

ProMinent® Makro TZ M E T E R I N G P U M P S



A Multi-Functional Trio: High Performance Along with High Capacity!

Metering range of up to 2100 l/h

ProMinent® Makro TZ motorised metering pumps are available in piston (K)-, diaphragm (M)- and hydraulic-diaphragm (MH)- versions. The Makro TZ diaphragm version (M) has a capacity



ProMinent® Makro TZ diaphragm metering pump

per liquid end of up to 2100 l/h at 3 bar. The piston version can operate effectively in back pressures of up to 320 bar. This opens up a wide spectrum of individual installation possibilities, which can be expanded further by the addition of duplex and add-on pumps.

Oscillating, adjustable diaphragm metering pump

A three phase standard motor drives the pump. The rotation is transmitted by a worm gear pair (1) via an adjustable cam (2) and connector rod (3) onto the push rod (4) to produce the reciprocal stroking action. The most important feature of this design principle is the

precision of the forced return stroke which is a necessary requirement for a high suction lift or when feeding highly viscous materials.

Harmonious, sinusoidal stroking via adjustable shift ring mechanism (TZ)

The stroke length is altered by fine adjustments to the eccentricity of the TZ shift ring (5). This produces the

oscillation. The result is a drive action which can be detected only by a minimal running noise.

0.75 kW for 4200 l/h - maximum output for minimum input!

The low friction wear on the drive mechanism gives the high performance of the standard four-pole three phase motor (0.75 kW or 1.5 kW) 230/400 V, 50/60 Hz, enclosure rating IP 55. A Makro TZ 9 HMD, for example, can operate at a rate of 4200 l/h at 2.5 bar from only 0.75 kW - this represents high performance but with significantly reduced energy consumption!

Far and away the best solution

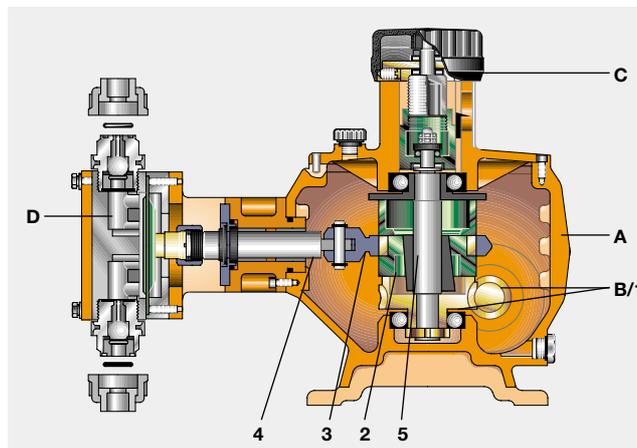
....because the liquid end is mechanically separated from the gears. This reliably prevents, for example, chemicals penetrating into the power end in the event of a ruptured diaphragm - good insurance for pumps in constant use!

Your requirements determine the configuration

ProMinent® Makro TZ pumps leave nothing to chance. Select from:

- 9 piston options for the K series
- 4 diaphragm sizes available for the (M) series, and one hydraulic diaphragm size for (MH) models
- 4 different dosing head materials for diaphragm (M) and hydraulic diaphragm (MH) models. Piston (K) models are fitted with stainless steel-plated liquid ends
- 4 stroking frequencies and 38 pressure ratings from 2.5 to 320 bar cover the whole capacity range.

Interchangeable motor flange mountings also make it simple to modify the system by adding explosion-proof motors, motors which conform to specific national standards, or motors with various different voltages.



Operating principle: ProMinent® Makro TZ HM/AM diaphragm metering pump

Main Components:

- A - Housing
- B - Gears
- C - Stroke length adjuster
- D - Liquid end

ProMinent® Makro TZ HM/AM: Specially Developed Diaphragm Technology for Universal Use!

High viscosity? No problem!

The specially developed liquid end incorporates easy-flow valves to allow metering of high viscosity liquids and 2.5 to 6 m water column suction lifts.

