ProMinent®

Metering Technology

Product catalogue 2022

Focus on **YOU**









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Heidelberg, January 2022

Product Catalogue Volume 1

Metering Pumps, Components and Metering Systems



Metering technology for professionals

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

Chapter 1

Solenoid metering pumps can cover all metering tasks ranging from a few ml/h up to 80 l/h at a back pressure of up to 25 bar.

Our new **peristaltic pumps** can cover demanding metering tasks ranging from 6 ml/h to 410 l/h at a back pressure of up to 8 bar.

All-purpose **motor-driven metering pumps** in the low-pressure range up to a metering rate of 1000 l/h, to ensure that your processes operate safely even when meeting maximum requirements.

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

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

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

Chapter 2

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

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.



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

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





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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 data sheet 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!

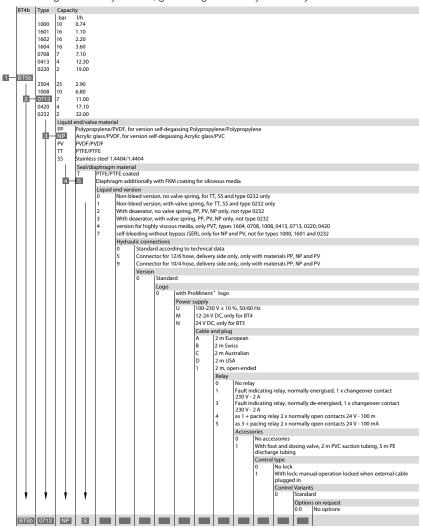
You've opted for a pump product range. It's now up to you to configure the pump exactly to meet your individual needs.

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.



We'll be happy to advise you on your metering task.

Give us a call should you still have any questions!

Sales at ProMinent Deutschland GmbH

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Technical consulting 0049 6221 842 – 1850

service@prominent.com



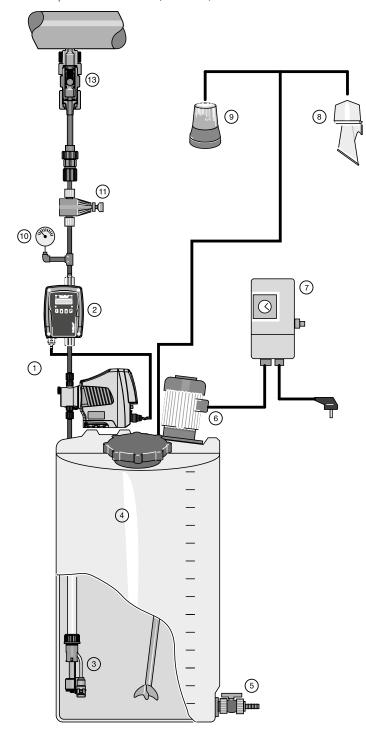


Metering Pumps also Need Accessories

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 accesso**ries. 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
- Manometer for precise adjustment of the back pressure valve
- 11 Back pressure valve
- 13 Injection valve

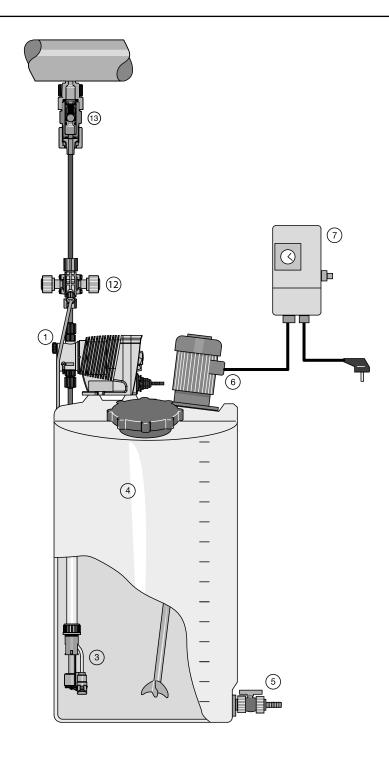




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Metering Pumps also Need Accessories

- 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





Metering technology product innovations





Hygienic design of motor-driven metering pump Sigma

Capacity range of the Sigma: 25 - 1,000 l/h, 10 - 4 bar

The Hygienic Design version of the Sigma diaphragm metering pumps is optimised in terms of dead space, features as few gaps as possible and has smooth, wetted surfaces for flexible and easy use in hygienically sensitive applications.

The simple construction and smooth surface make easy CIP possible and allow the device to be dismantled at speed. Ball non-return valves and EPDM seals ensure gentle and reliable metering for tasks with strict hygiene requirements (when working with aqueous foods or food additives).

Like all intelligent ProMinent metering pumps, the Sigma product range can be flexibly controlled using a highly diverse range of signals. Designed for continuous operation, hermetically sealed and without a shaft passage into the metering chamber, providing simple and reliable handling. The standard PTFE multi-layer diaphragm with diaphragm rupture control offers additional process reliability.

- Process reliability thanks to PTFE multi-layer safety diaphragm with condition monitoring
- Fast CIP, reliable operation and easy handling
- Simple construction, optimised in terms of dead space and small number of parts, reliable operation, no shaft passage into the media chamber
- Precise metering thanks to the option for adjusting the metering volume in 1% steps by means of stroke rate and stroke length
- Physiologically safe wetted materials (FDA and 1935/2004); reliable and flexible Sigma motor-driven metering pump with ball non-return valves enables a wide range of applications
- Flexibly connectible: connection to process control systems via integrated PROFIBUS®, CANopen interface.

For more information see page \rightarrow 94

Metering technology product innovations



Peristaltic metering pump DULCOFLEX DFYa

Feed rate of 5.1 I/h to 410 I/h at up to 8 bar back pressure

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

The new generation of peristaltic metering pumps can now 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 thus joins the remaining ProMinent product range of intelligent metering pumps, which all share the same menu structure and user interface.

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

- Operation by contact, batch, manual, analogue or BUS control
- Adjustment of the metering rate directly in I/h
- Connection to process control systems via a BUS interface, such PROFIBUS or CANopen
- No problems with very gaseous media or air locks
- Simple, menu-guided hose change
- Reversible direction of rotation
- Direct input of the required and desired concentration in concentration mode with volume-proportional metering tasks
- Automatic mode volume settings only (I/h, ml/contact etc.)
- Pump can run dry
- Suitable for viscosities of up to 20,000 mPas
- Sole contact with media in the hose

For more information see page→ 46

Hydraulic Diaphragm Metering Pump Evolution mikro

Capacity range 0.01 - 18 l/h, 400 - 10 bar

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

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

The Evolution mikro is the first of its kind with an electronically regulated direct drive (linear motor). It can be ideally adapted to the respective application, thanks to a control range of up to 1:200 and the combination of individually independent metering profiles with 3-parameter control.

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 drive
- 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

For more information see page→ 363





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 which enables digital fluid management by connecting smart pumps, controllers and sensors:

- DULCONNEX Platform
- DULCONNEX API
- DULCONNEX Gateway
- DULCONNEX Blue

DULCONNEX is based on robustly networked products that can be individually adapted to operating conditions. As all the components of a system are networked, metering pumps, disinfection systems, controllers and sensors can interact in an optimised manner – increasing process reliability and system efficiency.

Location-independent system monitoring in real time

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 not on site. Simply use the terminal device of your choice: smartphone, tablet or PC. Configurable alarms and messages inform you of relevant events 24/7.

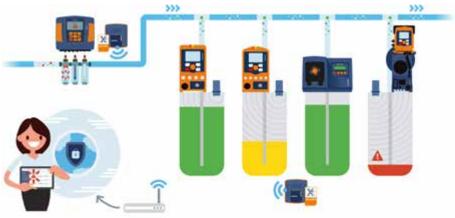
Be in a position to act promptly at all times with DULCONNEX. No matter whether you work with industrial and process water, cooling water, drinking water or swimming pool water – DULCONNEX supports you in ensuring the reliable treatment of your fluids.

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.





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

Controller

- DULCOMETER diaLog DACb
- AEGIS II
- SlimFLEX 5a

■ 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)



DULCONNEX Gateway

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	-	1098723	
DULCONNEX Gateway DACb	-	1098756	
DULCONNEX Gateway pumps and I/O	gamma/ X, gamma/ XL,	1105889	
modules	delta, DULCOFLEX DF4a,		
	DULCOFLEX DFXa,		
	DULCOFLEX DFYa,		
	I- and M-modules		
	(DULCOMARIN II), Fren-		
	zel+Berg modules (CIO50,		
	CIO57, CIO58, CIO60,		
	CIO300), Sigma X		
DULCONNEX Gateway UVCb	DULCODES LP/MP,	1098757	
	gamma/ X, sigma/ X		

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

Key features

- Secure communication Simple authentication and pairing with supported units for secure data exchange via Bluetooth interface.
- Reliable remote control Simply operate ProMinent devices in installation environments that are hard to access via remote control.
- Intuitive design Pumps can now be operated even more conveniently, thanks to its modern and multilingual user interface.
- Always up to date The key information from all units can be gathered at a glance on the clearly arranged dashboard. Information on current device status and performance data, as well as firmware updates, are available at any time.
- Simple pump configuration Restore saved device configurations at any time and copy them quickly from one pump to other pumps.
- End-to-end documentation Automatic recording of key operating data in the log book and the built-in commissioning report help to comply with regulatory documentation duties.
- Direct access to product documentation Permanent access to the latest version of product specific documents or relevant files.



Technical requirements

- Supported devices with the latest firmware version
- Built-in Bluetooth module (Bluetooth Classic or Bluetooth Low Energy)
- Mobile end device with supported operating system (Android from version 9.0 ("Pie") or later and iOS from version 12 or later)

Compatible devices

Solenoid-driven metering pump gamma/ X with Bluetooth Classic module from firmware version 02.05.06.02 or later with Bluetooth Low Energy module from firmware version: 02.06.01.01 or later

Further models will continuously follow in future.

Supported languages

- German (DE)
- English (EN)
- French (FR)
- Spanish (ES)
- Polish (PL)

Availability

- Apple App Store for mobile devices with iOS operating system (iPhone/iPad)
- Google Play Store for Android devices

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 log book 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 setup 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.

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 for employees increased. Comprehensive logging and automated generation of reports facilitate the fulfillment 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 in good time thanks to configurable alarms with e-mail notification function. In an emergency, easily create and share documentation in order to receive competent help as quickly as possible.
- A plus in transparency and security Gaining knowledge of the exact process and system status on site even before entering potentially dangerous environments. The complete history of all measured values and system data as well as their reliable storage in the cloud also offer additional protection against manipulation and data loss.
- Plan service assignments more efficiently and prepare them more effectively With the help of location-independent access to status and performance data, journeys for pure inspection and documentation purposes can be minimized. Knowledge of the exact system status before arrival at the place of use also enables service activities to be optimally prepared.
- Increased system availability and optimized process quality The visualization of freely combinable parameters in diagrams allows detailed analysis of processes and supports the identification of optimization potential.
- Easier fulfillment of regulatory documentation obligations Thanks to continuous logging, automated generation of reports and the simple export function, the manual effort required to provide evidence of proper operation is significantly reduced.

Technical Details

The responsive design and the intuitive user interface of the web application ensure that users benefit quickly and easily from the numerous functions of the IIoT platform:

- Dashboards The most important information from various systems or process sections can be seen at a glance on individually configurable dashboards
- Alarms Freely configurable alarm messages by e-mail inform about exceeding or falling below individually adjustable limit values and about other important events
- Log book The continuous logging of all system data and events creates increased transparency and additional security
- Data history A complete history of operating data and measured values supports operators in fulfilling regulatory documentation obligations and forms the basis for comprehensive analyzes
- **Visualization** Both current and historical measured values can be freely combined in diagrams, which facilitate detailed analyzes of system performance and process quality
- Reports With the help of the automated report generation and the simple creation of individual documentation in exportable file formats, proof of proper operation is possible with minimal effort.

Field of Application

- Increase transparency Regardless of whether it is pumps, controllers, sensors or systems, the current status and performance data are 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 effortlessly keep an eye on critical measured values such as dosing rate, fill level or system pressure.
- Ensure system availability Comprehensive logging of the device status, including all errors, warnings and events, pays off, especially in time-critical situations. Detailed documentation can be generated at the push of a button, which can be quickly and easily shared with local service contacts. This guarantees the fastest possible help in an emergency and minimizes the risk of longer downtimes.
- Optimize processes Current fill levels can be clearly displayed on the individually designed dashboards and reliably monitored with the help of configurable alarms. Upon request, automated notifications inform the responsible employees or chemical suppliers when critical limit values are reached, so that they can provide replenishment in good time. Process-critical chemicals can thus be delivered and stocked with pinpoint accuracy.
- **Protect employees** Via the DULCONNEX Platform, operators, employees or service technicians gain knowledge of the exact process and system status on site even before entering potentially dangerous environments. In this way, every operation can be optimally prepared and safety increased.
- Prove conformity The continuous logging of all relevant operating data facilitates the fulfillment of regulatory documentation obligations. By means of automatically generated reports, manual work is significantly reduced and the proper operation of systems can be easily verified at any time.



How to Find the Right Pump Type?

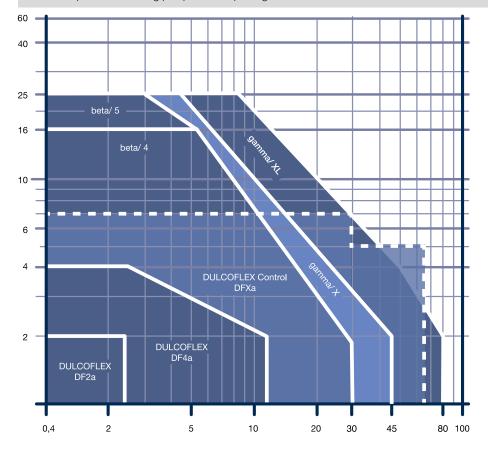
Low-pressure metering pumps for practically all liquid chemicals:

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 short list potential products. Determine the right product range of metering pumps based on a given back pressure (bar) and pump capacity (I/h). All our low-pressure metering pumps are self-priming!



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

You will find higher metering rates in the Motor-driven metering pumps chapter or under Process technol-

For help in quickly selecting the right pump, please consult our Pump Guide: www.pump-guide.com.

Low-pressure Metering Technology

1.1.2 Solenoid-Driven Metering Pump beta

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

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



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

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



beta b

Your Benefits

- Optional external control via 0/4 20 mA and potential-free contacts with pulse step-up and step-down of 64:1 to 1:64
- Simple adjustment of metering capacity via stroke rate and stroke length
- Adaptation to existing signal transducers by external control via potential-free contacts with pulse step-up and step-down
- Suitable for use with almost all liquid chemicals thanks to the available material combinations: PP, PVDF, clear acrylic, PTFE and stainless steel
- Self-bleeding dosing head design in clear acrylic/PVC and PP
- Virtually wear-free solenoid drive: economical and overload-proof
- Economical operation with up to 50% energy-savings, thanks to higher pump efficiency
- Everything in sight and under control: 3 LED display for operating, warning and error messages

Technical Details

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

Field of Application

Metering liquid media in water treatment and chemical processes





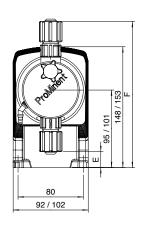
Low-pressure Metering Technology

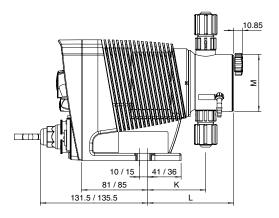
1.1 Solenoid-Driven Metering Pumps

Dimensional drawing of beta, PP material version

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

Туре	K	L	ØМ	
1000 - 1604	71	105.5	70	
0708 - 0220	77.5	111	90	
1008 - 0420	74	107.5	90	
0232	77.5	94.5	110	



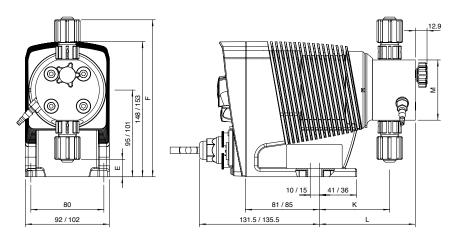


Dimensional drawing of beta, Material version PP - dimensions in mm

Dimensional drawing of beta, material version NP

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

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

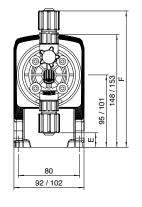


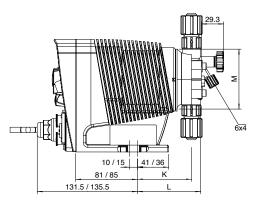
Dimensional drawing of beta, Material version NP - dimensions in mm

Dimensional drawing of beta, material version PV

Туре	E	F
1000 - 1604	19	179
1602	19	172
0708 - 0220	8	185.5
1008 - 0420	14	191.5
0232	3.2	199

Туре	K	L	ØМ
1000 - 1604	71	83	70
1602	77	105	70
0708 - 0220	73	90	90
1008 - 0420	73	90	90
0232	76	93	110

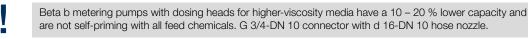




Dimensional drawing of beta, Material version PV - dimensions in mm

			Tech	nical Da	ata							
Pump type		p capa ack pro	•	Delivery	Delivery rate at medium back pressure			Connector size outside Ø x inside Ø	Suction lift*	Average power consumption	Shipping we	eight
	bar	l/h	ml/ stroke	bar	l/h	ml/ stroke	Strokes/ min	mm	m WC	w	PP, NP, PV, TT kg	SS kg
Metering pum	ps with	non-se	lf-bleed	ding dosin	g head							
BT4b 1000 **	10	0.74	0.07	5.0	0.82	0.08	180	6 x 4	6.0	7.2	2.9	3.6
BT4b 1601 **	16	1.1	0.10	8.0	1.4	0.13	180	6 x 4	6.0	9.6	2.9	3.6
BT4b 1602 **	16	2.2	0.20	8.0	2.5	0.24	180	6 x 4	6.0	11.2	2.9	3.6
BT4b 1604 **	16	3.6	0.33	8.0	4.3	0.40	180	6 x 4	5.0	15.2	3.1	3.9
BT4b 0708 **	7	7.1	0.66	3.5	8.4	0.78	180	8 x 5	4.0	15.2	3.1	3.9
BT4b 0413	4	12.3	1.14	2.0	14.2	1.31	180	8 x 5	3.0	15.2	3.1	3.9
BT4b 0220	2	19.0	1.76	1.0	20.9	1.94	180	12 x 9	2.0	15.2	3.3	4.4
BT5b 2504	25	2.9	0.27	10.0	5.0	0.46	180	8 x 4	4.0	19.2	4.5	5.3
BT5b 1008	10	6.8	0.63	5.0	8.3	0.76	180	8 x 5	3.0	19.2	4.5	5.3
BT5b 0713	7	11	1.02	3.5	13.1	1.21	180	8 x 5	3.0	19.2	4.5	5.3
BT5b 0420	4	17.1	1.58	2.0	19.1	1.77	180	12 x 9	3.0	19.2	4.7	5.8
BT5b 0232	2	32	2.96	1.0	36.2	3.35	180	12 x 9	2.0	19.2	5.1	6.6
Metering pum												
BT4b 1602 **	10	1.4	0.13	8.0	1.7	0.16	180	6 x 4	1.8	11.2	2.9	-
BT4b 1604 **	10	2.7	0.25	8.0	3.6	0.33	180	6 x 4	1.8	15.2	3.1	-
BT4b 0708 **	7	6.6	0.61	3.5	7.5	0.69	180	8 x 5	1.8	15.2	3.1	-
BT4b 0413	4	10.8	1.00	2.0	12.6	1.17	180	8 x 5	1.8	15.2	3.1	-
BT4b 0220	2	16.2	1.50	1.0	18.0	1.67	180	12 x 9	2.0	15.2	3.3	-
BT5b 1008	10	6.3	0.58	5.0	7.5	0.69	180	8 x 5	1.8	19.2	4.5	-
BT5b 0713	7	10.5	0.97	3.5	12.3	1.14	180	8 x 5	1.8	19.2	4.5	-
BT5b 0420	4	15.6	1.44	2.0	17.4	1.61	180	12 x 9	1.8	19.2	4.7	-

- * Suction lift with a filled dosing head and filled suction line, with a self-bleeding dosing head with air in the suction line.
- ** Pressure-reduced pump types are available in the pressure stages 4, 7 and 10 bar for special applications, for example in the swimming pool sector. More detailed information is available upon request.



All data calculated with water at 20 °C.

Materials in Contact with the Medium

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

Metering reproducibility: $\pm\,2\%$ when used according to the operating instructions.

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

Degree of protection: IP 66, insulation class F



Scope of supply

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

Identity Code Ordering System for Product Range beta, Version b

BT4b	Туре	Capacity	y									
	1000	10 bar	0.74 l/h									
	1601	16 bar	1.10 l/h									
	1602	16 bar	2.20 l/h									
	1604											
	1	16 bar	3.60 l/h									
	0708	7 bar	0 l/h									
	0413	4 bar	30 l/h									
	0220	2 bar	19.00 l/h									
		Liquid er	end/valve material									
		PP	Polypropylene/PVDF									
		NP	Clear acrylic/PVDF									
		PV	PVDF/PVDF									
		П	PTFE with carbon, PTFE									
		SS	Stainless steel 1.4404/1.4404									
			Material of seals/diaphragm									
			, , , , , , , , , , , , , , , , , , ,									
			M With vPTFE diaphragm + PTFE valve seats. Design for PV heads only									
			Liquid end version									
			0 Non-bleed, without valve spring , for TT, SS and type 0232 only									
			1 Non-bleed, with valve spring, for TT, SS and type 0232 only									
			2 With bleed valve, without valve spring , PP, PV, NP only, not type 0232									
			3 With bleed valve, with valve spring , PP, PV, NP only, not type 0232									
			Design for higher-viscosity media (10-20 % lower metering rate possible), only PVT, types 1604, 0708, 1008, 0413,									
			0713, 0220, 0420									
			7 self-bleeding without bypass, Only for NPT and PVT, not for types 1000 and 1601									
			Hydraulic connections									
			0 Standard according to technical data									
İ			5 Connector for 12/6 hose, delivery side only									
			9 Connector for 10/4 hose, delivery side only									
			Version									
			0 standard									
			logo									
			0 with ProMinent logo									
			Electrical Connection									
			U 100-230 V, ±10%, 50/60 Hz									
			M 12 – 24 V DC, Only for BT4b									
			Cable and plug									
			B 2 m Swiss									
			1 2 m, open-ended									
			Relay									
			1 Fault indicating relay, normally energised, 1 x changeover contact 230 V - 2 A									
İ		İ	3 Fault indicating relay, normally de-energised, 1 x changeover contact 230 V - 2 A									
			4 as 1 + pacing relay 2 x normally open contacts 24 V - 100 m									
1			5 as 3 + pacing relay 2 x normally open contacts 24 V - 100 mA									
			Accessories									
			0 no accessories									
			1 with foot and metering valve, 2 m PVC suction line, 5 m PE metering line									
			5 1+ universal control cable									
			Control type									
			1 With lock: manual operation locked when external cable plugged in									
			Control Variants									
			0 without analogue control									
			A with analogue control 0/4 – 20 mA									
			Options on request									
İ			00 No options									

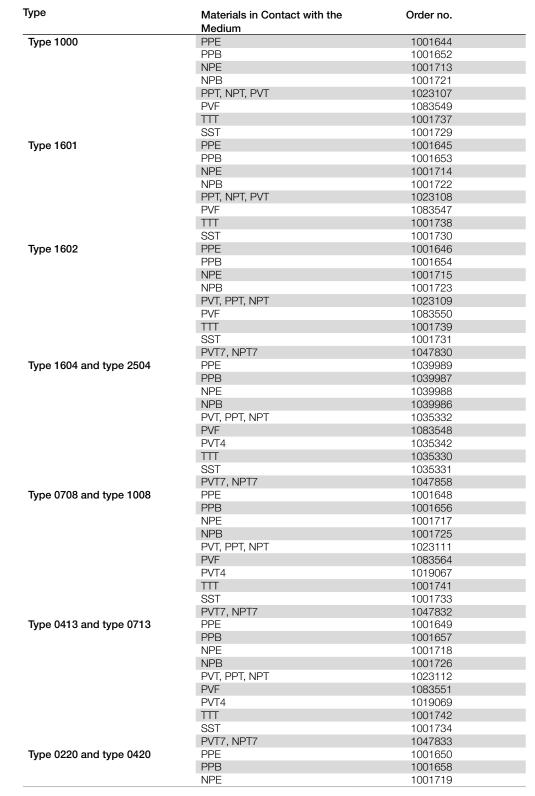
2504 25 bur 200 lb lb lb lb lb lb lb lb lb lb lb lb lb	BT5b	Туре	Capacity	,										
10 bar 5.50 Uh 754														
0713 7 bas 11.00 /h 0222 2 bar 32.00 /h 0223 2 bar 32.00 /h 0224 2 bar 32.00 /h 0225 2 bar 32.00 /h 0226 2 bar 32.00 /h 0227 2 bar 32.00 /h 0227 2 bar 32.00 /h 0228 2 bar 32.00 /h 0228 2 bar 32.00 /h 0228 2 bar 32.00 /h 0228 2 bar 32.00 /h 0228 2 bar 32.00 /h 0228 2 bar 32.00 /h 0328 2 bar 32.00 /h 0428 2 bar 32.00 /h 0528 2 bar 32.00 /h 0628 2 bar 32.00 /h 0628 2 bar 32.00 /h 0628 2 bar 32.00 /h 0738 2 bar 32.00 /h 03		!		1										
0420 2 bar 37.10 lm 17.10		!	1	!	1									
D232 2 bar 2 20.01 m PP Polypraylive interestion PP Polypraylive interestion PP PV Clear activity and professional profes		1		1										
Bud od vivalve material P		!	1	1										
PP Polypropleme/PUCF PV Cotar acynt/PUCP PV PV PVDF/PVDF PV PVDF/PVDF PV PVDF/PVDF PV PVDF/PVDF PV PVDF/PVDF PV PVDF/PVDF PV PVDF PVDF PVDF PVDF PVDF PVDF PVDF PV		0232		1										
NP PV PVPPPVDF TT PTE with cathon, PTFE SS Satiness date 1.404/1.4044 Material of seak/daphragm T PTFE/PDM, PTFE coated F DA-complaint design M With vPTFE daphragm+ PTFE valve seats. Design for PV heads only Louise and version O Non-bleed, with valve spring, for TT, SS and type 0232 only 1 Non-bleed, with valve spring, for TT, SS and type 0232 only 2 with bleed valve, without valve spring, PP, PV, NP orly, not type 0232 3 Beled version, with valve spring, PP, PV, NP orly, not type 0232 4 Design for higher-vacosity media (10-20 % lower metering rate possible), only PVT, types 1604, 0708, 1006, 0413, 0713, 0220, 0420 7 Saff-blooding without bypass, Only for NPT and PVT, not for types 1000 and 1601 Neyterate connections O Standard according to technical data 5 Commector for 10/2 hose, delivery side only 9 Connector for 10/2 hose, delivery side only 9 Connector for 10/2 hose, delivery side only 9 Connector for 10/2 hose, delivery side only 1 1 Fault indicating relay, normally energiaed, 1 x changeover contact 230 V - 2 A 1 2 m, open-ended 1														
PV PVEPPVP TTS PTE with carbon, PTE Stainkess steel 1,4040/1,4004 Material of seals/disphragm T PTE/EPPW, PTE coatod F PDA-compliant design M With vPTE-dephragm + PTEE valve seats. Design for PV heads only Liquid and version. O Non-bleed, with valve spring, for TT, SS and type 0232 only 1 Non-bleed, with valve spring, for TT, SS and type 0232 only 2 with bleed valve, without valve spring, PP, NP only, not type 0232 3 Blood varsion, with valve spring, PP, NP only, not type 0232 4 Design for higher-viscosity media (10-0) S lower materiang rate possible), only PVT, types 1604, 0708, 1008, 0413, 0713, 0220, 0420 7 Self-bleeding without bypass, Only for NPT and PVT, not for types 1000 and 1601 Bydrautic connections O Standard according to technical data 5 Connector for 104 hose, delivery side only Version U 100-230 V,±10%, 50/90 Hz N 24 V DC, Only for BTbb Carbon and plug A 2 PR European B 2 m Swiss C 2 m Australian D 2 m USA 1 2 m. open-ended Relay O Nor relay 1 Fault indicating relay, normally de-energised, 1 x changeover contact 230 V - 2 A 4 as 1 + pacing relay 2 x normally cenerorised, 1 x changeover contact 230 V - 2 A 5 as 1 + pacing relay 2 x normally cenerorised, 1 x changeover contact 230 V - 2 A 4 as 1 + pacing relay 2 x normally cenerorised, 1 x changeover contact 230 V - 2 A 5 as 1 + pacing relay 2 x normally cenerorised, 1 x changeover contact 230 V - 2 A 5 as 1 + pacing relay 2 x normally cenerorised, 1 x changeover contact 230 V - 2 A 5 as 1 + pacing relay 2 x normally cenerorised, 1 x changeover contact 230 V - 2 A 6 as 1 + pacing relay 2 x normally cenerorised, 2 V - 100 m A Accessories With foot and metering valve, 2 m PVC suction line, 5 m PE metering line Control Vgrains O With Dock manual operation locked when external coble plugged in Control Vgrains			1	, , ,	,									
TT PTEF with cathon, PTEF SS SIshiness sete if 1.40/4 / 404 Material of seals/disphragm T PTEFEPDN PTEF coated F DA-compliant design M With VFTEF disphragm + PTEF valve seats. Design for PV heads only Equal and versions 0 Non-bleed, without valve spring, for TT, SS and type 0232 only 1 Non-bleed, with valve spring, for TT, SS and type 0232 only 2 with bleed valve, without valve spring, FP, FV, NP only, not type 0232 3 Bleed version, with valve spring, PP, FV, NP only, not type 0232 4 Design for higher-viscosity medial (10-20 % lower metering rate possible), only PVT, types 1604, 0708, 1008, 0413, 0715, 0220, 0420 7 salf-bleeding without bypass, Only for NPT and FVT, not for types 1000 and 1601 Hydraulic connections 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 With ProMinent logo 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 No lock Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0 Standard according to technical data 0				1	-	J⊦								
SS Sainless steal 1.4404/1.4404 Material of seak/dishpragm T PTFE-EPDM, PTFE casted F FDA-complant design With VFTFE disphragm+ PTFE valve seats. Design for PV heads only Liquid and version 0 Non-bleed, without valve spring, for TT, SS and type 0232 only 1 Non-bleed, without valve spring, for TT, SS and type 0232 only 2 with bloed valve, without valve spring, PP, PV, NP only, not type 0232 3 Bilbed version, with valve spring, PP, PV, NP only, not type 0232 4 Design for higher-viscosity medial (10-02 is lower metring rate possible), only PVT, types 1604, 0708, 1008, 0413, 0713, 0220, 0420 7 set bleeding without bypass, Only for NPT and PVT, not for types 1000 and 1801 Hydraulic connections 0 Standard according to technical data 5 Connector for 10/4 hose, delivery side only Version 0 Standard Score (Connection of 10/4 hose, delivery side only Version 1 100-320 V ±10%, 50/60 Hz N 24 VDC, Only for BT5b Castes and plug A 2 m European B 2 m Swiss C 2 m Australian D 2 m USA 1 2 m, open-ended Belgy 0 No relay 1 Fault indicating relay, normally energised, 1 x changeover contact 230 V - 2 A 4 as 1 + pasing relay 2 x normally open contacts 24 V - 100 m A Accessories 0 No relay 1 Fault indicating relay, normally open contacts 24 V - 100 m A Accessories 0 No relay 0 No block 1 with foot and metering valve, 2 m PVC suction line, 5 m PE metering line 1 - Invivorad control cable Connectiver Control Versions 0 No block 1 With lock and and operation locked when external cable plugged in Control Versions 0 No block 1 With lock and and operation locked when external cable plugged in Control Versions				1										
Material of sesk/diaphragm T PFEE/EDPA, PTEC coated FDA-complant design M With VFTEE disphragm + PTEE valve seats. Design for PV heads only Liquid end version 0 Non-bload, without valve spring, for TT, SS and type 0232 only 1 Non-bload, without valve spring, for TT, SS and type 0232 only 2 with bleed valve, without valve spring, PP, PV, NP only, not type 0232 3 Bleed version, with valve spring, PP, PV, NP only, not type 0232 4 Design for higher viscosity modial (10-20 % lower matering rate possibile), only PVT, types 1604, 0708, 1008, 0413, 0713, 0220, 0420 7 self-bleeding without bypass, Only for NPT and PVT, not for types 1000 and 1601 Hydraulic connections 0 Standard according to technical data 5 Connector for 1014 hose, delivery side only Visistion 0 Standard according to technical data 6 Section of the PVT, not for types 1000 and 1601 Hydraulic connections 0 Standard according to technical data 5 Connector for 1024 hose, delivery side only Visistion 0 Standard 1 Diago 1 With ProMinent logo 1 Bedricial Connection 0 Standard 1 Diago 1 With ProMinent logo 1 Bedricial Connection 0 Standard 1 Diago 1 With ProMinent logo 1 Bedricial Connection 0 Standard 1 Diago 1 With ProMinent logo 1 ProMinent logo 1 With ProMinent logo 1 With ProMinent logo 1 Diago 2 Diago 3 ProMinent logo 3 Standard socretion and pure of the prominent logo and pure of the				1										
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F				Material	1		-							
M With vPTFE diaphragm + PTFE valve seats. Design for PV heads only Liquid end version Non-bleed, without valve spring, for TT, SS and type 0232 only Non-bleed, with valve spring, for TT, SS and type 0232 only with bloed valve, without valve spring, for TT, SS and type 0232 Bleed version, with valve spring, PP, VP, NP only, not type 0232 4 Design for higher-viscosity media (10 20 % lower melering rate possible), only PVT, types 1604, 0708, 1008, 0413, 0713, 0220, 0420 7 self-bleeding without bypass, Only for NPT and PVT, not for types 1000 and 1601 Hydraulia connections 0 Istandard according to technical data 5 Connector for 12/6 hose, delivery side only Wersion 0 Istandard according to technical data 5 Connector for 10/4 hose, delivery side only Wersion 0 I standard according to technical data 5 Connector for 10/4 hose, delivery side only Wersion 0 I standard according to technical data 5 Connector for 10/4 hose, delivery side only Wersion 0 I standard according to technical data 5 Connector for 10/4 hose, delivery side only Wersion 0 I standard according to technical data 5 Connector for 10/4 hose, delivery side only Wersion 0 I standard according to technical data 5 Connector for 10/4 hose, delivery side only Wersion 0 I standard according to technical data 5 Connector for 10/4 hose, delivery side only Wersion 0 I standard according to technical data 5 Connector for 10/4 hose, delivery side only Wersion 0 I standard according to technical data 5 Connector for 10/4 hose, delivery side only Wersion 0 I standard according to technical data 5 Connector for 10/4 hose, delivery side only Wersion 0 I standard according to technical data 5 Connector for 10/4 hose, delivery side only Wersion 0 I standard according to technical data 5 Connector for 10/4 hose, delivery side only Wersion 0 I with foot according to technical data 5 Connector for 10/4 hose, delivery side only 1 I with foot and metering valve, 2 m PVC suction line, 5 m PE metering line 5 1 t-universal control cable Connec				1.										
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Control Variants 0 without analogue control												0	No lock	
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						1	1						Control Variants	
A with analogue control 0/4 – 20 mA								0 without analogue control					0 without analogue control	
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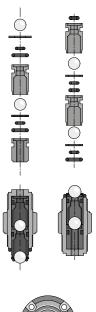
Spare Parts Kits for Solenoid-Driven Metering Pump beta

Spare parts kits for beta b, 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







Time		
Туре	Materials in Contact with the	Order no.
	Medium	
Type 0220 and type 0420	NPB	1001727
	PVT, PPT, NPT	1023113
	PVF	1083552
	PVT4	1019070
	ПТ	1001754
	SST	1001735
	PVT7, NPT7	1047837
Type 0232	PPE	1001651
	PPB	1001659
	NPE	1001720
	NPB	1001728
	PVT, PPT, NPT	1023124
	PVF	1083553
	ТТТ	1001755
	SST	1001736

Spare Diaphragms for Solenoid-Driven Metering Pump beta

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

Accessories

- \blacksquare Foot valves for low-pressure metering pumps, see page \rightarrow 139
- \blacksquare Injection valves for low-pressure metering pumps, see page \rightarrow 142
- \blacksquare Hoses and pipework for low-pressure metering pumps, see page \rightarrow 189
- \blacksquare Suction lances, suction assemblies without level switches, see page \rightarrow 208
- \blacksquare Connectors, fittings, connector kits, seals, see page \rightarrow 192

Spare Parts

 \blacksquare Special valve balls/special valve springs, see page \rightarrow 224



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 eXcellent ingenuity! With integrated pressure measurement, it ensures the smooth running of your metering process. The gamma/ X is ideal for all metering work involving liquid media.



The new solenoid-driven metering pump gamma/ X is user-friendly and has a long service life, just like its predecessor. An ingenious solenoid control measures the pending back pressure and protects the system from overload. This technology makes a pressure sensor superfluous, meaning that operating safety can be significantly increased: no additional parts come into contact with the feed chemical, there are no additional sealing surfaces and no electronic components come near the feed chemical.

Whether the metering volume fluctuates or hydraulic failures affect the metering process – the gamma/ X allows you to keep an eye on everything.

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



Your Benefits

- Simple adjustment of the metering rate directly in I/h
- Direct input of the required and desired concentration in concentration mode with 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 (optional)
- Adaptation to existing signal transducers by external control via potential-free contacts with pulse step-up and step-down
- External control via 0/4-20 mA standard signal with adjustable assignment of signal value to stroke rate (optional)
- Integrated 1-month timer for timed metering tasks
- Guaranteed metering by means of automatic bleeding
- Connection to process control systems via 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

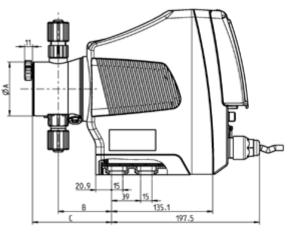
Field of Application

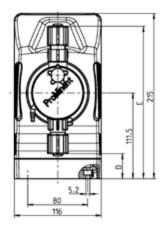
- Can be integrated into automated processes and used in all industries.
- The pump can work as a control unit with the timer, for example in cooling water treatment.



Dimensional drawing of gamma/ X, material version PPT

Туре		ØA	В
1602, 1604		70	71
0708, 1009		90	74
0414, 0715		90	74
0220, 0424		90	76
0245		110	76
Туре	С	D	E
Type 1602, 1604	C	D	E 198
1602, 1604	106	32	198
1602, 1604 0708, 1009	106 108	32 24	198 202
1602, 1604 0708, 1009 0414, 0715	106 108 107	32 24 24	198 202 202





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

Dimensional drawing of gamma/ X, material version NPT

Туре		ØΑ	В
1602 - 2504		70	77
0708, 1009		90	74
0414 - 0424		90	76
Туре	С	D	E
1602 - 2504	105	33	191
0708 1000	100	22	200

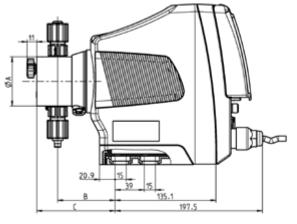
200

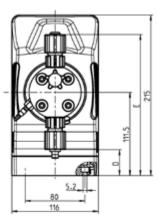
0414 - 0424

Type

1602, 1604

0708, 1009





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

Dimensional drawing of gamma/ X, material version PVT

0414, 0715		90	73
0220, 0424		90	79
Туре	С	D	E
1602, 1604	84	36	196
0708, 1009	92	25	203
0414, 0715	90	25	203
0220, 0424	90	25	203

Ø A

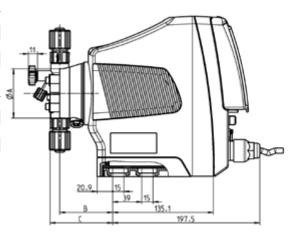
70

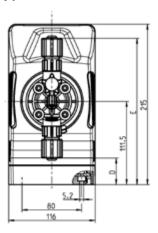
90

В

71

75





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

	Ted	chnical Data	1						
Pump type	Pump capa	city at max. ba	ck pressure	Stroke rate	Connector size outside Ø x inside Ø	Suction lift*	Shipping weight		
							PP, NP, PV, TT	SS	
	bar	l/h	ml/stroke	Strokes/min	mm	m WC	kg	kg	
	s with non-self-ble								
GMXa 1602	16	2.3	0.19	200	6 x 4	6.0	3.6	4.1	
GMXa 1604	16	3.6	0.30	200	6 x 4	5.0	3.6	4.1	
GMXa 0708	7	7.6	0.63	200	8 x 5	4.0	3.7	5.0	
GMXa 0414	4	13.5	1.13	200	8 x 5	3.0	3.7	5.0	
GMXa 0220	2	19.7	1.64	200	12 x 9	2.0	3.7	5.0	
GMXa 2504	25	3.8	0.32	200	8 x 4	4.0	4.9	5.5	
GMXa 1009	10	9.0	0.75	200	8 x 5	3.0	5.1	6.5	
GMXa 0715	7	14.5	1.21	200	8 x 5	3.0	5.1	6.5	
GMXa 0424	4	24.0	2.00	200	12 x 9	3.0	5.1	6.5	
GMXa 0245	2	45.0	3.70	200	12 x 9	2.0	5.2	7.0	
	s with self-bleedin								
GMXa 1602	10	1.5	0.13	200	6 x 4	1.8	3.6	-	
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.



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.

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
PPT	Polypropylene	PVDF	PVDF	PTFE	Ceramic
NPT	Clear acrylic	PVDF	PVDF	PTFE	Ceramic
PVT	PVDF	PVDF	PVDF	PTFE	Ceramic
TTT	Carbon-filled PTFE	Carbon-filled PTFE	Ceramic	PTFE	Ceramic
SST	Stainless steel 1.4404	Stainless steel 1.4404	Ceramic	PTFE	Ceramic

Metering reproducibility: $\pm 2\%$ when used according to the instructions in the operating instructions

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

Mean power consumption: 25/30 W

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



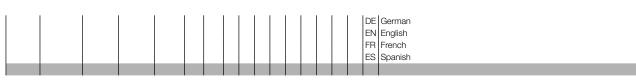
Scope of supply

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



Identity code ordering system for gamma/ X product range

GMXa	Туре	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													
	1	1	1													
	0715	7 bar	14.5 l/h													
	0424	4 bar	24.0 l/h													
	0245	2 bar	45.0 l/h													
			nd/valve n													
		PP	Polyprop	oylene/P	VDF											
		NP	Clear ac	rylic/PVI	DF											
		PV	PVDF/P\	VDF												
		П	PTFE													
		SS	Stainless	s steel 1	.4404	4/1.4	404									
			Material	of seals.	/diap	hragr	n									
			Т	PTFE/I				oated	ī _							
			F	FDA-c						r PV	and S	S				
			M	1			-		-				Daei	an f	for PV	heads only
			'''	Liquid					11.2	_ var	70 000		0001	9111	1011 •	Tioddo Offiy
				0	1			ithou	t vol	lvo o	orina	onh	/ \A/i+	h N	ID TT	and CC and type 0045
				1							_					and SS and type 0245
											-					d SS and type 0245
				2								-		-		P, PV, NP not for type 0245
				3							0.	,				NP not for type 0245
				4		sign fa 09, 07			ISCC	sity	rnedia	(10	J-20	% l	iower	metering rate possible), only with PV, types 1604, 0708, 0414,
				7			,		سا نان	11/12-2-		v, f-	r NIF	т -	and DI	/T. With type 0245 without vent screw.
				1		draulio					55, UH	y IO	II INF	ıa	aliu r v	71. With type 0245 without vent screw.
					0	1					+00b	nion	ı do			
					1 -						tech					also de deservoltes de Colonidado DD ND es de DV
					5						_				,	standard on suction side, Only with materials PP, NP and PV
					9								nose	10/	/4, SU	ction side standard, Only with materials PP, NP and PV
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						0				_	ım rup					
						1			phra	agm	ruptur	e in	idica	tor,	, not fo	or type 0245
							Ver	sion								
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									Elec	ctrica	l Con	nec	tion			
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						İ	i				- 1		,	atir	ina rela	ay (230 V, 8 A)
															-	ay (24 V, 100 mA) + pacing relay (24 V, 100 mA)
											- 1				0	ngue output + fault indicating / pacing relay (24 V - 100 mA)
																ed valve 230 V AC, not for pump type 0245
											- 1					ed valve 230 v AC, not for pump type 0245 ed valve 24 V DC and relay output, not for pump type 0245
													ssor			od valvo 27 v DO and relay odiput, not for pump type 0243
											0	_			ssories	
						ŀ						- 1				
											1					metering valve, 2 m PVC suction line, 5 m PE metering line, Only d NP, not for PVT4
											5	- 1			,	ontrol cable
											١	_			Variant	
												_	_			external with pulse control
													- 1			external with pulse control + analogue (0/4-20 mA)
												3	- 1			
												- 1	- 1			Nopen
												- 1	- 1			N open DULCOMARIN II
												- 1	- 1		3 + Pro	
												- 1	- 1			ROFIBUS® DP interface M12
												N			3 + Mo	
													N	/lete	ering n	monitor
													C	T	Pulse	signal input
															Remo	ote stop
																ithout Bluetooth
	1													-		ith Bluetooth
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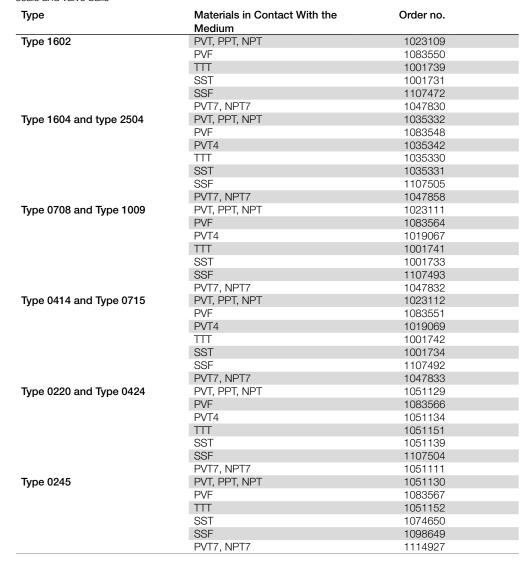
A relay cannot be used with these options.

Spare Parts Kit for gamma/ X

Spare parts kits for gamma/ X, consisting of:

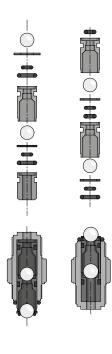
- 1 metering diaphragm
- 1 suction valve assembly
- 1 discharge valve assembly
- 1 connector kit

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



Spare Diaphragms for Solenoid-Driven Metering Pump gamma/ X

	Materials in Contact With	Order no.	
	the Medium		
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

- \blacksquare Foot valves for low-pressure metering pumps, see page \rightarrow 139
- \blacksquare Injection valves for low-pressure metering pumps, see page \rightarrow 142
- \blacksquare Hoses and pipework for low-pressure metering pumps, see page \rightarrow 189
- \blacksquare Suction lances, suction assemblies without level switches, see page \rightarrow 208
- Connectors, fittings, connector kits, seals, see page → 192

Spare Parts

 \blacksquare Special valve balls/special valve springs, see page \rightarrow 224



.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 new solenoid-driven metering pump gamma/ XL extends the capacity range of the proven gamma/ X to 80 l/h. In addition to the familiar relays and bus interfaces, the gamma/ XL provides a socket with 3 more configurable inputs and outputs. This allows the gamma/ XL to network with all common systems, devices and platforms. Like the gamma/ X, the gamma/ XL has an intuitive operating concept. The pump is adjusted using a click wheel and 4 additional operating keys. Pressure detection without wetted parts ensures maximum operational safety. Hydraulic error statuses, like "Gas in the dosing head", "Overpressure" and "No pressure" can be detected.

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

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

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

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

NEW

DULCONNEX

Your Benefits

- Simple adjustment of the metering rate directly in I/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

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 I 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 8 A
- Optional relay module with 2 x On, 24 V 100 mA



Field of Application

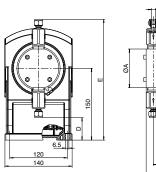
- Chemical distributors
- Systems engineering
- Food and beverage industry
- Potable water
- Waste water
- Chemical industry
- Electroplating
- Bottling processes, e.g. ink cartridges or highlighter pens
 - With an integrated process timer, suitable as a control unit for simple processes, e.g. biocide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

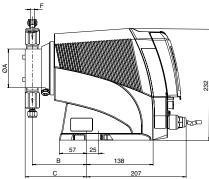


Dimensional drawing of gamma/ XL, material version SST

Туре	ØΑ	В
2508, 1608	90	108
1612	90	110
1020	90	110
0730	90	112
0450, 0280	100	115

Туре	С	D	E
2508, 1608	128	63	240
1612	130	63	240
1020	130	63	240
0730	132	63	240
0450, 0280	135	29	281

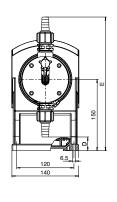


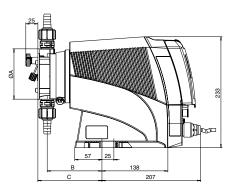


Dimensional drawing of gamma/ XL, material version SST - dimensions in mm

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

турс		271		_
0450, 0280		100	115	_
Туре	С	D	E	
0450, 0280	135	29	281	_





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

_		
IDC	hnica	I I 12t2
166	ııııca	Data

Pump type	Pump o	capacity at	Theor. stroke	Max. stroke	Nominal diam-	Suction lift*	Shipping weight NPE,
	max. bac	k pressure	volume	rate	eter		NPB, PVT / SST
	bar	l/h	ml/stroke	Strokes/min		m WC	kg
Metering pump	s with non-se	lf-bleeding of	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 pump	s with self-ble	eding dosin	g head				
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.
- 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.

All data calculated with water at 20 °C.

Materials in Contact with the Medium

Identity code of	Dosing head	Connection on suc-	Ball seat	Seals	Balls
material		tion/discharge side			
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

Connectors

	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 $\pm 2\%$ 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.



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

Identity Code Ordering System for Product Range gamma/ XL

GXLa	Regional d	esian									_		
	EU	Europe											
	US	USA											
		Туре	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 1/1									
		0730	7 bar	29.4 1/1									
		1	1	1	1								
		0450	4 bar	49 l/h									
		0280	2 bar	78.5 l/h									
			Liquid er	1			,			0.5			
			PV	PVDF/F		,			, ,				1000 1010 1000 - 10700
			NP							es 2	300	, 10	1608, 1612, 1020 and 0730
			SS	Stainles									
				Materia T	1		•	-		otod			
				F	1	E/EPI						D\/	My and CC
				M	1								V and SS
				IVI		uid en		_	_	+ [vaiv	alve seats. Design for PV heads only
					0	1				ıt ve	di co d	nnrin	pring, only with TT and SS materials
					1	1							oring, only with TT and SS materials
					2	1						-	g, only with TT and SS materials
					3								lve spring, only with NP and PV materials ring, only with NP and PV materials
					4								ity media, only for PV types 1608, 1612, 1020 and 0730
					7	1			_				s, only for types 1608, 1612, 1020 and 0730, only for material NP and PV
					l'	Hydi						100,	3, Only 101 types 1000, 1012, 1020 and 0700, Only 101 Material W and 1 V
						0						to te	technical data
						5					_		ge side for 12/6 hose, standard on suction side, only with NP and PV materials
						F						-	ge side for 8/4 hose, standard on suction side, Only with NP material
						ľ						_	dicator
							0		_	-			n rupture indicator
							1				_		upture indicator
							ľ	Vers		ipi ii c	.9	Тар	ptoro marcator
								0		ısinc	RA	50	5003, cover RAL 2003
									logo	_			
											Pro	Min	linent logo
													roMinent logo
						Ì				Elec	trica	al Co	Connection
										U	100	- 23	230 V ±10%, 50/60 Hz
		İ									Cab	le a	and plug
İ		İ		İ	İ	İ					Α	2 m	m European
											в	2 m	m Swiss
											c	2 m	m Australian
											D	2 m	m USA / 115 V
											1	2 m	m, open-ended
											Ì	Rela	elay, pre-set to
											ĺ	0	no relay
												1	Fault indicating relay (230 V, 8 A)
												4	Fault indicating relay (24 V, 100 mA) + pacing relay (24 V, 100 mA)
												- 1	3 1 7 1 31
												- 1	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
													P * As 3 + PROFINET® interface
													R * as 3 + PROFIBUS® interface, M12
													M * As 3 + Modbus RTU
													Communication
1													0 without interface
		1	1	I	1	1							B with Bluetooth
						1	ı						
													Operating menu language

^{*} A relay cannot be used with these options.

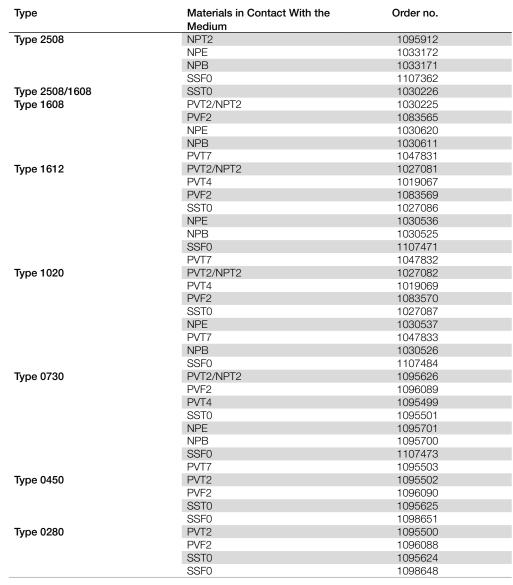




Spare parts kits for gamma/ XL, consisting of:

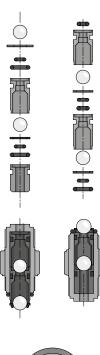
- 1 metering diaphragm
- 1 suction valve assembly
- 1 discharge valve assembly
- 1 connector kit

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



Spare Diaphragms for Solenoid-Driven Metering Pump gamma/ XL

	Materials in Contact With	Order no.	
	the Medium		
Type 2508/1608	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	
71			







Accessories

- \blacksquare Foot valves for low-pressure metering pumps, see page \rightarrow 139
- Injection valves for low-pressure metering pumps, see page \rightarrow 142
- \blacksquare Hoses and pipework for low-pressure metering pumps, see page \rightarrow 189
- Suction lances, suction assemblies without level switches, see page \rightarrow 208
- Connectors, fittings, connector kits, seals, see page → 192

Spare Parts

 \blacksquare Special valve balls/special valve springs, see page \rightarrow 224



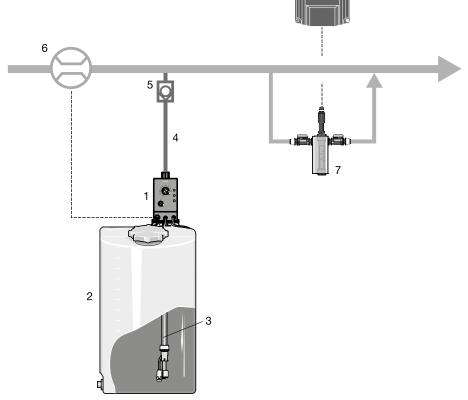
1.1.5 Application Examples

Volume-proportional Metering of Chlorine Bleach Solution in Potable Water

Product: beta
Feed chemical: NaOCI

Industry: Potable water
Application: Disinfection

- beta with self-bleeding dosing head, PMMA/PVC (clear acrylic)
- 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



Injection valve

gamma/ X with process timer
Suction assembly with foot valve and level switch
Dosing tank
Relay output for deactivation of conductance-controlled bleeding during biocide shock metering
Conductivity sensor
D1C conductivity

Dosing line

bleeding Waste water

2

3

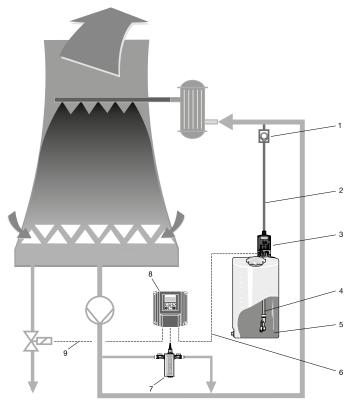
1.1 Solenoid-Driven Metering Pumps

Shock Metering of Biocide in Cooling Water Circuit

Product: gamma/ X
Feed chemical: Biocide

Industry: Cooling water treatment

Application: Disinfection



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



1.1.6 DULCONNEX: IIoT Solution for Digital Fluid Management

Location-independent system monitoring in real time

With DULCONNEX, you always have access to all the key data and measured values. Monitor the status of your system in real time and benefit from continuous documentation. Check your device data safely and reliably when you're not on site. Simply use the terminal device of your choice: smartphone, tablet or PC.

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



Low-pressure Metering Technology

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 6 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 (± 2 %) is guaranteed with this peristaltic pump under all process conditions. Hose replacement is a very simple process.



DULCOFLEX DFXa

DULCONNEX

The new DULCOFLEX DFXa meters reliably and is simple to operate. This sees the addition of an intelligent peristaltic metering pump to the ProMinent product range. ProMinent is making use of its decades-long experience in the metering pump sector to bring together the best of two worlds. Valve-free metering with the accuracy of a diaphragm metering pump, with full use of the properties of a peristaltic pump. The applications of this metering pump include very outgassing, high-viscosity, abrasive, shear-sensitive or chemically agaressive fluids.

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

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

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

A brushless direct current motor forms the heart of the DULCOFLEX DFXa. Its ingenious control provides for precise metering and reduced pump capacity with continuous metering up to 6 ml/h. What's more, the new peristaltic metering pump is IoT-enabled, meaning that it can be fully networked and connected to the DULCONNEX IIoT solution developed by ProMinent.

Your Benefits



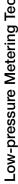
- Adjustment of the metering rate directly in I/h or mI/h
- Simple hose change
- No problems with very gaseous media or air locks
- Suitable for viscosities of up to 200,000 mPas (with VPT0530/VPT0565)
- Sole contact with media in the hose
- Many different control options, such as using an analogue 0/4-20 mA signal, contact controller, timer or via process control systems

Technical Details

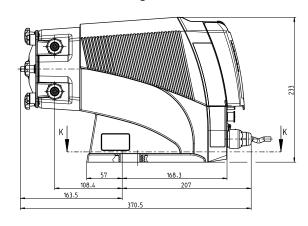
- Illuminated 3" LCD and 3-LED display for operating, warning and error messages, visible from all sides
- Adjustable feed rate between 65 I/ and 6 ml/h
- Connector for 2-stage level switch or continuous level measurement
- 3 additional freely configurable inputs and outputs on one port
- Optional 0/4–20 mA output for remote transmission of actual dosing rate and error messages
- Optional relay module with 1 x switch-over contact, 230 V 8 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

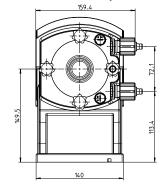
Field of Application

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

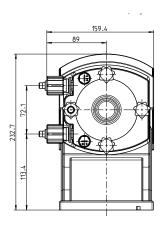


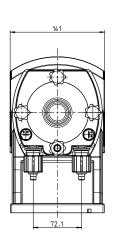
Dimensional drawing of DULCO flex Control DFXa without hose rupture alarm

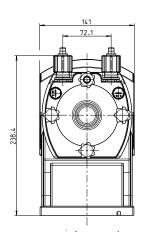




Dimensional drawing of DFXa, dosing head orientation on the right, dimensions in $\ensuremath{\mathsf{mm}}$

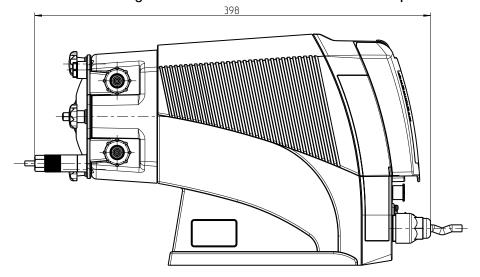






Dimensional drawing of DFXa, dosing head orientation (from left to right) left/bottom/top, dimensions in mm

Dimensional drawing of DULCO flex Control DFXa with hose rupture alarm



Dimensional drawing of DFXa, dimensions in mm

Identity code ordering system for product range DULCOFLEX DFXa

DFXa	Pogion	al desi-	0		.,	uci		y O	Jul		Iuc	1111	y a	ys	CII	101	or product range DULCOFLEX DFXa			
	Region	al desigi Europe																		
	US	USA																		
	CN	China	Cana	oity																
		Type 0518	Capa 5 bar	18 l/h																
		0530	5 bar	30 l/h																
		0730		30 l/h																
		0565		65 l/h materia																
			SP	1		stic v	tic vulcanisate (TPV/PVDF), the tube is ideally suited for NaOCI, Only available for types 0530 and 0730 e (PUR/PVDF), the tube is ideally suited to oils, fats, polymers Only available for types 0518, 0530 and 0556													
			VP				e (PUR/PVDF), the tube is ideally suited to oils, fats, polymers, Only available for types 0518, 0530 and 0556													
				Seal r	PTF															
				F			_	,												
					Dos	1	oottom Hydraulic connections													
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					U	top														
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												- 1			_		gue output + fault indicating / pacing relay (24 V - 100 mA)			
												_	Acces							
												1) n				s injection valve, 2 m suction line and 5 m discharge line			
												5					ontrol cable			
																iants	ts external with pulse control			
													3				external with pulse control external with pulse control + analogue 0/4 - 20 mA			
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																	FR French			
					*			31/ 03												

^{*} No relay can be selected with these options.



Low-pressure Metering Technology

1.2 Peristaltic Metering Pumps

Technical Data

Туре	Maximum back pressure	Delivery rate	Frequency	Connector size	Suction lift
	bar		rpm	outer Ø x inner Ø	m WC
0518	5	6 ml/h – 18 l/h	100	12 x 9	9
0530	5	10 ml/h – 30 l/h	100	12 x 9	9
0730	7	10 ml/h - 30 l/h	100	12 x 9	9
0565	5	22 ml/h – 65 l/h	100	12 x 9	9

Tube material: Thermoplastic vulcanisate (TPV), polyurethane (PUR)

Tube connectors: PVDF/PTFE

Metering reproducibility: ±2% with retracted tube (after approx. 200 revolutions)

Electrical connection: $100 - 230 \text{ V} \pm 10\%$, 50/60 Hz

Nominal power: approx. 50 W

Degree of protection: IP 66, NEMA 4X Indoor

Permissible ambient tempera-

ture:

Viscosities: The DFXa0530VPT has successfully metered viscosities of up to

0 ... 45 °C

200,000 mPas in testing. If you are working with viscosities of more than 10,000 mPas, please contact our technical consulting depart-

ment, who will be able to assist you.

All data calculated with water at 20 °C.

Spare parts kits for DULCOFLEX DFXa

	Order no.
Spare parts kit for DFXa 0518 VPT	1114522
Spare parts kit for DFXa 0518 VPF	1114521
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 0565 VPT	1112765
Spare parts kit for DFXa 0565 VPF	1112764
Spare parts kit for DFXa 0518/ 0565, rotor assembled	1116468
Spare parts kit for DFXa 0530/ 0730, 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	1115678
Dosing head (black plastic part)	1115677
DIN 7991 M 5x20 countersunk screw	1027519

1.2.2

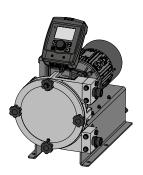
Peristaltic metering pump DULCOFLEX DFYa

The peristaltic pump DULCOFLEX DFYa combines the properties of top products from the ProMinent product range

Feed rate of 5.1 I/h to 410 I/h at up to 8 bar back pressure



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



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

The new generation of peristaltic metering pumps can now 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 thus joins the remaining ProMinent product range of intelligent metering pumps, which all share the same menu structure and user interface.

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

Your Benefits



DULCONNEX

- Operation by contact, batch, manual, analogue or BUS control
- Adjustment of the metering rate directly in I/h
- Connection to process control systems via a BUS interface, such PROFIBUS or CANopen
- No problems with very gaseous media or air locks
- Simple, menu-guided hose change
- Reversible direction of rotation
- Direct input of the required and desired concentration in concentration mode with volume-proportional metering tasks
- Automatic mode volume settings only (I/h, ml/contact etc.)
- Pump can run dry
- Suitable for viscosities of up to 20,000 mPas
- Sole contact with media in the hose

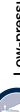
Technical Details

- Illuminated 3" LCD and 3-LED display for operating, warning and error messages, visible from all sides
- Adjustable feed rate between 5.1 I/ and 410 I/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 8 A
- Optional relay module with 2 x On, 24 V 100 mA
- DULCONNEX-compatible

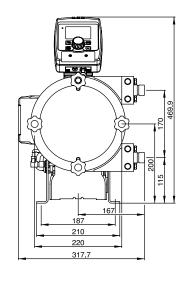
Field of Application

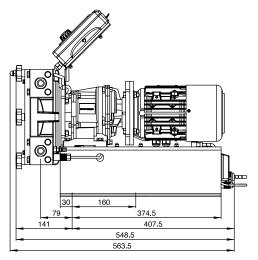
- Mining
- Potable water and waste water industry
- Chemical industry
- Paper industry
- Food and beverage industry

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



Dimensional drawing of DULCOFLEX DFYa





Dimensional drawing of DFYa, dimensions in mm

Technical Data

Туре	Maximum back	Delivery rate	Frequency	Suction lift	Intake head
	pressure				
	bar		rpm	m WC	m WC
04410	4	410 l/h ± 10 %	80	8	8
06410	6	410 l/h ± 10 %	80	8	8
08410	8	410 l/h ± 10 %	80	8	8

Hose material: NR, NBR, EPDM, NBR-A, Hypalon

Self-priming: Up to 8 m Rollers/shoes: Rollers

Metering reproducibility: \pm 2 % \pm 25ml with retracted hose after 500 revolutions

Electrical connection: $100 - 230 \text{ V} \pm 10\%$, 50/60 Hz

ture:

All data calculated with water at 20 $^{\circ}\text{C}.$

Spare parts for DULCOFLEX DFYa

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



Identity code ordering system for product range DULCOFLEX DFYa

DFYa	Туре	Capacity	/																
	04410	4 bar	410 l/h																
	06410	6 bar	410 l/h																
	08410	8 bar	410 l/h																
	30 1 10	Hose ma																	
		0	NR																
		В	NBR																
		C	NBR-A																
		E	EPDM																
		Н	Hypalon																
		G		ith FDA	+ El	J 193	35/20	004 c	ertif	icate), only	in	con	nbina	atior	۱ ۱	with	G or	or H connection
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			R	Right (v	iew f	rom f	ront)												
			L [Left (vie	w fro	om fro	nt)												
				Hydrau															
				A	١,	stainl		,											
				В		stainl		steel)	NP.	Γ3/4	,,,								
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				D		F BS													
				E F		F NP NPT													
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															_				(, 100 mA) + pacing relay (24 V, 100 mA)
											_				ana	alc	gue	outp	put + fault indicating/pacing relay
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												-							l contact with pulse control + analogue 0/4-20 mA
						Ì						6							g + analogue 0/ 4- 20 mA
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														- 1					k Wheel 0.5 m
																			k Wheel 2 m
																			k Wheel 5 m
													16						k Wheel 10 m
															- 1		ss cc		ccess control
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1.2.3 DULCONNEX: IIoT Solution for Digital Fluid Management

Location-independent system monitoring in real time

With DULCONNEX, you always have access to all the key data and measured values. Monitor the status of your system in real time and benefit from continuous documentation. Check your device data safely and reliably when you're not on site. Simply use the terminal device of your choice: smartphone, tablet or PC.

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



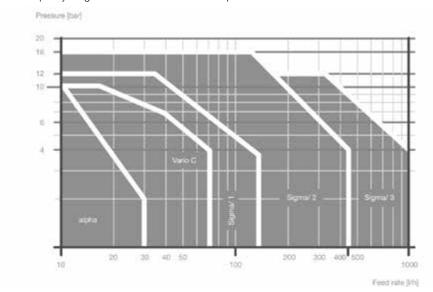
1.3.1 How to Find the Right Pump Type?

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

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

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

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

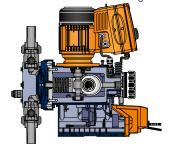


Back pressure [bar] as a function of feed rate [l/h]

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

Applications

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





1.3.2

Motor-Driven Metering Pump alpha

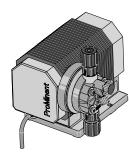
The cost-effective solution for simple applications in the lower performance range.

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



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

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



Your Benefits

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

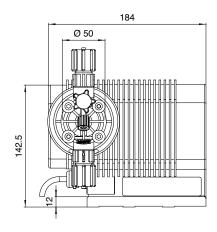
Technical Details

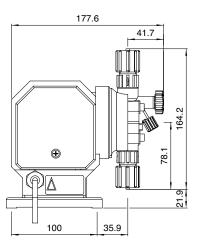
- Stroke length adjustment by changing the eccentricity on the pump drive when the pump is idle
- Stroke length adjustment in 10% steps
- Diaphragm deflection from the centre position
- Soft controlled suction and compression strokes

Field of Application

All low capacity applications where constant metering is required.

Dimensional drawing of the alpha





Dimension drawing of alpha - dimensions in mm

Technical Data

Pump type	Pump capacity at max. back pressure			Delivery	rate at me	dium back pressure	Stroke rate	Stroke length	Connector size outside Ø x inside 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
P\/T	PVDF	PVDF	PVDF	PTFF	Ceramic

Metering diaphragm with PTFE coating for all designs

FKM = fluorine rubber

Motor Data

Туре	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 Δ (at 230 V/50 Hz)

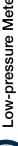
Warranty: The warranties listed in the General Terms and Conditions of Sale apply; there is a warranty period of 12 months for the alpha pump drive.



Identity Code Ordering System for Product Range alpha, version c

ALPc	Туре	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					
	0707	7 bar	6.9 l/h	1	8.3				
	0417	4 bar	17.0 l/h		20.6	3 l/h			
	0230		30.6 l/h		34.4	1 l/h			
			nd materia	d					
		PP	Polyprop		olypro	opylen	e e		
		NP	Acrylic/P						
		PV	PVDF/P\						
			Seal mat						
				EPDM					
			1	FKM A					
				PTFE					
				Valve s					
				2			live spring, with bleeding		
				3		vith 2 valve springs approx. 0.1 bar, material 1.4571, with bleeding			
					,	ydraulic connections			
					0	Standard according to technical data Version			
						0	with ProMinent logo		
						1 -	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		
							That took and motoring vary, 2 mm vo addition of the Emotoring mile		

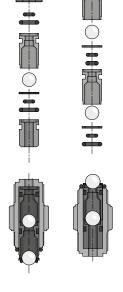
FKM = fluorine rubber



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.
0417, 0707	PPE	1001649
	PPB	1001657
	NPE	1001718
	NPB	1001726
	PVT	1023112
0230	PPE	1001650
	PPB	1001658
	NPE	1001719
	NPB	1001727
	PVT	1023113
1001, 1002, 1004, 1008	PPE	1001647
	PPB	1001655
	NPE	1001716
	NPB	1001724
	PVT	1023110



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 → 139
- Injection valves for low-pressure metering pumps, see page \rightarrow 142
- \blacksquare Hoses and pipework for low-pressure metering pumps, see page \rightarrow 189
- Suction lances, suction assemblies without level switches, see page \rightarrow 208
- Connectors, fittings, connector kits, seals, see page → 192

Spare Parts

 \blacksquare Special valve balls/special valve springs, see page \rightarrow 224



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

The robust pump for safe and reliable use

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



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

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



Sigma/ 1 Basic version

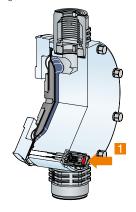
Your Benefits

Excellent process reliability:

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

Flexible adaptation to the process:

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



1: Diaphragm rupture sensor

Sigma / 1 liquid end on left

Technical Details

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

= FC

Field of Application

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



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 k Ω , degree of protection IP65.

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 50/60 Hz, degree of protection IP65, actual value output 0/4-20 mA for remote display.

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

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

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

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

Identity code example: S1BaH04084PV F S000S000

EU Regulation 1935/2004

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

Hygienic Design

Hygienic Design dosing heads are available in 1.4435 (AISI 316L) for hygienically demanding applications. Optimised in terms of dead space, feature as few gaps as possible and have smooth, wetted surfaces, easy to clean using CIP. Get in touch with us, we would be happy to advise you.

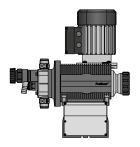
Identity code example: S1BAH07065SSHAHC0S000

Connection type: TriClamp / groove clamp DIN 11864-3 DIN shape A

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



Sigma / 1 liquid end on left

3/4-10

3/4-10

3/4-10

3/4-10

3/4-10

3/4-10

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1.3 Motor-Driven Metering Pumps

Technical Data

5.0

5.0

5.1

5.1

5.2

5.2

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9.7

Туре	Capacity at max. back pressure with 1500 rpm motor at 50 Hz				•	max. back rpm motor at 60 Hz	Suction lift	Perm. pre-pres- sure suction side	Connector Suction/ Discharge Side	Shipping weight	
				Max.			Max.				
				stroke			stroke rate				
				rate					_		
S1Ba	l/h	bar	ml/stroke	Strokes/	I/h/gph (US)	psi	Strokes/	m WC	bar	G-DN	kg
				min			min				
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	174	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

26.4/6.9

26.4/6.9

52.8/13.9

52.8/13.9

78.0/20.6

78.0/20.6

50.4/13.3

50.4/13.3

100.8/26.6

100.8/26.6

144.0/38.0

144.0/38.0

145

145

145

145

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Performance data for TTT, see type PVT

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205

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	PTFE/stainless steel 1.4435	Ceramic	-

- * Specifically for areas at risk from explosion
- ** DN 32 designed as ball non-return valve

10022 PVT

10022 SST

10044 PVT

10044 SST

07065 PVT

07065 SST

07042 PVT

07042 SST

04084 PVT

04084 SST

04120 PVT

04120 SST

22

22

44

44

65

65

42

42

84

84

120

120

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4

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4

Motor Data Identity code Power supply Δ/Υ Remarks specification 3-phase, IP 55 230 V/400 V 50 Hz 0.09 kW 265 V/460 V 60 Hz 0.09 kW Τ 3-phase, IP 55 230 V/400 V 50 Hz 0.09 kW With PTC, speed control range 1:5 265 V/460 V 60 Hz 0.09 kW 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) Μ 1-phase AC, IP 55 230 V \pm 5 % 50/60 Hz 0.12 kW Ν 1-phase AC, IP 55 115 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

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.

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.



