



## DOSING PUMPS

DDA, DDC, DDE, DDA XL, DDE XL, DME, DMX & DMH



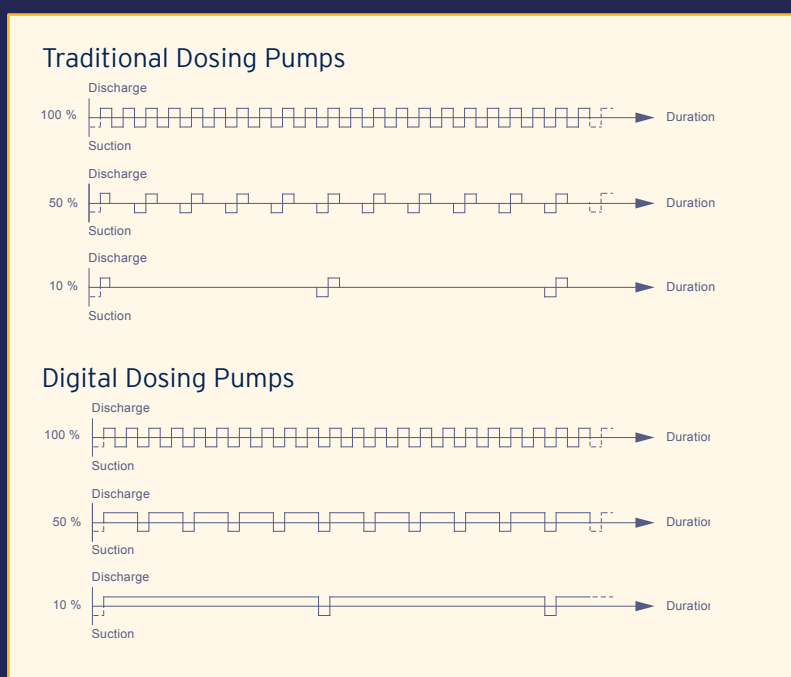
Digitals SMART & Mechanicals  
Dosing Pumps.

## INTRODUCTION

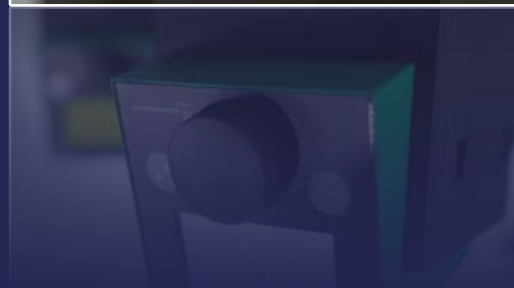
The Grundfos dosing pumps incorporate the latest technology with a precise, reliable and economical operation.

The innovative system with stepper motors (Digital Dosing™) covers a wide range of applications with only a few models. In addition, there are many advantages such as low pulsation, stable and continuous dosage of simple operation and universal connections for installations of existing processes.

In order to obtain a precise metering and a high reliability process, we offer fully integrated solutions. The Digital Dosing™ combined with an optimum head's design and a 100% stroke length allow the stable liquid spontaneously dosage, such as solid hypochlorite or hydrogen peroxide. With optional integral FlowControl or systems FlowMonitor, the functioning of dispensing errors can be detected and monitored. In addition, AutoFlowAdapt or AutoCal systems ensure an automatic compensation and a recalibration during dosing, even in the case of environmental changes.



Continuous dosing even in doses of a few ml/h



## Modularity » Flexibility for any environment or situation

The base installation with supplied instantaneous stop function gives even more flexibility to the new pumps. This allows three different positions without using additional accessories, like as wall mounts. On the other hand, it facilitates the repair and replacement of the pump, with a speed up installation and uninstallations procedures. The DDA pumps' cubic control panel can stand up and turn around easily in three different positions: front, left or right. The DME pumps are available with front or side control panel.

## Simplicity » Simple operation and great precision

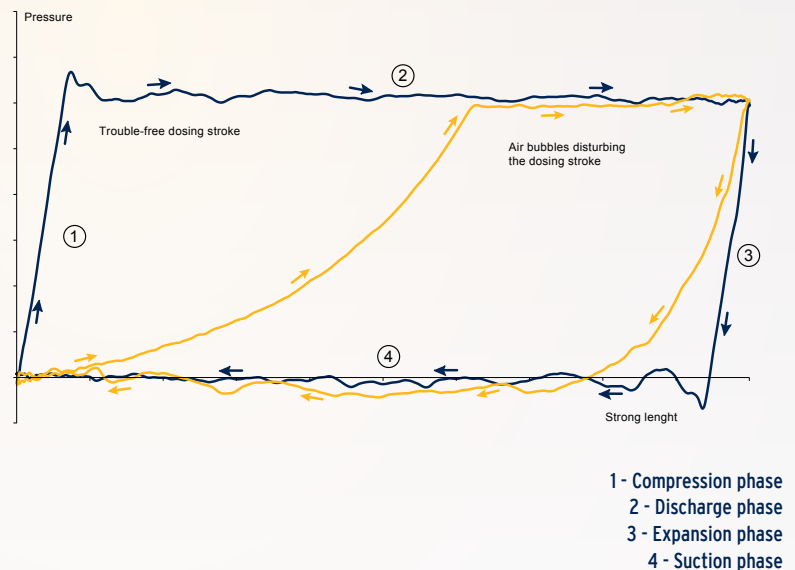
The pump can be easily installed and configured so it exactly doses the amount of liquid required for the application. The screen provides live view for pump's settings and displays the volume in ml/h, l/h or gph .

