DF2a	Type	Capacity								
	0204	1.5 bar	0.4 l/h							
	0208	1.5 bar	0.8 l/h							
	0216	1.5 bar	1.6 l/h							
	0224	1.5 bar	2.4 l/h							
		Hose material								
		P	PharMed®							
		V	Viton® for fragrances (special version)							
			Version							
			0	With ProMinent logo						
			1	Without ProMinent logo						
				Hydraulic connections						
				0	Connector for hose 6/4 mm suction and discharge side					
				9	Connector for hose 10/4 mm discharge side only					
					Electrical Connection					
					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		
								Type of mounting		
								W	Wall mounting	
									Accessories	
									0	No accessories

Viton® and PharMed® are registered trademarks.

Technical Data

Type	Pump capacity at max. back pressure		Frequency	Connector size	Suction lift	Intake head
	bar	l/h	rpm	outer Ø x inner 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

Permissible ambient temperature: 10-45 °C
Approx. power consumption: 5 W
Switching-on duration: 100%
Degree of protection: IP 65
All data calculated with water at 20 °C.

Spare Hoses

	Order no.
Hose 4.8 x 8.0 PharMed	1009480
Spare hose assembly Viton®	1023842

1.3 Peristaltic pumps DULCOFLEX

1.3.3 Peristaltic Pump DULCOFLEX DF4a

The optimum pump for use in swimming pools, hot tubs and spa and wellness facilities.

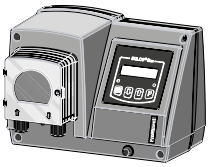
Capacity range 1.5 – 12 l/h, 4 – 2 bar

The peristaltic pump DULCOFLEX 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 DULCOFLEX DF4a available:

1. Metering of chemicals
2. Metering of active carbon
3. Metering of flocculants

This guarantees that the operating menu, inputs and outputs are always adapted to the respective application.



DULCONNEX

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.

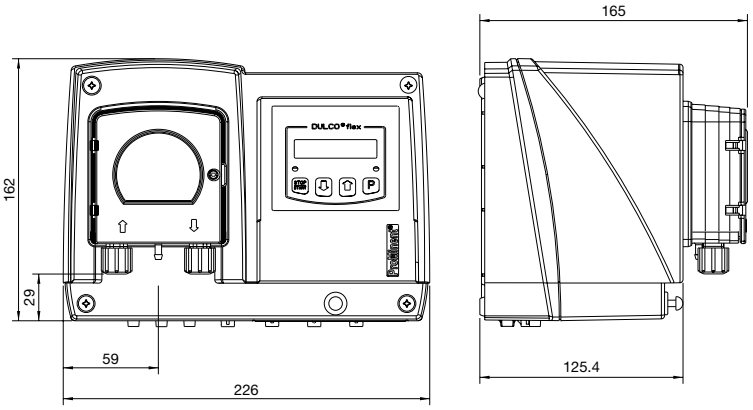
Technical Details

- 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 DULCOFLEX DF4a



Dimensional drawing of DULCOFLEX DF4a - dimensions in mm

1.3 Peristaltic pumps DULCOFLEX

Identity code ordering system for DULCOFLEX DF4a product range

DF4a	Application															
	0	Chemical pump														
	A	Activated charcoal metering														
	F	Flocculant metering														
		Type of mounting														
		W	Wall mounting													
			Version													
			0	With ProMinent logo												
			1	Without ProMinent logo												
				Type	Capacity											
				04004	4.0 bar	0.35 l/h										
				04015	3.0 bar	1.5 l/h										
				03060	2.0 bar	6.0 l/h										
				02120	1.5 bar	12.0 l/h										
					Hose material											
					P	PharMed®										
						Hydraulic connections										
						0	Standard connector 6x4									
						9	Special connector 10x4 discharge side									
							Electrical Connection									
							U	100 – 230 V ± 10 %, 50/60 Hz								
								Cable and plug								
								0	No mains lead							
								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	No accessories						
									2	With lip-seal metering valve PCB and 10 m PE metering line						
										Hardware extension						
										0	None					
											Preset language					
											00	Language-neutral				
												Relay				
												1	Fault signalling relay, drop-out action			
												3	Fault signalling relay, pick-up action			
													Control Variants			
													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

PharMed® is a registered trademark.

Technical Data

Priming lift:	3 m WC	**Approx. power consumption:**	24 W
Suction lift:	4 m WC	**Switching-on duration:**	100%
Speed:	0 – 85 rpm	**Degree of protection:**	IP 65
Permissible ambient temperature:	10 – 45 °C		

All data calculated with 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

1.3 Peristaltic pumps DULCOFLEX

1.3.4 Peristaltic Pump DULCOFLEX DFBa

Low and medium pump capacities

Pump capacity of up to 800 l/h; back pressures of up to 8 bar.

The peristaltic pump DULCOFLEX DFBa is designed for low and medium pump capacities of up to 800 l/h. Depending on application, the pump can be set for a back pressure of up to 8 bar.

The peristaltic pump DULCOFLEX 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

- Ideal for pumping pasty, high-viscosity, abrasive and gaseous media
- Simple operation
- Simple and quick hose change
- Self-priming
- Guaranteed not to run dry
- Reversible pumping direction
- Hose materials suitable for various chemicals
- No liquid lubricant in the hose housing
- Low initial torque
- Low energy consumption

Technical Details

- Hydraulic connector sizes 3/8"- 1"
- Pump capacity 0.023 to 0.246 l/revolution
- Hose material (fabric-reinforced): NR, NBR, EPDM, NBR-A, Hypalon
- Hose material (not reinforced): TPV, silicone, PVC
- Self-priming up to 8 m water column
- Back pressure up to 8 bar
- Patented hose clamp
- Cathodic dip coating makes housing resistant to chemicals

Options

- Stainless steel base plate
- Designed as mobile unit
- Rotor with 3 contact pressure rollers
- Various connectors, such as BSP, NPT, Tri-Clamp and DIN 11851
- Pulsation damper
- Leak sensor
- Pump housing with Halar coating (ECTFE)
- Food approval EU 1935/2004. Available with FDA-compliant hose and connectors on request
- For areas at risk from explosion II 2G Ex h IIB T4 Gb
- Pump available: with/without gears / variable speed motor with external fan and PTC resistor / motors with integrated frequency converter

Field of Application

- Water treatment and waste water treatment
- Mining
- Chemical industry
- Paper industry
- Food and beverages

Technical Data

Hose material (fabric-reinforced)	NR, NBR, EPDM, NBR-A, Hypalon
Hose material	TPV, silicone
Self-priming	up to 8 m
Back pressure	up to 8 bar
Contact pressure roller / shoes	Contact pressure roller, also with 3 contact pressure rollers on request

1.3 Peristaltic pumps DULCOFLEX

Type	Delivery rate	Maximum back pressure*	Delivery rate	Inner hose diameter	Max. size of solid particles**	Weight	Connection size
	l/rev	bar	l/h	mm	mm	kg	
DFBa 010	0.023	8	10…80	10	2.5	6	3/8"
DFBa 013	0.038	8	20…150	13	3.3	6	3/8"
DFBa 016	0.092	8	50…350	16	4.0	13	3/4"
DFBa 022	0.246	8	150…800	22	5.5	22	1"

* The back pressure can be adjusted up to 8 bar by adding several washers to suit the requirements of the respective application.

** Maximum particle size compared with inner diameter of hose; <25 % for soft solids and <15 % for hard solids.

A Resistance List of hose materials can be found at www.prominent.com.

1.3 Peristaltic pumps DULCOFLEX

Identity Code Ordering System for Peristaltic Pump DULCOFLEX DFBa 010

DFBa	Type											
	010	DFBa 010, 0.023 l/revolution										
		Drive *										
		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									
			Hose material									
			0	NR (natural rubber)								
			B	NBR								
			E	EPDM								
			N	Norprene (max. 2 bar back pressure)								
			A	NBR-A								
			H	Hypalon								
				Hydraulic connections								
				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, NW 10							
					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					
							Rotor					
							0	Rotor with 2 rollers				
								Batch controller				
								0	Without controller			
									Special version			
									0	Standard		
									H	Halar-coated housing		
										Vacuum system		
										0	None	
											Approvals	
											01	CE mark
											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.

1.3 Peristaltic pumps DULCOFLEX

Identity Code Ordering System for Peristaltic Pump DULCOFLEX DFBa 013

DFBa	Type											
	013	DFBa 013, 0.038 l/revolution										
		Drive *										
		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									
			Hose material									
			0	NR (natural rubber)								
			B	NBR								
			E	EPDM								
			N	Norprene (max. 2 bar back pressure)								
			A	NBR-A								
			H	Hypalon								
				Hydraulic connections								
				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, NW 15							
					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					
							Rotor					
							0	Rotor with 2 rollers				
								Batch controller				
								0	Without controller			
									Special version			
									0	Standard		
									H	Halar-coated housing		
										Vacuum system		
										0	None	
											Approvals	
											01	CE mark
											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.

1.3 Peristaltic pumps DULCOFLEX

Identity Code Ordering System for Peristaltic Pump DULCOFLEX DFBa 016

DFBa	Type										
	016	DFBa 016, 0.092 l/revolution									
		Drive *									
		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								
			Hose material								
			0	NR (natural rubber)							
			B	NBR							
			E	EPDM							
			N	Norprene (max. 2 bar back pressure)							
			A	NBR-A							
			H	Hypalon							
				Hydraulic connections							
				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, NW 20						
					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				
							Rotor				
							0	Rotor with 2 rollers			
								Batch controller			
								0	Without controller		
									Special version		
									0	Standard	
									H	Halar-coated housing	
										Vacuum system	
										0	None
											Approvals
											01 CE mark
											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.

1.3 Peristaltic pumps DULCOFLEX

Identity Code Ordering System for Peristaltic Pump DULCOFLEX DFBa 022

DFBa	Type										
	022	DFBa 022, 0.246 l/revolution									
		Drive *									
		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								
			Hose material								
			0	NR (natural rubber)							
			B	NBR							
			E	EPDM							
			N	Norprene (max. 2 bar back pressure)							
			A	NBR-A							
			H	Hypalon							
				Hydraulic connections							
				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, NW 25						
					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				
							Rotor				
							0	Rotor with 2 rollers			
								Batch controller			
								0	Without controller		
									Special version		
									0	Standard	
									H	Halar-coated housing	
										Vacuum system	
										0	None
											Approvals
											01 CE mark
											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.

1.3.5 Peristaltic Pump DULCOFLEX DFCa

High pump capacities and long service life

Pump capacity up to 25,000 l/h. Back pressure up to 8 bar.

High pump capacities are not a problem with the peristaltic pump DULCOFLEX 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 25,000 l/h. Depending on application, the pump can be set for a back pressure of up to 8 bar. 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.

As an option, with pumps of the DFCa product range, a vacuum device can be used to help the hose to return to its original shape, thereby improving their suction behaviour and ensuring the even feed of highly viscose media.

Your Benefits

- Ideal for pumping pasty, high-viscosity, abrasive and gaseous media
- Simple operation
- Simple and quick hose change
- Self-priming
- Guaranteed not to run dry
- Reversible pumping direction
- Hose materials suitable for various chemicals
- No liquid lubricant in the hose housing
- Low initial torque
- Low energy consumption

Technical Details

- Hydraulic connector sizes DN 32 to DN 80
- Pump capacity 0.43 - 11.7 l/revolution
- Hose material (fabric-reinforced): NR, NBR, EPDM, NBR-A, Hypalon
- Hose material (not reinforced): TPV, silicone, PVC
- Self-priming up to 8 m water column
- Back pressure up to 8 bar
- Integrated ball bearing housing
- Patented hose clamp
- Cathodic dip coating makes housing resistant to chemicals

Options

- Stainless steel base plate
- Designed as mobile unit
- Rotor with 3 contact pressure rollers
- Various connectors, such as BSP, NPT, Tri-Clamp and DIN 11851
- Pulsation damper
- Leak sensor
- Pump housing with Halar coating (ECTFE)
- Food approval EU 1935/2004. Available with FDA-compliant hose and connectors on request
- For areas at risk from explosion II 2G Ex h IIB T4 Gb
- Pump available: with/without gears / variable speed motor with external fan and PTC resistor / motors with integrated frequency converter

Field of Application

- Water treatment and waste water treatment
- Mining
- Chemical industry
- Paper industry
- Food and beverages

Technical Data

Hose material (fabric-reinforced)	NR, NBR, EPDM, NBR-A, Hypalon

1.3 Peristaltic pumps DULCOFLEX

Hose material	TPV, silicone
Self-priming	up to 8 m
Back pressure	up to 8 bar
Contact pressure roller / shoes	Contact pressure roller

Type	Delivery rate	Maximum back pressure*	Delivery rate	Inner hose diameter	Max. size of solid particles**	Weight	Connection size
	l/rev	bar	l/h	mm	mm	kg	
DFCa 030	0.43	8	300…1,500	28	7.0	62	DN 32
DFCa 040	0.86	8	600…2,500	35	8.8	89	DN 40
DFCa 050	1.47	8	1,500…4,500	40	10.0	140	DN 40
DFCa 060	2.69	8	2,500…8,000	55	13.8	235	DN 50
DFCa 070	6.72	8	5,000…15,000	65	16.3	440	DN 65
DFCa 080	11.70	8	9,000…25,000	80	20.0	800	DN 80

* The back pressure can be adjusted up to 8 bar by adding several washers to suit the requirements of the respective application.

** Maximum particle size compared with inner diameter of hose; <25 % for soft solids and <15 % for hard solids.

A Resistance List of hose materials can be found at www.prominent.com.

1.3 Peristaltic pumps DULCOFLEX

Identity Code Ordering System for Peristaltic Pump DULCOFLEX DFCa 030

DFCa	Type										
	030	DFCa 030, 0.433 l/revolution									
		Drive *									
		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								
			Hose material								
			0	NR							
			B	NBR							
			E	EPDM							
			A	NBR-A							
			N	Norprene (max. 2 bar back pressure)							
				Hydraulic connections							
				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, NW 32						
				I	DIN flange VA DN 32						
				L	ANSI flange VA, 1 1/4"						
				P	ANSI flange PVC, 1 1/4"						
					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				
							Rotor				
							0	Rotor with 2 rollers			
								Batch controller			
								0	Without controller		
									Special version		
									0	Standard	
									H	Halar-coated housing	
										Vacuum system	
										0	None
										V	With vacuum system
											Approvals
											01 CE mark
											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.

1.3 Peristaltic pumps DULCOFLEX

Identity Code Ordering System for Peristaltic Pump DULCOFLEX DFCa 040

DFCa	Type										
	040	DFCa 040, 0.86 l/revolution									
		Drive *									
		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								
			Hose material								
			0	NR							
			B	NBR							
			E	EPDM							
			A	NBR-A							
			N	Norprene (max. 2 bar back pressure)							
				Hydraulic connections							
				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, NW 40						
				I	DIN flange VA DN 40						
				L	ANSI flange VA, 1 1/2"						
				P	ANSI flange PVC, 1 1/2"						
					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 rollers			
								Batch controller			
								0	Without controller		
									Special version		
									0	Standard	
									H	Halar-coated housing	
										Vacuum system	
										0	None
										V	With vacuum system
											Approvals
											01 CE mark
											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.

1.3 Peristaltic pumps DULCOFLEX

Identity Code Ordering System for Peristaltic Pump DULCOFLEX DFCa 050

DFCa	Type											
	050	DFCa 050, 1.47 l/revolution										
		Drive *										
		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									
			Hose material									
			0	NR								
			B	NBR								
			E	EPDM								
			A	NBR-A								
			N	Norprene (max. 2 bar back pressure)								
				Hydraulic connections								
				I	DIN flange VA DN 40							
				G	Tri-Clamp, VA, 2"							
				H	DIN 11851, VA, NW 50							
				J	DIN flange PP DN 40							
				K	DIN flange PVDF/PTFE DN 40							
				L	ANSI flange VA, 1 1/2"							
				M	ANSI flange PP 1 1/2"							
				N	ANSI flange PVDF/PTFE 1 1/2"							
					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 rollers				
								Batch controller				
								0	Without controller			
									Special version			
									0	Standard		
									H	Halar-coated housing		
										Vacuum system		
										0	None	
										V	With vacuum system	
											Approvals	
											01	CE mark
											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.

1.3 Peristaltic pumps DULCOFLEX

Identity Code Ordering System for Peristaltic Pump DULCOFLEX DFCa 060

DFCa	Type										
	060	DFCa 060, 3.16 l/revolution									
		Drive *									
		000	Without drive unit								
		D11	2.2 kW, 18 rpm, 3.4 m^3/h, 4 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		D12	2.2 kW, 22 rpm, 4.2 m^3/h, 4 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		D13	3.0 kW, 27 rpm, 5.1 m^3/h, 4 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		D14	3.0 kW, 33 rpm, 6.3 m^3/h, 4 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		D15	3.0 kW, 42 rpm, 8.0 m^3/h, 4 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		D16	3.0 kW, 47 rpm, 8.9 m^3/h, 2 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		D31	3.0 kW, 7 – 25 rpm, 1.3 – 4.7 m^3/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 m^3/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 m^3/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 m^3/h, 2 bar, (Gear motor, external frequency converter required), 3-phase, 230/400 V AC								
			Hose material								
			0	NR							
			B	NBR							
			E	EPDM							
			A	NBR-A							
			N	Norprene (max. 2 bar back pressure)							
				Hydraulic connections							
				G	Tri-Clamp, VA, 2 1/2"						
				H	DIN 11851, VA, NW 50						
				J	ANSI flange PP DN 50						
				K	DIN flange VA, Halar-coated + PVDF inserts DN 50						
				L	ANSI flange VA 2"						
				M	ANSI flange PP 2"						
				N	ANSI flange VA, Halar-coated + PVDF inserts 2"						
					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 rollers			
								Batch controller			
								0	Without controller		
									Special version		
									0	Standard	
									H	Halar-coated housing	
										Vacuum system	
										0	None
										V	With vacuum system
											Approvals
											01 CE mark
											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.

Identity Code Ordering System for Peristaltic Pump DULCOFLEX DFCa 070

DFCa	Type										
	070	DFCa 070, 6.72 l/revolution									
		Drive *									
		000	Without drive unit								
		E11	2.2 kW, 13 rpm, 5.2 m^3/h, 4 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		E12	3.0 kW, 22 rpm, 8.9 m^3/h, 4 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		E13	4.0 kW, 26 rpm, 10.5 m^3/h, 4 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		E14	4.0 kW, 32 rpm, 12.9 m^3/h, 4 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		E15	5.5 kW, 37 rpm, 14.9 m^3/h, 4 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		E16	5.5 kW, 46 rpm, 18.5 m^3/h, 2 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		E31	5.5 kW, 8 - 27 rpm, 3.2 - 10.9 m^3/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 m^3/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 m^3/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 m^3/h, 3-65 Hz, 2 bar, (Gear motor, external frequency converter required), 3-phase, 230/400 V AC								
			Hose material								
			0	NR							
			B	NBR							
			E	EPDM							
			A	NBR-A							
				Hydraulic connections							
				I	DIN flange VA DN 65						
				G	Tri-Clamp, VA, 3"						
				H	DIN 11851, VA, NW 65						
				J	DIN flange PP DN 65						
				L	ANSI flange VA 2 1/2"						
				M	ANSI flange PP 2 1/2"						
				Q	DIN flange VA Halar-coated DN 65						
				R	ANSI flange VA Halar-coated 2 1/2"						
					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 rollers			
								Batch controller			
								0	Without controller		
									Special version		
									0	Standard	
									H	Halar-coated housing	
										Vacuum system	
										0	None
										V	With vacuum system
											Approvals
											01 CE mark
											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.

1.3 Peristaltic pumps DULCOFLEX

Identity code Ordering system Peristaltic Pumps DULCOFLEX DFCa 080

DFCa	Type										
	080	DFCa 080, 11.7 l/revolution									
		Drive *									
		000	Without drive unit								
		F11	3.0 kW, 13 rpm, 9.1 m^3/h, (Reduction gear system), 3-phase, 230/400 V AC								
		F12	4.0 kW, 18 rpm, 12.6 m^3/h, (Reduction gear system), 3-phase, 230/400 V AC								
		F13	5.5 kW, 22 rpm, 15.5 m^3/h, (Reduction gear system), 3-phase, 230/400 V AC								
		F14	5.5 kW, 26 rpm, 18.2 m^3/h, (Reduction gear system), 3-phase, 230/400 V AC								
		F15	7.5 kW, 30 rpm, 21.1 m^3/h, (Reduction gear system), 3-phase, 230/400 V AC								
		F16	7.5 kW, 34 rpm, 24.9 m^3/h, (Reduction gear system), 3-phase, 230/400 V AC								
			Hose material								
			0	NR							
			B	NBR							
			E	EPDM							
				Hydraulic connections							
				I	DIN flange VA DN 65						
				J	DIN flange PP DN 65						
				L	ANSI flange VA 2 1/2"						
				M	ANSI flange PP 2 1/2"						
					Base plate						
					0	Base plate, painted steel					
					1	Base plate, stainless steel					
						Leakage sensor					
						0	Without leakage sensor				
						L	With leakage sensor				
						M	As 'L' + relay output				
							Rotor				
							0	Rotor with 2 rollers			
								Batch controller			
								0	Without controller		
									Special version		
									0	Standard	
									H	Halar-coated housing	
										Vacuum system	
										0	None
										V	With vacuum system
											Approvals
											01 CE mark
											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.

1.3.6 Peristaltic Pump DULCOFLEX DFDa

Maximum pump capacities and high pressures

Pump capacity up to 35,000 l/h. Back pressure up to 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 35,000 l/h at back pressures of up to 15 bar.

As an option, with pumps of the DFDa product range, a vacuum device can be used to help the hose to return to its original shape, thereby improving their suction behaviour and ensuring the even feed of highly viscose media.

Your Benefits

- Ideal for pumping pasty, high-viscosity, abrasive and gaseous media
- Self-priming
- Guaranteed not to run dry
- Reversible pumping direction
- Hose materials suitable for various chemicals
- Handling to protect the hose at high pressures

Technical Details

- Hydraulic connector sizes DN 32 – DN 80
- Pump capacity 0.43 - 11.70 l/revolution
- Hose material (fabric-reinforced): NR, NBR, EPDM, NBR-A, Hypalon
- Self-priming up to 8 m water column
- Back pressure up to 15 bar
- Integrated ball bearing housing
- Patented hose clamp
- Cathodic dip coating makes housing resistant to chemicals

Options

- Stainless steel base plate
- Designed as mobile unit
- Various connectors, such as BSP, NPT, Tri-Clamp and DIN 11851
- Pulsation damper
- Leak sensor
- Pump housing with Halar coating (ECTFE)
- Food approval EU 1935/2004. Available with FDA-compliant hose and connectors on request
- For areas at risk from explosion II 2G Ex h IIB T4 Gb
- Pump available: with/without gears / variable speed motor with external fan and PTC resistor / motors with integrated frequency converter

Field of Application

- Water treatment and waste water treatment
- Mining
- Chemical industry
- Paper industry
- Food and beverages

Technical Data

Hose material (fabric-reinforced)	NR, NBR, EPDM, NBR-A, Hypalon
Self-priming	up to 8 m
Back pressure	up to 15 bar
Contact pressure roller / shoes	Shoes

1.3 Peristaltic pumps DULCOFLEX

Type	Delivery rate	Maximum back pressure*	Delivery rate	Inner hose diameter	Max. size of solid particles**	Weight	Connection size
	l/rev	bar	l/h	mm	mm	kg	
DFDa 025	0.30	15	250…800	28	7.0	57	DN 25
DFDa 032	0.62	15	450…1,800	35	8.8	89	DN 32
DFDa 040	1.33	15	1,500…3,500	40	10.0	150	DN 40
DFDa 060	2.90	15	3,000…6,500	55	13.8	252	DN 50
DFDa 070	6.70	15	5,500…12,500	65	16.3	530	DN 65
DFDa 080	11.70	15	8,500…18,500	80	20.0	900	DN 80
DFDa 100	20.00	15	14,500…33,000	100	25.0	1,100	DN 100

* The back pressure can be adjusted up to 15 bar by adding several washers to suit the requirements of the respective application.

** Maximum particle size compared with inner diameter of hose; <25 % for soft solids and <15 % for hard solids.

A Resistance List of hose materials can be found at www.prominent.com.

1.3 Peristaltic pumps DULCOFLEX

Identity Code Ordering System for Peristaltic Pump DULCOFLEX DFDa 025

DFDa	Type										
	025	DFDa 025, 0.3 l/revolution									
		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 DN 25						
				J	DIN flange PP DN 25						
				K	DIN flange PVDF DN 25						
				L	ANSI flange VA DN 25						
					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	None
										V	With vacuum system
											Approvals
											01 CE mark

* The pumps are factory-set to a maximum back pressure of 5 bar, unless the stated pressure is lower. Please state any deviating pressures when ordering.

1.3 Peristaltic pumps DULCOFLEX

Identity Code Ordering System for Peristaltic Pump DULCOFLEX DFDa 032

DFDa	Type										
	032	DFDa 032, 0.625 l/revolution									
		Drive *									
		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								
			Hose material								
			0	NR							
			B	NBR							
			E	EPDM							
				Hydraulic connections							
				I	DIN flange VA DN 32						
				J	DIN flange PP DN 32						
				K	DIN flange PVDF/PTFE DN 32						
				L	ANSI flange VA, 1 1/4"						
					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	None
										V	With vacuum system
											Approvals
											01 CE mark

* The pumps are factory-set to a maximum back pressure of 5 bar, unless the stated pressure is lower. Please state any deviating pressures when ordering.

1.3 Peristaltic pumps DULCOFLEX

Identity Code Ordering System for Peristaltic Pump DULCOFLEX DFDa 040

DFDa	Type										
	040	DFDa 040, 1.33 l/revolution									
		Drive *									
		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								
			Hose material								
			0	NR							
			B	NBR							
			E	EPDM							
				Hydraulic connections							
				I	DIN flange VA DN 40						
				J	DIN flange PP DN 40						
				K	DIN flange PVDF DN 40						
				L	ANSI flange VA, 1 1/2"						
				M	ANSI flange PP 1 1/2"						
				N	ANSI flange PVDF/PTFE 1 1/2"						
					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	None
										V	With vacuum system
											Approvals
											01 CE mark

* The pumps are factory-set to a maximum back pressure of 5 bar, unless the stated pressure is lower. Please state any deviating pressures when ordering.

1.3 Peristaltic pumps DULCOFLEX

Identity Code Ordering System for Peristaltic Pump DULCOFLEX DFDa 060

DFDa	Type										
	060	DFDa 060, 2.9 l/revolution									
		Drive *									
		000	Without drive unit								
		D11	2.2 kW, 22 rpm, 3.8 m^3/h, 5 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		D12	3.0 kW, 26 rpm, 4.5 m^3/h, 5 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		D15	4.0 kW, 32 rpm, 5.6 m^3/h, 5 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		D16	4.0 kW, 37 rpm, 6.4 m^3/h, 5 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		D17	5.5 kW, 47 rpm, 8.2 m^3/h, 5 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		D31	5.5 kW, 10 – 36 rpm, 1.7 – 6.3 m^3/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 m^3/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 m^3/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 m^3/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						
				J	ANSI flange PP DN 50						
				L	ANSI flange VA 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	None
										V	With vacuum system
											Approvals
											01 CE mark

* The pumps are factory-set to a maximum back pressure of 5 bar, unless the stated pressure is lower. Please state any deviating pressures when ordering.

Identity Code Ordering System for Peristaltic Pump DULCOFLEX DFDa 070

DFDa	Type										
	070	DFDa 070, 6.7 l/revolution									
		Drive *									
		000	Without drive unit								
		E11	3.0 kW, 13.5 rpm, 5.4 m^3/h, 5 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		E12	4.0 kW, 18 rpm, 7.2 m^3/h, 7.5 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		E14	5.5 kW, 26 rpm, 10.4 m^3/h, 5 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		E17	7.5 kW, 32 rpm, 12.8 m^3/h, 7.5 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		E18	7.5 kW, 40 rpm, 16 m^3/h, 5 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		E31	7.5 kW, 10 - 36 rpm, 4 - 14.4 m^3/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 m^3/h, 7-65 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 65						
				J	DIN flange PP DN 65						
				L	ANSI flange VA 2 1/2"						
				M	ANSI flange PP 2 1/2"						
				Q	DIN flange VA Halar-coated DN 65						
				R	ANSI flange VA Halar-coated 2 1/2"						
					Base plate						
					0	Base plate, painted steel					
					1	Base plate, stainless steel					
						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	None
										V	With vacuum system
											Approvals
											01 CE mark

* The pumps are factory-set to a maximum back pressure of 5 bar, unless the stated pressure is lower. Please state any deviating pressures when ordering.

1.3 Peristaltic pumps DULCOFLEX

Identity Code Ordering System for Peristaltic Pump DULCOFLEX DFDa 080

DFDa	Type										
	080	DFDa 080, 11.7 l/revolution									
		Drive *									
		000	Without drive unit								
		G11	4 kW, 12 rpm, 8.4 m^3/h, 5 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		G12	5.5 kW, 17 rpm, 11.9 m^3/h, 5 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		G15	7.5 kW, 23 rpm, 16.1 m^3/h, 7.5 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		G16	7.5 kW, 27 rpm, 18.9 m^3/h, 5 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		G17	11 kW, 30 rpm, 21.1 m^3/h, 5 bar, (Reduction gear system), 3-phase, 230/400 V AC								
			Hose material								
			0	NR							
			B	NBR							
			E	EPDM							
				Hydraulic connections							
				I	DIN flange VA DN 80						
				J	DIN flange PP DN 80						
				L	ANSI flange VA 3"						
				M	ANSI flange PP 3"						
				Q	DIN flange VA Halar-coated DN 80						
				R	ANSI flange VA Halar-coated 3"						
					Base plate						
					0	Base plate, painted steel					
						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	
										Vacuum system	
										0	None
										V	With vacuum system
											Approvals
											01 CE mark

* The pumps are factory-set to a maximum back pressure of 5 bar, unless the stated pressure is lower. Please state any deviating pressures when ordering.

Identity Code Ordering System for Peristaltic Pump DULCOFLEX DFDa 100

DFDa	Type										
	100	DFDa 100, 20.0 l/revolution									
		Drive *									
		000	Without drive unit								
		F11	7.5 kW, 12 rpm, 14.4 m^3/h, 5 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		F14	15 kW, 18 rpm, 21.6 m^3/h, 10 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		F15	15 kW, 23 rpm, 27.6 m^3/h, 7.5 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		F16	15 kW, 28 rpm, 33.6 m^3/h, 5 bar, (Reduction gear system), 3-phase, 230/400 V AC								
		F17	18.5 kW, 30 rpm, 36 m^3/h, 5 bar, (Reduction gear system), 3-phase, 230/400 V AC								
			Hose material								
			0	NR							
			B	NBR							
			E	EPDM							
				Hydraulic connections							
				I	DIN flange VA DN 100						
				J	DIN flange PP DN 100						
				L	ANSI flange VA 4"						
				M	ANSI flange PP 4"						
				Q	DIN flange VA Halar-coated DN 100						
				R	ANSI flange VA Halar-coated 4"						
					Base plate						
					0	Base plate, painted steel					
						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	
										Vacuum system	
										0	None
										V	With vacuum system
											Approvals
											01 CE mark

* The pumps are factory-set to a maximum back pressure of 5 bar, unless the stated pressure is lower. Please state any deviating pressures when ordering.

1.3 Peristaltic pumps DULCOFLEX

1.3.7 Spare Parts

Hose lubricant for peristaltic pumps

	Order no.
Hose lubricant 0.5 kg	1037255
Hose lubricant 1.0 kg	1037256

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 NORPRENE tube	1037155
DFBa 010 NBR tube	1037151
DFBa 010 EPDM tube	1037152
DFBa 010 HYPALON tube	1037156
DFBa 010 NBR-A tube	1037154
DFBa 010 NR tube	1037150
DFBa 010 NR-A tube	1037153

Spare Parts for DFBa 013

	Order no.
DFBa 013 NORPRENE tube	1037162
DFBa 013 NBR tube	1037158
DFBa 013 EPDM tube	1037159
DFBa 013 HYPALON tube	1037163
DFBa 013 NBR-A tube	1037161
DFBa 013 NR tube	1037157
DFBa 013 NR-A tube	1037160

Spare Parts for DFBa 016

	Order no.
DFBa 016 NBR-A tube	1037168
DFBa 016 NORPRENE tube	1037169
DFBa 016 NBR tube	1037165
DFBa 016 EPDM tube	1037166
DFBa 016 HYPALON tube	1037171
DFBa 016 NR tube	1037164

Spare Parts for DFBa 019

	Order no.
DFBa 019 TYGON tube	1037172
DFBa 019 NORPRENE tube	1037173

Spare Parts for DFBa 022

	Order no.
DFBa 022 hose NORPRENE	1037181
DFBa 022 NBR tube	1037176
DFBa 022 EPDM tube	1130027
DFBa 022 HYPALON tube	1037182
DFBa 022 NBR-A tube	1130026
DFBa 022 NR tube	1037175

Spare Parts for DFCa 030

	Order no.
DFCa 030 NBR-A tube	1037187
DFCa 030 NBR tube	1037184
DFCa 030 EPDM tube	1037185
DFCa 030 NORPRENE tube	1045073
DFCa 030 NR tube	1037183

Spare Parts for DFCa 040

	Order no.
DFCa 040 NBR-A tube	1037196
DFCa 040 NBR tube	1037193
DFCa 040 EPDM tube	1037194
DFCa 040 NORPRENE tube	1037198
DFCa 040 NR tube	1037192

Spare Parts for DFCa 050

	Order no.
DFCa 050 NBR-A tube	1037204
DFDa 040/DFCa 050 NBR tube	1037201
DFDa 040/DFCa 050 EPDM tube	1037202
DFCa 050 NORPRENE tube	1045084
DFDa 040/DFCa 050 NR tube	1037199

Spare Parts for DFCa 060

	Order no.
DFCa 060 NBR-A tube	1037211
DFCa 060 NBR tube	1037208
DFCa 060 EPDM tube	1037209
DFCa 060 NORPRENE tube	1045085
DFCa 060 NR tube	1037206

Spare Parts for DFCa 070

	Order no.
DFCa 070 NBR-A tube	1037217
DFDa 070/DFCa 070 NBR tube	1037214
DFDa 070/DFCa 070 EPDM tube	1037215
DFDa 070/DFCa 070 NR tube	1037213

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.
DFCa 032 NBR tube	1037226
DFDa 032 EPDM tube	1037227
DFDa 032 NR tube	1037225

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.
DFCa 060 NBR tube	1037237
DFDa 060 EPDM tube	1037238
DFDa 060 NR tube	1037236

Spare Parts for DFDa 070

	Order no.
DFDa 070/DFCa 070 NBR tube	1037214
DFDa 070/DFCa 070 EPDM tube	1037215
DFDa 070/DFCa 070 NR tube	1037213

Spare parts DFCa 080 / DFDa 080

	Order no.
DFCa 080 / DFDa 080 NBR hose	1041678
DFCa 080 / DFDa 080 EPDM hose	1041679
DFCa 080 / DFDa 080 Hose NR	1041677

Spare Parts for DFDa 100

	Order no.
DFCa 100 NBR tube	1037248
DFDa 100 EPDM tube	1037249
DFDa 100 NR tube	1037247

1.4 Chemical Transfer Pumps

1.4.1 Selection Guide

The right accessories offer even more: they increase the performance range, application options and 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:

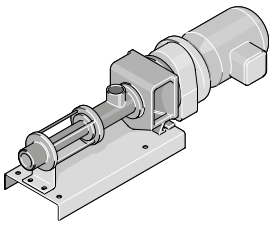
	Capacity range	see page
Eccentric screw pump SPECTRA	up to 12,000 l/h	→134
Centrifugal pump von Taine	up to 22,500 l/h	→136
Air-operated diaphragm pump DUODOS	up to 12,000 l/h, 7 bar	→140
Barrel pump DULCOTRANS	up to 6600 l/h	→144
Rotary lobe pump ROTADOS	25 – 100 m^3/h	→146

1.4 Chemical Transfer Pumps

1.4.2 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 wastewater treatment or sludge dewatering.

The Eccentric Screw Pump SPECTRA has been designed for pumping polymer solutions with a viscosity of up to 5000 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 can be operated via an external frequency converter. Given the motor's IE3 energy efficiency class, it doesn't have an external fan. The pump should be fitted with dry-running protection.

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

Wastewater treatment, sludge dewatering

Without base plate

	Delivery rate at 3 bar l/h	Maximum back pressure bar	Power uptake kW	Order no.
SPECTRA 12/13 F	1.3…13.2	6	0.37	1025285
SPECTRA 12/33 F	3.3…33	12	0.37	1025286
SPECTRA 12/100 F	5…100	12	0.37	1025287
SPECTRA 6/300 F	20…300	6	0.75	1025288
SPECTRA 6/650 F	65…650	3	0.75	1025289
SPECTRA 5/1400 F	140…1,400	4	0.75	1025290
SPECTRA 3/3000 F	300…3,000	2	0.75	1025291
SPECTRA 3/12000 F	2,000…12,000	3	2.20	1025293

With base plate

	Delivery rate at 3 bar l/h	Maximum back pressure bar	Power uptake kW	Order no.
SPECTRA 12/33 FB	3.3…33	12	0.37	1025296
SPECTRA 12/100 FB	5…100	12	0.37	1025297
SPECTRA 6/300 FB	20…300	6	0.75	1025298
SPECTRA 6/650 FB	65…650	3	0.75	1025299
SPECTRA 5/1400 FB	140…1,400	4	0.75	1025300
SPECTRA 3/3000 FB	300…3,000	2	0.75	1025301
SPECTRA 3/6500 FB	500…6,500	3	1.50	1025302

1.4 Chemical Transfer Pumps

Technical Data

Product designation	Weight	Dimensions L x W x H	Housing material	Housing material	Connection on suction/discharge side
	kg	mm			
SPECTRA 12/13 F	24	739 x 200 x 182	Cr Ni Mo 17 – 12 – 2	Cr Ni Mo 17 – 12 – 2	1/2", internal
SPECTRA 12/33 F	24	739 x 200 x 182	Cr Ni Mo 17 – 12 – 2	Cr Ni Mo 17 – 12 – 2	1/2", internal
SPECTRA 12/100 F	24	739 x 200 x 182	Cr Ni Mo 17 – 12 – 2	Cr Ni Mo 17 – 12 – 2	1/2", internal
SPECTRA 6/300 F	26	874 x 223 x 192	Grey cast iron	Cr Ni Mo 17 – 12 – 2	1 1/4", internal
SPECTRA 6/650 F	26	874 x 223 x 192	Grey cast iron	Cr Ni Mo 17 – 12 – 2	1 1/4", internal
SPECTRA 5/1400 F	26	874 x 223 x 192	Grey cast iron	Cr Ni Mo 17 – 12 – 2	1 1/4", internal
SPECTRA 3/3000 F	36	950 x 223 x 193	Grey cast iron	Cr Ni Mo 17 – 12 – 2	1 1/4", internal
SPECTRA 3/12000 F	81	1,487 x 264 x 244	Grey cast iron	Cr Ni Mo 17 – 12 – 2	DN 65, flange
SPECTRA 12/33 FB	28	739 x 220 x 232	Cr Ni Mo 17 – 12 – 2	Cr Ni Mo 17 – 12 – 2	1/2", internal
SPECTRA 12/100 FB	28	739 x 220 x 232	Cr Ni Mo 17 – 12 – 2	Cr Ni Mo 17 – 12 – 2	1/2", internal
SPECTRA 6/300 FB	33	874 x 230 x 242	Grey cast iron	Cr Ni Mo 17 – 12 – 2	1 1/4", internal
SPECTRA 6/650 FB	33	874 x 230 x 242	Grey cast iron	Cr Ni Mo 17 – 12 – 2	1 1/4", internal
SPECTRA 5/1400 FB	33	874 x 230 x 242	Grey cast iron	Cr Ni Mo 17 – 12 – 2	1 1/4", internal
SPECTRA 3/3000 FB	44	950 x 230 x 242	Grey cast iron	Cr Ni Mo 17 – 12 – 2	1 1/4", internal
SPECTRA 3/6500 FB	67	1,172 x 237 x 274	Grey cast iron	Cr Ni Mo 17 – 12 – 2	DN 50, flange

Spare Parts

	Order no.
FKM stator for SPECTRA 12/2	1025306
FKM stator for SPECTRA 12/13	1025307
FKM stator for SPECTRA 12/30, 12/33	1025308
FKM stator for SPECTRA 12/100	1025309
FKM stator for SPECTRA 6/300, 6/650	1025310
FKM stator for SPECTRA 5/1400	1025312
FKM stator for SPECTRA 3/3000	1025313
FKM stator for SPECTRA 3/6500	1025314
FKM stator 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 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 Cr Ni Mo 17 – 12 – 2 for SPECTRA 3/6500	1025324
Rotor Cr Ni Mo 17 – 12 – 2 for SPECTRA 3/12000	1025325
Pin joint spare parts kit SPECTRA 12/2 – 12/100	1025346
Pin joint spare parts kit SPECTRA 6/300 – 5/1400	1025350
Pin joint spare parts kit SPECTRA 3/3000	1025353
Pin joint spare parts kit SPECTRA 3/6500	1025354
Pin joint spare parts kit SPECTRA 3/12000	1025355
Axial face seal spare parts kit SPECTRA 12/2 – 12/100	1025326
Axial face seal spare parts kit SPECTRA 6/300 – 5/1400	1025330
Axial face seal spare parts kit SPECTRA 3/3000	1025333
Axial face seal spare parts kit SPECTRA 3/6500	1025334
Axial face seal spare parts kit SPECTRA 3/12000	1025335

1.4 Chemical Transfer Pumps

1.4.3 Centrifugal Pump von Taine

The safe and high-quality solution when liquid media need to be pumped leak-free.

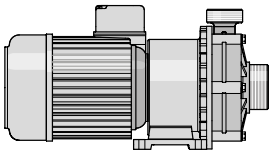
Capacity range up to 22,500 l/h, discharge lift up to 23.5 m WC

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, 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

von Taine, PP/FKM Version

	Feed rate at max. pressure	Feed lift max.	Power uptake	Voltage/frequency	Weight	Order no.
	l/h	m	kW		kg	
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	Feed lift max.	Power uptake	Voltage/frequency	Weight	Order no.
	l/h	m	kW		kg	
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

von Taine, PP/EPDM Version

	Feed rate at max. pressure	Feed lift max.	Power uptake	Voltage/frequency	Weight	Order no.
	l/h	m	kW		kg	
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 2323 PP/EPDM	22,500	23.5	1.50	3~/400 V/50 Hz	17.0	1028566

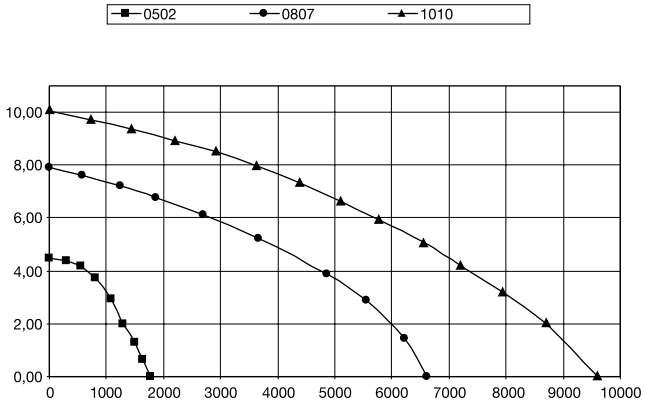
von Taine, PVDF/EPDM Version

	Feed rate at max. pressure	Feed lift max.	Power uptake	Voltage/frequency	Weight	Order no.
	l/h	m	kW		kg	
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 2323 PVDF/EPDM	22,500	23.5	1.50	3~/400 V/50 Hz	17.7	1028572

Parameters For Use

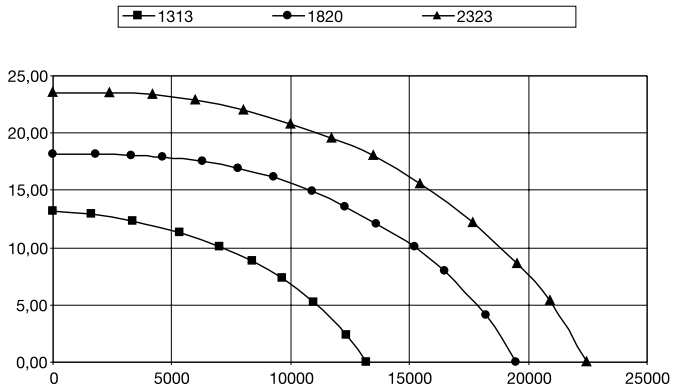
	Medium temperature max.	Max. density	Max. viscosity	Max. system pressure at 20 °C
	°C	kg/dm³	mPas	bar
von Taine 0502 PP/FKM	80	1.25…1.35	20	1.0
von Taine 0807 PP/FKM	80	1.20…1.80	20	2.5
von Taine 1010 PP/FKM	80	1.60…2.00	20	2.5
von Taine 1313 PP/FKM	80	1.60…1.90	20	2.5
von Taine 1820 PP/FKM	80	1.10…1.80	20	5.0
von Taine 2323 PP/FKM	80	1.00…2.00	20	5.0
von Taine 0502 PVDF/FKM	95	1.25…1.35	20	1.0
von Taine 0807 PVDF/FKM	95	1.20…1.80	20	2.5
von Taine 1010 PVDF/FKM	95	1.60…2.00	20	2.5
von Taine 1313 PVDF/FKM	95	1.60…1.90	20	2.5
von Taine 1820 PVDF/FKM	95	1.10…1.80	20	5.0
von Taine 2323 PVDF/FKM	95	1.00…2.00	20	5.0

Delivered quantity [l/h] as a function of the delivery head [m WC]

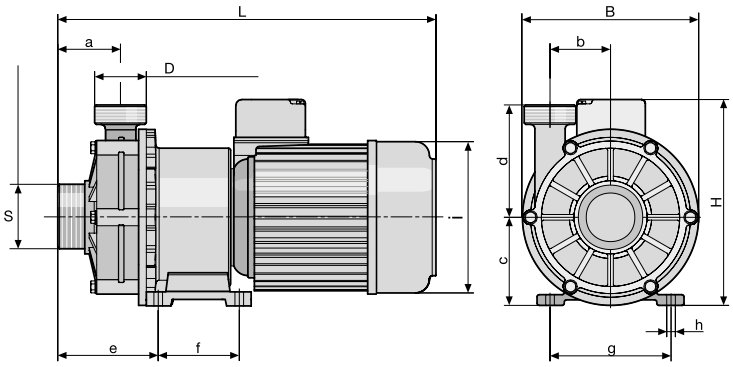


1.4 Chemical Transfer Pumps

Delivered quantity [l/h] as a function of the delivery head [m WC]



Dimensions



		von Taine 0502 PVDF/FKM	von Taine 0807 PVDF/FKM	von Taine 1010 PVDF/FKM	von Taine 1313 PVDF/FKM	von Taine 1820 PVDF/FKM	von Taine 2323 PVDF/FKM
Pressure connector		1"	1 1/4"	1 1/2"	1 1/2"	2"	2"
Suction connector		1 1/4"	1 1/4"	2"	2"	2 1/4"	2 1/4"
Dim. L	mm	240	283	346	350	455	455
Dim. B	mm	120	138	163	163	205	205
Dim. H	mm	145	185	181	191	216	216
Dim. a	mm	37.0	45.0	58.5	58.5	70.0	70.0
Dim. b	mm	29.5	29.5	56.0	56.0	70.0	70.0
Dim. c	mm	60.0	70.0	82.0	82.0	104.5	104.5
Dim. d	mm	65.5	86.0	104.0	104.0	134.5	134.5
Dim. e	mm	129	50	106	106	115	115
Dim. f	mm	78	71	74	74	100	100
Dim. g	mm	91	91	114	114	130	130
Dim. h	mm	6.5	8.5	8.5	8.5	10.0	10.0
Dimension l	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 forr von Taine 0807	1023979
PVDF/FKM liquid end for von Taine 0502	1023994
PVDF/FKM liquid end for von Taine 0807	1023995

	Order no.
PP/EPDM liquid end for von Taine 0502	1028573
PP/EPDM liquid end for von Taine 0807	1028574
PP/EPDM liquid end forvon Taine 1010	1028575
PP/EPDM liquid end for von Taine 1820	1028577
PVDF/EPDMliquid end for von Taine 0807	1028580
PVDF/EPDM liquid end for von Taine 1010	1028581
PVDF/EPDM liquid end for von Taine 1820	1028583
PVDF/EPDM liquid end for von Taine 2323	1028584

1.4 Chemical Transfer Pumps

1.4.4 Air-Operated Diaphragm Pump DUODOS

DUODOS pumps are air-driven double diaphragm transfer pumps. No electrical components are required.

Capacity range up to 12,000 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 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 housing with Santoprene diaphragm, PP valve seats and PTFE valve balls
- PVDF pump housing with PTFE diaphragm, PTFE valve seats and PTFE valve balls

DUODOS PP

	Housing material	Material of diaphragms, valves, slide rod	Delivery rate (2 bar differential pressure) l/h	Order no.
DUODOS UP03 PPS	PP	Santoprene, PP, PTFE	0…1,200	1139366
DUODOS UP05 PPS	PP	Santoprene, PP, PTFE	0…3,000	1139367
DUODOS UP10 PPS	PP	Santoprene, PP	0…12,000	1139369

DUODOS PVDF

	Housing material	Material of diaphragms, valves, slide rod	Delivery rate (2 bar differential pressure) l/h	Order no.
DUODOS UP03 PVT	PVDF	PTFE	0…1,200	1136624
DUODOS UP05 PVT	PVDF	PTFE	0…3,000	1139368
DUODOS UP10 PVT	PVDF	PTFE	0…12,000	1139372

Parameters For Use

	Min. temperature °C	Max. temperature °C	Max. viscosity mPas	Order no.
DUODOS UP03 PPS	10	80	200	1139366
DUODOS UP05 PPS	10	80	200	1139367
DUODOS UP10 PPS	10	80	200	1139369
DUODOS UP03 PVT	-13	93	200	1136624
DUODOS UP05 PVT	-13	93	200	1139368
DUODOS UP10 PVT	-13	93	200	1139372

Spare parts kit for diaphragms:

	Order no.
Diaphragm spare parts kit for DUODOS UP03 PPS	1139374
Diaphragm spare parts kit for DUODOS UP03 PVT	1139375
Diaphragm spare parts kit for DUODOS UP05 PPS	1139377
Diaphragm spare parts kit for DUODOS UP05 PVT	1139376
Diaphragm spare parts kit for DUODOS UP10 PPS	1139379
Diaphragm spare parts kit for DUODOS UP10 PVT	1139378

Spare parts kit valve balls:

	Order no.
Spare parts set valve balls for DUODOS UP03 PPS	1139380
Spare parts set valve balls for DUODOS UP03 PVT	1139383
Spare parts set valve balls for DUODOS UP05 PPS	1139385
Spare parts set valve balls for DUODOS UP05 PVT	1139386
Spare parts set valve balls for DUODOS UP10 PPS	1139387
Spare parts set valve balls for DUODOS UP10 PVT	1139388

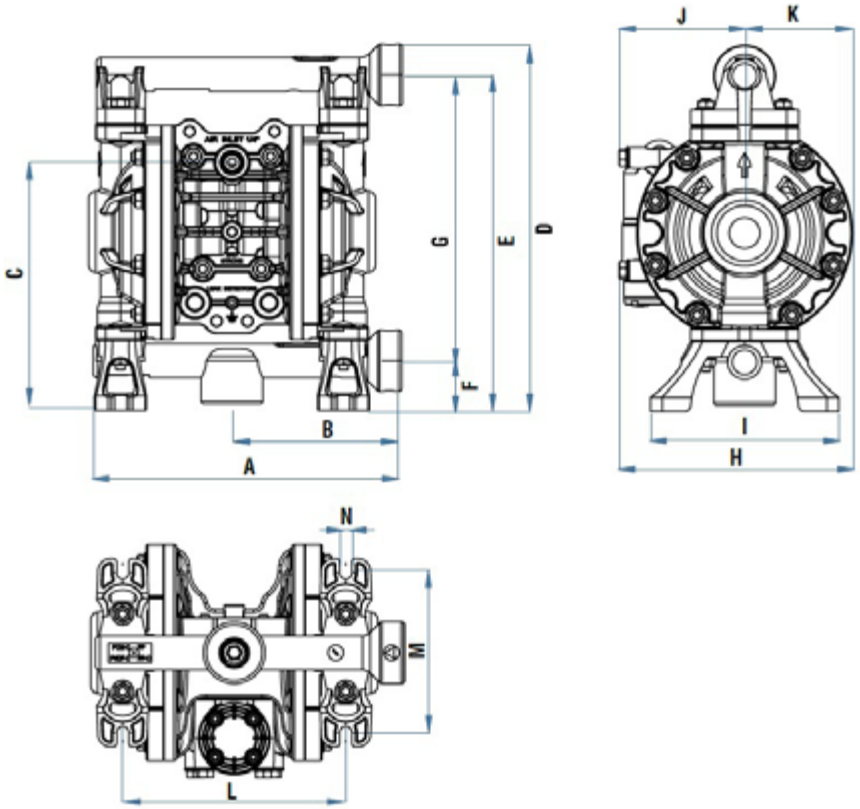
Spare parts kit for valve balls:

	Order no.
Liquid end spare parts kit for DUODOS UP03 PPS	1103390
Liquid end spare parts kit for DUODOS UP05 PPS	1103391
Spare parts kit, liquid end for DUODOS UP10	1103392

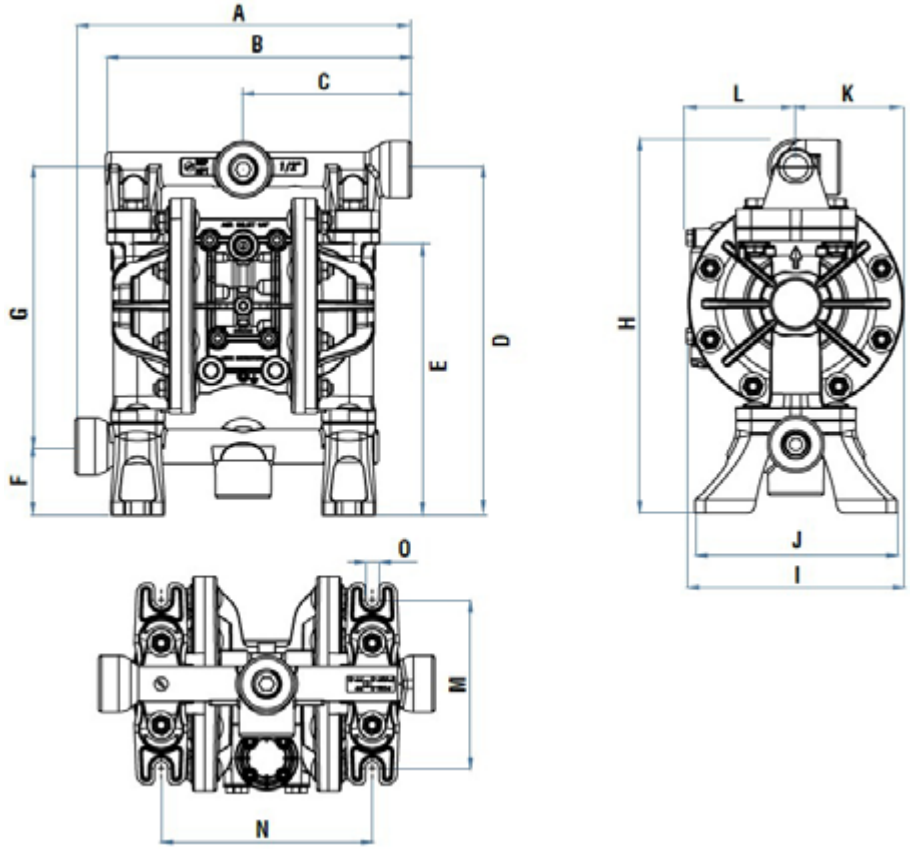
Dimensions

		DUODOS UP03	DUODOS UP05	DUODOS UP10
Dim. A	mm	202	250	399
Dim. B	mm	142	228	386
Dimension C	mm	161	125	250
Dim. D	mm	237	257	135
Dim. E	mm	217	200	108
Dimension F	mm	32	51	214
Dim. G	mm	185	206	146
Dim. H	mm	151	278	211
Dimension I	mm	122	161	59
Dimension J	mm	81	150	363
Dim. K	mm	70	80	280
Dim. L	mm	145	81	255
Dim. M	mm	104	125	128
Dimension N	mm	-	157	11
Dimension O	mm	-	10	-
Pressure connector		3/8" BSP (F)	1/2" BSP (F)	1" BSP (F)
Suction connector		3/8" BSP (F)	1/2" BSP (F)	1" BSP (F)
Differential pressure	bar	2	2	2
Air connection		1/4" NPSM (F)	1/4" NPSM (F)	1/2" NPSM (F)
Weight (PP)	kg	1.8	2.7	10.2
Weight (PVDF)	kg	2.3	3.0	13.5

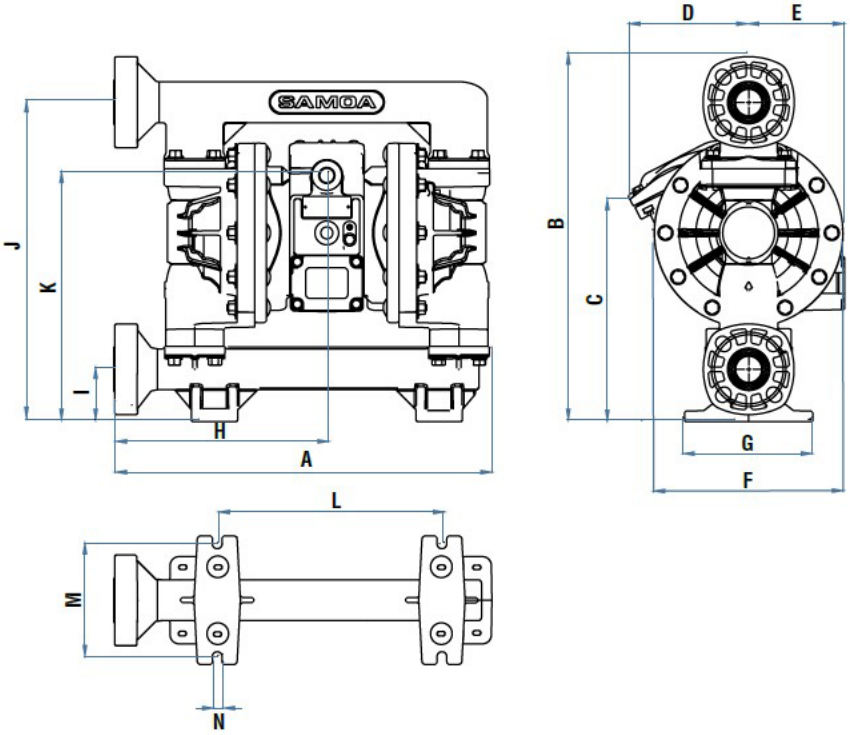
DUODOS UP03



DUODOS UP05



DUODOS UP10

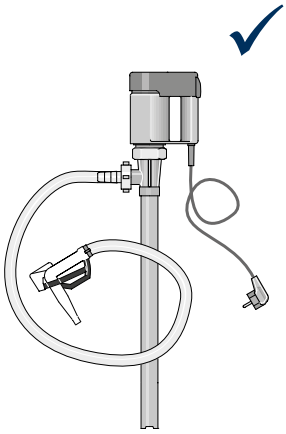


1.4 Chemical Transfer Pumps

1.4.5 Barrel pump DULCOTRANS

Barrel pumps are the ideal solution for moving liquids.

Pump capacity according to size from 2,800 – 6,600 l/h



The field of application of DULCOTRANS depends on the chemical resistance of the materials used.

DULCOTRANS is used for bottling, draining and transferring liquids from canisters, hobbocks, drums, tanks and containers.

Included in the scope of delivery: 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.

Materials in Contact with the Medium

The following materials come into contact with the liquids:

	PP design	PVDF design
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

DULCOTRANS PP Version

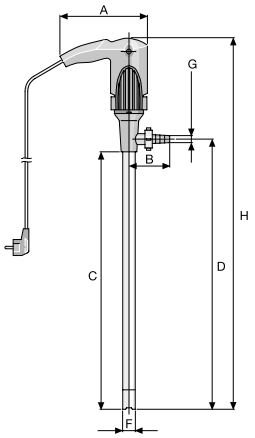
	Feed rate at max. pressure l/h	Feed lift max. m	Order no.
DULCOTRANS 32/700	2.800 *	10	1098490
DULCOTRANS 41/1000	5.400 *	11	1098491
DULCOTRANS 41/1200	6.600 *	16	1098489

* The pump capacity is understood as including the hose and pump nozzle, determined using water at room temperature as the medium.

DULCOTRANS PVDF Version

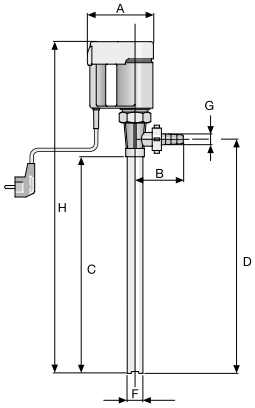
	Feed rate at max. pressure l/h	Feed lift max. m	Order no.
DULCOTRANS 32/700 PVDF	2.800 *	10	1098492
DULCOTRANS 41/1000 PVDF	5.400 *	11	1098493
DULCOTRANS 41/1200 PVDF	6.600 *	16	1098494

* The pump capacity is understood as including the hose and pump nozzle, determined using water at room temperature as the medium.



Technical Data

		DULCOTRANS 32/700	DULCOTRANS 41/1000	DULCOTRANS 41/1200
Max. density	kg/dm³	1.3	1.5	1.9
Max. viscosity	mPas	400	600	1,000
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		1~/230 V/50 Hz	1~/230 V/50 Hz	1~/230 V/50 Hz
Under-voltage cut-out		with	with	with
Overvoltage safety switch		with	with	with
Temperature monitoring		none	none	none
Speed control		none	none	none
Connecting cable		5 m, EUR plug	5 m, EUR plug	5 m, EUR plug
Drum adapter		G 2"	G 2"	G 2"
Weight	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

		DULCOTRANS 32/700	DULCOTRANS 41/1000	DULCOTRANS 41/1200
Dim. A	mm	170	220	220
Dimension C	mm	656	996	1,016
Dim. D	mm	700	1,000	1,200
Dimension F	mm	32	41	41
Dim. G	d	19	25	25
Dim. B	mm	90	90	90
Dim. H	mm	986	1,315	1,515

Spare parts kits for barrel pump DULCOTRANS

	Order no.
Spare parts kit for DULCOTRANS 32/700 PP	1098502
Spare parts kit for DULCOTRANS 32/700 PVDF	1098503
Spare parts kit for DULCOTRANS 41/1000 PP	1098500
Spare parts kit for DULCOTRANS 41/1000 PVDF	1098498
Spare parts kit for DULCOTRANS 41/1200 PP	1098501
Spare parts kit for DULCOTRANS 41/1200 PVDF	1098499

1.4.6 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

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

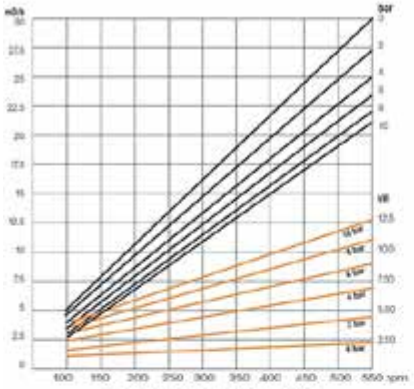
Field of Application

- Wastewater and sludge pumping
- Food and beverage industry

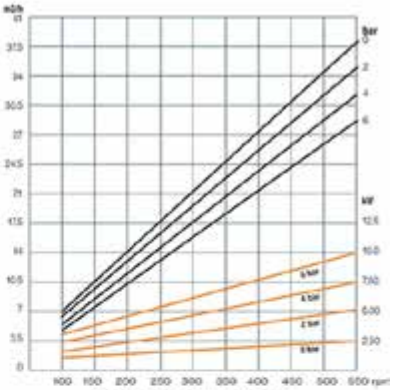
Rotary Lobe Pump ROTADOS

	Flange	Max. pump volume m³/h	Max. pressure bar	Weight kg	Order no.
ROTADOS type 070	DN 65	25	10	80	on request
ROTADOS type 090	DN 80	35	6	85	on request
ROTADOS type 100	DN 100	80	8	185	on request
ROTADOS type 125	DN 125	100	4	195	on request

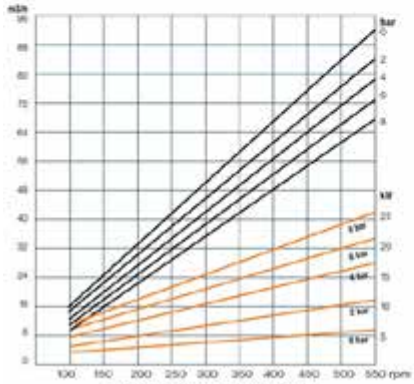
Characteristic curves type 070/090/100/125



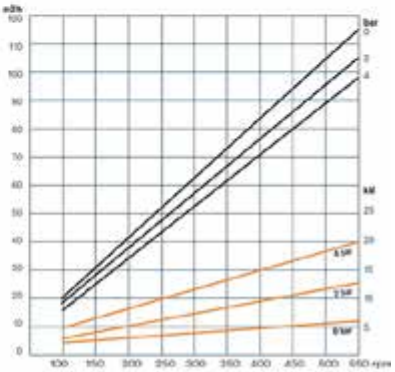
RODADOS TYP 070



RODADOS TYP 090



RODADOS TYP 100



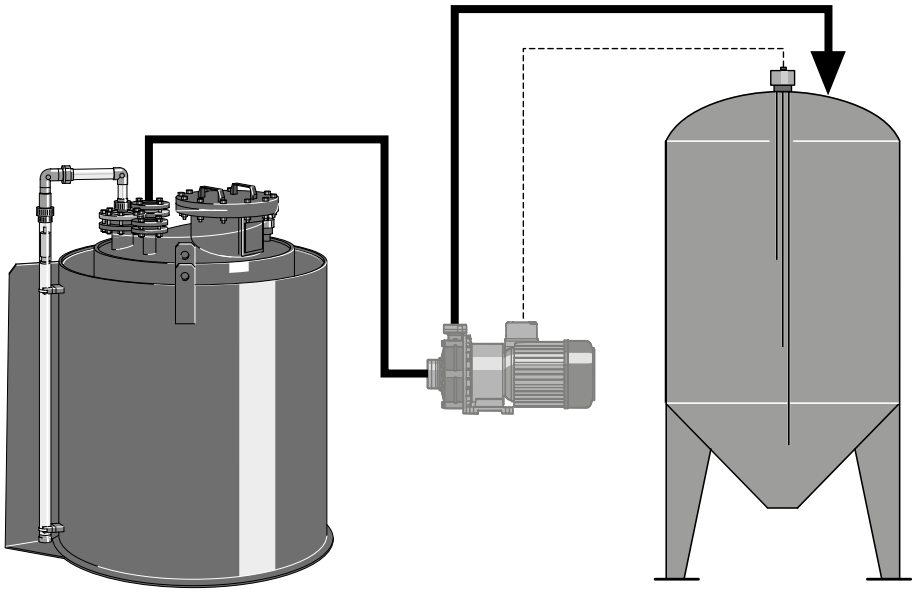
RODADOS TYP 125

1.4.7 Application Examples

Filling a Day Tank

Product:	**Centrifugal pump von Taine**
Feed chemical:	**32 % hydrochloric acid**
Industry:	**Food**
Application:	**Transfer of chemicals**

The von Taine centrifugal pump is automatically switched on and off via the level control in the day pump.



Problems and requirements

- Automatic filling of day tanks with 32 % hydrochloric acid

Operating conditions

- Installation indoors
- Automatic pump control

Notes on use

- Centrifugal pump controlled via a level control in dosing tank
- The centrifugal pump is not self-priming and requires a feed.
- Compatibility of material with hydrochloric acid should be noted (PP, PVDF; EPDM).
- Ensure that centrifugal pump has dry-running protection

Solution

- von Taine 1820 PP centrifugal pump
- Day tank with level control

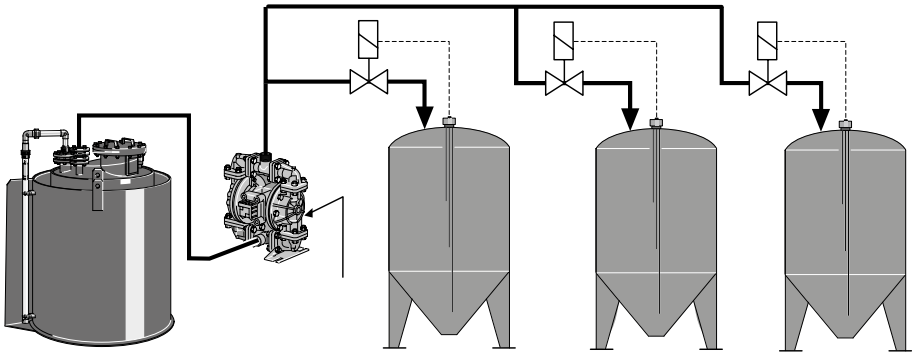
Benefits

- Safe handling of hydrochloric acid
- Fully automatic operation with minimum personnel and maintenance requirements

Filling Day Tanks

Product:	**Air-operated diaphragm pump DUO-DOS**
Feed chemical:	**Cleaning agent**
Industry:	**Laundry**
Application:	**Transfer of chemicals**

The level control in the day tanks opens the solenoid valves when the level falls below the minimum level. As back pressure in the dosing line falls, the DUODOS pump starts to pump automatically and switches off when the maximum level is reached in the tank and the solenoid valve has been closed.



Problems and requirements

- Automatic filling of day tanks with cleaning agent

Operating conditions

- Compressed air is needed to operate the air-operated diaphragm pump
- Automatic filling of day tanks

Notes on use

- Air-operated diaphragm pump controlled via a level control in dosing tank
- Air-operated diaphragm pump is self-priming.
- Also suitable for viscous media

Solution

- DUODOS air-operated diaphragm pump
- Day tank with level control

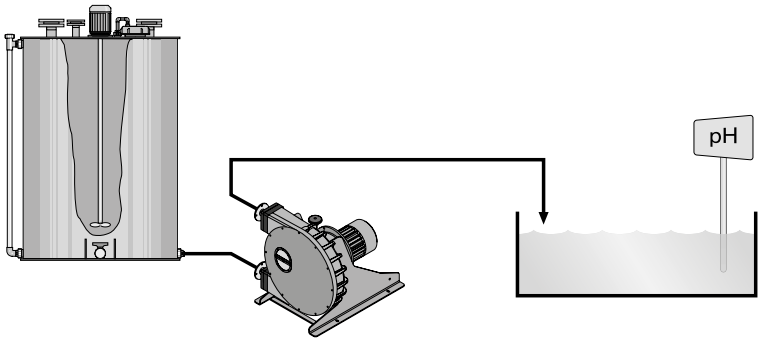
Benefits

- Simplified logistics thanks to central storage
- Fully automatic operation with minimum personnel and maintenance requirements

1.4 Chemical Transfer Pumps

Deacidification of Potable Water

Product:	**Peristaltic pump DULCOFLEX**
Feed chemical:	**10 % lime milk**
Industry:	**Drinking water**
Application:	**Feed of abrasive chemicals**



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

- DULCOFLEX 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 Accessories for Low-Pressure Metering Pumps

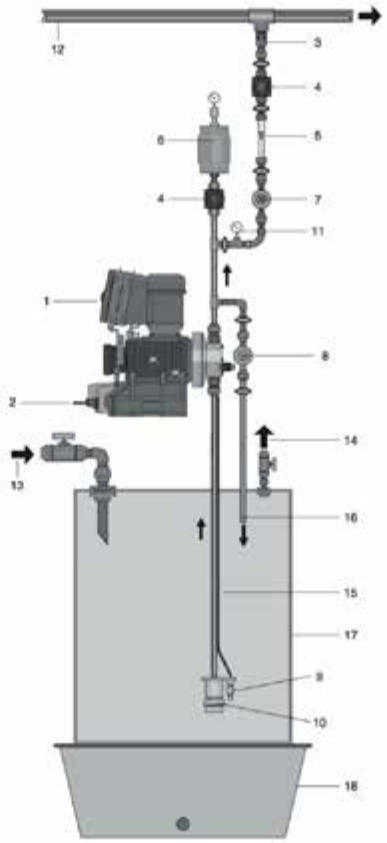
1.5.1 How to find the right accessories

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. The 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 Bleeding
15 Suction line
16 Bypass
17 Dosing tank
18 Collecting pan



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 the chemical as the suction line remains filled.
- **No. 17/18 Dosing tanks and collecting pans:** PE 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.

1.5 Accessories for Low-Pressure Metering Pumps

1.5.2 Measurement Technology Accessories

1.5.2.1 Radar Level Sensor DULCOLEVEL

Chemicals management is now child's play

NEW

With the new radar level sensor DULCOLEVEL, your chemical inventory management is child's play.

DULCOLEVEL makes it easier for you to manage your chemical stock levels. ProMinent's measuring range covers tank volumes of between 30 and 1500 litres (IBCs) or any tanks with a maximum height of 15 metres, with a precision of ±5 mm.

The sensor can be seamlessly integrated into your existing metering system. This is particularly easy with a tank and metering pump from ProMinent. With the mobile app, you can see the liquid level and all the data you need instantly even when working remotely. The Bluetooth connection means you don't need any additional cables, making retrofitting in existing applications simple and inexpensive.

DULCOLEVEL also improves your levels of health and safety at work. The measurements and sensor configuration are contactless, there is no contact with harmful media.

Your Benefits

- Seamless integration into ProMinent systems and ProMinent pumps (at present gamma/ X and gamma/ XL - in the future DULCOFLEX DFXa, sigma/ X)
- The Bluetooth connection makes simple retrofitting in existing systems possible
- Pump and tank values can be accessed from anywhere in the world via a secure IIOT platform (DULCONNEX Inventory Management)
- Meet all compliance standards by means of 24/7 reports on media consumed (DULCONNEX Inventory Management)

Technical Details

- Output of the liquid level via 0/4...20 mA standard signal possible
- Bluetooth coupling and data transmission from the sensor to the pump
- Connectivity to all common PLC standards (Profibus, Profinet, Modbus, CAN open) in combination with the pump
- Configuration and commissioning via mobile app "DULCONNEX Blue", downloadable free of charge from the App Store (iOS) or Play Store (Android)
- Measurement of any tanks up to a height of 15 m, with a precision of ±5 mm
  - A cut-out for the radar sensor is required for steel tanks
  - For plastic tanks, the DULCOEVEL can measure through max. 30 mm of plastic without a cut-out. For plastics with carbon content or glass fiber, there may be restrictions, in which case a cut-out is also required for measurement
- Simple clamp-on system for tanks or IBCs
- Integration into the IIoT-based fluid management system DULCONNEX. Direct connection via DULCONNEX BLE Gateway possible.
- No (liquid level) tank configuration required in combination with ProMinent tanks 30 to 1,500 l (IBCs)

	Order no.
DULCOLEVEL with 4-wire cable and output signal 4...20 mA (for connection to a PLC), operating manual EN, DE, FR	1124074
DULCOLEVEL with 4-wire cable and output signal 4...20 mA (for connection to a PLC), operating manual EN, ES, IT, PT	1125746
DULCOLEVEL with EU power supply, operating manual EN, DE, FR (only works in combination with a pump with Bluetooth interface)	1124075
DULCOLEVEL with EU power supply, operating manual EN, ES, IT, PT (only works in combination with a pump with Bluetooth interface)	1125745

Accessories

	Order no.
Tank fastening plate for DULCOLEVEL	1119041
IBC and wall mounting for DULCOLEVEL	1130661
Canister attachment for DULCOLEVEL	1110018
DULCONNEX API	1136479

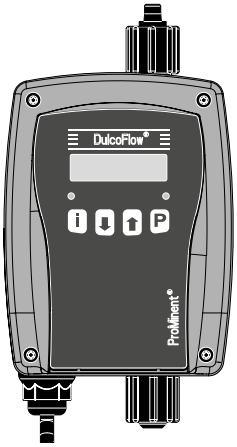
1.5.2.2 Flow Meter DULCOFLOW

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

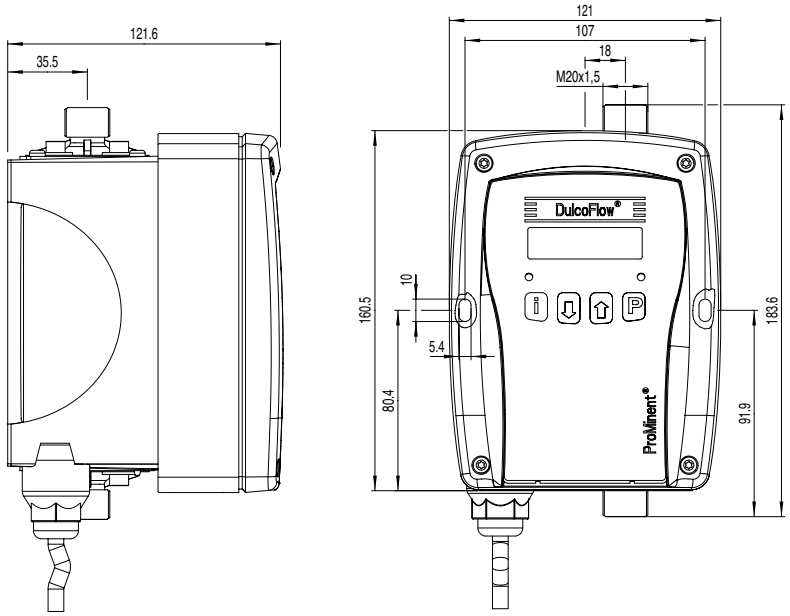
Technical Details

- 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 ± 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.**

Dimensional drawing of DULCOFLOW



Dimensional drawing of DULCOFLOW – dimensions in mm

Technical Data

	Type 05	Type 08
Max. operating pressure	16 bar	16 bar
Smallest measurable stroke volume	Approx. 0.03 ml/stroke, pulsing	Approx. 0.05 ml/stroke, pulsing
Min. pressure	3 bar	3 bar
Contact output with individual stroke detection	Open collector, 1 contact per stroke	Open collector, 1 contact per stroke
Frequency output	Open collector, up to 10 kHz at maximum flow (parametrisable)	Open collector, up to 10 kHz at maximum flow (parametrisable)
Analogue output	Parameters can be set, max. load 400 Ω	Parameters can be set, max. load 400 Ω
Type	beta 1000 – 0413/0713, gamma/ X 1602 – 0414/0715, gamma/ XL 1608 – 1612	beta 1604 – 0420, gamma/ X 1604 – 0424, gamma/ XL 1020 – 0450, Sigma/ 1

Identity Code Ordering System for Ultrasonic Flow Meter DULCOFLOW

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						
		Seal material						
		E	EPDM					
		V	FKM A					
		T	PTFE					
		F	FDA-compliant					
			Hydraulic connections					
			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 5 m		
					2	Contact output 2 m		
					3	Current output 5 m and contact output 2 m		
						Version		
						0	With ProMinent logo	
							Accessories	
							0	No accessories

1.5 Accessories for Low-Pressure Metering Pumps

1.5.3 Hydraulic/Mechanical Accessories

1.5.3.1 Foot Valves for Low-Pressure Metering Pumps

Foot valves are fitted at the end of the suction line to prevent contamination and backflow.