^{*} Three-phase motor according to IEC 60034-1

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

He will will will represent the process of the proc
12017 1205 12 bar 17 l/h 1205 12 bar 18 l/h 1006 10022 10 bar 22 l/h 10 bar 22 l/h 10 bar 22 l/h 10 bar 22 l/h 10 bar 22 l/h 10 bar 22 l/h 10 bar 24 l/h 10 bar 44 l/h 10705 7 bar 48 l/h 10 bar 44 l/h 10705 7 bar 48 l/h 10 bar 44 l/h 10 bar 44 l/h 10 bar 44 l/h 10 bar 44 l/h 10 bar 44 l/h 10 bar 44 l/h 10 bar 44 l/h 10 bar 44 l/h 10 bar 44 l/h 10 bar 44 l/h 10 bar 44 l/h 10 bar 44 l/h 10 bar 44 l/h 10 bar 45 l
12017 12 bar 17 lh 12036 10 bar 50 lh 10020 10 bar 50 lh 10021 10 bar 22 lh 10044 10 bar 44 lh 10 bar 44 lh 10 bar 44 lh 10 bar 44 lh 10 bar 42 lh 4 bar 64 lh 4 bar 120 lh 4 bar 120 lh 4 bar 120 lh 5 shariess stell 7 PTE 25% carbon (max. 10 bar) 8 shariess stell 8 shariess stell 7 PTE 25% carbon (max. 10 bar) 8 shariess stell 8 FDA-complant 9 FDA-complant 1 Hygianc Design only for 10022, 10044 and 07065 1 Backreagy 8 Mult-layer safety disphragm with rupture signalling (contact) 1 Backreagy 8 Mult-layer safety disphragm with rupture signalling (contact) 1 Backreagy 1 With pressure relef valve, RPM seal, with out valve spring, Chly with PV and SS 2 With pressure relef valve, RPM seal, with out valve spring, Chly with PV and SS 3 With pressure relef valve, EPDM seal, with valve spring, Chly with PV and SS 4 With pressure relef valve, EPDM seal, with valve spring, Chly with PV and SS 6 With pressure relef valve, EPDM seal, with valve spring, Chly with PV and SS 9 With pressure relef valve, EPDM seal, with valve spring, Chly with PV and SS 1 With pressure relef valve, EPDM seal, with valve spring, Chly with PV and SS 1 With pressure relef valve, EPDM seal, with valve spring, Chly with PV and SS 1 With pressure relef valve, EPDM seal, with valve spring, Chly with PV and SS 1 With pressure relef valve, EPDM seal, with valve spring, Chly with PV and SS 1 With pressure relef valve, EPDM seal, with valve spring, Chly with PV and SS 1 With pressure relef valve, EPDM seal, with valve spring, Chly with PV and SS 2 With pressure relef valve, EPDM seal, with valve spring, Chly with PV and SS 3 PDM union nut and insert 4 With pressure relef valve, EPDM seal, with valve spring, Chly with PV and SS 4 With pressure relef valve, EPDM seal, with valve spring, Chly with PV an
12 Dat S5 Vh 10080 10092 10 Dat 29 Vh 10044 10 Dat 44 Vh 107486 7 bar 65 Vh 10742 7 bar 42 Vh 14 Dat 44 Dat 70 Dat 7 bar 42 Vh 14 Dat 4 Dat 84 Vh 14 Dat 4 Dat 84 Vh 15 Dat 4 Dat 7 Dat 42 Vh 15 Dat 4 Dat 7 Dat 7 Dat 17 PTET 25% cabon (max. 10 Dat) 18 Similess steel 17 PTET 25% cabon (max. 10 Dat) 18 Similess steel 18 Similess steel 18 Similess steel 19 PTET 25% cabon (max. 10 Dat) 19 PTET 25% cabon (max. 10 Dat) 10 Similess steel 10 Similess steel 10 Similess steel 11 PTET 25% cabon (max. 10 Dat) 12 Similess steel 13 Similess steel 14 Hydines 15 Similess steel 15 Similess steel 15 Similess steel 16 Similess steel 15 Similess steel 17 PTET 15 Similess steel 18 Similess steel 15 Similess steel 18 Similess steel 15 Similess steel 19 Similess steel 15 Similess steel 10 Similess steel 15 Similess steel 10 Similess steel 15 Similess steel 15 Similess steel 10 Similess steel 15 Similess steel 15 Similess steel 10 Similess steel 15 Similess steel 15 Similess steel 10 Similess steel 15 Similess steel 15 Similess steel 15 Similess steel 10 Similess steel 15 Similess stee
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Description Description
PVP PVDF (max. 10 bar)
PV PVDE (max. 10 bar)
SS Stainless steel TT PTE + 28% carbon (max. 10 bar) Seal material T PTE seal (standard) F PA-complaint G 1935/2004-complaint H Hyglenic Design, only for 10022, 10044 and 07085 Diaphraem 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, fistandard) 1 With 2 valve springs, Hastelloy C, 0.1 bar 4 " With pressure relief valve, FKM seal, no valve springs, Only with PV and SS 5 " With pressure relief valve, FKM seal, involve springs, Only with PV and SS 6 " With pressure relief valve, EPDM seal, with valve springs, Only with PV and SS 7 " With pressure relief valve, EPDM seal, with valve springs, Only with PV and SS Hyglenic Design Hydraulic connections 0 Standard threaded connector (according to technical data) 1 PVC union nut and insert 2 Union nut and insert 2 Union nut and insert 4 " "SS union nut and insert 7 Union nut and stainless steel hose nozzle 9 Union nut and stainless steel hose nozzle 1 Union nut and stainless steel hose nozzle 9 Union nut and stainless steel hose nozzle 1 Union nut and Stainless steel hose nozzle 1 Union nut and Stainless steel hose nozzle 2 Union nut and Stainless steel hose nozzle 3 Union nut and Stainless steel hose nozzle 5 Left liquid end 6 Electrical power supply 8 S 3 ph, 230 V/400 V 50/60 Hz, 0.09 HW T S ph, 230 V/400 V 50/60 Hz, 0.09 HW T S ph, 230 V/400 V 50/60 Hz, 0.09 HW T S ph, 230 V/400 V 50/60 Hz, 0.09 HW T S ph, 230 V/400 V 50/60 Hz, 0.09 HW
TT PTFE + 25% carbon (max. 10 bar) Seal material T PTFE seal (standard) F FDA-compliant G 1935/2004-compliant H Hyglenic 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)
Seal material T PFTE seal (standard) FDA-compliant G 1935/2004-compliant G 1935/2004-compliant Hygienic Design, only for 10022, 10044 and 07065 Diaphragm S Mutil-layer safety diaphragm with optical rupture indicator A Mutil-layer safety diaphragm with optical rupture indicator A Mutil-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, FFM seal, with valve spring, 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 Hydraulic connections O Standard threaded connector (according to technical data) PVC union nut and insert 2 Union nut and insert 2 Union nut and insert 2 Union nut and insert 4 * S union nut and insert 4 * S union nut and stainless steel hose nozzle Union nut and stainless steel h
T PTFE seal (standard) F PDA-compliant G 1935/2004-compliant H Hylgienic 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 with valve springs, 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 H Hygjenic Design Hydraulic connections 0 Standard threaded connector (according to technical data) 1 PVC union nut and insert 2 Union nut and insert P 3 PVDF union nut and insert 7 Union nut and PVDF hose nozzle 8 Union nut and Sh sos nozzle 9 Union nut and stainless steel hose nozzle 1 Union nut and stainless steel hose nozzle 1 Union nut and stainless steel hose nozzle 1 Union nut and stainless steel hose nozzle 2 Union nut and stainless steel hose nozzle 3 Union nut and stainless steel hose nozzle 4 "Ticlamp / groove clamp DIN 11864-3 DIN shape A Version 0 With ProMinent logo (standard) M Modified 5 Letf tiquid end Electrical power supply 5 S a ph, 230 V/400 V 50/60 Hz, with PTC 8 Variable speed motor 3 ph, 230/400 V, with PTC, with external fan 1 ph 230 V 50/60 Hz
F FDA-compliant 1935/2004-compliant H Hydgenic Design, only for 10022, 10044 and 07065 Diaphragm S Multi-layer safety diaphragm with optical rupture indicator A Multi-layer safety diaphragm with nupture 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 springs, 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 Hydgenic Design Hydraulic connections 0 Standard threaded connector (according to technical data) 1 PVC union nut and insert 2 Union nut and insert 4 ""S union nut and insert 4 ""S union nut and insert 4 ""S union nut and insert 7 Union nut and PVF hose nozzle 8 Union nut and Shose nozzle 9 Union nut and Shose nozzle 0 Union nut and stainless steel hose nozzle 1 Union nut and With proMinent logo (standard) Modified 1 Eleft liquid end Electrical power supply 5 g g ph, 230 V/400 V 50/60 Hz, 0.09 kW T g yariable speed motor 3 ph, 230/400 V, with PTC, with external fan 1 ph 230 V 50/60 Hz
H Hygienic Design, only for 10022, 10044 and 07065 H Hygienic Design, only for 10022, 10044 and 07065 Diaphragm
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, FEPDM seal, without valve spring, Only with PV and SS H H Hygienic Design Hydraulic connections 0 Standard threaded connector (according to technical data) 1 PVC union nut and insert 2 Union nut and insert 2 Union nut and insert 4 "" SS union nut and insert 4 "" SS union nut and insert 4 "" SS union nut and insert 7 Union nut and Sh hose nozzle 9 Union nut and stainless steel hose nozzle Union nut and stainless steel hose nozzle 7 TirClamp / groove clamp DIN 11864-3 DIN shape A Version 0 With ProMinent logo (standard) M Modified 5 Left liquid end Electrical power supply S in ph, 230 V/400 V 50/60 Hz, with PTC R Variable speed motor 3 ph, 230/400 V, with PTC, with external fan 1 ph 230 V 50/60 Hz
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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, EPDM seal, without valve spring, 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, without valve spring, Only with PV and SS Hydienic Design Hydraulic connections 0 Standard threaded connector (according to technical data) 1 PVC union nut and insert 2 Union nut and insert 2 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 SS hose nozzle 9 Union nut and SS hose nozzle 1 Union nut and SS hose nozzle 2 Union nut and SS hose nozzle 3 Union nut and SS hose nozzle 6 Union nut and SS hose nozzle 7 IriClamp / groove clamp DIN 11864-3 DIN shape A 8 Version 0 With ProMinent logo (standard) M Modified 5 Left liquid end Electrical power supply S
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S **
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 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 PVDF hose nozzle 9 Union nut and stainless steel hose nozzle C TriClamp / groove clamp DIN 11864-3 DIN shape A Version 0 With ProMinent logo (standard) M Modified 5 Left liquid end Electrical power supply S 3 ph, 230 V/400 V 50/60 Hz, 0.09 kW T 3 ph, 230 V/400 V 50/60 Hz, with PTC, with external fan 1 ph 230 V 50/60 Hz
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4 *** SS union nut and insert 7 Union nut and PVDF hose nozzle 9 Union nut and SS hose nozzle 9 Union nut and stainless steel hose nozzle 1 TriClamp / groove clamp DIN 11864-3 DIN shape A Version 0 With ProMinent logo (standard) M Modified 1 Left liquid end 1 Electrical power supply 1 S 3 ph, 230 V/400 V 50/60 Hz, 0.09 kW 1 T 3 ph, 230 V/400 V 50/60 Hz, with PTC 1 R Variable speed motor 3 ph, 230/400 V, with PTC, with external fan 1 ph 230 V 50/60 Hz
7 Union nut and PVDF hose nozzle Union nut and SS hose nozzle Union nut and stainless steel hose nozzle TriClamp / groove clamp DIN 11864-3 DIN shape A Version Uith ProMinent logo (standard) Modified Left liquid end Electrical power supply S 3 ph, 230 V/400 V 50/60 Hz, 0.09 kW T 3 ph, 230 V/400 V 50/60 Hz, with PTC R Variable speed motor 3 ph, 230/400 V, with PTC, with external fan 1 ph 230 V 50/60 Hz
8 Union nut and SS hose nozzle 9 Union nut and stainless steel hose nozzle C TriClamp / groove clamp DIN 11864-3 DIN shape A Version 0 With ProMinent logo (standard) M Modified 5 Left liquid end Electrical power supply S 3 ph, 230 V/400 V 50/60 Hz, 0.09 kW T 3 ph, 230 V/400 V 50/60 Hz, with PTC R Variable speed motor 3 ph, 230/400 V, with PTC, with external fan 1 ph 230 V 50/60 Hz
9 Union nut and stainless steel hose nozzle TriClamp / groove clamp DIN 11864-3 DIN shape A Version 0 With ProMinent logo (standard) M Modified 5 Left liquid end Electrical power supply S 3 ph, 230 V/400 V 50/60 Hz, 0.09 kW T 3 ph, 230 V/400 V 50/60 Hz, with PTC R Variable speed motor 3 ph, 230/400 V, with PTC, with external fan 1 ph 230 V 50/60 Hz
C TriClamp / groove clamp DIN 11864-3 DIN shape A Version 0 With ProMinent logo (standard) M Modified 5 Left liquid end Electrical power supply S 3 ph, 230 V/400 V 50/60 Hz, 0.09 kW T 3 ph, 230 V/400 V 50/60 Hz, with PTC R Variable speed motor 3 ph, 230/400 V, with PTC, with external fan 1 ph 230 V 50/60 Hz
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R Variable speed motor 3 ph, 230/400 V, with PTC, with external fan 1 ph 230 V 50/60 Hz
N 1 ph, AC 115 V 60 Hz, 0.09 kW
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 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, 85265 V AC 50/60 Hz
4 With stroke control motor 0/420 mA 85265 V AC 50/60Hz

- * 10 bar for PVDF and TTT version.
- ** Standard with hose sleeve in the bypass. 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 metering 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 metering diaphragm
- 2 valve balls
- 4 complete sealing sets (cover rings, ball seat discs)
- 4 composite seals

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

(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 col.	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 o	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

Multi-layer Safety Diaphragm (Standard)

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

Metering diaphragm (execution until 2009)

	Older IIO.
Sigma/ 1 FM 50 (12017; 12035; 10050)	1010279
Sigma/ 1 FM 65 (10022; 10044; 07065)	1010282
Sigma/ 1 FM 120 (07042; 04084; 04120)	1010285

Spare parts 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	PVT/SST	FKM-A/	1031199
relief valve 4 bar		EPDM	
Spare parts kits for integrated	PVT/SST	FKM-A/	1031200
relief valve 7 bar		EPDM	
Spare parts kits for integrated	PVT	FKM-A/	1031201
relief valve 10 bar		EPDM	
Spare parts kits for integrated	PVT/SST	FKM-A/	1031202
relief valve 12 bar		EPDM	

Accessories

- \blacksquare Foot valves for motor-driven metering pumps, see page \rightarrow 159
- \blacksquare Injection valves for motor-driven metering pumps, see page \rightarrow 163
- \blacksquare Hoses and pipework for motor-driven metering pumps, see page \rightarrow 189
- \blacksquare Suction lances, suction assemblies without level switches, see page \rightarrow 208
- Connectors, fittings, connector kits, seals, see page → 192
- Speed controllers, see page → 234
- \blacksquare Metering monitor Flow Control, can be set for motor-driven metering pumps, see page \rightarrow 227

Spare Parts

 \blacksquare Special valve balls/special valve springs, see page \rightarrow 224



1.3.4

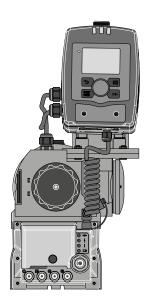
Motor-Driven Metering Pump Sigma X Control Type - Sigma/ 1 - S1Cb

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 log book significantly improves process management, optimisation and troubleshooting.



Your Benefits

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

Technical Details

- Stroke length: 4 mm
- Stroke length adjustment range: 0 100%
- Stroke length adjustment: manually using self-locking rotary dial in 1% increments
- Metering reproducibility is better than ± 2% in the 30 100% stroke length adjustment range under defined conditions and with correct installation
- Wetted materials: PVDF, stainless steel 1.4571/1.4404 (special materials on request)
- Power supply: 1 pH, 100 230 V ±10%, 240 V ±6%, 50/60 Hz (110 W)
- IP 65 degree of protection
- Fibreglass-reinforced plastic housing
- The liquid end on the left of the standard version can be selected for special installation situations or in combination with tanks, brackets etc.
- Manual or external contact mode can be set, factor with external contact control 99:1 1:99; batch mode with max. 99,999 strokes/start pulse.
- Metering profiles for optimum metering results.
- Display of wear parts in the Service menu.
- Connector for 2-stage level switch.
- Connection to PROFINET using the ProMinent DULCOnvert PROFIBUS®-PROFINET converter.
- VARIOus relay modules can be selected
- The Sigma product range is available in a "Physiologically safe in respect of wetted materials" design. Hygienic Design liquid ends are available for hygienically demanding applications.
- Customised designs are available on request.



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

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 waste water treatment
- Pulse-controlled metering in the bottling of different volumes e.g. glycerol 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 log book significantly improves process management, optimisation and troubleshooting.



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: Diaphragm rupture sensor

Metering profiles

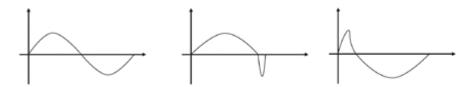
Metering profiles guarantee optimum metering results by adapting the metering behaviour of the metering pump to the application or chemical used.

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.

- Discharge stroke, suction stroke equal
- Long discharge stroke, short suction stroke
- Short discharge stroke, long suction stroke



"Physiologically safe" designs in respect to wetted sealing material

FDA

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

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

Available for pump designs in plastic (PV) and stainless steel (SS) and DN 25 ball valves (types 120145, 120190 and 120270).

Identity code example: S3CBH120270PVFS070UA01000DE

EU Regulation 1935/2004

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

Hygienic Design

Hygienic Design dosing heads are available in 1.4435 (AISI 316L) for hygienically demanding applications. Optimised in terms of dead space, feature as few gaps as possible and have smooth, wetted surfaces, easy to clean using CIP. Get in touch with us, we would be happy to advise you.

Identity code example: S3CBH040830SSHSHC0UA01000DE

Connection type: TriClamp / groove clamp DIN 11864-3 DIN shape A

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

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

01.01.2022

Identity code example: S1CbH07042PVTS01 5 UA1000EN



Sigma / 1 Control type design, liquid end on left



Technical Data

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

Materials in Contact with the Medium

Identity code of material	Dosing head	Connection on suc- tion/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	PTFE/stainless steel 1.4435	Ceramic	-

Motor Data

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

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

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

S1Cb	Drive type										yelem for the eighta. I contact type (eres)				
	Н	Main driv	e, dia	phragm	1										
		Type		Capacit											
		12017 * 12035 *		12 bar 12 bar	l .										
		10050			42 l/h										
		10022		10 bar	1										
		10044		10 bar	53 l/h										
		07065		7 bar	63 l/h	63 l/h									
		07042		7 bar	52 l/h										
		04084 04120		4 bar 4 bar	101 l/h 117 l/h										
		l		id end m											
					max. 10 b	oar)									
				Stainles											
				Seal ma		1.7.1									
				T F	PTFE se FDA-cor)							
				G	1935/20			nt							
				Н	1				1002	2, 100	044 and 07065				
					Diaphrag	gm									
									_		h optical rupture indicator				
									hragi	n with	h electrical signal				
					Liqu 0		d versional valve sp		(star	idard))				
					1			-	•	,	elloy C, 0.1 bar				
					2	with	bleed	valve	FKN	seal,	, no valve spring				
					3						, with valve spring				
					4 ** 5 **						FKM seal, no valve spring with valve springs				
					6 **						with valve springs EPDM seal, without valve spring				
					7 **						EPDM seal, with valve spring				
					8	with	bleed	valve	EPD	M sea	al, no valve spring				
					9				EPD	M sea	al, with valve spring				
					H		ienic D		otion						
						0	raulic c I Stand				onnector (according to technical data)				
						1	PVC u								
						2	Union	nut a	nd in	sert Pl	op o				
						3	PVDF								
						4 *** 7					nut and insert nose nozzle				
						8					nut and hose nozzle				
						9					ss steel welding sleeve				
						С	TriCla	mp/	groov	e clam	mp DIN 11864-3 DIN shape A				
							Versio								
								'ith Pi eft liqi			logo (standard)				
											supply				
							U	1 p	h, 10	0 – 23	30 V ±10%, 240 V ±6%, 50/60 Hz, 110 W				
										nd plug	•				
								- 1		Europ					
								ВС		Swiss Austra					
								D		USA					
									Rela						
										no rela	·				
											indicating relay (24 V 100 mA) + pacing relay (24 V 100 mA)				
											indicating relay (24 V, 100 mA) + pacing relay (24 V, 100 mA) 20 mA analogue output + fault indicating / pacing relay (24 V - 100 mA)				
											rol Variants				
										0 М	Manual + External contact with Pulse control				
											as 0 + analogue + metering profiles				
											as 1 + PROFIBUS® DP interface, M 12 Operating unit (HMI)				
										0					
										4	,				
										5	Operating unit with Click Wheel + 5 m cable				
										6					
										X	, ,				
											Access code 0 without access control				
											1 with access control				
											Language				
											DE German				

CS Czech DA Czech EL Czech ES Spanish ET Czech FI Czech FR French HU Czech HR Czech KO Czech LT Czech LT Czech LT Czech IT Italian NL Dutch	ı	1	I	1 1	1	1 1	ı	1 1	1 1	1	EN En	indish
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PT Portuguese											PT Po	ortuguese
RU Russian							İ					
SV Swedish												
ZH Chinese												

- * 10 bar for PVDF version.
- ** Standard with hose sleeve in the bypass. 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 metering 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 metering diaphragm
- 2 valve balls
- 4 complete sealing sets (cover rings, ball seat discs)
- 4 composite seals

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

(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	Materials in contact with the medium		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 i	n 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 Kits for Integrated Relief Valve (S1Ca, S1Cb)

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

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

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 (Standard)

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

Metering diaphragm (execution until 2009)

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

Protective cowling

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

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



Wall Mounting for Accumulator

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

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

Extension cable for operating unit (HMI)

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

Sigma X operating panel

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

Accessories

- \blacksquare Foot valves for motor-driven metering pumps, see page \rightarrow 159
- Injection valves for motor-driven metering pumps, see page \rightarrow 163
- \blacksquare Hoses and pipework for motor-driven metering pumps, see page \rightarrow 189
- \blacksquare Suction lances, suction assemblies without level switches, see page \rightarrow 208
- \blacksquare Connectors, fittings, connector kits, seals, see page \rightarrow 192
- Speed controllers, see page \rightarrow 234
- \blacksquare Metering monitor Flow Control, can be set for motor-driven metering pumps, see page \rightarrow 227

Spare Parts

 \blacksquare Special valve balls/special valve springs, see page \rightarrow 224



1.3.5

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

Excellent process reliability:

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

Flexible adaptation to the process:

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

Technical Details

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

Field of Application

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



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 k Ω , degree of protection IP65.

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 50/60 Hz, degree of protection IP65, actual value output 0/4-20 mA for remote display.

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

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

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

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

Identity code example: S2BaHM07220PV F S000S000

EU Regulation 1935/2004

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

Available for stainless steel (SS) pump design.

Hygienic Design

Hygienic Design dosing heads are available in 1.4435 (AISI 316L) for hygienically demanding applications. Optimised in terms of dead space, feature as few gaps as possible and have smooth, wetted surfaces, easy to clean using CIP. Get in touch with us, we would be happy to advise you.

Identity code example: S2BAHM07220SSHAHC0S000

Connection type: TriClamp / groove clamp DIN 11864-3 DIN shape A



Technical Data

Туре	Capacity at max. back pressure with 1500 rpm motor at 50 Hz			•	pacity at r		Suction lift	Perm. pre-pres- sure suction side	Connector Suction/Discharge	Shipping weight	
				Max. stroke			Max. stroke				
				rate			rate				
S2Ba	l/h	bar	ml/stroke	Strokes/	l/h/gph	psi	Strokes/	m WC	bar	G-DN	kg
				min	(US)		min				
16050 PVT	50	16	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	16	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	16	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	24
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	24
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	24
04350 SST *	350	4	29.4	198	420.0/110.9	58	238	5	1	1 1/2–25	24

^{*} 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

Materials in Contact with the Medium

Identity code of material	Dosing head	Connection on suc- tion/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	PTFE/stainless steel 1.4435	Ceramic	•

- * With 07120, 07220, 04350
- ** Specifically for areas at risk from explosion

Motor Data

Identity code specification	Power supply	Δ/Υ			Remarks
Ś	3-phase, IP 55	220 - 240 V/380 - 420 V	50 Hz	0.25 kW	
Т	3-phase, IP 55	220 - 240 V/380 - 420 V	50 Hz	0.25 kW	With PTC, speed control range 1:5
R	3-phase, IP 55	220 - 240 V/380 - 420 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)
М	1-phase AC, IP 55	230 V ± 5 %	50/60 Hz	0.18 kW	
Ν	1-phase AC, IP 55	115 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
P1	3-phase, II2GExellT3	250 - 280 V/440 - 480 V	60 Hz	0.18 kW	
P2	3-phase, II2GExdIICT4	250 - 280 V/440 - 480 V	60 Hz	0.21 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.

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

Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/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 driv	e, dia	aphragm	1									
		Туре		Capaci										
		16050 *		16 bar	ř –	h								
		16090 *		16 bar	l									
		16130 *		16 bar	l									
		07120		7 bar	126 l/h									
		07220		7 bar	220									
		04350		4 bar	350									
			Liau	id end n										
					VDF (max. 10 bar)									
				,			ui)							
			ı	l	nless steel F + 25% carbon (max 10 bar)									
			l'''		PTFE + 25% carbon (max. 10 bar) Seal material PTFE seal (standard)									
				T										
				F	FDA-				-,					
				G	l			 omplia	nt					
				lΗ	Hygi									
					Diap			9						
					1			r safe	tv di	aphrad	agm with optical rupture indicator			
					1 1						agm with rupture signalling (contact)			
								d vers		٠ مر				
								pring						
									∕e sr	orinas	s, Hastelloy C, 0.1 bar			
											valve, FKM seal, no valve spring, Only with PV and SS			
						1 1					valve, FKM seal with valve springs, Only with PV and SS			
											valve, EPDM seal, without valve spring, Only with PV and SS			
						- 1					valve, EPDM seal, with valve spring, Only with PV and SS			
								enic E						
								aulic	_		ons			
						Ī	0	Stand	dard	threa	aded connector (according to technical data)			
							1	PVC	unio	n nut	t and insert			
				İ			2	Unior	nut	and i	insert PP			
				İ			3	PVDF	uni	on nu	ut and insert			
				İ			4 ***	SS u	nion	nut ar	and insert			
							7	Unior	nut	and F	PVDF hose nozzle			
							8	Unior	nut	and S	SS hose nozzle			
							9	Unior	nut	and s	stainless steel hose nozzle			
							С	TriCla	mp	groo/	ove clamp DIN 11864-3 DIN shape A			
								Versi						
								0 V	Vith	ProMi	finent logo (standard)			
								M	/lodi	ied				
									_		power supply			
								S	- 1		230 V/400 V 50/60 Hz			
								T	- 1		230 V/400 V 50/60 Hz, with PTC			
								F	- 1		ole speed motor 3 ph, 230/400 V, with PTC, with external fan 1 ph 230 V 50/60 Hz			
								I N	- 1		AC, 230 V/50/60 Hz			
									- 1		AC 115 V 60 Hz			
								L			230 V/400 V, 0.37 kW, 50 Hz, (Exe, Exd)			
								1	- 1		otor, with B14 flange, Gr. 71 DIN			
								3	- 1-		otor, with B5 flange, Gr. 63 DIN			
											sure rating			
									0	- 1	P 55 (standard)			
									1		x-design ATEX-T3			
									2		x-design ATEX-T4			
											troke sensor			
										0				
										2				
										3	,			
											Stroke length adjustment			
											0 Manual (Standard)			
											1 With servomotor, 85265 V AC 50/60 Hz			
											4 With stroke control motor 0/420 mA 85265 V AC 50/60Hz			
				*		10	har	for E	ر \ ر	Fan	nd TTT version			

- * 10 bar for PVDF and TTT version.
- ** Standard with hose sleeve in the bypass. 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 Basic type (S2Ba)

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

Scope of delivery for PVT material version:

- 1 metering 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 metering 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	ТТТ	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	ТТТ	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 (Standard)

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



Metering diaphragm (execution until 2009)

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

Spare parts kit for integrated 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	PVT/SST	FKM-A/	1031199
relief valve 4 bar		EPDM	
Spare parts kits for integrated	PVT/SST	FKM-A/	1031200
relief valve 7 bar		EPDM	
Spare parts kits for integrated	PVT	FKM-A/	1031201
relief valve 10 bar		EPDM	
Spare parts kit for relief valve	SST	FKM-A/	1031203
16 bar		EPDM	

Gear Oil

	Volume	Order no.	
Mobilgear 634 VG 460 gear oil	11	1004542	

Accessories

- \blacksquare Foot valves for motor-driven metering pumps, see page \rightarrow 159
- \blacksquare Injection valves for motor-driven metering pumps, see page \rightarrow 163
- \blacksquare Hoses and pipework for motor-driven metering pumps, see page \rightarrow 189
- \blacksquare Suction lances, suction assemblies without level switches, see page \rightarrow 208
- \blacksquare Connectors, fittings, connector kits, seals, see page \rightarrow 192
- Speed controllers, see page \rightarrow 234
- \blacksquare Metering monitor Flow Control, can be set for motor-driven metering pumps, see page \rightarrow 227

Spare Parts

 \blacksquare Special valve balls/special valve springs, see page \rightarrow 224

1.3.6

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

The new Sigma X range - reliable, smart and connectible

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



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

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

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

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

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

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

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



Your Benefits

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



Technical Details

- Stroke length: 5 mm
- Stroke length adjustment range: 0 100%
- Stroke length adjustment: manually using self-locking rotary dial in 1% increments
- Metering reproducibility is better than ± 2% in the 30 100% stroke length adjustment range under defined conditions and with correct installation
- Power supply: 1 pH, 100 230 V ±10%, 240 V ±6%, 50/60 Hz (220 W)
- IP 65 degree of protection
- Fibreglass-reinforced plastic housing
- Manual or external contact mode can be set, factor with external contact control 99:1 1:99; batch mode with max. 99.999 strokes/start pulse.
- Display of wear parts in the Service menu.
- Connector for 2-stage level switch.
- Connection to PROFINET using the ProMinent DULCOnvert PROFIBUS®-PROFINET converter.
- The Sigma product range is available in the "Physiologically safe in respect of wetted materials" design, Hygienic Design liquid ends are available for hygienically demanding applications.
- VARIOus relay modules can be selected.
- Wetted materials: PVDF, stainless steel 1.4571/1.4404, special materials on request
- Customised designs are available on request.

For reasons of safety, provide suitable overload protection mechanisms when installing all mechanically deflected 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 waste water treatment
- Pulse-controlled metering in the bottling of different volumes e.g. glycerol 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 log book significantly improves process management, optimisation and troubleshooting.

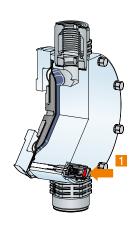


The Sigma X represents a durable motor-driven metering pump with integral control and patented multi-layer safety diaphragm, standing out on account of its excellent process reliability. In the event of an accident, the feed chemical does not escape to the outside nor into the pump's power end, thanks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

Metering profiles

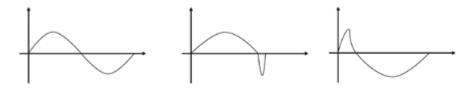
Metering profiles guarantee optimum metering results by adapting the metering behaviour of the metering pump to the application or chemical used.

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.

- Discharge stroke, suction stroke equal
- Long discharge stroke, short suction stroke
- Short discharge stroke, long suction stroke



"Physiologically safe" designs in respect to wetted sealing material

FDA

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

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

Available for pump designs in plastic (PV) and stainless steel (SS) and DN 25 ball valves (types 120145, 120190 and 120270).

Identity code example: S3CBH120270PVFS070UA01000DE

EU Regulation 1935/2004

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

Hygienic Design

Hygienic Design dosing heads are available in 1.4435 (AISI 316L) for hygienically demanding applications. Optimised in terms of dead space, feature as few gaps as possible and have smooth, wetted surfaces, easy to clean using CIP. Get in touch with us, we would be happy to advise you.

Identity code example: S3CBH040830SSHSHC0UA01000DE

Connection type: TriClamp / groove clamp DIN 11864-3 DIN shape A



Technical Data

Туре	Capacity	at max.	back pres- sure	Max. stroke rate	•	city at max. ck pressure	Suction lift	Perm. pre-pressure suction side	Connector Suction/ Discharge Side	Shipping weight
S2Cb	bar	l/h	ml/stroke	Strokes/	psi	gph (US)	m WC	bar	G-DN	kg
				min						
16050 PVT	10	61	11.4	90	145	16.1	7	2	1–15	15
16050 SST	16	56	10.4	90	232	14.8	7	2	1–15	20
16090 PVT	10	109	11.4	160	145	28.8	7	2	1–15	15
16090 SST	16	99	10.3	160	232	26.2	7	2	1–15	20
16130 PVT	10	131	10.9	200	145	34.6	7	2	1–15	15
16130 SST	16	129	10.9	200	232	34.1	7	2	1–15	20
07120 PVT	7	150	27.4	90	102	39.6	5	1	1 1/2-25 *	16
07120 SST	7	150	27.4	90	102	39.6	5	1	1 1/2–25	24
07220 PVT	7	271	27.7	160	102	71.6	5	1	1 1/2–25	16
07220 SST	7	271	27.7	160	102	71.6	5	1	1 1/2–25	24
04350 PVT	4	353	29.4	200	58	93.3	5	1	1 1/2-25	16
04350 SST	4	353	29.4	200	58	93.3	5	1	1 1/2–25	24

^{*} 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.

Materials in Contact with the Medium

Identity code of material	Dosing head	Connection on suc- tion/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	PTFE/stainless steel 1.4435	Ceramic	-

^{*} With 07120, 07220, 04350

Motor Data

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

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



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

S2Cb	Drive type																
	Н	Main dri	ve, dia	aphraam	1												
		Туре															
		16050 *		16 bar		'n											
1		16090 *		16 bar	ı												
		16130 *		16 bar	l												
1		07120		7 bar	150												
		07120			271												
		04350		l	353												
		3,555	Liqu	id end n													
						eriai x. 10 bar)											
				Stainles													
			1	Seal ma													
				T		rFE seal (standard)											
				F	1	DA-compliant											
				G	1	035/2004-compliant											
				Н					liai it								
				l''		rgienic Design aphragm											
					1	Multi-layer safety diaphragm with optical rupture indicator											
						Multi-layer safety diaphragm with electrical signal Liquid end version											
							No v				(otor	adar	۹/				
															0	1 600	
			1								-					1 bar	
			1													sprir	
																ve sp	
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																	hout valve spring
						7 **											h valve spring
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							Hygi				±:	_				-	
							Hydi	_							. ,		Production to the Production
							0								or (a	accor	rding to technical data)
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							2		on n								
							3		DF ur								
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							7		on n								
							8										ozzle
							9										g sleeve
							С			o / g	roov	/e cla	amp	DIN	V 1.	1864	-3 DIN shape A
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								0						•	and	lard)	
									Elec		-		-			0/ 0	40.V - 20/ - 50/20.LL - 200.W
										<u> </u>				V ±	:10	%, 24	40 V ±6%, 50/60 Hz, 220 W
										_		nd p	-				
												Eur		an			
												Sw					
												Aus		an			
		1	1									US,	н				
			1								Rela		ole:				
			1								0	no r			tina	role:	(/220 V 8 A)
			1								1				-		y (230 V, 8 A)
											3						y (24 V, 100 mA) + pacing relay (24 V, 100 mA) e output + fault indicating / pacing relay (24 V - 100 mA)
			1								8					_	с опіраі т тайн пічноаніну / расіну гетау (24 v - 100 MA)
			1									Cor 0					nal contact with Pulse control
			1													exteri anal	
			1														·
																OFIB	US® DP interface, M 12
			1														r-oii erload switch-off
													٥				unit (HMI)
			1											0 0			ing unit with Click Wheel (0.5 m cable)
			1											4			ing unit with Click Wheel + 2 m cable
			1											5			ing unit with Click Wheel + 2 m cable ing unit with Click Wheel + 5 m cable
			1											5 6			· ·
														Х			ing unit with Click Wheel + 10 m cable
			1											^	_		t operating unit (HMI)
			1													-	code
															0		hout access control
			1												["		h access control
																	nguage
			1													- 1	German
																	English
																108	Czech

1								DA	Czech
									Czech
			i i						Spanish
					i				Czech
					i				Czech
									French
								HU	Czech
									Czech
									Czech
			1 1						Czech
									Czech
									Italian
									Dutch
									Polish
									Czech
			1 1						Portuguese
									Russian
									Czech
									Czech
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									Chinese
								<u>-11</u>	OT 111 1000

- 10 bar for PVDF version.
- ** Standard with hose sleeve in the bypass. 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 metering 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 metering 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	ТТТ	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 (Standard)

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



Metering diaphragm (execution until 2009)

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

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

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

Gear Oil

	Volume	Order no.	
Mobilgear 634 VG 460 gear oil	11	1004542	

Spare Parts Kits for Integrated Bleed Valve (S2Cb)

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

For identity code specification "Dosing head 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

Extension cable for operating unit (HMI)

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

Sigma X operating panel

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



Accessories

- \blacksquare Foot valves for motor-driven metering pumps, see page \rightarrow 159
- Injection valves for motor-driven metering pumps, see page \rightarrow 163
- \blacksquare Hoses and pipework for motor-driven metering pumps, see page \rightarrow 189
- Suction lances, suction assemblies without level switches, see page \rightarrow 208
- Connectors, fittings, connector kits, seals, see page \rightarrow 192
- Speed controllers, see page \rightarrow 234
- Metering monitor Flow Control, can be set for motor-driven metering pumps, see page → 227

Spare Parts

■ Special valve balls/special valve springs, see page → 224



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

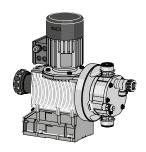
The robust pump for safe and reliable use

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



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

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



Sigma/3

Your Benefits

Excellent process reliability:

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

Flexible adaptation to the process:

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



1: Diaphragm rupture senso

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
- Metering reproducibility is better than ± 2% in the 30 100 % stroke length adjustment range under defined conditions and with correct installation.
- Wetted materials: PVDF, stainless steel 1.4571/1.4404, special materials on request
- Patented multi-layer safety diaphragm with optical diaphragm rupture display (optionally with diaphragm rupture warning system via a contact)
- Integrated hydraulic relief and bleed valve
- A wide range of power end versions is available: Three-phase standard motor, 1-phase AC motor, motors for use in Exe and Exde areas and different flange designs for use in customer-specific motors
- For areas at risk from explosion II 2G Ex h IIC T3 Gb X or II 2G Ex h IIC T4 Gb X (optional)
- IP 55 degree of protection
- High-strength fibreglass-reinforced plastic housing with excellent chemical resistance

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

Field of Application

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



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 k Ω , degree of protection IP65.

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 50/60 Hz, degree of protection IP65, actual value output 0/4-20 mA for remote display.

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

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

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

Available for pump designs in plastic (PV) and stainless steel (SS) and DN 25 ball valves (types 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 "Physiologically safe for wetted material in accordance with Regulation (EC) 1935/2004" stainless steel material version.

Available for pump designs in stainless steel (SS) and DN 25 ball valves (types 120145, 120190, 120270, 120330).

Hygienic Design

Hygienic Design dosing heads are available in 1.4435 (AISI 316L) for hygienically demanding applications. Optimised in terms of dead space, feature as few gaps as possible and have smooth, wetted surfaces, easy to clean using CIP. Get in touch with us, we would be happy to advise you.

Identity code example: S3BAH070410SSHAHC0S000

Connection type: TriClamp / groove clamp DIN 11864-3 DIN shape A



Technical Data

Туре	Capacity at max. back pressure with 1500 rpm motor at 50 Hz Max. stroke								Perm. pre-pres- sure suction side	Connector Suction/ Discharge Side	Shipping weight
				rate			rate				
S3Ba	l/h	bar	ml/	Strokes/min	psi	I/h/gph (US)	Strokes/min	m WC	bar	G-DN	kg
			stroke								
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

^{*} Only available for 50 Hz.

Performance data for TTT, see type PVT

Materials in Contact with the Medium

		DN 25 ball valves			DN 32 plate val	ves		
Identity code of material	Seals	Suction / dis- charge connec- tion on dosing head DN 25	Valve balls	Valve seats	Suction / discharge connection on dosing head DN 32	Valve plates/ valve springs		Integral relief valve
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/Has- telloy C	PTFE	Stainless steel/ FKM or EPDM
***	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	Stainless steel 1.4435	Ceramic	Stainless steel 1.4404	Stainless steel 1.4581	Ceram- ic/E-CTFE	Stainless steel 1.4404	-

^{*} With design "F", the ball seat is made of PVDF, only for DN 25 ball valves

^{**} DN32 plate valves with valve spring

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

^{***} Specifically for areas at risk from explosion

^{****} DN 32 designed as ball non-return valve

Motor Data Identity Power supply Δ/Υ Remarks code specification 3-phase, IP 55 230 V/400 V 50 Hz 0,37 kW 265 V/460 V 60 Hz 0,37 kW Т 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) 1-phase AC, IP 55 Μ 230 V \pm 5 % 50/60 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

Motor data sheets can be requested for more information. Versions 265/460V - 60Hz, special motors or special motor flanges are available on request.

In accordance with the Eco Design Directive 2009/125/EC, motors of less than 0.75 kW and motors designed for operation with variable speed are not subject to the IE3 standard.

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.

^{*} Three-phase motor according to IEC 60034-1

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

S3Ba	Drive type	e type														
	Н	Main drive	Main drive, diaphragm													
		Туре	,	Capaci												
		120145 *		12 bar	1	l/h										
1		120190 *			2 bar 208 l/h											
		120270 *		12 bar												
		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	1,00	30 l/h	١									
			Liqu	id end n	nater	ial										
			-	PVDF (ı			oar)									
			SS	Stainles	ss ste	eel										
			TT	PTFE +	25%	6 car	bon	(max.	10	ar)						
				Seal ma	ateria	· · · · · ·										
				Т	PTF	FE seal (standard)										
				F	FDA	\-cor	nplia	nt, or	ly fo	12 bar ve	ersion					
				G	193	5/20	04-с	ompl	iant,	only for 12	2 bar version					
				Н	Нус	jienic	Des	ign								
						ohraç										
						Mult	i-laye	er saf	ety c	aphragm	with optical rupture indicator					
					Α	Mult	i-laye	er saf	ety c	aphragm	with rupture signalling (contact)					
							1	d ver								
						0	No s	spring)							
						1					stelloy C 4; 0.1 bar (standard for DN 32)					
											e, FKM seal, no valve spring, Only with PV and SS					
											e, FKM seal with valve springs (standard at DN 32), Only with PV and SS					
											e, EPDM seal, without valve spring, Only with PV and SS					
						7 **					e, EPDM seal, with valve springs (standard at DN 32), Only with PV and SS					
						Н		ienic								
							-	1		nections						
							0				connector (according to technical data)					
							1			n nut and						
							2	1		t and inse						
							4 ***	1		on nut an nut and i						
							7				isert IF hose nozzle					
							8	1			nose nozzle					
							9	1			nless steel hose nozzle					
							C	1			clamp DIN 11864-3 DIN shape A					
								Vers	_	, g. 00 TO	James Bill 1100 1 0 Bill Onape 71					
								_		ProMinen	t logo (standard)					
								1 1	Mod							
									Elec	rical powe	er supply					
										ph, 230	***					
											V/400 V, with PTC					
											need motor 3 ph, 230/400 V, with PTC, with external fan 1 ph 230 V 50/60 Hz					
									М	-phase, 2	30 V, 50/60 Hz					
									L	ph, 230	V/400 V, 0.37 kW, 50 Hz, (Exe, Exd)					
									- 1		with B14 flange, size 80 (DIN)					
									з [No motor,	with B5 flange, size 71 (DIN)					
										nclosure	rating					
											standard)					
											sign ATEX-T3					
											sign ATEX-T4					
											sensor					
										1 1	o stroke sensor (standard)					
										1 1	acing relay (reed relay)					
										3 St	roke sensor (Namur) for hazardous locations					
										St	roke length adjustment					
										0	Manual (Standard)					
										1	with servomotor, 85265 V AC 50/60 Hz					
										4	With stroke control motor 0/420 mA 85265 V AC 50/60Hz					
										_						

- * 10 bar for PVDF and TTT version.
- ** Standard with 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 metering 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 metering 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 for version with multi-layer safety diaphragm

(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	

Multi-layer Safety Diaphragm (Standard)

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

Metering diaphragm (execution until 2009)

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

Spare parts kit for integrated 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

	Volume	Order no.	
Mobilgear 634 VG 460 gear oil	11	1004542	

Accessories

- Foot valves for motor-driven metering pumps, see page → 159
- Injection valves for motor-driven metering pumps, see page \rightarrow 163
- \blacksquare Hoses and pipework for motor-driven metering pumps, see page \rightarrow 189
- \blacksquare Suction lances, suction assemblies without level switches, see page \rightarrow 208
- \blacksquare Connectors, fittings, connector kits, seals, see page \rightarrow 192
- \blacksquare Speed controllers, see page \rightarrow 234
- \blacksquare Metering monitor Flow Control, can be set for motor-driven metering pumps, see page \rightarrow 227

Spare Parts

 \blacksquare Special valve balls/special valve springs, see page \rightarrow 224

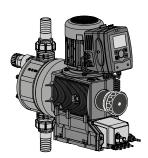
1.3.8 Motor-Driven Metering Pump Sigma X Control Type – Sigma/ 3 - S3Cb

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(lar)

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

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

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

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

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



Your Benefits

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

Technical Details

- Stroke length: 6 mm
- Stroke length adjustment range: 0 100%
- Stroke length adjustment: manually using self-locking rotary dial in 1% increments
- Metering reproducibility is better than ± 2% in the 30 100% stroke length adjustment range under defined conditions and with correct installation
- Power supply: 1 pH, 100 230 V ±10%, 240 V ±6%, 50/60 Hz (420 W)
- IP 65 degree of protection
- Fibreglass-reinforced plastic housing
- Manual or external contact mode can be set, factor with external contact control 99:1 1:99; batch mode with max. 99.999 strokes/start pulse.
- Metering profiles for optimum metering results.
- Display of wear parts in the Service menu.
- Connector for 2-stage level switch.
- Connection to PROFINET using the ProMinent DULCOnvert PROFIBUS®-PROFINET converter
- VARIOus relay modules can be selected.
- The Sigma product range is available in a "Physiologically safe in respect of wetted materials" design.
- Wetted materials: PVDF, stainless steel 1.4571/1.4404, special materials on request.
- Dosing heads with electro-polished stainless steel for aqueous media are available on request for hygienically challenging applications.
- We are happy to supply alternative material versions to comply with export conditions for pump capacities of >600 l/h and PVDF.
- Customised designs are available on request.

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



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 waste water 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.

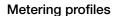
Relevant spare parts can be shown in the display. The integral log book significantly improves process management, optimisation and troubleshooting.



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.



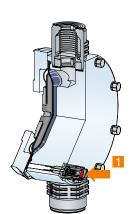
Metering profiles guarantee optimum metering results by adapting the metering behaviour of the metering pump to the application or chemical used.

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.

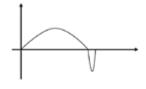


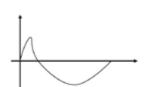


1: Diaphragm rupture sensor

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







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

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

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

Available for pump designs in plastic (PV) and stainless steel (SS) and DN 25 ball valves (types 120145, 120190 and 120270).

Identity code example: S3CBH120270PVFS070UA01000DE

EU Regulation 1935/2004

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

Hygienic Design

Hygienic Design dosing heads are available in 1.4435 (AISI 316L) for hygienically demanding applications. Optimised in terms of dead space, feature as few gaps as possible and have smooth, wetted surfaces, easy to clean using CIP. Get in touch with us, we would be happy to advise you.

Identity code example: S3CBH040830SSHSHC0UA01000DE

Connection type: TriClamp / groove clamp DIN 11864-3 DIN shape A



Technical Data

Туре	Pump ca	apacity at	max. back pressure	Max. stroke rate		capacity at k pressure	Suction lift	Perm. pre-pressure suction side	Connector Suction/ Discharge Side	Shipping weight
S3Cb	bar	l/h	ml/stroke	Strokes/	psi	gph (US)	m WC	bar	G-DN	kg
				min						
120145 PVT	10	182	33.7	90	145	48.0	5	2	1 1/2–25	22
120145 SST	12	182	33.7	90	174	48.0	5	2	1 1/2–25	26
120190 PVT	10	243	33.7	120	145	64.1	5	2	1 1/2-25	22
120190 SST	12	243	33.7	120	174	64.1	5	2	1 1/2–25	26
120270 PVT	10	365	33.8	180	145	96.4	5	2	1 1/2–25	22
120270 SST	12	365	33.8	180	174	96.4	5	2	1 1/2–25	26
070410 PVT	7	500	95.1	90	102	132.0	4	1	2-32 *	24
070410 SST	7	500	95.1	90	102	132.0	4	1	2-32 *	29
070580 PVT	7	670	95.1	120	102	176.9	4	1	2-32 *	24
070580 SST	7	670	95.1	120	102	176.9	4	1	2-32 *	29
040830 PVT	4	1,040	95.1	180	58	274.7	3	1	2-32 *	24
040830 SST	4	1,040	95.1	180	58	274.7	3	1	2–32 *	29

DN32 plate valves with valve spring

Materials in Contact with the Medium

		DN 25 ball valves			DN 32 plate val	DN 32 plate valves				
Identity code of material	Seals	Suction / dis- charge connec- tion on dosing head DN 25	Valve balls	Valve seats	Suction / discharge connection on dosing head DN 32	Valve plates/ valve springs	Valve seats	Integral relief valve		
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/Has- telloy C	PTFE	Stainless steel/ FKM or EPDM		
***	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	Stainless steel 1.4435	Stainless steel 1.4404	Stainless steel 1.4404	Stainless steel 1.4581	Ceram- ic/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

Motor Data

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

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



^{****} DN 32 designed as ball non-return valve

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

S3Cb	Drive type																
	H	Main driv	/e, dia	phragm	1												
		Туре		Capaci													
		120145		12 bar	I												
		120190		12 bar	I												
		120270 °		12 bar 7 bar	365 500												
		070580		7 bar 7 bar	670												
		040830		4 bar	1		1										
			Liqu	id end n													
			PV	PVDF (ı	max.	10 b	ar)										
			SS	Stainles													
				Seal ma			-1 (-1-		- D								
				T F G			al (sta nplian			or 12	har	· vor	eion				
					1		04-cc							ersi	on		
				Н	1		Desig		,								
					Diap	ohrag	jm										
																	re indicator
							i-layeı id end		_	_	ırag	m w	ith e	lecti	ical s	signa	nal
							No v				star	ndan	d)				
										_				/ C -	4; 0. ⁻	1 ba	ar (standard for DN 32)
							With				~						,
							With										· ·
																	alve spring
							With										ngs nout valve spring
																	n valve spring
							With p										
						9	With										
							Hygi			_							
							Hydr						onn	o o t o	r /00		diag to tooksical data)
										ion n					ir (aci	COIC	ding to technical data)
										ut an							
							3	PVE)F ur	nion	nut	and	inse	rt			
						-									inse		
															ozzle		
																	ozzle g sleeve
																_	3 DIN shape A
								Vers					Ė				
														`	ndar	rd)	
										etrica	-			-	100/	0.44	MOV - COV FO/CO I I - 400 W
										Cab				ν±	10%	, 241	40 V ±6%, 50/60 Hz, 420 W
									- 1	- 1			opea	an			
										в	2 m	Sw	iss				
													stralia	an			
										- 6		US	Ą				
1										- 1	Rela	-	elay				
													-		ing re	elav	y (230 V, 8 A)
1										- 1							/ (24 V, 100 mA) + pacing relay (24 V, 100 mA)
1																	e output + fault indicating / pacing relay (24 V - 100 mA)
												_	ntrol '				and contact with Dulco control
1																	nal contact with Pulse control + metering profiles
1																	US® DP interface, M 12
													Ove	rloa	d sw	vitch-	n-off
1														_			rload switch-off
1													- 1		_	_	init (HMI)
														0 4			ng unit with Click Wheel(0.5 m cable) ng unit with Click Wheel + 2 m cable
													- 1	5			ng unit with Click Wheel + 5 m cable
													- 1	6			ng unit with Click Wheel + 10 m cable
														Χ	with	out	operating unit (HMI)
1																_	code
																	hout access control
1																	h access control
1																	nguage German
																	English
																	Czech

						EL ES ET FI FR HU HR KO LT LV IT NL PL RO PT RU SK SL	Czech Czech Spanish Czech Czech French Czech Swedish
						SV	Swedish
						ZH	Chinese

- 10 bar for PVDF version.
- ** Standard with 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 metering 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 metering 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 for version with multi-layer safety diaphragm

(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	ТТТ	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	

Multi-layer Safety Diaphragm (Standard)

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



Metering diaphragm (execution until 2009)

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

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

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

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

Gear Oil

	Volume	Order no.	
Mobilgear 634 VG 460 gear oil	11	1004542	

Spare Parts Kits for Integrated Bleed Valve (S3Cb)

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

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

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

Protective Cowling for Operating Unit (HMI)

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

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

Wall Bracket for Operating Unit (HMI)

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

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

Extension cable for operating unit (HMI)

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

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 → 159
- Injection valves for motor-driven metering pumps, see page \rightarrow 163
- Hoses and pipework for motor-driven metering pumps, see page \rightarrow 189
- \blacksquare Suction lances, suction assemblies without level switches, see page \rightarrow 208
- \blacksquare Connectors, fittings, connector kits, seals, see page \rightarrow 192
- Speed controllers, see page → 234
- \blacksquare Metering monitor Flow Control, can be set for motor-driven metering pumps, see page \rightarrow 227

Spare Parts

 \blacksquare Special valve balls/special valve springs, see page \rightarrow 224



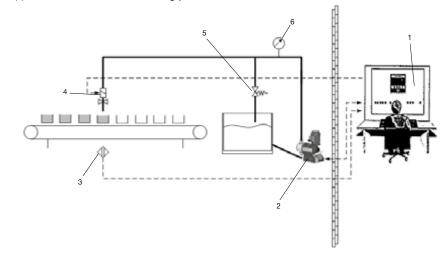
1.3.9 Application Examples

Metering Of Highly Viscous Substances

Product: Motor-driven metering pumps

Feed chemical: Viscous filler
Industry: Electronics sector
Application: Filling parts

- Process control system PLS (Master)
- 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



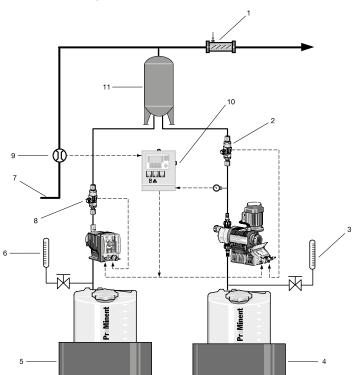
Mixing Two Reagents

Product: Motor-driven metering pumps, sole-

noid-driven metering pumps

Feed chemical: Chlorine activator, oxidant (NaOCI)
Industry: Process industry, power plants
Application: Biocide treatment of cooling water

systems



8 Flow Control 9 Flow measurement 10 Control cabinet 11 Reaction tank

Static mixer

Flow Control

Chlorine activator

Metering measuring unit NaOCI solution

Metering measuring unit Process water

2

3

5

6

Problems and requirements

- Biocide treatment of cooling water systems, used in conjunction with chlorination.
- Chlorine activator is mixed with NaOCI, forming hypobromous acid (HOBr), as an active biocide compound. HOBr is especially effective with pH values within a range of 7.5 to 9.0.
- Provide for a content of 0.5 g/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 NaOCI (12.5%) is 10 I to 26 52 I. 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.



Solution

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

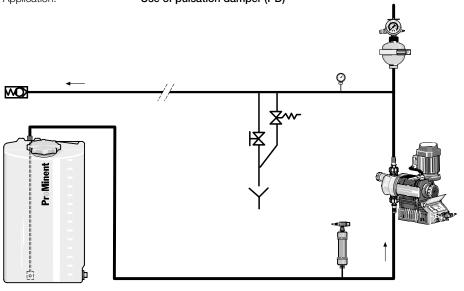
Benefits

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



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

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



1.3 Motor-Driven Metering Pumps

1.3.10

DULCONNEX: IIoT Solution for Digital Fluid Management

Location-independent system monitoring in real time

With DULCONNEX, you always have access to all the key data and measured values. Monitor the status of your system in real time and benefit from continuous documentation. Check your device data safely and reliably when you're not on site. Simply use the terminal device of your choice: smartphone, tablet or PC.

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



1.4.1 Peristaltic pumps DULCOFLEX

The virtually universal pump for many applications.

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

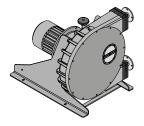


ProMinent peristaltic pumps operate on a simple functional principle and stand out thanks to their compact and robust design. They are self-priming and operate without seals and valves.

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 their suction behaviour and ensuring the even feed of viscose media.



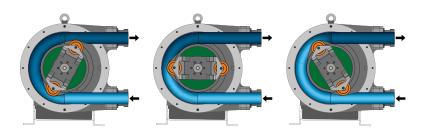
Whereas the pumps are fitted with roller technology for low pressures of up to 8 bar, they have shoes for higher pressures of up to 15 bar.

Your benefits

- Simple to operate
- Reversible pumping direction
- Hose materials suitable for various chemicals
- Simple and quick hose change
- Safeguarded against running dry
- Self-priming
- Ideal for pumping pasty, viscous, abrasive and gaseous media

Field of application

Chemical industry, clarification plants, mining



DULCOFLOW peristaltic pumps can be use 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.



	Overview			
Туре	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



1.4.2

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

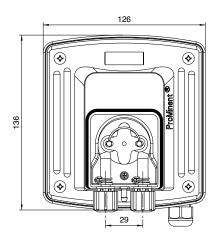
Technical Details

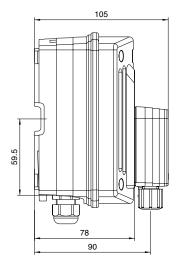
- Self-priming against max. 1.5 bar
- Control or flow control via ON/OFF power supply
- Degree of protection IP 65
- OEM versions on request

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



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 ma	aterial												
		Р	PharMed												
		V	Viton® fo	n® for fragrances (special version)											
			Version												
			0	with Pr	ProMinent logo										
			1	withou	out ProMinent logo										
				Hydrau	ulic connections										
				0	Connector for hose 6/4 mm suction and discharge side										
				9	Connector for hose 10/4 mm discharge side only										
					Elec	ctrical	Connection								
					Α	230	V ± 10%, 50/60 Hz								
						Cab	le and plug								
						0	No mains lead								
						1	With 2 m mains lead, open ended								
						Α	With mains cable, European plug								
							Drive								
							0 Mains ON/OFF								
							Type of mounting								
							W Wall mounting								
							Accessories								
						\perp	0 no accessories								

Viton® and PharMed® are registered trademarks.

Technical Data

Туре	Pump capacity max. back pre		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 tempera- $\,$ 10-45 $^{\circ}\mathrm{C}$

ture:

Approx. power consumption:5 WSwitching-on duration:100%Degree of protection:IP 65All data calculated with water at 20 °C.

Spare Hoses

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



1.4.3

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:

- Metering of chemicals
- 2. Metering of active carbon
- Metering of flocculants

This guarantees that the operating menu, inputs and outputs are always adapted to the respective applica-



DULCONNEX

Your Benefits

- Language-neutral user navigation
- Continuous adjustment of capacity
- Hose material in PharMed®
- Full control, as the capacity is shown in I/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 prob-
- Suitable for use around the clock 100% switch-on time
- Operating hours counter for the peristaltic pump always stay informed.



- 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

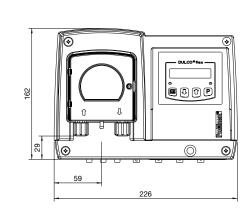


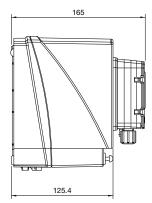


Low-pressure Metering Technology

1.4 Peristaltic pumps DULCOFLEX

Dimensional drawing of DULCOFLEX DF4a





Dimensional drawing of DULCOFLEX DF4a - dimensions in mm

Identity code ordering system for DULCOFLEX DF4a product range

DF4a	Applicat	tion											
	0	Chemic	al numn										
	A			oal meter	ina								
	F	1			ıı ıg								
	-		ant mete										
			mountin	•									
		W	Wall mo						_		_		
			Version										
			0		oMinent I								
			1	without	ProMine								
				Type		Capacity							
				04004		4.0 bar	0.3	5 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 m	naterial							
					Р	PharMed	9						
						Hydraulic	conr	nectio	ns				
						0	1			nnecto	r 6x	:4	
						9							lischarge side
										nnectio			
												% 50	50/60 Hz
							1			nd plug		70, 00	00/0011/2
										nains I			
												m. 6	; open end
								1 1					; Euro connector
												m; e	; Swiss connector
									- 1	essorie		-	
										no acc			
									- 1		_		metering valve PCB and 10 m PE metering line
										-		exter	tension
											ne		
											-		nguage
										00	_		juage-neutral
											R	elay	
											1	Fa	Fault signalling relay, drop-out action
											3	Fa	Fault signalling relay, pick-up action
												Co	Control Variants
İ				İ			İ	l l			İ	8	manual + external contact and analogue 0/4 - 20 mA + 0 - 10 V
İ				İ	İ		İ	l i			İ	С	as "8" and CANopen
											İ	D	Such as "8" and CANopen and CAN connector
											ı		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 mWS	Approx. power consumption:	24 W
Suction lift:	4 mWS	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 $^{\circ}\text{C}.$

Spare Hoses

	Order no.
For type 04004 PharMed®	1034997
For type 04015 PharMed®	1030722
For type 03060 PharMed®	1030723
For type 02120 PharMed®	1030774



1.4.4

Peristaltic Pump DULCOFLEX DFBa

Low and medium pump capacities

Feed rates of up to 649 I/h at 8 bar



The peristaltic pump DULCOFLEX DFBa is designed for low and medium pump capacities of up to $649 \ l/h$ at $8 \ bar$.

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

- Simple to operate
- Reversible pumping direction
- Hose materials suitable for various chemicals
- Simple and quick hose change
- Ideal for pumping pasty, high-viscosity, abrasive and gaseous media
- Self-priming
- Safeguarded against running dry

Technical Details

- Connector sizes 3/8 1"
- Feed rates of 0.023 0.24 l/rev
- Hose materials NR, NBR, EPDM, NR-A, Norprene, NBR-A, Hypalon, Tygon
- Self-priming up to 8 m
- Back pressure up to 8 bar

Options

- Stainless steel base plate
- Available as a mobile unit
- VARIOus connectors, such as BSP, NPT, Tri-Clamp and DIN 11851
- Pulsation damper
- Leak sensor
- Housing with Halar coating
- Food approval EU 1935/2004

Field of Application

- Chemical industry
- Waste water
- Mining

Technical Data

Hose NR, NBR, EPDM, NR-A, Norprene, NBR-A, Hypalon, Tygon

Self-priming up to 8 m **Rollers / shoes** Rollers

Туре	Feed rate / revolution	Pump capacity a	t max. back pressure	Diameter Ø	Max. solids	Weight	Connection size	
	I/rev	bar	· I/h	mm	mm	kg		
DFBa 010	0.02	8	60	10	2.5	6	3/8"	
DFBa 013	0.04	8	100	13	3.3	6	3/8"	
DFBa 016	0.09	8	188	16	4.0	13	3/4"	
DFBa 019	0.12	2	671	19	4.8	13	1"	
DFBa 022	0.24	8	649	22	5.5	22	1"	

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



Identity Code Ordering System for Peristaltic Pump DULCOFLEX DFBa 010

DFBa	Туре														
	010	DFR ₂ 01	10, 0.023	l/revoluti	on										
	1310	Drive *	10, 0.020 1	,, i CvOiuli	511										
		000	without of	drive uni	t										
		A10	1			/h 8 l	nar (Ri	Reduction gear system), 3-phase, 230/400 V AC							
		A11						Reduction gear system), 3-phase, 230/400 V AC							
		A12						Reduction gear system), 3-phase, 230/400 V AC							
		A13						Reduction gear system), 3-phase, 230/400 V AC							
		A14						Reduction gear system), 3-phase, 230/400 V AC							
		A15						Reduction gear system), 3-phase, 230/400 V AC							
		A21						bar , (Manual adjustment gear), 3-phase, 230/400 V AC							
		A22			29 rpm, 7 – 40 l/h, 6 bar , (Manual adjustment gear), 3-phase, 230/400 V AC 53 rpm, 14-73 l/h, 4 bar , (Manual adjustment gear), 3-phase, 230/400 V AC										
		A23	1												
		A24	1					n, 2 bar , (Manual adjustment gear), 3-phase, 230/400 V AC							
		A31	1					20 – 75 Hz, 6 bar , (Gear motor with integrated frequency converter), 1-phase, 230 V AC							
		A32	1					20-75 Hz, 4 bar , (Gear motor with integrated frequency converter), 1-phase, 230 V AC							
		A41	1					3 – 75 Hz, 6 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC							
		A42	1					3 – 75 Hz, 4 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC							
		A43						5 Hz, 4 bar, (Gear motor, external frequency converter required), 3-phase, 230/400 V AC							
			Hose ma												
			0	NR (na	tural	rubbe	r)								
			В	NBR											
			E	EPDM											
			N	Norpre	ne (m	ax. 2	bar bad	pack pressure)							
			А	NBR-A											
		İ	Н	Hypalo	n										
		İ		Hydrau	ulic co	nnect	ions								
				Α	VA I	BSP 3	/8"								
				В		NPT 3									
				С	PP I	BSP 3	/8"								
				D			≥ 3/8"								
				E			Γ3/8"	1							
				F	1	NPT									
				G			, VA, 1/								
				Н				, NW 10							
						e plat									
					0	1		e, painted steel							
					1	1		e, stainless steel							
					2			unit + painted steel base plate							
					3		able un age se	unit + stainless steel base plate							
						0		out leakage sensor							
						L		leakage sensor							
						М		" + relay output							
						l'v'	Rotor	, ,							
							-	Rotor with 2 rollers							
				•				Batch controller							
							0								
								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.

01.01.2022



DFBa	Туре														
5, 54	013	IDFBa 0	13, 0.038	l/revoluti	ion										
	0.0	Drive *	10, 0.000	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1011										
		000	without of	drive uni	it										
		B10	0.12 kW	, 15 rpm	n, 34 l	/h, 8 I	oar, (Re	duction	gear system), 3-phase, 230/400 V AC						
		B11	0.12 kW	, 20 rpm	n, 46 l	/h, 8 l	oar , (R	eductio	n gear system), 3-phase, 230/400 V AC						
		B12	0.18 kW	, 29 rpm	ո, 66 Լ	/h, 6 l	oar, (Re	duction	gear system), 3-phase, 230/400 V AC						
		B13	0.18 kW	, 46 rpm	ո, 105	05 l/h, 4 bar, (Reduction gear system), 3-phase, 230/400 V AC									
		B14	0.25 kW	, 57 rpm	ո, 130	l/h, 4	bar, (F	eductic	n gear system), 3-phase, 230/400 V AC						
		B15	0.25 kW	', 70 rpm	ո, 160	60 l/h, 2 bar, (Reduction gear system), 3-phase, 230/400 V AC									
		B21	1						anual adjustment gear), 3-phase, 230/400 V AC						
		B22	1			n, 11 – 66 l/h, 6 bar, (Manual adjustment gear), 3-phase, 230/400 V AC									
		B23	1						(Manual adjustment gear), 3-phase, 230/400 V AC						
		B24	1						(Manual adjustment gear), 3-phase, 230/400 V AC						
		B31	1						Hz, 6 bar, (Gear motor with integrated frequency converter), 1-phase, 230 V AC						
		B32 B41	1						75 Hz, 4 bar, (Gear motor with integrated frequency converter), 1-phase, 230 V AC						
		B42							, 6 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC iz. 4 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC						
		B43	1						bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC						
		1043	Hose ma		۱۱۱, /۰	- 10/ 1	/11, J-/;	J 1 IZ, 4	uai , Nasai motoi, external requericy converter required), 3-priase, 230/400 v AC						
			0	NR (na	itural i	uhhe	r)								
			В	NBR	etarar i	abbo	' /								
			E	EPDM											
			N	Norpre	ene (m	ax. 2	bar ba	ck pres	sure)						
			Α	NBR-A	,				'						
			Н	Hypalo	n										
				Hydrau	ulic co	nnect	ions								
				Α	VA E	BSP 3	/8"								
				В	1 AV	NPT 3	/8"								
				С		BSP 3									
				D			≥ 3/8"								
				E			T 3/8"								
				G		NPT		(A))							
				Н			, VA, 3/ 1, VA, 1								
				''		e plat		NVV 13							
					0			painted	steel						
					1	1		stainles							
					2				ited steel base plate						
			İ		3	Port	able un	it + stai	nless steel base plate						
						Leak	age se	nsor							
						0	Withou	ıt leaka	ge sensor						
						L		eakage :							
						М		+ relay	output						
							Rotor								
							_		n 2 rollers						
							Ba	atch cor							
									ut controller al version						
									ai version tandard						
								1 1	lalar-coated housing						
									acuum system						
									, ,						
					1				Approvals						
					1	1			01 CE mark						
					1	1			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.



DFBa	Туре														
51 Da	016	DFBa 01	16, 0.092 l	/revolution	on										
	"	Drive *	,	voiuti	J11										
		000	without o	trive unit											
		C10	1			/h 8 l	ar (Re	Reduction gear system), 3-phase, 230/400 V AC							
		C11	1					(Reduction gear system), 3-phase, 230/400 V AC							
		C12	1		32 rpm, 177 l/h, 4 bar, (Reduction gear system), 3-phase, 230/400 V AC										
		C13	1		16 rpm, 254 l/h, 4 bar, (Reduction gear system), 3-phase, 230/400 V AC										
		C14	1		rpm, 315 l/h, 4 bar, (Reduction gear system), 3-phase, 230/400 V AC										
		C15	1		rpm, 386 l/h, 2 bar , (Reduction gear system), 3-phase, 230/400 V AC										
		C21	1					, 4 bar , (Manual adjustment gear), 3-phase, 230/400 V AC							
		C22	1					I/h, 2 bar, (Manual adjustment gear), 3-phase, 230/400 V AC							
		C23	1					h, 1 bar , (Manual adjustment gear), 3-phase, 230/400 V AC							
		C31	1				,	/h, 20 – 75 Hz, 4 bar, (Gear motor with integrated frequency converter), 1-phase, 230 V AC							
		C32						h, 20-75 Hz, 2 bar , (Gear motor with integrated frequency converter), 1-phase, 230 V AC							
		C41	1					n, 3 – 75 Hz, 4 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC							
		C42	1					3-75 Hz, 4 bar, (Gear motor, external frequency converter required), 3-phase, 230/400 V AC							
		C43	0.37 kW,	3-69 rp	m, 16	3-381	I/h, 3-7	3-75 Hz, 2 bar, (Gear motor, external frequency converter required), 3-phase, 230/400 V AC							
			Hose ma												
			0	NR (nat	tural r	ubbe	-)								
			В	NBR											
			E	EPDM											
			N	Norpre	ne (m	ax. 2	bar bad	pack pressure)							
			Α	NBR-A											
			Н	Hypaloi	n										
				Hydrau	lic co	nnect	ions								
				Α	1	SSP 3									
				В		IPT 3									
				С		BSP 3									
				D			3/4"								
				E			Г 3/4"								
				F		NPT									
				G H			VA, 1"								
				П		e plate		A, NW 20							
					0			te, painted steel							
					1	1		te, painteu steel							
					2	l		unit + painted steel base plate							
					3			unit + stainless steel base plate							
					ا ا			sensor							
						0	-	nout leakage sensor							
						L		n leakage sensor							
						М		L" + relay output							
							Rotor	or .							
							0 Ro	Rotor with 2 rollers							
							Ва	Batch controller							
							0	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.



DFBa	Туре															
	019	DFBa 0	19, 0.123	l/revoluti	ion											
		Drive *														
		000	without o	drive uni	t											
		D10	0.18 kW	, 15 rpm	n, 111	l/h, 2	bar, (F	Redu	ction	gear system), 3-phase, 230/400 V AC						
		D11	0.18 kW	, 20 rpm	n, 148	l/h, 2	bar, (Red	uction	n gear system), 3-phase, 230/400 V AC						
		D12	0.25 kW	, 32 rpm	n, 236	l/h, 2	bar, (Red	uction	n gear system), 3-phase, 230/400 V AC						
		D13	0.25 kW	, 46 rpm	n, 339	l/h, 2	bar, (Red	uction	gear system), 3-phase, 230/400 V AC						
		D14	0.37 kW	, 57 rpm	n, 421	l/h, 2	h, 2 bar , (Reduction gear system), 3-phase, 230/400 V AC									
		D15	0.37 kW	, 70 rpm	ո, 517	l/h, 2	h, 2 bar , (Reduction gear system), 3-phase, 230/400 V AC -369 l/h, 2 bar , (Manual adjustment gear), 3-phase, 230/400 V AC									
		D21	0.37 kW	, 8 - 50	rpm, 8	59-36										
		D22	0.37 kW	, 10 - 61	1 rpm,	74-4	50 l/h,	2 ba	ar, (N	lanual adjustment gear), 3-phase, 230/400 V AC						
		D23	0.37 kW	, 16 - 91	1 rpm,	118-	671 l/h	ı, 2 k	oar, (Manual adjustment gear), 3-phase, 230/400 V AC						
		D31	0.37 kW	, 9 - 34 :	rpm, 6	66-25	1 l/h, 2	0-78	5 Hz,	2 bar , (Gear motor with integrated frequency converter), 1-phase, 230 V AC						
		D32	1							Iz, 2 bar , (Gear motor with integrated frequency converter), 1-phase, 230 V AC						
		D41	0.25 kW	, 1-34 rp	om, 7-	·251 I	/h, 3-7	5 Hz	, 2 b	ar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC						
		D42	1							par , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC						
		D43	1							par , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC						
			Hose ma	aterial												
			N	Norpre	ne (m	ax. 2	bar ba	ck p	ressu	re)						
			Т	TYGON				Ċ								
				Hydrau	_											
				A	1	SSP 1										
				В	VA N	NPT 1	"									
				С	PP E	BSP 1	,,									
				D	PVD	F BS	⊃ 1"									
				E	PVD	F NP	T 1"									
				F	PVC	NPT	1"									
				G	Tri-C	lamp	, VA, 1	"								
				Н	DIN	1185	1, VA,	NW:	25							
					Base	e plat	Э									
				İ	0	Base	plate,	pair	ited s	teel						
				İ	1	Base	plate,	stai	nless	steel						
				İ	2	Port	able ur	it +	oaint:	ed steel base plate						
					3	Port	able ur	it + :	stainl	ess steel base plate						
						Leak	age se	nsor								
						0	Witho	ut le	akage	e sensor						
						L	With I	eaka	ge se	ensor						
						М	As "L'	+ re	lay o	utput						
							Rotor									
										2 rollers						
							В	-	conti							
							0	_		t controller						
									-	version						
								0		ndard						
								Н	-	ar-coated housing						
										cuum 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.

DFBa	Туре								
DI Da	022	DER ₂ 03	22, 0.246	/revoluti	าก				
	022	Drive *	.c, v.240 I	, i e voiulle	۱ ار				
		000	without o	triva unit					
		E10	1			I/h 8	har	(Reduction gear system), 3-phase, 230/400 V AC	
		E11	1					(Reduction gear system), 3-phase, 230/400 V AC	
		E12	1					(Reduction gear system), 3-phase, 230/400 V AC	
		E13	1				,	(Reduction gear system), 3-phase, 230/400 V AC	
		E14	1					(Reduction gear system), 3-phase, 230/400 V AC	
		E15	1					(Reduction gear system), 3-phase, 230/400 V AC	
		E21	1					3 har , (Manual adjustment gear), 3-phase, 230/400 V AC	
		E22	1					4 bar , (Manual adjustment gear), 3-phase, 230/400 V AC	
		E23	1					n, 2 bar , (Manual adjustment gear), 3-phase, 230/400 V AC	
		E31	1					h, 2 bar , (wanda adjustment gear), 3-phase, 230/400 V AC /h, 20-75 Hz, 4 bar , (Gear motor with integrated frequency converter), 3-phase, 400 V AC	
		E32	1					/h, 20-75 Hz, 4 bar , (Gear motor with integrated frequency converter), 3-phase, 400 V AC	
		E41	1					n, 3 – 75 Hz, 4 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC	
		E42	1					1, 3 – 73 Hz, 4 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC	
		E43	1					3-75 Hz, 2 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC	
		E43	Hose ma		111, 44	+-119	O 1/11, ·	3-73 Hz, 2 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 v AC	
			0		ural r	ubbo	-1		
			В	NR (nat	urai i	ubbe)		
			E	EPDM					
			N		20 (m	ov 2	har ha	pack pressure)	
			A	NBR-A	,	ax. Z	Dai Da	ack pressure)	
			l'h	Hypaloi					
			''	Hydrau		nnoot	iono		
				A		SSP 1			
				В		NPT 1			
				C		SSP 1			
				D		F BSI			
				E		F NP			
				F		NPT			
				G			, VA, 1	1"	
				Н				, NW 25	
						e plate		, 	
					0			e, painted steel	
					1	ł		e, stainless steel	
					2	ł		ınit + painted steel base plate	
					3	1		ınit + stainless steel base plate	
				1		Leak	age s	sensor	
						0	Witho	out leakage sensor	
						L	With	leakage sensor	
						М	As "L	_" + relay output	
							Rotor	r	
							0 F	Rotor with 2 rollers	
							Е	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.



ProMinent

1.4 Peristaltic pumps DULCOFLEX

1.4.5 Peristaltic Pump DULCOFLEX DFCa

High pump capacities and long service life

Feed rates of up to 8,900 I/h at 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 8900 l/h at 8 bar back pressure. A ball bearing-mounted rotor ensures extremely smooth running and a long service life.

Pumps with a Halar-coated pump housing can be produced for use in the chemical industry.

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

- Simple to operate
- Reversible pumping direction
- Hose materials suitable for various chemicals
- Simple and quick hose change
- Ideal for pumping pasty, high-viscosity, abrasive and gaseous media
- Self-priming
- Safeguarded against running dry

Technical Details

- Connector sizes 1 1/4"- DN 80
- Feed rates of 0.43 6.72 l/rev
- Hose materials NR, NBR, EPDM, Norprene, NR-A, NBR-A
- Self-priming up to 8 m
- Back pressure up to 8 bar

Options

- Stainless steel base plate
- Available as a mobile unit
- VARIOus connectors, such as BSP, NPT, Tri-Clamp, DIN 11851 and flange
- Pulsation damper
- Leak sensor
- Housing with Halar coating
- Vacuum system
- Food approval EU 1935/2004

Field of Application

- Chemical industry
- Waste water
- Mining

Technical Data

Hose NR, NBR, EPDM, NR-A, Norprene, NBR-A

Self-priming up to 8 m

Туре	Feed rate / revolution	Pump capacit	y at max. back pressure	Diameter Ø D1	Max. solids	Weight	Connection size
	l/rev	bar	l/h	mm	mm	kg	
DFCa 030	0.43	8	727	28	7.0	62	DN 32
DFCa 040	0.86	8	1,495	35	8.8	89	DN 40
DFCa 050	1.47	8	1,852	40	10.0	140	DN 40
DFCa 060	3.16	8	5,100	55	13.8	235	DN 50
DFCa 070	6.72	8	8,900	65	16.3	440	DN 65

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



-ow-pressure Metering Technology

DFCa	Туре															
	030	DFCa 03	30, 0.433	433 I/revolution												
		Drive *														
		000	without of	drive uni	it											
		A11	1			3 l/h, 4	bar .	(Re	duct	ion gear system), 3-phase, 230/400 V AC						
		A12	1							ion gear system), 3-phase, 230/400 V AC						
		A13	1							ion gear system), 3-phase, 230/400 V AC						
		A14	1		,			,		tion gear system), 3-phase, 230/400 V AC						
		A31	1							75 Hz, 4 bar, (Gear motor with integrated frequency converter), 3-phase, 400 V AC						
		A32	1							-75 Hz, 2 bar , (Gear motor with integrated frequency converter), 3-phase, 400 V AC						
		A41	1							Hz, 4 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC						
		A42								dz, 2 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC						
			Hose ma			,										
			0	NR												
			В	NBR												
			E	EPDM												
			Α	NBR-A	4											
			N	Norpre	ene (m	nax. 2	bar b	ack	pres	sure)						
				Hydrau					i							
				Α	VA I	BSP 1	1/4"									
				В	1 AV	NPT 1	1/4"									
				С	PP	BSP 1	1/4"									
				D	PVE	F/PTI	E BS	SP 1	1/4"							
				F	PVC	NPT	1 1/4	1"								
				G	Tri-C	Clamp	, VA,	1 1/	2"							
				Н	DIN	1185	1, VA	, NV	V 32							
				1	DIN	flange	e VA I	ON 3	32							
				L	ANS	SI flan	ge VA	, 1 1	/4"							
				Р		SI flan	_	'C, 1	1/4	,						
					Bas	e plat										
					0					disteel						
					1	1				ss steel						
					2	1				nted steel base plate						
					3					nless steel base plate						
						Leak										
						0				ge sensor						
						L			-	sensor						
						М	Roto		relay	output						
							-		vr varit	h 2 rollers						
						1	1 ° L			ntroller						
						1				out controller						
									_	ial version						
								- 5	-	tandard						
								- 1		Halar-coated housing						
										/acuum system						
										•						
									1							
									Ι,	Approvals						
										01 CE mark						
										02 CE+Food approval EU 1935/2004						
										02 02 1 000 approval E0 1000/2007						

^{*} 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.



DFCa	Туре									
	040	DFCa 0	40, 0.86 l	/revolutic	on					
		Drive *								
		000	without	drive uni	it					
		B11	1			l/h, 4	bar.	(Red	uction	n gear system), 3-phase, 230/400 V AC
		B12	1					•		on gear system), 3-phase, 230/400 V AC
		B13	1							on gear system), 3-phase, 230/400 V AC
		B14								n gear system), 3-phase, 230/400 V AC
		B31								Hz, 4 bar , (Gear motor with integrated frequency converter), 3-phase, 400 V AC
		B32	1							Hz, 2 bar , (Gear motor with integrated frequency converter), 3-phase, 400 V AC
		B41								, 2 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
		B42								2 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
		10.12	Hose m		Jiii, 1	J 1 Z,	100 1/1	1, 0 0	0112	, 2 bai , (adai motor, oxtorna noquency convertor required), o priade, 200/100 v / to
			0	INR						
			В	NBR						
			E	EPDM						
			Ā	NBR-A						
			ĺ _N	Norpre		ax 2	har h	ack n	ressi	re)
			''	Hydrau				aort p	10000	
				A	1	3SP 1				
				В		NPT 1				
				C		3SP 1				
				D			FE BS	P 1 1	/2"	
				G			, VA,			
				Н			1, VA,			
				li			e VA D			
				L		_	ge VA,			
				P			ge PV			
						e plat	_	-, -	_	
					0		e plate	, pair	nted s	oteel
					1	1	e plate			
					2	1				ed steel base plate
					3	1				ess steel base plate
						Leak	kage s	enso		
						0	Witho	out le	akage	e sensor
						L	With	leaka	ge se	ensor
			1		1	М	As "L		-	
							Roto	r		
							0 F	Rotor	with:	2 rollers
					1	1	E	Batch	cont	roller
							C	W	ithou	t controller
					1	1		S	oecia	version
					1	1		0	sta	ndard
								Н	На	lar-coated housing
										cuum system
									0	none
1		1							V	with vacuum system
1			1		1	1				Approvals
1			1		1	1				01 CE mark
1			1		1	1				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.

DFCa	Туре									
	050	DFCa 0	50, 1.47 1/	revolutio	on					
		Drive *								
		000	without o	drive uni	it					
		C11	0.55 kW	, 14 rpm	n, 1,2	35 l/h	4 ba	r , (F	Redu	ction gear system), 3-phase, 230/400 V AC
		C12	0.75 kW	, 21 rpm	n, 1,8	52 l/h	4 ba	r , (F	Redu	ction gear system), 3-phase, 230/400 V AC
		C13	1.1 kW,	30 rpm,	2,64	6 l/h, 4	4 bar	, (Re	educt	ion gear system), 3-phase, 230/400 V AC
		C14	1.5 kW,	38 rpm,	3,35	2 l/h, 4	4 bar	, (Re	educt	ion gear system), 3-phase, 230/400 V AC
		C15	1.5 kW,	48 rpm,	4,23	4 l/h, :	2 bar	, (Re	educt	ion gear system), 3-phase, 230/400 V AC
		C16	2.2 kW,	58 rpm,	5,11	6 l/h, :	2 bar	, (Re	educt	ion gear system), 3-phase, 230/400 V AC
		C31	1.5 kW,	8 - 29 rp	om, 7	06-2,	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	-5,29	2 l/h	, 20-	70 Hz, 2 bar , (Gear motor with integrated frequency converter), 3-phase, 400 V AC
		C41	1.5 kW,	1 - 27 rp	pm, 8	8-2,38	31 l/h	, 3-6	55 Hz	, 4 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
		C42	2.2 kW,	3 - 55 rp	pm, 2	65-4,8	351 l/	h, 3-	-65 F	z, 2 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
			Hose ma							
			0	NR						
			В	NBR						
			E	EPDM						
			Α	NBR-A						
			N	Norpre				ack	pres	sure)
				Hydrau	-				_	
					1	flange			.0	
				G H		Clamp			150	
				J		1185 flange				
				K		-				ON 40
				L		ilange SI flanc				JN 40
				M		SI flan	_			
				N			_			1 1/2"
				.,		e plat	_	D171		1 1/2
					0			e, pa	inted	steel
					1	1				is steel
					2	1				ated steel base plate
					3	1				nless steel base plate
						Leak	age s	senso	or	
			İ		İ	0	With	out l	eaka	ge sensor
						L	With	leak	age	sensor
						М	As "	_" +	relay	output
							Roto	r		
										n 2 rollers
								-		ntroller
								_	_	out controller
									-	al version
										tandard
						ļ				lalar-coated housing
									_	acuum system
									C	
									\	
										Approvals
										01 CE mark 02 CE+Food approval EU 1935/2004
										02 0E+1 000 approval EU 1900/2004

^{*} 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.



DFCa	Туре									
	060	DFCa 06	3.16 l/r	revolutio	n					
		Drive *								
		000	without o	drive uni	t					
		D11	2.2 kW,	18 rpm,	3.4 n	n³/h, 4	bar ,	(Red	ductio	n gear system), 3-phase, 230/400 V AC
		D12	2.2 kW, 2	22 rpm,	4.2 n	n³/h, 4	bar ,	(Red	ductio	n gear system), 3-phase, 230/400 V AC
		D13	3.0 kW, 2	27 rpm,	5.1 n	n³/h, 4	bar,	(Red	ductic	n gear system), 3-phase, 230/400 V AC
		D14	3.0 kW, 3	33 rpm,	6.3 n	n³/h, 4	bar ,	(Red	ductio	n gear system), 3-phase, 230/400 V AC
		D15	3.0 kW, 4	42 rpm,	8.0 n	n³/h, 4	bar ,	(Red	ductio	n gear system), 3-phase, 230/400 V AC
		D16	3.0 kW, 4	47 rpm,	8.9 n	n³/h, 2	bar ,	(Red	ductio	n gear system), 3-phase, 230/400 V AC
		D31	3.0 kW,	7 – 25 rp	pm, 1	.3 – 4	.7 m ³	'n, 4	bar,	(Gear motor with integrated frequency converter), 3-phase, 400 V AC
		D32	4.0 kW,	17 - 59	rpm,	3,2-1	1.2 m	/h, 2	bar	(Gear motor with integrated frequency converter), 3-phase, 400 V AC
		D41	3.0 kW,	1 – 24 rp	pm, 0	.2 – 4	.5 m ³	'n, 4	bar,	(Gear motor, external frequency converter required), 3-phase, 230/400 V AC
		D42	4.0 kW, 2	2 - 55 rp	om, 0	,4-10.	4 m ³ /	h, 2 l	oar,	Gear motor, external frequency converter required), 3-phase, 230/400 V AC
			Hose ma	aterial						
			0	NR						
			В	NBR						
			E	EPDM						
			Α	NBR-A	١					
			N	Norpre	ne (m	ax. 2	bar b	ack p	ressi	ure)
				Hydrau	ulic cc	nnect	ions			
				I	DIN	flange	VA [N 50)	
				G	Tri-C	Clamp	, VA, :	1/2	"	
				Н	DIN	1185	1, VA,	NW	50	
				J	ANS	SI flanç	ge PP	DN :	50	
				K	DIN	flange	VA,	Halar	-coat	ed + PVDF inserts DN 50
				L	ANS	SI flanç	ge VA	2"		
				М	ANS	SI flanç	ge PP	2"		
				N	ANS	SI flanç	ge VA	Hala	ar-coa	ated + PVDF inserts 2"
					Bas	e plate	€			
					0	Base	plate	, pai	nted	steel
					1	Base	plate	, sta	inless	steel
					2	1				ed steel base plate
					3					ess steel base plate
						Leak	_			
						1			-	e sensor
						L			-	ensor
						М			elay c	utput
							Roto			
										2 rollers
						ļ		-	cont	
								_		t controller
								_		I version
								0	- 1	andard
								H	_	lar-coated housing
										cuum 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



DFCa	Туре									
	070	DFCa 0	70, 6.72 1/	revolutio	on					
		Drive *								
		000	without	drive uni	it					
		E11	2.2 kW,	13 rpm,	5.2 r	n³/h, 4	4 bar	(Red	ductio	on gear system), 3-phase, 230/400 V AC
		E12								on gear system), 3-phase, 230/400 V AC
		E13								ion gear system), 3-phase, 230/400 V AC
		E14								ion gear system), 3-phase, 230/400 V AC
		E15								ion gear system), 3-phase, 230/400 V AC
		E16	1							ion gear system), 3-phase, 230/400 V AC
		E31								Hz, 4 bar, (Gear motor with integrated frequency converter), 3-phase, 400 V AC
		E32								0 Hz, 2 bar , (Gear motor with integrated frequency converter), 3-phase, 400 V AC
		E41								Hz, 4 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
		E42								Hz, 2 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
			Hose ma		, ,					,, ,,,,,,,
			0	NR						
			В	NBR						
			E	EPDM						
			Α	NBR-A	4					
				Hydrau	ulic co	nnec	tions			
				I	DIN	flang	a VA [N 6	5	
İ				G	Tri-0	Clamp	, VA,	3"		
				Н	DIN	1185	1, VA	NW	65	
				J	DIN	flang	e PP I	ON 6	5	
				L	ANS	SI flan	ge VA	2 1/	2"	
				M	ANS	SI flan	ge PF	2 1/	2"	
				Q	DIN	flang	e VA F	lalar-	coate	ed DN 65
				R	ANS	SI flan	ge VA	Hala	r-coa	ated 2 1/2"
					Bas	e plat	е			
					0	Base	e plate	, pai	nted	steel
					1	1				s steel
					2	1				ted steel base plate
					3					less steel base plate
							kage s			
						0			_	e sensor
						L			-	ensor
						М			elay d	putput
							Roto			
										2 rollers
										troller
										ut controller
								_		al version
								0		andard
								H		alar-coated housing
										loum system
									0 V	none
									ľ	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.