Wheel selector and LCD graphic screen with text menu in more than 20 languages makes intuitive the commissioning and operation processes. Due to retro-illumination system, the screen is able to light up in different colours, depending on its operating status (working, attention, alarm), allowing control it at a distance.

## "Flow" Intelligence » Reliability on advanced processes

**Flow Control** » The pump monitors the dosing process of liquids. Although the pump is still operating, some influences such as air bubbles may cause reduced flow rates or even stop the dosing process. The system is based on an intelligent and maintenance-free sensor integrated in the dosing head. An internal indicator diagram is generated combining the actual pressure value with the diaphragm position, to achieve optimal security and reliability. FlowControl function immediately detects and displays the following malfunctions:

- Overpressure / Discharge line burst
- Air bubbles in the dosing head
- Cavitation at the suction side
- Suction and discharge valve leakage



**Flow Measurement** » Monitoring and control of additional equipment. The pump can precisely measure and display the actual dosing flow. By the analog 0/4-20 mA output or the data BUS, the actual flow signal can easily be integrated in any process control system, without needing any additional measurement equipment.

**AutoFlowAdapt** » When activating the AutoFlowAdapt function even environmental changes will be compensated. The integrated AutoFlowAdapt makes additional monitoring and control devices redundant. The detected bubbles will be expelled by a special motor sequence. This is particularly important when the degassing liquids are dosed. In addition, the system compensates the pressure fluctuations in the system through constant and automatic adaption of the engine speed in order to maintain a constant flow.

## SMART DIGITAL S: DDA, DDC and DDE

Smart diaphragm dosing pumps of up to 30 l/h

The Smart Digital S Dosing Pumps allow to face up to any challenge thanks to its modern drive Technology, its unmatched ease of use and the intelligent FlowControl System. Those properties guarantee an extreme precision, reliability and economy of processes, as well as the best possible price/efficiency.

There are three ranges of available pumps which are equipped with powerful stepper motors with variable speed, universal power supply and diaphragm made with PTFE to satisfy the most demanding requirements in terms of durability and chemical resistance.



### DDA

High-end DDA pump is designed for complex and demanding applications where the key is to maximize the reliability of the process. If required liquid baking soda, flow rates of up to 30 l/h or a process advanced control, this pump offers the perfect solution. For industrial applications package includes more operating modes complementary, as weekly dosing timed, and new features like the automatic venting.

### DDC

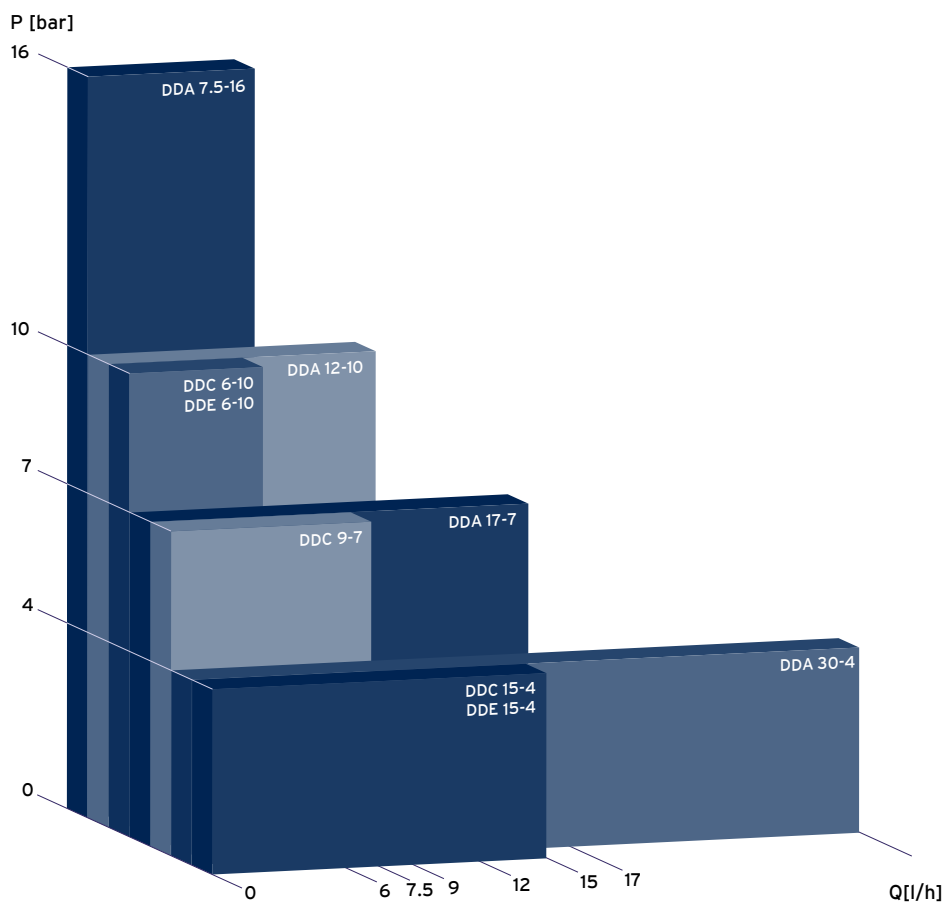
The DDC range is the optimal solution for common applications. It has graphic screen LCD and menus available in over 25 languages. It offers a wide range of possibilities standard operation, inputs and outputs such as analog control ports and the output relays, which are very easy to integrate in control systems. This pump is suitable for universal use thanks to the SlowMode (anti-cavitation) function, which allows you to treat as well as a method of calibration nice high-viscosity fluids.