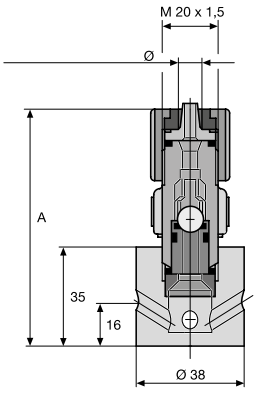
Foot valves include filter mesh and ball check – ceramic weight with connectors 6/4, 8/5, 12/6, 12/9.

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!

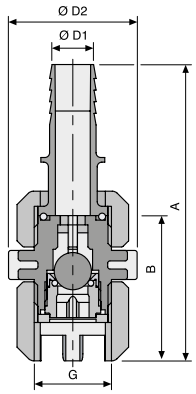
PPE foot valves



pk_1_038

Housing made of PP, seals made of EPDM.

Connection size	oØ x iØ mm	Dim. 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



P_AC_0206_SW

Housing made of PP, seals made of EPDM, with filter meshes and ball check (glass).

DN 10, DN 15 With union nut and hose sleeve
DN 20 to DN 40 No connection parts

	Dim. G	Dim. B mm	Ø D2 mm	Dim. 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	-	0	1006434
DN 40	2 1/4	113	90	-	-	1004204

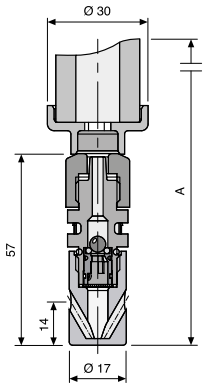
* PVDF/Teflon design

PPB Foot Valve

Housing made of PP, seals made of FKM.

Connection size	oØ x iØ mm	Dim. 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

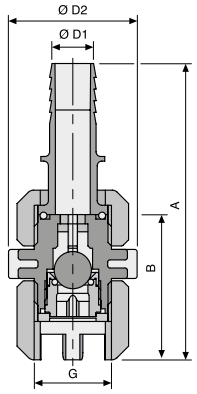
PCB Foot Valve



P_AC_0207_SW

Housing made of PVC, seals made of FKM.

Connection size	oØ x iØ mm	Dim. 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



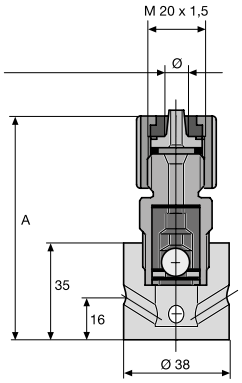
Housing made of PP, seals made of FKM, with filter meshes and ball check (glass).

DN 10, DN 15 With union nut and hose sleeve
DN 20 to DN 40 No connection parts

	Dim. G	Dim. B mm	Ø D2 mm	Dim. 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	-	0	1006434
DN 40	2 1/4	108	83	-	-	1029475

* PVDF/Teflon design

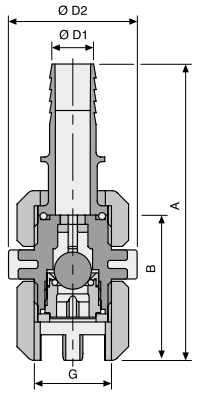
PVT Foot Valve



pk_1_040

Housing made of PVDF, seals made of PTFE.

Connection size	oØ x iØ mm	Dimen-sion 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

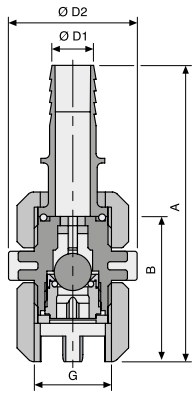


Housing made of PVDF, ball seat made of PTFE + 25% carbon, PTFE seals, with filter mesh and ball check (ceramic DN 10 - 20, glass DN 25 - 40).

DN 10, DN 15 With union nut and hose sleeve
DN 20 to DN 40 No connection parts

	Dim. G	Dim. B mm	Ø D2 mm	Dim. 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	-	0	1006434
DN 40	2 1/4	108	83	-	-	1029475

1.5 Accessories for Low-Pressure Metering Pumps



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:

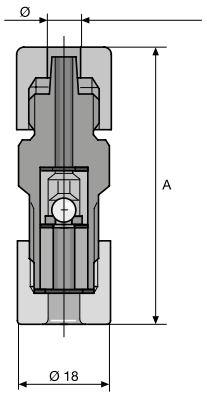
- Material PTFE: FDA No. 21 CFR § 177.1550
- Material PVDF: FDA No. 21 CFR § 177.2510

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 sleeve
DN 20 to DN 40 No connection parts

	Dim. G	Dim. B mm	Ø D2 mm	Dim. 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

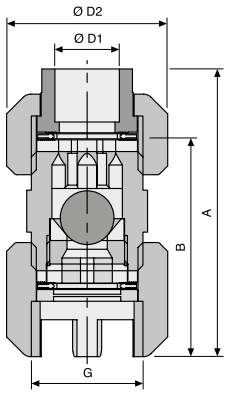
Foot Valve TTT



pk_1_039

Housing made of PTFE, seals made of PTFE. With 6/4, 8/5, 12/6 and 12/9 connectors with ceramic weight.

Connection size	oØ x iØ mm	Dim. 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



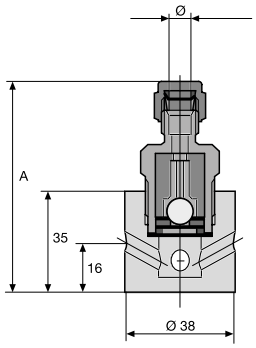
Housing made of PTFE, seals made of PTFE, with filter meshes and ball check (ceramic).

DN 10, DN 15 With union nut and insert
DN 20 to DN 40 No connection parts

	Dim. G	Dim. B mm	Ø D2 mm	Dim. 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	-	0	1006434
DN 40	2 1/4	116	89	-	-	1004205

* PVDF/Teflon design

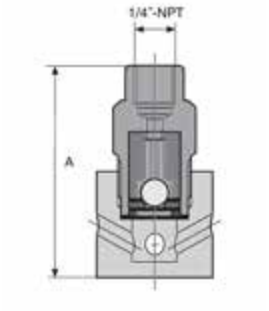
Foot Valve SST



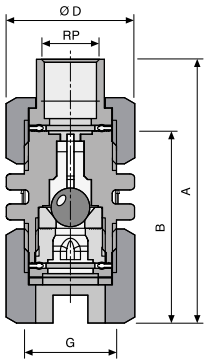
P_AC_0229_SW1

Housing made of stainless steel no. 1.4404, seals made of PTFE. 6/4, 8/5, 12/9 hose connectors require a support insert.

Connection size	oØ x iØ mm	Dim. 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

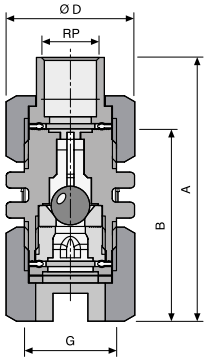


Housing made of SS, PTFE + 25% ball seat, PTFE seals, with filter meshes and ball check (1.4571/1.4581).

DN 10, DN 15 With union nut and insert
DN 20 to DN 40 No connection parts

	Dim. G	Dim. A mm	B mm	Dim. 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:

- PTFE material: FDA No. 21 CFR § 177.1550
- PVDF material: FDA No. 21 CFR § 177.2510

Housing made of SS, ball seat 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 insert
DN 20 to DN 40 No connection parts

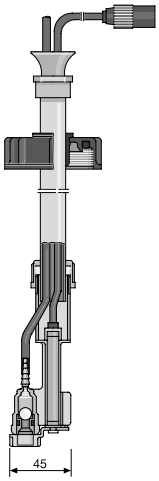
	Dim. G	Dim. A mm	B mm	Dim. Rp	Ø D mm	Order no.
DN 10	3/4	75	56	3/8	37	1078275
DN 15	1	83	59	1/2	48	1078289
DN 20	1 1/4	-	73	-	55	1078290
DN 25	1 1/2	-	82	-	63	1078291

1.5 Accessories for Low-Pressure Metering Pumps

1.5.3.2 Suction lances and suction assemblies for solenoid-driven metering pumps

Note
We are happy to provide suction lances without a level switch as well as suction lances with a single-stage level switch on request.

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 connector, height-adjustable Ø 50 mm screw cap and 2 m suction line. Length 640 mm.

Switching mode when liquid level low: 2 x N/C

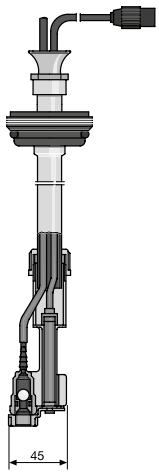
Suitable for metering pumps of the beta, gamma/ X, gamma/ XL and Dulcoflex DF4a (6 x 4) product ranges.

Note: For tank openings with Ø 44, the required screw cap Ø 44 is available as an individual part and can be swapped for the screw cap Ø 50 by the customer.

Material	PPE	PCB
Support pipe and foot valve	PP	PVC
Seals and valve ball	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 stopper and 3 m suction line. Length 1,000 mm.

Switching mode when liquid level low: 2 x N/C

Suitable for metering pumps of the beta, gamma/ X and gamma/ XL product ranges.

Note: Adapters for other threads are available on request

Material	PPE	PCB
Support pipe and foot valve	PP	PVC
Seals and valve ball	EPDM	FKM
Hose	PE	Soft PVC

Material	Length mm	Hose oØ x iØ mm	For tank	Order no.
PPE	1,000	6 x 4	200 l	802279
PPE	1,000	8 x 5	200 l	802280
PPE	1,000	12 x 9	200 l	790374
PCB	1,000	6 x 4	200 l	802079
PCB	1,000	8 x 5	200 l	802080
PCB	1,000	12 x 9	200 l	790373

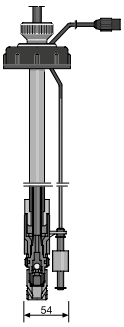
Suction lances for IBC containers

Suction lance for 300 – 1000-litre IBC container with 150 mm container lid. Hose length 5 m, level switch 5 m with round connector.

Material	Hose oØ x iØ	Hose	Order no.
PC/FKM	6 x 4	PVC flexible	1081925
PC/FKM	8 x 5	PVC flexible	1081923
PC/FKM	12 x 9	PVC flexible	1081920
PP/EPDM	6 x 4	PE	1081924
PP/EPDM	8 x 5	PE	1081922
PP/EPDM	12 x 9	PE	1081921

Suitable for metering pumps of the beta, gamma/ X, gamma/ XL and DULCOFLEX DFXa product ranges.

Suction lance with two-stage level switch for 60-litre canister, fixed length, gas-tight



Variable suction lance with two-stage level switch for connection to 60 litre canister, gas-tight, comprising a support pipe, foot valve, level switch with round connector, Ø 55 mm screw cap and 2 m suction line. Length 560 mm. Design with vent valve and bleed valve.

Switching mode when liquid level low: 2 x N/C

Suitable for metering pumps of the beta, gamma/ X and gamma/ XL product ranges.

Material	PPE	PCB
Support pipe and foot valve	PP	PVC
Seals and valve ball	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.

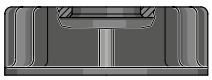
Note: A matching connector kit for hose 8/6 to standard 6/4, 8/5 and 12/9 connectors is included in the scope of delivery.

Switch mode when liquid level low: 2 x N/C

Suitable for metering pumps of the beta, gamma/ X and gamma/ XL product ranges using a 2 m level sensor cable, order no. 707715.

Material	
Support pipe and foot valve	PVDF
Seals and valve ball	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

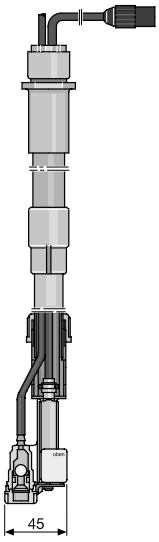


pk_1_066

Screw Cap

For container openings with Ø 44, the required screw cap Ø 44 is available as an individual part and can be swapped for the screw cap Ø 50 by the customer.

	Order no.
Ø 44 screw cap	811626



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 suction line, or 3 m suction line for 1,000 litre tanks. Adjustable length.

For 1,500-litre tanks, fixed length with 3 m suction line.

Switching mode when liquid level low: 2 x N/C

Suitable for metering pumps of the beta, gamma/ X and gamma/ XL product ranges.

Material	PPE	PCB
Support pipe and foot valve	PP	PVC
Seals and valve ball	EPDM	FKM
Hose	PE	Soft PVC

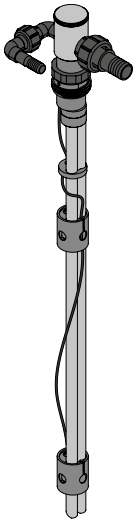
Material	Long support pipe mm	Hose oØ x iØ mm	For tank	Order no.
PPE	375 – 550	6 x 4	35, 60 l	790365
PPE	375 – 550	8 x 5	35, 60 l	790366
PPE	375 – 550	12 x 9	35, 60 l	790367
PPE	655 – 1.060	6 x 4	100–500 l	790368
PPE	655 – 1.060	8 x 5	100–500 l	790369
PPE	655 – 1.060	12 x 9	100–500 l	790370
PPE	1.085 – 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

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

1.5.3.3 Suction lances and suction assemblies for motor-driven metering pumps



A Overall length
B Immersion depth
C Diameter of the immersion pipe
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 tank height. In addition, the suction tube length can easily be shortened by the customer. A PTFE ball check 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 sleeves in DN 10, DN 15, DN 20, DN 25 (not for canisters) plus FKM seal form part of the scope of delivery.

Return connector is not supplied ready mounted. Fittings and pressure hose sleeves 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 place a separate order for the level signal cable for connection to ProMinent metering pumps or a PLC or terminal box.

Tank connection: 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 → 209

Version	Dim. A	Dim. B	Dim. C	Dim. D			Order no.
	mm	mm	mm	mm	mm	mm	
For 20-litre canister	542	405	41	100	250	200	1039206
For 20 – 60-litre canister	584	447	41	100	300	200	1038817
For 200-litre drum	1,072	935	51	50	700	700	1039397
For container IBC	1,162	1,025	51	50	800	800	1039399

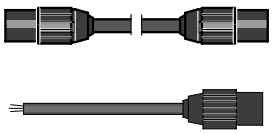
PPE universal suction lance, 'physiologically safe' design

The universal suction lance is also available as a 'Physiologically safe (FDA) in respect of wetted materials' design.

Version	Dim. A	Dim. B	Dim. C	Dim. D			Order no.
	mm	mm	mm	mm	mm	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.

1.5 Accessories for Low-Pressure Metering Pumps



P_AC_0243_SW

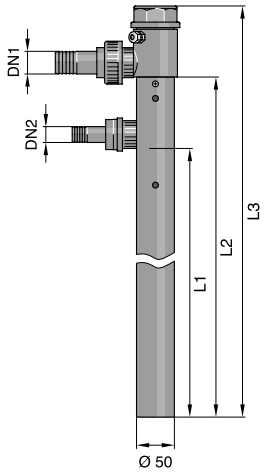
Level sensor cable for connecting universal suction lance and motor-driven, solenoid and peristaltic metering pumps

To connect the level switch of the universal suction lance to metering pumps from the sigma, beta, gamma/ X, gamma/ XL, DULCOFLEX DFXa and DULCOFLEX DFYa product ranges or to the superordinate system (e.g. PCS).

Suitable for PPE universal suction lance for motor-driven, solenoid and peristaltic metering pumps →163

	Lead 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

Suction lance with two-stage level switch



Suction lance with two-stage level switch in PVC protective tube Ø 50 with check valve in DN 10-DN 25, flap valve in DN 32 (valve is not removable).

For sizes DN 10/15 and DN 20/25, connector components for both sizes plus a dummy panel for the return line are included in the scope of supply. A return line is not available for suction lances of size DN 32. Barrel suction lances are fitted with a barrel lid.

2-stage level switch is wired to a terminal in the head.

Level sensor cable must be ordered separately.

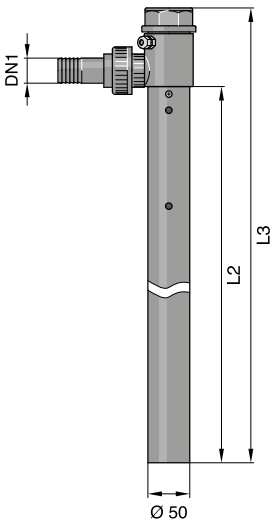
Special designs (materials, functions, Dytex adhesive etc.) are available on request.

Reed cable with round 3-pin connector, PE

Caution: The product contains adhesive joints with Tangit. Please note the resistance of Tangit adhesive.

Suction lance for 200 l/600 l drum

Version	Suction connector DN 1	Return DN 2	Seals	L1	L2	L3	Order no.
				mm	mm	mm	
PCB	10/15	10/15	FKM A	1,000	1,100	1,200	1037748
PCE	10/15	10/15	EPDM	1,000	1,100	1,200	1037749
PCB	20/25	20/25	FKM A	1,000	1,100	1,200	1037750
PCE	20/25	20/25	EPDM	1,000	1,100	1,200	1037751
PCB	32	-	FKM A	-	1,100	1,200	1037752
PCE	32	-	EPDM	-	1,100	1,200	1037753



L1: Length up to return
L2: Length up to suction connector
L3: Overall length

Suction lance for 1,000 l container

Version	Suction connector DN 1	Return DN 2	Seals	L1	L2	L3	Order no.
				mm	mm	mm	
PCB	10/15	10/15	FKM A	1,200	1,300	1,400	1037722
PCE	10/15	10/15	EPDM	1,200	1,300	1,400	1037723
PCB	20/25	20/25	FKM A	1,200	1,300	1,400	1037744
PCE	20/25	20/25	EPDM	1,200	1,300	1,400	1037745
PCB	32	-	FKM A	-	1,300	1,400	1037746
PCE	32	-	EPDM	-	1,300	1,400	1037747

L1: Length up to return
L2: Length up to suction connector
L3: Overall length

Reed cable with 3-pin round plug, PE

P_AC_0243_SW

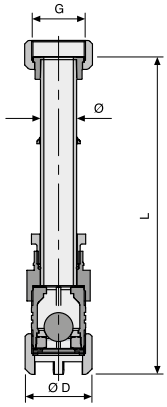
For metering pumps from the sigma, beta, gamma/ X, gamma/ XL, DULCOFLEX DFXa and DULCOFLEX DFYa product ranges with 3-pin round connector and 3-wire cable with open end for level control.

Suitable for suction lance for motor-driven, solenoid and peristaltic metering pumps →164

Lead length m	Order no.
2	1030334
3	1030335
5	1030336

Suction assembly PPE for tanks up to 1,500 litres

Connector size	Dim. G	Tank contents l	Diameter Ø mm	Diameter Ø D mm	Dim. 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-shaped composite seal, can be used.

Suction assembly PCB for tanks up to 1,500 litres

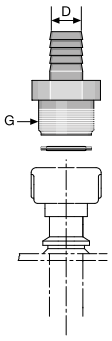
Connector size	Dim. G	Tank contents l	Diameter Ø mm	Diameter Ø D mm	Dim. L mm	Order no.
DN 10	3/4	1,000	20	47	1,340	790387
DN 15	1	1,000	20	47	1,320	790391
DN 20	1 1/4	1,000	25	55	1,345	790392
DN 25	1 1/2	1,000	32	60	1,315	790393
DN 32	2	1,000	40	74	1,170	1005525
DN 10	3/4	1,500	20	47	1,830	1077555

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-shaped composite seal, can be used.

Important: The product contains connections bonded with Tangit. Always note the durability of Tangit adhesive.

Intake Fitting – Hose Connection Kit

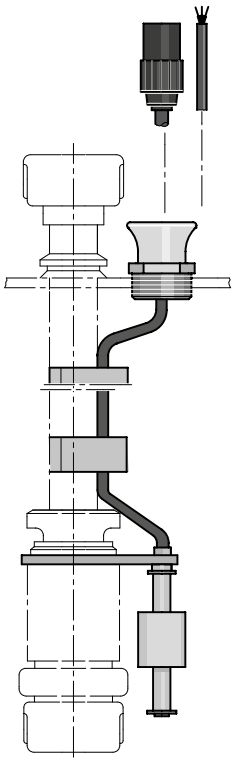


Comprising PVDF screw-in nozzle and a PTFE-shaped composite seal.

Suitable for PPE suction assembly for 1000 l tank

Connector size	Material	Dim. G	Diameter Ø D mm	Order no.
DN 10	PVDF	3/4	16	1029486
DN 15	PVDF	1	20	1029487
DN 20	PVDF	1 1/4	25	1029488
DN 25	PVDF	1 1/2	32	1029489
DN 32	PVDF	2	40	1029490

1.5 Accessories for Low-Pressure Metering Pumps



Level Switch Kit Complete, PVDF, Two-Stage with Round Connector or Lead

The level switch set can be ordered in conjunction with the DN 10 - DN 32 suction assemblies.

For level monitoring in the supply tank, two-stage with pre-warning alarm message and switch-off of the metering pump after a further 30 mm reduction in level.

Switching mode when liquid level low: 2 x N/C

Technical data:

Max. switching voltage: 24 V

Switching current: 0.5 A

Switching power: 5 W/5 VA

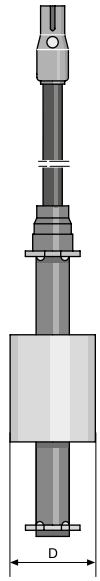
Temperature range: -10 °C to 65 °C

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.

Connector size	Version	Lead 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 10/15	with lead	5	1034883
DN 20	with lead	5	1034884
DN 25	with lead	5	1034885
DN 32	with lead	5	1034886



Level switch, single-stage with flat plug

Single-stage level switch with flat plug for level monitoring in the supply tank.

Suitable for metering pumps of the D_4a product range.

Technical data

Max. switching voltage 24 V

Switching current 0.5 A

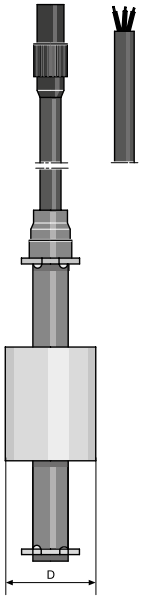
Switching power 5 W/5 VA

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



Two-Stage Float Switch

Two-stage level switch for level monitoring in the supply tank with advance warning - alarm message and shutdown of the metering pump after a further 30 mm drop in level.

With 3-pin round plug for direct connector to the metering pump or with 3 leads, e.g. in conjunction with relay control.

Switching mode for liquid level low: 2 x N/C contacts

Suitable for Metering Pumps of the beta, gamma/ X and gamma/ XL product ranges.

Technical data

Max. switching voltage: 24 V DC, Switching current: 0.5 A, Switching power: 5 W/5 VA,

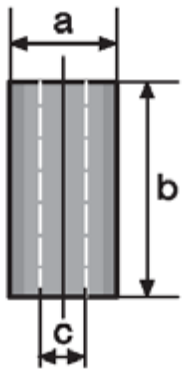
Temperature range: - 10 °C to 65 °C, Degree of protection IP 67.

Material	PVDF/PE	PVDF/PVDF
Level switch	PVDF	PVDF
Float	PE foamed	PVDF
Cable	PE	PE

Material		Lead length m	Order no.
PVDF/PE	Round plug	2	1031604
PVDF/PE	Round plug	5	1031606
PVDF/PE	Open end	2	1031607
PVDF/PE	Open end	5	1031609
PVDF/PVDF	Round plug	2	1034697
PVDF/PVDF	Round plug	5	1034698
PVDF/PVDF	Open end	2	1034699
PVDF/PVDF	Open end	5	1034700

Cable assignment on 3-wire cable:

Colour	Function
black	Ground
blue	Minimum pre-warning
brown	Minimum limit stop



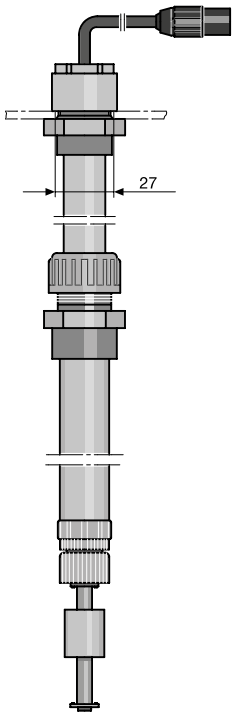
Ceramic Weight for Vertical Fixing of Float Switch

	Ø A mm	Dim. B mm	Ø C mm	Weight g	Version	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

13 x 27 mm slot

With the two-stage level switch with round connector, the weight is slid on from below after the float is removed.

1.5 Accessories for Low-Pressure Metering Pumps



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	Float switch	Order no.
PCB	350…550	two-stage with round connector	802010
PCB	660…1,160	two-stage with round connector	802011
PCB	350…550	single-stage with flat plug	801727
PCB	660…1,160	single-stage with flat plug	801728

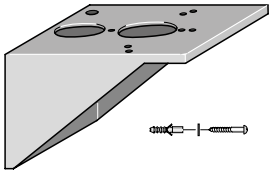
Extension Lead, 3-Core

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

1.5.3.4 Brackets and adapter plates for low-pressure metering pumps

PPE Wall Mounting Bracket



pk_1_092

pk_1_094

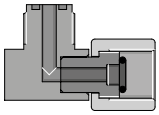
Wall bracket made of glass fiber reinforced plastic PPE for the collector of Metering Pumps, including mounting material.

Size 1:
Suitable for Metering Pumps of the product range: alpha, beta/ 4, beta/ 5, CONCEPT PLUS
Dimensions: (L x W x H) 208 x 120 x 140 mm

Size 2:
Suitable for Metering Pumps of the product range: beta/ X, gamma/ X,gamma/ XL, Dulcoflex DFXa, Sigma/ 1, Vario
Dimensions: (L x W x H) 282 x 120 x 140 mm

	Fig.	Order no.
Size 1	pk_1_092	810164
Size 2	pk_1_094	1139337

PVC Right-Angled Threaded Connector

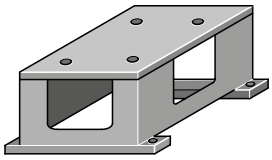


pk_1_083

For mounting a multifunctional valve on a self-bleeding dosing head design of the beta, gamma/ X or gamma/ XL product ranges

	Material	Order no.
PCE Version	PVC/EPDM	1003472
PCB Version	PC/FKM	1003318

PP Foot Bracket

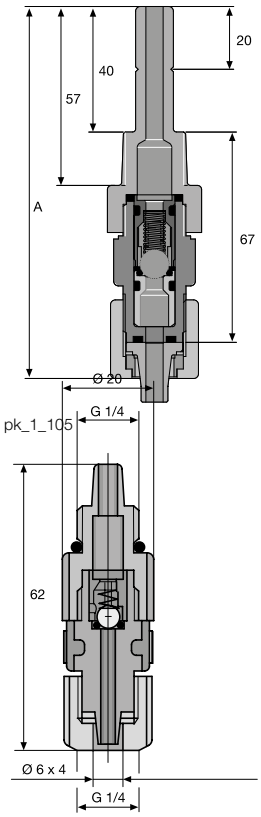


For mounting metering pump, includes fixings. Material PP.

Measurements: L x W x H 250 x 160 x 150 mm

	Order no.
PP foot brackets	809910

1.5.3.5 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 back-flow 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.

Connection size	oØ x iØ mm	Dim. 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

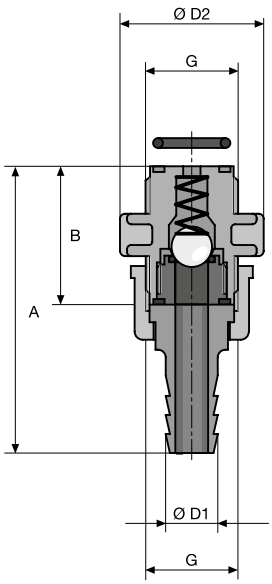
* Valve spring made from stainless steel 1.4571, priming pressure approx. 0.8 bar

Application when using an appropriate dosing line

25 °C – max. operating pressure 16 bar

45 °C – max. operating pressure 9 bar

PPE Injection Valve



pk_2_029

PP housing, EPDM seals with spring-loaded ball check (glass), priming pressure approx. 0.5 bar.

DN 10, DN 15 With union nut and hose sleeve
DN 20 to DN 40 No connection parts

	Dim. G	Dim. B mm	Ø D2 mm	Dim. 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

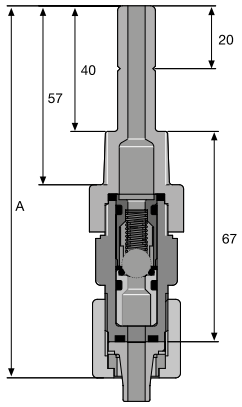
* PVDF/Teflon design

Application

25 °C - max. operating pressure 16 bar

50 °C - max. operating pressure 9 bar

PPB Injection Valve



PP housing, FKM seals with spring-loaded non-return ball, prepressure approx. 0.5 bar.

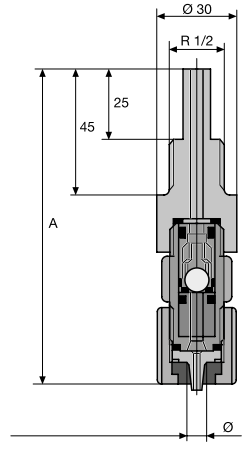
Connection size	oØ x iØ mm	Dim. A mm	Fig.	Order no.
6/4 - R 1/2 for PE/PTFE pipe	6 x 4	119	pk_1_105	924682
8/5 - R 1/2 for PE/PTFE pipe	8 x 5	119	pk_1_105	924687
12/9 - R 1/2 for PE/PTFE pipe	12 x 9	119	pk_1_105	924688
10/4 - R 1/2 for PVC hose	10 x 4	119	pk_1_105	1002921
12/6 - R 1/2 for PVC hose	12 x 6	119	pk_1_105	924689

Application when using an appropriate dosing line

25 °C – max. operating pressure 16 bar

45 °C – max. operating pressure 9 bar

PP/PTFE Injection Valve



pk_1_046

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).

Connection size	oØ x iØ mm	Dim. 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

Application when using an appropriate dosing line

25 °C – max. operating pressure 16 bar

45 °C – max. operating pressure 9 bar

1.5 Accessories for Low-Pressure Metering Pumps

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.

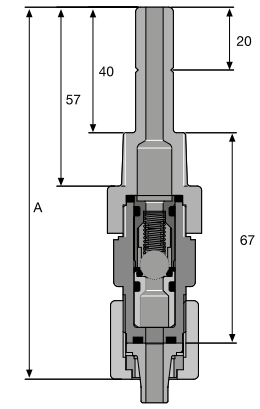
	oØ x iØ mm	Fig.	Order no.
6/4 - R 1/2 for PE/PTFE pipe	6 x 4	pk_1_046	809450
8/5 - R 1/2 for PE/PTFE pipe	8 x 5	pk_1_046	809451
12/9 - R 1/2 for PE/PTFE pipe	12 x 9	pk_1_046	809452
10/4 - R 1/2 for PVC hose	10 x 4	pk_1_046	1002924
12/6 - R 1/2 for PVC hose	12 x 6	pk_1_046	809453

Application when using an appropriate dosing line

25 °C – max. operating pressure 16 bar

45 °C – max. operating pressure 7 bar

PCB Injection Valve



pk_1_105

PVC housing, FKM seals, with Hastelloy C spring-loaded check ball, priming pressure approx. 0.5 bar, with extra-long screw-in fitting.

Connection size	oØ x iØ mm	Dim. 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

* Valve spring made from stainless steel 1.4571, priming pressure approx. 0.8 bar

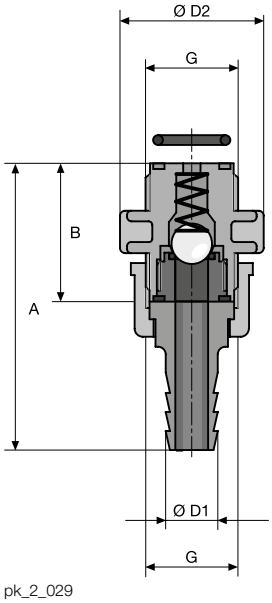
Application when using appropriate metering line

25 °C – max. operating pressure 25 bar for 8/4 design

25 °C – max. operating pressure 16 bar

45 °C – max. operating pressure 7 bar

PCB Injection Valve



pk_2_029

PVC housing, FKM seals with spring-loaded ball check (glass), priming pressure approx. 0.5 bar.

DN 10, DN 15 With union nut and hose sleeve
DN 20 to DN 40 No connection parts

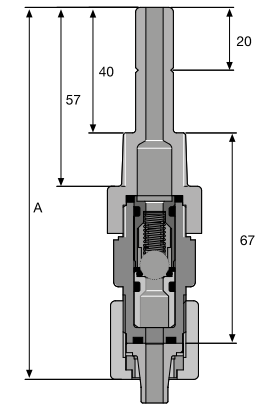
	Dim. G	Dim. B mm	Ø D2 mm	Dim. A mm	Ø D1 mm	Order no.
DN 10	3/4	41	40	83	16	809460
DN 15	1	43	47	108	20	924520
DN 20	1 1/4	55	55	-	-	803712
DN 25	1 1/2	60	58	-	-	803713
DN 32 *	2	68	70	-	-	1002783
DN 40	2 1/4	85	84	-	-	804760

* PVDF/Teflon design

Application

25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 7 bar



pk_1_105

PVT Injection Valve and PVT FDA Injection Valve

PVDF housing, PTFE seals, with Hastelloy C spring-loaded ball check, priming pressure approx. 0.5 bar, with extra-long screw-in fitting. In the FDA-compliant design, the spring is made from 1.4571.

Connection size	oØ x iØ mm	Dim. 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
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

Application when using appropriate metering line

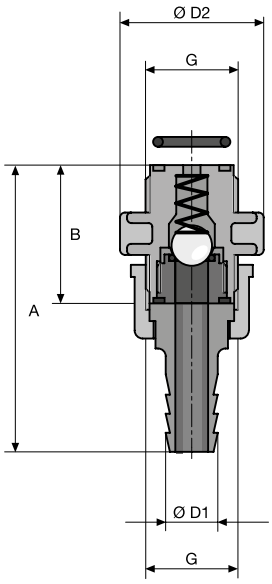
25 °C – max. operating pressure 25 bar for 8x4 design

25 °C – max. operating pressure 20 bar for 6x3 design

25 °C – max. operating pressure 16 bar

45 °C – max. operating pressure 12 bar

PVT Injection Valve



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.

	Dim. G	Dim. B mm	Ø D2 mm	Dim. 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

Application

25 °C - max. operating pressure 16 bar

65 °C - max. operating pressure 10 bar

PVT-FDA Injection Valve

'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

PVDF housing, PTFE seals, with spring-loaded ball check (ceramic), priming pressure approx. 0.5 bar.

DN 10, DN 15 With union nut and hose sleeve
DN 20 to DN 40 No connection parts

	Dim. G	Dim. B mm	Ø D2 mm	Dim. 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

Application

25 °C - max. operating pressure 16 bar

65 °C - max. operating pressure 10 bar

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.

	Dim. A mm	Fig.	Order no.
Universal connector, R 1/2	119	pk_1_105	1044653

Application when using appropriate metering line

25 °C – max. operating pressure 25 bar for 8x4 design

25 °C – max. operating pressure 20 bar for 6x3 design

25 °C – max. operating pressure 16 bar

45 °C – max. operating pressure 12 bar

PVT Injection Valve with FEP-coated Spring

Injection valve, 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 spring-loaded ball check with FEP-coated spring, priming pressure approx. 1 bar, with extra-long screw-in fitting.

	Dimension A mm	Fig.	Order no.
Universal connector, R 1/2	119	pk_1_105	1110471

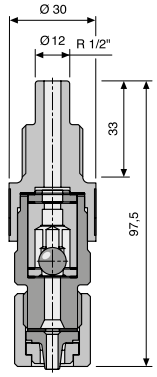
Application when using appropriate metering line

25 °C – max. operating pressure 25 bar for 8x4 design

25 °C – max. operating pressure 20 bar for 6x3 design

25 °C – max. operating pressure 16 bar

45 °C – max. operating pressure 12 bar



P_AC_0184_SW

TTT Injection Valve

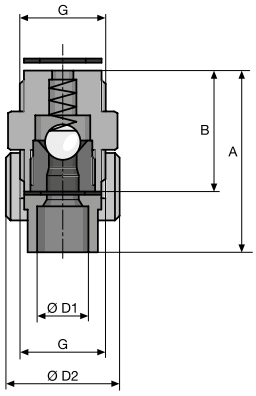
Vertical installation from below. With ball check, without spring. Valve spring (Order No. 469404) can be retro-fitted. Body and seals made of PTFE.

Connection size	oØ x iØ mm	Dim. 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

Application when using an appropriate dosing line

25 °C – max. operating pressure 10 bar

45 °C – max. operating pressure 5 bar



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

	Dim. G	Dim. B mm	Ø D2 mm	Dim. 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

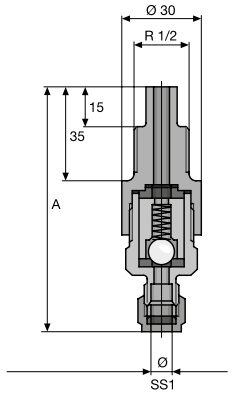
* PVDF/Teflon design

Application

25 °C - max. operating pressure 10 bar

90 °C - max. operating pressure 5 bar

1.5 Accessories for Low-Pressure Metering Pumps



pk_1_032_1

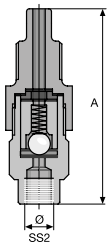
SST Injection Valve

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.

Connection size	oØ x iØ mm	Dim. 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

Application when using an appropriate dosing line

45 °C – max. operating pressure 30 bar

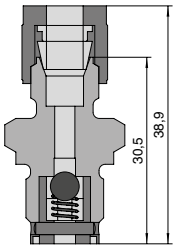


pk_1_032_2

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

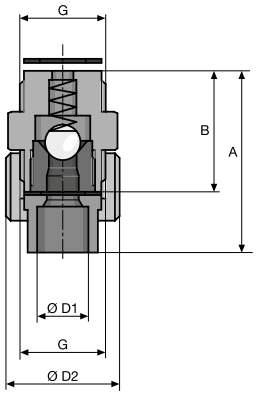


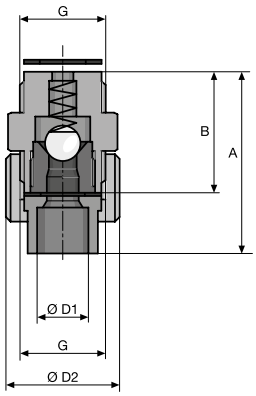
P_AC_0253_SW

	Dim. G	Max. pressure bar	Dim. B mm	Diameter Ø D2 mm	Dim. A mm	Diameter Ø D1 mm	Order no.
DN 10	3/4	320	38	36	55	10	809463
DN 15	1	240	43	48	63	15	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

Application

90 °C - max. operating pressure, see table





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.

Application

90 °C - max. operating pressure, see table

	Dim. G	Max. pressure bar	Dim. B mm	Diameter Ø D2 mm	Dim. A mm	Diameter Ø D1 mm	Order no.
DN 10	3/4	320	38	36	55	10	1078251
DN 15	1	240	43	48	63	15	1078252
DN 20	1 1/4	130	55	55	-	-	1078266
DN 25	1 1/2	70	60	58	-	-	1078267

DN 10, DN 15	With union nut and insert
DN 20 to DN 40	No connection parts

Potable water injection valve

ProMinent's potable water injection valve meets all the requirements of § 17 of the German Drinking Water Directive and is therefore ideal for use in the supply of potable water. The valve is designed such that micro-organisms are not able to form in impermissible concentrations and substances harmful to health cannot enter the water. The valve can be used with all ProMinent metering pumps and for all feed chemicals commonly used in potable water, such as phosphate, silicate, chlorine, pH correction agents or flocculants. When setting up new systems or maintaining old ones, an injection valve compliant with § 17 of the German Drinking Water Directive is mandatory for German potable water.

Material: PVC-U, silicone

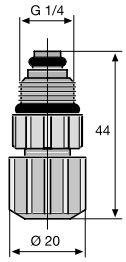
Valve springs	Thread	Hose connection	Max. pressure bar	Opening pressure bar	Order no.
Hastelloy C	R 1/2"	M 20 x 1.5 universal	16	0.9…1.0	1119846
Tantalum	R 1/2"	M 20 x 1.5 universal	16	0.9…1.0	1120092
Hastelloy C	R 3/4"	G 3/4"	10	0.5…0.6	1119848
Hastelloy C	R 1"	G 1"	10	0.6…0.7	1119849
Hastelloy C	R 1 1/4"	G 1 1/4"	10	0.4	1119885
Hastelloy C	R 1 1/2"	G 1 1/2"	10	0.4	1119888

Important:
Injection valves are not absolutely leak-tight shut-off devices. Take appropriate precautions when handling hazardous media.

1.5 Accessories for Low-Pressure Metering Pumps

PPB Injection Valve O-Ring Loaded

PP body, FKM seals. Priming pressure approx. 0.5 bar.



P_AC_0008_SW

	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

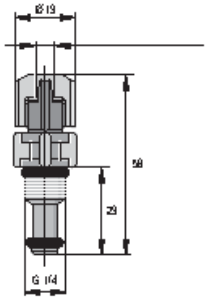
Application when using an appropriate dosing line

25 °C – max. operating pressure 16 bar

45 °C – max. operating pressure 9 bar

PCB Injection Valve O-Ring Loaded

PVC body, FKM seals, priming pressure approx. 0.5 bar.



P_AC_0009_SW

	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

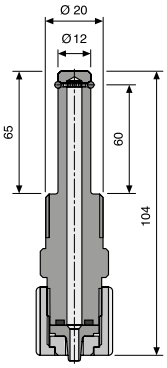
Application when using an appropriate dosing line

25 °C – max. operating pressure 16 bar

45 °C – max. operating pressure 7 bar

PTFE Injection Valve O-Ring Loaded

PTFE housing, FKM seals.



P_AC_0183_SW

Connection size	oØ x iØ mm	Dim. 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

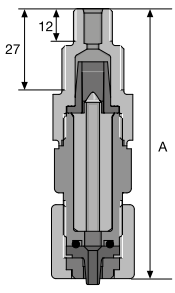
Application when using appropriate metering line

25 °C – max. operating pressure 10 bar

45 °C – max. operating pressure 6 bar

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.



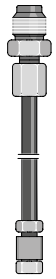
pk_1_070

Connection size	oØ x iØ mm	Dim. 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

Application when using appropriate metering line

25 °C – max. operating pressure 2 bar

45 °C – max. operating pressure 2 bar



pk_1_049

Metering connector for hot water up to 200 °C

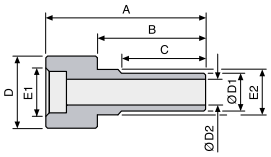
Consists of stainless steel 1.4404 injection valve, 1 m stainless steel 1.4571 discharge line and threaded connector with reinforcing sleeve for connection of PE/PTFE pipe to stainless steel pipe.

Connection size	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

Operating pressure max. 40 bar

Please note the pressure and temperature limits of the hoses you wish to connect up.
Do not isolate metering connector for hot water, cooling section must be retained.

PVDF Metering Valve Adapter



For the installation of injection valves into pipework with straight unions. The adapter extends into the pipework or storage tank and can be adjusted (shortened) to various cross-sections. Direct contact between the chemicals being metered and the wall can be avoided by installing the adapter. Metering into the centre of the pipework improves how the metering solution is mixed and other aspects.

Material: PVDF

Application

25 °C - max. operating pressure 16 bar

65 °C - max. operating pressure 10 bar

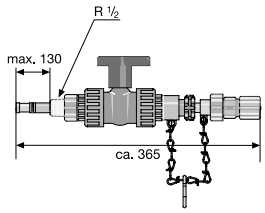
G1	Dim. G	Dim. A	Dim. B	Dimension C	Diameter Ø D	Ø D1	Ø D2	Order no.
		mm	mm	mm	mm	mm	mm	
Rp 3/4	R 3/4	93	63	49	32	22	15	1022052
Rp 1	R 1	95	65	50	41	27	18	1022053
G 1 1/4	G 1 1/4 A *	150	119	104	50	27	18	1040722
G 1 1/2	G 1 1/2 A *	171	135	118	60	31	20	1040723

* In the kit with 1 x FKM and 1 x EPDM O-ring.

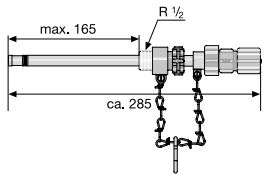
1.5 Accessories for Low-Pressure Metering Pumps

1.5.3.6 Injection Lances, Non-Return Valves for Low-Pressure Metering Pumps

PPE Injection Lance



pk_1_007

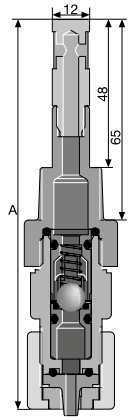


pk_1_062

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.

Version	Seals	Max. pressure bar	Fig.	Order no.
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

Short Injection Lance



P_AC_0020_SW

Injection lance with universal connector kit, thereby enabling various hose sizes from 6/4 to 12/9 to be connected. Hastelloy C spring, ceramic ball and silicone hose. Material of screwed socket: PVDF.

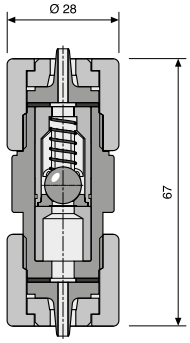
Application when using an appropriate dosing line

25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 12 bar

Version	Material, valve body	Max. pressure bar	Seals	Dim. A mm	Fig.	Order no.
PPE	PP	16	EPDM	126	P_AC_0020_SW	1028383
PCB Version	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



P_AC_0181_SW

With connector kit on both sides for installation in the hose line

With ball check, spring-loaded with Hastelloy C spring, priming pressure approx. 0.5 bar

PVDF housing, PTFE seals

The use of different connector kits allows hoses of various sizes between 6/4 and 12/9 to be joined together.

Application when using appropriate metering line

25 °C – max. operating pressure 16 bar

45 °C – max. operating pressure 12 bar

Connection size	oØ x iØ mm	Dim. 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

1.5.3.7 Back Pressure Valves/Relief Valves for Low-Pressure Metering Pumps

Back**pressure valves** are used to generate a constant back pressure for precision delivery or to protect against overdosing in the event of a free drain, fluctuating back pressure or priming pressure on the suction side. They are also used in conjunction with pulsation dampers to generate low-pulsation dosing.

Relief valves are used in the bypass to protect pumps, pipes and fittings against overpressure in the event of incorrect operation or clogging. In the event of a malfunction, the pump circulates or returns to the supply tank.

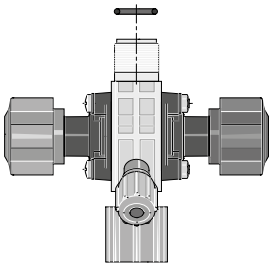
Important: Back pressure valves are not absolutely tight shut-off devices. Appropriate safety precautions must be taken when handling dangerous media. According to the definition of DIN EN ISO 4126-1, relief valves are not safety valves.

Important: When used as a relief valve in conjunction with sticky media (e.g. milk of lime), appropriate safety measures must be taken (e.g. flushing).

Important: If back pressure valves are used in conjunction with strongly oxidizing acids (e.g. nitric acid HNO3), diffusion effects may occur which may have further effects beyond the chemical resistance of the wetted parts. The designs shown in the following chapter may be unsuitable under certain circumstances. Please contact ProMinent for an application-specific design.

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 back into the supply tank.

Multifunctional Valve Type MFV-DK, PVDF



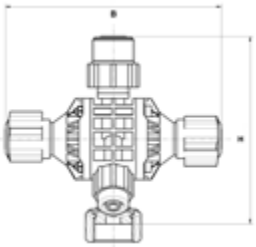
Pressure maintenance/relief valve for mounting directly on the dosing head of the pump with the following functions:

- Back pressure valve, opening pressure approx. 1.5 bar, with free drain or priming pressure on the suction side (black rotary dial)
- Relief valve, opening pressure approx. 6, 10 or 16 bar (red rotary dial)
- Priming aid when back pressure is present, no need to loosen the pressure line
- Relieves the pressure line, e.g. before service work

The multi-function valve is operated via smooth-running rotary dials that automatically return to their original position when released. This guarantees safe operation even when access is difficult. The multi-function valve is designed in PVDF materials and can be used for dosing many chemicals.

Attention: Back pressure valves are not absolutely tight shut-off devices! The installation instructions in the operating instructions must be observed!

Caution: The bypass line must always be connected.



For hoses see page → 195

Valve body	PVDF
Diaphragm	PTFE-coated
Seal	FKM and EPDM (loose)

Type	Relief opening pressure*	Connector size	Bypass connector	Dim. B mm	Dim. H mm	Order no.
Size I	16 bar	6-12	6 x 4	118	89	792011
Size I	10 bar	6-12	6 x 4	118	89	791715
Size I	6 bar	6-12	6 x 4	118	89	1005745
Size II	10 bar	6-12	12 x 9	138	96	792203
Size II	6 bar	6-12	12 x 9	138	96	740427
Size III	10 bar	DN 10	12 x 9	138	120	792215

* The relief opening pressure given above is the pressure at which the valve starts to open. The pressure may be up to 50% more than this before the valve is fully open depending on the type of pump.

Multi-function valve application

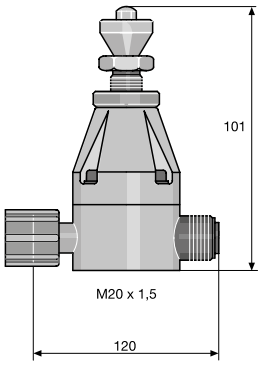
Size I	ALPc 1001, 1002, 1004, 1008, 0708 beta/ b, type 1000, 1601, 1602, 1604, 1605, 1005, 1008, 0708, 0413, 0220 beta/ X type 16006 gamma/ X type 1602, 1604, 1009, 0708, 0414, 0220 gamma/ XL type 1608, 1612
Size II	ALPc 0417, 0230 beta/ b, type 1605, 1008, 0713, 0420, 0232

1.5 Accessories for Low-Pressure Metering Pumps

	beta/ X type 07018, 04028, 02050
	gamma/ X type 1009, 0715, 0424, 0245
	gamma/ XL type 1020, 0730
	DULCOFLEX DFXa
Size III	gamma/ XL type 0450, 0280
	Sigma 1 with DN10

For material version PP, PV, NP, TT

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.

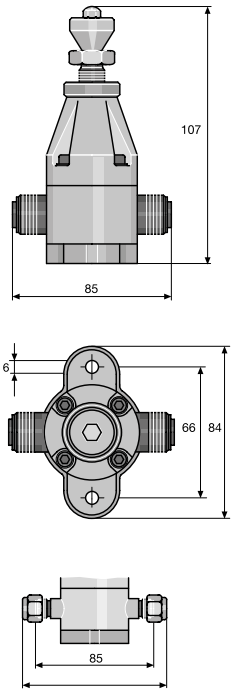
Please note: Back pressure valves are not absolutely leak-tight shut-off devices! It is essential that you observe the installation notes in the operating instructions!

Applications: Metering pump alpha, beta, gamma/ X, gamma/XL, Pneumados b, EXTRONIC

Type	adjustable pressure max. bar	Connector width DIN / ANSI	Material	Order no.
DHV-S-DK	10	6 to 12 mm	PP	302320
DHV-S-DK	10	6 to 12 mm	PC/FKM	302321
DHV-S-DK	10	6 to 12 mm	TT	302322
DHV-S-DK	10	6 mm	SS	1003793
DHV-S-DK	10	8 mm	SS	1003795
DHV-S-DK	10	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

Use in conjunction with pulsation damper only with a free outlet and short metering line. Use type DHV-U when using a pulsation damper with back pressure or long lines.

Please note: Back pressure valves are not absolutely leak-tight shut-off devices! It is essential that you observe the installation notes in the operating instructions!

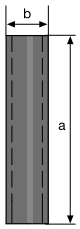
Applications: Metering pumps alpha, beta, gamma/ X, gamma/ XL, Pneumados b, EXTRONIC

Type	adjustable pressure max. bar	Connector width DIN / ANSI	Material	Order no.
DHV-S-DL	10	6 to 12 mm	PP	302323
DHV-S-DL	10	6 to 12 mm	PC/FKM	302324
DHV-S-DL	10	6 to 12 mm	TT	302325
DHV-S-DL	10	6 mm	SS	302326
DHV-S-DL	10	8 mm	SS	302327
DHV-S-DL	10	12 mm	SS	302328

2 connector kits of the required hose size should be ordered as extras for the connection.

* **Please note:** The product contains connections bonded with Tangit. Always note the durability of Tangit adhesive.

(single connector kit, see page →199)



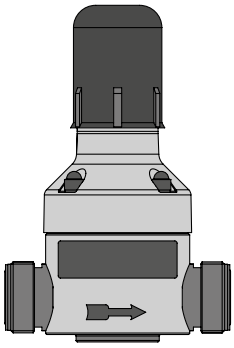
pk_1_017

Pipe Nipples

For the direct connection of the pressure maintenance valve DHV-S-DL in stainless steel (SS) to the liquid end.

Type	Dim. A mm	Dim. B mm	Order no.
1.4571 pipe nipple	6	40	818537
1.4571 pipe nipple	8	40	818538
1.4571 pipe nipple	12	40	818539

1.5 Accessories for Low-Pressure Metering Pumps



Back Pressure Valve/Relief Valve Type DHV-U

The universally applicable back pressure valves of the DHV-U product range are internally flowed, piston diaphragm valves with no back pressure effect. They are used to generate a constant back pressure and as a relief valve. They can be installed at any point in the piping system.

Adjustable pressure 0.5 - 10 bar

Application of PPE/PPB/PCE/PCB

20 °C - max. operating pressure 10 bar

Application of PVT/PVE/SST

30 °C - max. operating pressure 10 bar

Version	Nominal diameter	Dim. G	Order no.
PVT	DN 10	3/4	1139731
PVE	DN 10	3/4	1139847
PCB Version	DN 10	3/4	1139727
PCE	DN 10	3/4	1139729
SST	DN 10	3/4	1043194
PVT	DN 15	1	1139732
PVE	DN 15	1	1139848
PCB	DN 15	1	1139728
PCE	DN 15	1	1139730
SST	DN 15	1	1043193
PVT	DN 20	1 1/4	1037777
PPE	DN 20	1 1/4	1037284
PCB	DN 20	1 1/4	1037775
PPB	DN 20	1 1/4	1038147
PCE	DN 20	1 1/4	1038148
SST	DN 20	1 1/4	1043192
PCE	DN 25	1 1/2	1038150
PPE	DN 25	1 1/2	1036633
PCB	DN 25	1 1/2	1037774
PVT	DN 25	1 1/2	1037776
PPB	DN 25	1 1/2	1038149
SST	DN 25	1 1/2	1043191
PPE	DN 32	2	1051517
PVT	DN 32	2	1051503
PCE	DN 32	2	1051514
SST	DN 32	2	1051516
PCB	DN 32	2	1051520
PPB	DN 32	2	1051522
PPE	DN 40	2 1/4	1051518
PCE	DN 40	2 1/4	1051501
PVT	DN 40	2 1/4	1051502
SST	DN 40	2 1/4	1051515
PCB	DN 40	2 1/4	1051519
PPB	DN 40	2 1/4	1051521

Materials used

Version	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

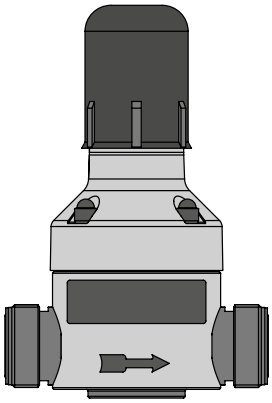
* Cover ring made from PTFE/FKM

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/PVE/SST

30 °C - max. operating pressure 10 bar

Version	Nominal diameter	Dim. G	Order no.
PVE	DN 10	3/4	1139847
SST	DN 10	3/4	1076532
PVT	DN 10	3/4	1139733
PPE	DN 15	1	1139848
SST	DN 15	1	1076531
PVT	DN 15	1	1139734
PVT	DN 20	1 1/4	1076583
PPE	DN 20	1 1/4	1076582
SST	DN 20	1 1/4	1076597
PPE	DN 25	1 1/2	1076585
SST	DN 25	1 1/2	1076584
PVT	DN 25	1 1/2	1076586
PVT	DN 32	2	1076588
PPE	DN 32	2	1076587
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 used

Version	Housing/Connectors	Plungers	Plunger Seal	Seal/Connectors
PVE	PP	PVDF	EPDM	EPDM
PVT	PVDF	PVDF	PTFE *	FKM
SST	1.4404	PTFE	PTFE *	PTFE

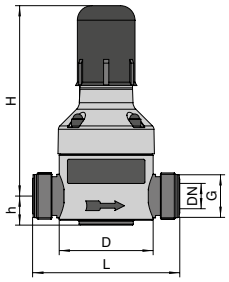
* Cover ring made from PTFE/FKM

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

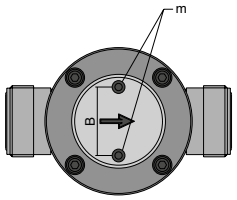
We are happy to supply back pressure valves and relief valves DHV-U/DHV-UR in stainless steel and wetted EC 1935/2004 on request.

1.5 Accessories for Low-Pressure Metering Pumps



Dimensions of DHV-U (PP, PVC, PVDF design)

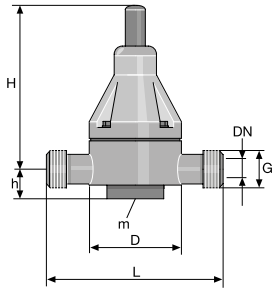
DN	G	H mm	L mm	h mm	D mm	m	B mm
10	3/4	144	118	24	79	M6	40
15	1	144	118	24	79	M6	40
20	1 1/4	196	150	37	99	M6	46
25	1 1/2	196	150	37	99	M6	46
32	2	252	200	54	139.5	M8	65
40	2 1/4	252	200	54	139.5	M8	65



Dimensions of DHV-U (SS version)

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



Back Pressure Valve / Relief Valve Type DHV 712-R

Adjustable pressure 0.5 - 10 bar

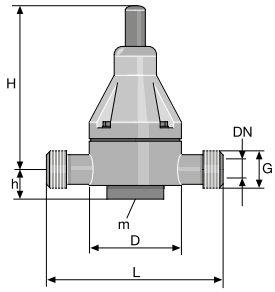
Application of PPE/PCB

20 °C - max. operating pressure 10 bar

Application of PVT/TT/SS

30 °C - max. operating pressure 10 bar

Version	Nominal diameter	Dim. G	Order no.
TT	DN 10	3/4	1000059
TT	DN 15	1	1000060
TT	DN 20	1 1/4	1000061
TT	DN 25	1 1/2	1000062
TT	DN 32	2	1000063
TT	DN 40	2 1/4	1000064



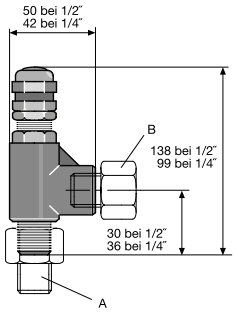
Caution: The product contains adhesive joints with Tangit. Please note the resistance of Tangit adhesive.

Dimensions of DHV 712-R

Dimension DN DN	Dim. G G	Dim. H H	Dim. L L	Dimension h h	Dim. D D	Dimension m m
10	3/4	173	120	-	81	M6
15	1	173	120	-	81	M6
20	1 1/4	201	150	-	107	M6
25	1 1/2	201	150	-	107	M6
32	2	260	205	59 / 37	147	M8
40	2 1/4	260	205	59 / 37	147	M8

Materials used

Version	Housing/Connectors	Plungers	Plunger Seal	Seal/Connectors
TT	Carbon-filled PTFE	PTFE	PTFE	PTFE



Back Pressure Valve / Relief Valve for High-Pressure Systems

Material: stainless steel 316/FKM

Temperature range: -18 °C to 120 °C

Recommended use up to 200 l/h

	Connector size	Order no.
Overflow valve	1/4" NPT inner and outer thread	202505

Spring counter pressure min. bar	Spring counter pressure max. bar	Spring colour	Order no.
3.4	24	blue	202519
24.0	52	yellow	202520
52.0	103	violet	202525
103.0	155	orange	202524
155.0	207	brown	202523
207.0	276	white	202522
276.0	345	red	202521

Recommended use up to 300 l/h

	Connector size	Order no.
Overflow valve	1/2" NPT inner and outer thread	1005499

Spring counter pressure min. bar	Spring counter pressure max. bar	Spring colour	Order no.
3.4	24	blue	1005500
24.0	50	yellow	1005501
50.0	100	violet	1005502

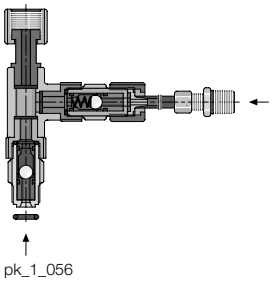
Reducing pipe nipple

Connector size	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

1.5 Accessories for Low-Pressure Metering Pumps

1.5.3.8 Flushing Assemblies and Overload Protection Assemblies for Low-Pressure Metering Pumps


pk_1_056

Flushing Assembly

For flushing and cleaning dosing heads, metering lines and injection valves

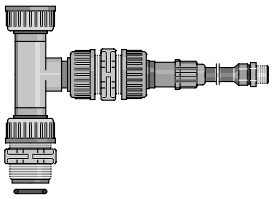
As a manual or automatic, time-controlled design. Installation, even retrospectively, on the suction connector of the metering pump. Supplied with 2 m flushing pipe and R 3/8 connection nipple.

Automatic flushing equipment for the fully automatic flushing of the pump head is possible on request.

PPE Flushing Assembly

Material: PP, 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


pk_1_057

PCB Flushing Assembly

Material: PVC, FKM seal.

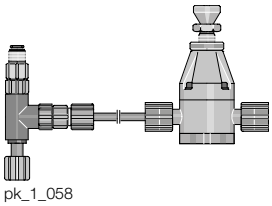
	Fig.	Order no.
For 6/4, 8/5, 12/6, 12/9 connectors	pk_1_056	809925
For G 3/4 -DN 10 connector	pk_1_057	809926
For G 1 -DN 15 connector	pk_1_057	803960

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.

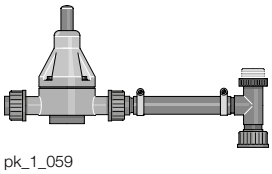
Connector size 6 - 12 mm, depending on the pressure connector on the metering pump.


pk_1_058

PPE Relief Valve Assembly

Material: PP, EPDM seal.

	Fig.	Order no.
For 6/4, 8/5, 12/6, 12/9 connectors	pk_1_058	809990
For G 3/4 -DN 10 connector	pk_1_059	809991
For G 1 -DN 15 connector	pk_1_059	809992

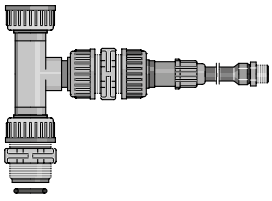

pk_1_059

PCB Relief Valve Assembly

Material: PVC, FKM seal.

	Fig.	Order no.
For 6/4, 8/5, 12/6, 12/9 connectors	pk_1_058	809989
For G 3/4 -DN 10 connector	pk_1_059	809993
For G 1 -DN 15 connector	pk_1_059	914745

Caution: The product contains adhesive joints with Tangit. Please note the resistance of Tangit adhesive.


pk_1_057

Flushing assemblies for motor-driven metering pumps on request.

1.5.3.9 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: The pulsation dampers should always be protected by 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.

Application

5-30°C - max. operating pressure 10 bar

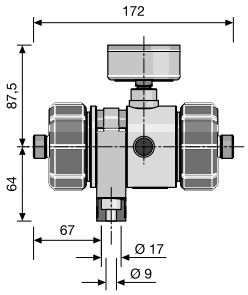
40 °C - max. operating pressure 8 bar

60 °C - max. operating pressure 4 bar

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	Tubular diaphragms	Seal material	Connector size	Order no.
PPE in-line damper	0.05	CSM	EPDM	M20 x 1.5	1026768
PPB in-line damper	0.05	FKM A	FKM A	M20 x 1.5	1026771
PPE in-line damper	0.05	CSM	EPDM	G 3/4 - DN 10	1026769
PPB in-line damper	0.05	FKM A	FKM A	G 3/4 - DN 10	1026772
PDS 2.5	2.50	Hypalon	EPDM	G 2 – DN 32	1001344
PDS 2.5	2.50	FKM A	FKM A	G 2 – DN 32	1001345

For other sizes (0.2 l and 0.5 l), see PVDF inline pulsation damper.

Blanking threaded connector PP

Material	Connector size	Order no.
PP	M20 x 1.5	1030200
PP	G 3/4 - DN 10	1001352

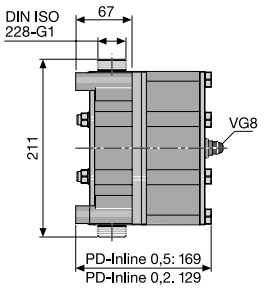
1.5 Accessories for Low-Pressure Metering Pumps

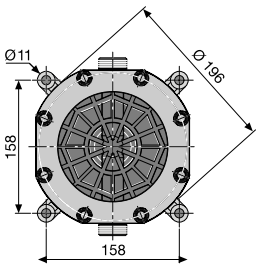
PVC Accumulators

Application

Max. operating pressure 10 bar

	Volume	Diaphragm material	Connector size	Order no.
Accumulators	0.09 l	EPDM	DN 10	1057944
Accumulators	0.36 l	EPDM	DN 20	1047542
Accumulators	0.95 l	EPDM	DN 25	1057978
Accumulators	0.09 l	FKM A	DN 10	1057946
Accumulators	0.36 l	FKM A	DN 20	1047654
Accumulators	0.95 l	FKM A	DN 25	1057980





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PVDF In-Line Pulsation Damper

Function: Hydropneumatic reservoir with deflection

The PVDF reservoir with PTFE diaphragm offers excellent chemical resistance, making it suitable for a wide range of liquids. The pulsation damper has two liquid connections and can be installed either directly in the pipework or diagonally across with a set of blanking plugs. Deflection in the fluid valve aims the volume flow directly at the diaphragm. This causes the volume flow to come into direct contact with the diaphragm. In this way the trapped gas volume optimally balances out fluctuations in the volume flow.

For Sigma metering pumps up to 370 l/h, DN 25.

Important: The pulsation dampers should always be protected by a relief valve.

Type	Volume	Max. pressure	Connector size	Order no.
	l	bar		
PD In-line	0.2	10	G 1 – DN 15	1026252
PD In-line	0.5	10	G 1 – DN 15	1026736
PD In-line	0.2	16	G 1 – DN 15	1033446
PD In-line	0.5	16	G 1 – DN 15	1033447
PD In-line	0.2	25	G 1 – DN 15	1036154
PD In-line	0.5	25	G 1 – DN 15	1036155

The preload pressure is approximately 0.6 x the operating pressure. Maximum medium temperature 65 °C.

Connectors must be ordered separately.

The reservoir is filled with nitrogen via the VG8 gas filling connector or with compressed air using a standard filling valve (e.g. a car tyre valve).

Important: 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

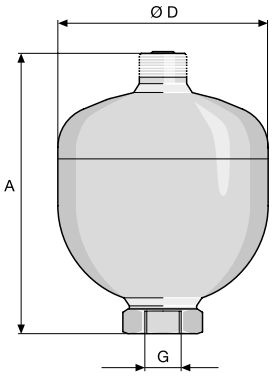
Connection/adapter kits

Consisting of a PTFE-shaped composite seal, insert/adapter piece and union nut.

Connection size	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



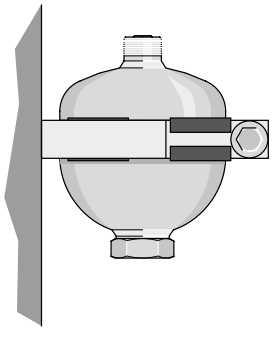
Admissible operating temperature: -10 to +80 °C.

Response pressure: 2 bar (nitrogen).

Other accumulator/diaphragm materials available on request.

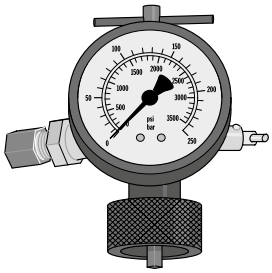
Stainless Steel Pulsation Damper

Volume	Max. pressure bar	Diaphragm material	Connector G	Dim. 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 A	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 A	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 A	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 A	Rp 3/4	224	167	1008650
0.75	140	NBR	Rp 1	168	121	1027617
0.75	140	Butyl	Rp 1	168	121	1027618
0.75	140	FKM A	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 A	Rp 1 1/2	224	167	1027622



Mounting Clamp for Stainless Steel Pulsation Damper

Volume l	Number of Clamps	Diameter 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 test and filling device is used to charge pressure reservoirs with nitrogen and to check or change the prevailing precharge pressure.

It includes:

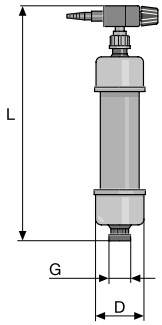
- Test and filling device with manometer, check valve on charging connector, in-built bleeder valve, valve stem for opening the gas charging valve on the reservoir
- Charging hose, length 2 m

Adjustment range	Order no.
Up to 25 bar	1008769
Up to 100 bar	1008669
Up to 250 bar	1008670

1.5.3.10 Vacuum Cylinder

Used for low-pulsation metering and to reduce the flow resistance with long lines as well as viscous media.

Important: An overflow device with an adjustable back pressure valve should always be fitted in the pressure line when using diaphragm pulsation dampers (bladder dampers).



PVC Vacuum Cylinder

Vacuum cylinder as priming aid for long suction line and viscous media. Housing – with PVC transparent middle section. With connector for vacuum pump.

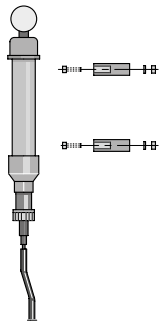
Max. operating pressure: 2 bar at 40 °C operating temperature.

With this: Vacuum pump assembly

Volume	Connector size	Seal material	Dim. L*	Dim. D	Order no.
l			mm	mm	
0.5	G 1 – DN 15	FKM A	380	78	243591
0.5	G 1 – DN 15	EPDM	380	78	1025699
1.0	G 1 1/4 – DN 20	FKM A	440	86	243592
1.0	G 1 1/4 – DN 20	EPDM	440	86	1025701
2.5	G 1 1/2 – DN 25	FKM A	520	133	243593
2.5	G 1 1/2 – DN 25	EPDM	520	133	1025702
5.0	G 2 1/4 – DN 40	FKM A	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.



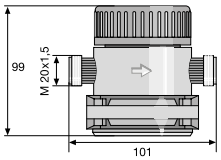
Vacuum Pump Assembly / Priming Aid

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.

1.5 Accessories for Low-Pressure Metering Pumps



Suction pressure regulator

The suction pressure regulator is a spring-loaded diaphragm valve (max. 50 l/h), which is opened through the effect of the pump's suction pressure. This ensures that no medium can flow if the pump is not running or no vacuum can be produced as a result of a line rupture.

An adjustable spring can be used to set the maximum negative pressure needed for the respective operating situation up to 400 mbar. For pumps with a positive feed pressure, a very low vacuum of approx. 50 mbar is sufficient. In each instance, this vacuum must be generated by the pump, even if the feed is at atmospheric pressure.

An unwanted suction effect at the pump outlet (e. g. siphon effect) must be ruled out by using a back pressure valve.

Max. flow rate	50
Max. feed pressure	4
Max. intake pressure	0.3
Max. temperature	40
Housing material	PVC
Diaphragm material	FKM A
Seals	FKM A
Ball material	Glass
Spring material	Hastelloy C

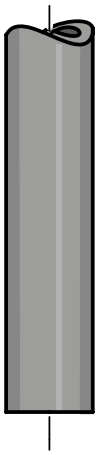
Type		Connector size	Order no.
SDR 50	For solenoid-driven pumps	M20 x 1.5	1005505
SDR 50	For motor-driven pumps up to 50 l/h	G 3/4 - DN 10	1005506

Connectors must be ordered separately.

1.5.3.11 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 is ensured.

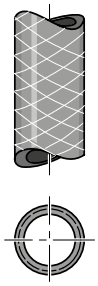
Supply with food-use certification is available upon request.

Material	Length	oØ x iØ	permitted operating pressure*	Order no.
	m	mm	bar	
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	37020
	Sold in metres	22 x 18	0.5	37022

* Permissible operating pressure at 20 °C as per DIN EN ISO 7751 subject to chemical resistance and correct connection

Please note:

PVC soft hoses do not offer the same resistance as rigid PVC. Always note the resistance of soft PVC and the cleaning instructions for use in food applications.



Soft PVC Suction and Discharge Line with Woven Fabric Core

Supply with food-use certification is available upon request.

Material	Length	oØ x iØ	Description	permitted operating pressure*	Order no.
	m	mm		bar	
Soft PVC with woven inner layer	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	37040
	Sold in metres	27 x 19	for DN 15	15	37041
	Sold in metres	34 x 25	for DN 20	12	37043
	Sold in metres	40 x 30	for DN 25	10	1000527
	Sold in metres	52 x 40	for DN 32	7	1005508

* Permissible operating pressure at 20 °C as per DIN EN ISO 7751 subject to chemical resistance and correct connection

1.5 Accessories for Low-Pressure Metering Pumps

Please note:

PVC soft hoses do not offer the same resistance as rigid PVC. Always note the resistance of soft PVC and the cleaning instructions for use in food applications.

With socket-welded and PVC-bonded rigid PP and PVDF piping, pipes and fittings of pressure rating PN 16 or PN 10 bar should be used.

Soft PVC Suction and Metering Line with Woven Inner Layer Approved for Food Use

Material	Length	oØ x iØ	permitted operating pressure	Order no.
	m	mm	bar	
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

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.

Temperature dependency

Operating temperature in °C	Permissible pressure temperature factor in %
+20 °C	100%
+30°C	85%
+40°C	73%
+50°C	60%
+60°C	46%

PE Suction and Discharge Line

Material	Length	oØ x iØ	permitted operating 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

* Permissible operating pressure at 20 °C as per DIN EN ISO 7751 subject to chemical resistance and correct connection

Temperature dependency

Operating temperature in °C	Permissible pressure temperature factor in %
+23°C	100%
+40°C	75%
+50°C	50%

PTFE Suction and Discharge Lines

Material	Length	oØ x iØ	permitted operating pressure*	Order no.
	m	mm	bar	
PTFE	Sold in metres	1.75 x 1.15	12	37414
	Sold in metres	3.2 x 2.4	8	37415
	Sold in metres	6 x 3	20	1021353
	Sold in metres	6 x 4	14	37426
	Sold in metres	8 x 4	25	1033166
	Sold in metres	8 x 5	16	37427
	Sold in metres	12 x 9	10	37428

* Permissible operating pressure at 20 °C as per DIN EN ISO 7751 subject to chemical resistance and correct connection

Temperature dependency

Operating temperature in °C	Permissible pressure temperature factor in %
+20 °C	100%
+50°C	75%
+75°C	55%
+100°C	45%

Double-wall hoses

Double-wall hoses improve process reliability.

The outer hose serves as a protective sleeve. It reduces the risk of accident should the inner metering hose tear.

Material	Length	oØ x iØ	permitted operating pressure*	Order no.
	m	mm	bar	
PE in PE	100	6x4/12x10	13	1096596
	100	8x5/12x10	15	1096597
	100	12x9/18x14	9	1096598
PTFE in PE	50	6x4/12x10	15	1096600
	50	8x5/12x10	17	1096603
	50	12x9/18x14	11	1096616
PTFE in PTFE	50	6x4/12x10	15	1104330
	50	8x5/12x10	14	1104333
	50	12x9/16x14	9	1104334

* Permissible operating pressure at 20 °C as per DIN EN ISO 7751 subject to chemical resistance and correct connection

Please note:

PVC soft hoses do not offer the same resistance as rigid PVC. Always note the resistance of soft PVC and the cleaning instructions for use in food applications.

Stainless Steel Pipes

Material	Length	oØ x iØ	permitted operating 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	15738
	Sold in metres	6 x 4	185	15739
	Sold in metres	8 x 7	160	15740
	Sold in metres	12 x 10	200	15743

* Permissible operating pressure at 20 °C as per DIN EN ISO 7751 subject to chemical resistance and correct connection

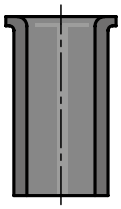
1.5 Accessories for Low-Pressure Metering Pumps

Hose Cutting Kit

Hose Cutting Set for Plastic Pipes up to a Diameter of 25 mm. Manufacturer: Gedore.

