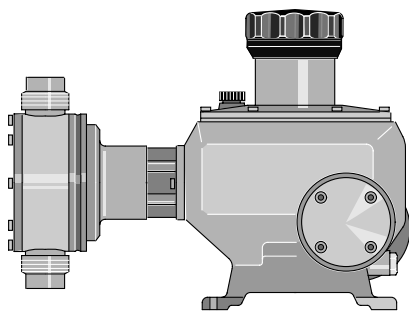


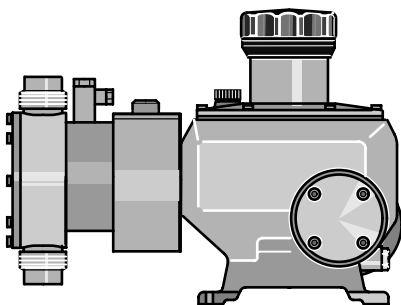
Supplement to the Operating Instruction

ProMinent® Makro TZ

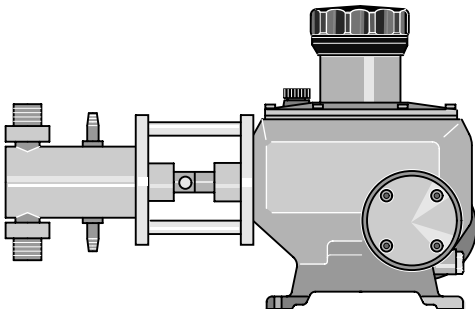
Metering Pump



Makro TZ TZMa



Makro TZ TZHa



Makro TZ TZKa

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Notice!

**This supplementary information forms part
of the operating instructions!**

Please keep this information with the instructions!

Imprint: Supplement to the Operating Instruction
ProMinent® Makro TZ Metering Pump
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Subject to technical modifications.
Printed in the F.R. Germany

Identcode Ordering System TZMa Base Model

TZMa	Motor-Driven Metering Pump TZMa Makro TZ 6/9 (mechanically driven add-on diaphragm pump)									
	Drive type H Main drive A Add-on power end D Double main drive B Double add-on power end									
	Pump type: (digits 1 +2 = back pressure [bar], digits 3-6 = feed rate [l/h] 120190* 060397 031875 120254* 060529 031050 120317* 060661 031395 120381* 060793 031740 030750 032100 031000 032500 031250 031500 * material version PCA/PPE/TTT max. 10 bar									
	PC	Liquid end material: PVC								
	PP	Polypropylene								
	SS	Stainless steel								
	TT	PTFE + 25% carbon								
	A	Seal material: Viton® A								
	E	EPDM								
	T	PTFE								
	T	Positive displacement element: Standard diaphragm; PTFE version								
	0	Liquid end version: No valve springs								
	1	With valve springs								
	0	Hydraulic connection: Standard connection								
	1	PVC union nut and insert								
	2	PP union nut and insert								
	3	PVDF union nut and insert								
	4	SS union nut and insert								
	0	Version: with ProMinent® logo								
	2	No ProMinent® logo								
	A	0 with ProMinent® logo, with frame, simplex								
	B	0 with ProMinent® logo, with frame, duplex								
	C	0 with ProMinent® logo, with frame, triplex								
	S	Electrical power supply: 3 ph. 230/400 V 50/60 Hz (dual wound)								
	P	3 ph. 230/400 V 60 Hz (Exe, Exde)								
	L	3 ph. 230/400 V 50 Hz (Exe, Exde)								
	R	Variable speed motor 4 pole 230/400 V								
	V	Variable speed motor with integr.speed changer								
	Z	Speed control kit								
	4	No motor, with 56 C flange								
	7	No motor, with 120/80 flange								
	8	No motor, with 160/90 flange								
	9	No motor, with 200/90 flange								
	0	Enclosure rating: IP 55 (Standard) ISO class F								
	1	Exe version (Eexe II T3) -F								
	2	Exde version (Eexde II C T4) -F								
	0	Stroke sensor: No stroke sensor								
	1	With stroke sensor (Namur)								
	0	Stroke length adjustment: 0 Stroke length adjustment, man.								
	1	230 V stroke actuator								
	2	115 V stroke actuator								
	3	230 V 0-20 mA stroke controller								
	4	230 V 4-20 mA stroke controller								
	5	115 V 0-20 mA stroke controller								
	6	115 V 4-20 mA stroke controller								
	0	Applications: Standard								
TZMa										