### DDE

Pump DDE, still being the most economic model of all, enjoys all the advantages of technology Digital Dosing with the basic functions of this technology. Works with a maximum reduction coefficient of 1:1000 and have a capacity of homogeneous dosing and continuous. It is a model that can replace a range of existing models with flow rates of dosage between 0.006 and 15 l/h. The flow rate is adjusted using a logarithmic scale which ranges from 0.1 to 100%. The nice control pulse, external stop function and vacuum level signal model, has become an ideal equipment for OEM applications.

Pump Type	DDA		DDC	DDE	
Control variant	FCM	AR	AR	P	B
<b>Operation modes</b>					
Manual speed control	✓	✓	✓	✓	✓
Pulse control in ml/pulse	✓	✓	✓		
Pulse control (1:n)				✓	
Analog control 0/4-20 mA	✓	✓	✓		
Batch control (pulse-based)	✓	✓			
Dosing timer cycle	✓	✓			
Dosing timer week	✓	✓			
Fieldbus control	✓	✓			
<b>Functions</b>					
Auto deaeration also during pump standby	✓	✓			
FlowControl system with selective fault diagnosis	✓				
Pressure monitoring (min / max)	✓				
Flow measurement	✓				
AutoFlowAdapt	✓				
SlowMode (anti-cavitation)	✓	✓	✓		
Output relay (2 relays)	✓	✓	✓		

## Performance range

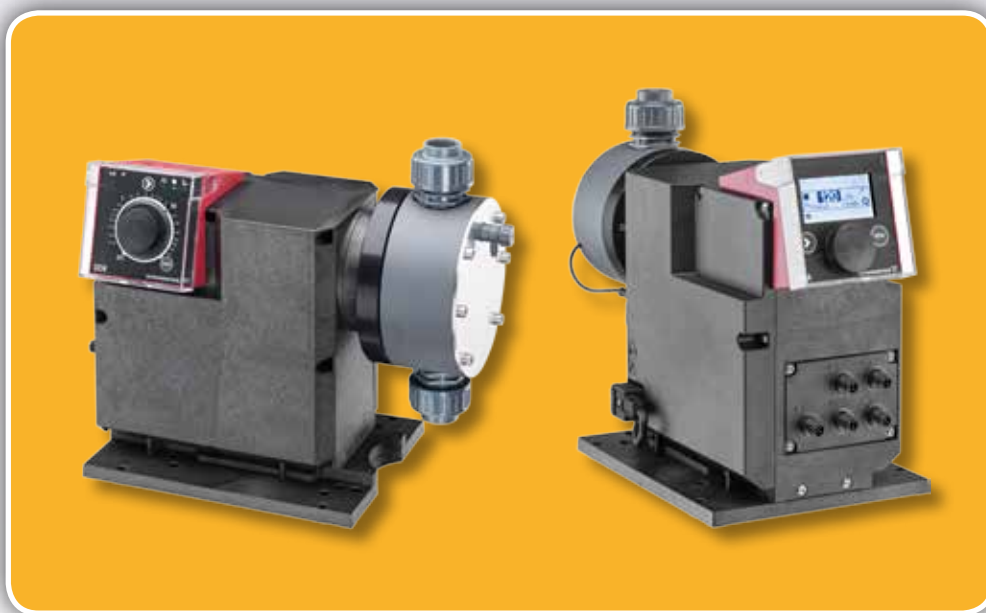


## SMART DIGITAL XL: DDA XL & DDE XL

Smart diaphragm dosing pumps of up to 200 l/h

For applications requiring high accuracy at flow rates up to 200 l/h, the SMART Digital XL DDA and DDE units cover the entire range with only three pump models. The pumps offer many of the same control and communication options as SMART Digital S pumps, but with higher flow throughput. The pumps can be easily mounted on horizontal surfaces with the click mounting plate.

The high flow performance of SMART Digital XL pumps make them the ideal choice for applications requiring high flow rates and high precision, such as flocculant dosing. For other applications, such as dosing pliers in drinking water treatment, the combination of high flow and high pressure offered by SMART Digital XL pumps (such as 120 l/h to 7 bar) provides the necessary results.