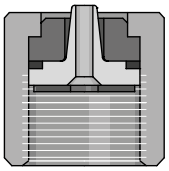
	Order no.
Hose Cutting Kit	1038571

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	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 Connector Kit

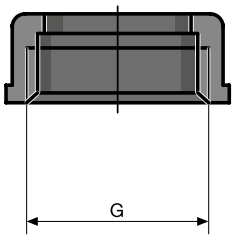
Connection kit for fitting hoses of different sizes to the suction and pressure connector of the dosing head of alpha, beta, gamma/ X, gamma/ XL, Pneumados b and accessories, consisting of hose sleeve, clamp ring, union nut and seal for one or two connectors

	Description	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
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-compliant	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

1.5 Accessories for Low-Pressure Metering Pumps

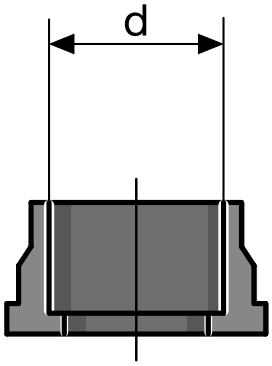
Double Connector Kit

	Description	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



Union Nuts

	Material	Connector size	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
	PP	G 2 3/4 - DN 50	358619
	PVC	G 5/8 – DN 8	800565
	PVC	G 3/4 - DN 10	356562
	PVC	G 1 – DN 15	356563
	PVC	G 1 1/4 – DN 20	356564
	PVC	G 1 1/2 - DN 25	356565
	PVC	G 2 - DN 32	740690
	PVC	G 2 1/4 - DN 40	356567
	PVC	G 2 3/4 - DN 50	356568
	PVDF	G 3/4 - DN 10	358813
	PVDF	G 1 - DN 15	358814
	PVDF	G 1 1/4 - DN 20	358815
	PVDF	G 1 1/2 - DN 25	358816
	PVDF	G 2 - DN 32	1003639
	PVDF	G 2 1/4 - DN 40	358818
	PVDF	G 2 3/4 - DN 50	358819
	1.4571	G 3/4 - DN 10	805270
	1.4571	G 1 - DN 15	805271
	1.4571	G 1 1/4 - DN 20	805272
	1.4571	G 1 1/2 - DN 25	805273
	1.4571	G 2 - DN 32	805274
	1.4571	G 2 1/4 - DN 40	805275
	1.4571	G 2 3/4 - DN 50	805276

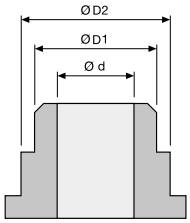


Inserts (welding sleeves)

	Material	Connector size	Order no.
Welding sleeve	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

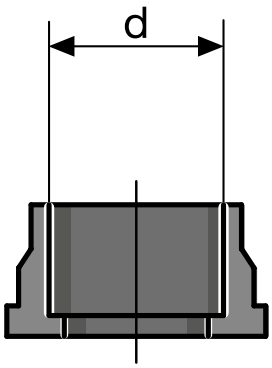
	Material	Connector size	Order no.
Welding sleeve, grooved *	PP	d 16 – DN 10	1001785
	PP	d 20 – DN 15	1001395
	PP	d 25 – DN 20	1036258
	PP	d 32 – DN 25	1001787
	PP	d 40 – DN 32	1005105
	PP	d 50 – DN 40	1025960
	PP	d 63 – DN 50	1019207
	PVDF	d 16 – DN 10	358803
	PVDF	d 20 – DN 15	358804
	PVDF	d 25 – DN 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

* Should be used in combination with ProMinent's PTFE-shaped composite seals.



	Material	Diameter Ø D1 mm	Diameter Ø D2 mm	Connector size	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

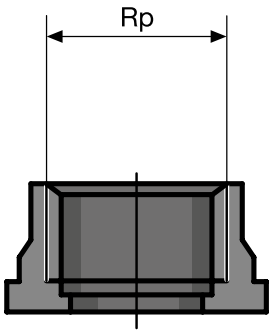
1.5 Accessories for Low-Pressure Metering Pumps



PVC insert (straight solvent union)

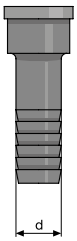
Description	Material	Dimension d mm	Connector size	Order no.
PVC insert (straight solvent union)	PVC-U	12	DN 8	356571
	PVC-U	16	DN 10	356572
	PVC-U	20	DN 15	356573
	PVC-U	25	DN 20	356574
	PVC-U	32	DN 25	356575
	PVC-U	40	DN 32	356576
	PVC-U	50	DN 40	356577
	PVC-U	63	DN 50	356578

	Material	Connector size	Order no.
Union coupler, grooved *	PVC-U	d 16 – DN 10	1001784
	PVC-U	d 20 – DN 15	1001394
	PVC-U	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



* Should be used in combination with ProMinent's PTFE-shaped composite seals.

	Material	Connector size	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

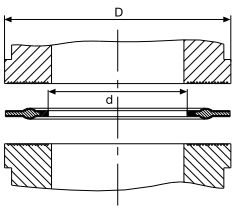


Pressure hose nozzles with seal

	Material	Connector size	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	Connector size	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

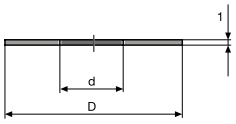
* Should be used in combination with ProMinent's PTFE-shaped composite seals.



PTFE Formed Composite Seals

Formed composite seals to be used on grooved sealing surfaces (e.g. pump valve and grooved inserts from ProMinent).

Connector width DIN / ANSI	Material	Dim. D mm	Dim. 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



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.

	Seal material	Dim. D mm	Dim. 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

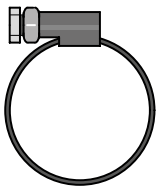
Comprising two EPDM seals, **physiologically safe (FDA).**

	Seal material	Dimension d mm	Dim. D mm	Order no.
DN 10	EPDM	14.0	23.5	1045440
DN 15	EPDM	18.0	29.5	1045441
DN 25	EPDM	28.0	44.0	1045442

Flat seals for stainless steel liquid ends

Consisting of two PTFE flat seals Gylon Style 3504, physiologically safe (EU Regulation 1935/2004).

	Seal material	Dim. D mm	Dimension 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



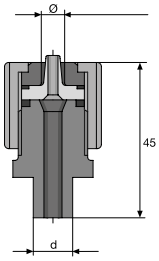
Stainless Steel Threaded Clip

For connecting suction and dosing line with pressure hose sleeve.

	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

Hose adhesive nipple

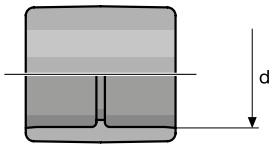
With union nut to connect PVC, PE and PTFE hose to PVC fittings, for creation of own connection systems.



Material	PCB	PCE
PVC housing	PVC	PVC
Seals	FKM	EPDM

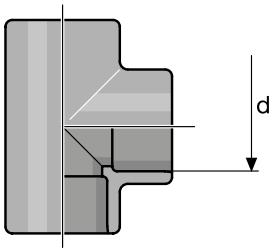
	Material	Dimension d mm	Hose oØ x iØ mm	Order no.
PCB hose adhesive nipple	PCB	12	6 x 4	817088
	PCB	12	8 x 5	817089
	PCB	12	12 x 9	817090
	PCB	12	12 x 6	817091
	PCB	16	6 x 4	817092
	PCB	16	8 x 5	817093
	PCB	16	12 x 9	817094
	PCB	16	12 x 6	817095
PCE hose adhesive nipple	PCE	12	6 x 4	1077673
	PCE	12	8 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



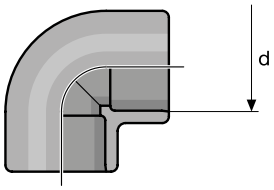
Description	Material	Dimension d mm	Connector size	Order no.
PVC straight solvent union	PVC	12	DN 8	356608
	PVC	16	DN 10	356609
	PVC	20	DN 15	356610
	PVC	25	DN 20	356611

PVC T-joint



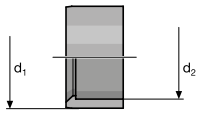
Description	Material	Dimension d mm	Connector size	Order no.
PVC T-joint	PVC	12	DN 8	356406
	PVC	16	DN 10	356407
	PVC	20	DN 15	356408
	PVC	25	DN 20	356409

90° PVC elbow joint



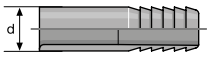
Description	Material	Dimension d mm	Connector size	Order no.
90° PVC elbow joint	PVC	12	DN 8	356315
	PVC	16	DN 10	356316
	PVC	20	DN 15	356317
	PVC	25	DN 20	356318

PVC short reducing union



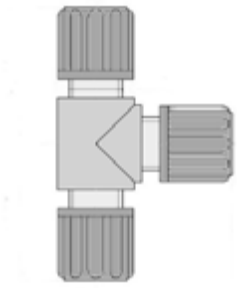
	Material	d1 mm	d2 mm	Order no.
PVC short reducing union	PVC	12	8	357025
	PVC	16	12	357026
	PVC	20	16	357027
	PVC	25	20	357028

PVC pressure hose sleeve for glueing



Description	Material	Dimension d mm	Connector size	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

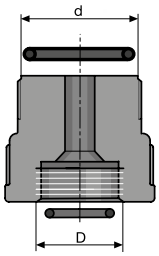
PVDF T-threaded connectors



T-piece to connect 3 hoses.

	oØ x iØ	Order no.
6/4 PVDF T-threaded connector	6 x 4	1045258
8/6 PVDF T-threaded connector	8 x 6	1045259
12/9 PVDF T-threaded connector	12 x 9	1045260
8/5 PVDF T-threaded connector	8 x 5	1046513

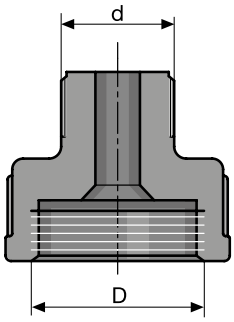
Single adapter kit



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	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
PC/FKM	DN 8	M20 x 1.5	G 5/8	817069
PVDF/PTFE	DN 8	M20 x 1.5	G 5/8	1031073
PP	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
PC/FKM	DN 10	M20 x 1.5	G 3/4	740601
PVDF/PTFE	DN 10	M20 x 1.5	G 3/4	1028409

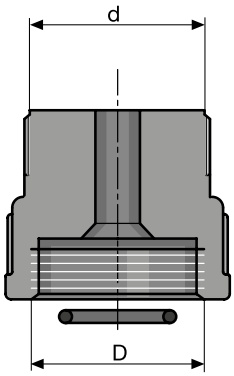
Single adapter kit



For mounting accessory parts of the A, B, C and E product ranges on the current 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

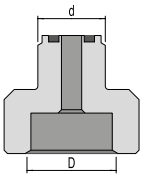
1.5 Accessories for Low-Pressure Metering Pumps



Single adapter kit

For mounting current accessories with M20 x 1.5 connector on metering pumps of the A, B, C and E product ranges.

Material	Size	Internal thread D	External thread d	Order no.
PC/FKM	6-8 mm connector	G 1/4	M20 x 1.5	741087
PP	12 mm connector	G 3/8	M20 x 1.5	741090
PC/FKM	12 mm connector	G 3/8	M20 x 1.5	741089
PTFE	12 mm connector	G 3/8	M20 x 1.5	741092



Adapter

Adapter suitable for connector kit for 12 x 9 hose.

	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-compliant	DN 10, G 3/4	M20 x 1.5	1080408

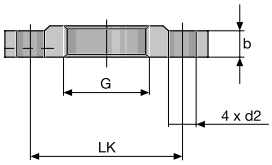
Adapter (complete) from M20 x 1.5 to G3/4 DN10

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.

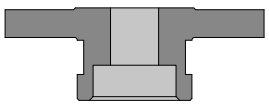
	Material	Order no.
Adapter (complete) from M20 x 1.5 to G3/4 DN10	PVT	1028409

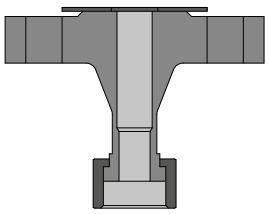
Flange Mountings



Flange connection for ProMinent valve sizes.

Material		Connector width DIN / ANSI	Pressure rating	Dimension b mm	Diameter (Ø HC) mm	d2 mm	Order no.
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
PVDF	With seal	G 3/4 - DN 10	PN 16	12.5	60	14	1036279
PVDF	With seal	G 1 - DN 15	PN 16	13.5	65	14	1036280
PVDF	With seal	G 1 1/2 - DN 25	PN 16	16.0	85	14	1036281
PVDF	With seal	G 2 - DN 32	PN 16	18.0	100	18	1036282
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
1.4571	With seal	G 3/4 - DN 10 (DIN 2637)	PN 100	20.0	70	14	1006005
1.4571	With seal	G 1 - DN 15 (DIN 2637)	PN 40	16.0	65	14	1006006
1.4404	With seal	G 1 1/2 - DN 25 (DIN 1092-1)	PN 40	18.0	85	14	1041796
1.4404	With seal	G 2 - DN 32 (DIN 1092-1)	PN 40	18.0	100	18	1041797

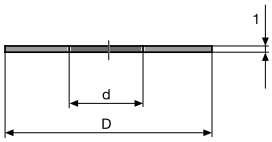




1.4571/1.4404 with collar

Use flange mountings with a seal for pumps Sigma/ 1, Sigma/ 2 with DN 15 connector and Sigma/ 3 pumps with DN 25 connector. Sigma/ 3-DN 25 1" EN 1092-11.4404, order no. 1041796.

Further material versions and details available on request.

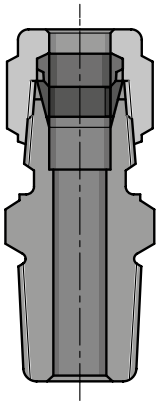


Flat Seals for Threaded Flange to DIN 2566

Material	Connector width DIN / ANSI	Dim. D mm	Dimension d mm	Order no.
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 A	G 3/4 - DN 15	52	12	483939
FKM A	G 1 - DN 15	52	17	483942
FKM A	G 1 1/4 - DN 20	62	22	483943
FKM A	G 1 1/2 - DN 25	72	27	483944
FKM A	G 1 1/2 - DN 32	83	33	1007542
FKM A	G 2 1/4 - DN 40	92	40	483946
FKM A	G 3 - DN 65	130	60	1020467

Flange connections as per DIN 2629. For META HK and MAKRO TZ HK plunger metering pumps on request.

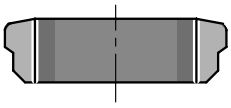
1.5 Accessories for Low-Pressure Metering Pumps



Straight Male Adapter Stainless Steel

Swagelock system, stainless steel SS 316 (1.4401) for fitting tubing to dosing heads and valves with inner threads and for SB versions.

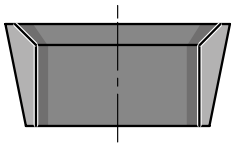
Description	Order no.
6 mm - ISO 7 R 1/4	359526
8 mm - ISO 7 R 1/4	359527
12 mm - ISO 7 R 1/4	359528
12 mm - ISO 7 R 3/8	359520
16 mm - ISO 7 R 3/8	359521
16 mm - ISO 7 R 1/2	359529

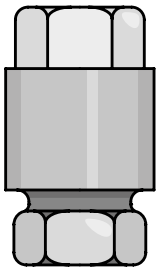


Stainless steel clamping ring sets

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.

	Diameter (outer Ø)	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

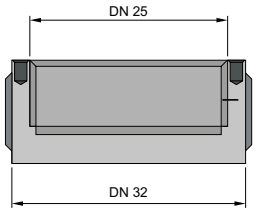




Stainless steel threaded connector

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



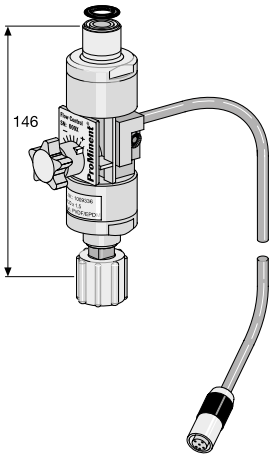
Valve adapter DN 32 - DN 25

Suitable for the liquid end of the Sigma/ 3 metering pump FM 1000 up to 600 l/h.

	Material version	Material	Order no.
Valve adapter DN 32 - DN 25	SST	1.4404	1035729
Valve adapter DN 32 - DN 25	PVT	PVDF	1035732
Valve adapter DN 32 - DN 25	TT	PTFE	1040414

1.5.4 Electrical Accessories

1.5.4.1 Metering Monitor, Signal Cable



Flow Control Dosing Monitor for Discharge Side Installation

Metering monitor assembly with connector cable for assembly directly on the dosing head to monitor individual strokes based on the float 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 permitted number of incompletely performed strokes on gamma/ X and gamma/ XL metering pumps can be selected as a figure between 1 to 127, ensuring optimum adaptation to process requirements.

Suitable for metering pumps of the gamma/ X and gamma/ XL product ranges in PP, NP, PV and TT material designs.

Please note: It is essential that you observe the minimum values for the stroke length. The design of the pressure stroke must be set to 'fast'

Note: The metering monitor Flow Control is only suitable for viscosities of less than 100 mPas.

Materials

Housing:	PVDF
Float:	PTFE-coated
Seals:	FKM/EPDM

Flow Control for Discharge Side Installation

Note the minimum values for the stroke length.

Flow Control	For pump type	Material	Order no.
Size I	GMXa 1602	PVDF/EPDM	1009229
Size I	GMXa 1602	PVDF/FKM	1009335
Size II	GMXa 1604-0245, GXLa 1608-0730	PVDF/EPDM	1009336
Size II	GMXa 1604-0245, GXLa 1608-0730	PVDF/FKM	1009338

Pump type	Mean operating pressure	Stroke length (scale division)	Maximum 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 %

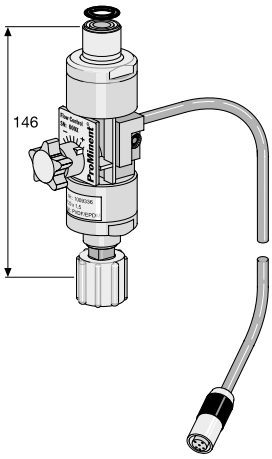
Flow Control for Suction Side Installation

Individual strokes are detected on the suction side where the flow velocity is sufficiently high. 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 gamma/ XL product ranges with slow compression stroke.

Flow Control	For pump type	Material	Order no.
Size II	GMXa 1604-0245, GXLa 1608-0730	PVDF/EPDM	1036407
Size II	GMXa 1604-0245, GXLa 1608-0730	PVDF/FKM	1036409
Size III	GXLa 0450 – 0280	PVDF/EPDM	1036439
Size III	GXLa 0450 – 0280	PVDF/FKM	1036440

1.5 Accessories for Low-Pressure Metering Pumps



Metering monitor Flow Control adjustable

Suitable for GXLa 0450/0280 pumps and the sigma product range up to 130l/h in the PVT and SST material versions. Complete with connector cable for assembly directly on the dosing head.

For monitoring the individual strokes based on 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 significantly below the required level. The permitted number of incompletely performed strokes on the sigma/ X control type (S1Cb/S2Cb/S3Cb) can be selected as a figure between 1-150, ensuring optimum adaptation to process requirements.

Note: The metering monitor Flow Control is only suitable for viscosities of less than 100 mPas.

Materials

Flow meter:	PVDF
Float:	PTFE-coated
Seals:	FKM/EPDM

Flow Control	For pump type	Material	Nominal diameter	Order no.
Size III	Sigma/ 1, GXLa 0450 - GXLa 0280	PVDF/EPDM	DN 10	1021168
Size III	Sigma/ 1, GXLa 0450 - GXLa 0280	PVDF/FKM	DN 10	1021169
Size III	Sigma/1/2, GXLa 0450 - GXLa 0280	PVDF/EPDM	DN 15	1021170
Size III	Sigma/1/2, GXLa 0450 - GXLa 0280	PVDF/FKM	DN 15	1021171

Universal Signal Cable

Universal control cable with 5-pin plastic round plug and 5-wire cable with open end for external control of the metering pump via potential-free contacts, standard signals – analogue control and for potential-free switching on/off – connection function.

Suitable for metering pumps of the beta, gamma/ X, gamma/ XL, DFXa, DFYa and Sigma 1,2,3 product ranges

	Lead length m	Order no.
Universal cable, 5-pin round plug	2 m	1001300
Universal cable, 5-pin round plug	5 m	1001301
Universal cable, 5-pin round plug	10 m	1001302
Universal cable, 5-pin round plug	50 m	1032811

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, gamma/ XL, DFXa, DFYa and Sigma 1,2,3 product ranges via contacts.

	Lead length m	Order no.
External cable 5-pin round plug	2 m	707702
External cable 5-pin round plug	5 m	707703
External cable 5-pin round plug	10 m	707707

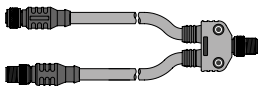
Control cable for configurable inputs and outputs

Control cable and round plug for configurable inputs and outputs for controlling the process timer or for additional alarm messages.

Suitable for metering pumps of the gamma/ XL and DFXa product ranges.

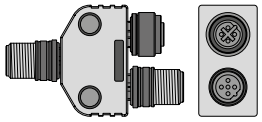
	Lead length	Order no.
Control cable for configurable inputs and outputs	2 m	1094091
Control cable for configurable inputs and outputs	5 m	1094093
Control cable for configurable inputs and outputs	10 m	1094092

PROFIBUS® Adapter, Enclosure Rating IP 65



P_AC_0245_SW

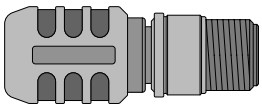
Description		Fig.	Order no.
Y-adapter 2 x M12 x 1 male/female	M12 x 1 male	P_AC_0245_SW	1040956
PROFIBUS® termination assembly, comprising a Y-plug and terminating resistance	M12	-	1040955
PROFIBUS® Y-adapter	M 12 x 1	P_AC_0230_SW	1036621
PROFIBUS® termination resistor, plug-in	M 12 x 1	P_AC_0239_SW	1036622



P_AC_0230_SW

Cabling accessories for CAN pumps

This BUS accessory can be used for all CAN pumps and Modbus RTU pumps. The M12 plug connectors, cables and terminal resistors for CAN can also be used for Modbus connections. Use the cables listed below with open ends 1113889 to run to the Modbus PLC.



P_AC_0239_SW

	Length m	Order no.
T-distributor M12 5 pole CAN	-	1022155
Termination resistor M12 coupling	-	1022154
Termination resistor M12 plug	-	1022592
Connecting cable - CAN M12 5-pin.	0.3	1024568
Connecting cable - CAN M12 5-pin.	0.5	1022137
Connecting cable - CAN M12 5-pin.	1.0	1022139
Connecting cable - CAN M12 5-pin.	2.0	1022140
Connecting cable - CAN M12 5-pin.	5.0	1022141
Connecting cable - CAN M12 5-pin.	10	1046383
Connecting cable - CAN M12 5-pin.	25	1055588
Connecting cable - CAN M12 5-pin.	50	1055589
Connecting cable - CAN, sold by the metre	-	1022160
Plug-CAN M12 5-pole screw terminal	-	1022156
Coupling-CAN M12 5-pole screw terminal	-	1022157
Connecting cable - Modbus RTU - PLC M12 A-cod. pin with 5 pins, cable end sleeve 1 m *	-	1113889

* TN 1113889 can be used as a connecting cable between Modbus RTU and the PLC. CAN cables can be used to run to the pump.

1.5 Accessories for Low-Pressure Metering Pumps

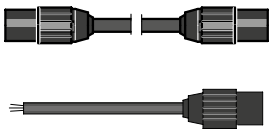
P_AC_0243_SW

Reed cable with 3-pin round plug, PE

For metering pumps from the sigma, beta, gamma/ X, gamma/ XL, DULCOFLEX DFXa and DULCOFLEX DFYa product ranges with 3-pin round connector and 3-wire cable with open end for level control.

Suitable for suction lance for motor-driven, solenoid and peristaltic metering pumps →164

Lead length m	Order no.
2	1030334
3	1030335
5	1030336



P_AC_0243_SW

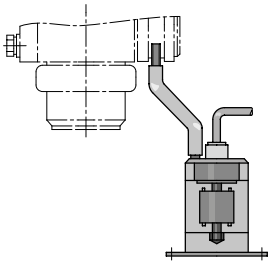
Level sensor cable for connecting universal suction lance and motor-driven, solenoid and peristaltic metering pumps

To connect the level switch of the universal suction lance to metering pumps from the sigma, beta, gamma/ X, gamma/ XL, DULCOFLEX DFXa and DULCOFLEX DFYa product ranges or to the superordinate system (e.g. PCS).

Suitable for PPE universal suction lance for motor-driven, solenoid and peristaltic metering pumps →163

	Lead 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

1.5.4.2 Safety Equipment



Diaphragm rupture indicator

To trigger an alarm and switch off the metering pump in the event of diaphragm rupture. Consisting of PVC/ PE level switch, clear acrylic 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, Meta, Makro TZ and Makro/5

Retrofitting is also possible

	Order no.
Diaphragm rupture indicator for pumps of the beta, Meta and Makro TZ product ranges	803640

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.

Suitable for gamma/ X, gamma/ XL and DFXa pump product ranges

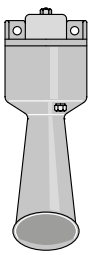
It can also be retrofitted in the backplate.

	Order no.
Diaphragm rupture indicator with optical sensor for pumps of the gamma/ X and gamma/ XL product ranges and DFXa	1044477

Horn

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.
Horn	705002

Indicator Lamp

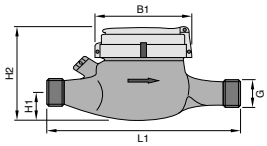
Red for wall mounting 230 V, 50-60 Hz (e.g. in connection with fault signalling relay, relay control or clock generator relay)

	Order no.
Indicator lamp, red	914780

1.5 Accessories for Low-Pressure Metering Pumps

1.5.5 Contact Water Meters for Use in Potable Water and Accessories

Contact water meter for cold water



Multi-jet dry water meter, max. water temperature 50 °C.

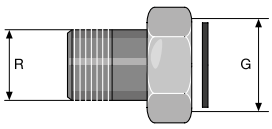
Horizontal fitting position, laterally tilted up to 90° and vertically rising and falling. With reed switch and 2 m cable with injection-moulded round coupling for direct connection to the external contact input of the metering pump.

Pulse value: 1/l

Suitable for metering pumps of the beta, gamma/ X, gamma/ XL and sigma X product ranges.

Threaded connector width	Connector thread	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

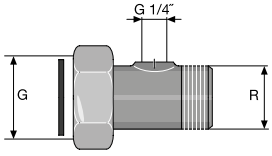
Union assembly set with seal



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

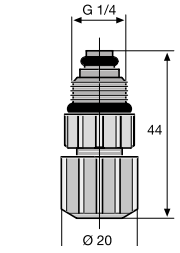
Complete threaded connector with seal and connector for injection valve

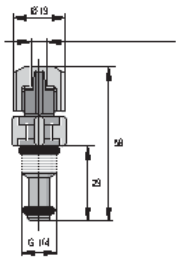


For threaded water meter with G 1/4 connector for injection valve, brass.

		Order no.
G 1 – 1/4	R 3/4	359030
G 1 1/4 – 1/4	R 1	359032
G 2 – 1/4	R 1 1/2	359038
G 2 1/2 – 1/4	R 2	801321

O-ring loaded injection valve





P_AC_0009_SW

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

Connection size	Material	oØ x iØ mm	Fig.	Order no.
6/4 - G 1/4 short	PP/FKM	6 x 4	P_AC_0008_SW	914754
6/4 - G 1/4 long	PP/FKM	6 x 4	P_AC_0009_SW	741193
6/4 - G 1/4 short	PC/FKM	6 x 4	P_AC_0008_SW	914558
6/4 - G 1/4 long	PC/FKM	6 x 4	P_AC_0009_SW	915091

Application when using appropriate metering line

25 °C – max. operating pressure 16 bar

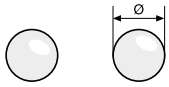
45 °C – max. operating pressure 9 bar

1.5.6 Mechanical/hydraulic special accessories

1.5.6.1 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.

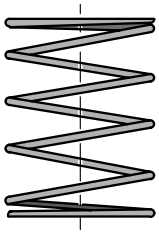
Valve balls



Material	Diameter Ø	Description	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
Ceramic	20.0	to valve DN 20	404273
Ceramic	25.0	to valve DN 25	404274
Ceramic	38.1	to valve DN 40	404278

Please enter the identity code of the selected pump.

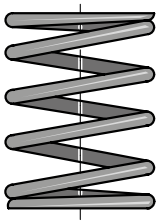
Valve springs for liquid ends



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.

Material	Priming pressure bar	Description	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
Hast. C	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

1.5 Accessories for Low-Pressure Metering Pumps



Valve springs for injection valve made of stainless steel 1.4568

Approx. 0.5/1/2 bar prepressure for increasing metering accuracy and preventing suction and siphoning effect.

Material	Priming pressure bar	Description	Order no.
1.4568	1.0	for R 1/4" connector - Ø 6 mm	469401
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 springs for injection valve made of Hast. C

Approx. 0.5/1/2 bar prepressure for increasing metering accuracy and preventing suction and siphoning effect.

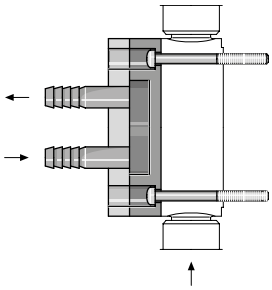
Material	Priming pressure bar	Description	Order no.
Hast. C	0.5	for R 1/2" connector - Ø 6, 8 and 12 mm	469404
Hast. C	1.0	for R 1/2" connector - Ø 6, 8 and 12 mm	469413
Hast. C	2.0	for R 1/2" connector - Ø 6, 8 and 12 mm	469410
Hast. C	0.5	for DN 10	469115
Hast. C	1.0	for DN 10	469119
Hast. C	0.5	for DN 15	469108
Hast. C	1.0	for DN 15	469116
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 32	1002799
Hast. C	1.0	for DN 32	1002805
Hast. C	0.5	for DN 40	469104

Valve springs for injection valve made of Hast. C with FEP coating

The FEP-coated Hastelloy C valve spring is ideal for use with chemically aggressive products.

Material	Priming pressure bar	Description	Order no.
Hast. C/FEP	0.5	for R 1/2” connector – Ø 6, 8 and 12 mm	818590
Hast. C/FEP	1.0	for R 1/2” connector – Ø 6, 8 and 12 mm	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

1.5.7 Cooling/Heating Device for Diaphragm Metering Pumps



For stainless steel dosing head. For installing on dosing head, retrofitting also possible. Connecting sockets for cooling/heating medium Ø 10 mm, complete with fixing bolts. Dimensions in mm, outer diameter (Ø O), hole circle diameter (Ø HC).

Temperature -10...80 °C

For pump	Ø A mm	Ø HC mm	Order no.
HYDRO HP2a/3 FMH 025/060	-	-	1024743
HYDRO HP3a FMH 150	-	-	1040112
HYDRO HP4a 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

1.5 Accessories for Low-Pressure Metering Pumps

1.5.8 PE Metering Tanks and Collecting Pans

1.5.8.1 Dosing Tanks

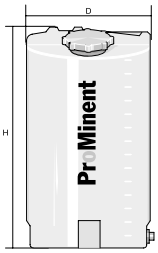
Anyone who works with chemicals, needs to store them safely. ProMinent dosing tanks are tough and ideal for working with metering pumps.

Capacity 35 – 1,000 l

PE storage tanks produced in a rotation process. ProMinent metering pumps, suction lances and stirrers can all be added. The stackable PE collecting 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 tanks
- Safe storage: A screw cover closes safely (push-on lid for 35-litre tank)
- Flat sides to secure the tank.
- Standard colours: natural and black.



Natural coloured/transparent PE metering tank

Threaded bush for the dosing pumps	Usable capacity l	Dim. D mm	Dim. H mm	Weight kg	Order no.
without threaded sockets	35	350	485	3.5	791993
gamma/ X, beta	60	410	590	5.0	791994
alpha, beta, gamma/ X	100	500	760	7.0	1001490
alpha, beta, gamma/ X	140	500	860	9.5	791995
alpha, beta, gamma/ X, Sigma/ 1/ 2/ 3, gamma/ XL	250	650	1,100	17.5	1023175
2 x gamma/ X, 2 x Sigma/ 1, 2, 3, 2 x gamma/ XL, 2 x beta	500	820	1,215	33.0	791997
2 x gamma/ X, 2 x Sigma/ 1, 2, 3, 2 x gamma/ XL, 2 x beta	1000	1,070	1,260	51.0	1010909
2 x gamma/ X, 2 x Sigma/ 1, 2, 3, 2 x gamma/ XL, 2 x beta	1500	1,150	1,735	80.0	1060975

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.

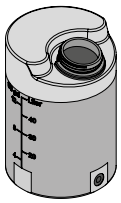
When using manual or electric stirrers, the customer should produce through holes on the tank.

Black PE metering tank

For light-sensitive media (UV-stabilised). Conductive material for discharging static electric discharges to protective earth conductor potential.

Usable capacity l	Order no.
35	1039183
60	1039184
100	1039185
140	1039186
250	1039187
500	1039188
1000	1039189
1500	1139861

Dosing tanks without ProMinent logo are available on request.



Natural/transparent PE dosing tank with flat mounting surface

- '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

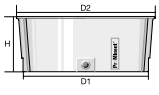
Threaded bush for the dosing pumps	Dim. D mm	Dim. H mm	Usable capacity l	Weight kg	Order no.
without threaded sockets	410	590	60	5.0	1061060
without threaded sockets	500	760	100	7.0	1008599
without threaded sockets	650	1,100	250	17.5	1061061

1.5.8.2 PE Stackable Collecting Pans For Metering Tanks

Made of UV-stabilised polyethene in a stackable design with ProMinent logo. 2 flat sides for fixing the collecting pan.

PE colourless/transparent stackable collecting pans

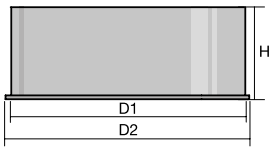
Usable capacity l	D1 mm	D2 mm	Dim. H mm	Weight kg	Order no.
35	507	565	220	3.0	1010879
60	607	680	270	4.3	1010880
100	727	802	320	6.5	1010881
140	727	811	370	7.0	1010882
250	807	917	520	11.0	1010883
500	1009	1155	670	16.0	1010884



Black PE Collecting Pan

Usable capacity l	D1 mm	D2 mm	Dim. H mm	Weight kg	Order no.
35	507	565	220	3.0	1139862
60	607	680	270	4.3	1139863
100	727	802	320	6.5	1139974
140	727	811	370	7.0	1081705
250	807	917	520	11.0	1139975
500	1009	1155	670	16.0	1139976

An R 3/4" threaded sleeve is moulded on 35 – 500 litre collecting pans for drainage. This sleeve may require drilling (Ø 10 mm) on-site. An R 3/4" PE sealing stopper with a seal is screwed in (accessory part no. 200692).



Natural PE Collecting Pan

Usable capacity l	D1 mm	D2 mm	Dim. H mm	Weight kg	Order no.
1000	1200	1280	980	34.0	740719
1500	1350	1410	1,280	42.0	1060980

PE black stackable collecting pans

Usable capacity l	D1 mm	D2 mm	Dim. H mm	Weight kg	Order no.
1000	1200	1280	980	34.0	740726
1500	1350	1410	1,280	42.0	1060981

1.5.8.3 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

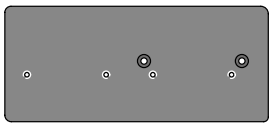
1.5.8.4 Fittings and Attachments for Dosing Tanks

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:

- Suction lances and suction assemblies for solenoid-driven metering pumps see page →160
- Suction lances and suction assemblies for motor-driven metering pumps see page →163

Attachment of pumps to metering tanks



PP mounting plates

For mounting metering pumps on dosing tanks (including screws for securing mounting plates to dosing tanks)

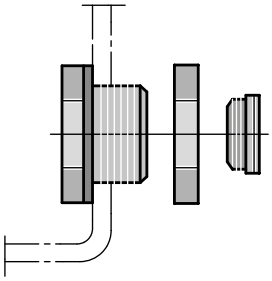
	Order no.
Mounting plate, Sigma/ 1/ 2/ 3	740476
Mounting plate, alpha	790850
Mounting plate for Beta®, gamma/ X	801575
Mounting plate 3 x gamma/ X, 3 x Beta®	801580
Mounting plate 2 x gamma/ X, 2 x Beta®	801583
Installation panel for gamma/ XL	801569

Please refer to the following table for the order numbers for the mounting plates.

	Dosing tank						
Metering pumps	**35 l**	**60 l**	**100 l**	**140 l**	**250 l**	**500 l**	**1000 l/1500 l**
alpha	790850	790850	x	x	x	2 x 790850	2 x 790850
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
2 x beta or 2 x gamma/ X	-	801583	801583	801583	801583	2 x 801583	2 x 801583
3 x beta or 3 x gamma/ X	-	-	801580	801580	801580	2 x 801580	2 x 801580

- 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

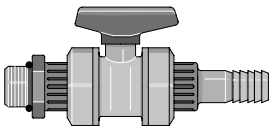
Tank connectors with PE plugs



	Order no.
R 1/2" as additional connecting option for PE 35 – 1000 l dosing tank	809755
R 3/4" as additional connecting option for PE 35 – 1000 l dosing tank	809756

- 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

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

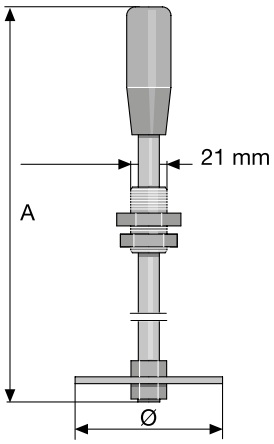
PVC discharge tap

	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

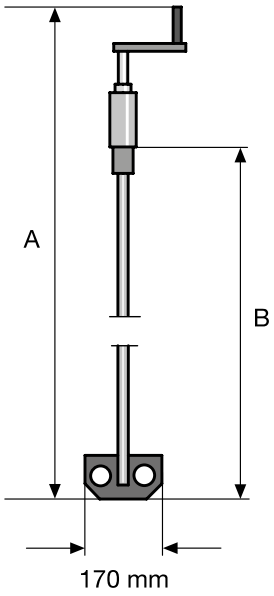
Stirrers



PP Hand mixer

Fully assembled.

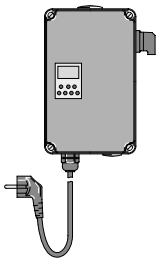
	Dim. A mm	Diameter Ø mm	Order no.
Hand mixer made from PP for 35 and 60 l tanks	515	90	741118
Hand mixer made from PP for 100 and 140 l tanks	715	90	741119
Hand mixer made from PP for 250 and 500 l tanks	1,040	130	741120



PP Hand stirrer

With crank, fully assembled

	Dim. A mm	Dim. 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



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

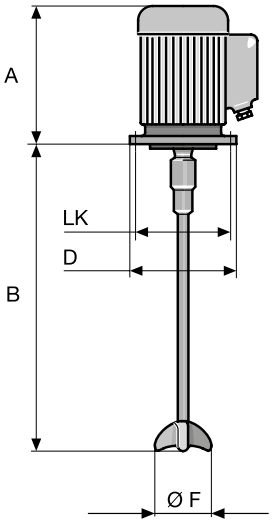
For the batching and mixing of liquids up to max. 500 mPas viscosity. Intermittent operation using timer is recommended.

- Wide-range motor with insulation class F
- 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 l	Power uptake W	Shaft	Propeller	Weight kg	Order no.
60	20	1.4571	PP	2.9	818576
100	180	1.4571	PP	3.0	1001566
140	180	1.4571	PP	7.3	791502
250	180	1.4571	PP	7.3	791503
500	250	1.4571	PP	8.5	791504
1,000	750	1.4571	PVDF	18.0	791458
1,500	550	1.4535	PVDF	22.0	1078647

Chemical resistant electric stirrer



Size	A	B	Ø D	Ø HC	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

For tank l	Power uptake W	Voltage (50 Hz)	Nominal current (50 Hz) A	Speed (50 Hz) rpm	Enclosure rating
60	20	1-phase, 230 V	0.38	1400	IP 55
100	180	1-phase, 230 V	1.9	1440	IP 55
140	180	1-phase, 230 V	1.9	1440	IP 55
250	180	1-phase, 230 V	1.9	1440	IP 55
500	250	1-phase, 230 V	1.8	1440	IP 55
1,000	750	3-phase, 230/400 V	2.96/1.71	1440	IP 55
1,500	550	3-phase, 230/400 V	4.1/2.3	750	IP 55

For tank l	Power uptake W	Shaft	Propeller	Weight kg	Order no.
60	20	1.4571/PVDF	PP	2.9	818577
100	180	1.4571/PVDF	PP	3.0	1002035
140	180	1.4571/PVDF	PP	7.3	791454
250	180	1.4571/PVDF	PP	7.3	791455
500	250	1.4571/PVDF	PP	8.5	791456
1,000	750	1.4571/PVDF	PVDF	18.0	791457
1,500	550	Steel/PE	PVDF	22.0	1078646

1.6 Metering Systems

1.6.1 Overview of Metering Systems DULCODOS

Standardised (modular) metering stations are pre-assembled complete solutions, which are almost immediately available and ready for use for the most important applications. The modularised metering systems with a host of different system components are ideal for precise and controlled basic metering processes involving fluids.

The metering pump is the heart of the metering process. Additional system-related components, such as pulsation dampers, valves, priming aids or leak sensors, are used to ensure an optimum metering process. These components are combined on the basis of a predefined selection (material as well as diameter) of various hose or pipe elements on specially produced panels and/or skids for the customer to mount on the wall or floor.

Whether a cost-optimised standard system or individually customised – you'll find the right solution here to suit the metering function and capacity range of your pump.

Tip: The table provides a good overview.

Selection guide for DULCODOS standardised metering systems

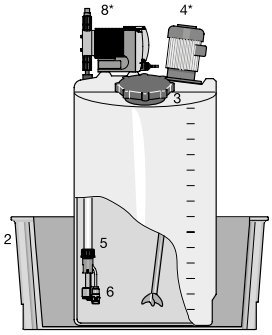
	Number of pumps	Function	Capacity range	see page
Metering system DULCODOS eco (DSBa)	1 metering pump	Storage, metering	35 – 1000 l	→225
Metering system DULCODOS universal (DSUa)	Max. 2 solenoid metering pumps	Metering	up to 75 l/h	→PL
Metering system DULCODOS compact (DSKb)	Max. 1 motor-driven metering pump	Metering	40 – 1000 l/h	→242
Metering system DULCODOS F&B (DSKBF)	Max. 1 metering pump (food)	Metering	up to 410 l/h	→245
Metering system DULCODOS panel (DSWb)	Max. 2 metering pumps	Metering	0.74 – 1000 l/h	→PL

1.6.2 Metering System DULCODOS eco (DSBa)

Choose from a range of different components and adapt the metering system to your requirements.

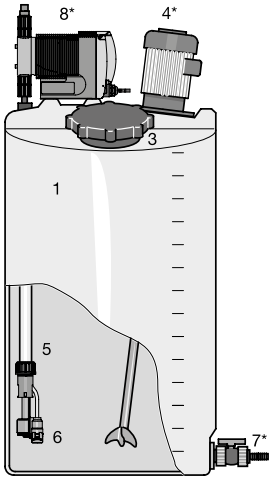
For storing and metering liquid chemicals use a selection guide (identity code) to quickly and flexibly adapt your metering system to your metering task.

Two hydraulic connection points guarantee simple installation of the metering system. The pre-assembled system consists of components that have been perfectly matched to each other to ensure problem-free operation. You get a complete tank-based system, which is ideally suited to mobile applications. A huge range of different metering pumps can be fitted depending on tank volume. The dosing tanks and collection pans we manufacture in-house ensure low system costs, which can be configured individually when ordering. The DULCODOS eco's simple selection system combined with a metering pump increases variance and at the same time makes ordering much easier. The plug-and-play system therefore makes drawing up a quotation a highly efficient process.



Your Benefits

- One freely selectable metering pump mounted on a tank, ready for connection with all the necessary accessories
- Short delivery times
- Excellent 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
- Mobile solution for different and alternating places of use



Technical Details

- Dosing tanks: PE, 35 – 1500 litres
- Collection pan: PE, 35 – 1500 litres
- Lock for screw top
- 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: beta, gamma/ X, gamma/ XL, sigma/ 1, sigma/ 2, sigma/ 3

Field of Application

Treatment of cooling, process and swimming pool water

ProMinent metering systems with PE 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 tanks (35 – 1500 litres)
2. Stackable collection pans (35 – 1500 litres)
3. Lock for tank screw top
4. Stirrer (*)
5. Suction assembly
6. Level switch for suction assembly
7. Drain tap for tank (*)
8. DULCOLEVEL level monitoring
9. Order metering pump (*) separately(Order the pump separately due to the large number of possible pumps that can be installed on 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.

1.6 Metering Systems

Identity Code Ordering System for Metering System with Storage Tank, 35 litres

DSBa	PE tank											
	0035N	35 l PE dosing tank										
		Collecting pan										
		0	Without collecting pan									
		1	with collection pan									
			Version									
			0	With ProMinent logo								
				Lock for tank screw top								
				0	Without lock							
					Stirrers							
					0	None						
						Metering pump mounting						
						0	No pump					
						E	For beta, gamma/ X					
							Suction assembly selection					
							0	Without suction assembly				
							1	Suction assembly with 6x4 Suction hose				
							2	Suction assembly with suction hose 8 x 5				
							3	Suction assembly with suction hose 12 x 9				
								Suction assembly material				
								0	None			
								1	PVC			
								2	PP			
									Suction assembly float switch			
									0	Without level switch		
									1	2-stage, round plug, (6 x 4, 8 x 5, 12 x 9) for Beta®, gamma/ X and XL		
										Accessories - discharge tap for tank		
										0	No accessories	
										1 **	With PVC ball valve, d16 hose sleeve	
											Liquid level monitor	
											0	None
											6	DULCOLEVEL
												Information – pump *
												- e.g. GMXa 0414 PVT

* Please enter the identity code of the selected pump.

** Ball valve can only be selected if the metering station has been ordered without a collecting pan.

Identity Code Ordering System for Metering System with Storage Tank, 60 litres

DSBa	PE tank													
	0060N	60 l PE dosing tank												
		Collecting pan												
		0	Without collecting pan											
		1	with collection pan											
			Version											
			0	With ProMinent logo										
				Lock for tank screw top										
				0	Without lock									
				1	With lock									
					Stirrers									
					0	None								
					B	With PP hand stirrer								
					H	With stainless steel 0.02 kW electric stirrer								
					P	With PVDF 0.02 kW electric stirrer								
						Metering pump mounting								
						0	No pump							
						A	For beta, gamma/ X							
						F	For sigma/ 1							
						P	For gamma/ XL							
							Suction assembly selection							
							0	Without suction assembly						
							1	Suction assembly with 6x4 Suction hose						
							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						
								Suction assembly material						
								0	None					
								1	PVC					
								2	PP					
									Suction assembly float switch					
									0	Without level switch				
									1	2-stage, round plug, (6 x 4, 8 x 5, 12 x 9) for Beta®, gamma/ X and XL				
									2	2-stage, round plug, (DN 10 - 32) for Sigma/ 1/ 2/ 3, gamma/ XL				
										Accessories - discharge tap for tank				
										0	No accessories			
										1 **	With PVC ball valve, d16 hose sleeve			
											Liquid level monitor			
											0	None		
											6	DULCOLEVEL		
												Information – pump *		
												-	e.g. GMXa 0414 PVT	

* Please enter the identity code of the selected pump.

** Ball valve can only be selected if the metering station has been ordered without a collecting pan.

1.6 Metering Systems

Identity Code Ordering System for Metering System with Storage Tank, 100 litres

DSBa	PE tank											
	0100N	100 l PE dosing tank										
		Collecting pan										
		0	Without collecting pan									
		1	with collection pan									
			Version									
			0	With ProMinent logo								
				Lock for tank screw top								
				0	Without lock							
				1	With lock							
					Stirrers							
					0	None						
					C	With PP hand stirrer						
					I	With stainless steel 0.18 kW electric stirrer						
					R	With PVDF 0.18 kW electric stirrer						
						Metering pump mounting						
						0	No pump					
						A	For beta, gamma/ X					
						P	For gamma/ XL					
						L	For sigma/ 1					
							Suction assembly selection					
							0	Without suction assembly				
							1	Suction assembly with 6x4 Suction hose				
							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				
								Suction assembly material				
								0	None			
								1	PVC			
								2	PP			
									Suction assembly float switch			
									0	Without level switch		
									1	2-stage, round plug, (6 x 4, 8 x 5, 12 x 9) for Beta®, gamma/ X and XL		
									2	2-stage, round plug, (DN 10 - 32) for Sigma/ 1/ 2/ 3, gamma/ XL		
										Accessories - discharge tap for tank		
										0	No accessories	
										1 **	With PVC ball valve, d16 hose sleeve	
											Liquid level monitor	
											0	None
											6	DULCOLEVEL
												Information – pump *
												- e.g. GMXa 0414 PVT

* Please enter the identity code of the selected pump.

** Ball valve can only be selected if the metering station has been ordered without a collecting pan.

Identity Code Ordering System for Metering System with Storage Tank, 140 litres

DSBa	PE tank											
	0140N	140 l PE dosing tank										
		Collecting pan										
		0	Without collecting pan									
		1	with collection pan									
			Version									
			0	With ProMinent logo								
				Lock for tank screw top								
				0	Without lock							
				1	With lock							
					Stirrers							
					0	None						
					D	With PP hand stirrer						
					K	With stainless steel 0.18 kW electric stirrer						
					S	With PVDF 0.18 kW electric stirrer						
						Metering pump mounting						
						0	No pump					
						A	For beta, gamma/ X					
						P	For gamma/ XL					
						H	For sigma/ 1					
							Suction assembly selection					
							0	Without suction assembly				
							1	Suction assembly with 6x4 Suction hose				
							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				
								Suction assembly material				
								0	None			
								1	PVC			
								2	PP			
									Suction assembly float switch			
									0	Without level switch		
									1	2-stage, round plug, (6 x 4, 8 x 5, 12 x 9) for Beta®, gamma/ X and XL		
									2	2-stage, round plug, (DN 10 - 32) for Sigma/ 1/ 2/ 3, gamma/ XL		
										Accessories - discharge tap for tank		
										0	No accessories	
										1 **	With PVC ball valve, d16 hose sleeve	
											Liquid level monitor	
											0	None
											6	DULCOLEVEL
												Information – pump *
												- e.g. GMXa 0414 PVT

* Please enter the identity code of the selected pump.

** Ball valve can only be selected if the metering station has been ordered without a collecting pan.

1.6 Metering Systems

Identity Code Ordering System for Metering System with Storage Tank, 250 litres

DSBa	PE tank											
	0250N	250 l PE dosing tank										
		Collecting pan										
		0	Without collecting pan									
		1	with collection pan									
			Version									
			0	With ProMinent logo								
				Lock for tank screw top								
				0	Without lock							
				1	With lock							
					Stirrers							
					0	None						
					E	With PP hand stirrer						
					L	With stainless steel 0.18 kW electric stirrer						
					T	With PVDF 0.18 kW electric stirrer						
						Metering pump mounting						
						0	No pump					
						A	For beta, gamma/ X					
						P	For gamma/ XL					
						B	For sigma/ 2/ 3					
						C	For sigma/ 1					
							Suction assembly selection					
							0	Without suction assembly				
							1	Suction assembly with 6x4 Suction hose				
							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				
								Suction assembly material				
								0	None			
								1	PVC			
								2	PP			
									Suction assembly float switch			
									0	Without level switch		
									1	2-stage, round plug, (6 x 4, 8 x 5, 12 x 9) for Beta®, gamma/ X and XL		
									2	2-stage, round plug, (DN 10 - 32) for Sigma/ 1/ 2/ 3, gamma/ XL		
										Accessories - discharge tap for tank		
										0	No accessories	
										1 **	With PVC ball valve, d16 hose sleeve	
											Liquid level monitor	
											0	None
											6	DULCOLEVEL
												Information – pump *
												- e.g. GMXa 0414 PVT

* Please enter the identity code of the selected pump.

** Ball valve can only be selected if the metering station has been ordered without a collecting pan.

Identity Code Ordering System for Metering System with Storage Tank, 500 litres

DSBa	PE tank												
	0500N	500 l PE dosing tank											
		Collecting pan											
		0	Without collecting pan										
		1	with collection pan										
			Version										
			0	With ProMinent logo									
				Lock for tank screw top									
				0	Without lock								
				1	With lock								
					Stirrers								
					0	None							
					F	With PP hand stirrer							
					M	With stainless steel 0.25 kW electric stirrer							
					U	With PVDF 0.25 kW electric stirrer							
						Metering pump mounting							
						0	No pump						
						A	For beta, gamma/ X						
						P	For gamma/ XL						
						C	For sigma/ 1						
						J	For sigma/ 2/ 3						
							Suction assembly selection						
							0	Without suction assembly					
							1	Suction assembly with 6x4 Suction hose					
							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					
								Suction assembly material					
								0	None				
								1	PVC				
								2	PP				
									Suction assembly float switch				
									0	Without level switch			
									1	2-stage, round plug, (6 x 4, 8 x 5, 12 x 9) for Beta®, gamma/ X and XL			
									2	2-stage, round plug, (DN 10 - 32) for Sigma/ 1/ 2/ 3, gamma/ XL			
										Accessories - discharge tap for tank			
										0	No accessories		
										1 **	With PVC ball valve, d16 hose sleeve		
										2 **	With PP ball valve, d20 hose sleeve		
											Liquid level monitor		
											0	None	
											6	DULCOLEVEL	
												Information – pump *	
												-	e.g. GMXa 0414 PVT

* Please enter the identity code of the selected pump.

** Ball valve can only be selected if the metering station has been ordered without a collecting pan.

1.6 Metering Systems

Identity Code Ordering System for Metering System with Storage Tank, 1000 litres

DSBa	PE tank												
	1000N	1000 l PE dosing tank											
		Collecting pan											
		0	Without collecting pan										
		1	with collection pan										
			Version										
			0	With ProMinent logo									
				Lock for tank screw top									
				0	Without lock								
				1	With lock								
					Stirrers								
					0	None							
					G	With PP hand stirrer							
					N	With stainless steel 0.75 kW electric stirrer							
					W	With PVDF 0.75 kW electric stirrer							
						Metering pump mounting							
						0	No pump						
						A	For beta, gamma/ X						
						P	For gamma/ XL						
						B	For sigma/ 2/ 3						
						C	For sigma/ 1						
							Suction assembly selection						
							0	Without suction assembly					
							1	Suction assembly with 6x4 Suction hose					
							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					
								Suction assembly material					
								0	None				
								1	PVC				
								2	PP				
									Suction assembly float switch				
									0	Without level switch			
									1	2-stage, round plug, (6 x 4, 8 x 5, 12 x 9) for Beta®, gamma/ X and XL			
									2	2-stage, round plug, (DN 10 - 32) for Sigma/ 1/ 2/ 3, gamma/ XL			
										Accessories - discharge tap for tank			
										0	No accessories		
										1 **	With PVC ball valve, d16 hose sleeve		
										2 **	With PP ball valve, d20 hose sleeve		
											Liquid level monitor		
											0	None	
											6	DULCOLEVEL	
												Information – pump *	
												-	e.g. GMXa 0414 PVT

* Please enter the identity code of the selected pump.

** Ball valve can only be selected if the metering station has been ordered without a collecting pan.

Identity code ordering system for metering system with storage tank, 1500 litres

DSBa	PE tank															
	1500N	1500 l PE dosing tank														
		Collecting pan														
		0	Without collecting pan													
		1	with collection pan													
			Version													
			0	With ProMinent logo												
				Lock for tank screw top												
				0	Without lock											
				1	With lock											
					Stirrers											
					0	None										
					O	With stainless steel electric stirrer 0.55 kW										
					X	With electric stirrer ST./PE 0.55 kW										
						Metering pump mounting										
						0	No pump									
						A	For beta, gamma/ X									
						P	For gamma/ XL									
						B	For sigma/ 2/ 3									
						C	For sigma/ 1									
							Suction assembly selection									
							0	Without suction assembly								
							1	Suction assembly with 6x4 Suction hose								
							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								
								Suction assembly material								
								0	None							
								1	PVC							
								2	PP							
									Suction assembly float switch							
									0	Without level switch						
									1	2-stage, round plug, (6 x 4, 8 x 5, 12 x 9) for Beta®, gamma/ X and XL						
									2	2-stage, round plug, (DN 10 - 32) for Sigma/ 1/ 2/ 3, gamma/ XL						
										Accessories - discharge tap for tank						
										0	No accessories					
											Liquid level monitor					
											0	None				
											6	DULCOLEVEL				
												Information – pump *				
												-	e.g. GMXa 0414 PVT			

* Please enter the identity code of the selected pump.

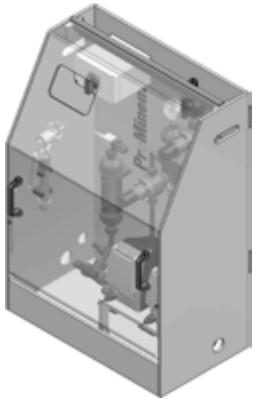
1.6 Metering Systems

1.6.3 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.



DULCODOS universal mini PP, type 1

DULCODOS universal mini PP, type 2

DULCODOS universal mini PP, type 3

The metering system DULCODOS universal mini PP 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 valve block.

The compact metering system is optionally available with up to two solenoid-driven metering pumps of the beta 4 or 5, gamma/ X and gamma/ XL product range. It is also easy to operate. The system is cost-effective and can be delivered extremely quickly.

Your Benefits

- Compact and well-arranged 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, splash guard

Technical Details

- ProMinent solenoid-driven metering pumps beta 4/5, gamma/ X or gamma/ XL
- Dimensions of metering frame:
- Type 1: 850 x 600 x 520 mm (H x W x D)
- Type 2: 1000 x 700 x 520 mm (H x W x D)
- Type 3: 850 x 900 x 520 mm (H x W x D)
- Retaining tank with leak sensor
- Flushing connectors
- Terminal box with main switch
- Splash guard available for selection
- Mounting frame material: PP

Field of Application

- Cooling water treatment
- Wastewater 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

Identity code ordering system for 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

	Mounting frame
A	PP white, 850 x 600 x 520 mm (H x W x D)
B	PP white, 1,000 x 700 x 520 mm (H x W x D)
C	PP white, 850 x 900 x 520 mm (H x W x D)

	Version
00	With ProMinent logo
01	Without ProMinent Logo

	Pulsation damper
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

	Hydraulic connectors
0	Insert
1	Hose nipple 6x4
2	Hose nipple 8x5
3	Hose nipple 12x9
4	Pressure hose nozzle DN10

	Flushing connectors
0	Closed
1	Pressure hose nozzle DN10
2	Gardena

	Splash guard
0	None
A	With splash guard, W= 600 mm
B	With splash guard, W= 700 mm
C	With splash guard, W= 900 mm

	Stainless steel bracket
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

	Pump 1
00	No pump
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
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, 12.9
54	2 bar/32.00 l/h, BT5b 0232 NPE2000U1100000, 12x9
D1	16 bar / 12 l/h, GXLAEU1612PVT20000U11030DE, 8x5
D2	10 bar / 19.6 l/h, GXLAEU1020PVT20000U11030DE, 12x9
D3	7 bar / 29.4 l/h, GXLAEU0730PVT20000U11030DE, 12X9
D4	4 bar / 49.0 l/h, GXLAEU0450PVT20000U11030DE, DN10
D5	2 bar / 78.5 l/h, GXLAEU0280PVT20000U11030DE, DN10
X1	16 bar / 3.6 l/h, GMXa 1604 PVT20000U110300DE, 6x4
X2	7 bar / 7.6 l/h, GMXa 0708 PVT20000U110300DE, 8x5
X3	10 bar / 9.0 l/h, GMXa 1009 PVT20000U110300DE, 8x5
X4	4 bar / 13.5 l/h, GMXa 0414 PVT20000U110300DE, 8x5
X5	7 bar / 14.5 l/h, GMXa 0715 PVT20000U110300DE, 8x5
X6	2 bar / 19.7 l/h, GMXa 0220 PVT20000U110300DE, 12x9
X7	4 bar / 24.0 l/h, GMXa 0424 PVT20000U110300DE, 12x9
X8	2 bar / 45.0 l/h, GMXa 0245 PVT00000U110300DE, 12x9

	Pump 2
00	No pump
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 PVT 2000U1100000, 8x5
45	4 bar / 12.30 l/h, BT4b 0413 PVT2000U1100000, 8x5
46	2 bar / 19.00 l/h, BT4b 0220 PVT2000U1100000, 12x9
51	10 bar / 6.80 l/h, BT5b 1008 PVT2000U1100000, 8x5
52	7 bar / 11.0 l/h, BT5b 0713 PVT2000U1100000, 8x5

1.6 Metering Systems

53	4 bar / 17.10 l/h, BT5b 0420 PVT2000U1100000, 12x9
54	2 bar / 32.00 l/h, BT5b 0232 NPE2000U1100000, 12x9
D1	16 bar / 12 l/h, GXLAEU1612PVT20000U11030DE, 8x5
D2	10 bar / 19.6 l/h, GXLAEU1020PVT20000U11030DE, 12x9
D3	7 bar / 29.4 l/h, GXLAEU0730PVT20000U11030DE, 12x9
D4	4 bar / 49.0 l/h, GXLAEU0450PVT20000U11030DE, DN10
D5	2 bar / 78.5 l/h, GXLAEU0280PVT20000U11030DE, DN10
X1	16 bar / 3.6 l/h, GMXa 1604 PVT20000U110300DE, 6x4
X2	7 bar / 7.6 l/h, GMXa 0708 PVT20000U110300DE, 8x5
X3	10 bar / 9.0 l/h, GMXa 1009 PVT20000U110300DE, 8x5
X4	4 bar / 13.5 l/h, GMXa 0414 PVT20000U110300DE, 8x5
X5	7 bar / 14.5 l/h, GMXa 0715 PVT20000U110300DE, 8x5
X6	2 bar / 19.7 l/h, GMXa 0220 PVT20000U110300DE, 12x9
X7	4 bar / 24.0 l/h, GMXa 0424 PVT20000U110300DE, 12x9
X8	2 bar / 45.0 l/h, GMXa 0245 PVT00000U110300DE, 12x9

	Operating instructions	
	DE	German
	EN	English
	FR	French
	ES	Spanish
	PT	Portuguese
	IT	Italian
		Approvals
		01 CE mark

1.6.4 Metering System DULCODOS panel

Modular Metering System for high-precision chemical dosing

Pump capacity from 0.01 to 1,000 l/h depending on the pump selected, back pressure 10 - 2 bar

The Metering System DULCODOS panel is modular & flexible - with a choice of three Metering Pumps and even more options

DULCODOS panel DSWc combines individual configuration and short delivery times.

The Metering System offers **maximum flexibility** in pump selection, as up to 3 pumps with a capacity range of up to 1,000 l/h can be used.

As with a **modular system**, the components are selected according to material resistance, pump performance and function and are perfectly tuned to each other.
This includes the mounting plate, piping, hydraulic and electrical accessories. Additional features can be added on top for even more **safety and convenience** if required.

The Metering System DULCODOS® panel DSWc requires only a **small footprint** thanks to its **standardization** and optimised frame. The modular design makes it **quickly available** to the customer despite its individuality.

Your Benefits

NEW

- Modular plug-and-play metering station
- Large pump selection with 3 pumps combined covers comprehensive dosing volumes
- Flexible and customizable with many configurable product features
- Modular Metering System with three low-pressure metering pumps (one of which is on standby)
- Plug-and-play system with customizable and advanced product features
  - Flow meter
  - Priming aids
  - Filter inserts
  - Filters
- Maximum of Safety
  - Easy-to-handle splash guard
  - Retaining tank with leak sensor
  - Overflow vessel with acid vapor separator
- Innovative installation for maximum flexibility thanks to movable mounting plates
- Wide range of material resistances (thanks to infrared welding)

1.6 Metering Systems

Technical Details

- Innovative construction for maximum flexibility with height-adjustable piping on the pressure and suction side and laterally adjustable and rotatable pumps
- Easy to service due to accessibility of the dosing head
- High-quality infrared-welded PVC and PVDF pipework|tubing with EPDM and FKM seals
- Options for outgassing media, e.g. peroxides
- Priming aids or vacuum cylinders
- 3-way ball valves for system flushing
- Manometers and diaphragm seals for monitoring the working pressure
- High-quality pulsation damper with integrated bladder
- Clamp-on ultrasonic flow meters
- Filter inserts integrated in the pressure side
- Backwashing for relief on the pressure side
- Overflow functions with various options such as collecting vessel and fume separator
- Electrical pre-installation in terminal box with main switch
- Retaining tank with leak sensor as an option, also with WHG approval
- Frame dimensions (skid width x height) for 1 pump or 2 pumps with 1 point of injection (standby) depending on the pump capacity of the metering pump:
  - 0 to 99 l/h: 1200 x 1550 mm
  - 100 to 399 l/h: 1200 x 1800 mm
  - 400 to 1,040 l/h: 1200 x 1950 mm
- The following dimensions for 2 pumps with 2 points of injection and 3 pumps:
  - 0 to 99 l/h: 1800 x 1550 mm
  - 100 to 399 l/h: 1800 x 1800 mm
  - 400 to 1,040 l/h: 1800 x 1950 mm
- Frame depth 650 mm
- Flow-optimized due to curved elements
- Pressure-tested priming and overflow vessels
- In accordance with European standards for complete machines: CE or manufacturer's declaration

Field of Application

- Cooling water treatment
- Waste water treatment
- Water recycling plants
- Electroplating
- Power plants
- Chemical-intensive industries such as paper and textiles

Identity code ordering system Metering System DULCODOS® panel (DSWC)

DSWc	Product range					
	DSWC	Dulcodos plate-mounted				
		Application				
		S	Max. 3 pumps GXLa-sigma/ 3			
			Pump function			
			1	1 pump, 1 point of injection		
			D	2 pumps standby (2P-1D)		
			2	2 pumps, 2 points of injection		
			T	3 pumps standby (3P-2D)		
				Pump type		
				0	no pump	
				S	Magmetering pump (0.01 - 80 l/h)	
				B	Basic Type motor pump (50 - 1,030 l/h)	
				C	Motor pump control type (50 - 1,040 l/h)	
					Pump 1	
					00	without
					01	without adapter S1 < 65l/h
					02	without adapter S1 < 120l/h
					03	without adapter S2Ba < 135l/h
					04	without adapter S2Ba < 350l/h
					05	without adapter S2C < 134l/h
					06	without adapter S2C < 353l/h
					07	without adapter S3 < 365l/h
					08	without adapter S3 < 670l/h
					90	without adapter S3 < 1040l/h
					X1	16 bar/3.6 l/h, GMXa 1604 PVT
					X2	7bar/7.6 l/h, GMXa 0708 PVT
					X3	10bar/9.0 l/h, GMXa 1009 PVT
					X4	4bar/13.5 l/h, GMXa 0414 PVT
					X5	7bar/14.5 l/h, GMXa 0715 PVT
					X6	2bar/19.7 l/h, GMXa 0220 PVT
					X7	4bar/24.0 l/h, GMXa 0424 PVT
					X8	2bar/45.0 l/h, GMXa 0245 PVT
					L1	16 bar/12 l/h, GXLa 1612 PVT
					L2	10 bar/19.6 l/h, GXLa 1020 PVT
					L3	7 bar/29.4 l/h, GXLa 0730 PVT
					L4	4 bar/49.0 l/h, GXLa 0450 PVT
					L5	2 bar/78.5 l/h, GXLa 0280 PVT
					11	12bar/17 l/h, S1BaH 12017 PVT
					12	10bar/22 l/h, S1BaH 10022 PVT
					13	12bar/35 l/h, S1BaH 12035 PVT
					14	7bar/42 l/h, S1BaH 07042 PVT
					15	10bar/44 l/h, S1BaH 10044 PVT
					16	10bar/50 l/h, S1BaH 10050 PVT
					17	7bar/65 l/h, S1BaH 07065 PVT
					18	4bar/84 l/h, S1BaH 04084 PVT
					19	4bar/120 l/h, S1BaH 04120 PVT
					1A	12bar/21 l/h, S1CbH 12017 PVT
					1B	10bar/27 l/h, S1CbH 10022 PVT
					1C	12bar/42 l/h, S1CbH 12035 PVT
					1D	10bar/49 l/h, S1CbH 10050 PVT
					1E	7bar/52 l/h, S1CbH 07042 PVT
					1F	10bar/53 l/h, S1CbH 10044 PVT
					1G	7bar/63 l/h, S1CbH 07065 PVT
					1H	4bar/101 l/h, S1CbH 04084 PVT
					1J	4bar/117 l/h, S1CbH 04120 PVT
					21	10bar/50 l/h, S2BaHM 16050 PVT
					22	10bar/88 l/h, S2BaHM 16090 PVT
					23	7bar/126 l/h, S2BaHM 07120 PVT
					24	10bar/135 l/h,S2BaHM 16130 PVT
					25	7bar/220 l/h, S2BaHM 07220 PVT
					26	4bar/350 l/h, S2BaHM 04350 PVT
					2A	10bar/61 l/h, S2CbH 16050 PVT
					2B	10bar/109 l/h, S2CbH 16090 PVT
					2C	10bar/131 l/h, S2CbH 16130 PVT
					2D	7bar/150 l/h, S2CbH 07120 PVT
					2E	7bar/271 l/h, S2CbH 07220 PVT
					2F	4bar/353 l/h, S2CbH 04350 PVT
					31	10bar/146 l/h,S3BaH 120145 PVT
					32	10bar/208 l/h,S3BaH 120190 PVT
					33	10bar/292 l/h,S3BaH 120270 PVT
					34	10bar/365 l/h,S3BaH 120330 PVT
					35	7bar/410 l/h, S3BaH 070410 PVT
					36	7bar/580 l/h, S3BaH 070580 PVT
					37	4bar/830 l/h, S3BaH 040830 PVT

38	4bar/1030 l/h,S3BaH 041030 PVT
3A	10bar/182 l/h,S3CbH 120145 PVT
3B	10bar/243 l/h,S3CbH 120190 PVT
3C	10bar/365 l/h,S3CbH 120270 PVT
3D	7bar/500 l/h, S3CbH 070410 PVT
3E	7bar/670 l/h, S3CbH 070580 PVT
3F	4bar/1040 l/h,S3CbH 040830 PVT
	Pump 2
	00 without
	01 without adapter S1 < 65l/h
	02 without adapter S1 < 120l/h
	03 without adapter S2Ba < 135l/h
	04 without adapter S2Ba < 350l/h
	05 without adapter S2C < 134l/h
	06 without adapter S2C < 353l/h
	07 without adapter S3 < 365l/h
	08 without adapter S3 < 670l/h
	90 without adapter S3 < 1040l/h
	X1 16 bar/3.6 l/h, GMXa 1604 PVT
	X2 7bar/7.6 l/h, GMXa 0708 PVT
	X3 10bar/9.0 l/h, GMXa 1009 PVT
	X4 4bar/13.5 l/h, GMXa 0414 PVT
	X5 7bar/14.5 l/h, GMXa 0715 PVT
	X6 2bar/19.7 l/h, GMXa 0220 PVT
	X7 4bar/24.0 l/h, GMXa 0424 PVT
	X8 2bar/45.0 l/h, GMXa 0245 PVT
	L1 16 bar/12 l/h, GXLa 1612 PVT
	L2 10 bar/19.6 l/h, GXLa 1020 PVT
	L3 7 bar/29.4 l/h, GXLa 0730 PVT
	L4 4 bar/49.0 l/h, GXLa 0450 PVT
	L5 2 bar/78.5 l/h, GXLa 0280 PVT
	11 12bar/17 l/h, S1BaH 12017 PVT
	12 10bar/22 l/h, S1BaH 10022 PVT
	13 12bar/35 l/h, S1BaH 12035 PVT
	14 7bar/42 l/h, S1BaH 07042 PVT
	15 10bar/44 l/h, S1BaH 10044 PVT
	16 10bar/50 l/h, S1BaH 10050 PVT
	17 7bar/65 l/h, S1BaH 07065 PVT
	18 4bar/84 l/h, S1BaH 04084 PVT
	19 4bar/120 l/h, S1BaH 04120 PVT
	1A 12bar/21 l/h, S1CbH 12017 PVT
	1B 10bar/27 l/h, S1CbH 10022 PVT
	1C 12bar/42 l/h, S1CbH 12035 PVT
	1D 10bar/49 l/h, S1CbH 10050 PVT
	1E 7bar/52 l/h, S1CbH 07042 PVT
	1F 10bar/53 l/h, S1CbH 10044 PVT
	1G 7bar/63 l/h, S1CbH 07065 PVT
	1H 4bar/101 l/h, S1CbH 04084 PVT
	1J 4bar/117 l/h, S1CbH 04120 PVT
	21 10bar/50 l/h, S2BaHM 16050 PVT
	22 10bar/88 l/h, S2BaHM 16090 PVT
	23 7bar/126 l/h, S2BaHM 07120 PVT
	24 10bar/135 l/h,S2BaHM 16130 PVT
	25 7bar/220 l/h, S2BaHM 07220 PVT
	26 4bar/350 l/h, S2BaHM 04350 PVT
	2A 10bar/61 l/h, S2CbH 16050 PVT
	2B 10bar/109 l/h, S2CbH 16090 PVT
	2C 10bar/131 l/h, S2CbH 16130 PVT
	2D 7bar/150 l/h, S2CbH 07120 PVT
	2E 7bar/271 l/h, S2CbH 07220 PVT
	2F 4bar/353 l/h, S2CbH 04350 PVT
	31 10bar/146 l/h,S3BaH 120145 PVT
	32 10bar/208 l/h,S3BaH 120190 PVT
	33 10bar/292 l/h,S3BaH 120270 PVT
	34 10bar/365 l/h,S3BaH 120330 PVT
	35 7bar/410 l/h, S3BaH 070410 PVT
	36 7bar/580 l/h, S3BaH 070580 PVT
	37 4bar/830 l/h, S3BaH 040830 PVT
	38 4bar/1030 l/h,S3BaH 041030 PVT
	3A 10bar/182 l/h,S3CbH 120145 PVT
	3B 10bar/243 l/h,S3CbH 120190 PVT
	3C 10bar/365 l/h,S3CbH 120270 PVT
	3D 7bar/500 l/h, S3CbH 070410 PVT
	3E 7bar/670 l/h, S3CbH 070580 PVT
	3F 4bar/1040 l/h,S3CbH 040830 PVT
	Media resistance

CEI PVC-U, EPDM, IR-welded
CFI PVC-U, FKM, IR-welded
FF0 PVDF, FKM, IR-welded

Priming aid + manual vacuum pump
0 without
V Vacuum cylinder (1 connection)
S Siphon vessel (2 closures)

Pulsation damper
0 without
P with pulsation dam. (incl.DHV)

Filter
0 without
S with filter

Flow meter
0 without
S with flow sensor (can be clamped on)

Overflow recirculation
H with hose sleeve
R on suction side in suction line
T Damage pot

Hydraulic connectors
1 PVC-U d20/DN15 hose sleeve
2 PVC-U d32/DN25 hose sleeve
3 PVDF d20/DN15 Hose sleeve
4 PVDF d32/DN25 Hose sleeve
A Insert - VA pipe 19x1.5
B Insert - VA pipe 29x1.5

Electrical connection
0 without
T Terminal box + repair sh.
M Main switch
R Repair switch
C Terminal box + main switch

Skid, splash guard and base frame
PP pP frame only
PS PP frame, splash guard
PF PP frame, floor claw
SF PP frame, splash guard, floor claw

Leak sensor
0 without
L with leakage probe (floating)
W with leakage probe (WHG approval)

Design
S Standard - with PM logo
0 Without logo

Approval
C CE approval
M Declaration of Incorporation (without CE)

Operating instructions
DE Englisch
EN English
FR French
ES Spanish
PT Portuguese
IT Italian

1.6 Metering Systems

1.6.5 Metering system DULCODOS Compact (DSKb)

Can be deployed in a modular fashion, as if using building blocks, with a motor-driven metering pump for precise metering

Metering rate: 50 – 1040 l/h

The ready-wired metering system DULCODOS Compact is used for the ultra-precise metering of chemicals with a huge range of different motor-driven metering pumps. Thanks to its modular construction, the plug-and-play solution is ideal for replicable installations.

The metering system DULCODOS compact (DSKb) is a flexible and reliable metering solution with a sigma motor pump for delivery volumes of between 50 l/h and 1040 l/h. The construction of the DULCODOS compact allows us to provide a metering station, which can be flexibly integrated into automated industrial processes. With the optional design of a stainless steel assembly frame, applications in the hygiene field are also possible. The metering system is delivered ready mounted and can be quickly and easily installed and started up.