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Identcode Ordering System Hydraulic Diaphragm Dosing Pumps

TZHa	Makro TZ 20 Hydraulic Diaphragm Pump									
	Drive type:									
	H	Main drive	B	Double add-on power end						
	D	Double main drive	A	Add-on power end						
	Pump type:									
	160300*		160500*		100502					
	160400*		160600*		100669					
	100836									
	101004									
	101224 * material version PCA/PPE/TTT max. 10 bar									
	Liquid end material:									
	PC	PVC								
	PP	Polypropylene								
	SS	Stainless steel								
	TT	PTFE + 25% carbon								
	Seal material:									
	A	Viton® A								
	E	EPDM								
	T	PTFE seal								
	Positive displacement element:									
	T	PTFE coating composite diaphragm								
	Liquid end version:									
	0	No valve springs								
	1	With valve springs								
	Hydraulic connection:									
	0	Standard connection								
	1	PVC union nut and insert								
	2	PPP union nut and insert								
	3	PVDF union nut and insert								
	4	SS union nut and insert								
	Version:									
	0	With ProMinent® logo, no frame								
	2	No ProMinent® logo, no frame								
	A	With ProMinent® logo, with frame, simplex								
	B	With ProMinent® logo, with frame, duplex								
	C	With ProMinent® logo, with frame, triplex								
	Electrical power supply:									
	S	3 ph. 230/400 V 50/60 Hz (dual wound)								
	P	3 ph. 230/400 V 60 Hz (Exe, Exde)								
	L	3 ph. 230/400 V 50 Hz (Exe, Exde)								
	R	Variable speed motor 4 pole 230/400 V								
	V	Variable speed motor with integr. speed control								
	1	1 ph, 230 V, 50/60 Hz								
	Z	1 ph, variable speed control set 1 ph, 230 V, 50/60 Hz								
	4	No motor, with 56 C flange								
	7	No motor, with 120/80 flange								
	8	No motor, with 160/90 flange								
	9	No motor, with 200/90 flange								
	Enclosure rating:									
	0	IP 55 (Standard) ISO class F								
	1	Exe version (Exe II T3) -F								
	2	Exde version (Exde II C T4) -F								
	Stroke sensor:									
	0	No stroke sensor								
	1	With stroke sensor (Namur)								
	Stroke length adjustment:									
	0	Stroke length adjustment, man.								
	1	230 V stroke actuator								
	2	115 V stroke actuator								
	3	230 V 0-20 mA stroke controller								
	4	230 V 4-20 mA stroke controller								
	5	115 V 0-20 mA stroke controller								
	6	115 V 4-20 mA stroke controller								
	Applications:									
	0	Standard								
TZHa										