With temperature-controlled liquid ends for adhesive products, liquid ends in stainless steel (1.4571) or in chlorine

Now with optional 9 mm stroke length - and 40% more capacity!

A whole 3 mm more stroke length than the standard models marks the introduction of a completely new cost of ownership ratio! We are now supplying ProMinent® Makro TZ diaphragm metering pumps with 9 mm stroke length which

- when used with specially

A heart of steel: ProMinent® Makro TZ HM/AM

The core of the liquid end is the manifestly proven DEVELOPAN® metering diaphragm. A large surface-area steel core is vulcanised into a chemical and temperature-resistant EPDM material which is additionally strengthened with a nylon mesh. The diaphragm is



The DEVELOPAN® dosing diaphragm

A long and productive life for your diaphragm!

The long operating life of these diaphragms is the result of the symbiosis of materials, construction and maximum dosing stroke of just 6 and 9 mm resp.

The liquid ends are fitted with precision ball valves - plate valves take over for chemical feed in the upper capacity range. The liquid end material versions - Polypropylene, PVC, PTFE and stainless steel 1.4571/81 which all produce highly accurate reproducible metering - make the ProMinent® Makro TZ metering pump ideal for practically any application.



ProMinent® Makro TZ HM in a range of materials

and acid-resistant Hastelloy C, ProMinent® Makro TZ pumps can tackle anything!

The optional manual or timer-controlled flushing assemblies allow a flexible approach to specialised processes.

developed DN 40 plate valves produce 40 % more metering capacity from a similar-sized system

- can operate as 4200 l/h duplex versions or as multiplex pumps with 4 x 2100 l/h
- can be fitted with liquid ends in any material-type

PTFE coated on the chemical-contact side. This design guarantees reliable chemical feed, even under fluctuating operating conditions.

ProMinent® Makro TZ HK/AK: A Step Up for Piston Metering Pumps!

Highly accurate and low on maintenance: ProMinent® Makro TZ HK/AK

The standard sized liquid end is fitted with a flushing ring (3) and a specially designed piston shaft. The piston itself is made of a ceramic coated stainless steel which is by its nature tough and highly resistant. Re-tensioning PTFE packing rings (2) provide reliable seals.

Ball valves (5) with highly precise valve balls in aluminium oxide (incorporating flushing connector for abrasive and aggressive liquids) guarantee accurate metering reproducibility and durability when in constant use.

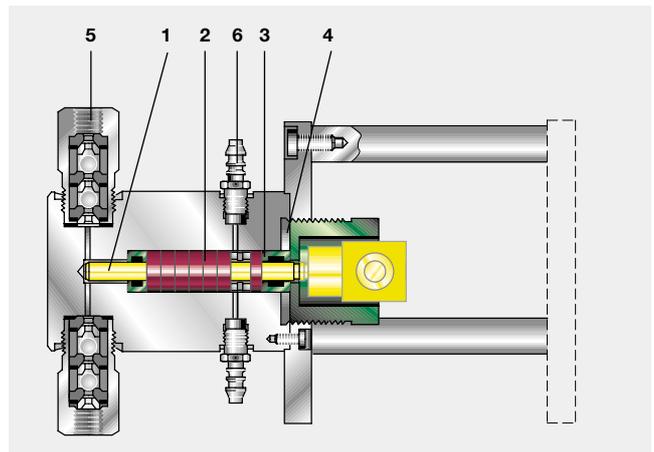
**Only the best will do:
Stainless steel and/or
Hastelloy C**

The liquid ends and connectors are in either stainless steel or are optionally available in Hastelloy C. The valve seals are PTFE packing rings.