1.4.6 Peristaltic Pump DULCOFLEX DFDa

Maximum pump capacities and high pressures

Feed rates of up to 15,000 l/h at 15 bar



The peristaltic pump DFDa is designed for maximum pump capacities and high pressures and is winning customers over with its noiselessness and long service life. It is fitted with shoes and fabric-reinforced hoses – perfect for industrial use.

The pump housing is filled with glycerine to reduce friction. A ball-bearing mounted rotor ensures extremely smooth running and a long service life. In tough industrial use, the DFDa conveys volumes of up to 15,000 l/h with back pressures of up to 15 bar.

A vacuum unit can optionally be used to help the hose to return to its original shape with pumps of the product range DFDa, thereby improving their suction behaviour and ensuring the even feed of high-viscosity media.

Your Benefits

- Simple to operate
- Reversible pumping direction
- Hose materials suitable for various chemicals
- Simple and quick hose change
- Ideal for pumping pasty, high-viscosity, abrasive and gaseous media
- Self-priming
- Safeguarded against running dry

Technical Details

- Connector sizes DN 25 DN 100
- Feed rates of 0.3 20.0 l/rev
- Hose materials NR, NBR, EPDM
- Self-priming up to 8 m
- Back pressure up to 15 bar

Options

- Stainless steel base plate
- Available as a mobile unit
- VARIOus connectors, such as Tri-Clamp, DIN 11851 and flange
- Pulsation damper
- Leak sensor
- Vacuum system

Field of Application

- Chemical industry
- Waste water
- Mining

Technical Data

Hose NR, NBR, EPDM
Self-priming up to 8 m
Rollers / shoes Shoes

Type	Feed rate /	Pump capacity	at max. back	Diameter Ø	Max. solids	Weight	Connection
	revolution		pressure				size
	I/rev	bar	l/h	mm	mm	kg	
DFDa 025	0.30	15	504	25	6.3	57	DN 25
DFDa 032	0.62	15	787	32	8.0	89	DN 32
DFDa 040	1.33	15	2,075	40	10.0	150	DN 40
DFDa 060	2.90	15	3,800	57	14.3	252	DN 50
DFDa 070	6.70	15	7,200	65	16.3	530	DN 65
DFDa 080	11.70	15	8,700	80	20.0	900	DN 80
DFDa 100	20.00	15	14,400	100	25.0	1,100	DN 100

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



DFDa	Туре									
	025	DFDa 02	25, 0.3 l/re	volution						
		Drive *								
		000	without o	drive unit	t					
		A11	0.37 kW,	, 18 rpm	, 324	l/h, 1	5 bar, (l	Redu	uction	n gear system), 3-phase, 230/400 V AC
		A12	0.55 kW,	. 28 rpm	, 504	l/h, 1	5 bar, (l	Redi	uction	n gear system), 3-phase, 230/400 V AC
		A13	0.75 kW.	, 39 rpm	1, 702	l/h, 1	0 bar,	(Rec	luctio	on gear system), 3-phase, 230/400 V AC
		A14						•		n gear system), 3-phase, 230/400 V AC
		A15								gear system), 3-phase, 230/400 V AC
		A31							-	s, 5 bar, (Gear motor with integrated frequency converter), 3-phase, 400 V AC
		A32	1.5 kW,	18 - 63 ı	rpm,	324-1	,134 l/h	, 20	-70 ⊢	Hz, 5 bar , (Gear motor with integrated frequency converter), 3-phase, 400 V AC
		A41								z, 15 bar, (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
		A42								5 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
		A43								5 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
			Hose ma		,		- 15 011,			, (,,,,,,,,,,,,
			0	INR						
			В	NBR						
			E	EPDM						
				Hydrau	ılic cc	nnect	ions			
				ī	DIN	flange	e VA DN	125		
				J	DIN	flange	PP DN	125		
				K	DIN	flange	PVDF	DN	25	
		İ		L	ANS	SI flan	ge VA D	N 2	5	
		İ			Bas	e plat	Э			
					0	Base	plate,	pain	ted st	steel
					1	Base	plate,	stair	iless s	steel
					2	Port	able uni	t + p	ainte	ed steel base plate
					3	Port	able uni	t + s	tainle	ess steel base plate
						Leak	age ser	nsor		
						0	Withou	t lea	kage	esensor
						L	With le	akaç	ge sei	ensor
						М	As "L"	+ re	lay ou	utput
							Rotor			
							_			2 shoes
							-	7	contr	
							0			t controller
										version
								0		ndard
								ļΗ		ar-coated housing
										cuum system
										none
										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.



DFDa	Туре									
	032	DFDa 03	32, 0.625	l/revoluti	ion					
		Drive *								
		000	without o	drive uni	t					
		B11	0.75 kW	, 21 rpm	n, 787	l/h, 1	0 bar	, (Red	, (Reduction gear system), 3-phase, 230/400 V AC	
		B12	1.1 kW,	21 rpm,	787 L	/h, 15	bar,	(Redu	(Reduction gear system), 3-phase, 230/400 V AC	
		B13	1.1 kW,	30 rpm,	1,125	5 l/h,	10 bar	, (Re	r, (Reduction gear system), 3-phase, 230/400 V AC	
		B14	1.1 kW,	38 rpm,	1,425	5 l/h,	10 bar	, (Re	r, (Reduction gear system), 3-phase, 230/400 V AC	
		B15	1.5 kW,	47 rpm,	1,762	2 l/h, {	5 bar ,	(Red	, (Reduction gear system), 3-phase, 230/400 V AC	
		B16	1.5 kW,	58 rpm,	2,175	ī l/h, ŧ	5 bar ,	(Red	, (Reduction gear system), 3-phase, 230/400 V AC	
		B31							5 l/h, 20 - 70 Hz, 7.5 bar , (Gear motor with integrated frequency converter), 3-phase, 400 V AC	
		B32	1						5 l/h, 20-70 Hz, 5 bar , (Gear motor with integrated frequency converter), 3-phase, 400 V AC	
		B41							I/h, 7 – 65 Hz, 7.5 bar, (Gear motor, external frequency converter required), 3-phase, 230/400 V AC	
		B42	1						I/h, 7 – 65 Hz, 7.5 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC	
		B43			om, 30	00 – 2	2812 1/	h, 7-6	/h, 7-65 Hz, 5 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC	_
			Hose ma	1						
			0	NR						
			В	NBR						
			E	EPDM	P					
				Hydrau	1			NI 00	NI 00	
				ľ.	1	_			DN 32 DN 32	
				K		_			F/PTFE DN 32	
					1	_			, 1 1/4"	
				-	_	e plat	_	1 1/-	. 1 1/4	
					0			. pain	e, painted steel	
					1	1			e, stainless steel	
					2				nit + painted steel base plate	
					3				nit + stainless steel base plate	
						Leak	age s	ensor	ensor	
						0	Witho	ut lea	out leakage sensor	
						L	With	eaka	leakage sensor	
						М	As "L	" + re	_" + relay output	
							Roto			
									Rotor with 2 shoes	
									Batch controller	
							0			_
									Special version	
								0		
								IH.	H Halar-coated housing	
									Vacuum system	
									0 none V with vacuum system	
									The state of the s	
									Approvals 01 CE mark	
									OT OF INCIN	

^{*} 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.

Low-pressure Metering Technology

1.4 Peristaltic pumps DULCOFLEX

DFDa	Туре								
	040	DFDa 04	40, 1.33 l/	revolutio	n				
		Drive *							
		000	without o	drive uni	t				
		C11	1.1 kW,	21 rpm,	1,676	3 l/h,	10 bar	, (Re	duction gear system), 3-phase, 230/400 V AC
		C14	1.5 kW,	26 rpm,	2,07	5 l/h,	15 bar	, (Re	duction gear system), 3-phase, 230/400 V AC
		C15	1.5 kW,	38 rpm,	3,032	2 l/h,	7.5 bar	, (Re	eduction gear system), 3-phase, 230/400 V AC
		C16	1.5 kW,	43 rpm,	3,43	1 l/h,	5 bar ,	Red	uction gear system), 3-phase, 230/400 V AC
		C17	2.2 kW,	48 rpm,	3,830) l/h, :	5 bar ,	Red	uction gear system), 3-phase, 230/400 V AC
		C31	2.2 kW,	17 - 60	rpm,	1,356	- 4,78	8 l/h	, 20-70 Hz, 5 bar , (Gear motor with integrated frequency converter), 3-phase, 400 V AC
		C41	1.5 kW,	4 - 34 rp	m, 3	20 – 2	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 η	om, 4	00 – 3	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 rp	m, 5	58 – 4	1,948 /	h, 7 ·	- 64 Hz, 5 bar , (Gear motor, external frequency converter required), 3-phase, 230/400 V AC
			Hose ma	aterial					
			0	NR					
			В	NBR					
			E	EPDM					
				Hydrau	1				
				1	1	_	ID AV e		
				J	1	_	PP DI		
				K	1	_	PVDF		
				L			ge VA,		
				M N			ge PP 1		
				IN		e plat	_	F/PI	FE 1 1/2"
					0			nain	ted steel
					1	1			less steel
					2	1			painted steel base plate
					3	1			stainless steel base plate
					١		age se		·
						0			akage sensor
						L			ge sensor
						1			lay output
						İ	Rotor		
							0 R	otor \	with 2 shoes
					İ	İ	Ва	atch	controller
							0	Wi	thout controller
								Sp	ecial version
								0	standard
								Н	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.



DFDa	Type								
	060	DFDa 06	60, 2.9 l/re	evolution	1				
		Drive *							
		000	without	drive uni	it				
		D11	2.2 kW.	22 rpm.	3.8 n	ո³/h. <i>է</i>	5 bar	(Rec	duction gear system), 3-phase, 230/400 V AC
		D12							duction gear system), 3-phase, 230/400 V AC
		D15							duction gear system), 3-phase, 230/400 V AC
		D16							duction gear system), 3-phase, 230/400 V AC
		D17							duction gear system), 3-phase, 230/400 V AC
		D31						,	20 – 70 Hz, 5 bar , (Gear motor with integrated frequency converter), 3-phase, 400 V AC
		D32							20 – 70 Hz, 5 bar , (Gear motor with integrated frequency converter), 3-phase, 400 V AC
		D32	1						0 – 70 Hz, 5 bar , (Gear motor, external frequency converter required), 3-phase, 400 V AC
		D41	1 '						
		D42	Hose ma		pm, i	.2 – 1	0.011	17/11, 2	20 - 70 Hz, 5 bar , (Gear motor, external frequency converter required), 3-phase, 400/660 V AC
			0	NR					
			В	NBR					
			E	EPDM					
			=				L'aaa	-	
				Hydrau	1		iions e VA [NI EC	
				ľ,		_	ge PP		
				L			ge rr ge VA		
				M			ge VA ge PP		
				U			_		-coated + PVDF inserts DN 50
				V		_			ar coated + PVDF inserts DN 50
				ľ	_	e plat	~	, I Iala	di coalea + FVDF iliseris din 30
					0			nai	nted steel
					1	1			inless steel
					2	1			painted steel base plate
					-		kage s		•
						0			akage sensor
						Ľ	1		age sensor
						М			elay output
							Roto		
							O F	Rotor	with 2 shoes
						İ	Е	Batch	controller
						İ) W	/ithout controller
								S	pecial version
								0	standard
								Н	Halar-coated housing
						İ	i i	İ	Vacuum system
						İ	l i	İ	0 none
					İ	İ	i i	İ	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.

DFDa	Туре												
	070	DFDa 07	070, 6.7 l/revolution										
		Drive *											
000 without drive unit													
		E11 3.0 kW, 13.5 rpm, 5.4 m³/h, 5 bar , (Reduction gear system), 3-phase, 230/400 V AC E12 4.0 kW, 18 rpm, 7.2 m³/h, 7.5 bar , (Reduction gear system), 3-phase, 230/400 V AC E14 5.5 kW, 26 rpm, 10.4 m³/h, 5 bar , (Reduction gear system), 3-phase, 230/400 V AC											
		E17		kW, 32 rpm, 12.8 m³/h, 7.5 bar , (Reduction gear system), 3-phase, 230/400 V AC									
		E18			rpm, 16 m³/h, 5 bar , (Reduction gear system), 3-phase, 230/400 V AC - 36 rpm, 4 - 14.4 m³/h, 20-70 Hz, 5 bar , (Gear motor with integrated frequency converter), 3-phase, 400 V AC								
		E31											
		E41				n, 1.6 - 13.7 m ³ /h, 7-65 Hz, 5 bar , (Gear motor, external frequency converter required), 3-phase, 400/660 V A							
			Hose ma										
			0	NR									
			В	NBR									
			E	EPDM									
				Hydrau	ılic cc	nnec	tions						
				I	DIN	flange	e VA I	ON 6	DN 65				
				J	DIN	flange	e PP I	DN (DN 65				
				L	ANS	SI flan	ge VA	2 1	3 2 1/2"				
		İ		М	ANS	SI flan	ge PF	2 1	2 1/2"				
				Q	DIN	flange	e VA I	Hala	Halar-coated DN 65				
				R	ANS	SI flan	ge VA	Hal	Halar-coated 2 1/2"				
					Bas								
					0								
					1								
						Leak			sensor				
						0 Without leakage sensor							
						L With leakage sensor							
						М			L" + relay output				
							Roto						
									Rotor with 2 shoes				
								-	Batch controller				
						ļ			0 Without controller				
								- 6	Special version				
								- 1	0 standard				
									H Halar-coated housing				
									Vacuum system				
									0 none				
									V with vacuum system				
						Approvals							
						01 CE mark							

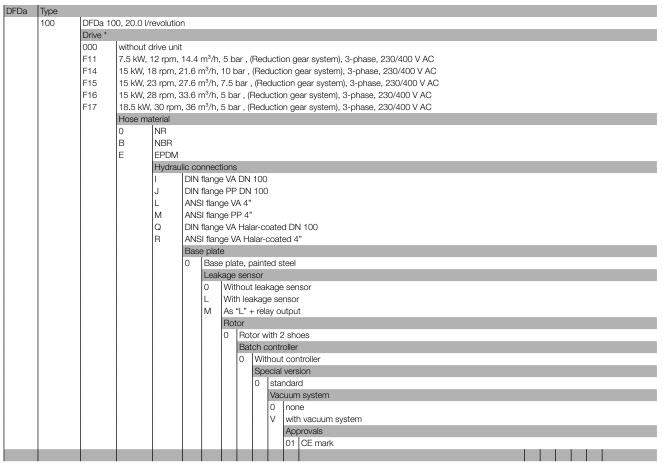
^{*} The pumps are factory-set to a maximum back pressure of 5 bar, unless the stated pressure is lower. Please state any deviating pressures when ordering.



DFDa	Туре										
	080	DFDa 080, 11.7 l/revolution									
		Drive *									
		000	without	drive uni	it						
		G11	4 kW, 12	2 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	.9 m³/h, 5 bar, (Reduction gear system), 3-phase, 230/400 V AC					
		G15							r, (Reduction gear system), 3-phase, 230/400 V AC		
		G16	7.5 kW,	27 rpm,	, 18.9 m³/h, 5 bar, (Reduction gear system), 3-phase, 230/400 V AC						
		G17	11 kW, 3	l1 kW, 30 rpm, 21.1 m³/h, 5 bar, (Reduction gear system), 3-phase, 230/400 V AC Hose material							
			Hose ma								
			0	NR							
			В	NBR							
			E	EPDM							
				Hydrau	ulic cc	nnect	ions				
			l	1	DIN	flange	e VA	DN 8	180		
				J	DIN	flange	PP	DN 8	180		
				L	ANS DIN	SI flanç	ge VA	3"	,		
				M Q R		SI flanç	ge Pl	≥ 3"	n		
									lar-coated DN 80		
							_	\ Hala	alar-coated 3"		
Base plate 0 Base plate, painted steel											
Leakage sensor											
									it leakage sensor		
									akage sensor		
									+ relay output		
							Rote				
							ı .		tor with 2 shoes		
									tch controller		
									Without controller		
									Special version 0 standard		
								1			
									Vacuum system 0 none		
									V with vacuum system		
									Approvals		
									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



* 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.



ProMinent

1.4.7 Spare Parts

Spare Parts for DFAa 003

	Order no.
DFAa 003 silicone tube	1037107
DFAa 003 Norprene tube A-60-F	1037144
DFAa 003 Solva tube	1037145

Spare Parts for DFAa 008

	Order no.
DFAa 008 silicone tube	1037146
DFAa 008 Norprene tube A-60-G	1037147
DFAa 008 silicone tube	1037148
DFAa 008 Solva tube	1037149

Spare Parts for DFBa 010

	Order no.
DFBa 010 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

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

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	1037178
DFBa 022 HYPALON tube	1037182
DFBa 022 NBR-A tube	1037180
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

	Oraer no.
DFCa 032 NBR tube	1037226
DFDa 032 EPDM tube	1037227
DFDa 032 NR tube	1037225



Spare Parts for DFDa 040

	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 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 DFDa 080

	Order no.
DFDa 080 NBR tube	1041678
DFDa 080 EPDM tube	1041679
DFDa 080 NR tube	1041677

Spare Parts for DFDa 100

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



1.5 Chemical Transfer Pumps

1.5.1 Selection Guide

The right accessories offer even more: they increase the performance range, application options or the feed rates.

This chapter includes chemical transfer pumps, which enable you to define the pump capacity precisely.



The table will assist with quick selection. It is sorted by relevant key figures and details.

Selection Guide - Transfer Pumps:

	Capacity range	see page
Eccentric screw pump SPECTRA	up to 12,000 l/h	→139
Centrifugal pump von Taine	up to 22,500 l/h	→142
Air-operated diaphragm pump DUODOS	up to 12,000 l/h, 7 bar	→146
Barrel pump DULCOTRANS	up to 6600 l/h	→149
Rotary lobe pump ROTADOS	25 – 100 m³/h	→151



Low-pressure Metering Technology

1.5 Chemical Transfer Pumps

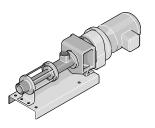
1.5.2 Eccentric Screw Pump SPECTRA

Pump ultra-gently, meter precisely and with a wealth of applications.

Capacity range 2.4 - 12,000 l/h, 12 - 3 bar



The eccentric screw pump SPECTRA meters liquid polyelectrolytes in concentrated and dilute form. It can be used, for example, in waste water treatment or sludge dewatering.



The eccentric screw pump SPECTRA has been designed for the transport of polymer solutions with a viscosity of up to 5,000 mPas. It is low-maintenance and can even be used if polymer solutions containing oil are to be metered.

The pumps are equipped with gear motors and external fans and can be operated via an external frequency converter. Protect the pump from running dry.

Your Benefits

- Low-pulsation pumping
- Feed rate is proportional to the speed
- Reversible pumping direction

Technical Details

- FKM stator
- Stainless steel (Cr-Ni-Mo 17-12-2) rotor
- Stainless steel housing for 12/2 12/100
- Grey cast iron housing for 6/300 3/12000
- Axial face seal
- Voltage: 3-phase, 230/400 VAC
- Degree of protection: IP55

Field of Application

Waste water treatment, sludge dewatering

Without base plate

	Delivery rate at 3 bar	Maximum back pressure	Power uptake	Order no.	
	I/h	bar	kW		
SPECTRA 12/2 F	0.242.4	12	0.37	1025284	
SPECTRA 12/13 F	1.313.2	12	0.37	1025285	
SPECTRA 12/33 F	3.333	12	0.37	1025286	
SPECTRA 12/100 F	10100	12	0.37	1025287	
SPECTRA 6/300 F	30300	6	0.37	1025288	
SPECTRA 6/650 F	65650	6	0.55	1025289	
SPECTRA 5/1400 F	1401,400	5	0.75	1025290	
SPECTRA 3/3000 F	3003,000	3	0.75	1025291	
SPECTRA 3/6500 F	6506,500	3	1.50	1025292	
SPECTRA 3/12000 F	1,20012,000	3	2.20	1025293	

With base plate

	Delivery rate at	Maximum	Power uptake	Order no.	
	3 bar	back pressure			
	l/h	bar	kW		
SPECTRA 12/2 FB	0.242.4	12	0.37	1025294	
SPECTRA 12/13 FB	1.313.2	12	0.37	1025295	
SPECTRA 12/33 FB	3.333	12	0.37	1025296	
SPECTRA 12/100 FB	10100	12	0.37	1025297	
SPECTRA 6/300 FB	30300	6	0.37	1025298	
SPECTRA 6/650 FB	65650	6	0.55	1025299	
SPECTRA 5/1400 FB	1401,400	5	0.75	1025300	
SPECTRA 3/3000 FB	3003,000	3	0.75	1025301	
SPECTRA 3/6500 FB	6506,500	3	1.50	1025302	
SPECTRA 3/12000 FB	1,20012,000	3	2.20	1025303	

Chemical Transfer Pumps 1.5

Frequency converter for SPECTRA

		Recommended for pumps up to kW	Order no.
SK500E - 550	0.55 kW, 1 ph, 230 V, incl. control panel	0.37	1010980
SK500E - 750	0.75 kW, 1 ph, 230 V, incl. control panel	0.55	1010981
SK500E - 111	1.10 kW, 1 ph, 230 V, incl. control panel	0.75	1025304
SK500E - 151	1.50 kW, 1 ph, 230 V, incl. control panel	1.10	1010982
SK500E - 221	2.20 kW, 3 ph, 400 V, incl. control panel	2.20	1025305

The frequency converters do not form part of the SPECTRA scope of supply.

Motor Data

Electrical connection	Frequency	Degree of protection	Overheating protection	Cooling
230/400 V AC, 3 ph	4 – 89 Hz	IP 55	3 PTC in the winding	External fan: 1~, 230 V AC, 50 Hz

Technical Data

	ieciilicai Da	ııa			
Product designation	Weight	Dimensions L x W x H	Housing material Housing material		Connection on suction/dis- charge side
	kg	mm			
SPECTRA 12/2 F	24	739 x 200 x 182	Cr Ni Mo 17 – 12 – 2	Cr Ni Mo 17 – 12 – 2	1/2", internal
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 3/6500 F	56	1,172 x 237 x 224	Grey cast iron	Cr Ni Mo 17 – 12 – 2	DN 50, flange
SPECTRA 3/12000 F	81	1,487 x 264 x 244	Grey cast iron	Cr Ni Mo 17 – 12 – 2	DN 65, flange
SPECTRA 12/2 FB	28	739 x 220 x 232	Cr Ni Mo 17 – 12 – 2	Cr Ni Mo 17 – 12 – 2	1/2", internal
SPECTRA 12/13 FB	28	739 x 220 x 232	Cr Ni Mo 17 – 12 – 2	Cr Ni Mo 17 – 12 – 2	1/2", internal
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
SPECTRA 3/12000 FB	96	1,487 x 265 x 294	Grey cast iron	Cr Ni Mo 17 – 12 – 2	DN 65, flange



1.5 Chemical Transfer Pumps

Spare Parts

	Order no.
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

1.5 Chemical Transfer Pumps

1.5.3

Centrifugal Pump von Taine

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

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

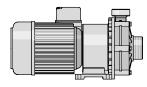


The solenoid-coupled centrifugal pump von Taine for the pumping of liquid media works safely and reliably: liquid media are pumped leak-free.

The von Taine pump is a solenoid-coupled centrifugal pump. Thanks to the solenoid coupling, the pump transports the liquid medium from storage tank to storage tank without any leaks or even from a tank to a discharge line. The von Taine centrifugal pump transports media at up to 22,500 l/h and up to a discharge lift of 23.5 metres. As the pump capacity is highly dependent on the back pressure, always observe the performance curve.

Important note

Check the material tolerability when selecting your pump. Take into consideration the density, viscosity and temperature of the medium to be transported. Please also note: The transported media should not contain any solid fractions. The pump is not self-priming and requires a feed.



Your Benefits

- Safe and reliable: Leak-free pumping of liquid chemicals
- Coupling between motor and impeller via magnetic coupling

Technical Details

- Pump head made of PP or PVDF
- FKM or EPDM seal
- The pump is not self-priming and requires a feed
- Protect the pump from running dry
- Hydraulic connectors with pipe threading as per DIN ISO 228-1

Field of Application

Leak-free pumping of liquid chemicals

von Taine, PP/FKM Version

	Feed rate at max. pres- sure	Feed lift max.	Power uptake	Voltage / fre- quency	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. pres- sure	Feed lift max.	Power uptake	Voltage / fre- quency	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	on				
	Feed rate at max. pres- sure	Feed lift max.	Power uptake	Voltage / fre- quency	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 1820 PP/EPDM	19,500	18.1	1.10	3~/400 V/50 Hz	16.0	1028565	
von Taine 2323 PP/EPDM	22,500	23.5	1.50	3~/400 V/50 Hz	17.0	1028566	

von Taine, PVDF/EPDM Version

	Feed rate at max. pres- sure	Feed lift max.	Power uptake	Voltage / fre- quency	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 1313 PVDF/EPDM	13,200	13.2	0.65	3~/400 V/50 Hz	9.0	1028570	
von Taine 1820 PVDF/EPDM	19,500	18.1	1.10	3~/400 V/50 Hz	16.7	1028571	
von Taine 2323 PVDF/EPDM	22,500	23.5	1.50	3~/400 V/50 Hz	17.7	1028572	

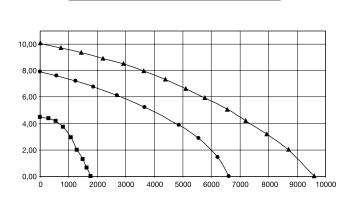
Parameters For Use

	Medium tempera- ture max.	Max. density	Max. viscosity	Max. system pressure at 20° C
	°C	kg/dm³	mPas	bar
von Taine 0502 PP/FKM	80	1.251.35	20	1.0
von Taine 0807 PP/FKM	80	1.201.80	20	2.5
von Taine 1010 PP/FKM	80	1.602.00	20	2.5
von Taine 1313 PP/FKM	80	1.601.90	20	2.5
von Taine 1820 PP/FKM	80	1.101.80	20	5.0
von Taine 2323 PP/FKM	80	1.002.00	20	5.0
von Taine 0502 PVDF/FKM	95	1.251.35	20	1.0
von Taine 0807 PVDF/FKM	95	1.201.80	20	2.5
von Taine 1010 PVDF/FKM	95	1.602.00	20	2.5
von Taine 1313 PVDF/FKM	95	1.601.90	20	2.5
von Taine 1820 PVDF/FKM	95	1.101.80	20	5.0
von Taine 2323 PVDF/FKM	95	1.002.00	20	5.0

-1010

Characteristic Curves

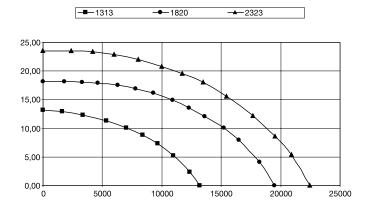
Delivered quantity [I/h] as a function of the delivery head [m WC]



--0807



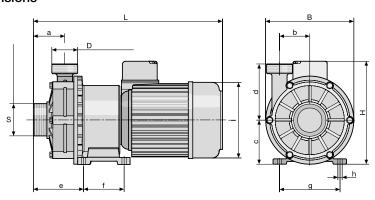
Delivered quantity [I/h] as a function of the delivery head [m WC]



Dimensions

von Taine 0502

von Taine 0807



von Taine 1313

von Taine 1820

von Taine 2323

		PVDF/FKM	PVDF/FKM	PVDF/FKM	PVDF/FKM	PVDF/FKM	PVDF/FKM
Pressure con-		1"	1 1/4"	1 1/2"	1 1/2"	2"	2"
nector							
Suction con-		1 1/4"	1 1/4"	2"	2"	2 1/4"	2 1/4"
nector							
Dim. L	mm	240	283	346	350	455	455
Dim. B	mm	120	138	163	163	205	205
H dimension	mm	145	185	181	191	216	216
Dim. a	mm	37.0	45.0	58.5	58.5	70.0	70.0
Dimension b	mm	29.5	29.5	56.0	56.0	70.0	70.0
Dimension c	mm	60.0	70.0	82.0	82.0	104.5	104.5
Dimension d	mm	65.5	86.0	104.0	104.0	134.5	134.5
Dimension e	mm	129	50	106	106	115	115
Dimension f	mm	78	71	74	74	100	100
Dimension g	mm	91	91	114	114	130	130
Dimension h	mm	6.5	8.5	8.5	8.5	10.0	10.0
Dimension i	mm	92	135	136.5	135	160	160
Enclosure rating	g	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55
Min. flow	l/h	30	60	60	60	90	120

von Taine 1010

Spare Parts Kits

	Order no.
PP/FKM liquid end for von Taine 0502	1023978
PP/FKM liquid end forr von Taine 0807	1023979
PP/FKM liquid end for von Taine 1010	1023980
PP/FKM liquid end for von Taine 1313	1023981
PP/FKM liquid end for von Taine 1820	1023982
PP/FKM liquid end for von Taine 2323	1023983
PVDF/FKM liquid end for von Taine 0502	1023994
PVDF/FKM liquid end for von Taine 0807	1023995
PVDF/FKM liquid end for von Taine 1010	1023996
PVDF/FKM liquid end for von Taine 1313	1023997
PVDF/FKM liquid end for von Taine 1820	1023998
PVDF/FKM liquid end for von Taine 2323	1023999

	Order no.
PP/EPDM liquid end for von Taine 0502	1028573
PP/EPDM liquid end for von Taine 0807	1028574
PP/EPDM liquid end forvon Taine 1010	1028575
PP/EPDM liquid end for von Taine 1313	1028576
PP/EPDM liquid end for von Taine 1820	1028577
PP/EPDM liquid end for von Taine 2323	1028578
PVDF/EPDM liquid end for von Taine 0502	1028579
PVDF/EPDMliquid end for von Taine 0807	1028580
PVDF/EPDM liquid end for von Taine 1010	1028581
PVDF/EPDM liquid end for von Taine 1313	1028582
PVDF/EPDM liquid end for von Taine 1820	1028583
PVDF/EPDM liquid end for von Taine 2323	1028584

Order no.
1024000
1024001
1024002
1024003
1024004
1024005

1.5.4

Air-Operated Diaphragm Pump DUODOS

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

Capacity range up to 6,700 l/h, discharge lift up to 70 m WC



Air-operated Diaphragm Pump DUODOS for pumping liquid media.

The pump capacity of the pump can be controlled by changing the pressure in the air supply. The air control is designed for oil-free operation. DUODOS pumps are ideally suited for the transport of liquid chemicals. DUODOS pumps transport media at up 6,700 l/h and up to a discharge lift of 70 m. As the pump capacity is highly dependent on the back pressure, the performance curve must always be observed. At the same time, the differential pressure between the hydraulic and pneumatic sides should not exceed 2 bar. Higher values reduce the service life of the pump. When selecting pumps, check the material compatibility. In addition, consider the density, viscosity and temperature of the transported medium.

Your Benefits

- No electrical components are required because the pumps are air-operated
- DUODOS pumps are run-dry safe and self-priming

Technical Details

- Maximum air pressure 7 bar
- The air control is designed for oil-free operation
- If the back pressure is greater than the air pressure in the pump, the pump remains stationary

Field of Application

Pumping of liquid chemicals

The following materials are available:

- PP pump chambers with Santoprene® diaphragms and valves
- PVDF pump chambers with PTFE diaphragms and valves

DUODOS PP

	Housing material	Material of dia- phragms, valves	Delivery rate (2 bar differential pressure) I/h	Order no.	
DUODOS 20 PPS	PP	Santoprene®	01,200	1103381	
DUODOS 50 PPS	PP	Santoprene®	03,000	1103384	
DUODOS 100 PPS	PP	Santoprene®	06,000	1103383	
DUODOS 200 PPS	PP	Santoprene®	012,000	1103377	

DUODOS PVDF

	Housing material	Material of dia- phragms, valves	Delivery rate (2 bar differential pressure) I/h	Order no.	
DUODOS 20 PVT	PVDF	PTFE	01,200	1103378	
DUODOS 50 PVT	PVDF	PTFE	03,000	1103382	
DUODOS 100 PVT	PVDF	PTFE	06,000	1103379	
DUODOS 200 PVT	PVDF	PTFE	012,000	1103380	

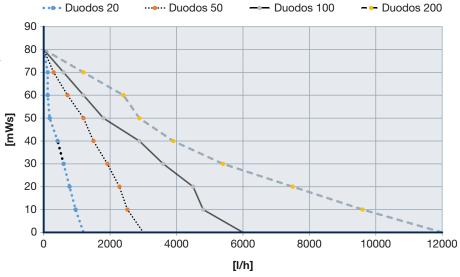


Parameters For Use

	Min. temperature	Max. temperature	Max. viscosity
	°C	°C	mPas
DUODOS 20 PPS	10	80	200
DUODOS 50 PPS	10	80	200
DUODOS 100 PPS	10	80	200
DUODOS 200 PPS	10	80	200
DUODOS 20 PVT	-13	93	200
DUODOS 50 PVT	-13	93	200
DUODOS 100 PVT	-13	93	200
DUODOS 200 PVT	-13	93	200

Characteristic Curves

Feed lift [m WC] over feed rate [l/h] at 7 bar



Spare Parts Kits

Spare part kits for pneumatics comprising

- Seals
- O-rings
- Clamp rings
- Air control valve

	Order no.
Spare parts kit, pneumatics for DUODOS 20 PPS/PVT	1103386
Spare parts kit, pneumatics for DUODOS 50 PPS/PVT	1103387
Spare parts kit, pneumatics for DUODOS 100 PPS/PVT	1103388
Spare parts kit, pneumatics for DUODOS 200 PPS/PVT	1103389

Spare part kits for the liquid end comprising

- Diaphragms
- Valve balls
- Seals

	Order no.
Spare parts kit, liquid end for DUODOS 20 PPS	1103391
Spare parts kit, liquid end for DUODOS 50 PPS	1103390
Spare parts kit, liquid end for DUODOS 100 PPS	1103393
Spare parts kit, liquid end for DUODOS 200 PPS	1103392
Spare parts kit, liquid end for DUODOS 20 PVT	1103394
Spare parts kit, liquid end for DUODOS 50 PVT	1103396
Spare parts kit, liquid end for DUODOS 100 PVT	1103395
Spare parts kit, liquid end for DUODOS 200 PVT	1103397



Dimensions

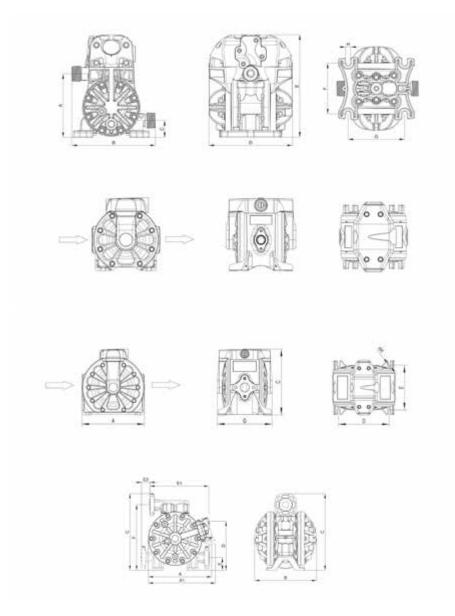
		DUODOS 20	DUODOS 50	DUODOS 100	DUODOS 200
Dim. A	mm	108	156	216	311
Dim. B	mm	142	160	218	320
Dimension C	mm	29	185	230	60
Dim. D	mm	142	105	175	295
Dimension E	mm	173	122	154	364
Dimension F	mm	86	8	8	9
Dim. G	mm	96	141	184	-
H dimension	mm	9	70	95	-
Dimension K	mm	-	166	212	-
Dimension M	mm	-	24	62	-
Pressure connector		1/4" NPT (F)	1/2" BSP	1" BSP	DN 25
Suction connector		3/4" NPT (M)	1/2" BSP	1" BSP	DN 25
Air consumption	m³/h	0.618	1.224	1.830	3.078
Differential pressure	bar	2	2	2	2
Air connection		3/8 NPSM (F)	3/8 NPSM (F)	3/8 NPSM (F)	3/8 NPSM (F)
Weight (PP)	kg	1.2	2.2	5.1	10.5
Weight (PVDF)	kg	1.7	2.7	5.6	11

DUODOS 20

DUODOS 50

DUODOS 100

DUODOS 200





Low-pressure Metering Technology

1.5 Chemical Transfer Pumps

1.5.5

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

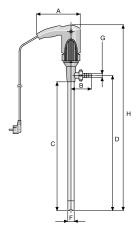
* The pump capacity is understood as including the hose and pump nozzle, determined using water at room temperature as the medium.

DULCOTRANS PVDF Version

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

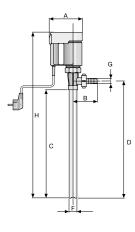
The pump capacity is understood as including the hose and pump nozzle, determined using water at room temperature as the medium.

Technical Data



		DULCOTRANS	DULCOTRANS	DULCOTRANS
		32/700	41/1000	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	m	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	DULCOTRANS	DULCOTRANS
		32/700 PP	41/1000 PP	41/1200 PP
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
Dimension G	d	19	25	25
Dim. B	mm	90	90	90
H dimension	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



1.5.6 Rotary Lobe Pump ROTADOS

The robust solution for the pumping of viscose media and media containing solids

Capacity range 25-100 m³/h, 10-4 bar



The compact rotary lobe pump pumps viscose and even abrasive media at up to 100 m³/h and also with reversible pumping direction thanks to its valveless construction. Housing, plunger and seals are available in different materials to match the medium.

The rotary lobe pump is robust and surprisingly powerful given its compact dimensions: depending on the model it can pump up to 100 m^3 /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

- Waste water and sludge pumping
- Food and beverage industry

Rotary Lobe Pump ROTADOS

	Flange	Max. pump volume	Max. pres- sure	Weight	Order no.	
		m³/h	bar	kg		
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	



1.5.7 Application Examples

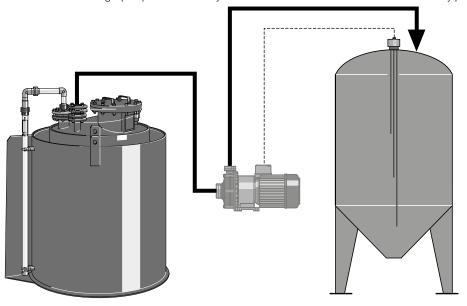
Filling a Day Tank

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



Low-pressure Metering Technology

1.5 Chemical Transfer Pumps

Filling Day Tanks

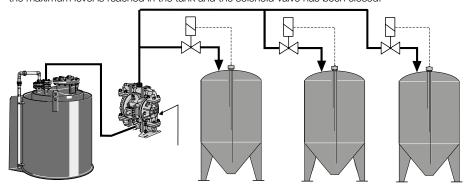
Product: Air-operated diaphragm pump

DUODOS Cleaning agent

Feed chemical: Cleaning age 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

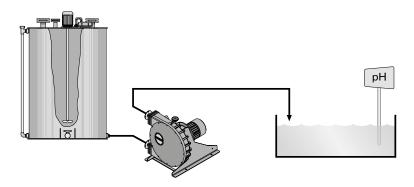


Deacidification of Potable Water

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



Low-pressure Metering Technology

1.6 Accessories for Low-Pressure Metering Pumps

1.6.1

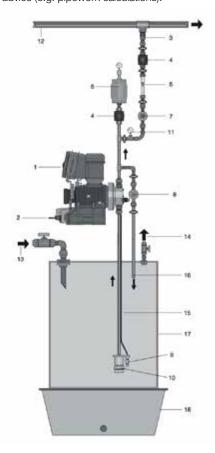
How to find the right accessories

Apart from a correctly selected metering pump, individually combined accessories, installed in accordance with all pertinent regulations, are needed for the perfect operation of metering systems. This drawing below shows a number of accessories. Not all of them are of course always needed but the drawing provides a brief overview of what is possible and may be useful.

The tips provide initial orientation guidelines and a simple option for selection of the right accessories.

We would be happy to assist with the selection of the correct accessories for your metering task and also to provide ongoing plant engineering advice (e.g. pipework calculations).

- 1 Metering pump
- 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



Zips

- No. 2 Activation and control option intelligent motor-driven metering pumps: Direct control, e.g. via analogue signal or potential-free contacts, external pause or via universal control cable.
- No. 3 Injection valves are used to connect the metering line at the point of injection. They protect against backflow and generate a defined back pressure.
- No. 6 Pulsation dampers: To lower the flow resistance with long lines and for low-pulsation metering.
- No. 7 Back pressure valve: With fluctuating back pressure or to generate a constant back pressure to protect against over-metering or to improve dosing precision with a free outlet and priming pressure on the suction side
- No. 8 Relief valves: For reasons of safety, provide suitable overload protection mechanisms when installing all mechanically deflected motor-driven metering pumps.
- No. 9 Level switches are used in conjunction with foot valves or suction lances for level monitoring in dosing tanks. There is no need for re-priming of the chemical as the suction line remains filled.
- No. 17/18 Dosing tanks and collecting pans: 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.



1.6.2 Flow Meter DULCOFLOW

Your reliable control unit: unobtrusively measures, monitors and detects faults.

For the measurement of pulsating volumetric flows within the range of 0.03 ml/stroke to 10 ml/stroke



The flow meter DULCOFLOW reliably measures pulsating flows in the range above 0.03 ml/stroke based on the ultrasound measuring principle. The flow meter achieves maximum chemical resistance as all wetted parts are made of PVDF and PTFE.

The device works on the ultrasound measuring principle. It was developed specifically for measuring small pulsating volumetric flows. It is installed around 30 cm downstream of the metering pump, so that there is still sufficient pulsation in the flow. All liquids that conduct ultrasound waves can be measured.

Your Benefits

- Maximum chemical resistance by the use of PVDF and PTFE
- No electrical conductivity of the medium is needed
- Measurement above stroke volumes of approx. 30 μl
- Detection of gas bubbles in the feed chemical
- No bottlenecks in the measuring tube. Media with small undissolved particles or with increased viscosity can be measured
- A 0/4 -20 mA current output and a frequency output are available for remote transmission of the measured values.
- Use as a single stroke monitor with feedback to the pump. This ensures that the metering stroke is performed within an adjustable lower and upper limit
- Summation of the metering volume measured with stroke counter
- Intuitive user guidance and simple programming

Technical Details

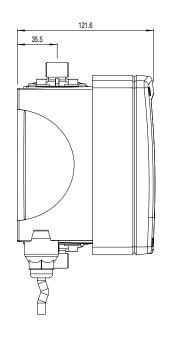
- 2 LEDs for status display and stroke feedback
- 2-line graphic display
- 0/4-20 mA standard signal and 0 10 kHz frequency output for remote transmission of the measured value
- Compact, chemically-resistant plastic housing
- Measuring accuracy ± 2 % if the device has been calibrated to the chemical to be measured. Max. operating pressure 16 bar.

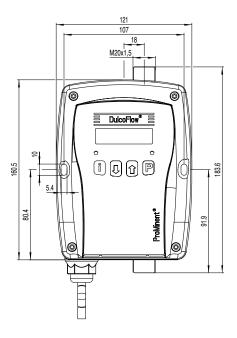
Field of Application

- 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

lype	Type 05	Type 08
Max. operating pressure	16 bar	16 bar
Smallest measurable stroke volume	Approx. 0.03 ml/stroke,	Approx. 0.05 ml/stroke,
	pulsing	pulsing
Min. pressure	3 bar	3 bar
Contact output with individual stroke detec-	Open collector, 1 contact	Open collector, 1 contact
tion	per stroke	per stroke
Frequency output	Open collector, up to 10	Open collector, up to 10
	kHz at maximum flow (parametrisable)	kHz at maximum flow (parametrisable)
Analogue output	Parameters can be set, max. load 400 Ω	Parameters can be set, max. load 400 Ω
Туре	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 p	ump serie	np series)									
	05		1000 – 0413/0713, gamma/ X 1602 – 0414/0715, gamma/XL 1608 – 1612									
	08	beta 160	04 - 0420, gamma/ X 1604 - 0424, gamma/ XL 1020 - 0450, Sigma/ 1									
		Seal ma	terial	erial								
		E	EPDM									
		V	FKM A	FKM A								
		Т	PTFE	TFE								
		F	FDA-cor	DA-compliant								
			Hydrauli									
			1	6/4 mn								
			2	8/5 mn								
			3	12/9 m								
			4		-,	xternal thread for DN 10 connector						
						nnection, cable						
				Α	1	- 230 V AC, 2 m European						
				В	1	- 230 V AC, 2 m Swiss						
				С	1	- 230 V AC, 2 m Australian						
				D		– 230 V AC, 2 m USA						
						al output						
					0	No output						
					1	Current output						
					2	Contact output						
					3	Current output and contact output						
					4 Current output for gamma/ XL with control module							
						Version 0 with ProMinent logo						
						0 with ProMinent logo Accessories						
						0 no accessories						

Low-pressure Metering Technology

Accessories for Low-Pressure Metering Pumps 1.6

1.6.3

Hydraulic/Mechanical Accessories

1.6.3.1

Foot Valves for Low-Pressure Metering Pumps

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

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

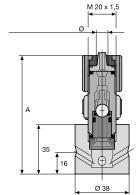
During installation, ensure that there is a sufficient gap between the foot valve and the pump foot and between the foot valve and the lowest suction water level.

Union nuts and inserts/hose nozzles are included in the scope of delivery with DN 10 and DN 15 foot valve

Important: Foot valves are not completely sealed shut-off devices!

PPE foot valves

Housing made of PP, seals made of EPDM.

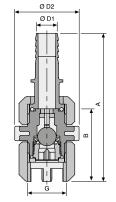


-	
Connection size	0Ø v

Connection size	00 X 10	DIM. A	Fig.	Oraer no.	
	mm	mm			
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	

pk_1_038

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



P_AC_0206_SW

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

DIN 20 10 DIN 40		INO COLLINEC					
	Dim. G	Dim. B	Ø D2	Dim. A	Ø D1	Order no.	
		mm	mm	mm	mm		
DN 10	3/4	59	40	101	16	809465	
DN 15	1	66	47	142	20	924516	
DN 20	1 1/4	77	55	-	-	803721	
DN 25	1 1/2	84	60	-	-	803722	
DN 32 *	2	98	74	-	-	1006434	
DN 40	2 1/4	113	90	-	-	1004204	

PVDF/Teflon design

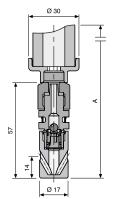
PPB Foot Valve

Housing made of PP, seals made of FKM.

Connection size	oØ x iØ	Dim. A	Fig.	Order no.	
	mm	mm			
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

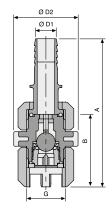
Housing made of PVC, seals made of FKM.



Connection size	oØ x iØ	Dim. A	Fig.	Order no.	
	mm	mm			
6/4 for hose	6 x 4	84	pk_1_038	924557	
8/5 for hose	8 x 5	84	pk_1_038	924562	
12/9 for hose	12 x 9	87	pk_1_038	924564	
10/4 for hose	10 x 4	87	pk_1_038	1002917	
12/6 for hose	12 x 6	87	pk_1_038	924563	
6/4 for hose	6 x 4	57	P_AC_0207_SW	914505	

P_AC_0207_SW

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

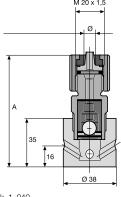


DN 10, DN 15	With union nut and hose sleeve								
DN 20 to DN 40		No connec							
	Dim. G	Dim. B	Ø D2	Dim. A	Ø D1	Order no.			
		mm	mm	mm	mm				
DN 10	3/4	59	40	101	16	809464			
DN 15	1	66	47	142	20	924515			
DN 20	1 1/4	77	55	-	-	803723			
DN 25	1 1/2	84	60	-	-	803724			
DN 32 *	2	98	74	-	-	1006434			
DN 40	2 1/4	108	83	-	-	1029475			

^{*} PVDF/Teflon design

PVT Foot Valve

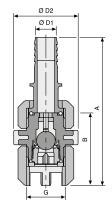
Housing made of PVDF, seals made of PTFE.



Connection size	oØ x iØ	Dimen- sion A	Fig.	Order no.	
	mm	mm			
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	

pk_1_040

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 ho	se sleeve			
DN 20 to DN 40		No connect					
	Dim. G	Dim. B	Ø D2	Dim. A	Ø D1	Order no.	
		mm	mm	mm	mm		
DN 10	3/4	58	36	92	16	1029471	
DN 15	1	64	48	131	20	1029472	
DN 20	1 1/4	78	58	-	-	1029473	
DN 25	1 1/2	81	65	-	-	1029474	
DN 32	2	98	74	-	-	1006434	
DN 40	2 1/4	108	83	-	-	1029475	



Low-pressure Metering Technology

1.6 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

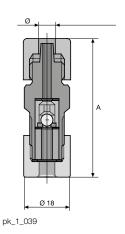
Housing made of PVDF, seals made of PTFE, with filter mesh and ball check (ceramic DN 10 - 20, glass DN 25).

DN 10, DN 15		With union	nut and hos	se sleeve			
DN 20 to DN 40		No connect	tion parts				
	Dim. G	Dim. B	Ø D2	Dim. A	Ø D1	Order no.	
		mm	mm	mm	mm		
DN 10	3/4	58	36	92	16	1078269	
DN 15	1	64	48	131	20	1078270	
DN 20	1 1/4	78	58	-	-	1078271	
DN 25	1 1/2	81	65	-	-	1078272	

Foot Valve TTT

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

,		,	· · · · · · · · · · · · · · · · · · ·		O
Connection size	oØ x iØ	Dim. A	Fig.	Order no.	
	mm	mm			
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	

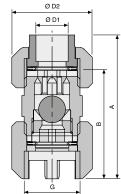


Ø D2

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

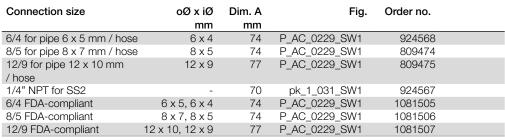
		DN 10, DN 15		With union nut and insert							
	1	DN 20 to DN 40	Dim. G	No connect Dim. B	ction parts Ø D2			Order no.			
	_		Dilli. G	mm	mm	mm	mm	Older IIO.			
\mathbb{I}	1	DN 10	3/4	59	40	101	16	809466			
1		DN 15	1	66	47	142	20	924517			
	∢	DN 20	1 1/4	81	57	-	-	803725			
L		DN 25	1 1/2	86	64	-	-	803726			
	m	DN 32 *	2	98	74	-	-	1006434			
1		DN 40	2 1/4	116	89	-	-	1004205			

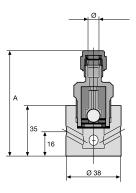
^{*} PVDF/Teflon design



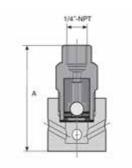
Foot Valve SST

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





P_AC_0229_SW1



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	В	Dim.	ØD	Order no.				
				Rp						
		mm	mm		mm					
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

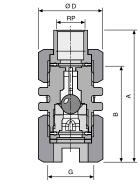
"Physiologically safe (FDA) in respect of wetted materials" design.

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).

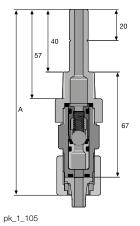
DN 10, DN 15	With union nut and insert								
DN 20 to DN 40	No connection parts								
	Dim. G	Dim. A	В	Dim.	ØD	Order no.			
				Rp					
		mm	mm		mm				
DN 10	3/4	75	56	3/8	37	1078275			
DN 15	1	83	59	1/2	48	1078289			
DN 20	1 1/4	-	73	-	55	1078290			
DN 25	1 1/2	-	82	-	63	1078291			





1.6.3.2

Injection Valve for Low-Pressure Metering Pumps



Injection valves are mounted at the point of injection to connect the metering line. They protect against backflow and generate a defined back pressure.

With the PP, PVC, PVDF and stainless steel version, the injection valve with ball check is spring-loaded with a Hastelloy C spring, priming pressure approx. 0.5 bar (with R1/4 connector, spring made of stainless steel no. 1.4571, priming pressure approx. 1 bar). They may be fitted in any position.

The TT version without a spring is suitable for vertical installation from below. Valve springs can be retrofitted.

Injection valve sizes DN 10 and 15 have union nuts and inserts / hose nozzles in the scope of delivery.

Important: Injection valves are not absolutely leak-tight shut-off devices!

Injection valves are mounted at the point of injection to connect the metering line. They protect against backflow and generate a defined back pressure.

With the PP, PVC, PVDF and stainless steel version, the injection valve with ball check is spring-loaded with a Hastelloy C spring, priming pressure approx. 0.5 bar (with R1/4 connector, spring made of stainless steel no. 1.4571, priming pressure approx. 1 bar). They may be fitted in any position.

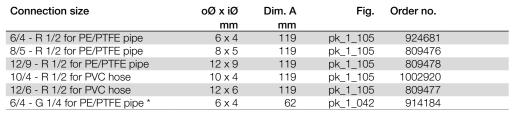
The TT version without a spring is suitable for vertical installation from below. Valve springs can be retrofitted.

Injection valve sizes DN 10 and 15 have union nuts and inserts / hose nozzles in the scope of delivery.

Important: Injection valves are not absolutely leak-tight shut-off devices!

PPE Injection Valve

PP housing, EPDM seals with non-return ball, spring-loaded with Hastelloy C spring, prepressure approx. 0.5 bar with extended screwed socket.

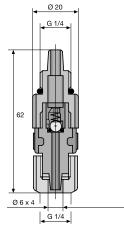


^{*} Valve spring made from stainless steel 1.4571, priming pressure approx. 0.8 bar

Application when using an appropriate dosing line

25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 9 bar



pk_1_042

G D2 G G G D1 G D1

PPE Injection Valve

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

DN 10, DN 15	With union nut and hose sleeve								
DN 20 to DN 40		No connect	ion parts						
	Dim. G	Dim. B	Ø D2	Dim. A	Ø D1	Order no.			
		mm	mm	mm	mm				
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			

Application

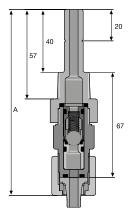
25 °C - max. operating pressure 16 bar

50 °C - max. operating pressure 9 bar

PPB Injection Valve

PP housing, FKM seals with spring-loaded non-return ball, prepressure approx. $0.5\ \mathrm{bar}$.

Connection size	oØ x iØ	Dim. A	Fig.	Order no.	
	mm	mm			
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

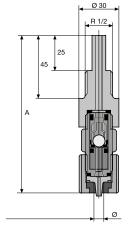
25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 9 bar

PP/PTFE Injection Valve

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	Dim. A	Fig.	Order no.	
	mm	mm			
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	



pk_1_046

Application when using an appropriate dosing line

25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 9 bar

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	Fig.	Order no.	
	mm			
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

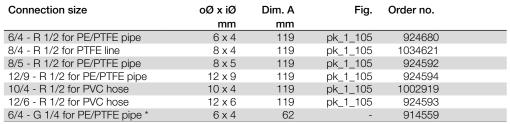
PCB Injection Valve

20

40

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.



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

Application when using appropriate metering line

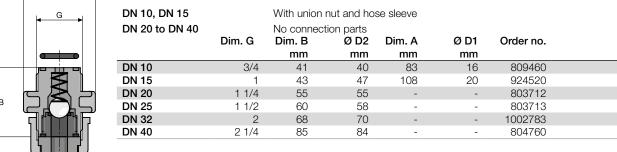
 $25\ ^{\circ}\text{C}$ – max. operating pressure 25 bar for 8/4 design

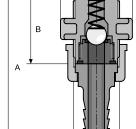
25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 7 bar

PCB Injection Valve

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





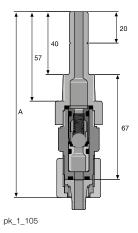
Ø D1

Ø D2

Application

25 $^{\circ}\text{C}$ - max. operating pressure 16 bar

45 °C - max. operating pressure 7 bar



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.

DN 10, DN 15	With union nut and	nose sleeve			
DN 20 to DN 40 Connection size	No connection part oØ x iØ	S Dim. A	Fig.	Order no.	
	mm	mm			
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-complian	t 6 x 4 - 12 x 9	119	pk_1_105	1081423	

Application when using appropriate metering line

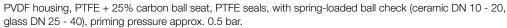
25 °C - max. operating pressure 25 bar for 8x4 design

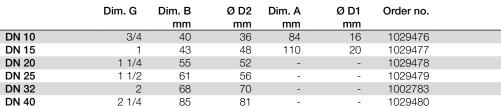
25 °C - max. operating pressure 20 bar for 6x3 design

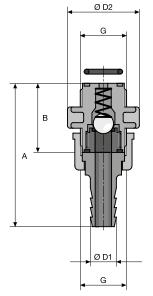
25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 12 bar

Injection valve PVT







Application

25 °C - max. operating pressure 16 bar

65 °C - max. operating pressure 10 bar

Injection valve PVT-FDA

"Physiologically safe (FDA) in respect of wetted materials" design.

All wetted materials in the "Physiologically safe (FDA) in respect of wetted materials" design comply with the FDA guidelines.

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. With union put and hose sleeve

	With dilion hat and hose sieeve							
	No connect	tion parts						
Dim. G	Dim. B	Ø D2	Dim. A	Ø D1	Order no.			
	mm	mm	mm	mm				
3/4	40	36	84	16	1078237			
1	43	48	110	20	1078238			
1 1/4	55	52	-	-	1078239			
1 1/2	61	56	-	-	1078240			
	3/4 1 1 1/4	Dim. G No connect Dim. B mm 3/4 40 1 43 1 1/4 55	Dim. G No connection parts Dim. B Ø D2 mm mm 3/4 40 36 1 43 48 1 1/4 55 52	Dim. G Dim. B mm Ø D2 mm Dim. A mm 3/4 40 36 84 1 43 48 110 1 1/4 55 52 -	Dim. G No connection parts Dim. A mm Ø D2 mm Dim. A mm Ø D1 mm 3/4 40 36 84 16 1 43 48 110 20 1 1/4 55 52 - -	Dim. G No connection parts Dim. B mm Ø D2 mm Dim. A mm Ø D1 mm Order no. mm 3/4 40 36 84 16 1078237 1 43 48 110 20 1078238 1 1/4 55 52 - - 1078239		

Application

DN 10 DN 15

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 6×4 , 8×4 , 8×5 , 12×9 , 10×4 and 12×6 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	Fig.	Order no.	
	mm			
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 6×4 , 8×4 , 8×5 , 12×9 , 10×4 and 12×6 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	Fig.	Order no.
	mm		
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

TTT Injection Valve

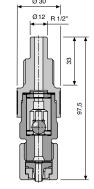
Vertical installation from below. With ball check, without spring. Valve spring (Order No. 469404) can be retrofitted. Body and seals made of PTFE.

Connection size	oØ x iØ	Dim. A	Fig.	Order no.	
	mm	mm			
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

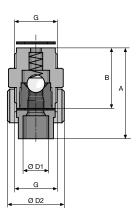
45 °C - max. operating pressure 5 bar



P_AC_0184_SW

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 connec	tion parts						
	Dim. G	Dim. B	Ø D2	Dim. A	Ø D1	Order no.			
		mm	mm	mm	mm				
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			

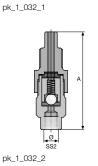
Application

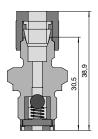
25 °C - max. operating pressure 10 bar

90 °C - max. operating pressure 5 bar

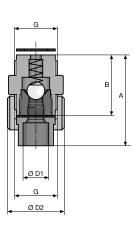


0 30 R 1/2 A





P_AC_0253_SW



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	Dim. A	Fig.	Order no.	
	mm	mm			
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

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 20 t	DN 15 to DN 40 Dim. G		h union nu connectio Dim. B	ut and inser in parts Diame- ter Ø D2	t Dim. A	Diam- eter Ø D1	Order no.	
		bar	mm	mm	mm	mm		
DN 10	3/4	320	38	36	55	3/8	809463	
DN 15	1	240	43	48	63	1/2	924523	
DN 20	1 1/4	130	55	55	-	-	803716	
DN 25	1 1/2	70	60	58	-	-	803717	
DN 32	2	45	69	68	-	-	1002801	
DN 40	2 1/4	25	85	84	-	-	804763	

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 $^{\circ}\text{C}$ - max. operating pressure, see table

	Dim. G	Max. pres- sure	Dim. B	Diame- ter Ø D2	Dim. A	Diam- eter Ø D1	Order no.	
		bar	mm	mm	mm	mm		
DN 10	3/4	320	38	36	55	3/8	1078251	
DN 15	1	240	43	48	63	1/2	1078252	
DN 20	1 1/4	130	55	55	-	-	1078266	
DN 25	1 1/2	70	60	58	-	-	1078267	

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

PPB Injection Valve O-Ring Loaded

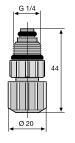
PP body, FKM seals. Priming pressure approx. 0.5 bar.

	00 X 10	Fig.	Oraer no.	
	mm			
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



P_AC_0008_SW

29

P_AC_0009_SW

PCB Injection Valve O-Ring Loaded

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

	oØ x iØ	Fig.	Order no.	
	mm			
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



Order no.

809484

809485

1002925

809487

809486

Fig.

P_AC_0183_SW

P_AC_0183_SW

P_AC_0183_SW

P_AC_0183_SW

104 P_AC_0183_SW

Low-pressure Metering Technology

1.6 Accessories for Low-Pressure Metering Pumps

oØ x iØ

mm

6 x 4

8 x 5

10 x 4

12 x 6

12 x 9

Ø 20 Ø 12 Ø 9 Ø 9

P_AC_0183_SW

Application when using appropriate metering line

PTFE Injection Valve O-Ring Loaded

PTFE housing, FKM seals.

6/4 - for PE/PTFE line

8/5 - for PE/PTFE line

10/4 – for PVC hose

12/6 - for PVC hose

12/9 - for PE/PTFE line

Connection size

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.

Dim. A

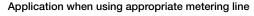
mm

104

104

104

Connection size	oØ x iØ	Dim. A	Fig.	Order no.	
	mm	mm			
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	



25 °C - max. operating pressure 2 bar

45 °C - max. operating pressure 2 bar

Metering connector for hot water up to 80 °C

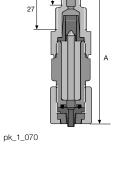
Consists of stainless steel 1.4404 injection valve, 1 m stainless steel 1.4571 discharge line and threaded connector with reinforcing sleeve for connection of PE/PTFE pipe to stainless steel pipe.

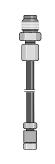
Connection size	Fig.	Order no.

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. 30 bar

Please note the pressure and temperature limits of the hoses you wish to connect up.





pk_1_049

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	Dimen- sion C	Dimen- sion 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.



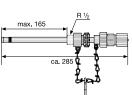
Low-pressure Metering Technology

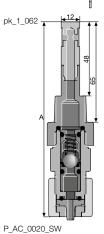
1.6 Accessories for Low-Pressure Metering Pumps

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

max. 130 ca. 365

pk_1_007





0 28

P_AC_0181_SW

PPE Injection Lance

For immersion depths of 20 - 165 mm, in large diameter pipe to prevent chemical deposition at the point of injection. Consists of spring-loaded metering valve, Hastelloy C spring, ceramic ball, adjustable immersion rod and hose valve. With connectors for all hose sizes used with solenoid-driven metering pumps: 6/4, 8/5, 12/9, 10/4 and 12/6.

Version	Seals	Max. pres- sure bar	Fig.	Order no.	
PPE without stopcock	EPDM/sili- cone	6	pk_1_062	1021530	
PPE with stopcock	EPDM/sili- cone	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

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. pres- sure bar	Seals	Dim. A	Fig.	Order no.	
PPE	PP	16	EPDM	126	P_AC_0020_SW	1028383	
PCB Ver- sion	PVC	16	FKM-B	126	P_AC_0020_SW	1028363	
PVT	PVDF	16	PTFE	126	P_AC_0020_SW	1028081	

PVDF Non-Return Valve for Hose Installation

With 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

Product Catalogue Volume 1

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	Dim. A	Fig.	Order no.	
	mm	mm			
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	

1.6.3.4

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

Back pressure valves are used to generate a constant back pressure to ensure precise metering and protect against over-metering or metering imprecision through a free outlet and priming pressure on the suction side. They are also used in conjunction with pulsation dampers to generate low-pulsation metering. We recommend back pressure valves type DHV-U with fluctuating back pressure.

The DHV listed below are designed for different applications. Please note the relevant notes for the different mounting forms.

Important:

Back pressure valves are not absolutely leak-tight shut-off devices. Take appropriate precautions when handling hazardous media.

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

Back pressure valve / relief valve for fitting directly on the pump's dosing head with the functions:

- Back pressure valve, opening pressure approx. 1.5 bar with free outlet or priming pressure at the suction end (black rotary dial)
- Relief valve, opening pressure approx. 6, 10 or 16 bar (red rotary dial)
- Priming aid for pending back pressure, no need to release discharge line
- Discharge line relief, e.g. prior to service work

The multifunctional valve is operated by free-moving rotary dials that automatically return to their original position when released by the operator. This means operation is possible even when access is difficult. The multifunctional valve is made of PVDF and can be used to meter almost any chemical.

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

Caution: The bypass line should always be connected.

Valve body	PVDF				
Diaphragm	PTFE-	coated			
Seal	FKM a	and EPDM (loo	se)		
Type	Relief opening pressure *	Connector	Bypass connector	Order no.	
		size			
Size I	16 bar	6-12	6 x 4	792011	
Size I	10 bar	6-12	6 x 4	791715	
Size I	6 bar	6-12	6 x 4	1005745	
Size II	10 bar	6-12	12 x 9	792203	
Size II	6 bar	6-12	12 x 9	740427	
Size III	10 bar	DN 10	12 x 9	792215	

* The relief opening pressure given above is the pressure at which the valve 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.

Application: multifunctional valves

Size I ALPc 1001, 1002, 1004, 1008, 0708

beta, type 1000, 1601, 1602, 1604, 1605, 1005, 1008, 0708, 0413,

0220

gamma/ X type 1602, 1604, 1009, 0708, 0414, 0220

gamma/ XL type 1608, 1612

Size II ALPc 0417, 0230

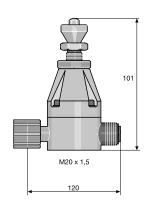
beta, type 1605, 1008, 0713, 0420, 0232 gamma/ X type 1009, 0715, 0424, 0245

gamma/XL type 1020, 0730

Size III gamma/ XL type 0450, 0280

For material version PP, PV, NP, TT





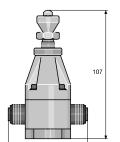
Back Pressure Valve Type DHV-S-DK, 0-10 bar Adjustable

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					
Туре	adjustable pressure max.	Connector width	Material	Order no.			
	bar	DIN / ANSI					
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.



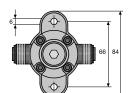
Back Pressure Valve / Relief Valve Type DHV-S-DL, 0-10 bar Adjustable

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

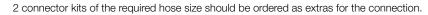
Use in conjunction with pulsation damper only with a free outlet and short metering line. Use type DHV-U when using a pulsation damper with back pressure or long lines.

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!

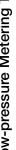


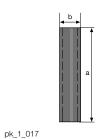
Applications: Metering pumps alpha, beta, gamma/X, gamma/XL, Pneumados b, **FXTRONIC**

Туре	adjustable pressure	Connector width	Material	Order no.	
	max.				
	bar	DIN / ANSI			
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	П	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	



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





Pipe Nipples

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

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

Back Pressure Valve / Relief Valve Type DHV-U

Universal back pressure valves of the DHV-U product range are back pressure-free piston diaphragm valves with an internal flow. They are used to generate a constant back pressure and also as relief valves. They can be installed at any location in the pipework system.

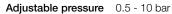
Back pressure valves are used to generate a constant back pressure for precise pumping and to protect against over-metering where there is a free outlet, fluctuating back pressure or priming pressure on the suction side. They are also used in conjunction with pulsation dampers to generate low-pulsation metering.

Relief valves are used to protect pumps, pipes and fittings from overpressure, in the event of incorrect operation or blockages in the bypass. In the event of a malfunction, the pump pumps around the circuit or back into the supply tank.

Important: Back pressure valves cannot be used as absolutely leak-tight shut-off devices. Take appropriate safety precautions when handling hazardous media. Relief valves are not safety valves by their definition as per DIN EN ISO 4126-1.

Important: Take appropriate safety measures (e.g. flushing after possible response) when using as relief valves in conjunction with viscous media (e.g. lime milk).

Nominal diameter

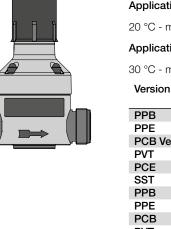


Application of PPE/PPB/PCE/PCB

20 °C - max. operating pressure 10 bar

Application of PVT/SST

30 °C - max. operating pressure 10 bar



version	Nominal diameter	Dilli. G	Order no.	
PPB	DN 10	3/4	1038133	
PPE	DN 10	3/4	1037285	
PCB Version	DN 10	3/4	1037765	
PVT	DN 10	3/4	1037767	
PCE	DN 10	3/4	1038144	
SST	DN 10	3/4	1043194	
PPB	DN 15	1	1038145	
PPE	DN 15	1	1036816	
PCB	DN 15	1	1037764	
PVT	DN 15	1	1037766	
PCE	DN 15	1	1038146	
SST	DN 15	1	1043193	
PPB	DN 20	1 1/4	1038147	
PPE	DN 20	1 1/4	1037284	
PCB	DN 20	1 1/4	1037775	
PVT	DN 20	1 1/4	1037777	
PCE	DN 20	1 1/4	1038148	
SST	DN 20	1 1/4	1043192	
PPB	DN 25	1 1/2	1038149	
PPE	DN 25	1 1/2	1036633	
PCB	DN 25	1 1/2	1037774	
PVT	DN 25	1 1/2	1037776	
PCE	DN 25	1 1/2	1038150	
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	

Dim. G

Order no



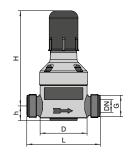
Version	Nominal diameter	Dim. G	Order no.	
PPB	DN 32	2	1051522	
PPE	DN 40	2 1/4	1051518	
PCE	DN 40	2 1/4	1051501	
PVT	DN 40	2 1/4	1051502	
SST	DN 40	2 1/4	1051515	
PCB	DN 40	2 1/4	1051519	
PPB	DN 40	2 1/4	1051521	

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

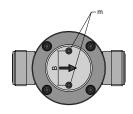
^{*} Cover ring made from PTFE/FKM

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



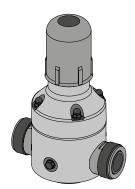
DN	G	Н	L	h	D	m	В
		mm	mm	mm	mm		mm
10	3/4	144	118	24	79	M6	40
15	1	144	118	24	79	M8	40
20	1 1/4	196	150	37	99	M8	46
25	1 1/2	196	150	37	99	M6	46
32	2	252	200	54	139.5	M8	65
40	2 1/4	252	200	54	139.5	M8	65

Dimensions of DHV-U (SS version)



DN	G	H*	L	h	D	m	В
		mm	mm	mm	mm		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-U M configured for a manometer

The relief valves DHV-U M are configured with a plug for manometer installation.

Manometers with threaded socket G 1/4" (ISO 228) can be fitted by the customer directly to the relief valve via the additional housing opening. Standard manometers with part number are available for neutral media. This also enables savings in terms of installation.

Adjustable pressure 0.5 - 10 bar

Application of PPE/PPB/PCE/PCB

20 °C - max. operating pressure 10 bar

Application of PVT/SST

30 °C - max. operating pressure 10 bar

Version	Nominal diameter	Dim. G	Order no.	
PPB	DN 10	3/4	1077878	
PPE	DN 10	3/4	1077866	
PCE	DN 10	3/4	1077872	
PCB	DN 10	3/4	1077884	
PVT	DN 10	3/4	1077890	
PPB	DN 15	1	1077877	
PPE	DN 15	1	1077865	
PCE	DN 15	1	1077871	
PCB	DN 15	1	1077883	
PVT	DN 15	1	1077889	
PPB	DN 20	1 1/4	1077876	
PPE	DN 20	1 1/4	1077864	
PCE	DN 20	1 1/4	1077870	
PCB	DN 20	1 1/4	1077882	
PVT	DN 20	1 1/4	1077888	
PPB	DN 25	1 1/2	1077875	
PPE	DN 25	1 1/2	1077863	
PCE	DN 25	1 1/2	1077869	
PCB	DN 25	1 1/2	1077881	
PVT	DN 25	1 1/2	1077887	
PPB	DN 32	2	1077874	
PPE	DN 32	2	1077862	
PCE	DN 32	2	1077868	
PCB	DN 32	2	1077880	
PVT	DN 32	2	1077886	
PPB	DN 40	2 1/4	1077873	
PPE	DN 40	2 1/4	1077861	
PCE	DN 40	2 1/4	1077867	
PCB	DN 40	2 1/4	1077879	
PVT	DN 40	2 1/4	1077885	

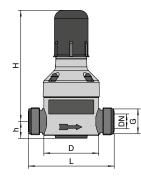
Materials used

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

^{*} Cover ring made from PTFE/FKM

FDA design (21CFR177...)

We are happy to supply physiologically harmless (FDA) material designs of wetted materials for PPE, PVT and SST





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

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

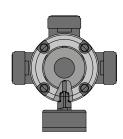
^{*} Approximate values



Dimensions of DHV-U M (SS design)

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

Approximate values



Pipe spring manometer

Pipe spring manometers in accordance with DIN EN 837-1 for neutral media for use with relief valves DHV-UR design M. When ordered, the manometer is supplied with the relief valve.

Nominal width63 mmDisplay range0 - 16 barHousing material1.4571Connector materialBrass

Connector Threaded assembly G 1/4" (ISO 228)

 Connector position
 Radial at bottom

 Filling liquid
 Glycerol

Pipe spring manometer 792726

Back Pressure Valve / Relief Valve Type DHV-U in physiologically safe design (FDA)

Back pressure valves for motor-driven metering pumps are designed for different applications. Please refer to the relevant notes for the different designs.

Relief valves are used in the bypass to protect pumps, pipes and fittings from overpressure in the event of incorrect operation or blockages. In the event of a malfunction, the pump pumps back into the storage tank.

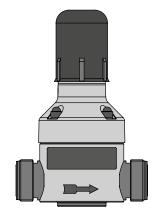
Adjustable pressure 0.5 - 10 bar

Application of PPE/PPB/PCE/PCB

20 °C - max. operating pressure 10 bar

Application of PVT/SST

30 °C - max. operating pressure 10 bar



Version	Nominal diameter	Dim. G	Order no.	
PPE	DN 10	3/4	1076578	
SST	DN 10	3/4	1076532	
PVT	DN 10	3/4	1076579	
PPE	DN 15	1	1076580	
SST	DN 15	1	1076531	
PVT	DN 15	1	1076581	
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
PPE	PP	PVDF	EPDM	EPDM
PVT	PVDF	PVDF	PTFE *	FKM
SST	1.4404	PTFE	PTFE *	PTFE

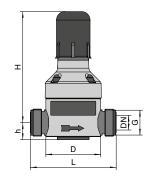
^{*} Cover ring made from PTFE/FKM

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.

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



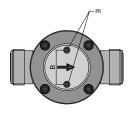
DN	G	H*	L	h	D	m	В
		mm	mm	mm	mm		mm
10	3/4	144	118	24	79	M6	40
15	1	144	118	24	79	M8	40
20	1 1/4	196	150	37	99	M8	46
25	1 1/2	196	150	37	99	M6	46
32	2	252	200	54	139.5	M8	65
40	2 1/4	252	200	54	139.5	M8	65

^{*} Approximate values

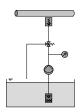
Dimensions of DHV-U (FDA) (SS design)

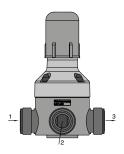
DN	G	H*	L	h	D	m	В
		mm	mm	mm	mm		mm
10	3/4	144	118	20	79	M6	40
15	1	144	118	20	79	M6	40
20	1 1/4	196	150	30	99	M6	46
25	1 1/2	196	150	30	99	M6	46
32	2	252	200	37	139.5	M8	65
40	2 1/4	252	200	37	139.5	M8	65

^{*} Approximate values









- 1 Inle
- 2 Relief outlet
- 3 Outlet



- 1 Inlet
- 2 Relief outlet
- 3 Outlet

Relief valve type DHV-UR

The universal relief valves type DHV-UR, like all valves of the DHV-U product range, are infinitely adjustable piston diaphragm valves with internal flow. In the event of impermissible overpressure, the internal piston diaphragm opens the second outlet line, the relief outlet. It can be installed at any location in the pipework system. Very low pressure losses with a closed relief valve due to virtually free pipe cross-section Simple spare parts management, the wear parts (pressure spring, diaphragms, plunger seal, seal connection set) correspond to the DHV-U range of valves.

The benefits of the new relief valves DHV-UR include simpler assembly due to the saving of installation material/connection parts etc. and a reduction of adhesion points. The new installation method permits a slimmer design of metering stations.

Relief valves for fitting directly into the discharge line of the motor-driven metering pump with the functions:

- Installation at any location in the pipework system.
- Very low pressure losses with a closed relief valve due to virtually free pipe cross-section

Adjustable pressure

0.5 - 10 bar

Application of PP and PVC (PPE/PPB/PCE/PCB)

20 °C - maximum operating pressure 10 bar

Application of PVDF and stainless steel (PVT/SST)

30 °C - maximum operating pressure 10 bar

The benefits for you:

- Simpler installation due to saving of installation material/connecting parts
- Reduced adhesion points.
- Slimmer construction type of metering stations.
- Simple spare parts management, wear parts conform to the DHV-U valve product range.

Version	Nominal diameter	Dim. G	Order no.	
PVT	DN 10	3/4	1061365	
PPE	DN 10	3/4	1061337	
PCE	DN 10	3/4	1061339	
PPB	DN 10	3/4	1061341	
PCB	DN 10	3/4	1061343	
SST	DN 10	3/4	1061550	
PCB	DN 15	1	1061342	
PPE	DN 15	1	1061336	
PCE	DN 15	1	1061338	
PPB	DN 15	1	1061340	
PVT	DN 15	1	1061364	
SST	DN 15	1	1061551	
PCE	DN 20	1 1/4	1061369	
PPE	DN 20	1 1/4	1061367	
PPB	DN 20	1 1/4	1061371	
PCB	DN 20	1 1/4	1061373	
PVT	DN 20	1 1/4	1061375	
SST	DN 20	1 1/4	1061569	
PCE	DN 25	1 1/2	1061368	
PPE	DN 25	1 1/2	1061366	
PPB	DN 25	1 1/2	1061370	
PCB	DN 25	1 1/2	1061372	
PVT	DN 25	1 1/2	1061374	
SST	DN 25	1 1/2	1061570	

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	1.4404	PTFE *	PTFE

^{*} Cover ring made from PTFE/FKM

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

DN	G	H*	L	h	D	m	В
		mm	mm	mm	mm		mm
10	3/4	144	118	24	79	M6	35
15	1	144	118	24	79	M6	35
20	1 1/4	196	150	37	99	M6	46
25	1 1/2	196	150	37	99	M6	46

^{*} Approximate values

Dimensions of DHV-UR (SS design)

DN	G	H*	L	h	D	m	В
		mm	mm	mm	mm		mm
10	3/4	144	118	24	79	M6	35
15	1	144	118	24	79	M6	35
20	1 1/4	196	150	37	99	M6	46
25	1 1/2	196	150	37	99	M6	46

^{*} Approximate values

Relief valve type DHV-UR, FDA design

Back pressure valves for motor-driven metering pumps are designed for different applications. Please refer to the relevant notes for the different designs.

Relief valves are used in the bypass to protect pumps, pipes and fittings from overpressure in the event of incorrect operation or blockages. In the event of a malfunction, the pump pumps back into the storage tank.

