Product Information Motor-driven Diaphragm Dosing Pumps MEMDOS E/DX

Reliable dosing of chemicals

Motor-driven diaphragm dosing pumps play an important role in the reliable and accurate dosing of liquids in the process cycles. They are appropriate for low-pressure applications and high dosing quantities.

Dosing pumps are used in many branches of industry that work with liquid chemicals - not excluding toxic and aggressive media.

Riding on the crest of the waves

Two models of the MEMDOS are available, each with or without microprocessor control. The smaller version can be used for capacities from 0...4 to 0...160 l/h and the larger version for capacities from 0...170 to 0...380 l/h. Pressures are admissible between 4 and 10 bar, depending on the size.

Thanks to the sturdy tappet drive with manual or automatic capacity adjustment, the conveyed media such as acids, lyes, precipitating agents and flocculents are dosed reliably and precisely.

On request, the MEMDOS pumps can also be supplied with a double-diaphragm system. Then uncontrolled leakage of media is avoided even if the dosing diaphragm wears out.

Versatile and flexible

MEMDOS E pumps can be integrated in controls or automatic control systems.

For constant dosing without control, the motor of MEMDOS E is directly connected to the terminal box. A great variety of three-phase and single-phase motors is available for this purpose.

To change the metering capacity, either the stroke length can be adjusted mechanically or the speed of the three-phase motor can be controlled by means of a separate frequency converter.

The intelligence of the MEMDOS DX is derived from the well-proved series of MAGDOS DE/DX solenoid metering pumps.

The MEMDOS DX controller allows the adaption to a large number of different control signals and system monitoring equipment. For the chemical supply, for example, two controls are available: tank level control with alarm signal and low level indication. The signals required for external activation of the pump can be simple voltage-free closing contacts from water meters or controllers or analog 0/4...20 mA signals. Depending on the version, the MEMDOS DX can be adjusted continuously between 0 and 142 strokes/min. for internal control. A single stroke follows each contact.

In short

- Suitable for accurate mixing tasks
- Capacity range 4 to 393 l/h, at up to 10 bar
- Minor dependence of the back pressure
- Linear development of the dosing quantity according to the stroke length
- Tappet drive with manual and automatic capacity adjustment
- Also suitable for frequency converter operation
- Wide range of dosing head materials
- Double-diaphragm system optional
- Small stand, requires little space
- Batch dosing optional

Technical data

MEMDOS E/DX		Size	4	8	15	25	26	50	75	76	110	150	156	160	200	260	300	380
Capacity at max. pressure**		l/h	4	7.5	15	23	23	48	72	72	107	160	160	170	208	263	292	393
Stroke volume		ml / pulse	2.6					8.5			19			36.5			51.2	54.5
Max. pressure		bar	10								5	4		10			8	6
Stroke frequency**		1/min	26	48	95	142	142	95	142	142	95	142	142	71	95	120	95	120
Diaphragm-ø		mm	52					64			90			120			150	
Stroke length		mm	6					9						10				
Suction lift		mbar	900					800			700			600			450	
Max. ambient temperature*		°C	40															
Capacity E (3~)		W	50						250					370				
Power DX (1~)		W	50					120						250				
Insulation class			F															
Protective class			IP 55															
Voltage at pulse input			5 V DC (must be voltage-free for contact making)															
Voltage at level connection			5 V DC (level probe with break contact for alarm/empty)															
Alarm reley, voltage-free changeo-ver contact			250 V AC, 2.5 A or 30 V DC, 2.5 A															
Weight plastic	E	kg	7.4					7.6			10.2			18.0			19.0	
	DX	kg	8.0					9.2			12.0			22.0			26.0	
Weight stain-less steel	E	kg	8.1					9.5			18.0			26.4			32.0	
	DX	kg	8.7					11.1			20.0			30.4			39.0	

*) Ambient temperature for PVC metering head 40 °C and for PP or stainless steel metering heads 60 °C (for a short time 80 °C).
**) At 60 Hz operation the values increase by factor 1.2