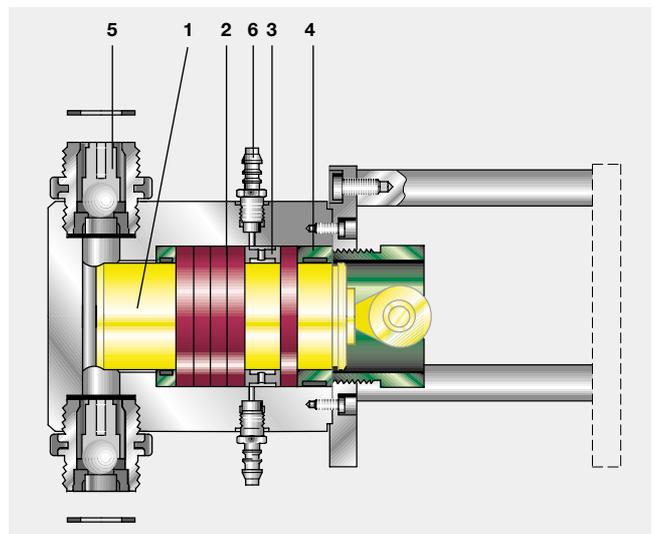
We recommend additional valve springs when using with highly viscous liquids or to generate slight priming pressure. The maximum operating pressure is 320 bar.



Makro TZ piston metering pump



Piston liquid end FK 12 ... FK 30



Piston liquid end FK 40 ... FK 85

Design: 1. Piston 3. Flushing ring 5. Valves
2. Packing 4. Piston shaft 6. Flushing connector

ProMinent® Makro TZ HMH: Setting the Standard in Hydraulic-Diaphragm Technology!

Safety first: ProMinent® Makro TZ 20 HMH

The Makro TZ 20 HMH series redefines the term safety in chemical dosing. A key feature of this is the ProMinent® composite diaphragm.

The overall principle: The hydraulic unit is not damaged even when a diaphragm becomes defective, because chemicals cannot penetrate into the hydraulic area. By-pass and bleed valves protect against excess pressure and remove fumes created by the hydraulic liquid in the liquid end. If a diaphragm ruptures, or when back pressure becomes too high, an alarm signal is automatically triggered. So even when pressures fluctuate, the pump rate is effectively maintained.

Total protection against contact between chemicals and dosing liquids!

Selected materials are layered to produce an effective, flexible, impenetrable diaphragm:

1. On the chemical-contact side a PTFE layer is vulcanised onto an EPDM carrier material
2. A second Teflon layer is bonded to the diaphragm with a further elastomer layer which allows it to move freely.

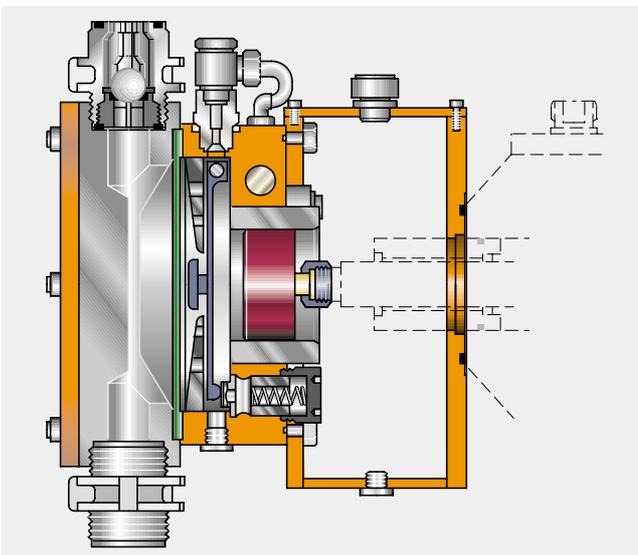
If the diaphragm ruptures, the liquid can only travel as far as the central Teflon layer. This causes the inner pressure to rise. The diaphragm will distend to a predetermined position which then triggers a micro-switch, automatically signalling an alarm!



ProMinent® Makro TZ 20 HMH



Patented composite diaphragm



Piston diaphragm metering pump with patented DEVELOPAN® safety diaphragm

Long term reproducible dosing accuracy, with safety as standard!