Adjustable pressure 0.5 - 10 bar

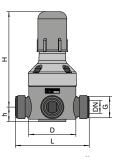
Application of PPE/PPB/PCE/PCB:

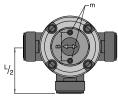
20 °C - max. operating pressure 10 bar

Application of PVT/SST:

30 °C - max. operating pressure 10 bar

Version	Nominal diameter	Dim. G	Order no.	
PVT	DN 10	3/4	1075830	
PPE	DN 10	3/4	1075828	
SST	DN 10	3/4	1075847	
PVT	DN 15	1	1075829	
PPE	DN 15	1	1075827	
SST	DN 15	1	1075846	
PPE	DN 20	1 1/4	1075833	
PVT	DN 20	1 1/4	1075845	
SST	DN 20	1 1/4	1075849	
PVT	DN 25	1 1/2	1075844	
PPE	DN 25	1 1/2	1075832	
SST	DN 25	1 1/2	1075848	









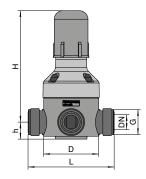
Materials used

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

^{*} Cover ring made from PTFE/FKM

All wetted materials in the "Physiologically safe (FDA) in respect of wetted materials" design comply with the following FDA guidelines:

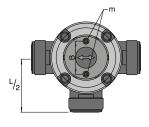
Material	Guideline
PTFE	21CFR177.1510
PVDF	21CFR177.2510
PP	21CFR177.1520
EPDM/FKM	21CFR177.2600



Dimensions of DHV-UR (FDA) (PP, PVC, PVDF design)

DN	G	H*	L	h	D	m	В
		mm	mm	mm	mm		mm
10	3/4	144	118	24	79	M6	35
15	1	144	118	24	79	M6	35
20	1 1/4	196	150	37	99	M6	46
25	1 1/2	196	150	37	99	M6	46

Approximate values

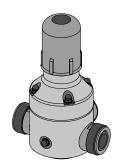


Dimensions of DHV-UR (FDA) (SS design)

DN	G	H*	L	h	D	m	В
		mm	mm	mm	mm		mm
10	3/4	144	118	24	79	M6	35
15	1	144	118	24	79	M6	35
20	1 1/4	196	150	37	99	M6	46
25	1 1/2	196	150	37	99	M6	46

^{*} Approximate values

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.



Relief valve type DHV-UR M configured for manometer

The relief valves DHV-UR with M designs are configured with a plug for manometer installation. Manometer with threaded socket G 1/4" (ISO 228) can be fitted by the customer directly to the relief valve via the additional housing opening. Standard manometers with part number are available for neutral media. This also enables savings in terms of installation.

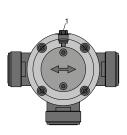
Adjustable pressure 0.5 - 10 bar

Application of PPE/PPB/PCE/PCB

20 $^{\circ}\text{C}$ - max. operating pressure 10 bar

Application of PVT/SST

30 °C - max. operating pressure 10 bar



Version	Nominal diameter	Dim. G	Order no.	
PPE	DN 10	3/4	1077221	
	-		-	
PPB	DN 10	3/4	1077259	
PCE	DN 10	3/4	1077255	
PVT	DN 10	3/4	1077267	
PCB	DN 10	3/4	1077263	
PPE	DN 15	1	1077220	
PPB	DN 15	1	1077258	
PCE	DN 15	1	1077254	
PCB	DN 15	1	1077262	
PVT	DN 15	1	1077266	
PPE	DN 20	1 1/4	1077219	
PCE	DN 20	1 1/4	1077223	
PCB	DN 20	1 1/4	1077261	
PVT	DN 20	1 1/4	1077265	
PPB	DN 20	1 1/4	1077257	
PPE	DN 25	1 1/2	1077218	
PPB	DN 25	1 1/2	1077256	
PCE	DN 25	1 1/2	1077222	
PCB	DN 25	1 1/2	1077260	
PVT	DN 25	1 1/2	1077264	

Materials used

Version	Housing/Connectors	Plungers	Plunger Seal	Seal/Connectors
PPE	PP	PVDF	EPDM	EPDM
PPB	PP	PVDF	FKM	FKM
PCE	PVC	PVDF	EPDM	EPDM
PVT	PVDF	PVDF	PTFE *	FKM
PCB	PVC	PVDF	FKM	FKM

L

mm

118

118

150

150

h

mm

24

24

37

37

D

mm

79

99

99

В

mm

35

35

46

46

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m

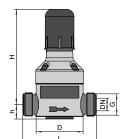
M6

M6

M6

M6

Cover ring made from PTFE/FKM



^{*} Approximate values

G

3/4

1 1/2

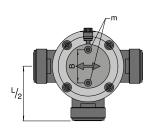
DN

10

15

20

25





Dimensions of DHV-UR M (PP, PVC, PVDF design)

Н*

144

144

196

196

Pipe spring manometer

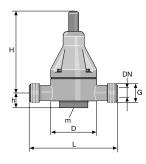
Pipe spring manometers in accordance with DIN EN 837-1 for neutral media for use with relief valves DHV-UR design M. When ordered, the manometer is supplied with the relief valve.

Nominal width63 mmDisplay range0 - 16 barHousing material1.4571Connector materialBrass

Connector Threaded assembly G 1/4" (ISO 228)

Connector positionRadial at bottomFilling liquidGlycerol

Pipe spring manometer 792726



Back Pressure Valve / Relief Valve Type DHV 712-R

Adjustable pressure 0.5 - 10 bar

Application of PPE/PCB

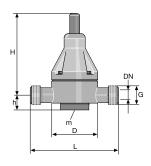
20 °C - max. operating pressure 10 bar

Application of PVT/TT/SS

30 °C - max. operating pressure 10 bar

Version	Nominal diameter	Dim. G	Order no.	
ТТ	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	

 $\textbf{Caution:} \ \ \textbf{The product contains adhesive joints with Tangit.} \ \ \textbf{Please note the resistance of Tangit adhesive.}$

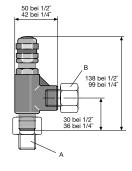


Dimensions of DHV 712-R

DN	G	Н	L	h	D	m	
		mm	mm	mm	mm		
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
П	Carbon-filled PTFE	PTFE	PTFE	PTFE



Low-pressure Metering Technology

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.	Spring counter pressure	Spring	Order no.	
	max.	colour		
bar	bar			
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.	Spring counter pressure max.	Spring colour	Order no.	
bar	bar			
3.4	24	blue	1005500	
24.0	50	yellow	1005501	
50.0	100	violet	1005502	

Reducing pipe nipple

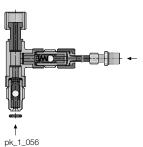
Connector size	Order no.
1/4" NPT internal – 1/4" NPT external (A)	359378
1/4" NPT external – 1/4 Rp internal (B)	359379
1/2" NPT internal - 1/2" NPT external (A)	1005503
1/2" NPT external – 1/2 Rp internal (B)	1005504

For use as an adjustable safety relief valve and as a back pressure valve. Relief valve and corresponding spring must be ordered separately



1.6.3.5

Flushing Assemblies and Overload Protection Assemblies for Low-Pressure Metering Pumps



Flushing Assembly

For flushing and cleaning dosing heads, metering lines and injection valves

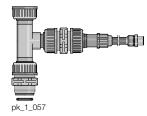
As a manual or automatic, time-controlled design. Installation, even retrospectively, on the suction connector of the metering pump. Supplied with 2 m flushing pipe and R 3/8 connection nipple.

Automatic flushing equipment for the fully automatic flushing of the pump head is possible on request.

PPE Flushing Assembly

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	



PCB Flushing Assembly

Material: PVC, FKM seal.

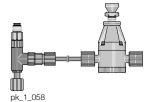
	Fig.	Order no.	
For 6/4, 8/5, 12/6, 12/9 connectors	pk_1_056	809925	
For G 3/4 -DN 10 connector	pk_1_057	809926	
For G 1 -DN 15 connector	pk_1_057	803960	

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.

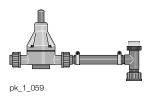
Connector size 6 - 12 mm, depending on the pressure connector on the metering pump.



PPE Relief Valve Assembly

Material: PP, EPDM seal.

	rig.	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	

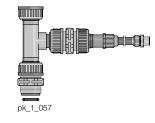


PCB Relief Valve Assembly

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.





Flushing Assemblies for Motor-Driven Metering Pumps

Flushing assemblies for flushing and cleaning liquid end, metering line and metering valve as well as for preventing deposits.

PPE Flushing Device

	Dim. G	Order no.	
DN 10	3/4	809917	
DN 15	1	809919	
DN 20	1 1/4	809921	
DN 25	1 1/2	809923	

PCB Flushing Assembly

	Dim. G	Order no.	
DN 10	3/4	809926	
DN 15	1	803960	
DN 20	1 1/4	803961	
DN 25	1 1/2	803962	
DN 40	2 1/4	803963	

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

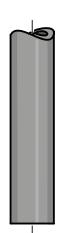
1.6.3.6

Hoses and Pipework for Low-Pressure Metering Pumps

For metering pumps and accessories



We recommend that only original lines are used so that the mechanical connection of the compression fitting and the pressure rating and chemical resistance can be ensured.



Soft PVC Suction Line

For metering pumps and accessories. We recommend that only original tubing is used so that the mechanical connection of the compression fitting and the pressure rating and chemical resistance are ensured.

Supply with food-use certification is available upon request.

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

Caution:

The resistance of soft PVC hoses is not identical to that of hard PVC. Please observe the resistance for soft PVC as well as the cleaning instructions when using the equipment for food applications (see homepage).





Soft PVC Suction and Discharge Line with Woven Fabric Core

Supply with food-use certification is available upon request.

117						
Material	Length	oØ x iØ	Descrip- tion	permitted operating pressure*	Order no.	
	m	mm		bar		
Soft PVC with	5	10 x 4		18	1004533	
woven inner	5	12 x 6		17	1004538	
layer	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

Caution:

The resistance of soft PVC hoses is not identical to that of hard PVC. Please observe the resistance for soft PVC as well as the cleaning instructions when using the equipment for food applications (see homepage).

For socket welded and PVC cemented rigid PP and PVDF pipe, pipes and fittings with a pressure rating of PN 16 or PN 10 bar are to be used.



1.6

Accessories for Low-Pressure Metering Pumps

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	5	10 x 4	10	1037556	
woven inner layer	5	12 x 6	10	1037561	
approved for food	10	10 x 4	10	1037557	
use	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%

Stainless Steel Pipes

Material	Length	oØ x iØ	permitted operating pressure*	Order no.	
	m	mm	bar		
Stainless steel pipe	Sold in metres	1.58 x 0.9	400	1020774	
1.4435	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

Hose Cutting Kit

Hose Cutting Set for Plastic Pipes up to a Diameter of 25 mm. Manufacturer: Gedore.

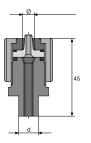
	Order no.		
Hose Cutting Kit	1038571		

1.6.3.7

Connectors, Fittings, Connector Kits, Seals

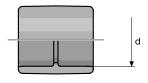
Hose adhesive nipple

With union nut to connect PVC, PE and PTFE hose to PVC fittings, for creation of own connection systems.



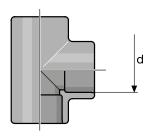
Material	PCB	PCE
PVC housing	PVC	PVC
Seals	FKM	EPDM

	Material	Dimen- sion d	Hose oØ x iØ	Order no.	
		mm	mm		
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	



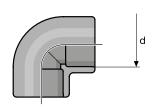
PVC straight solvent union

Description	Material	Dimension	Order no.		
		d			
		mm			
PVC straight solvent	PVC	12	DN 8	356608	
union	PVC	16	DN 10	356609	
	PVC	20	DN 15	356610	
	PVC	25	DN 20	356611	



	_		
PVC	1-1	O	nt

Description	Material	Dimension d	Order no.		
		mm			
PVC T-joint	PVC	12	DN 8	356406	
	PVC	16	DN 10	356407	
	PVC	20	DN 15	356408	
	PVC	25	DN 20	356409	

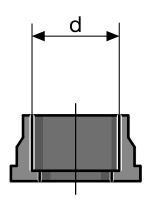


90° PVC elbow joint

Description	Material	Dimension d	Order no.		
		mm			
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



PVC insert (straight solvent union)						
Description	Material	Dimension	Order no.			
		d				
		mm				
PVC insert (straight	PVC	12	DN 8	356571		
solvent union)	PVC	16	DN 10	356572		
	PVC	20	DN 15	356573		
	PVC	25	DN 20	356574		
	PVC	32	DN 25	356575		
	PVC	40	DN 32	356576		
	P\/C	50	DN 40	356577		

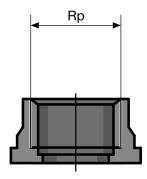
63

DN 50

Connector size

356578

Order no.

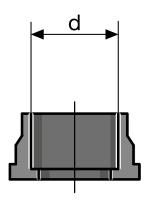


	Material	Connector size	Order no.
Union coupler, grooved *	PVC	d 16 – DN 10	1001784
	PVC	d 20 – DN 15	1001394
	PVC	d 25 – DN 20	1036257
	PVC	d 32 – DN 25	1001786
	PVC	d 40 – DN 32	1005104
	PVC	d 50 – DN 40	1025961
	PVC	d 63 – DN 50	1019206

Should be used in combination with ProMinent's PTFE shaped composite seals.

Material

	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



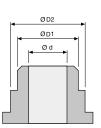
Inserts (welding sleeves)

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
Welding sleeve, grooved	PVDF	d 16 – DN 10	358803
	PVDF	d 20 – DN 15	358804
Welding sleeve	PVDF	d 25 – DN 20	358805
	PVDF	d 32 – DN 25	358806
Welding sleeve, grooved	PVDF	d 40 – DN 32	1003640
Welding sleeve	PVDF	d 50 – DN 40	358808
	PVDF	d 63 – DN 50	358809

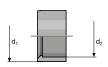
	Material	Connector size	Order no.
Welding sleeve, grooved *	PP	d 63 – DN 50	1019207
	PP	d 20 – DN 15	1001395
	PP	d 16 – DN 10	1001785
	PP	d 32 – DN 25	1001787
	PP	d 40 – DN 32	1005105
	PP	d 50 – DN 40	1025960
	PP	d 25 – DN 20	1036258
	PVDF	d 50 – DN 40	1025959
	PVDF	d 32 – DN 25	1001788
	PVDF	d 63 – DN 50	1019208
	PVDF	d 25 – DN 20	1036259

^{*} 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,	1.4404	15.0	19.5	d 12 – DN 10	1006011
grooved	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



PVC short reducing union

	Material	d1	d2	Order no.	
		mm	mm		
PVC short reducing	PVC	12	8	357025	
union	PVC	16	12	357026	
	PVC	20	16	357027	
	PVC	25	20	357028	



PVC hose connection nozzle

Description	Material	Dimension d	Order no.		
		mm			
PVC hose connec-	PVC	12	DN 8	356655	
tion nozzle	PVC	16	DN 10	356656	
	PVC	20	DN 15	356657	
	PVC	25	DN 20	356658	



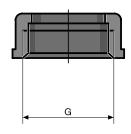
Pressure hose nozzles with seal

	Material	Connector size	Order no.	
Hose nozzle, grooved	PVDF	d 40 – DN 32	1005106	
Pressure hose nozzle	PVC	d 20 – DN 15	811407	
	PVC	d 16 – DN 10	800554	
	PVC	d 25 – DN 20	811408	
	PVC	d 32 – DN 25	811409	
	PTFE	d 16 – DN 10	811572	
	PTFE	d 20 – DN 15	811424	
	PP	d 32 – DN 25	811418	
	PP	d 20 – DN 15	800655	
	PP	d 25 – DN 20	800656	
	PP	d 16 – DN 10	800657	
	1.4571	d 25 – DN 20	810568	
	1.4571	d 40 – DN 32	1005360	
	1.4571	d 16 – DN 10	810536	
	1.4571	d 20 – DN 15	810567	
	1.4571	d 32 – DN 25	810569	

	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.





Union Nuts

	Material	Connector size	Order no.	
Union nut	PP	G 5/8 – DN 8	800665	
	PP	G 2 1/4 - DN 40	358618	
	PP	G 2 - DN 32	358617	
	PP	G 1 1/2 - DN 25	358616	
	PP	G 1 1/4 – DN 20	358615	
	PP	G 1 – DN 15	358614	
	PP	G 3/4 - DN 10	358613	
	1.4571	G 2 1/4 - DN 40	805275	
	1.4571	G 2 3/4 - DN 50	805276	

Single Connector Kit



Connection kit for fitting hoses of different sizes to the suction and pressure connector of the dosing head of alpha, beta, gamma, delta, Pneumados b and accessories, consisting of hose nozzle, clamp ring, union nut and seal for one or two connectors.

	Description	oØ x iØ	Order no.	
		mm		
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	

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	

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 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	

d D

Single adapter kit

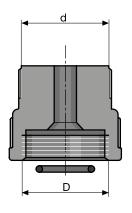
For mounting accessory parts of the A, B, C and E product ranges on the current M20 x 1.5 connectors.

Product Catalogue Volume 1

iviateriai	Size	internal tillead D	External tillead d	Order no.	
PP	6-8 mm connector	M20 x 1.5	G 1/4	811904	
PVC	6-8 mm connector	M20 x 1.5	G 1/4	811902	







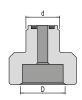
Single adapter kit

For mounting current accessories with M20 \times 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.



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	

External thread d

Order no.

Internal thread D

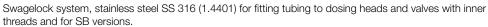
Stainless Steel Threaded Clip



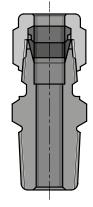
For connecting suction and dosing line with pressure hose sleeve.

	bandwidth	Clamping range	Order no.	
	mm	mm		
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	

Straight Male Adapter Stainless Steel



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

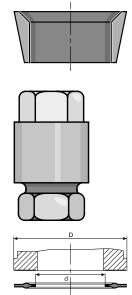




Stainless steel clamping ring sets

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

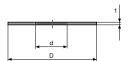
Serto system for connecting PE or PTFE discharge line to stainless steel pipe, made from stainless steel with clamping ring, but without support insert (parts in contact with chemicals stainless steel 1.4571).

	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	

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	Material	Dim. D	Dimension d	Order no.	
DIN / ANSI		mm	mm		
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	Dimension d	Dim. D	Order no.	
		mm	mm		
DN 10	(EPDM/FKM)	14.0	23.5	1024159	
DN 15	(EPDM/FKM)	18.0	29.5	1024160	
DN 20	(EPDM/FKM)	22.6	38.0	1036254	
DN 25	(EPDM/FKM)	28.0	44.0	1024161	
DN 32	(EPDM/FKM)	36.0	56.0	1024162	
DN 40	(EPDM/FKM)	41.0	62.0	1029508	

comprising two EPDM seals, physiologically safe (FDA). An elastomer flat seal must be used with smooth sealing surfaces. If a PTFE shaped composite seal is used, leakage may occur at the connection.

	Seal material	Dimension d	Dim. D	Order no.	
		mm	mm		
DN 10	EPDM	14.0	23.5	1045440	
DN 15	EPDM	18.0	29.5	1045441	
DN 25	EPDM	28.0	44.0	1045442	



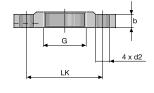
Flat seals for stainless steel liquid ends

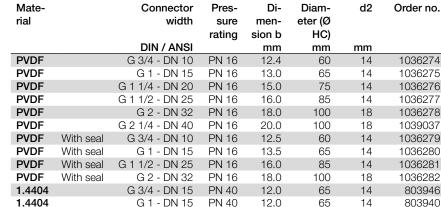
consisting of two PTFE flat seals Gylon Style 3504, physiologically safe (EU Regulation 1935/2004).

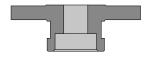
	Seal material	Dim. D	Dimen- sion d	Order no.	
		mm	mm		
DN 10	PTFE	23.8	14.0	1107282	
DN 15	PTFE	29.5	18.0	1107281	
DN 20	PTFE	38.0	22.6	1107299	
DN 25	PTFE	44.0	27.6	1107280	
DN 32	PTFE	56.0	34.6	1107300	
DN 40	PTFE	62.0	40.6	1107301	

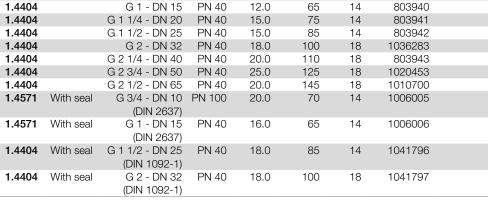
Flange Mountings

Flange connection for ProMinent valve sizes.

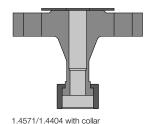






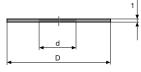


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Use flange mountings with a seal for pumps Sigma/ 1, Sigma/ 2 with DN 15 connector and Sigma/ 3 pumps with DN 25 connector. Sigma/ 3-DN 25 1" EN 1092-11.4404, order no. 1041796.

Further material versions and details available on request.



Flat Seals for Threaded Flange to DIN 2566

Material	Connector width	Dim. D	Dimension d	Order no.	
	DIN / ANSI	mm	mm		
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 mountings as DIN 2629. To order for Meta HK and Makro TZ HK plunger metering pumps.

FKM = Fluorine Rubber



1.6.3.8

Pulsation Damper / Diaphragm Accumulator for Low Pressure Metering Pumps

Pulsation dampers are available in different versions: as in-line dampers and as accumulators.

Pulsation dampers are used for low-pulsation metering and to reduce the flow resistance with long metering lines. They are also ideally suited to viscous media. The gas cushion between the housing and hose is compressed when the metering pump has a pressure stroke, at the same time as a partial volume of the medium is metered into the metering line. The overpressure that forms in the gas cushion causes the compressed volume to be transported on at the following suction stroke and the original, relaxed volume of gas is present



Important: Protect the pulsation dampers in principle with a relief valve.

PP In-Line Damper

Please note: Only use pulsation dampers in conjunction with an overflow device with adjustable back pressure / relief valve. With this: Dummy plugs to seal the output side of the damper in installations with a T-piece.

Application

5-30°C - max. operating pressure 10 bar

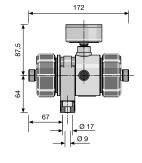
40 °C - max. operating pressure 8 bar

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	Tubular di- aphragms	Seal ma- terial	Connector size	Order no.	
	I					
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 I and 0.5 I), 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	

PVC In-Line Damper

Please note:Only use pulsation dampers in conjunction with an overflow device with adjustable back pressure / relief valve.

With this: Dummy plugs to seal the output side of the damper in installations with a T-piece.

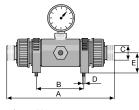
Application

5-20°C - max. operating pressure 10 bar

40 °C - max. operating pressure 6 bar

60 °C - max. operating pressure 2 bar

Removable hose, FKM seals.



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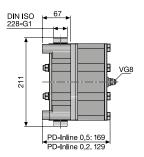
G2 D 11 99,5 Low-pressure Metering Technology

	Volume I	Tubular di- aphragms	Seal ma- terial	Connector size	Order no.	
PCE in-line damper	0.05	CSM	EPDM	M20 x 1.5	1026774	
PCB in-line damper	0.05	FKM A	FKM A	M20 x 1.5	1026777	
PCE in-line damper	0.05	CSM	EPDM	G 3/4 - DN 10	1026775	
PCB in-line damper	0.05	FKM A	FKM A	G 3/4 - DN 10	1026778	
PDS 2.5	2.50	Hypalon	FKM A	G 2 – DN 32	1001342	
PDS 2.5	2.50	FKM A	FKM A	G 2 – DN 32	1001343	

For other sizes (0.2 I and 0.5 I), see PVDF inline pulsation damper.

Blanking threaded connector PP

Material	Connector size	Order no.	
PVC	M20 x 1.5	1030458	
PVC	G 3/4 - DN 10	1001349	



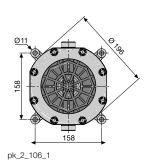
PVDF In-Line Pulsation Damper

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 pipe 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.

Important: The pulsation dampers should always be protected by a relief valve.

Туре	Volume	Max. pres- sure	Connector size	Order no.	
	I	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 0.6×10^{-5} x the operating pressure. Maximum medium temperature, $65 \, ^{\circ}$ C. Connection parts 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).

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

1027619

1027620

1027621

1027622

121

167

167

167

1.6 Accessories for Low-Pressure Metering Pumps

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

Stainless Steel Pulsation Damper

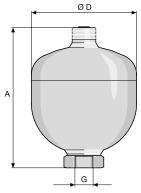
140

100

100

100

	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 com-	-	1036156	
pressed air system, 25 bar; 2.5 m			
Charging hose with connector for nitrogen	-	1036157	
bottle or pressure reducer		<u> </u>	



Admissible operating temperature: -10 to +80 °C

Response pressure: 2 bar (nitrogen).

Other accumulator/diaphragm materials available on request.

0.75

2.00

2.00

2.00

Volume	Max. pres- sure	Diaphragm material	Connec- tor G	Dim. A	ØD	Order no.	
	bar			mm	mm		
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	

Rp 1

Rp 1 1/2

Rp 1 1/2

Rp 1 1/2

168

224

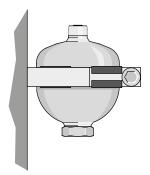
224

FKM A

NBR

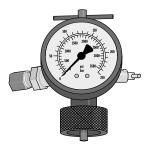
Butyl

FKM A



Mounting Clamp for Stainless Steel Pulsation Damper

Volume	Number of Clamps	Diameter Ø D	Order no.	
1		mm		
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:

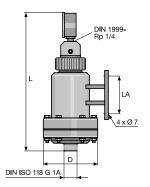
- Test and filling device with manometer, check valve on charging connector, in-built bleeder valve, valve stem for opening the gas charging valve on the reservoir
- Charging hose, length 2 m

Adjustment range	Order no.
Up to 25 bar	1008769
Up to 100 bar	1008669
Up to 250 bar	1008670



1.6.3.9

Accumulators



Pulsation dampers with separating diaphragm / bubble for providing separation between the gas cushion and metered chemical are used for low-pulsation metering as well as for reducing the flow resistance in long metering lines and with viscous media. The preload 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.

PVC Accumulators

Accumulator removable, FKM seals.

Application (0.5/1 I)

25 °C - max. operating pressure 10 bar

40 °C - max. operating pressure 6 bar

Application (2.5/5 I)

25 °C - max. operating pressure 6 bar

40 °C - max. operating pressure 4 bar

Volume	Dia- phragm material	Connector size	Dim. L	ØD	Dimen- sion LA	Order no.	
			mm	mm	mm		
0.5	Butyl	G 1 - DN 15	361	145	100	791691	
0.5	FKM A	G 1 - DN 15	361	145	100	791695	
1.0	Butyl	G 1 1/4 - DN 20	411	170	100	791692	
1.0	FKM A	G 1 1/4 - DN 20	411	170	100	791696	
2.5	Butyl	G 1 1/2 - DN 25	571	170	190	791693	
2.5	FKM A	G 1 1/2 - DN 25	571	170	190	791697	

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

PP Accumulators

Accumulator removable, FKM seals.

Application (0.5/1 I)

25 $^{\circ}\text{C}$ - max. operating pressure 10 bar

40 °C - max. operating pressure 6 bar

Application (2.5/5 I)

25 °C - max. operating pressure 6 bar

40 °C - max. operating pressure 4 bar

Volume	Dia- phragm material	Connector size	Dim. L	ØD	Dimen- sion LA	Order no.	
			mm	mm	mm		
1.0	Butyl	G 1 1/4 - DN 20	411	170	100	792129	
1.0	FKM A	G 1 1/4 - DN 20	411	170	100	792133	
2.5	Butyl	G 1 1/2 - DN 25	571	170	190	792130	
2.5	FKM A	G 1 1/2 - DN 25	571	170	190	792134	

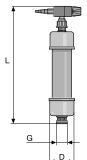


1.6.3.10

Vacuum Cylinder

Pulsation dampers with no diaphragm separating the gas cushion and the chemical are used to produce minimal pulsation metering and to reduce flow resistance in long pipes and when metering viscous liquids.

Important: When using accumulators or pulsation dampers it is imperative that a relief valve with an adjustable back pressure valve is fitted.



PVC Vacuum Cylinder

Vacuum cylinder as priming aid for long suction line and viscous media. Housing – with 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 ma- terial	Dim. L*	Dim. D	Order no.	
1			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.

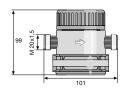


Vacuum Pump Assembly / Priming Aid

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.



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

Туре		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	

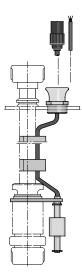
Connectors must be ordered separately.

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



1.6.3.11

Suction Lances, Suction Kit without Level Switch



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

The level switch 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	Order no.	
		m		
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	

Variable suction lance without level switch for 200-litre barrel

Variable suction lance without level switch for connection to 200 litre barrel, comprising a support pipe, foot valve, height-adjustable 2" screw plug (DIN S70x6) and 3 m long suction line. Length 1,000 mm.

Note: Adapters for other threads are available on request.

To fit metering pumps of the alpha and Pneumados product ranges.

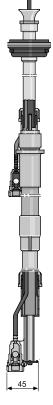
Material		PPE	PCB		
Support pipe and for	ot valve	PP	PVC		
Seals and valve ball		EPDM/ceramic	FKM/ce	eramic	
Hose		PE	Soft PV	C	
Material	Length	Hose	For tank	Order no.	
		oØ x iØ			
	mm	mm			
PPE	1,000	6 x 4	2001/2"	790545	
PPE	1,000	8 x 5	2001/2"	790546	
PPE	1,000	12 x 9	2001/2"	790547	
PCB	1,000	6 x 4	2001/2"	790542	
PCB	1,000	8 x 5	2001/2"	790543	
PCB	1,000	12 x 9	2001/2"	790544	

Variable suction assembly without level switch for PE 35 dosing tank up to 1,500 litres

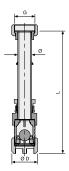
Variable suction assembly without level switch for connection to 35 - 1,500 litre storage tanks, comprising a support pipe, foot valve, threaded connector and 2 m suction line. Adjustable length.

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

To fit metering pumps of the alpha and Pneumados product ranges.



Material	PPE		PCB		
Support pipe and for	ot valve PP		PVC		
Seals and valve ball	EPD	M/ceramic	FKM/c	eramic	
Hose	PE		Soft P\	/C	
Material	Long sup- port pipe mm	Hose oØ x iØ mm	For tank	Order no.	
PPE	375 – 550	6 x 4	35, 60 l	790333	
PPE	375 – 550	8 x 5	35, 60 l	790334	
PPE	375 – 550	12 x 9	35, 60	790335	
PPE	655 - 1.060	6 x 4	100, 140, 250, 500 l	790336	
PPE	655 - 1.060	8 x 5	100, 140, 250, 500 l	790337	
PPE	655 - 1.060	12 x 9	100, 140, 250, 500 l	790338	
PPE	1.085 - 1.425	6 x 4	1000 I	790453	
PPE	1.085 - 1.425	8 x 5	1000 I	790454	
PPE	1.085 - 1.425	12 x 9	1000 l	790455	
PPE	fixed length	6 x 4	1500 l	1078653	
PPE	fixed length	8 x 5	1500 l	1078685	
PPE	fixed length	12 x 9	1500 l	1078687	
PCB	375 – 550	6 x 4	35, 60	790327	
PCB	375 – 550	8 x 5	35, 60 l	790328	
PCB	375 – 550	12 x 9	35, 60	790329	
PCB	655 - 1.060	6 x 4	100, 140, 250, 500 l	790330	
PCB	655 - 1.060	8 x 5	100, 140, 250, 500	790331	
PCB	655 - 1.060	12 x 9	100, 140, 250, 500 l	790332	
PCB	1.085 - 1.425	6 x 4	1000 l	790450	
PCB	1.085 - 1.425	8 x 5	1000 I	790451	
PCB	1.085 - 1.425	12 x 9	1000	790452	
PCB	fixed length	6 x 4	1500 l	1078652	
PCB	fixed length	8 x 5	1500	1078684	
PCB	fixed length	12 x 9	1500 I	1078686	



Suction assembly PPE for tanks up to 1,500 litres

Connec- tor size	Dim. G	Tank con- tents	Diameter Ø	Diameter Ø D	Dim. L	Order no.	
		l	mm	mm	mm		
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

Connec- tor size	Dim. G	Tank con- tents	Diameter Ø	Diameter Ø D	Dim. L	Order no.	
		I	mm	mm	mm		
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.



1.6.3.12

Suction Lances, Suction Assemblies with Two-Stage Level Switch



Variable suction lance with two-stage level switch

Variable suction lance with two-stage level switch for connection to 5 - 60 litre disposable tanks, comprising a support pipe, foot valve, level switch with round plug, height-adjustable Ø 50 mm screw cap and 2 m long suction line. Length 640 mm.

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

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

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

Support pipe and foot valve PP PVC Seals and valve ball EPDM FKM Hose PE Soft PVC Material Length Hose For tank Order no	
Hose PE Soft PVC Material Length Hose For tank Order no	
Material Length Hose For tank Order no	
9	
mm mm	
PPE 640 6 x 4 5–60 l / 50 mm 80227	
PPE 640 8 x 5 5–60 l / 50 mm 80227	
PPE 640 12 x 9 5–60 l / 50 mm 79037.	
PCB 640 6 x 4 5–60 1 / 50 mm 80207	
PCB 640 8 x 5 5–60 l / 50 mm 80207	
PCB 640 12 x 9 5-60 l / 50 mm 79037	

Variable suction lance with two-stage level switch for 200-litre barrel

Variable suction lance with 2-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 delta 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	Hose oØ x iØ	For tank	Order no.	
	mm	mm			
PPE	1,000	6 x 4	200 I	802279	
PPE	1,000	8 x 5	200 I	802280	
PPE	1,000	12 x 9	200 I	790374	
PCB	1,000	6 x 4	200 I	802079	
PCB	1,000	8 x 5	200 I	802080	
PCB	1,000	12 x 9	200 I	790373	





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

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

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

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

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

Material	Length	Hose oØ x iØ			
	mm	mm			
PPE	560	6 x 4	60 I / 55 mm	802285	
PPE	560	8 x 5	60 I / 55 mm	802286	
PPE	560	12 x 9	60 I / 55 mm	802287	
PCB	560	6 x 4	60 I / 55 mm	802081	
PCB	560	8 x 5	60 I / 55 mm	802082	
PCB	560	12 x 9	60 I / 55 mm	802083	

Suction lance with two-stage level switch

Fixed length suction lance made of PVDF with two-stage level switch, consisting of PVDF support pipe, foot valve, two-stage level switch with open end and PTFE suction line 8 x 6 mm.

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

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

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

Material	PVT
Support pipe and foot valve	PVDF
Seals and valve ball	PTFE
Hose	PTFF

Material	Length	Hose oØ x iØ	For tank	Order no.	
	mm	mm			
PVT	350	8 x 6	10–30 l	1038304	
PVT	650	8 x 6	50–60 I	1038305	







Suction lances with continuous level measurement

Suction lance with continuous level measurement for connection via the 3-pin level switch input to metering pumps of the gamma/ X and gamma/ XL product ranges. For precise consumption detection, prediction of chemical range and planning of subsequent deliveries web-based via DULCONNEX.

The scope of delivery includes a 3 m connecting cable with plug-in connectors for the suction lance and metering pump as well as a 3 m suction line

With adjustable screw cap 50 mm, length of suction lance to fit 30 I tank size.

Wetted materials PE, ceramic valve ball.

Material		PET					
Support pipe and foot valve		PE/PVDF	PE/PVDF				
Seals and valve	ball	PTFE/ceramic					
Hose		PE					
Material	Length	Hose	For tank	Order no.			
		oØ x iØ					
	mm	mm					
PET	480	6 x 4	30 I	1094379			
PET	480	8 x 5	30 I	1094382			
PET	480	12 x 9	30 I	1094380			

Suction assembly with two-stage level switch for PE 35 dosing tanks up to 1,500

Variable suction assembly with two-stage level switch for connection to 35 to 1,500 litre tanks, comprising a support pipe, foot valve, level switch with 3-pin round connector and 2 m long suction line, or 3 m for 1,000 litre tanks. Adjustable length.

PCB

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

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

Material

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

Support pipe and foot valve PP			PVC		
Seals and valve ball		DM FKM			
Hose	PE		Soft PV	C/C	
Material	Long sup-	Hose	For tank	Order no.	
	port pipe	oØ x iØ			
PPE	mm 075 550	mm	05.001	700005	
· · =	375 – 550	6 x 4	35, 60	790365	
PPE	375 – 550	8 x 5	35, 60	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 I	790466	
PPE	1.085 – 1.425	12 x 9	1000 I	790467	
PPE	fixed length	6 x 4	1500 I	1077558	
PPE	fixed length	8 x 5	1500 I	1077519	
PPE	fixed length	12 x 9	1500 I	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 I	790362	
PCB	655 - 1.060	8 x 5	100-500 I	790363	
PCB	655 - 1.060	12 x 9	100-500 I	790364	
PCB	1.085 - 1.425	6 x 4	1000 I	790462	
PCB	1.085 - 1.425	8 x 5	1000 I	790463	
PCB	1.085 - 1.425	12 x 9	1000 I	790464	
PCB	fixed length	6 x 4	1500 I	1077559	
PCB	fixed length	8 x 5	1500 I	1077520	
PCB	fixed length	12 x 9	1500 I	1077561	



pk_1_066

Screw Cap

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

		Older IIO.
Ø4	4 screw cap	811626

Order no

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 I and 20-60 I canisters: Ø 50 screw lid 200 I drum: 70x6 opening in plastic bung drum IBC container: DN150 IBC cap

Version	Dim. A	Dim. B	Di- men- sion 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

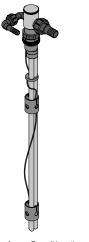
The universal suction lance is also available as a "Physiologically safe (FDA) in respect of wetted materials" design.

Version	Dim. A	Dim. B	Di- men- sion 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 *

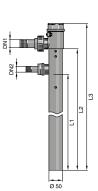
^{*} Replace the screw lid when using FDA containers.

Suction lance with two-stage level switch

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



- A Overall length
- B Immersion depth
- C Diameter of the immersion
- D Threaded connector adjust-
- Warning level adjustment range
- F Switch-off level adjustment range





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 I/600 I drum

Version	Suction connec- tor 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	

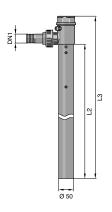
L1: Length up to return

L2: Length up to suction connector

L3: Overall length



Suction lance for 1,000 I container



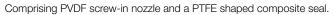
Version	Suction connec- tor DN 1	Return DN 2	Seals	L1	L2	L3	Order no.	
				mm	mm	mm		
PCB	10/15	10/15	FKM A	1,200	1,300	1,400	1037722	
PCE	10/15	10/15	EPDM	1,200	1,300	1,400	1037723	
PCB	20/25	20/25	FKM A	1,200	1,300	1,400	1037744	
PCE	20/25	20/25	EPDM	1,200	1,300	1,400	1037745	
PCB	32	-	FKM A	-	1,300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

L1: Length up to return

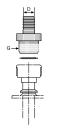
L2: Length up to suction connector

L3: Overall length

Intake Fitting - Hose Connection Kit



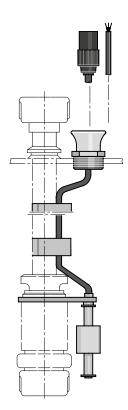
Suitable for PPE suction assembly for 1000 I tank



Connector size	Material	Dim. G	Diameter Ø D	Order no.	
DN 10	PVDF	3/4		1029486	
DN 15	PVDF	1	20	1029487	
DN 20	PVDF	1 1/4	25	1029488	
DN 25	PVDF	1 1/2	32	1029489	
DN 33	DVDE	2	40	1020400	

1.6.3.13

Level Switch, Ceramic Weight, Extension Cable



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

The level switch 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 $^{\circ}\text{C}$ to 65 $^{\circ}\text{C}$

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	Order no.	
		m		
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 storage tank with pre-warning alarm message and switch-off of the metering pump after a further 30 mm reduction in level.



With a 3-pin round connector for direct connection to metering pump or with 3 leads, e.g. in conjunction with relay control, order no. 914768.

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

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

Technical data

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

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

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

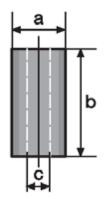
Material		Lead length	Order no.	
PVDF/PE	Round plug	2 m	1031604	
PVDF/PE	Round plug	5 m	1031606	
PVDF/PE	Open end	2 m	1031607	
PVDF/PE	Open end	5 m	1031609	
PVDF/PVDF	Round plug	2 m	1034697	
PVDF/PVDF	Round plug	5 m	1034698	
PVDF/PVDF	Open end	2 m	1034699	
PVDF/PVDF	Open end	5 m	1034700	

Cable assignment on 3-wire cable:

Colour	Function
black	Ground

blueMinimum pre-warningbrownMinimum limit stop

Ceramic Weight for Vertical Fixing of Float Switch

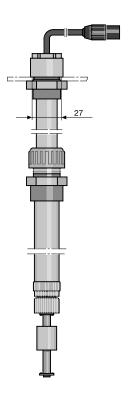


	Ø A E	Dim. B	ØС	Weight	Version	Order no.	
	mm	mm	mm	g			
Size 1	25	50	10	60	For round and latch plug	1019244	
Size 2	39	32	-	65	For round plug/flat connector	404004	
Size 3	40	50	24	70	For round plug/flat connector	1030189	

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.





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

PCB Support pipe PVC FKM Seals Level switch **PVDF** Cable PΕ

Material	Long support pipe	Float switch	Order no.	
	mm			
PCB	350550	two-stage with round	802010	
		connector		
PCB	6601,160	two-stage with round	802011	
		connector		
PCB	350550	single-stage with flat plug	801727	
PCB	6601,160	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.

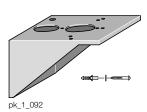
Orde	
Extension cable, 3-pin, 3 m length 1008	5559

Low-pressure Metering Technology

1.6.3.14

Wall Brackets for Metering Pumps

PPE Wall Mounting Bracket



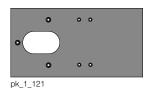
Wall bracket made of fibreglass-reinforced PPE to hold metering pumps, including attachment fittings. Dimensions (L x W x H): 208 x 120 x 140 mm.

To fit all metering pumps of the alpha, beta and gamma/ X product ranges.

The metering pumps of the beta/ 4 and gamma/ X product ranges can either be mounted parallel or cross-wise to each other.

	Fig.	Order no.	
for BT4, BT5, gamma/ X	pk_1_092	810164	

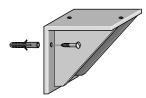
PP Adapter Plate



With fixing materials for vertical wall-mounting of Beta® or gamma pumps with self-degassing liquid ends. Used with PPE wall bracket.

	Fig.	Oraer no.	
for BT4, BT5, gamma/ X	pk_1_121	1003030	

PP Wall Bracket

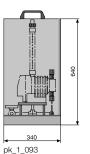


PP wall mounting, holds pump parallel to the wall, includes fixings.

Measurements: L x W x H, 230 x 220 x 220 mm

	Order no.
gamma/ XL, DFXa, VARIO and Sigma	1001906

Portable Plastic Pump Stand



To accommodate a metering pump of the product range beta or gamma/ X. The pump stand can either be designed in PP or black PE. It is prepared for accommodating a fixed pipe and has collector equipment for escaping feed chemical, e.g. in the event of a leakage on the suction line or a rupture of the diaphragm.

Supplied with carrying handle, but without pump and pipework

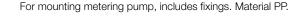
	rig.	Order no.	
Light grey PP	pk_1_093	1000180	
Black PE	pk_1_093	1000181	

PVC Right-Angled Threaded Connector

For mounting multifunctional valve onto Beta® or gamma/ L models, self-degassing liquid end version.

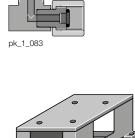
Description	Material	Fig.	Order no.
PCE Version	PVC/EPDM	pk_1_083	1003472
PCB Version	PC/FKM	pk_1_083	1003318

PP Foot Bracket



Measurements: LxWxH 250x160x150mm

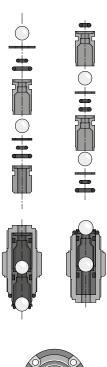
	Order no.
PP foot brackets	809910

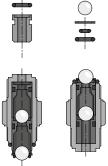




1.6.4 Mechanical/hydraulic special accessories

1.6.4.1 Spare Parts Kits







Spare Parts Kits for Solenoid-Driven Metering Pump beta a and gamma/ L

Spare parts kits for beta a and gamma/ L, consisting of:

- 1 metering diaphragm
- 1 suction valve assembly
- 1 discharge valve assembly
- 2 valve balls

Type selection

1 connector kit

Stainless steel design without suction valve assembly and without discharge valve assembly

Materials in Contact with the

Medium

Order no.

	iviedium	
1000	SST	1001729
	PPE	1001644
	PPB	1001652
	NPE	1001713
	NPB	1001721
	NPT, PPT, PVT	1023107
	ПТ	1001737
1601	SST	1001730
	PPE	1001645
	PPB	1001653
	NPE	1001714
	NPB	1001722
	NPT, PPT, PVT	1023108
	TTT	1001738
	NPE9	1001660
	PPB9	1001762
	PPE9	1001756
	NPB9	1001666
1602	SST	1001731
	PPE	1001646
	PPB	1001654
	NPE	1001715
	NPB	1001723
	NPT, PPT, PVT	1023109
	Íπ	1001739
	NPB9	1001667
	NPE9	1001661
	PPE9	1001757
	PPB9	1001763
1005, 1605	SST	1001732
	PPE	1001647
	PPB	1001655
	NPE	1001716
	NPB	1001724
	NPT, PPT, PVT	1023110
	TTT	1001740
	PVT4	1019066
	NPB9	1001668
	NPE9	1001662
	PPB9	1001764
	PPE9	1001758
0708, 1008	SST	1001733
	PPE	1001648
	PPB	1001656
	NPE	1001717
	NPB	1001725
	NPT, PPT, PVT	1023111
	TTT	1001741
	PVT4	1019067
	NPB9	1001669
	NPE9	1001663
	PPB9	1001765

Type selection	Materials in Contact with the	Order no.
	Medium	
	PPE9	1001759
0413, 0713	PPE	1001649
	PPB	1001657
	NPE	1001718
	NPB	1001726
	NPB9	1001670
	NPE9	1001664
	PPB9	1001766
	PPE9	1001760
0220, 0420	SST	1001735
	PPE	1001650
	PPB	1001658
	NPE	1001719
	NPB	1001727
	NPT, PPT, PVT	1023113
	П	1001754
	PVT4	1019070
	NPB9	1001671
	NPE9	1001665
	PPB9	1001767
	PPE9	1001761
0232	SST	1001736
	PPE	1001651
	PPB	1001659
	NPE	1001720
	NPB	1001728
	NPT, PPT, PVT	1023124
	ПТ	1001755

Spare Parts Kits for Solenoid-Driven Metering Pump beta a and gamma/ L with Self-bleeding Dosing Head with Bypass (SEK)

Spare parts kits for beta a and gamma/ L with self-bleeding dosing head, consisting of:

- 1 metering diaphragm
- 1 suction valve complete
- 1 discharge valve complete
- 1 bleed valve complete
- 2 valve balls
- 1 connector kit

Type selection	Materials in Contact with the	Order no.	
	Medium		
1601	PPE9	1001756	
	PPB9	1001762	
	NPE9	1001660	
	NPB9	1001666	
1602	PPE9	1001757	
	PPB9	1001763	
	NPE9	1001661	
	NPB9	1001667	
1005, 1605	PPE9	1001758	
	PPB9	1001764	
	NPE9	1001662	
	NPB9	1001668	
0708, 1008	PPE9	1001759	
	PPB9	1001765	
	NPE9	1001663	
	NPB9	1001669	
0413, 0713	PPE9	1001760	
	PPB9	1001766	
	NPE9	1001664	
	NPB9	1001670	
0220, 0420	PPE9	1001761	
	PPB9	1001767	
	NPE9	1001665	
	NPB9	1001671	

1.6.4.2 Pump Diaphragms

Spare diaphragms for solenoid-driven metering pumps beta a and gamma/ L

Type selection	Materials in Contact with the Medium	Туре
Type 1000	all materials	1000244
Type 1601	all materials	1000245
Type 1602	all materials	1000246
Type 1005 and Type 1605	all materials	1000247
Type 0708 and type 1008	all materials	1000248
Type 0413 and type 0713	all materials	1000249
Type 0220 and type 0420	all materials	1000250
Type 0232	all materials	1000251



1.6

Accessories for Low-Pressure Metering Pumps

1.6.4.3

Custom Valve Balls/Valve Springs

For on-site retrofitting of metering pumps and accessories, for applications where standard materials are unsuitable. Supplied loose only, not fitted.

Valve balls





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	4.7	for valve Ø 6 mm	404233
1.4404			
stainless steel	9.5	for valve Ø 8 and 12 mm	404240
1.4404			
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



Material	Priming	Description	Order no.
	pressure bar		
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





Valve springs for injection valves

Approx. 0.5/1/2 bar prepressure for increasing metering accuracy and preventing suction and siphoning effect.

Material	Priming pressure	Description	Order no.
Hast. C	0.5	for DN 20	469409
Hast. C	1.0	for DN 20	469135
Hast. C	0.5	for DN 25	469414
Hast. C	1.0	for DN 25	469136
Hast. C	0.5	for DN 40	469104
Hast. C	0.5	for DN 32	1002799
Hast. C	1.0	for DN 32	1002805
1.4568	0.5	for DN 10	1079882
1.4568	0.5	for DN 15	1079883
1.4568	0.5	for DN 20	1079894
1.4568	0.5	for DN 25	1079895
1.4568	1.5	for DN 25	1080071
1.4568	2.0	for DN 25	1080070

Valve spring made of Hastelloy C with FEP coating

The FEP-coated Hastelloy C valve spring is ideal for use with chemically aggressive products.

	-		
Material	Priming	Description	Order no.
	pressure		
	bar		
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

1.6.4.4 Adapter (complete) from M20 x 1.5 to G3/4 DN10

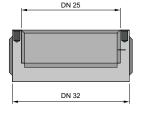
Consisting of an adapter and a PTFE, EPDM/P, FPM-A flat seal and PTFE shaped composite seal.

Suitable for connection of the flow meter DULCOFLOW to a Sigma/ 1.

	Material	Order no.	
Adapter (complete) from M20 x 1.5 to G3/4 DN10	PVT	1028409	

1.6.4.5 Valve adapter DN 32 - DN 25

Suitable for the liquid end of the Sigma/ 3 metering pump FM 1000 up to 600 l/h.

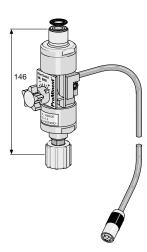


	Material version	Material	Order no.	
Valve adapter DN 32 - DN 25	SST	1.4404	1035729	
Valve adapter DN 32 - DN 25	PVT	PVDF	1035732	
Valve adapter DN 32 - DN 25	П	PTFE	1040414	



1.6.5 Electrical Accessories

1.6.5.1 Metering Monitor, Signal Cable



Flow Control Dosing Monitor for Discharge Side Installation

Metering monitor complete with connector cable for assembly directly on the dosing head to monitor individual strokes 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 versions.

Important: It is essential that you observe the minimum values for the stroke length. The design of the pressure stroke must be set to "fast".

Materials

Housing:PVDFFloat:PTFE-coatedSeals: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	

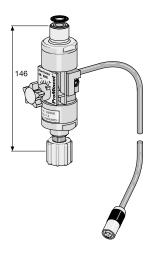
Pump type	Mean operating pressure	Stroke length (scale division)	Maximum permissible operating pressure	Stroke length (scale division)
1602	8 bar	> 50 %	16 bar	> 60 %
1604	5 bar	> 30 %	16 bar	> 50 %
0708	4 bar	> 30 %	7 bar	> 40 %
1009	5 bar	> 30 %	10 bar	> 40 %
0414	2 bar	> 30 %	4 bar	> 30 %
0715	4 bar	> 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



Metering monitor Flow Control set up for motor-driven metering pumps

Suitable for GXLa 0450/0280 pumps and the Sigma 1/2/3 product range 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 Control (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

Meas- For pump type Material Nominal Order no. ured diameter

Size III	Sigma/ 1, GXLa 0450 - GXLa 0280	PVDF/EPDM	DN 10	1021168	
	Sigma/ 1, GXLa 0450 - GXLa 0280	PVDF/FKM	DN 10	1021169	
	Sigma/1/2	PVDF/EPDM	DN 15	1021170	
	Sigma/1/2	PVDF/FKM	DN 15	1021171	
Size IV	Sigma/2/3	PVDF/EPDM	DN 25	1021164	
	Sigma/2/3	PVDF/FKM	DN 25	1021165	
Size V	Sigma/ 3	PVDF/EPDM	DN 32	1021166	
	Sigma/ 3	PVDF/FKM	DN 32	1021167	



Universal Signal Cable

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	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	

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	Oraer 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

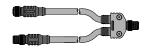
Control cable and round plug for configurable inputs and outputs for controlling the process timer or for additional alarm messages.

Suitable for metering pumps of the gamma/ XL and DFXa product ranges.

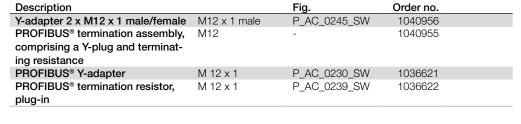


	Lead length	Order no.	
Control cable for configurable inputs and outputs	2 m	1094091	
Control cable for configurable inputs and outputs	5 m	1094093	
Control cable for configurable inputs and outputs	10 m	1094092	

PROFIBUS® Adapter, Enclosure Rating IP 65



P_AC_0245_SW



P_AC_0230_SW

P_AC_0239_SW

Cabling accessories for CAN pumps

This BUS accessory can be used for all CAN pumps and Modbus pumps. Modbus and CAN are physically compatible.

	Order no.
T-distributor M12 5 pole CAN	1022155
Termination resistor M12 coupling	1022154
Termination resistor M12 plug	1022592
Connecting cable - CAN M12 5 pole 0.3 m	1024568
Connecting cable - CAN M12 5-pole 0.5 m	1022137
Connecting cable - CAN M12 5-pole 1 m	1022139
Connecting cable - CAN M12 5-pole 2 m	1022140
Connecting cable - CAN M12 5-pole 5 m	1022141
Connecting cable - CAN M12 5-pin. 10 m	1046383
Connecting cable - CAN M12 5-pole 25 m	1055588
Connecting cable - CAN M12 5-pole 50 m	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
Coupling-CAN M12 5-pole screw terminal *	1113889



Reed cable with 3-pin round plug, PE

Round plug coupling for M12

open end

For Sigma metering pumps with 3-pin round plugs and a 3-core cable with an open end for level control.

Suitable for suction lance for motor-driven metering pumps \rightarrow 214



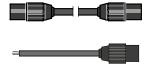
Lead length	Order no.
m	
2	1030334
3	1030335
5	1030336

Level sensor cable for connecting universal suction lance and motor-driven metering pump

For connection of the level switch of the universal suction lance for Sigma metering pumps or the higher-level control system (e.g. PLS).

P_AC_0243_SW

1022537

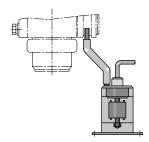


Suitable for PPE universal suction lance for motor-driven metering pumps → 214					
	Lead length Fig.				
	m				
Round plug coupling for M12 3-pin round plug	2	pk_1_126	1040962		
Round plug coupling for M12 3-pin round plug	5	pk_1_126	1040963		
Round plug coupling for M12 open end	1.1	P_AC_0243_SW	1009873		

P_AC_0243_SW

1.6.5.2

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 storage tank, connecting sockets and connecting hose. Potential-free N/O switch, max. contact load 60 V AC, 300 mA, 18 W.

Fits all types of beta and gamma/ L, Meta, Makro TZ and Makro/5

Retrofitting is also possible

	Order no.	
Diaphragm rupture indicator beta, gamma/ L, Meta, Makro TZ	803640	
Diaphragm rupture indicator Makro/ 5	1019528	

Diaphragm rupture indicator with optical sensor

To trigger an alarm and switch off the metering pump in the event of diaphragm rupture. Consisting of an optical sensor, which defines the changes to the refractive index when wetted with liquid. With connecting cable for connection to the pump.

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	1044477	
gamma/ X and gamma/ XL product ranges and DFXa		

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)

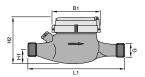
	Order no.		
Indicator lamp, red	914780		



1.6.6

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.

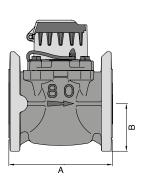
Horizontal fitting position, laterally tilted up to 90° and vertically rising and falling. With reed switch and 2 m cable with injection-moulded round coupling for direct connection to the external contact input of the metering pump.

Pulse weight: 1/l

Fits product ranges beta, gamma, delta and Sigma control.

Threaded con- nector width	Connector thread	Continuous flow Q3	Overload flow Q4	Minimum flow Q1	Installed length L1	Weight	Order no.	
		m³/h	m³/h	l/h	mm	kg		
R 3/4 - DN 20	1	4	5	50	190	1.3	1093919	
R 1 - DN 25	1 1/4	10	12.5	125	260	2.1	1093921	
R 1 1/2 - DN 40	2	16	20	200	300	4.0	1093922	
R 2 - DN 50	2 1/2	25	31	310	300	4.0	1093923	

Woltmann hybrid counter for cold water



Max. water temperature 50°C, ambient temperature -25°C to +55°C, battery life 15 years, degree of protection IP 68

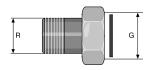
- Large measuring range
- Installation in every fitting position
- No calming sections needed
- Electronic counter with flow display
- Two electronic pulse outputs
- Issue of consumption and service data via M-bus

Performance data

Overload flow	200 m ³ /h
Continuous flow	160 m³/h
Transition flow	0.2 m ³ /h
Minimum flow	0.13 m ³ /h
Start-up value	0.05 m ³ /h
Pressure lose at Q ₃	0.3 - 0.4 bar
Channel 3	Direction flag
Max. contact loading	30 V DC, 30 mA

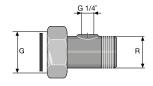
		maxi coma	rt iodding	O	0 1 00, 00 111	,			
Nominal diameter	Construc- tion length WS form	Flange Ø	Weight	Pulse weight channel 1	Pulse weight channel 2	Pulse width channel 1	Pulse width channel 2	Order no.	
mm		mm	kg	l/pulse	l/pulse	ms	ms		
DN 80	300	201	16.0	1	100	5	100	1078183	
DN 100	360	228	21.3	1	100	5	100	1078184	
DI 1 100	300	220	21.0		100	J	100	1010104	

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.



Low-pressure Metering Technology

Accessories for Low-Pressure Metering Pumps 1.6

		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

For use with threaded connectors on water meters

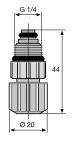
Short design for R 3/4 and R 1 threaded connectors, long design for R $1\ 1/2$ and R 2 threaded connectors

Connection size	Material	oØ x iØ	Fig.	Order no.	
		mm			
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	

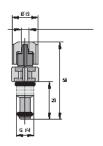


25 °C - max. operating pressure 16 bar

45 °C – max. operating pressure 9 bar



P_AC_0008_SW



P_AC_0009_SW

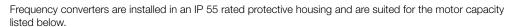
1.6.7

4.00

MF3a, MF4a

Speed Controllers

Frequency Converters for Speed Control



Integrated control unit with many different functions, which are perfectly tailored to the ProMinent metering pumps: Switchover between external/internal control, internal/external reset, temperature monitoring and control by means of a PTC sensor, motor-external fan control and evaluation of diaphragm rupture control.



External control: 0/4-20 mA corresponding to 0-50 (60) Hz output frequency

Frequency converters can be used in the range of -10 $^{\circ}\text{C}$ to 40 $^{\circ}\text{C}$.

Management	F	Wallana and a	Wallana anna la	Occident	Outro	
Max. motor output _kW	For pump type	Voltage supply	Voltage supply, external fan	Control range	Order no.	
0.37	Sigma/ 1, Sigma/ 2, Meta, HYDRO HP2a, MF1a, DR15	1 ph 200 – 240 V	230 V 50/60 Hz	1:10	1030684	
0.75	Sigma/ 3, HYDRO HP3a, MF2a	1 ph 200 – 240 V	230 V 50/60 Hz	1:10	1030685	
1.50	Makro TZ, MF2a, MF3a, DR150	1 ph 200 – 240 V	230 V 50/60 Hz	1:10	1030686	
2 20	Makro TZ ME3a DR150	1 ph 200 – 240 V	230 V 50/60 Hz	1.10	1030687	

3 ph 380 - 500 V

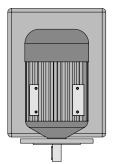
Dimensions and weight

Dim. B	H dimension	Dimension C	Weight	Order no.	
mm	mm	mm	kg		
210	240	163	6.3	1030684	
210	240	163	6.3	1030685	
215	297	192	8.8	1030686	
230	340	222	10.7	1030687	
230	340	222	10.7	1030688	

3-phase 380 V

1030688

Explosion-protected compact drive with integrated frequency converter Protection class II 2G Eexde II C T4



Power supply: 400 V, 50/60 Hz

Mains feed: 3-phase + neutral + earth

Mounting: IM B5

Inputs: 2 x analogue 4...20 mA

4 x digital (includes frequency input 0...100 kHz)

Outputs: 2 x analogue 4...20 mA

4 x digital 0/+20 V, 10 mA

1 x frequency output 0...10 kHz, 0/18...24 V, max. 5 mA

Terminal strip connectors: ON/OFF

Self-locking RESET

Winding and temperature monitoring by PTC resistor with integral evaluation.

External control circuit: 230 V with internal fuse.

Note: These drives can only be ordered after consultation.



Max. motor output kW	For pump	Control range	Flange Ø	Order no.	
0.55	HYDRO HP2a, Sigma/ 3, ORLITA MF	1:10	80	1024392	
0.75	HYDRO HP3a, ORLITA MF	1:10	80	1114531	
1.50	MAKRO TZ, ORLITA MF	1:10	200	1024188	
2.20	MAKRO TZ, ORLITA MF	1:10	200	1024190	
4.00	MAKRO 5, ORLITA MF	1:10	250	1115008	

Pumps with compact drive are always delivered on a frame.

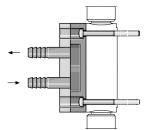
Motor data sheets can be requested for more information.

Special motors or special motor flanges and other control ranges are available on request.

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



1.6.8 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).

cooling/neating medium Ø 10 mm, complete with fixing bolts. Dimensions in mm, outer diamet circle diameter (Ø HC).

Temperature -10...80 °C

Temperature -1080 °C				
For pump	ØA	Ø HC	Order no.	
	mm	mm		
HYDRO HP2a/3 FMH	-	-	1024743	
025/060				
HYDRO HP3a FMH 150	-	-	1040112	
HYDRO HP4a FMH 400	-	-	1047700	
META, MAKRO TZ FM	145	127	803751	
130, FM 260				
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	

1.6.9

Fittings and Attachments for Dosing Tanks

1.6.9.1

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 I



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 storage tanks
- Safe storage: A screw cover closes safely (push-on lid for 35-litre storage tank)
- Flat sides to secure the storage tank.
- Standard colours: natural, black, blue, yellow and red.

Natural coloured/transparent PE metering tank

Threaded bush for the dosing pumps	Usable capacity	Dim. D	H dimen- sion	Weight	Order no.	
	<u> </u>	mm	mm	kg		
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	1,000	1,070	1,260	51.0	1010909	
2 x gamma/ X, 2 x Sigma/ 1, 2, 3, 2 x gamma/ XL, 2 x beta	1,500	1,150	1,735	80.0	1060975	



Natural coloured/transparent PE metering tank

Designed for the installation of a manually operated or electric stirrer.

Usable capacity I	with an opening for	Order no.	
60	manually operated stirrer	792104	
60	electric stirrer	792105	
100	manually operated stirrer	1002034	
100	electric stirrer	1002033	
140	manually operated stirrer	792106	
140	electric stirrer	792107	
250	manually operated stirrer	792108	
250	electric stirrer	792109	
500	manually operated stirrer	792110	
500	electric stirrer	792111	
1,000	manually operated stirrer	1010910	
1,000	electric stirrer	1010911	

The 35 - 1,000-litre storage tank have an R 3/4" threaded sleeve (1,500 I: R 1 1/4") for drainage that can be drilled to \emptyset 10 mm on site if required. A PE R 3/4" sealing stopper (1,500 I: R 1 1/4") with a seal is screwed in.

Dosing tanks without ProMinent logo are available on request.





Black PE metering tank

For light sensitive media.

Usable capacity	Order no.
1	
35	791998
60	791999
100	1001322
140	792000
250	1023176
500	792002
1,000	1010912
1,500	1060976

Blue PE metering tank

Usable capacity I	Order no.
35	1003812
60	1003813
100	1003814
140	1003815
250	1023177
500	1003817
1,000	1010913
1,500	1060977

Yellow PE metering tank

Usable capacity	Order no.
1	
35	1003818
60	1003819
100	1003820
140	1003821
250	1023178
500	1003823
1,000	1010914
1,500	1060978

Red PE metering tank

Usable capacity I	Order no.
35	1003824
60	1003825
100	1003826
140	1003827
250	1023179
500	1003829
1,000	1010915
1,500	1060979



Low-pressure Metering Technology

1.6 Accessories for Low-Pressure Metering Pumps

Natural/transparent PE dosing tank with flat mounting surface

Threaded bush for the dosing pumps	Dim. D	H dimen- sion	Usable capacity	Weight	Order no.	
	mm	mm	I	kg		
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	



Your benefits

- "Natural/transparent PE dosing tank" design without sintered threaded socket
- Level mounting surface for the installation of metering pumps on the storage tank
- Additional installation of a manual or electric stirrer is possible

1.6.9.2

PE Stackable Collecting Pans For Metering Tanks

Made of UV-stabilised polyethylene in a stackable design with ProMinent logo. 2 flat sides for fixing the collecting pan.

PE colourless/transparent stackable collecting pans

Usable capacity	D1	D2	H dimen- sion	Weight	Order no.	
1	mm	mm	mm	kg		
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	1,009	1,155	670	16.0	1010884	



Black PE Collecting Pan

Usable capacity	D1	D2	H dimen- sion	Weight	Order no.	
1	mm	mm	mm	kg		
35	507	565	220	3.0	1010885	
60	607	680	270	4.3	1010886	
100	727	802	320	6.5	1010887	
140	727	811	370	7.0	1010888	
250	807	917	520	11.0	1010889	
500	1,009	1,155	670	16.0	1010890	

PE blue stackable collecting pans

Usable capacity	D1	D2	H dimen-	Weight	Order no.	
			sion			
1	mm	mm	mm	kg		
35	507	565	220	3.0	1010891	
60	607	680	270	4.3	1010892	
100	727	802	320	6.5	1010893	
140	727	811	370	7.0	1010894	
250	807	917	520	11.0	1010895	
500	1,009	1,155	670	16.0	1010896	

PE yellow stackable collecting pans

Usable capacity	D1	D2	H dimen-	Weight	Order no.	
			sion			
1	mm	mm	mm	kg		
35	507	565	220	3.0	1010897	
60	607	680	270	4.3	1010898	
100	727	802	320	6.5	1010899	
140	727	811	370	7.0	1010900	
250	807	917	520	11.0	1010901	
500	1,009	1,155	670	16.0	1010902	

PE red stackable collecting pans

Usable capacity	D1	D2	H dimen-	Weight	Order no.	
			sion			
1	mm	mm	mm	kg		
35	507	565	220	3.0	1010903	
60	607	680	270	4.3	1010904	
100	727	802	320	6.5	1010905	
140	727	811	370	7.0	1010906	
250	807	917	520	11.0	1010907	
500	1,009	1,155	670	16.0	1010908	

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).

D1 D2

Natural PE Collecting Pan

Usable capacity	D1	D2	H dimen- sion	Weight	Order no.	
1	mm	mm	mm	kg		
1,000	1,200	1,280	980	34.0	740719	
1,500	1,350	1,410	1,280	42.0	1060980	

PE black stackable collecting pans

Usable capacity	D1	D2	H dimen- sion	Weight	Order no.	
I	mm	mm	mm	kg		
1,000	1,200	1,280	980	34.0	740726	
1,500	1,350	1,410	1,280	42.0	1060981	

1.6.9.3	Spare Parts	
		Order no.
	Push cap for 35 I 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



ow-pressure Metering Technology

1.6 Accessories for Low-Pressure Metering Pumps

1.6.9

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, suction assemblies without level switches, see page
- Suction lances, suction assemblies with level switches, see page

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

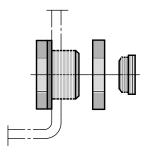
Please refer to the following table for the order numbers for the mounting plates.

Dosing tank

	Dooming turn	•					
Metering pumps	35 I	60 I	100 l	140 I	250 I	500 I	1000 l/1500 l
alpha	790850	790850	X	X	X	2 x 790850	2 x 790850
beta, gamma/ X	801575	х	X	Х	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/	-	801583	801583	801583	801583	2 x 801583	2 x 801583
3 x beta or 3 x gamma/	-	-	801580	801580	801580	2 x 801580	2 x 801580

- \mathbf{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



- R 1/2" as additional connecting option for PE 35 1000 I dosing tank
 R 3/4" as additional connecting option for PE 35 1000 I dosing tank
 809756
- \mathbf{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	809714	
direct connection to the threaded connector on the tank.		

PVC discharge tap

	Order no.	
For metering tanks with d 16, Ø 16 mm hose nozzle and 3/4" nipple for	809745	
direct connection to the threaded connector on the tank.		



Screw cap lock

	Order 110.	
Lock with key for screw cap	200683	

Stirrers

21 mm

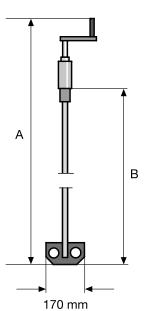
PP Hand mixer

Fully assembled.

	Dim. A	Diameter Ø	Order no.	
	mm	mm		
Hand mixer made from PP for 35 and 60 I tanks	515	90	741118	
Hand mixer made from PP for 100 and 140 I tanks	715	90	741119	
Hand mixer made from PP for 250 and 500 I tanks	1,040	130	741120	

PP Hand stirrer

With crank, fully assembled



	Dim. A	Dim. B	Order no.	
	mm	mm		
For 60 I tanks	670	465	914701	
For 100 I tanks	855	650	914738	
For 140 I tanks	965	765	914702	
For 250 and 500 I tanks	1,175	965	914703	
For 1000 I tanks	1 240	1 040	01/1705	





Timer with digital clock

	Order no.
In plastic housing for the control of a stirrer or a metering pump, 230 V,	1005561
50 Hz, max. 6A, IP 65. Day and week programs, shortest switching time	
1 min. with 2 m power cable and euro plug.	

Stirrers should only be operated via the motor protection switch!

Electric stirrers for dosing tanks

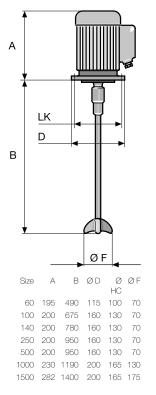
For the batching and mixing of liquids up to max. 500 mPas viscosity. Intermittent operation using timer recommended.

- Wide-range motor with insulation class F
- 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 I	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



For tank	Power uptake	Voltage (50 Hz)	Nominal current (50 Hz)	Speed (50 Hz)	Enclosure rating
	W		Α	rpm	
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	Power uptake	Shaft	Propeller	Weight	Order no.	
I	W			kg		
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	

.7.1 Overview of Metering Systems DULCODOS

Metering systems are ready mounted complete solutions, which are immediately available and ready for use for the most important applications. Whether standard or customised – you'll find the right solution here.



Tip: The table provides a good overview.

Selection Guide for DULCODOS

	Function	Capacity range	see page
Metering system DULCODOS eco (DSBa)	Storage, metering	35 – 1000 l	→245
Metering system DULCODOS universal (DSUa)	Metering	up to 75 l/h	→254
Metering system DULCODOS panel (DSWb)	Metering	0.74 - 1000 l/h	→262
Metering system DULCODOS modular (DSKa)	Metering	40 – 1000 l/h	→272



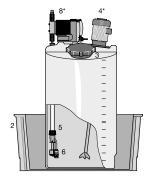
1.7.2 Metering System DULCODOS eco (DSBa)

Choose from a range of different components and adapt the metering system to your requirements.



For storing and metering liquid chemicals Use a selection guide (identity code) to quickly and flexibly adapt your metering system to your metering task.

Two hydraulic connection points guarantee simple installation of the metering system. The ready mounted system consists of components that have been perfectly matched to each other to ensure problem-free operation. You obtain a complete system. Individually configure your metering system at the time of ordering. A simple selection system makes ordering easy and guarantees maximum efficiency even at the time of ordering.



Your Benefits

- One to three metering pumps mounted on a storage tank, ready for connection with all the necessary accessories
- Short delivery time
- Outstanding value for money
- Compact construction
- Fast commissioning
- Versatile use
- All the components are perfectly matched to each other and fit precisely
- Environmentally-friendly handling of chemicals

Technical Details

- Dosing tanks: PE, various colours, 35 1,500 litres
- Collecting pan: PE, various colours, 35 1,500 litres
- Lock for screw top
- Hand mixer / stirrer: PP, PVDF or stainless steel, various outputs
- Suction assembly: PP, PVC, various connectors
- Level switch for suction assembly: 2-stage
- Drain tap: PP, PVC, with ball valve
- Metering pump: alpha, beta, gamma/ X, Sigma/ 1, Sigma/ 2, Sigma/ 3, gamma/ XL

Field of Application

Treatment of cooling, process and swimming pool water

ProMinent metering systems with PE storage tanks can be selected and ordered with the help of an identity code system. First select the metering pump using the separate pump identity code.

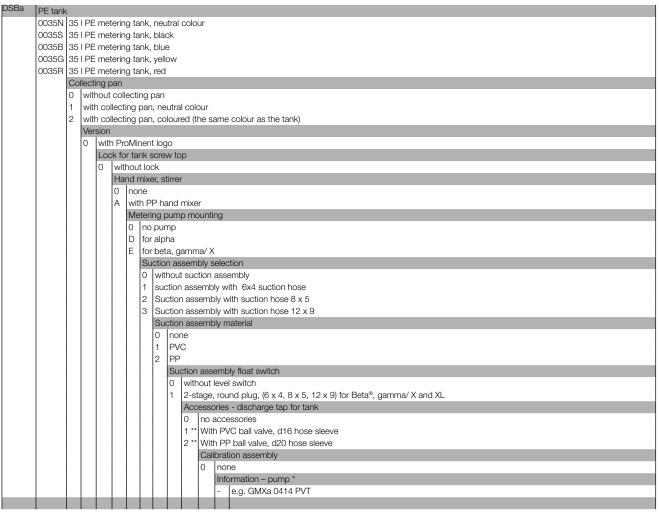
Selectable components

- 1. PE dosing tanks (35 1,500 litres)
- 2. Stackable collecting pans (35 1,500 litres)
- 3. Lock for tank screw top
- 4. Hand mixer/stirrer (*)
- Suction assembly
- 6. Level switch for suction assembly
- 7. Drain tap for storage tank (*)
- 8. Order metering pump (*) separately(Order the pump separately due to the large number of possible pumps that can be installed on storage tanks. Use the identity code for the pump you require.)
- * These components are ready for subsequent installation, but are supplied separately to avoid damage in transit. Customers should fully install the system on site.



5

Identity Code Ordering System for Metering System with Storage Tank, 35 litres



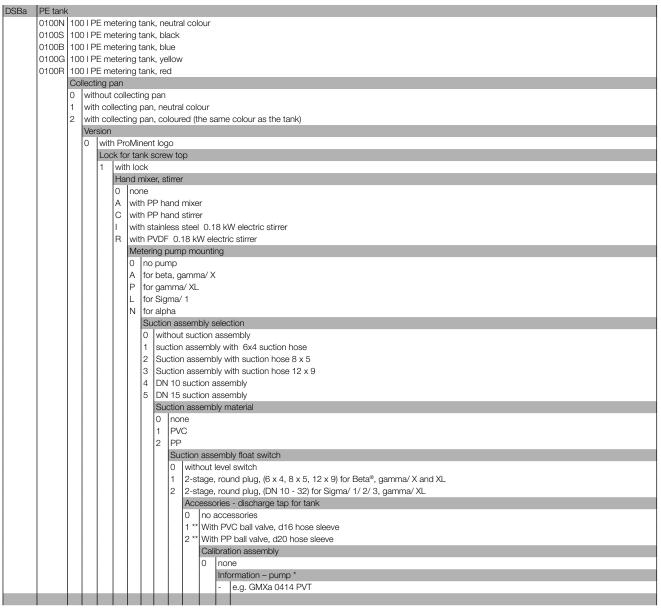
- * Please enter the identity code of the selected pump.
- Ball valve can only be selected if the metering station has been ordered without a collecting pan.

Identity Code Ordering System for Metering System with Storage Tank, 60 litres



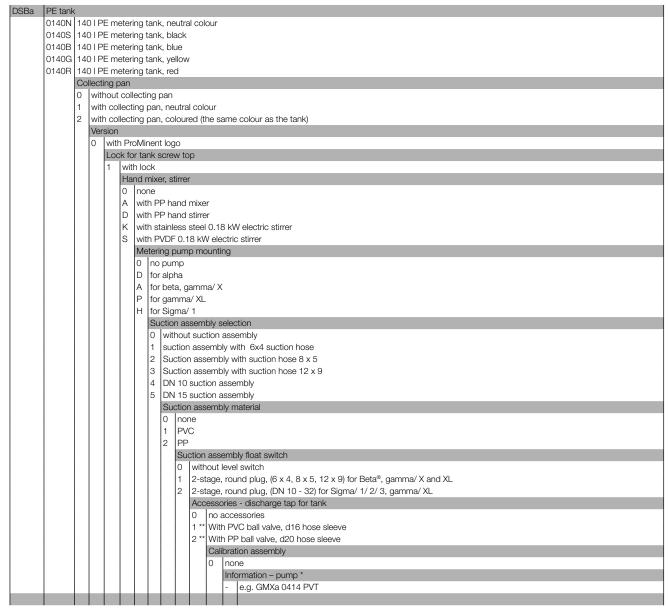
- * Please enter the identity code of the selected pump.
- ** Ball valve can only be selected if the metering station has been ordered without a collecting pan.

Identity Code Ordering System for Metering System with Storage Tank, 100 litres



- 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



- * 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, 250 litres



- * 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



- * 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, 1000 litres



- * 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



- * 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.

1.7.3 Me

Metering system DULCODOS universal

Liquid chemicals are metered conveniently, cost-effectively and reliably

Pump volume depending on the selected pump up to 75 l/h, back pressure 10 - 2 bar



The metering system DULCODOS universal combines carefully selected standard components with the solenoid-driven metering pump you have selected. This is your convenient method for the reliable metering of liquid chemicals – and is available cost-effectively and extremely quickly thanks to the preconfigured modules.



pensable, but scarcely variable – ensure the reliable operation of the system. That is why we have pre-configured the new metering system DULCODOS universal with these standards. The benefits for you: low costs, fast delivery, simple commissioning.

Metering is dependent on the metering pump. Components, such as pipes, relief valves and electrics - indis-

Naturally you have a choice here as well: Should it be the solenoid driven metering pump beta 4 or 5, gamma/ X or gamma/ XL? Should the pipes and seals be made of PP/FKM or PVC/EPDM? And do you need one or two points of injection with one or two pumps?

The novel valve block gives every metering system a clearly arranged structure. Every system features two relief valves, a collecting pan with leak sensor and a calibration tank for controlled metering for complete operational safety.

DULCODOS Universal, type 1

Your Benefits

- Reliable and precise metering of liquid chemicals with proven solenoid-driven metering pumps
- Safe operation thanks to relief valves and retaining tank
- Stable installation frame rotationally sintered from a single piece
- Systems with 1 or 2 pumps and 1 or 2 points of injection
- Calibration unit with priming function for controlled metering
- Optional: Pulsation damper, splash guard



Technical Details

- ProMinent solenoid driven metering pumps beta 4/5, gamma/ X or gamma/ XL
- Dimensions: 1,700 x 1,200 x 635 mm (H x W x D)
- Material combinations: PP/FKM or PVC/EPDM (note compatibility with the feed chemical)
- Relief valves to protect the pipework
- Manometer
- Collecting pan with leak sensor
- Flushing connectors
- Terminal box with master switch
- Assembly frame available in 4 standard colours

Sociologic Grinologi, type 2

Field of Application

Metering of liquid chemicals, e.g.