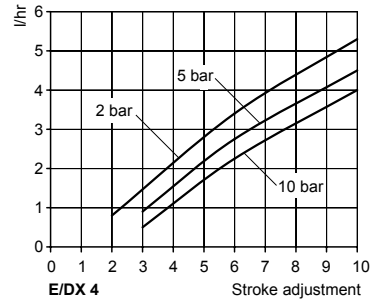
Model variants

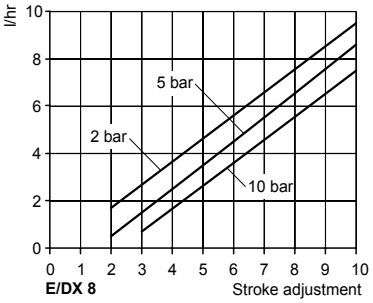
MEMDOS E/DX	Plastic				Stainless steel			
	Material	Connection	Order no.		Material	Connection	Order no.	
			E	DX			E	DX
4	PVC/FPM	6/12	10402001	10402019	1.4571/PTFE	G 1/4	10402010	10402028
8		6/12	10402004	10402022		G 1/4	10402013	10404586
15		6/12	10402002	10402020		G 1/4	10402011	10402029
25*		6/12	10402003	10402021		G 1/4	10402012	10402030
26**		6/12	10402436	10402857		G 1/4	10402437	10404098
50	PVC/CSM	6/12	10402005	10402023	1.4571/AF	G 1/4	10402014	10402032
75*		d 16	10402353	10402140		G 1/4	10402015	10402033
76**		d 16	10402451	10404711		G 1/4	10402438	10404100
110	PP/CSM	d 16	10402008	10402026		G 1/2	10402017	10402035
150*		d 20	10402009	10402027		G 1/2	10402018	10402036
156**		d 20	10402439	10404080		G 1/2	10402440	10404102
160		d 20	10402053	10402055		G 1/2	10402054	10402056
200		d 20	10402037	10402045		G 1/2	10402041	10402049
260*		d 20	10402038	10402046		G 1/2	10402042	10402050
300		d 20	10402039	10402047		G 1/2	10402043	10402051
380*		d 20	10402040	10402048		G 1/2	10402044	10402052

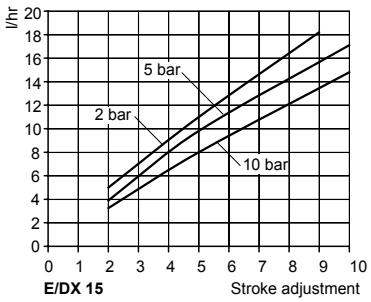
*) Pump not suitable for 60 Hz operation
**) Special size for 60 Hz operation

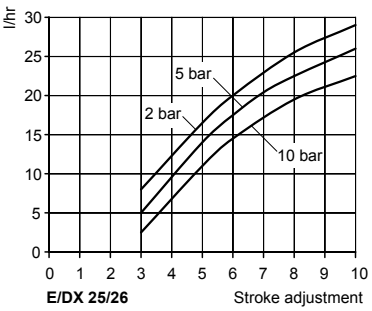
Performance curves

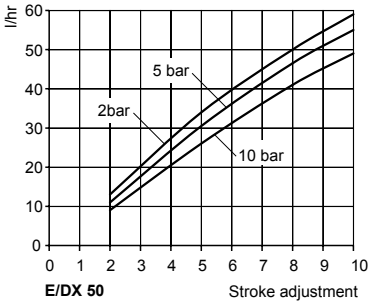
The performance curves refer to water at 20 °C (68 °F) and a suction lift of 0.5 m. The performance of the dosing pump depends on the viscosity of the process fluid and hydraulic installation conditions.
Dosing pumps must therefore be gauged in litres during application.