The liquid end - in Polypropylene, PVC, PTFE or stainless steel - has an automatic permanent bleed for the hydraulic liquid. An integrated overflow valve protects the metering pump against overload and, if necessary, triggers an alarm via a contact signal.

Add-Ons, Accessories: Optimising Installation Possibilities!

Increased metering capacity whenever you want it

You always have the option of connecting two liquid ends to a single gear mechanism (duplex metering pump), or attaching a number of add-on pumps to one main pump - simply ask us to advise you on the best solution!

You can, of course, use one TZ main pump to drive a battery of metering pumps selected from the ProMinent® Makro TZ and ProMinent® Meta series.

For complete control: external controllers

For external control of ProMinent® Makro TZ metering pumps, and for incorporating the Makro TZ into

and mechanical accessories. When used in conjunction with the optimally compatible DULCOMETER® measurement and control systems you can always be sure of being on the safe side.

Variable speed controllers

ProMinent supply a choice of variable speed controllers. The top model is a microprocessor-based speed controller, fully assembled in a control cabinet and ready for operation. Effective speed control ranges between 1:10 or 1:20.

Stroking rate system

The stroke sensor has been specifically designed to precisely determine every individual pump stroke. The ProMinent® Makro TZ stroke



ProMinent® Makro TZ with stroke length adjuster

“DOS-Control“ universal controller

The proportional flow controller acts as an external pulse controller for ProMinent® Makro TZ simplex, duplex or multi-function pumps. The pre-selected stroking rate can be reset at any time to between 1 and 29999 strokes at the keyboard and display panel.

Standard features include:

- connector for the stroke feedback signal via stroke sensor and
 - connector for a float switch (monitors chemical levels)
 - external analogue input 0/4-20 mA and/or contact
- The “pre-select stroking rate“ function greatly facilitates the batching process.

Automatic stroke length adjuster

In this version a servo motor is substituted for the manual adjustment knob for automatic stroke length adjustment. The setting times are approx. 1 second per 1 % stroke length.

For automatic remote stroke adjustment we offer two solutions:

- A stroke length servo motor in conjunction with an external controller (e.g. DULCOMETER® controller series)
- A stroke length control motor with integrated controller for direct control via 0/4-20 mA analogue signal.



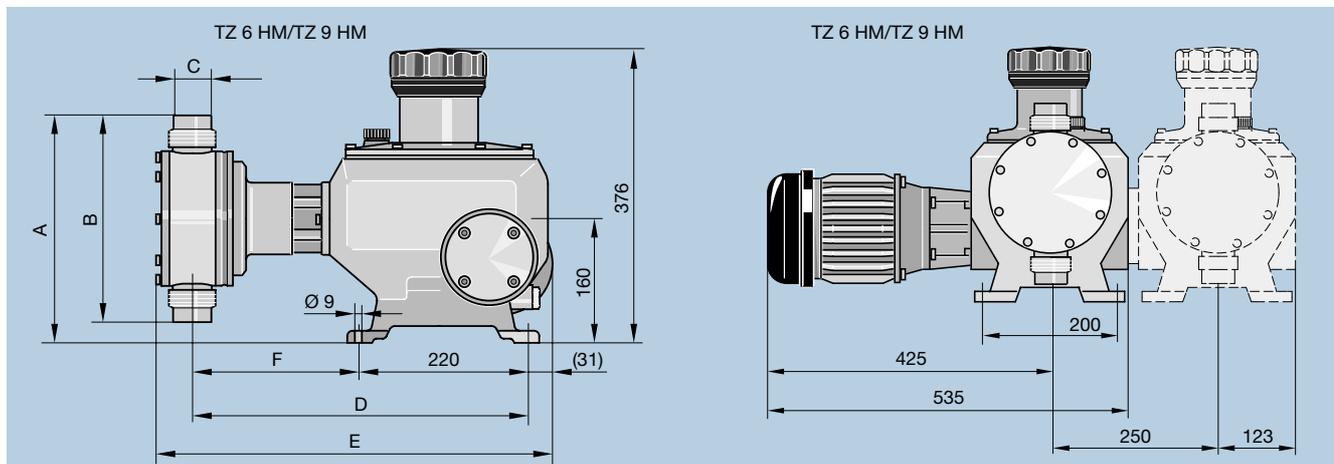
“DOS-Control“ flow controller

automatic process systems, ProMinent offer a comprehensive range of electronic

sensor transmits a stroke feedback signal to an external controller.