- cooling water treatment
- Waste water and process water treatment
- Paper industry



DULCODOS Universal, type 3

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

DSUa	Pipewo	rk / S	Seal	/ Fur	oction	n		
	1						mp ar	d 1 point of injection
	2							nd 1 point of injection
	3							•
								nd 2 points of injection
	4							point of injection
	5							point of injection
	6				_	ımps	and:	points of injection
				ig frai		700		0. 005 (IL) W. D)
								0 x 635 mm (H x W x D)
				,	-			00 x 635 mm (H x W x D)
								0 x 635 mm (H x W x D)
		I .			1,70	ı∪ X ⁻	1,200	x 635 mm (H x W x D)
			vers		ProN.	/linon	nt logo	
							nent l	000
			- 1	Pulsa				ogo
			- 1	- 1	one		ipci	
				- 1			ion da	mper PVC/EPDM
			- 1	- 1				mper PP/FKM
			- 1	- 1				mpers PVC/EPDM
								mpers PP/FKM
				- 1			conn	·
					-	sert		
				-	н	lose	nipple	6x4
				2			nipple	
				3	- 1			12x9
				4	l P	ress	ure ho	se nozzle DN10
					F	lushi	ng co	nnectors
					0	1 .	osed	
					1			hose nozzle DN10
					2	_	arden	
							olash	
							none	
						1		splash guard
								less steel bracket
							1 1	loor bracket (2 x brackets)
							1 1	Machine feet
							1 1	tainless steel bracket + machine feet
								Vall installation
								Pump 1 0 no pump
								1 10 bar / 0.74 /h, BT4b 1000 PVT2000U1100000, 6x4
								2 16 bar / 2.2 l/h, BT4b 1602 PVT2000U1100000, 6x4
							1 1	3 16 bar / 3.60 l/h, BT4b 1604 PVT2000U1100000, 6x4
								4 7 bar / 7.10 l/h, BT4b 0708 PVT2000U1100000, 8x5
							1 1	5 4 bar / 12.30 /h, BT4b 0413 PVT2000U1100000, 8x5
							1 1	6 2 bar / 19.00 l/h, BT4b 0220 PVT2000U1100000, 12x9
								1 10 bar / 6.80 l/h, BT5b 1008 PVT2000U1100000, 8x5
							1 1	2 7 bar / 11.0 l/h, BT5b 0713 PVT2000U1100000, 8x5
								3 4 bar / 17.10 l/h, BT5b 0420 PVT2000U1100000, 12.9
								4 2 bar/32.00 l/h, BT5b 0232 NPE2000U1100000, 12x9
							1 1	or 1 16 bar / 12 l/h, GXLAEU1612PVT20000U11030DE, 8x5
								02 10 bar / 19.6 l/h, GXLAEU1020PVT20000U11030DE, 12x9
							i	3 7 bar / 29.4 l/h, GXLAEU0730PVT20000U11030DE, 12X9
							1 1	04 4 bar / 49.0 l/h, GXLAEU0450PVT20000U11030DE, DN10
							1 1	2 bar / 78.5 l/h, GXLAEU0280PVT20000U11030DE, DN10
							1 1	1 16 bar / 3.6 l/h, GMXa 1604 PVT20000U110300DE, 6x4
							1 1	2 7 bar / 7.6 l/h, GMXa 0708 PVT20000U110300DE, 8x5
								3 10 bar / 9.0 l/h, GMXa 1009 PVT20000U110300DE, 8x5
							1 1	4 4 bar / 13.5 l/h, GMXa 0414 PVT20000U110300DE, 8x5
							1 1	5 7 bar / 14.5 l/h, GMXa 0715 PVT20000U110300DE, 8x5
							1 1	6 2 bar / 19.7 l/h, GMXa 0220 PVT20000U110300DE, 12x9
							1 1	7 4 bar / 24.0 l/h, GMXa 0424 PVT20000U110300DE, 12x9
							$ \cdot ^2$	8 2 bar / 45.0 l/h, GMXa 0245 PVT00000U110300DE, 12x9 Pump 2
								Pump 2 00 no pump
								10 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 0210 PVT2000U1100000, 8x5
								40 2 0ai / 19.00 /11, B140 0220 F V120000 1100000, 12x9
								52 7 bar / 11.0 l/h, BT5b 0713 PVT2000U1100000, 8x5
								53 4 bar / 17.10 l/h, BT5b 0420 PVT2000U1100000, 12x9

	2 bar / 32.00 l/h, BT5b 0232 NPE2000U1100000, 12x9
	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
	4 bar / 49.0 l/h, GXLAEU0450PVT20000U11030DE, DN10
	2 bar / 78.5 l/h, GXLAEU0280PVT20000U11030DE, DN10
X1	16 bar / 3.6 l/h, GMXa 1604 PVT20000U110300DE, 6x4
	7 bar / 7.6 l/h, GMXa 0708 PVT20000U110300DE, 8x5
	10 bar / 9.0 l/h, GMXa 1009 PVT20000U110300DE, 8x5
	4 bar / 13.5 l/h, GMXa 0414 PVT20000U110300DE, 8x5
	7 bar / 14.5 l/h, GMXa 0715 PVT20000U110300DE, 8x5
	2 bar / 19.7 l/h, GMXa 0220 PVT20000U110300DE, 12x9
	4 bar / 24.0 l/h, GMXa 0424 PVT20000U110300DE, 12x9
	2 bar / 45.0 l/h, GMXa 0245 PVT00000U110300DE, 12x9
	Operating instructions
	DE German
	EN English
	FR French
	ES Spanish
	PT Portuguese
	RU Russian
	Approvals
	01 CE mark

1.7.4

Metering system DULCODOS universal mini PE

Compact metering system meters liquid chemicals cost-effectively and reliably

Up to 75 l/h (10 - 2 bar) pump volume depending on the pump selected



The metering system DULCODOS universal mini PE combines reliable standard components, tailored precisely to your needs, in the most compact space.



The metering system DULCODOS universal mini PE is supplied ready connected and its small footprint enables it to be easily integrated into the process. The construction is exceptionally well laid out with the new valve block.

The compact metering system DULCODOS universal mini PE is optionally available with a solenoid-driven metering pump of the beta 4 or 5, delta, gamma/ X and gamma/ XL product ranges. It is also easy to operate. The system is cost-effective and can be delivered extremely quickly.

Your Benefits

- Compact and well-arranged construction
- Reliable and precise metering of liquid chemicals with proven solenoid-driven metering pumps
- Systems with 1 pump and 1 point of injection
- Calibration unit with priming function for controlled metering
- Optional: Pulsation damper, splash guard

Technical Details

- ProMinent solenoid-driven metering pumps beta 4/5, gamma/ X or gamma/ XL
- Dimensions of metering frame: Type 1: 900 x 660 x 440 mm (H x W x D)
- Collecting pan with leak sensor
- Flushing connectors
- Terminal box with master switch
- Range of splash guards
- Mounting frame material: PE

Field of Application

- Cooling water treatment
- Waste water and process water treatment
- Paper industry
- Food industry
- Beverage industry

Type selection

	Metering pumps	Points of injection	Material combinations	Hose materials
Type 1	1	1	PVC/EPDM or PP/FKM	PTFE

Low-pressure Metering Technology

Identity code ordering system, DULCODOS universal mini PE

DSUa	Pipewo	ork /	Sea	I / Fu	ncti	on														
	М	PV	C, E	PDM	l, fo	r 1 p	um	p ar	nd 1 p	oint	t of injection									
	N				_		p ar	nd 1	point	of ir	injection									
			1	ng fra																
		5 6		Natu Oran																
		7		Yello	~															
		8		Blue																
			Ver	sion																
				with				_												
			01						Logo	go										
				Puls 0	nor		amp	er												
							satio	n d	ampe	PV	/C/EPDM									
									amper PVC/EPDM amper PP/FKM											
					Нус	drau	lic c	onn	ectors	·										
						Inse														
					1				e 6x4											
									e 8x5 e 12x9	a										
											e DN10									
					5	Pre	ssur	e h	ose sle	eeve	e 1/2" NPT									
								-	onnect	ors										
						- 1	clos				and DN40									
						- 1	Gan			e no	ozzle DN10									
										e sle	eeve 1/2" NPT									
İ						- 1	Spla	ash	guard											
							- 1	non												
									splas	_	uard el bracket									
											allation (without brackets)									
											feet (4 no.)									
							3	- 4			ullation									
								- 1	Pump		Imp.									
								- 1	00 no		ar / 0.74 l/h, BT4b 1000 PVT2000U1100000, 6x4									
											ar / 2.2 l/h, BT4b 1602 PVT2000U1100000, 6x4									
								İ	43 16	bar	ar / 3.60 l/h, BT4b 1604 PVT2000U1100000, 6x4									
											/ 7.10 l/h, BT4b 0708 PVT2000U1100000, 8x5									
								- 1			/ 12.30 l/h, BT4b 0413 PVT2000U1100000, 8x5 / 19.00 l/h, BT4b 0220 PVT2000U1100000, 12x9									
								- 1			ar / 6.80 l/h, BT5b 1008 PVT2000U1100000, 12x9									
								- 1			/ 11.0 l/h, BT5b 0713 PVT2000U1100000, 8x5									
İ							İ		53 4	bar /	/ 17.10 l/h, BT5b 0420 PVT2000U1100000, 12.9									
								- 1			/32.00 l/h, BT5b 0232 NPE2000U1100000, 12x9									
											ar / 3.6 l/h, GMXa 1604 PVT20000U110300DE, 6x4 / 7.6 l/h, GMXa 0708 PVT20000U110300DE, 8x5									
								- 1			ar / 9.0 l/h, GMXa 0100 PVT20000U110300DE, 8x5									
							İ				/ 13.5 l/h, GMXa 0414 PVT20000U110300DE, 8x5									
									X5 7	bar /	/ 14.5 l/h, GMXa 0715 PVT20000U110300DE, 8x5									
								- 1			/ 19.7 l/h, GMXa 0220 PVT20000U110300DE, 12x9									
								- 1			/ 24.0 l/h, GMXa 0424 PVT20000U110300DE, 12x9									
										ump	7 / 45.0 l/h, GMXa 0245 PVT00000U110300DE, 12x9									
									0		no pump									
											Operating instructions									
		1									DE German									
											EN English FR French									
											ES Spanish									
											Portuguese									
		1								IT										
											Approvals 01 CE mark									
											OT OE Mark									

Metering Systems 1.7

1.7.5 Metering system DULCODOS universal mini PP

Compact metering system meters liquid chemicals cost-effectively and reliably

Up to 75 l/h (10 - 2 bar) pump volume depending on the pump selected



The metering system DULCODOS universal mini PP combines reliable standard components, tailored precisely to your needs, in the most compact space.



DULCODOS universal mini PP, type 1

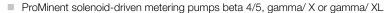
The metering system DULCODOS universal mini PP is supplied ready connected and its small footprint enables it to be integrated simply into the process. The construction is exceptionally well arranged with the new valve block.

The compact metering system is optionally available with up to two solenoid-driven metering pumps of the product range beta 4 or 5, gamma/ X and gamma/ XL. It is also unbelievably simple. The system is cost-effective and can be delivered extremely quickly.

Your Benefits

- Compact and 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



- 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
- Waste water and process water treatment
- Paper industry
- Food industry
- Beverage industry

Type selection



DULCODOS universal mini PP, type 2

DULCODOS universal mini PP, type 3

	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

Low-pressure Metering Technology

1.7 **Metering Systems**

Identity code ordering system for DULCODOS universal mini PP

DSUa	Pipewo	rk/S	eal	/ Fun	ction	า			
	A						mp a	and 1 point of injection	
	1	l .						· · · · · ·	
	В							s and 1 point of injection	
	C	1						s and 2 points of injection	
	D							1 point of injection	
	E	PP, F	KN	l, for	2 pu	mps	s and	d 1 point of injection	
	F	PP, F	KN	l, for	2 pu	mps	s and	d 2 points of injection	
		Mou			_				
				~) x 6	00 x	x 520 mm (H x W x D)	
								0 x 520 mm (H x W x D)	
		1 1						x 520 mm (H x W x D)	
			/ers	_				· · · · · · · · · · · · · · · · · · ·	
			_	with I	⊃roN/	1inen	nt loc	go.	
			- 1				-	t Logo	
			- 6	Pulsa				<u> </u>	
			- 6	-	one		ihei		
				- 1				dama as DVO/FDDM	
			- 1	- 1				damper PVC/EPDM	
				- 1				damper PP/FKM	
			- 1	- 1				dampers PVC/EPDM	
			ď	_				dampers PP/FKM	
					-			nnectors	
				C	- 1	sert			
				1				ple 6x4	
				2	- 1			ple 8x5	
				3	- 1			ple 12x9	
				4	_			hose nozzle DN10	
					FI	lushi	ing c	connectors	
					0		osed		
					1		ressu	ure hose nozzle DN10	
					2	Ga	arde	ena ena	
						Sp	plash	h guard	
						0	nor	one	
						A	wit	th splash guard, W= 600 mm	
						В	wit	th splash guard, W= 700 mm	
						C	wit	th splash guard, W= 900 mm	
							Sta	ainless steel bracket	
							D	none	
							Α	Stainless steel bracket (H= 150 mm) + machine feet	
							В	Stainless steel bracket (H= 150 mm) + machine feet	
							С	Stainless steel bracket (H= 150 mm) + machine feet	
		l I	ı	İ			İ	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	
	İ	l I	ı	İ	İ	İ	İ	45 4 bar / 12.30 l/h, BT4b 0413 PVT2000U1100000, 8x5	
	İ	l I	ı	İ	İ	İ	İ	46 2 bar / 19.00 l/h, BT4b 0220 PVT2000U1100000, 12x9	
		l l	ı			İ	İ	51 10 bar / 6.80 l/h, BT5b 1008 PVT2000U1100000, 8x5	
			ı		İ	İ	İ	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 0424 FV1200000110300DE, 12x9	
								Pump 2	
								00 no pump	
								41 10 bar / 0.74 l/h, BT4b 1000 PVT2000U1100000, 6x4	
								41 10 bar / 0.74 l/h, B14b 1000 PV1200001100000, 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	
		1 1						52 7 bar / 11.0 l/h, BT5b 0713 PVT2000U1100000, 8x5	

	33 4 bar / 17.10 l/h, BT5b 0420 PVT2000U1100000, 12x9
	4 2 bar / 32.00 l/h, BT5b 0232 NPE2000U1100000, 12x9
	01 16 bar / 12 l/h, GXLAEU1612PVT20000U11030DE, 8x5
	02 10 bar / 19.6 l/h, GXLAEU1020PVT20000U11030DE, 12x9
	03 7 bar / 29.4 l/h, GXLAEU0730PVT20000U11030DE, 12x9
	04 4 bar / 49.0 l/h, GXLAEU0450PVT20000U11030DE, DN10
	05 2 bar / 78.5 l/h, GXLAEU0280PVT20000U11030DE, DN10
	(1 16 bar / 3.6 l/h, GMXa 1604 PVT20000U110300DE, 6x4
	7 bar / 7.6 l/h, GMXa 0708 PVT20000U110300DE, 8x5
	(3 10 bar / 9.0 l/h, GMXa 1009 PVT20000U110300DE, 8x5
	4 4 bar / 13.5 l/h, GMXa 0414 PVT20000U110300DE, 8x5
	(5 7 bar / 14.5 l/h, GMXa 0715 PVT20000U110300DE, 8x5
	(6 2 bar / 19.7 l/h, GMXa 0220 PVT20000U110300DE, 12x9
	(7 4 bar / 24.0 l/h, GMXa 0424 PVT20000U110300DE, 12x9
	(8 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
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1.7.6

Metering System DULCODOS panel (DSWb)

Our quickly available solution for your metering task.

Pump capacity depending on the selected pump up to 1,000 l/h, back pressure 10 - 2 bar



DULCODOS panel is a complete metering system for reliable chemical metering. It is now even more space-saving and quickly available – our new standards ensure this. You can select perfectly coordinated components depending on material resistance, pump capacity and function.

The metering system DULCODOS panel is a convenient method for reliably metering liquid chemicals – and can be obtained cost-effectively and quickly thanks to the preconfigured modules.

The metering pump is the heart of the metering system. The number of points of injection and metering pumps must be defined. There are several models to choose from. The right components, such as mounting plate, pipework, hydraulic and electric accessories, come from this.

The new valve block for solenoid metering pumps gives the metering systems a well arranged structure. Every system features two relief valves, a collecting pan with leak sensor and a calibration tank for controlled metering for complete operational safety. An inductive flow meter can also be selected. This simple configuration enables fast delivery and seamless commissioning.



DULCODOS panel, type 1

DULCODOS panel, type 2

DULCODOS panel, type 3

Your Benefits

- Reliable and precise metering of liquid chemicals with proven diaphragm metering pumps
- Safe operation thanks to relief valves and integrated collecting pan
- Stable assembly frame and assembly cabinets
- Systems with 1 or 2 pumps and 1 or 2 points of injection
- Material selection in PVC or PP with FKM or EPDM seals
- Selected adhesive for PVC: Tangit or DTX
- Calibration unit with priming function for controlled metering
- Optional: pulsation damper, splash guard, inductive flow meter, angled seat filter

Technical Details

- ProMinent diaphragm metering pumps of the beta, gamma/ X, gamma/ XL or sigma product range
- Mounting frame dimensions:
 - 1200 x 800 x 450 mm for 1 pump, DN 10 (solenoid-driven metering pumps)
 - 1400 x 1000 x 450 for 2 pumps, DN 10 (solenoid-driven metering pumps)
 - 1600 x 1200 x 650 for 1 pump, DN 15/20/25/32 (sigma/ 1/2/3)
 - 1600 x 1200 x 650 for 2 pumps, DN 15 (sigma/ 1)
 - 2000 x 1600 x 650 for 2 pumps, DN 20/25/32 (sigma/ 2/3)
- Cabinet dimensions:
 - 2000 x 1600 x 650 mm for 2 pumps, DN 25/32 (sigma/ 2/3)
- Material combinations: PP/FKM, PP/EPDM or PVC/FKM, PVC/EPDM (note compatibility with the feed chemical)
- PVC adhesive selection: Tangit or DTX
- Relief valves to protect the pipework
- Manometer
- Collection pan with leak sensor
- Flushing connectors
- Terminal box with main switch
- Assembly frame with splash guard or metering cabinet with sliding doors

Field of Application

Metering of liquid chemicals, e.g.

- Cooling water treatment
- Waste water and process water treatment
- Paper industry



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

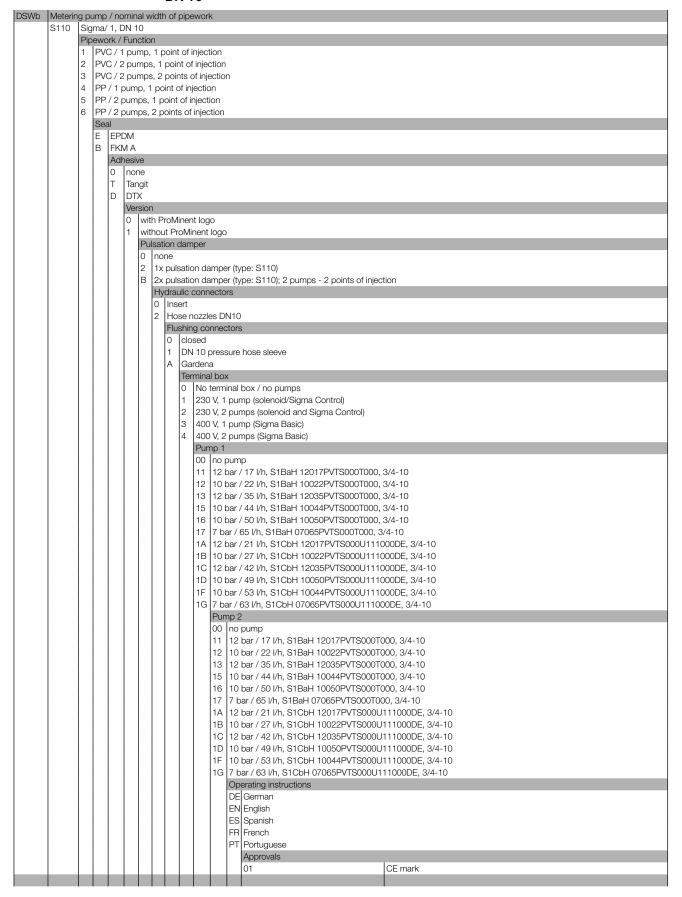


Identity code ordering system, plate-mounted metering systems for beta and gamma/ X, DN 10

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											10 bar / 0.74 l/h, BT4b 1000PVT2000U1100000, 6x4 16 bar / 2.2 l/h, BT4b 1602PVT2000U1100000, 6x4
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										44	7 bar / 7.10 l/h, BT4b 0708PVT2000U1100000, 8x5
										45	4 bar / 12.30 l/h, BT4b 0413PVT2000U1100000, 8x5
											2 bar / 19.00 l/h, BT4b 0220PVT2000U1100000, 12x9
										51 52	10 bar / 6.80 l/h, BT5b 1008PVT2000U1100000, 8x5 7 bar / 11.0 l/h, BT5b 0713PVT2000U1100000, 8x5
											4 bar / 17.10 l/h, BT5b 0420PVT2000U1100000, 0x3
											2 bar / 32.00 l/h, BT5b 0232NPE2000U1100000, 12x9
										1	16 bar / 12 l/h, GXLAEU1612PVT20000U11030DE, 8x5
											10 bar / 19.6 l/h, GXLAEU1020PVT20000U11030DE, 12x9
											7 bar / 29.4 l/h, GXLAEU0730PVT20000U11030DE, 12x9
										1	4 bar / 49.0 l/h, GXLAEU0450PVT20000U11030DE, DN10 2 bar / 78.5 l/h, GXLAEU0280PVT20000U11030DE, DN10
										X1	16 bar / 3.6 l/h, GMXa 1604PVT20000U11030DE, DN10
										X2	7 bar / 7.6 l/h, GMXa 0708PVT20000U110300EN, 8x5
										ХЗ	10 bar / 9.0 l/h, GMXa 1009PVT20000U110300DE, 8x5
											4 bar / 13.5 l/h, GMXa 0414PVT20000U110300DE, 8x5
										1	7 bar / 14.5 l/h, GMXa 0715PVT20000U110300DE, 8x5
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											2 bar / 45.0 l/h, GMXa 0424F V1200000110300DE, 12x9
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											42 16 bar / 2.2 l/h, BT4b 1602PVT2000U1100000, 6x4
											43 16 bar / 3.60 l/h, BT4b 1604PVT2000U1100000, 6x4
											44 7 bar / 7.10 l/h, BT4b 0708PVT2000U1100000, 8x5 45 4 bar / 12.30 l/h, BT4b 0413PVT2000U1100000, 8x5
											45 4 bar / 12.30 l/1, B14b 0413PV1200001100000, 8x3
											51 10 bar / 6.80 l/h, BT5b 1008PVT2000U1100000, 8x5
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			İ				X8 2	2 ba	ar / 45.0 l/h, GMXa 0245PVT00000U11	10300DE, 12x9	
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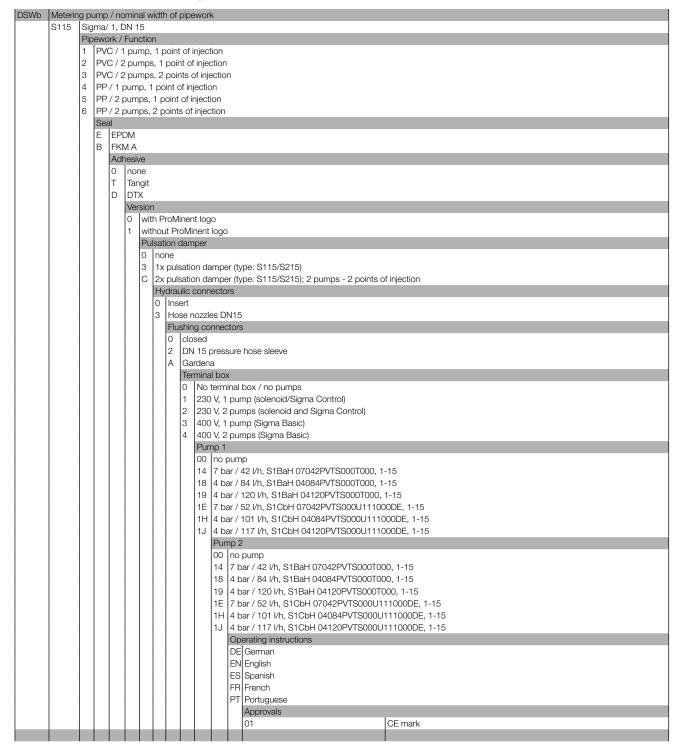
Identity Code Ordering System for Plate-Mounted Metering Systems for Sigma/ 1, DN 10



ProMinent®

1.7 Metering Systems

Identity Code Ordering System for Plate-Mounted Metering Systems for Sigma/ 1, DN 15

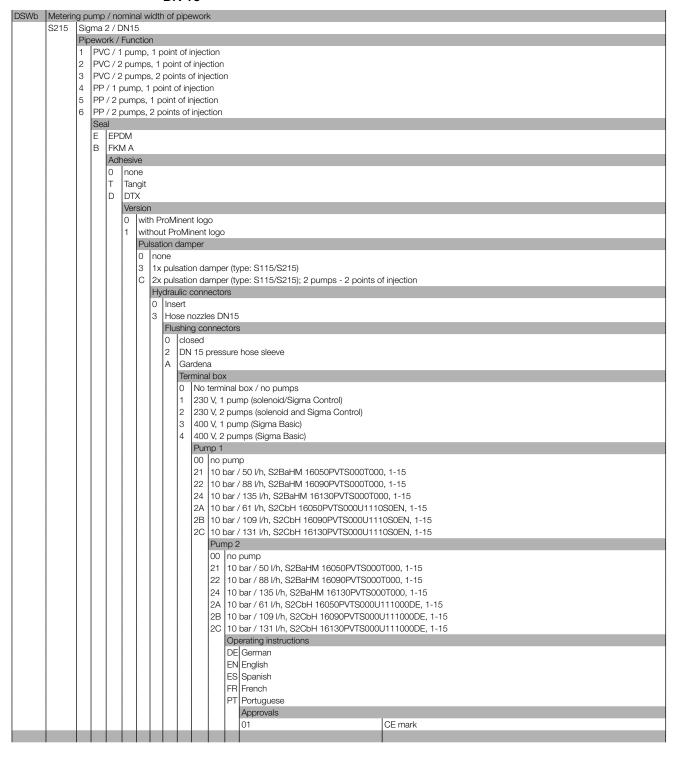




Low-pressure Metering Technology

1.7 **Metering Systems**

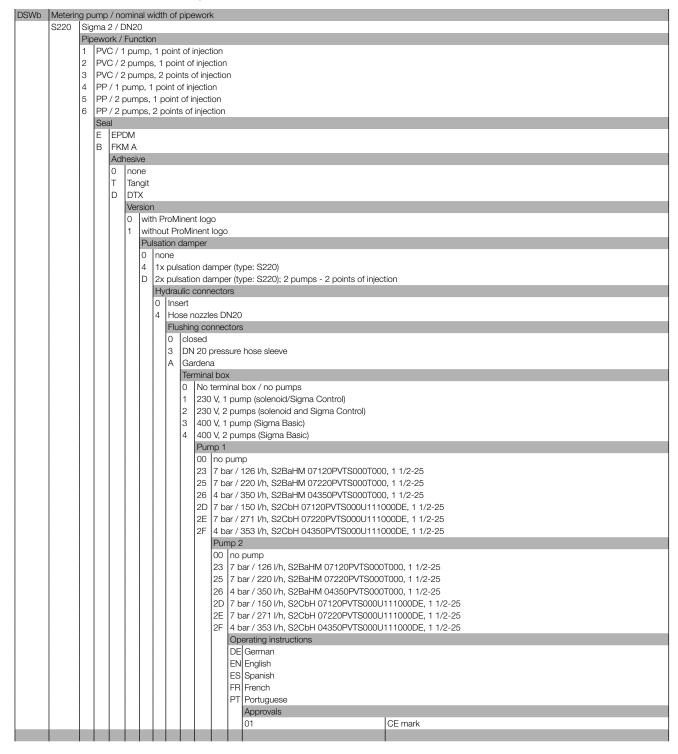
Identity Code Ordering System for Plate-Mounted Metering Systems for Sigma/ 2,



ProMinent®

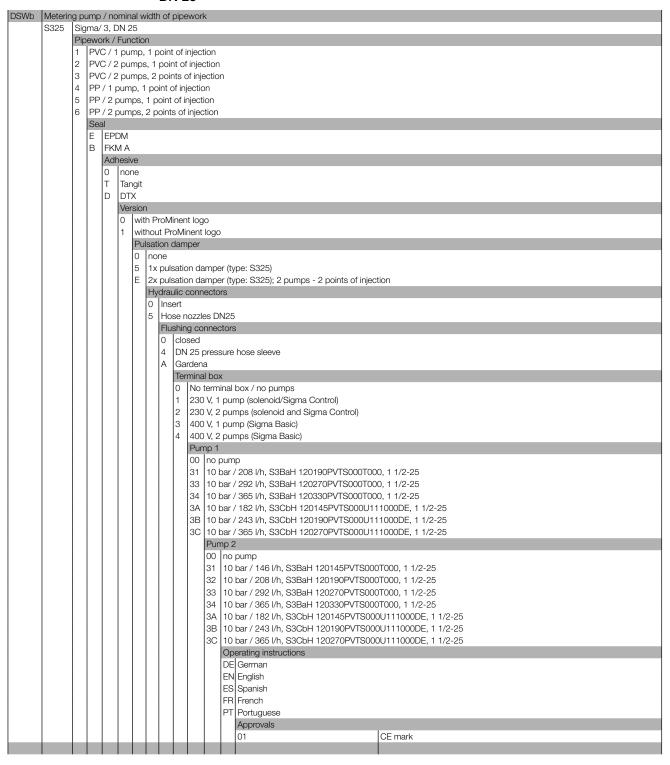
1.7 Metering Systems

Identity Code Ordering System for Plate-Mounted Metering Systems for Sigma/ 2, DN 20





Identity Code Ordering System for Plate-Mounted Metering Systems for Sigma/ 3, DN 25

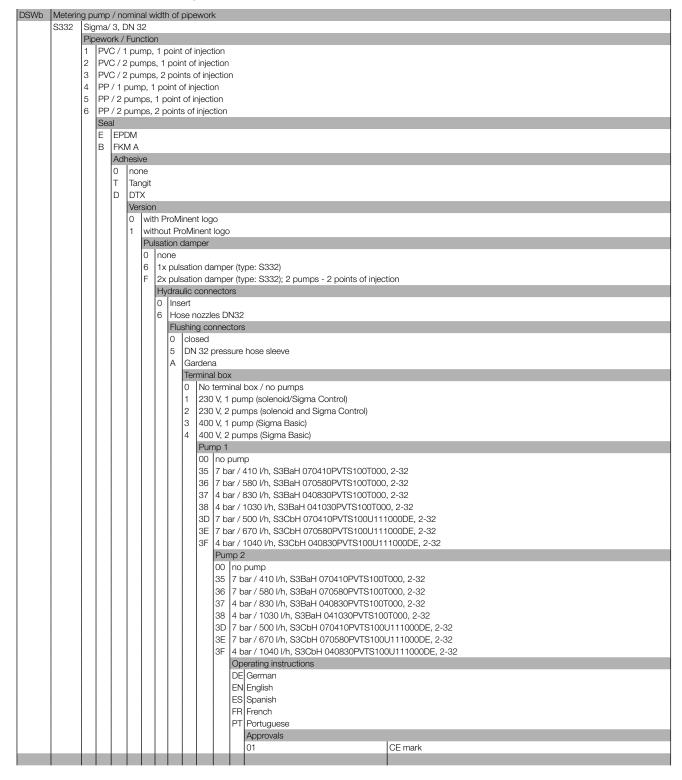




ProMinent®

1.7 Metering Systems

Identity Code Ordering System for Plate-Mounted Metering Systems for Sigma/ 3, DN 32





Metering Systems 1.7

Metering system DULCODOS modular (DSKa) 1.7.7

Modular and flexible for precise metering

Capacity: 40 - 1,000 l/h



The ready-wired modular metering system DULCODOS is used for the ultra-precise metering of chemicals. It has a modular design and can be flexibly integrated into the most varied applications.



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The construction of the DULCODOS modular enables them to be flexibly tailored to your processes. The system is configured via an identity code. The metering systems are delivered ready mounted and can be quickly and easily installed.

Your Benefits

- Simple and fast installation, thanks to its ready-wired design
- Flexible, practical process integration with the identity code "DSKa"
- Minimal space requirement, thanks to compact construction
- Short delivery times due to the use of standard components
- Minimal stock of spare parts

Technical Details

Selectable via the identity code:

- Metering system for the integration of a Sigma product range motor-driven metering pump
- Plastic or stainless steel brackets
- Splash guard
- PP, PVC or PVDF pipework
- EPDM or FPM seals
- VA base frame with machine feet
- Manometer for commissioning of the back pressure valves
- Hydraulic connectors, (d25 hose nozzles, welding/straight solvent unions, stainless steel sleeves)
- Electrical connectors
- Motor-driven metering pump Sigma

Included in the standard scope of delivery:

- Leak sensor (contained in the standard scope of delivery)
- Flushing connectors with 3-way ball valve
- Pulsation damper with back pressure valve
- Relief valve with return line
- Hose nozzles on suction side and return in d 25

Field of Application

Metering of chemicals: cleaning agents, disinfectants, additives and auxiliary agents



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								В	1		ss steel pipe 23x1.5 (1039507)
								С	Insert fo		ss steel pipe 29x1.5(1039549)
									K	Termina	
									Н	Master	
									R	Repair	
										Pump	
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										01	no pump, with adapter set Sigma 1 to 65 l/h
										02	no pump, with adapter set Sigma 1 to 120 l/h
										03	no pump, with adapter set Sigma 2, Basic to 135 l/h
										04	no pump, with adapter set Sigma 2, Basic to 350 l/h
										05 06	no pump, with adapter set Sigma 2, Control to 131 l/h no pump, with adapter set Sigma 2, Control to 353 l/h
										07	no pump, with adapter set Sigma 3, to 365 l/h
										08	no pump, with adapter set Sigma 3, to 670 l/h
										09	no pump, with adapter set Sigma 3, to 1040 l/h
										11	12 bar / 17 l/h, S1BaH 12017PVTS000T000, 3/4-10
										12	10 bar / 22 l/h, S1BaH 10022PVTS000T000, 3/4-10
										13	12 bar / 35 l/h, S1BaH 12035PVTS000T000, 3/4-10
										14	10 bar / 44 l/h, S1BaH 10044PVTS000T000, 3/4-10
										15 16	10 bar / 50 l/h, S1BaH 10050PVTS000T000, 3/4-10 7 bar / 65 l/h, S1BaH 07065PVTS000T000, 3/4-10
										17	7 bar / 42 l/h, S1BaH 07042PVTS000T000, 3/4-10
										18	4 bar / 84 l/h, S1BaH 04084PVTS000T000, 1-15
										19	4 bar / 120 l/h, S1BaH 04120PVTS000T000, 1-15
										1A	12 bar / 21 l/h, S1CbH 12017PVTS000U1110S0DE, 3/4-10
										1B	10 bar / 27 l/h, S1CbH 10022PVTS000U1110S0DE, 3/4-10
										1C	12 bar / 42 l/h, S1CbH 12035PVTS000U1110S0DE, 3/4-10
										1D	10 bar / 49 l/h, S1CbH 10050PVTS000U1110S0DE, 3/4-10
										1E	10 bar / 53 l/h, S1CbH 10044PVTS000U1110S0DE, 3/4-10
										1F	7 bar / 63 l/h, S1CbH 07065PVTS000U1110S0DE, 3/4-10
										1G	7 bar / 52 l/h, S1CbH 07042PVTS000U1110S0DE, 1-15
										1H	4 bar / 101 l/h, S1CbH 04084PVTS000U1110S0DE, 1-15
										1J 21	4 bar / 117 l/h, S1CbH 04120PVTS000U1110S0DE, 1-15 10 bar / 50 l/h, S2BaHM 16050PVTS000T000, 1-15
										22	10 bar / 50 l/n, S2BaHM 16050PVTS000T000, 1-15
										23	10 bar / 135 l/h, S2BaHM 16130PVTS000T000, 1-15
										24	7 bar / 126 l/h, S2BaHM 07120PVTS000T000, 1 1/2-25
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			DE German

1.7.8

Metering System DULCODOS Ammonia

The metering system for the targeted dilution and metering of ammonia solution to prevent corrosion in the steam boiler.



Metering system DULCODOS Ammonia for the low-odour and safe handling of ammonia solution. For a stable pH value and reduced corrosion in the vapour system.



Thousands of steam generators operate in industry. Corrosion in systems equates to idleness, which needs to be prevented. The DULCODOS Ammonia metering system produces a usable solution of 0.1 to 2.5% from the maximum 25% commercial ammonia product. The transfer pump, measuring tank and mixing tank are important for production of the required solution. The beta metering pump meters the solution precisely into the steam system to be protected.

Your Benefits

- Compact metering system
- Gas-tight application, no escape of ammonia vapours
- Operationally safe thanks to level switch in the measuring tanks, intrinsically safe design

Technical Details

Ready-to-use assembled metering system, essentially consisting of:

- PE dosing tank with a litre scale, with lockable screw lid and manual stirrer.
- Each with a dispensing and metering pump with suction assembly, level switch, as well as complete rigid PVC pipework with two ball valves, the measuring tank and active carbon filter.
- Terminal box for control of the metering pumps.
- Injection valve VA, ½", 5 m PE hose, 12x9 mm.

The container with concentrated ammonia solution is not included in the scope of delivery.

Field of Application

- Steam circuits
- Power plants
- Max. 25% commercial ammonia can be used
- Solution: 0.1 to 2.5%

Design

Ready-to-use assembled metering system, essentially consisting of:

- Dosing tank made of PE with a litre scale, with lockable screw lid and manual stirrer.
- Each with a dispensing and metering pump with suction assembly, level switch, as well as complete rigid PVC-U, pipework with two ball valves, the measuring tank and active carbon filter.
- Terminal box for control of the metering pumps.
- Injection valve VA, ½", 5 m PE hose, 12x9 mm
- The container with the commercial product is not included in the scope of delivery

Metering Tank Contents	Metering pump Capacity	Metering pump Feed Rate	Transfer Pump Discharge Flow	Order no.	
	l/h	bar	l/h		
130	7.1	7	17.1	1039192	
250	11.0	7	32	1039193	

Accessories

	Order no.
Gas-tight suction lance for the delivery container	on request



Metering Systems 1.7

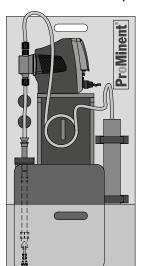
1.7.9

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 m³/h when adding between 0.5 mg/l and 155 m³/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.	
1.6 l/h	1081318	



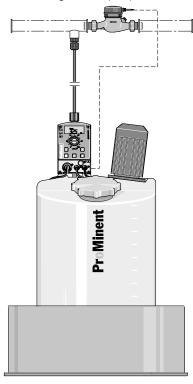
1.7.10 Application Examples

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

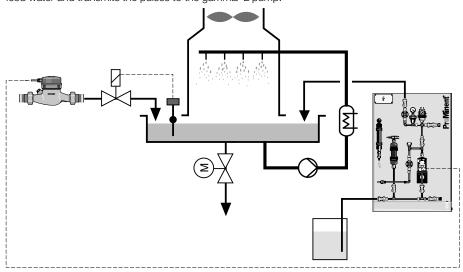
Product: DULCODOS panel / DULCODOS uni-

versal

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



1.8 **Domestic Water Technology**

1.8.1 Systems for Domestic Water Installations

Proportional Flow Dosing System for Liquid Dosing

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 SiO₂ silicate and/or 6.7 mg/l of phosphate PO₄ (5mg/I P₂O₅) 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.



1.8 Domestic Water Technology

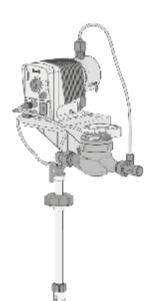
Metering System Promatik

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 (hori-	m³/h	0.025	0.063	0.1	0.16
zontal)					
Metering interval approx.	I/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	Order no.	
	kg		
S 4 split system	6	1078282	
S 10 split system	7	1078283	
S 16 split system	9	1078284	
S 25 split system	11	1078285	
o zo opiit oyotom		1010200	

Materials

- Dosing head/valves: Polypropylene (PP)
- Metering diaphragm EPDM with PTFE insert
- Seals: EPDM
- Valve balls: ceramic
- Float switches: PP
- Suction assembly: flexible PVC
- Discharge tube: PE



1.8 Domestic Water Technology

1.8.2 Chemicals

EXACTAPHOS® SP 210

Silicate phosphate liquid metering solution. Drinking water treatment for soft water. Promatik compact metering system.

	Volume	Order no.	
	I		
EXACTAPHOS® SP 210	20	950097	
EXACTAPHOS® SP 210 *	200	950043	

^{* 200}l 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 I	Order no.	
EXACTAPHOS® P 612	20	950098	
EXACTAPHOS® P 612 *	200	950048	

^{* 200}l barrels are only available without DVGW approval.

EXACTAPHOS® P 1020

Phosphate liquid metering solution. Drinking water treatment for hard water. Promatik compact metering system.

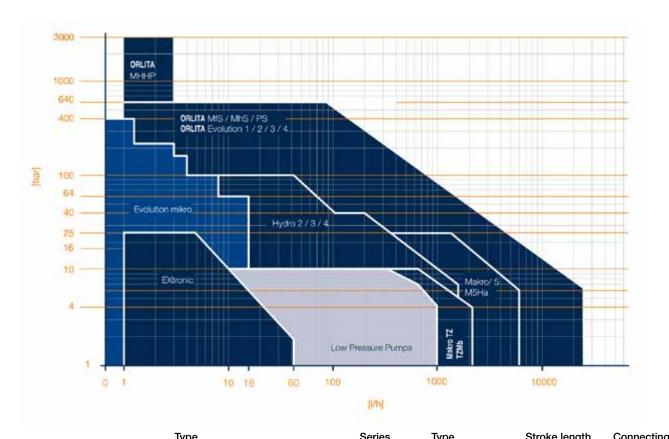
	Volume	Order no.	
	I		
EXACTAPHOS® P 1020	20	950099	
EXACTAPHOS® P 1020 *	200	950053	

^{* 200}l barrels are only available without DVGW approval.



2.1 Overview of Process Metering Pumps

2.1.1 Selection Guide



lype	Series	Type	Stroke length	Connecting
				rod force
Diaphragm Metering Pumps	EXTRONIC	EXBb	0 - 1,25	2,000
	MAKRO	TZMb	0 – 10	8,000
Hydraulic Diaphragm Metering	HYDRO	HP2a *	0 – 15	2,000
Pumps	Classic	HP3a *	0 – 15	4,200
		HP4a *	0 – 20	5,800
	HYDRO API	HA1a *	0 – 15	2,000
		HA2a *	0 – 15	2,000
		HA3a *	0 – 15	4,200
		HA4a *	0 – 20	5,800
	MAKRO	M5Ha	0 – 50	10,000
	ORLITA	EMFa	0 – 60	500
	Evolution	EMHa	0 – 60	500
		E1Sa	0 – 16	2,000
		EF1a	0 – 16	2,600
		EF2a	0 – 16	6,200
		EF3a	0 – 25	9,000
		EF4a	0 – 40	18,000
	ORLITA	MfS / MhS 35	0 – 20	3,500
		MfS / MhS 80	0 – 20	14,000
		MfS / MhS 180	0 – 40	18,000
		MfS / MhS 600	0 – 40	40,000
		MfS 1400	0 – 60	60,000
Plunger Metering Pumps	MAKRO	TZKa	0 – 20	8,000
		M5Ka	0 – 50	10,000
	ORLITA	Rb 15	0 – 15	1,800
		PS 35	0 – 20	3,500
		PS 80	0 – 20	14,000
		Rb 150	0 – 32	15,000
		PS 180	0 – 40	18,000
		PS 600	0 – 40	40,000
	Sigma	SBKa / SCKa	0 – 15	1,700
4 0 1 1 1 1				

^{*} Stroke volume control



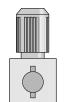
2.1 Overview of Process Metering Pumps

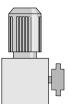


2.1.2

Mounting forms of process metering pumps

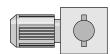
Single-head pump with vertical motor (e.g HYDRO)





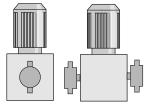


Single-head pump with horizontal motor (e.g. MAKRO)



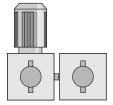


Double-head pump (e.g. HYDRO)



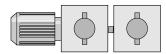


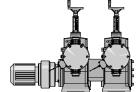
Duplex pump with vertical motor (e.g. HYDRO)



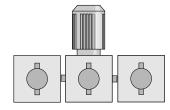


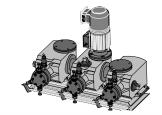
Duplex pump with horizontal motor (e.g. MAKRO)



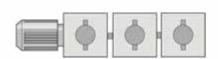


Triplex pump with vertical motor (e.g. HYDRO)





Triplex pump with horizontal motor (e.g. Evolution)





Other variants are available on request.



2.1 Overview of Process Metering Pumps

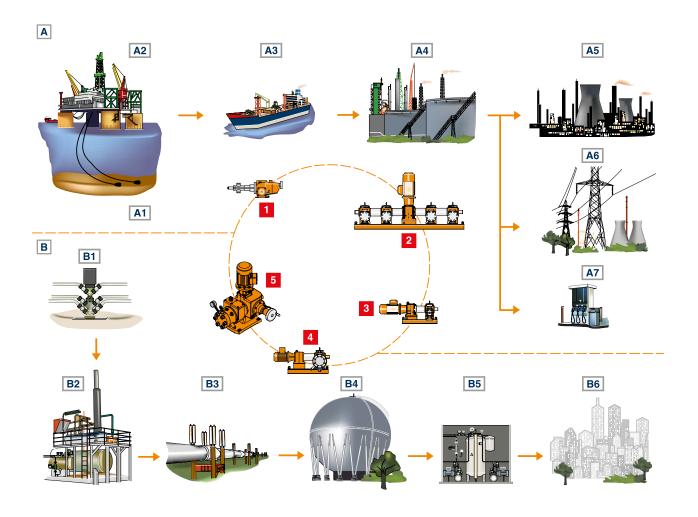
Installation Option

- A Oil industry
- A1 Well

2.1.3

- A2 Platform
- A3 Transportation (tanker, pipeline)
- A4 Refiner
- 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

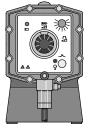
Precise metering with explosion protection

Capacity range of single head pump: 1 - 60 l/h; 25 - 1 bar



The diaphragm metering pump EXTRONIC is perfectly suited for the sensitive use of liquid media in facilities with an explosive gas atmosphere as well as for mines at risk of firedamp, as it is approved in compliance with the EU EX Regulation 2014/34/EU (ATEX).

The ATEX-compliant diaphragm metering pump EXTRONIC (EXBb) is tested and approved in line with EN 60079/-1 for the ignition type "compression-resistant enclosures" and thus offers the maximum level of protection. The short-stroke solenoid and the complete pump control are integrated in the pump housing so that, together with the explosion-proof drive, there is IP 65 protection against contact and moisture as per EN 60529 even when the front cover is open.



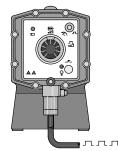
range 1:250

"Internal" control type stroke length adjustment 1:10, stroke rate adjustment 1:25, total adjustment

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



"External contact" control type stroke length adjustment 1:10, stroke rate control 0 – 100 %, depending on external switching contacts. *)

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
- Metering reproducibility 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)
- \blacksquare T6 Temperature class permissible for gases and vapours with ignition temperature > 85 $^{\circ}\text{C}$
- EXBb M on request

This means:

- EEx Equipment complies with European standards
- [i,a] Control input is intrinsically safe when 2 independent errors occur
- d Type of ignition protection, compression-resistant enclosure
- IC Explosion group I for mines at risk from firedamp
- IIC Explosion group II for all areas at risk from explosion with the exception of mining, sub-group IIC (includes IIA and IIB)
- \blacksquare T6 Temperature class permissible for gases and vapours with ignition temperature > 85 $^{\circ}\text{C}$

"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.

Field of Application

- Oil, gas and petrochemicals
 - Mining
- For use in areas at risk of gases and vapours
- Use in mines at risk from firedamp



2.2 Diaphragm Metering Pumps

Technical data for EXTRONIC EXBb

Туре	Pump ca	pacity at	max. back pressure*	Delivery r	ate at me	dium back pressure*	Stroke rate	oØ x iØ	Suction lift	Shipping weight PP, NP, TT-SS
	bar		ml/stroke	bar	l/h	ml/stroke	Strokes/min	mm	m WC	kg
	- metering p	oumps								
1000	10	0.19	0.03	5	0.27	0.04	120	6 x 4	1.5	12
0260	1	60.00	9.09	-	-	-	110	DN 15	1.5	16
0308	3	8.60	1.20	1	10.30	1.43	120	8 x 5	5.0	12
0417	3	17.40	2.42	2	17.90	2.49	120	12 x 9	4.5	13
0430	3	27.00	4.09	2	29.50	4.47	110	DN 10	5.0	16
0613	6	13.10	1.82	3	14.90	2.07	120	8 x 5	5.5	13
0803	8	3.70	0.51	4	3.90	0.54	120	6 x 4	3.0	12
0814	8	14.00	2.12	4	15.40	2.33	110	12 x 9	5.0	16
1002	10	2.30	0.31	5	2.70	0.38	120	8 x 5	5.0	12
1006	10	6.00	0.83	5	7.20	1.00	120	8 x 5	5.0	13
1201	12	1.70	0.23	6	2.00	0.28	120	6 x 4	5.0	12
1310	13	10.50	1.59	6	11.90	1.80	110	8 x 5	5.0	16
1601	16	1.00	0.15	8	1.30	0.18	120	6 x 4	5.0	12
2501	25	1.14	0.15	20	1.10	0.17	120	6 x 4	5.0	-
2502	25	2.00	0.28	20	2.20	0.31	120	8 x 5	5.0	13
2505	25	4.20	0.64	20	4.80	0.73	110	8 x 5	5.0	16
EXTRONIC	- metering p	oumps for	media of h	igher viscosi	ty					
1006	10	6.00	0.83	5	7.20	1.00	120	DN 10	2.0	-
0814	8	14.00	2.12	4	15.40	2.33	110	DN 15	2.0	-
1002	10	2.30	0.31	5	2.70	0.38	120	DN 10	1.8	-
1310	10	10.50	1.59	5	11.90	1.80	110	DN 15	2.8	-
EXTRONIC	- metering p	oumps wit	th self-bleed	ding dosing h	nead					
1201	12	1.00	0.14	-	-	-	120	6 x 4	2.0	-
0803	8	2.40	0.33	-	-	-	120	6 x 4	2.8	-
1002	10	1.80	0.25	-	-	-	120	6 x 4	2.0	-
1601	16	0.66	0.09	-	-	-	120	6 x 4	1.8	-

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 suc- tion/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

G Gas-EX-proof	EXBb	Enclosure rating								
Topic Capacity										
1000 10 bar 25 bar 1.4 l/h			1	nd explosion protection, permitted liquid end material: stainless steel and PTFE						
1000 10 bar 1.14 bh 120 bar 1.14 bh 120 bar 1.00 bh 180 bar 1.00 bh 180 bar 1.00 bh 180 bar 1.00 bh		Type Capacity								
160				10 bar	0.19 l/h					
1601 16 bar 1.00 l/h 120 l/h			2501	25 bar	1.14 l/h	(onl	v avai	lable in SSM and SBM)		
1201 12 bar 1.70 l/h 0803 8 bar 3.70 l/h 100a 2.30 l/h 250a 2.00 l/h 250a 2.00 l/h 100a 6.00 l/h 101 bar 6.00 l/h 101 bar 1.74 0 l/h 250 2.5 bar 2.00 l/h 201 4.20 l/h 250 bar 1.70 l/h 250 2.5 bar 1.70 l/h 250 3.5 bar 1.70 l/h 250 2.5 bar 1.70 l/h 250 3.5 bar 1.70 l/h 250 3.5 bar 1.70 l/h 250 3.5 bar 1.70 l/h 250 3.5 bar 1.70 l/h 250 3.5 bar 1.70 l/h 250 3.5 bar 1.70 l/h 250 4.20 l/h 201 6.00 l/h 201 6.00 l/h 201 6.00 l/h 201 6.00 l/h 201 6.00 l/h 201 7.70 l/h 202 7.70 l/h 202 7.70 l/h 203 7.70 l/h 204 7.70 l/h 205 7.70 l/h 205 7.70 l/h 205 7.70 l/h 205 7.70 l/h 206 7.70 l/h 206 7.70 l/h 207 7.70 l/h 208 7				1	1	1,	•	,		
1002			1	1	1					
1002			0803	8 bar	3.70 l/h					
0.338			1	1						
2502 25 bar 2.00 /h (available in SS and SB only) 10 0ar 6.00 /h			1	1						
1006 10 bar 6.00 l/h 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 (6.00 l/h Liquid and material PP1 Polypropylene with EPDM O-ring PP4 Polypropylene with EFDM O-ring NP1 * Clear acrylic with FKM A O-ring NP1 * Clear acrylic with FKM B O-ring TT1 SS1 Stainless steel with 1/4* NP1 internal thread, PTFE seal SS2 Stainless steel with 1/4* NP1 internal thread, PTFE seal SS3 SS1, with diaphragm rupture indicator , Type 2501 only as SS1, 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 External contact 1 External contact 2 Analogue 0-20 mA 3 Analogue 4-20 mA, Intrinsically safe [i,a] 5 Analogue 4-20 mA, Intrinsically safe [i,a] 6 Analogue 4-20 mA, Intrinsically safe [i,a] 7 Manual with zero volts ON/OFF, intrinsically safe [i,a] 8 Manual with zero volts ON/OFF, intrinsically safe [i,a] 8 Manual with zero volts ON/OFF, intrinsically safe [i,a]			1	1	1	l (ava	ailable	in SS and SB only)		
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 0430 4 bar 27.00 l/h 10200 194			1			1(0.00		35 a 35 a y,		
0417 4 bar 17-40 kh 2505 25 bar 4:20 kh (available in SS and SB only) 130 bar 10.50 kh (only available in NP, PP4, SS and SB) 0814 8 bar 14.00 kh 27.00 kh 0260 2 bar 60.00 kh 10.00 kh			1							
25 bar 1310 13 bar 10.50 l/h (lonly available in SS and SB only) 1350 l/h (lonly available in NR, PP4, SS and SB) 1841 14.00 l/h 2 bar 60.00 l			1	1	1					
1310 13 bar 10.50 l/h (only available in NP, PP4, SS and SB) 8 bar 14.00 l/h 0430 2 bar 27.00 l/h 0260 2 bar 66.00 l/h Liquid end material PP1 PP1 PP4 NP1 ** Clear acrylic with FKM A O-ring NP3** Clear acrylic with FKM A O-ring TT1 PF with carbon, PTFE seal SS1 Stainless steel, no. 1.4404, with PTFE seal SS2 Stainless steel with 1/4" NP1 internal thread, PTFE seal SS3 Stainless steel with 1/4" NP1 internal thread, PTFE seal SSM as SS1, with diaphragm rupture indicator , Type 2501 only as SS1, with diaphragm rupture indicator , Type 2501 only as SS1, 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 Control type Control type D Manual stroke rate adjustment via potentiometer External contact			1	1	1	l (ava	ailable	in SS and SB only)		
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 HV for high-viscosity media with EPDM O-ring and valve springs in Hastelloy C, Only for types 1002, 1006, 1310 and 0814 NP1 ** NP3 ** Clear acrylic with FKM A O-ring NP3 ** S1 Stainless steel, no. 1.404, with PTFE seal S21 Stainless steel with 1/4" NPT internal thread, PTFE seal S31 Stainless steel with 180 7 Rp 1/4 internal thread, ISO 7 Rp 1/2 on type 0260, PTFE seal (recommended for flammable materials) S3M as S31, with diaphragm rupture indicator , Type 2501 only as S31, with diaphragm rupture indicator , Type 2501 only Valve springs 0 no valve spring 1 With 2 valve springs 0 no valve spring 1 Electrical Connection A 230 V.50/60 Hz B 115 V,50/60 Hz Control type 0 Manual stroke rate adjustment via potentiometer External contact 2 Analogue 0-20 mA 3 Analogue 0-20 mA 4 External contact, intrinsically safe [i.a] 5 Analogue 0-20 mA, intrinsically safe [i.a] 7 Manual with zero volts ON/OFF, intrinsically safe [i.a] 7 Manual with zero volts ON/OFF, intrinsically safe [i.a]			1	1	1	,		• • • • • • • • • • • • • • • • • • • •		
Oddo			1	1	1		, ara	,,,		
Control type				1	l .					
Liquid end material PP1 Polypropylene with EPDM O-ring PP4 NP1* Olear acrylic with FKM A O-ring NP3* Clear acrylic with FKM B O-ring NP3 * Clear acrylic with FKM B O-ring NP3 * Stainless steel, no. 1.4404, with PTFE seal SS1 SS2 SS2 SS3 Stainless steel with 1/4* NPT internal thread, PTFE seal SS3 SS4 SS5, with diaphragm rupture indicator , Type 2501 only as SS1, 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 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] 7 Manual with zero volts ON/OFF, intrinsically safe [i,a] 7 Manual with zero volts ON/OFF, intrinsically safe [i,a]			1	1						
PP1 Polypropylene with EPDM O-ring 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 PTFE with carbon, PTFE seal Stainless steel, no. 1.4404, with PTFE seal Stainless steel with 1/4" NPT internal thread, PTFE seal Stainless steel with 1/4" NPT internal thread, ISO 7 Rp 1/2 on type 0260, PTFE seal (recommended for flammable materials) as SS1, with diaphragm rupture indicator , Type 2501 only as SB1, with diaphragm rupture indicator , Type 2501 only Valve springs O no valve spring O no valve spring O no valve spring			0200			al				
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* NP3* TT1 PTE with carbon, PTE seal Stainless steel, no. 1.4404, with PTFE seal Stainless steel with I/3* NPT internal thread, ISO 7 Rp 1/2 on type 0260, PTFE seal (recommended for flammable materials) as SS1, 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] 7 Manual with zero volts ON/OFF, intrinsically safe [i,a] Manual with zero volts ON/OFF, intrinsically safe [i,a]							with	EPDM O-ring		
NP1 * Clear acrylic with FKM A O-ring NP3 * Clear acrylic with FKM B O-ring TT1 PTFE with carbon, PTFE seal Stainless steel, no. 1.4404, with PTFE seal Stainless steel with 1/4" NPT internal thread, PTFE seal Stainless steel with 1/4" NPT internal thread, ISO 7 Rp 1/2 on type 0260, PTFE seal (recommended for flammable materials) as SS1, with diaphragm rupture indicator , Type 2501 only as SS1, with diaphragm rupture indicator , Type 2501 only Valve springs 0										
NP3 * Clear acrylic with FKM B O-ring TT1 SS1 SS2 Stainless steel, no. 1.4404, with PTFE seal Stainless steel with 1/4" NPT internal thread, PTFE seal Stainless steel with 1/50 7 Rp 1/4 internal thread, ISO 7 Rp 1/2 on type 0260, PTFE seal (recommended for flammable materials) as SS1, with diaphragm rupture indicator, Type 2501 only as SS1, 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 External contact 2 Analogue 0-20 mA 3 Analogue 4-20 mA 4 External contact, intrinsically safe [i,a] 5 Analogue 4-20 mA, intrinsically safe [i,a] 7 Manual with zero volts ON/OFF, intrinsically safe [i,a] Manual with zero volts ON/OFF, intrinsically safe [i,a]				1						
TT1 SS1 stainless steel, no. 1.4404, with PTFE seal Stainless steel with 1/4" NPT internal thread, PTFE seal Stainless steel with 1/4" NPT internal thread, ISO 7 Rp 1/2 on type 0260, PTFE seal (recommended for flammable materials) as SS1, with diaphragm rupture indicator, Type 2501 only as SB1, with diaphragm rupture indicator, Type 2501 only Valve springs 0						-		· ·		
SS1 Stainless steel, no. 1.4404, with PTFE seal SS2 Stainless steel with 1/4" NPT internal thread, PTFE seal SSB1 Stainless steel with ISO 7 Rp 1/4 internal thread, ISO 7 Rp 1/2 on type 0260, PTFE seal (recommended for flammable materials) as SS1, with diaphragm rupture indicator , Type 2501 only SBM SBM sSB1, 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] 7 Manual with zero volts ON/OFF, intrinsically safe [i,a]						-		· ·		
SS2 Stainless steel with 1/4" NPT internal thread, PTFE seal Stainless steel with ISO 7 Rp 1/4 internal thread, ISO 7 Rp 1/2 on type 0260, PTFE seal (recommended for flammable materials) as SS1, with diaphragm rupture indicator , Type 2501 only as SS1, 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 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] 7 Manual with zero volts ON/OFF 8 Manual with zero volts ON/OFF, intrinsically safe [i,a]					1					
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) as SS1, with diaphragm rupture indicator , Type 2501 only as SB1, 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				1						
as SS1, with diaphragm rupture indicator , Type 2501 only as SB1, 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, intrinsically safe [i,a]				1						
SBM as SB1, 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 External contact, intrinsically safe [i,a] 5 Analogue 4-20 mA, intrinsically safe [i,a] 6 Analogue 4-20 mA, intrinsically safe [i,a] 7 Manual with zero volts ON/OFF, intrinsically safe [i,a]					1					
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 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, intrinsically safe [i,a]				SBM	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]					Valve spri	ings				
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, intrinsically safe [i,a]					0	no v	valve s	spring		
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, intrinsically safe [i,a]					1	Witl	h 2 va	ulve springs, 1.4571, 0.1 bar		
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]						Elec	ctrical	Connection		
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]						Α	230 \	V, 50/60 Hz		
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]						В	115 \	V, 50/60 Hz		
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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]							1 E	External contact		
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]							2 A	Analogue 0-20 mA		
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]							3 A	Analogue 4-20 mA		
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]							4 E	External contact, intrinsically safe [i,a]		
7 Manual with zero volts ON/OFF 8 Manual with zero volts ON/OFF, intrinsically safe [i,a]							5 A	Analogue 0-20 mA, intrinsically safe [i,a]		
8 Manual with zero volts ON/OFF, intrinsically safe [i,a]							6 A	Analogue 4-20 mA, intrinsically safe [i,a]		
							7 N	Manual with zero volts ON/OFF		
							8 1	Manual with zero volts ON/OFF, intrinsically safe [i,a]		
Control Variants								Control Variants		
0 With potentiometer, Only for control types 0, 7 and 8							c	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							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							2	With manual auxiliary frequency changer key for maximum stroke rate, Only for control types 1 – 6		
Approved/Language								Approved/Language		
0 BVS - Europe, German, 100 V - 500 V								0 BVS - Europe, German, 100 V - 500 V		
BVS - Europe, English, 100 V - 500 V										
2 FM - USA, English, 115 V										
3 CSA - Canada, English, 115 V, 230 V								3 CSA - Canada, English, 115 V, 230 V		

^{*} FKM = Fluorine Rubber



2.2 Diaphragm Metering Pumps

Design of connectors

with stainless steel SS1/SSM	6, 8 and 12 mm	Swagelok system threaded connector
with stainless steel SS2	6, 8 and 12 mm	Internal thread 1/4" NPT
with stainless steel SS1/SBM	6, 8 and 12 mm	Internal thread ISO 7 Rp 1/4

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.



2.2 **Diaphragm Metering Pumps**

Spare Parts Kits for Diaphragm Metering Pump ProMinent EXTRONIC

Scope of delivery for PP and NP mat. versions:

Scope of delivery for TT-PTFE material version:

Order no.

1 metering diaphragm

1 suction valve assembly 1 discharge valve assembly

2 valve balls

1 sealing set, complete

1 connector kit

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: Scope of delivery for SS stainless steel mat. vers.:

1 metering diaphragm

1 suction valve assembly

1 connector component assembly

1 discharge valve assembly

1 bleed valve assembly

1 connector kit

1 metering diaphragm

4 valve balls

4 ball seat discs 1 sealing set, complete

1 connector kit

Pump type			

EXBb 1000	PP1		740357
EXBb 1000	NP3		740354
EXBb 1000	Π		910776
EXBb 1000	SS/SK		910777
EXBb 2501	SBM		1020281
EXBb 2501	SSM		1020282
EXBb 1601	PP1		740361
EXBb 1601	NP3		740358
EXBb 1601	NS3/PS3		792033
EXBb 1601	П		910778
EXBb 1601	SS/SK		910779
EXBb 1201	PP1		740380
EXBb 1201	NP3		740362
EXBb 1201	NS3/PS3		792034
EXBb 1201	Π		910780
EXBb 1201	SS/SK		910781
EXBb 0803	PP1		740384
EXBb 0803	NP3		740381
EXBb 0803	NS3/PS3		792035
EXBb 0803	П		910782
EXBb 0803	SS		910783
EXBb 1002/2502	PP1		740388
EXBb 1002/2502	NP3		740385
EXBb 1002/2502	NS3/PS3		792036
EXBb 1002/2502	Π		910784
EXBb 1002/2502	SS		910785
EXBb 1002/2502	HV/PP 4	Type 1002	910743
EXBb 0308/1006/2505	PP1		740497
EXBb 0308/1006/2505	NP1		740498
EXBb 0308/1006/2505	Π		910957
EXBb 0308/1006/2505	SS		910959
EXBb 0308/1006/2505	HV/PP4	Type 1006	910939
EXBb 0613/1310	PP1		740504
EXBb 0613/1310	NP1		740505
EXBb 0613/1310	Π		910969
EXBb 0613/1310	SS		910971
EXBb 0613/1310	HV/PP4	Type 1310	910941
EXBb 0417/0814	PP1		740501
EXBb 0417/0814	NP1		740502
EXBb 0417/0814	Π		910977
EXBb 0417/0814	SS		910979
EXBb 0417/0814	HV/PP4	Type 0814	910943
EXBb 0430-DN 10	PP1		740507
EXBb 0430-DN 10	NP1		740508
EXBb 0430-DN 10	TT		910993
EXBb 0430-DN 10	SS		910995

Spare parts kit as of DN 10 with single ball valves.



Process metering technology

2.2 **Diaphragm Metering Pumps**



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	

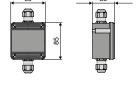
Ex-Proof Ancillary Equipment



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 explo-

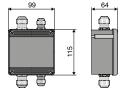




Plastic terminal box: Type II

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).

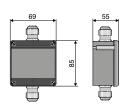
	Order no.	
2 inputs (mains and controller cable), 2 outputs 2 terminals + PE, 1	1000072	
partition, 2 terminals and 2 M 20-12 screw glands and 2 M 16-0.8 screw		
glands		



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	1000073	
screw glands		



2.2 **Diaphragm Metering Pumps**



Rp 1/2

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/

	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	

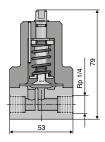
Stainless steel 1.4404 "SB" dosing valve

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 $< 10^7 \, \Omega$

Material	Length	Connector size outside Ø x inside 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	

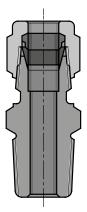
Permissible operating pressure at 20 °C as per DIN EN ISO 7751 subject to chemical resistance and correct connection

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 accesso-

(Hydraulic/mechanical accessories, see page → 159)



2.2 Diaphragm 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.

	Order no.
6 mm - ISO 7 R 1/4	359526
8 mm - ISO 7 R 1/4	359527
12 mm - ISO 7 R 1/4	359528
16 mm - ISO 7 R 1/2	359529



2.2 Diaphragm Metering Pumps

2.2.2

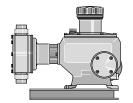
Diaphragm Metering Pump Makro TZ

Greater safety in continuous operation through mechanically deflected multi-layer safety diaphragm.

Capacity range of single head pump: 260 - 2,100 l/h, 12 - 4 bar



The modular construction of the diaphragm metering pump MAKRO 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.



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 safety and reliability:

- Patented multi-layer safety diaphragm with integral diaphragm rupture warning system
 - Metering reproducibility is better than ± 2% within the 30 100% stroke length range under defined conditions and with correct installation



- The modular construction with single and double head versions permits a wide range of applications, with the double head designs being operated in push-pull mode
- It is possible to combine up to 4 metering units, even with different pump capacities, in multiple pump systems
- 5 different gear ratios are available
- Customised designs are available on request

Makro TZ TZMb

Makro TZ externally mounted pump

Makro TZ double head pump

Technical Details

- Stroke length: 0-10 mm, Rod force: 8,000 N
- Stroke length adjustment range: 0 100%
- Stroke length adjustment: manually by scaled rotary dial in 0.5% increments (optionally with electric actuator or control drive)
- Metering reproducibility is better than ± 2% within the 30 100% stroke length range under defined conditions and with correct installation. Observe the information in the operating instructions
- Patented multi-layer safety diaphragm with optical diaphragm rupture display (optionally with electrical diaphragm rupture warning system / warning via a contact)
- Wetted materials: Polypropylene, PVC, PTFE+25% carbon, stainless steel 1.4571. Special materials are available on request
- A wide range of 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 overload protection mechanisms during the installation of all mechanically deflected diaphragm metering pumps

Field of application

- Volume-proportional metering of chemicals/additives in water treatment
- Metering of reactants and catalysts in the chemical industry
- Level-dependent metering of additives in industrial production engineering



Process metering technology

2.2 **Diaphragm Metering Pumps**

Technical data for MAKRO TZMb

Туре	Capac			pressure with notor at 50 Hz	Capacity	y at max. ba	nck pressure rpm mot	Suction lift	Connector Suction/ Discharge Side	Shipping weight PP, NP, TT-SS	
				Max. stroke				Max.			
				rate				stroke rate			
	l/h	bar	ml/	Strokes/min	l/h	psi	gph (US)	Strokes/	m WC	G-DN	kg
			stroke					min			
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

Stroke length 10 mm

Plastic material design: max. 10 bar back pressure

The permissible priming pressure on the suction side is approximately 50% of the max. permitted back pressure

Wetted materials for MAKRO TZMb

			DN 25 ball	valves		DN 32 / DN 40 plate valves			
Identity	Dosing head	Connection	Seals DN	Valve balls	Valve	Seals DN	Valve plates/valve	Valve	
code of material		on suction/ discharge side	25		seats	32/DN 40	springs	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	
ТТТ	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.

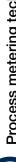
Special designs available on request.



2.2 Diaphragm Metering Pumps

Identity Code Ordering System for Makro TZMb Mechanically Deflected Diaphragm Metering Pump

TZMb	Drive type												
	H	Main drive											
	A	Add-on drive											
	D	Main drive for	double-head	pump									
	В	Add-on drive t	for double-hea	ad pump									
		Type *											
1		120260											
		120340											
		120430											
		120510											
1		120650											
		070430											
		070570											
		070720											
		070860											
		071070											
		040840											
		041100											
		041100											
		041400											
		042100	Limited and										
			Liquid end m										
			PC	PVC									
			PP	Polypro									
			SS	Stainles									
1			Π		25% car								
1					of seals/	'diaphrag	ım						
				Т	PTFE								
					Displace	ement bo	,						
					1				gm with r	upture in	dicator		
1						_	nd versio						
1						0	no valve						
1						1		ve spring					
1							-	ic conne					
							0	1	d connec				
1							1	1	ion nut a				
1							2	1	ut and in				
							3	1	nion nut		t		
1							4		n nut and	d insert			
								Version	1				
1								0	1	Minent Id			
								2	1	ProMine	_		
1								А	1		-	th frame, si	
								В	1		-	th frame, d	
								С			logo, wit	th frame, tr	iplex
								М	Modified				
										al power			
1									S	3 ph. 23	30/400 V	/ 50/60 Hz	
									R	Variable	speed r	notor 4-po	le, 230/400 V
1									V-0	Variable	speed r	notor with	integrated frequency converter
									Z		control c		
									L			/ 50 Hz (Ex	
1									Р	3 ph. 23	30/400 V	/ 60 Hz (Ex	e, Exd)
									4	no moto	or, with n	notor flang	e 56 C
1									7	no moto	or, with n	notor flang	e 120/80
									8	no moto	or, with n	notor flang	e 160/90
1									0	Without	motor, e	externally n	nounted drive
										Enclosu			
										0	IP 55 (s	standard)	
1										2	Exd mo	otor versior	n ATEX-T4
										А	ATEX d	Irive	
1											Stroke	sensor	
											0	No stroke	e sensor
											1		ke sensor (Namur)
													ngth adjustment
												0	Stroke length adjustment, manual
												1	230 V stroke actuator
1												2	115 V stroke actuator
												3	230 V 0-20 mA stroke controller
	l	1	1	1								4	230 V 0-20 mA stroke controller
						1	1	i .	1	1	1	14	12.5U V 4-ZU IIIA SIIOKA CONTROLLAR
												1	
												5	115 V 0-20 mA stroke controller
												1	115 V 0-20 mA stroke controller 115 V 4-20 mA stroke controller, Servomotors fo
												5	115 V 0-20 mA stroke controller



2.2 **Diaphragm Metering Pumps**



- Figure 1 + 2=back pressure [bar]; figure 3 6=pump capacity [l/h] Material versions PCT/PPT/TTT max. 10 bar

2.2 Diaphragm Metering Pumps

Motor data for MAKRO TZMb

	Wiotoi da	ta for IVIAINTO IZIVID			
Identity code specification		Power supply			Remarks
Ŝ	3-phase, IP 55*	230 V/400 V 265 V/460 V	50 Hz 60 Hz	0.75 kW	
R	3-phase, IP 55°	230 V/400 V	50/60 Hz	1.5 kW	With PTC, speed control range 1:20 with external fan (1-phase 230 V; 50/60 Hz, 20 W)
VO	3-phase, IP 55*	230 V ±5%	50/60 Hz	1.5 kW	Variable speed motor with integrated frequency converter
L1	3-phase, II 2G Ex eb IIC T3 Gb	220 – 240 V/380 – 420 V	50 Hz	0.75 kW	On request
L2	3-phase, II 2G Ex db IIC T4 Gb	220 – 240 V/380 – 420 V	50 Hz	0.75 kW	With PTC, speed control range 1:5
P1	3-phase, II 2G Ex eb IIC T3 Gb	250 – 280 V/440 – 480 V	60 Hz	0.75 kW	On request
P2	3-phase, II 2G Ex db IIC T4 Gb	250 – 280 V/440 – 480 V	60 Hz	0.75 kW	With PTC, speed control range 1:5
V2	3-phase, Il 2G Ex de IIC T4	400 V ±10 %	50/60 Hz	1.5 kW	Ex-variable speed motor with integrated frequency converter, 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.

The motors are designed in compliance with the Ecodesign Directive 2009/125/EC.

Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/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.



Process metering technology

2.2 **Diaphragm Metering Pumps**

Spare parts MAKRO TZMb

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

- 1 metering diaphragm (multi-layer safety diaphragm)
- 1 suction valve assembly
- 1 discharge valve assembly
- 2 valve balls (DN 32/DN 40 with plate and spring)
- 1 complete sealing set (O-rings or flat seals, valve seats, valve seat bushings)

Spare parts kits for diaphragm metering pump MAKRO TZMb

Identity Code: 120260, 120340, 120430, 120510, 120650

Liquid end			Order no.	
FM 650 - DN 25	PCT, PPT, TTT		1025164	
FM 650 - DN 25	SST		1022896	
FM 650 - DN 25	SST	without valves cpl.	1022895	

Identity Code: 070430, 070570, 070720, 070860, 071070

Liquid end			Order no.	
FM 1100 - DN 32	PCT, PPT, TTT		1025167	
FM 1100 - DN 32	SST		1022917	
FM 1100 - DN 32	SST	without valves cpl.	1022916	

Identity Code: 040840, 041100, 041400, 041670, 042100

Liquid end			Order no.	
FM 2100 - DN 40	PCT, PPT, TTT		1025169	
FM 2100 - DN 40	SST		1022930	
FM 2100 - DN 40	SST	without valves cpl.	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

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.



2.3.1

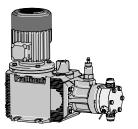
Hydraulic Diaphragm Metering Pump HYDRO Classic

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 drive versions is available for use in areas at risk from explosion with ATEX certification. The Hydro product range is designed to comply with API 675 among others.

Your Benefits

Excellent process safety and reliability:

- PTFE multi-layer diaphragm with integral diaphragm rupture warning system
- Integral hydraulic relief valve
- Metering reproducibility is better than ± 1% within the 20-100% stroke volume range under defined conditions and with proper installation

Excellent flexibility:

- The modular construction with single and double head versions permits a wide range of applications, with the double head designs being operated in push-pull mode
- It is possible to combine up to 5 metering units, even with different pump capacities, in multiple pump systems
- 5 different gear ratios are available



HYDRO double-head pump

Technical Details

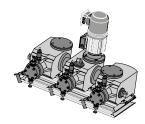
- Stroke length: 15 mm (HP2a, HP3a), 20 mm (HP4a)
- Rod force: 2000 N (HP2a), 4200 N (HP3a), 5800 N (HP4a)
- Stroke volume adjustment range: 0 100%
- Stroke volume adjustment: manually using scaled rotary dial (optionally with electric actuator or control drive)
- Metering reproducibility is better than ± 1% in 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 bleed valve
- Wetted materials: PVDF, PTFE+25% carbon, stainless steel 1.4571, Hastelloy C.
- A wide range of 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 → PL



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



2.3.1.1

Hydraulic Diaphragm Metering Pump HYDRO HP2a

Technical data for HYDRO HP2a

Туре				back pres- m motor at 50 Hz	Capacity at max. back pressure at 60 Hz			Suc- tion lift	Perm. pre-pres- sure suc- tion side	Suction / discharge side con- nector	Ship- ping weight	Plunger Ø
				Мах.			Max.					
				stroke rate			stroke rate					
	l/h	bar	ml/	Strokes/	psi	I/h/gph (US)	Strokes/	m WC	bar	G-DN	kg	mm
100000 #			stroke	min	==		min					
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 *	10	100	3.0	187	1,450	11.0/2.9	224	3.0	5	Rp 1/4	31	16
100010 *		100	3.0	212	-	0.4/0.0	70	3.0	5	Rp 1/4	31	16
064007	7 15	64	3.8	60	928	8.4/2.2	72	3.0	5	G 3/4-10	31	18 18
064015	18	64 64	3.8	125	928	18.0/4.8	150	3.0	5	G 3/4-10	31	
064018 064022	22	64	3.8 3.8	150 187	928	21.0/5.5	180	3.0	5	G 3/4-10 G 3/4-10	31 31	18 18
064022	25	64	3.8	212	928	26.0/6.9	224	3.0	5 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
040014	29	40	5.7	125	580	34.8/9.2	150	3.0	5	G 3/4-10	31	22
040029	35	40	5.7	150	580	42.0/11.1	180	3.0	5	G 3/4-10	31	22
040033	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	02.0/10.5	-	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

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/dis- charge side	Seals/ball seat	Balls
HCT	Hastelloy C	Hastelloy C	PTFE/Hastelloy C	Ceramic
PVT *	PVDF	PVDF	PTFE/PTFE	Ceramic
SST	Stainless steel 1.4571/1.4404	Stainless steel 1.4581	PTFE/stainless steel 1.4404	Ceramic
ТП	PTFE + 25% carbon	PVDF (polyvinylidene fluoride)	PTFE/PTFE	Ceramic

Not for areas at risk from explosion



^{**} HV design with G1 - DN 15 connector

	Motor da	ta for HYDRO HP2a			
Identity code specification		Power supply			Remarks
Ś	3-phase, IP 55	220 - 240 V/380 - 420 V	50 Hz	0.37 kW	
		250 - 280 V/440 - 480 V	60 Hz		
Т	3-phase, IP 55	220 - 240 V/380 - 420 V	50 Hz	0.37 kW	With PTC, speed control range 1:5
		250 – 280 V/440 – 480 V	60 Hz		
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
VO	1-phase, IP 55	230 V ±10%	50/60 Hz	0.37 kW	Variable speed motor with integrated frequency converter
L1	3-phase, II 2G Ex eb IIC T3 Gb	220 – 240 V/380 – 420 V	50 Hz	0.37 kW	
L2	3-phase, Il 2G Ex de IIC T4 Gb	220 – 240 V/380 – 420 V	50 Hz	0.37 kW	With PTC, speed control range 1:5
P1	3-phase, Il 2G Ex e Il T3	254 - 277 V/440 - 480 V	60 Hz	0.37 kW	
P2	3-phase, Il 2G Ex de IIC T4	254 - 277 V/440 - 480 V	60 Hz	0.37 kW	With PTC, speed control range 1:5
V2	3-phase, Il 2G Ex db IIC T4T6 Gb	400 V ± 10 %	50/60 Hz	0.55 kW	Ex-variable speed motor with integrated frequency converter

^{*} 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.

The motors are designed in accordance with the Eco Design Directive 2009/125/EC.

Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/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 HP2a

D:::													
Drive t													
H	Main drive												
D	Main drive, o												
E	Main drive fo	or add-on	pump										
F	Main drive,	double-he	ad version for	add-on	gmuc								
Α	Add-on drive												
В			la a a al a . a										
1			head version	1011									
Т		compris	ing 3 drives ar	nd 3 iden	tical head	is							
	Type		Capacity										
	100003		100 bar	3 l/h									
	100006		100 bar	6 l/h									
	100007		100 bar	7 l/h									
				1									
	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									
			1	1									
	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									
			1	1									
	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									
	023000	12		100 1/11									
			end material										
		SS	Stainless ste										
	1	PV	PVDF, Not t	or types	100, m	ax. 25 ba	ır						
		HC	Hastelloy C										
		П	PTFE + 25 9	6 carbon	max 16	har							
		1	Sealing mate		, 1110011 10	- DOI							
			-										
			1	PTFE									
				Diaphra	igm								
				0	Standa	d multila	er diaph	ragm with	n rupture	signallin	g facility		
					Liauid e	nd version	n						
					1		ve spring	10					
					D	1			- COT	-LUCT			
					1	1		, Only fo					
					H				19 – 02	5060, or	nly for SST		
						Hydraul	ic conne	ctions					
						0	Standar	d threade	ed conne	ector			
						E	!	N ISO flar					
						F	!	ISI flange	.90				
						'		voi ilalige					
							Version						
							0	with Pro		-			
							1	without	ProMine	nt logo			
							M	Modified	l				
	1	1						Electrica	l power	supply			
	1							S			10 V 50/er) Hz, 0.37 kW	
								T				, with PTC	
								R				r, 230 V/400 V, 0	
		1						V-0	Variable	speed r	notor with	integrated frequ	ency converter
		1				1		Z	1 ph, va	ariable sc	eed contro	ol cpl., 230 V, 50)/60 Hz
	İ	1	1	1		1	1	L	' '			ke, Exd), 0.37 kV	
		1				1		P	' '		,	ke, Exd), 0.37 kV	
								1	' '			. ,.	
	1							1				e B 14, size 200	ı
	1							3			0	e B5, size 160	
	1			1				4	no moto	or, with n	notor flange	e NEMA 56 C	
	1	1	1	1				0	Add-on				
	1		1							re rating			
	1								0				
	1										tandard)		
	1								2	!		n ATEX-T4	
	1								Α	ATEX di	rive		
	1	1		1						Stroke s	sensor		
	1		1							0		sensor (standa	rd)
	1				1					1	1	•	,
	1									1			on-proof applications)
	1										Stroke ler	ngth adjustment	
			1		1						0 1	Manual (Standar	d)
						1	I	1		i		,	A CONTRACTOR OF THE CONTRACTOR
					İ						11 IN	With stroke nosi	tioning motor 230 V/50/60 Hz
													•
											2	With stroke posi	tioning motor, 115 V/60 Hz
											2 A	With stroke posi With stroke cont	tioning motor, 115 V/60 Hz rol motor 0-20 mA 230 V/50/6
											2 A	With stroke posi With stroke cont	tioning motor, 230 V/50/60 Hz tioning motor, 115 V/60 Hz rol motor 0-20 mA 230 V/50/6 rol motor 4-20 mA 230 V/50/6

						D		rol motor 0-20 mA 115 V/60 Hz rol motor 4-20 mA 115 V/60 Hz
							0	standard
							1	Food grade
							2	Low temperature to -25 °C
							3	Low temperature Zone 2

Spare parts kits for HYDRO HP2a without valves

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.100SST	1029260	
16, 18	H1	HP2a.100HCT, HP2a.064HCT	1009571	
18	S1	HP2a.064SST	1005549	
22, 26	S1	HP2a.040SST, HP2a.025SST	1005553	
22, 26	H1	HP2a.040HCT, HP2a.025HCT	1009573	

^{*} Piston Ø 16 mm, material S1, version for double ball valves

Spare parts kits for HYDRO HP2a with valves

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.100PVT, HP2a.064PVT	1005548
18	S1	HP2a.064SST	1005550
22, 26	S1	HP2a.040SST, HP2a.025SST	1005554
22, 26	P1	HP2a.040PVT, HP2a.025PVT	1005552

Diaphragms PTFE/1.4404 for HYDRO HP2a

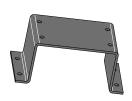
Plunger Ø	Material	Suitable for identity code	Order no.
_mm			
9, 12 (HA1a), 16, 18 (HA2a, HP2a)	S1, P1	HP2a.100SST, HP2a.064 SST, HP2a.100PVT, HP2a.064PVT	1005545
22, 26	S1, P1	HP2a.040SST, HP2a.025 SST, HP2a.040PVT, HP2a.025PVT	1005546

Diaphragms PTFE/Hastelloy C Coated for HYDRO HP2a

Plunger Ø mm	Material	Suitable for identity code	Order no.
16, 18	H1	HP2a.100HCT, HP2a.064HCT	1006481
22, 26	H1	HP2a.040HCT, HP2a.025HCT	1006482

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

Туре				back pres- m motor at 50 Hz	Capad	city at max. ba	ck pressure at 60 Hz	Suc- tion lift	Perm. pre-pres- sure suc- tion side	Suction / discharge side con- nector	Ship- ping weight	Plunger Ø
				Мах.			Max.					
				stroke rate			stroke rate					
	l/h	bar	ml/	Strokes/	psi	I/h/gph (US)	Strokes/	m WC	bar	G-DN	kg	mm
			stroke	min			min					
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

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
HCT	Hastelloy C	Hastelloy C	PTFE/Hastelloy C	Ceramic
PVT *	PVDF	PVDF	PTFE/PTFE	Ceramic
SST	Stainless steel 1.4571/1.4404	Stainless steel 1.4581	PTFE/ZrO ₂ (DN 15/DN20 stainless steel 1.4404)	Ceramic
ТТТ	PTFE + 25% carbon	PVDF (polyvinylidene fluoride)	PTFE/PTFE	Ceramic

* Not for areas at risk from explosion



^{**} HV design (SST only) with G 1 - DN 15 connector

^{***} HV design (SST only) with 1 1/4" - DN 20 connector

Motor data for HYDRO HP3a Identity Power supply Remarks code specification 3-phase, IP 55 220 - 240 V/380 - 420 V 50 Hz 0.75 kW 250 - 280 V/440 - 480 V 60 Hz Τ 3-phase, IP 55 220 - 240 V/380 - 420 V 50 Hz 0.75 kW with PTC, speed control range 1:5 250 - 280 V/440 - 480 V 60 Hz R 3-phase, IP 55 230 V/400 V 50/60 Hz with PTC, speed control range 1:20 0.75 kW with external fan 1-phase 230 V; 50/60 Hz V0 1-phase, IP 55 230 V ±10% 50/60 Hz 0.75 kW Variable speed motor with integrated frequency converter L1 3-phase, Il 2G Ex eb IIC 220 - 240 V/380 - 420 V 50 Hz 0.75 kW T3 Gb 220 - 240 V/380 - 420 V 50 Hz 0.75 kW L2 3-phase, Il 2G Ex de IIC T4 with PTC, speed control range 1:5 P1 3-phase, Il 2G Ex e Il T3 254 - 277 V/440 - 480 V 60 Hz $0.75~\mathrm{kW}$ P2 3-phase, II 2G Ex de IIC T4 254 - 277 V/440 - 480 V 60 Hz 0.75 kW with PTC, speed control range 1:5 V2 3-phase, Il 2G Ex db IIC $400 V \pm 10 \%$ 50/60 Hz 0.75 kW Ex-variable speed motor with integ-T3...T6 Gb rated frequency converter

Motor data sheets can be requested for more information. Versions 265/460V - 60Hz, special motors or special motor flanges are available on request.

The motors are designed in accordance with the Eco Design Directive 2009/125/EC.

Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/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.

^{*} Three-phase motor according to IEC 60034-1

Identity code ordering system for HYDRO HP3a

Main drive Main drive Autor of the action of the control of	HP3a	Drive typ	pe												
F		Н	Main drive												
F		D	Main drive, d	louble-he	ad version										ļ
F		1													
A Add contration Tiptic comprising a proximation and statistical toxado Tiptic compr						add-on o	Irive								
B Coulte-head vession and/or on altive		1			au version ioi	auu-on c	IIIVE								ļ
Types compressing 3 power ents and 3 identical heads		!	!		alal and differ										,
Total		!													
100110		T	Triplex comp	rising 3 p	ower ends and	d 3 identi	cal heads	3							
100025			Type		Capacity										
100025			100010		100 bar	10 l/h									
100035			100021		100 bar	21 l/h									
1000035	İ		100025		100 bar	25 l/h									
1000355			100031		100 bar	31 l/h									
DG4019															
064948															
064-048															
064-080															
064088															
D40029			l			1									
040022			064068		64 bar	68 l/h									
Q00074			040029		40 bar	29 l/h									
Q40092			040062		40 bar	62 l/h									
Q40092			040074		40 bar	74 l/h									
Q40105					1	1									
C25048					1	1									,
C25100			1		1	1									
Display					1	1									
C25170					1	1									
25 tar 170 Vh 1					1										
SS Staniless steel					1										
SS Stainless steel PV			025170			170 l/h									
PV				Liquid e	nd material										
HC				SS	Stainless ste	el									
TT				PV	PVDF, max.	25 bar, c	only for 02	25048 – (025170,	064019 -	- 064068	3			
TT				HC	Hastellov C										
PTFE Diaphragm Diaphragm with rupture signalling facility Diaphragm Diaphragm with rupture signalling facility Diaphragm with rupture signalling				lπ		carbon.	max. 16	bar							
PTE Diaphragm				1											
Diaphragm O Standard multilayer diaphragm with rupture signalling facility Liquid end version O No valve springs (standard) 1 With valve springs D Double ball valve , for 100010 – 100035, 064019 – 064060, only for SST and HCT H HV version , for 064019 - 064060, 25048 - 25170, only for SST Hydraulic connections O Standard threaded connector E With DNI ISOT flange F With DNI Sot flange Version O with ProMinent logo 1 without ProMinent logo 1 without ProMinent logo M Modified Electrical power supply S 3 ph. 230/400 V, 50/60 Hz, 0.75 kW T 3 ph. 230/400 V, 50/60 Hz, 0.75 kW T 3 ph. 230/400 V, 50/60 Hz, 0.75 kW V-O Variable speed motor, 230 V/400 V, 0.76 kW V-O Variable speed motor, 230 V/400 V, 0.76 kW V-O Variable speed control cpl., 230 V, 50/60 Hz L 3 ph. 230/400 V 50 Hz (Exe, Expl.), 0.75 kW P 3 ph. 266/400 V 50 Hz (Exe, Expl.), 0.75 kW 1 no motor, with motor flange B14, size 200 no motor, with motor flange B14, size 200 no motor, with motor flange B5, size 160 no motor, with motor flange B14, size 200 Add-on drive Enclosure rating					_										
Standard multilayer diaphragm with rupture signalling facility Liquid end version 0 No valve springs (standard) 1 With valve springs D Double bell valve, for 100010 – 100035, 064019 – 064060, only for SST and HCT H H Version, for 064019 - 064060, 25048 - 25170, only for SST and HCT Hydraulic connections 0 Standard threaded connector E With DNI ISO flange Wersion 0 with ProMinent logo 1 without ProMinent logo M Modified Electrical power supply S 3 3 ph, 230/400 V, 50/60 Hz, 0.75 kW 3 ph, 230/400 V, 50/60 Hz, with PTC R 3 ph, 230/400 V, 50/60 Hz, with PTC I sph, variable speed motor, 230 V/400 V, 0.75 kW V-0 Variable speed motor vith integrated frequency converter 1 ph, variable speed control opl, 230 V, 50/60 Hz L 3 ph, 230/400 V 50 Pt (Exe, Exd), 0.75 kW 1 no motor, with motor flange B14, size 200 3 no motor, with motor flange B5, size 160 no motor, with motor flange B6, size 160 no motor, with motor flange B6, size 160 no motor, with motor flange B6, size 160 P55 (standard) Exclosure rating PF5 (standard) PF5 (standard)					['		am								
Liquid end version						-	î .	d multila	or dianh	roam with	a ri nati ire	o oi an allin	a facility		
No valve springs (standard) With valve springs Double bell valve for 100010 - 100035, 064019 - 064060, only for SST and HCT HV version for 054019 - 064060, 25048 - 25170, only for SST Hydraulic connections O Standard threaded connector E With DIN ISO flange F With ANSI flange Version 0 with ProMinent logo 1 without ProMinent logo M Modified Electrical power supply S 3 ph, 230/400 V, 50/60 Hz, with PTC R 3 ph, variable speed motor, 230 W400 V, 0.75 kW V-0 Variable speed motor, 230 W400 V, 0.75 kW V-0 Variable speed motor, 230 W400 V, 50/60 Hz L 3 ph, 230/400 V 50 Hz (Exe, Exd), 0.75 kW P 3 ph, 265/440 V 60 Hz (Exe, Exd), 0.75 kW 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 B 14, size 200 1 no motor, with motor flange NEMA 56 C Add-on drive Encissure rating 0 IP 55 (standard) 2 Exert motor version ATEX-T4 A ATEX drive Stroke sensor (standard) 1 Stroke sensor (standard) 1 Stroke sensor (standard) 1 Stroke sensor (for explosion-proof applications) Stroke sensor (standard) 1 Manual (Standard)						ľ				ragiii wili	Trupture	s signann	ig lacility		
With valve springs							-	1		/ 1 1	n				
D							0				d)				
H							1	1							
Hydraulic connections 0 Standard threaded connector E With DNI ISO flange F With ANSI flange Version 0 with ProMinent logo 1 without ProMinent logo M Modified Electrical power supply S 3 ph, 230/400 V, 50/60 Hz, 0.75 kW T 3 ph, 230/400 V, 50/60 Hz, with PTC R 3 ph, variable speed motor, 230 V/400 V, 0.75 kW V-0 Variable speed motor, 230 V/400 V, 0.75 kW V-0 Variable speed motor orthol cpl, 230 V, 50/60 Hz L 3 ph, 230/400 V 50 Hz (Exe, Exd), 0.75 kW P 3 ph, 265/440 V 60 Hz (Exe, Exd), 0.75 kW n motor, with motor flange B14, size 200 n motor, with motor flange B15, size 160 no motor, with motor flange B16, size 160 no motor, with motor flange B17 kise 200 0 Add-on drive Enclosure rating 0 IP 55 (standard) 2 Exd motor version ATEX-T4 A ATEX drive Stroke sensor (standard) 1 Stroke sensor (for explosion-proof applications) Stroke length adjustment 0 Manual (Standard)							1	1							SST and HCT
Standard threaded connector With DIN ISO flange F With NASI flange Version 0 with ProMinent logo with ProMinent logo M Modified Electrical power supply S 3 ph, 230/400 V, 50/60 Hz, 0.75 kW T 3 ph, 230/400 V, 50/60 Hz, with PTC R 3 ph, variable speed motor, 230 V/400 V, 0.75 kW V-0 Variable speed motor with integrated frequency converter 2 1 ph, variable speed control cpl., 230 V, 50/60 Hz L 3 ph, 230/400 V 50 Hz (Exe, Exd), 0.75 kW P 3 ph, 285/440 V 60 Hz (Exe, Exd), 0.75 kW 1 no motor, with motor flange B 14, size 200 3 no motor, with motor flange B 14, size 200 3 no motor, with motor flange B 5, size 160 no motor, with motor flange NEMA 56 C Add-on drive Enclosure rating 0 IP 55 (standard) 2 Exd motor version ATEX-T4 A ATEX drive Stroke sensor 0 No stroke sensor (standard) 1 Stroke sensor (for explosion-proof applications) Stroke length adjustment 0 Manual (Standard)							H				064060	, 25048	- 25170,	only for SST	
E With DIN ISO flange With ANSI flange Version								Hydrauli	c conne	ctions					
With ANSI flange Version 0 with ProMinent logo without ProMinent logo M Modified Electrical power supply S 3 ph, 230/400 V, 50/60 Hz, 0.75 kW T 3 ph, 230/400 V, 50/60 Hz, with PTC R 3 ph, variable speed motor, 230 V/400 V, 0.75 kW V-0 Variable speed motor with integrated frequency converter Z 1 ph, variable speed control cpl., 230 V, 50/60 Hz L 3 ph, 230/400 V 50 Hz (Exe, Exd), 0.75 kW P 3 ph, 265/440 V 60 Hz (Exe, Exd), 0.75 kW 1 no motor, with motor flange B 14, size 200 3 no motor, with motor flange B 14, size 200 3 no motor, with motor flange NEMA 56 C 0 Add-on drive Enclosure rating 0 IP 55 (standard) 2 Exd motor version ATEX-T4 A ATEX drive Stroke sensor (standard) 1 Stroke sensor (for explosion-proof applications) Stroke length adjustment 0 Manual (Standard)								1	Standar	d threade	ed conne	ector			
Version 0 with ProMinent logo 1 without ProMinent logo Modified									With DII	N ISO flar	nge				
0 with ProMinent logo without ProMinent logo Modified Electrical power supply S 3 ph, 230/400 V, 50/60 Hz, 0.75 kW T 3 ph, 230/400 V, 50/60 Hz, with PTC R 3 ph, variable speed motor, v30 V/400 V, 0.75 kW V-0 Variable speed motor with integrated frequency converter Z 1 ph, variable speed control cpl., 230 V, 50/60 Hz L 3 ph, 230/400 V 50 Hz (Exe, Exd), 0.75 kW P 3 ph, 265/440 V 60 Hz (Exe, Exd), 0.75 kW no motor, with motor flange B14, size 200 no motor, with motor flange B14, size 200 no motor, with motor flange NEMA 56 C Add-on drive Enclosure rating 0								F	With AN	ISI flange					
Mithout ProMinent logo Modified Electrical power supply S									Version						
M Modified Electrical power supply									0	with Pro	Minent I	ogo			
Modified Electrical power supply S 3 ph, 230/400 V, 50/60 Hz, 0.75 kW T 3 ph, 230/400 V, 50/60 Hz, with PTC R 3 ph, variable speed motor, 230 V/400 V, 0.75 kW V-0 Variable speed motor with integrated frequency converter 2 1 ph, variable speed control cpl., 230 V, 50/60 Hz L 3 ph, 230/400 V 50 Hz (Exe, Exd), 0.75 kW P 3 ph, 265/440 V 60 Hz (Exe, Exd), 0.75 kW 1 no motor, with motor flange B 14, size 200 3 no motor, with motor flange B5, size 160 no motor, with motor flange NEMA 56 C 0 Add-on drive Enclosure rating 0 IP 55 (standard) Exd motor version ATEX-T4 A ATEX drive Stroke sensor (for explosion-proof applications) Stroke sensor (for explosion-proof applications) Stroke length adjustment 0 Manual (Standard) No stroke sensor (for explosion-proof applications) Stroke length adjustment 0 Manual (Standard) No stroke sensor (for explosion-proof applications) No stroke length adjustment 0 Manual (Standard) No stroke length adjustment No stroke length ad									1	without	ProMine	nt logo			
Electrical power supply S									м						
S										Flectrica	al nower	supply			
T 3 ph, 230/400 V, 50/60 Hz, with PTC R 3 ph, variable speed motor, 230 V/400 V, 0.75 kW V-0 Variable speed motor with integrated frequency converter I ph, variable speed control cpl., 230 V, 50/60 Hz L 3 ph, 230/400 V 50 Hz (Exe, Exd), 0.75 kW P 3 ph, 265/440 V 60 Hz (Exe, Exd), 0.75 kW no motor, with motor flange B 14, size 200 no motor, with motor flange B5, size 160 no motor, with motor flange NEMA 56 C Add-on drive Enclosure rating 0													/ 50/60 H	Hz 0.75 kW	
R 3 ph, variable speed motor, 230 V/400 V, 0.75 kW V-0 Variable speed motor with integrated frequency converter Z 1 ph, variable speed control cpl., 230 V, 50/60 Hz L 3 ph, 230/400 V 50 Hz (Exe, Exd), 0.75 kW P 3 ph, 265/440 V 60 Hz (Exe, Exd), 0.75 kW no motor, with motor flange B 14, size 200 no motor, with motor flange B 14, size 200 no motor, with motor flange NEMA 56 C Add-on drive Enclosure rating 0 IP 55 (standard) 2 Exd motor version ATEX-T4 A ATEX drive Stroke sensor 0 No stroke sensor (standard) 1 Stroke sensor (for explosion-proof applications) Stroke length adjustment 0 Manual (Standard)															
V-0 Variable speed motor with integrated frequency converter 2										1					75 WW
Z 1 ph, variable speed control cpl., 230 V, 50/60 Hz L 3 ph, 230/400 V 50 Hz (Exe, Exd), 0.75 kW P 3 ph, 265/440 V 60 Hz (Exe, Exd), 0.75 kW 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 Add-on drive Enclosure rating 0 IP 55 (standard) 2 Exd motor version ATEX-T4 A ATEX drive Stroke sensor 0 No stroke sensor (standard) 1 Stroke sensor (for explosion-proof applications) Stroke length adjustment 0 Manual (Standard)										1					
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 Add-on drive Enclosure rating 0 IP 55 (standard) 2 Exd motor version ATEX-T4 A ATEX drive Stroke sensor 0 No stroke sensor (standard) 1 Stroke sensor (for explosion-proof applications) Stroke length adjustment 0 Manual (Standard)										1		'			· '
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 motor version ATEX-T4 A ATEX drive Stroke sensor 0 No stroke sensor (standard) 1 Stroke sensor (for explosion-proof applications) Stroke length adjustment 0 Manual (Standard)										1					
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 motor version ATEX-T4 A ATEX drive Stroke sensor 0 No stroke sensor (standard) 1 Stroke sensor (for explosion-proof applications) Stroke length adjustment 0 Manual (Standard)										1					
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 motor version ATEX-T4 A ATEX drive Stroke sensor 0 No stroke sensor (standard) 1 Stroke sensor (for explosion-proof applications) Stroke length adjustment 0 Manual (Standard)										I .					
4 no motor, with motor flange NEMA 56 C 0 Add-on drive Enclosure rating 0 IP 55 (standard) 2 Exd motor version ATEX-T4 A ATEX drive Stroke sensor 0 No stroke sensor (standard) 1 Stroke sensor (for explosion-proof applications) Stroke length adjustment 0 Manual (Standard)										1	no mot	or, with r	notor flan	ige B 14, size 200	
0 Add-on drive Enclosure rating										3	no mot	or, with r	notor flan	ige B5, size 160	
Enclosure rating 0										4	no mot	or, with r	notor flan	ige NEMA 56 C	
0 IP 55 (standard) 2 Exd motor version ATEX-T4 A ATEX drive Stroke sensor 0 No stroke sensor (standard) 1 Stroke sensor (for explosion-proof applications) Stroke length adjustment 0 Manual (Standard)	į i			İ					İ	0	Add-on	drive			
0 IP 55 (standard) 2 Exd motor version ATEX-T4 A ATEX drive Stroke sensor 0 No stroke sensor (standard) 1 Stroke sensor (for explosion-proof applications) Stroke length adjustment 0 Manual (Standard)											Enclosu	ure ratino			
2 Exd motor version ATEX-T4 A TEX drive Stroke sensor 0 No stroke sensor (standard) 1 Stroke sensor (for explosion-proof applications) Stroke length adjustment 0 Manual (Standard)															
A ATEX drive Stroke sensor 0 No stroke sensor (standard) 1 Stroke sensor (for explosion-proof applications) Stroke length adjustment 0 Manual (Standard)												1		on ATEY_T/	
Stroke sensor O No stroke sensor (standard) 1 Stroke sensor (for explosion-proof applications) Stroke length adjustment O Manual (Standard)														JI AI LA-14	
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1 Stroke sensor (for explosion-proof applications) Stroke length adjustment 0 Manual (Standard)													1		
Stroke length adjustment O Manual (Standard)												0	1		
Stroke length adjustment O Manual (Standard)					[1	Strokes	sensor (for explosion	on-proof applications)
0 Manual (Standard)		İ			1	İ	İ	İ							
		İ			1	l	İ	İ							d)
That salette positioning motel, 200 9700/00 Hz					1								1		
														I Su su o posit	3

						2	With stroke posit	ioning motor, 115 V/60 Hz
						Α	With stroke conti	rol motor 0-20 mA 230 V/50/60 Hz
						В	With stroke conti	rol motor 4-20 mA 230 V/50/60 Hz
						С	With stroke conti	rol motor 0-20 mA 115 V/60 Hz
						D	With stroke conti	rol 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 HP3a

Spare parts kits for HYDRO HP3a without valves

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.100SST, HP3a.064SST	1005553
22 *	S1	HP3a.100SST	1005555
22, 26	H1	HP3a.100HCT, HP3a.064HCT	1009573
32, 38	S1	HP3a.040SST, HP3a.025SST	1005557
32, 38	H1	HP3a.040HCT, HP3a.025HCT	1009575

^{*} Piston Ø 22 mm, material S1, version for double ball valves (optional)

Spare parts kits for HYDRO HP3a with valves

Scope of delivery:

1 spare diaphragm complete, 1 suction valve, 1 injection valve, 1 sealing set, 2 valve seats, 2 valve balls

Plunger Ø	Material	Suitable for identity code	Order no.
mm			
22, 26	S1	HP3a.100SST, HP3a.064SST	1005554
22, 26	P1	HP3a.100PVT, HP3a.064PVT	1005552
32, 38	S1	HP3a.040SST, HP3a.025SST	1005558
32, 38	P1	HP3a.040PVT, HP3a.025PVT	1005556

Diaphragms PTFE/1.4404 for HYDRO HP3a

Plunger Ø mm	Material	Suitable for identity code	Order no.
22, 26	S1, P1	HP3a.100SST, HP3a.064SST, HP3a.100PVT, HP3a.064PVT	1005546
32, 38	S1, P1	HP3a.040SST, HP3a.025SST, HP3a.040PVT, HP3a.025PVT	1005547

Diaphragms PTFE/Hastelloy C Coated for HYDRO HP3a

Plunger Ø mm	Material	Suitable for identity code	Order no.
22, 26	H1	HP3a.100HCT, HP3a.064HCT	1006482
32, 38	H1	HP3a.040HCT, HP3a.025HCT	1006483

Base for HYDRO Hydraulic Diaphragm Metering Pumps

	Oraer 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

Туре				back presom motor at 50 Hz	Capad	Capacity at max. back pressure at 60 Hz			Perm. pre-pres- sure suc- tion side	Suction / discharge side con- nector	Ship- ping weight	Plunger Ø
				Max.			Max.					
				stroke rate			stroke rate					
	l/h	bar	ml/	Strokes/	psi	I/h/gph (US)	Strokes/	m WC	bar	G-DN	kg	mm
	L .		stroke	min			min	_				
400071	71	40	25.1	71	580	85/22	86	3	1	G 1 1/2-25	69	40
400105	105	40	25.1	103	580	126/33	124	3	1	G 1 1/2-25	69	40
400140	140	40	25.1	136	580	168/44	164	3	1	G 1 1/2-25	69	40
400190	190	40	25.1	188	580	188/49	225	3	1	G 1 1/2-25	69	40
400220	220	40	25.1	214	580		-	3	1	G 1 1/2-25	69	40
250130	130	25	42.4	71	363	155/41	86	3	1	G 1 1/2-25	69	52
250190	190	25	42.4	103	363	230/61	124	3	1	G 1 1/2-25	69	52
250250	250	25	42.4	136	363	300/79	164	3	1	G 1 1/2-25	69	52
250350	350	25	42.4	188	363	420/111	225	3	1	G 1 1/2-25	69	52
250400	400	25	42.4	214	-	-	-	3	1	G 1 1/2-25	69	52
160210	210	16	62.3	71	232	250/66	86	3	1	G 1 1/2-25	76	63
160300	300	16	62.3	103	232	360/95	124	3	1	G 1 1/2-25	76	63
160400	400	16	62.3	136	232	480/127	164	3	1	G 1 1/2-25	76	63
160550	550	16	62.3	188	232	660/174	225	3	1	G 1 1/2-25	76	63
160625	625	16	62.3	214	-	-	-	3	1	G 1 1/2-25	76	63
100330	330	10	100.4	71	145	400/106	86	3	1	G 2-32	87	80
100480	480	10	100.4	103	145	580/153	124	3	1	G 2-32	87	80
100635	635	10	100.4	136	145	760/201	164	3	1	G 2-32	87	80
100880	880	10	100.4	188	145	1,050/277	225	3	1	G 2-32	87	80
101000	1,000	10	100.4	214	-	-	-	3	1	G 2-32	87	80
070465	465	7	138.7	71	102	560/148	86	3	1	G 2 1/4-40	96	94
070670	670	7	138.7	103	102	805/213	124	3	1	G 2 1/4-40	96	94
070890	890	7	138.7	136	102	1,070/283	164	3	1	G 2 1/4-40	96	94
071230	1,230	7	138.7	188	102	1,450/383	225	3	1	G 2 1/4-40	96	94
071400	1,400	7	138.7	214	-	-	-	3	1	G 2 1/4-40	96	94

PVDF version max. 25 bar, PTFE + 25 % carbon; PTFE max.10 bar

Wetted materials for HYDRO HP4a

	********	materiale for fire	D. 10 111 10	•		
Identity code of material	Dosing head	Connection on suction/dis- charge side	Seals	Valve seats	Valve balls up to DN 25	Valve plates/ valve springs
HCT	Hastelloy C	Hastelloy C	PTFE	PTFE	Hastelloy C	Hastelloy C/E-CTFE
PVT *	PVDF	PVDF	PTFE	PTFE	Glass	Ceram- ic/E-CTFE
SST	Stainless steel 1.4404	Stainless steel 1.4404	PTFE	PTFE	Stainless steel 1.4401	Stainless steel 1.4404/ Hastelloy C
ПТ	PTFE + 25% carbon	PVDF (polyvi- nylidene fluoride)	PTFE	PTFE	Glass	Ceram- ic/E-CTFE

^{*} Not for areas at risk from explosion



	Motor da	ata for HYDRO HP4a			
Identity code speci- fication		Power supply			Remarks
S	3-phase, IP 55	220 - 240 V/380 - 420 V	50 Hz	1.1 kW	
		250 - 280 V/440 - 480 V	60 Hz		
T	3-phase, IP 55	220 - 240 V/380 - 420 V	50 Hz	1.1 kW	With PTC, speed control range 1:5
		250 – 280 V/440 – 480 V	60 Hz		
R	3-phase, IP 55	230 V/400 V	50/60 Hz	1.5 kW	With PTC, speed control range 1:20 with external fan 1-phase 230 V; 50/60 Hz
VO	3-phase, IP 55	400 V	50/60 Hz	1.5 kW	Variable speed motor with integrated frequency converter
L1	3-phase, Il 2G Ex e Il T3	220 - 240 V/380 - 420 V	50 Hz	1.1 kW	
L2	3-phase, Il 2G Ex de IIC T4 Gb	220 – 240 V/380 – 420 V	50 Hz	1.1 kW	With PTC, speed control range 1:5
P1	3-phase, Il 2G Ex e Il T3	254 - 277 V/440 - 480 V	60 Hz	1.1 kW	

^{*} Three-phase motor according to IEC 60034-1

400 V ± 10 %

254 - 277 V/440 - 480 V

3-phase, II 2G Ex de IIC T4

3-phase, Il 2G Ex de IIC T4

Motor data sheets can be requested for more information. Versions 265/460V - 60Hz, special motors or special motor flanges are available on request.

60 Hz

50/60 Hz

1.1 kW

1.5 kW

With PTC, speed control range 1:5

Ex-variable speed motor with integrated frequency converter

The motors are designed in accordance with the Eco Design Directive 2009/125/EC.

Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/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.



P2

V2

Identity code ordering system for HYDRO HP4a

Drive ty	type												
H	Main drive												
D		ble-head version											
E													
	Main drive for add-on drive Main drive, double-head version for add-on drive												
F		ble-head version fo	radd-on d	drive									
Α	Add-on drive												
В	Double-head ve	ersion add-on drive											
T	ı	ng 3 power ends ar	nd 3 ident	ical head	s								
l		Capacity											
	Type		71 1/5										
	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										
	I		1										
	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										
			1										
	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										
	l l	10 bar	1	h									
	101000	1	1,000 1/	11									
	070465	7 bar	465 l/h										
	070670	7 bar	670 l/h										
	070890	7 bar	890 l/h										
	071230	7 bar	1,230 1/	'n									
	07 1230												
	l		1.400 1/										
	071400	7 bar	1,400 1/										
	071400	7 bar iquid end material											
	071400 L S	7 bar iquid end material S Stainless st	eel										
	071400 L S	7 bar iquid end material S Stainless stainless	eel										-
	071400 L S	7 bar iquid end material S Stainless st	eel										-
	071400 L S P	7 bar iquid end material S Stainless stainless	eel 25 bar	'n) bar								
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C	eel 25 bar % carbon,	'n) bar								
	071400 L S P	7 bar iquid end material S Stainless st. V PVDF, max. IC Hastelloy C T PTFE + 25	eel 25 bar % carbon,	'n) bar								
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE	h , max. 10) bar								
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10		ver dianh	ragm wit	a ti inti in	e signallin	a facility			
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE	max. 10 gm Standal	rd multilay		ragm witl	n rupture	e signallin	g facility			
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid 6	rd multilay	n			e signallin	g facility			
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic	on e springs	(standar		e signallin	g facility			
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid 6	rd multilay end versic No valve With val	on e springs Ive spring	(standar		e signallin	g facility			
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val	on e springs	(standar		ə signallin	g facility			
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid 6	rd multilay end versic No valve With val	on e springs lve spring ic connec	(standar	d)		g facility			
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid 6	rd multilay and versic No valve With val Hydraul	on e springs lve spring ic connec Standar	(standari js ctions	d) ed conne		g facility			
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid 6	rd multilay end versic No valve With val Hydraul 0	e springs lve spring ic connec Standar With DIN	(standan is ctions d threade N ISO flar	d) ed conne		g facility	=		
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid 6	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connec Standar With DIN	(standard ps otions od threade	d) ed conne		g facility			
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid 6	rd multilay end versic No valve With val Hydraul 0 E	on e springs lve spring ic connec Standar With DIN With AN Version	(standard ps ctions d threade N ISO flar ISI flange	d) ed conne	ection	g facility			
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid 6	rd multilay end versic No valve With val Hydraul 0 E	on e springs live spring ic connect Standar With DIN With AN Version 0	(standard ps ctions of threade N ISO flar ISI flange	d) ed conne nge • •Minent I	ection	g facility			
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid 6	rd multilay end versic No valve With val Hydraul 0 E	on e springs live spring ic connect Standar With DIN With AN Version 0	(standards) (standards) (standards) (d threads) (standards) (stand	d) ed conne nge Minent I ProMine	ection logo ent logo				
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid 6	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standards) (stand	ed connenge Minent I ProMine	ection logo ent logo	g facility th electrical overpre	ssure displa	ay	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid 6	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standards) (stand	ed conne nge Minent I ProMine oMinent ^a	ection logo ent logo logo, wi		ssure displa	ay	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid 6	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standards) (stand	ed conne nge Minent I ProMine oMinent ^a	ection logo ent logo logo, wi		ssure displa	ay	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standards) (stand	ed conne nge Minent I ProMine oMinent ^d	ection logo ent logo supply		ssure displa	ay	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standards) (stand	ed conne nge Minent I ProMine oMinent ^o d d lal power 3 ph, 2	ection logo ent logo logo, wi supply 30/400 V	th electrical overpre		ay	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standards) stions d threade N ISO flar ISI flange with Pro without With Pro Modified Electrica S T	ed connenge Minent I ProMine Minent J J J J J J J J J J J J J	ection logo ent logo blogo, wi supply 30/400 V 30/400 V	th electrical overpre 5, 50/60 Hz, 1.1 kW 5, 50/60 Hz, with PT	C		
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standarius) stions d threade N ISO flar ISI flange with Pro withour With Pro Modified Electrica S T R	ed connenge Minent I ProMine Minent J J J J J J J J J J J J J	ection logo ent logo blogo, wi supply 30/400 V 30/400 V ariable sp	th electrical overpre , 50/60 Hz, 1.1 kW , 50/60 Hz, with PT eed motor, 230/400	C O V, 1.5 kW	1	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standards) (stand	ed conners of the con	ection logo ent logo supply 30/400 v 30/400 v ariable sped r	th electrical overpre , 50/60 Hz, 1.1 kW , 50/60 Hz, with PT leed motor, 230/400 notor with integrate	C) V, 1.5 kW d frequency	/ y converter	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standards) (stand	ed conners of the con	ection logo ent logo supply 30/400 v 30/400 v ariable speed r ariable speed r	th electrical overpre , 50/60 Hz, 1.1 kW , 50/60 Hz, with PT leed motor, 230/400 notor with integrates leed control set, 230	C O V, 1.5 kW d frequency O V, 50/60 F	/ y converter	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standarius) stitions d threade N ISO flar ISI flange with Pro without With Pro Modified Electrica S T R V-0 Z L	ed connenge Minent I ProMine Minent I 3 ph, 2 3 ph, 2 3 ph, y Variable 1 ph, v 3 ph, y	ection logo ent logo supply 30/400 V ariable spe speed r ariable sp ariable sp 30/400 V	th electrical overpre , 50/60 Hz, 1.1 kW , 50/60 Hz, with PT eed motor, 230/400 notor with integrate eed control set, 230 50 Hz (Exe, Exd), 1	C O V, 1.5 kW d frequency O V, 50/60 H I.1 kW	/ y converter	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standards) (stand	ed connenge Minent I ProMine Minent I 3 ph, 2 3 ph, 2 3 ph, y Variable 1 ph, v 3 ph, y	ection logo ent logo supply 30/400 V ariable spe speed r ariable sp ariable sp 30/400 V	th electrical overpre , 50/60 Hz, 1.1 kW , 50/60 Hz, with PT leed motor, 230/400 notor with integrates leed control set, 230	C O V, 1.5 kW d frequency O V, 50/60 H I.1 kW	/ y converter	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standarius) stitions d threade N ISO flar ISI flange with Pro without With Pro Modified Electrica S T R V-0 Z L	ed connent of the con	ection logo ent logo supply 30/400 v 30/400 v ariable sped r ariable sp 30/400 v 65/440 v	th electrical overpre , 50/60 Hz, 1.1 kW , 50/60 Hz, with PT eed motor, 230/400 notor with integrate eed control set, 230 50 Hz (Exe, Exd), 1	C O V, 1.5 kW d frequency O V, 50/60 H I.1 kW	/ y converter	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standaniss titions of threade, N ISO flar ISI flange) with Prowithout With Prowithout With Prowithout With Prowithout With Prowithout S T R V-0 Z L P 1	ed connent of the con	ection logo ent logo supply 30/400 v 30/400 v ariable sped r ariable sp 30/400 v 65/440 v or, with n	th electrical overpre , 50/60 Hz, 1.1 kW , 50/60 Hz, with PT eed motor, 230/40 notor with integrate eed control set, 23 50 Hz (Exe, Exd), 1 60 Hz (Exe, Exd), 1 notor flange 250	C D V, 1.5 kW d frequency D V, 50/60 h I.1 kW I.1 kW	/ y converter	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standaniss titions distributed with Province Without With Province S T R V-0 Z L P 1 3	ed connent of the connect of the con	ection ogo ent logo supply 30/400 v 30/400 v ariable sp ariable sp 30/400 v 65/440 v or, with n or, with n	th electrical overpre , 50/60 Hz, 1.1 kW , 50/60 Hz, with PT eed motor, 230/400 notor with integrate eed control set, 23 50 Hz (Exe, Exd), 1 60 Hz (Exe, Exd), 1 notor flange 250 notor flange B5, size	C O V, 1.5 kW d frequency O V, 50/60 H I.1 kW J.1 kW	/ y converter Hz	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standariss) (stan	ed connent le ProMinent le ProMinent le ProMine de Minent le 1 power 2 3 ph, 2 3 ph, vi Variable 1 ph, vi 3 ph, 2 3 ph, 2 no mot no mot no mot no mot	ection logo ant logo logo, wi supply 30/400 v ariable sp e speed r ariable sp 65/440 v or, with n or, with n	th electrical overpre , 50/60 Hz, 1.1 kW , 50/60 Hz, with PT eed motor, 230/40 notor with integrate eed control set, 23 50 Hz (Exe, Exd), 1 60 Hz (Exe, Exd), 1 notor flange 250	C O V, 1.5 kW d frequency O V, 50/60 H I.1 kW J.1 kW	/ y converter Hz	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standaniss titions distributed with Province Without With Province S T R V-0 Z L P 1 3	ed connenge Minent I ProMine Minent ⁰ I power I ph, v Variable I ph, v J ph, 2 J ph, 4 J ph,	ection logo ent logo ent logo supply 30/400 v ariable speed r	th electrical overpre , 50/60 Hz, 1.1 kW , 50/60 Hz, with PT eed motor, 230/400 notor with integrated eed control set, 230 50 Hz (Exe, Exd), 1 60 Hz (Exe, Exd), 1 notor flange 250 notor flange NEMA	C O V, 1.5 kW d frequency O V, 50/60 H I.1 kW J.1 kW	/ y converter Hz	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standariss) (stan	ed connenge Minent I ProMine Minent ⁰ I power I ph, v Variable I ph, v J ph, 2 J ph, 2 J ph, 2 J ph, 2 J ph, 2 J ph, 2 J ph, 2 J ph, 2 J ph, 4 J ph,	ection logo ant logo logo, wi supply 30/400 v ariable sp e speed r ariable sp 65/440 v or, with n or, with n	th electrical overpre , 50/60 Hz, 1.1 kW , 50/60 Hz, with PT eed motor, 230/400 notor with integrated eed control set, 230 50 Hz (Exe, Exd), 1 60 Hz (Exe, Exd), 1 notor flange 250 notor flange NEMA	C O V, 1.5 kW d frequency O V, 50/60 H I.1 kW J.1 kW	/ y converter Hz	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standariss) (stan	ed connenge Minent I ProMine Minent ⁰ I power I ph, v Variable I ph, v J ph, 2 J ph, 2 J ph, 2 J ph, 2 J ph, 2 J ph, 2 J ph, 2 J ph, 2 J ph, 4 J ph,	ection logo ent logo ent logo supply 30/400 v ariable sped r aria	th electrical overpre , 50/60 Hz, 1.1 kW , 50/60 Hz, with PT eed motor, 230/400 notor with integrated eed control set, 230 50 Hz (Exe, Exd), 1 60 Hz (Exe, Exd), 1 notor flange 250 notor flange B5, size notor flange NEMA	C O V, 1.5 kW d frequency O V, 50/60 H I.1 kW J.1 kW	/ y converter Hz	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standariss) (stan	ed connenge Minent I ProMine Minent I ProMine J A J A J A J A J A J A J A J A J A J	ection logo ent logo logo, wi supply 30/400 V 30/400 V ariable sp e speed r ariable sp or, with n or, with n or, with n or, with n	th electrical overpre , 50/60 Hz, 1.1 kW , 50/60 Hz, with PTieed motor, 230/400 notor with integrate leed control set, 230 50 Hz (Exe, Exd), 1 60 Hz (Exe, Exd), 1 notor flange 250 notor flange B5, size notor flange NEMA	C O V, 1.5 kW d frequency O V, 50/60 H I.1 kW I.1 kW e 200 143/145 TC	/ y converter Hz	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standariss) (stan	ed connents Minent I ProMine Minent I 3 ph, 2 3 ph, 2 3 ph, 2 3 ph, v Variable 1 ph, v 3 ph, 2 3 ph, 2 no mot no mot Add-or Enclose 0	ection logo ent logo ent logo supply 30/400 V 30/400 V ariable speed r ariable speed r ariable sy, 65/440 V or, with n o	th electrical overpre 5,50/60 Hz, 1.1 kW 5,50/60 Hz, with PTieed motor, 230/40/ notor with integrate- eed control set, 230/50 Hz (Exe, Exd), 160 Hz (Exe, Exd), 160 Hz (Exe, Exd), 160 tor flange B5, size, notor flange NEMA standard) tandard) tor version ATEX-T4	C O V, 1.5 kW d frequency O V, 50/60 H I.1 kW I.1 kW e 200 143/145 TC	/ y converter Hz	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standariss) (stan	ed connenge Minent I ProMine Minent I ProMine J A J A J A J A J A J A J A J A J A J	ection logo ent logo ent logo supply 30/400 V ariable speed r ariable speed r ariable sy 65/440 V or, with n or, with n or, with n or, with n or, with n or, with n or, with n or, with n or, with n or, with n or, with n	th electrical overpre , 50/60 Hz, 1.1 kW , 50/60 Hz, with PTieed motor, 230/400 notor with integrate leed control set, 230 50 Hz (Exe, Exd), 1 60 Hz (Exe, Exd), 1 notor flange 250 notor flange B5, size notor flange NEMA	C O V, 1.5 kW d frequency O V, 50/60 H I.1 kW I.1 kW e 200 143/145 TC	/ y converter Hz	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standariss) (stan	ed connents Minent I ProMine Minent I 3 ph, 2 3 ph, 2 3 ph, 2 3 ph, v Variable 1 ph, v 3 ph, 2 3 ph, 2 no mot no mot Add-or Enclose 0	ection logo ent logo ent logo supply 30/400 v ariable speed r ariable sp 30/400 v or, with n	th electrical overpre , 50/60 Hz, 1.1 kW , 50/60 Hz, with PT leed motor, 230/400 notor with integrate leed control set, 23 50 Hz (Exe, Exd), 1 60 Hz (Exe, Exd), 1 notor flange 250 notor flange B5, size notor flange NEMA tandard) tor version ATEX-T4 ive	C D V, 1.5 kW d frequency D V, 50/60 h .1 kW .1 kW 9 200 143/145 TC	/ y converter Hz	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standariss) (stan	ed connents Minent I ProMine Minent I 3 ph, 2 3 ph, 2 3 ph, 2 3 ph, v Variable 1 ph, v 3 ph, 2 3 ph, 2 no mot no mot Add-or Enclose 0	ection logo ent logo ent logo supply 30/400 V ariable speed r ariable speed r ariable sy 65/440 V or, with n or, with n or, with n or, with n or, with n or, with n or, with n or, with n or, with n or, with n or, with n	th electrical overpre 5, 50/60 Hz, 1.1 kW, 50/60 Hz, with PT, leed motor, 230/40(notor with integrate, 23(50 Hz (Exe, Exd), 1 60 Hz (Exe, Exd), 1 notor flange B5, size notor flange NEMA tandard) tor version ATEX-T4 tive sensor No stroke sensor (C D V, 1.5 kW d frequency D V, 50/60 F I.1 kW 200 143/145 TC	y converter Hz	
	071400 L S P	7 bar iquid end material S Stainless str V PVDF, max. IC Hastelloy C T PTFE + 25 Sealing mat	eel 25 bar % carbon, erial PTFE Diaphra	max. 10 gm Standar Liquid e	rd multilay end versic No valve With val Hydraul 0 E	e springs lve spring ic connect Standar With DIN With AN Version 0 1	(standariss) (stan	ed connents Minent I ProMine Minent I 3 ph, 2 3 ph, 2 3 ph, 2 3 ph, v Variable 1 ph, v 3 ph, 2 3 ph, 2 no mot no mot Add-or Enclose 0	ection logo ent logo ent logo logo, wi supply 30/400 \ ariable speed r ariable sp 30/400 \ or, with n or, wit	th electrical overpre , 50/60 Hz, 1.1 kW , 50/60 Hz, with PT leed motor, 230/400 notor with integrate leed control set, 23 50 Hz (Exe, Exd), 1 60 Hz (Exe, Exd), 1 notor flange 250 notor flange B5, size notor flange NEMA tandard) tor version ATEX-T4 ive	C D V, 1.5 kW d frequency D V, 50/60 F I.1 kW 200 143/145 TC	y converter Hz	s)

Τ		1						Stroke le	length adjustment		
								0	Manual (Standard	a)	
								K	Manual (outdoor,	SS)	
İ								1	With stroke positioning motor, 230 V/50/60 Hz		
								2	With stroke positioning motor, 115 V/60 Hz		
								Α	With stroke control motor 0-20 mA 230 V/50/60 Hz		
								В	With stroke contr	ol motor 4-20 mA 230 V/50/60 Hz	
								С	With stroke contr	ol motor 0-20 mA 115 V/60 Hz	
								D	With stroke contr	ol 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

Spare parts kits for HYDRO HP4a without valves

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	S1	HP4a.040SST	1114342
40	H1	HP4a.040HCT	1114365
40	P1	HP4a.040PVT	1114368
52	S1	HP4a.025SST	1040812
52	H1	HP4a.025HCT	1040860
52	P1	HP4a.025PVT	1043763
63	S1	HP4a.016SST	1040824
63	H1	HP4a.016HCT	1040861
63	P1	HP4a.016PVT	1043775
80	S1	HP4a.010SST	1040826
80	H1	HP4a.010HCT	1040864
80	P1	HP4a.010PVT	1043776
94	S1	HP4a.007SST	1040828
94	H1	HP4a.007HCT	1040867
94	P1	HP4a.007PVT	1043777

Spare parts kit for HYDRO HP4a with valves

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	S1	HP4a.040SST	1114343
40	P1	HP4a.040PVT	1114369
52	S1	HP4a.025SST	1040813
52	P1	HP4a.025PVT	1023057
63	S1	HP4a.016SST	1040825
63	P1	HP4a.016PVT	1040863
80	S1	HP4a.010SST	1040827
80	P1	HP4a.010PVT	1040866
94	S1	HP4a.007SST	1040829
94	P1	HP4a.007PVT	1040869

Diaphragms PTFE/1.4404 for HYDRO HP4a

Plunger Ø	Material	Suitable for identity code	Order no.
mm			
40, 52	S1, P1	HP4a.040SST, HP4a.052SST, HP4a.040PVT,	1040808
		HP4a.052PVT	
63	S1, P1	HP4a.016SST, HP4a.016PVT	1040809
80	S1, P1	HP4a.010SST, HP4a.010PVT	1040810
94	S1, P1	HP4a.007SST, HP4a.007PVT	1040811

Diaphragms PTFE/Hastelloy C Coated for HYDRO HP4a

Plunger Ø	Material	Suitable for identity code	Order no.
mm			
40, 52	H1	HP4a.040HCT, HP4a.025HCT	1040874
63	H1	HP4a.016HCT	1040875
80	H1	HP4a.010HCT	1040876
94	H1	HP4a.007HCT	1040877



Base for HYDRO Hydraulic Diaphragm Metering Pumps

	Order no.	
Base for HYDRO HP4a, dimensions: 344 x 250 x 120 mm (LxWxH)	1051421	



Process met

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 - 1506 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.



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 I/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
- Integrated hydraulic relief valve with ventilation function
- Metering reproducibility is better than ± 1% in 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

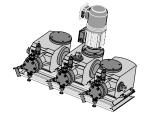
HYDRO double-head pump



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).
- Metering reproducibility is better than ± 1% in 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 bleed valve
- Full-motion drive
- Wetted materials: PVDF, PTFE+25% carbon, stainless steel 1.4571, Hastelloy C.
- A wide range of 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



Process metering technology

2.3 Hydraulic Diaphragm Metering Pumps

2.3.2.1

Hydraulic Diaphragm Metering Pump HYDRO HA1a

Technical data for HYDRO Ha1a (50 Hz)

Plung- er Ø	Max. pres- sure	Max. pump capacity in I/h at strokes/min						Theor. stroke volume		Connection on suction/discharge side	Shipping weight
mm	bor	50 l/h	60 l/h	125 l/h	150	187 l/h	214 l/h	ml/	m WC	C DN	ka
mm	bar	<i>V</i> n	1/11	1/11	l/h	1/11	1/11	ml/ stroke	m wc	G-DN	kg
9	100	_	_	_	_	_	_	0.9	3.0	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	DN 3	31
9	40	(1.4) - 1.4	(1.7) - 1.8	(2.7) - 3.9	(3.6) - 4.7	(4.0) - 6.0	(5.5) - 6.8	0.9	3.0	DN 3	31
9	25	(1.7) - 1.8	(1.7) - 2.1	(2.8) - 4.5	(3.8) - 5.6	(4.6) - 7.0	(5.5) - 8.0	0.9	3.0	DN 3	31
9	10	(1.7) - 2.1	(1.7) - 2.5	(2.8) - 5.2	(3.8) - 6.3	(4.6) - 7.8	(5.5) - 9.1	0.9	3.0	DN 3	31
12	100	(2.4) - 2.4	(2.9) - 2.9	(5.5) - 6.0	(7.4) - 7.4	(8.0) - 9.3	(9.0) - 10.1	1.7	3.0	DN 3	31
12	64	(2.0) - 3.0	(2.8) - 3.6	(4.5) - 7.7	(7.0) - 9.1	(8.0) - 11.4	(9.0) - 13.0	1.7	3.0	DN 3	31
12	40	(2.2) - 3.4	(2.5) - 4.1	(4.5) - 8.7	(6.0) - 10.4	(7.0) - 13.0	(9.0) - 14.7	1.7	3.0	DN 3	31
12	25	(2.2) - 3.5	(2.3) - 4.5	(4.8) - 9.4	(6.0) - 11.1	(7.0) - 13.8	(9.0) - 15.9	1.7	3.0	DN 3	31
12	10	(2.2) - 3.7	(2.5) - 4.8	(4.8) - 10.1	(6.0) - 12.1	(7.0) - 15.1	(9.0) - 17.1	1.7	3.0	DN 3	31

Technical data for HYDRO Ha1a (60 Hz)

Plunger Ø	Max. pres- sure		. ,	I/h at strokes		Theor. stroke volume	Suction lift	Connection on suction/ discharge side	Shipping weight	
	la au	60	72	149	180	224		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	O DN	1
mm	bar	I/h	l/h	l/h	I/h	l/h	ml/stroke	m WC	G-DN	kg
9	100	_	-	-	-	-	0.9	3.0	DN 3	31
9	64	_	(1.6) - 1.6	(3.3) - 3.3	(3.7) - 3.7	(4.8) - 5.7	0.9	3.0	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	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	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	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	DN 3	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	DN 3	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	DN 3	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	DN 3	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	DN 3	31

Piston \varnothing 9 and 12, version with double ball valves.

When pumps are selected in accordance with API 675 (control range 1:10), the permitted rated flow configuration is possible in the stated range.

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.

Wetted materials for HYDRO HA1a

Identity code of material	Dosing head	Suction / discharge con- nection	Seals/ball seat	Balls
S1 *	Stainless steel	Stainless steel 1.4581	PTFE/stainless steel 1.4404	Ceramic
	1.4571/1.4404			

* Not for areas at risk from explosion



Motor data for HYDRO HA1a

Identity code specification		Power supply			Remarks
Ś	3-phase, IP 55*	230 V/400 V 265 V/460 V	50 Hz 60 Hz	0.37 kW	
Т	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	50/60 Hz	0.37 kW	With PTC, speed control range 1:20, with external fan 1-phase 230 V; 50/60 Hz
V	3-phase, IP 55°	230 V ±10 %	50/60 Hz	0.37 kW	Variable speed motor with integrated frequency converter
L	3-phase, II 2G Ex de IIC T4 Gb	220 – 240 V/380 – 420 V	50 Hz	0.37 kW	With PTC, speed control range 1:5
Q	3-phase, Il 2G Ex de IIC T4	254 - 277 V/440 - 480 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.

The motors are designed in accordance with the Eco Design Directive 2009/125/EC.

Information for use in areas at risk from explosion

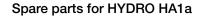
Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/EC in premises at risk from explosion. Ensure that the explosion group, category and degree of protection specified on the label correspond to or are superior to the conditions prevalent in the intended application.

Identity code ordering system for HYDRO HA1a

HA1a	Drive type														
	V	Simplex	(vertical)												
	D		double head	4											
	U		double nead	ı											
	T	Duplex													
	1	Triplex													
		Plungers													
		009	Plunger 9 r												
		012	Plunger 12	mm											
			stroke rate												
			050	50 strok	es/min.; {	50 Hz									
			060	60 strok	es/min.; {	50 Hz									
			125		kes/min.;										
			150		kes/min.;										
			187		kes/min.;										
			214		kes/min.;										
			1	!											
			059		es/min.; (
			072		es/min.; 6										
			149		kes/min.;										
			180	180 stro	kes/min.;	60 Hz									
			224	224 stro	kes/min.;	60 Hz									
				Pressure	e rating										
				Α	10 bar										
				D	25 bar										
				E	40 bar										
				H	64 bar										
				l''	100 bar										
				٦		ad matari	al								
						nd materi			TCC						
					S1		d stainles	s steel; P	IFE						
						Valve de									
						0	standard								
								gm monit							
							0	standard	t						
							1	none							
							2	visual in	dication						
				İ		İ		Hydrauli	c connec	tor					
								0	standard	d					
						İ		F	Flange A						
								N	NPT cor						
										l Connec	tion				
									S		, 230/400	1 V 50/60) Hz		
									Т					7 kW, witl	h PTC
									' 						
									-					W, (Exde)	
									Q					W, (Exde)	
									R						e, 230/400 V
									V					ed frequer	ncy converter
									2	!	motor, wi	_			
									3		motor, wi				
									5	Without	motor, wi	th 160/7	1 ATEX fl	ange	
									6	Without	motor, wi	th NEMA	ATEX fla	ange	
										Stroke le	ength adju	ustment			
										0			ustment :	standard	
						İ		İ		Α	1				V, 50/60 Hz
										В	1				V, 50/60 Hz
										C	ł				V, 60 Hz
1										D	1				V, 60 Hz
															V, 00 1 12
													bient / flu	,	100 %0 (00: 110) - 50 %
					1						0				+90 °C (SS; HC) or +50 °C
1							-						or +65 °C	(L ADL)	
												Paint	C2 C4-	dord + '	urad point DAI 0000
1												0P	1		ured paint - RAL 2003
												1P	1	-	ss paint - RAL 2003
												2P	1	door - RA	
												3P		hore - RA	L 2003
1													Tests		
					1								S1	Standar	d performance test
					1								S2	1	ance test including 3.1 certificate
1													S3	1	3.1 certificate wetted material
										l	İ		S4	1	3.1 certificate wetted material
													A1	1	nplete test including S4
													1	1	-
													A2	As A1 +	
													A3	As A1 +	
														Approva	
														0	CE
														1	CE + ATEX
1														2	CE + EAC



							4 5	EN FR ES RU M0	A + ATEX ation German English French Spanish Russian Modified Measuring 0	unit bar, I/h psi, gph
										kPa, I/h



Spare parts kits for HYDRO HA1a with valves

Scope of delivery:

1 spare diaphragm complete, 1 suction valve, 1 injection valve, 1 sealing set, 4 valve balls

Plunger Material Suitable for identity code Order no.

Ø
mm

9, 12 S1 HA1a.009....S1, HA1a.012....S1 1119517

Diaphragms PTFE/1.4404 for HYDRO HA1a

Plunger Ø	Material	Suitable for identity code	Order no.	
mm				
9, 12 (HA1a), 16, 18 (HA2a, HP2a	S1, P1	HA1a.009S1,	1005545	
		HA1a.012S1		



2

2.3 Hydraulic Diaphragm Metering Pumps

2.3.2.2

Hydraulic Diaphragm Metering Pump HYDRO HA2a

Technical data for HA2a 50 Hz

Plunger Ø	Max. pres- sure	Max. pump	capacity in I	/h at strokes/m	Theor. stroke volume	Suction lift				
		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	_	_	(8.5) - 8.5	(10) - 11	(12) - 13	3.0	3.0	Rp 1/4 – DKV *	31
16	64	-	(10) - 10	(10) - 13	(12) - 16.5	(14) – 18.5	3.0	3.0	Rp 1/4 – DKV *	31
16	40	_	(10) - 13	(12) - 15.5	(14) - 19.5	(16) - 23.5	3.0	3.0	Rp 1/4 – DKV *	31
16	25	-	(12) - 14.5	(14) - 17.5	(17) - 22.5	(20) - 26.5	3.0	3.0	Rp 1/4 – DKV *	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 – DKV *	31
18	64	_	(12) - 15.5	(18.5) - 18.5	(24.5) - 24.5	(26) - 26.5	3.8	3.0	G 3/4 - 10 **	31
18	40	(7) – 8	(13) - 18.5	(22) - 22	(26) - 28.5	(26) - 32.5	3.8	3.0	G 3/4 - 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 - 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 - 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 - 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 - 10 **	31
22	10	(8) – 10	(17) - 28.5	(25) - 36.5	(30) - 47	(40) - 54	5.7	3.0	G 3/4 - 10 **	31
26	25	(20) – 22	(35) - 49	(40) - 59	(65) – 72	(50) – 83	7.9	3.0	G 3/4 - 10 **	31
26	10	(20) - 23.5	(30) – 51	(35) – 61	(40) - 76	(45) – 86	7.9	3.0	G 3/4 – 10 **	31

- * 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

When pumps are selected in accordance with API 675 (control range 1:10), the permitted rated flow configuration in the stated range is possible.

Example: a piston 16 mm, pressure 25 bar and stroke rate 150 strokes/min results in (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 HA2a 60 Hz

Plunger Ø	Max. pressure	Max. pump ca	apacity in I/h a	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	I/h	l/h	ml/stroke	m WC	G-DN	kg
16	100	_	_	(10) - 10	(12) – 13	3.0	3.0	Rp 1/4 – DKV *	31
16	64	-	(10) – 11.5	(12) - 15.5	(14.5) - 19.5	3.0	3.0	Rp 1/4 – DKV *	31
16	40	_	(12) - 15.5	(14.5) - 18.5	(16.5) – 23	3.0	3.0	Rp 1/4 – DKV *	31
16	25	-	(14.5) - 17	(16.5) - 21	(20.5) - 27	3.0	3.0	Rp 1/4 – DKV *	31
16	10	(8.5) – 9	(15.5) - 19.5	(18) - 23	(21.5) - 29	3.0	3.0	Rp 1/4 – DKV *	31
18	64	-	(14.5) - 18.5	(22) - 22	(29) - 29	3.8	3.0	G 3/4 – 10 **	31
18	40	(8.5) – 9.5	(15.5) - 22	(26) - 26	(31) - 34	3.8	3.0	G 3/4 - 10 **	31
18	25	(9.5) – 10.5	(19.5) - 23	(27.5) - 29	(31) – 36.5	3.8	3.0	G 3/4 - 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 - 10 **	31
22	40	(8.5) - 9	(24) - 30	(32.5) - 34	(44) - 50.5	5.7	3.0	G 3/4 – 10 **	31
22	25	(8.5) – 10	(24) - 30	(30) - 40	(42) - 52	5.7	3.0	G 3/4 - 10 **	31
22	10	(9.5) - 12	(20) - 34	(36) - 56	(44) - 50.5	5.7	3.0	G 3/4 - 10 **	31
26	25	(24) – 26	(42) – 58	(48) - 70.5	(78) – 86	7.9	3.0	G 3/4 – 10 **	31
26	10	(24) – 28	(36) - 60.5	(42) - 73	(48) – 91	7.9	3.0	G 3/4 - 10 **	31

- * 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



Identity code of material	Dosing head	Connection on suction/dis- charge side	Seals/ball seat	Balls
HCT	Hastelloy C	Hastelloy C	PTFE/Hastelloy C	Ceramic
PVT *	PVDF	PVDF	PTFE/PTFE	Ceramic
SST	Stainless steel 1.4571/1.4404	Stainless steel 1.4581	PTFE/stainless steel 1.4404	Ceramic
ТТТ	PTFE + 25% carbon	PVDF	PTFE/PTFE	Ceramic

^{*} Not for areas at risk from explosion

Motor data for HYDRO HA2a

Identity code specification		Power supply			Remarks
Š	3-phase, IP 55*	230 V/400 V 265 V/460 V	50 Hz 60 Hz	1.1 kW	
Т	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	50/60 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	50/60 Hz	1.5 kW	Variable speed motor with integrated frequency converter
K	3-phase, Il 2G Ex e Il T3	220 - 240 V/380 - 420 V	50 Hz	1.1 kW	On request
L	3-phase, II 2G Ex de IIC T4 Gb	220 – 240 V/380 – 420 V	50 Hz	1.1 kW	With PTC, speed control range 1:5
Р	3-phase, Il 2G Ex e Il T3	254 - 277 V/440 - 480 V	60 Hz	1.1 kW	On request
Q	3-phase, Il 2G Ex de IIC T4	254 - 277 V/440 - 480 V	60 Hz	1.1 kW	With PTC, speed control range 1:5
W	3-phase, Il 2G Ex de IIC T4	400 V ± 10 %	50/60 Hz	1.5 kW	Ex-variable speed motor with integrated frequency converter, 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.

The motors are designed in accordance with the Eco Design Directive 2009/125/EC.

Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/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		double head	d									
	U	Duplex											
	T	Triplex											
	'	Plungers											
		_											
		016	Plunger 16										
		018	Plunger 18										
		022	Plunger 22										
		026	Plunger 26										
			stroke rate										
			060	60 strok	kes/min.;	50 Hz							
			125	125 str	okes/min.	; 50 Hz							
			150	150 stro	okes/min.	; 50 Hz							
			187	187 stro	okes/min.	; 50 Hz							
			214	214 str	okes/min.	; 50 Hz							
			072	60 strok	kes/min.;	50 Hz							
			149	1	okes/min.								
			180	1	okes/min.								
			224	1	okes/min.								
			1227	Pressur		, 00 1 12							
				A	10 bar								
				1	1								
				D	25 bar								
				E	40 bar								
				H	64 bar								
				J	100 bar								
					Material	1							
					S1	1	d stainles		TFE				
					H1	Hastello	y C; PTFI	Ξ					
					P1	PVDF; F	TFE up t	o 25 bar					
					T1	PTFE +	25 % car	bon; PTF	E up to 1	6 bar			
						Valve de	esign						
						0	standard	d					
						1		ve spring	S				
								gm ruptu		,			
							0	1	d (electric				
							1	1	d (electric				
							2	visual in		, cai,			
							2	Hydrauli		tor			
								0					
								1	standard				
								E	DIN flan	_			
								F	Flange A				
										d Connec			
									S				0 Hz, 0.37 kW
									Т				0 Hz, 0.37 kW, with PTC
									L	3-phase	, 230/40	0 V, 50 H	z, 0.37 kW, (Exde) T4
									Q	3-phase	, 265/46	0 V, 60 H	z, 0.37 kW, (Exde) T4
									R	Variable	speed m	otor, 1-p	hase, 230/400 V, 0.37 kW
									V	Variable	speed m	otor with	integr. frequency converter, 1-phase, 230 V, 50/60
										Hz, 0.37	′ kW		
									1	no moto	r, with m	otor flanc	ge 200/80
					1				2	no moto	r, with m	otor flang	ge 160/71
									3	without	motor, w	ith motor	flange 56C
									4	!			flange 200/80 ATEX
					1			1	5	1			flange 160/71 ATEX
									6		,		flange 56C
									1		ength adj		
										0			ustment standard
										A	•		otor 0-20 mA, 230 V, 50/60 Hz
										В	1		otor 4-20 mA, 230 V, 50/60 Hz
										С	ł		otor 0-20 mA, 115 V, 60 Hz
										D			otor 4-20 mA, 115 V, 60 Hz
												1	bient / fluid)
					1						0		+40 °C / -20 °C +90 °C (SS; HC) / +50 °C
											l.		+65 °C (PVDF)
					1						1		+50 °C / -20 °C +90 °C (SS; HC) / +50 °C
													+65 °C (PVDF)
					1						2		+40 °C / -25 °C +90 °C (SS; HC) / +50 °C
													+65 °C (PVDF)
												Paint	1
												0P	C3 Standard textured paint - RAL 2003
												1P	C3 Standard gloss paint - RAL 2003
												2P	C4 Outdoor - RAL 2003
1												3P	C5 - Offshore - RAL 2003
				1	1	i	1	I	1	I	1	I	
													Tests
													lests

						S2 S3 S4 A1 A2 A3	Standar certifica As S1 + As S2 + API com As A1 + As A1 +	3.1 certifica 3.1 certifica aplete test in NPSH NPIP	ce test inclu te wetted m te wetted m	aterial
							Approva 0 1 2 3 4 5	CE + ATEX CE + EAC CE + EAC CE + EAC CE + EAC Documenta DE EN FR ES RU M0	+ ATEX + ATEX + ATEX	unit bar, I/h psi, gph kPa, I/h

Spare parts for HYDRO HA2a

Spare parts kits for HYDRO HA2a without valves

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.016S1	1029260	
16, 18	H1	HA2a.016H1, HA2a.018H1	1009571	
18	S1	HA2a.018S1	1005549	
22, 26	S1	HA2a.022S1, HA2a.026S1	1005553	
22, 26	H1	HA2a.022H1, HA2a.026H1	1009573	

^{*} Piston Ø 16 mm, material S1, version for double ball valves

Spare parts kits for HYDRO HA2a with valves

Scope of delivery:

1 spare diaphragm complete, 1 suction valve, 1 injection valve, 1 sealing set, 2 valve seats, 2 valve balls

Plunger Ø	Material	Suitable for identity code	Order no.
mm			
16, 18	P1	HA2a.016P1, HA2a.018P1	1005548
18	S1	HA2a.018S1	1005550
22, 26	S1	HA2a.022S1, HA2a.026S1	1005554
22, 26	P1	HA2a.022P1, HA2a.026P1	1005552

Diaphragms PTFE/1.4404 for HYDRO HA2a

Plunger Ø mm	Material	Suitable for identity code	Order no.
9, 12 (HA1a), 16, 18 (HA2a, HP2a)	S1, P1	HA2a.016 S1, HA2a.018 S1, HA2a.016P1, HA2a.018P1	1005545
22, 26	S1, P1	HA2a.022 S1, HA2a.026 S1, HA2a.022P1, HA2a.026P1	1005546

Diaphragms PTFE/Hastelloy C coated for HYDRO HA2a

Plunger Ø mm	Material	Suitable for identity code	Order no.
16, 18	H1	HA2a.016H1, HA2a.018H1	1006481
22, 26	H1	HA2a.022H1, HA2a.026H1	1006482



2.3.2.3

Hydraulic Diaphragm Metering Pump HYDRO HA3a

Technical data for HA3a 50 Hz

Plung- er Ø	Max. pres-	Max. pump o	apacity in I/h	at strokes/m	in		Theor. stroke	Suction lift	Connection on suc- tion/discharge side	Shipping weight
	sure	60	125	150	187	214	volume			
mm	bar	l/h	l/h	l/h	l/h	l/h	ml/	m WC	G-DN	kg
							stroke			
22	100	_	-	-	-	-	5.7	3.0	Rp 3/8 – 10-DKV *	41
22	64	-	-	-	-	-	5.7	3.0	Rp 3/8 – 10-DKV *	41
22	40	_	_	_	_	_	5.7	3.0	Rp 3/8 – 10-DKV *	41
22	25	-	_	_	_	_	5.7	3.0	Rp 3/8 – 10-DKV *	41
22	10	_	_	_	_	_	5.7	3.0	Rp 3/8 – 10-DKV *	41
26	64	-	(35) - 43.5	(40) - 51.5	(55) - 63	(65) – 73	7.9	3.0	G 3/4 - 10 **	41
26	40	(18) – 21	(37) - 45.5	(40) - 55	(50) - 71	(70) – 81	7.9	3.0	G 3/4 - 10 **	41
26	25	(15) – 21	(30) - 49.5	(40) - 59	(55) - 74	(70) – 84	7.9	3.0	G 3/4 – 10 **	41
26	10	(15) – 22	(30) - 49.5	(35) - 61	(50) - 77	(80) – 87	7.9	3.0	G 3/4 – 10 **	41
32	40	(25) - 25.5	(50) - 66	(70) - 80	(65) - 101.5	(70) – 116.5	12.0	3.0	G 1 – 15 ***	41
32	25	(25) - 26.5	(50) - 69	(65) - 83	(65) - 105.5	(70) – 122.5	12.0	3.0	G 1 – 15 ***	41
32	10	(22) – 31.5	(50) - 74	(70) - 90	(60) - 112.5	(65) – 129	12.0	3.0	G 1 – 15 ***	41
38	25	(25) - 50.5	(70) - 110.5	(80) - 126	(150) - 166	(180) – 187	17.0	3.0	G 1 – 15 ***	41
38	10	(30) – 51.5	(80) – 111.5	(90) – 135	(150) – 168	(180) – 191	17.0	3.0	G 1 – 15 ***	41

- * 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
- *** HV design (SST only) with 1 1/4" DN 20 connector

When pumps are selected in accordance with API 675 (control range 1:10), the permitted rated flow configuration in the stated range is possible.

Example: a piston 26 mm, pressure 25 bar and stroke rate 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.

Version PVDF max. 25 bar

* Version SST with double ball valve, valve connector on the suction/discharge side with female thread Rp 3/8, male thread G 3/4-DN 10

Technical data for HA3a 60 Hz

Plunger Ø						Theor. stroke volume	Suction lift	Connection on suction/discharge side	Shipping weight
		72	149	180	224				
mm	bar	l/h	I/h	I/h	l/h	ml/stroke	m WC	G-DN	kg
22	100	_	_	_	-	5.7	3.0	Rp 3/8 – 10-DKV *	41
22	64	_	_	_	-	5.7	3.0	Rp 3/8 – 10-DKV *	41
22	40	_	_	_	-	5.7	3.0	Rp 3/8 – 10-DKV *	41
22	25	_	-	_	-	5.7	3.0	Rp 3/8 – 10-DKV *	41
22	10	_	_	_	-	5.7	3.0	Rp 3/8 - 10-DKV *	41
26	64	(21.5) – 22.5	(42) - 51.5	(48) - 61.5	(66) – 75	7.9	3.0	G 3/4 – 10 **	41
26	40	(21.5) – 25	(44) - 54	(48) - 66	(60) – 85	7.9	3.0	G 3/4 - 10 **	41
26	25	(18) – 25	(36) - 59	(48) - 70.5	(66) – 88.5	7.9	3.0	G 3/4 – 10 **	41
26	10	(18) – 26	(36) - 59	(42) - 73	(60) - 92	7.9	3.0	G 3/4 - 10 **	41
32	40	(30) - 30.5	(60) - 78.5	(84) - 96	(78) – 121	12.0	3.0	G 1 – 15 ***	41
32	25	(30) - 31.5	(60) - 82	(78) - 99.5	(78) – 126	12.0	3.0	G 1 – 15 ***	41
32	10	(26.5) - 37.5	(60) - 88	(84) - 108	(72) - 134.5	12.0	3.0	G 1 – 15 ***	41
38	25	(30) - 60.5	(84) - 131	(96) - 151	(180) – 198	17.0	3.0	G 1 – 15 ***	41
38	10	(36) – 61.5	(96) – 132	(108) – 162	(180) – 201	17.0	3.0	G 1 – 15 ***	41

- 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
- *** HV design (SST only) with 1 1/4" DN 20 connector



Process metering technology

2.3 **Hydraulic Diaphragm Metering Pumps**

Wetted materials for HYDRO HA3a								
Identity code of material	Dosing head	Connection on suction/dis- charge side	Seals/ball seat	Balls				
H1	Hastelloy C	Hastelloy C	PTFE/Hastelloy C	Ceramic				
P1	PVDF	PVDF	PTFE/PTFE	Ceramic				
S1	Stainless steel 1.4571/1.4404	Stainless steel 1.4581	PTFE/ZrO ₂ (DN 15/DN20 stainless steel 1.4404)	Ceramic				

Motor data for HYDRO HA3a

Identity code		Power supply			Remarks
Ŝ	3-phase, IP 55°	230 V/400 V 265 V/460 V	50 Hz 60 Hz	0.75 kW	
Т	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	50/60 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 ±10 %	50/60 Hz	0.75 kW	Variable speed motor with integrated frequency converter
K	3-phase, II 2G Ex eb IIC T3 Gb	220 – 240 V/380 – 420 V	50 Hz	0.75 kW	On request
L	3-phase, Il 2G Ex de IIC T4	220 - 240 V/380 - 420 V	50 Hz	0.75 kW	With PTC, speed control range 1:5
Р	3-phase, Il 2G Ex e Il T3	254 - 277 V/440 - 480 V	60 Hz	0.75 kW	On request
Q	3-phase, Il 2G Ex de IIC T4	254 - 277 V/440 - 480 V	60 Hz	0.75 kW	With PTC, speed control range 1:5
W	3-phase, II 2G Ex db IIC T3T6 Gb	400 V ±10 %	50/60 Hz	0.75 kW	Ex-variable speed motor with integrated frequency converter, 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.

The motors are designed in accordance with the Eco Design Directive 2009/125/EC.

Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/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	3									
		022	Plunger 22	mm								
		026	Plunger 26									
		032	Plunger 32									
		038	Plunger 38									
		000	stroke rate									
			060	60 strok	es/min.; t	50 Hz						
			125		kes/min.;							
			150	1	kes/min.;							
			187		kes/min.;							
			214	1	kes/min.;							
			072		es/min.; {							
			149		kes/min.;							
			180		kes/min.;							
			224		kes/min.;							
			224	Pressure		30 T IZ						
				A	10 bar							
				D	25 bar							
				E								
1				1	40 bar							
				H	64 bar							
1				J	100 bar							
1					Material	Ctc= 1	d otale !	o otaal o	TEE			
					S1			s steel; P -	'IFE			
					H1		y C; PTFI					
					P1		TFE up t			0.1		
					T1			bon; PTF	E up to i	6 bar		
						Valve de						
						0	standard					
						1		ve spring:				
						D		ve spring				
							-	gm ruptui				
							0		d (electric	,		
							1		d (electric	al)		
							2	Visual in				
									c connec			
								0	standard			
								E	DIN flan	_		
								F	Flange A			
										l Connec		
									S			V, 50/60 Hz, 0.75 kW
									T			V, 50/60 Hz, 0.75 kW, with PTC
									IL.			V, 50 Hz, 0.75 kW, (Exde) T4
									Q			V, 60 Hz, 0.75 kW, (Exde) T4
									R	!		tor, 1-phase, 230/400 V
									V			tor with integr. Frequency converter, 1-phase, 230 V, 50/60
									_	Hz, 0.75		flamma 000/00
									1	ı		or flange 200/80
									2	ı		or flange 160/71
									3	ı		motor flange 56C
									4 5			n motor flange 200/80 ATEX n motor flange 160/71 ATEX
										1		S
									6			motor flange 56C
1											ength adjus	
										0		ngth adjustment standard
1										A		ntrol motor , 0-20 mA, 230 V, 50/60 Hz
										В	l	ntrol motor , 4-20 mA, 230 V, 50/60 Hz
										С		ntrol motor , 0-20 mA, 115 V, 60 Hz
										D		ntrol motor , 4-20 mA, 115 V, 60 Hz
												ure (ambient / fluid)
												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)
1												25 °C +40 °C (PVDF)
												PTFE) / +65 °C (PVDF)
1										1		Paint
												DP C3 Standard textured paint - RAL 2003
1												IP C3 Standard gloss paint - RAL 2003
1												2P C4 Outdoor - RAL 2003
												PP C5 Offshore - RAL 2003
1												Tests
												16313

													S1 S2 S3 S4 A1 A2 A3	Standard certificate As S1 + As S2 + API test As A1 + Approve 0 1 2 3 4 5 5	3.1 certifica 3.1 certifica 3.1 certifica complete in NPSH NPIP Is CE CE + ATEX CE + EAC CE + EAC CE Documenta DE EN FR ES RU M0	ce test inclu te wetted m te wetted m cluding S4 + ATEX	aterial aterial
--	--	--	--	--	--	--	--	--	--	--	--	--	--	---	--	--	--------------------

Spare parts for HYDRO HA3a

Spare parts kits for HYDRO HA3a without valves

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.022S1, HA3a.026S1	1005553	
, -	-	•		
22	S1	HA3a.022S1	1005555	
22, 26	H1	HA3a.022H1, HA3a.026H1	1009573	
32, 38	S1	HA3a.032S1, HA3a.038S1	1005557	
32, 38	H1	HA3a.032H1, HA3a.038H1	1009575	

Spare parts kits for HYDRO HA3a with valves

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.022S1, HA3a.026S1	1005554
22, 26	P1	HA3a.022P1, HA3a.026P1	1005552
32, 38	S1	HA3a.032S1, HA3a.038S1	1005558
32, 38	P1	HA3a.032P1, HA3a.038P1	1005556

Diaphragms PTFE/1.4404 for HYDRO HA3a

Plunger Ø	Material	Suitable for identity code	Order no.
_mm			
22, 26	S1, P1	HA3a.022S1, HA3a.026S1, HA3a.022P1, HA3a.026P1	1005546
32, 38	S1, P1	HA3a.032S1, HA3a.038S1, HA3a.032P1, HA3a.038P1	1005547

Diaphragms PTFE/Hastelloy C Coated for HYDRO HA3a

Plunger Ø mm	Material	Suitable for identity code	Order no.
22, 26	H1	HA3a.022H1, HA3a.026H1	1006482
32, 38	H1	HA3a.032H1, HA3a.038H1	1006483



2.3.2.4

Hydraulic Diaphragm Metering Pump HYDRO HA4a

Technical data for HA4a 50 Hz

Plung- er Ø	Max. pres- sure	Max. pump	capacity in I/	h at strokes/	Theor. stroke volume	Suction lift	Connection on S suction/dis- charge side	Shipping weight		
		71	103	136	188	214			-	
mm	bar	l/h	l/h	l/h	l/h	l/h	ml/	m WC	G-DN	kg
							stroke			
40	7	_	(100) - 127	(150) - 167	(200) - 230	(220) – 261	25.1	3	G 1 A – DN 15	69
40	10	-	(100) - 125	(150) - 166	(200) - 228	(220) - 256	25.1	3	G 1 A – DN 15	69
40	16	_	_	_	(200) - 225	(220) – 254	25.1	3	G 1 A – DN 15	69
40	25	-	_	(150) - 160	(200) - 219	(220) - 250	25.1	3	G 1 A – DN 15	69
40	40	_	-	(150) - 154	(200) - 211	(220) – 242	25.1	3	G 1 A – DN 15	69
52	7	-	(180) - 209	(200) - 277	-	-	42.4	3	G 1 1/2 A – DN 25	69
52	10	_	(180) - 207	(200) - 276	(370) – 379	-	42.4	3	G 1 1/2 A – DN 25	69
52	16	-	(190) - 205	(200) - 274	(370) - 376	-	42.4	3	G 1 1/2 A – DN 25	69
52	25	_	(200) - 204	(200) - 271	(370) – 372	-	42.4	3	G 1 1/2 A – DN 25	69
63	7	(210) - 216	(280) - 312	(370) - 408	-	-	62.3	3	G 1 1/2 A – DN 25	76
63	10	(210) – 215	(280) - 311	(380) - 407	_	-	62.3	3	G 1 1/2 A – DN 25	76
63	16	(200) - 212	(280) - 306	(390) - 401	-	-	62.3	3	G 1 1/2 A – DN 25	76
80	7	(270) - 352	(420) - 513	(590) - 683	(890) - 947	(1.050) - 1.080	100.4	3	G 2 A – DN 32	87
80	10	(280) - 350	(420) - 509	(580) - 657	(890) - 914	(1.050) - 1.056	100.4	3	G 2 A – DN 32	87
94	7	(350) – 493	(500) - 710	(820) – 936	(1.000) - 1.258	(1.400) - 1.440	138.7	3	G 2 1/2 A – DN 40	96

When pumps are selected in accordance with API 675 (control range 1:10), the permitted rate flow configuration is possible in the stated

Example: a piston 52 mm, pressure 10 bar and stroke rate 136 strokes/min results in (200) - 276, i.e. the control range of 1:10 is met for a rate flow of between 200 l/h and 276 l/h.