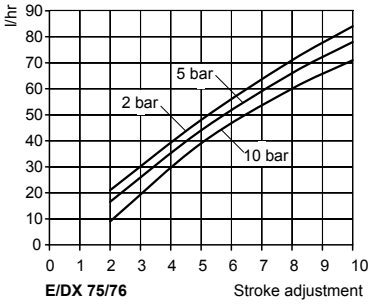


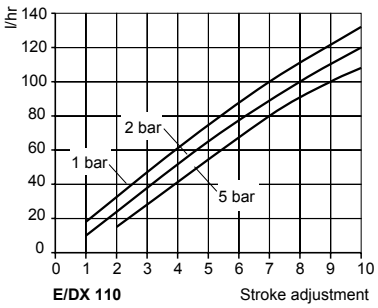


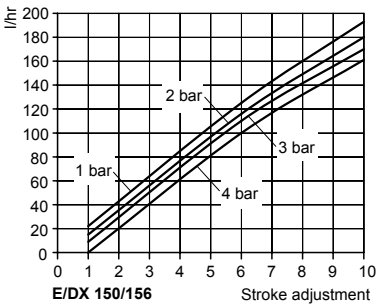


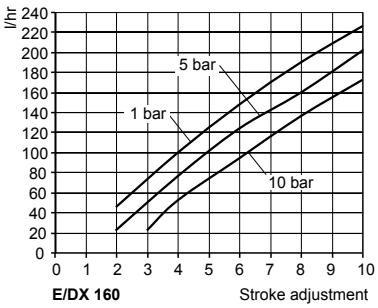


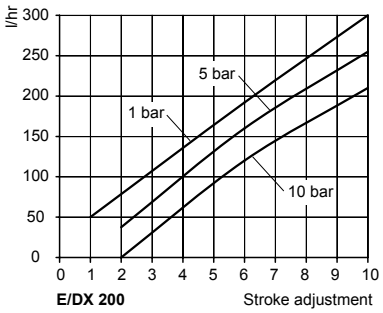


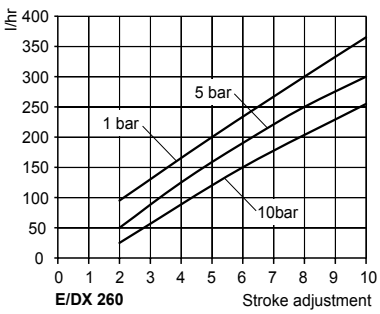


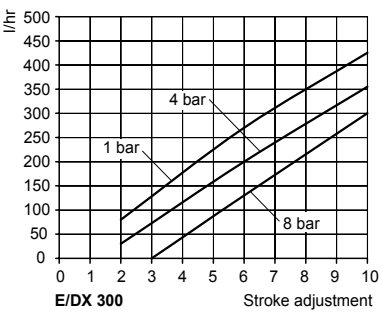


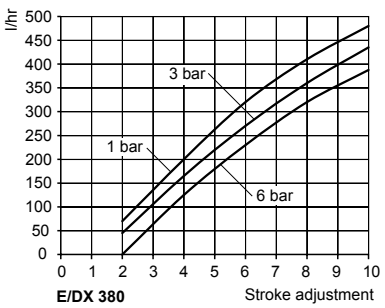






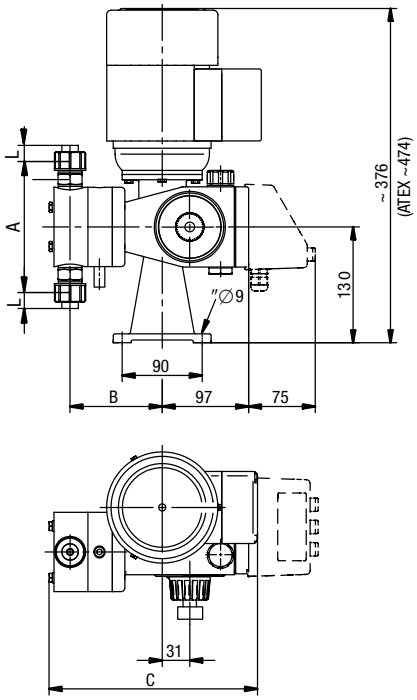


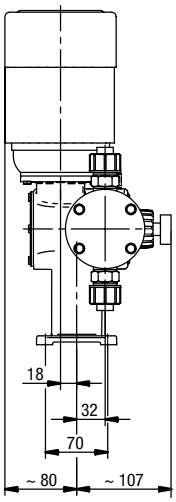




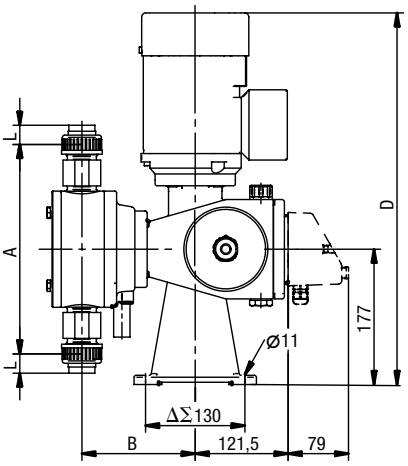
Product Information Motor-driven Diaphragm Dosing Pumps
MEMDOS E/DX