### DDA XL

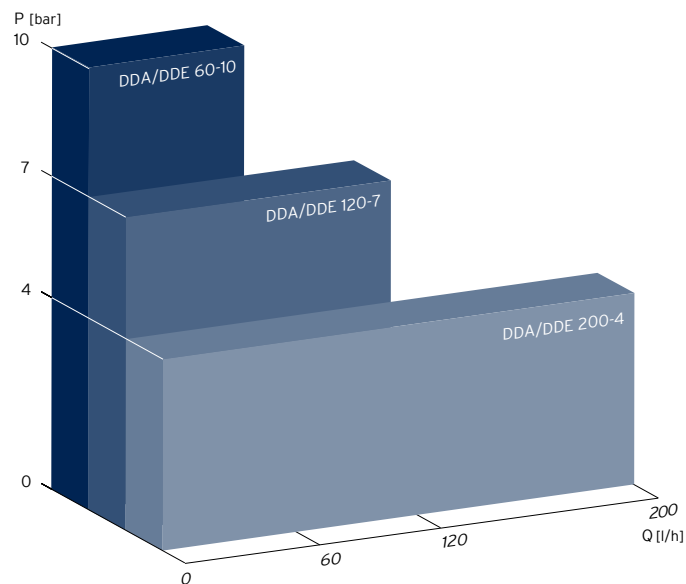
With the integration options with the CIU interface and the multiple control and communication functions incorporated, the DDA pumps represent the most advanced SMART Digital XL offer. In the same way as the SMART Digital S DDA range, it offers functions that provide added value, such as automatic purging, and can be specified in the control variants with FlowControl, built-in pressure monitoring and flow measurement and AutoFlowAdapt. With unrivaled precision in this range of flow throughput, the DDA range offers safety, flexibility and ease of use for a wide range of applications.

### DDE XL

In the same way as the SMART Digital DDE pump, the SMART Digital XL DDE offers a cost-effective Dosing Digital Technology, but meets more application requirements thanks to its wider flow range. The AR control variant offers added value functions, such as pulse control in ml/pulse and an input for 0/4-20 mA analog control. The control variant B offers basic dosing functions with manual speed control in a unit of simple manipulation by the operator. When high flow performance is required at a competitive price, SMART Digital XL DDE is the solution.

Pump type	DDA XL		DDE XL	
	FCM	AR	AR	B
<b>Control variant</b>				
<b>Operation modes</b>				
Manual speed control	✓	✓	✓	✓
Pulse control in ml/pulse	✓	✓	✓	
Analog control (0)4-20 mA	✓	✓	✓	
Batch control (pulse-based)	✓	✓		
Dosing timer, cycle	✓	✓		
Dosing timer, week	✓	✓		
Fieldbus control	✓	✓		
<b>Functions</b>				
Auto-deaeration also during pump standby	✓	✓		
FlowControl system with selective fault diagnosis	✓			
Pressure monitoring (min/max)	✓			
Flow measurement	✓			
AutoFlowAdapt	✓			
SlowMode (anti-cavitation)	✓	✓		
Double-diaphragm leakage detection (optional)		✓		
<b>Inputs / Outputs</b>				
Input for external stop	✓	✓	✓	
Input for pulse control	✓	✓	✓	
Input for analog 0/4-20 mA control	✓	✓	✓	
Input for low-level signal	✓	✓	✓	
Input for empty tank signal	✓	✓	✓	
Output relays (2 relays)	✓	✓	✓	
Output analog 0/4-20 mA	✓	✓		
Input / Output for GeniBus	✓	✓		
Input / Output for CIU's Grundfos (Profibus DP & additional alarm relay)	✓	✓		

## Performance range





## DIGITAL DIAPHRAGM DOSING PUMP: DME

Dosing up to 940 l/h

Dosing is precision work, Digital Dosing represents state-of-the-art technology. Grundfos DME Digital Dosing pumps combine perfect precision with user-friendliness, covering large dosing quantities of 375 l/h and 940 l/h with few variants.

The use of stepper motors and EC drives allow optimizing the running speed control and executing it with the utmost precision. The duration of each suction race is always constant, but can be extended using the anti-cavitation function to adapt it to the corresponding requirements.



Thus, suction always occurs with the volume full career.

The result is a continuous dosing and fewer keystrokes in the dosing system, both important factors in ensuring uniform pumping fluids and installations that require very long suction lines.

### Precise and easy settings

The operator can easily install and set the pump to discharge exactly the quantity of dosing liquid required in the application. In the display, the setting of the pump is read out directly in ml/h or l/h, pulse or batch. The operation mode is easily identified by means of icons.

### Turndown ratio 1:800

With a turndown ratio ten times better than that of traditional equipment, the DME Digital Dosing pumps offer maximum flexibility and accuracy.

Turndown of the suction stroke to 75%, 50% or 25% of the maximum speed ensures optimal priming and displacement of even the most difficult liquids.