PVDF version max. 25 bar, PTFE + 25 % carbon; PTFE up to 10 bar

Pump types with "-" do not meet the test requirements of API 675 with regard to the 1:10 control range

Technical data for HA4a 60 Hz

Plu	unger Ø	Max. pres- sure	Max. pump ca	pacity in I/h a	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	16	_	-	_	(240) – 269	25.1	3	G 1 A – DN 15	69
	40	7	-	(120) - 152	(180) - 201	(240) – 275	25.1	3	G 1 A – DN 15	69
	40	10	_	(120) - 150	(180) - 200	(240) – 272	25.1	3	G 1 A – DN 15	69
	40	25	-	-	(180) – 185	(240) - 262	25.1	3	G 1 A – DN 15	69
	40	40	_	_	(180) - 200	(240) - 252	25.1	3	G 1 A – DN 15	69
	52	16	-	(230) - 246	(240) - 330	(450) – 450	42.4	3	G 1 1/2 A – DN 25	69
	52	7	_	(220) - 251	(240) - 334	_	42.4	3	G 1 1/2 A – DN 25	69
	52	10	-	(220) - 249	(240) - 333	(450) – 455	42.4	3	G 1 1/2 A – DN 25	69
	52	25	_	(240) - 245	(240) - 327	(440) – 445	42.4	3	G 1 1/2 A - DN 25	69
	63	10	(255) – 260	(340) - 374	(460) - 490	-	62.3	3	G 1 1/2 A – DN 25	76
	63	7	(260) - 262	(340) - 375	(445) - 491	_	62.3	3	G 1 1/2 A - DN 25	76
	63	16	(245) – 256	(340) - 368	(470) - 483	-	62.3	3	G 1 1/2 A – DN 25	76
	80	7	(330) – 426	(505) - 618	(711) - 823	(1.065) - 1.133	100.4	3	G 2 A – DN 32	87
	80	10	(340) - 424	(505) - 613	(700) - 792	(1.065) - 1.094	100.4	3	G 2 A – DN 32	87
	94	7	(430) – 597	(600) - 854	(990) - 1.128	(1.200) - 1.506	138.7	3	G 2 1/2 A - DN 40	96

	Wetted	materials for HY	DRO HA4a			
Identity code of material	Dosing head	Connection on suction/dis- charge side	Seals	Valve seats	Valve balls up to DN 25	Valve plates/ valve springs
H1	Hastelloy C	Hastelloy C	PTFE	PTFE	Hastelloy C	Hastelloy C/E-CTFE
P1	PVDF	PVDF	PTFE	PTFE	Glass	Ceram- ic/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	Glass	Ceram- ic/E-CTFE
V1	PVC	PVDF	PTFE	PTFE	Glass	Ceram- ic/E-CTFE
Y1	PPT	PVDF	PTFE	PTFE	Glass	Ceram- ic/E-CTFE

Motor data for HYDRO HA4a

Identity code specification		Power supply			Remarks
Ŝ	3-phase, IP 55*	230 V/400 V 265 V/460 V	50 Hz 60 Hz	0.37 kW	
Т	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	50/60 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 ±10 %	50/60 Hz	0.37 kW	Variable speed motor with integrated frequency converter
K	3-phase, II 2G Ex eb IIC T3 Gb	220 – 240 V/380 – 420 V	50 Hz	0.37 kW	On request
L	3-phase, II 2G Ex de IIC T4 Gb	220 – 240 V/380 – 420 V	50 Hz	0.37 kW	With PTC, speed control range 1:5
Р	3-phase, Il 2G Ex e Il T3	254 - 277 V/440 - 480 V	60 Hz	0.37 kW	On request
Q	3-phase, Il 2G Ex de IIC T4	254 - 277 V/440 - 480 V	60 Hz	0.37 kW	With PTC, speed control range 1:5
W	3-phase, II 2G Ex db IIC T4T6 Gb	400 V ±10 %	50/60 Hz	0.55 kW	Ex-variable speed motor with integrated frequency converter, 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.

The motors are designed in accordance with the Eco Design Directive 2009/125/EC.

Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/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		double head	4								
	U		double riea	ı								
	_	Duplex										
	Т	Triplex										
		Plungers										
		040	Plunger d 4	10								
		052	Plunger d 5	52								
		063	Plunger d 6	33								
		080	Plunger d 8									
		094	Plunger d 9									
			stroke rate	, ,								
			071	71 otrok	es/min; 5	:∩ ⊔						
			1	1								
			103	1	kes/min;							
			136		kes/min;							
			188	1	kes/min;							
			214	1	kes/min;							
			086	86 strok	es/min; 6	0 Hz						
			124	124 stro	kes/min;	60 Hz						
			164	164 stro	kes/min;	60 Hz						
			225	225 stro	kes/min;	60 Hz						
				Pressure	e ratina							
				Z	7 bar							
				A	10 bar							
				В	16 bar							
				D	1							
					25 bar							
				E	40 bar							
					Material	1						
					S1			s steel; F	'IFE			
					H1		y-C; PTF	E				
					P1	PVDF; F	TFE					
					T1	PTFE +	carbon; F	PTFE				
					V1	PVC; PT	FE					
			i		Y1	PP; PTF	E					
						Valve de						
						0		valve spr	ina			
						1	1	e spring	9			
								gm monit	orina			
							0	standar	-			
		1					1	none	4			
							2	Visual in	diaction			
							1	1				A
							A	1	d with ele			
							В	1			-	electric overload indication
							С				ric overlo	ad indication
								,	c connec			
								0	standard			
								E	DIN flan	-		
								F	Flange A	NSI		
										I Connec		
									S	3-phase	, 230/40	0 V, 50/60 Hz, 1,1 kW
		İ						İ	Т			0 V, 50/60 Hz, 1,1 kW mit PTC
									L			0 V, 50 Hz, 1,1 kW (Exde) T4
									Q			0 V; 60 Hz, 1,1 kW (Exde) T4
1							1		R			otor, 3 ph. 1,5 kW, 230/400 V
									V	1		
1									\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			notor with integrated frequency converter
									['			ith motor flange 200/90
1									2			ith motor flange 250/100
									3			ith motor flange NEMA
1									4			ith motor flange 200/90 ATEX
									5			ith motor flange 250/100 ATEX
1									6	without	motor, wi	ith motor flange NEMA ATEX
										Stroke le	ength adj	ustment
1					1		1			0	Stroke le	ength adjustment standard
1							İ		1	K	1	ength adjustment standard
1							1			A	1	control motor 0-20 mA; 230 V; 50/60 Hz
1							1			В	1	control motor 4-20 mA; 230 V; 50/60 Hz
										С	1	control motor 0-20 mA; 115 V; 60 Hz
1											1	
										D		control motor 4-20 mA; 115 V; 60 Hz
1												ature (ambient / fluid)
											0	-20 °C+40 °C / -20 °C+90 °C (SS; HC) +50 °C (PTFE)
												+65 °C (PVDF)
1					1		1				1	-10 °C+50 °C / -20 °C+90 °C (SS; HC) +50 °C(PTFE)
												+65 °C (PVDF)
1					1		1				2	-25 °C+40 °C / -25 °C+90 °C (SS; HC) +50 °C (PTFE)
												+65 °C (PVDF)

Process metering technology

2.3 Hydraulic Diaphragm Metering Pumps

Spare parts for HYDRO HA4a

Spare parts kits for HYDRO HA4a without valves

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	S1	HA4a.040S1	1114342
40	H1	HA4a.040H1	1114365
40	P1	HA4a.040P1	1114368
52	S1	HA4a.052S1	1040812
52	H1	HA4a.052H1	1040860
52	P1	HA4a.052P1	1043763
63	S1	HA4a.063S1	1040824
63	H1	HA4a.063H1	1040861
63	P1	HA4a.063P1	1043775
80	S1	HA4a.080S1	1040826
80	H1	HA4a.080H1	1040864
80	P1	HA4a.080P1	1043776
94	S1	HA4a.094S1	1040828
94	H1	HA4a.094H1	1040867
94	P1	HA4a.094P1	1043777

Spare parts kits for HYDRO HA4a with valves

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	S1	HA4a.016S1	1114343
40	P1	HA4a.016P1	1114369
52	S1	HA4a.018S1	1040813
52	P1	HA4a.052P1	1023057
63	S1	HA4a.063S1	1040825
63	P1	HA4a.063P1	1040863
80	S1	HA4a.080S1	1040827
80	P1	HA4a.080P1	1040866
94	S1	HA4a.026S1	1040829
94	P1	HA4a.026P1	1040869

Diaphragms PTFE/1.4404 for HYDRO HA4a

Plunger Ø	Material	Suitable for identity code	Order no.
mm			
40, 52	S1, P1	HA4a.040S1, HA4a.052S1, HA4a.040P1,	1040808
		HA4a.052P1	
63	S1, P1	HA4a.063S1, HA4a.063P1	1040809
80	S1, P1	HA4a.080S1, HA4a.080P1	1040810
94	S1, P1	HA4a.094S1, HA4a.094P1	1040811

Diaphragms PTFE/Hastelloy C Coated for HYDRO HA4a

Plunger Ø mm	Material	Suitable for identity code	Order no.
40, 52	H1	HA4a.040H1, HA4a.052H1	1040874
63	H1	HA4a.063H1	1040875
80	H1	HA4a.080H1	1040876
94	H1	HA4a.094H1	1040877



2.3.3

Hydraulic Diaphragm Metering Pump Makro/ 5

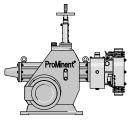
Excellent feed rates in the low pressure range

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.

The MAKRO hydraulic diaphragm metering pump (M5Ha) together with the MAKRO diaphragm and plunger



MAKRO M5Ha

MAKRO M5Ha

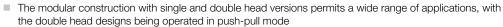
metering pumps form an integrated product range with stroke lengths of 20 or 50 mm. This covers the capacity range from 38 to 6108 l/h at 320 - 4 bar. A wide range of drive versions is available for use in areas at risk from explosion with ATEX certification. The MAKRO product range is designed to comply with API 675 among others.

Your Benefits

Excellent process safety and reliability:

- PTFE multi-layer diaphragm with integral diaphragm rupture warning system
- Integral hydraulic relief valve
- Metering reproducibility is better than ± 1% within the 10-100% stroke length range under defined conditions and with correct installation.

Excellent flexibility:



- 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

MAKRO add-on pump

Technical Details

- Stroke length: 0 50 mm, Rod force: 10,000 N
- Stroke length adjustment range: 0 100%
- Stroke length adjustment: manually by means of a manual adjustment wheel and scaled display (optionally with electric actuator or control drive)
- Metering reproducibility is better than \pm 1 % within the 10 100% stroke length range under defined conditions and with correct installation
- PTFE multi-layer diaphragm with electrical diaphragm rupture warning system via a contact
- Integrated hydraulic relief and bleed valve
- Wetted materials: PVDF, PTFE+25% carbon, stainless steel 1.4571, special materials are available on
- A wide range of drive versions is available: Three-phase standard motors, motors for use in areas at risk from explosion and different flange designs for use in customer-specific motors
- Degree of protection: IP 55
- Design in compliance with API 675 among others

MAKRO double-head 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



Process metering technology

2.3 Hydraulic Diaphragm Metering Pumps

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 → 234

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

Туре	Capacity at max. back pressure with 1500 rpm motor at 50 Hz			Capacity		. back pres rpm moto		Suction lift	Suction / discharge side con- nector	Ship- ping weight	Plunger Ø	
				Max.				Max.				
				stroke				stroke				
				rate				rate				
	l/h	bar	ml/	Strokes/	l/h	psi	gph (US)	Strokes/	m WC	G-DN	kg	mm
050450	450	0.5	stroke	min		000		min	0.0	0.0.00	000	
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 250997	772 997	25 25	125.0 125.0	103 133	922	362 362	244 315	123	3.0	G 2-32 G 2-32	320 320	60 60
250997	1,170	25	125.0	156	1,191 -			159	3.0	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
ТТ	Carbon-filled PTFE	Carbon-filled PTFE	PTFE	Hastelloy C	PTFE

Patented multi-layer diaphragm, vacuum-packed

Special designs available on request

 $\label{thm:policy} \mbox{Viton} \mbox{\@scite{0.05ex}\@scite{0.0$



Identity code ordering system for MAKRO M5Ha

М5На	Drive type										
		Main drive									
	А	Add-on drive									
	D	Double main o	drive								
	В	Double add-or									
		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 m	aterial							
			PC	PVC							
			PP	Polyprop	ovlene						
			SS	Stainles							
			П	1	25% carl	bon					
					of seals/		m				
				Т	PTFE						
					Displace	ement bo	dy				
								ragm, P	TFE coat	ing, with	rupture indicator
							nd versio				
						1	With val	ve spring			
							Hydrauli				
							0		d connec	ction	
							1	PVC uni	on nut a	nd insert	t
							2	ı	ut and in:		
							3	PVDF ur	nion nut a	and inser	rt
							4	SS unio	n nut and	d insert	
								Version			
								0			logo, no frame
								2	without	ProMiner	ent® logo, no frame
								Α	with Pro	Minent®	logo, with frame, simplex
								В			logo, with frame, duplex
								С			logo, with frame, triplex
								D	!		logo, with frame, quadruplex
								М	Modified		
										al power	
									S		30/400 V 50/60 Hz (WBS)
									R	1	e speed motor 4-pole, 230/400 V
									VO	1	with integr. frequency converter
									L		30/400 V 50 Hz (Exe, Exd)
									Р		30/400 V 60 Hz (Exe, Exd)
									5		tor, with gearbox IEC 100
									6		tor, with gearbox IEC 112
									0		tor, no gearbox
										Enclosu	ure rating
										0	IP 55 (standard)
										2	Exd motor version ATEX-T4
										А	ATEX drive

						Stroke s	e sensor		
						0	No stroke	e sensor	
			İ			1	With strol	ke sensor (Namı	ır)
			İ				Stroke ler	ngth adjustment	
			İ				0	Stroke length a	djustment, manual
			İ	İ			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

PC/PP/TT material versions max. 10 bar

Motor data for MAKRO M5Ha

Identity code specification		Power supply			Remarks
Ŝ	3-phase, IP 55°	230 V/400 V 265 V/460 V	50 Hz 60 Hz	3 kW	
R	3-phase, IP 55 [*]	230 V/400 V	50/60 Hz	3 kW	With PTC, speed control range 1:5
VO	3-phase, IP 55°	400 V ±10 %	50/60 Hz	3 kW	Variable speed motor with integrated frequency converter
L1	3-phase, Il 2G Ex e Il T3 X	220 - 240 V/380 - 420 V	50 Hz	3.6 kW	On request
L2	3-phase, II 2G Ex de IIC T4 Gb	220 – 240 V/380 – 420 V	50 Hz	4 kW	With PTC, speed control range 1:5
P1	3-phase, Il 2G Ex e IIC T3	250 - 280 V/440 - 480 V	60 Hz	3.6 kW	On request
P2	3-phase, Il 2G Ex de IIC T4	250 - 280 V/440 - 480 V	60 Hz	4 kW	With PTC, speed control range 1:5
V2	3-phase, 2GDe Ex db IIB T4 Gb, IP67	400 V ± 10 %	50/60 Hz	4 kW	Ex-variable speed motor with integrated frequency converter, 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.

The motors are designed in compliance with the Ecodesign Directive 2009/125/EC.

Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/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.





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

- 1 metering diaphragm
- 1 suction valve assembly
- 1 discharge valve assembly
- 2 valve plates and Hast. C spring
- 1 complete sealing set (O-rings, cover rings, valve seat, valve seat bushing)

Spare Parts Kits for Makro/ 5 HMH

Identity code: 250450, 250562, 250772, 250997, 251170

Liquid end			Order no.
FMH 60-50	SST	with 2 valves cpl.	1008170
FMH 60-50	SST	without valves cpl.	1008169

Identity code: 160616, 160770, 161058, 161366, 161602, 120716, 120895, 121229, 121588, 121862, 120919, 121148, 121577, 122037, 122389

Liquid end			Order no.	
FMH 70/75/85-50	PPT	-	911904	
FMH 70/75/85-50	PCT	-	911902	
FMH 70/75/85-50	TTT	-	911906	
FMH 70/75/85-50	SST	-	911910	
FMH 70/75/85-50	SST	without valves cpl.	911909	

Identity code: 101345, 101680, 102310, 102980, 103500

Liquid end			Order no.
FMH 100-50	PPT	-	1008246
FMH 100-50	PCT	-	1008247
FMH 100-50	TTT	-	1008248
FMH 100-50	SST	with valves cpl.	1008250
FMH 100-50	SST	without valves cpl.	1008249

Identity code: 062305, 062880, 063960, 065110, 066000

Liquid end		(Order no.
FMH 130-50	PP	-	1008251
FMH 130-50	Р	_	1008252
FMH 130-50	Т	-	1008253
FMH 130-50	S	with valves cpl.	1008265
FMH 130-50	S	without valves cpl.	1008264



Diaphragms for MAKRO M5Ha

Liquid end	Order no.
FMH 60/70/75/85-50	1007298
FMH 100/130-50	1007852



2.3.4

Hydraulic Diaphragm Metering Pump ORLITA Evolution

Maximum process reliability and flexibility.

Capacity range of single head pump: 3 - 7,400 l/h, 400 - 8 bar



The ORLITA Evolution meets the most exacting safety requirements as an extremely robust hydraulic diaphragm metering pump. It is characterised by its PTFE multi-layer diaphragm with integral diaphragm rupture warning / signalling and unique diaphragm position control.

The ORLITA Evolution hydraulic diaphragm metering pump range of EF1a, EF2a, EF3a and EF4a form an integrated product range with stroke lengths of 15 to 40 mm. This covers the capacity range of 3 to 7,400 I/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.

ORI ITA Evolution FF1a

ORI ITA Evolution EE4a

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)
- Metering reproducibility is better than ± 1% within the 10-100% stroke length adjustment range under certain defined conditions and with proper installation
- Continuous bleeding of the oil chamber ensures reliable operation

Excellent flexibility:

- The modular and compact construction with single and multiple pump versions permits a wide range of applications. In multiple pump systems up to 5 metering units can be combined, including units with different pump capacities
- 7 different gear ratios are available
- Drive configuration ideal for installation in any position (vertical or horizontal)
- Plunger metering pumps are also available in addition to the hydraulic diaphragm versions.
- 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
- Metering reproducibility is better than \pm 1% within the 10 100% stroke length range under defined conditional to the strong reproducibility is better than \pm 1% within the 10 100% stroke length range under defined conditional to the strong reproducibility is better than \pm 1% within the 10 100% stroke length range under defined conditional to the strong reproducibility is better than \pm 1% within the 10 100% stroke length range under defined conditional to the strong reproducibility is better than \pm 1% within the 10 100% stroke length range under defined conditional to the strong reproducibility is better than \pm 1% within the 10 100% stroke length range under defined conditional to the strong reproducibility is better than \pm 1% within the 10 100% stroke length range under defined conditional to the strong reproducibility is better than \pm 1% within the 10 100% stroke length range under defined conditional to the strong reproducibility is the strong reproducibility is the strong reproducibility of the strong reproducibility is the strong reproducibility of the strong reproducibility is the strong reproducibility of the strong reproducibility is the strong reproducibility of the strong reproducibility is the strong reproducibility of the strong repr tions and with correct installation
- PTFE multi-layer diaphragm with electrical diaphragm rupture warning / signalling system via a contact
- Integrated hydraulic relief and bleed valve
- Wetted materials: Stainless steel 1.4404, special designs available on request Plastics PVC, PVDF, special designs available on request
- A wide range of 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



Process metering technology

Hydraulic Diaphragm Metering Pumps 2.3

2.3.4.1

ORLITA Evolution EF1a

Technical data for EF1a single head pump 50 Hz SST

Plung- er Ø		Max. pump	o capacity i	n I/h at str	okes/min				Theor. stroke volume		Connection on suction/ discharge side	Shipping weight
		71	97	116	145	165	181	201				
mm	bar	l/h	l/h	l/h	l/h	I/h	l/h	l/h	ml/ stroke	m WC	G-DN	kg
8	400		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		8.1	9.7	12.1	13.8	15.1	16.8	-	3.0	DN 6	80
13	200		10.3	12.3	15.3	17.5	19.1	21.3		3.0	DN 6	80
14	172		8.9	10.6	13.3	15.1	16.6	18.4	2.46	3.0	DN 6	80
15	150	_	11.0	13.2	16.5	18.8	20.6	22.9	2.83	3.0	DN 6	80
16	132		13.5	16.1	20.2	22.9	25.2	27.9		3.0	DN 6	80
17	117	-	16.3	19.5	24.3	27.7	30.4	33.7	3.63	3.0	DN 6	80
18	104		19.4	23.2	29.1	33.1	36.3	40.3	4.07	3.0	DN 6	80
19	93		23.0	27.5	34.3	39.1	42.9	47.6		3.0	DN 6	80
20	84		24.3	29.0	36.3	41.3	45.3	50.3		3.0	DN 10	80
21	76		27.4	32.8	41.0	46.6	51.2	56.8		3.0	DN 10	80
22	70	_	30.4	36.4	45.5	51.8	56.8	63.1	6.08	3.0	DN 10	80
23	64		33.6	40.3	50.3	57.3	62.8	69.8		3.0	DN 10	80
25	54		41.1	49.2	61.5	70.0	76.8	85.3		3.0	DN 10	80
29	40	_	58.4	69.9	87.4	99.4	109.0	121.1	10.57	3.0	DN 10	80
32	34		66.7	79.7	99.6	113.4	124.4	138.1	12.87	3.0	DN 10	80
38	25		98.2	117.5	146.8	167.1	183.3	203.5		3.0	DN 10	80
44	17	-	133.1	159.2	199.0	226.4	248.4	275.8		3.0	DN 16	80
47	14		151.9	181.6	227.0	258.3	283.4	314.7	27.76	3.0	DN 16	80
50	14		173.7	207.7	259.7	295.5	324.1	359.9		3.0	DN 16	80
54	12		202.6	242.3	302.9	344.6	378.1	419.8		3.0	DN 16	80
58	10		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)



Technical data for Evolution EF1a single-head pump 60 Hz

Plunger Ø	Max. pres- sure	Max. pump	capacity in l	/h at strokes/m	in		Theor. stroke volume	Suction lift	Connection on s suction/dis- charge 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/dia- phragm mount- ing screw	Connection on suction/dis- charge side	Seals	Valve seats	Valve balls up to DN 10	Valve plates/ valve springs as of DN 16
S2	Stainless steel	PTFE / stainless	Stainless steel	stainless steel	Stainless steel	Al ₂ O ₃ ceramic	Stainless steel
	1.4571/1.4404	steel 1.4462	1.4404	1.4404	1.4404	2 0	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

Identity code ordering system for Evolution EF1a

EF1a	Drive type						
	٧	Simplex (vert	ical)				
		Simplex (hori					
1			ives / 2 heads	:			
	T		ves / 2 neads				
	1		ves / 3 neads				
		Plungers	1				
		008	Plunger 8 mr				
		010	Plunger 10 m				
		011	Plunger 11 m	nm			
		012	Plunger 12 m	nm			
		013	Plunger 13 m				
		014	Plunger 14 m				
		015	Plunger 15 m				
		016	Plunger 16 m				
		017					
			Plunger 17 m				
		018	Plunger 18 m				
		019	Plunger 19 m				
		020	Plunger 20 m				
		021	Plunger 21 m				
		022	Plunger 22 m	nm			
		023	Plunger 23 m	nm			
		025	Plunger 25 m	nm			
1		029	Plunger 29 m				
		032	Plunger 32 m				
		038	Plunger 38 m				
		044	Plunger 44 m				
		044					
			Plunger 47 m				
		050	Plunger 50 m				
		054	Plunger 54 m				
		058	Plunger 58 m				
		060	Plunger 60 m	nm			
			stroke rate				
			071	71 stro	kes/min	.; 50 Hz	2
			097	97 stro	kes/min	.; 50 Hz	Z
			116	116 str	okes/mi	n.; 50 H	l z
			145	1		n.; 50 H	
			165			n.; 50 H	
			181	1		n.; 50 H	
			201			n.; 50 H	
			088			.; 60 Hz	
			1				
			117	1		n.; 60 H	
			140			n.; 60 H	
			175			n.; 60 H	
			199			n.; 60 H	tz
				Pressui			
				Α	400 ba	r	
				В	337 ba	r	
				С	278 ba	r	
				D	234 ba	r	
				E	200 ba		
				F	172 ba		
				G	150 ba		
				Н	132 ba		
				[132 ba		
				[',	104 ba		
				J		1	
				K	93 bar		
				L	84 bar		
				М	76 bar		
				N	70 bar		
				0	64 bar		
				Р	54 bar		
				Q	40 bar		
1				R	34 bar		
				S	25 bar		
1				Т	17 bar		
				U	14 bar		
				V	12 bar		
				w	10 bar		
				V V		d	
					Materia		and stainless stady stainless steel
					S2		ard stainless steel; stainless steel
						PVDF; F	
						PVC; P	
						Valve de	
						0	standard

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				4 5	Ball val	ve ve with	spring							
1				6		ball val								
				7		alve with								
				8	Cone v		_							
				9		alve wit		1						
					Diaphra 2	agm mo Lvisual ir	nitor ndicatio	n						
					1	1		rı ragm mo	onitoring	1				
					3	1		ure gauç		,				
					4	Electric	pressu	ire switc						
1						Hydrau								
1						0 E	standa DIN fla							
						F	Flange	0						
						N	NPT c	onnectic	n					
								cal Conr						
							S T				50/60 H	z z, with F	TC	
							L					z, with F Exde) T4		
1							Q	1 '				Exde) T4		
1							V	1				0	requen	cy converter
1							1	1			ange 16			
1							2	1			ange 20 FMA 56	0/90 5/143 flai	nae	
1							4	1				TEX flan	-	
1							5	Withou	it motor	, with 20	00/90 A	TEX flan	ge	
							6					5/143 AT	EX flang	je
1								Stroke 0	length a	-		ent stan	dard	
1								1	1	-	-	ent Alun		
1								2	Stroke	length :	adjustm	ent stair	less ste	
								A						50/60 Hz
								ВС				1-20 mA)-20 mA		50/60 Hz
								D				1-20 mA		
								E						80 V, 50/60 Hz
								F	1					80 V, 50/60 Hz
								G H	1					30 V, 50/60 Hz 5 V, 50/60 Hz
								Z	Fixed s		TILIOI TIIC	101 4-20	illiA, I	5 V, 50/60 HZ
											ambient)		
									0		+40			
									1 2	1) +50) +40			
									5	1	; +40 ; +60			
										Paint				
										0P	1			paint - RAL 2003
										1P				nt - RAL 2003
1										2P 3P		itdoor - I shore -		
											Tests			
											S1			rmance test
1											S2	Standa certifica		rmance test including 3.1
1											S3			rtificate wetted material
											S4	As S2	+ 3.1 ce	rtificate wetted material
1											A1			ete includiung S4
											A2 A3	As A1	+ NPSH + NPIP	
1											170	Approv		
1												0	CE	
1												1	CE + A	
1												2	CE + E	
												4	CE + L	AC + ATEX JKCA
												5	!	JKCA + ATEX
													Docum	nentation
													DE	German
1													EN FR	English French
													ES	French Spanish
1													RU	Russian
													MO	modified
														Measuring unit
														0 bar, I/h

								İ	1 2	psi, gph kPa, l/h

<u>a</u>

2.3

Hydraulic Diaphragm Metering Pumps

2.3.4.2

ORLITA Evolution EF2a

Technical data for Evolution EF2a single-head pump 50 Hz

Plung- er Ø	Max. pressure	Max. pump	capacity i	n I/h at str	okes/min				Theor. stroke volume		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	I/h	ml/	m WC	G-DN	kg
-			2.0						stroke			
11	400	3.9	5.2	6.2	7.8	8.9	10.1	10.8		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		3.0	DN 6	95
14	400	3.8	5.1	6.0	7.6	8.5	9.7	10.4		3.0	DN 6	95
15	351	5.4	7.1	8.5	10.7	12.1	13.7	14.8		3.0	DN 6	95
16	309		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		3.0	DN 6	95
18	244		16.2	19.4	24.2	27.6	31.2	33.6		3.0	DN 6	95
19	219		20.3	24.2	30.3	34.4	39.0	42.0		3.0	DN 6	95
20	198		21.4	26.5	31.9	36.3	41.2	44.3		3.0	DN 10	95
21	179		24.2	28.9	36.1	41.1	46.6	50.1		3.0	DN 10	95
22	163		27.2	32.5	40.6	46.2	52.4	56.3		3.0	DN 10	95
23	149		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		55.4	66.3	82.8	94.3	106.8	114.8		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		91.9	109.9	137.3	156.3	177.1	190.4		3.0	DN 10	95
44	41	95.6	127.0	151.9	189.9	216.1	244.9	263.2		3.0	DN 16	95
47	36		146.2	174.8	218.5	248.7	281.8	302.9		3.0	DN 16	95
50	32		166.6	199.3	249.1	283.5	321.3	345.3		3.0	DN 16	95
54	27	148.0	196.7	235.2	294.0	334.5	379.1	407.5		3.0	DN 16	95
58	24		229.0	273.9	342.4	389.6	441.6	474.6		3.0	DN 16	95
60	22		246.7	295.0	368.8	419.6	475.6	511.2		3.0	DN 16	95
65	19		289.3	346.0	432.5	492.1	557.8	599.5		3.0	DN 20	95
70	16		338.5	404.8	506.0	575.8	652.6	701.4	61.58	3.0	DN 20	95
76	14		402.9	481.8	602.2	685.3	776.7	834.8		3.0	DN 20	95
78	13		425.8	509.2	636.4	724.2	820.8	882.2		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)

Technical data for Evolution EF2a single-head pump 60 Hz

Plunger Ø	Max. pres- sure	Max. pump o	apacity in I/h	at strokes/min			Theor. stroke volume	Suction lift	Connection on S suction/dis- charge 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/dia- phragm mount- ing screw	Connection on suction/dis- charge side	Seals	Valve seats	Valve balls up to DN 10	Valve plates/ valve springs as of DN 16
S2	Stainless steel	PTFE / stainless	Stainless steel	stainless steel	Stainless steel	Al ₂ O ₃ ceramic	Stainless steel
	1.4404	steel 1.4462	1.4404	1.4404	1.4404	2 0	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



Identity code ordering system for Evolution EF2a

EF2a	Drive time			,		J	-,			Juon			
u	Drive type V	Simplex (vert	rical)										
	H	Simplex (veri											
			rives / 2 heads	3									
	Т		ives / 3 heads										
		Plungers											
		011	Plunger 11 n										
		012	Plunger 12 n										
		013 014	Plunger 13 n Plunger 14 n										
		014	Plunger 15 n										
		016	Plunger 16 n										
		017	Plunger 17 n										
		018	Plunger 18 n										
		019	Plunger 19 n	nm									
		020	Plunger 20 n										
		021	Plunger 21 n										
		022	Plunger 22 n										
		023 025	Plunger 23 n Plunger 25 n										
		029	Plunger 29 n										
		032	Plunger 32 n										
		038	Plunger 38 n										
		044	Plunger 44 n										
		047	Plunger 47 n										
		050	Plunger 50 n										
		054	Plunger 54 n										
		058 060	Plunger 58 n Plunger 60 n										
		065	Plunger 65 n										
		070	Plunger 70 n										
		076	Plunger 76 n										
		078	Plunger 78 n										
		080	Plunger 80 n	nm									
			stroke rate	1									
			071 097		kes/min. kes/min.								
			116		okes/mir								
			145	!	okes/mir								
			165	!	okes/mir								
			181	!	okes/mir								
			201	!	okes/mir								
			088	!	kes/min.								
			117 140	!	okes/mir okes/mir								
			175	!	okes/mir								
			199		okes/mir								
					re rating								
				A	400 bar								
				ВС	337 bar 278 bar								
				D	234 bar								
				E	200 bar								
				F	172 bar								
				G	150 bar								
				Н	132 bar								
					117 bar								
				K	104 bar 93 bar								
				ı	84 bar								
				М	76 bar								
				N	70 bar								
				0	64 bar								
				Р	54 bar								
				Q	40 bar								
				R S	34 bar								
				T	25 bar 17 bar								
				Ü	14 bar								
				V	12 bar								
				W	10 bar								
					Material								
						Standard sta	inless st	eel; stainl	ess steel				
						PVDF; PTFE PVC; PTFE							
					V 1	VO, 1 11 E							

		Valve d										
		0	standa									
		4	Ball val									
		5		ve with								
		6		ball val								
		7		alve with	spring							
		8	1	Cone valve Cone valve with spring								
		19		aive will agm mo		j						
				visual ir		n						
						ragm mo	nitorina					
			3			ure gaug	-					
			4	Electric	pressu	ire switcl	h					
				Hydrau								
				0	standa							
				E F	DIN fla Flange	-						
				N N	_	onnectio	n					
						cal Conn						
					S	3-phas		400 V, 5	50/60 H	Z		
					Т	1 '				z, with F	TC	
					L					Exde) T4		
					Q	1 '				Exde) T4		
					٧	1				-	requen	cy converter
					1 2	Withou Withou			0			
					3	1			-	0/90 3/143 flai	nae	
					4	1				TEX flan	-	
					5	1				TEX flan	~	
					6	1				6/143 AT	~	je
						Stroke						
						0	ı	_		ent stan		
						1			,	th adjus		
						2 A				length a		nt 50/60 Hz
						В						50/60 Hz
						С				0-20 mA		
						D				4-20 mA		
						E	EXd str	oke co	ntrol mo	otor 0-20	mA, 23	80 V, 50/60 Hz
												30 V, 50/60 Hz
						G	1					30 V, 50/60 Hz
							Fixed s		ntroi mo	otor 4-20	ıma, i	5 V, 50/60 Hz
						1	Tempe		amhient	.)		
							0		+40	,		
							1		+50			
							2		+40			
							5	-10 °C	+60) °C		
								Paint	loo o			and all DAL COOR
								0P 1P				paint - RAL 2003
								2P		anaara g ıtdoor - I		nt - RAL 2003
								3P		fshore -		
									Tests			
									S1	Standa	rd perfo	rmance test
									S2			rmance test including 3.1
									S3	certifica		rtificate wetted material
									S4			rtificate wetted material
									A1	1		ete + S4
									A2	As A1		
									АЗ	As A1		
										Approv		
										0	CE	
										1	CE + A	
										2	CE + E	
										3	CE + L	AC + ATEX
										5	1	JKCA + ATEX
										Ĭ		nentation
											DE	German
											EN	English
											FR	French
											ES	Spanish
											RU	Russian
											MO	modified

								Measu	ring unit
								0	bar, I/h
								1	psi, gph
								2	kPa, I/h

Process metering technology

2.3 **Hydraulic Diaphragm Metering Pumps**

2.3.4.3

ORLITA Evolution EF3a

Technical data for EF3a single head pump 50 Hz SST

Plunger Ø	Plunger Ø Theor. stroke Theoretical pump capacity in I/h at strokes/min volume										ciency	Standard type of valve
		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 %	At 50 %	
										pressure	pressure	
17	5.67	24	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 EF3a single head pump 60 Hz SST

Pl	unger Ø	Theor. stroke volume	Theoretical p	oump capaci	ty in I/h at s	trokes/min		Max. pressure	Efficiend	Standard type of valve	
		.,	88 [2]	117 [3]	140 [4]	175 [5]	199 [6]		11.100.0/	4. 50 0/	
	mm	ml/stroke	l/h	l/h	l/h	l/h	l/h	bar	At 100 %	At 50 %	
									pressure	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	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 headDiaphragm retaining screwDiaphragmStainless steel 1.4404Stainless steel 1.4462PTFE multi-layer diaphragm

Ball valve DN 6 - DN 10

Standard type of valve	e Connection on suction/dis- charge side	Valve/head seal	Valve balls	Valve seats	Valve housing	Clamp ring
DN 6	Stainless steel	Stainless steel	SiN ceramic	Stainless steel	Stainless steel	Hastelloy C-4
DN 10	Stainless steel 1.4404	Stainless steel 1.4404	Al ₂ O ₃ ceramic	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C-4

DN 16 - DN 40 Plate valve

Standard type of valve	e Connection on suction/dis- charge 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-4
DN 20	Stainless steel 1.4404	Stainless steel 1.4404	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C-4
DN 25	Stainless steel 1.4404	Stainless steel 1.4404	Stainless steel 1.4462	Stainless steel 1.4404	Stainless steel 1.4404	Hastelloy C-4

Further material versions and details available on request.

2.3.4.4

ORLITA Evolution EF4a

Technical data for EF4a single head pump 50 Hz SST

Plung- er Ø	Theor. stroke volume											Standard type of valve
		73 [2]	97 [3]	116 [4]	145 [5]	165 [6]	181 [7]	201 [8]				
mm	ml/	l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar	At 100 %	At 50 %	
	stroke									pressure	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 EF4a single head pump 60 Hz SST

Plunger Ø	Theor. stroke volume	Theoretical p	oump capacit	ty in I/h at st	rokes/min		Max. pressure	•		
mm	ml/stroke	88 [2] I/h	117 [3] I/h	140 [4] l/h	175 [5] l/h	199 [6] 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

Wetted materials for Evolution EF4a

Dosing head assembly

Dosing headDiaphragm retaining screwDiaphragmStainless steel 1.4404Stainless steel 1.4462PTFE multi-layer diaphragm

Plate valve

Standard type	Connection on suction/	Valve/head seal	Valve plate	Valve seats	Valve housing
of valve	discharge side				
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

Safety processes as standard.

Capacity range of single-head pump: 0.8 - 126 l/h, 260 - 28 bar



As an extremely robust hydraulic diaphragm metering pump, the ORLITA Evolution E1Sa 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 1S together with the ORLITA Evolution hydraulic diaphragm metering pumps EF1a, EF2a and EF4a form an integrated product range with stroke lengths of 15 to 40 mm. This covers the capacity range from 3 to 7400 l/h at 400 - 10 bar. A wide range of drive versions is available, including some for use in Zone 1 or Zone 2 areas at risk from explosion with ATEX certification. The ORLITA Evolution product range is designed to comply with API 675.



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)
- Metering reproducibility is better than ± 1% within the 10-100% stroke length adjustment range under certain defined conditions and with proper installation
- Continuous bleeding of the oil chamber ensures reliable operation

Technical Details

- Stroke length: 0 16 mm
- Rod force: 2000 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). A fixed stroke variant in accordance with API 674 is also available as an alternative
- Metering reproducibility 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 bleed valve
- Wetted materials: Stainless steel 1.4404, special designs available on request Plastics PVC, PVDF, special
- A wide range of 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



Technical data for Evolution E1Sa single-head pump 50 Hz

Plung- er Ø	Max. pressure		. ,			405	404	004	Theor. stroke volume	Suction lift	Connection on suction/ discharge side	Shipping weight
mm	bar	71 l/h	97 l/h	116 l/h	145 l/h	165 l/h	181 l/h	201 l/h	!	m WC	G-DN	kg
	Dai	, ,,,	7	,,,,	7	V	,,,,	.,,,	stroke	****	G DIV	'\9
6	260	0.8	1.0	1.2	1.5	1.7	1.9	2.1	0.49	3.0	DN 3	45
8	260	1.8	2.4	2.9	3.6	4.1	4.5	5.0	0.80	3.0	DN 3	45
10	255	2.6	3.5	4.2	5.2	6.0	6.5	7.3	1.25	3.0	DN 6	45
13	163	5.8	7.6	9.1	11.4	13.0	14.3	15.8	1.96	3.0	DN 6	45
22	51	23.1	30.7	36.7	45.9	52.3	57.3	63.7	6.28	3.0	DN 10	45
30	28	46.1	61.2	73.2	91.5	104.1	114.2	126.8	11.31	3.0	DN 10	45

Valve type: Double ball valve

Technical data for Evolution E1Sa single-head pump 60 Hz

Plunger Ø	Max. pres- sure	Max. pump	capacity in l	/h at strokes/m	in		Theor. stroke volume	Suction lift	Connection on suction/dis- charge 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
6	260	1.0	1.2	1.4	1.8	2.0	0.49	3.0	DN 3	45
8	260	2.2	2.9	3.5	4.3	4.9	0.80	3.0	DN 3	45
10	255	3.1	4.2	5.0	6.2	7.2	1.25	3.0	DN 6	45
13	163	7.0	9.1	10.9	13.7	15.6	1.96	3.0	DN 6	45
22	51	27.7	36.8	44.0	55.1	62.8	6.28	3.0	DN 10	45
30	28	55.3	73.4	87.8	109.8	124.9	11.31	3.0	DN 10	45

Valve type: Double ball valve

Wetted materials for Evolution E1Sa

Identity code of material	Dosing head	Diaphragm/ diaphragm mounting screw	Connection on suction/dis- charge 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 ₂ O ₃ ceramic	Stainless steel 1.4462
S3	Stainless steel 1.4404	PTFE / stainless steel 1.4462	Stainless steel 1.4404	stainless steel 1.4404	Stainless steel 1.4404	Al ₂ O ₃ ceramic	Stainless steel 1.4462

Important note:

Abridged presentation of our complete product range. Other types on request



Identity code ordering system for Evolution E1Sa

E1Sa	Drive type									
		Cimpley (yes	tioo!\							
	V	Simplex (ver								
	X		ut liquid end)							
		Plungers								
		006	Plunger 6 m	m						
		008	Plunger 8 m							
		010	Plunger 10 r							
		013	Plunger 13 r							
			-							
		022	Plunger 22 n							
		030	Plunger 30 n	nm						
			stroke rate							
			071	71 stro	kes/mi	n.; 50 H	Z			
			097	97 stro	kes/mi	n.; 50 H	z			
			116	116 st	rokes/n	nin.; 50	Hz			
			145	145 st	rokes/n	nin.; 50	Hz			
			165	165 st	rokes/n	nin.; 50	Hz			
			181			nin.; 50				
			201	1		nin.; 50				
			088	1		n.; 60 H				
			117			nin.; 60				
			140			nin.; 60				
				1						
			175			nin.; 60				
			199			nin.; 60	HZ			
					ire ratin	_				
1				Α	260 ba					
1				В	163 ba					
				D	51 bar					
1				E	30 bar					
				X	Drive (without	liquid e	nd)		
					Materi	al				
					S2	Standa	ard stair	less ste	el; stain	less steel - DIN EN
					S3					less steel - AISI
					XX	l .	without			
						Valve of			,	
						0	standa	rd		
						4	Ball va			
						5	1		oprina	
									spring	
						6		ball va		
						7			h spring	
						8	Cone v			
						9			th spring	
						X			liquid en	d)
							Diaphr	agm m	onitor	
							2	visual i	ndication	1
							1	Withou	ut diaphr	agm monitoring
							3	Contac	ct pressu	ire gauge
			İ				4	Electric	pressu	re switch
							X			iquid end)
									ulic conn	. ,
								0	standar	
								E	DIN flar	
								F	Flange	· ·
								N N	_	nnection
								X	1	rinection vithout liquid end)
								^	_ `	. ,
										al Connection
1										3-phase, 230/400 V, 50/60 Hz
										3-phase, 230/400 V, 50/60 Hz, with PTC
										3-phase, 230/400 V, 50 Hz, (Exde) T4
										3-phase, 265/460 V, 60 Hz, (Exde) T4
										Variable speed motor with integrated frequency converter
										Without motor, with flange 160/71
									2	Without motor, with flange 200/90
									3	Without motor, with NEMA 56/143 flange
										Without motor, with 160/71 ATEX flange
									1 1	Without motor, with 200/90 ATEX flange
									1 1	Without motor, with NEMA 56/143 ATEX flange
1										Without motor, without flange
1										Stroke length adjustment
										O Stroke length adjustment standard
										Temperature (ambient)
1										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 Ot	itdoor - RAL 20	03	
İ					İ	3P	C5 Of	fshore - RAL 20	003	
						XX	Drive,	unpainted with	rust pro	otection
							Tests			
							S1	Standard perfo	ormanc	e test
							S2	Standard perfo	ormanc	e test including 3.1 certificate
					İ		S3	As S1 + 3.1 ce	ertificate	e wetted material
							S4	As S2 + 3.1 ce	ertificate	e wetted material
							A1	API test comp	lete incl	luding S4
							A2	As A1 + NPSH	1	
							АЗ	As A1 + NPIP		
							XX	Drive (without	liquid e	nd)
								Approvals		
								0	CE	
								1	CE + A	
								2	CE + E	
								3		EAC + ATEX
								4	CE + l	
								5		UKCA + ATEX
								X		(without liquid end)
										mentation
									DE	German
									EN	English
									FR	French
									ES	Spanish
									RU	Russian
									XX	Power end (without liquid
									MO	end) modified
									INIO	Measuring unit
										0 bar, I/h 1 psi, qph
										1 psi, gph 2 kPa, l/h
										X Drive (without liquid
										end)
										5.13,

2.3.6

Hydraulic Diaphragm Metering Pump Evolution mikro

For the smallest quantities at the highest pressures

Capacity range 0.01 - 18 l/h, 400 - 10 bar



The Evolution mikro is an innovative micro-metering pump for high pressures. The hydraulic diaphragm metering pump is the first of its kind with an electronically regulated linear direct power end. The drive has few mechanical functional elements and thus operates with virtually minimal maintenance.

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

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

The Evolution mikro is the first of its kind with an electronically regulated direct drive (linear motor). It can be ideally adapted to the respective application, thanks to a control range of up to 1:200 and the combination of individually independent metering profiles with 3-parameter control.

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 drive
- 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

- Stroke length: 0 60 mm
- Stroke rate: 0 200 strokes/min.
- Precise metering of 0.01 l/h up to a max. of 18 l/h at up to 400 bar
- Stroke length adjustment range 0 100%
- Metering reproducibility is better than ± 1% under defined conditions and with proper installation
- PTFE multi-layer safety diaphragm with integrated diaphragm rupture signalling system or metal diaphragm
- Large real volumetric flow control range: 1:200
- Wetted materials: 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 controls are possible
- Individual process-dependent metering profiles are possible
- Space-saving, easy-to-fit solution
- IP 55 degree of protection
- 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 EMFa - Evo mikro with PTFE multi-layer safety diaphragm

Plung- er Ø	Max. pres-	Мах. р	ump c	apacity	y in I/h	at stro	kes/m	in			Theor. stroke	Suc- tion	Connection on suction/ discharge side	Shipping weight
0. 2	sure										volume	lift	u.cou.go o.u.o	
		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/	m WC	G-DN	kg
											stroke			
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
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	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	64	0.5	1.1	1.4	1.8	2.2	2.5	2.9	3.2	3.7	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	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	160	0.4	0.8	1.1	1.4	1.7	2.0	2.2			0.42	1	1/4" NPTi - DN 3 - DKV	25
3	250	0.3	0.6	0.8							0.42	1	1/4" NPTi - DN 3 - DKV	25
6	10	2.8	5.7	7.6	9.5	11.3	13.2	15.1	17.0	18.9	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	40	2.6	5.2	6.9	8.6	10.3	12.1	13.8			1.69	1	1/4" NPTi - DN 6 - DKV	25
6	64	2.6	5.1	6.8	8.5	10.2	11.9				1.69	1	1/4" NPTi - DN 6 - DKV	25

Data applies at ambient temperature of up to 45°C and with motor energy supply of 72 V DC.

Pumps can be operated with reduced output at ambient temperatures of 50° C, 55° C, 60° C and also at 24 V DC (e.g. using solar energy). Further details on request.

Technical data for Evolution mikro EMFa 72 V DC

Plung- er Ø	Max. pres- sure	Мах. р	ump ca	apacity	y in I/h	at stro	kes/m	in			Theor. stroke volume	Suc- tion lift	Connection on suction/ discharge side	Shipping weight
mm	bar	30 l/h	60 l/h	80 I/h	100 l/h	120 l/h	140 l/h	160 l/h	180 l/h	200 l/h	ml/ stroke	m WC	G-DN	kg
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
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	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	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	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	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	160	0.4	8.0	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	250	0.4	0.7	1.0	1.2						0.42	1	1/4" NPTi - DN 3 - DKV	25
6	10	2.8	5.7	7.6	9.5	11.3	13.2	15.1	17.0	18.9	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	40	2.6	5.2	6.9	8.6	10.3	12.1	13.8	15.5	17.2	1.69	1	1/4" NPTi - DN 6 - DKV	25
6	64	2.6	5.1	6.8	8.5	10.2	11.9	13.6	15.3		1.69	1	1/4" NPTi - DN 6 - DKV	25

All performance data applies at an ambient temperature of 40 °C and 72 V DC power supply.

Performance data for 320, 400 bar (plunger diameter 3 mm) and for 80, 100 bar (plunger diameter 6 mm) is available on request.

Performance data for 50 °C, 55 °C and 60 °C is available on request.



Stainless steel 1.4404 Stainless steel 1.4404

2.3 Hydraulic Diaphragm Metering Pumps

rechnical data for Evolution mil	kro EMHa 2	4 V DC
acity in I/h at etrokee/min	Theor	Suc-

Plung- er Ø	Max. pres- sure	Мах. р	ump ca	apacity	y in l/h	at stro	kes/mi	in			Theor. stroke volume	Suc- tion lift	Connection on suction/ discharge side	Shipping weight
mm	bar	30 l/h	60 l/h	80 l/h	100 l/h	120 l/h	140 l/h	160 l/h	180 l/h	200 l/h	ml/ stroke	m WC	G-DN	kg
3	10	0.7	1.4	1.9	2.3	2.8	3.3	3.7	4.2	4.7	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	25	0.7	1.4	1.9	2.3	2.8	3.3	3.7	4.2	4.7	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	40	0.7	1.3	1.8	2.2	2.7	3.1	3.5	4.0	4.4	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	64	0.7	1.3	1.8	2.2	2.7	3.1	3.5	4.0	4.4	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	80	0.6	1.3	1.7	2.1	2.5	3.0	3.4	3.8	4.2	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	100	0.6	1.3	1.7	2.1	2.5	3.0	3.4	3.8	4.2	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	160	0.6	1.2	1.6	2.0	2.4	2.8	3.2			0.42	1	1/4" NPTi - DN 3 - DKV	25
3	250	0.3	0.5	1.4	1.7						0.42	1	1/4" NPTi - DN 3 - DKV	25

All performance data applies at an ambient temperature of 40 °C and 24 V DC power supply.

Performance data for 320, 400 bar is available on request.

Performance data for 50 °C, 55 °C and 60 °C is available on request.

Technical data for Evolution mikro EMHa 72 V DC

Plung- er Ø	Max. pres- sure	Мах. р	ump c	apacity	y in l/h	at stro	kes/mi	n			Theor. stroke volume	Suc- tion lift	Connection on suction/ discharge side	Shipping weight
mm	bar	30 l/h	60 l/h	80 l/h	100 l/h	120 l/h	140 l/h	160 l/h	180 l/h	200 l/h	ml/ stroke	m WC	G-DN	kg
3	10	0.7	1.4	1.9	2.3	2.8	3.3	3.7	4.2	4.7	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	25	0.7	1.4	1.9	2.3	2.8	3.3	3.7	4.2	4.7	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	40	0.7	1.3	1.8	2.2	2.7	3.1	3.5	4.0	4.4	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	64	0.7	1.3	1.8	2.2	2.7	3.1	3.5	4.0	4.4	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	80	0.6	1.3	1.7	2.1	2.5	3.0	3.4	3.8	4.2	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	100	0.6	1.3	1.7	2.1	2.5	3.0	3.4	3.8	4.2	0.42	1	1/4" NPTi - DN 3 - DKV	25
3	160	0.6	1.2	1.6	2.0	2.4	2.8	3.2	3.6		0.42	1	1/4" NPTi - DN 3 - DKV	25
3	250	0.5	1.0	1.4	1.7						0.42	1	1/4" NPTi - DN 3 - DKV	25

All performance data applies at an ambient temperature of 40 °C and 72 V DC power supply.

Performance data for 320, 400 bar is available on request.

Performance data for 50 °C, 55 °C and 60 °C is available on request.

Wetted materials for Evolution mikro EMFa

Stainless steel 1.4404 Stainless steel 1.4404 Al₂O₃ ceramic

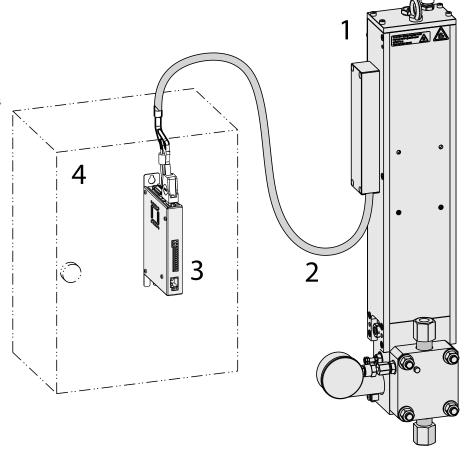
Dosing head assembly

DN 3 (double ball)

Dosing nead	Diaphragm r	etaining screw		Diaphragm	
Stainless steel 1.4404	Stainless stee	el 1.4462		PTFE multi-layer diaphrag	jm
Identity code of	Connection on suc-	Valve/head seal	Valve balls	Valve seats	Valve housing

Scope of delivery

- Pump
- 2 m cable
- Drive Control
- 1: Pump 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 Evolution mikro EMFa

EMFa	Drive type															
	V	Simplex	(vertical)													
	ļ ·	Plungers	, ,													
		003	Plunger 3 n	nm												
		003														
		000	Plunger 6 n	1111												
			stroke rate													
			030		es / min.											
			060		es / min.											
			080		es / min.											
			100	100 stro	kes / min	١.										
			120	120 stro	kes / min	١.										
			140	140 stro	kes / min	١.										
			160	160 stro	kes / min	١.										
			180		kes / min											
			200		kes / min											
			200	Pressure												
				A	10 bar											
				D	25 bar											
					1											
				E	40 bar											
				Н	64 bar											
				J	80 bar											
				K	100 bar											
				N	160 bar											
				Р	250 bar											
					Material											
					S2	Standar	d stainles	s steel: 1	.4404							
						Valve de										
						0	standard	1								
						ľ	Diaphrag		or							
							1	none	Oi							
							2	visual in	diantion							
							3		pressure							
							4		oressure							
									c connec							
								0	standard							
									Electrica	l Connec	ction					
									G	Standar	d linear m	otor with	12 m cab	le, 24 V I	DC	
									Н	Standar	d linear m	otor with	14 m cab	le, 24 V I	DC	
									J	Standar	d linear m	otor with	out cable	e, 24 V D	C	
									K	ATEX lin	ear moto	r with 2 n	n cable, 2	24 V DC		
									L	ATEX lin	ear moto	r with 4 n	n cable, 2	24 V DC		
									М	ATEX lin	ear moto	r without	cable, 24	V DC		
									Α	!	d linear m				DC	
									В	!	d linear m					
									C	!	d linear m					
									D	!	ear moto				0	
									E	!	ear moto					
									F	!						
									F		ear moto	without	cable, 72	V DC		
										Control						
										0					the customer)	
										2			ameter (s			
										3	Analogu	e - 1 para	ameter (s	troke len	gth)	
										4	Analogu	e - 2 para	ameters			
										5	Analogu	e - 3 para	ameters			
										6	Analogu	e - fieldb	us			
											Ambient	tempera	iture			
											0	-20 °C .	+40 °C	;		
						1				l	1		+50 °C			
											3		+55 °C			
		1			l	1					4	0 ℃				
											'		rk/pump	housing	1	
												0A	Unpaint			
		1			1		1					0S			illium iless steel	
																minium
												1A	1	-	ss paint RAL 2003 - alur	
												1S		uard glos	ss paint RAL 2003 - stai	iless
													steel	DA:	0000	
												2A	1		2003 - aluminium	
												2S		oor RAL	2003 - stainless steel	
													Tests			
													S1	Standar	rd performance test	
													S2		d performance test inclu	uding 3.1
														certifica	te	-
						1							S3	As S1 +	- 3.1 certificate wetted n	naterial
													S4	As S2 +	- 3.1 certificate wetted n	naterial
													A1	API test	complete including S4	

						A2 A3	As A1 + As A1 + Approve 0 1 2 3 4 5	NPIP als CE CE + ATEX CE + EAC CE + EAC CE + UKCA Documenta DE EN FR ES RU M0	+ ATEX A + ATEX A + ATEX A + ATEX A + ATEX A + ATEX Comman English French Spanish Russian modified Measuring 0 1	bar, I/h psi, gph
									2	kPa, I/h

Spare parts for Evolution mikro

The spare parts kits generally include the wear parts for liquid ends and/or drives.

Spare parts for Evolution mikro EMFa

Plunger Ø mm	Material		Remark	Order no.	
3	S2	PTFE safety diaphragm complete Ø 3 mm	-	1107488	
3	S2	Double ball valve complete DN 3	2 items required	1035931	
3, 6	S2	Hydraulic oil	=	1101749	
6	S2	PTFE safety diaphragm complete Ø 6 mm	-	1107570	
6	S2	Double ball valve complete DN 6	2 items required	1038943	
3, 6	S2	Bearing for linear motor	Only for ATEX, 2 items required	1113156	

Spare parts for Evolution mikro EMHa

Plunger Ø mm	Material		Remark	Order no.
3	S2	Simple metal diaphragm complete Ø 3 mm	-	1016977
3	S2	Double ball valve complete DN 3	2 items required	1035931
3, 6	S2	Hydraulic oil	=	1101749
3, 6	S2	Bearing for linear motor	Only for ATEX, 2 items required	1113156

Accessories for Evolution mikro

Converter cable for service, analysis functions and software adaptations.

	Order no.
USB-RS232 converter cable for control C1100, C1150	1115604



2.3.7

Hydraulic Diaphragm Metering Pump ORLITA MF

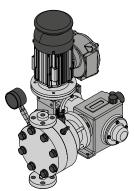
Reliable capacity even at high pressure

Capacity range of single-head pump: 0 - 14,000 l/h; 450 - 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 MF hydraulic diaphragm metering pumps (MFS 35 to MFS 1400) with a stroke length of 15 to 60 mm



provide a capacity ranging from 0 to 14,000 l/h at 450 - 30 bar. A wide range of drive versions is available, including some for use in Zone 1 or Zone 2 areas at risk from explosion with ATEX certification. The ORLITA MF product range is designed to comply with API 675. Its modular construction permits the free combination of drive units, drives and dosing heads, producing a pump for a range of different feed rates and media operating at different working pressures.

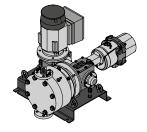
Excellent process safety and reliability:

- 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:

Your Benefits

- 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



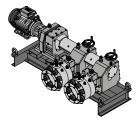
ORLITA MHS 35/45

ORLITA MHS 35-8-8

ORLITA MHS 18-20

Technical Details

- MfS 35 (MF2a) stroke length: 0-20 mm, rod force: 3500 N
- MfS 80 (MF3a) stroke length: 0-20 mm, rod force: 14,000 N
- MfS 180 (MF4a) stroke length: 0-40 mm, rod force: 18,000 N
- MfS 600 (MF5b) stroke length: 0-40 mm, rod force: 40,000 N
- MfS 1400 (MF6a) stroke length: 0-60 mm, rod force: 60,000 N
- Stroke length adjustment range: 0 100% in operation and idle
- Stroke length adjustment: manually using manual adjustment wheel and scaled display (optionally with electric actuator or control drive)
- Metering reproducibility 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 bleed valve
- Wetted materials: Stainless steel, special designs are available on request
- A wide range of drive versions is available: Three-phase AC motors, motors for use in areas at risk from explosion and different flange designs for use in customer-specific motors
- Degree of protection: IP 55
- Temperature range 40 °C to + 150 °C
- Suction lift up to 8 m
- Design in compliance with API 675 among others



ORLITA MHS 600-28-28

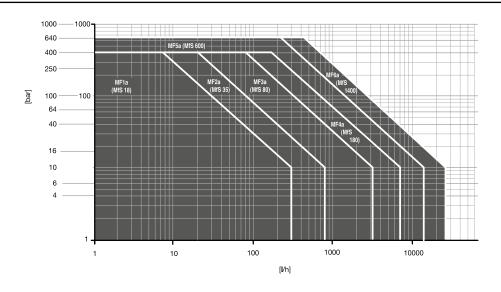
Field of Application

- Oil/ gas production (onshore/offshore)
- Refineries
- Chemical/Petrochemical industry
- Pharmaceuticals & cosmetics
- Food production
- Packaging industry (bottling pumps)

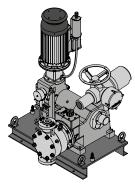


Process metering technology

2.3 Hydraulic Diaphragm Metering Pumps



Pressure [bar] depending on the metering volume [l/h] at 50 Hz



catio

Actuation of ORLITA MF, MH, PS, DR

Control drive consisting of an actuator with servomotor 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; key switch for stroke adjustment in manual mode, mechanical position display of actual stroke length value output 0/4 - 20 mA for remote display. Control drives can also be designed with bus systems, like HART, PROFIBUS, Fieldbus Foundation ...

Variable speed motors with integrated frequency converter (identity code specification V)

Power supply 1 ph 230 V, 50/60 Hz (up to 3 kW). Externally controllable with 0/4 - 20 mA.

The following functions are integrated in the terminal box cover:

- Start/stop switch
- Switch for manual/external operation
- Potentiometer for speed control in manual mode

ORLITA MFS 180 with 3-phase

ORLITA MFS 35/12-12-12 with control drives

Speed controllers with frequency converter (identity code specification Z)

The frequency converter is accommodated in an IP 55 rated protective housing with integral control unit and main switch, suitable for max. 0.37/0.75 kW motor capacity.

Externally controllable with 0/4 - 20 mA or 0 - 10 V corresponding to 0 - 50 (60) Hz output frequency.

Integrated control unit with versatile functions, such as switching between external/internal control; frequency input using arrow keys with internal control, multilingual fault message display etc. and motor temperature monitoring (thermistor protection).

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

Technical	data for	MFS 35	single head	d numn	50 Hz
1 c ci ii iicai	uata iui	1411 0 00	Siliule liea	a Duillib	JU 1 12

Plung- er Ø	Theor. stroke volume		pump cap	acity in I/h	Max. pres- sure	Efficiency		Standard type of valve				
		36	58	73	91	112	145	207				
mm	ml/	l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar	At 100 %	At 50 %	
	stroke									pressure	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
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

Technical data for MFS 80 single head pump 50 Hz

Plung- er Ø	Theor. stroke	Theoretica	l pump cap	acity in I/h	at strokes	/min			Max. pres-	Effi	ciency	Standard type of
	volume	68	78	86	104	134	160	193	sure			valve
mm	ml/	l/h	l/h	l/h	l/h	l/h	l/h	I/h		At 100 %	At 50 %	
	stroke									pressure	pressure	
20	6.28	26	29	33	39	51	60	73	400	0.75	0.83	DN 6
22	7.60	31	36	39	47	61	73	88	368	0.79	0.83	DN 6
25	9.82	40	46	51	61	79	94	113	285	0.79	0.85	DN 10
27	11.45	47	54	59	71	92	110	132	245	0.81	0.85	DN 10
29	13.21	54	62	68	82	107	127	153	212	0.82	0.85	DN 10
30	14.14	58	66	73	88	114	136	163	198	0.83	0.86	DN 10
36	20.36	83	95	105	127	164	195	235	138	0.85	0.87	DN 16
40	25.13	102	118	130	157	203	241	290	111	0.86	0.88	DN 16
44	30.41	124	142	158	190	245	292	351	92	0.86	0.88	DN 16
50	39.27	160	184	203	245	317	377	454	71	0.87	0.88	DN 16
60	56.55	230	265	293	353	456	543	653	50	0.88	0.89	DN 25
65	66.37	270	310	344	414	535	637	767	42	0.88	0.89	DN 25
80	100.53	409	470	521	627	811	965		28	0.89	0.89	DN 32
100	157.08	639	735	814	980	1,267	1,508		18	0.89	0.89	DN 32

Valve type: Cone valve

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 MFS 180 single head pump 50 Hz													
Plung	- Theor.	Theoretica	l pump cap	acity in I/h	at strokes	/min			Max.	Effi	iciency	Standard		
er									pres-			type of		
	volume								sure			valve		
		72	81	92	107	152	171	199						
mı		l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar	At 100 %	At 50 %			
	stroke									pressure	pressure			
	4 18.10	_	88	99	116	165	186	216		0.77	0.83	DN 16		
2	5 19.63	84	96	108	126	179	201	235	367	0.77	0.83	DN 16		
2	6 21.24	91	103	117	137	193	218	254	339	0.79	0.85	DN 16		
3	0 28.27	121	138	155	182	257	290	338	255	0.81	0.85	DN 16		
3	3 34.21	147	167	188	220	311	351	409	210	0.82	0.86	DN 16		
3	6 40.72	175	198	224	262	371	418	487	177	0.83	0.86	DN 16		
3	7 43.01	185	209	236	277	391	441	514	167	0.84	0.87	DN 16		
4	0 50.27	216	245	276	323	457	516	601	143	0.85	0.87	DN 25		
4	4 60.82	261	296	334	391	553	624	727	118	0.85	0.87	DN 25		
4	6 66.48	286	324	365	428	605	682	794	108	0.86	0.88	DN 25		
5	0 78.54	337	382	431	505	715	806	939	92	0.86	0.88	DN 25		
5	5 95.03	408	463	522	612	865	975	1,136	76	0.87	0.88	DN 32		
7	0 153.94	661	749	845	991	1,401	1,579	1,840	47	0.88	0.89	DN 40		
7	5 176.71	759	860	971	1,137	1,608	1,813	2,112	41	0.88	0.89	DN 40		
8	0 201.06	864	979	1,104	1,294	1,830	2,063	2,403	36	0.88	0.89	DN 40		
9	0 254.47	1,093	1,239	1,398	1,637	2,316	2,611	3,041	28	0.89	0.89	DN 40		
10	0 314.16	1,350	1,529	1,725	2,022	2,859	3,223		23	0.89	0.89	DN 65		
11	5 415.48	1,785	2,023	2,282	2,674	3,781	4,263		17	0.89	0.89	DN 65		
12	5 490.87	2,109	2,390	2,696	3,159	4,467	5,036		15	0.89	0.90	DN 65		
13	0 530.93	2,281	2,585	2,916	3,416	4,832	5,447		14	0.89	0.90	DN 65		
13	5 572.56	2,460	2,787	3,145	3,684	5,210	5,874		13	0.89	0.90	DN 65		
14	2 633 47	2 722	3.084	3 479	4 076	5 765	6 499		11	0.89	0.90	DN 65		

Technical data for MFS 600 single head pump 50 Hz

Plung- er Ø	Theor. stroke	Theoretical	pump capa	acity in I/h	at strokes/	min			Max.	Effi	iciency	Standard
er Ø	volume								pres- sure			type of valve
	Volumo	65	76	88	105	139	166	192	Juic			vaivo
mm	ml/	l/h	l/h	l/h	l/h	l/h	l/h	l/h	bar	At 100 %	At 50 %	
	stroke									pressure	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		609	697	834	1,109	1,326	1,532	121	0.85	0.87	DN 32
70	153.94		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	-	923	1,056	1,263	1,680	2,008	2,320	80	0.87	0.88	DN 40
90	254.47		1,168	1,337	1,598	2,127	2,542	2,936	63	0.87	0.88	DN 40
100	314.16	,	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	,	2,436	2,789	3,335	4,437	5,303		30	0.89	0.89	DN 65
135	572.56	,	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: Cone valve up to DN 40, plate valve as of DN 50

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 MFS 1400 single head pump 50 Hz													
Plung-		Theoretica	l pump cap	acity in I/h	at strokes	/min			Max.	Efficiency		Standard	
er Ø	stroke								pres-			type of	
	volume	66	76	86	100	134	166	191	sure			valve	
mm	ml/	I/h	l/h	l/h	I/h	I/h	l/h	I/h	bar	At 100 %	At 50 %		
	stroke	-	-		-	-		_		pressure	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	
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	
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: Cone valve

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.



2.3.8

Hydraulic Diaphragm Metering Pumps with Metal Diaphragm ORLITA MH

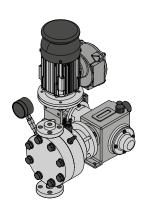
Reliable capacity even at very high pressure

Capacity range of single pump: up to 320 l/h, up to 780 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

ORLITA MH hydraulic diaphragm metering pumps (MHS 35 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 drive versions is available for use in areas at risk from explosion with ATEX certification. The ORLITA MH product range is designed to comply with API 675. Its modular construction permits the free combination of drive units, drives and dosing heads, producing a pump for a range of different feed rates and media operating at different



Your Benefits

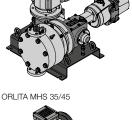
working pressures.

Excellent process safety and reliability:

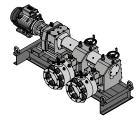
- Metal double diaphragm with integrated diaphragm rupture warning system ensures precise and low-wear operation even at very high pressure
- The product chamber is hermetically separated from the hydraulic part
- Integrated hydraulic relief valve and automatic bleed valve for the hydraulic chamber
- Wear-free, valveless enforced anti-cavitation of the hydraulic leakage guarantees optimum dosing precision
- Cone valves for use as suction and/or discharge valves with minimal wear, good self-cleaning and low pressure loss (NPSHR)



- 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
- Drive configuration ideal for installation in any position (vertical or horizontal)
- Temperature range -60 °C to +200 °C
- Customised designs are available on request



ORLITA MHS 18-20



ORLITA MHS 600-28-28

Technical Details

- MHS 35 stroke length: 0-20 mm, rod force: 3500 N
- MHS 80 stroke length: 0-20 mm, rod force: 14,000 N
- MHS 180 stroke length: 0-40 mm, rod force: 18,000 N
- MHS 600 stroke length: 0-40 mm, rod force: 40,000 N
- 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).
- Metering reproducibility is better than ± 1% within the 10 100 % stroke length range under defined conditions and with proper installation (API 675).
- Metal diaphragm with diaphragm rupture monitoring system
- Integrated hydraulic relief and bleed valve
- Wetted materials: Stainless steel, special designs are available on request
- A wide range of drive versions is available: Three-phase AC motors, motors for use in areas at risk from explosion and different flange designs for use in customer-specific motors
- Degree of protection: IP 55
- Temperature range 60 °C to + 200 °C
- Design in compliance with API 675 among others

Field of Application

- Oil/ gas production (onshore/offshore)
- Chemical/Petrochemical industry
- Pharmaceuticals & cosmetics
- Food production
- Packaging industry (bottling pumps)

Technical data for ORLITA MhS 35 single-head pump 50 Hz

Plunger Ø	Theor. stroke volume			Max. c	nin (50 Hz)	Max. pressure	Standard type of valve			
		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	400	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
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
20 *	4.71	10.2	12.8	20.5	25.6	31.5	41.0	58.6	80	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

¹⁵ mm stroke length

Technical data for ORLITA MhS 80 single-head pump 50 Hz

Plunger Ø	Theor. stroke volume			Max. c	nin (50 Hz)	Max. pressure	Standard type of valve			
		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	
18	5.09	21	24	26	32	41	49	59	550	DN 6
25	9.82	40	46	51	61	79	94	113	285	DN 10
45	31.81	129	149	165	198	256	305	368	88	DN 16

Technical data for ORLITA MhS 600 single-head pump 50 Hz

Plunger Ø	Theor. stroke volume			Max. pressure	Standard type of valve					
		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



2.3.9

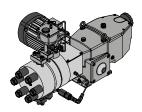
Hydraulic Metal Diaphragm Metering Pump High-pressure ORLITA MHHP

Reliable capacity even at maximum pressure

Capacity range of single pump: 3 - 11 l/h, 3,000 bar



The metal diaphragm metering pumps ORLITA MHHP are special pumps, which provide precise pump capacities even at maximum pressures of up to 3000 bar.



ORLITA MHR 150/7

The hydraulic metal diaphragm metering pumps ORLITA MHRH 150 / MHSH 600 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

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 bleed valve for the hydraulic chamber
- Wear-free, valveless enforced anti-cavitation of the hydraulic leakage guarantees optimum dosing precision
- Metering reproducibility is better than ± 0.5 % within the 10 100% stroke length range under defined conditions and with correct installation
- Cone valves for use as suction and/or discharge valves with minimal wear, good self-cleaning and low pressure loss (NPSHR)

Technical Details

- MHSH: Stroke length: 0 40 mm, rod force: 40,000 N
- MHRH: Stroke length: 0 32 mm, Rod force: 15,000 N
- Stroke length adjustment range: 0 100% in operation and idle
- Stroke length adjustment: manually by means of a manual adjustment wheel and scaled display (optionally with electric actuator or control drive)
- Metering reproducibility is better than ± 0.5% within the 10 100% stroke length range under defined conditions and with correct installation
- Metal diaphragm
- Integrated hydraulic relief and bleed valve
- Wetted materials: Stainless steel, special designs are available on request
- A wide range of 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	o.) in I/h at strok	es/min (50 Hz)	Max. pressure
			58	87	116	145	
	mm	ml/stroke	l/h	l/h	l/h	I/h	bar
MHRH 150/	7	1.23	4.2	6.4	8.5	10.7	3,000



2.4.1

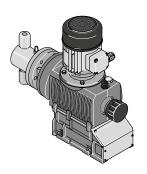
Plunger Metering Pump Sigma SBKa (Basic Type)

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)
- Metering reproducibility is better than ± 1 % within the 10-100% stroke volume adjustment range under certain defined conditions and with correct installation
- Wetted materials: Stainless steel 1.4571/1.4404, special materials are available on request
- High-performance oxide ceramic plunger
- A wide range of power end versions is available: Three-phase standard motor, 1-phase AC motor, motors for use in areas at risk from explosion and different flange designs for use in customer-specific motors
- Degree of protection IP 55
- Highly rigid fibreglass-reinforced plastic housing with excellent chemical resistance
- Provide suitable overload protection in all plunger metering pumps during installation for safety reasons

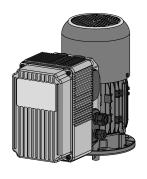
Field of Application

- Volume-proportional metering of chemicals in the treatment of boiler feed water
- Metering of reactants and catalysts in the chemical industry
- Level-dependent metering of auxiliary agents in industrial production engineering, for instance hot wax metering in the production of adhesive strips





Sigma Basic Type Control Functions



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 K 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 \rightarrow 234)

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 → 234)



Technical data for Sigma SBKa

Туре		•		pressure at 50 Hz		•		pressure at 60 Hz	Suction lift	Perm. pre-pres- sure suc- tion side	Connector Suction/ Discharge Side	Ship- ping weight	Plunger Ø
				Max. stroke				Max. stroke					
				rate				rate					
	l/h	bar		Strokes/	l/h	psi	٠.	Strokes/	m WC	bar	G-DN	kg	mm
32002	1.0	320	stroke	min 71	0.0	1 6 1 1	(US)		5.0	160	1/4	24	
23004	1.9	230	0.46	129	2.3	4,641 3,336	0.61	154	5.0	115	1/4 1/4	24	8
	4.0					,				-			
10006	6.4	100	0.55	195	7.6	1,450	2.01	233	5.0	50	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
10011	11.0	100	1.43	129	13.1	1,450	3.46	153	4.0	50	1/4	24	12
05016	16.7	50	1.43	195	20.0	725	5.28	233	4.0	25	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
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
04022	22.4	40	5.26	71	26.5	580	7.00	84	4.0	20	3/8	25	23
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 con- nection 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 speci- fication		Power supply			Remarks
S	3-phase, IP 55	220 - 240 V/380 - 420 V	50 Hz	0.25 kW	
		250 - 280 V/440 - 480 V	60 Hz		
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
VO	1-phase, IP 55	230 V ± 5 %	50/60 Hz	0.37 kW	Variable speed motor with integrated frequency converter
М	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, Il 2G Ex e Il T3	220 - 240 V/380 - 420 V	50 Hz	0.18 kW	
L2	3-phase, Il 2G Ex de IIC T4	220 - 240 V/380 - 420 V	50 Hz	0.18 kW	With PTC, speed control range 1:5
P1	3-phase, Il 2G Ex e Il T3	250 - 280 V/440 - 480 V	60 Hz	0.18 kW	
P2	3-phase, Il 2G Ex de IIC T4	250 - 280 V/440 - 480 V	60 Hz	0.21 kW	With PTC, speed control range 1:5

 $^{^{\}ast}$ 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.

The motors are designed in compliance with the Ecodesign Directive 2009/125/EC.

Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/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 SBKa

SBKa	Drive type												
	HK	Main drive,	plunger										
		Type	ļ J.	Capacity									
		32002		320 bar	1.9 l/h								
		23004		230 bar	4.0 l/h								
		10006		100 bar	6.4 l/h								
		14006		140 bar	6.1 l/h								
		10011		100 bar	11.0 l/h								
		05016		50 bar	16.7 l/h								
		07012		70 bar	12.4 l/h								
		04522		45 bar	22.5 l/h								
		02534		25 bar	34.1 l/h								
		04022		40 bar	22.4 l/h								
		02541		25 bar	41.5 l/h								
		01264		12 bar	64.0 l/h								
			Liquid end		10 110								
			SS	Stainless steel									
			100	Sealing material									
				Т	PTFE								
					Diaphragm								
					4		oxide cera	amic)					
						Liquid er	nd version						
						0	No valve	springs (s	standard)				
						1	With 2 va	alve spring	gs, Hastell	oy C, 0.1	bar		
							Hydraulio	connecti	ons				
	İ		İ		İ		0	Standard	d threaded	l connecto	or (accordi	ing to tecl	nnical data)
								Version					
								0	with Prof	Minent log	in		
								1	1	ProMinent			
								M	Modified		logo		
								IVI					
										power su		E0/00 II	0.40.134/
									S				z, 0.18 kW
									R				230 V/400 V, 0.37 kW
									V0				tegrated frequency converter 1
									_	1.	V, 50/60 F		21/ 52/22 11
									Z				0 V, 50/60 Hz
									М	1	, 230 V/ 5		
									N	1 ph, AC	115 V 60	Hz, 0.18	kW
									L	3 ph, 23	0 V/400 V,	50 Hz, (E	Exe, EExd), 0.18 kW
									Р	3 ph, 23	0 V/400 V,	60 Hz, (E	Exe, EExd), 0.18 kW
									1	No moto	r, with B 1	4 flange (size 71 (DIN)
					İ				2	No moto	r, C 56 fla	nge (NEM	A)
									3	1	r, B 5 size		
										Enclosur		,	
										0	IP 55 (sta	andard)	
										2		or version	ΔΤΕΥ-ΤΛ
										A	ATEX driv		AID II
										<u> </u> ^			
											Stroke se		
											0		e sensor (standard)
											2		elay (reed relay)
											3		ensor (Namur) for hazardous
												locations	
													ngth adjustment
												0	Manual (Standard)
												1	With stroke positioning motor,
													230 V/50/60 Hz
												2	With stroke positioning motor,
													115 V/50/60 Hz
											1	3	With stroke control motor 020
													mA 230 V/50/60 Hz
												4	With stroke control motor 420
												_	mA 230 V/50/60 Hz
												5	With stroke control motor 020
												6	mA 115 V/50/60 Hz
												6	With stroke control motor 420 mA 115 V/50/60 Hz
													THAT I TO V/OU/OUTIZ



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,	1001572	
	23004, 10006		
Liquid end FK 12.5	Applies to identity code: 14006,	910470	
	10011, 05016		
Liquid end FK 25	Applies to identity code: 07012,	910471	
	04522, 02534		
Liquid end FK 50	Applies to identity code: 04022,	910472	
	02541, 01264		



Plunger Metering Pumps 2.4

2.4.2

Plunger Metering Pump Sigma SCKa (Control Type)

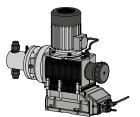
Sigma plunger pump - durable, high-performance and intelligent.

Capacity range 2 - 76 l/h, 320 - 12 bar



The plunger metering pump Sigma SCKa is a robust metering pump with integral control for analogue and/or contact operation and offers the option of adjusting the pump capacity in 0.2% increments. A wide range of drive versions and flange designs are available.

The plunger metering pump Sigma/ 2 (Control Type) (SCKa) is a metering pump, the pump capacity of which can be precisely adjusted in 0.2% increments, either manually or optionally with an electric actuator or control drive. The integrated controller allows the pump to adapt quickly and reliably to changing metering tasks.



Sigma Control Type SCKa

Process reliability:

Your Benefits

■ 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:

- The integrated controller allows the pump to adapt quickly and reliably to changing metering tasks
- Customised designs are available on request



Sigma Controlle

Technical Details

- Stroke length: 15 mm
- Stroke length adjustment range: 0 100%
- Stroke length adjustment: manually by self-locking rotary dial in 0.2% increments (optionally with electric actuator or control drive)
- Metering reproducibility is better than ± 1% within the 10-100% stroke length adjustment range under certain defined conditions and with proper installation
- Wetted materials: Stainless steel 1,4571/1.4404, special materials are available on request
- High-performance oxide ceramic plunger
- Integrated control for analogue and/or contact operation
- Power supply: 1-phase, $100 230 \text{ V} \pm 10\%$, $240 \text{ V} \pm 6\%$, 50/60 Hz (220 W)
- Degree of protection IP 55
- Highly rigid fibreglass-reinforced plastic housing with excellent chemical resistance
- Provide suitable overload protection in all plunger metering pumps during installation for safety reasons

Field of Application

- Volume-proportional metering of chemicals in the treatment of boiler feed water
- Metering of reactants and catalysts in the chemical industry
- Level-dependent metering of auxiliary agents in industrial production engineering, for instance hot wax metering in the production of adhesive strips

Process metering technology

Technical data for Sigma SCKa

Туре		capacity at k pressure	Capacity a	it max. bac	k pressure rpm moto	with 1800 or at 60 Hz	Suction lift	Perm. pre-pres- sure suction side	Connector Suction/Discharge	Shipping weight	Plunger Ø
	bar	ml/stroke	l/h	psi	gph (US)	Strokes/ min	m WC	bar	G-DN	kg	mm
32002	320	0.46	2.3	4,641	0.61	84	5.0	160	1/4	24	8
23004	230	0.52	4.8	3,336	1.27	154	5.0	115	1/4	24	8
10006	100	0.55	7.6	1,450	2.01	233	5.0	50	1/4	24	8
14006	140	1.42	7.1	2,031	1.88	84	4.0	70	1/4	24	12
10011	100	1.43	13.1	1,450	3.46	153	4.0	50	1/4	24	12
05016	50	1.43	20.0	725	5.28	233	4.0	25	1/4	24	12
07012	70	2.90	14.8	1,015	3.91	85	4.0	35	1/4	24	17
04522	45	2.91	26.7	653	7.05	153	4.0	22.5	1/4	24	17
02534	25	2.92	40.8	363	10.78	233	4.0	12.5	1/4	24	17
04022	40	5.26	26.5	580	7.00	84	4.0	20	3/8	25	23
02541	25	5.37	49.2	363	13.00	153	4.0	12.5	3/8	25	23
01264	12	5.45	65.4	174	17.28	200	4.0	6	3/8	25	23

Wetted materials for Sigma SCKa

Identity code of material	Dosing head	Suction / discharge con- nection 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 SCKa

Identity code specifica- tion		Power supply			Remarks
U	1-phase, IP 55	100 – 230 V ±10 %, 240 V ±6 %,	50/60 Hz	220 W	

The motors are designed in compliance with the Ecodesign Directive 2009/125/EC.

Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/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 SCKa

HK Men drive, plurger 1	SCKa	Drive type															
Spocy Spot		HK	Main driv	e, plunger													
S2002				7,1 3	Capacity												
230Ad																	
100 part 6.4 M					I	ı											
14006			1			ı											
10011			l .			ı											
1,50 1,50			1		l	ı											
1			10011		100 bar	13.1 l/h											
04522			05016		50 bar	16.7 l/h											
0.6534			07012		70 bar	14.8 l/h											
QSS34			1			ı											
00022			1		l	ı											
Depth Dept			1		1	1											
12 ber			1		l	ı											
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																0	manual

Spare Parts Kits

Consisting of: 1 ceramic metering plunger, 4 valve balls, 4 ball seat discs, 2 PTFE/graphite ball seals, 2 plunger guides, 14 flat seals, 2 O-rings.

	Version	Order no.
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

2.4.3

Plunger Metering Pump Makro TZ

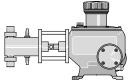
Powerful, built to last with a plunger

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.

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



MAKRO TZ plunger metering pump

20 mm. A wide range of drive versions is available, including some for use in Exe and Exde areas with ATEX certification.

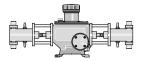
Your Benefits

Process reliability:

■ Metering reproducibility is better than ± 0.5 % within the 10 – 100% stroke length range under defined conditions and with correct installation

Excellent flexibility:

- The modular construction with single and double head versions permits a wide range of applications, with the double head designs being operated in push-pull mode
- It is possible to combine up to 4 metering units, even with different pump capacities, in multiple pump systems
- 4 different gear ratios are available
- Customised designs are available on request



MAKRO TZ TZKa externally mounted

MAKRO TZ TZKa double-head pump

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)
- Metering reproducibility is better than ± 0.5% within the 10 100% stroke length range under defined conditions and with proper installation. Observe the information in the operating instructions.
- High-performance ceramic-coated stainless steel plunger Wetted materials: Stainless steel 1.4571. Special materials are available on request
- A wide range of 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
- Provide suitable overflow equipment in all plunger metering pumps during installation for safety reasons

Field of Application

- Volume-proportional metering of chemicals/additives in water treatment
- Metering of reactants and catalysts in the chemical industry
- Level-dependent metering of additives in industrial production engineering



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 k 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→ 234

Speed controllers with frequency converter (identity code specification Z)

The speed controller (complete) comprises a frequency converter and a variable speed motor (see also identity code specification R). The frequency converter is accommodated in an IP 55 rated protective housing with integral control unit and main switch.

Externally controllable with 0/4 - 20 mA or 0 - 10 V corresponding to 0 - 50 (60) Hz output frequency.

Frequency converter for controlling speed, see page \rightarrow 234



Technical data for MAKRO TZKa

Туре	Capacit	•	0 rpm mot	essure with or at 50 Hz Max. stroke rate	Capacit	y at max. bacl	k pressure at 60 Hz		Connector Suction/Dis- charge Side	Shipping weight	Plunger Ø
	l/h	bar	ml/	Strokes/	psi	I/h/gph (US)	Strokes/min	m WC	G-DN	kg	mm
000000#			stroke	min		10/00					
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 17
320018 *	17.7	320	4.1	72	4,627	21/5.5	86	4.0	Rp 1/4–8	50	
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	313 192	4.1 7.6	144 72	4,526	42/11.1 39/10.3	173 86	4.0 4.0	Rp 1/4–8 Rp 3/8–10	54 55	17 23
192033 * 192044 *	32.9 43.9	192	7.6	96	2,776 2,776	59/10.3	115	4.0	Rp 3/8–10	55	23
192044	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
014475	475.1	14	110.0	72	202	571/150.8	86	4.0	G 2 1/4-40	68	85
014634	634.1	14	110.0	96	202	761/201.0	115	4.0	G 2 1/4-40	68	85
013793	792.6	13	110.0	120	189	951/251.2	144	4.0	G 2 1/4-40	68	85
011951	951.1	11	110.0	144	160	1,141/301.4	173	4.0	G 2 1/4–40	68	85

^{*} 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/ce- ramic
SST	60 S to 70 S	Stainless steel 1.4571/1.4404	Stainless steel 1.4581	PTFE	Stainless steel 1.4404	Stainless steel/ce- ramic
SST	85 S	Stainless steel 1.4571/1.4404	Stainless steel 1.4581	PTFE	Stainless steel 1.4404 (plate)/Has- telloy C (spring)	Stainless steel/ce- ramic



V2

2.4 Plunger Metering Pumps

3-phase,II 2G Ex de IIC T4

Motor data for Makro TZKa Identity Power supply Remarks code specification 3-phase, IP 55 220 - 240 V/380 - 420 V 50 Hz 1.5 kW 250 - 280 V/440 - 480 V 60 Hz R 3-phase, IP 55 230 V/400 V 50/60 Hz 2.2 kW With PTC, speed control range 1:20 with external fan 1-phase 230 V; 50/60 Hz V0 3-phase, IP 55 400 V ±10% 50/60 Hz 3.0 kW Variable speed motor with integrated frequency converter 3-phase,II 2G Ex eb IIC L1 220 - 240 V/380 - 420 V 50 Hz 1.5 kW T3 Gb 3-phase,II 2G Ex db IIC L2 220 - 240 V/380 - 420 V 50 Hz 1.5 kW With PTC, speed control range 1:5 T4 Gb P1 250 - 280 V/440 - 480 V 3-phase,II 2G Ex e IIC T3 60 Hz 2.0 kW 250 - 280 V/440 - 480 V P2 3-phase,II 2G Ex de IIC T4 60 Hz 1.5 kW With PTC, speed control range 1:5

400 V ±10%

Motor data sheets can be requested for more information. Versions 265/460V - 60Hz, special motors or special motor flanges are available on request.

50/60 Hz

2.2 kW

Ex-variable speed motor with integrated frequency converter

The motors are designed in compliance with the Ecodesign Directive 2009/125/EC.

Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/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.



^{*} Three-phase motor according to IEC 60034-1

Plunger Metering Pumps 2.4

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/graphitepiston guide bands
- flat seals/ O-rings

	Orger no.
Spare parts kit for MAKRO TZ FK 12/20 S DN 8	1019106
Spare parts kit for MAKRO TZ FK 17/20 S DN 8	1019107
Spare parts kit for MAKRO TZ FK 23/20 S DN 10	1019108
Spare parts kit for MAKRO TZ FK 30/20 S DN 10	1019109
Spare parts kit for MAKRO TZ FK 40/20 S DN 20	1019110
Spare parts kit for MAKRO TZ FK 50/20 S DN 20	1019111
Spare parts kit for MAKRO TZ FK 60/20 S DN 25	1019112
Spare parts kit for MAKRO TZ FK 70/20 S DN 25	1019113
Spare parts kit for MAKRO TZ FK 85/20 S DN 40	1019124



2.4.4

Plunger Metering Pump Makro/ 5

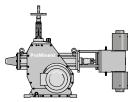
Powerful, built to last with a plunger

Capacity range of single head pump: 38 - 6,014 l/h, 320 - 6 bar



The plunger metering pump Makro/ 5 can virtually be used throughout the low-pressure range and its modular construction enables it to be outstandingly adapted to the performance requirements of the respective application.

The plunger metering pump MAKRO 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.



MAKRO M5Ka

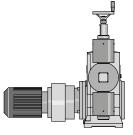
Your Benefits

Process reliability:

■ Metering reproducibility 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 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

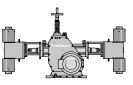


MAKRO M5Ka

pump

Technical Details

- Stroke length: 0-50 mm
- Rod force: 10,000 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)
- Metering reproducibility 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 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
- Provide suitable overflow equipment in all plunger metering pumps during installation for safety reasons



MAKRO M5Ka externally mounted

MAKRO double-head pump

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

Plunger Metering Pumps 2.4

Makro/ 5 Pump Control

Makro/ 5 stroke length controller

Control drive consisting of an actuator with servomotor and integral microprocessor controller for stroke length adjustment via a standard signal. Actuating period approx. 100 sec for 100% stroke length, equipped with 2 limit switches for min./max. position, degree of protection: IP 54. Electrical connection 230 V (±10%), 50/60 Hz, 40 W mechanical stroke length display fitted on the Makro/ 5 drived.

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.

Frequency converter for controlling speed in metal housing with IP 54 degree of protection

The frequency converter is accommodated in an IP 54 rated protective housing with integral control unit and main switch, suitable for motor capacity listed below.

Externally controllable with 0/4-20 mA or 0-10 V corresponding to 0-50 (60) Hz output frequency.

Integrated control unit with versatile functions, such as switching between external/internal control; frequency specified using arrow keys with internal control, multilingual fault message display etc.

With evaluation equipment for monitoring temperature of motor (thermistor protection).

Stroke sensor with Namur signal

Mounting on the crank drive mechanism of the Makro/ 5 gearbox. For precise measurement of each metering stroke, comprising electronic cams and inductive proximity switches, switching signal according to Namur. In combination with electronic pre-selection meters suitable for batch metering or proportional metering in conjunction with proportional control.

Retrospective fitting only possible in the factory.

Approved for Ex safety operation with degree of protection EEx ia II C T6.



Technical data for MAKRO M5Ka

Туре	Capacity		•	ssure with r 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
				Max. stroke rate				Max. stroke rate				
	l/h	bar	ml/ stroke	Strokes/ min	l/h		gph (US)	Strokes/ min	m WC	G-DN	kg	mm
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
3200066	66	320	11	103	78	4,640	21	123	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
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
2160157	157	216	21	133	187	3,132	49	159	3.0	Rp 3/8–10	300	23
1700184	184	170	21	156	-	-	-	-	3.0	G 1–15	300	23
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
1270267	267	127	35	133	319	1,842	84	159	3.0	G 1 1/4–20	302	30
1000314	314	100	35	156	-	-	- 07	- 74	3.0	G 1 1/4–20	302	30
0800214	214	80	63	60	253	1,160	67	71	3.0	G 1 1/4–20	303	40
0800268 0800368	268 368	80 80	63 63	75	318	1,160	84	89 123	3.0 3.0	G 1 1/4–20 G 1 1/4–20	303 303	40 40
		70		103	439	1,160	116					40
0700476 0560558	476 558	70 56	63 63	133 156	569	1,015	150	159	3.0 3.0	G 1 1/2–25 G 1 1/2–25	303 303	40
0500336	335	50	98	60	396	725	105	71	3.0	G 1 1/2-25 G 1 1/2-25	303	50
0500333	419	50	98	75	497	725	131	89	3.0	G 1 1/2-25 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
0450744	744	45	98	133	889	653	235	159	3.0	G 2–32	303	50
0350872	872	35	98	156	-	-	-	109	3.0	G 2–32	303	50
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
0301071	1,071	30	141	133	1,280	435	338	159	3.0	G 2–32	311	60
0251257	1,257	25	141	156	-	-	-	-	3.0	G 2–32	311	60
0250658	658	25	192	60	778	363	206	71	3.0	G 2–32	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
0231458	1,458	23	192	133	1,743	334	460	159	3.0	G 2 1/4-40	311	70
0181710	1,710	18	192	156	-	-	-	-	3.0	G 2 1/4-40	311	70
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
0161665	1,665	16	284	103	1,988	232	525	123	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
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
0103491	3,491	10	393	156	-	-	-	-	3.0	G 2 3/4-50	331	100
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
0063896	3,896	6	664	103	4,652	87	1,229	123	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

2.4 Plunger Metering Pumps

	Wetted n					
Туре	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/ce- ramic
M5Ka	DN 15 - DN 25	Stainless steel 1.4571/1.4404	Stainless steel 1.4581	PTFE	Stainless steel 1.4401	Stainless steel/ce- ramic
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/ce- ramic

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
Š	3-phase, IP 55	220 - 240 V/380 - 420 V	50 Hz	3 kW	
		250 - 280 V/440 - 480 V	60 Hz		
R	3-phase, IP 55	230 V/400 V	50/60 Hz	3 kW	With PTC, speed control range 1:5
VO	3-phase, IP 55	400 V ±10%	50/60 Hz	3 kW	Variable speed motor with integrated frequency converter
L1	3-phase, Il 2G Ex e Il T3 X	220 - 240 V/380 - 420 V	50 Hz	3.6 kW	
L2	3-phase, Il 2G Ex de IIC T4 Gb	220 – 240 V/380 – 420 V	50 Hz	4 kW	With PTC, speed control range 1:5
P1	3-phase, Il 2G Ex e IIC T3	250 - 280 V/440 - 480 V	60 Hz	3.6 kW	
P2	3-phase, Il 2G Ex de IIC T4	250 - 280 V/440 - 480 V	60 Hz	4 kW	With PTC, speed control range 1:5
V2	3-phase, Il 2GDc Ex de IIB T4 Gb, IP67	400 V ±10%	50/60 Hz	4 kW	Ex-variable speed motor with integrated frequency converter

 $^{^{\}star}$ 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.

Spare Parts Kits

Spare parts kit for Makro/ 5, consisting of:

- Valve balls
- Valve plate with spring
- Ball seat discs
- Plunger packings made from PTFE/graphite
- Piston guide bands
- Flat seals / O-rings



Process metering technology

2.4 Plunger Metering Pumps

	Order no.
Spare parts kit for MAKRO M5Ka FK 17/50 S DN 8	1005899
Spare parts kit for MAKRO M5Ka FK 17/50 S DN 10	1005536
Spare parts kit for MAKRO M5Ka FK 23/50 S DN 10	1005004
Spare parts kit for MAKRO M5Ka FK 23/50 S DN 15	1005900
Spare parts kit for MAKRO M5Ka FK 30/50 S DN 15	1005901
Spare parts kit for MAKRO M5Ka FK 30/50 S DN 20	1005537
Spare parts kit for MAKRO M5Ka FK 40/50 S DN 20	1005902
Spare parts kit for MAKRO M5Ka FK 40/50 S DN 25	1005538
Spare parts kit for MAKRO M5Ka FK 50/50 S DN 25	1005539
Spare parts kit for MAKRO M5Ka FK 60/50 S DN 25	1005903
Spare parts kit for MAKRO M5Ka FK 60/50 S DN 32	1005540
Spare parts kit for MAKRO M5Ka FK 70/50 S DN 32	1005541
Spare parts kit for MAKRO M5Ka FK 70/50 S DN 40	1005904
Spare parts kit for MAKRO M5Ka FK 85/50 S DN 40	1005542
Spare parts kit for MAKRO M5Ka FK 85/50 S DN 50	1005905
Spare parts kit for MAKRO M5Ka FK 100/50 S DN 50	1005543
Spare parts kit for MAKRO M5Ka FK 130/50 S DN 65	1005544

Plunger Metering Pumps 2.4

2.4.5

Plunger Metering Pump ORLITA PS

ORLITA PS - simple, robust and reliable.

Capacity range of single-head pump: 0 - 2800 l/h, 600 - 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 18-36

ORLITA PS 80-30

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

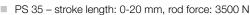
Flexible adaptation to the process:

- Precise capacity even at maximum pressure
- Metering reproducibility is better than ± 0.5 % within the 10-100% stroke length range under defined conditions and with correct installation.
- Cone valves for use as suction and/or discharge valves with minimal wear, good self-cleaning and low pressure loss (NPSHR)
- Excellent hydraulic efficiency

Excellent flexibility:

- The modular construction ensures a wide range of uses
- It is possible to combine up to 6 metering units, even with different pump capacities, in multiple pump systems
- 6 different gear ratios are available
- Drive configuration ideal for installation in any position (vertical or horizontal)
- Customised designs are available on request





PS 80 – stroke length: 0-20 mm, rod force: 14,000 N

PS 180 - stroke length: 0-40 mm, rod force: 18,000 N

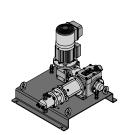
■ PS 600 – stroke length: 0-40 mm, rod force: 40,000 N

Stroke length adjustment range: 0 – 100% in operation and idle

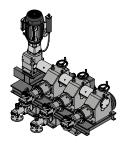
- The plunger packing can be tightened by the tensioning screw on the front even during operation
- Metering reproducibility is better than \pm 0.5 % within the 10 100% stroke length range under defined conditions and with correct installation
- Wetted materials: Stainless steel, special designs are available on request
- A wide range of 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

- 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 18-12 high-temperature



ORLITA PS 6607470-40-40

Process metering technology

01.01.2022 Product Catalogue Volume 1

Process metering technology

2.4 **Plunger Metering Pumps**

Technical data for ORLITA PS 35 single-head pump 50 Hz

Plunger Ø	Theor. stroke volume			Max. c	apacity (the	eo.) in I/h a	it strokes/n	nin (50 Hz)	Max. pressure	Standard type of valve
		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			Мах. с	nin (50 Hz)	Max. pressure	Standard type of valve			
		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 I/h at strokes/min (50 Hz)							Standard type of valve
		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. ca	apacity (the	eo.) in I/h a	t strokes/m	nin (50 Hz)	Max. pressure	Standard type of valve
		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.



ProMinent

2.4 Plunger Metering Pumps

2.4.6

Plunger Metering Pump ORLITA DR

range due to its operation without valves.

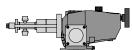
For the precise metering of high-viscosity and extremely high-viscosity media even containing solid fractions

Capacity range of single-head pump: 0 - 2000 l/h, 400 - 5 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 -40 °C to 400 °C.

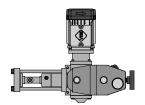
ORLITA DR plunger metering pumps (DR 15 to DR 150) are special pumps for high-viscosity and extremely high-viscosity media, which can also contain solids. The pump can be operated within a broad stroke rate



ORLITA DR

Your Benefits

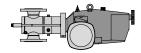
Optimum adaptation to processes with high-viscosity and extremely high-viscosity media, even containing solid fractions:



ORLITA DR 15/12

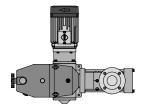
- Low-wear and precise operation even at high pressures thanks to the rotary piston with abrasion-resistant / wear-resistant surface coating
- Valve-free operation guarantees a broad stroke rate range
- Wide range of uses: Operating pressure of up to 400 bar, temperature range of 40 °C to + 400 °C
- 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
- Drive configuration ideal for installation in any position (vertical or horizontal)
- Excellent hydraulic efficiency
- 4 different gear ratios are available
- Customised designs are available on request

Technical Details



ORLITA 150/90

- DR 15 stroke length: 0-15 mm, Rod force: 1,800 N
- DR 150 stroke length: 0-32 mm, Rod force: 15,000 N
- Stroke length adjustment range: 0 100% in operation and idle
- Stroke length adjustment: manually by means of a manual adjustment wheel and scaled display (optionally with electric actuator or control drive)
- Metering reproducibility is better than ± 0.5% within the stroke length adjustment range of 10 to 100% under defined conditions and with proper installation
- Wetted materials: Stainless steel, special designs are available on request
- A wide range of drive versions is available: Three-phase AC standard motors, motors for use in areas at risk from explosion and different flange designs for use in customer-specific motors
- Degree of protection: IP 55
- Temperature range 40 °C to + 400 °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 150/90

Field of Application

■ Metering of high-viscosity and extremely high-viscosity media containing solid fractions.

Process metering technology

2.4 Plunger Metering Pumps

Technical data for ORLITA DR 15 single-head pump 50 Hz

Plunger Ø	Theor. stroke volume	Max.	capacity (the	eo.) in I/h at /min (50 Hz)	Max. pressure	Standard type of valve
		58	77	116		
mm	ml/stroke	l/h	l/h	l/h	bar	
7	0.58	2.0	2.7	4.0	400	DN 8
12	1.70	5.9	7.9	11.8	400	DN 8
18	3.82	13.3	17.7	26.6	250	DN 16
25	7.36	25.6	34.1	51.2	147	DN 25
36	15.27	53.1	70.8	106.3	76	DN 32

Technical data for ORLITA DR 150 single-head pump 50 Hz

Plunger Ø	Theor. stroke volume	Theoretical pump capacity in I/h at strokes/min			Max. pressure	Standard type of valve
		70	94	141		
mm	ml/stroke	l/h	l/h	l/h	bar	
12	3.62	15.2	20.3	30.4	400	DN 8
18	8.14	34.2	45.6	68.4	400	DN 8
25	15.71	66.0	87.9	131.9	250	DN 16
36	32.57	136.8	182.3	273.6	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

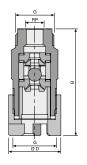
Hydraulic/Mechanical Accessories

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.

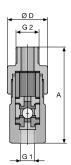
Foot Valve SST for High-Pressure Metering Pumps



	Dim. G	Dim. B	Dim. Rp	Diameter Ø D	Order no.	
		mm		mm	000700	
DN 10	3/4	70	1/4	41	803730	
DN 10	3/4	70	3/8	41	803731	

2512

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 $^{\circ}\text{C}$ - max. operating pressure, see table

	Max. pres- sure	G1	G2	Diameter Ø D	Dim. A	Order no.	
	bar			mm	mm		
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



Accessories for Process Metering Pumps 2.5

2.5.1.4

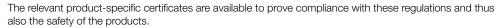
Safety Valve



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



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, 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



Process metering technology

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.

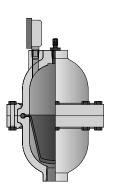


Bladder dampers, metal

Volume0.066 - 379 IPressure20.7 barMaterial of bladder/diaphragmEPDM or FKM

Housing material 316 L stainless steel, Hastelloy C, PTFE

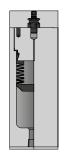
Further material versions and details available on request.



Bladder damper, plastic

Volume0.066 – 19 lPressure17.2 barMaterial of bladder/diaphragmEPDM or FKMHousing materialPVDF

Further material versions and details available on request.

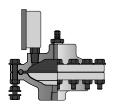


Bladder damper, high pressure

Volume0.13 – 0.39 IPressure793 barMaterial of bladder/diaphragmEPDM 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

Volume0.20 lPressure137 barMaterial of bladder/diaphragmPTFE

Housing material 316 L stainless steel, Hastelloy C, Alloy 20

Further material versions and details available on request.



2.5 Accessories for Process Metering Pumps

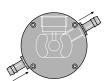
2.5.2

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.

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Cooling/Heating Equipment, Plunger Metering Pumps



The cooling/heating device is integrated in the dosing head. Connecting sockets \varnothing 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. mo- tor output kW	•	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.



Data Required for Specification of Metering Pump and Accessories

Pump Specificatio	n 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	a/m³, ppm



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
+/0	practically resistant
0	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	\geq 70 % H ₂ SO ₄ + 5 % K ₂ Cr ₂ O ₇ /Na ₂ Cr ₂ O ₇
Chromic acid	≥ 10 % CrO ₃
Hydrochloric acid	≥ 25 % HCl
Hydrogen peroxide	≥ 5 % H ₂ O 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 polyethylene
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

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	Concentra-	Acryl	PVC	PP	PVDF	1.4404	FKM	EPDM	PharMed®	PE	Hastel-	WGK
A t - - - - -	CILCIO	tion in %		-	_				. /-			loyC	0
Acetaldehyde	CH ₃ CHO	100	-		0	-	+	-	+/0	- /-	+	+	2
Acetamide	CH ₃ CONH ₂	S	+	+	+	+	+	0	+	+/0	+	+	1
Acetic anhydride	(CH ₃ CO) ₂ O	100	-	-	0	-	+	-	+/0	+	0	+	1
Ethyl acetoacetate	C ₆ H ₁₀ O ₃	100	n	-	+	+	+	-	+/0	+/0	+	+	1
Acetone	CH ₃ COCH ₃	100	-	-	+	-	+	-	+	-	+	+	1
Acetophenone	C ₆ H ₅ COCH ₃	100	-	n	+	-	+	-	+	n	+	+	-
Acetylacetone	CH3COCH2COCH3	100	-	-	+	-	+	-	+	n	+	+	1
Acetyl chloride	CH ₃ COCI	100	-	+	n	-	0	+	-	0	n	+	1
1,2-Dichloroethene	C ₂ H ₂ Cl ₂	100	-	-	0	+	+	0	-	0	-	+	2
Acetylene tetrachloride	C ₂ H ₂ CI ₄	100	-	-	0	+	+	0	-	0	0	+	3
Acrylonitrile	CH ₂ =CH-CN	100	-	-	+	+	+	-	-	-	+	+	3
Adipic acid	HOOC(CH ₂) ₄ COOH	S	+	+	+	+	+	+	+	+/0	+	+	1
Battery acid	H ₂ SO ₄	98%	30%	50%	85%	+	20%	+	80%	30%	80%	+	1
Allyl alcohol	CH,CHCH,OH	96	-	0	+	+	+	-	+	0	+	+/0	2
Aluminium acetate	AI(CH,COO)	S	+	+	+	+	+	+	+	+	+	+/0	1
Aluminium bromide	AlBr.	S	+	+	+	+	n	+	+	+	+	+	2
Aluminium chloride	AICI	S	+	+	+	+	-	+	+	+	+	+	1
Aluminium fluoride	AIF.	10	+	+	+	+	-	+	+	+	+	+/0	1
Aluminium hydroxide	Al(OH) ₂	S	+	+	+	0	+	+	+	+	+	+	1
Aluminium nitrate	Al(NO ₂) ₃	S	+	+	+	+	+	+	+	+	+	+	1
Aluminium phosphate	AIPO ₄	S	+	+	+	+	+	+	+	+	+	+	1
Aluminium priospriate Aluminium sulfate	$AI_2(SO_4)_3$	S	+	+	+	+	+	+	+	+	+	+	1
Formic acid			+					+	+				
	HCOOH	S		+/0	+	+ (05.00)	+			+/0	+	+	1
Ammonia	"NH ₄ OH"	30	+	+	+	+ (25 °C)	+	-	+	+	+	+	2
Ammonium acetate	CH ₃ COONH ₄	S	+	+/0	+	+	+	+	+	+	+	+	1
Ammonium aluminium sulfate	NH ₄ Al(SO ₄) ₂	S	+	+	+	+	+	+	+	+	+	+	1
Ammonium carbonate	(NH ₄) ₂ CO ₃	40	+	+	+	+	+	+	+	+	+	+	1
Ammonium chloride	NH ₄ CI	S	+	+	+	+	-	+	+	+	+	+/0	1
Ammonium fluoride	NH₄F	S	+	0	+	+	0	+	+	+	+	+	1
Ammonium bicarbonate	NH ₄ HCO ₃	S	+	+	+	+	+	+	+	+	+	+	1
Ammonium hydroxide	"NH,OH"	30	+	+	+	+ (25 °C)	+	-	+	+	+	+	2
Ammonium nitrate	NH,NO,	S	+	+	+	+	+	+	+	+	+	+	1
Ammonium oxalate	(COONH ₄) ₂ * H ₂ O	S	+	+	+	+	+	+	+	+	+	+	1
Ammonium perchlorate	NH,CIO,	10	+	+	+	+	+	+	+	+	+	+	1
Ammonium peroxodisulfate	4 4	S	+	+	+	+	5%	+	+	+	+	5%	2
Ammonium phosphate	(NH ₄) ₂ PO ₄	S	+	+	+	+	10%	+	+	+	+	10%	1
Ammonium sulfate	(NH ₄) ₃ SO ₄	S	+	+	+	+	10%	+	+	+	+	10%	1
Ammonium sulfide	(NH ₄) ₂ S	S	+	+	+	+	n	+	+	n	+	n	2
Ammonium nitrate	NH ₄ NO ₂	s	+	+	+	+	+	+	+	+	+	+	1
Amyl alcohol	C ₅ H ₁₁ OH	100	+	+	+	+	+	-	+	-	+	+	1
Aniline		100	-	-				-					2
	C ₆ H ₅ NH ₂				+	+	+		+/0	0	+	+	
Anilinium chloride	C ₆ H ₅ NH ₂ * HCl	S 100	n	+	+	+	-	+/0	+/0	0	+	+	2
Cyclohexanone	C ₆ H ₁₀ O	100	-	-	+	-	+	-	+/0	-	+	+	1
Antimony trichloride	SbCl ₃	S	+	+	+	+	-	+	+	+	+	n	2
Malic acid	C ₄ H ₆ O ₅	S	+	+	+	+	+	+	+	+	+	+	1
Arsenic acid	H ₃ AsO ₄	S	+	+	+	+	+	+	+	0	+	+	3
Askarels	C ₆ H ₁₀ O	100	-	-	+	-	+	-	+/0	-	+	+	1
Ether		100	-	-	0	+	+	-	-	0	0	+	1
Barium carbonate	BaCO ₃	S	+	+	+	+	+	+	+	+	+	+	1
Barium chloride	BaCl,	S	+	+	+	+	-	+	+	+	+	+	1
Barium hydroxide	Ba(OH)	S	+	+	+	+	+	+	+	+	+	+	1
Barium nitrate	Ba(NO ₃) ₂	s	+	+	+	+	+	+	+	+	+	+	1
Barium sulfate	BaSO,	S	+	+	+	+	+	+	+	+	+	+	1
Barium sulfide	BaS	S	+	+	+	+	+	+	+	+	+	+	1
Barium hydroxide	Ba(OH) ₂	S	+	+	+	+	+	+	+	+	+	+	1
Benzaldehyde	C ₆ H ₅ CHO	100	-	-	+	-	+	+	+	-	0	+	1
Benzine	-	100	-	-	+	+	+	+	-		+	+	2
Benzine Benzoic acid	C_H_COOH	100 S	+			+				+/0			1
	0 0			+	+		+	+	+		+	+	
Benzyl benzoate	C ₆ H ₅ COOC ₇ H ₇	100	-	-	+	0	+	+	-	-	+	+	2
Methyl benzoate	C ₆ H ₅ COOCH ₃	100	-	-	+	0	+	+	-	-	+	+	2
Benzene	C ₆ H ₆	100	-	-	0	+	+	0	-	-	0	+	3
Benzenesulfonic acid	C ₆ H ₅ SO ₃ H	10	n	n	+	+	+	+	-	-	n	+	2
Benzoyl chloride	C ₆ H ₅ COCI	100	-	n	0	n	0	+	+	n	0	+	2
Benzyl alcohol	C ₆ H ₅ CH ₂ OH	100	-	-	+	+	+	+	-	+	+	+	1



				D) (0		D) (D.E.		=:4.4		D. 14 10			
Corrosive agent	Formula	Concentra- tion in %	Acryl	PVC	PP	PVDF	1.4404	FKM	EPDM	PharMed®		Hastel- loyC	
Benzyl chloride	C ₆ H ₅ CH ₂ Cl	90%	-	n	0	+	+	+	-	-	0	+	2
Succinic acid Epsomite	C ₄ H ₆ O ₄ MgSO ₄	S S	+	+	+	+	+	+	+	+	+	+	1
Hydrogen cyanide	HCN	S	+	+	+	+	+	+	+	+	+	+	3
Lead(II) acetate / lead(IV)	Pb(CH ₃ COO) ₂	S	+	+	+	+	+	+	+	+	+	+	2
acetate													
Sodium hypochlorite Lead(II) nitrate	NaOCI + NaCI Pb(NO ₂) ₂	12% 50	+	+	0	+	-	+	+	+	0 +	> 10%	2
Lead(II) sulfate	Pb(NO ₃) ₂ PbSO,	S S	+	+	+	+	+	+	+	+	+	+	2
Tetraethyl lead	Pb(C ₂ H _E) ₄	100	+	+	+	+	+	+	-	n	+	+	3
Sugar of lead	Pb(CH ₂ COO) ₂	S	+	+	+	+	+	+	+	+	+	+	2
Potassium ferrocyanide /	K,Fe(CN)	S	+	+	+	+	+	+	+	+	+	+	1
potassium ferricyanide	4 ' '6												
Borax Paris said	Na ₂ B ₄ O ₇ * _{10H2} O	S	+	+	+	+	+	+	+	+	+	+	1
Boric acid	H ₃ BO ₃	s 100	+	+	+	+	+	+	+	+	+	+	1 2
Bromine (dry) Bromobenzene	Br ₂ C _e H _e Br	100	n	n	0	+	+	0	-	-	0	+	2
Bromochloromethane	CH ₂ BrCl	100	-	-	-	+	+	n	+/0	-	0	+	2
Bromochlorotrifluoroethane	HCCIBrCF ₂	100	-	-	0	+	+	+	-	+	0	+	3
Potassium bromide	KBr	S	+	+	+	+	10%	+	+	+	+	0.1	1
Bromine water	Br, + H,O	s	-	+	-	+	-	-	-	n	_	n	2
Hydrogen bromide	HBr	50	+	+	+	+	-	-	+	-	+	0	1
Butanediol	HOC,H,OH	10	n	+	+	+	+	0	+	+	+	+	1
Butanol	C ₄ H ₃ OH	100	-	+	+	+	+	0	+/0	-	+	+	1
Butanone	CH ₂ COC ₂ H ₅	100	-	-	+	-	+	-	+	-	+	+	1
Butanetriol	C ₄ H ₁₀ O ₃	S	+	+	+	+	+	0	+	+	+	+	1
Butyric acid	C ₃ H ₇ COOH	100	5%	20%	+	+	+	+	+	+/0	+	+	1
Butyl acetate	CH ₃ COOC ₄ H ₃	100	-	-	0	+	+	-	+/0	+/0	-	+	1
Butyl acrylate	C ₇ H ₁₃ O ₂	100	-	-	+	+	+	-	-	+/0	+	+	1
Butyl alcohol	C ₄ H ₉ OH	100	-	+	+	+	+	0	+/0	-	+	+	1
Butylamine	C ₄ H ₉ NH ₂	100	n	n	n	-	+	-	-	n	+	+	1
Butyl benzoate	C ₆ H ₅ COOC ₄ H ₉	100	-	-	0	n	+	+	+	-	0	+	2
Butyl mercaptan	C ₄ H ₉ SH	100	n	n	n	+	n	+	-	n	n	n	3
Butyl oleate	$C_{22}H_{42}O_2$	100	n	n	n	+	+	+	+/0	n	n	+	1
Butyl stearate	C ₂₂ H ₄₄ O ₂	100	0	n	n	+	+	+	-	n	n	+	1
Butyraldehyde	C ₃ H ₇ CHO	100	-	n	+	n	+	-	+/0	-	+	+	1
Calcium acetate	(CH ₃ COO) ₂ Ca	S	+	+	+	+	+	+	+	+	+	+	1
Calcium bisulfite	Ca(HSO ₃) ₂	S	+	+	+	+	+	+	+	+	+	+	1
Calcium carbonate	CaCO ₃	S	+	+	+	+	+	+	+	+	+	+	1
Calcium chloride	CaCl ₂ Ca(CN) ₂	S	+	+	+	+	-	+	+	+	+	+	3
Calcium cyanide Calcium bisulfite	Ca(HSO ₃) ₂	S	+	+	+	+	n	+	+	+	+	n	1
Calcium hydroxide	Ca(OH) ₂	S S	+	+	+	+	+	+	+	+	+	+	1
Calcium hypochlorite	Ca(OCI) ₂	S	+	+	0	+	-	0	+	+	+	+	2
Calcium nitrate	Ca(NO ₂) ₂	S	+	50%	50%	+	+	+	+	+	+	+	1
Calcium phosphate	Ca ₃ (PO ₄) ₂	s	+	+	+	+	+	+	+	+	+	+	1
Calcium sulfate	CaSO,	s	+	+	+	+	+	+	+	+	+	+	1
Calcium sulfide	CaS	S	+	+	+	+	n	+	+	+	+	+	2
Calcium sulfite	CaSO ₃	S	+	+	+	+	+	+	+	+	+	+	1
Calcium thiosulfate	CaS,O,	S	+	+	+	+	-	+	+	+	+	+	1
Caprylic aldehyde	C ₅ H ₁₁ CHO	100	n	n	+	+	+	-	+/0	-	+	+	1
Chloracetone	CICH, COCH,	100	-	-	n	n	+	-	+	-	n	+	3
Chloral hydrate	CCI ₃ CH(OH) ₂	S	-	-	0	-	+	0	0	n	+	+	2
Chlorobenzene	C ₆ H ₅ Cl	100	-	-	+	+	+	+	-	-	0	+	2
Sodium hypochlorite	NaOCI + NaCI	12%	+	+	0	+	-	+	+	+	0	> 10%	2
Chloroprene	C₄H₅CI	100	-	-	n	n	+	+	-	-	n	+	1
Chlorine dioxide solution	CIO ₂ + H ₂ O	0.5%	0	+	0	+1)	-	0	-	-	0	+	-
Ethyl chloroacetate	CICH ₂ COOC ₂ H ₅	100	-	0	+	+	+	+	-	-	+	+	2
Methyl chloroacetate	CICH ₂ COOCH ₃	100	-	0	+	+	+	0	-	-	+	+	2
2-Chloroethanol	CICH ₂ CH ₂ OH	100	-	-	+	0	+	-	0	+	+	+	3
Chloroethylbenzene	C ₆ H ₄ CIC ₂ H ₅	100	-	-	0	n	+	0	-	-	0	+	2
Chlorinated lime	Ca(OCI) ₂	S	+	+	0	+	-	0	+	+	+	+	2
Chloroformic acid ethyl ester	CICO ₂ C ₂ H ₅	100	n	n	n	n	n	+	-	n	n	n	2
Chloroform	CHCI ₂	100	-	-	0	+	+	+	-	0	-	+	2
Chloroprene	C,H _E CI	100	-	-	n	n	+	+	-	-	n	+	1
Chlorophenol	C _s H _s OHCl	100	-	n	+	+	+	n	-	-	+	+	2
Chloric acid	HCIO ₃	20	+	+	-	+	-	0	0	+	10%	+	2
Disulfur dichloride	S,Cl,	100	n	n	n	+	n	+	-	-	n	n	-
Chlorosulfuric acid	SO ₂ (OH)Cl	100	-	0	-	+	-	-	-	-	-	0	1
Chlorotoluene	C,H,CI	100	-	-	n	+	+	+	-	-	n	+	2
Chlorine water	Cl ₂ + H ₂ O	S	+	+	0	+	-	+	+	-	0	+	-
Hydrochloric acid	HČI	38%	32%	+	+	+	-	+	0	0	+	0	1
Chromium(III) potassium sulfate dodecahydrate	KCr(SO ₄) ₂	S	+	+	+	+	+	+	+	+	+	+	1
Chromic acid	H _a CrO ₄	50	-	+	0	+	10%	+	-	0	+	10%	3
Chromo-sulfuric acid	K ₂ CrO ₄ K ₃ CrO ₄ + H ₃ SO ₄	\$ \$	-	+	-	+	n	n +	n	-	-	n	3
Chromium(III) sulfate	Cr ₂ (SO ₄) ₃	S	+	+	+	+	+	+	+	+	+	+	1
Ornormani(III) Sundle	J1 ₂ (JJ ₄ / ₃	J	т	-	11"	т	-	-	т	т	т	т	



ProMinent®

Corrosive agent	Formula	Concentra- tion in %	Acryl	PVC	PP	PVDF	1.4404	FKM	EPDM	PharMed®	PE	Hastel- loyC	
Colamine	HOC ₂ H ₄ NH ₂	100	0	n	+	-	+	-	+/0	0	+	+	1
Crotonaldehyde	CH ₃ C ₂ H ₂ CHO	100	n	-	+	+	+	-	+	-	+	+	3
Cumene	C ₆ H ₅ CH(CH ₃) ₂	100	-	-	0	+	+	+	-	-	0	+	1
Potassium cyanide	KCN	S	+	+	+	+	5%	+	+	+	+	5%	3
Prussic acid	HCN	S	+	+	+	+	+	+	+	+	+	+	3
Cyclohexane	C ₆ H ₁₂	100	+	- ,	+	+	+	+	-	-	+	0	1
Cyclohexanol	C ₆ H ₁₁ OH	100	0	+/0	+	+	+	+	- ,	-	+	+	1
Cyclohexanone	C ₆ H ₁₀ O	100	-	- /-	+	-	+	-	+/0	-	+	+	1
Cyclohexyl alcohol	C ₆ H ₁₁ OH	100	0	+/0	+	+	+	+	-	-	+	+	1
Cyclohexylamine	C ₆ H ₁₁ NH ₂	100	n	n	n	n	+	-	n	n	n	+	2
Decahydronaphthalene	C ₁₀ H ₁₈	100	-	+/0	0	+	n	0	-	-	0	+	2
Decalin	C ₁₀ H ₁₈	100	-	+/0	0	+	n	0	-	-	0	+	2
Dextrin	-	S	+	+	+	+	+	+	+	+	+	+	1
Dextrose	C ₆ H ₁₂ O ₆	S	+	+	+	+	+	+	+	+	+	+	1
Diacetone alcohol	C ₆ H ₁₂ O ₂	100	-	-	+	0	+	-	+	-	+	+	1
Dibromoethane	C ₂ H ₄ Br ₂	100	-	-	n	+	+	+	-	-	-	+	3
Dibutylamine	(C ₄ H ₉) ₂ NH	100	n	n	+	+	+	-	-	n	+	+	1
Dibutyl ether	C ₄ H ₉ OC ₄ H ₉	100	-	-	+	+	+	-	0	-	+	+	2
Dibutyl phthalate	C ₁₆ H ₂₂ O ₄	100	-	-	+	+	+	+	+/0	+	0	+	2
Dichlorobenzene	C ₆ H ₄ Cl ₂	100	-	-	0	+	+	+	-	-	0	+	2
Dichlorobutane	C ₄ H ₈ Cl ₂	100	-	-	0	+	+	+	-	-	0	+	3
Dichlorobutene	C ₄ H ₆ Cl ₂	100	-	-	0	+	+	0	-	-	0	+	3
Dichlorobutene	C ₄ H ₆ Cl ₂	100	-	-	0	+	+	0	-	-	0	+	3
Dichloroacetic acid	Cl ₂ CHCOOH	100	-	+	+	+	+	-	+	0	+	+	1
Dichloroacetic acid methyl ester	Cl ₂ CHCOOCH ₃	100	-	-	+	n	+	-	n	-	+	+	2
Dichloroethane	C ₂ H ₄ Cl ₂	100	-	-	0	+	+	+	-	0	-	+	3
Dichloroethene	C ₂ H ₂ Cl ₂	100	-	-	0	+	+	0	-	0	-	+	2
Dichloroisopropyl ether	(C ₃ H ₆ Cl) ₂ O	100	-	-	0	n	+	0	0	-	0	+	2
Dichloromethane	CH ₂ Cl ₂	100	-	-	0	0	0	+	-	0	-	+	2
Dicyclohexylamine	(C ₆ H ₁₂) ₂ NH	100	-	-	0	n	+	-	-	-	0	+	2
Diethylene glycol	C ₄ H ₁₀ O ₃	S	+	+	+	+	+	+	+	+	+	+	1
Diethylene glycol monoethyl	C ₈ H ₁₈ O ₃	100	n	n	+	+	+	n	+/0	0	+	+	1
ether Diethyl ether	C,H,OC,H,	100	-	-	0	+	+	-	-	0	0	+	1
Diethylene glycol	C ₄ H ₁₀ O ₃	S	+	+	+	+	+	+	+	+	+	+	1
Diglycolic acid	C,H,O,	30	+	+	+	+	+	+	n	+/0	+	+	3
Dihexyl phthalate	C ₂₀ H ₂₆ O ₄	100	-	-	+	+	+	-	n	+	+	+	1
Diisobutyl ketone	C ₀ H ₁₈ O	100	-	-	+	+	+	-	+	-	+	+	1
Diisononyl phthalate	C ₂₆ H ₄₂ O ₄	100	-	-	+	+	+	n	n	+	+	+	1
Diisopropyl ketone	C,H,O	100	-	-	+	+	+	-	+	-	+	+	1
Dimethyl carbonate	(CH ₃ O) ₂ CO	100	n	n	+	+	+	+	-	n	+	+	1
Dimethylformamide	HCON(CH ₂) ₂	100	-	-	+	-	+	-	+	+/0	+	+	1
Dimethylhydrazine	H ₂ NN(CH ₂) ₂	100	n	n	+	n	+	-	+	n	+	+	3
Dimethyl ketone	CH_COCH_	100	-	-	+	-	+	-	+	-	+	+	1
Dimethyl phthalate	C ₁₀ H ₁₀ O ₄	100	-	-	+	+	+	-	+/0	+	+	+	1
Disodium hydrogen phos- phate	Na ₂ HPO ₄	S	+	+	+	+	+	+	+	+	+	+	1
Dioctyl phthalate	C ₄ H ₄ (COOC ₈ H ₁₇) ₂	100	_	-	+	+	+	-	+/0	+	+	+	1
Dioxane		100	_	-	0	+	+	_	+/0	+	+	+	1
Disulfur dichloride	C ₄ H ₈ O ₂ S ₂ Cl ₂	100	n	n	n	+	n +	+	+/0	-	n +	n +	-
Disulfuric acid	H ₂ SO ₄ + SO ₃	s	n		-		+		-	+	-	+	2
DMF	H ₂ SO ₄ + SO ₃ HCON(CH ₂) ₂	100	n -	-	+	-		+		+/0		+	1
DOP	C,H,(COOC,H,,),	100	-	-	+	+	+	-	+/0	+/0	+	+	1
Iron(II) chloride	FeCl ₂	S S	+	+	+	+	-	+	+/0	+	+	+/0	1
Iron(III) chloride	FeCl ₂	S	+	+	+	+	-	+	+	+	+	+/0	1
Iron(III) chloride	Fe(NO ₃) ₃	S S	+	+	+	+	+					+/0	1
Iron(III) phosphate	FePO,	S	+	+	+	+	+	+	+	+	+	+	1
Iron(III) sulfate	Fe ₂ (SO ₄) ₃	S											1
Iron(II) sulfate	FeSO ₄	S	+	+	+	+	0	+	+	+	+	+	1
* *	FeSO ₄						+	+	+				1
Ferrous sulfate Glacial acetic acid	CH ₂ COOH	s 100	+	+ 50%	+	+	+	+	+	+ 60%	+ 70%	+	1
Epichlorohydrin	CH ₃ COOH	100	-		+							+	3
Acetic ester	CH,COOC,H	100	-	n -	+ 35%	-	+	+	0	+	+	+	1
Acetic ester Acetic acid	CH ₃ COOC ₂ H ₅ CH ₂ COOH		-	50%		+	+	-	+/0	+/o 60%	+ 70%	+	1
	(CH,CO),O	100	-	JU%	+	+	+		0			+	
Acetic acid anhydride		100			0	-	+	-	+/0	+ +/0	0	+	1
Butyl acetate	CH ₃ COOC ₄ H ₉	100	-	-	0	+	+	-	+/0		- n	+	
Acetyl chloride	CH COOC H	100	-	+	n 25%	-	0	+	-	0	n	+	1
Ethyl acetate	CH ₃ COOC ₂ H ₅	100	-	-	35%	+	+	-	+/0	+/0	+	+	1
Propyl acetate	CH ₃ COOC ₃ H ₇	100	-	-	+	+	+	-	+/0	-	+	+	1
	C ₂ H ₅ OH	100	-	+	+	+	+	-	+	+	+	+	1
Ethanol	LICCIANIA		0	n	+	-	+	-	+/0	0	+	+	1 2
Ethanolamine	HOC ₂ H ₄ NH ₂												,
Ethanolamine Ethyl acrylate	C,H,COOC,H,	100	-	-	+	0	+	-	+/0	-	+	+	
Ethanolamine Ethyl acrylate Ethylacrylic acid	C ₂ H ₃ COOC ₂ H ₅ C ₄ H ₇ COOH	100 100	n	n	+	+	+	n	+/0	n	+	+	1
Ethanolamine Ethyl acrylate Ethylacrylic acid Ethyl alcohol	C ₂ H ₃ COOC ₂ H ₅ C ₄ H ₇ COOH C ₂ H ₅ OH	100 100 100	n -	n +	+ +	+	+	n -	+/o +	n +	+	+	1
Ethanolamine Ethyl acrylate Ethylacrylic acid Ethyl alcohol Ethyl benzoate	C ₂ H ₃ COOC ₂ H ₅ C ₄ H ₇ COOH C ₂ H ₅ OH C ₆ H ₅ COOC ₂ H ₅	100 100 100 100	n - n	n + -	+ + + +	+ + 0	+ + + +	n - +	+/0 + -	n + -	+ + + +	+ + + +	1 1 1
Ethanolamine Ethyl acrylate Ethylacrylic acid Ethyl alcohol	C ₂ H ₃ COOC ₂ H ₅ C ₄ H ₇ COOH C ₂ H ₅ OH	100 100 100	n -	n +	+ +	+	+	n -	+/o +	n +	+	+	1



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Corrosive agent	Formula	Concentra- tion in %	Acryl	PVC	PP	PVDF	1.4404	FKM	EPDM	PharMed®	PE	Hastel- loyC	WG
Ethylcyclopentane	C ₅ H ₄ C ₂ H ₅	100	+	+	+	+	+	+	-	-	+	+	1
Ethylene dichloride	C ₂ H ₄ Cl ₂	100	-	-	0	+	+	+	-	0	-	+	3
Ethylenediamine	(CH ₂ NH ₂) ₂	100	0	0	+	-	0	-	+	n	+	0	2
Ethylene dibromide	C ₂ H ₄ Br ₂	100			n	+	+	+	-	-	-	+	3
Ethylene dichloride	C ₂ H ₄ Cl ₂	100	-	-	0 +	+	+	+	-	0	-	+	3
Ethylene glycol	C ₂ H ₄ (OH) ₂	100	+ n	+ n		+	+	+ n	+/0	+ O	+	+	1
Ethylene glycol ethyl ether 2-Ethylhexanol	HOC ₂ H ₄ OC ₂ H ₅	100	n	+/0	+		+	+	+/0	0		+	2
Fatty acids	C ₈ H ₁₆ O R-COOH	100	+	+/0	+	+	+	+	0	0	+	+	1
Sodium thiosulfate	Na ₂ S ₂ O ₂	S	+	+	+	+	25%	+	+	+	+	25%	1
Fluorobenzene	C _e H _e F	100	-	-	+		+	0	-	-	0	+	2
Fluoroboric acid	HBF ₄	35%	+	+	+	+	0	+	+	-	+	+	1
Hexafluorosilicic acid	-	100		30%	30%	+				-	40%	+/0	2
Hydrofluoric acid	H ₂ SiF ₆ HF	80%	+	40%*	40%**	+	0	+	+	0	40%	+/0	1
•			-	40%			-	+	0	-	40%		1
Hydrofluoric acid	HF	80% 40			40%**	+		+	0	-		+/0	2
Formaldehyde	CH ₂ O		+	+	+	+	+	-	+/0	-	+	+	
Formalin	CH ₂ O	40	+	+	+	+	+	-	+/0	-	+	+	2
Formamide	HCONH ₂	100	+	-	+	+	+	+	+	n	+	+	1
Furan	C ₄ H ₄ O	100	-	-	+	-	+	-	n	-	+	+	3
Furanaldehyde	C ₅ H ₅ O ₂	100	n	n	n	0	+	-	+/0	-	n	n	2
Furfural	C ₅ H ₅ O ₂	100	n	n	n	0	+	-	+/0	-	n	n	2
Furfuryl alcohol	OC ₄ H ₃ CH ₂ OH	100	-	-	+	0	+	n	+/0	-	+	+	1
Gallic acid	C ₆ H ₂ (OH) ₃ COOH	5%	+	+	+	+	+	+	+/0	+	+	+	1
Calcium hydroxide	Ca(OH) ₂	S	+	+	+	+	+	+	+	+	+	+	1
Tannin	C ₇₆ H ₅₂ O ₄₆	50	+	+	+	+	+	+	+	+	+	+	1
Plaster	CaSO ₄	S	+	+	+	+	+	+	+	+	+	+	1
Glauber's salt	Na ₂ SO ₄	S	+	+	+	+	+	+	+	+	+	+	1
Glucose	C ₆ H ₁₂ O ₆	S	+	+	+	+	+	+	+	+	+	+	1
Glycerol	C ₃ H ₅ (OH) ₃	100	+	+	+	+	+	+	+	+	+	+	1
Glycerol chlorohydrin	C ₃ H ₅ OCI	100	-	n	+	-	+	+	0	+	+	+	3
Triacetin	C ₃ H ₅ (CH ₃ COO) ₃	100	n	n	+	+	+	-	+	n	+	+	1
Glycine	NH,CH,COOH	10	+	+	+	+	+	+	+	+	+	+	1
Glycine	NH,CH,COOH	10	+	+	+	+	+	+	+	+	+	+	1
Glycol	C ₂ H ₄ (OH) ₂	100	+	+	+	+	+	+	+	+	+	+	1
Glycolic acid	CH_OHCOOH	70%	+	37%	+	+	+	+	+	+/0	+	+	1
Green vitriol	FeSO,	S	+	+	+	+	+	+	+	+	+	+	1
Jrea	CO(NH ₂) ₂	S	+	+/0	+	+	+	+	+	20%	+	+	1
Heptane	C ₇ H ₁₆	100	+	+	+	+	+	+	-	-	+	+	1
Hexachloroplatinic acid	H ₂ PtCl ₆	S	n	+	+	+	-	n	+	n	+	-	
Hexafluorosilicic acid	H ₂ SiF ₆	100	+	30%	30%	+	0	+	+	0	40%	+/0	2
Hexane	C ₆ H ₁₄	100	+	+	+	+	+	+	-	-	+	+	1
Hexanal	C ₅ H ₁₁ CHO	100	n	n	+	+	+	Ċ	+/0		+	+	1
Hexanol	C ₆ H ₁₂ OH	100	-	-	+	+	+	n	+	0	+	+	1
Hexanetriol	C ₆ H ₁₃ OH C ₆ H ₀ (OH) ₂	100	n	n	+	+	+	+	+	n	+	+	1
Hexene		100							-	-			1
1-Hexanol	C ₆ H ₁₂		n -	+	+	+	+	+			+	+	1
	C ₆ H ₁₃ OH	100		-	+	+	+	n	+	0	+	+	
Ammonium carbonate	(NH ₄) ₂ CO ₃	40	+	+	+	+	+	+	+	+	+	+	1
Silver nitrate	AgNO ₃	S	+	+	+	+	+	+	+	+	+	+/0	3
-lydrazin hydrate	N ₂ H ₄ * H ₂ O	S	+	+	+	+	+	n	+	0	+	+	3
Hydroquinone	C ₆ H ₄ (OH) ₂	s	0	+	+	+	+	+	-	+/0	+	+	2
Hydroxylammonium sulfate	(NH ₂ OH) ₂ * H ₂ SO ₄	10	+	+	+	+	+	+	+	+	+	+	2
Hypochlorous acid	HOCI	S	+	+	0	+	-	+	+/0	+	0	+	1
odine	l ₂	S	0	-	+	+	-	+	+/0	+	0	+/0	-
odkalium	KI	S	+	+	+	+	+	+	+	+	+	+	1
Hydroiodic acid	HI	S	+	+	+	+	-	-	n	-	+	n	1
sobutyl alcohol	C ₂ H ₅ CH(OH)CH ₃	100	-	+	+	+	+	+	+	0	+	+	1
sopropanol	(CH ₃) ₂ CHOH	100	-	+/0	+	+	+	+	+	0	+	+	1
sopropyl acetate	CH ₃ COOCH(CH ₃) ₂	100	-	-	+	+	+	-	+/0	+/0	+	+	1
sopropyl alcohol	(CH ₃) ₂ CHOH	100	-	+/0	+	+	+	+	+	0	+	+	1
sopropylbenzene	C ₆ H ₅ CH(CH ₃) ₂	100	-	-	0	+	+	+	-	-	0	+	1
sopropyl chloride	CH,CHCICH,	80%	-	-	0	+	+	+	-	0	0	+/0	2
sopropylether	C ₆ H ₁₄ O	100	-	-	0	+	+	-	-	0	0	+	1
Potassium alum	KAI(SO ₄) ₂	S	+	+	+	+	+	+	+	+	+	+	1
Caustic potash	KOH	50	+	+	+	+ (25 °C)	+	-	+	10%	+	+	1
altpetre	KNO ₂	s	+	+	+	+ (20 0)	+	+	+	+	+	+	1
Potassium acetate	CH ₂ COOK	S	+	+	+	+	+	+	+	+	+	+	1
Potassium aluminium sulfate	KAISO I	S S										+	1
		40	+	+	+	+	+	+	+	+	+		1
Potassium bicarbonate	KHCO ₃		+	+	+	+	+ 25%	+	+	+	+	+/0	
Potassium dichromate	K ₂ Cr ₂ O ₇	S E0/	+	+	+	+	25%	+	+	+	+	10%	3
Potassium bisulfate	KHSO ₄	5%	+	+	+	+	+	+	+	+	+	+	1
Potassium bitartrate	KC ₄ H ₅ O ₆	S	+	+	+	+	+	+	+	+	+	+	1
Potassium metaborate	KBO ₂	S	+	+	+	+	+	+	+	+	+	+	1
Potassium bromate	KBrO ₃	S	+	+	+	+	+	+	+	+	+	+	2
Potassium bromide	KBr	S	+	+	+	+	10%	+	+	+	+	0.1	1
Potassium carbonate	K ₂ CO ₃	S	+	+	+	+	+	+	+	55%	+	+	1
Potassium chlorate	KCIO ₃	S	+	+	+	+	+	+	+	+	+	+	2
Potassium chloride	KCI	S	+	+	+	+	-	+	+	+	+	+/0	1



ProMinent

Corrosive agent	Formula	Concentra- tion in %	Acryl	PVC	PP	PVDF	1.4404	FKM	EPDM	PharMed®	PE	Hastel- loyC	
Potassium chromate	K ₂ CrO ₄	10	+	+	+	+	+	+	+	+	+	+	3
Chromium(III) potassium	KCr(SO ₄) ₂	S	+	+	+	+	+	+	+	+	+	+	1
sulfate dodecahydrate													
Potassium cyanate	KOCN	S	+	+	+	+	+	+	+	+	+	+	2
Potassium cyanide	KCN	S	+	+	+	+	5%	+	+	+	+	5%	3
Potassium dichromate	K ₂ Cr ₂ O ₇	S	+	+	+	+	25%	+	+	+	+	10%	3
Potassium fluoride	KF	S	+	+	+	+	+	+	+	+	+	+	1
Potassium ferrocyanide	K ₄ Fe(CN) ₆	S	+	+	+	+	+	+	+	+	+	+	1
Potassium hexacyanofer-	K₃Fe(CN) ₆	S	+	+	+	+	+	+	+	+	+	+	1
rate(III)													
Potassium hydrogen fluoride	2	S	n	+	+	+	+	+	+	+	+	+	1
Potassium hydroxide	KOH	50	+	+	+	+ (25 °C)	+	-	+	10%	+	+	1
Potassium iodide	KI	S	+	+	+	+	+	+	+	+	+	+	1
Potassium nitrate	KNO ₃	S	+	+	+	+	+	+	+	+	+	+	1
Potassium perchlorate	KCIO ₄	S	+	+	+	+	n	+	+	+	+	+	1
Potassium permanganate	KMnO ₄	S	+	+	+	+	+	+	+	6%	+	+	2
Potassium persulfate	$K_2S_2O_8$	S	+	+	+	+	+	+	+	+	+	+	1
Potassium persulfate	K,S,O,	S	+	+	+	+	+	+	+	+	+	+	1
Tripotassium phosphate	KH,PO,	S	+	+	+	+	+	+	+	+	+	+	1
Potassium sulfate	K,SO,	S	+	+	+	+	+	+	+	+	+	+	1
Potassium sulfite	K,SO,	S	+	+	+	+	+	+	+	+	+	+	1
Limescale	CaCO	S	+	+	+	+	+	+	+	+	+	+	1
Lime milk	Ca(OH)	S	+	+	+	+	+	+	+	+	+	+	1
Calcium nitrate	Ca(NO ₂) ₂	S	+	50%	50%	+	+	+	+	+	+	+	1
Carbolic acid	C ₆ H ₅ OH	100	-	-	+	+	+	+	-	+	+	+	2
Silicic acid	SiO ₂ * x H ₂ O	S	+	+	+	+	+	+	+	+	+	+	1
Cobalt chloride	CoCl ₂	S	+	+	+	+	-	+	+	+	+	+	2
Sodium chloride (table salt)	NaCl	S		+			-						1
Carbonic acid			+		+	+		+	+	+	+	+	1
	"H ₂ CO ₃ "	s 100	+	+	+	+	+	+	+	+	+	+	2
Carbon disulfide Carbon tetrachloride	CS ₂	100	-	-	0	+	+	+	-	-	0	+	3
	4					+ + ²⁾	+	+			0	+	
Aqua regia	3 HCl + HNO ₃	100	-	+	-		-	-	0	-	-	-	2
Cresol	C ₆ H ₄ CH ₃ OH	100	0	0	+	+	+	+	-	-	+	+	2
Copper(II) acetate	Cu(CH ₃ COO) ₂	S	+	+	+	+	+	+	+	+	+	+	3
Copper arsenite	Cu ₃ (AsO ₃) 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	+	+	+	+	+	+	+	+	+	+/0	2
Copper(II) sulfate	CuSO ₄	S	+	+	+	+	+	+	+	+	+	+	2
Vitriol of copper	CuSO ₄	S	+	+	+	+	+	+	+	+	+	+	2
Levoxin	N,H, * H,O	S	+	+	+	+	+	n	+	0	+	+	3
Lithium bromide	LiBr	S	+	+	+	+	+	+	+	+	+	+	1
Lithium chloride	LiCI	S	+	+	+	+	-	+	+	+	+	n	1
Magnesium carbonate	MgCO ₂	S	+	+	+	+	+	+	+	+	+	+/0	1
Magnesium chloride	MgCl ₂	S	+	+	+	+	0	+	+	+	+	+	1
Magnesium hydroxide	Mg(OH)	S	+	+	+	+	+	+	+	+	+	+	1
Magnesium nitrate	Mg(NO ₃)	S	+	+	+	+	+	+	+	+	+	+	1
Magnesium sulfate	MgSO ₄	S	+	+	+	+	+	+	+	+	+	+/0	1
Maleic acid	C ₄ H ₄ O ₄	s	+	+	+	+	+	+	+	0	+	+	1
Manganese(II) chloride	MnCl ₂	S	+	+	+	+	-	+	+	+	+	+	1
Manganese(II) sulfate	MnSO ₄	S	+	+	+	+	+	+	+	+	+	+	1
MEK		100	-	-	+	-	+	-	+	-	+	+	1
Mesityl oxide		100	-	-	n n	n	+	-	+/0	-	n n	+	1
Methacrylic acid	C,H,COOH	100	n	n		+	+	0	+/0	+/0	+	+	1
	3 3	100	n -	n -	+								1
Methanol	CH O(CH) OH				+	+	+	0	+	+/0	+	+	
Methoxybutanol	CH ₃ O(CH ₂) ₄ OH	100	-	-	+	+	+	+	0	0	+	+	1
Methyl acetate	CH ₃ COOCH ₃	60%	-	-	+	+	+	-	+/0	+/0	+	+	2
Methyl acetoacetate	C ₅ H ₈ O ₃	100	-	-	+	+	+	-	+/0	0	+	+	2
Methyl acrylate	C ₂ H ₃ COOCH ₃	100	-	-	+	+	+	-	+/0	0	+	+	2
Methyl alcohol	CH ₃ OH	100	-	-	+	+	+	0	+	+/0	+	+	1
Methylamine	CH ₃ NH ₂	32%	+	0	+	0	+	-	+	+	+	+	2
4-Methylcatechol	C ₆ H ₃ (OH) ₂ CH ₃	S	+	+	+	+	+	+	-	+/0	+	+	1
Methyl cellulose	-	S	+	+	+	+	+	+	+	+	+	+	1
Methyl chloroform	CCI ₃ CH ₃	100	-	-	0	+	+	+	-	0	0	+	3
Methylcyclopentane	C ₅ H ₉ CH ₃	100	+	+	+	+	+	+	-	-	+	+	1
Methylene chloride	CH,Cl,	100	-	-	0	0	0	+	-	0	-	+	2
Methyl ethyl ketone	CH,COC,H	100	-	-	+	-	+	-	+	-	+	+	1
Methylglycol	C,H,O,	100	+	+	+	+	+	-	+/0	+	+	+	1
Methyl isobutyl ketone	CH,COC,H,	100	-	-	+	-	+	-	0	-	+	+	1
Methyl isopropyl ketone	CH,COC,H,	100	-	-	+	-	+	-	+/0	-	+	+	1
Methyl methacrylate	C ₂ H _E COOCH ₂	100	-	-	+	+	+	-	-	-	+	+	1
Methyl oleate	C ₁₇ H ₃₃ COOCH ₃	100	n	n	+	+	+	+	+/0	n	+	+	1
			-	-						-			1
Methyl salicylate	HOC ₆ H ₄ COOCH ₃	100			+	+	+	n	+/0		+	+	
MIBK	CH ₃ COC ₄ H ₉	100	-	-	+	-	+	-	0	- 1/0	+	+	1
Lactic acid	C ₃ H ₆ O ₃	100	-	+	+	+	+/0	+	10%	+/0	+	+	1
Morpholine	C ₄ H ₀ ON	100	-	-	+	-	+	n	n	-	+	+	2



Corrosive agent	Formula	Concentra- tion in %	Acryl	PVC	PP	PVDF	1.4404	FKM	EPDM	PharMed®	PE	Hastel- loyC	WG
Motor oils	-	100	n	+/0	+	+	+	+	-	-	+	+	2
Sodium acetate	NaCH ₃ COO	S	+	+	+	+	+	+	+	+	+	+	1
Sodium benzoate	C ₆ H ₅ COONa	S	+	+	+	+	+	+	+	+	+	+	1
Sodium bicarbonate	NaHCO ₃	S	+	+	+	+	+	+	+	+	+	+	1
Sodium dichromate	Na ₂ Cr ₂ O ₇	S	+	+	+	+	+	+	+	+	+	+	3
Sodium bisulfate	NaHSO ₄	S	+	+	+	+	+	+	+	+	+	+	1
Sodium bisulfite	NaHSO ₃	S	+	+	+	+	+	+	+	+	+	+	1
Borax	NaBO _a	s	+	+	+	+	+	+	+	+	+	+	1
Sodium bromate	NaBrO _a	S	+	+	+	+	+	+	+	+	+	+	3
Sodium bromide	NaBr	S	+	+	+	+	+	+	+	+	+	+	1
Sodium carbonate	Na ₂ CO ₂	S	+	+	+	+	+/0	+	+	+	+	+	1
Sodium chlorate	NaClO ₂	S	+	+	+	+	+	+	+	+	+	+	2
Sodium chloride	NaCl	s	+	+	+	+		+	+	+	+	+	1
							100/						
Sodium chlorite	NaClO ₂	24%	+	+	+	+	10%	+	+	+	+	10%	2
Sodium chromate	Na ₂ CrO ₄	S	+	+	+	+	+	+	+	+	+	+	3
Sodium cyanide	NaCN	S	+	+	+	+	+	+	+	+	+	+	3
Sodium metabisulfite	Na ₂ S ₂ O ₅	S	+	+	+	+	+	n	n	+	+	+	1
Sodium dithionite	Na ₂ S ₂ O ₄	S	+	10%*	10%	+	+	n	n	+	10%	+/0	1
Sodium fluoride	NaF	S	+	+	+	+	10%	+	+	+	+	+	1
odium hydrogen sulfate	NaHSO,	S	+	+	+	+	+	+	+	+	+	+	1
odium hydroxide	NaOH ⁴	50	+	+	+	+ (60%/25 °C)	+	-	+	30%	+	+	1
odium hypochlorite	NaOCI + NaCI	12%	+	+	0	+	-	+	+	+	0	> 10%	2
Sodium iodide	Nal	S	+	+	+	+	+	+	+	+	+	+	1
Sodium metaphosphate	(NaPO ₃) _n	S	+	+	+	+	+	+	+	+	+	+	1
													1
Sodium nitrate	NaNO ₃	S	+	+	+	+	+	+	+	+	+	+	
Sodium nitrite	NaNO ₂	S	+	+	+	+	+	+	+	+	+	+	2
odium oxalate	Na ₂ C ₂ O ₄	S	+	+	+	+	+	+	+	+	+	+	1
Sodium perborate	NaBO ₂ *H ₂ O ₂	S	+	+/0	+	+	+	+	+	+	+	+/0	1
Sodium perchlorate	NaClO ₄	S	+	+	+	+	10%	+	+	+	+	10%	1
Sodium peroxide	Na ₂ O ₂	S	+	+	+	+	+	+	+	n	-	+	1
odium peroxodisulfate	Na,S,O,	S	n	+	+	+	+	+	+	+	+	+	1
odium salicylate	C ₆ H ₄ (OH)COONa	S	+	+/0	+	+	+	+	+	+	+	+	1
odium silicate	Na _a SiO _a	s	+	+	+	+	+	+	+	+	+	+	1
	2 3												1
Sodium sulfate	Na ₂ SO ₄	S	+	+	+	+	+	+	+	+	+	+	
odium sulfide	Na ₂ S	S	+	+	+	+	+	+	+	+	+	+	2
Sodium sulfite	Na ₂ SO ₃	S	+	+	+	+	50%	+	+	+	+	50%	1
Sodium tetraborate	Na ₂ B ₄ O ₇ * _{10H2} O	S	+	+	+	+	+	+	+	+	+	+	1
Sodium thiosulfate	Na ₂ S ₂ O ₃	S	+	+	+	+	25%	+	+	+	+	25%	1
Sodium tripolyphosphate	Na ₅ P ₃ O ₁₀	S	+	+	+	+	+	+/0	+	+	+	+	1
latron	NaHCO ₂	S	+	+	+	+	+	+	+	+	+	+	1
Sodium hydroxide solution	NaOH	50	+	+	+	+ (60%/25 °C)	+	-	+	30%	+	+	1
Chile saltpeter	NaNO _a	S	+	+	+	+	+	+	+	+	+	+	1
lickel(II) acetate	(CH ₂ COO) ₂ Ni	S	+	+	+	+	+	-	+	+	+	+	2
. ,	. 3 /2						-						2
lickel(II) chloride	NiCl ₂	S	+	+	+	+		+	+	+	+	+	
lickel(II) nitrate	Ni(NO ₃) ₂	S	+	+	+	+	+	+	+	+	+	+/0	2
lickel(II) sulfate	NiSO ₄	S	+	+	+	+	+	+	+	+	+	+/0	2
litromethane	CH ₃ NO ₂	100	-	-	+	0	+	-	+/0	-	+	+	2
litropropane	(CH ₃) ₂ CHNO ₂	100	-	-	+	n	+	-	+/0	-	+	+	2
litrotoluene	C ₆ H ₄ NO ₂ CH ₃	100	-	-	+	+	+	0	-	-	+	+	2
Octane	C ₈ H ₁₈	100	0	+	+	+	+	+	-	-	+	+	1
Octanol	C ₈ H ₁₇ OH	100	-	-	+	+	+	+	+	-	+	+	1
-Octanol	C ₈ H ₁₇ OH	100	-	-	+	+	+	+	+	-	+	+	1
Octylcresol		100	-										
•	C ₁₅ H ₂₄ O			. /-	+	+	+	0	n	-	+	+	1
Dil	-	100	n	+/0	+	+	+	+	-	-	+	+	2
Dleum	H ₂ SO ₄ + SO ₃	S	n	-	-	-	+	+	-	+	-	+	2
Orthophosphoric acid	H ₃ PO ₄	85%	50%	+	+	+	+	+	+	+	+	+	1
xalic acid	(COOH) ₂	S	+	+	+	+	10%	+	+	+/0	+	+/0	1
entane	C ₅ H ₁₂	100	+	+	+	+	+	+	-	-	+	+	1
-Pentanol	C ₅ H ₁₁ OH	100	+	+	+	+	+	-	+	-	+	+	1
ER	C,Cl,	100	-	-	0	+	+	0	-	0	0	+	3
etrachloroethylene	C ₂ Cl ₄	100	-	-	0	+	+	0	-	0	0	+	3
erchloric acid	HCIO ₄	70%	n	10%*	10%	+	_	+	+/0	+	+	n	1
erhydrol	H ₂ O ₂	90%	40%	40%*	30%	+	+	30%	30%	+	+	+	1
•													
etroleum ether	C _n H _{2n+2}	100	+	+/0	+	+	+	+	-	-	+	+	1
henol	C ₆ H ₅ OH	100	-	-	+	+	+	+	-	+	+	+	2
henylethyl ether		100	-	-	+	n	+	-	-	-	+	+	2
henylhydrazine	C ₆ H ₅ NHNH ₂	100	-	-	0	+	+	0	-	-	0	+	2
hosphoric acid	H,PO,	85%	50%	+	+	+	+	+	+	+	+	+	1
hosphorus trichloride	PCI ₂	100	-	-	+	+	+	0	+	+/0	+	+	1
nosphoryl chloride	POCI ₂	100	-	-	+	+	n	+	+	n	+	+	1
hthalic acid	C ₆ H ₄ (COOH) ₂	S	+	+	+	+	+	+	+	+	+	+	1
icric acid	C ₆ H ₂ (NO ₃) ₃ OH	S	+	+	+	+	+	+	+	-	+	+	2
iperidine	C ₅ H ₁₁ N	100	-	-	n	n	+	-	-	-	n	+	2
otassium carbonate	K ₂ CO ₃	S	+	+	+	+	+	+	+	55%	+	+	1
ropionitrile	CH ₃ CH ₂ CN	100	n	n	+	+	+	+	-	-	+	+	2
Propionic acid	C,H,COOH	100	0	+	+	+	+	+	+	+/0	+	+	1
	2 5		-										



Corrosive agent	Formula	Concentra- tion in %	Acryl	PVC	PP	PVDF	1.4404	FKM	EPDM	PharMed®	PE	Hastel- loyC	WGK
Propyl acetate	CH ₃ COOC ₃ H ₇	100	-	-	+	+	+	-	+/0	-	+	+	1
Propylene glycol	CH ₃ CHOHCH ₂ OH	100	+	+	+	+	+	+	+	+	+	+	1
Pyridine	C ₅ H ₅ N	100	-	-	0	-	+	-	-	0	+	+	2
Pyrrole	C ₄ H ₄ NH	100	n	n	+	n	+	-	-	-	+	+	2
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
Salicylic acid	HOC,H,COOH	S	+	+	+	+	+	+	+	+	+	+/0	1
Salmiac	NH,CI	S	+	+	+	+	-	+	+	+	+	+/0	1
Ammonia solution	"NH,OH''	30	+	+	+	+ (25 °C)	+	-	+	+	+	+	2
Nitric acid	HNO.	99%	10%	10%*	50%	65%2)	50%	65%	10%	35%	50%	65%	1
Hydrochloric acid	HCI	38%	32%	+	+	+	-	+	0	0	+	0	1
Salt water	-	S	+	+/0	+	+	+/0	+	+	+	+	+	1
Sulfur chloride	S ₂ Cl ₂	100	n	n	n	+	n	+	_	_	n	n	_
Disulfur dichloride	S ₂ Cl ₂	100	n	n	n	+	n	+	_	_	n	n	_
Carbon disulfide	CS ₂	100	-	-	0	+	+	+	-	-	0	+	2
Sulfuric acid	H ₂ SO ₄	98%	30%	50%	85%	+	20%	+	80%	30%	80%	+	1
Sulfuric acid, furning	H ₂ SO ₄ H ₂ SO ₄ + SO ₅	90% S		50%	-	+	+	+	-	+	JU 76	+	2
	2 4 3		n								-		
Sulfurous acid	H ₂ SO ₃	S	+	+	+	+	10%	+	+	+	+	+	1
Silver bromide	AgBr	S	+	+	+	+	+/0	+	+	+	+	+	1
Silver chloride	AgCl	S	+	+	+	+	-	+	+	+	+	+/0	1
Silver nitrate	AgNO ₃	S	+	+	+	+	+	+	+	+	+	+/0	3
Starch	(C ₆ H ₁₀ O ₅) _n	S	+	+	+	+	+	+	n	+	+	+	1
Styrene	C ₆ H ₅ CHCH ₂	100	-	-	0	+	+	0	-	-	0	+	2
Sulfuryl chloride	SO ₂ Cl ₂	100	-	-	-	0	n	+	0	-	-	n	1
Tetrachloroethane	C ₂ H ₂ Cl ₄	100	-	-	0	+	+	0	-	0	0	+	3
Tetrachloroethylene	C ₂ CI ₄	100	-	-	0	+	+	0	-	0	0	+	3
Tetrachloromethane	CCI ₄	100	-	-	-	+	+	+	-	-	0	+	3
Tetraethyllead	Pb(C ₂ H ₅) ₄	100	+	+	+	+	+	+	-	n	+	+	3
Tetrahydrofuran	C ₄ H ₈ O	100	-	-	0	-	+	-	-	-	0	+	1
Tetralin	C ₁₀ H ₁₂	100	-	-	-	+	+	+	-	-	0	+	3
Thionyl chloride	SOCI	100	-	-	-	+	n	+	+	+	-	n	1
Thiophene	C,H,Ś	100	n	-	0	n	+	-	-	-	0	+	3
Titanium tetrachloride	TiCI	100	n	n	n	+	n	0	-	n	n	n	1
Toluene	C _e H _e CH _e	100	-	-	0	+	+	0	-	-	0	+	2
Toluene diisocyanate	C ₂ H ₂ (NCO) ₂	100	n	n	+	+	+	-	+/0	n	+	+	2
Tributyl phosphate	(C ₄ H ₂) ₂ PO ₄	100	n	-	+	+	+	-	+	+	+	+	1
Trichloroacetic acid	CCI ₂ COOH	50	-	+	+	+	_	-	0	+/0	+	+	1
Trichloroethane	CCI ₂ CH ₂	100	-	-	0	+	+	+	-	0	0	+	3
Trichloroethylene	C,HCl,	100	_	_	0	+	+/0	0	-	0	0	+	3
•		100		-	-			-	- /0		-		1
Triethanolamine	N(C ₂ H ₄ OH) ₃		+	0	+	n	+		+/0	0	+	+	
Tricresyl phosphate	(C ₇ H ₇) ₃ PO ₄	90%	-	-	+	n	+	0	+	+	+	+	2
Trisodium phosphate	Na ₃ PO ₄	S	+	+	+	+	+	+	+	+	+	+	1
Tris(2-ethylhexyl) phosphate		100	n	-	+	+	+	0	+	+	+	+	2
Hypochlorous acid	HOCI	S	+	+	0	+	-	+	+/0	+	0	+	1
Vinyl acetate	CH ₂ =CHOOCCH ₃	100	-	-	+	+	+	n	n	+/0	+	+	2
Hydrogen peroxide	H ₂ O ₂	90%	40%	40%*	30%	+	+	30%	30%	+	+	+	1
Tartaric acid	C ₄ H ₆ O ₆	S	50%	+	+	+	+	+	+/0	+	+	+	1
Xylene	C ₆ H ₄ (CH ₃) ₂	100	-	-	-	+	+	0	-	-	0	+	2
Zinc acetate	(CH ₃ COO) ₂ Zn	S	+	+	+	+	+	-	+	+	+	+	1
Zinc chloride	ZnCl ₂	S	+	+	+	+	-	+	+	+	+	n	1
Zinc sulfate	ZnSO	S	+	+	+	+	+	+	+	+	+	+/0	1
Tin(II) chloride	SnCl ₂	S	+	0	+	+	-	+	+	+	+	+/0	1
Tin(II) sulfate	SnSO,	S	n	+	+	+	+	+	+	+	+	+/0	1
Tin(IV) chloride	SnCl ₄	S	n	+	+	+	-	+	+	+	+	+	1
Citric acid	C _e H _o O ₇	S	+	+	+	+	+	+	+	+	+	+	1
Sugar solution	- С ₆ П ₈ О ₇												
ougai solulioi l	-	S	+	+	+	+	+	+	+	+	+	+	1

 $^{^{\}scriptsize 1)}$ Chlorine dioxide is capable of penetrating PVDF without destroying it. This can lead to damage to PVDF-coated parts.

The statements made in this list do not necessarily apply to components, such as valves, even if they are made from the same materials.



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.



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
0	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
Acetone	all	-
Acetylene tetrabromide	100	-
Alums of all kinds, aqueous	all	+
Aluminium salts, aqueous	all	+
Ammonium, aqueous	15	-
Ammonium, aqueous	saturated	-
Ammonium salts, aqueous	all	+
Aniline	100	-
Benzene	100	-
Bisulfite, aqueous	40	+
Borax solution	all	+
Boric acid, aqueous	10	+
Bromine, vaporous and liquid	-	-
Hydrogen bromide	10	+
Butanol	100	+
Butyric acid, aqueous	conc.	-
Butyric acid, aqueous	20	+
Butyl acetate	100	-
Calcium chloride, aqueous	all	+
Chlorinated hydrocarbons	all	-
Chrome-alum, aqueous	all	+
Chromic acid, aqueous	50	-
Dextrin, aqueous	saturated	+
Diesel oils, compressed oils	100	0
Diethyl ether	100	-
Fertilizing manure salt, aqueous	all	+
Ferric chloride, aqueous	all	+
Glacial acetic acid	100	-
Acetic ester	100	-
Acetic acid	50	0
Acetic acid (wine vinegar)	-	0
Acetic acid, aqueous	10	+
Acetic acid anhydride	100	-
Ethanol	96	-
Ethyl acetate	100	-
Ethylene glycol	30	+
Formaldehyde, aqueous	30	0
Difluorodichloromethane	100	-
Glycerol	100	-
Glucose, aqueous	saturated	+
Halogens	all	-
Urea, aqueous	all	+
Caustic potash	15	+
Potassium bichromate, aqueous	saturated	+
Potassium persulfate, aqueous	saturated	+
Creosote	-	-
Sodium chloride, aqueous	all	+
Carbonic acid	all	+
Copper sulfate, aqueous	all	+
Magnesium salts, aqueous	all	+





Corrosive agent	Concentration in %	Evaluation
Methyl alcohol	100	+
Methylene chloride	100	-
Sodium hypochlorite	15	+
Sodium salts	-	-
Sodium hydroxide solution	aqueous	+
Oils	-	-
Perchloric acid	all	0
Phenol, aqueous	all	0
Phosphoric acid, aqueous	100	-
Nitric acid, aqueous	25	+
Hydrochloric acid	15	+
Sulfur dioxide, gaseous	all	+
Carbon disulfide	100	-
Sulfuric acid	30	+
Hydrogen sulfide, gaseous	100	-
Silver nitrate	10	+
Tetrachloromethane	100	-
Ink	-	+
Toluene	100	-
Trichloroethylene	100	-
Hydrogen peroxide	up to 10	+
Xylene	100	-
Zinc salts	all	+



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