Your Benefits

- Simple and quick to install and commission thanks to its ready-wired design
- Versatile and practical process integration
- Minimal space requirement thanks to compact construction
- Several modules strung together permit multiple system integrity
- Modular construction as well as the options available for selection boost flexibility
- Options: Splash guard, pulsation damper, suction and deaeration device, flushing function, leak sensor, piping on suction side, manometer, returns into overflow vessels on discharge side

Technical Details

- Metering system for the integration of a motor-driven metering pump up to 1040 l/h
- Plastic or stainless steel skid with collection pan; skid dimensions (W x H x D):
  - Polypropylene: 700 x 1100 x 615 mm
  - Stainless steel: 684 x 1092 x 572 mm
- Stainless steel base frame with machine feet
- Splash guard
- Flexible supply cable on the suction side
- PVC, PP and PVDF pipework
- EPDM and FKM seal materials
- Tangit and DTX adhesives
- Hydraulic connectors (hose sleeves, welding/straight solvent unions, stainless steel straight unions)
- Vacuum cylinders or siphon vessels (for outgassing media among other things)
- Returns for relief on the discharge side
- Leak sensor complies with water legislation (German Federal Water Act)
- CE approval

Field of Application

- System solution for precise metering of chemicals
- Replicable applications with excellent process reliability
- Wide range of uses of feed chemical, such as outgassing media (peroxide)

DSKb	DULCODOS Compact DSKb							
	S	1 pump, 1 point of injection						
		Type of control						
		0	no pump, only pump bracket					
		B	Basic type					
		C	Control type					
			Choice of pumps					
			00	no pump, no pump mounting bracket				
			01	no pump, with adapter set S1 < 65 l/h				
			02	no pump, with adapter set S1 < 120 l/h				
			03	no pump, with adapter set S2Ba < 135 l/h				
			04	no pump, with adapter set S2Ba < 350 l/h				
			05	no pump, with adapter set S2C < 131 l/h				
			06	no pump, with adapter set S2C < 353 l/h				
			07	no pump, with adapter set S3 < 365 l/h				
			08	no pump, with adapter set S3 < 670 l/h				
			09	no pump, with adapter set S3 < 1.040 l/h				
			11	10 bar / 35 l/h, S1BaH 3/4-10				
			12	10 bar / 22 l/h, S1BaH 3/4-10				
			13	10 bar / 35 l/h, S1BaH 3/4-10				
			14	10 bar / 44 l/h, S1BaH 3/4-10				
			15	10 bar / 50 l/h, S1BaH 3/4-10				
			16	7 bar / 65 l/h, S1BaH 3/4-10				
			17	7 bar / 42 l/h, S1BaH 1-15				
			18	4 bar / 84 l/h, S1BaH 1-15				
			19	4 bar / 120 l/h, S1BaH 1-15				
			1A	10 bar / 21 l/h, S1CbH 3/4-10				
			1B	10 bar / 27 l/h, S1CbH 3/4-10				
			1C	10 bar / 42 l/h, S1CbH 3/4-10				
			1D	10 bar / 49 l/h, S1CbH 3/4-10				
			1E	10 bar / 53 l/h, S1CbH 3/4-10				
			1F	7 bar / 63 l/h, S1CbH 3/4-10				
			1G	7 bar / 52 l/h, S1CbH 1-15				
			1H	4 bar / 101 l/h, S1CbH 1-15				
			1J	4 bar / 117 l/h, S1CbH 1-15				
			21	10 bar / 50 l/h, S2BaHM 1-15				
			22	10 bar / 88 l/h, S2BaHM 1-15				
			23	10 bar / 135 l/h, S2BaHM 1-15				
			24	7 bar / 126 l/h, S2BaHM 1 1/2-25				
			25	7 bar / 220 l/h, S2BaHM 1 1/2-25				
			26	4 bar / 350 l/h, S2BaHM 1 1/2-25				
			2A	10 bar / 61 l/h, S2CbH 1-15				
			2B	10 bar / 109 l/h, S2CbH 1-15				
			2C	10 bar / 131 l/h, S2CbH 1-15				
			2D	7 bar / 150 l/h, S2CbH 1 1/2-25				
			2E	7 bar / 271 l/h, S2CbH 1 1/2-25				
			2F	4 bar / 353 l/h, S2CbH 1 1/2-25				
			31	10 bar / 146 l/h, S3BaH 1 1/2-25				
			32	10 bar / 208 l/h, S3BaH 1 1/2-25				
			33	10 bar / 292 l/h, S3BaH 1 1/2-25				
			34	10 bar / 365 l/h, S3BaH 1 1/2-25				
			35	7 bar / 410 l/h, S3BaH 2-32				
			36	7 bar / 580 l/h, S3BaH 2-32				
			37	4 bar / 830 l/h, S3BaH 2-32				
			38	4 bar / 1,030 l/h, S3BaH 2-32				
			3A	10 bar / 182 l/h, S3CbH 1 1/2-25				
			3B	10 bar / 243 l/h, S3CbH 1 1/2-25				
			3C	7 bar / 500 l/h, S3CbH 2-32				
			3D	10 bar / 365 l/h, S3CbH 1 1/2-25				
			3E	7 bar / 670 l/h, S3CbH 2-32				
			3F	4 bar / 1,040 l/h, S3CbH 2-32				
				Chemical Resistance				
				CEP	PVC-U, EPDM, Tangit Plus			
				CED	PVC-U, EPDM, Tangit DTX			
				CFD	PVC-U, FKM, Tangit DTX			
				PE0	PP, EPDM			
				FF0	PVDF, FKM			
					Priming Aid			
					0	None		
					S	Siphon vessel (2 connectors + vacuum pump)		
					V	Vacuum cylinder (1 connector)		
						Suction side		
						0	w/o	
						1	Pipe with hose sleeve	
						2	Pipe with 2-way ball valve and Hose Nozzle (stopcock)	
						3	Pipe with 3-way ball valve and Hose Nozzle (Flushing connector)	
							Pressure display	
							0	w/o ProMinent Logo
							M	With manometer

1.6 Metering Systems

Code	Description
Pulsation damper	
0	w/o (Injection Valve only with valve spring)
P	With pulsation damper (incl. back pressure valve)
Flushing function on the discharge side	
0	None
F	with Flush Function
Relief return line	
H	With hose sleeve
R	recirculation
T	Overflow Vessel with Acid Fume Separator
Hydraulic Connectors Discharge Side	
0	w/o
1	Nozzle d25 PVC for hose 25x34
2	Nozzle d25 PP, for hose 25x34
3	Nozzle d25 PVDF, for hose 25x34
4	Straight Solvent Union d25, PVC-U
5	Straight solvent union d25 PVC-C
6	Welding sleeve d25 PP-H
7	Welding sleeve d25 PVDF
A	Insert for stainless steel pipe 19x1.5
B	Insert for stainless steel pipe 23x1.5
C	Insert for stainless steel pipe 29x1.5
Electrical Connection	
0	w/o
T	Terminal box + main switch grey
M	Main switch yellow/red
R	Main switch grey
C	Terminal box + main switch yellow/red
Mounting frame and base frame	
PP	PP Skid w/o Floor Stand
VA	Stainless Steel Skid w/o Floor Stand
PC	PP Skid with Floor Stand
VC	Stainless Steel Skid with Floor Stand
Splash guard	
0	None
S	with splash protection
Leakage sensor	
0	None
L	Leakage Sensor (Floating Switch)
W	Leakage Sensor with WHG approval (Retroreflective)
Version	
S	Standard - with ProMinent Logo
Approvals	
CE	CE mark
MD	Declaration of Incorporation (not CE)
Operating instructions *	
DE	German
EN	English
ES	Spanish
FR	French
PT	Portuguese

* other languages on request

1.6.6 Metering system DULCODOS Compact F&B

Compact dosing system for direct food contact

Metering rate: 0.01 – 410 l/h

DULCODOS Compact F&B is a ready-to-connect, compact dosing system for precise dosing of food-stuffs in accordance with European Regulation EC 1935/2004. The robust stainless steel design fulfils the highest hygiene standards and is ready for immediate use - ideal for flexible integration into beverage and food processes.

nd precisely solves dosing tasks for delivery volumes from a few millilitres to several hundred litres. Thanks to its compact design, it can be flexibly integrated into existing processes and individually configured.

ls of European Regulation (EC) No. 1935/2004 and are therefore approved for contact with food. The optional equipment with peristaltic pumps also allows the dosing of media with high viscosity.

e rinsed using a standard three-stage CIP cleaning process - ideal for sensitive production areas with high hygiene requirements.

Your Benefits

- Plug-and-play dosing system for direct food dosing
- Food contact materials in accordance with EU1935/2004
- Quick and easy installation and commissioning thanks to ready-to-connect design
- Flexible and practical process integration
- Compact design minimises space requirements
- Materials designed for the industry-standard three-stage CIP process (cleaning-in-place)

Technical Details

- Metering system for the integration of a 0.01 - 410 l/h metering pump
- Peristaltic pump up to 65 l/h can be added
- Plastic or stainless steel skid with collection pan; skid dimensions (W x H x D):
  - Polypropylene: 700 x 1100 x 615 mm
  - Stainless steel: 684 x 1092 x 572 mm
- Stainless steel base frame with machine feet
- Splash guard
- Pipework free of adhesive in PVC-U (IR welding) or PP
- EPDM and FKM seal materials
- Hydraulic connectors (hose sleeves, welding/straight solvent unions, stainless steel straight unions)
- Leak sensor complies with water legislation (German Federal Water Act)
- CE approval
- Materials conform to EU Reg. 1935/2004

NEW

Field of Application

- Any applications with direct food contact such as:
  - Breweries
  - Dairies
  - Drinking water bottling
  - Dosing of liquid flavors, food ingredients, vitamins, sugar, or the treatment of product water for beer and lemonade production

1.6 Metering Systems

DULCODOS Compact F&B identity code

Code	Description
DSKb	DULCODOS Compact DSKb
F	Food&Beverage; 1 pump, 1 point of injection
	Type of control
0	no pump, only pump bracket
S	Solenoid metering pump
M	Motor-driven metering pump
P	Peristaltic pump
	Choice of pumps
00	no pump, no pump mounting bracket
T1	Without adapter S1 < 65l/h
T2	Without adapter S1 < 120l/h
T3	Without adapter S2Ba < 135l/h
T4	Without adapter S2Ba < 350l/h
T5	Without adapter S2C < 134l/h
T6	Without adapter S2C < 353l/h
T7	Without adapter S3 < 365l/h
U1	12bar / 17 l/h, S1BaH 3/4-10
U2	10bar / 22 l/h, S1BaH 3/4-10
U3	12bar / 35 l/h, S1BaH 3/4-10
U4	10bar / 44l/h, S1BaH 3/4-10
U5	10bar / 50l/h, S1BaH 3/4-10
U6	7bar / 65l/h, S1BaH 3/4-10
U7	7bar / 42l/h, S1BaH 1-15
U8	4bar / 84l/h, S1BaH 1-15
U9	4bar / 120l/h, S1BaH 1-15
UA	12bar / 21l/h, S1CbH 3/4-10
UB	10bar / 27l/h, S1CbH 3/4-10
UC	12bar / 42l/h, S1CbH 3/4-10
UD	10bar / 49l/h, S1CbH 3/4-10
UE	10bar / 53l/h, S1CbH 3/4-10
UF	7bar / 63l/h, S1CbH 3/4-10
UG	7bar / 52l/h, S1CbH 1-15
UH	4bar / 101l/h, S1CbH 1-15
UJ	4bar / 117l/h, S1CbH 1-15
V1	10bar / 50l/h, S2BaHM 1-15
V2	10bar / 88l/h, S2BaHM 1-15
V3	10bar / 135l/h, S2BaHM 1-15
V4	7bar / 126l/h, S2BaHM 1 1/2-25
V5	7bar / 220l/h, S2BaHM 1 1/2-25
V6	4bar / 350l/h, S2BaHM 1 1/2-25
VA	10bar / 61l/h, S2CbH 1-15
VB	10bar / 109l/h, S2CbH 1-15
VC	10bar / 131l/h, S2CbH 1-15
VD	7bar / 150l/h, S2CbH 1 1/2-25
VE	7bar / 271l/h, S2CbH 1 1/2-25
VF	4bar / 353l/h, S2CbH 1 1/2-25
X1	10bar / 146l/h, S3BaH 1 1/2-25
X2	10bar / 208l/h, S3BaH 1 1/2-25
X3	10bar / 292l/h, S3BaH 1 1/2-25
X4	10bar / 365l/h, S3BaH 1 1/2-25
Y1	3 bar / 65 l/h, DFXa
Z1	7 bar / 30 l/h, GXLa
Z2	10 bar / 20 l/h, GXLa
	Chemical Resistance
CEI	PVC-U, EPDM, IR-geschweißt
CFI	PVC-U, FKM, IR-geschweißt
PEI	PP, EPDM, IR-geschweißt
	Priming Aid
0	None
S	Siphon vessel (2 connectors + vacuum pump)
	Suction side
3	Pipe with 3-way ball valve and Hose Nozzle (Flushing connector)
	Pressure display
0	w/o ProMinent Logo
S	With pressure sensor
	Pulsation damper
P	With pulsation damper (incl. back pressure valve)
	Flushing function on the discharge side
F	with Flush Function
	Relief return line
H	With hose sleeve
	Hydraulic Connectors Discharge Side
0	w/o
A	Insert for stainless steel pipe 19x1.5
B	Insert for stainless steel pipe 23x1.5
C	Insert for stainless steel pipe 29x1.5
U	PVC-U hose sleeve
V	PP hose sleeve

Code	Description
X	PP-H IR welding sleeve
Y	PVC-U IR welding sleeve
	Electrical Connection
C	Terminal box + main switch yellow/red
	Mounting frame and base frame
PP	PP Skid w/o Floor Stand
VA	Stainless Steel Skid w/o Floor Stand
PC	PP Skid with Floor Stand
VC	Stainless Steel Skid with Floor Stand
	Splash guard
0	None
S	with splash protection
	Leakage sensor
0	None
W	Leakage Sensor with WHG approval (Retroreflective)
	Version
0	Without logo
L	Standard - with ProMinent logo and F&B sticker
F	No ProMinent logo, with F&B sticker
	Approvals
CE	CE mark
	Operating instructions *
DE	German
EN	English
ES	Spanish
FR	French
PT	Portuguese

* other languages on request

1.6.7 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

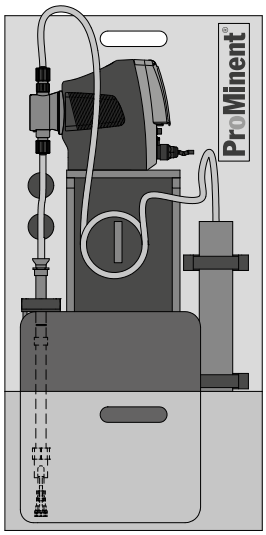
Ready-to-use assembled metering system, essentially consisting of:

- 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 l	Metering pump Capacity l/h	Metering pump Feed Rate bar	Transfer Pump Discharge Flow l/h	Order no.
130	7.1	7	17.1	1039192
250	11.0	7	32	1039193

1.6.8 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.

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
- Volume-proportional metering if customer has a water meter fitted
- Adequate for treatment of up to 372 m^3/h when adding between 0.5 mg/l and 155 m^3/h of chlorine with the addition of 1.2 mg/l (when using sodium 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 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

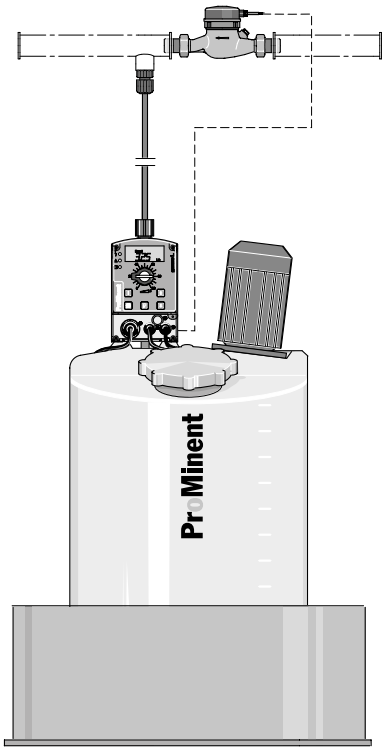
	Metering pump Capacity	Order no.
Potable water disinfection with GMXa 1604	1.6 l/h	1081318

1.6.9 Application Examples

Proportional Metering of Phosphate

Product:	**DULCODOS eco**
Feed chemical:	**Phosphate**
Industry:	**Potable water**
Application:	**Potable water treatment**

The liquid phosphate is added to the potable water as a proportion of volume. The flow meter forwards pulses onto the gamma/ L pump. The metering volume is adjusted by stepping the incoming pulses up or down.



Problems and requirements

Metering phosphate in potable water to prevent limescale and corrosion in the pipework

Operating conditions

- Treatment of potable water
- Fluctuating water demand
- Water temperature of 4 – 30 °C

Notes on use

- Proportional metering of phosphate depending on water supply
- Metering pump is controlled via a contact water meter
- Gauge the metering pump during commissioning

Solution

- DULCODOS eco with 140-litre dosing tank and collecting pan
- gamma/ L with contact input and Pulse Control
- Contact water meter

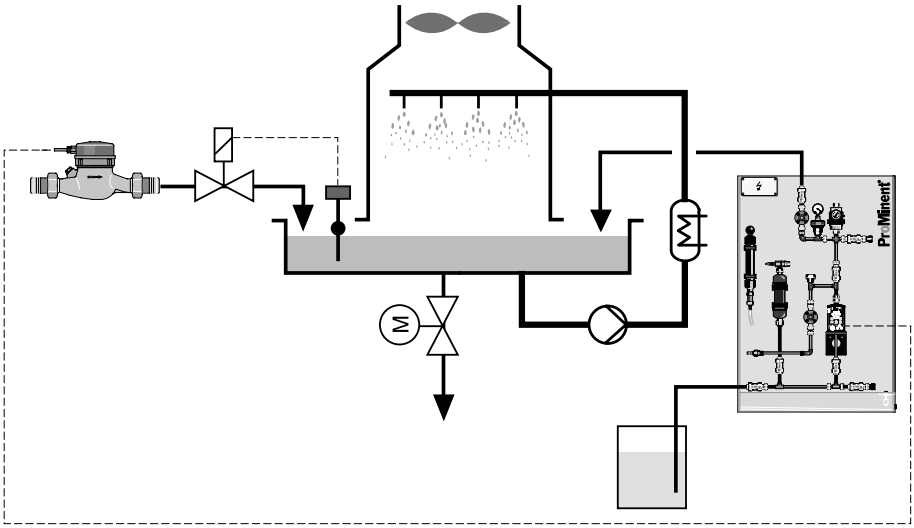
Benefits

- Constant solution concentration even if the water supply fluctuates
- Fully automatic operation with minimum personnel and maintenance requirements
- Versatile process configuration by adapting the pump to different concentration requirements

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.



Problems and requirements

Metering corrosion inhibitors into supply water to prevent limescale and corrosion in the cooling water circuit

Operating conditions

- Treatment of river water
- Fluctuating water demand
- Water temperature of 4 to 20 °C

Notes on use

- Proportional metering of inhibitor depending on water supply
- Metering pump is controlled via a contact water meter
- Gauge the metering pump during commissioning

Solution

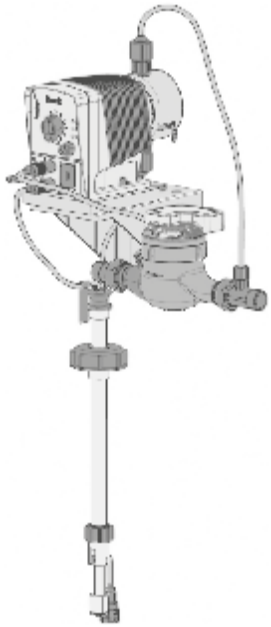
- DULCODOS panel including stand-by pump
- gamma/ L with contact input and Pulse Control
- Contact water meter

Benefits

- Protection against corrosion in the pipework and heat exchanger
- Constant solution concentration even if the water supply fluctuates
- Fully automatic operation with minimum personnel and maintenance requirements
- Versatile process configuration by adapting the pump to different concentration requirements

1.7 Domestic Water Technology

1.7.1 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 metering rate of the Promatik and DULCODOS units. This ensures that the permitted proportions of max 40 mg/l SiO_2 silicate and/or 6.7 mg/l of phosphate PO_4 (5mg/l P_2O_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 at 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 metering system

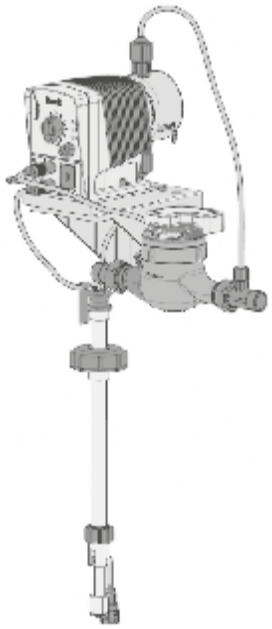
Consisting of a beta metering pump with sound insulation plate, contact water meter, suction assembly with foot valve and 2-phase level switch with pre-warning, acting as dry-running protection and empty signal, injection valve and metering line. With wall brackets to mount the metering pump. Fitting position of the contact water meter – horizontal and vertical. DVGW-tested in conjunction with the EXACTAPHOS® metering solution. DVGW No. NW-9101 CM 0179.

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.

Technical Details

- Consisting of a beta metering pump, contact water meter, suction assembly with foot valve and 2-phase level switch with pre-warning as dry-running protection and empty signal, injection valve and dosing line.
- In the 'R' design compact metering system, the metering pump is built onto the contact water meter.
- In the 'W' design split system there are wall brackets for accommodating the metering pump. Contact cable and PE dosing line 2 m long. Horizontal fitting position of the contact water meter.

Field of Application

Potable water treatment

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
Metering 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
Connector width		R 3/4	R 1	R 1 1/2	R 2
Length without thread	mm	190	260	300	270

	Shipping weight kg	Order no.
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

1.7.2 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

* 200l barrels are only available without DVGW approval.

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

* 200l barrels are only available without DVGW approval.

EXACTAPHOS® P 1020

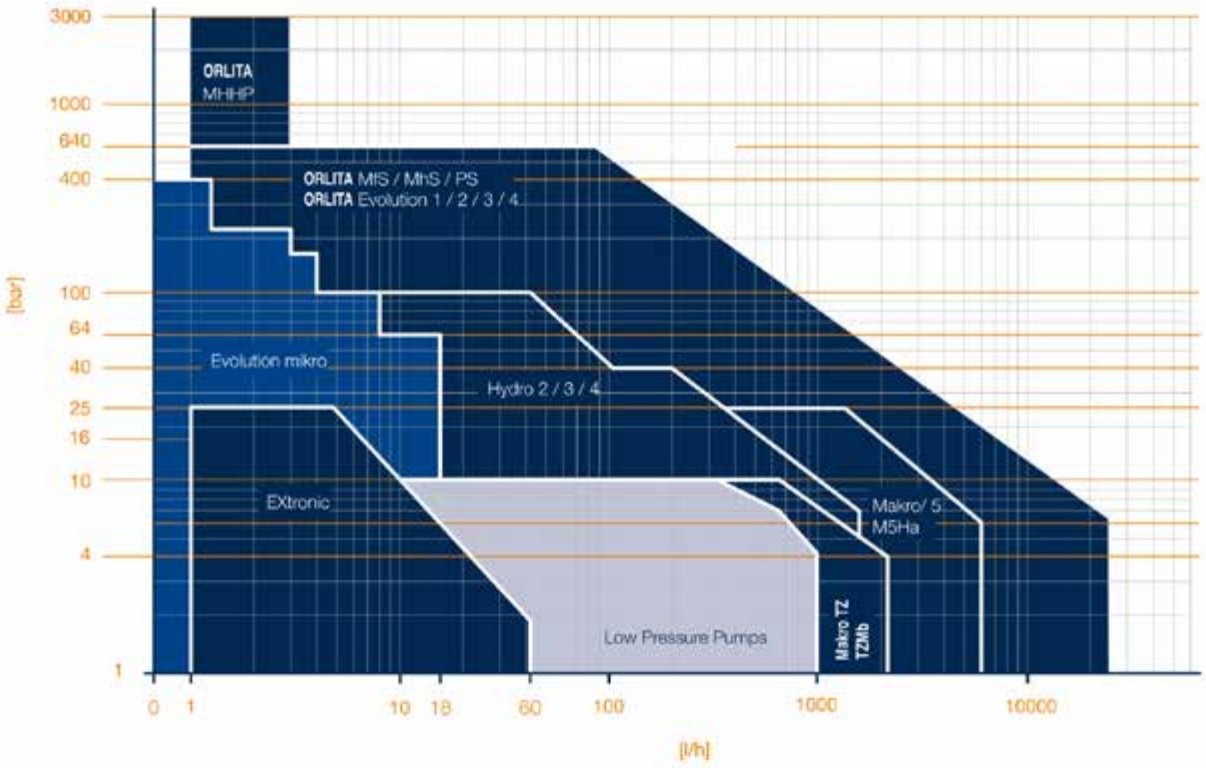
Phosphate liquid metering solution. Drinking water treatment for hard water. Promatik compact metering system.

	Volume l	Order no.
EXACTAPHOS® P 1020	20	950099
EXACTAPHOS® P 1020 *	200	950053

* 200l barrels are only available without DVGW approval.

2.1 Overview of Process Metering Pumps

2.1.1 Selection Guide



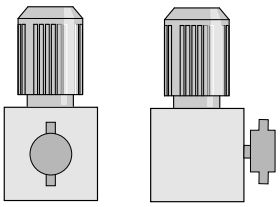
Type	Series	Type	Stroke length mm	Connecting rod force N
Diaphragm Metering Pumps	EXTRONIC	EXBb	0 – 1,25	2,000
	MAKRO	TZMb	0 – 10	8,000
Hydraulic Diaphragm Metering Pumps	HYDRO API	HA1a *	0 – 15	2,000
		HA2a *	0 – 15	2,000
		HA3a *	0 – 15	4,200
		HA4a *	0 – 20	5,800
	HYDRO Classic	HP2a *	0 – 15	2,000
		HP3a *	0 – 15	4,200
		HP4a *	0 – 20	5,800
	Evolution	E1Sa	0 – 16	2,000
		E2Sa	0 – 16	4,500
		EF1a	0 – 16	2,600
		EF2a	0 – 16	6,200
		EF3a	0 – 25	9,000
		EF4a	0 – 40	18,000
		EMFa	0 – 60	500
	MAKRO	M5Ha	0 – 50	10,000
	ORLITA	MhS 18	0 – 15	1,800
		MfS / MhS 35	0 – 20	3,500
		MfS / MhS 600	0 – 40	40,000
		MfS 1400	0 – 60	60,000
Plunger Metering Pumps	sigma	SBKa	0 – 15	1,700
	MAKRO	M5Ka	0 – 50	10,000
		TZKa	0 – 20	8,000
	ORLITA	PS 35	0 – 20	3,500
		PS 80	0 – 20	14,000
		PS 180	0 – 40	18,000
		PS 600	0 – 40	40,000
		Rb 15	0 – 15	1,800
		Rb 150	0 – 32	15,000

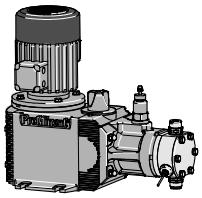
* Stroke volume control

2.1 Overview of Process Metering Pumps

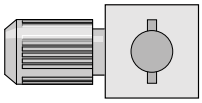
2.1.2 Mounting forms of process metering pumps

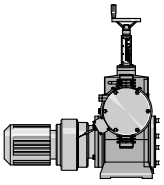
Single-head pump with vertical motor (e.g. HYDRO)



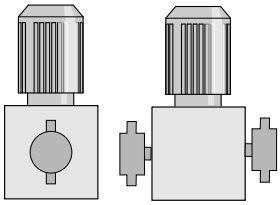


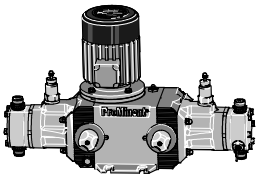
Single-head pump with horizontal motor (e.g. MAKRO)



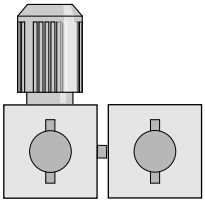


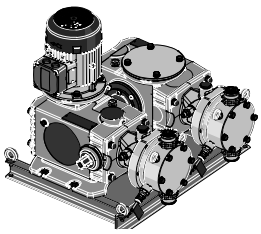
Double-head pump (e.g. HYDRO)
Boxer version



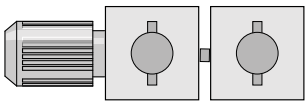


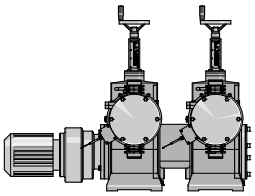
Double pump with vertical motor (e.g. HYDRO)
Duplex version



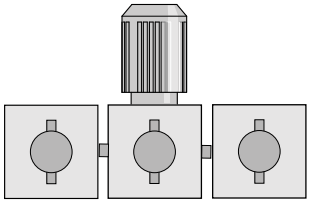


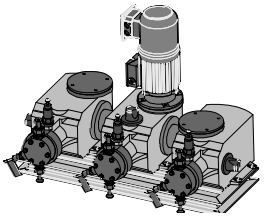
Duplex pump with horizontal motor (e.g. MAKRO)



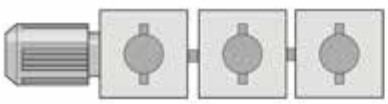


Triple pump with vertical motor (e.g. HYDRO)
Triplex version





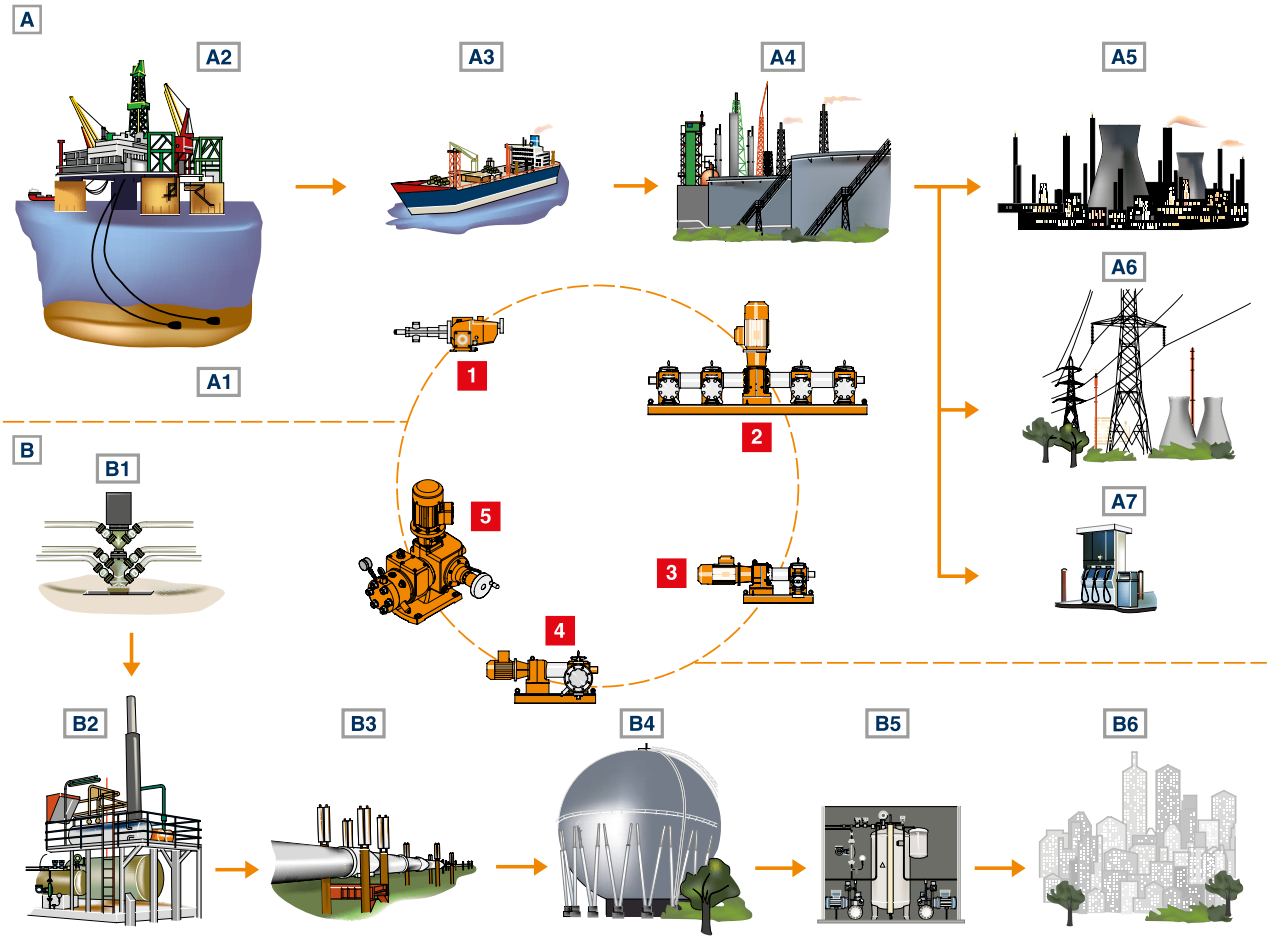
Triple pump with horizontal motor (e.g. Evolution)
Triplex version



Other variants are available on request.

2.1.3 Installation Options

- 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



1 Valveless piston-type dosing pump DR

2 Multiplexed dosing pumps

3 Piston-type dosing pump PS

4 Hydraulic diaphragm-driven dosing pump Mh (metal diaphragm)

5 Hydraulic diaphragm-driven dosing pump ORLITA Evolution (PTFE diaphragm)

2.2 Diaphragm Metering Pumps

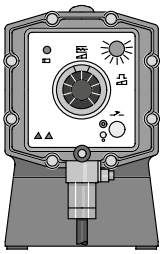
2.2.1 Diaphragm metering pump EXTRONIC

Precise metering with explosion protection

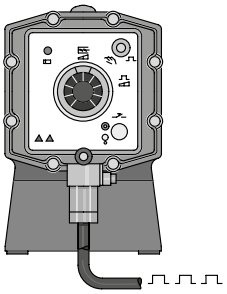
Capacity range of single head pump: 1 – 60 l/h; 25 – 1 bar

The diaphragm metering pump EXTRONIC is perfectly suited to the sensitive application of liquid media in facilities at risk of gas explosions as it is approved in compliance with the EU EX Regulation 2014/34/EU (ATEX).

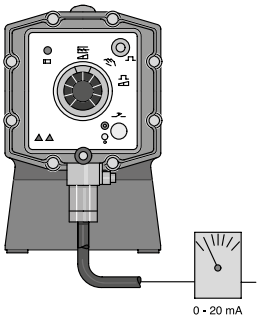
The ATEX-compliant diaphragm metering pump EXTRONIC (EXBb) is tested and approved in line with EN 60079/-1 for the ignition type 'compression-resistant enclosures' and thus offers the maximum level of protection. The short-stroke solenoid and the complete pump control are integrated in the pump housing so that, together with the explosion-proof drive, there is IP 65 protection against contact and moisture as per EN 60529 even when the front cover is open.



'Internal' control type
stroke length adjustment 1:10, stroke rate adjustment 1:25, total adjustment range 1:250



'External contact' control type
stroke length adjustment 1:10, stroke rate control 0 – 100 %, depending on external switching contacts. *)



'Analogue' control type
stroke length adjustment 1:10, stroke rate control 0 – 100 % proportional to 0/4 – 20 mA analogue signal. *)

*) The electric connecting cable for mains power cable, contact or analogue control are already routed out of the pump. Note the relevant specifications for connection and control.

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: 2000 N
- Stroke length adjustment range: 0 – 100% in operation and idle
- Stroke length adjustment: manually using scaled rotary dial
- The dosing precision is better than ± 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 monitoring
- Wetted materials: Polypropylene, PVC, PTFE with carbon, clear acrylic, stainless steel, special designs available on request
- Degree of protection: IP 65 (even 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 °C

Field of Application

- Oil, gas and petrochemicals
- For use in areas with hazardous gases and vapours
- Use in mines at risk from firedamp

2.2 Diaphragm Metering Pumps

Technical data for EXTRONIC EXBb

Type	Capacity at max. back pressure*			Delivery rate at medium back pressure*			Stroke rate	oØ x iØ	Suction lift	Shipping weight PP, NP, TT-SS
	l/h	bar	ml/stroke	l/h	bar	ml/stroke	Strokes/min	mm	m WC	kg
EXTRONIC - metering pumps										
1000	0.19	10	0.03	0.27	5	0.04	120	6 x 4	1.5	12
1601	1.00	16	0.15	1.30	8	0.18	120	6 x 4	5.0	12
2501	1.14	25	0.15	1.10	20	0.17	120	6 x 4	5.0	-
1201	1.70	12	0.23	2.00	6	0.28	120	6 x 4	5.0	12
2502	2.00	25	0.28	2.20	20	0.31	120	8 x 5	5.0	13
1002	2.30	10	0.31	2.70	5	0.38	120	8 x 5	5.0	12
0803	3.70	8	0.51	3.90	4	0.54	120	6 x 4	3.0	12
2505	4.20	25	0.64	4.80	20	0.73	110	8 x 5	5.0	16
1006	6.00	10	0.83	7.20	5	1.00	120	8 x 5	5.0	13
0308	8.60	3	1.20	10.30	1	1.43	120	8 x 5	5.0	12
1310	10.50	13	1.59	11.90	6	1.80	110	8 x 5	5.0	16
0613	13.10	6	1.82	14.90	3	2.07	120	8 x 5	5.5	13
0814	14.00	8	2.12	15.40	4	2.33	110	12 x 9	5.0	16
0417	17.40	3	2.42	17.90	2	2.49	120	12 x 9	4.5	13
0430	27.00	3	4.09	29.50	2	4.47	110	DN 10	5.0	16
0260	60.00	1	9.09	-	-	-	110	DN 15	1.5	16
EXTRONIC - metering pumps for media of higher viscosity										
1002	2.30	10	0.31	2.70	5	0.38	120	DN 10	1.8	-
1006	6.00	10	0.83	7.20	5	1.00	120	DN 10	2.0	-
1310	10.50	10	1.59	11.90	5	1.80	110	DN 15	2.8	-
0814	14.00	8	2.12	15.40	4	2.33	110	DN 15	2.0	-
EXTRONIC - metering pumps with self-bleeding dosing head										
1601	0.66	16	0.09	-	-	-	120	6 x 4	1.8	-
1201	1.00	12	0.14	-	-	-	120	6 x 4	2.0	-
1002	1.80	10	0.25	-	-	-	120	6 x 4	2.0	-
0803	2.40	8	0.33	-	-	-	120	6 x 4	2.8	-

* The performance data stated represents guaranteed minimum values, calculated using water as the medium at room temperature.

Wetted materials for EXTRONIC EXBb

Identity code of material	Dosing head	Connection on suction/discharge side	Seals	Balls (6 – 12 mm connection)	Balls (DN 10 and DN 15 connection)
PP1	Polypropylene	Polypropylene	EPDM	Ceramic	Borosilicate glass
PP4 *	Polypropylene	Polypropylene	EPDM	-	Ceramic
NP1	Clear acrylic	PVC	FKM A	Ceramic	Borosilicate glass
PP4 *	Clear acrylic	PVC	FKM B	Ceramic	Ceramic
PP4 *	PVC	PVC	FKM B	Ceramic	Ceramic
TT1	Carbon-filled PTFE	Carbon-filled PTFE	PTFE	Ceramic	Ceramic
SS ..	Stainless steel 1.4404	Stainless steel 1.4404	PTFE	Ceramic	Stainless steel 1.4404

* PP4 with valve springs made of Hastelloy C

FKM = fluorine rubber

2.2 Diaphragm Metering Pumps

Identity code ordering system for EXTRONIC EXBb

EXBb	Enclosure rating								
	G	Gas-EX-proof							
		Type	Capacity						
		1000	10 bar	0.19 l/h					
		2501	25 bar	1.14 l/h	(only available in SSM and SBM)				
		1601	16 bar	1.00 l/h					
		1201	12 bar	1.70 l/h					
		0803	8 bar	3.70 l/h					
		1002	10 bar	2.30 l/h					
		0308	3 bar	8.60 l/h					
		2502	25 bar	2.00 l/h	(available in SS and SB only)				
		1006	10 bar	6.00 l/h					
		0613	6 bar	13.10 l/h					
		0417	4 bar	17.40 l/h					
		2505	25 bar	4.20 l/h	(available in SS and SB only)				
		1310	13 bar	10.50 l/h	(only available in NP, PP4, SS and SB)				
		0814	8 bar	14.00 l/h					
		0430	4 bar	27.00 l/h					
		0260	2 bar	60.00 l/h					
			Liquid end material						
			PP1	Polypropylene with EPDM O-ring					
			PP4	Polypropylene HV for high-viscosity media with EPDM O-ring and valve springs in Hastelloy C, Only for types 1002, 1006, 1310 and 0814					
			NP1 *	Clear acrylic with FKM A O-ring					
			NP3 *	Clear acrylic with FKM B O-ring					
			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	Stainless steel with 1/4" NPT internal thread, with diaphragm rupture indicator, Type 2501 only					
				Valve springs					
				0	No valve spring				
				1	With 2 valve springs, 1.4571, 0.1 bar				
					Electrical Connection				
					A	230 V, 50/60 Hz			
					B	115 V, 50/60 Hz			
						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 Variants		
							0	With potentiometer, Only for control types 0, 7 and 8	
							1	With manual auxiliary key for maximum stroke rate, Only for control types 1 – 6	
							2	With manual auxiliary frequency changer key for maximum stroke rate, Only for control types 1 – 6	
								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

Design of connectors

With PP, NP, NS, PS and TT	6, 8 and 12 mm	Hose sleeve with clamp connection
With stainless steel SS1/SSM	6, 8 and 12 mm	Swagelok system threaded connector
With stainless steel SS2/SBM	6, 8 and 12 mm	Internal thread 1/4" NPT
With stainless steel SB1	6, 8 and 12 mm	Internal thread ISO 7-1 Rp 1/4

Repeatability of metering ±2 % when performed in line with the information in the operating instructions.

For type 1601 with self-bleeding dosing head ±5 %.

Permissible ambient temperature –20 °C to +45 °C.

Electrical connection:	230 V ±10 %, 50/60 Hz
	115 V ±10 %, 50/60 Hz
	Special voltage on request
Degree of protection:	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 table.

Spare Parts Kits for Diaphragm Metering Pump EXTRONIC

Scope of delivery for PP and NP mat. versions:
1 metering diaphragm
1 suction valve assembly
1 discharge valve assembly
2 valve balls
1 sealing set, complete
1 connector kit

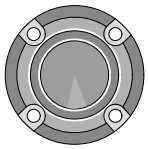
Scope of delivery for TT-PTFE material version:
1 metering diaphragm
1 suction valve assembly
1 discharge valve assembly
2 valve balls
2 ball seat discs
1 sealing set, complete
1 connector kit

Scope of delivery for NS3 and PS3 mat. versions:
1 metering diaphragm
1 suction valve assembly
1 connector component assembly
1 discharge valve assembly
1 bleed valve assembly
1 connector kit

Scope of delivery for SS stainless steel mat. vers.:
1 metering diaphragm
4 valve balls
4 ball seat discs
1 sealing set, complete
1 connector kit

Pump type			Order no.
EXBb 1000	PP1		740357
	NP3		740354
	TT		910776
	SS/SK		910777
EXBb 2501	SBM		1020281
	SSM		1020282
EXBb 1601	PP1		740361
	NP3		740358
	NS3/PS3		792033
	TT		910778
	SS/SK		910779
EXBb 1201	PP1		740380
	NP3		740362
	NS3/PS3		792034
	TT		910780
	SS/SK		910781
EXBb 0803	PP1		740384
	NP3		740381
	NS3/PS3		792035
	TT		910782
	SS		910783
EXBb 1002/2502	PP1		740388
	NP3		740385
	NS3/PS3		792036
	TT		910784
	SS		910785
	HV/PP 4	Type 1002	910743
EXBb 0308/1006/2505	PP1		740497
	NP1		740498
	TT		910957
	SS		910959
	HV/PP4	Type 1006	910939
EXBb 0613/1310	PP1		740504
	NP1		740505
	TT		910969
	SS		910971
	HV/PP4	Type 1310	910941
EXBb 0417/0814	PP1		740501
	NP1		740502
	TT		910977
	SS		910979
	HV/PP4	Type 0814	910943
EXBb 0430-DN 10	PP1		740507
	NP1		740508
	TT		910993
	SS		910995

Spare parts kit as of DN 10 with single ball valves.



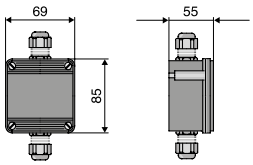
Spare Diaphragms for Diaphragm Metering Pump ProMinent EXTRONIC

DEVELOPAN® metering diaphragms from ProMinent made of EPDM with woven inner layer, large-area vulcanised steel core and PTFE Teflon layer on the wetted side.

For pump type	Description	Order no.
1000	31.0 x 6.0	811452
1601	48.0 x 9.5	811453
1201	48.0 x 12.5	811454
0803	48.0 x 18.5	811455
1002, 2502	60.0 x 17.0	811456
0308, 2505, 1006	60.0 x 28.0	811457
0430, 0230	127.5 x 63.0	811460
0260	127.5 x 91.0	811461
1310, 0613	76.0 x 37.0	811458
0814, 0417	76.0 x 45.0	811459
2501	35.0 x 11.5	1000246

Ex-Proof Ancillary Equipment

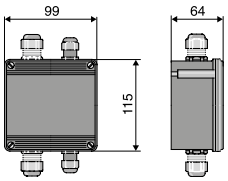
Plastic terminal box: Type I



IP 66, EEx e II T 6, max. 380 V to mains connection of e.g. ProMinent EXTRONIC in area at risk from explosion.

	Order no.
1 input, 1 output for power supply cable. 2 terminals + PE and 2 M 20-12 screw glands	1000071

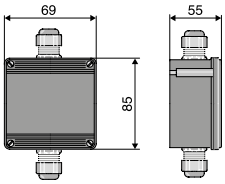
Plastic terminal box: Type II



IP 6, 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).

	Order no.
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	1000072

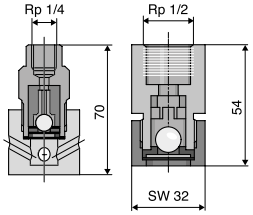
Plastic terminal box: EExi Type I



IP 66, EEx ia II T 6 for intrinsically safe control cable

	Order no.
1 input, 1 output for control cable, 2 terminals and 2 M 16-0.8, blue screw glands	1000073

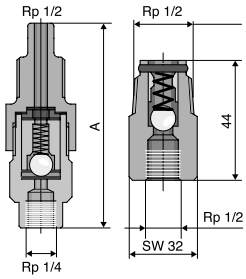
Stainless steel foot valve 1.4404 „SB“



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

2.2 Diaphragm Metering Pumps



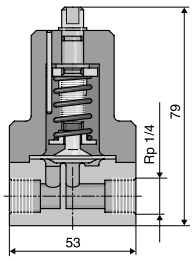
Stainless steel 1.4404 „SB“ dosing valve

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

Adjustable ‘SB’ back pressure valve

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.



	Order no.
Operating range approx. 1-10 bar, closed version, designed for use with flammable materials.	924555

PTFE dosing pipe

Carbon-filled, surface resistance < 10^7 Ω

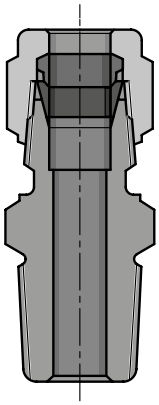
Material	Length	Connector size Ø x i Ø	permitted operating pressure*	Order no.
	m	mm	bar	
Carbon-filled PTFE	Sold in metres	6 x 4	12	1024831
Carbon-filled PTFE	Sold in metres	8 x 5	16	1024830
Carbon-filled PTFE	Sold in metres	12 x 9	9	1024832

* Permissible operating pressure at 20 °C as per DIN EN ISO 7751 subject to chemical resistance and correct connection

Further accessories, such as foot valves, injection valves and back pressure valves in the usual material versions, are identical to gamma accessories and/or those for connecting DN 15 VARIO accessories.

(Hydraulic/mechanical accessories, see page → 156)

Straight Male Adapter Stainless Steel



Swagelock system, stainless steel SS 316 (1.4401) for fitting tubing to dosing heads and valves with inner threads and for SB versions.

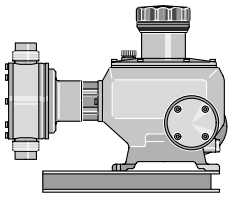
	Order no.
6 mm - ISO 7 R 1/4	359526
8 mm - ISO 7 R 1/4	359527
12 mm - ISO 7 R 1/4	359528
16 mm - ISO 7 R 1/2	359529

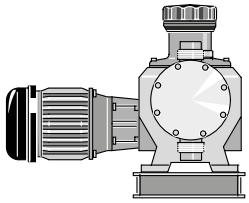
2.2.2 Diaphragm Metering Pump Makro TZ

Greater safety in continuous operation through mechanically deflected multi-layer safety diaphragm.

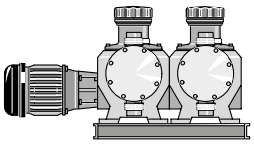
Capacity range of single head pump: 260 – 2,100 l/h, 12 – 4 bar

The modular construction of the diaphragm metering pump MAKRO TZMb with adjustable eccentric drive mechanism and mechanically deflected multi-layer safety diaphragm enables it to be outstandingly adapted to the performance requirements of the respective application.

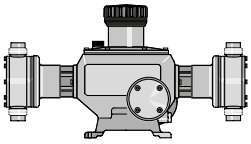




Makro TZ TZMb



Makro TZ externally mounted pump



Makro TZ double-head pump

The diaphragm metering pump MAKRO 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 or 20 mm. A wide range of drive versions is available for use in areas at risk from explosion with ATEX certification.

Your benefits

Excellent process reliability:

- Patented multi-layer safety diaphragm with integral diaphragm rupture warning / signalling system
- The dosing precision is better than ± 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 (boxer principle) 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: 8000 N
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually by means of scaled rotary dial in 0.5% increments (optionally with electric actuator or control drive)
- The dosing precision is better than ± 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 signalling 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/drive 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 overflow equipment during the installation of all mechanically actuated 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 Metering Pumps

Technical data for MAKRO TZMb

Type	Capacity at max. back pressure with 1500 rpm motor at 50 Hz				Capacity at max. back pressure with 1800 rpm motor at 60 Hz				Suction lift	Connector Suction/ Discharge Side	Shipping weight	
	l/h	bar	ml/ stroke	Max. stroke rate Strokes/ min	l/h	psi	gph (US)	Max. stroke rate Strokes/ min	m WC	G-DN	PP, NP, TT kg	SS kg
120260	260	12	60	72	312	174	82	86	4.0	1 1/2–25	46	54
120340	340	12	60	96	408	174	108	115	4.0	1 1/2–25	46	54
120430	430	12	60	120	516	174	136	144	4.0	1 1/2–25	46	54
120510	510	12	60	144	622	174	164	173	4.0	1 1/2–25	46	54
120650	640	12	60	180	-	174	-	-	4.0	1 1/2–25	46	54
070430	430	7	99	72	516	100	136	86	3.5	2–32	50	64
070570	570	7	99	96	684	100	181	115	3.5	2–32	50	64
070720	720	7	99	120	864	100	228	144	3.5	2–32	50	64
070860	860	7	99	144	1,032	100	273	173	3.5	2–32	50	64
071070	1,070	7	99	180	-	100	-	-	3.5	2–32	50	64
040840	840	4	194	72	1,008	58	266	86	3.0	2 1/4–40	56	80
041100	1,100	4	194	96	1,320	58	349	115	3.0	2 1/4–40	56	80
041400	1,400	4	194	120	1,680	58	444	144	3.0	2 1/4–40	56	80
041670	1,670	4	194	144	2,004	58	529	173	3.0	2 1/4–40	56	80
042100	2,100	4	194	180	-	58	-	-	3.0	2 1/4–40	56	80

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

Wetted materials for MAKRO TZMb

			DN 25 ball valves			DN 32 / DN 40 plate valves		
Identity code of material	Dosing head	Connection on suction/ discharge side	Seals DN 25	Valve balls	Valve seats	Seals DN 32/DN 40	Valve plates/valve springs	Valve seats
PCT	PVC	PVDF	PTFE	Borosilicate glass	PTFE	PTFE	Ceramic/Hastelloy C + CTFE *	PTFE
PPT	Polypropylene	PVDF	PTFE	Borosilicate glass	PTFE	PTFE	Ceramic/Hastelloy C + CTFE *	PTFE
SST	Stainless steel 1.4404	Stainless steel 1.4581	PTFE	Stainless steel 1.4401	PTFE	PTFE	Stainless steel 1.4404/Hastelloy C	PTFE
TTT	Carbon-filled PTFE	PVDF	PTFE	Ceramic	PTFE	PTFE	Ceramic/Hastelloy C + CTFE *	PTFE

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

Multi-layer safety diaphragm with PTFE coating. Special designs available on request.

Identity Code Ordering System for Makro TZMb Mechanically Deflected Diaphragm Metering Pump

TZMb	Drive type													
	H	Main drive												
	A	Add-on drive												
	D	Main drive for double-head pump												
	B	Add-on drive for double-head pump												
		Type												
		120260												
		120340												
		120430												
		120510												
		120650												
		070430												
		070570												
		070720												
		070860												
		071070												
		040840												
		041100												
		041400												
		041670												
		042100												
			Liquid end material											
			PC	PVC (max. 10 bar)										
			PP	Polypropylene (max. 10 bar)										
			SS	Stainless steel										
			TT	PTFE + 25% carbon (max. 10 bar)										
				Material of seals/diaphragm										
				T	PTFE									
					Displacement body									
					1	Multi-layer safety diaphragm with rupture indicator								
						Liquid end version								
						0	No valve spring							
						1	With valve springs							
							Hydraulic connections							
							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					
								2	Without 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-phase 230/400 V 50 Hz, 0.75 kW				
									R	4-pin variable speed stroke control motor 230/400 V, 1.5 kW				
									V-0	Variable speed stroke control motor with integrated frequency converter, 3-phase, 400 V, 50/60 Hz, 1.5 kW				
									L	3-phase 230/400 V 50 Hz, 0.75 kW (Exe, Exd)				
									P	3-phase 230/400 V 60 Hz, 0.75 kW (Exe, 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	Without motor, externally mounted drive				
										Enclosure rating				
										0	IP 55 (standard)			
										2	Exd motor version ATEX-T4			
										A	ATEX drive			
											Stroke sensor			
											0	No stroke sensor		
											1	With stroke sensor (Namur)		
												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	
													Application	

2.2 Diaphragm Metering Pumps

Motor data for MAKRO TZMb

Identity code specification		Power supply			Remarks
S	3-phase, IP 55*	230 V/400 V	50 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; 20 W)
V0	3-phase, IP 55*	400 V	50 Hz	1.5 kW	Variable speed stroke control motor with integrated frequency converter
L2	3-phase, II 2G Ex db IIC T4 Gb	230 V/400 V	50 Hz	0.75 kW	With PTC, speed control range 1:5
P2	3-phase, II 2G Ex db IIC T4 Gb	265 V/400 V	60 Hz	0.75 kW	With PTC, speed control range 1:5

* Three-phase motor according to IEC 60034-1

Motor data sheets can be requested for more information. Versions 265/460V - 60Hz, 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/EC in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label correspond to or are superior to the conditions prevalent in the intended application.

Maintenance kits for MAKRO TZMb with valve wear parts

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

Scope of delivery:

1 spare diaphragm, complete, 2 valve balls (DN32 / DN40 with plate and spring), 1 sealing set

Liquid end	Materials in contact with the medium	Suitable for identity code	Order no.
FM 650 - DN 25	PCT, PPT, TTT	120260, 120340, 120430, 120510, 120650	1025164
FM 650 - DN 25	SST	120260, 120340, 120430, 120510, 120650	1022896
FM 1100 - DN 32	PCT, PPT, TTT	070430, 070570, 070720, 070860, 071070	1025167
FM 1100 - DN 32	SST	070430, 070570, 070720, 070860, 071070	1022917
FM 2100 - DN 40	PCT, PPT, TTT	040840, 041100, 041400, 041670, 042100	1025169
FM 2100 - DN 40	SST	040840, 041100, 041400, 041670, 042100	1022930

Maintenance kits for MAKRO TZMb with valve, complete

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

Scope of delivery:

1 spare diaphragm, complete, 2 valves, complete, 2 valve balls (DN32 / DN40 with plate and spring), 1 sealing set

Liquid end	Materials in contact with the medium	Suitable for identity code	Order no.
FM 650 - DN 25	SST	120260, 120340, 120430, 120510, 120650	1022895
FM 1100 - DN 32	SST	070430, 070570, 070720, 070860, 071070	1022916
FM 2100 - DN 40	SST	040840, 041100, 041400, 041670, 042100	1022929

Multi-layer safety diaphragm for MAKRO 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

Standard oil for maintaining hydraulics and gearbox MAKRO TZMb

The oils are available in 1l containers. For example, if 1.8 l is required for maintenance work, 2 containers are needed.

	Required quantity	Order no.
Mobilgear 600 XP 460 gear oil, 1 litre	3.2 l	1004542

Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/EC in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label correspond to or are superior to the conditions prevalent in the intended application.

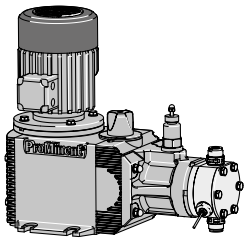
2.3 Hydraulic Diaphragm Metering Pumps

2.3.1 Hydraulic Diaphragm Metering Pump HYDRO Classic

For flexible metering with excellent process reliability in the medium pressure range.

Capacity range of single-head pump: 3 – 1450 l/h, 100 – 7 bar

As an extremely robust hydraulic diaphragm metering pump, the HYDRO range 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.



HYDRO

The hydraulic diaphragm metering pump HYDRO with its HP2a, HP3a and HP4a product ranges forms an integrated product range with stroke lengths of 15 or 20 mm. This covers the capacity range from 3 to 1450 l/h at 100 – 7 bar. A wide range of power end versions is available, including some for use in areas at risk from explosion with ATEX certification.

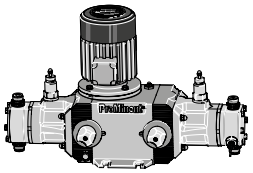
Your Benefits

Excellent process reliability:

- PTFE multi-layer diaphragm with integral diaphragm rupture warning / signalling system
- Integral hydraulic relief valve
- The dosing precision is better than ± 1 % within the 20-100 % stroke volume range under defined conditions and with correct installation

Excellent flexibility:

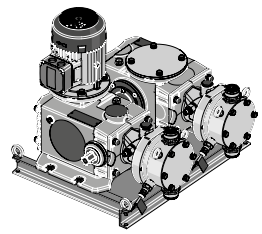
- The modular construction with single and double head versions permits a wide range of applications, with the double head designs (boxer principle) being operated in push-pull mode
- It is possible to combine up to 5 metering units, even with different pump capacities, in multiple pump systems
- 5 different gear ratios are available



HYDRO double-head pump

Technical Details

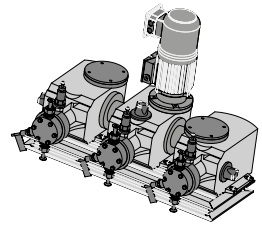
- Stroke length: 15 mm (HP2a, HP3a), 20 mm (HP4a)
- Rod force: 2000 N (HP2a), 4200 N (HP3a), 5800 N (HP4a)
- Stroke volume adjustment range: 0 – 100%
- Stroke volume adjustment: manually using scaled rotary dial (optionally with electric actuator or control drive)
- The dosing precision is better than ± 1 % within the 20 to 100% stroke volume range under defined conditions and with correct installation
- PTFE multi-layer diaphragm with electrical diaphragm rupture warning / signalling system via a contact
- Integrated hydraulic relief and vent valve
- Wetted materials: PVDF, PTFE+25% carbon, stainless steel 1.4571, Hastelloy C.
- A wide range of power end/drive 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 see page →289



HYDRO add-on pump

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



HYDRO triplex pump

2.3 Hydraulic Diaphragm Metering Pumps

2.3.1.1 Hydraulic Diaphragm Metering Pump HYDRO HP2a

Technical data for HYDRO HP2a

Type	Capacity at max. back pressure with 1500 rpm motor at 50 Hz				Capacity at max. back pressure at 60 Hz			Suction lift	Perm. pre-pressure suction side	Suction/ discharge side connector	Shipping weight	Plunger Ø
	l/h	bar	ml/ stroke	Max. stroke rate Strokes/ min	psi	l/h / gph (US)	Max. stroke rate Strokes/ min	m WC	bar	G-DN	kg	mm
100003 *	3	100	3.0	60	1,450	3.6/1.0	72	3.0	5	Rp 1/4	31	16
100006 *	6	100	3.0	125	1,450	7.0/1.8	150	3.0	5	Rp 1/4	31	16
100007 *	7	100	3.0	150	1,450	8.0/2.1	180	3.0	5	Rp 1/4	31	16
100009 *	9	100	3.0	187	1,450	11.0/2.9	224	3.0	5	Rp 1/4	31	16
100010 *	10	100	3.0	212	-	-	-	3.0	5	Rp 1/4	31	16
064007	7	64	3.8	60	928	8.4/2.2	72	3.0	5	G 3/4-10	31	18
064015	15	64	3.8	125	928	18.0/4.8	150	3.0	5	G 3/4-10	31	18
064018	18	64	3.8	150	928	21.0/5.5	180	3.0	5	G 3/4-10	31	18
064022	22	64	3.8	187	928	26.0/6.9	224	3.0	5	G 3/4-10	31	18
064025	25	64	3.8	212	-	-	-	3.0	5	G 3/4-10	31	18
040014	14	40	5.7	60	580	16.8/4.4	72	3.0	5	G 3/4-10	31	22
040029	29	40	5.7	125	580	34.8/9.2	150	3.0	5	G 3/4-10	31	22
040035	35	40	5.7	150	580	42.0/11.1	180	3.0	5	G 3/4-10	31	22
040044	44	40	5.7	187	580	52.8/13.9	224	3.0	5	G 3/4-10	31	22
040050	50	40	5.7	212	580	-	-	3.0	5	G 3/4-10	31	22
025019 **	19	25	7.9	60	362	23.0/6.1	72	3.0	5	G 3/4-10	31	26
025040 **	40	25	7.9	125	362	48.0/12.7	150	3.0	5	G 3/4-10	31	26
025048 **	48	25	7.9	150	362	58.0/15.3	180	3.0	5	G 3/4-10	31	26
025060 **	60	25	7.9	187	362	72.0/19.0	224	3.0	5	G 3/4-10	31	26
025068 **	68	25	7.9	212	-	-	-	3.0	5	G 3/4-10	31	26

* SST version with double ball valve, valve connector on the suction-discharge side with female thread Rp 1/4 and male thread G 3/4 - DN 10

** HV design with G1 - DN 15 connector

PVDF version max. 25 bar, PTFE + 25 % carbon; PTFE max.16 bar

Wetted materials for HYDRO HP2a

Identity code of material	Dosing head	Connection on suction/discharge side	Seals/ball seat	Balls
PVT *	PVDF	PVDF	PTFE/PTFE + 25 % carbon	Ceramic
SST	Stainless steel 1.4571/1.4404	Stainless steel 1.4581	PTFE/stainless steel 1.4404	Ceramic
TTT	PTFE + 25% carbon	PVDF (polyvinylidene fluoride)	PTFE/PTFE + 25 % carbon	Ceramic
SCT	Stainless steel 316L	Stainless steel 1.4581	PTFE/stainless steel 1.4404	Ceramic

* Not for areas at risk from explosion

Motor data for HYDRO HP2a

Identity code Feature		Power supply			Remarks
S	3 ph, IP 55 *	230 V/400 V	50 Hz	0.37 kW	
T	3 ph, IP 55 *	230 V/400 V 265 V/460 V	50 Hz 60 Hz	0.37 kW	with PTC, speed control range 1:5
R	3 ph, IP 55 *	230 V/400 V	50 Hz	0.45 kW	with PTC, speed control range 1:20 with external fan 1 ph 230 V; 50/60 Hz
V0	1 ph, IP 55 *	230 V	50 Hz	0.37 kW	Variable speed motor with integrated frequency converter, speed control range 1:20
L2	3 ph, II 2G Ex de IIC T4 Gb	230 V/400 V	50 Hz	0.37 kW	with PTC, speed control range 1:5
P2	3 ph, II 2G Ex de IIC T4	265 V/460 V	60 Hz	0.37 kW	with PTC, speed control range 1:5

* Three-phase motor according to IEC 60034-1

Motor data sheets can be requested for more information. Versions 265/460V - 60Hz, 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/EC in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label correspond to or are superior to the conditions prevalent in the intended application.

2.3 Hydraulic Diaphragm Metering Pumps

Identity code ordering system for HYDRO HP2a

HP2a	Drive type													
	H	Main drive												
	D	Main drive, double-head version												
	E	Main drive for add-on pump												
	F	Main drive, double-head version for add-on pump												
	A	Add-on drive												
	B	Add-on drive, double-head version												
	T	Triplex pump comprising 3 drives and 3 identical heads												
		Type	Capacity											
		100003	100 bar	3 l/h										
		100006	100 bar	6 l/h										
		100007	100 bar	7 l/h										
		100009	100 bar	9 l/h										
		100010	100 bar	10 l/h										
		064007	64 bar	7 l/h										
		064015	64 bar	15 l/h										
		064018	64 bar	18 l/h										
		064022	64 bar	22 l/h										
		064025	64 bar	25 l/h										
		040014	40 bar	14 l/h										
		040029	40 bar	29 l/h										
		040035	40 bar	35 l/h										
		040044	40 bar	44 l/h										
		040050	40 bar	50 l/h										
		025019	25 bar	19 l/h										
		025040	25 bar	40 l/h										
		025048	25 bar	48 l/h										
		025060	25 bar	60 l/h										
		025068	25 bar	68 l/h										
			Liquid end material											
			SS	Stainless steel										
			PV	PVDF, Not for types 100..., max. 25 bar										
			TT	PTFE + 25 % carbon, max. 16 bar										
			SC	Stainless steel 316L										
				Sealing material										
				T	PTFE									
					Diaphragm									
					0	Standard multilayer diaphragm with rupture signalling facility								
						Liquid end version								
						1	With valve springs							
						D	Double ball valve , Only for SST and HCT							
							Hydraulic connections							
							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-phase, 230/400 V, 50 Hz, 0.37 kW				
									T	3-phase, 230/400 V, 50/60 Hz, 0.37 kW, with PTC				
									R	3-phase variable speed stroke control motor, 230/400 V, 0.45 kW				
									V-0	Variable speed stroke control motor with integrated frequency converter, 1-phase, 230/400 V, 50/60 Hz, 0.37 kW				
									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				
									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)			
										2	Exde design ATEX-T4 (L2, P2)			
										A	ATEX drive			
											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

Maintenance kits for HYDRO HP2a with valve wear parts

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

Scope of delivery:
1 spare diaphragm complete, 1 sealing set, 2 valve seats, 2 valve balls (4 valve seats, 4 valve balls for double ball valve)

Plunger Ø mm	Material	Suitable for identity code	Order no.
16 *	S1	HP2a.100..SST	1029260
16, 18	H1	HP2a.100..HCT, HP2a.064..HCT	1009571
18	S1	HP2a.064..SST	1005549
22, 26	S1	HP2a.040..SST, HP2a.025..SST	1005553
22, 26	H1	HP2a.040..HCT, HP2a.025..HCT	1009573

* Piston Ø 16 mm, material S1, version for double ball valves

Maintenance kits for HYDRO HP2a with valves, complete

Scope of delivery:
1 spare diaphragm complete, 1 suction valve, 1 injection valve, 1 sealing set, 2 valve seats, 2 valve balls

Plunger Ø mm	Material	Suitable for identity code	Order no.
16, 18	P1	HP2a.100..PVT, HP2a.064..PVT	1005548
18	S1	HP2a.064..SST	1005550
22, 26	S1	HP2a.040..SST, HP2a.025..SST	1005554
22, 26	P1	HP2a.040..PVT, HP2a.025..PVT	1005552

Diaphragms PTFE/1.4404 for HYDRO HP2a

Plunger Ø mm	Material	Suitable for identity code	Order no.
16, 18	S1	HP2a.100..SST, HP2a.064..SST	1005545
16, 18	P1	HP2a.100..PVT, HP2a.064..PVT	1122578
22, 26	S1	HP2a.040..SST, HP2a.025..SST	1005546
22, 26	P1	HP2a.040..PVT, HP2a.025..PVT	1122579

Diaphragms PTFE/Hastelloy C Coated for HYDRO HP2a

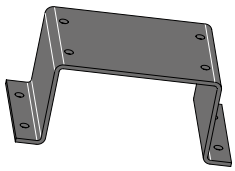
Plunger Ø mm	Material	Suitable for identity code	Order no.
16, 18	H1	HP2a.100..HCT, HP2a.064..HCT	1006481
22, 26	H1	HP2a.040..HCT, HP2a.025..HCT	1006482

Standard oil for maintaining hydraulics and gearbox HYDRO HP2a

The oils are available in 1l containers. For example, if 1.8 l is required for maintenance work, 2 containers are needed.

	Required quantity	Order no.
Mobilube 1SHC 75W-90 gear oil, 1 litre	Simplex (V, H) - 2.5 l Double head (D) - 2.9 l Duplex (U) - 2 x 2.5 l Triplex (T) - 3 x 2.5 l	1006010

Base for HYDRO Hydraulic Diaphragm Metering Pumps



	Order no.
Base for HYDRO HP2a, dimensions: 300 x 160 x 128 mm (LxWxH)	1005660

2.3.1.2 Hydraulic Diaphragm Metering Pump HYDRO HP3a

Technical data for HYDRO HP3a

Type	Capacity at max. back pressure with 1500 rpm motor at 50 Hz				Capacity at max. back pressure at 60 Hz			Suction lift	Perm. pre-pressure suction side	Suction/ discharge side connector	Shipping weight	Plunger Ø
	l/h	bar	ml/ stroke	Max. stroke rate Strokes/ min	psi	l/h / gph (US)	Max. stroke rate Strokes/ min	m WC	bar	G-DN	kg	mm
100010	10	100	5.7	60	1,450	12/3.2	72	3.0	5	Rp 3/8-10	41	22
100021 *	21	100	5.7	125	1,450	25/6.6	150	3.0	5	Rp 3/8-10	41	22
100025 *	25	100	5.7	150	1,450	30/7.9	180	3.0	5	Rp 3/8-10	41	22
100031 *	31	100	5.7	187	1,450	37/9.8	224	3.0	5	Rp 3/8-10	41	22
100035 *	35	100	5.7	212	1,450	-	-	3.0	5	Rp 3/8-10	41	22
064019 **	19	64	7.9	60	928	23/6.1	72	3.0	5	G 3/4-10	41	26
064040 **	40	64	7.9	125	928	48/12.7	150	3.0	5	G 3/4-10	41	26
064048 **	48	64	7.9	150	928	58/15.3	180	3.0	5	G 3/4-10	41	26
064060 **	60	64	7.9	187	928	72/19.0	224	3.0	5	G 3/4-10	41	26
064068 **	68	64	7.9	212	928	-	-	3.0	5	G 3/4-10	41	26
040029 ***	29	40	12.0	60	580	35/9.2	72	3.0	5	G 1-15	41	32
040062 ***	62	40	12.0	125	580	74/19.7	150	3.0	5	G 1-15	41	32
040074 ***	74	40	12.0	150	580	89/23.5	180	3.0	5	G 1-15	41	32
040092 ***	92	40	12.0	187	580	110/29.2	224	3.0	5	G 1-15	41	32
040105 ***	105	40	12.0	212	580	-	-	3.0	5	G 1-15	41	32
025048 ***	48	25	17.0	60	362	58/15.3	72	3.0	5	G 1-15	41	38
025100 ***	100	25	17.0	125	362	120/31.7	150	3.0	5	G 1-15	41	38
025120 ***	120	25	17.0	150	362	144/38.0	180	3.0	5	G 1-15	41	38
025150 ***	150	25	17.0	187	362	180/47.6	224	3.0	5	G 1-15	41	38
025170 ***	170	25	17.0	212	362	-	-	3.0	5	G 1-15	41	38

* SST version with double ball valve, valve connector on the suction/discharge side with female thread Rp 3/8, male 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

PVDF version max. 25 bar, PTFE + 25 % carbon; PTFE max.16 bar

SST version with double ball valve, valve connector on the suction/discharge side with female thread Rp 3/8, male thread G 3/4-DN 10

Wetted materials for HYDRO HP3a

Identity code of material	Dosing head	Connection on suction/discharge side	Seals/ball seat	Balls
PVT *	PVDF	PVDF	PTFE/PTFE + 25 % carbon	Ceramic
SST	Stainless steel 1.4571/1.4404	Stainless steel 1.4581	PTFE/ZrO_2 (DN 15/DN20 stainless steel 1.4404)	Ceramic
TTT	PTFE + 25% carbon	PVDF (polyvinylidene fluoride)	PTFE/PTFE + 25 % carbon	Ceramic
SCT	Stainless steel 316L	Stainless steel 1.4581	PTFE/stainless steel 1.4404	Ceramic

* Not for areas at risk from explosion

2.3 Hydraulic Diaphragm Metering Pumps

Motor data for HYDRO HP3a

Identity code Feature	Power supply				Remarks
S	3 ph, IP 55 *	230 V/400 V	50 Hz	0.75 kW	
T	3 ph, IP 55 *	230 V/400 V 265 V/460 V	50 Hz 60 Hz	0.75 kW	with PTC, speed control range 1:5
R	3 ph, IP 55 *	230 V/400 V	50 Hz	0.75 kW	with PTC, speed control range 1:20 with external fan 1 ph 230 V; 50/60 Hz
V0	1 ph, IP 55 *	230 V	50 Hz	0.75 kW	Variable speed motor with integrated frequency converter, speed control range 1:20
L2	3 ph, II 2G Ex de IIC T4	230 V/400 V	50 Hz	0.75 kW	with PTC, speed control range 1:5
P2	3 ph, II 2G Ex de IIC T4	265 V/460 V	60 Hz	0.75 kW	with PTC, speed control range 1:5

* Three-phase motor according to IEC 60034-1

Motor data sheets can be requested for more information. Versions 265/460V - 60Hz, 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/EC in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label correspond to or are superior to the conditions prevalent in the intended application.

Identity code ordering system for HYDRO 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	Capacity										
		100010	100 bar	10 l/h									
		100021	100 bar	21 l/h									
		100025	100 bar	25 l/h									
		100031	100 bar	31 l/h									
		100035	100 bar	35 l/h									
		064019	64 bar	19 l/h									
		064040	64 bar	40 l/h									
		064048	64 bar	48 l/h									
		064060	64 bar	60 l/h									
		064068	64 bar	68 l/h									
		040029	40 bar	29 l/h									
		040062	40 bar	62 l/h									
		040074	40 bar	74 l/h									
		040092	40 bar	92 l/h									
		040105	40 bar	105 l/h									
		025048	25 bar	48 l/h									
		025100	25 bar	100 l/h									
		025120	25 bar	120 l/h									
		025150	25 bar	150 l/h									
		025170	25 bar	170 l/h									
			Liquid end material										
			SS	Stainless steel									
			PV	PVDF, max. 25 bar, only for 025048 – 025170, 064019 – 064068									
			TT	PTFE + 25 % carbon, max. 16 bar									
			SC	Stainless steel 316L									
				Sealing material									
				T	PTFE								
					Diaphragm								
					0	Standard multilayer 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						
							Hydraulic connections						
							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-phase, 230/400 V, 50 Hz, 0.75 kW			
									T	3-phase, 230/400 V, 50/60 Hz, 0.75 kW, with PTC			
									R	3 ph, variable speed motor, 230 V/400 V, 0.75 kW			
									V-0	Variable speed stroke control motor with integrated frequency converter, 1-phase, 230 V, 50 Hz, 0.75 kW			
									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			
									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)		
										2	Exd design ATEX-T4 (L2, P2)		
										A	ATEX drive		
											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

ProMinent®

2.3 Hydraulic Diaphragm Metering Pumps

												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

Process metering technology

Spare parts for HYDRO HP3a

Maintenance kits for HYDRO HP3a with valve wear parts

Scope of delivery:
1 spare diaphragm complete, 1 sealing set, 2 valve seats, 2 valve balls (4 valve seats, 4 valve balls for double ball valve)

Plunger Ø mm	Material	Suitable for identity code	Order no.
22, 26	S1	HP3a.100...SST, HP3a.064...SST	1005553
22 *	S1	HP3a.100..SST	1005555
22, 26	H1	HP3a.100...HCT, HP3a.064...HCT	1009573
32, 38	S1	HP3a.040...SST, HP3a.025...SST	1005557
32, 38	H1	HP3a.040...HCT, HP3a.025...HCT	1009575

* Piston Ø 22 mm, material S1, version for double ball valves (optional)

Maintenance kits for HYDRO HP3a with valves, complete

Scope of delivery:
1 spare diaphragm complete, 1 suction valve, 1 injection valve, 1 sealing set, 2 valve seats, 2 valve balls

Plunger Ø mm	Material	Suitable for identity code	Order no.
22, 26	S1	HP3a.100...SST, HP3a.064...SST	1005554
22, 26	P1	HP3a.100...PVT, HP3a.064...PVT	1005552
32, 38	S1	HP3a.040...SST, HP3a.025...SST	1005558
32, 38	P1	HP3a.040...PVT, HP3a.025...PVT	1005556

Diaphragms PTFE/1.4404 for HYDRO HP3a

Plunger Ø mm	Material	Suitable for identity code	Order no.
22, 26	S1	HP3a.100...SST, HP3a.064...SST	1005546
22, 26	P1	HP3a.100...PVT, HP3a.064...PVT	1122579
32, 38	S1	HP3a.040...SST, HP3a.025...SST	1005547
32, 38	P1	HP3a.040...PVT, HP3a.025...PVT	1122580

Diaphragms PTFE/Hastelloy C Coated for HYDRO HP3a

Plunger Ø mm	Material	Suitable for identity code	Order no.
22, 26	H1	HP3a.100...HCT, HP3a.064...HCT	1006482
32, 38	H1	HP3a.040...HCT, HP3a.025...HCT	1006483

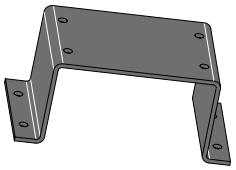
Standard oil for maintaining hydraulics and gearbox HYDRO HP3a

The oils are available in 1l containers. For example, if 1.8 l is required for maintenance work, 2 containers are needed.

	Required quantity	Order no.
Mobilube 1SHC 75W-90 gear oil, 1 litre	Simplex (V, H) - 3.5 l Double head (D) - 4.0 l Duplex (U) - 2 x 3.5 l Triplex (T) - 3 x 3.5 l	1006010

Base for HYDRO Hydraulic Diaphragm Metering Pumps

	Order no.
Base for HYDRO HP3a, dimensions: 324 x 180 x 128 mm (LxWxH)	1005661



2.3.1.3 Hydraulic Diaphragm Metering Pump HYDRO HP4a

Technical data for HYDRO HP4a

Type	Capacity at max. back pressure with 1500 rpm motor at 50 Hz				Capacity at max. back pressure at 60 Hz			Suction lift	Perm. pre-pressure suction side	Suction/ discharge side connector	Shipping weight	Plunger Ø
	l/h	bar	ml/ stroke	Max. stroke rate Strokes/ min	psi	l/h / gph (US)	Max. stroke rate Strokes/ min	m WC	bar	G-DN	kg	mm
400071	71	40	25.1	71	580	85/22	86	3	5	G 1 1/2-25	69	40
400105	105	40	25.1	103	580	126/33	124	3	5	G 1 1/2-25	69	40
400140	140	40	25.1	136	580	168/44	164	3	5	G 1 1/2-25	69	40
400190	190	40	25.1	188	580	188/49	225	3	5	G 1 1/2-25	69	40
400220	220	40	25.1	214	580	-	-	3	5	G 1 1/2-25	69	40
250130	130	25	42.4	71	363	155/41	86	3	5	G 1 1/2-25	69	52
250190	190	25	42.4	103	363	230/61	124	3	5	G 1 1/2-25	69	52
250250	250	25	42.4	136	363	300/79	164	3	5	G 1 1/2-25	69	52
250350	350	25	42.4	188	363	420/111	225	3	5	G 1 1/2-25	69	52
250400	400	25	42.4	214	-	-	-	3	5	G 1 1/2-25	69	52
160210	210	16	62.3	71	232	250/66	86	3	5	G 1 1/2-25	76	63
160300	300	16	62.3	103	232	360/95	124	3	5	G 1 1/2-25	76	63
160400	400	16	62.3	136	232	480/127	164	3	5	G 1 1/2-25	76	63
160550	550	16	62.3	188	232	660/174	225	3	5	G 1 1/2-25	76	63
160625	625	16	62.3	214	-	-	-	3	5	G 1 1/2-25	76	63
100330	330	10	100.4	71	145	400/106	86	3	5	G 2-32	87	80
100480	480	10	100.4	103	145	580/153	124	3	5	G 2-32	87	80
100635	635	10	100.4	136	145	760/201	164	3	5	G 2-32	87	80
100880	880	10	100.4	188	145	1,050/277	225	3	5	G 2-32	87	80
101000	1,000	10	100.4	214	-	-	-	3	5	G 2-32	87	80
070465	465	7	138.7	71	102	560/148	86	3	5	G 2 1/4-40	96	94
070670	670	7	138.7	103	102	805/213	124	3	5	G 2 1/4-40	96	94
070890	890	7	138.7	136	102	1,070/283	164	3	5	G 2 1/4-40	96	94
071230	1,230	7	138.7	188	102	1,450/383	225	3	5	G 2 1/4-40	96	94
071400	1,400	7	138.7	214	-	-	-	3	5	G 2 1/4-40	96	94

PVDF version max. 25 bar, PTFE + 25 % carbon; PTFE max.10 bar

Wetted materials for HYDRO HP4a

Identity code of material	Dosing head	Connection on suction/discharge side	Seals	Valve seats	Valve balls up to DN 25	Valve plates/ valve springs
SCT	Stainless steel 316L	Stainless steel 1.4581	PTFE	Stainless steel 1.4404	Ceramic	Stainless steel 1.4404/ Hastelloy C
PVT *	PVDF	PVDF	PTFE	PTFE + 25% carbon	Glass	Ceramic/E-CTFE
SST	Stainless steel 1.4404	Stainless steel 1.4404	PTFE	PTFE	Stainless steel 1.4401	Stainless steel 1.4404/ Hastelloy C
TTT	PTFE + 25% carbon	PVDF (polyvinylidene fluoride)	PTFE	PTFE + 25% carbon	Glass	Ceramic/E-CTFE

* Not for areas at risk from explosion

2.3 Hydraulic Diaphragm Metering Pumps

Motor data for HYDRO HP4a

Identity code specification	Power supply				Remarks
S	3-phase, IP 55*	230 V/400 V	50 Hz	1.1 kW	
T	3-phase, IP 55*	230 V/400 V 265 V/460 V	50 Hz 60 Hz	1.1 kW	With PTC, speed control range 1:5
R	3-phase, IP 55*	230 V/400 V	50 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 Hz	1.5 kW	Variable speed stroke control motor with integrated frequency converter
L2	3-phase, II 2G Ex de IIC T4 Gb	230 V/400 V	50 Hz	1.1 kW	With PTC, speed control range 1:5
P2	3-phase, II 2G Ex de IIC T4	265 V/460 V	60 Hz	1.1 kW	With PTC, speed control range 1:5

* Three-phase motor according to IEC 60034-1

Motor data sheets can be requested for more information. Versions 265/460V - 60Hz, 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/EC in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label correspond to or are superior to the conditions prevalent in the intended application.