### Unique technology

A unique drive technology and microprocessor control make sure that liquids are dosed precisely and with low pulsation, even when the pump is operating with high viscosity or degassing liquids. Instead of the conventional stroke length adjustment, the capacity of the DME is regulated by automatic adjustment of the motor speed during the discharge stroke, and by fixed suction stroke speed. This guarantees optimal and uniform mixing.

### Fieldbus communication

Available with Profibus interface to supply performance data and status information for quality control, preventive maintenance and future reference.

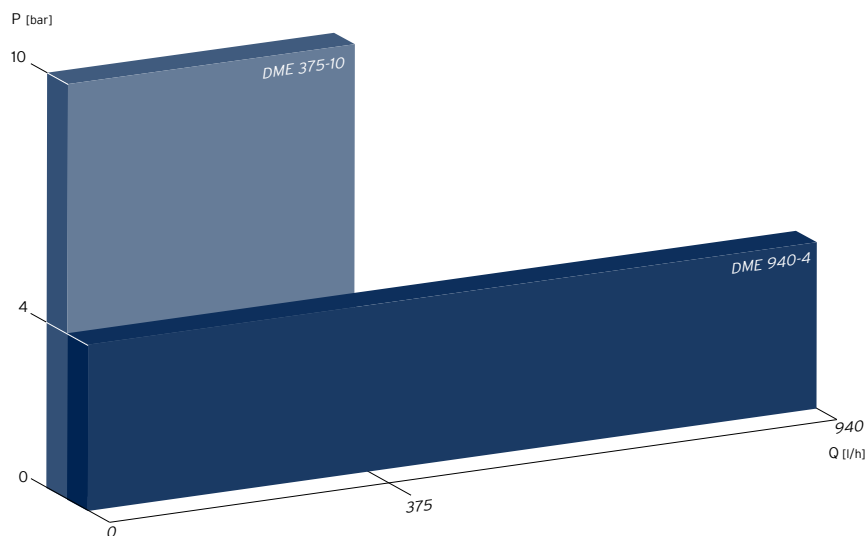
### Overload protection

Built-in overload protection monitors the counter-pressure of the pump and protects it against too high pressure loads.



Pump type		DME 375	DME 940	
Mechanical data	Max capacity	[l/h]	375	940
	Max. capacity with anti-cavitation 75%*	[l/h]	282	705
	Max. capacity with anti-cavitation 50%*	[l/h]	101	252
	Max. capacity with anti-cavitation 25%*	[l/h]	10	4
	Max. pressure	[bar]	160	
	Max. stroke frequency	[impulsos/min]	6	
	Max. suction lift during operation	[m]	0 to 50	
	Liquid temperature	[°C]	-10 a 45	
	Ambient temperature	[°C]	± 1%	
	Accuracy of repeatability		1 x 100-240 V, 50 - 60 Hz	
Electrical data	Supply voltage	[V]	2.4 to 100 V	
	Max. current consumption	[A]	1.0 to 230 V	
	Max. power consumption P.	[W]	240	
	Enclosure class		IP 65	
Signal output	Max. load of alarm relay output, (at ohmic load)	[A]	B	
	Max. voltage, alarm relay output	[V]	2	
Signal input	Voltage in level sensor input	[VDC]	42	
	Voltage in pulse input	[VDC]	5	
	Min. pulse-repetition period	[ms]	3.3	
	Impedance in analog 0/4-20 mA input	[Ω]	250	
	Max. loop resistance in pulse signal circuit	[Ω]	350	
Sound pressure level	Max. sound pressure level	[dB(A)]	70	

## Performance range



## MECHANICAL DIAPHRAGM DOSING PUMPS: DMX

Dosing up to 2.000 l/h (up to 10 bar)

The DMX range has proven its worth in dosing applications worldwide. With their robust diaphragm-based design and their high-quality motors, DMX pumps require minimum maintenance and are best choice for many dosing applications. The DMX range is highly versatile: it covers a wide flow range and offers a variety of dosing head sizes, materials and accessories.



### Accurate dosing

The diaphragm design makes sure, that the dosing flow fluctuation is  $\pm 1.5\%$  and the linearity deviation is  $\pm 4\%$  at all times. This allows very precise dosing of chemicals: as much as necessary, as little as possible.

### Smooth and low-pulsation dosing

The DMX range combines sophisticated drive technology and gear kinematics to ensure smooth and low-pulsation dosing without pressure peaks. This means less stress to all system components, such as tubes and valves, and leads to longer service intervals for the entire system.

### Motors to match application needs

The versatile DMX range includes motors 50Hz, 60Hz and 100Hz (with variable frequency VFD), as well as motors with ATEX or EX approval, all of excellent quality, allowing to cover the conditions of those applications that have specific requirements in relation to the motor.