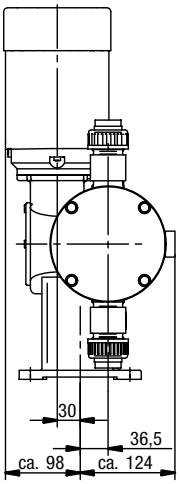
Dimensions

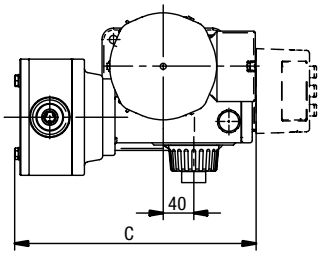




E/DX	A	B	C	L
4...26	108	95	222	13
50	153	104	234	13
75, 76	153	104	234	17
110...156	246	117	259	22







Type	A	B	C	D	L	D with ATEX motor
E 160...260	278	148	317	approx. 469	22	632
DX 160...260	278	148	317	approx. 486	22	-
E 300...380	318	153,5	320	approx. 469	22	632
DX 300...380	318	153,5	320	approx. 486	22	-

Accessories

Even the best dosing pump is capable of improvement - by means of appropriate technical surroundings. That is why a particularly comprehensive accessories programme is available which turns your dosing pump into an efficient dosing system.

As an option, the multifunctional valve PENTABLOC is available, which offers the functionalities of a back-pressure valve as well as those of a safety blowdown valve. Such functions as anti-siphon, pressure relief and flow indication and monitoring are also integrated.

For further accessories for your dosing pump, please refer to our dosing pump brochure.

To optimise the dosing process, we recommend back-pressure and pressure-relief valves. They are used

- to increase the dosing accuracy in the presence of fluctuating back pressures.
- for long dosing lines in order to prevent excess delivery. (The accelerated medium continues moving on account of its own inertia even when the delivery stroke has already ended.)
- to prevent siphoning through the dosing pump if the suction pressure is higher than the system pressure.
- to prevent the system pressure from rising to an impermissibly high level on the discharge side of the dosing pump; this may for example be caused by the accidental closing of valves while the pump is in operation or a clogged injector.

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MEMDOS GMR

General

Double diaphragm metering pumps of the Memdos GMR series can be supplied as single or duplex metering pumps. The pumps are used to meter large quantities at relatively low back pressures. They are frequently used in waste-water treatment to meter pH-regulating chemicals or flocculents. The metering pumps are available in three sizes as single metering pumps for 2000 to 4000 l/h. Different metering heads can be connected to the duplex metering pumps. The metering heads are then operating in a reciprocating mode and the quantity metered is set for both heads at the same time.

Designs

Standard designs are: Single metering pump with left-hand metering head arangement.
Type designation GMR Symbol

Duplex metering pumps with two metering heads.
Type designation ZGMR Symbol

Metering head

The characteristic feature is the duplex diaphragm (7+8). The eccentric (5) guides the diaphragm (7) almost following the sine wave over the constant stroke. Since the large supporting disks always carry the whole surface of the diaphragm (7) in the maximum eccentric positions, a piston-like displacement effect is achieved. This results in a very high metering accuracy for diaphragm metering pumps independent of the back pressure. The front supporting disk for the suction stroke must not get into touch with the medium because of chemical resistance and the possible abrasivity. Therefore, a second diaphragm (8) is provided, which has a merely separating function and is therefore neutral in respect to forces. The medium side of the EPDM separating diaphragm (8) is coated with PTFE.
A precisely dimensioned glycerin filling (6) acts as hydraulic push rod and thus the distance between the two diaphragms remains constant. Also the rear diaphragm chamber is partly filled with glycerin for lubrication purposes. The suction (12) and discharge valves (13) are single-ball valves. The suction (11) and discharge connections (10) are available in plastic or stainless steel design.