Identcode Ordering System Plunger Dosing Pumps

TZKa Motor-Driven Metering Pump TZKa Makro TZ 20 (Plunger Metering Pump)												
Drive type												
H	Main drive	B Double add-on power end										
D	Double main drive	A Add-on power end										
Pump type: digits 1 - 3 =back pressure [bar], digits 4 - 6 =feed rate [l/h]												
320009	320018	192033	113058	063104	040163	028237	020322	014475				
320012	320024	192044	113077	063139	040217	028316	020430	014634				
320014	320030	192055	113096	063174	040271	027395	020538	013793				
320017	313035	168066	096115	052208	033326	022474	016645	011951				
SS		Liquid end material:										
		Stainless steel										
T		Seal material:										
		PTFE seal										
S		Positive displacement element:										
		Stainless steel plunger, chromoxide coated										
0		Liquid end version:										
		No valve springs										
1		Liquid end version:										
		With valve springs										
0		Hydraulic connection:										
		Standard connection										
4		Hydraulic connection:										
		SS union nut and insert										
0		Version:										
		With ProMinent® logo, no frame										
		No ProMinent® logo, no frame										
		With ProMinent® logo, with frame, simplex										
		With ProMinent® logo, with frame, duplex										
		With ProMinent® logo, with frame, triplex										
S		Electrical power supply:										
		3 ph. 230/400 V 50/60 Hz (dual wound)										
		3 ph. 230/400 V 60 Hz (Exe, Exde)										
		3 ph. 230/400 V 50 Hz (Exe, Exde)										
		Variable speed motor 4 pole230/400 V										
		Variable speed motor with integr. speed control 1 ph, 230 V, 50/60 Hz										
		1 ph, variable speed control set 1 ph, 230 V, 50/60 Hz										
		No motor, with 56 C flange										
		No motor, with 120/80 flange										
		No motor, with 160/90 flange										
4		Enclosure rating:										
		IP 55 (Standard) ISO class F										
		Exe version (Eexe II T3) -F										
		Exde version(Eexde II C T4) -F										
0		Stroke sensor:										
		No stroke sensor										
1		Stroke sensor:										
		With stroke sensor (Namur)										
0		Stroke length adjustment:										
		Stroke length adjustment, man.										
		230 V stroke adjustment motor										
		115 V stroke adjustment motor										
		230 V 0-20 mA stroke controller										
		230 V 4-20 mA stroke controller										
		115 V 0-20 mA stroke controller										
6		Applications:										
		Standard										

Technical Data Add On Pump AM Continued

Pump type TZMa	with 1500 rpm motor at 50 Hz				with 1800 rpm motor at 60 Hz					
	Pump Capacity at Max. Back Pressure**			Max. Stroke Freq.	Pump Capacity at Max. Back Pressure**	Max. Stroke Freq.	Suc- tion Lift	Connection Suction/ Discharge Side	Shipping Weight	
	bar	l/h	ml/ stroke	strokes/ min.	psi	l/h/gph	strokes/ min.	mWG	G-DN	kg
120190	12*	190	44	72	174	228/ 60	86	5	1 1/4 - 20	53
120254	12*	254	44	96	174	304/ 80	115	5	1 1/4 - 20	53
120317	12*	317	44	120	174	381/100	144	5	1 1/4 - 20	53
120381	12*	381	44	144	174	457/120	173	5	1 1/4 - 20	53
060397	6	397	91.8	72	87	476/125	86	4	1 1/2 - 25	48
060529	6	529	91.8	96	87	634/167	115	4	1 1/2 - 25	48
060661	6	661	91.8	120	87	793/209	144	4	1 1/2 - 25	48
060793	6	793	91.8	144	87	952/251	173	4	1 1/2 - 25	48
030750	3	750	173.6	72	44	900/237	86	2.5	2 1/4 - 40	62
031000	3	1000	173.6	96	44	1200/317	115	2.5	2 1/4 - 40	62
031250	3	1250	173.6	120	44	1500/396	144	2.5	2 1/4 - 40	62
031500	3	1500	173.6	144	44	1800/475	173	2.5	2 1/4 - 40	62
031875	3	1875	173.6	180	44	- / -	-	2.5	2 1/4 - 40	62
031050	3	1050	240.0	73	44	1250/330	87	3	2 1/4 - 40	62
031395	3	1395	240.0	97	44	1685/445	117	3	2 1/4 - 40	62
031740	3	1740	240.0	121	44	2100/555	146	3	2 1/4 - 40	62
032100	3	2100	240.0	146	44	2490/658	173	3	2 1/4 - 40	62
032500	3	2500	240.0	180	44	- / -	-	3	2 1/4 - 40	87

The permissible admission pressure on the suction side is approx. 50 % of max. permissible back pressure.