ProMinent® Makro TZ Diaphragm Metering Pumps

ProMinent® Makro TZ Hydraulic Diaphragm Metering Pumps



ProMinent® Makro TZ 6 HM/AM, TZ 9 HM/AM

Pump type	Connector	A	B	C	D	E	F	G	H		
TZ 6 HM	... 260	DN 20	269	218	G 1 1/4	424	497	204	609	693	
	... 530	DN 25	292	264	G 1 1/2	428	504	208	617	707	
	... 1500	DN 40	347	375	G 2 1/4	451/446	542/515	231/226	663/653	783/729	
TZ 9 HM	... 2100	DN 40	347	375	G 2 1/4	451/446	542/515	231/226	663/653	783/729	
	TZ 20 HMH (HMHD)	... 70 - 20	DN 25	319	318	G 1 1/2	471	548/536*	251	703	804/780*
		... 90 - 20	DN 40	339	358	G 2 1/4	481	571/559*	261	728	852/826*

Capacity tables for 1 x power end 1500 min⁻¹ motor (four-pole motor, 50 Hz)

Liquid end	Back pressure	Stroke volume	Feed rate l/h with power end				
			Type HM 8 stroke rate	Type HM 10 stroke rate	Type HM 12 stroke rate	Type HM 15 stroke rate	Type HM 20 stroke rate
	bar	ml	180 strokes/min	144 strokes/min	120 strokes/min	96 strokes/min	72 strokes/min
			l/h	l/h	l/h	l/h	l/h
FM 260	12*	44.1	457	381	318	254	191
FM 530	6**	91.8	952	793	661	529	397
FM 1500	3**	173.0	1800	1500	1250	1000	750
FM 2100	3**	173.0	2490	2100	1740	1395	1050
FHM 70-90	16*	76.0	720	600	500	400	300
FHM 90-20	10	127.0	1204	1004	836	669	502

* In PP/PVC and PTFE versions maximum back pressure is reduced to 10 bar

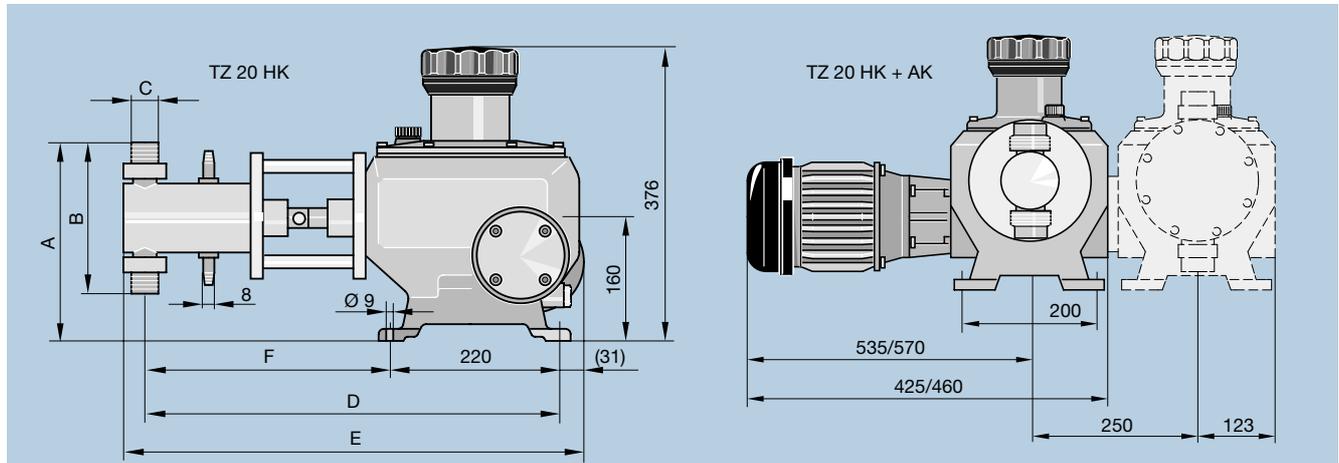
** For duplex pumps maximum permissible back pressure is reduced to 5 and 2.5 bar respectively.