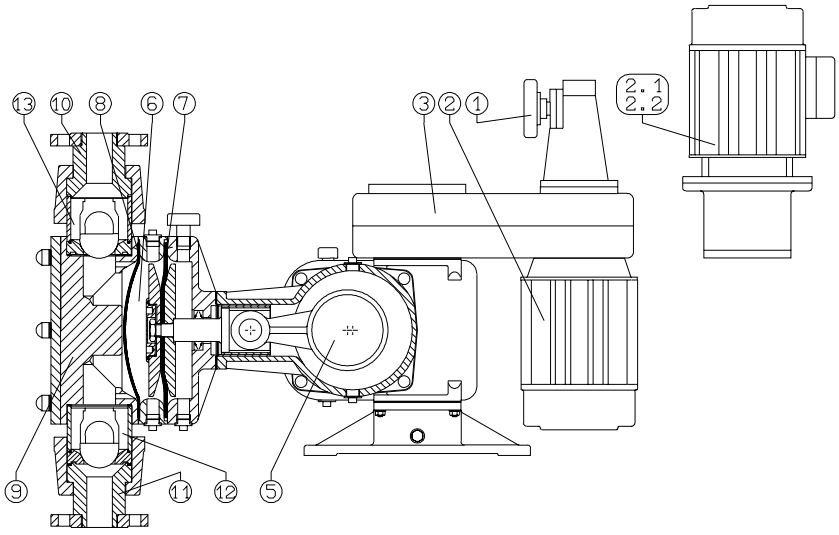
Drive

There are three possibilities to drive the eccentric (5):

1. By means of a variable speed belt drive (3). The control range is 1:6.5. The drive may only be adjusted while *the motor is rotating* (2).
2. By means of a DC motor (2.1) with thyristor controller. Motors equipped with a tachometer feedback may have a control range of 1:100.
3. By means of a three phase AC motor (2.2). The speed of this motor can be controlled within a range of 1:20 via also available frequency inverters.

Legend

1 Handwheel for speed adjustment
2 Motor
2.1 DC motor
2.2 three-phase AC motor
3 Belt gearbox
5 Eccentric
6 Glycerin filling
7 Rear diaphragm
8 Front diaphragm
9 Metering head
10 Discharge connection
11 Suction connection
12 Suction valve
13 Discharge valve



Additional components

Upon request, the Memdos GMR can be equipped with an inductive probe which samples the crankshaft to count the strokes. For diaphragm rupture detection, the front glycerin chamber can be monitored by means of a conductivity probe.

A reversible servomotor can be supplied for the gearbox adjustment which is required for the remote control of the metered quantity or for a process-dependent open-loop or closed-loop control, with the GMR acting as final control element. The actual speed, and thus the metered quantity, is proportionally converted into an analog direct voltage signal by means of a tachogenerator.

The signal can be directly transmitted to indicators. For operation in control mode, the signal must be amplified e.g. 0-20 mA.

Important

Ensure that control circuits are connected such that the automatic stroke adjustment only works when the drive motor is rotating.

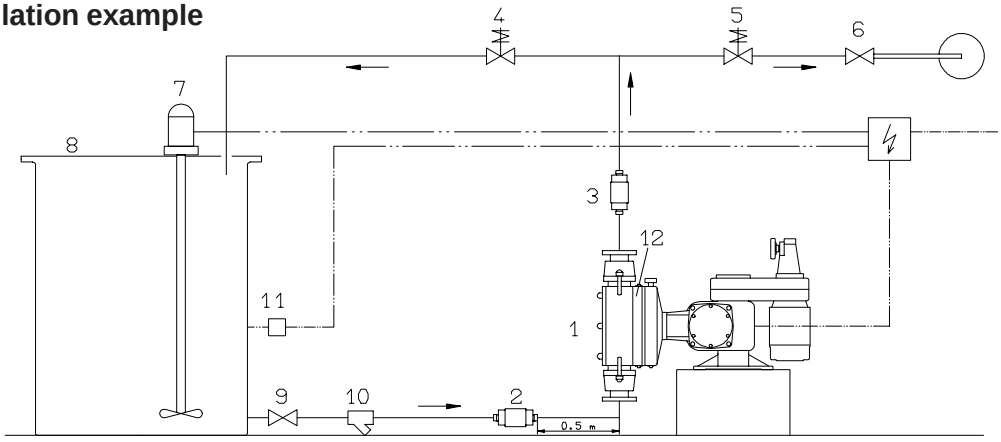
Upon request, a variable d.c. main drive is available instead of the variable speed belt drive. This can be adjusted from 0 to 100%. The motor is controlled via a thyristor controller. The speed is remotely indicated by means of a tachometer or an I x R compensation.