All statements apply to water at 20 °C.

The suction lift applies to filled suction line and liquid end – when correctly installed.

The 2 m priming lift applies to clean moist valves and atmospheric pressure outlet.

* Material version PPE/PCA/TTT max. 10 bar.

** For double-head pumps, reduces the maximum permissible back-pressure from 6 to 5 bar and/or 3 to 2.5 bar (from 87 psi to 72 psi and/or 44 psi to 36 psi)

Materials In Contact With Chemical In Version

Version	Dosing Head	Suction/ Dis- charge Connector	DN 20/DN 25 Ball Valves			DN 40 Plate Valves**		
			Seals	Valve Balls	Valve Seat	Seals	Valve Plate/ Valve Spring	Valve Seat
PPE	Polypropylene	Polypropylene	EPDM	Borosilicate glass	EPDM	PTFE	Hast. C	PTFE
PCA	PVC	PVC	Viton® A	Borosilicate glass	Viton® A	PTFE	Hast. C	PTFE
TTT	PTFE with carbon	PTFE with carbon	PTFE	ceramic	PTFE	PTFE	Hast. C	PTFE
SST	stainless steel no. 1.4571/1.4404	stainless steel no. 1.4581	PTFE	stainless steel no. 1.4401	PTFE	PTFE	Hast. C	PTFE

DEVELOPAN® pump diaphragm with PTFE coating.

** The DN 40 valves of the 1500 and 2100 liquid ends . . are plate valves.

Valves and springs are Hastelloy C (spring pressure approx. 0.1 bar).

Custom designs available to order.

Viton® is a registered trademark of DuPont Dow Elastomers.

Technical Data for Main Pump HMM Hydraulic Diaphragm Dosing Pumps

Pump type TZHa	with 1500 rpm motor at 50 Hz				with 1800 rpm motor at 60 Hz						
	Pump Capacity at Max. Back Pressure			Max. Stroke Freq.	Pump Capacity at Max. Back Pressure		Max. Stroke Freq.	Suc- tion Lift	Connection Suction/ Discharge Side	Shipping Weight	Plunger
	bar	l/h	ml/ stroke	strokes/ min.	psi	l/h/gph	strokes/ min.	mWG	G-DN	kg	Ø mm
160300	16*	300	69.4	72	232	424/112	86	3	1 1/2-25	80	70
160400	16*	400	69.4	96	232	480/126	115	3	1 1/2-25	80	70
160500	16*	500	69.4	120	232	600/158	144	3	1 1/2-25	80	70
160600	16*	600	69.4	144	232	720/190	173	3	1 1/2-25	80	70
100502	10	502	116.2	72	145	602/159	86	3	2 1/4-40	81	90
100669	10	669	116.2	96	145	802/211	115	3	2 1/4-40	81	90
100836	10	836	116.2	120	145	1003/264	144	3	2 1/4-40	81	90
101004	10	1004	116.2	144	145	1204/318	173	3	2 1/4-40	81	90
101204	10	1204	116.2	180	145	– / –	–	3	2 1/4-40	81	90

Custom designs to order.

The permissible admission pressure on the suction side is approx. 50 % of max. permissible back pressure.

All statements apply to water at 20 °C.

The suction lift applies to filled suction line and liquid end – when correctly installed.

The 2 m priming lift applies to clean moist valves and atmospheric pressure outlet.

* Liquid end versions PP/PC/TT max. 10 bar.