Identity code ordering system for HYDRO 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	Capacity									
		400071	40 bar	71 l/h								
		400105	40 bar	105 l/h								
		400140	40 bar	140 l/h								
		400190	40 bar	190 l/h								
		400220	40 bar	220 l/h								
		250130	25 bar	130 l/h								
		250190	25 bar	190 l/h								
		250250	25 bar	250 l/h								
		250350	25 bar	350 l/h								
		250400	25 bar	400 l/h								
		160210	16 bar	210 l/h								
		160300	16 bar	300 l/h								
		160400	16 bar	400 l/h								
		160550	16 bar	550 l/h								
		160625	16 bar	625 l/h								
		100330	10 bar	330 l/h								
		100480	10 bar	480 l/h								
		100635	10 bar	635 l/h								
		100880	10 bar	880 l/h								
		101000	10 bar	1,000 l/h								
		070465	7 bar	465 l/h								
		070670	7 bar	670 l/h								
		070890	7 bar	890 l/h								
		071230	7 bar	1,230 l/h								
		071400	7 bar	1,400 l/h								
			Liquid end material									
			SS	Stainless steel								
			PV	PVDF, max. 25 bar								
			TT	PTFE + 25 % carbon, max. 10 bar								
			SC	Stainless steel 316L								
				Sealing material								
				T	PTFE							
					Diaphragm							
					0	Standard multilayer diaphragm with rupture signalling facility						
						Liquid end version						
						0	No valve springs (standard)					
						1	With valve springs					
							Hydraulic connections					
							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-phase, 230/400 V, 50 Hz, 1.1 kW		
									T	3-phase, 230/400 V, 50/60 Hz, with PTC, 1.1 kW		
									R	3 ph, variable speed motor, 230/400 V, 1.5 kW		
									V-0	Variable speed stroke control motor with integrated frequency converter, 1-phase, 230/400 V, 50 Hz, 1.5 kW		
									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		
									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)	
										2	Exd design ATEX-T4 (L2, P2)	
										A	ATEX drive	
											Stroke sensor	
											0	No stroke sensor (standard)
											1	Stroke sensor (for explosion-proof applications)

2.3 Hydraulic Diaphragm Metering Pumps

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

Spare parts for HYDRO HP4a

Maintenance kits for HYDRO HP4a with valve wear parts

Scope of delivery:
1 spare diaphragm complete, 1 sealing set, 2 valve seats, 2 valve balls

Plunger Ø mm	Material	Suitable for identity code	Order no.
40, 52	S1	HP4a.025...SST	1040812
40, 52	H1	HP4a.025...HCT	1040860
40, 52	P1	HP4a.025...PVT	1043763
63	S1	HP4a.016...SST	1040824
63	H1	HP4a.016...HCT	1040861
63	P1	HP4a.016...PVT	1043775
80	S1	HP4a.010...SST	1040826
80	H1	HP4a.010...HCT	1040864
80	P1	HP4a.010...PVT	1043776
94	S1	HP4a.007...SST	1040828
94	H1	HP4a.007...HCT	1040867
94	P1	HP4a.007...PVT	1043777

Spare parts kit for HYDRO HP4a with valves, complete

Scope of delivery:
1 spare diaphragm complete, 1 suction valve, 1 injection valve, 1 sealing set, 2 valve seats, 2 valve balls

Plunger Ø mm	Material	Suitable for identity code	Order no.
40, 52	S1	HP4a.025...SST	1040813
40, 52	P1	HP4a.025...PVT	1023057
63	S1	HP4a.016...SST	1040825
63	P1	HP4a.016...PVT	1040863
80	S1	HP4a.010...SST	1040827
80	P1	HP4a.010...PVT	1040866
94	S1	HP4a.007...SST	1040829
94	P1	HP4a.007...PVT	1040869

Diaphragms PTFE/1.4404 for HYDRO HP4a

Plunger Ø mm	Material	Suitable for identity code	Order no.
40, 52	S1	HP4a.040...SST, HP4a.052...SST	1040808
40, 52	P1	HP4a.040...PVT, HP4a.052...PVT	1122581
63	S1	HP4a.016..SST	1040809
63	P1	HP4a.016...PVT	1122582
80	S1	HP4a.010..SST	1040810
80	P1	HP4a.010...PVT	1122583
94	S1	HP4a.007..SST	1040811
94	P1	HP4a.007...PVT	1122594

Diaphragms PTFE/Hastelloy C Coated for HYDRO HP4a

Plunger Ø mm	Material	Suitable for identity code	Order no.
40, 52	H1	HP4a.040...HCT, HP4a.025...HCT	1040874
63	H1	HP4a.016...HCT	1040875
80	H1	HP4a.010...HCT	1040876
94	H1	HP4a.007...HCT	1040877

2.3 Hydraulic Diaphragm Metering Pumps

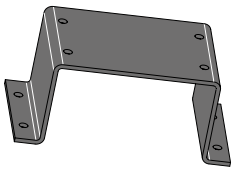
Standard oil for maintaining hydraulics and gearbox HYDRO HP4a

The oils are available in 1l containers. For example, if 1.8 l is required for maintenance work, 2 containers are needed.

	Required quantity	Order no.
Mobilube 1SHC 75W-90 gear oil, 1 litre	Simplex (V, H) - 5.8 l Double head (D) - 6.8 l Duplex (U) - 2 x 5.8 l Triplex (T) - 3 x 5.8 l	1006010

Base for HYDRO Hydraulic Diaphragm Metering Pumps

	Order no.
Base for HYDRO HP4a, dimensions: 344 x 250 x 120 mm (LxWxH)	1051421

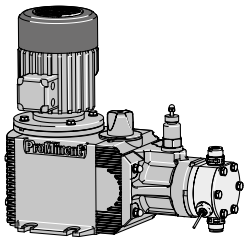


2.3.2 Hydraulic Diaphragm Metering Pump HYDRO API

For flexible metering with excellent process reliability in the medium pressure range.

Capacity range of single-head pump: 7 – 1,506 l/h, 100 – 7 bar

The HYDRO API 675 is an extremely robust hydraulic diaphragm metering pump, which meets the most exacting safety requirements and is designed in accordance with API 675. This is ensured by the PTFE multi-layer diaphragm with diaphragm monitoring, the full-motion drive and automatic bleeding, for example. Its modular construction makes it extremely versatile.



HYDRO Simplex (vertical)

The HYDRO API 675 hydraulic diaphragm metering pumps form an integrated product range with stroke lengths of 15 or 20 mm. Equipped with full-motion drive and automatic bleeding, they therefore cover the capacity range of 7 to 1506 l/h at 100 – 7 bar. They also meet the requirements of API 675.

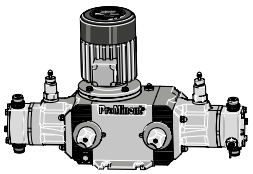
Your Benefits

Excellent process reliability:

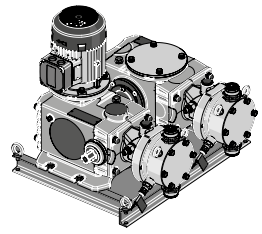
- PTFE multi-layer diaphragm with integrated diaphragm monitoring with condition signals sent via contact
- Integrated hydraulic relief valve with ventilation function
- The dosing precision is better than ± 1 % within the 10-100 % stroke volume range under defined conditions and with correct installation.

Excellent flexibility:

- The modular construction with single and double head versions permits a wide range of applications, with the double head designs (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



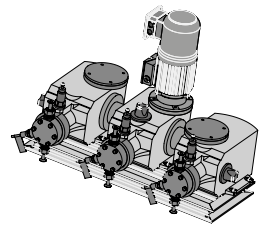
HYDRO double-head pump



HYDRO add-on pump

Technical Details

- Stroke length: 15 mm (HA1a, HA2a, HA3a), 20 mm (HA4a)
- Rod force: 2000 N (HA1a, HA2a), 4200 N (HA3a), 5800 N (HA4a)
- Stroke volume adjustment range: 0 – 100%
- Stroke volume adjustment: manually using scaled rotary dial (with electric actuator or control drive as an option).
- The dosing precision is better than ± 1 % within the 10 – 100 % stroke volume range under defined conditions and with correct installation
- PTFE multi-layer diaphragm with electrical diaphragm monitoring with condition signals sent via contact
- Integrated hydraulic relief and vent valve
- Full-motion drive
- Wetted materials: PVDF, PTFE+25% carbon, stainless steel 1.4571, Hastelloy C.
- A wide range of power end/drive versions is available: Three-phase or standard three-phase motors or 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



HYDRO triplex pump

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

2.3.2.1 Hydraulic Diaphragm Metering Pump HYDRO HA1a

Technical data for HYDRO HA1a (50 Hz)

Plunger Ø	Max. pressure	Max. pump capacity in l/h at strokes/min					Theor. stroke volume	Suction lift	Connection on suction/discharge 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
9	100	[0.8]	[1.5]	[1.9]	[2.5]	[3.0]	0.9	3.0	NPT 1/4 – DN 3 *	31
9	64	(1.3) – 1.3	(2.9) – 2.9	(3.1) – 3.1	(4.0) – 4.8	(4.8) – 5.3	0.9	3.0	NPT 1/4 – DN 3 *	31
9	40	(1.7) – 1.8	(2.7) – 3.9	(3.6) – 4.7	(4.0) – 6.0	(5.5) – 6.8	0.9	3.0	NPT 1/4 – DN 3 *	31
9	25	(1.7) – 2.1	(2.8) – 4.5	(3.8) – 5.6	(4.6) – 7.0	(5.5) – 8.0	0.9	3.0	NPT 1/4 – DN 3 *	31
9	10	(1.7) – 2.5	(2.8) – 5.2	(3.8) – 6.3	(4.6) – 7.8	(5.5) – 9.1	0.9	3.0	NPT 1/4 – DN 3 *	31
12	100	(2.9) – 2.9	(5.5) – 6.0	(7.4) – 7.4	(8.0) – 9.3	(9.0) – 10.1	1.7	3.0	NPT 1/4 – DN 6 *	31
12	64	(2.8) – 3.6	(4.5) – 7.7	(7.0) – 9.1	(8.0) – 11.4	(9.0) – 13.0	1.7	3.0	NPT 1/4 – DN 6 *	31
12	40	(2.5) – 4.1	(4.5) – 8.7	(6.0) – 10.4	(7.0) – 13.0	(9.0) – 14.7	1.7	3.0	NPT 1/4 – DN 6 *	31
12	25	(2.3) – 4.5	(4.8) – 9.4	(6.0) – 11.1	(7.0) – 13.8	(9.0) – 15.9	1.7	3.0	NPT 1/4 – DN 6 *	31
12	10	(2.5) – 4.8	(4.8) – 10.1	(6.0) – 12.1	(7.0) – 15.1	(9.0) – 17.1	1.7	3.0	NPT 1/4 – DN 6 *	31

* Double ball valve with female thread

The permitted rated flow configuration is possible in the stated range when pumps are selected in accordance with API 675 (control range 1:10).

The litre capacity indicated using [...] is the maximum litre capacity with an applicable control range of 1:5 and does not therefore satisfy API 675.

Example: a 12 mm piston, 40 bar pressure and stroke rate of 125 strokes/min results in (4.5) - 8.7, i.e. the control range of 1:10 is met for a rated flow of between 4.5 l/h and 8.7 l/h.

Technical data for HYDRO HA1a (60 Hz)

Plunger Ø	Max. pressure	Max. pump capacity in l/h at strokes/min					Theor. stroke volume	Suction lift	Connection on suction/discharge side	Shipping weight
		59	72	149	180	224				
mm	bar	l/h	l/h	l/h	l/h	l/h	ml/stroke	m WC	G-DN	kg
9	100	[0.5]	[0.8]	[1.8]	[2.0]	[3.0]	0.9	3.0	NPT 1/4 – DN 3 *	31
9	64	[1.2]	(1.6) – 1.6	(3.3) – 3.3	(3.7) – 3.7	(4.8) – 5.7	0.9	3.0	NPT 1/4 – DN 3 *	31
9	40	(1.7) – 1.7	(2.0) – 2.1	(3.2) – 4.6	(4.3) – 5.6	(4.8) – 7.2	0.9	3.0	NPT 1/4 – DN 3 *	31
9	25	(2.0) – 2.1	(2.0) – 2.5	(3.4) – 5.4	(4.5) – 6.7	(5.5) – 8.4	0.9	3.0	NPT 1/4 – DN 3 *	31
9	10	(2.0) – 2.5	(2.0) – 3.0	(3.4) – 6.2	(4.5) – 7.5	(5.5) – 9.3	0.9	3.0	NPT 1/4 – DN 3 *	31
12	100	(2.8) – 2.8	(3.5) – 3.5	(6.6) – 7.2	(8.8) – 8.8	(9.6) – 11.1	1.7	3.0	NPT 1/4 – DN 6 *	31
12	64	(2.4) – 3.6	(3.4) – 4.3	(5.4) – 9.2	(8.4) – 10.9	(9.6) – 13.6	1.7	3.0	NPT 1/4 – DN 6 *	31
12	40	(2.6) – 4.0	(3.0) – 4.9	(5.4) – 10.4	(7.2) – 12.4	(8.4) – 15.6	1.7	3.0	NPT 1/4 – DN 6 *	31
12	25	(2.6) – 4.4	(3.0) – 5.4	(5.7) – 11.2	(7.2) – 13.3	(8.4) – 16.5	1.7	3.0	NPT 1/4 – DN 6 *	31
12	10	(2.6) – 4.4	(3.0) – 5.7	(5.7) – 12.1	(7.2) – 14.5	(8.4) – 18.1	1.7	3.0	NPT 1/4 – DN 6 *	31

* Double ball valve with female thread

Piston Ø 9 and 12, version with double ball valves.

Wetted materials for HYDRO HA1a

Identity code of material	Dosing head	Suction/discharge connection	Seals/ball seat	Balls
S1	Stainless steel 1.4571/1.4404	Stainless steel 1.4581	PTFE/stainless steel 1.4404	Ceramic

Motor data for HYDRO HA1a

Identity code specification		Power supply			Remarks
S	3-phase, IP 55*	230 V/400 V	50 Hz	0.37 kW	
T	3-phase, IP 55*	230 V/400 V 265 V/460 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 Hz	0.37 kW	With PTC, speed control range 1:20, with external fan 1-phase 230 V; 50/60 Hz
V	1-phase, IP 55*	230 V	50 Hz	0.37 kW	Variable speed stroke control motor with integrated frequency converter
L	3-phase, II 2G Ex de IIC T4 Gb	230 V/400 V	50 Hz	0.37 kW	With PTC, speed control range 1:5
Q	3-phase, II 2G Ex de IIC T4	265 V/460 V	60 Hz	0.37 kW	With PTC, speed control range 1:5

* Three-phase motor according to IEC 60034-1

Motor data sheets can be requested for more information. Versions 265/460V - 60Hz, 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/EC in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label correspond to or are superior to the conditions prevalent in the intended application.

Identity code ordering system for HYDRO HA1a

HA1a	Drive type														
	V	Simplex (vertical)													
	D	Simplex double head													
	U	Duplex													
	T	Triplex													
		Plungers													
		009	Plunger 9 mm												
		012	Plunger 12 mm												
			stroke rate												
			060	60 strokes/min.; 50 Hz											
			125	125 strokes/min.; 50 Hz											
			150	150 strokes/min.; 50 Hz											
			187	187 strokes/min.; 50 Hz											
			214	214 strokes/min.; 50 Hz											
			059	59 strokes/min.; 60 Hz											
			072	72 strokes/min.; 60 Hz											
			149	149 strokes/min.; 60 Hz											
			180	180 strokes/min.; 60 Hz											
			224	224 strokes/min.; 60 Hz											
				Pressure rating											
				A	10 bar										
				D	25 bar										
				E	40 bar										
				H	64 bar										
				J	100 bar										
					Liquid end material										
					S1	Standard stainless steel; PTFE									
						Valve design									
						0	Standard								
							Diaphragm monitor								
							0	Standard							
							1	None							
							2	Visual indication							
								Hydraulic connector							
								0	Standard						
								F	Flange ANSI						
								N	NPT connection						
									Electrical Connection						
									S	3-phase 230/400 V, 50 Hz, 0.37 kW					
									T	3-phase, 230/400 V, 50/60 Hz, 0.37 kW, with PTC					
									L	3-phase, 230/400 V, 50 Hz, 0.37 kW, (Exde) T4					
									Q	3-phase, 265/460 V, 60 Hz, 0.37 kW, (Exde) T4					
									R	3-phase variable speed stroke control motor, 230/ 400 V, 50 Hz, 0.37 kW					
									V	Controllable motor with integrated frequency converter, 1-phase, 230 V, 50 Hz, 0.37 kW					
									1	Without motor, with flange 200/80					
									2	Without motor, with flange 160/71					
									3	Without motor, with 56C flange					
									4	Without motor, with 200/80 ATEX flange					
									5	Without motor, with 160/71 ATEX flange					
									6	Without motor, with NEMA ATEX flange					
										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				
											Temperature (ambient / fluid)				
											0	-20 °C … +40 °C / -20 °C … +90 °C (SS; HC) or +50 °C (PTFE) or +65 °C (PVDF)			
												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		
													Tests		
													S1	Standard performance test	
													S2	Standard performance test including 3.1 certificate	
													S3	As S1 + 3.1 certificate wetted material	
													S4	As S2 + 3.1 certificate wetted material	
													A1	API complete test including 3.1 certificate	
													A2	As A1 + NPSH	
													A3	As A1 + NPIP	
													A4	As A1 + 3.1 material certificate	

																Approvals			
																0	CE		
																1	CE + ATEX		
																2	CE + EAC		
																3	CE + EAC + ATEX		
																4	CE + UKCA		
																5	CE + UKCA + ATEX		
																	Documentation		
																	DE	German	
																	EN	English	
																	FR	French	
																	ES	Spanish	
																	RU	Russian	
																	M0	Modified	
																		Measuring unit	
																		0	bar, l/h
																		1	psi, gph
																		2	kPa, l/h

Spare parts for HYDRO HA1a

Maintenance kits for HYDRO HA1a with valves, complete

Scope of delivery:
1 spare diaphragm complete, 1 suction valve, 1 injection valve, 1 sealing set, 4 valve balls

Plunger Ø mm	Material	Suitable for identity code	Order no.
9	S1	HA1a.009....S1	1119517
12	S1	HA1a.012....S1	1128389

Diaphragms PTFE/1.4404 for HYDRO HA1a

Plunger Ø mm	Material	Suitable for identity code	Order no.
9, 12	S1	HA1a.009....S1, HA1a.012....S1	1005545

Standard oil for maintaining hydraulics and gearbox HYDRO HA1a

The oils are available in 1l containers. For example, if 1.8 l is required for maintenance work, 2 containers are needed.

	Required quantity	Order no.
Mobilube 1SHC 75W-90 gear oil, 1 litre	Simplex (V, H) - 2.5 l Double head (D) - 2.9 l Duplex (U) - 2 x 2.5 l Triplex (T) - 3 x 2.5 l	1006010

2.3.2.2 Hydraulic Diaphragm Metering Pump HYDRO HA2a

Technical data for HYDRO HA2a 50 Hz

Plunger Ø	Max. pressure	Max. pump capacity in l/h at strokes/min					Theor. stroke volume	Suction lift	Connection on suction/discharge 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	[3.0]	[6.5]	(8.5) – 8.5	(10) – 11	(12) – 13	3.0	3.0	Rp 1/4 – DN 6 *	31
16	64	[4.0]	(10) – 10	(10) – 13	(12) – 16.5	(14) – 18.5	3.0	3.0	Rp 1/4 – DN 6 *	31
16	40	[5.5]	(10) – 13	(12) – 15.5	(14) – 19.5	(16) – 23.5	3.0	3.0	Rp 1/4 – DN 6 *	31
16	25	[6.5]	(12) – 14.5	(14) – 17.5	(17) – 22.5	(20) – 26.5	3.0	3.0	Rp 1/4 – DN 6 *	31
16	10	(7) – 7.5	(13) – 16.5	(15) – 19.5	(18) – 24.5	(22) – 29.5	3.0	3.0	Rp 1/4 – DN 6 *	31
18	64	[6.5]	(12) – 15.5	(18.5) – 18.5	(24.5) – 24.5	(26) – 26.5	3.8	3.0	G 3/4 – DN 10	31
18	40	(7) – 8	(13) – 18.5	(22) – 22	(26) – 28.5	(26) – 32.5	3.8	3.0	G 3/4 – DN 10	31
18	25	(8) – 9	(16) – 19.5	(23) – 24.5	(26) – 30.5	(28) – 35.5	3.8	3.0	G 3/4 – DN 10	31
18	10	(8) – 10	(16) – 21.5	(23) – 26.5	(29) – 33.5	(28) – 37.5	3.8	3.0	G 3/4 – DN 10	31
22	40	(7) – 7.5	(20) – 25.5	(27) – 28.5	(37) – 42.5	(44) – 48	5.7	3.0	G 3/4 – DN 10	31
22	25	(7) – 8.5	(20) – 25.5	(25) – 33.5	(35) – 43.5	(40) – 51	5.7	3.0	G 3/4 – DN 10	31
22	10	(8) – 10	(17) – 28.5	(25) – 36.5	(30) – 47	(40) – 54	5.7	3.0	G 3/4 – DN 10	31
26	25	(20) – 22	(35) – 49	(40) – 59	(65) – 72	(50) – 83	7.9	3.0	G 3/4 – DN 10	31
26	10	(20) – 23.5	(30) – 51	(35) – 61	(40) – 76	(45) – 86	7.9	3.0	G 3/4 – DN 10	31

* Double ball valve with female thread

The permitted rated flow configuration is possible in the stated range when pumps are selected in accordance with API 675 (control range 1:10).

The litre capacity indicated using [...] is the maximum litre capacity with an applicable control range of 1:5 and does not therefore satisfy API 675.

Example: with 16 mm piston, pressure 25 bar and stroke rate of 150 strokes/min gives (14) - 17.5, i.e. the control range of 1:10 is met for a rated flow of between 14 l/h and 17.5 l/h.

PVDF version max. 25 bar, PTFE + 25 % carbon; PTFE up to 16 bar

Technical data for HYDRO HA2a 60 Hz

Plunger Ø	Max. pressure	Max. pump capacity in l/h at strokes/min				Theor. stroke volume	Suction lift	Connection on suction/discharge side	Shipping weight
		72	149	180	224				
mm	bar	l/h	l/h	l/h	l/h	ml/stroke	m WC	G-DN	kg
16	100	[3.5]	[7.5]	(10) – 10	(12) – 13	3.0	3.0	Rp 1/4 – DN 6 *	31
16	64	[4.5]	(10) – 11.5	(12) – 15.5	(14.5) – 19.5	3.0	3.0	Rp 1/4 – DN 6 *	31
16	40	[6.5]	(12) – 15.5	(14.5) – 18.5	(16.5) – 23	3.0	3.0	Rp 1/4 – DN 6 *	31
16	25	[7.5]	(14.5) – 17	(16.5) – 21	(20.5) – 27	3.0	3.0	Rp 1/4 – DN 6 *	31
16	10	(8.5) – 9	(15.5) – 19.5	(18) – 23	(21.5) – 29	3.0	3.0	Rp 1/4 – DN 6 *	31
18	64	[7.5]	(14.5) – 18.5	(22) – 22	(29) – 29	3.8	3.0	G 3/4 – DN 10	31
18	40	(8.5) – 9.5	(15.5) – 22	(26) – 26	(31) – 34	3.8	3.0	G 3/4 – DN 10	31
18	25	(9.5) – 10.5	(19.5) – 23	(27.5) – 29	(31) – 36.5	3.8	3.0	G 3/4 – DN 10	31
18	10	(9.5) – 12	(19.5) – 25.5	(27.5) – 31.5	(34.5) – 40	3.8	3.0	G 3/4 – DN 10	31
22	40	(8.5) – 9	(24) – 30	(32.5) – 34	(44) – 50.5	5.7	3.0	G 3/4 – DN 10	31
22	25	(8.5) – 10	(24) – 30	(30) – 40	(42) – 52	5.7	3.0	G 3/4 – DN 10	31
22	10	(9.5) – 12	(20) – 34	(36) – 43	(44) – 50.5	5.7	3.0	G 3/4 – DN 10	31
26	25	(24) – 26	(42) – 58	(48) – 70.5	(78) – 86	7.9	3.0	G 3/4 – DN 10	31
26	10	(24) – 28	(36) – 60.5	(42) – 73	(48) – 91	7.9	3.0	G 3/4 – DN 10	31

* Double ball valve with female thread

Wetted materials for HYDRO HA2a

Identity code of material	Dosing head	Connection on suction/discharge side	Seals/ball seat	Balls
P1	PVDF	PVDF	PTFE/PTFE + 25 % carbon	Ceramic
S1	Stainless steel 1.4571/1.4404	Stainless steel 1.4581	PTFE/stainless steel 1.4404	Ceramic
T1	PTFE + 25% carbon	PVDF	PTFE/PTFE + 25 % carbon	Ceramic

2.3 Hydraulic Diaphragm Metering Pumps

Motor data for HYDRO HA2a

Identity code specification	Power supply				Remarks
S	3-phase, IP 55*	230 V/400 V	50 Hz	0.37 kW	
T	3-phase, IP 55*	230 V/400 V 265 V/460 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 Hz	0.45 kW	With PTC, speed control range 1:20, with external fan 1-phase 230 V; 50/60 Hz
V	1-phase, IP 55*	230 V	50 Hz	0.37 kW	Variable speed stroke control motor with integrated frequency converter
L	3-phase, II 2G Ex de IIC T4 Gb	230 V/400 V	50 Hz	0.37 kW	With PTC, speed control range 1:5
Q	3-phase, II 2G Ex de IIC T4	265 V/460 V	60 Hz	0.37 kW	With PTC, speed control range 1:5

* Three-phase motor according to IEC 60034-1

Motor data sheets can be requested for more information. Versions 265/460V - 60Hz, 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/EC in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label correspond to or are superior to the conditions prevalent in the intended application.

Identity code ordering system for HYDRO HA2a

HA2a	Drive type																
	V	Simplex (vertical)															
	D	Simplex double head															
	U	Duplex															
	T	Triplex															
		Plungers															
		016	Plunger 16 mm														
		018	Plunger 18 mm														
		022	Plunger 22 mm														
		026	Plunger 26 mm														
			stroke rate														
			060	60 strokes/min.; 50 Hz													
			125	125 strokes/min.; 50 Hz													
			150	150 strokes/min.; 50 Hz													
			187	187 strokes/min.; 50 Hz													
			214	214 strokes/min.; 50 Hz													
			072	60 strokes/min.; 50 Hz													
			149	125 strokes/min.; 50 Hz													
			180	187 strokes/min.; 50 Hz													
			224	214 strokes/min.; 50 Hz													
				Pressure rating													
				A	10 bar												
				D	25 bar												
				E	40 bar												
				H	64 bar												
				J	100 bar												
					Material												
					S1	Standard stainless steel; PTFE											
					P1	PVDF with PTFE diaphragm, up to 25 bar											
					T1	PTFE + 25 % carbon; PTFE up to 16 bar											
						Valve design											
						0	Standard										
						1	With valve springs										
							Diaphragm rupture display										
							0	Standard (electrical)									
							1	Standard (electrical)									
							2	Visual indication									
								Hydraulic connector									
								0	Standard								
								E	DIN flange								
								F	Flange ANSI								
									Electrical Connection								
									S	3-phase 230/400 V, 50 Hz, 0.37 kW							
									T	3-phase, 230/400 V, 50/60 Hz, 0.37 kW, with PTC							
									L	3-phase, 230/400 V, 50 Hz, 0.37 kW, (Exde) T4							
									Q	3-phase, 265/460 V, 60 Hz, 0.37 kW, (Exde) T4							
									R	Variable speed stroke control motor, 1-phase, 230/400 V, 50 Hz, 0.45 kW							
									V	Variable speed stroke control motor with integrated frequency converter, 1-phase, 230 V, 50 Hz, 0.37 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							
										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						
											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)					
												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				
													Tests				
													S1	Standard performance test			

													S2	Standard performance test including 3.1 certificate			
													S3	As S1 + 3.1 certificate wetted material			
													S4	As S2 + 3.1 certificate wetted material			
													A1	API complete test including 3.1 certificate			
													A2	As A1 + NPSH			
													A3	As A1 + NPIP			
													A4	As A1 + 3.1 material certificate			
														Approvals			
														0	CE		
														1	CE + ATEX		
														2	CE + EAC		
														3	CE + EAC + ATEX		
														4	CE + EAC + ATEX		
														5	CE + EAC + ATEX		
															Documentation		
															DE	German	
															EN	English	
															FR	French	
															ES	Spanish	
															RU	Russian	
															M0	Modified	
																Measuring unit	
																0	bar, l/h
																1	psi, gph
																2	kPa, l/h

Spare parts for HYDRO HA2a

Maintenance kits for HYDRO HA2a with valve wear parts

Scope of delivery:
1 spare diaphragm complete, 1 sealing set, 2 valve seats, 2 valve balls (4 valve seats, 4 valve balls for double ball valve)

Plunger Ø mm	Material	Suitable for identity code	Order no.
16 *	S1	HA2a.016....S1	1029260
16, 18	H1	HA2a.016....H1, HA2a.018....H1	1009571
18	S1	HA2a.018....S1	1005549
22, 26	S1	HA2a.022....S1, HA2a.026....S1	1005553
22, 26	H1	HA2a.022....H1, HA2a.026....H1	1009573

* Piston Ø 16 mm, material S1, version for double ball valves

Maintenance kits for HYDRO HA2a with valves, complete

Scope of delivery:
1 spare diaphragm complete, 1 suction valve, 1 injection valve, 1 sealing set, 2 valve seats, 2 valve balls

Plunger Ø mm	Material	Suitable for identity code	Order no.
16, 18	P1	HA2a.016....P1, HA2a.018....P1	1005548
18	S1	HA2a.018....S1	1005550
22, 26	S1	HA2a.022....S1, HA2a.026....S1	1005554
22, 26	P1	HA2a.022....P1, HA2a.026....P1	1005552

Diaphragms PTFE/1.4404 for HYDRO HA2a

Plunger Ø mm	Material	Suitable for identity code	Order no.
16, 18	S1	HA2a.016....S1, HA2a.018....S1	1005545
16, 18	P1	HA2a.016....P1, HA2a.018....P1	1122578
22, 26	S1	HA2a.022....S1, HA2a.026....S1	1005546
22, 26	P1	HA2a.022....P1, HA2a.026....P1	1122579

Diaphragms PTFE/Hastelloy C coated for HYDRO HA2a

Plunger Ø mm	Material	Suitable for identity code	Order no.
16, 18	H1	HA2a.016....H1, HA2a.018....H1	1006481
22, 26	H1	HA2a.022....H1, HA2a.026....H1	1006482

Standard oil for maintaining hydraulics and gearbox HYDRO HA2a

The oils are available in 1l containers. For example, if 1.8 l is required for maintenance work, 2 containers are needed.

	Required quantity	Order no.
Mobilube 1SHC 75W-90 gear oil, 1 litre	Simplex (V, H) - 2.5 l Double head (D) - 2.9 l Duplex (U) - 2 x 2.5 l Triplex (T) - 3 x 2.5 l	1006010

2.3 Hydraulic Diaphragm Metering Pumps

2.3.2.3 Hydraulic Diaphragm Metering Pump HYDRO HA3a

Technical data for HYDRO HA3a 50 Hz

Plunger Ø	Max. pressure	Max. pump capacity in l/h at strokes/min					Theor. stroke volume	Suction lift	Connection on suction/discharge 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
22	100	[9.0]	[19.0]	[25.0]	[30.5]	[32.0]	5.7	3.0	Rp 3/8 – DN 8 *	41
22	64	[11.0]	[26.0]	[31.5]	[40.0]	[46.0]	5.7	3.0	Rp 3/8 – DN 8 *	41
22	40	[12.0]	[28.5]	[35.5]	[45.0]	[51.5]	5.7	3.0	Rp 3/8 – DN 8 *	41
22	25	[12.5]	[30.5]	[37.0]	[47.0]	[55.0]	5.7	3.0	Rp 3/8 – DN 8 *	41
22	10	[13.5]	[31.5]	[39.0]	[50.0]	[57.5]	5.7	3.0	Rp 3/8 – DN 8 *	41
26	64	(18) – 19	(35) – 43.5	(40) – 51.5	(55) – 63	(65) – 73	7.9	3.0	G 3/4 – DN 10	41
26	40	(18) – 21	(37) – 45.5	(40) – 55	(50) – 71	(70) – 81	7.9	3.0	G 3/4 – DN 10	41
26	25	(15) – 21	(30) – 49.5	(40) – 59	(55) – 74	(70) – 84	7.9	3.0	G 3/4 – DN 10	41
26	10	(15) – 22	(30) – 49.5	(35) – 61	(50) – 77	(80) – 87	7.9	3.0	G 3/4 – DN 10	41
32	40	(25) – 25.5	(50) – 66	(70) – 80	(65) – 101.5	(70) – 116.5	12.0	3.0	G 1 – DN 15	41
32	25	(25) – 26.5	(50) – 69	(65) – 83	(65) – 105.5	(70) – 122.5	12.0	3.0	G 1 – DN 15	41
32	10	(22) – 31.5	(50) – 74	(70) – 90	(60) – 112.5	(65) – 129	12.0	3.0	G 1 – DN 15	41
38	25	(25) – 50.5	(70) – 110.5	(80) – 126	(150) – 166	(180) – 187	17.0	3.0	G 1 – DN 15	41
38	10	(30) – 51.5	(80) – 111.5	(90) – 135	(150) – 168	(180) – 191	17.0	3.0	G 1 – DN 15	41

* Double ball valve with female thread

The permitted rated flow configuration is possible in the stated range when pumps are selected in accordance with API 675 (control range 1:10).

The litre capacity indicated using [...] is the maximum litre capacity with an applicable control range of 1:5 and does not therefore satisfy API 675.

Example: a 26 mm piston, 25 bar pressure and stroke rate of 150 strokes/min results in (40) - 59, i.e. the control range of 1:10 is met for a rated flow of between 40 l/h and 59 l/h.

PVDF version max. 25 bar, PTFE + 25 % carbon; PTFE up to 16 bar

Technical data for HYDRO HA3a 60 Hz

Plunger Ø	Max. pressure	Max. pump capacity in l/h at strokes/min				Theor. stroke volume	Suction lift	Connection on suction/discharge side	Shipping weight
		72	149	180	224				
mm	bar	l/h	l/h	l/h	l/h	ml/stroke	m WC	G-DN	kg
22	64	[13.0]	[30.5]	[38.0]	[47.5]	5.7	3.0	Rp 3/8 – DN 8 *	41
22	40	[14.5]	[34.0]	[42.5]	[53.5]	5.7	3.0	Rp 3/8 – DN 8 *	41
22	25	[15.0]	[36.5]	[44.5]	[56.0]	5.7	3.0	Rp 3/8 – DN 8 *	41
22	10	[16.0]	[37.5]	[47.0]	[59.5]	5.7	3.0	Rp 3/8 – DN 8 *	41
22	100	[10.0]	[22.0]	[29.5]	[36.5]	5.7	3.0	Rp 3/8 – DN 8 *	41
26	64	(21.5) – 22.5	(42) – 51.5	(48) – 61.5	(66) – 75	7.9	3.0	G 3/4 – DN 10	41
26	40	(21.5) – 25	(44) – 54	(48) – 66	(60) – 85	7.9	3.0	G 3/4 – DN 10	41
26	25	(18) – 25	(36) – 59	(48) – 70.5	(66) – 88.5	7.9	3.0	G 3/4 – DN 10	41
26	10	(18) – 26	(36) – 59	(42) – 73	(60) – 92	7.9	3.0	G 3/4 – DN 10	41
32	40	(30) – 30.5	(60) – 78.5	(84) – 96	(78) – 121	12.0	3.0	G 1 – DN 15	41
32	25	(30) – 31.5	(60) – 82	(78) – 99.5	(78) – 126	12.0	3.0	G 1 – DN 15	41
32	10	(26.5) – 37.5	(60) – 88	(84) – 108	(72) – 134.5	12.0	3.0	G 1 – DN 15	41
38	25	(30) – 60.5	(84) – 131	(96) – 151	(180) – 198	17.0	3.0	G 1 – DN 15	41
38	10	(36) – 61.5	(96) – 132	(108) – 162	(180) – 201	17.0	3.0	G 1 – DN 15	41

* Double ball valve with female thread

Wetted materials for HYDRO HA3a

Identity code of material	Dosing head	Connection on suction/discharge side	Seals/ball seat	Balls
P1	PVDF	PVDF	PTFE/PTFE + 25 % carbon	Ceramic
S1	Stainless steel 1.4571/1.4404	Stainless steel 1.4581	PTFE/ZrO_2 (DN 15/DN20 stainless steel 1.4404)	Ceramic
T1	PTFE + 25% carbon	PVDF	PTFE/PTFE + 25 % carbon	Ceramic

Motor data for HYDRO HA3a

Identity code specification		Power supply			Remarks
S	3-phase, IP 55*	230 V/400 V	50 Hz	0.75 kW	
T	3-phase, IP 55*	230 V/400 V 265 V/460 V	50 Hz 60 Hz	0.75 kW	With PTC, speed control range 1:5
R	3-phase, IP 55*	230 V/400 V	50 Hz	0.75 kW	With PTC, speed control range 1:20, with external fan 1-phase 230 V; 50/60 Hz
V	1-phase, IP 55*	230 V	50 Hz	0.75 kW	Variable speed stroke control motor with integrated frequency converter
L	3-phase, II 2G Ex de IIC T4	230 V/400 V	50 Hz	0.75 kW	With PTC, speed control range 1:5
Q	3-phase, II 2G Ex de IIC T4	265 V/460 V	60 Hz	0.75 kW	With PTC, speed control range 1:5

* Three-phase motor according to IEC 60034-1

Motor data sheets can be requested for more information. Versions 265/460V - 60Hz, 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/EC in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label correspond to or are superior to the conditions prevalent in the intended application.

Identity code ordering system for HYDRO HA3a

HA3a	Drive type													
	V	Simplex (vertical)												
	D	Simplex double head												
	U	Duplex												
	T	Triplex												
		Plungers												
		022	Plunger 22 mm											
		026	Plunger 26 mm											
		032	Plunger 32 mm											
		038	Plunger 38 mm											
			stroke rate											
			060	60 strokes/min.; 50 Hz										
			125	125 strokes/min.; 50 Hz										
			150	150 strokes/min.; 50 Hz										
			187	187 strokes/min.; 50 Hz										
			214	214 strokes/min.; 50 Hz										
			072	60 strokes/min.; 50 Hz										
			149	125 strokes/min.; 50 Hz										
			180	187 strokes/min.; 50 Hz										
			224	214 strokes/min.; 50 Hz										
				Pressure rating										
				A	10 bar									
				D	25 bar									
				E	40 bar									
				H	64 bar									
				J	100 bar									
					Material									
					S1	Standard stainless steel; PTFE								
					P1	PVDF with PTFE diaphragm, up to 25 bar								
					T1	PTFE + 25 % carbon; PTFE up to 16 bar								
						Valve design								
						0	Standard							
						1	With valve springs							
						D	With valve springs							
							Diaphragm rupture display							
							0	Standard (electrical)						
							1	Standard (electrical)						
							2	Visual indication						
								Hydraulic connector						
								0	Standard					
								E	DIN flange					
								F	Flange ANSI					
									Electrical Connection					
									S	3-phase, 230/400 V, 50 Hz, 0.75 kW				
									T	3-phase, 230/400 V, 50/60 Hz, 0.75 kW, with PTC				
									L	3-phase, 230/400 V, 50 Hz, 0.75 kW, (Exde) T4				
									Q	3-phase, 265/460 V, 60 Hz, 0.75 kW, (Exde) T4				
									R	Variable speed stroke control motor, 3-phase, 230/400 V, 50 Hz, 0.75 kW				
									V	Variable speed stroke control motor with integrated frequency converter, 1-phase, 230 V, 50 Hz, 0.75kW				
									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				
										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			
											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)		
												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	
													Tests	
													S1	Standard performance test

														S2	Standard performance test including 3.1 certificate				
														S3	As S1 + 3.1 certificate wetted material				
														S4	As S2 + 3.1 certificate wetted material				
														A1	API test complete including 3.1 certificate				
														A2	As A1 + NPSH				
														A3	As A1 + NPIP				
														A4	As A1 + 3.1 material certificate				
															Approvals				
															0	CE			
															1	CE + ATEX			
															2	CE + EAC			
															3	CE + EAC + ATEX			
															4	CE			
															5	CE			
																Documentation			
																DE	German		
																EN	English		
																FR	French		
																ES	Spanish		
																RU	Russian		
																M0	Modified		
																	Measuring unit		
																	0	bar, l/h	
																	1	psi, gph	
																	2	kPa, l/h	

Spare parts for HYDRO HA3a

Maintenance kits for HYDRO HA3a with valve wear parts

Scope of delivery:
1 spare diaphragm complete, 1 sealing set, 2 valve seats, 2 valve balls (4 valve seats, 4 valve balls for double ball valve)

Plunger Ø mm	Material	Suitable for identity code	Order no.
22, 26	S1	HA3a.022....S1, HA3a.026....S1	1005553
22	S1	HA3a.022....S1	1005555
22, 26	H1	HA3a.022....H1, HA3a.026....H1	1009573
32, 38	S1	HA3a.032....S1, HA3a.038....S1	1005557
32, 38	H1	HA3a.032....H1, HA3a.038....H1	1009575

Maintenance kits for HYDRO HA3a with valve, complete

Scope of delivery:
1 spare diaphragm complete, 1 suction valve, 1 injection valve, 1 sealing set, 2 valve seats, 2 valve balls

Plunger Ø mm	Material	Suitable for identity code	Order no.
22, 26	S1	HA3a.022....S1, HA3a.026....S1	1005554
22, 26	P1	HA3a.022....P1, HA3a.026....P1	1005552
32, 38	S1	HA3a.032....S1, HA3a.038....S1	1005558
32, 38	P1	HA3a.032....P1, HA3a.038....P1	1005556

Diaphragms PTFE/1.4404 for HYDRO HA3a

Plunger Ø mm	Material	Suitable for identity code	Order no.
22, 26	S1	HA3a.022....S1, HA3a.026....S1	1005546
22, 26	P1	HA3a.022....P1, HA3a.026....P1	1122579
32, 38	S1	HA3a.032....S1, HA3a.038....S1	1005547
32, 38	P1	HA3a.032....P1, HA3a.038....P1	1122580

Diaphragms PTFE/Hastelloy C Coated for HYDRO HA3a

Plunger Ø mm	Material	Suitable for identity code	Order no.
22, 26	H1	HA3a.022....H1, HA3a.026....H1	1006482
32, 38	H1	HA3a.032....H1, HA3a.038....H1	1006483

Standard oil for maintaining hydraulics and gearbox HYDRO HA3a

The oils are available in 1l containers. For example, if 1.8 l is required for maintenance work, 2 containers are needed.

	Required quantity	Order no.
Mobilube 1SHC 75W-90 gear oil, 1 litre	Simplex (V, H) - 3.5 l Double head (D) - 4.0 l Duplex (U) - 2 x 3.5 l Triplex (T) - 3 x 3.5 l	1006010

2.3.2.4 Hydraulic Diaphragm Metering Pump HYDRO HA4a

Technical data for HYDRO HA4a 50 Hz

Plunger Ø	Max. pressure	Max. pump capacity in l/h at strokes/min					Theor. stroke volume	Suction lift	Connection on suction/discharge side	Shipping weight
		71	103	136	188	214				
mm	bar	l/h	l/h	l/h	l/h	l/h	ml/stroke	m WC	G-DN	kg
40	40	[79]	[118]	(150) – 154	(200) – 211	(220) – 242	25.1	3	G 1 1/2 – DN 25	69
40	25	[80]	[121]	(150) – 160	(200) – 219	(220) – 250	25.1	3	G 1 1/2 – DN 25	69
40	16	[82]	[125]	[162]	(200) – 225	(220) – 254	25.1	3	G 1 1/2 – DN 25	69
40	10	[83]	(100) – 125	(150) – 166	(200) – 228	(220) – 256	25.1	3	G 1 1/2 – DN 25	69
40	7	[84]	(100) – 127	(150) – 167	(200) – 230	(220) – 261	25.1	3	G 1 1/2 – DN 25	69
52	25	[142]	(200) – 204	(200) – 271	(370) – 372	[425]	42.4	3	G 1 1/2 – DN 25	69
52	16	[143]	(190) – 205	(200) – 274	(370) – 376	[425]	42.4	3	G 1 1/2 – DN 25	69
52	10	[144]	(180) – 207	(200) – 276	(370) – 379	[426]	42.4	3	G 1 1/2 – DN 25	69
52	7	[145]	(180) – 209	(200) – 277	[380]	[426]	42.4	3	G 1 1/2 – DN 25	69
63	16	(200) – 212	(280) – 306	(390) – 401	[562]	[635]	62.3	3	G 1 1/2 – DN 25	76
63	10	(210) – 215	(280) – 311	(380) – 407	[562]	[638]	62.3	3	G 1 1/2 – DN 25	76
63	7	(210) – 216	(280) – 312	(370) – 408	[564]	[648]	62.3	3	G 1 1/2 – DN 25	76
80	10	(280) – 350	(420) – 509	(580) – 657	(890) – 914	(1,050) – 1,056	100.4	3	G 2 – DN 32	87
80	7	(270) – 352	(420) – 513	(590) – 683	(890) – 947	(1,050) – 1,080	100.4	3	G 2 – DN 32	87
94	7	(350) – 493	(500) – 710	(820) – 936	(1,000) – 1,258	(1,400) – 1,440	138.7	3	G 2 1/4 – DN 40	96

The permitted rated flow configuration is possible in the stated range when pumps are selected in accordance with API 675 (control range 1:10).

The litre capacity indicated using [...] is the maximum litre capacity with an applicable control range of 1:5 and does not therefore satisfy API 675.

Example: with 52 mm piston, 10 bar pressure and stroke rate of 136 strokes/min results in (200) - 276, i.e. the control range of 1:10 is met for a rated flow of between 200 l/h and 276 l/h.

PVDF version max. 25 bar, PTFE + 25 % carbon; PTFE up to 10 bar

Technical data for HYDRO HA4a 60 Hz

Plunger Ø	Max. pressure	Max. pump capacity in l/h at strokes/min				Theor. stroke volume	Suction lift	Connection on suction/discharge side	Shipping weight
		86	124	164	225				
mm	bar	l/h	l/h	l/h	l/h	ml/stroke	m WC	G-DN	kg
40	40	[95]	[142]	(180) – 185	(240) – 252	25.1	3	G 1 1/2 – DN 25	69
40	25	[96]	[145]	(180) - 192	(240) – 262	25.1	3	G 1 1/2 – DN 25	69
40	16	[99]	[150]	[195]	(240) – 269	25.1	3	G 1 1/2 – DN 25	69
40	10	[100]	(120) – 150	(180) – 200	(240) – 272	25.1	3	G 1 1/2 – DN 25	69
40	7	[101]	(120) – 152	(180) – 201	(240) – 275	25.1	3	G 1 1/2 – DN 25	69
52	25	[171]	(240) – 245	(240) – 327	(440) – 445	42.4	3	G 1 1/2 – DN 25	69
52	16	[172]	(230) – 246	(240) – 330	(450) – 450	42.4	3	G 1 1/2 – DN 25	69
52	10	[174]	(220) – 249	(240) – 333	(450) – 455	42.4	3	G 1 1/2 – DN 25	69
52	7	[176]	(220) – 251	(240) – 334	[454]	42.4	3	G 1 1/2 – DN 25	69
63	16	(245) – 256	(340) – 368	(470) – 483	[672]	62.3	3	G 1 1/2 – DN 25	76
63	10	(255) – 260	(340) – 374	(460) – 490	[672]	62.3	3	G 1 1/2 – DN 25	76
63	7	(260) – 262	(340) – 375	(445) – 491	[674]	62.3	3	G 1 1/2 – DN 25	76
80	10	(340) – 424	(505) – 613	(700) – 792	(1,065) – 1,094	100.4	3	G 2 – DN 32	87
80	7	(330) – 426	(505) – 618	(711) – 823	(1,065) – 1,133	100.4	3	G 2 – DN 32	87
94	7	(430) – 597	(600) – 854	(990) – 1,128	(1,200) – 1,506	138.7	3	G 2 1/4 – DN 40	96

2.3 Hydraulic Diaphragm Metering Pumps

Wetted materials for HYDRO HA4a

Identity code of material	Dosing head	Connection on suction/discharge side	Seals	Valve seats	Valve balls up to DN 25	Valve plates/ valve springs
P1	PVDF	PVDF	PTFE	PTFE + 25% carbon	Glass	Ceramic/E-CTFE
S1	Stainless steel 1.4404	Stainless steel 1.4404	PTFE	PTFE	Stainless steel 1.4401	Stainless steel 1.4404/ Hastelloy C
T1	PTFE + 25% carbon	PVDF	PTFE	PTFE + 25% carbon	Glass	Ceramic/E-CTFE
V1	PVC	PVDF	PTFE	PTFE	Glass	Ceramic/E-CTFE
Y1	PPT	PVDF	PTFE	PTFE	Glass	Ceramic/E-CTFE

Motor data for HYDRO HA4a

Identity code specification		Power supply			Remarks
S	3-phase, IP 55*	230 V/400 V	50 Hz	1.1 kW	
T	3-phase, IP 55*	230 V/400 V 265 V/460 V	50 Hz 60 Hz	1.1 kW	With PTC, speed control range 1:5
R	3-phase, IP 55*	230 V/400 V	50 Hz	1.5 kW	With PTC, speed control range 1:20, with external fan 1-phase 230 V; 50/60 Hz
V	3-phase, IP 55*	400 V	50 Hz	1.5 kW	Variable speed stroke control motor with integrated frequency converter
L	3-phase, II 2G Ex de IIC T4 Gb	230 V/400 V	50 Hz	1.1 kW	With PTC, speed control range 1:5
Q	3-phase, II 2G Ex de IIC T4	265 V/460 V	60 Hz	1.1 kW	With PTC, speed control range 1:5

* Three-phase motor according to IEC 60034-1

Motor data sheets can be requested for more information. Versions 265/460V - 60Hz, 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/EC in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label correspond to or are superior to the conditions prevalent in the intended application.

Identity code ordering system for HYDRO HA4a

HA4a	Drive type											
	V	Simplex (vertical)										
	D	Simplex double head										
	U	Duplex										
	T	Triplex										
		Plungers										
		040	Plunger d 40									
		052	Plunger d 52									
		063	Plunger d 63									
		080	Plunger d 80									
		094	Plunger d 94									
			stroke rate									
			071	71 strokes/min; 50 Hz								
			103	103 strokes/min; 50 Hz								
			136	136 strokes/min; 50 Hz								
			188	188 strokes/min; 50 Hz								
			214	214 strokes/min; 50 Hz								
			086	86 strokes/min; 60 Hz								
			124	124 strokes/min; 60 Hz								
			164	164 strokes/min; 60 Hz								
			225	225 strokes/min; 60 Hz								
				Pressure rating								
				Z	7 bar							
				A	10 bar							
				B	16 bar							
				D	25 bar							
				E	40 bar							
					Material							
					S1	Standard stainless steel; PTFE						
					P1	PVDF with PTFE diaphragm, up to 25 bar						
					T1	PTFE + carbon; PTFE up to 10 bar						
					V1	PVC with PTFE diaphragm, up to 10 bar						
					Y1	PP with PTFE diaphragm, up to 10 bar						
						Valve design						
						0	Without valve spring					
						1	With valve spring					
							Diaphragm monitoring					
							0	Standard				
							1	None				
							2	Visual indication				
							A	Standard with electrical overload indication				
							B	Without diaphragm monitoring, with electrical overpressure display				
							C	Visual indication with electric overload indication				
								Hydraulic connector				
								0	Standard			
								E	DIN flange			
								F	Flange ANSI			
									Electrical Connection			
									S	3-phase 230/400 V, 50 Hz, 1.1 kW		
									T	3-phase, 230/400 V, 50/60 Hz, 1,1 kW mit PTC		
									L	3-phase, 230/400 V, 50 Hz, 1,1 kW (Exde) T4		
									Q	3-phase, 265/460 V; 60 Hz, 1,1 kW (Exde) T4		
									R	Variable speed stroke control motor, 3-phase 1.5 kW, 230/400 V		
									V	Controllable motor with integrated frequency converter, 3-phase, 400 V, 50 Hz, 1.5 kW		
									1	Without motor, with motor flange 200/90		
									2	Without motor, with motor flange 250/100		
									3	Without motor, with motor flange NEMA		
									4	Without motor, with motor flange 200/90 ATEX		
									5	Without motor, with motor flange 250/100 ATEX		
									6	Without motor, with motor flange NEMA ATEX		
										Stroke length adjustment		
										0	Stroke length adjustment standard	
										K	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	
											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)
												Paint

0P	C3 Standard textured paint - RAL2003				
1P	C3 Standard gloss paint - RAL2003				
2P	C4 Outdoor - RAL2003				
3P	C5 Offshore - RAL2003				
	Tests				
	S1	Standard performance test			
	S2	Standard performance test including 3.1 certificate			
	S3	As S1 + 3.1 certificate wetted material			
	S4	As S2 + 3.1 certificate wetted material			
	A1	API test complete including S4			
	A2	As A1 + NPSH			
	A3	As A1 + NPIP			
	A4	As A1 + 3.1 material certificate			
		Approvals			
		0	CE		
		1	CE + ATEX		
		2	CE + EAC		
		3	CE + EAC+ ATEX		
		4	CE		
		5	CE + UKCA + ATEX		
			Documentation		
			DE	German	
			EN	English	
			FR	French	
			ES	Spanish	
			RU	Russian	
			M0	Modified	
				Measuring unit	
				0	bar, l/h
				1	psi, gph
				2	kPa, l/h

Maintenance kits for HYDRO HA4a with valve wear parts

Scope of delivery:
1 spare diaphragm complete, 1 sealing set, 2 valve seats, 2 valve balls

Plunger Ø mm	Material	Suitable for identity code	Order no.
40, 52	S1	HA4a.040....S1, HA4a.052....S1	1040812
40, 52	H1	HA4a.040....H1, HA4a.052....H1	1040860
40, 52	P1	HA4a.040....P1, HA4a.052....P1, HA4a.040....V1, HA4a.052....V1, HA4a.040....Y1, HA4a.052....Y1	1043763
63	S1	HA4a.063....S1	1040824
63	H1	HA4a.063....H1	1040861
63	P1	HA4a.063....P1, HA4a.063....V1, HA4a.063....Y1	1043775
80	S1	HA4a.080....S1	1040826
80	H1	HA4a.080....H1	1040864
80	P1	HA4a.080....P1, HA4a.080....V1, HA4a.080....Y1	1043776
94	S1	HA4a.094....S1	1040828
94	H1	HA4a.094....H1	1040867
94	P1	HA4a.094....P1, HA4a.094....V1, HA4a.094....Y1	1043777

Maintenance kits for HYDRO HA4a with valves, complete

Scope of delivery:
1 spare diaphragm complete, 1 suction valve, 1 injection valve, 1 sealing set, 2 valve seats, 2 valve balls

Plunger Ø mm	Material	Suitable for identity code	Order no.
40, 52	S1	HA4a.040....S1, HA4a.052....S1	1040813
40, 52	P1	HA4a.040....P1, HA4a.052....P1, HA4a.040....V1, HA4a.052....V1, HA4a.040....Y1, HA4a.052....Y1	1023057
63	S1	HA4a.063....S1	1040825
63	P1	HA4a.063....P1, HA4a.063....V1, HA4a.063....Y1	1040863
80	S1	HA4a.080....S1	1040827
80	P1	HA4a.080....P1, HA4a.080....V1, HA4a.080....Y1	1040866
94	S1	HA4a.026....S1	1040829
94	P1	HA4a.094....P1, HA4a.094....V1, HA4a.094....Y1	1040869

Diaphragms PTFE/1.4404 for HYDRO HA4a

Plunger Ø mm	Material	Suitable for identity code	Order no.
40, 52	S1	HA4a.040....S1, HA4a.052....S1	1040808
40, 52	P1	HA4a.040....P1, HA4a.052....P1, HA4a.040....V1, HA4a.052....V1, HA4a.040....Y1, HA4a.052....Y1	1122581
63	S1	HA4a.063....S1	1040809
63	P1	HA4a.063....P1, HA4a.063....V1, HA4a.063....Y1	1122582
80	S1	HA4a.080....S1	1040810
80	P1	HA4a.080....P1, HA4a.080....V1, HA4a.080....Y1	1122583
94	S1	HA4a.094....S1	1040811
94	P1	HA4a.094....P1, HA4a.094....V1, HA4a.094....Y1	1122594

Diaphragms PTFE/Hastelloy C Coated for HYDRO HA4a

Plunger Ø mm	Material	Suitable for identity code	Order no.
40, 52	H1	HA4a.040....H1, HA4a.052....H1	1040874
63	H1	HA4a.063....H1	1040875
80	H1	HA4a.080....H1	1040876
94	H1	HA4a.094....H1	1040877

Standard oil for maintaining hydraulics and gearbox HYDRO HA4a

The oils are available in 1l containers. For example, if 1.8 l is required for maintenance work, 2 containers are needed.

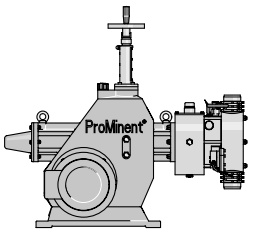
	Required quantity	Order no.
Mobilube 1SHC 75W-90 gear oil, 1 litre	Simplex (V, H) - 5.8 l Double head (D) - 6.8 l Duplex (U) - 2 x 5.8 l Triplex (T) - 3 x 5.8 l	1006010

2.3.3 Hydraulic Diaphragm Metering Pump Makro/ 5

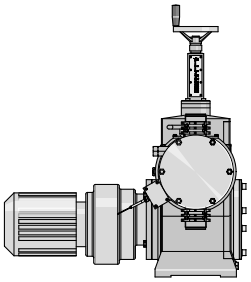
Excellent feed rates in the low-pressure range

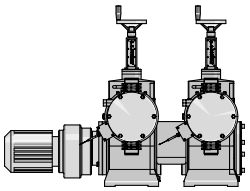
Capacity range of single pump: 450 – 6,108 l/h, 25 – 6 bar

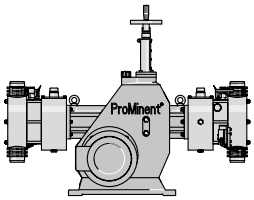
The robust hydraulic diaphragm metering pump Makro/ 5 guarantees outstanding process reliability. Its modular construction offers extremely good flexibility and a large range of drive versions are available.



MAKRO M5Ha


MAKRO M5Ha


MAKRO add-on pump



MAKRO double-head pump

The MAKRO hydraulic diaphragm metering pump (M5Ha) together with the MAKRO diaphragm and plunger metering pumps form an integrated product range with stroke lengths of 20 or 50 mm. This covers the capacity range from 38 to 6108 l/h at 320 – 4 bar. A wide range of drive versions is available for use in areas at risk from explosion with ATEX certification. The MAKRO product range is designed to comply with API 675 among others.

Your Benefits

Excellent process reliability:

- PTFE multi-layer diaphragm with integral diaphragm rupture warning / signalling system
- Integral hydraulic relief valve
- The dosing precision is better than ± 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 (boxer principle) 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: 10000 N
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually using manual adjustment wheel and scaled display (optionally with electric actuator or control drive)
- The dosing precision is better than ± 1 % within the 10 – 100% stroke length range under defined conditions and with correct installation
- PTFE multi-layer diaphragm with electrical diaphragm rupture warning / signalling system via a contact
- Integrated hydraulic relief and vent valve
- Wetted materials: PVDF, PTFE+25% carbon, stainless steel 1.4571, special materials are available on request
- A wide range of power end/drive versions is available: Three-phase standard 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
- 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

Control of MAKRO Hydraulic Diaphragm Metering Pumps

Stroke length controller MAKRO M5Ha

Stroke length adjustment via a standard signal. Actuating period approx. 100 sec for 100% stroke length, equipped with 2 limit switches for min./max. position, degree of protection: IP 54. Electrical connection 230 V (±10%), 50/60 Hz, approx. 40 W mechanical Stroke length display fitted on the Makro/ 5 drive.

Special voltage/higher degrees of protection/explosion protection on request.

Design with:

Standard current input 0/4 – 20 mA, corresponds to stroke length 0 – 100 %; internal switch-over 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 complete speed controller comprises a frequency converter and 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 converter for controlling speed, see page → PL

Stroke sensor with Namur signal

Mounting on crank drive mechanism of MAKRO 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 explosion protection operation with degree of protection EEx ia II C T6.

Technical data for MAKRO M5Ha

Type	Capacity at max. back pressure with 1500 rpm motor at 50 Hz				Capacity at max. back pressure with 1800 rpm motor at 60 Hz				Suction lift	Suction/ discharge side con- nector	Ship- ping weight	Plunger Ø
	l/h	bar	ml/stro- ke	Max. stroke rate Strokes/ min	l/h	psi	gph (US)	Max. stroke rate Strokes/ min	m WC	G-DN	kg	mm
250450	450	25	125.0	60	537	362	142	72	3.0	G 2-32	320	60
250562	562	25	125.0	75	671	362	177	89	3.0	G 2-32	320	60
250772	772	25	125.0	103	922	362	244	123	3.0	G 2-32	320	60
250997	997	25	125.0	133	1,191	362	315	159	3.0	G 2-32	320	60
251170	1,170	25	125.0	156	-	-	-	-	-	G 2-32	320	60
160616	616	16	171.2	60	736	232	194	72	3.0	G 2 1/4-40	320	70
160770	770	16	171.2	75	920	232	243	89	3.0	G 2 1/4-40	320	70
161058	1,058	16	171.2	103	1,264	232	334	123	3.0	G 2 1/4-40	320	70
161366	1,366	16	171.2	133	1,633	232	431	159	3.0	G 2 1/4-40	320	70
161602	1,602	16	171.2	156	-	-	-	-	3.0	G 2 1/4-40	320	70
120716	716	12	199.0	60	855	174	226	72	3.0	G 2 1/4-40	320	75
120895	895	12	199.0	75	1,069	174	282	89	3.0	G 2 1/4-40	320	75
121229	1,229	12	199.0	103	1,469	174	388	123	3.0	G 2 1/4-40	320	75
121588	1,588	12	199.0	133	1,898	174	501	159	3.0	G 2 1/4-40	320	75
121862	1,862	12	199.0	156	-	-	-	-	3.0	G 2 1/4-40	320	75
120919	919	12	255.3	60	1,098	174	290	72	3.0	G 2 1/4-40	320	85
121148	1,148	12	255.3	75	1,372	174	362	89	3.0	G 2 1/4-40	320	85
121577	1,577	12	255.3	103	1,885	174	498	123	3.0	G 2 1/4-40	320	85
122037	2,037	12	255.3	133	2,435	174	643	159	3.0	G 2 1/4-40	320	85
122389	2,389	12	255.3	156	2,856	-	754	-	3.0	G 2 1/4-40	320	85
101345	1,345	10	374.0	60	1,607	145	425	72	3.0	G 2 3/4-50	330	100
101680	1,680	10	374.0	75	2,008	145	530	89	3.0	G 2 3/4-50	330	100
102310	2,310	10	374.0	103	2,761	145	729	123	3.0	G 2 3/4-50	330	100
102980	2,980	10	374.0	133	3,562	145	941	159	3.0	G 2 3/4-50	330	100
103500	3,500	10	374.0	156	-	-	-	-	3.0	G 2 3/4-50	330	100
062305 *	2,305	6	641.0	60	2,755	87	728	72	3.0	Flange–65	330	130
062880 *	2,880	6	641.0	75	3,443	87	910	89	3.0	Flange–65	330	130
063960 *	3,960	6	641.0	103	4,734	87	1,251	123	3.0	Flange–65	330	130
065110 *	5,110	6	641.0	133	6,108	87	1,614	159	3.0	Flange–65	330	130
066000 *	6,000	6	641.0	156	-	-	-	-	3.0	Flange–65	330	130

* SST design with G 2 1/2"

PPT/PCT/TTT material version max. 10 bar

Wetted materials for MAKRO M5Ha

Identity code of material	Dosing head	Connection on suction/ discharge side	DN 32 - DN 65 seals	Valve plates/valve springs	Valve seats
SST	Stainless steel 1.4571/1.4404	Stainless steel 1.4571/1.4404	PTFE	Hastelloy C	PTFE
PCT	PVC	PVC	PTFE	Hastelloy C	PTFE
PPT	Polypropylene	Polypropylene	PTFE	Hastelloy C	PTFE
TTT	Carbon-filled PTFE	Carbon-filled PTFE	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 MAKRO M5Ha

M5Ha	Drive type											
	H	Main drive										
	A	Add-on drive										
	D	Double main drive										
	B	Double add-on drive										
		Type										
		250450										
		250562										
		250772										
		250997										
		251170										
		160616										
		160770										
		161058										
		161366										
		161602										
		120716										
		120895										
		121229										
		121588										
		121862										
		120919										
		121148										
		121577										
		122037										
		122389										
		101345										
		101680										
		102310										
		102980										
		103500										
		062305										
		062880										
		063960										
		065110										
		066000										
			Liquid end material									
			PC	PVC (max. 10 bar)								
			PP	Polypropylene (max. 10 bar)								
			SS	Stainless steel								
			TT	PTFE + 25% carbon (max. 10 bar)								
				Material of seals/diaphragm								
				T	PTFE							
					Displacement body							
					T	Composite diaphragm, PTFE coating, with rupture indicator						
						Liquid end version						
						1	With valve springs					
							Hydraulic connections					
							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-phase 230/400 V, 50 Hz, 3.0 kW		
									R	3-phase variable speed stroke control motor, 230/ 400V, 50 Hz, 3.0 KW		
									V0	Motor with integrated frequency converter, 3-phase, 360 V, 50 Hz, 3.0 kW		
									L	3-phase 230/400 V 50 Hz, 4.0 kW (Exe, Exd)		
									P	3-phase 230/400 V 60 Hz, 4.8 kW (Exe, 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)	
										2	Exd motor version ATEX-T4	

											A	ATEX drive			
												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

2.3 Hydraulic Diaphragm Metering Pumps

Motor data for MAKRO M5Ha

Identity code specification	Power supply				Remarks
S	3-phase, IP 55*	230 V/400 V	50 Hz	3 kW	
R	3-phase, IP 55*	230 V/400 V	50 Hz	3 kW	With PTC, speed control range 1:5
V0	3-phase, IP 55*	360 V	50 Hz	3 kW	Variable speed stroke control motor with integrated frequency converter
L2	3-phase, II 2G Ex de IIC T4 Gb	230 V/400 V	50 Hz	4 kW	With PTC, speed control range 1:5
P2	3-phase, II 2G Ex de IIC T4	265 V/460 V	60 Hz	4.8 kW	With PTC, speed control range 1:5

* Three-phase motor according to IEC 60034-1

Motor data sheets can be requested for more information. Versions 265/460V - 60Hz, 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/EC in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label correspond to or are superior to the conditions prevalent in the intended application.

Maintenance kits for MAKRO M5Ha with valve wear parts

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

Scope of delivery:

1 spare diaphragm, complete, 2 fastening bodies and sockets, 2 springs, 1 sealing set

Liquid end	Materials in contact with the medium	Suitable for identity code	Order no.
FMH 60–50	SST	250450, 250562, 250772, 250997, 251170	1008169
FMH 70/75/85–50	SST	160616, 160770, 161058, 161366, 161602, 120716, 120895, 121229, 121588, 121862, 120919, 121148, 121577, 122037 122389	911909
FMH 100–50	SST	101345, 101680, 102310, 102980, 103500	1008249
FMH 130–50	SST	062305, 068380, 063960, 065110, 066000	1008264

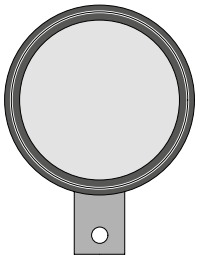
Maintenance kits for MAKRO M5Ha with valve, complete

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

Scope of delivery:

1 spare diaphragm, complete, 2 valves, complete, 2 fastening bodies and sockets, 2 springs, 1 sealing set

Liquid end	Materials in contact with the medium	Suitable for identity code	Order no.
FMH 60–50	SST	250450, 250562, 250772, 250997, 251170	1008170
FMH 70/75/85–50	TTT	160616, 160770, 161058, 161366, 161602, 120716, 120895, 121229, 121588, 121862, 120919, 121148, 121577, 122037 122389	911906
FMH 70/75/85–50	SST	160616, 160770, 161058, 161366, 161602, 120716, 120895, 121229, 121588, 121862, 120919, 121148, 121577, 122037 122389	911910
FMH 70/75/85–50	PPT	160616, 160770, 161058, 161366, 161602, 120716, 120895, 121229, 121588, 121862, 120919, 121148, 121577, 122037 122389	911904
FMH 70/75/85–50	PCT	160616, 160770, 161058, 161366, 161602, 120716, 120895, 121229, 121588, 121862, 120919, 121148, 121577, 122037 122389	911902
FMH 100–50	TTT	101345, 101680, 102310, 102980, 103500	1008248
FMH 100–50	SST	101345, 101680, 102310, 102980, 103500	1008250
FMH 100–50	PPT	101345, 101680, 102310, 102980, 103500	1008246
FMH 100–50	PCT	101345, 101680, 102310, 102980, 103500	1008247
FMH 130–50	TTT	062305, 068380, 063960, 065110, 066000	1008253
FMH 130–50	SST	062305, 068380, 063960, 065110, 066000	1008265
FMH 130–50	PPT	062305, 068380, 063960, 065110, 066000	1008251
FMH 130–50	PCT	062305, 068380, 063960, 065110, 066000	1008252



Diaphragms for MAKRO M5Ha

Liquid end	Order no.
FMH 60/70/75/85–50	1007298
FMH 100/130–50	1007852

Standard oil for maintaining hydraulics and gearbox MAKRO M5Ha

	Required quantity	Order no.
Mobil DTE 10 Excel hydraulic oil, 15.1 litres	5 l	1044365
Mobilgear 634 VG 460 gear oil, 20 litres	16.5 l	1006284

2.3 Hydraulic Diaphragm Metering Pumps

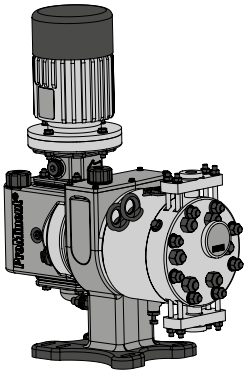
2.3.4 Hydraulic Diaphragm Metering Pump ORLITA Evolution

Maximum process reliability and flexibility.

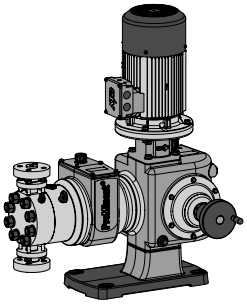
Capacity range of single-head pump: 3 – 7400 l/h, 400 – 10 bar

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.

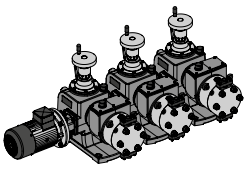
The ORLITA Evolution hydraulic diaphragm metering pump range of EF1a, EF2a, EF3a and EF4a form an integrated product range with stroke lengths of 15 to 40 mm. This covers the capacity range of 3 to 7,400 l/h at 400 – 10 bar. A wide range of drive versions is available, including some with ATEX certification 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.



