

Hydraulic Diaphragm Metering Pump Makro/ 5

Excellent feed rates in the low pressure range

ProMinent®



Capacity range of single pump: 450 – 6,108 l/h, 25 – 6 bar

The Makro/ 5 hydraulic diaphragm metering pump (M5Ha) together with the Makro/ 5 diaphragm and plunger metering pumps form an integrated product range with stroke lengths of 20 and/or 50 mm. This covers the capacity range from 38 to 6,108 l/h at 320 – 4 bar. A wide range of power endversions is available for use in areas at risk from explosion with ATEX certification. The Makro/ 5 product range is designed to comply with API 675 among others.

Your benefits

Excellent process safety and reliability:

- PTFE multi-layer diaphragm with integral diaphragm rupture warning system.
- Integral hydraulic relief valve.
- Metering reproducibility is better than $\pm 1\%$ within the 10-100% stroke length range under defined conditions and with correct installation.

Excellent flexibility:

- The modular construction with single and double head versions permits a wide range of applications, with the double head designs being operated in push-pull mode.
- It is possible to combine up to 4 metering units, even with different pump capacities, in multiple pump systems.
- 5 different gear ratios are available.

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 strip.



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Technical Data

Control of Makro/5 Hydraulic Diaphragm Metering Pumps

Makro/ 5 stroke length controller

Control drive consisting of an actuator with servomotor and integral microprocessor controller for stroke length adjustment via a standard signal. Actuating period approx. 100 sec for 100% stroke length, including 2 limit switches for min./max. position, IP 54 degree of protection. Electrical connection 230 V ($\pm 10\%$), 50/60 Hz, 40 W mechanical stroke length display fitted on the Makro/ 5 power end.

Special voltage/higher degrees of protection/explosion protection on request.

Version with:

Standard signal current input 0/4-20 mA, corresponds to stroke length 0 - -100%; internal switch for manual /automatic operation, key switch for stroke adjustment in manual mode. Actual value output 0/4-20 mA for remote display.

Speed controllers with frequency converter (identity code specification Z)

The speed controller (complete) comprises a frequency converter and a variable speed motor (see also identity code specification R).

The frequency converter is accommodated in an IP 55 rated protective housing with integral control unit and main switch, suitable for max. motor power 0.37/0.75/1.1 kW.

Externally controllable with 0/4-20 mA or 0-10 V corresponding to 0-50 (60) Hz output frequency.

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.



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Technical Data

Type M5Ha	With 1500 rpm motor at 50 Hz				With 1800 rpm motor at 60 Hz				Suction lift	Connection, suction/discharge side	Shipping weight	Plunger Ø
	Delivery rate at max. back pressure		Max. stroke rate		Delivery rate at max. back pressure		Max. stroke rate					
	bar	l/h	ml/stroke	Strokes/min	psi	l/h	gph (US)	Strokes/min	m WC	G-DN	kg	mm
250450	25	450	125.0	60	362	537	142	72	3.0	G 2-32	320	60
250562	25	562	125.0	75	362	671	177	89	3.0	G 2-32	320	60
250772	25	772	125.0	103	362	922	244	123	3.0	G 2-32	320	60
250997	25	997	125.0	133	362	1,191	315	159	3.0	G 2-32	320	60
251170	25	1,170	125.0	156	–	–	–	–	–	G 2-32	320	60
160616	16	616	171.2	60	232	736	194	72	3.0	G 2 1/4-40	320	70
160770	16	770	171.2	75	232	920	243	89	3.0	G 2 1/4-40	320	70
161058	16	1,058	171.2	103	232	1,264	334	123	3.0	G 2 1/4-40	320	70
161366	16	1,366	171.2	133	232	1,633	431	159	3.0	G 2 1/4-40	320	70
161602	16	1,602	171.2	156	–	–	–	–	3.0	G 2 1/4-40	320	70
120716	12	716	199.0	60	174	855	226	72	3.0	G 2 1/4-40	320	75
120895	12	895	199.0	75	174	1,069	282	89	3.0	G 2 1/4-40	320	75
121229	12	1,229	199.0	103	174	1,469	388	123	3.0	G 2 1/4-40	320	75
121588	12	1,588	199.0	133	174	1,898	501	159	3.0	G 2 1/4-40	320	75
121862	12	1,862	199.0	156	–	–	–	–	3.0	G 2 1/4-40	320	75
120919	12	919	255.3	60	174	1,098	290	72	3.0	G 2 1/4-40	320	85
121148	12	1,148	255.3	75	174	1,372	362	89	3.0	G 2 1/4-40	320	85
121577	12	1,577	255.3	103	174	1,885	498	123	3.0	G 2 1/4-40	320	85
122037	12	2,037	255.3	133	174	2,435	643	159	3.0	G 2 1/4-40	320	85
122389	12	2,389	255.3	156	–	2,856	754	–	3.0	G 2 1/4-40	320	85
101345	10	1,345	374.0	60	145	1,607	425	72	3.0	G 2 3/4-50	330	100
101680	10	1,680	374.0	75	145	2,008	530	89	3.0	G 2 3/4-50	330	100
102310	10	2,310	374.0	103	145	2,761	729	123	3.0	G 2 3/4-50	330	100
102980	10	2,980	374.0	133	145	3,562	941	159	3.0	G 2 3/4-50	330	100
103500	10	3,500	374.0	156	–	–	–	–	3.0	G 2 3/4-50	330	100
062305	6	2,305	641.0	60	87	2,755	728	72	3.0	flange-65*	330	130
062880	6	2,880	641.0	75	87	3,443	910	89	3.0	flange-65*	330	130
063960	6	3,960	641.0	103	87	4,734	1,251	123	3.0	flange-65*	330	130
065110	6	5,110	641.0	133	87	6,108	1,614	159	3.0	flange-65*	330	130
066000	6	6,000	641.0	156	–	–	–	–	3.0	flange-65*	330	130