### Perfect material selection for housing and liquid-wetted parts

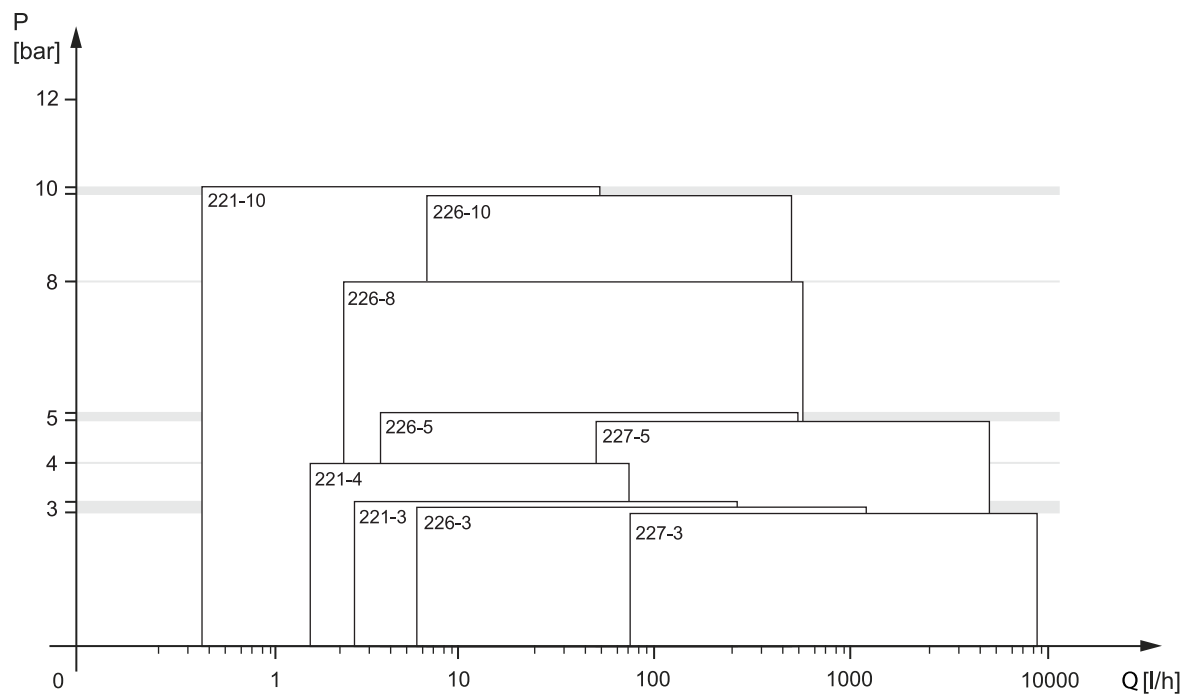
The smaller DMX models have plastic housings offering chemical resistance and all the protection necessary for many applications. The larger models have a robust cast-aluminium housing with epoxy coating to meet all application needs. Investment costs and running costs for spare parts are kept low over the years: A wide choice of materials for dosing head, valves and accessories allow selecting exactly the degree of chemical resistance required. All liquid-wetted parts need to be resistant to the chemicals used. The diaphragm is made of NBR and PTFE-coated.

### Accessories ensure perfect operation of the entire system

A wide range of accessories specially designed for the DMX range helps optimise performance: AR control electronics, integrated relief valve, dosing controller, diaphragm leakage detection, servomotor for automatic stroke-length adjustment, PTC motors with Variable Frequency Drive (VFD), pressure-loading valves and pulsation dampers.

Pump type	DMX 22X
Dosing head material	PP / PVDF / PVC / SS 1.4571
	All dosing head material variants are also available with diaphragm leakage detection.
	On request: With integrated relief valve (per a PVDF) 0 to 50
Gasket material	EPDM, PTFE, FKM
Valve ball material	PTFE/ Glass / PP / PVC / SS 1.4401
Valve type	Standard
	Spring-loaded (discharge side); Standard (suction side)
	Valve for abrasive liquids

## Performance range



## HYDRAULIC PISTON DIAPHRAGM DOSING PUMPS: DMH

Dosing up to 1.150 l/h (up to 200 bar)

The DMH range is composed of extremely robust pumps, designed for applications that require reliable dosing functions and the ability to develop high pressures, such as those related to process engineering.

The DMH 25x and DMH 28x models have been specially designed for applications where high pressures are required (up to 200 bar). It is a highly versatile range: it covers a wide range of flow rates, has dosing heads of different sizes, is available in various materials and incorporates a wide range of accessories. Customers from all over the world have enjoyed their DMH pumps for years without any problems.



### Accurate dosing

DMH pumps have a very high dosing accuracy and allow an exact reproducibility. The dosing flow fluctuation is  $\leq \pm 1\%$  within the 10-100 % control range, and the linearity deviation is  $\pm 1\%$  of the full-scale value.

### Motors to match application needs

For applications with specific motor requirements, the versatile DMH range offers high-quality motors for 50 Hz, 60 Hz, 100 Hz (with Variable Frequency Drive VFD) as well as EX classified or ATEX-certified motors, if required.

### Perfect material selection - for housing and liquid-wetted parts

The DMH models have a robust cast-aluminium housing with epoxy coating to meet all application needs (grey castiron if API 675 is required). A wide choice of materials for dosing head, valves and accessories allows selecting exactly the degree of chemical resistance required. All liquid-wetted parts need to be resistant to the chemicals used. The diaphragm is made of full-PTFE material.