Technical data

Memdos GMR			2000	3000	4000
Pressure		bar	4	3	2
Pump capacity		ml/stroke	463	694	926
Driven by	Flow rate	l/h	310...2000	460...3000	610...4000
continuous control	Stroke freq.	min^{-1}	11...72	11...72	11...72
Driven by three-phase AC or	Flow rate	l/h	1600	2400	3200
DC motor with 2850 min^{-1}	Stroke freq.	min^{-1}	58	58	58
Drive power		kW	2.2	2.2	2.2
Diaphragm diameter		mm	212	252	252
Stroke length		mm	23	26	32
Suction lift		mbar	120	120	120
max. temperature		°C	40	40	40
Weight	Plastic metering head	kg	145	165	165
	Stainless steel head	kg	155	195	195

For higher or lower capacities, d. c. motors can be equipped with thyristor controlllers according to data sheet MB 4 20 02, and three-phase a. c. motors can be connected to frequency inverters according to data sheet MB 4 70 01.

Installation example



Legend

1. Metering pump GMR — MB 1 06 01
2. Pulsation dampener f. suction pipe — MB 1 27 01
3. Pulsation dampener f. discharge pipe — MB 1 27 01
4. Relief valve — MB 1 25 01
5. Backpressure valve — MB 1 25 01
6. Injection nozzle — MB 1 23 01
7. Agitator — MB 1 36 01
8. PE tank — MB 1 20 01
9. Ball valve
10. Dirt trap (filter) — MB 1 22 02
11. Dry run protection — MB 4 10 00
12. Diaphragm failure monitoring — Part No. 41028906

Use shown fittings when required.

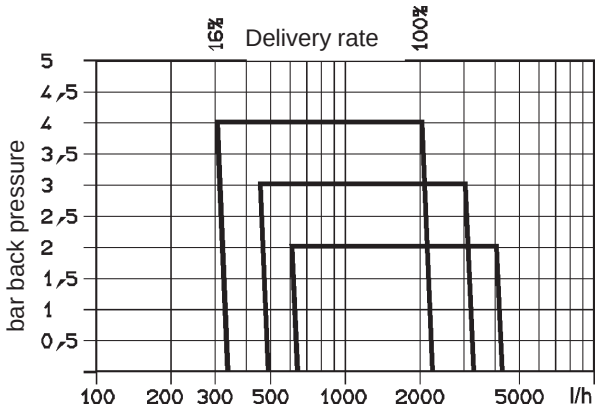
MEMDOS GMR

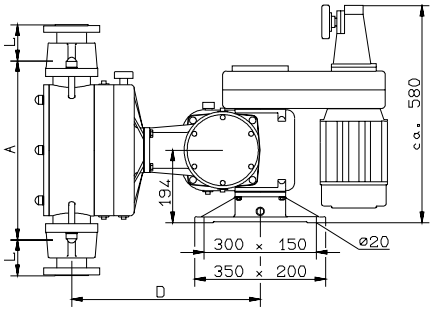
Dimensions

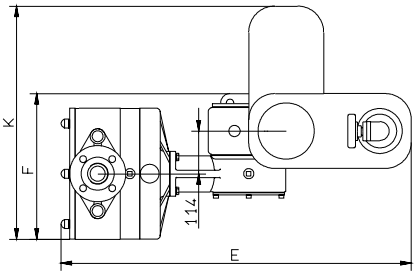
GMR			2000	3000	4000
Metering head made of:	Plastic	A	410	480	480
		D	492	504	504
		E	923	935	935
		F	358	388	388
		G	589	600	600
		H	589	600	600
		K	593	623	623
	Stainless steel	A	410	480	480
		D	472	484	484
		E	868	880	880
		F	358	388	388
		G	534	545	545
		H	534	545	545
		K	593	623	623

For dimension L see table 5, Connections.