Materials in Contact With Chemicals:

Dosing head	Suction/dis-charge connector	DN 20/DN 25 Ball Valves			DN 40 plate valves			
		Seals	Valve balls	Valve seats	Seals	Valve plates	Valve seats	
PP	Polypropylene	Polypropylene	EPDM	Duran 50	EPDM	PTFE	Hast. C	PTFE
P	PVC	PVC	Viton A	Duran 50	Viton A	PTFE	Hast. C	PTFE
T	PTFE with carbon	PTFE with carbon	PTFE	ceramic	PTFE	PTFE	Hast. C	PTFE
S	stainless steel	stainless steel	PTFE	No. 1.4401	PTFE	PTFE	Hast. C	PTFE
	No. 1.4571	No. 1.4581						

The technical specifications sheet for the Makro TZ is available on request.

ProMinent® Makro TZ HK/K/HKD Piston Metering Pumps



ProMinent® Makro TZ 20 HK/AK/HKD technical specifications

Pump type	Connector	A	B	C*	D	E	F	G	H
12/17 S	DN 8	257	193	Rp 1/4	540	592	320	840	842
23/30 S	DN 10	257	193	Rp 3/8	540	592	320	840	842
40/50 S	DN 15	247	173	G 1 1/4	548	606	328	856	910
60 S	DN 25	257	193	G 1 1/2	546	607	326	853	913
70 S	DN 25	257	193	G 1 1/2	553	614	333	867	926
85 S	DN 40	293	265	G 2 1/4	563	632	343	886	962

* Rp 1/4, Rp 3/8 inner thread and double ball valves. G 1 1/4-DN 15 model and larger have outer threads and a single ball valve except for DN 40 which has a plate valve.

Capacity tables for one power end with one liquid end, 1500 min⁻¹ 50 Hz motor

Feed rate Liquid end size	Back pressure 0.75/1.5 kW motor	Stroke volume	Feed rate l/h				
			Type HK 08 stroke rate 180 strokes/min	Type HK 10 stroke rate 144 strokes/min	Type HK 12 stroke rate 120 strokes/min	Type HK 15 stroke rate 96 strokes/min	Type HK 20 stroke rate 72 strokes/min
	bar	ml	l/h	l/h	l/h	l/h	l/h
12 S	320	2.0	21	17.4	14.5	11.6	8.7
17 S	320	4.1	42	35.4	29.5	23.6	11.7
23 S	168/192	7.6	79	65.8	54.8	43.9	32.9
30 S	96/113	13.3	138	115.0	95.8	76.6	57.5
40 S	52/ 63	24.2	250	209.0	174.0	139.0	140.0
50 S	33/ 40	37.7	391	326.0	272.0	217.0	163.0
60 S	22/ 20	54.9	569	474.0	395.0	316.0	237.0
70 S	16/ 20	74.7	774	645.0	538.0	430.0	323.0
85 S	11/ 14	110.0	1141	951.0	793.0	634.0	476.0

Materials in Contact With Chemicals:

Dosing head	Connector parts	Valve balls	Piston rings	Seals	Piston
1.4571	1.4571/1.4581	oxide ceramic/ stainless steel	PTFE with graphite	PTFE	stainless steel ceramic coated



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