### Safe and trouble-free operation

The serially integrated pressure relief valve and active diaphragm protection system (AMS) keep the pump and the entire system protected against overpressure, if the discharge line is blocked. In addition, the degassing valve at the pump guarantees high functional safety of the pump, the installation and the whole process. Due to their aluminium enclosure and the piston diaphragm technology, DMH pumps have a very long operating life and long service intervals.

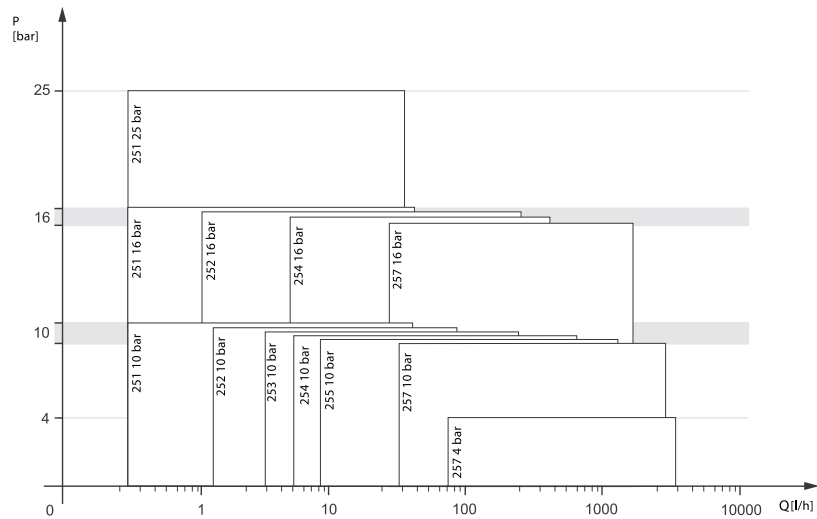
### Approvals and certificates

For potentially explosive areas we offer EX classified or ATEX-certified motors and pumps. For applications in the petrochemistry we provide DMH dosing pumps with API 675 certificates.

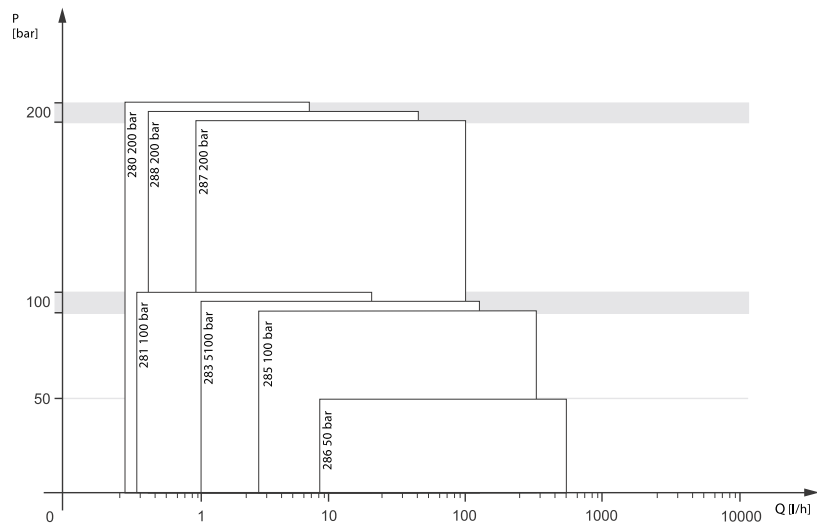
Pump Type	DMH 25x / 28x
Dosing head	PP / PVDF / PVC / SS 1.4571 / Hastelloy C All dosing head materials are also available with diaphragm leakage detection.
Gasket	EPDM, PTFE, FKM
Valve ball	Ceramic / PTFE / Glass / SS 1.4401
Valve type	Not spring-loaded Spring-loaded
Ex Zone	Directive ATEX 94/9 Group II, category 2 (zone 1/21) Group II, category 3 (zone 2/22)