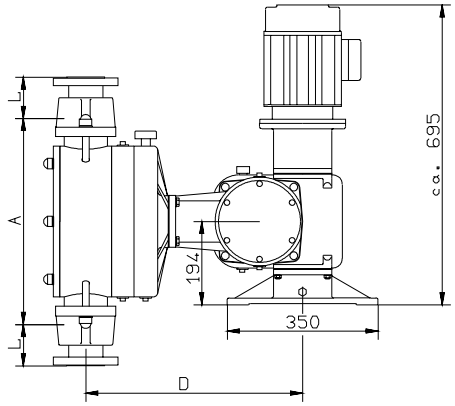
Delivery rate characteristics (in control mode)

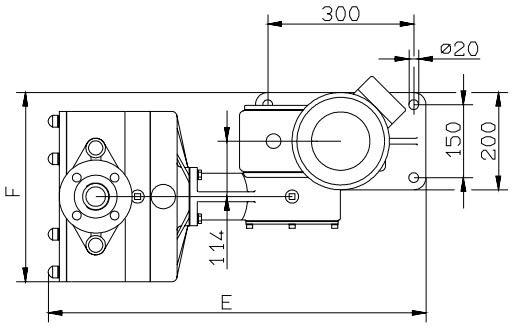




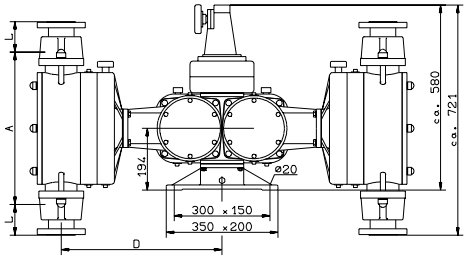


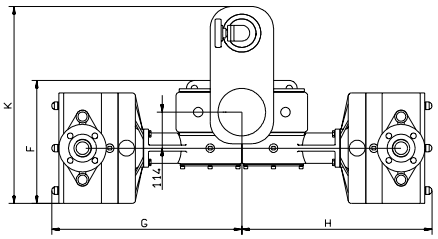
Dimension drawings
Simplex pumps





Dimension drawing
Duplex pump



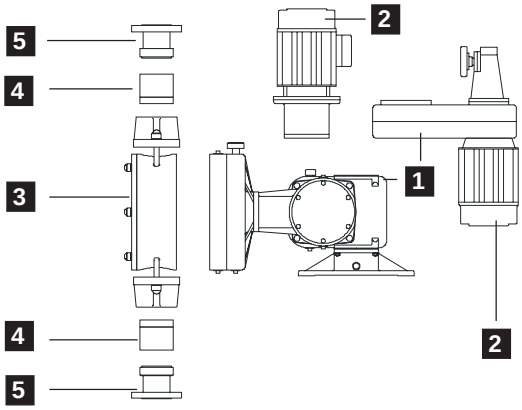


MEMDOS GMR

Selection tables
In order to offer a great variety of metering pumps to the user, the metering pumps have been divided into the most important functional groups. The pump can be individually assembled. The pump must be equipped with the following units:

1 Gearbox **2** Motor **3** Metering head
4 Valves **5** Connections

The numbers at the metering pump drawing refer to the corresponding selection tables.



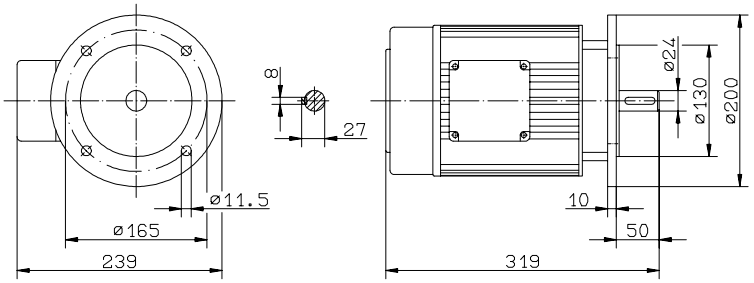
1 Gearbox									
Simplex pump GMR				Duplex pump ZGMR					
Drive with:	2000	3000	4000	2000 2000	2000 3000	2000 4000	3000 3000	3000 4000	4000 4000
3-ph. AC motor	32179	32180	32181	32182	32183	32184	32185	32186	32187
Gearbox	32344	32345	32346	32347	32348	32349	32350	32351	32352