ORLITA Evolution EF1a



ORLITA Evolution EF4a



ORLITA Evolution triplex pump

Your Benefits

Maximum process reliability:

- PTFE multi-layer diaphragm with integral diaphragm rupture warning / signalling 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)
- The dosing precision is better than ± 1 % within the 10-100 % stroke length adjustment range under defined conditions and with correct 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 different gear ratios are available
- Power end configuration ideal for installation in any position (vertical or horizontal)
- Plunger metering pumps are also available in addition to the hydraulic diaphragm version.
- 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: 2600 N (Evo 1), 5400 N (Evo 2), 8000 N (Evo 3), 15,700 N (Evo 4)
- Stroke length adjustment range: 0 – 100%. Stroke length adjustment: manually using manual adjustment wheel and scaled display (optionally with electric actuator or control drive). A fixed stroke variant in accordance with API 674 is also available as an alternative
- The dosing precision is better than ± 1 % within the 10 – 100 % stroke length range under defined conditions and with correct installation
- PTFE multi-layer diaphragm with electrical diaphragm rupture warning / signalling system via a contact
- Integrated hydraulic relief and vent 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/drive 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 / 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

2.3.4.1 ORLITA Evolution EF1a

Technical data for Evolution EF1a single head pump 50 Hz SST

Plunger Ø	Max. pressure	Max. pump capacity in l/h at strokes/min							Theor. stroke volume	Suction lift	Connection on suction/ discharge side	Shipping weight
		71	97	116	145	165	181	201				
mm	bar	l/h	l/h	l/h	l/h	l/h	l/h	l/h	ml/ stroke	m WC	G-DN	kg
8	400	1.5	2.0	2.4	3.0	3.4	3.8	4.2	0.80	3.0	DN 3	80
10	337	3.3	4.5	5.3	6.7	7.6	8.3	9.2	1.26	3.0	DN 3	80
11	278	4.6	6.3	7.5	9.4	10.7	11.7	13.0	1.52	3.0	DN 6	80
12	234	5.9	8.1	9.7	12.1	13.8	15.1	16.8	1.81	3.0	DN 6	80
13	200	7.5	10.3	12.3	15.3	17.5	19.1	21.3	2.12	3.0	DN 6	80
14	172	6.5	8.9	10.6	13.3	15.1	16.6	18.4	2.46	3.0	DN 6	80
15	150	8.1	11.0	13.2	16.5	18.8	20.6	22.9	2.83	3.0	DN 6	80
16	132	9.9	13.5	16.1	20.2	22.9	25.2	27.9	3.22	3.0	DN 6	80
17	117	11.9	16.3	19.5	24.3	27.7	30.4	33.7	3.63	3.0	DN 6	80
18	104	14.2	19.4	23.2	29.1	33.1	36.3	40.3	4.07	3.0	DN 6	80
19	93	16.8	23.0	27.5	34.3	39.1	42.9	47.6	4.54	3.0	DN 6	80
20	84	17.8	24.3	29.0	36.3	41.3	45.3	50.3	5.03	3.0	DN 10	80
21	76	20.1	27.4	32.8	41.0	46.6	51.2	56.8	5.54	3.0	DN 10	80
22	70	22.3	30.4	36.4	45.5	51.8	56.8	63.1	6.08	3.0	DN 10	80
23	64	24.6	33.6	40.3	50.3	57.3	62.8	69.8	6.65	3.0	DN 10	80
25	54	30.1	41.1	49.2	61.5	70.0	76.8	85.3	7.85	3.0	DN 10	80
29	40	42.8	58.4	69.9	87.4	99.4	109.0	121.1	10.57	3.0	DN 10	80
32	34	48.8	66.7	79.7	99.6	113.4	124.4	138.1	12.87	3.0	DN 10	80
38	25	71.9	98.2	117.5	146.8	167.1	183.3	203.5	18.15	3.0	DN 10	80
44	17	97.4	133.1	159.2	199.0	226.4	248.4	275.8	24.33	3.0	DN 16	80
47	14	111.2	151.9	181.6	227.0	258.3	283.4	314.7	27.76	3.0	DN 16	80
50	14	127.1	173.7	207.7	259.7	295.5	324.1	359.9	31.42	3.0	DN 16	80
54	12	148.3	202.6	242.3	302.9	344.6	378.1	419.8	36.64	3.0	DN 16	80
58	10	171.1	233.7	279.5	349.4	397.6	436.1	484.3	42.27	3.0	DN 16	80
60	10	183.1	250.1	299.1	373.9	425.5	466.7	518.3	45.24	3.0	DN 16	80

Valve type: Double ball valve up to DN 10, plate valve as of DN 16

Version PVC, PVDF max. 16 bar (slight deviation in pump capacity possible)

2.3 Hydraulic Diaphragm Metering Pumps

Technical data for Evolution EF1a single-head pump 60 Hz

Plunger Ø	Max. pressure	Max. pump capacity in l/h at strokes/min					Theor. stroke volume	Suction lift	Connection on suction/discharge side	Shipping weight
		88	117	140	175	199				
mm	bar	l/h	l/h	l/h	l/h	l/h	ml/stroke	m WC	G-DN	kg
8	400	1.8	2.4	2.9	3.6	4.1	0.80	3.0	DN 3	80
10	337	4.1	5.4	6.4	8.1	9.2	1.26	3.0	DN 3	80
11	278	5.7	7.6	9.1	11.3	12.9	1.52	3.0	DN 6	80
12	234	7.4	9.8	11.7	14.6	16.6	1.81	3.0	DN 6	80
13	200	9.3	12.4	14.8	18.5	21.1	2.12	3.0	DN 6	80
14	172	8.1	10.7	12.8	16.0	18.2	2.46	3.0	DN 6	80
15	150	10.0	13.3	15.9	19.9	22.6	2.83	3.0	DN 6	80
16	132	12.2	16.3	19.5	24.3	27.7	3.22	3.0	DN 6	80
17	117	14.8	19.6	23.5	29.4	33.4	3.63	3.0	DN 6	80
18	104	17.6	23.4	28.0	35.1	39.9	4.07	3.0	DN 6	80
19	93	20.8	27.7	33.2	41.4	47.1	4.54	3.0	DN 6	80
20	84	22.0	29.3	35.1	43.8	49.8	5.03	3.0	DN 10	80
21	76	24.9	33.1	39.6	49.5	56.2	5.54	3.0	DN 10	80
22	70	27.6	36.7	43.9	54.9	62.5	6.08	3.0	DN 10	80
23	64	30.5	40.6	48.6	60.7	69.1	6.65	3.0	DN 10	80
25	54	37.3	49.6	59.4	74.2	84.4	7.85	3.0	DN 10	80
29	40	53.0	70.5	84.3	105.4	119.9	10.57	3.0	DN 10	80
32	34	60.5	80.4	96.2	120.3	136.7	12.87	3.0	DN 10	80
38	25	89.1	118.5	141.8	177.2	201.5	18.15	3.0	DN 10	80
44	17	120.8	160.5	192.1	240.1	273.1	24.33	3.0	DN 16	80
47	14	137.8	183.2	219.1	274.0	311.6	27.76	3.0	DN 16	80
50	14	157.6	209.5	250.7	313.4	356.4	31.42	3.0	DN 16	80
54	12	183.8	244.4	292.4	365.5	415.7	36.64	3.0	DN 16	80
58	10	212.0	281.9	337.3	421.7	479.5	42.27	3.0	DN 16	80
60	10	226.9	301.7	361.0	451.3	513.2	45.24	3.0	DN 16	80

Valve type: Double ball valve up to DN 10, plate valve as of DN 16

Important note:

Abridged presentation of our complete product range. Other types on request

Wetted materials for Evolution EF1a

Identity code of material	Dosing head	Diaphragm/diaphragm mounting screw	Connection on suction/discharge side	Seals	Valve seats	Valve balls up to DN 10	Valve plates/ valve springs as of DN 16
S2	Stainless steel 1.4571/1.4404	PTFE / stainless steel 1.4462	Stainless steel 1.4404	stainless steel 1.4404	Stainless steel 1.4404	Al_2O_3 ceramic	Stainless steel 1.4462
P1	PVDF	PTFE / Hastelloy C	PVDF	PTFE	PTFE	Glass	Ceramic / E-CTFE
V1	PVC	PTFE / Hastelloy C	PVDF	PTFE	PTFE	Glass	Ceramic / E-CTFE

Motor data for EVOLUTION EF1a single-head pump

Identity code specification		Power supply			Remarks
S	3-phase, IP 55	230 V/400 V	50 Hz	0.37 kW	With PTC, speed control range 1:5
T	3-phase, IP 55	230 V/400 V 265 V/460 V	50 Hz 60 Hz	0.37 kW	
L	3-phase, IP 55, II 2G Ex de IIC T4 Gb	230 V/400 V	50 Hz	0.37 kW	With PTC, speed control range 1:5
Q	3-phase, IP 55, II 2G Ex de IIC T4	265 V/460 V	60 Hz	0.45 kW	With PTC, speed control range 1:5
V	1-phase, IP 55	230 V	50 Hz	0.75 kW	Variable speed stroke control motor with integrated frequency converter

Identity code ordering system for Evolution EF1a

EF1a	Drive type						
	V	Simplex (vertical)					
	H	Simplex (horizontal)					
	U	Duplex - 2 drives / 2 heads					
	T	Triplex - 3 drives / 3 heads					
		Plungers					
		008	Plunger 8 mm				
		010	Plunger 10 mm				
		011	Plunger 11 mm				
		012	Plunger 12 mm				
		013	Plunger 13 mm				
		014	Plunger 14 mm				
		015	Plunger 15 mm				
		016	Plunger 16 mm				
		017	Plunger 17 mm				
		018	Plunger 18 mm				
		019	Plunger 19 mm				
		020	Plunger 20 mm				
		021	Plunger 21 mm				
		022	Plunger 22 mm				
		023	Plunger 23 mm				
		025	Plunger 25 mm				
		029	Plunger 29 mm				
		032	Plunger 32 mm				
		038	Plunger 38 mm				
		044	Plunger 44 mm				
		047	Plunger 47 mm				
		050	Plunger 50 mm				
		054	Plunger 54 mm				
		058	Plunger 58 mm				
		060	Plunger 60 mm				
			Stroke rate				
			071	71 strokes/min.; 50 Hz			
			097	97 strokes/min.; 50 Hz			
			116	116 strokes/min.; 50 Hz			
			145	145 strokes/min.; 50 Hz			
			165	165 strokes/min.; 50 Hz			
			181	181 strokes/min.; 50 Hz			
			201	201 strokes/min.; 50 Hz			
			088	88 strokes/min.; 60 Hz			
			117	117 strokes/min.; 60 Hz			
			140	140 strokes/min.; 60 Hz			
			175	175 strokes/min.; 60 Hz			
			199	199 strokes/min.; 60 Hz			
				Pressure rating			
				A	400 bar		
				B	337 bar		
				C	278 bar		
				D	234 bar		
				E	200 bar		
				F	172 bar		
				G	150 bar		
				H	132 bar		
				I	117 bar		
				J	104 bar		
				K	93 bar		
				L	84 bar		
				M	76 bar		
				N	70 bar		
				O	64 bar		
				P	54 bar		
				Q	40 bar		
				R	34 bar		
				S	25 bar		
				T	17 bar		
				U	14 bar		
				V	12 bar		
				W	10 bar		
					Material		
					S2	Standard stainless steel; stainless steel	
					P1	PVDF with PTFE diaphragm	
					V1	PVC with PTFE diaphragm	
						Valve design	
						0	Standard

4	Ball valve
5	Ball valve with spring
6	Double ball valve
7	Plate valve with spring
8	Cone valve
9	Cone valve with spring

Diaphragm monitor

1	Without diaphragm monitoring
2	Visual indication
3	Contact pressure gauge
4	Electric pressure switch

Hydraulic connector

0	Standard
E	DIN flange
F	Flange ANSI
N	NPT connection

Electrical Connection

S	3-phase 230/400 V, 50 Hz, 0.37 kW
T	3-phase, 230/400 V, 50/60 Hz, 0.37 kW, with PTC
L	3-phase, 230/400 V, 50 Hz, 0.37 kW, (Exde) T4
Q	3-phase, 265/460 V, 60 Hz, 0.45 kW, (Exde) T4
V	Controllable motor with integrated frequency converter, 1-phase, 230 V, 50 Hz, 0.75 kW
1	Without motor, with flange 160/71
2	Without motor, with flange 200/90
3	Without motor, with NEMA 56/143 flange
4	Without motor, with 160/71 ATEX flange
5	Without motor, with 200/90 ATEX flange
6	Without motor, with NEMA 56/143 ATEX flange

Stroke length adjustment

0	Stroke length adjustment standard
1	Stroke length adjustment Aluminium
2	Stroke length adjustment stainless steel
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
E	EXd stroke control motor 0-20 mA, 230 V, 50/60 Hz
F	EXd stroke control motor 4-20 mA, 230 V, 50/60 Hz
G	EXe stroke control motor 4-20 mA, 230 V, 50/60 Hz
H	EXe stroke control motor 4-20 mA, 115 V, 50/60 Hz
Z	Fixed stroke

Temperature (ambient)

0	-20 °C … +40 °C
1	-10 °C … +50 °C
2	-25 °C … +40 °C
5	-10 °C … +60 °C

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

Tests

S1	Standard performance test
S2	Standard performance test including 3.1 certificate
S3	As S1 + 3.1 certificate wetted material
S4	As S2 + 3.1 certificate wetted material
A1	API test complete includiung S4
A2	As A1 + NPSH
A3	As A1 + NPIP
A4	As A1 + 3.1 material certificate

Approvals

0	CE
1	CE + ATEX
2	CE + EAC
3	CE + EAC + ATEX
4	CE + UKCA
5	CE + UKCA + ATEX

Documentation

DE	German
X	EN=English, FR=French, ES=Spanish, RU=Russian
M0	Modified

Measuring unit

0	bar, l/h
1	psi, gph
2	kPa, l/h

Spare parts kits for ORLITA Evolution EF1a

Scope of delivery:
1 spare diaphragm complete, 1 sealing set, 2 valve seats, 2 valve balls

Plunger Ø mm	Material	Suitable for identity code	Order no.
8-10	S1	EF1a.008....S1, EF1a.009....S1, EF1a.010....S1	1125626
11-13	S1	EF1a.011....S1, EF1a.012....S1, EF1a.013....S1	1125627
14-19	S1	EF1a.014....S1, EF1a.015....S1, EF1a.016....S1, EF1a.017....S1, EF1a.018....S1, EF1a.019....S1	1125628
20-30	S1	EF1a.020....S1, EF1a.021....S1, EF1a.022....S1, EF1a.023....S1, EF1a.024....S1, EF1a.025....S1, EF1a.026....S1, EF1a.027....S1, EF1a.028....S1, EF1a.029....S1, EF1a.030....S1	1125630
31-40	S1	EF1a.031....S1, EF1a.032....S1, EF1a.033....S1, EF1a.034....S1, EF1a.035....S1, EF1a.036....S1, EF1a.037....S1, EF1a.038....S1, EF1a.039....S1, EF1a.040....S1	1125631
41-60	S1	EF1a.041....S1, EF1a.042....S1, EF1a.043.... S1, EF1a.044....S1, EF1a.045....S1, EF1a.046.... S1, EF1a.047....S1, EF1a.048....S1, EF1a.049.... S1, EF1a.050....S1, EF1a.051....S1, EF1a.052.... S1, EF1a.053....S1, EF1a.054....S1, EF1a.035.... S1, EF1a.055....S1, EF1a.056....S1, EF1a.057....S1, EF1a.058....S1, EF1a.059....S1, EF1a.059....S1	1125632

Metering diaphragm PTFE/1.4404 for Evolution EF1a

Plunger Ø mm	Material	Suitable for identity code	Order no.
8-10	S1	EF1a.008....S1, EF1a.009....S1, EF1a.010....S1	1051826
11-13	S1	EF1a.011....S1, EF1a.012....S1, EF1a.013....S1	1051756
14-19	S1	EF1a.014....S1, EF1a.015....S1, EF1a.016....S1, EF1a.017....S1, EF1a.018....S1, EF1a.019....S1	1051827
20-30	S1	EF1a.020....S1, EF1a.021....S1, EF1a.022....S1, EF1a.023....S1, EF1a.024....S1, EF1a.025....S1, EF1a.026....S1, EF1a.027....S1, EF1a.028....S1, EF1a.029....S1, EF1a.030....S1	1051776
31-40	S1	EF1a.031....S1, EF1a.032....S1, EF1a.033....S1, EF1a.034....S1, EF1a.035....S1, EF1a.036....S1, EF1a.037....S1, EF1a.038....S1, EF1a.039....S1, EF1a.040....S1	1051828
41-60	S1	EF1a.041....S1, EF1a.042....S1, EF1a.043.... S1, EF1a.044....S1, EF1a.045....S1, EF1a.046.... S1, EF1a.047....S1, EF1a.048....S1, EF1a.049.... S1, EF1a.050....S1, EF1a.051....S1, EF1a.052.... S1, EF1a.053....S1, EF1a.054....S1, EF1a.035.... S1, EF1a.055....S1, EF1a.056....S1, EF1a.057....S1, EF1a.058....S1, EF1a.059....S1, EF1a.059....S1	1060332

Standard oil for maintaining hydraulics and gearbox Evolution EF1a

The oils are available in 1l containers. For example, if 1.8 l is required for maintenance work, 2 containers are needed.

	Required quantity	Order no.
Shell Tellus S2V32 hydraulic oil, 1 litre	1.3 – 2.0 l	1050416
Renolin PG 220 gear oil, 1 litre	2.2 l	1101750

2.3.4.2 ORLITA Evolution EF2a

Technical data for Evolution EF2a single-head pump 50 Hz

Plunger Ø	Max. pressure	Max. pump capacity in l/h at strokes/min							Theor. stroke volume	Suction lift	Connection on suction/ discharge side	Shipping weight
		71	97	116	145	165	181	201				
mm	bar	l/h	l/h	l/h	l/h	l/h	l/h	l/h	ml/ stroke	m WC	G-DN	kg
11	400	3.9	5.2	6.2	7.8	8.9	10.1	10.8	1.52	3.0	DN 6	95
12	400	5.5	7.3	8.7	10.9	12.4	14.0	15.1	1.81	3.0	DN 6	95
13	400	7.3	9.8	11.7	14.6	16.6	18.8	20.2	2.12	3.0	DN 6	95
14	400	3.8	5.1	6.0	7.6	8.5	9.7	10.4	2.46	3.0	DN 6	95
15	351	5.4	7.1	8.5	10.7	12.1	13.7	14.8	2.83	3.0	DN 6	95
16	309	7.3	9.7	11.6	14.5	16.5	18.7	20.1	3.22	3.0	DN 6	95
17	274	9.5	12.4	15.3	18.9	21.6	24.4	26.3	3.63	3.0	DN 6	95
18	244	12.2	16.2	19.4	24.2	27.6	31.2	33.6	4.07	3.0	DN 6	95
19	219	15.2	20.3	24.2	30.3	34.4	39.0	42.0	4.54	3.0	DN 6	95
20	198	16.1	21.4	26.5	31.9	36.3	41.2	44.3	5.03	3.0	DN 10	95
21	179	18.2	24.2	28.9	36.1	41.1	46.6	50.1	5.54	3.0	DN 10	95
22	163	20.5	27.2	32.5	40.6	46.2	52.4	56.3	6.08	3.0	DN 10	95
23	149	22.9	30.4	36.4	45.5	51.8	58.7	63.1	6.65	3.0	DN 10	95
25	127	28.4	37.7	45.1	56.3	64.1	72.7	78.1	7.85	3.0	DN 10	95
29	94	41.7	55.4	66.3	82.8	94.3	106.8	114.8	10.57	3.0	DN 10	95
32	77	42.9	57.0	68.1	85.2	96.9	109.9	118.1	12.87	3.0	DN 10	95
38	55	69.1	91.9	109.9	137.3	156.3	177.1	190.4	18.15	3.0	DN 10	95
44	41	95.6	127.0	151.9	189.9	216.1	244.9	263.2	24.33	3.0	DN 16	95
47	36	110.0	146.2	174.8	218.5	248.7	281.8	302.9	27.76	3.0	DN 16	95
50	32	125.4	166.6	199.3	249.1	283.5	321.3	345.3	31.42	3.0	DN 16	95
54	27	148.0	196.7	235.2	294.0	334.5	379.1	407.5	36.64	3.0	DN 16	95
58	24	172.4	229.0	273.9	342.4	389.6	441.6	474.6	42.27	3.0	DN 16	95
60	22	185.7	246.7	295.0	368.8	419.6	475.6	511.2	45.24	3.0	DN 16	95
65	19	217.7	289.3	346.0	432.5	492.1	557.8	599.5	53.09	3.0	DN 20	95
70	16	254.7	338.5	404.8	506.0	575.8	652.6	701.4	61.58	3.0	DN 20	95
76	14	303.2	402.9	481.8	602.2	685.3	776.7	834.8	72.58	3.0	DN 20	95
78	13	320.4	425.8	509.2	636.4	724.2	820.8	882.2	76.45	3.0	DN 20	95
80	12	338.2	449.3	537.4	671.7	764.4	866.3	931.1	80.42	3.0	DN 20	95

Valve type: Double ball valve up to DN 10, plate valve as of DN 16

Version PVC, PVDF max. 16 bar (slight deviation in pump capacity possible)

2.3 Hydraulic Diaphragm Metering Pumps

Technical data for Evolution EF2a single-head pump 60 Hz

Plunger Ø	Max. pressure	Max. pump capacity in l/h at strokes/min					Theor. stroke volume	Suction lift	Connection on suction/discharge side	Shipping weight
		88	117	140	175	199				
mm	bar	l/h	l/h	l/h	l/h	l/h	ml/stroke	m WC	G-DN	kg
11	400	4.7	6.3	7.5	9.4	10.7	1.52	3.0	DN 6	95
12	400	6.6	8.8	10.5	13.1	14.9	1.81	3.0	DN 6	95
13	400	8.8	11.8	14.1	17.6	20.0	2.12	3.0	DN 6	95
14	400	4.6	6.1	7.4	9.2	10.5	2.46	3.0	DN 6	95
15	351	6.5	8.6	10.3	12.9	14.6	2.83	3.0	DN 6	95
16	309	8.8	11.7	14.0	17.4	19.8	3.22	3.0	DN 6	95
17	274	11.4	15.3	18.3	22.9	26.0	3.63	3.0	DN 6	95
18	244	14.6	19.5	23.4	29.2	33.2	4.07	3.0	DN 6	95
19	219	18.2	24.4	29.2	36.5	41.5	4.54	3.0	DN 6	95
20	198	19.3	25.8	30.8	38.5	43.8	5.03	3.0	DN 10	95
21	179	21.8	29.2	34.9	43.6	49.6	5.54	3.0	DN 10	95
22	163	24.6	32.8	39.2	49.0	55.8	6.08	3.0	DN 10	95
23	149	27.5	36.7	43.9	54.9	62.5	6.65	3.0	DN 10	95
25	127	34.1	45.5	54.4	68.0	77.3	7.85	3.0	DN 10	95
29	94	50.0	66.8	80.0	100.0	113.7	10.57	3.0	DN 10	95
32	77	51.5	68.7	82.2	102.8	116.9	12.87	3.0	DN 10	95
38	55	82.9	110.8	132.6	165.7	188.5	18.15	3.0	DN 10	95
44	41	114.7	153.2	183.3	229.2	260.6	24.33	3.0	DN 16	95
47	36	132.0	176.3	211.0	263.7	299.9	27.76	3.0	DN 16	95
50	32	150.5	201.0	240.5	300.6	341.9	31.42	3.0	DN 16	95
54	27	177.6	237.2	251.1	413.8	403.5	36.64	3.0	DN 16	95
58	24	206.9	276.3	330.6	413.2	469.9	42.27	3.0	DN 16	95
60	22	222.8	297.6	356.1	445.1	506.1	45.24	3.0	DN 16	95
65	19	261.2	349.0	417.6	522.0	593.6	53.09	3.0	DN 20	95
70	16	305.6	408.3	488.6	610.7	694.4	61.58	3.0	DN 20	95
76	14	363.8	485.9	581.5	726.8	826.5	72.58	3.0	DN 20	95
78	13	384.5	513.5	614.5	768.1	873.5	76.45	3.0	DN 20	95
80	12	405.8	542.0	648.5	810.7	921.9	80.42	3.0	DN 20	95

Valve type: Double ball valve up to DN 10, plate valve as of DN 16

Important note:

Abridged presentation of our complete product range. Other types on request

Wetted materials for Evolution EF2a

Identity code of material	Dosing head	Diaphragm/diaphragm mounting screw	Connection on suction/discharge side	Seals	Valve seats	Valve balls up to DN 10	Valve plates/ valve springs as of DN 16
S2	Stainless steel 1.4404	PTFE / stainless steel 1.4462	Stainless steel 1.4404	stainless steel 1.4404	Stainless steel 1.4404	Al_2O_3 ceramic	Stainless steel 1.4462
P1	PVDF	PTFE / Hastelloy C	PVDF	PTFE	PTFE	Glass	Ceramic / E-CTFE
V1	PVC	PTFE / Hastelloy C	PVDF	PTFE	PTFE	Glass	Ceramic / E-CTFE

Motor data for EVOLUTION EF2a single-head pump

Identity code specification		Power supply			Remarks
S	3-phase, IP 55	230 V/400 V	50 Hz	1.1 kW	With PTC, speed control range 1:5
T	3-phase, IP 55	230 V/400 V 265 V/460 V	50 Hz 60 Hz	1.1 kW	
L	3-phase, IP 55, II 2G Ex de IIC T4 Gb	230 V/400 V	50 Hz	1.1 kW	With PTC, speed control range 1:5
Q	3-phase, IP 55, II 2G Ex de IIC T4	265 V/460 V	60 Hz	1.1 kW	With PTC, speed control range 1:5
V	3-phase, IP 55	230 V	50 Hz	1.5 kW	Variable speed stroke control motor with integrated frequency converter

Identity code ordering system for Evolution EF2a

EF2a	Drive type					
	V	Simplex (vertical)				
	H	Simplex (horizontal)				
	U	Duplex - 2 drives / 2 heads				
	T	Triplex - 3 drives / 3 heads				
		Plungers				
		011	Plunger 11 mm			
		012	Plunger 12 mm			
		013	Plunger 13 mm			
		014	Plunger 14 mm			
		015	Plunger 15 mm			
		016	Plunger 16 mm			
		017	Plunger 17 mm			
		018	Plunger 18 mm			
		019	Plunger 19 mm			
		020	Plunger 20 mm			
		021	Plunger 21 mm			
		022	Plunger 22 mm			
		023	Plunger 23 mm			
		025	Plunger 25 mm			
		029	Plunger 29 mm			
		032	Plunger 32 mm			
		038	Plunger 38 mm			
		044	Plunger 44 mm			
		047	Plunger 47 mm			
		050	Plunger 50 mm			
		054	Plunger 54 mm			
		058	Plunger 58 mm			
		060	Plunger 60 mm			
		065	Plunger 65 mm			
		070	Plunger 70 mm			
		076	Plunger 76 mm			
		078	Plunger 78 mm			
		080	Plunger 80 mm			
			stroke rate			
			071	71 strokes/min.; 50 Hz		
			097	97 strokes/min.; 50 Hz		
			116	116 strokes/min.; 50 Hz		
			145	145 strokes/min.; 50 Hz		
			165	165 strokes/min.; 50 Hz		
			181	181 strokes/min.; 50 Hz		
			201	201 strokes/min.; 50 Hz		
			088	88 strokes/min.; 60 Hz		
			117	117 strokes/min.; 60 Hz		
			140	140 strokes/min.; 60 Hz		
			175	175 strokes/min.; 60 Hz		
			199	199 strokes/min.; 60 Hz		
				Pressure rating		
				A	400 bar	
				B	337 bar	
				C	278 bar	
				D	234 bar	
				E	200 bar	
				F	172 bar	
				G	150 bar	
				H	132 bar	
				I	117 bar	
				J	104 bar	
				K	93 bar	
				L	84 bar	
				M	76 bar	
				N	70 bar	
				O	64 bar	
				P	54 bar	
				Q	40 bar	
				R	34 bar	
				S	25 bar	
				T	17 bar	
				U	14 bar	
				V	12 bar	
				W	10 bar	
					Material	
					S2	Standard stainless steel; stainless steel
					P1	PVDF with PTFE diaphragm
					V1	PVC with PTFE diaphragm

Valve design	
0	Standard
4	Ball valve
5	Ball valve with spring
6	Double ball valve
7	Plate valve with spring
8	Cone valve
9	Cone valve with spring

Diaphragm monitor	
2	Visual indication
1	Without diaphragm monitoring
3	Contact pressure gauge
4	Electric pressure switch

Hydraulic connector	
0	Standard
E	DIN flange
F	Flange ANSI
N	NPT connection

Electrical Connection	
S	3-phase 230/400 V, 50 Hz, 1.1 kW
T	3-phase, 230/400 V, 50 Hz, 1.1 kW, with PTC
L	3-phase, 230/400 V, 50 Hz, 1.1 kW, (Exde) T4
Q	3-phase, 265/460 V, 60 Hz, 1.1 kW, (Exde) T4
V	Controllable motor with integrated frequency converter, 3-phase, 230 V, 50 Hz, 1.5 kW
1	Without motor, with flange 160/71
2	Without motor, with flange 200/90
3	Without motor, with NEMA 56/143 flange
4	Without motor, with 160/71 ATEX flange
5	Without motor, with 200/90 ATEX flange
6	Without motor, with NEMA 56/143 ATEX flange

Stroke length adjustment	
0	Stroke length adjustment standard
1	Aluminium stroke length adjustment
2	Stainless steel stroke length adjustment
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
E	EXd stroke control motor 0-20 mA, 230 V, 50/60 Hz
F	EXd stroke control motor 4-20 mA, 230 V, 50/60 Hz
G	EXe stroke control motor 4-20 mA, 230 V, 50/60 Hz
H	EXe stroke control motor 4-20 mA, 115 V, 50/60 Hz
Z	Fixed stroke

Temperature (ambient)	
0	-20 °C … +40 °C
1	-10 °C … +50 °C
2	-25 °C … +40 °C
5	-10 °C … +60 °C

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

Tests	
S1	Standard performance test
S2	Standard performance test including 3.1 certificate
S3	As S1 + 3.1 certificate wetted material
S4	As S2 + 3.1 certificate wetted material
A1	API test complete + S4
A2	As A1 + NPSH
A3	As A1 + NPIP
A4	As A1 + 3.1 material certificate

Approvals	
0	CE
1	CE + ATEX
2	CE + EAC
3	CE + EAC + ATEX
4	CE + UKCA
5	CE + UKCA + ATEX

Documentation	
DE	German
EN	English
FR	French
ES	Spanish
RU	Russian
M0	Modified

2.3 Hydraulic Diaphragm Metering Pumps

																Measuring unit	
																0	bar, l/h
																1	psi, gph
																2	kPa, l/h

Spare parts kits for ORLITA Evolution EF2a

Scope of delivery:
1 spare diaphragm complete, 1 sealing set, 2 valve seats, 2 valve balls

Plunger Ø mm	Material	Suitable for identity code	Order no.
11-13	S1	EF2a.011....S1, EF2a.012....S1, EF2a.013....S1	1125627
14-19	S1	EF2a.014....S1, EF2a.015....S1, EF2a.016....S1, EF2a.017....S1, EF2a.018....S1, EF2a.019....S1	1125628
20-30	S1	EF2a.020....S1, EF2a.021....S1, EF2a.022....S1, EF2a.023....S1, EF2a.024....S1, EF2a.025....S1, EF2a.026....S1, EF2a.027....S1, EF2a.028....S1, EF2a.029....S1, EF2a.030....S1	1125630
31-40	S1	EF2a.031....S1, EF2a.032....S1, EF2a.033....S1, EF2a.034....S1, EF2a.035....S1, EF2a.036....S1, EF2a.037....S1, EF2a.038....S1, EF2a.039....S1, EF2a.040....S1	1125631
41-60	S1	EF2a.041....S1, EF2a.042....S1, EF2a.043.... S1, EF2a.044....S1, EF2a.045....S1, EF2a.046.... S1, EF2a.047....S1, EF2a.048....S1, EF2a.049.... S1, EF2a.050....S1, EF2a.051....S1, EF2a.052.... S1, EF2a.053....S1, EF2a.054....S1, EF2a.055.... S1, EF2a.056....S1, EF2a.057....S1, EF2a.058....S1, EF2a.059....S1, EF2a.060....S1	1125632
61-80	S1	EF2a.061....S1, EF2a.062....S1, EF2a.063.... S1, EF2a.064....S1, EF2a.065....S1, EF2a.066.... S1, EF2a.067....S1, EF2a.068....S1, EF2a.069.... S1, EF2a.070....S1, EF2a.071....S1, EF2a.072.... S1, EF2a.073....S1, EF2a.074....S1, EF2a.075.... S1, EF2a.076....S1, EF2a.077....S1, EF2a.078....S1, EF2a.079....S1, EF2a.080....S1	1125633

Metering diaphragms PTFE/1.4404 for Evolution EF2a

Plunger Ø mm	Material	Suitable for identity code	Order no.
11-13	S1	EF2a.011....S1, EF2a.012....S1, EF2a.013....S1	1051756
14-19	S1	EF2a.014....S1, EF2a.015....S1, EF2a.016....S1, EF2a.017....S1, EF2a.018....S1, EF2a.019....S1	1051827
20-30	S1	EF2a.020....S1, EF2a.021....S1, EF2a.022....S1, EF2a.023....S1, EF2a.024....S1, EF2a.025....S1, EF2a.026....S1, EF2a.027....S1, EF2a.028....S1, EF2a.029....S1, EF2a.030....S1	1051776
31-40	S1	EF2a.031....S1, EF2a.032....S1, EF2a.033....S1, EF2a.034....S1, EF2a.035....S1, EF2a.036....S1, EF2a.037....S1, EF2a.038....S1, EF2a.039....S1, EF2a.040....S1	1051828
41-60	S1	EF2a.041....S1, EF2a.042....S1, EF2a.043.... S1, EF2a.044....S1, EF2a.045....S1, EF2a.046.... S1, EF2a.047....S1, EF2a.048....S1, EF2a.049.... S1, EF2a.050....S1, EF2a.051....S1, EF2a.052.... S1, EF2a.053....S1, EF2a.054....S1, EF2a.055.... S1, EF2a.056....S1, EF2a.057....S1, EF2a.058....S1, EF2a.059....S1, EF2a.060....S1	1060332
61-80	S1	EF2a.061....S1, EF2a.062....S1, EF2a.063.... S1, EF2a.064....S1, EF2a.065....S1, EF2a.066.... S1, EF2a.067....S1, EF2a.068....S1, EF2a.069.... S1, EF2a.070....S1, EF2a.071....S1, EF2a.072.... S1, EF2a.073....S1, EF2a.074....S1, EF2a.075.... S1, EF2a.076....S1, EF2a.077....S1, EF2a.078....S1, EF2a.079....S1, EF2a.080....S1	1051815

Standard oil for maintaining hydraulics and gearbox Evolution EF2a

The oils are available in 1l containers. For example, if 1.8 l is required for maintenance work, 2 containers are needed.

	Required quantity	Order no.
Shell Tellus S2V32 hydraulic oil, 1 litre	1.3 – 2.0 l	1050416
Renolin PG 220 gear oil, 1 litre	2.9 l	1101750

2.3.4.3 ORLITA Evolution EF3a

Technical data for Evolution EF3a single head pump 50 Hz SST

Plunger Ø	Theor. stroke volume	Theoretical pump capacity in l/h at strokes/min							Max. pressure	Efficiency		Nominal diameter
		73 [2]	97 [3]	116 [4]	145 [5]	165 [6]	181 [7]	201 [8]				
mm	ml/stroke	l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar	At 100 % pressure	At 50 % pressure	
17	5.67	24	33	39	49	56	61	68	397	0.72	0.80	DN 6
22	9.50	41	55	66	82	94	103	114	237	0.87	0.93	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	0.92	0.95	DN 10
34	22.70	99	132	158	197	224	246	273	99	0.90	0.94	DN 16
38	28.35	124	165	197	246	280	307	341	79	0.93	0.95	DN 16
44	38.01	166	221	264	330	376	412	458	59	0.95	0.97	DN 20
50	49.09	215	285	341	427	486	533	592	46	0.97	0.98	DN 20
58	66.05	289	384	459	574	653	717	796	34	0.98	0.99	DN 20
63	77.93	341	453	542	678	771	846	939	29	0.97	0.98	DN 25
70	96.21	421	559	669	837	952	1,044	1,160	23	0.97	0.98	DN 25
75	110.45	483	642	768	960	1,093	1,199	1,332	20	0.98	0.98	DN 25
100	196.35	860	1,142	1,366	1,708	1,943	2,132	2,368	11	0.99	0.98	DN 40

Version PVC, PVDF max. 16 bar

Technical data for Evolution EF3a single head pump 60 Hz SST

Plunger Ø	Theor. stroke volume	Theoretical pump capacity in l/h at strokes/min					Max. pressure	Efficiency		Nominal diameter
		88 [2]	117 [3]	140 [4]	175 [5]	199 [6]				
mm	ml/stroke	l/h	l/h	l/h	l/h	l/h	bar	At 100 % pressure	At 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	9.00	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.

Wetted materials for Evolution EF3a

Dosing head assembly

Dosing head	Diaphragm retaining screw	Diaphragm
Stainless steel 1.4404	Stainless steel 1.4462	PTFE multi-layer diaphragm

Ball valve DN 6 - DN 10

Nominal diameter	Connection on suction/discharge side	Valve/head seal	Valve balls	Valve seats	Valve housing	Clamp ring
DN 6	Stainless steel 1.4404	Stainless steel 1.4404	SiN ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C
DN 10	Stainless steel 1.4404	Stainless steel 1.4404	Al_2O_3 ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C

Plate valve DN 16 - DN 40

Nominal diameter	Connection on suction/discharge side	Valve/head seal	Valve plate	Valve seats	Valve housing	Clamp ring
DN 16	Stainless steel 1.4404	Stainless steel 1.4404	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C
DN 20	Stainless steel 1.4404	Stainless steel 1.4404	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C
DN 25	Stainless steel 1.4404	Stainless steel 1.4404	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C

Further material versions and details available on request.

2.3.4.4 ORLITA Evolution EF4a

Technical data for Evolution EF4a single head pump 50 Hz SST

Plunger Ø	Theor. stroke volume	Theoretical pump capacity in l/h at strokes/min							Max. pressure	Efficiency		Nominal diameter
		73 [2]	97 [3]	116 [4]	145 [5]	165 [6]	181 [7]	201 [8]				
mm	ml/stroke	l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar	At 100 % pressure	At 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

Version PVC, PVDF max. 16 bar

Technical data for Evolution EF4a single head pump 60 Hz SST

Plunger Ø	Theor. stroke volume	Theoretical pump capacity in l/h at strokes/min					Max. pressure	Efficiency		Nominal diameter
		88 [2]	117 [3]	140 [4]	175 [5]	199 [6]				
mm	ml/stroke	l/h	l/h	l/h	l/h	l/h	bar	At 100 % pressure	At 50 % pressure	
22	15.21	80	106	127	159	181	400	0.67	0.81	DN 16
25	19.63	103	137	164	206	234	368	0.74	0.85	DN 16
30	28.27	149	198	237	269	337	255	0.76	0.85	DN 16
34	36.32	191	254	305	381	433	199	0.84	0.87	DN 16
38	45.36	239	318	381	476	541	159	0.84	0.90	DN 20
44	60.82	321	427	510	638	726	119	0.88	0.87	DN 20
50	78.54	414	551	659	824	937	92	0.92	0.90	DN 25
60	113.10	597	793	950	1,187	1,350	64	0.93	0.91	DN 32
70	153.94	812	1,080	1,293	1,616	1,838	47	0.93	0.91	DN 40
75	176.71	933	1,240	1,484	1,855	2,110	41	0.93	0.91	DN 40
86	232.35	1,226	1,631	1,951	2,439	2,774	31	0.94	0.93	DN 50
90	254.47	1,343	1,786	2,137	2,671	3,038	28	0.94	0.93	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	0.93	DN 65
130	530.93	2,803	3,727	4,459	5,574	6,339	14	0.95	0.94	DN 65
140	615.75	3,251	4,322	5,172	6,465	7,352	12	0.96	0.96	DN 65

2.3 Hydraulic Diaphragm Metering Pumps

Wetted materials for Evolution EF4a

Dosing head assembly

Dosing head	Diaphragm retaining screw	Diaphragm
Stainless steel 1.4404	Stainless steel 1.4462	PTFE multi-layer diaphragm

Plate valve

Nominal diameter	Connection on suction/ discharge side	Valve/head seal	Valve plate	Valve seats	Valve housing
DN 16	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404
DN 20	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404
DN 25	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404
DN 32	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404
DN 40	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404
DN 50	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404
DN 65	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404

Note:

Abridged presentation of our complete product range. Other piston diameters (22–140 mm) on request.

2.3.5 Hydraulic Diaphragm Metering Pump ORLITA Evolution E1Sa/E2Sa

Safety processes as standard.

Capacity range of single-head pump: 0.9 – 134 l/h, 260 – 30 bar

As an extremely robust hydraulic diaphragm metering pump, the ORLITA Evolution E1Sa/E2Sa meets the most exacting safety requirements. It is characterised by its PTFE multi-layer diaphragm with integral diaphragm rupture warning / signalling system and unique diaphragm position control.

The ORLITA Evolution E1Sa/E2Sa product ranges together with the ORLITA Evolution hydraulic diaphragm metering pumps product ranges EF1a, EF2a, EF3a and EF4a 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 power end versions is available, including some for use in the Zone 1 or Zone 2 areas at risk from explosion with ATEX certification. The entire ORLITA Evolution product range is designed to comply with API 675.

Your Benefits

Maximum process reliability:

- Capacity range of 0.9 – 134 l/h, 260 – 30 bar
- PTFE multi-layer diaphragm with integral diaphragm rupture warning / signalling 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)
- The dosing precision is better than ±1 % in a stroke length adjustment range of 10 - 100 % under defined conditions and with correct installation
- Continuous venting of the oil chamber ensures reliable operation

Technical Details

- Capacity range of pump with a dosing head: E1Sa/E2Sa 0.9 – 134 l/h, 260 – 30 bar
- Stroke length: 0 - 16 mm
- Rod force: 2000 N (E1Sa) / 4500 N (E2Sa)
- Adjustment range of stroke length: 0 - 100 %. Stroke length adjustment: manually by means of manual adjustment wheel and scaled display (optionally with electric power end or control drive). A fixed stroke variant in accordance with API 674 is also available as an alternative
- Dosing precision is better than ± 1 % with a 10 - 100% stroke length range under defined conditions and with correct installation
- PTFE multi-layer diaphragm with optical and/or electrical diaphragm rupture warning / signalling system via a contact
- Integrated hydraulic vent and vent valve
- Materials in contact with fluids: Stainless steel 1.4404, special designs are available on request
- A wide range of power end versions is available: Three-phase standard motors, also for use with speed control and/or in areas at risk from explosion, different flange designs for the use of customer-specific motors
- Degree of protection: IP 55
- Design in compliance with API 675 / API 674, ATEX 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

2.3 Hydraulic Diaphragm Metering Pumps

2.3.5.1 ORLITA Evolution E1Sa

Technical data for Evolution E1Sa single-head pump 50 Hz

Plunger Ø	Max. pressure	Max. pump capacity in l/h at strokes/min						Theor. stroke volume	Suction lift	Connection on suction/ discharge side	Shipping weight
		93 l/h	112 l/h	140 l/h	159 l/h	175 l/h	194 l/h				
mm	bar							ml/ stroke	m WC	G-DN	kg
6	260	(0.8) – 0.9	(0.9) – 1.0	(1.2) – 1.3	(1.3) – 1.5	(1.4) – 1.6	(1.6) – 1.8	0.49	3.0	G 1/4 - DN 3 *	31
6	240	(0.9) – 1.0	(1.0) – 1.1	(1.3) – 1.4	(1.5) – 1.6	(1.6) – 1.8	(1.8) – 2.0	0.49	3.0	G 1/4 - DN 3 *	31
6	190	(1.1) – 1.2	(1.3) – 1.4	(1.6) – 1.8	(1.9) – 2.1	(2.0) – 2.3	(2.3) – 2.5	0.49	3.0	G 1/4 - DN 3 *	31
6	160	(1.2) – 1.3	(1.5) – 1.6	(1.8) – 2.0	(2.1) – 2.3	(2.3) – 2.6	(2.6) – 2.8	0.49	3.0	G 1/4 - DN 3 *	31
6	120	(1.4) – 1.5	(1.7) – 1.9	(2.1) – 2.3	(2.4) – 2.7	(2.6) – 2.9	(2.9) – 3.3	0.49	3.0	G 1/4 - DN 3 *	31
8	260	(1.9) – 2.1	(2.3) – 2.5	(2.9) – 3.2	(3.3) – 3.6	(3.6) – 4.0	(4.0) – 4.5	0.80	3.0	G 1/4 - DN 3 *	31
8	240	(2.0) – 2.3	(2.4) – 2.7	(3.1) – 3.4	(3.5) – 3.9	(3.9) – 4.3	(4.3) – 4.8	0.80	3.0	G 1/4 - DN 3 *	31
8	190	(2.4) – 2.6	(2.8) – 3.2	(3.6) – 4.0	(4.1) – 4.5	(4.5) – 5.0	(5.0) – 5.5	0.80	3.0	G 1/4 - DN 3 *	31
8	160	(2.6) – 2.8	(3.1) – 3.4	(3.9) – 4.3	(4.4) – 4.9	(4.8) – 5.4	(5.4) – 6.0	0.80	3.0	G 1/4 - DN 3 *	31
8	120	(2.8) – 3.1	(3.4) – 3.8	(4.3) – 4.7	(4.8) – 5.4	(5.3) – 5.9	(5.9) – 6.6	0.80	3.0	G 1/4 - DN 3 *	31
8	90	(3.0) – 3.4	(3.6) – 4.0	(4.6) – 5.1	(5.2) – 5.8	(5.7) – 6.3	(6.3) – 7.1	0.80	3.0	G 1/4 - DN 3 *	31
10	260	(2.9) – 3.2	(3.4) – 3.8	(4.3) – 4.8	(4.9) – 5.5	(5.4) – 6.0	(6.0) – 6.7	1.25	3.0	G 1/4 – DN 6 *	35
10	240	(3.0) – 3.4	(3.6) – 4.0	(4.5) – 5.1	(5.2) – 5.7	(5.7) – 6.3	(6.3) – 7.0	1.25	3.0	G 1/4 – DN 6 *	35
10	190	(3.4) – 3.8	(4.1) – 4.5	(5.1) – 5.7	(5.8) – 6.5	(6.4) – 7.1	(7.1) – 7.9	1.25	3.0	G 1/4 – DN 6 *	35
10	160	(3.6) – 4.0	(4.4) – 4.8	(5.5) – 6.1	(6.2) – 6.9	(6.8) – 7.6	(7.6) – 8.4	1.25	3.0	G 1/4 – DN 6 *	35
10	120	(3.9) – 4.4	(4.7) – 5.2	(5.9) – 6.6	(6.7) – 7.5	(7.4) – 8.2	(8.2) – 9.1	1.25	3.0	G 1/4 – DN 6 *	35
10	90	(4.2) – 4.6	(5.0) – 5.6	(6.2) – 6.9	(7.1) – 7.9	(7.8) – 8.7	(8.7) – 9.7	1.25	3.0	G 1/4 – DN 6 *	35
13	160	(6.7) – 7.5	(8.1) – 9.0	(10.1) – 11.2	(11.5) – 12.8	(12.6) – 14.0	(14.0) – 15.6	1.96	3.0	G 1/4 – DN 6 *	35
13	120	(7.3) – 8.1	(8.7) – 9.7	(10.9) – 12.1	(12.4) – 13.8	(13.6) – 15.2	(15.2) – 16.9	1.96	3.0	G 1/4 – DN 6 *	35
13	90	(7.7) – 8.5	(9.2) – 10.2	(11.5) – 12.8	(13.1) – 14.5	(14.4) – 16.0	(16.0) – 17.8	1.96	3.0	G 1/4 – DN 6 *	35
15	120	(8.0) – 8.9	(9.6) – 10.6	(12.0) – 13.3	(13.6) – 15.1	(15.0) – 16.7	(16.7) – 18.5	2.83	3.0	G 1/4 – DN 6 *	39
15	90	(9.0) – 10.1	(10.9) – 12.1	(13.6) – 15.1	(15.5) – 17.2	(17.0) – 18.9	(18.9) – 21.0	2.83	3.0	G 1/4 – DN 6 *	39
15	64	(10.0) – 11.1	(12.0) – 13.3	(15.0) – 16.7	(17.0) – 18.9	(18.8) – 20.8	(20.8) – 23.2	2.83	3.0	G 1/4 – DN 6 *	39
17	90	(13.1) – 14.5	(15.7) – 17.4	(19.6) – 21.8	(22.3) – 24.8	(24.6) – 27.3	(27.3) – 30.3	3.78	3.0	G 1/4 – DN 6 *	39
17	64	(14.2) – 15.7	(17.0) – 18.9	(21.3) – 23.6	(24.2) – 26.9	(26.6) – 29.6	(29.6) – 32.9	3.78	3.0	G 1/4 – DN 6 *	39
19	64	(18.6) – 20.7	(22.3) – 24.8	(27.9) – 31.1	(31.8) – 35.3	(34.9) – 38.8	(38.8) – 43.2	4.64	3.0	G 1/4 – DN 6 *	39
19	51	(19.3) – 21.5	(23.2) – 25.8	(29.0) – 32.2	(32.9) – 36.6	(36.2) – 40.3	(40.3) – 44.7	4.64	3.0	G 1/4 – DN 6 *	39
22	51	(24.7) – 27.4	(29.6) – 32.9	(37.0) – 41.1	(42.1) – 46.7	(46.3) – 51.4	(51.4) – 57.1	6.28	3.0	G 1/4 – DN 10	46
22	30	(27.0) – 30.0	(32.4) – 36.0	(40.5) – 45.0	(46.0) – 51.1	(50.6) – 56.2	(56.2) – 62.5	6.28	3.0	G 1/4 – DN 10	46
30	30	(53.0) – 58.9	(63.6) – 70.6	(79.5) – 88.3	(90) – 100	(99) – 110	(110) – 122	11.31	3.0	G 1/4 – DN 10	46

* Double ball valve with female thread

Other performance variants and materials on request.

2.3 Hydraulic Diaphragm Metering Pumps

Technical data for Evolution E1Sa single-head pump 60 Hz

Plunger Ø	Max. pressure	Max. pump capacity in l/h at strokes/min					Theor. stroke volume	Suction lift	Connection on suction/discharge side	Shipping weight
		113 l/h	136 l/h	170 l/h	193 l/h	213 l/h				
mm	bar						ml/stroke	m WC	G-DN	kg
6	260	(0.9) – 1.0	(1.1) – 1.3	(1.4) – 1.6	(1.6) – 1.8	(1.8) – 2.0	0.49	3.0	G 1/4 - DN 3 *	31
6	240	(1.1) – 1.2	(1.3) – 1.4	(1.6) – 1.7	(1.8) – 2.0	(2.0) – 2.2	0.49	3.0	G 1/4 - DN 3 *	31
6	190	(1.3) – 1.5	(1.6) – 1.8	(2.0) – 2.2	(2.3) – 2.5	(2.5) – 2.8	0.49	3.0	G 1/4 - DN 3 *	31
6	160	(1.5) – 1.6	(1.8) – 2.0	(2.2) – 2.5	(2.5) – 2.8	(2.8) – 3.1	0.49	3.0	G 1/4 - DN 3 *	31
6	120	(1.7) – 1.9	(2.0) – 2.3	(2.6) – 2.9	(2.9) – 3.3	(3.2) – 3.6	0.49	3.0	G 1/4 - DN 3 *	31
8	260	(2.3) – 2.6	(2.8) – 3.1	(3.5) – 3.9	(4.0) – 4.4	(4.4) – 4.9	0.80	3.0	G 1/4 - DN 3 *	31
8	240	(2.5) – 2.8	(3.0) – 3.3	(3.7) – 4.2	(4.3) – 4.7	(4.7) – 5.2	0.80	3.0	G 1/4 - DN 3 *	31
8	190	(2.9) – 3.2	(3.5) – 3.9	(4.3) – 4.8	(4.9) – 5.5	(5.4) – 6.0	0.80	3.0	G 1/4 - DN 3 *	31
8	160	(3.1) – 3.5	(3.8) – 4.2	(4.7) – 5.2	(5.3) – 5.9	(5.9) – 6.5	0.80	3.0	G 1/4 - DN 3 *	31
8	120	(3.4) – 3.8	(4.1) – 4.6	(5.2) – 5.8	(5.9) – 6.6	(6.5) – 7.2	0.80	3.0	G 1/4 - DN 3 *	31
8	90	(3.7) – 4.1	(4.4) – 4.9	(5.5) – 6.2	(6.3) – 7.0	(6.9) – 7.7	0.80	3.0	G 1/4 - DN 3 *	31
10	260	(3.5) – 3.9	(4.2) – 4.7	(5.2) – 5.8	(6.0) – 6.6	(6.6) – 7.3	1.25	3.0	G 1/4 – DN 6 *	35
10	240	(3.7) – 4.1	(4.4) – 4.9	(5.5) – 6.1	(6.3) – 7.0	(6.9) – 7.7	1.25	3.0	G 1/4 – DN 6 *	35
10	190	(4.1) – 4.6	(5.0) – 5.5	(6.2) – 6.9	(7.1) – 7.9	(7.8) – 8.7	1.25	3.0	G 1/4 – DN 6 *	35
10	160	(4.4) – 4.9	(5.3) – 5.9	(6.6) – 7.4	(7.5) – 8.4	(8.3) – 9.2	1.25	3.0	G 1/4 – DN 6 *	35
10	120	(4.8) – 5.3	(5.7) – 6.4	(7.2) – 8.0	(8.2) – 9.1	(9.0) – 10.0	1.25	3.0	G 1/4 – DN 6 *	35
10	90	(5.1) – 5.6	(6.1) – 6.7	(7.6) – 8.4	(8.6) – 9.6	(9.5) – 10.6	1.25	3.0	G 1/4 – DN 6 *	35
13	160	(8.2) – 9.2	(9.8) – 10.9	(12.3) – 13.6	(13.9) – 15.5	(15.3) – 17.1	1.96	3.0	G 1/4 – DN 6 *	35
13	120	(8.8) – 9.8	(10.6) – 11.8	(13.2) – 14.7	(15.1) – 16.7	(16.6) – 18.4	1.96	3.0	G 1/4 – DN 6 *	35
13	90	(9.3) – 10.3	(11.2) – 12.4	(14.0) – 15.5	(15.9) – 17.7	(17.5) – 19.4	1.96	3.0	G 1/4 – DN 6 *	35
15	120	(9.7) – 10.8	(11.6) – 12.9	(14.6) – 16.2	(16.6) – 18.4	(18.2) – 20.2	2.83	3.0	G 1/4 – DN 6 *	39
15	90	(11.0) – 12.2	(13.2) – 14.7	(16.5) – 18.4	(18.8) – 20.9	(20.7) – 23.0	2.83	3.0	G 1/4 – DN 6 *	39
15	64	(12.1) – 13.5	(14.6) – 16.2	(18.2) – 20.3	(20.7) – 23.0	(22.8) – 25.3	2.83	3.0	G 1/4 – DN 6 *	39
17	90	(15.9) – 17.7	(19.1) – 21.2	(23.9) – 26.5	(27.1) – 30.1	(29.8) – 33.1	3.78	3.0	G 1/4 – DN 6 *	39
17	64	(17.2) – 19.1	(20.7) – 23.0	(25.8) – 28.7	(29.4) – 32.6	(32.3) – 35.9	3.78	3.0	G 1/4 – DN 6 *	39
19	64	(22.6) – 25.1	(27.1) – 30.2	(33.9) – 37.7	(38.6) – 42.9	(42.4) – 47.2	4.64	3.0	G 1/4 – DN 6 *	39
19	51	(23.3) – 25.8	(27.9) – 31.0	(34.9) – 38.8	(39.7) – 44.1	(43.6) – 48.5	4.64	3.0	G 1/4 – DN 6 *	39
22	51	(29.9) – 33.3	(35.9) – 39.9	(44.9) – 49.9	(51.1) – 56.8	(56.2) – 62.4	6.28	3.0	G 1/4 – DN 10	46
22	30	(32.7) – 36.4	(39.3) – 43.7	(49.1) – 54.6	(55.9) – 62.1	(61.4) – 68.3	6.28	3.0	G 1/4 – DN 10	46
30	30	(64.3) – 71.5	(77.2) – 85.8	(96.5) – 107.2	(109.7) – 121.9	(120.6) – 134.1	11.31	3.0	G 1/4 – DN 10	46

* Double ball valve with female thread

Other performance variants and materials on request.

Wetted materials for Evolution E1Sa

Identity code of material	Dosing head	Diaphragm/diaphragm mounting screw	Connection on suction/discharge side	Seals	Valve seats	Valve balls up to DN 10
S2	Stainless steel 1.4404	PTFE / stainless steel 1.4462	Stainless steel 1.4404	stainless steel 1.4404	Stainless steel 1.4404	Al_2O_3 ceramic
S3	Stainless steel 1.4404	PTFE / stainless steel 1.4462	Stainless steel 1.4404	stainless steel 1.4404	Stainless steel 1.4404	Al_2O_3 ceramic

Motor data for EVOLUTION E1Sa single-head pump

Identity code specification	Power supply				Remarks
S	3-phase, IP 55	230 V/400 V	50 Hz	0.37 kW	With PTC, speed control range 1:5
T	3-phase, IP 55	230 V/400 V 265 V/460 V	50 Hz 60 Hz	0.37 kW	
L	3-phase, IP 55, II 2G Ex de IIC T4 Gb	230 V/400 V	50 Hz	0.37 kW	With PTC, speed control range 1:5
V	3-phase, IP 55	230 V	50 Hz	0.75 kW	Variable speed motor with integrated frequency converter

2.3 Hydraulic Diaphragm Metering Pumps

Identity code ordering system for Evolution E1Sa

Code	Description
E1Sa	**Drive type**
V	Simplex (vertical)
X	Drive (without liquid end)
	Plungers
006	Plunger 6 mm
008	Plunger 8 mm
010	Plunger 10 mm
013	Plunger 13 mm
015	Piston 15 mm
017	Piston 17 mm
019	Piston 19 mm
022	Plunger 22 mm
030	Plunger 30 mm
	stroke rate
93	93 strokes/min.; 50 Hz
112	112 strokes/min.; 50 Hz
140	140 strokes/min.; 50 Hz
159	159 strokes/min.; 50 Hz
175	175 strokes/min.; 50 Hz
194	194 strokes/min.; 50 Hz
113	113 strokes/min.; 60 Hz
136	136 strokes/min.; 60 Hz
170	170 strokes/min.; 60 Hz
193	193 strokes/min.; 60 Hz
213	213 strokes/min.; 60 Hz
	Pressure rating
A	260 bar
B	240 bar
C	190 bar
D	160 bar
E	120 bar
F	90 bar
G	64 bar
H	51 bar
I	30 bar
J	12 bar
X	Drive (without liquid end)
	Material
S2	Standard stainless steel; stainless steel - DIN EN
S3	Standard stainless steel; stainless steel - AISI
XX	Drive (without liquid end)
	Valve design
0	Standard
4	Ball valve
6	Double ball valve
X	Drive (without liquid end)
	Diaphragm monitor
1	Without diaphragm monitoring
2	Visual indication
3	Contact pressure gauge
4	Electric pressure switch
X	Drive (without liquid end)
	Hydraulic connector
0	Standard
E	DIN flange
F	Flange ANSI
N	NPT connection
X	Drive (without liquid end)
	Electrical Connection
S	3-phase 230/400 V, 50 Hz, 0.37 kW
T	3-phase, 230/400 V, 50/60 Hz, 0.37 kW with PTC
L	3-phase, 230/400 V, 50 Hz, 0.37 kW, (Exde) T4
V	Controllable motor with integrated frequency converter, 1-phase, 230 V, 50 Hz, 0.75 kW
1	Without motor, with flange 160/71
2	Without motor, with flange 200/80
3	Without motor, with NEMA 56/143 flange
4	Without motor, with 160/71 ATEX flange
5	Without motor, with 200/80 ATEX flange
6	Without motor, with NEMA 56/143 ATEX flange
X	Without motor, without flange
	Stroke length adjustment
0	Stroke length adjustment standard
A	Stroke control motor 0-20 mA; 230 V
B	Stroke control motor 4-20 mA; 230 V

C	Stroke control motor 0-20 mA; 115 V
D	Stroke control motor 4-20 mA; 115 V
E	EXd stroke control motor 0-20 mA; 230 V
F	EXd stroke control motor 4-20 mA; 230 V
G	EXd stroke control motor 0-20 mA; 115 V
H	EXd stroke control motor 4-20 mA; 115 V

Temperature (ambient)	
0	-20 °C … +40 °C
1	-10 °C … +50 °C

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
XX	Drive, unpainted with rust protection

Tests	
S1	Standard performance test
S2	Performance test including 3.1 certificate
S3	As S1 + 3.1 certificate wetted material
S4	As S2 + 3.1 certificate wetted material
A1	API complete test including certificate
A2	As A1 + NPSH
A3	As A1 + NPIP
A4	As A1 + 3.1 material certificate
XX	Drive (without liquid end)

Approvals	
0	CE
1	CE + ATEX
2	CE + EAC
3	CE + EAC + ATEX
4	CE + UKCA
5	CE + UKCA + ATEX
N	without approval
X	Drive (without liquid end)

Documentation	
DE	German
EN	English
FR	French
ES	Spanish
RU	Russian
ZH	Chinese
XX	Power end (without liquid end)
M0	Modified

Measuring unit	
0	bar, l/h
1	psi, gph
2	kPa, l/h
X	Drive (without liquid end)

Spare parts kits for ORLITA Evolution E1Sa

Scope of delivery:
1 spare diaphragm complete, 1 sealing set, 2 valve seats, 2 valve balls

Plunger Ø mm	Material	Suitable for identity code	Order no.
6, 8	S1	E1Sa.006....S1, E1Sa.008....S1	1125625
10, 13	S1	E1Sa.010....S1, E1Sa.013....S1	1125627
15, 17, 19	S1	E1Sa.015...S1, E1Sa.017...S1, E1Sa.019...S1	1125628
22, 30	S1	E1Sa.022....S1, E1Sa.030....S1	1125629

Metering diaphragms PTFE/1.4404 for Evolution E1Sa

Plunger Ø mm	Material	Suitable for identity code	Order no.
6, 8	S1	E1Sa.006....S1, E1Sa.008....S1	1129176
10, 13	S1	E1Sa.010....S1, E1Sa.013....S1	1129268
15, 17, 19	S1	E1Sa.015...S1, E1Sa.017...S1, E1Sa.019...S1	1129197
22, 30	S1	E1Sa.022....S1, E1Sa.030....S1	1129201

Standard oil for maintaining hydraulics and gearbox Evolution E1Sa

The oils are available in 1l containers. For example, if 1.8 l is required for maintenance work, 2 containers are needed.

	Required quantity	Order no.
Mobilube 1SHC 75W-90 gear oil, 1 litre	2 l	1006010

2.3.5.2 ORLITA Evolution E2Sa

Technical data for Evolution E2Sa single-head pump 50 Hz

Plunger Ø	Max. pressure	Max. pump capacity in l/h at strokes/min					Theor. stroke volume	Suction lift	Connection on suction/ discharge side	Shipping weight
		112	140	159	175	194				
mm	bar	l/h	l/h	l/h	l/h	l/h	ml/ stroke	m WC	G-DN	kg
10	260	(3.4) – 3.8	(4.3) – 4.8	(4.9) – 5.5	(5.4) – 6.0	(6.0) – 6.7	1.25	3.0	G 1/4 – DN 6 *	42
10	240	(3.6) – 4.0	(4.5) – 5.1	(5.2) – 5.7	(5.7) – 6.3	(6.3) – 7.0	1.25	3.0	G 1/4 – DN 6 *	42
10	190	(4.1) – 4.5	(5.1) – 5.7	(5.8) – 6.5	(6.5) – 7.1	(7.1) – 7.9	1.25	3.0	G 1/4 – DN 6 *	42
10	160	(4.4) – 4.8	(5.5) – 6.1	(6.2) – 6.9	(6.8) – 7.6	(7.6) – 8.4	1.25	3.0	G 1/4 – DN 6 *	42
10	120	(4.7) – 5.2	(5.9) – 6.6	(6.7) – 7.5	(7.4) – 8.2	(8.2) – 9.1	1.25	3.0	G 1/4 – DN 6 *	42
10	90	(5.0) – 5.6	(6.2) – 6.9	(7.1) – 7.9	(7.8) – 8.7	(8.7) – 9.7	1.25	3.0	G 1/4 – DN 6 *	42
13	260	(7.7) – 8.5	(9.6) – 10.7	(10.9) – 12.1	(12.0) – 13.3	(13.3) – 14.8	1.96	3.0	G 1/4 – DN 6 *	42
13	240	(7.9) – 8.8	(9.9) – 11.2	(11.2) – 12.5	(12.4) – 13.7	(13.7) – 15.3	1.96	3.0	G 1/4 – DN 6 *	42
13	190	(8.5) – 9.4	(10.6) – 11.8	(12.0) – 13.4	(13.3) – 14.7	(14.7) – 16.4	1.96	3.0	G 1/4 – DN 6 *	42
13	160	(8.8) – 9.8	(11.0) – 12.3	(12.5) – 13.9	(13.8) – 15.3	(15.3) – 17.0	1.96	3.0	G 1/4 – DN 6 *	42
13	120	(9.3) – 10.3	(11.6) – 12.9	(13.2) – 14.7	(14.5) – 16.1	(16.1) – 17.9	1.96	3.0	G 1/4 – DN 6 *	42
13	90	(9.9) – 10.7	(12.0) – 13.4	(13.7) – 15.2	(15.0) – 16.7	(16.7) – 18.6	1.96	3.0	G 1/4 – DN 6 *	42
15	260	(9.9) – 11.0	(12.4) – 13.7	(14.0) – 15.6	(15.5) – 17.2	(17.2) – 19.1	2.83	3.0	G 1/4 – DN 6 *	46
15	240	(10.2) – 11.4	(12.8) – 14.2	(14.6) – 16.2	(16.0) – 17.8	(17.8) – 19.8	2.83	3.0	G 1/4 – DN 6 *	46
15	190	(11.2) – 12.4	(14.0) – 15.5	(15.9) – 17.7	(17.5) – 19.4	(19.4) – 21.6	2.83	3.0	G 1/4 – DN 6 *	46
15	160	(11.7) – 13.0	(14.7) – 16.3	(16.7) – 18.5	(18.4) – 20.4	(20.4) – 22.7	2.83	3.0	G 1/4 – DN 6 *	46
15	120	(12.5) – 13.9	(15.6) – 17.3	(17.7) – 19.7	(19.5) – 21.7	(21.7) – 24.1	2.83	3.0	G 1/4 – DN 6 *	46
15	90	(13.0) – 14.5	(16.3) – 18.1	(18.5) – 20.6	(20.4) – 22.7	(22.7) – 25.2	2.83	3.0	G 1/4 – DN 6 *	46
17	190	(16.0) – 17.7	(20.2) – 22.2	(22.7) – 25.2	(25.0) – 27.8	(27.8) – 30.8	3.78	3.0	G 1/4 – DN 6 *	46
17	160	(16.6) – 18.5	(20.8) – 23.1	(23.6) – 26.3	(26.0) – 28.9	(28.9) – 32.1	3.78	3.0	G 1/4 – DN 6 *	46
17	120	(17.5) – 19.5	(21.9) – 24.3	(24.9) – 27.6	(27.4) – 30.4	(30.4) – 33.8	3.78	3.0	G 1/4 – DN 6 *	46
17	90	(18.2) – 20.2	(22.7) – 25.2	(25.8) – 28.7	(28.4) – 31.6	(31.6) – 35.1	3.78	3.0	G 1/4 – DN 6 *	46
19	160	(22.4) – 24.9	(28.0) – 31.1	(31.8) – 35.4	(35.0) – 38.9	(38.9) – 43.2	4.64	3.0	G 1/4 – DN 6 *	46
19	120	(23.1) – 25.7	(28.9) – 32.1	(32.8) – 36.5	(36.1) – 40.1	(40.1) – 44.6	4.64	3.0	G 1/4 – DN 6 *	46
19	90	(23.6) – 26.3	(29.6) – 32.8	(33.6) – 37.3	(37.0) – 41.1	(41.1) – 45.6	4.64	3.0	G 1/4 – DN 6 *	46
22	120	(30.7) – 34.2	(38.4) – 42.7	(43.7) – 48.5	(48.0) – 53.4	(53.4) – 59.3	6.28	3.0	G 1/4 – DN 10	52
22	90	(32.1) – 35.7	(40.1) – 44.6	(45.6) – 50.7	(50.2) – 55.7	(55.7) – 61.9	6.28	3.0	G 1/4 – DN 10	52
22	64	(33.3) – 37.0	(41.6) – 46.2	(47.3) – 52.5	(52.0) – 57.8	(57.8) – 64.2	6.28	3.0	G 1/4 – DN 10	52
30	64	(60.1) – 66.8	(75.2) – 83.6	(85.5) – 95.0	(94.0) – 104.5	(104.5) – 116.1	11.31	3.0	G 1/4 – DN 10	52
30	51	(61.4) – 68.3	(76.8) – 85.3	(87.3) – 97.0	(96.0) – 106.7	(106.7) – 118.6	11.31	3.0	G 1/4 – DN 10	52

* Double ball valve with female thread

Other performance variants and materials on request.

2.3 Hydraulic Diaphragm Metering Pumps

Technical data for Evolution E2Sa single-head pump 60 Hz

Plunger Ø	Max. pressure	Max. pump capacity in l/h at strokes/min					Theor. stroke volume	Suction lift	Connection on suction/discharge side	Shipping weight
		113 l/h	136 l/h	170 l/h	193 l/h	213 l/h				
mm	bar						ml/stroke	m WC	G-DN	kg
10	260	(3.5) – 3.9	(4.2) – 4.7	(5.2) – 5.8	(6.0) – 6.6	(6.6) – 7.3	1.25	3.0	G 1/4 – DN 6 *	42
10	240	(3.7) – 4.1	(4.4) – 4.9	(5.5) – 6.1	(6.3) – 7.0	(6.9) – 7.7	1.25	3.0	G 1/4 – DN 6 *	42
10	190	(4.1) – 4.6	(5.0) – 5.5	(6.2) – 6.9	(7.1) – 7.9	(7.8) – 8.7	1.25	3.0	G 1/4 – DN 6 *	42
10	160	(4.4) – 4.9	(5.3) – 5.9	(6.6) – 7.4	(7.5) – 8.4	(8.3) – 9.2	1.25	3.0	G 1/4 – DN 6 *	42
10	120	(4.8) – 5.3	(5.7) – 6.4	(7.2) – 8.0	(8.2) – 9.1	(9.0) – 10.0	1.25	3.0	G 1/4 – DN 6 *	42
10	90	(5.1) – 5.6	(6.1) – 6.7	(7.6) – 8.4	(8.6) – 9.6	(9.5) – 10.6	1.25	3.0	G 1/4 – DN 6 *	42
13	260	(7.8) – 8.6	(9.3) – 10.4	(11.7) – 13.0	(13.2) – 14.7	(14.6) – 16.2	1.96	3.0	G 1/4 – DN 6 *	42
13	240	(8.0) – 8.9	(9.6) – 10.7	(12.0) – 13.3	(13.6) – 15.2	(15.0) – 16.7	1.96	3.0	G 1/4 – DN 6 *	42
13	190	(8.6) – 9.5	(10.3) – 11.4	(12.9) – 14.3	(14.6) – 16.3	(16.1) – 17.9	1.96	3.0	G 1/4 – DN 6 *	42
13	160	(8.9) – 9.9	(10.7) – 11.9	(13.4) – 14.9	(15.2) – 16.9	(16.8) – 18.6	1.96	3.0	G 1/4 – DN 6 *	42
13	120	(9.4) – 10.4	(11.3) – 12.5	(14.4) – 15.7	(16.0) – 17.8	(17.6) – 19.6	1.96	3.0	G 1/4 – DN 6 *	42
13	90	(9.7) – 10.8	(11.7) – 13.0	(14.6) – 16.2	(16.6) – 18.5	(18.3) – 20.3	1.96	3.0	G 1/4 – DN 6 *	42
15	260	(10.0) – 11.1	(12.0) – 13.3	(15.0) – 16.7	(17.1) – 19.0	(18.8) – 20.9	2.83	3.0	G 1/4 – DN 6 *	46
15	240	(10.4) – 11.5	(12.4) – 13.8	(15.6) – 17.3	(17.7) – 19.7	(19.5) – 21.6	2.83	3.0	G 1/4 – DN 6 *	46
15	190	(11.3) – 12.6	(13.6) – 15.1	(17.0) – 18.9	(19.3) – 21.5	(21.2) – 23.6	2.83	3.0	G 1/4 – DN 6 *	46
15	160	(11.9) – 13.2	(14.3) – 15.8	(17.8) – 19.8	(20.3) – 22.5	(22.3) – 24.8	2.83	3.0	G 1/4 – DN 6 *	46
15	120	(12.6) – 14.0	(15.2) – 16.8	(19.0) – 21.1	(21.5) – 23.9	(23.7) – 26.3	2.83	3.0	G 1/4 – DN 6 *	46
15	90	(13.2) – 14.7	(15.8) – 17.6	(19.8) – 22.0	(22.5) – 25.0	(24.8) – 27.5	2.83	3.0	G 1/4 – DN 6 *	46
17	190	(16.2) – 18.0	(19.4) – 21.6	(24.3) – 27.0	(27.6) – 30.6	(30.3) – 33.7	3.78	3.0	G 1/4 – DN 6 *	46
17	160	(16.8) – 18.7	(20.4) – 22.4	(25.3) – 28.1	(28.7) – 31.9	(31.6) – 35.1	3.78	3.0	G 1/4 – DN 6 *	46
17	120	(17.7) – 19.7	(21.3) – 23.6	(26.6) – 29.5	(30.2) – 33.6	(33.2) – 36.9	3.78	3.0	G 1/4 – DN 6 *	46
17	90	(18.4) – 20.4	(22.1) – 24.5	(27.6) – 30.7	(31.4) – 34.8	(34.5) – 38.3	3.78	3.0	G 1/4 – DN 6 *	46
19	160	(22.7) – 25.2	(27.2) – 30.2	(34.0) – 37.8	(38.7) – 43.0	(42.5) – 47.3	4.64	3.0	G 1/4 – DN 6 *	46
19	120	(23.4) – 26.0	(28.1) – 31.2	(35.1) – 39.0	(39.9) – 44.3	(43.9) – 48.7	4.64	3.0	G 1/4 – DN 6 *	46
19	90	(23.9) – 26.6	(28.7) – 31.9	(35.9) – 39.9	(40.8) – 45.3	(44.9) – 49.9	4.64	3.0	G 1/4 – DN 6 *	46
22	120	(31.1) – 34.6	(37.3) – 41.5	(46.7) – 51.9	(53.0) – 58.9	(58.4) – 64.8	6.28	3.0	G 1/4 – DN 10	52
22	90	(32.5) – 36.1	(39.0) – 43.3	(48.7) – 54.1	(55.4) – 61.5	(60.9) – 67.7	6.28	3.0	G 1/4 – DN 10	52
22	64	(33.7) – 37.4	(40.4) – 44.9	(50.5) – 56.1	(57.4) – 63.8	(63.1) – 70.2	6.28	3.0	G 1/4 – DN 10	52
30	64	(60.9) – 67.6	(73.0) – 81.2	(91.3) – 101.5	(103.8) – 115.3	(114.2) – 126.9	11.31	3.0	G 1/4 – DN 10	52
30	51	(62.2) – 69.1	(74.6) – 82.9	(93.3) – 103.6	(106.0) – 117.8	(116.6) – 129.6	11.31	3.0	G 1/4 – DN 10	52

* Double ball valve with female thread

Other performance variants and materials on request.

Wetted materials for Evolution E2Sa

Identity code of material	Dosing head	Diaphragm/diaphragm mounting screw	Connection on suction/discharge side	Seals	Valve seats	Valve balls up to DN 10
S2	Stainless steel 1.4404	PTFE / stainless steel 1.4462	Stainless steel 1.4404	stainless steel 1.4404	Stainless steel 1.4404	Al_2O_3 ceramic

Motor data for EVOLUTION E2Sa single-head pump

Identity code specification	Power supply			Remarks
S	3-phase, IP 55	230 V/400 V	50 Hz	0.75 kW	With PTC, speed control range 1:5
T	3-phase, IP 55	230 V/400 V 265 V/460 V	50 Hz 60 Hz	0.75 kW	
L	3-phase, IP 55, II 2G Ex de IIC T4 Gb	230 V/400 V	50 Hz	0.75 kW	With PTC, speed control range 1:5
Q	3-phase, IP 55, II 2G Ex de IIC T4	265 V/460 V	60 Hz	0.75 kW	With PTC, speed control range 1:5
V	3-phase, IP 55	230 V	50 Hz	0.75 kW	Variable speed motor with integrated frequency converter

Identity code ordering system for Evolution E2Sa

E2Sa	Drive type																	
	V	Simplex (vertical)																
	X	Drive (without liquid end)																
		Plungers																
		010	Plunger 10 mm															
		013	Plunger 13 mm															
		015	Piston 15 mm															
		017	Piston 17 mm															
		019	Piston 19 mm															
		022	Plunger 22 mm															
		030	Plunger 30 mm															
			stroke rate															
			093	93 strokes/min.; 50 Hz														
			112	112 strokes/min.; 50 Hz														
			140	140 strokes/min.; 50 Hz														
			159	159 strokes/min.; 50 Hz														
			175	175 strokes/min.; 50 Hz														
			194	194 strokes/min.; 50 Hz														
			113	113 strokes/min.; 60 Hz														
			136	136 strokes/min.; 60 Hz														
			170	170 strokes/min.; 60 Hz														
			193	193 strokes/min.; 60 Hz														
			213	213 strokes/min.; 60 Hz														
				Pressure rating														
				A	260 bar													
				B	240 bar													
				C	190 bar													
				D	160 bar													
				E	120 bar													
				F	90 bar													
				G	64 bar													
				H	51 bar													
				I	30 bar													
				X	Drive (without liquid end)													
					Material													
					S2	Standard stainless steel; stainless steel - DIN EN												
					S3	Standard stainless steel; stainless steel - AISI												
					XX	Drive (without liquid end)												
						Valve design												
						0	Standard											
						4	Ball valve											
						6	Double ball valve											
						X	Drive (without liquid end)											
							Diaphragm monitor											
							1	Without diaphragm monitoring										
							2	Visual indication										
							3	Contact pressure gauge										
							4	Electric pressure switch										
							X	Drive (without liquid end)										
								Hydraulic connector										
								0	Standard									
								E	DIN flange									
								F	Flange ANSI									
								N	NPT connection									
								X	Drive (without liquid end)									
									Electrical Connection									
									S	3-phase 230/400 V, 50 Hz, 0.75 kW								
									T	3-phase, 230/400 V, 50/60 Hz, 0.75 kW with PTC								
									L	3-phase, 230/400 V, 50 Hz, 0.75 kW, (Exde) T4								
									Q	3-phase, 265/460 V, 60 Hz, 0.75 kW, (Exde) T4								
									V	Controllable motor with integrated frequency converter, 1-phase, 230 V, 50 Hz, 0.75 kW								
									1	Without motor, with flange 160/71								
									2	Without motor, with flange 200/80								
									3	Without motor, with NEMA 56/143 flange								
									4	Without motor, with 160/71 ATEX flange								
									5	Without motor, with 200/80 ATEX flange								
									6	Without motor, with NEMA 56/143 ATEX flange								
									X	Without motor, without flange								
										Stroke length adjustment								
										0	Stroke length adjustment standard							
										A	Stroke control motor 0-20 mA; 230 V							
										B	Stroke control motor 4-20 mA; 230 V							
										C	Stroke control motor 0-20 mA; 115 V							
										D	Stroke control motor 4-20 mA; 115 V							

2.3 Hydraulic Diaphragm Metering Pumps

E	EXd stroke control motor 0-20 mA; 230 V
F	EXd stroke control motor 4-20 mA; 230 V
G	EXd stroke control motor 0-20 mA; 115 V
H	EXd stroke control motor 4-20 mA; 115 V

Temperature (ambient)

0	-20 °C ... +40 °C
1	-10 °C ... +50 °C

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
XX	Drive, unpainted with rust protection

Tests

S1	Standard performance test
S2	Performance test including 3.1 certificate
S3	As S1 + 3.1 certificate wetted material
S4	As S2 + 3.1 certificate wetted material
A1	API complete test including certificate
A2	As A1 + NPSH
A3	As A1 + NPIP
A4	As A1 + 3.1 material certificate
XX	Drive (without liquid end)

Approvals

0	CE
1	CE + ATEX
2	CE + EAC
3	CE + EAC + ATEX
4	CE + UKCA
5	CE + UKCA + ATEX
N	without approval
X	Drive (without liquid end)

Documentation

DE	German
EN	English
FR	French
ES	Spanish
RU	Russian
ZH	Chinese
XX	Power end (without liquid end)
M0	Modified

Measuring unit

0	bar, l/h
1	psi, gph
2	kPa, l/h
X	Drive (without liquid end)

Spare parts kits for ORLITA Evolution E2Sa

Scope of delivery:
1 spare diaphragm complete, 1 sealing set, 2 valve seats, 2 valve balls

Plunger Ø mm	Material	Suitable for identity code	Order no.
10, 13	S1	E2Sa.010....S1, E2Sa.013....S1	1125627
15, 17, 19	S1	E2Sa.015...S1, E2Sa.017...S1, E2Sa.019...S1	1125628
22, 30	S1	E2Sa.022....S1, E2Sa.030....S1	1125629

Metering diaphragm for maintenance assembly PTFE/1.4404 for Evolution E2Sa

Plunger Ø mm	Material	Suitable for identity code	Order no.
10, 13	S1	E2Sa.010....S1, E2Sa.013....S1	1129268
15, 17, 19	S1	E2Sa.015...S1, E2Sa.017...S1, E2Sa.019...S1	1129197
22, 30	S1	E2Sa.022....S1, E2Sa.030....S1	1129201

Standard oil for maintaining hydraulics and gearbox Evolution E2Sa

The oils are available in 1l containers. For example, if 1.8 l is required for maintenance work, 2 containers are needed.

	Required quantity	Order no.
Mobilube 1SHC 75W-90 gear oil, 1 litre	2 l	1006010

2.3 Hydraulic Diaphragm Metering Pumps

2.3.6 Hydraulic Diaphragm Metering Pump ORLITA Evolution mikro

For the smallest quantities at high pressures

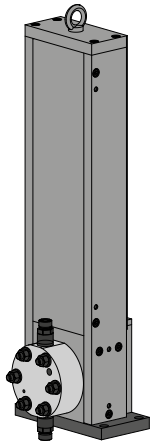
Capacity range 0.01 – 18 l/h, 250 – 10 bar

The ORLITA 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 250 bar (400 bar design), the hydraulic diaphragm metering pump ORLITA Evolution mikro EMFa is ideally suited to ultra-precise micrometering in a very wide range of processes. Typical applications include metering additives in processes in the oil, gas and petrochemical industries as well as the chemical industry. It is also used in R&D and research for high-pressure laboratory use and pilot plants. Other typical applications include filling processes. The Evolution mikro variant with a metal diaphragm is also used in gas odourisation.

The ORLITA Evolution mikro is the first of its kind with an electronically regulated direct power end.

A metering usage range in a control ratio of 1:200 and the combination of individually independent metering profiles with 3-parameter control make optimum adaptation to the respective application possible.