## Performance range

DMH 25x



DMH 28x



# DOSING PUMPS SUMMARY

## SMART DIGITAL & DIGITAL PUMPS

Pump Type	DDA		DDC	DDE		DDA XL		DDE XL		DME	
Control Variant	FCM	AR	AR	P	B	FCM	AR	AR	B	AR	AP
<b>Mechanical data</b>											
Max. capacity	[l/h]	7'5 / 12 / 17 / 30		6 / 9 / 15		6 / 15		60 / 120 / 200		375 / 940	
Max. capacity with SlowMode 75%	[l/h]									282 / 705	
Max. capacity with SlowMode 50%	[l/h]	3.75 / 6.0 / 8.5 / 15.0		3.0 / 4.5 / 7.5				30 / 60 / 100		210 / 525	
Max. capacity with SlowMode 25%	[l/h]	1.88 / 3.00 / 4.25 / 7.5		1.5 / 2.25 / 3.75				15 / 30 / 50		101 / 252	
Max. pressure	[bar]	16 / 10 / 7 / 4		10 / 7 / 4		10 / 4		10 / 7 / 4		10 / 4	
Max. stroke frequency	[imp./min]	190 / 155 / 205 / 180		140 / 200 / 180		140 / 180		196 / 188 / 188		160	
Max. suction lift during operation	[m]	6		6		6		3		3	
Liquid temperature	[°C]	-10 to 45		-10 to 45		-10 to 45		0 to 50		0 to 50	
Storage temperature	[°C]	0 to 45		0 to 45		0 to 45		0 to 45		0 to 50	
Accuracy of repeatability	[%]			±1				±1.5		±1	
<b>Electrical Data</b>											
Voltage	[V]	1 x 100-240V									
Frequency	[Hz]	50-60									
Max. inrush current	[A] a 100V			8				35		2.4	
	[A] a 230V			25				70		1.0	
Max. power consumption P <sub>1</sub>	[W]	24		22		19		62		240	
Protection grade		IP65									
Enclosure class		NEMA 4X									
<b>Operation Modes</b>											
Turn-down ratio (setting range)		1:3000 (7.5-16) 1:1000 (rest of models)		1:1000		1:1000		1:800		1:800	
Manual speed control		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pulse control in ml/pulse		✓	✓	✓			✓	✓	✓	✓	✓
Pulse control (1:n)					✓						
Analog control 0/4-20 mA		✓	✓	✓			✓	✓	✓	✓	✓
Batch control (pulse-based)		✓	✓				✓	✓		✓	✓
Dosing timer cycle		✓	✓				✓	✓			
Dosing timer week		✓	✓				✓	✓			
Fieldbus control		✓	✓				✓	✓		✓	✓
<b>Functions</b>											
Auto deaeration also during pump standby		✓	✓				✓	✓			
FlowControl system with selective fault diagnosis		✓					✓				
Pressure monitoring (min / max)		✓					✓				
Flow measurement		✓					✓				
AutoFlowAdapt		✓					✓				
SlowMode (anti-cavitation)		✓	✓	✓			✓	✓		✓	✓
Diaphragm leakage detection (optional)		✓	✓	✓				✓		✓	✓
<b>Inputs / Outputs</b>											
Input for external stop		✓	✓	✓	✓		✓	✓	✓	✓	✓
Input for pulse control		✓	✓	✓	✓		✓	✓	✓	✓	✓
Input for analog 0/4-20 mA control		✓	✓	✓			✓	✓	✓	✓	✓
Input for low-level signal		✓	✓	✓	✓		✓	✓	✓		
Input for empty tank signal		✓	✓	✓	✓		✓	✓	✓		
Output relay (2 relays)		✓	✓	✓			✓	✓	✓		
Output analog 0/4-20 mA		✓	✓				✓	✓			
Input / Output for GeniBus		✓	✓				✓	✓			
Input / Output for CIU's Grundfos (Profibus DP or additional alarm relay)		✓	✓				✓	✓			
<b>Other</b>											
Weight	[kg]			2.4 - 4				6.7 - 15		11.8 / 22.5	
Sound pressure	[dB(A)]			< 60				80		70	

## MECHANICAL DIAPHRAGM PUMPS / HYDRAULIC PISTON

Pump Type	DMX 22x		DMH 25x / 28x	
Control Variant	B	AR	B	AR
<b>Mechanical data</b>				
Max. capacity	[l/h]	up 2.000		up 1.150
Max. pressure	[bar]	up 10		up 200
Lineality	[%]	±4		±1%
Max. suction lift during operation	[m]	3 ( at 50Hz)		1
Liquid temperature	[°C]	0 to 40 (PVC/PP), -10 to 60 (PVDF)		-10 to 90
Storage temperature	[°C]	0 to 40		0 to 40
Max. viscosity at 100%	[mPas]	up 1.000		up 300
<b>Electrical data</b>				
Voltage	[V]	1 x 230 V, 50/60 Hz 3 x 230/400V, 50/60 Hz, 440/480V, 60Hz		1 x 230 V, 50/60 Hz 3 x 230/400V, 50/60 Hz, 440/480V, 60Hz
Enclosure class		IP65/F		IP65/F
<b>Operation modes</b>				
Turn-down ratio		1:10		1:10
Manual control (stroke-length adjustment)		✓	✓	✓
AR control unit			✓	✓
Level control			✓	✓
Input analog 0/4-20 mA			✓	✓
Pulse control			✓	✓
Input for external stop			✓	✓
Output analog 0/4-20 mA			✓	✓
Output relay (2)			✓	✓
Manual Flow control		✓	✓	✓
Diaphragm leakage detection (optional)			✓	
<b>Other</b>				
Sound pressure	[dB(A)]	< 70		< 75 ± 5





CHEMICAL DOSING AND DISINFECTION

ELÈCTRICA PINTÓ, S.L.

Pol. Ind. Santa Anna I · Ctra. BV-4511 Km. 4,2  
08251 Santpedor · Barcelona (Spain)

Tel.: (+34) 938 366 036

Fax: (+34) 938 366 031

E-mail: comercial@clorep.es

www.clorep.es

Official partner:



GROUP

**aquaCENTER** water, energy & environment