Materials In Contact With Chemicals

Version	Dosing Head	Suction/ Discharge Connector	DN 20/DN 25 Ball Valves			DN 40 Plate Valves**		
			Seals	Valve Balls	Valve Seat	Seals	Valve Plate/ Valve Spring	Valve Seat
PPE	Polypropylene	Polypropylene	EPDM	Borosilicate glass	EPDM	EPDM	Hast. C	PTFE
PCA	PVC	PVC	Viton® A	Borosilicate glass	Viton® A	Viton®	Hast. C	PTFE
TTT	PTFE with carbon	PTFE with carbon	PTFE	ceramic	PTFE	PTFE	Hast. C	PTFE
SST	stainless steel no. 1.4571/1.4404	stainless steel no. 1.4581	PTFE	stainless steel no. 1.4401	PTFE	PTFE	Hast. C	PTFE

Multilayer diaphragm with signalling.

** The DN 40 valves of the 1500 and 2100 liquid ends are plate valves.

The valve plates and springs are made of Hastelloy C (spring pressure approx 0.1 bar).

Custom versions to order.

Viton® is a registered trademark of DuPont Dow Elastomers.

Technical Data Main Pump HK Plunger Dosing Pumps

Pump type TZKa	with 1500 rpm motor at 50 Hz				with 1800 rpm motor at 60 Hz							Plunger Ø mm
	Pump Capacity at Max. Back Pressure	Max. Stroke Freq.			Pump Capacity at Max. Back Pressure	Max. Stroke Freq.	Suc- tion Lift	Connection Suction/ Discharge Side	Shipping Weight			
	bar	l/h	ml/ stroke	strokes/ min.	psi	l/h/gph	strokes/ min.	mWG	G-DN	kg		
320009	320	8,7	2	72	4627	10/ 2,6	86	4	Rp 1/4**-	8	50	12
320012	320	11,6	2	96	4627	14/ 3,7	115	4	Rp 1/4**-	8	50	12
320014	320	14,5	2	120	4627	17/ 4,5	144	4	Rp 1/4**-	8	50	12
320017	320	17,4	2	144	4627	21/ 5,5	173	4	Rp 1/4**-	8	50	12
320018	320	17,7	4,1	72	4627	21/ 5,5	86	4	Rp 1/4**-	8	50	17
320024	320	23,6	4,1	96	4627	28/ 7,4	115	4	Rp 1/4**-	8	54	17
320030	320	29,5	4,1	120	4627	35/ 9,2	144	4	Rp 1/4**-	8	54	17
313035	313	35,4	4,1	144	4526	42/ 11	173	4	Rp 1/4**-	8	54	17
192033	192	32,9	7,6	72	2776	39/ 10	86	4	Rp 3/8**-	10	55	23
192044	192	43,9	7,6	96	2776	59/ 14	115	4	Rp 3/8**-	10	55	23
192055	192	54,8	7,6	120	2776	66/ 17	144	4	Rp 3/8**-	10	55	23
168066	168	65,8	7,6	144	2437	79/ 20	173	4	Rp 3/8**-	10	55	23
113057	113	57,5	13,3	72	1634	69/ 18	86	4	Rp 3/8**-	10	56	30
113077	113	76,6	13,3	96	1634	92/ 24	115	4	Rp 3/8**-	10	56	30
113096	113	95,8	13,3	120	1634	115/ 30	144	4	Rp 3/8**-	10	56	30
096115	96	114,9	13,3	144	1392	138/ 36	173	4	Rp 3/8**-	10	56	30
063104	63	104,3	24,2	72	911	125/ 33	86	4	1 1/4-	20	58	40
063139	63	139	24,2	96	911	167/ 44	115	4	1 1/4-	20	58	40
063174	63	173,8	24,2	120	914	209/ 55	144	4	1 1/4-	20	58	40
052208	52	208,5	24,2	144	754	250/ 66	173	4	1 1/4-	20	58	40
040163	40	162,9	37,7	72	578	195/ 51	86	4	1 1/4-	20	58	50
040217	40	217,2	37,7	96	578	261/ 68	115	4	1 1/4-	20	58	50
040271	40	271,5	37,7	120	580	326/ 86	144	4	1 1/4-	20	58	50
033326	33	325,8	37,7	144	479	391/103	173	4	1 1/4-	20	58	50
028237	28	237	54,9	72	405	284/ 75	86	4	1 1/2-	25	62	60
028316	28	315,9	54,9	96	405	379/100	115	4	1 1/2-	25	62	60
027395	27	394,9	54,9	120	392	474/125	144	4	1 1/2-	25	62	60
022474	22	473,9	54,9	144	319	569/150	173	4	1 1/2-	25	62	60
020322	20	322,5	74,7	72	289	387/102	86	4	1 1/2-	25	62	70
020430	20	430	74,7	96	289	516/136	115	4	1 1/2-	25	62	70
020538	20	537,6	74,7	120	290	645/170	144	4	1 1/2-	25	62	70
016645	16	645,1	74,7	144	232	774/204	173	4	1 1/2-	25	62	70
014475	14	475,1	110	72	202	571/150	86	4	2 1/4-	40	68	85
014634	14	634,1	110	96	202	761/201	115	4	2 1/4-	40	68	85
013793	13	792,6	110	120	189	951/251	144	4	2 1/4-	40	68	85
011951	11	951,1	110	144	160	1141/301	173	4	2 1/4-	40	68	85