Pump

Your Benefits

Maximum process reliability:

- Precise micro-metering even 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 positioning accuracy guarantees reproducibility of better than ±1 %

Excellent flexibility:

- Greatly extended control 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

- Precise metering of 0.01 l/h up to a max. of 18 l/h at up to 250 bar (400 bar design)
- Stroke length: 0 - 60 mm
- Stroke rate: 0 - 200 strokes/min.
- Stroke length adjustment range of 0 - 100 %, stroke rate range of 0 – 100 %
- The metering reproducibility is better than ±1 % under defined conditions and with correct installation
- PTFE multi-layer safety diaphragm with integrated diaphragm rupture signalling system or metal diaphragm
- Large real volumetric flow control range: 1:200
- Materials in contact with fluids: Stainless steel 1.4404, special materials such as Hastelloy C, PVDF etc. available on request
- Universal control options - with 0-10 V / 4-20 mA analogue signal as standard - other variants, such as fieldbus or contact control, are possible
- Individual process-dependent metering profiles are possible
- Space-saving, easy-to-install solution
- Degree of protection IP 55
- Designs compliant with API 675 and ATEX

Field of Application

- Additive metering in the oil, gas, chemical and petrochemical industry
- General filling processes in industry
- Additive metering in the pharmaceutical and food industry
- Universal lab applications
- Gas metering applications

Technical data for ORLITA Evolution Mikro EMFa with aluminium housing

Plunger Ø	Max. pressure	Max. pump capacity in l/h at strokes/min									Theor. stroke volume	Suction lift	Connection on suction/ discharge side	Shipping weight
		30	60	80	100	120	140	160	180	200				
mm	bar	l/h	l/h	l/h	l/h	l/h	l/h	l/h	l/h	l/h	ml/ stroke	m WC	G-DN	kg
3	250	0.3	0.6	0.8	1.0	1.1	1.3	1.5	1.7	1.9	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	160	0.4	0.8	1.1	1.4	1.6	1.9	2.2	2.4	2.7	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	100	0.5	1.0	1.3	1.6	1.9	2.2	2.6	2.9	3.2	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	80	0.5	1.0	1.3	1.6	1.9	2.2	2.6	2.9	3.2	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	64	0.5	1.1	1.4	1.8	2.2	2.5	2.9	3.2	3.6	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	40	0.5	1.1	1.4	1.8	2.2	2.5	2.9	3.2	3.6	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	25	0.6	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	10	0.6	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	0.42	1	1/4" NPTi - DN 3 - DKV	25
6	40	2.1	4.1	5.5	6.9	8.2	9.6	11.0	12.3	13.7	1.69	1	1/4" NPTi - DN 6 - DKV	25
6	25	2.7	5.4	7.2	9.0	10.8	12.6	14.4	16.2	18.0	1.69	1	1/4" NPTi - DN 6 - DKV	25
6	10	2.8	5.6	7.5	9.4	11.3	13.2	15.0	16.9	18.8	1.69	1	1/4" NPTi - DN 6 - DKV	25

Technical data for ORLITA Evolution Mikro EMFa with stainless steel housing

Plunger Ø	Max. pressure	Max. pump capacity in l/h at strokes/min									Theor. stroke volume	Suction lift	Connection on suction/ discharge side	Shipping weight
		30	60	80	100	120	140	160	180	200				
mm	bar	l/h	l/h	l/h	l/h	l/h	l/h	l/h	l/h	l/h	ml/ stroke	m WC	G-DN	kg
3	250	0.3	0.6	0.8	1.0	1.1	1.3	1.5	1.7	1.9	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	160	0.4	0.8	1.1	1.4	1.6	1.9	2.2	2.4	2.7	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	100	0.5	1.0	1.3	1.6	1.9	2.2	2.6	2.9	3.2	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	80	0.5	1.0	1.3	1.6	1.9	2.2	2.6	2.9	3.2	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	64	0.5	1.1	1.4	1.8	2.2	2.5	2.9	3.2	3.6	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	40	0.5	1.1	1.4	1.8	2.2	2.5	2.9	3.2	3.6	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	25	0.6	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	10	0.6	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	0.42	1	1/4" NPTi - DN 3 - DKV	25
6	40	2.6	5.1	6.8	8.6	10.3	12.0	13.7	15.4	17.1	1.69	1	1/4" NPTi - DN 6 - DKV	25
6	25	2.7	5.4	7.2	9.0	10.8	12.6	14.4	16.2	18.0	1.69	1	1/4" NPTi - DN 6 - DKV	25
6	10	2.8	5.6	7.5	9.4	11.3	13.2	15.0	16.9	18.8	1.69	1	1/4" NPTi - DN 6 - DKV	25

Performance data applies at ambient temperature of 40 °C, 50 °C and 55 °C and at 24 and 72 V DC. Performance data for ambient temperature of 60 °C is available on request.

Performance data for ambient temperature of 60°C is available on request.

Performance data for 320, 400 bar (piston diameter 3 mm) and for 64 bar (piston diameter 6 mm) is available on request.

Performance data for metal diaphragm variant is available on request.

Housing unpainted.

Wetted materials for ORLITA Evolution mikro EMFa

Dosing head	Diaphragm retaining screw	Diaphragm
Stainless steel 1.4404	Stainless steel 1.4462	PTFE multi-layer diaphragm

Identity code of material	Connection on suction/discharge side	Valve/head seal	Valve balls	Valve seats	Valve housing
DN 3 (double ball)	Stainless steel 1.4404	Stainless steel 1.4404	Al_2O_3 ceramic	Stainless steel 1.4404	Stainless steel 1.4404
DN 6 (double ball)	Stainless steel 1.4404	Stainless steel 1.4404	Al_2O_3 ceramic	Stainless steel 1.4404	Stainless steel 1.4404

Scope of delivery

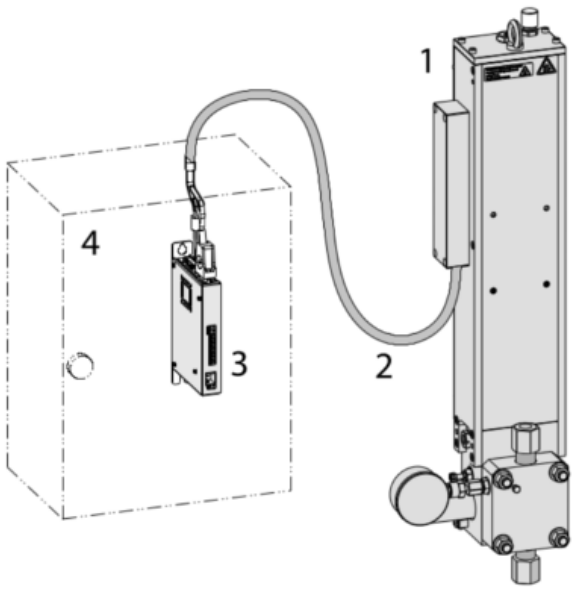
- Pump
- 2 m cable
- Drive Control

1: Pump ORLITA Evolution mikro

2: Universal cable 2 m (other lengths as options)

3: Drive Control

(4: Control cabinet provided by customer, not included in scope of delivery)



Identity code ordering system for the ORLITA Evolution mikro EMFa

EMFa	Drive type															
	V	Simplex (vertical)														
	P	Replacement pump without cable and control														
		Plungers														
		003	Plunger 3 mm													
		006	Plunger 6 mm													
			stroke rate													
			030	30 strokes / min.												
			060	60 strokes / min.												
			080	80 strokes / min.												
			100	100 strokes / min.												
			120	120 strokes / min.												
			140	140 strokes / min.												
			160	160 strokes / min.												
			180	180 strokes / min.												
			200	200 strokes / min.												
				Pressure rating												
				A	10 bar											
				D	25 bar											
				E	40 bar											
				H	64 bar											
				J	80 bar											
				K	100 bar											
				N	160 bar											
				P	250 bar											
					Material											
					S2	Standard stainless steel; 1.4404										
						Valve design										
						0	Standard									
							Diaphragm monitor									
							1	None								
							2	Visual indication								
							3	Contact pressure gauge								
							4	Electric pressure switch								
								Hydraulic connector								
								0	Standard							
									Electrical Connection							
									G	Standard linear motor with 2 m cable, 24 V DC						
									H	Standard linear motor with 4 m cable, 24 V DC						
									J	Standard linear motor without cable, 24 V DC						
									K	ATEX linear motor with 2 m cable, 24 V DC						
									L	ATEX linear motor with 4 m cable, 24 V DC						
									M	ATEX linear motor without cable, 24 V DC						
									A	Standard linear motor with 2 m cable, 72 V DC						
									B	Standard linear motor with 4 m cable, 72 V DC						
									C	Standard linear motor without cable, 72 V DC						
									D	ATEX linear motor with 2 m cable, 72 V DC						
									E	ATEX linear motor with 4 m cable, 72 V DC						
									F	ATEX linear motor without cable, 72 V DC						
										Control Variants						
										2	Analogue - 1 parameter (stroke rate, control range 1:200)					
										P	Replacement pump without cable and control					
											Ambient temperature					
											0	-20 °C … +40 °C				
											3	-10 °C … +55 °C				
											4	0 °C … +55 °C				
												Paintwork / pump housing				
												0A	Unpainted - aluminium			
												0S	Unpainted - stainless steel			
												2S	C5 outdoor RAL 2003 - stainless steel			
													Tests			
													S1	Standard performance test		
													S2	Standard performance test including 3.1 certificate		
													S3	As S1 + 3.1 certificate wetted material		
													S4	As S2 + 3.1 certificate wetted material		
													A1	API test complete including 3.1 certificate		
													A4	As A1 + 3.1 certificate wetted material		
														Approvals		
														0	CE	
														1	CE + ATEX	
															Documentation	
															DE	German
															EN	English
															FR	French

															ES	Spanish	
															RU	Russian	
															M0	Modified	
																Measuring unit	
																0	bar, l/h
																1	psi, gph
																2	kPa, l/h

Maintenance parts for ORLITA Evolution mikro

The maintenance parts generally include the wear parts for liquid ends and/or power ends.

Maintenance kits for ORLITA Evolution mikro EMFa

Scope of delivery

1 spare diaphragm assembly, 4 valve balls, 2 valve seats, sealing set

Plunger Ø mm	Material	Suitable for identity code	Order no.
3	S2	EMFaV003....S2, EMFaP003....S2	1128659
6	S2	EMFaV006....S2, EMFaP006....S2	1128660

Metering diaphragms for maintenance assembly for ORLITA Evolution mikro EMFa

Plunger Ø mm	Material	Suitable for identity code	Order no.
3	S2	EMFaV003....S2, EMFaP003....S2	1128661
6	S2	EMFaV006....S2, EMFaP006....S2	1128662

Maintenance parts for ORLITA Evolution mikro EMFa

2 items required in each case

Plunger Ø mm	Material		Remark	Order no.
3	S2	Double ball valve complete DN 3	-	1035931
6	S2	Double ball valve complete DN 6	-	1038943
3, 6	S2	Bearing for linear motor	only with ATEX	1113156

Standard oil for maintaining hydraulics and gearbox Evolution mikro

	Required quantity	Order no.
Shell Tellus S2V32 hydraulic oil, 1 litre	50 ml	1050416

Accessories for ORLITA Evolution mikro

Converter cable for service, analysis functions and software adaptations.

	Order no.
USB-RS232 converter cable for control C1100, C1150	1115604

2.3 Hydraulic Diaphragm Metering Pumps

2.3.7 Hydraulic Diaphragm Metering Pump ORLITA MF

Reliable capacity even at high-pressure

Capacity range of single-head pump: 0 – 9200 l/h, 400 – 30 bar

The hydraulic diaphragm metering pump ORLITA MF offers reliable dosing rates even under high pressure and has a modular construction, making it highly versatile. Thanks to its modular design, this pump is tailored to meet your requirements even at very high pump capacities.

ORLITA MFS 35/30

ORLITA MFS 600b/81

ORLITA MFS 1400/46

ORLITA MF hydraulic diaphragm metering pumps (MFS 35 to MFS 1400) with a stroke length of 20 to 60 mm provide a capacity ranging from 0 to 9200 l/h at 400 – 30 bar. A wide range of power end 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:

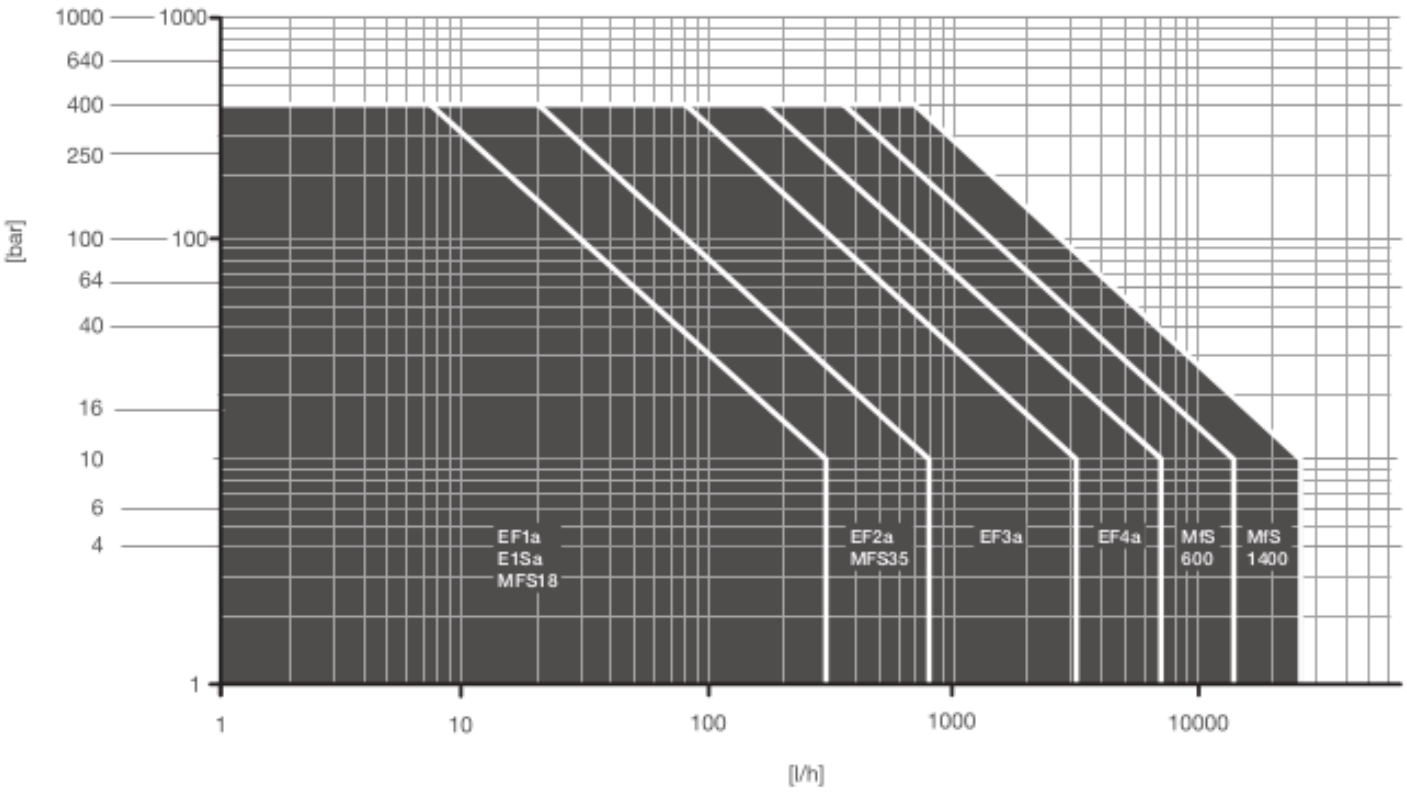
- The modular construction allows a wide range of uses. In multiple pump systems it is possible to combine up to 6 metering units, even with different pump capacities. In single pumps the drive arrangement may be either vertical or horizontal.
- 10 different gear ratios are available
- Temperature range -40 to +150 °C
- Customised designs are available on request

Technical Details

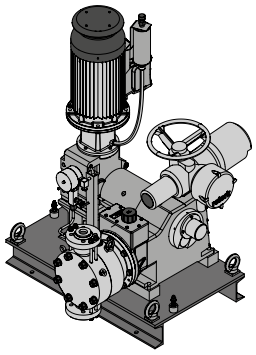
- MfS 35 (MF2a) – stroke length: 0-20 mm, rod force: 3500 N
- MfS 600 (MF5b) – stroke length: 0-40 mm, rod force: 40000 N
- MfS 1400 (MF6a) – stroke length: 0-60 mm, rod force: 60000 N
- Stroke length adjustment range: 0 – 100% in operation and idle
- Stroke length adjustment: manually using manual adjustment wheel and scaled display (optionally with electric actuator or control drive)
- The dosing precision is better than ± 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 / signalling system via a contact
- Integrated hydraulic relief and vent valve
- Wetted materials: Stainless steel, special designs are available on request
- A wide range of power end/drive versions is available: Three-phase standard 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

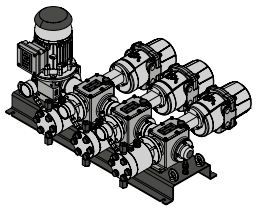
- Oil/ gas production (onshore/offshore)
- Refineries
- Chemical/Petrochemical industry
- Pharmaceuticals & cosmetics
- Food production



Pressure [bar] depending on the metering volume [l/h] at 50 Hz



Orlita MFS with stroke length controller



ORLITA MFS 35/12-12-12 with control drives

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 current input 0/4 – 20 mA, corresponds to stroke length 0 – 100 %, mechanical position display of actual stroke length value output 0/4 – 20 mA for remote display. Control drives can also sometimes be designed with bus systems, like HART, PROFIBUS®, Fieldbus Foundation ...

Variable speed motors with integrated frequency converter

Power supply 1-phase 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-over for manual/external operation
- Potentiometer for speed control in manual mode

2.3 Hydraulic Diaphragm Metering Pumps

Technical data for ORLITA MFS 35 single head pump 50 Hz

Plunger Ø	Theor. stroke volume	Theoretical pump capacity in l/h at strokes/min							Max. pressure	Efficiency		Nominal diameter
		36	58	73	91	112	145	207				
mm	ml/stroke	l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar	At 100 % pressure	At 50 % pressure	
7	0.77	1.7	2.7	3.3	4.2	5.2	6.7	9.6	400	0.50	0.70	DN 3
8	1.01	2.2	3.5	4.4	5.5	6.7	8.7	12.5	400	0.50	0.70	DN 3
10	1.57	3.4	5.5	6.8	8.5	10.5	13.7	19.5	400	0.50	0.70	DN 6
11	1.90	4.1	6.6	8.3	10.3	12.7	16.5	23.6	368	0.65	0.75	DN 6
12	2.26	4.9	7.9	9.8	12.3	15.1	19.7	28.1	309	0.79	0.85	DN 6
14	3.08	6.7	10.7	13.4	16.7	20.6	26.8	38.3	227	0.81	0.85	DN 6
16	4.02	8.7	14.0	17.5	21.9	26.9	35.0	50.0	174	0.83	0.86	DN 6
20	6.28	13.7	21.9	27.3	34.2	42.0	54.7	78.1	111	0.86	0.88	DN 6
22	7.60	16.5	26.5	33.1	41.3	50.9	66.1	94.5	92	0.86	0.88	DN 10
25	9.82	21.4	34.2	42.7	53.4	65.7	85.4	122.0	71	0.87	0.88	DN 10
27	11.45	24.9	39.8	49.8	62.3	76.6	99.6	142.3	61	0.87	0.88	DN 10
30	14.14	30.7	49.2	61.5	76.9	94.6	123.0	175.7	50	0.88	0.89	DN 10
36	20.36	44.3	70.8	88.6	110.7	136.2	177.1	253.0	34	0.88	0.89	DN 16
40	25.13	54.7	87.5	109.3	136.7	168.2	218.7	312.4	28	0.89	0.89	DN 16
44	30.41	66.1	105.8	132.3	165.4	203.5	264.6	378.0	23	0.89	0.89	DN 16
50	39.27	85.4	136.7	170.8	213.5	262.8	341.6	488.1	18	0.89	0.89	DN 16
60	56.55	123.0	196.8	246.0	307.5	378.4	492.0	702.8	12	0.89	0.90	DN 25
65	66.37	144.3	231.0	288.7	360.9	444.1	577.4	824.8	11	0.89	0.90	DN 25

Valve type: Ball or double ball valve up to DN 6, conical valve as of DN 10

Technical data for ORLITA MFS 600 single head pump 50 Hz

Plunger Ø	Theor. stroke volume	Theoretical pump capacity in l/h at strokes/min							Max. pressure	Efficiency		Nominal diameter
		65	76	88	105	139	166	192				
mm	ml/stroke	l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar	At 100 % pressure	At 50 % pressure	
33	34.21	133	157	180	215	286	342	395	400	0.76	0.83	DN 16
36	40.72	158	187	214	256	340	407	470	393	0.76	0.83	DN 16
37	43.01	167	197	226	270	359	430	496	372	0.77	0.83	DN 16
38	45.36	176	208	238	285	379	453	523	353	0.78	0.83	DN 16
40	50.27	195	231	264	316	420	502	580	318	0.78	0.84	DN 25
44	60.82	237	279	320	382	508	608	702	263	0.80	0.85	DN 25
46	66.48	259	305	349	418	556	664	767	241	0.81	0.85	DN 25
50	78.54	305	360	413	493	656	784	906	204	0.83	0.86	DN 25
55	95.03	370	436	499	597	794	949	1,097	168	0.84	0.87	DN 32
60	113.10	440	519	594	710	945	1,130	1,305	141	0.84	0.87	DN 32
65	132.73	516	609	697	834	1,109	1,326	1,532	121	0.85	0.87	DN 32
70	153.94	599	706	809	967	1,287	1,538	1,776	104	0.86	0.88	DN 40
75	176.71	687	811	928	1,110	1,477	1,765	2,039	91	0.86	0.88	DN 40
80	201.06	782	923	1,056	1,263	1,680	2,008	2,320	80	0.87	0.88	DN 40
90	254.47	990	1,168	1,337	1,598	2,127	2,542	2,936	63	0.87	0.88	DN 40
100	314.16	1,222	1,442	1,650	1,973	2,626	3,138		51	0.88	0.89	DN 50
115	415.48	1,616	1,906	2,183	2,610	3,472	4,150		39	0.88	0.89	DN 65
125	490.87	1,909	2,252	2,579	3,083	4,102	4,903		33	0.89	0.89	DN 65
130	530.93	2,065	2,436	2,789	3,335	4,437	5,303		30	0.89	0.89	DN 65
135	572.56	2,227	2,627	3,008	3,597	4,785	5,719		28	0.89	0.89	DN 65
142	633.47	2,464	2,907	3,328	3,979	5,294	6,327		25	0.89	0.89	DN 65

Valve type: Ball or plate valve available

Note

All performance data applies to 50 Hz. If a 60 Hz motor is used, the performance will be correspondingly higher.

Abridged presentation of our complete product range. Other types on request.

Technical data for ORLITA MFS 1400 single head pump 50 Hz

Plunger Ø	Theor. stroke volume	Theoretical pump capacity in l/h at strokes/min							Max. pressure	Efficiency		Nominal diameter
		66	76	86	100	134	166	191				
mm	ml/stroke	l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar	At 100 % pressure	At 50 % pressure	
42	83.13	329	380	430	498	670	830	953	433	0.76	0.83	DN 25
44	91.23	361	417	472	547	736	911	1,046	395	0.76	0.83	DN 25
46	99.71	394	456	516	598	804	996	1,143	361	0.76	0.83	DN 25
48	108.57	429	496	562	651	875	1,084	1,245	332	0.78	0.83	DN 25
50	117.81	465.9	538.3	610.1	706.4	949.9	1,167.7	1,350.4	306	0.79	0.84	DN 25
53	132.37	523	605	685	794	1,067	1,322	1,517	272	0.79	0.84	DN 32
57	153.11	605	700	793	918	1,234	1,529	1,755	235	0.81	0.84	DN 32
58	158.52	627	724	821	950	1,278	1,583	1,817	227	0.84	0.85	DN 32
60	169.65	671	775	879	1,017	1,368	1,695	1,945	212	0.82	0.86	DN 32
70	230.91	913	1,055	1,196	1,384	1,862	2,306	2,647	156	0.83	0.87	DN 40
75	265.07	1,048	1,211	1,373	1,589	2,137	2,648	3,038	136	0.84	0.87	DN 40
80	301.59	1,193	1,378	1,562	1,808	2,432	3,012	3,457	119	0.84	0.87	DN 40
85	340.47	1,346	1,556	1,763	2,041	2,745	3,401	3,903	106	0.85	0.87	DN 50
90	381.70	1,509	1,744	1,977	2,289	3,078	3,813	4,375	94	0.88	0.88	DN 50
100	471.24	1,863.5	2,153.2	2,440.3	2,825.5	3,799.6	4,707.0		76	0.86	0.87	DN 65
108	549.65	2,173.6	2,511.5	2,846.4	3,295.6	4,431.9	5,490.2		65	0.88	0.89	DN 65
115	623.21	2,464.5	2,847.7	3,227.4	3,736.7	5,025.0	6,225.0		58	0.88	0.89	DN 65
120	678.58	2,683	3,101	3,514	4,069	5,471	6,778		53	0.88	0.89	DN 80
125	736.31	2,912	3,364	3,813	4,415	5,937	7,355		49	0.88	0.89	DN 80
140	923.63	3,653	4,220	4,783	5,538	7,447	9,226		39	0.89	0.89	DN 80

Valve type: Ball or double ball valve up to DN 6, conical valve as of DN 10

Note

All performance data applies to 50 Hz. If a 60 Hz motor is used, the performance will be correspondingly higher.

Abridged presentation of our complete product range. Other types on request.

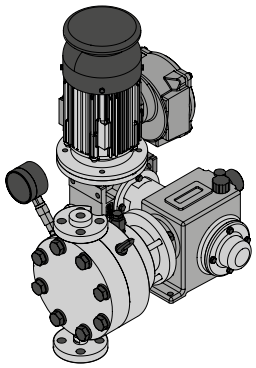
2.3 Hydraulic Diaphragm Metering Pumps

2.3.8 Hydraulic Diaphragm Metering Pumps with Metal Diaphragm ORLITA MH

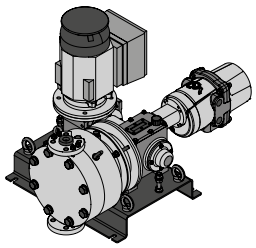
Reliable capacity even at very high-pressure

Capacity range of single pump: up to 320 l/h, up to 900 bar

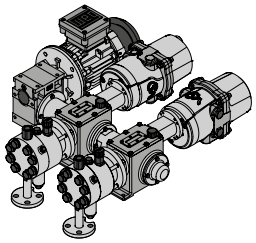
The diaphragm metering pump ORLITA MH has a robust metal diaphragm. This permits precise pump capacities even at very high pressure. The ORLITA MH has a modular construction and is therefore very versatile. For example, a range of drive versions is available and drives and dosing heads can be freely combined.



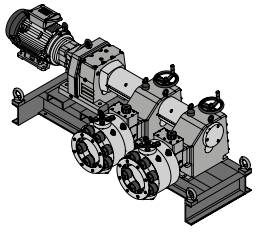
ORLITA MHS 18-20



ORLITA MHS 35/45



ORLITA MHS 35-8-8



ORLITA MHS 600-28-28

ORLITA MH hydraulic diaphragm metering pumps (MHS 18 to MHS 600) with a stroke length of 15 to 40 mm provide a capacity range of up to 320 l/h at pressures of up to 780 bar. A wide range of power end versions is available, including some 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 reliability:

- Metal double diaphragm with integrated diaphragm rupture warning /signalling 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 vent 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 -40 °C to +200 °C
- Customised designs are available on request

Technical Details

- MHS 18 – stroke length: 0-15 mm, rod force: 1800 N
- MHS 35 – stroke length: 0-20 mm, rod force: 3500 N
- MHS 600 – stroke length: 0-40 mm, rod force: 40000 N
- Stroke length adjustment range: 0 – 100% in operation and idle.
- Stroke length adjustment: manually using manual adjustment wheel and scaled display (optionally with electric actuator or control drive).
- The dosing precision is better than ± 1 % within the 10 – 100 % stroke length range under defined conditions and with correct installation (API 675).
- Metal diaphragm with diaphragm rupture monitoring system
- Integrated hydraulic relief and vent valve
- Wetted materials: Stainless steel, special designs are available on request
- A wide range of power end/drive versions is available: Three-phase standard 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)
- Chemical/Petrochemical industry
- Pharmaceuticals & cosmetics
- Food production
- Packaging industry (bottling pumps)

Technical data for ORLITA MhS 18 single-head pump 50 Hz

Plunger Ø	Theor. stroke volume	Max. capacity (theo.) in l/h at strokes/min (50 Hz)							Max. pressure	Nominal diameter
		36	45	73	91	112	145	207		
mm	ml/stroke	l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar	
3	0.11	0.2	0.3	0.5	0.6	0.7	0.9	1.3	100	DN 3
5	0.29	0.6	0.8	1.3	1.6	2.0	2.6	3.7	400	DN 3
6	0.42	0.9	1.2	1.8	2.3	2.8	3.7	5.3	400	DN 3
20	4.71	10.2	12.8	20.5	25.6	31.5	41	58.6	80	DN 6

Technical data for ORLITA MhS 35 single-head pump 50 Hz

Plunger Ø	Theor. stroke volume	Max. capacity (theo.) in l/h at strokes/min (50 Hz)							Max. pressure	Nominal diameter
		36	45	73	91	112	145	207		
mm	ml/stroke	l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar	
7	0.77	1.7	2.1	3.3	4.2	5.2	6.7	9.6	900	DN 3.5
8	1.01	2.2	2.7	4.4	5.5	6.7	8.7	12.5	630	DN 3
10	1.57	3.4	4.3	6.8	8.5	10.5	13.7	19.5	446	DN 6
16	4.02	8.7	10.9	17.5	21.9	26.9	35.0	50.0	174	DN 6
25	9.82	21.4	26.7	42.7	53.4	65.7	85.4	122.0	71	DN 10
45	31.81	69.2	86.5	138.4	173.0	212.9	276.7	395.3	22	DN 16

Technical data for ORLITA MhS 600 single-head pump 50 Hz

Plunger Ø	Theor. stroke volume	Max. capacity (theo.) in l/h at strokes/min (50 Hz)							Max. pressure	Nominal diameter
		65	76	105	121	139	166	192		
mm	ml/stroke	l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar	
26	21.24	83	97	133	154	177	212	245	753	DN 6
28	24.63	96	113	155	179	206	246	284	650	DN 10
29	26.42	103	121	166	192	221	264	305	606	DN 16

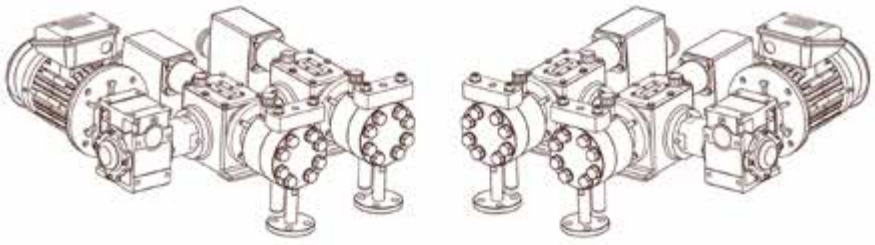
Note

All performance data applies to 50 Hz. If a 60 Hz motor is used, the performance will be correspondingly higher.

Important note:

Abridged presentation of our complete product range. Other types on request

MhS 35/8-8 LHD and MhS 35/8-8 RHD



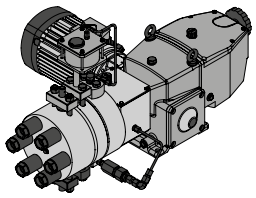
Flexible arrangement possible: drive on the left or right

2.3.9 Hydraulic metal diaphragm metering pump high-pressure ORLITA MHRH

Reliable capacity even at maximum pressure

Capacity range of a single pump: 3 – 4 l/h; 3000 bar

The metal diaphragm metering pumps ORLITA MHHP are special pumps, which provide precise pump capacities even at maximum pressures of up to 3000 bar.



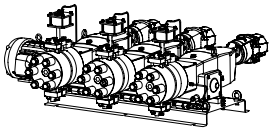
ORLITA MhR 150/7

The hydraulic metal diaphragm metering pumps ORLITA MHRH 150 have a metal diaphragm, which is designed to meter precisely at maximum pressures of up to 3000 bar. Only in this way can excellent process reliability be ensured.

Your Benefits

High process reliability:

- Robust single diaphragm enables reliable and low-maintenance operation - even at high pressures in non-hazardous areas
- Product chamber hermetically separated from the hydraulic section
- Dosing precision is better than ±1 % in the stroke length range 10-100 % under defined conditions and correct installation



Mh3R150-7-7-7

Technical Details

- MHRH: Stroke length: 0 – 32 mm, Rod force: 15000 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)
- The dosing precision is better than +/- 1 % within the 10 – 100 % stroke length range under defined conditions and with correct installation
- Metal diaphragm
- Wetted materials: Stainless steel
- 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

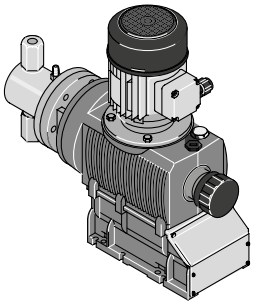
Pump type	Plunger Ø	Theor. stroke volume	Max. capacity (theo.) in l/h at strokes/min (50 Hz)				Max. pressure
			58	87	116	145	
	mm	ml/stroke	l/h	l/h	l/h	l/h	bar
MHRH 150/7	7	1.23	4.2	6.4	8.5	10.7	3,000

2.4.1 Plunger Metering Pump Sigma SBKa (Basic Type)

Sigma plunger pump – durable and high-performance

Capacity range 2 – 76 l/h, 320 – 12 bar

The plunger metering pump Sigma SBKa 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.



Sigma Basic Type SBKa

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 ± 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

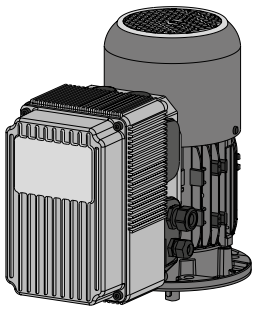
Technical Details

- 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)
- The dosing precision is better than ± 1 % within the 10-100 % stroke volume adjustment range under 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
- High-strength fibreglass-reinforced plastic housing with excellent chemical resistance
- For safety reasons, provide suitable overflow equipment with all plunger metering pumps during installation

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 Sigma Basic type SBKa



Variable speed motor with integrated frequency converter

Stroke length actuator/control drive

Actuator for automatic stroke length adjustment, actuating period approx. 1 second for 1 % stroke length, return potentiometer 1 kΩ degree of protection IP 54.

Control drive consisting of an actuator and an 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, key switch for stroke adjustment in manual mode, mechanical position display of actual stroke length value output 0/4-20 mA for remote display.

Variable speed motors with integrated frequency converter (identity code specification V)

Power supply 1-phase 230 V, 50/60 Hz, 0.37 kW

Externally controllable with 0/4-20 mA (see Fig. pk_2_103).

(Speed controllers, see page → PL)

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 page → PL)

2.4 Plunger Metering Pumps

Technical data for Sigma SBKa

Type	Capacity at max. back pressure with 1500 rpm motor at 50 Hz				Capacity at max. back pressure with 1800 rpm motor at 60 Hz				Suction lift	Perm. pre-pressure suction side	Connector Suction/ Discharge Side	Shipping weight	Plunger Ø
	l/h	bar	ml/ stroke	Max. stroke rate Strokes/ min	l/h	psi	gph (US)	Max. stroke rate Strokes/ min	m WC	bar	G-DN	kg	mm
32002	1.9	320	0.46	71	2.3	4,641	0.61	84	5.0	160	1/4	24	8
23004	4.0	230	0.52	129	4.8	3,336	1.27	154	5.0	115	1/4	24	8
14006	6.1	140	1.42	71	7.1	2,031	1.88	84	4.0	70	1/4	24	12
10006	6.4	100	0.55	195	7.6	1,450	2.01	233	5.0	50	1/4	24	8
10011	11.0	100	1.43	129	13.1	1,450	3.46	153	4.0	50	1/4	24	12
07012	12.4	70	2.90	71	14.8	1,015	3.91	85	4.0	35	1/4	24	17
05016	16.7	50	1.43	195	20.0	725	5.28	233	4.0	25	1/4	24	12
04022	22.4	40	5.26	71	26.5	580	7.00	84	4.0	20	3/8	25	23
04522	22.5	45	2.91	129	26.7	653	7.05	153	4.0	22.5	1/4	24	17
02534	34.1	25	2.92	195	40.8	363	10.78	233	4.0	12.5	1/4	24	17
02541	41.5	25	5.37	129	49.2	363	13.00	153	4.0	12.5	3/8	25	23
01264	64.0	12	5.45	195	76.0	174	20.08	233	4.0	6	3/8	25	23

Wetted materials for Sigma SBKa

Identity code of material	Dosing head	Suction / discharge connection on dosing head DN 25	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 for Sigma SBKa

Identity code specification		Power supply			Remarks
S	3-phase, IP 55*	230 V/400 V	50 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	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	On request
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

* Three-phase motor according to IEC 60034-1

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/EC in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label correspond to or are superior to the conditions prevalent in the intended application.

2.4 Plunger Metering Pumps

Identity code ordering system for Sigma SBKa

SBKa	Drive type												
	HK	Main drive, plunger											
		Type		Capacity									
		32002		320 bar	1.9								
		23004		230 bar	4.0								
		10006		100 bar	6.4								
		14006		140 bar	6.1								
		10011		100 bar	11.0								
		05016		50 bar	16.7								
		07012		70 bar	12.4								
		04522		45 bar	22.5								
		02534		25 bar	34.1								
		04022		40 bar	22.4								
		02541		25 bar	41.5								
		01264		12 bar	64.0								
			Liquid end material										
			SS	Stainless steel									
				Sealing material									
				T	PTFE								
					Diaphragm								
					4	Plunger (oxide ceramic)							
						Liquid end version							
						0	No valve springs (standard)						
						1	With 2 valve springs, Hastelloy C, 0.1 bar						
							Hydraulic connections						
							0	Standard threaded connector (according to technical data)					
								Version					
								0	With ProMinent logo				
								1	Without ProMinent logo				
								M	Modified				
									Electrical power supply				
									S	3-phase, 230 V/400 V 50 Hz, 0.18 kW			
									R	3 ph, Variable speed motor, 230 V/400 V, 0.37 kW			
									V0	Variable speed stroke control motor with integrated frequency converter, 1-phase, 230 V, 50/60 Hz, 0.37 kW			
									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, (EExe, EExd), 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)			
										Enclosure rating			
										0	IP 55 (standard)		
										2	Exd design ATEX-T4 (L2, P2)		
										A	ATEX drive		
											Stroke sensor		
											0	No stroke sensor (standard)	
											2	Pacing relay (reed relay)	
											3	Stroke sensor (Namur) for hazardous locations	
												Stroke length adjustment	
												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 for Sigma SBKa

consists of: 1 ceramic metering piston, 4 valve balls, 4 ball seat discs, 2 piston packings made from PTFE / graphite, 2 piston guide bands, 14 flat seals, 2 O-rings

		Product designation
Liquid end FK 08	Applies to identity code: 32002, 23004, 10006	1001572
Liquid end FK 12.5	Applies to identity code: 14006, 10011, 05016	910470
Liquid end FK 25	Applies to identity code: 07012, 04522, 02534	910471
Liquid end FK 50	Applies to identity code: 04022, 02541, 01264	910472

Standard oil for maintaining hydraulics and gearbox Sigma SBKa

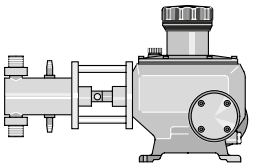
	Required quantity	Order no.
Mobilgear 600 XP 460 gear oil, 1 litre	0.5 l	1004542

2.4.2 Plunger Metering Pump Makro TZ

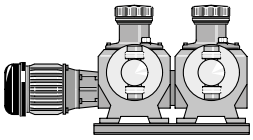
Powerful, built to last with a plunger

Capacity range of single head pump: 8 – 1,141 l/h, 320 – 11 bar

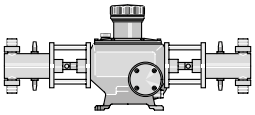
The plunger metering pump Makro TZ impresses with its excellent process reliability, outstanding flexibility and its modular construction enables it to be outstandingly adapted to the performance requirements of the respective application.



MAKRO TZ plunger metering pump



MAKRO TZ TZKa externally mounted pump



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:

- The dosing precision is better than ± 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 (boxer principle) 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

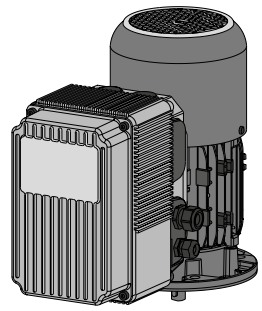
Technical Details

- Stroke length: 0-20 mm
- Rod force: 8000 N
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually using shift ring in 0.5% increments (optionally with electric actuator or control drive)
- The dosing precision is better than ± 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/drive versions is available: Three-phase standard 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
- Salt water-resistant, acrylic resin-coated cast aluminium housing
- For safety reasons, provide suitable overflow equipment with all plunger metering pumps during installation

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

Control of MAKRO TZ metering pumps



Variable speed motor with integrated frequency converter

Stroke length actuator/control drive MAKRO TZ

Actuator MAKRO TZ

Servomotor for automatic stroke length adjustment, actuating period approx. 1 sec for 1 % stroke length, including 1 kΩ return potentiometer for stroke position response signal; degree of protection: IP 54. Electrical connection 230 V (±10 %), 50/60 Hz, 40 W mechanical stroke length display present on the MAKRO TZ drive.

Special voltage/higher degrees of protection/explosion protection on request.

Control drive MAKRO TZ

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 current input 0/4-20 mA corresponds to stroke length 0 – 100 %, switch-over for manual/automatic operation, 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-over (0/4 – 20 mA)
- Potentiometer for speed control in manual mode
- On request externally controllable via PROFIBUS® DP

Variable speed motors with integrated frequency converter, IP 55 degree of protection, see page→ PL

2.4 Plunger Metering Pumps

Technical data for MAKRO TZKa

Type	Capacity at max. back pressure with 1500 rpm motor at 50 Hz				Capacity at max. back pressure at 60 Hz			Suction lift	Connector Suction/Discharge Side	Shipping weight	Plunger Ø
	l/h	bar	ml/stroke	Max. stroke rate Strokes/min	psi	l/h / gph (US)	Max. stroke rate Strokes/min	m WC	G-DN	kg	mm
320009 *	8.7	320	2.0	72	4,627	10/2.6	86	4.0	Rp 1/4–8	50	12
320012 *	11.6	320	2.0	96	4,627	14/3.7	115	4.0	Rp 1/4–8	50	12
320014 *	14.5	320	2.0	120	4,627	17/4.5	144	4.0	Rp 1/4–8	50	12
320017 *	17.4	320	2.0	144	4,627	21/5.5	173	4.0	Rp 1/4–8	50	12
320018 *	17.7	320	4.1	72	4,627	21/5.5	86	4.0	Rp 1/4–8	50	17
320024 *	23.6	320	4.1	96	4,627	28/7.4	115	4.0	Rp 1/4–8	54	17
320030 *	29.5	320	4.1	120	4,627	35/9.2	144	4.0	Rp 1/4–8	54	17
313035 *	35.4	313	4.1	144	4,526	42/11.1	173	4.0	Rp 1/4–8	54	17
192033 *	32.9	192	7.6	72	2,776	39/10.3	86	4.0	Rp 3/8–10	55	23
192044 *	43.9	192	7.6	96	2,776	59/15.6	115	4.0	Rp 3/8–10	55	23
192055 *	54.8	192	7.6	120	2,776	66/17.4	144	4.0	Rp 3/8–10	55	23
168066 *	65.8	168	7.6	144	2,437	79/20.9	173	4.0	Rp 3/8–10	55	23
113057 *	57.5	113	13.3	72	1,634	69/18.2	86	4.0	Rp 3/8–10	56	30
113077 *	76.6	113	13.3	96	1,634	92/24.3	115	4.0	Rp 3/8–10	56	30
113096 *	95.8	113	13.3	120	1,634	115/30.4	144	4.0	Rp 3/8–10	56	30
096115 *	114.9	96	13.3	144	1,392	138/36.5	173	4.0	Rp 3/8–10	56	30
063104	104.3	63	24.2	72	911	125/33.0	86	4.0	G 1 1/4–20	58	40
063139	139.0	63	24.2	96	911	167/44.1	115	4.0	G 1 1/4–20	58	40
063174	173.8	63	24.2	120	914	209/55.2	144	4.0	G 1 1/4–20	58	40
052208	208.5	52	24.2	144	754	250/66.0	173	4.0	G 1 1/4–20	58	40
040163	162.9	40	37.7	72	578	195/51.5	86	4.0	G 1 1/4–20	58	50
040217	217.2	40	37.7	96	578	261/68.9	115	4.0	G 1 1/4–20	58	50
040271	271.5	40	37.7	120	580	326/86.1	144	4.0	G 1 1/4–20	58	50
033326	325.8	33	37.7	144	479	391/103.3	173	4.0	G 1 1/4–20	58	50
028237	237.0	28	54.9	72	405	284/75.0	86	4.0	G 1 1/2–25	62	60
028316	315.9	28	54.9	96	405	379/100.1	115	4.0	G 1 1/2–25	62	60
027395	394.9	27	54.9	120	392	474/125.2	144	4.0	G 1 1/2–25	62	60
022474	473.9	22	54.9	144	319	569/150.3	173	4.0	G 1 1/2–25	62	60
020322	322.5	20	74.7	72	289	387/102.2	86	4.0	G 1 1/2–25	62	70
020430	430.0	20	74.7	96	289	516/136.3	115	4.0	G 1 1/2–25	62	70
020538	537.6	20	74.7	120	290	645/170.4	144	4.0	G 1 1/2–25	62	70
016645	645.1	16	74.7	144	232	774/204.5	173	4.0	G 1 1/2–25	62	70

* The suction and discharge side Rp 1/4 and Rp 3/8 connectors have an internal thread connection and are configured as double ball valves.

Other gear reduction ratios are available upon request.

The permissible priming pressure on the suction side is approximately 50% of the max. permitted back pressure.

Wetted materials for MAKRO TZKa

Identity code of material	Hydraulic Ø mm	Dosing head	Connection on suction/discharge side	Ball seat	Valve balls	Plungers
SST	…12 S to 50 S	Stainless steel 1.4571/1.4404	Stainless steel 1.4571/1.4404	Stainless steel/PTFE	Oxide ceramic	Stainless steel/ceramic
SST	…60 S to 70 S	Stainless steel 1.4571/1.4404	Stainless steel 1.4581	PTFE	Stainless steel 1.4404	Stainless steel/ceramic

Motor data for Makro TZKa

Identity code specification		Power supply			Remarks
S	3-phase, IP 55˙	230 V/400 V	50 Hz	1.5 kW	

2.4 Plunger Metering Pumps

Identity code specification		Power supply			Remarks
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	50 Hz	3.0 kW	Variable speed stroke control 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	On request
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, available on request

* Three-phase motor according to IEC 60034-1

Motor data sheets can be requested for more information. Versions 265/460V - 60Hz, 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/EC in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label correspond to or are superior to the conditions prevalent in the intended application.

Identity Code Ordering System TZKa

TZKa	Drive type										
	H	Main drive									
	A	Add-on drive									
	D	Double main drive									
	B	Double add-on power end									
		Type *	Capacity								
		320009	320 bar	8.7 l/h							
		320012	320 bar	11.6 l/h							
		320014	320 bar	14.5 l/h							
		320017	320 bar	17.4 l/h							
		320018	320 bar	17.7 l/h							
		320024	320 bar	23.6 l/h							
		320030	320 bar	29.5 l/h							
		313035	313 bar	35.4 l/h							
		192033	192 bar	32.9 l/h							
		192044	192 bar	43.9 l/h							
		192055	192 bar	54.8 l/h							
		168066	168 bar	114.9 l/h							
		113057	113 bar	57.5 l/h							
		113077	113 bar	76.6 l/h							
		113096	113 bar	95.8 l/h							
		096115	96 bar	114.9 l/h							
		063104	63 bar	104.3 l/h							
		063139	63 bar	139.0 l/h							
		063174	63 bar	173.8 l/h							
		052208	52 bar	208.5 l/h							
		040163	40 bar	162.9 l/h							
		040217	40 bar	217.2 l/h							
		040271	40 bar	271.5 l/h							
		033326	33 bar	352.8 l/h							
		028237	28 bar	237.0 l/h							
		028316	28 bar	315.9 l/h							
		027395	27 bar	394.9 l/h							
		022474	22 bar	473.9 l/h							
		020322	20 bar	322.5 l/h							
		020430	20 bar	430.0 l/h							
		020538	20 bar	537.6 l/h							
		016645	16 bar	645.1 l/h							
		014475	14 bar	475.1 l/h							
		014634	14 bar	634.1 l/h							
		013793	13 bar	792.6 l/h							
		011951	11 bar	951.1 l/h							
			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 spring				
						1	With valve springs				
							Hydraulic connections				
							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	
									V0	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)	
									V2	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)

1	Exe motor version ATEX-T3			
2	Exd motor 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	
		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

* Figure 1 - 3=back pressure [bar]; figure 4 - 6=flow rate [l/h]

Spare Parts Kits for Plunger Metering Pump Makro TZ

consists of:

- valve balls
- valve plate with spring
- ball seat discs
- piston packings made from PTFE/graphite
- piston guide bands
- flat seals/ O-rings

	Order no.
Maintenance kit for MAKRO TZ FK 12/20 S DN 8	1019106
Maintenance kit for MAKRO TZ FK 17/20 S DN 8	1019107
Maintenance kit for MAKRO TZ FK 23/20 S DN 10	1019108
Maintenance kit for MAKRO TZ FK 30/20 S DN 10	1019109
Maintenance kit for MAKRO TZ FK 40/20 S DN 20	1019110
Maintenance kit for MAKRO TZ FK 50/20 S DN 20	1019111
Maintenance kit for MAKRO TZ FK 60/20 S DN 25	1019112
Maintenance kit for MAKRO TZ FK 70/20 S DN 25	1019113
Maintenance kit for MAKRO TZ FK 85/20 S DN 40	1019124

Standard oil for maintaining hydraulics and gearbox MAKRO TZKa

The oils are available in 1l containers. For example, if 1.8 l is required for maintenance work, 2 containers are needed.

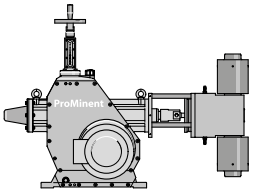
	Required quantity	Order no.
Mobilgear 600 XP 460 gear oil, 1 litre	3.2 l	1004542

2.4.3 Plunger Metering Pump Makro/ 5

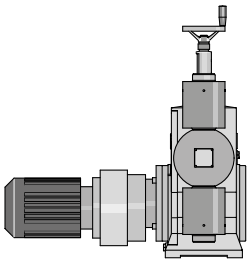
Powerful, built to last with a plunger

Capacity range of single head pump: 38 – 6,014 l/h, 320 – 6 bar

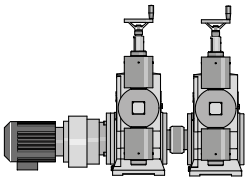
The plunger metering pump Makro/ 5 can virtually be used throughout the low-pressure range and its modular construction enables it to be outstandingly adapted to the performance requirements of the respective application.



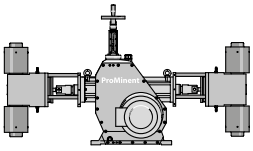
MAKRO M5Ka



MAKRO M5Ka



MAKRO M5Ka externally mounted pump



MAKRO double-head pump

The plunger metering pump MAKRO M5Ka together with the MAKRO hydraulic diaphragm and diaphragm metering pumps form a range of drive mechanisms with stroke lengths of 20 or 50 mm. A wide range of drive versions is available for use in areas at risk from explosion with ATEX certification.

Your Benefits

Process reliability:

- The dosing precision is better than ± 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 (boxer principle) 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: 10000 N
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually using manual adjustment wheel and scaled display in 0.5% increments (optionally with electric control drive)
- The dosing precision is better than ± 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/drive versions is available: Three-phase standard 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
- Salt water-resistant, acrylic resin-coated cast aluminium housing
- For safety reasons, provide suitable overflow equipment with all plunger metering pumps during installation
- Design in compliance with API 675 among others

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

Control of MAKRO M5Ka metering pumps

Stroke length controller MAKRO M5Ka

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, equipped with 2 limit switches for min./max. position, degree of protection: IP 54. Electrical connection 230 V (±10%), 50/60 Hz, approx. 40 W mechanical stroke length display fitted on the Makro/ 5 drive.

Special voltage/higher degrees of protection/explosion protection available on request.

Design with:

0/4-20 mA standard current input (corresponds to stroke length 0-100%); internal switch-over for manual/ automatic operation, key switch for stroke adjustment in manual mode. 0/4-20 mA actual value output for remote display.

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 explosion protection operation with degree of protection EEx ia II C T6.

Technical data for MAKRO M5Ka

Type	Capacity at max. back pressure with 1500 rpm motor at 50 Hz				Capacity at max. back pressure with 1800 rpm motor at 60 Hz				Suction lift	Connector Suction/ Discharge Side	Ship- ping weight	Plunger Ø
	l/h	bar	ml/ stroke	Max. stroke rate Strokes/ min	l/h	psi	gph (US)	Max. stroke rate Strokes/ min	m WC	G-DN	kg	mm
3200066	66	320	11	103	78	4,640	21	123	3.0	Rp 1/4–8	300	17
3200038	38	320	11	60	44	4,640	12	71	3.0	Rp 1/4–8	300	17
3200048	48	320	11	75	56	4,640	15	89	3.0	Rp 1/4–8	300	17
3200085	85	320	11	133	101	4,640	27	159	3.0	Rp 3/8–10	300	17
3200100	100	320	11	156	-	-	-	-	3.0	Rp 3/8–10	300	17
1700184	184	170	21	156	-	-	-	-	3.0	G 1–15	300	23
2160157	157	216	21	133	187	3,132	49	159	3.0	Rp 3/8–10	300	23
2400070	70	240	21	60	82	3,480	22	71	3.0	Rp 3/8–10	300	23
2400088	88	240	21	75	104	3,480	27	89	3.0	Rp 3/8–10	300	23
2400121	121	240	21	103	144	3,480	38	123	3.0	Rp 3/8–10	300	23
1000314	314	100	35	156	-	-	-	-	3.0	G 1 1/4–20	302	30
1270267	267	127	35	133	319	1,842	84	159	3.0	G 1 1/4–20	302	30
1400120	120	140	35	60	142	2,030	38	71	3.0	G 1–15	302	30
1400151	151	140	35	75	179	2,030	47	89	3.0	G 1–15	302	30
1400207	207	140	35	103	247	2,030	65	123	3.0	G 1–15	302	30
0800214	214	80	63	60	253	1,160	67	71	3.0	G 1 1/4–20	303	40
0560558	558	56	63	156	-	-	-	-	3.0	G 1 1/2–25	303	40
0700476	476	70	63	133	569	1,015	150	159	3.0	G 1 1/2–25	303	40
0800268	268	80	63	75	318	1,160	84	89	3.0	G 1 1/4–20	303	40
0800368	368	80	63	103	439	1,160	116	123	3.0	G 1 1/4–20	303	40
0350872	872	35	98	156	-	-	-	-	3.0	G 1 1/2–25	303	50
0450744	744	45	98	133	889	653	235	159	3.0	G 1 1/2–25	303	50
0500335	335	50	98	60	396	725	105	71	3.0	G 1 1/2–25	303	50
0500419	419	50	98	75	497	725	131	89	3.0	G 1 1/2–25	303	50
0500576	576	50	98	103	687	725	181	123	3.0	G 1 1/2–25	303	50
0251257	1,257	25	141	156	-	-	-	-	3.0	G 2–32	311	60
0301071	1,071	30	141	133	1,280	435	338	159	3.0	G 2–32	311	60
0350483	483	35	141	60	571	508	151	71	3.0	G 1 1/2–25	311	60
0350604	604	35	141	75	716	508	189	89	3.0	G 1 1/2–25	311	60
0350829	829	35	141	103	989	508	261	123	3.0	G 2–32	311	60
0250658	658	25	192	60	778	363	206	71	3.0	G 2–32	311	70
0181710	1,710	18	192	156	-	-	-	-	3.0	G 2 1/4–40	311	70
0231458	1,458	23	192	133	1,743	334	460	159	3.0	G 2 1/4–40	311	70
0250822	822	25	192	75	975	363	258	89	3.0	G 2–32	311	70
0251129	1,129	25	192	103	1,348	363	356	123	3.0	G 2–32	311	70
0161665	1,665	16	284	103	1,988	232	525	123	3.0	G 2 1/4–40	317	85
0160970	970	16	284	60	1,147	232	303	71	3.0	G 2 1/4–40	317	85
0161212	1,212	16	284	75	1,438	232	380	89	3.0	G 2 1/4–40	317	85
0162150	2,150	16	284	133	2,570	232	679	159	3.0	G 2 3/4–50	317	85
0162522	2,522	16	284	156	-	-	-	-	3.0	G 2 3/4–50	317	85
0103491	3,491	10	393	156	-	-	-	-	3.0	G 2 3/4–50	331	100
0121343	1,343	12	393	60	1,589	174	420	71	3.0	G 2 3/4–50	331	100
0121678	1,678	12	393	75	1,991	174	526	89	3.0	G 2 3/4–50	331	100
0122305	2,305	12	393	103	2,752	174	727	123	3.0	G 2 3/4–50	331	100
0122977	2,977	12	393	133	3,558	174	940	159	3.0	G 2 3/4–50	331	100
0063896	3,896	6	664	103	4,652	87	1,229	123	3.0	G 2 1/2–65	350	130
0062269	2,269	6	664	60	2,684	87	709	71	3.0	G 2 1/2–65	350	130
0062837	2,837	6	664	75	3,366	87	889	89	3.0	G 2 1/2–65	350	130
0065031	5,031	6	664	133	6,014	87	1,589	159	3.0	G 2 1/2–65	350	130
0066000	6,000	6	664	156	-	-	-	-	3.0	G 2 1/2–65	350	130

Identity Code Ordering System for M5Ka

M5Ka	Drive type									
	H	Main drive								
	A	Add-on drive								
	D	Double main drive								
	B	Double add-on power end								
		Type *	Capacity							
		3200038	320 bar	38 l/h						
		3200048	320 bar	48 l/h						
		3200066	320 bar	66 l/h						
		3200085	320 bar	85 l/h						
		3200100	320 bar	100 l/h						
		2400070	240 bar	70 l/h						
		2400088	240 bar	88 l/h						
		2400121	240 bar	121 l/h						
		2160157	216 bar	157 l/h						
		1700184	170 bar	184 l/h						
		1400120	140 bar	120 l/h						
		1400151	140 bar	151 l/h						
		1400207	140 bar	207 l/h						
		1270267	127 bar	267 l/h						
		1000314	100 bar	314 l/h						
		0800214	80 bar	214 l/h						
		0800268	80 bar	268 l/h						
		0800368	80 bar	368 l/h						
		0700476	70 bar	476 l/h						
		0560558	56 bar	558 l/h						
		0500335	50 bar	335 l/h						
		0500419	50 bar	419 l/h						
		0500576	50 bar	576 l/h						
		0450744	45 bar	744 l/h						
		0350872	35 bar	872 l/h						
		0350483	35 bar	483 l/h						
		0350604	35 bar	604 l/h						
		0350829	35 bar	829 l/h						
		0301071	30 bar	1,071 l/h						
		0251257	25 bar	1,257 l/h						
		0250658	25 bar	658 l/h						
		0250822	25 bar	822 l/h						
		0251129	25 bar	1,129 l/h						
		0231458	23 bar	1,458 l/h						
		0181710	18 bar	1,710 l/h						
		0160970	16 bar	970 l/h						
		0161212	16 bar	1,212 l/h						
		0161665	16 bar	1,665 l/h						
		0162150	16 bar	2,150 l/h						
		0162522	16 bar	2,522 l/h						
		0121343	12 bar	1,343 l/h						
		0121678	12 bar	1,678 l/h						
		0122305	12 bar	2,305 l/h						
		0122977	12 bar	2,977 l/h						
		0103491	10 bar	3,491 l/h						
		0062269	6 bar	2,269 l/h						
		0062837	6 bar	2,837 l/h						
		0063896	6 bar	3,896 l/h						
		0065031	6 bar	5,031 l/h						
		0066000	6 bar	6,000 l/h						
			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 spring			
						1	With valve springs			
							Hydraulic connections			
							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	
								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					
										V0	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)					
										V2	Motor with integrated 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)				
											1	Exe motor version ATEX-T3				
											2	Exd motor 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		
													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	

* Figure 1 - 3=back pressure [bar]; figure 4 - 7=flow rate [l/h]

2.4 Plunger Metering Pumps

Wetted materials for MAKRO M5Ka

Type	Identity code of material	Dosing head	Connection on suction/ discharge side	Valve seat/seals	Valve balls	Plungers
M5Ka	DN 8 - DN 10	Stainless steel 1.4571/1.4404	Stainless steel 1.4571/1.4404	Stainless steel/PTFE	Oxide ceramic	Stainless steel/ceramic
M5Ka	DN 15 - DN 25	Stainless steel 1.4571/1.4404	Stainless steel 1.4581	PTFE	Stainless steel 1.4401	Stainless steel/ceramic
M5Ka	DN 32 - DN 65	Stainless steel 1.4571/1.4404	Stainless steel 1.4581/1.4404	PTFE	Stainless steel 1.4404 (plate/spring)	Stainless steel/ceramic

The permissible priming pressure on the suction side is approximately 50% of the max. permitted back pressure.

Motor data for MAKRO M5Ka

Identity code specification	Power supply				Remarks
S	3-phase, IP 55*	230 V/400 V	50 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	50 Hz	3 kW	Variable speed stroke control motor with integrated frequency converter
L2	3-phase, II 2G Ex de IIC T4 Gb	230 V/400 V	50 Hz	4 kW	With PTC, speed control range 1:5
P2	3-phase, II 2G Ex de IIC T4	265 V/460 V	60 Hz	4 kW	With PTC, speed control range 1:5

* Three-phase motor according to IEC 60034-1

Motor data sheets can be requested for more information. Versions 265/460V - 60Hz, 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/EC in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label correspond to or are superior to the conditions prevalent in the intended application.

Maintenance Kits

Spare parts kit for Makro M5Ka, consisting of:

- Valve balls
- Valve plate with spring
- Ball seat discs
- Plunger packings made from PTFE/graphite
- Plunger guide bands
- Flat seals / O-rings

	Order no.
Maintenance kit for MAKRO M5Ka FK 17/50 S DN 8	1005899
Maintenance kit for MAKRO M5Ka FK 17/50 S DN 10	1005536
Maintenance kit for MAKRO M5Ka FK 23/50 S DN 10	1005004
Maintenance kit for MAKRO M5Ka FK 23/50 S DN 15	1005900
Maintenance kit for MAKRO M5Ka FK 30/50 S DN 15	1005901
Maintenance kit for MAKRO M5Ka FK 30/50 S DN 20	1005537
Maintenance kit for MAKRO M5Ka FK 40/50 S DN 20	1005902
Maintenance kit for MAKRO M5Ka FK 40/50 S DN 25	1005538
Maintenance kit for MAKRO M5Ka FK 50/50 S DN 25	1005539
Maintenance kit for MAKRO M5Ka FK 60/50 S DN 25	1005903
Maintenance kit for MAKRO M5Ka FK 60/50 S DN 32	1005540
Maintenance kit for MAKRO M5Ka FK 70/50 S DN 32	1005541
Maintenance kit for MAKRO M5Ka FK 70/50 S DN 40	1005904
Maintenance kit for MAKRO M5Ka FK 85/50 S DN 40	1005542
Maintenance kit for MAKRO M5Ka FK 85/50 S DN 50	1005905
Maintenance kit for MAKRO M5Ka FK 100/50 S DN 50	1005543
Maintenance kit for MAKRO M5Ka FK 130/50 S DN 65	1005544

Standard oil for maintaining hydraulics and gearbox MAKRO M5Ka

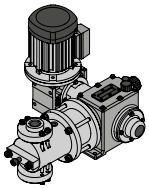
	Required quantity	Order no.
Mobilgear 634 VG 460 gear oil, 20 litres	16.5 l	1006284

2.4.4 Plunger Metering Pump ORLITA PS

ORLITA PS - simple, robust and reliable.

Capacity range of single-head pump: 0 – 2800 l/h, 800 – 11 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 is therefore very flexible.



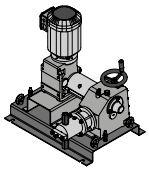
ORLITA PS

ORLITA PS plunger metering pumps (PS 35 to PS 600) with a stroke length of 20 to 40 mm provide a capacity ranging from 0 to 2800 l/h at 600 – 11 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 drive units, drives 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
- The dosing precision is better than ± 1 % 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

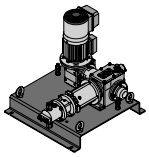


ORLITA PS 80-30

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

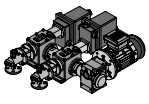
Technical Details



ORLITA PS 18-12 high-temperature

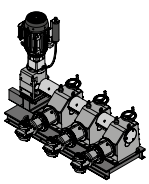
- PS 35 – stroke length: 0-20 mm, rod force: 3500 N
- PS 80 – stroke length: 0-20 mm, rod force: 14000 N
- PS 180 – stroke length: 0-40 mm, rod force: 18000 N
- PS 600 – stroke length: 0-40 mm, rod force: 40000 N
- Stroke length adjustment range: 0 – 100% in operation and idle
- The plunger packing can be tightened by the tensioning screw on the front even during operation
- The dosing precision is better than ± 1 % 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/drive versions is available: Three-phase standard AC 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



ORLITA PS 35-7-7

- Oil/ gas production (onshore/offshore)
- Refineries
- Chemical/Petrochemical industry
- Pharmaceuticals & cosmetics
- Packaging industry (bottling pumps)
- Maximum temperature applications of up to +400 °C



ORLITA PS 600-40-40-40

Technical data for ORLITA PS 35 single-head pump 50 Hz

Plunger Ø	Theor. stroke volume	Max. capacity (theo.) in l/h at strokes/min (50 Hz)							Max. pressure	Nominal diameter
		36	45	58	91	112	145	207		
mm	ml/stroke	l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar	
5	0.39	0.9	1.1	1.4	2.1	2.6	3.4	4.9	250	DN 3
6	0.57	1.2	1.5	2.0	3.1	3.8	4.9	7.0	250	DN 3
7 *	0.77	1.7	2.1	2.7	4.2	5.2	6.7	9.6	250	DN 3
8	1.01	2.2	2.7	3.5	5.5	6.7	8.7	12.5	250	DN 3
10	1.57	3.4	4.3	5.5	8.5	10.5	13.7	19.5	250	DN 6
12	2.26	4.9	6.1	7.9	12.3	15.1	19.7	28.1	250	DN 6
16	4.02	8.7	10.9	14.0	21.9	26.9	35.0	50.0	174	DN 6
20	6.28	13.7	17.1	21.9	34.2	42.0	54.7	78.1	111	DN 6
25	9.82	21.4	26.7	34.2	53.4	65.7	85.4	122.0	71	DN 10
30	14.14	30.7	38.4	49.2	76.9	94.6	123.0	175.7	50	DN 10
36	20.36	44.3	55.3	70.8	110.7	136.2	177.1	253.0	34	DN 16
40	25.13	54.7	68.3	87.5	136.7	168.2	218.7	312.4	28	DN 16
50	39.27	85.4	106.8	136.7	213.5	262.8	341.6	488.1	18	DN 16
65	66.37	144.3	180.4	231.0	360.9	444.1	577.4	824.8	11	DN 25

* Plunger diameter 7 mm also available as high-pressure version

Technical data for ORLITA PS 80 single-head pump 50 Hz

Plunger Ø	Theor. stroke volume	Max. capacity (theo.) in l/h at strokes/min (50 Hz)							Max. pressure	Nominal diameter
		68	78	86	104	134	160	193		
mm	ml/stroke	l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar	
20	6.28	26	29	33	39	51	60	73	250	DN 6
30	14.14	58	66	73	88	114	136	163	198	DN 10
36	20.36	83	95	105	127	164	195	235	138	DN 16
40	25.13	102	118	130	157	203	241	290	111	DN 16
50	39.27	160	184	203	245	317	377	454	71	DN 16
60	56.55	230	265	293	353	456	543	653	50	DN 25
65	66.37	270	310	344	414	535	637	767	37	DN 25
100	157.08	639	735	814	980	1,267	1,508		18	DN 32
125	245.44	998	1,148	1,272	1,531	1,979	2,357		11	DN 40

Technical data for ORLITA PS 180 single-head pump 50 Hz

Plunger Ø	Theor. stroke volume	Max. capacity (theo.) in l/h at strokes/min (50 Hz)							Max. pressure	Nominal diameter
		68	78	86	104	134	160	193		
mm	ml/stroke	l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar	
30	28.27	115	132	147	176	228	272	327	250	DN 16
40	50.27	204	235	260	313	405	483	581	143	DN 16
50	78.54	319	367	407	490	633	754	907	92	DN 25
54	91.61	373	428	475	571	739	880	1,058	79	DN 25
80	201.06	818	940	1,042	1,254	1,621	1,931	2,323	36	DN 40

Technical data for ORLITA PS 600 single-head pump 50 Hz

Plunger Ø	Theor. stroke volume	Max. capacity (theo.) in l/h at strokes/min (50 Hz)							Max. pressure	Nominal diameter
		72	79	90	117	134	156	173		
mm	ml/stroke	l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar	
40	50.27	217	240	270	353	404	471	521	250	DN 16
70	153.94	665	734	828	1,081	1,237	1,442	1,596	104	DN 32
80	201.06	869	959	1,082	1,412	1,615	1,883	2,085	80	DN 40
94	277.59	1,199	1,324	1,494	1,949	2,230	2,600	2,878	58	DN 50

All performance data applies to 50 Hz. If a 60 Hz motor is used, the performance will be correspondingly higher.

Abridged presentation of our complete product range. Other types on request.

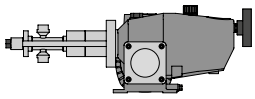
2.4 Plunger Metering Pumps

2.4.5 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 – 273 l/h, 400 – 76 bar

The plunger metering pump ORLITA DR does not need valves and can therefore 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 10^6 mPas within a wide temperature range of -30 °C to +200 °C.

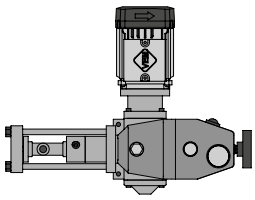


ORLITA DR

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

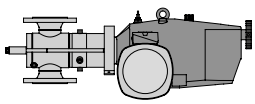
Optimum adaptation to processes with high-viscosity and extremely high-viscosity media, even those containing solid fractions:



ORLITA DR 15/12

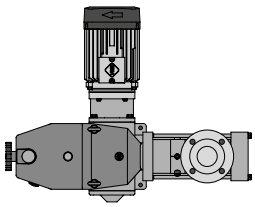
- Low-wear and precise operation even at high pressures thanks to the rotary piston with abrasion-resistant / wear-resistant surface coating
- Valve-free operation guarantees a broad stroke rate range
- Wide range of uses: Operating pressure of up to 400 bar, temperature range of -30°C to +200°C
- Pumping direction can be selected depending on the fitting position of the piston
- A reverse suction effect can be set in a continuously variable manner by rotating the pump head around its longitudinal axis
- Power end configuration ideal for installation in any position (vertical or horizontal)
- Excellent hydraulic efficiency
- 2 different gear ratios are available
- Customised designs are available on request

Technical Details



ORLITA 150/36

- DR 15 - stroke length: 0-15 mm, rod force: 1800 N
- DR 150 - stroke length: 0-32 mm, rod force: 15000 N
- Stroke length adjustment range: 0 – 100% in operation and idle
- Stroke length adjustment: manually using manual adjustment wheel and scaled display (optionally with electric actuator or control drive)
- The dosing precision is better than ± 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/drive versions is available: Three-phase standard 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 -30°C to +200°C
- The play between the piston 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



ORLITA DR 150/36

Field of Application

- Metering of high-viscosity and extremely high-viscosity media containing solid fractions.

Technical data for ORLITA DR 15 single-head pump 50 Hz

Plunger Ø	Theor. stroke volume	Max. capacity (theo.) in l/h at strokes/min (50 Hz)			Max. pressure	Nominal diameter
		58	77	116		
mm	ml/stroke	l/h	l/h	l/h	bar	
7	0.58	2.0	2.7	4.0	400	DN 4
12	1.70	5.9	7.9	11.8	159	DN 8
18	3.82	13.3	17.7	26.6	71	DN 10
25	7.36	25.6	34.1	51.2	37	DN 16
36	15.27	53.1	70.8	106.3	18	DN 25

Technical data for ORLITA DR 150 single-head pump 50 Hz

Plunger Ø	Theor. stroke volume	Theoretical pump capacity in l/h at strokes/min					Max. pressure	Nominal diameter
		58	77	97	116	145		
mm	ml/stroke	l/h	l/h	l/h	l/h	l/h	bar	
12	3.62	12.6	16.8	21.0	25.2	31.5	400	DN 8
18	8.14	28.3	37.8	47.2	56.7	70.8	400	DN 8
25	15.71	54.7	72.8	91.0	109.3	136.7	250	DN 16
36	32.57	113.4	151.0	188.8	226.7	283.4	147	DN 25

Note

All performance data applies to 50 Hz. If a 60 Hz motor is used, the performance will be correspondingly higher.

Abridged presentation of our complete product range. Other types on request.

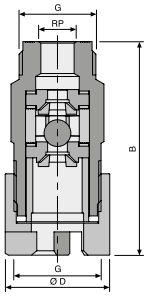
2.5 Accessories for Process Metering Pumps

2.5.1 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:

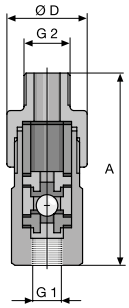
Please observe the permitted pressure stages or material combinations in your selection. Further accessories are available on request.

2.5.1.1 Foot Valve SST for High-Pressure Metering Pumps



	Dim. G	Dim. B mm	Dim. Rp	Diameter Ø D mm	Order no.
DN 10	3/4	70	1/4	41	803730
DN 10	3/4	70	3/8	41	803731

2.5.1.2 Injection Valve SST for High-Pressure Metering Pumps



To fit metering pumps of the sigma, META and MAKRO TZ-HK product ranges.

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.

Application

90 °C - max. operating pressure, see table

	Max. pressure bar	G1	G2	Diameter Ø D mm	Dim. 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

2.5.1.3 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.

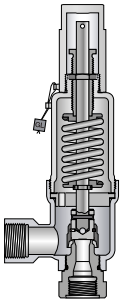
Features:

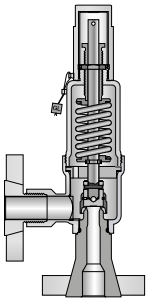
- Female thread on both sides or with sealing surface
- For bracing between 2 flanges
- PN 200 or PN 400
- Settings factory-set
- Standard design in stainless steel, hastelloy also available on request, as is Inconel

Also available heatable on request.

Dimension DN	Adjustable pressure bar	Construction	Order no.
6	2.0	Ball	1020074
6	4.0	Ball	1019224
6	8.0 – 9.0	Ball	1019097
10	2.0	Cone, fixed	1019649
10	3.0 – 6.0	Cone, adjustable	1023053
10	8.0 – 14.0	Cone, adjustable	1024065
16	2.0	Cone, fixed	1017937
16	3.0	Cone, fixed	1035266
16	4.5 – 5.4	Cone, fixed	1017936
25	1.0 – 2.0	Cone, fixed	1021843

2.5.1.4 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.

Connections: NPT threaded connectors, threaded sockets and flange connections 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

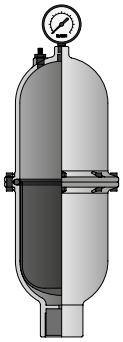
Dimensions, pressure ranges, weights	**Standard 10 mm**
Pressure stage at inlet	320 PN
Pressure stage at outlet	160 PN
Min. response pressure	0.1 bar
Max. response pressure (4373/4374)	68 bar
Narrowest flow cross-section	78.5 mm^2
Narrowest flow diameter	10 mm
Leg length (outlet/inlet)	30 mm/33 mm
Pin 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

2.5 Accessories for Process Metering Pumps

2.5.1.5 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.

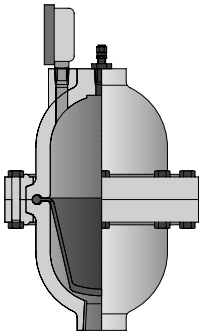
Important: A pressure relief valve should always be fitted with an adjustable back pressure valve when using a pulsation damper.



Bladder dampers, metal

Volume	0.066 – 379 l
Pressure	20.7 bar
Material of bladder/diaphragm	EPDM or FKM
Housing material	316 L stainless steel, Hastelloy C, PTFE

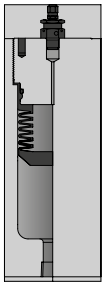
Further material versions and details available on request.



Bladder damper, plastic

Volume	0.066 – 19 l
Pressure	17.2 bar
Material of bladder/diaphragm	EPDM or FKM
Housing material	PVDF

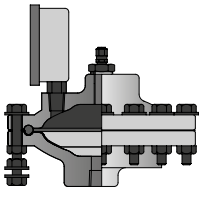
Further material versions and details available on request.



Bladder damper, high-pressure

Volume	0.13 – 0.39 l
Pressure	793 bar
Material of bladder/diaphragm	EPDM or FKM
Housing material	316 L stainless steel, Hastelloy C, Alloy 20

Further material versions and details available on request.



Diaphragm damper with PTFE diaphragm

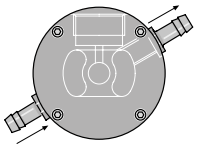
Volume	0.20 l
Pressure	137 bar
Material of bladder/diaphragm	PTFE
Housing material	316 L stainless steel, Hastelloy C, Alloy 20

Further material versions and details available on request.

2.5.2 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.

2.5.2.1 Cooling/Heating Equipment, Plunger Metering Pumps

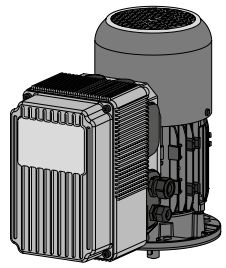


The cooling/heating device is integrated in the dosing head. Connecting sockets Ø 10 mm. Modification at a later date is not possible.

For pump	Order no.
Sigma HK - 08 S	1040459
META/Sigma HK - 12.5 S	803551
META/Sigma HK - 25 S	803552
META/Sigma HK - 50 S	803553
MAKRO TZ FK 30	1036645
MAKRO TZ FK 50	1036655
MAKRO TZ FK 85	1024665

Cooling/heating device for Makro TZ HK available on request.

2.5.3 Variable speed motors with integrated frequency converter with IP 55 degree of protection



Variable speed motor with integrated frequency converter

Externally controllable by 5 digital inputs, 1 analogue output 0 - 20 mA, 1 analogue input 0 - 10 V.

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 HP2a	1106898
0.75	1-phase, 230 V, 50/60 Hz	1:20	160	HYDRO HP3a	1106900
1.50	3-phase, 400 V, 50/60 Hz	1:20	200	HYDRO HP4a, 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. Versions 265/460V - 60Hz, 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.