Material Version PPT/PCT/TTT max. 10 bar

* SST version with G 2 1/2" thread



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Materials in Contact With the Medium

DN 32 - DN65 plate valves					
Dosing head		Suction/discharge valve	Seals	Valve plates/ valve springs	Valve seats
PPT	Polypropylene	Polypropylene	PTFE	Hastelloy C	PTFE
PCT	PVC	PVC	PTFE	Hastelloy C	PTFE
TTT	PTFE with carbon	PTFE with carbon	PTFE	Hastelloy C	PTFE
SST	Stainless steel material no. 1.4571/1.4404	Stainless steel material no. 1.4571/1.4404	PTFE	Hastelloy C	PTFE

Patented multi-layer diaphragm, vacuum-packed

Special designs available on request

Viton® is a registered trademark of DuPont Dow Elastomers

Motor Data

Identity code specification		Power supply			Remarks
S	3-phase, IP 55	220 – 240 V/380 – 420 V	50 Hz	3 kW	
		250 – 280 V/440 – 480 V	60 Hz		
R	3-phase, IP 55	230 V/400 V	50/60 Hz	3 kW	with PTC, speed control range 1:5
V0	3-phase, IP 55	400 V ±10 %	50/60 Hz	3 kW	Variable speed motor with integrated frequency converter
L1	3-phase, II 2G Ex e II T3	220 – 240 V/380 – 420 V	50 Hz	3.6 kW	
L2	3-phase, II 2G Ex de IIC T4 Gb	220 – 240 V/380 – 420 V	50 Hz	4 kW	with PTC, speed control range 1:5
P1	3-phase, II 2G Ex e IIC T3	250 – 280 V/440 – 480 V	60 Hz	3.6 kW	
P2	3-phase, II 2G Ex de IIC T4	250 – 280 V/440 – 480 V	60 Hz	4 kW	with PTC, speed control range 1:5
V2	3-phase, 2GDc Ex db IIB T4 Gb, IP 67	400 V ±10%	50/60 Hz	4 kW	Ex-variable speed motor with integrated frequency converter

Motor data sheets can be requested for more information. Motors for Sigma basic pumps, special motors or special motor flanges are available on request.

The motors are designed in compliance with the Ecodesign Directive 2009/125/EC.

Information for use in areas at risk from explosion

Only use pumps with the appropriate labelling in line with the ATEX Directive 2014/34/EU in premises at risk from explosion.

Ensure that the explosion group, category and degree of protection specified on the label corresponds to or is better than the conditions prevalent in the intended field of application.

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