The permissible admission pressure on the suction side is approx. 50 % of max. permissible back pressure.

All statements apply to water at 20 °C.

The suction lift applies to filled suction line and liquid end – when correctly installed.

The 2 m priming lift applies to clean moist valves and atmospheric pressure outlet.

** The suction and discharge connectors Rp 1/4 and Rp 3/8 are inner threaded and fitted with double ball valves.

Materials In Contact With Chemicals with Plunger

Plunger Ø mm	Dosing Head	Suction/Dis- charge Connector	Ball Seats/ Seals	Valve Balls	Plungers
... 12 S to 30 S	stainless steel no. 1.4571/1.4404	no. 1.4571/1.4404	SS/PTFE	oxide ceramic	stainless steel/ceramic
... 40 S to 70 S	stainless steel no. 1.4571/1.4404	no. 1.4581	PTFE/PTFE	stainless steel no. 1.4401	stainless steel/ceramic
... 85 S	stainless steel no. 1.4571/1.4404	no. 1.4581	PTFE/PTFE	Hastelloy C (valve plate)	stainless steel/ceramic

Diaphragm Dosing Pumps

<i>Model from 1/2003</i>	<i>Model up to 1/2003</i>
TZMaH ...	Makro TZ 6 HM...
120190	20-260
120254	15-260
120317	12-260
120381	10-260
060397	20-530
060529	15-530
060661	12-530
060793	10-530
030750	20-1500
031000	15-1500
031250	12-1500
031500	10-1500
TZMaH ...	Makro 5/50 TZ 9 HM...
031050	20-2100
031395	15-2100
031740	12-2100
032100	10-2100

Hydraulic Diaphragm Dosing Pumps

<i>Model from 1/2003</i>	<i>Model up to 1/2003</i>
TZHaH ...	Makro TZ 20 HMMH ...
160300	201 70-20
160400	151 70-20
160500	121 70-20
160600	101 70-20
100502	201 90-20
100669	151 90-20
100836	121 90-20
101004	101 90-20

Plunger Dosing Pumps

<i>Model from 1/2003</i>	<i>Model up to 1/2003</i>
TZKaH ...	Makro TZ 20 HK ...
320009	20-12
320012	15-12
320014	12-12
320017	10-12
320018	20-17
320024	151-17
320030	121-17
313035	101-17
192033	201-23
192044	151-23
192055	121-23
168066	101-23
113057	201-30
113077	151-30
113096	121-30
096115	101-30
063104	201-40
063139	151-40
063174	121-40
052208	101-40
040163	201-50
040217	151-50
040271	121-50
033326	101-50
028237	201-60
028316	151-60
027395	121-60
022474	101-60
020322	201-70
020430	151-70
020538	121-70
016645	101-70
014475	201-85
014634	151-85
013793	121-85
011951	101-85