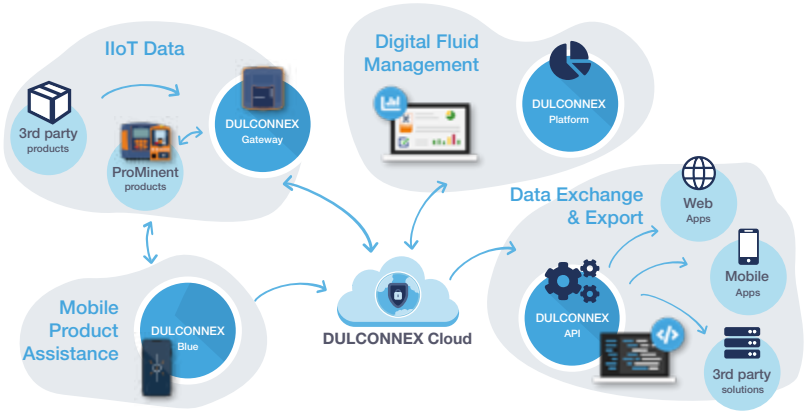
3.1 DULCONNEX: IIoT Solution for Digital Fluid Management

3.1.1 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 cloud-based IIoT solution for digitally networking your system components. The solution consists of individual solution modules, which can be combined specifically to meet customer requirements:

	Pricing logic	Order no.
DULCONNEX Gateway AGIb	One-time price	1098723
DULCONNEX Gateway DACb	One-time price	1098756
DULCONNEX Gateway pumps and I/O modules	One-time price	1105889
DULCONNEX Gateway UVCb, CDLb	One-time price	1098757
DULCONNEX API	One-time price	1136479
CAN connection kit UVCb	One-time price	1107357
DULCONNEX Blue	Free app (Google Play Store / Apple App Store)	-
DULCONNEX Platform	Monthly fee per connected device	1093138
DULCONNEX Inventory Management	Monthly fee per connected Inventory Management-enabled device	DX000004
DULCONNEX API	Monthly fee per connected device	1110567



The DULCONNEX Cloud lies at the heart of the DULCONNEX solution. It meets stringent safety standards, receives data from connected devices and makes this data available to target applications, such as the DULCONNEX Platform. A DULCONNEX Gateway is needed to integrate both ProMinent products as well as third-party products into the cloud.

Using the DULCONNEX Blue app, our digital wizard, ProMinent products can also be connected to the user's mobile via a Bluetooth connection without connecting to the cloud, greatly simplifying user interactions.

On the basis of data available in the cloud, external services can be fed data via API.

Location-independent system monitoring in real time

With DULCONNEX, you always have access to all the key data and measured values for your pump installations. Monitor the status of your system in real time and benefit from continuous documentation. Check your device 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 notifications inform you of relevant events 24/7.

Be in a position to act promptly at all times with DULCONNEX. No matter whether you work with industrial and process water, cooling water, potable water or swimming pool water – DULCONNEX supports you in ensuring the reliable treatment of your fluids.

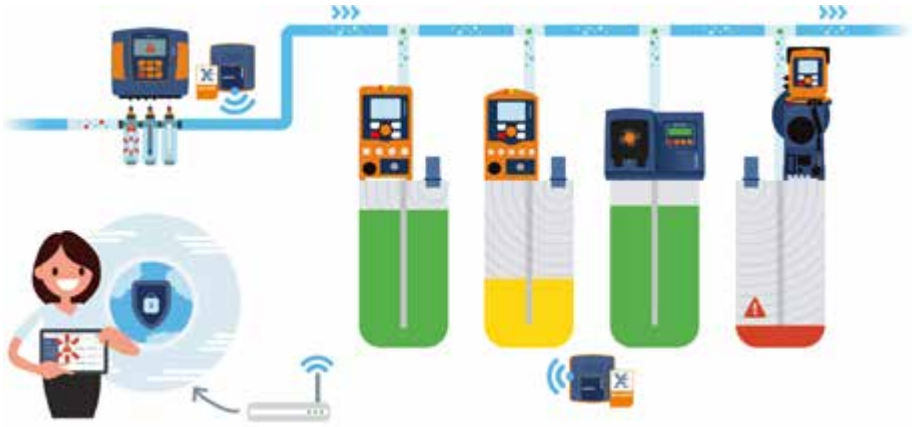
3.1 DULCONNEX: IIoT Solution for Digital Fluid Management

3.1.2 Use case - 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, 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.



3.1 DULCONNEX: IIoT Solution for Digital Fluid Management

3.1.3 Your Benefits of Digital Fluid Management

- **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 DULCONNEX Platform can be accessed at **https://dulconnex.prominent.com**. Please contact us for free access to try out the solution and send us your questions.

Privacy and data security

The architecture of DULCONNEX 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 products

- **Pumps**
  - gamma/ X
  - gamma/ XL
  - DULCOFLEX DFXa
  - DULCOFLEX DFYa
  - sigma/ X
  - DULCOFLEX DF4a
- **Controllers**
  - DULCOMETER diaLog X
  - DULCOMETER diaLog DACb
  - DULCOPOOL Pro
  - AEGIS II
  - SlimFLEX 5a
  - AEGIS S
- **Radar sensor** DULCOLEVEL
- **Water treatment and disinfection systems**
  - UV systems DULCODES MP, LP/LP certified/LP F&B/LP-PE
  - Chlorine dioxide systems Bello Zon CDLb, CDKd and CDVd
  - Electrolysis system CHLORINSITU IIa 60–2500 g/h
- **Industrial standard signals via dedicated I/O modules**
  - Digital inputs (relays, with counters too)
  - Analogue inputs (4…20 mA)

3.1 DULCONNEX: IIoT Solution for Digital Fluid Management

3.1.4 DULCONNEX Gateway

Secure and reliable provision of IIoT data

The DULCONNEX Gateway safely and reliably transfers the data of all products supported as standard to the DULCONNEX Cloud

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

Using a gateway matched to the relevant product guarantees smooth and reliable operation. The customer must provide a WiFi access point with an internet connection in order to communicate with the DULCONNEX Platform.

	Suitable for system types	Order no.
DULCONNEX Gateway AGIb	AEGIS II	1098723
DULCONNEX Gateway DACb	DULCOMETER diaLog DACb	1098756
DULCONNEX Gateway pumps and I/O modules	gamma/ X, gamma/ XL, delta, DULCOFLEX DF4a, DULCOFLEX DFXa, DULCOFLEX DFYa, I- and M-modules (DULCOMARIN II), Frenzel+Berg modules (CIO50, CIO57, CIO58, CIO60, CIO300), Sigma X	1105889
DULCONNEX Gateway UVCb, CDLb	DULCODES LP/MP, chlorine dioxide systems Bello Zon CDLb	1098757
DULCONNEX API	DULCOLEVEL	1136479

3.1 DULCONNEX: IIoT Solution for Digital Fluid Management

3.1.5 DULCONNEX Blue

Efficient and safe operation of pumps by smartphone

Mobile app for Android and iOS

The next generation of mobile product assistance from ProMinent – DULCONNEX Blue. The smart app enables intelligent pumps to be conveniently controlled by Bluetooth.

Your Benefits

- Easy operation and configuration of gamma/ X pumps in installation environments that are hard to access
- Live monitoring of device status and performance data from a safe distance
- Reliable remote control of supported ProMinent products
- User-friendly operation by means of intuitive interface and multilingual displays
- Efficient commissioning by simply copying of the configuration from one pump to other pumps
- Obtain professional support quickly in an emergency case – generate error logs at the press of a button and share them directly with service personnel

Technical Details

Important functions

- **Safe communication** - Easy authentication and pairing with supported devices for secure data exchange via Bluetooth interface.
- **Reliable remote control** - Easily operate ProMinent devices in hard-to-reach installation environments from a safe distance.
- **Intuitive design** - Thanks to the modern and multilingual user interface, pumps can now be operated even more conveniently.
- **Always up to date** - The clear dashboard provides the most important information on all devices at a glance. Information on current device status and performance data, as well as firmware updates, is available at all times.
- **Simple pump configuration** - Once saved, device configurations can be restored at any time and quickly copied from one pump to another.
- **Complete documentation** - The automatic logging of important operating data in the log book and the integrated commissioning report help to fulfill regulatory documentation requirements.
- **Direct access to product documentation** - Permanent access to the latest version of product-specific documents or relevant files.

Technical requirements

- Supported device model with the latest firmware version
- Integrated Bluetooth module (Bluetooth Classic or Bluetooth Low Energy)
- Mobile device with supported operating system (Android from version 9.0 (“Pie”) and iOS from version 12)

Supported devices

- Solenoid-Driven Metering Pump beta/ X, gamma/ X and gamma/ XL
  with Bluetooth Classic module from firmware version: 02.05.06.02
  with Bluetooth Low Energy module from firmware version: 02.06.01.01
- Radar liquid level sensor DULCOLEVEL

Further models will follow continuously in the future.

Supported languages

- English (DE)
- English (EN)
- French (FR)
- Spanish (ES)
- Polish (PL)

Availability

- Apple App Store for mobile devices with iOS (iPhone/iPad)
- Google Play Store for Android devices

3.1 DULCONNEX: IIoT Solution for Digital Fluid Management

Field of Application

- **Enhanced safety for personnel and processes** – Adapt the settings of connected devices directly or control the pump capacity and metering volume from a safe distance without having to put on protective equipment in advance. The opportunity to simply save device configurations and reset them to earlier statuses at any time provides for additional safety.
- **Commissioning in record time** – Significant time saved particularly when setting up multiple devices by transmitting the configuration of one pump to other pumps.
- **Everything under control** – Keep an eye on the statuses and performance data of connected pumps at all times, thanks to the clearly laid out dashboard. Access real-time operating data, including dosing rate, liquid level and system pressure, and make changes immediately if you need to.
- **Minimise downtimes** – The device automatically generates a logbook with all errors, warnings and events that have occurred. Detailed error logs can be generated at the press of a button, which can be shared quickly and easily with local service personnel. This guarantees the fastest possible help in an emergency to avoid long downtimes.
- **Provision of evidence** – The built-in commissioning report provides straightforward evidence of the set-up and commissioning of systems. Automatic recording of key operating data, including the current feed rate or number of strokes, simplifies compliance with regulatory documentation obligations.

3.1 DULCONNEX: IIoT Solution for Digital Fluid Management

3.1.6 DULCONNEX Platform

Location-independent monitoring and documentation of system and process data

Web-based IIoT platform for digital fluid management

DULCONNEX Platform is a web-based IIoT platform for digital fluid management. The web application offers simple and location-independent access to all relevant system and process data and thus increases system availability. By continuously monitoring important parameters, the process quality can be optimized and the safety of employees increased. Comprehensive logging and automated generation of reports facilitate the fulfilment of documentation obligations.

Your Benefits

- **Always one step ahead of events** - keep an eye on the status and functionality of systems at all times and react early thanks to configurable alarms with email notification function. Easily create and share documentation in the event of an emergency in order to receive competent assistance as quickly as possible.
- **Greater transparency and safety** - gain knowledge of the exact process and system status on site before entering potentially dangerous environments. The complete history of all measured values and system data and their reliable storage in the cloud also offer additional protection against manipulation and data loss. Different user authorizations and one-time passwords can be used to limit functions and prevent unintentional or unauthorized changes.
- **Plan service calls more efficiently and prepare more effectively** - With the help of location-independent access to condition and performance data, trips for pure inspection and documentation purposes can be minimized. Knowing the exact condition of the system before arriving on site also allows service activities to be optimally prepared.
- **Increased system availability and optimized process quality** - The visualization of freely combinable parameters in diagrams allows detailed analyses of processes and supports the identification of optimization potential.
- **Easier compliance with regulatory documentation requirements** - Thanks to continuous logging, automated report generation and the simple export function, the manual effort required to provide proof of proper operation is significantly reduced.

Technical Details

The responsive design and intuitive user interface of the web application ensure that users can quickly and easily benefit from the numerous functions of the IIoT platform:

- **Dashboards** - Customizable dashboards show the most important information of different systems or process sections at a glance
- **Alarms** - Freely configurable alarm messages by email provide information about exceeding or falling below individually configurable limit values and other important events
- **Log book** - The continuous logging of all system data and events creates increased transparency and additional safety
- **Data history** - A complete history of operating data and measured values supports operators in fulfilling regulatory documentation obligations and forms the basis for comprehensive analyses
- **Visualization** - Both current and historical measured values can be freely combined and displayed in diagrams, facilitating detailed analyses of system performance and process quality. It also supports the operator in fulfilling regulatory documentation obligations
- **Reports** - With the help of automated report generation and the simple creation of individual documentation in exportable file formats, proof of proper operation can be provided with minimal effort

3.1 DULCONNEX: IIoT Solution for Digital Fluid Management

Field of Application

- **Increase transparency** - Whether pumps, controllers, sensors or systems, the current status and performance data is retrieved from all installation locations in real time and stored securely in the DULCONNEX Cloud. With the help of the DULCONNEX Platform, operators have access to the complete history of their process data at any time and from anywhere and can easily keep an eye on critical measured values such as dosing rate, liquid level or system pressure at all times.
- **Ensure system availability** - The comprehensive logging of the device status, including all errors, Warnings and events that occur, is particularly useful in time-critical situations. Detailed documentation can be generated at the touch of a button and shared quickly and easily with local service contacts. This guarantees the fastest possible assistance in an emergency and minimizes the risk of longer downtimes.
- **Optimize processes** - Current liquid levels can be clearly displayed on the customizable dashboards and reliably monitored with the help of configurable alarms. If desired, automated notifications can inform responsible employees or chemical suppliers when critical limit values are reached so that they can ensure replenishment in good time. Process-critical chemicals can thus be delivered and stocked with pinpoint accuracy.
- **Protect employees** - The DULCOnneX Platform gives operators, employees or service technicians knowledge of the exact process and system status on site before entering potentially dangerous environments. This means that every operation can be optimally prepared and safety increased.
- **Prove compliance** - The continuous logging of all relevant operating data facilitates the fulfillment of regulatory documentation requirements. Customized, automatically generated reports significantly reduce manual effort and the proper operation of systems can be easily verified at any time.
- **Increase responsiveness** - Adjustments to changing conditions can be viewed from anywhere and conveniently changed remotely.

	Pricing logic	Order no.
DULCONNEX Platform	Monthly fee per connected device	1093138

3.1 DULCONNEX: IIoT Solution for Digital Fluid Management

3.1.7 DULCONNEX Inventory Management

The ideal DULCONNEX extension for your tank level application

The DULCONNEX Inventory Management add-on is an extension to the DULCONNEX Platform. It can be used to monitor tank levels and inventory levels of chemicals at various sites regardless of your location. Tank level monitoring is based on the data of the DULCOLEVEL radar level sensor.

The DULCONNEX Inventory Management add-on is an extension to the DULCONNEX Platform. It can be used to monitor tank levels and inventory levels of chemicals at various sites regardless of your location.

It also provides specific dashboards, reports and views to allow you to use your tank level application as efficiently as possible.

- Simple integration of existing or new tank level applications
- Detailed overview of all elements of the application, such as tank levels with warning levels, inventory levels, chemicals and locations
- Geographic overview of all systems with colour visualisation of tank levels and inventory levels
- Specific reports for tank level applications such as a detailed usage certificate for compliance with specifications

	Pricing logic	Order no.
DULCONNEX Inventory Management	Monthly fee per connected Inventory Management-enabled device	DX000004

3.1.8 DULCONNEX API

Integrate the raw data from your application into any system of your choice

With DULCONNEX API, you can access your data on request from the DULCONNEX Cloud. Use this for integration into existing process control systems, SCADA, mobile or online apps as well as MES or share data with other digital solutions.

Your Benefits

- Simple integration of existing or new tank level applications
- Detailed overview of all elements of the application, such as tank levels with warning levels, inventory levels, chemicals and locations
- Geographic overview of all systems with colour visualisation of tank levels and inventory levels
- Specific reports for tank level applications such as a detailed usage certificate for compliance with specifications

Technical Details

The responsive design and intuitive user interface of the web application ensure that users quickly and easily benefit from the numerous functions of the Inventory Management module in the IIoT platform:

Dashboard – The Inventory Management dashboard helps to provide a clear view of all key information, such as designation, location, current liquid level, critical classification of the liquid level, remaining tank range, chemicals as well as associated inventory levels for all tank level applications.

List view – The list view allows all tank level applications to be displayed grouped in one complete overview or by location. Inventory levels, tanks, locations and complete tank level applications can be managed within these views. In addition, detailed filters can be used to align the view to the user's needs.

Map – The overview map features colour indicators and so can be used to quickly and easily view all liquid and inventory levels. More detailed information can be displayed by selecting a location.

Inventory report – All inventory movements of the chemicals can be provided in PDF or Excel format for the desired time period, allowing transparency to be improved and documentation to be simplified.

Consumption report – All consumption of chemicals for each location and the total consumption of a chemical is documented in PDF or Excel format when using this report. The data is provided accurate to the day, ensuring a high level of traceability.

Compliance report – When using certain chemicals, this report helps you to comply with regulations as it generates a usage certificate per device.

	Pricing logic	Order no.
DULCONNEX API	Monthly fee per connected device	1110567

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^3/h _____
Required final concentration	g/m^3, ppm _____

ProMinent Chemical Resistance List

Resistance of Materials Used in Liquid Ends to the Chemicals Most Frequently Used

This data applies to standard conditions (20 °C, 1,013 mbar).

s	saturated solution in water
+	resistant
+/o	practically resistant
o	conditionally resistant
-	not resistant
n	resistance not known
=>	see under
*	The resistance of the adhesive (e.g. Tangit) should be taken into account for bonded connections. (We would not recommend materials rated as 'o' and '-' !)
**	Does not apply to fibre glass-reinforced material

Concentrations are stated as weight percentages with reference to aqueous solutions. If the level of resistance is provided with a percentage figure, it only applies up to this concentration.

NOTE:

The **CSM (Hypalon®)** and **IIR (butyl rubber)** elastomers used as the diaphragm materials in bladder dampers have similar characteristics to **EPDM**.

PTFE is resistant to all the chemicals in this list.

However, **PTFE filled with carbon** is attacked by aggressive oxidants such as bromine (anhydrous) or concentrated acids (nitric acid, sulfuric acid, chromic acid).

The resistance of PVC-U connections bonded with Tangit deviates from the list below for the following chemicals:

Medium	Concentration range
Chromo-sulfuric acid	≥ 70 % H_2SO_4 + 5 % $K_2Cr_2O_7$/$Na_2Cr_2O_7$
Chromic acid	≥ 10 % CrO_3
Hydrochloric acid	≥ 25 % HCl
Hydrogen peroxide	≥ 5 % H_2O_2
Hydrofluoric acid	≥ 0 % HF

Abbreviations used in the column designations:

Acrylic:	Resistance of poly(methyl methacrylate) (clear acrylic)
PVC:	Resistance of polyvinyl chloride, hard (PVC-U)
PP:	Resistance of polypropylene
PVDF:	Resistance of polyvinylidene fluoride (PVDF)
1.4404:	Resistance of stainless steel 1.4404, 1.4571 and 1.4435
FKM:	Resistance of fluorine rubber (e. g. Viton® A and B)
EPDM:	Resistance of ethylene propylene diene monomer
PharMed®:	Resistance of PharMed®
PE:	Resistance of polyethene
2.4819:	Resistance of Hastelloy C-276
WGK:	Water hazard class

Viton® is a registered trademark of DuPont Dow Elastomers

Water Hazard Classes (WGK):

1	Low hazard to waters
2	Hazard to waters
3	Severe hazard to waters
(X)	Not classified. Classified through conclusion by analogy. To be used with reservations.

Safety data sheets

Safety data sheets for our products can be found on our website and are available in versions for numerous different countries: www.prominent.com/MSDS

ProMinent Chemical Resistance List

The data has been taken from relevant manufacturers' literature and supplemented by our own tests and experience. As the resistance of materials also depends on other factors (operating conditions, state of surface 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 feed chemicals 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	Formula	Concentration in %	Acryl	PVC	PP	PVDF	1.4404	FKM	EPDM	Pharmed®	PE	HastelloyC	WGK
1,2-Dichloroethene	$C_2H_2Cl_2$	100	-	-	o	+	+	o	-	o	-	+	2
1-Hexanol	$C_6H_{13}OH$	100	-	-	+	+	+	n	+	o	+	+	1
1-Octanol	$C_8H_{17}OH$	100	-	-	+	+	+	+	+	-	+	+	1
1-Pentanol	$C_5H_{11}OH$	100	+	+	+	+	+	-	+	-	+	+	1
2-Chloroethanol	$ClCH_2CH_2OH$	100	-	-	+	o	+	-	o	+	+	+	3
2-Ethylhexanol	$C_8H_{16}O$	100	n	+/o	+	+	+	+	+	-	+	+	2
4-Methylcatechol	$C_6H_3(OH)_2CH_3$	s	+	+	+	+	+	+	-	+/o	+	+	1
Acetaldehyde	CH_3CHO	100	-	-	o	-	+	-	+/o	-	+	+	2
Acetamide	CH_3CONH_2	s	+	+	+	+	+	o	+	+/o	+	+	1
Acetic acid	CH_3COOH	100	-	50%	+	+	+	-	o	60%	70%	+	1
Acetic acid anhydride	$(CH_3CO)_2O$	100	-	-	o	-	+	-	+/o	+	o	+	1
Acetic anhydride	$(CH_3CO)_2O$	100	-	-	o	-	+	-	+/o	+	o	+	1
Acetic ester	$CH_3COOC_2H_5$	100	-	-	35%	+	+	-	+/o	+/o	+	+	1
Acetone	CH_3COCH_3	100	-	-	+	-	+	-	+	-	+	+	1
Acetophenone	$C_6H_5COCH_3$	100	-	n	+	-	+	-	+	n	+	+	-
Acetyl chloride	CH_3COCl	100	-	+	n	-	o	+	-	o	n	+	1
Acetyl chloride	CH_3COCl	100	-	+	n	-	o	+	-	o	n	+	1
Acetylacetone	$CH_3COCH_2COCH_3$	100	-	-	+	-	+	-	+	n	+	+	1
Acetylene tetrachloride	$C_2H_2Cl_4$	100	-	-	o	+	+	o	-	o	o	+	3
Acrylonitrile	CH_2=CH-CN	100	-	-	+	+	+	-	-	-	+	+	3
Adipic acid	$HOOC(CH_2)_4COOH$	s	+	+	+	+	+	+	+	+/o	+	+	1
Allyl alcohol	CH_2CHCH_2OH	96	-	o	+	+	+	-	+	o	+	+/o	2
Aluminium acetate	$Al(CH_3COO)_3$	s	+	+	+	+	+	+	+	+	+	+/o	1
Aluminium bromide	$AlBr_3$	s	+	+	+	+	n	+	+	+	+	+	2
Aluminium chloride	$AlCl_3$	s	+	+	+	+	-	+	+	+	+	+	1
Aluminium fluoride	AlF_3	10	+	+	+	+	-	+	+	+	+	+/o	1
Aluminium hydroxide	$Al(OH)_3$	s	+	+	+	o	+	+	+	+	+	+	1
Aluminium nitrate	$Al(NO_3)_3$	s	+	+	+	+	+	+	+	+	+	+	1
Aluminium phosphate	$AlPO_4$	s	+	+	+	+	+	+	+	+	+	+	1
Aluminium sulfate	$Al_2(SO_4)_3$	s	+	+	+	+	+	+	+	+	+	+	1
Ammonia	"NH_4OH"	30	+	+	+	+ (25 °C)	+	-	+	+	+	+	2
Ammonia solution	"NH_4OH"	30	+	+	+	+ (25 °C)	+	-	+	+	+	+	2
Ammonium acetate	CH_3COONH_4	s	+	+/o	+	+	+	+	+	+	+	+	1
Ammonium aluminium sulfate	$NH_4Al(SO_4)_2$	s	+	+	+	+	+	+	+	+	+	+	1
Ammonium bicarbonate	NH_4HCO_3	s	+	+	+	+	+	+	+	+	+	+	1
Ammonium carbonate	$(NH_4)_2CO_3$	40	+	+	+	+	+	+	+	+	+	+	1
Ammonium carbonate	$(NH_4)_2CO_3$	40	+	+	+	+	+	+	+	+	+	+	1
Ammonium chloride	NH_4Cl	s	+	+	+	+	-	+	+	+	+	+/o	1
Ammonium fluoride	NH_4F	s	+	o	+	+	o	+	+	+	+	+	1
Ammonium hydroxide	"NH_4OH"	30	+	+	+	+ (25 °C)	+	-	+	+	+	+	2
Ammonium nitrate	NH_4NO_3	s	+	+	+	+	+	+	+	+	+	+	1
Ammonium nitrate	NH_4NO_3	s	+	+	+	+	+	+	+	+	+	+	1
Ammonium oxalate	$(COONH_4)_2 * H_2O$	s	+	+	+	+	+	+	+	+	+	+	1
Ammonium perchlorate	NH_4ClO_4	10	+	+	+	+	+	+	+	+	+	+	1
Ammonium peroxodisulfate	$(NH_4)_2S_2O_8$	s	+	+	+	+	5%	+	+	+	+	5%	2
Ammonium phosphate	$(NH_4)_3PO_4$	s	+	+	+	+	10%	+	+	+	+	10%	1
Ammonium sulfate	$(NH_4)_2SO_4$	s	+	+	+	+	10%	+	+	+	+	10%	1
Ammonium sulfide	$(NH_4)_2S$	s	+	+	+	+	n	+	+	n	+	n	2
Amyl alcohol	$C_5H_{11}OH$	100	+	+	+	+	+	-	+	-	+	+	1
Aniline	$C_6H_5NH_2$	100	-	-	+	+	+	-	+/o	o	+	+	2
Anilinium chloride	$C_6H_5NH_2 * HCl$	s	n	+	+	+	-	+/o	+/o	o	+	+	2
Antimony trichloride	$SbCl_3$	s	+	+	+	+	-	+	+	+	+	n	2
Aqua regia	$3\ HCl + HNO_3$	100	-	+	-	+[2)]	-	-	o	-	-	-	2
Arsenic acid	H_3AsO_4	s	+	+	+	+	+	+	+	o	+	+	3
Askarels	$C_6H_{10}O$	100	-	-	+	-	+	-	+/o	-	+	+	1
Barium carbonate	$BaCO_3$	s	+	+	+	+	+	+	+	+	+	+	1
Barium chloride	$BaCl_2$	s	+	+	+	+	-	+	+	+	+	+	1
Barium hydroxide	$Ba(OH)_2$	s	+	+	+	+	+	+	+	+	+	+	1
Barium hydroxide	$Ba(OH)_2$	s	+	+	+	+	+	+	+	+	+	+	1
Barium nitrate	$Ba(NO_3)_2$	s	+	+	+	+	+	+	+	+	+	+	1
Barium sulfate	$BaSO_4$	s	+	+	+	+	+	+	+	+	+	+	1
Barium sulfide	BaS	s	+	+	+	+	+	+	+	+	+	+	1
Battery acid	H_2SO_4	98%	30%	50%	85%	+	20%	+	80%	30%	80%	+	1
Benzaldehyde	C_6H_5CHO	100	-	-	+	-	+	+	+	-	o	+	1
Benzene	C_6H_6	100	-	-	o	+	+	o	-	-	o	+	3
Benzenesulfonic acid	$C_6H_5SO_3H$	10	n	n	+	+	+	+	-	-	n	+	2

ProMinent Chemical Resistance List

Corrosive agent	Formula	Concentration in %	Acryl	PVC	PP	PVDF	1.4404	FKM	EPDM	PharMed®	PE	HastelloyC	WGK
Benzine	-	100	-	-	+	+	+	+	-	-	+	+	2
Benzoic acid	C_6H_5COOH	s	+	+	+	+	+	+	+	+/o	+	+	1
Benzoyl chloride	C_6H_5COCl	100	-	n	o	n	o	+	+	n	o	+	2
Benzyl alcohol	$C_6H_5CH_2OH$	100	-	-	+	+	+	+	-	+	+	+	1
Benzyl benzoate	$C_6H_5COOC_7H_7$	100	-	-	+	o	+	+	-	-	+	+	2
Benzyl chloride	$C_6H_5CH_2Cl$	90%	-	n	o	+	+	+	-	-	o	+	2
Bleaching lye	NaOCl + NaCl	12%	+	+	o	+	-	o	+	+	o	> 10%	2
Borax	$Na_2B_4O_7 * {}_{10H2}O$	s	+	+	+	+	+	+	+	+	+	+	1
Borax	$NaBO_2$	s	+	+	+	+	+	+	+	+	+	+	1
Boric acid	H_3BO_3	s	+	+	+	+	+	+	+	+	+	+	1
Bromine (dry)	Br_2	100	-	-	-	+	-	-	-	-	-	+	2
Bromine water	$Br_2 + H_2O$	s	-	+	-	+	-	-	-	n	-	n	2
Bromobenzene	C_6H_5Br	100	n	n	o	+	+	o	-	-	o	+	2
Bromochloromethane	CH_2BrCl	100	-	-	-	+	+	n	+/o	-	o	+	2
Bromochlorotrifluoroethane	$HCClBrCF_3$	100	-	-	o	+	+	+	-	+	o	+	3
Butanediol	HOC_4H_8OH	10	n	+	+	+	+	o	+	+	+	+	1
Butanetriol	$C_4H_{10}O_3$	s	+	+	+	+	+	o	+	+	+	+	1
Butanol	C_4H_9OH	100	-	+	+	+	+	o	+/o	-	+	+	1
Butanone	$CH_3COC_2H_5$	100	-	-	+	-	+	-	+	-	+	+	1
Butyl acetate	$CH_3COOC_4H_9$	100	-	-	o	+	+	-	+/o	+/o	-	+	1
Butyl acetate	$CH_3COOC_4H_9$	100	-	-	o	+	+	-	+/o	+/o	-	+	1
Butyl acrylate	$C_7H_{13}O_2$	100	-	-	+	+	+	-	-	+/o	+	+	1
Butyl alcohol	C_4H_9OH	100	-	+	+	+	+	o	+/o	-	+	+	1
Butyl benzoate	$C_6H_5COOC_4H_9$	100	-	-	o	n	+	+	+	-	o	+	2
Butyl mercaptan	C_4H_9SH	100	n	n	n	+	n	+	-	n	n	n	3
Butyl oleate	$C_{22}H_{42}O_2$	100	n	n	n	+	+	+	+/o	n	n	+	1
Butyl stearate	$C_{22}H_{44}O_2$	100	o	n	n	+	+	+	-	n	n	+	1
Butylamine	$C_4H_9NH_2$	100	n	n	n	-	+	-	-	n	+	+	1
Butyraldehyde	C_3H_7CHO	100	-	n	+	n	+	-	+/o	-	+	+	1
Butyric acid	C_3H_7COOH	100	5%	20%	+	+	+	+	+	+/o	+	+	1
Calcium acetate	$(CH_3COO)_2Ca$	s	+	+	+	+	+	+	+	+	+	+	1
Calcium bisulfite	$Ca(HSO_3)_2$	s	+	+	+	+	+	+	+	+	+	+	1
Calcium bisulfite	$Ca(HSO_3)_2$	s	+	+	+	+	+	+	+	+	+	+	1
Calcium carbonate	$CaCO_3$	s	+	+	+	+	+	+	+	+	+	+	1
Calcium chloride	$CaCl_2$	s	+	+	+	+	-	+	+	+	+	+	1
Calcium cyanide	$Ca(CN)_2$	s	+	+	+	+	n	+	+	+	+	n	3
Calcium hydroxide	$Ca(OH)_2$	s	+	+	+	+	+	+	+	+	+	+	1
Calcium hydroxide	$Ca(OH)_2$	s	+	+	+	+	+	+	+	+	+	+	1
Calcium hypochlorite	$Ca(OCl)_2$	s	+	+	o	+	-	o	+	+	+	+	2
Calcium nitrate	$Ca(NO_3)_2$	s	+	50%	50%	+	+	+	+	+	+	+	1
Calcium nitrate	$Ca(NO_3)_2$	s	+	50%	50%	+	+	+	+	+	+	+	1
Calcium phosphate	$Ca_3(PO_4)_2$	s	+	+	+	+	+	+	+	+	+	+	1
Calcium sulfate	$CaSO_4$	s	+	+	+	+	+	+	+	+	+	+	1
Calcium sulfide	CaS	s	+	+	+	+	n	+	+	+	+	+	2
Calcium sulfite	$CaSO_3$	s	+	+	+	+	+	+	+	+	+	+	1
Calcium thiosulfate	CaS_2O_3	s	+	+	+	+	-	+	+	+	+	+	1
Caprylic aldehyde	$C_5H_{11}CHO$	100	n	n	+	+	+	-	+/o	-	+	+	1
Carbolic acid	C_6H_5OH	100	-	-	+	+	+	+	-	+	+	+	2
Carbon disulfide	CS_2	100	-	-	o	+	+	+	-	-	o	+	2
Carbon disulfide	CS_2	100	-	-	o	+	+	+	-	-	o	+	2
Carbon tetrachloride	CCl_4	100	-	-	-	+	+	+	-	-	o	+	3
Carbonic acid	"H_2CO_3"	s	+	+	+	+	+	+	+	+	+	+	1
Caustic potash	KOH	50	+	+	+	+ (25 °C)	+	-	+	10%	+	+	1
Chile saltpeter	$NaNO_3$	s	+	+	+	+	+	+	+	+	+	+	1
Chloracetone	$ClCH_2COCH_3$	100	-	-	n	n	+	-	+	-	n	+	3
Chloral hydrate	$CCl_3CH(OH)_2$	s	-	-	o	-	+	o	o	n	+	+	2
Chloric acid	$HClO_3$	20	+	+	-	+	-	o	o	+	10%	+	2
Chlorinated lime	$Ca(OCl)_2$	s	+	+	o	+	-	o	+	+	+	+	2
Chlorine bleaching	NaOCl + NaCl	12%	+	+	o	+	-	o	+	+	o	> 10%	2
Chlorine dioxide solution	$ClO_2 + H_2O$	0.5%	o	+	o	+[1)]	-	o	-	-	o	+	-
Chlorine water	$Cl_2 + H_2O$	s	+	+	o	+	-	+	+	-	o	+	-
Chlorobenzene	C_6H_5Cl	100	-	-	+	+	+	+	-	-	o	+	2
Chloroethylbenzene	$C_6H_4ClC_2H_5$	100	-	-	o	n	+	o	-	-	o	+	2
Chloroform	$CHCl_3$	100	-	-	o	+	+	+	-	o	-	+	2
Chloroformic acid ethyl ester	$ClCO_2C_2H_5$	100	n	n	n	n	n	+	-	n	n	n	2
Chlorophenol	C_6H_4OHCl	100	-	n	+	+	+	n	-	-	+	+	2
Chloroprene	C_4H_5Cl	100	-	-	n	n	+	+	-	-	n	+	1
Chloroprene	C_4H_5Cl	100	-	-	n	n	+	+	-	-	n	+	1
Chlorosulfuric acid	$SO_2(OH)Cl$	100	-	o	-	+	-	-	-	-	-	o	1
Chlorotoluene	C_7H_7Cl	100	-	-	n	+	+	+	-	-	n	+	2
Chromic acid	H_2CrO_4	50	-	+	o	+	10%	+	-	o	+	10%	3
Chromium(III) potassium sulfate dodecahydrate	$KCr(SO_4)_2$	s	+	+	+	+	+	+	+	+	+	+	1
Chromium(III) potassium sulfate dodecahydrate	$KCr(SO_4)_2$	s	+	+	+	+	+	+	+	+	+	+	1
Chromium(III) sulfate	$Cr_2(SO_4)_3$	s	+	+	+	+	+	+	+	+	+	+	1
Chromo-sulfuric acid	$K_2CrO_4 + H_2SO_4$	s	-	+	-	+	n	n	n	-	-	n	3

ProMinent Chemical Resistance List

Corrosive agent	Formula	Concentration in %	Acryl	PVC	PP	PVDF	1.4404	FKM	EPDM	Pharmed®	PE	HastelloyC	WGK
Citric acid	$C_6H_8O_7$	s	+	+	+	+	+	+	+	+	+	+	1
Cobalt chloride	$CoCl_2$	s	+	+	+	+	-	+	+	+	+	+	2
Colamine	$HOC_2H_4NH_2$	100	o	n	+	-	+	-	+/o	o	+	+	1
Copper arsenite	$Cu_3(AsO_3)_2$	s	+	+	+	+	+	+	+	+	+	+	3
Copper(II) acetate	$Cu(CH_3COO)_2$	s	+	+	+	+	+	+	+	+	+	+	3
Copper(II) carbonate	$CuCO_3$	s	+	+	+	+	+	+	+	+	+	+	2
Copper(II) chloride	$CuCl_2$	s	+	+	+	+	1%	+	+	+	+	+	2
Copper(II) cyanide	$Cu(CN)_2$	s	+	+	+	+	+	+	+	+	+	+	3
Copper(II) fluoride	CuF_2	s	+	+	+	+	+	+	+	+	+	+	2
Copper(II) nitrate	$Cu(NO_3)_2$	s	+	+	+	+	+	+	+	+	+	+/o	2
Copper(II) sulfate	$CuSO_4$	s	+	+	+	+	+	+	+	+	+	+	2
Cresol	$C_6H_4CH_3OH$	100	o	o	+	+	+	+	-	-	+	+	2
Crotonaldehyde	$CH_3C_2H_2CHO$	100	n	-	+	+	+	-	+	-	+	+	3
Cumene	$C_6H_5CH(CH_3)_2$	100	-	-	o	+	+	+	-	-	o	+	1
Cyclohexane	C_6H_{12}	100	+	-	+	+	+	+	-	-	+	o	1
Cyclohexanol	$C_6H_{11}OH$	100	o	+/o	+	+	+	+	-	-	+	+	1
Cyclohexanone	$C_6H_{10}O$	100	-	-	+	-	+	-	+/o	-	+	+	1
Cyclohexanone	$C_6H_{10}O$	100	-	-	+	-	+	-	+/o	-	+	+	1
Cyclohexyl alcohol	$C_6H_{11}OH$	100	o	+/o	+	+	+	+	-	-	+	+	1
Cyclohexylamine	$C_6H_{11}NH_2$	100	n	n	n	n	+	-	n	n	n	+	2
Decahydronaphthalene	$C_{10}H_{18}$	100	-	+/o	o	+	n	o	-	-	o	+	2
Decalin	$C_{10}H_{18}$	100	-	+/o	o	+	n	o	-	-	o	+	2
Dextrin	-	s	+	+	+	+	+	+	+	+	+	+	1
Dextrose	$C_6H_{12}O_6$	s	+	+	+	+	+	+	+	+	+	+	1
Diacetone alcohol	$C_6H_{12}O_2$	100	-	-	+	o	+	-	+	-	+	+	1
Dibromoethane	$C_2H_4Br_2$	100	-	-	n	+	+	+	-	-	-	+	3
Dibutyl ether	$C_4H_9OC_4H_9$	100	-	-	+	+	+	-	o	-	+	+	2
Dibutyl phthalate	$C_{16}H_{22}O_4$	100	-	-	+	+	+	+	+/o	+	o	+	2
Dibutylamine	$(C_4H_9)_2NH$	100	n	n	+	+	+	-	-	n	+	+	1
Dichloroacetic acid	$Cl_2CHCOOH$	100	-	+	+	+	+	-	+	o	+	+	1
Dichloroacetic acid methyl ester	$Cl_2CHCOOCH_3$	100	-	-	+	n	+	-	n	-	+	+	2
Dichlorobenzene	$C_6H_4Cl_2$	100	-	-	o	+	+	+	-	-	o	+	2
Dichlorobutane	$C_4H_8Cl_2$	100	-	-	o	+	+	+	-	-	o	+	3
Dichlorobutene	$C_4H_6Cl_2$	100	-	-	o	+	+	o	-	-	o	+	3
Dichlorobutene	$C_4H_6Cl_2$	100	-	-	o	+	+	o	-	-	o	+	3
Dichloroethane	$C_2H_4Cl_2$	100	-	-	o	+	+	+	-	o	-	+	3
Dichloroethene	$C_2H_2Cl_2$	100	-	-	o	+	+	o	-	o	-	+	2
Dichloroisopropyl ether	$(C_3H_6Cl)_2O$	100	-	-	o	n	+	o	o	-	o	+	2
Dichloromethane	CH_2Cl_2	100	-	-	o	o	o	+	-	o	-	+	2
Dicyclohexylamine	$(C_6H_{12})_2NH$	100	-	-	o	n	+	-	-	-	o	+	2
Diethyl ether	$C_2H_5OC_2H_5$	100	-	-	o	+	+	-	-	o	o	+	1
Diethylene glycol	$C_4H_{10}O_3$	s	+	+	+	+	+	+	+	+	+	+	1
Diethylene glycol	$C_4H_{10}O_3$	s	+	+	+	+	+	+	+	+	+	+	1
Diethylene glycol monoethyl ether	$C_8H_{18}O_3$	100	n	n	+	+	+	n	+/o	o	+	+	1
Diglycolic acid	$C_4H_6O_5$	30	+	+	+	+	+	+	n	+/o	+	+	3
Dihexyl phthalate	$C_{20}H_{26}O_4$	100	-	-	+	+	+	-	n	+	+	+	1
Diisobutyl ketone	$C_9H_{18}O$	100	-	-	+	+	+	-	+	-	+	+	1
Diisononyl phthalate	$C_{26}H_{42}O_4$	100	-	-	+	+	+	n	n	+	+	+	1
Diisopropyl ketone	$C_7H_{14}O$	100	-	-	+	+	+	-	+	-	+	+	1
Dimethyl carbonate	$(CH_3O)_2CO$	100	n	n	+	+	+	+	-	n	+	+	1
Dimethyl ketone	CH_3COCH_3	100	-	-	+	-	+	-	+	-	+	+	1
Dimethyl phthalate	$C_{10}H_{10}O_4$	100	-	-	+	+	+	-	+/o	+	+	+	1
Dimethylformamide	$HCON(CH_3)_2$	100	-	-	+	-	+	-	+	+/o	+	+	1
Dimethylhydrazine	$H_2NN(CH_3)_2$	100	n	n	+	n	+	-	+	n	+	+	3
Dioctyl phthalate	$C_4H_4(COOC_8H_{17})_2$	100	-	-	+	+	+	-	+/o	+	+	+	1
Dioxane	$C_4H_8O_2$	100	-	-	o	-	+	-	+/o	-	+	+	1
Disodium hydrogen phosphate	Na_2HPO_4	s	+	+	+	+	+	+	+	+	+	+	1
Disulfur dichloride	S_2Cl_2	100	n	n	n	+	n	+	-	-	n	n	-
Disulfur dichloride	S_2Cl_2	100	n	n	n	+	n	+	-	-	n	n	-
Disulfur dichloride	S_2Cl_2	100	n	n	n	+	n	+	-	-	n	n	-
Disulfuric acid	$H_2SO_4 + SO_3$	s	n	-	-	-	+	+	-	+	-	+	2
DMF	$HCON(CH_3)_2$	100	-	-	+	-	+	-	+	+/o	+	+	1
DOP	$C_4H_4(COOC_8H_{17})_2$	100	-	-	+	+	+	-	+/o	+	+	+	1
Epichlorohydrin	C_3H_5OCl	100	-	n	+	-	+	+	o	+	+	+	3
Epsomite	$MgSO_4$	s	+	+	+	+	+	+	+	+	+	+/o	1
Ethanol	C_2H_5OH	100	-	+	+	+	+	-	+	+	+	+	1
Ethanolamine	$HOC_2H_4NH_2$	100	o	n	+	-	+	-	+/o	o	+	+	1
Ether	$C_2H_5OC_2H_5$	100	-	-	o	+	+	-	-	o	o	+	1
Ethyl acetate	$CH_3COOC_2H_5$	100	-	-	35%	+	+	-	+/o	+/o	+	+	1
Ethyl acetoacetate	$C_6H_{10}O_3$	100	n	-	+	+	+	-	+/o	+/o	+	+	1
Ethyl acrylate	$C_2H_3COOC_2H_5$	100	-	-	+	o	+	-	+/o	-	+	+	2
Ethyl alcohol	C_2H_5OH	100	-	+	+	+	+	-	+	+	+	+	1
Ethyl benzoate	$C_6H_5COOC_2H_5$	100	n	-	+	o	+	+	-	-	+	+	1
Ethyl bromide	C_2H_5Br	100	-	n	+	+	n	+	-	o	+	+	2
Ethyl chloroacetate	$ClCH_2COOC_2H_5$	100	-	o	+	+	+	+	-	-	+	+	2

ProMinent Chemical Resistance List

Corrosive agent	Formula	Concentration in %	Acryl	PVC	PP	PVDF	1.4404	FKM	EPDM	PharMed®	PE	HastelloyC	WGK
Ethylacrylic acid	C_4H_7COOH	100	n	n	+	+	+	n	+/o	n	+	+	1
Ethylbenzene	C_6H_5-C_2H_5	100	-	-	o	+	+	o	-	-	o	+	1
Ethylcyclopentane	$C_5H_4C_2H_5$	100	+	+	+	+	+	+	-	-	+	+	1
Ethylene dibromide	$C_2H_4Br_2$	100	-	-	n	+	+	+	-	-	-	+	3
Ethylene dichloride	$C_2H_4Cl_2$	100	-	-	o	+	+	+	-	o	-	+	3
Ethylene dichloride	$C_2H_4Cl_2$	100	-	-	o	+	+	+	-	o	-	+	3
Ethylene glycol	$C_2H_4(OH)_2$	100	+	+	+	+	+	+	+	+	+	+	1
Ethylene glycol ethyl ether	$HOC_2H_4OC_2H_5$	100	n	n	+	+	+	n	+/o	o	+	+	1
Ethylenediamine	$(CH_2NH_2)_2$	100	o	o	+	-	o	-	+	n	+	o	2
Fatty acids	R-COOH	100	+	+	+	+	+	+	o	o	+	+	1
Ferrous sulfate	$FeSO_4$	s	+	+	+	+	+	+	+	+	+	+	1
Fluorobenzene	C_6H_5F	100	-	-	+	+	+	o	-	-	o	+	2
Fluoroboric acid	HBF_4	35%	+	+	+	+	o	+	+	-	+	+	1
Formaldehyde	CH_2O	40	+	+	+	+	+	-	+/o	-	+	+	2
Formalin	CH_2O	40	+	+	+	+	+	-	+/o	-	+	+	2
Formamide	$HCONH_2$	100	+	-	+	+	+	+	+	n	+	+	1
Formic acid	HCOOH	s	-	+/o	+	+	+	-	-	+/o	+	+	1
Furan	C_4H_4O	100	-	-	+	-	+	-	n	-	+	+	3
Furanaldehyde	$C_5H_5O_2$	100	n	n	n	o	+	-	+/o	-	n	n	2
Furfural	$C_5H_3O_2$	100	n	n	n	o	+	-	+/o	-	n	n	2
Furfuryl alcohol	$OC_4H_3CH_2OH$	100	-	-	+	o	+	n	+/o	-	+	+	1
Gallic acid	$C_6H_2(OH)_3COOH$	5%	+	+	+	+	+	+	+/o	+	+	+	1
Glacial acetic acid	CH_3COOH	100	-	50%	+	+	+	-	o	60%	70%	+	1
Glauber's salt	Na_2SO_4	s	+	+	+	+	+	+	+	+	+	+	1
Glucose	$C_6H_{12}O_6$	s	+	+	+	+	+	+	+	+	+	+	1
Glycerol	$C_3H_5(OH)_3$	100	+	+	+	+	+	+	+	+	+	+	1
Glycerol chlorohydrin	C_3H_5OCl	100	-	n	+	-	+	+	o	+	+	+	3
Glycine	NH_2CH_2COOH	10	+	+	+	+	+	+	+	+	+	+	1
Glycine	NH_2CH_2COOH	10	+	+	+	+	+	+	+	+	+	+	1
Glycol	$C_2H_4(OH)_2$	100	+	+	+	+	+	+	+	+	+	+	1
Glycolic acid	$CH_2OHCOOH$	70%	+	37%	+	+	+	+	+	+/o	+	+	1
Green vitriol	$FeSO_4$	s	+	+	+	+	+	+	+	+	+	+	1
Heptane	C_7H_{16}	100	+	+	+	+	+	+	-	-	+	+	1
Hexachloroplatinic acid	H_2PtCl_6	s	n	+	+	+	-	n	+	n	+	-	-
Hexafluorosilicic acid	H_2SiF_6	100	+	30%	30%	+	o	+	+	o	40%	+/o	2
Hexafluorosilicic acid	H_2SiF_6	100	+	30%	30%	+	o	+	+	o	40%	+/o	2
Hexanal	$C_5H_{11}CHO$	100	n	n	+	+	+	-	+/o	-	+	+	1
Hexane	C_6H_{14}	100	+	+	+	+	+	+	-	-	+	+	1
Hexanetriol	$C_6H_9(OH)_3$	100	n	n	+	+	+	+	+	n	+	+	1
Hexanol	$C_6H_{13}OH$	100	-	-	+	+	+	n	+	o	+	+	1
Hexene	C_6H_{12}	100	n	+	+	+	+	+	-	-	+	+	1
Hydrazin hydrate	$N_2H_4 * H_2O$	s	+	+	+	+	+	n	+	o	+	+	3
Hydrochloric acid	HCl	38%	32%	+	+	+	-	+	o	o	+	o	1
Hydrochloric acid	HCl	38%	32%	+	+	+	-	+	o	o	+	o	1
Hydrofluoric acid	HF	80%	-	40%*	40%**	+	-	+	o	-	40%	+/o	1
Hydrofluoric acid	HF	80%	-	40%*	40%**	+	-	+	o	-	40%	+/o	1
Hydrogen bromide	HBr	50	+	+	+	+	-	-	+	-	+	o	1
Hydrogen cyanide	HCN	s	+	+	+	+	+	+	+	+	+	+	3
Hydrogen peroxide	H_2O_2	90%	40%	40%*	30%	+	+	30%	30%	+	+	+	1
Hydroiodic acid	HI	s	+	+	+	+	-	-	n	-	+	n	1
Hydroquinone	$C_6H_4(OH)_2$	s	o	+	+	+	+	+	-	+/o	+	+	2
Hydroxylammonium sulfate	$(NH_2OH)_2 * H_2SO_4$	10	+	+	+	+	+	+	+	+	+	+	2
Hypochlorous acid	HOCl	s	+	+	o	+	-	+	+/o	+	o	+	1
Hypochlorous acid	HOCl	s	+	+	o	+	-	+	+/o	+	o	+	1
Iodine	I_2	s	o	-	+	+	-	+	+/o	+	o	+/o	-
Iodkalium	KI	s	+	+	+	+	+	+	+	+	+	+	1
Iron(II) chloride	$FeCl_2$	s	+	+	+	+	-	+	+	+	+	+/o	1
Iron(II) sulfate	$FeSO_4$	s	+	+	+	+	+	+	+	+	+	+	1
Iron(III) chloride	$FeCl_3$	s	+	+	+	+	-	+	+	+	+	+/o	1
Iron(III) nitrate	$Fe(NO_3)_3$	s	+	+	+	+	+	+	+	+	+	+	1
Iron(III) phosphate	$FePO_4$	s	+	+	+	+	+	+	+	+	+	+	1
Iron(III) sulfate	$Fe_2(SO_4)_3$	s	+	+	+	+	o	+	+	+	+	+	1
Isobutyl alcohol	$C_2H_5CH(OH)CH_3$	100	-	+	+	+	+	+	+	o	+	+	1
Isopropanol	$(CH_3)_2CHOH$	100	-	+/o	+	+	+	+	+	o	+	+	1
Isopropyl acetate	$CH_3COOCH(CH_3)_2$	100	-	-	+	+	+	-	+/o	+/o	+	+	1
Isopropyl alcohol	$(CH_3)_2CHOH$	100	-	+/o	+	+	+	+	+	o	+	+	1
Isopropyl chloride	$CH_3CHClCH_3$	80%	-	-	o	+	+	+	-	o	o	+/o	2
Isopropylbenzene	$C_6H_5CH(CH_3)_2$	100	-	-	o	+	+	+	-	-	o	+	1
Isopropylether	$C_6H_{14}O$	100	-	-	o	+	+	-	-	o	o	+	1
Lactic acid	$C_3H_6O_3$	100	-	+	+	+	+/o	+	10%	+/o	+	+	1
Lead(II) acetate / lead(IV) acetate	$Pb(CH_3COO)_2$	s	+	+	+	+	+	+	+	+	+	+	2
Lead(II) nitrate	$Pb(NO_3)_2$	50	+	+	+	+	+	+	+	+	+	+	2
Lead(II) sulfate	$PbSO_4$	s	+	+	+	+	+	+	+	+	+	+	2
Levoxin	$N_2H_4 * H_2O$	s	+	+	+	+	+	n	+	o	+	+	3
Lime milk	$Ca(OH)_2$	s	+	+	+	+	+	+	+	+	+	+	1
Limescale	$CaCO_3$	s	+	+	+	+	+	+	+	+	+	+	1

ProMinent Chemical Resistance List

Corrosive agent	Formula	Concentration in %	Acryl	PVC	PP	PVDF	1.4404	FKM	EPDM	PharMed®	PE	HastelloyC	WGK
Lithium bromide	LiBr	s	+	+	+	+	+	+	+	+	+	+	1
Lithium chloride	LiCl	s	+	+	+	+	-	+	+	+	+	n	1
Magnesium carbonate	$MgCO_3$	s	+	+	+	+	+	+	+	+	+	+/o	1
Magnesium chloride	$MgCl_2$	s	+	+	+	+	o	+	+	+	+	+	1
Magnesium hydroxide	$Mg(OH)_2$	s	+	+	+	+	+	+	+	+	+	+	1
Magnesium nitrate	$Mg(NO_3)_2$	s	+	+	+	+	+	+	+	+	+	+	1
Magnesium sulfate	$MgSO_4$	s	+	+	+	+	+	+	+	+	+	+/o	1
Maleic acid	$C_4H_4O_4$	s	+	+	+	+	+	+	+	o	+	+	1
Malic acid	$C_4H_6O_5$	s	+	+	+	+	+	+	+	+	+	+	1
Manganese(II) chloride	$MnCl_2$	s	+	+	+	+	-	+	+	+	+	+	1
Manganese(II) sulfate	$MnSO_4$	s	+	+	+	+	+	+	+	+	+	+	1
MEK	$CH_3COC_2H_5$	100	-	-	+	-	+	-	+	-	+	+	1
Mercury	Hg	100	+	+	+	+	+	+	+	+	+	+	3
Mercury(II) chloride	$HgCl_2$	s	+	+	+	+	-	+	+	+	+	+	3
Mercury(II) cyanide	$Hg(CN)_2$	s	+	+	+	+	+	+	+	+	+	+	3
Mercury(II) nitrate	$Hg(NO_3)_2$	s	+	+	+	+	+	+	+	+	+	+	3
Mesityl oxide	$C_6H_{10}O$	100	-	-	n	n	+	-	+/o	-	n	+	1
Methacrylic acid	C_3H_5COOH	100	n	n	+	+	+	o	+/o	+/o	+	+	1
Methanol	CH_3OH	100	-	-	+	+	+	o	+	+/o	+	+	1
Methoxybutanol	$CH_3O(CH_2)_4OH$	100	-	-	+	+	+	+	o	o	+	+	1
Methyl acetate	CH_3COOCH_3	60%	-	-	+	+	+	-	+/o	+/o	+	+	2
Methyl acetoacetate	$C_5H_8O_3$	100	-	-	+	+	+	-	+/o	o	+	+	2
Methyl acrylate	$C_2H_3COOCH_3$	100	-	-	+	+	+	-	+/o	o	+	+	2
Methyl alcohol	CH_3OH	100	-	-	+	+	+	o	+	+/o	+	+	1
Methyl benzoate	$C_6H_5COOCH_3$	100	-	-	+	o	+	+	-	-	+	+	2
Methyl cellulose	-	s	+	+	+	+	+	+	+	+	+	+	1
Methyl chloroacetate	$ClCH_2COOCH_3$	100	-	o	+	+	+	o	-	-	+	+	2
Methyl chloroform	CCl_3CH_3	100	-	-	o	+	+	+	-	o	o	+	3
Methyl ethyl ketone	$CH_3COC_2H_5$	100	-	-	+	-	+	-	+	-	+	+	1
Methyl isobutyl ketone	$CH_3COC_4H_9$	100	-	-	+	-	+	-	o	-	+	+	1
Methyl isopropyl ketone	$CH_3COC_3H_7$	100	-	-	+	-	+	-	+/o	-	+	+	1
Methyl methacrylate	$C_3H_5COOCH_3$	100	-	-	+	+	+	-	-	-	+	+	1
Methyl oleate	$C_{17}H_{33}COOCH_3$	100	n	n	+	+	+	+	+/o	n	+	+	1
Methyl salicylate	$HOC_6H_4COOCH_3$	100	-	-	+	+	+	n	+/o	-	+	+	1
Methylamine	CH_3NH_2	32%	+	o	+	o	+	-	+	+	+	+	2
Methylcyclopentane	$C_5H_9CH_3$	100	+	+	+	+	+	+	-	-	+	+	1
Methylene chloride	CH_2Cl_2	100	-	-	o	o	o	+	-	o	-	+	2
Methylglycol	$C_3H_8O_2$	100	+	+	+	+	+	-	+/o	+	+	+	1
MIBK	$CH_3COC_4H_9$	100	-	-	+	-	+	-	o	-	+	+	1
Morpholine	C_4H_9ON	100	-	-	+	-	+	n	n	-	+	+	2
Motor oils	-	100	n	+/o	+	+	+	+	-	-	+	+	2
Natron	$NaHCO_3$	s	+	+	+	+	+	+	+	+	+	+	1
Nickel(II) acetate	$(CH_3COO)_2Ni$	s	+	+	+	+	+	-	+	+	+	+	2
Nickel(II) chloride	$NiCl_2$	s	+	+	+	+	-	+	+	+	+	+	2
Nickel(II) nitrate	$Ni(NO_3)_2$	s	+	+	+	+	+	+	+	+	+	+/o	2
Nickel(II) sulfate	$NiSO_4$	s	+	+	+	+	+	+	+	+	+	+/o	2
Nitric acid	HNO_3	99%	10%	50%	o	65%[2]	50%	50%	10%	35%	50%	65%	1
Nitromethane	CH_3NO_2	100	-	-	+	o	+	-	+/o	-	+	+	2
Nitropropane	$(CH_3)_2CHNO_2$	100	-	-	+	n	+	-	+/o	-	+	+	2
Nitrotoluene	$C_6H_4NO_2CH_3$	100	-	-	+	+	+	o	-	-	+	+	2
Octane	C_8H_{18}	100	o	+	+	+	+	+	-	-	+	+	1
Octanol	$C_8H_{17}OH$	100	-	-	+	+	+	+	+	-	+	+	1
Octylcresol	$C_{15}H_{24}O$	100	-	-	+	+	+	o	n	-	+	+	1
Oil	-	100	n	+/o	+	+	+	+	-	-	+	+	2
Oleum	$H_2SO_4 + SO_3$	s	n	-	-	-	+	+	-	+	-	+	2
Orthophosphoric acid	H_3PO_4	85%	50%	+	+	+	+	+	+	+	+	+	1
Oxalic acid	$(COOH)_2$	s	+	+	+	+	10%	+	+	+/o	+	+/o	1
Pentane	C_5H_{12}	100	+	+	+	+	+	+	-	-	+	+	1
PER	C_2Cl_4	100	-	-	o	+	+	o	-	o	o	+	3
Perchloric acid	$HClO_4$	70%	n	10%*	10%	+	-	+	+/o	+	+	n	1
Perhydrol	H_2O_2	90%	40%	40%*	30%	+	+	30%	30%	+	+	+	1
Petroleum ether	C_nH_{2n+2}	100	+	+/o	+	+	+	+	-	-	+	+	1
Phenol	C_6H_5OH	100	-	-	+	+	+	+	-	+	+	+	2
Phenylethyl ether	$C_6H_5OC_2H_5$	100	-	-	+	n	+	-	-	-	+	+	2
Phenylhydrazine	$C_6H_5NHNH_2$	100	-	-	o	+	+	o	-	-	o	+	2
Phosphoric acid	H_3PO_4	85%	50%	+	+	+	+	+	+	+	+	+	1
Phosphorus trichloride	PCl_3	100	-	-	+	+	+	o	+	+/o	+	+	1
Phosphoryl chloride	$POCl_3$	100	-	-	+	+	n	+	+	n	+	+	1
Phthalic acid	$C_6H_4(COOH)_2$	s	+	+	+	+	+	+	+	+	+	+	1
Picric acid	$C_6H_2(NO_3)_3OH$	s	+	+	+	+	+	+	+	-	+	+	2
Piperidine	$C_5H_{11}N$	100	-	-	n	n	+	-	-	-	n	+	2
Plaster	$CaSO_4$	s	+	+	+	+	+	+	+	+	+	+	1
Potassium acetate	CH_3COOK	s	+	+	+	+	+	+	+	+	+	+	1
Potassium alum	$KAl(SO_4)_2$	s	+	+	+	+	+	+	+	+	+	+	1
Potassium aluminium sulfate	$KAl(SO_4)_2$	s	+	+	+	+	+	+	+	+	+	+	1
Potassium bicarbonate	$KHCO_3$	40	+	+	+	+	+	+	+	+	+	+/o	1
Potassium bisulfate	$KHSO_4$	5%	+	+	+	+	+	+	+	+	+	+	1

ProMinent Chemical Resistance List

Corrosive agent	Formula	Concentration in %	Acryl	PVC	PP	PVDF	1.4404	FKM	EPDM	PharMed®	PE	HastelloyC	WGK
Potassium bitartrate	$KC_4H_5O_6$	s	+	+	+	+	+	+	+	+	+	+	1
Potassium bromate	$KBrO_3$	s	+	+	+	+	+	+	+	+	+	+	2
Potassium bromide	KBr	s	+	+	+	+	10%	+	+	+	+	0.1	1
Potassium bromide	KBr	s	+	+	+	+	10%	+	+	+	+	0.1	1
Potassium carbonate	K_2CO_3	s	+	+	+	+	+	+	+	55%	+	+	1
Potassium carbonate	K_2CO_3	s	+	+	+	+	+	+	+	55%	+	+	1
Potassium chlorate	$KClO_3$	s	+	+	+	+	+	+	+	+	+	+	2
Potassium chloride	KCl	s	+	+	+	+	-	+	+	+	+	+/o	1
Potassium chromate	K_2CrO_4	10	+	+	+	+	+	+	+	+	+	+	3
Potassium cyanate	KOCN	s	+	+	+	+	+	+	+	+	+	+	2
Potassium cyanide	KCN	s	+	+	+	+	5%	+	+	+	+	5%	3
Potassium cyanide	KCN	s	+	+	+	+	5%	+	+	+	+	5%	3
Potassium dichromate	$K_2Cr_2O_7$	s	+	+	+	+	25%	+	+	+	+	10%	3
Potassium dichromate	$K_2Cr_2O_7$	s	+	+	+	+	25%	+	+	+	+	10%	3
Potassium ferrocyanide	$K_4Fe(CN)_6$	s	+	+	+	+	+	+	+	+	+	+	1
Potassium ferrocyanide / potassium ferricyanide	$K_4Fe(CN)_6$	s	+	+	+	+	+	+	+	+	+	+	1
Potassium fluoride	KF	s	+	+	+	+	+	+	+	+	+	+	1
Potassium hexacyanoferrate(III)	$K_3Fe(CN)_6$	s	+	+	+	+	+	+	+	+	+	+	1
Potassium hydrogen fluoride	KHF_2	s	n	+	+	+	+	+	+	+	+	+	1
Potassium hydroxide	KOH	50	+	+	+	+ (25 °C)	+	-	+	10%	+	+	1
Potassium iodide	KI	s	+	+	+	+	+	+	+	+	+	+	1
Potassium metaborate	KBO_2	s	+	+	+	+	+	+	+	+	+	+	1
Potassium nitrate	KNO_3	s	+	+	+	+	+	+	+	+	+	+	1
Potassium perchlorate	$KClO_4$	s	+	+	+	+	n	+	+	+	+	+	1
Potassium permanganate	$KMnO_4$	s	+	+	+	+	+	+	+	6%	+	+	2
Potassium persulfate	$K_2S_2O_8$	s	+	+	+	+	+	+	+	+	+	+	1
Potassium persulfate	$K_2S_2O_8$	s	+	+	+	+	+	+	+	+	+	+	1
Potassium sulfate	K_2SO_4	s	+	+	+	+	+	+	+	+	+	+	1
Potassium sulfite	K_2SO_3	s	+	+	+	+	+	+	+	+	+	+	1
Propionic acid	C_2H_5COOH	100	o	+	+	+	+	+	+	+/o	+	+	1
Propionitrile	CH_3CH_2CN	100	n	n	+	+	+	+	-	-	+	+	2
Propyl acetate	$CH_3COOC_3H_7$	100	-	-	+	+	+	-	+/o	-	+	+	1
Propyl acetate	$CH_3COOC_3H_7$	100	-	-	+	+	+	-	+/o	-	+	+	1
Propylene glycol	$CH_3CHOHCH_2OH$	100	+	+	+	+	+	+	+	+	+	+	1
Prussic acid	HCN	s	+	+	+	+	+	+	+	+	+	+	3
Pyridine	C_5H_5N	100	-	-	o	-	+	-	-	o	+	+	2
Pyrrole	C_4H_4NH	100	n	n	+	n	+	-	-	-	+	+	2
Salicylic acid	HOC_6H_4COOH	s	+	+	+	+	+	+	+	+	+	+/o	1
Salmiac	NH_4Cl	s	+	+	+	+	-	+	+	+	+	+/o	1
Salt water	-	s	+	+/o	+	+	+/o	+	+	+	+	+	1
Saltpetre	KNO_3	s	+	+	+	+	+	+	+	+	+	+	1
Silicic acid	$SiO_2 * x H_2O$	s	+	+	+	+	+	+	+	+	+	+	1
Silver bromide	AgBr	s	+	+	+	+	+/o	+	+	+	+	+	1
Silver chloride	AgCl	s	+	+	+	+	-	+	+	+	+	+/o	1
Silver nitrate	$AgNO_3$	s	+	+	+	+	+	+	+	+	+	+/o	3
Silver nitrate	$AgNO_3$	s	+	+	+	+	+	+	+	+	+	+/o	3
Sodium acetate	$NaCH_3COO$	s	+	+	+	+	+	+	+	+	+	+	1
Sodium benzoate	C_6H_5COONa	s	+	+	+	+	+	+	+	+	+	+	1
Sodium bicarbonate	$NaHCO_3$	s	+	+	+	+	+	+	+	+	+	+	1
Sodium bisulfate	$NaHSO_4$	s	+	+	+	+	+	+	+	+	+	+	1
Sodium bisulfite	$NaHSO_3$	s	+	+	+	+	+	+	+	+	+	+	1
Sodium bromate	$NaBrO_3$	s	+	+	+	+	+	+	+	+	+	+	3
Sodium bromide	NaBr	s	+	+	+	+	+	+	+	+	+	+	1
Sodium carbonate	Na_2CO_3	s	+	+	+	+	+/o	+	+	+	+	+	1
Sodium chlorate	$NaClO_3$	s	+	+	+	+	+	+	+	+	+	+	2
Sodium chloride	NaCl	s	+	+	+	+	-	+	+	+	+	+	1
Sodium chloride (table salt)	NaCl	s	+	+	+	+	-	+	+	+	+	+	1
Sodium chlorite	$NaClO_2$	24%	+	+	+	+	10%	+	+	+	+	10%	2
Sodium chromate	Na_2CrO_4	s	+	+	+	+	+	+	+	+	+	+	3
Sodium cyanide	NaCN	s	+	+	+	+	+	+	+	+	+	+	3
Sodium dichromate	$Na_2Cr_2O_7$	s	+	+	+	+	+	+	+	+	+	+	3
Sodium dithionite	$Na_2S_2O_4$	s	+	10%*	10%	+	+	n	n	+	10%	+/o	1
Sodium fluoride	NaF	s	+	+	+	+	10%	+	+	+	+	+	1
Sodium hydrogen sulfate	$NaHSO_4$	s	+	+	+	+	+	+	+	+	+	+	1
Sodium hydroxide	NaOH	50	+	+	+	+ (60%/25 °C)	+	-	+	30%	+	+	1
Sodium hydroxide solution	NaOH	50	+	+	+	+ (60%/25 °C)	+	-	+	30%	+	+	1
Sodium hypochlorite	NaOCl + NaCl	12%	+	+	o	+	-	o	+	+	o	> 10%	2
Sodium iodide	NaI	s	+	+	+	+	+	+	+	+	+	+	1
Sodium metabisulfite	$Na_2S_2O_5$	s	+	+	+	+	+	n	n	+	+	+	1
Sodium metaphosphate	$(NaPO_3)_n$	s	+	+	+	+	+	+	+	+	+	+	1
Sodium nitrate	$NaNO_3$	s	+	+	+	+	+	+	+	+	+	+	1
Sodium nitrite	$NaNO_2$	s	+	+	+	+	+	+	+	+	+	+	2
Sodium oxalate	$Na_2C_2O_4$	s	+	+	+	+	+	+	+	+	+	+	1
Sodium perborate	$NaBO_2*H_2O_2$	s	+	+/o	+	+	+	+	+	+	+	+/o	1

ProMinent Chemical Resistance List

Corrosive agent	Formula	Concentration in %	Acryl	PVC	PP	PVDF	1.4404	FKM	EPDM	Pharmed®	PE	HastelloyC	WGK
Sodium perchlorate	$NaClO_4$	s	+	+	+	+	10%	+	+	+	+	10%	1
Sodium peroxide	Na_2O_2	s	+	+	+	+	+	+	+	n	-	+	1
Sodium peroxodisulfate	$Na_2S_2O_8$	s	n	+	+	+	+	+	+	+	+	+	1
Sodium salicylate	$C_6H_4(OH)COONa$	s	+	+/o	+	+	+	+	+	+	+	+	1
Sodium silicate	Na_2SiO_3	s	+	+	+	+	+	+	+	+	+	+	1
Sodium sulfate	Na_2SO_4	s	+	+	+	+	+	+	+	+	+	+	1
Sodium sulfide	Na_2S	s	+	+	+	+	+	+	+	+	+	+	2
Sodium sulfite	Na_2SO_3	s	+	+	+	+	50%	+	+	+	+	50%	1
Sodium tetraborate	$Na_2B_4O_7 * {}_{10H2}O$	s	+	+	+	+	+	+	+	+	+	+	1
Sodium thiosulfate	$Na_2S_2O_3$	s	+	+	+	+	25%	+	+	+	+	25%	1
Sodium thiosulfate	$Na_2S_2O_3$	s	+	+	+	+	25%	+	+	+	+	25%	1
Sodium tripolyphosphate	$Na_5P_3O_{10}$	s	+	+	+	+	+	+/o	+	+	+	+	1
Starch	$(C_6H_{10}O_5)_n$	s	+	+	+	+	+	+	n	+	+	+	1
Styrene	$C_6H_5CHCH_2$	100	-	-	o	+	+	o	-	-	o	+	2
Succinic acid	$C_4H_6O_4$	s	+	+	+	+	+	+	+	+	+	+	1
Sugar of lead	$Pb(CH_3COO)_2$	s	+	+	+	+	+	+	+	+	+	+	2
Sugar solution	-	s	+	+	+	+	+	+	+	+	+	+	1
Sulfur chloride	S_2Cl_2	100	n	n	n	+	n	+	-	-	n	n	-
Sulfuric acid	H_2SO_4	98%	30%	50%	85%	+	20%	+	80%	30%	80%	+	1
Sulfuric acid, fuming	$H_2SO_4 + SO_3$	s	n	-	-	-	+	+	-	+	-	+	2
Sulfurous acid	H_2SO_3	s	+	+	+	+	10%	+	+	+	+	+	1
Sulfuryl chloride	SO_2Cl_2	100	-	-	-	o	n	+	o	-	-	n	1
Tannin	$C_{76}H_{52}O_{46}$	50	+	+	+	+	+	+	+	+	+	+	1
Tartaric acid	$C_4H_6O_6$	s	50%	+	+	+	+	+	+/o	+	+	+	1
Tetrachloroethane	$C_2H_2Cl_4$	100	-	-	o	+	+	o	-	o	o	+	3
Tetrachloroethylene	C_2Cl_4	100	-	-	o	+	+	o	-	o	o	+	3
Tetrachloroethylene	C_2Cl_4	100	-	-	o	+	+	o	-	o	o	+	3
Tetrachloromethane	CCl_4	100	-	-	-	+	+	+	-	-	o	+	3
Tetraethyl lead	$Pb(C_2H_5)_4$	100	+	+	+	+	+	+	-	n	+	+	3
Tetraethyllead	$Pb(C_2H_5)_4$	100	+	+	+	+	+	+	-	n	+	+	3
Tetrahydrofuran	C_4H_8O	100	-	-	o	-	+	-	-	-	o	+	1
Tetralin	$C_{10}H_{12}$	100	-	-	-	+	+	+	-	-	o	+	3
Thionyl chloride	$SOCl_2$	100	-	-	-	+	n	+	+	+	-	n	1
Thiophene	C_4H_4S	100	n	-	o	n	+	-	-	-	o	+	3
Tin(II) chloride	$SnCl_2$	s	+	o	+	+	-	+	+	+	+	+/o	1
Tin(II) sulfate	$SnSO_4$	s	n	+	+	+	+	+	+	+	+	+/o	1
Tin(IV) chloride	$SnCl_4$	s	n	+	+	+	-	+	+	+	+	+	1
Titanium tetrachloride	$TiCl_4$	100	n	n	n	+	n	o	-	n	n	n	1
Toluene	$C_6H_5CH_3$	100	-	-	o	+	+	o	-	-	o	+	2
Toluene diisocyanate	$C_7H_3(NCO)_2$	100	n	n	+	+	+	-	+/o	n	+	+	2
Triacetin	$C_3H_5(CH_3COO)_3$	100	n	n	+	+	+	-	+	n	+	+	1
Tributyl phosphate	$(C_4H_9)_3PO_4$	100	n	-	+	+	+	-	+	+	+	+	1
Trichloroacetic acid	CCl_3COOH	50	-	+	+	+	-	-	o	+/o	+	+	1
Trichloroethane	CCl_3CH_3	100	-	-	o	+	+	+	-	o	o	+	3
Trichloroethylene	C_2HCl_3	100	-	-	o	+	+/o	o	-	o	o	+	3
Tricresyl phosphate	$(C_7H_7)_3PO_4$	90%	-	-	+	n	+	o	+	+	+	+	2
Triethanolamine	$N(C_2H_4OH)_3$	100	+	o	+	n	+	-	+/o	o	+	+	1
Tripotassium phosphate	KH_2PO_4	s	+	+	+	+	+	+	+	+	+	+	1
Tris(2-ethylhexyl) phosphate	$(C_8H_{17})_3PO_4$	100	n	-	+	+	+	o	+	+	+	+	2
Trisodium phosphate	Na_3PO_4	s	+	+	+	+	+	+	+	+	+	+	1
Urea	$CO(NH_2)_2$	s	+	+/o	+	+	+	+	+	20%	+	+	1
Vinyl acetate	$CH_2=CHOOCCH_3$	100	-	-	+	+	+	n	n	+/o	+	+	2
Vitriol of copper	$CuSO_4$	s	+	+	+	+	+	+	+	+	+	+	2
Xylene	$C_6H_4(CH_3)_2$	100	-	-	-	+	+	o	-	-	o	+	2
Zinc acetate	$(CH_3COO)_2Zn$	s	+	+	+	+	+	-	+	+	+	+	1
Zinc chloride	$ZnCl_2$	s	+	+	+	+	-	+	+	+	+	n	1
Zinc sulfate	$ZnSO_4$	s	+	+	+	+	+	+	+	+	+	+/o	1

[1] Chlorine dioxide is capable of penetrating PVDF without destroying it. This can lead to damage to PVDF-coated parts.

[2] Nitric acid is a highly diffusive acid and tends to permeate depending on temperature and concentration. For potential limitations on its use in piston diaphragm valves, please contact ProMinent.

The statements made in this list do not necessarily apply to components, such as valves, even if they are made from the same materials.

Overview of the Resistance of Soft PVC Hoses (Guttasyn®) to the Most Common Chemicals

This data applies to standard conditions (20 °C, 1,013 mbar).

+	resistant
o	conditionally resistant
-	not resistant

The data has been 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 feed chemicals 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
Acetic acid	50	o
Acetic acid (wine vinegar)	-	o
Acetic acid anhydride	100	-
Acetic acid, aqueous	10	+
Acetic ester	100	-
Acetone	all	-
Acetylene tetrabromide	100	-
Aluminium salts, aqueous	all	+
Alums of all kinds, aqueous	all	+
Ammonium salts, aqueous	all	+
Ammonium, aqueous	saturated	-
Ammonium, aqueous	15	-
Aniline	100	-
Benzene	100	-
Bisulfite, aqueous	40	+
Borax solution	all	+
Boric acid, aqueous	10	+
Bromine, vaporous and liquid	-	-
Butanol	100	+
Butyl acetate	100	-
Butyric acid, aqueous	20	+
Butyric acid, aqueous	conc.	-
Calcium chloride, aqueous	all	+
Carbon disulfide	100	-
Carbonic acid	all	+
Caustic potash	15	+
Chlorinated hydrocarbons	all	-
Chrome-alum, aqueous	all	+
Chromic acid, aqueous	50	-
Copper sulfate, aqueous	all	+
Creosote	-	-
Dextrin, aqueous	saturated	+
Diesel oils, compressed oils	100	o
Diethyl ether	100	-
Difluorodichloromethane	100	-
Ethanol	96	-
Ethyl acetate	100	-
Ethylene glycol	30	+
Ferric chloride, aqueous	all	+
Fertilizing manure salt, aqueous	all	+
Formaldehyde, aqueous	30	o
Glacial acetic acid	100	-
Glucose, aqueous	saturated	+
Glycerol	100	-
Halogens	all	-
Hydrochloric acid	15	+
Hydrogen bromide	10	+
Hydrogen peroxide	up to 10	+
Hydrogen sulfide, gaseous	100	-
Ink	-	+

ProMinent Chemical Resistance List

Corrosive agent	Concentration in %	Evaluation
Magnesium salts, aqueous	all	+
Methyl alcohol	100	+
Methylene chloride	100	-
Nitric acid, aqueous	25	+
Oils	-	-
Perchloric acid	all	o
Phenol, aqueous	all	o
Phosphoric acid, aqueous	100	-
Potassium bichromate, aqueous	saturated	+
Potassium persulfate, aqueous	saturated	+
Silver nitrate	10	+
Sodium chloride, aqueous	all	+
Sodium hydroxide solution	aqueous	+
Sodium hypochlorite	15	+
Sodium salts	-	-
Sulfur dioxide, gaseous	all	+
Sulfuric acid	30	+
Tetrachloromethane	100	-
Toluene	100	-
Trichloroethylene	100	-
Urea, aqueous	all	+
Xylene	100	-
Zinc salts	all	+

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