2 Electrical drives										
Motor type	Power [kW]	Size	Design	Speed [1/min]	Volt-age [V]	Fre-quency [Hz]	Current [A]	IP	ISO-class	Part No.
3-ph. AC motor	2.2	90L	V1	2850	400	50	4.9	54	F	78897
	2.2	90L	V1	2850	400	50	4.9	55	F	78898
3-ph. AC motor	2.2	100L	Special	1410	400	50	5.2	54	F	32214
with gearbox (500...3600 min-1)	2.2	100L	Special	1410	400	50	5.2	55	F	32215
DC motor *	2.4	100L	V18	2850	200	-	-	44	F	32218

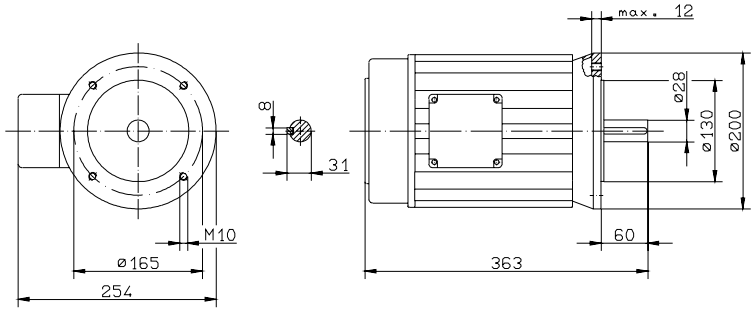
* Also available with tachogenerator

Dimension drawing

Motor size 90L



Motor size 100L

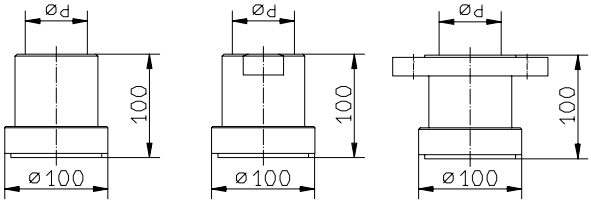


3 Metering heads		
Pump size	PP	1.4571
GMR 2000	32138	32157
GMR 3000	32188	32204
GMR 4000	32188	32204

4 Valves			
PP housing		1.4571 housing	
Valve-spring retainer of PVDF		Valve-spring retainer of 1.4571	
Hastelloy spring			
Sealing material			
Hypalon	Viton	Hypalon	Viton
24072	24073	24071	29961

5 Connections					
GMR	DN	Fig.	d	PVC	1.4571
2000 (3000)*	40	C1	50	21548	-
		D1	G 11/2	32159	25255
		F1	-	27100	27101
2000, 3000 and 4000	50	C1	63	21529	-
		D1	G 2	29888	27046
		F1	-	27103	27104

* Pressure loss calculation required!



C1 Cemented connection

D1 Threaded connection

F1 Flange connection

Ordering example

A metering pump is required for metering lime slurry.

Given operating data:
Lime slurry : 3800l/h
Back pressure : 3 bar
Temperature : 20 °C
Mains voltage : 400/230V, 50Hz
Manual power adjustment.

Selection of the metering pump:
The chemical permits the use of the standard material PP and Hypalon seals.
The plastic flange connection DN 50 is selected for both, the suction and the discharge side.
The 4000 l unit is able to operate at a max. pressure of 2 bar. When having a pressure of 3 bar, the duplex pump ZGMR 2000/2000 is selected.

The metering pump consists of:

	Table	Part No.
Gearbox	1	32347
Motor	2	32214
Metering head	3	32138
Suction valve	4	24072
Discharge valve	4	24072
Connections	5	27103

Diaphragm metering pump MEMDOS MR

General

Diaphragm metering pumps of the MEMDOS MR series have been developed for a broad range of applications in metering technology. Thus they are used in the industrial sector, in process engineering and very frequently in water and waste water treatment. Diaphragm metering pumps are leakproof.

Standard versions are metering pumps with the head located on the left-hand side.
Type MR...L (Symbol)

Upon request, metering pumps with the head on the right-hand side can be supplied.
Type MR...R (Symbol)

Duplex metering pumps are available with the head combinations shown in the following tables. The heads are arranged in diagonals.
Type ZMR.../... (Symbol)

The power of the motor is the same for simplex and duplex metering pumps because the diaphragms operate in a push-pull arrangement.

Metering Head

The heads are available in polypropylene and stainless steel. Special materials upon request.

Suction and discharge valves are double-ball valves up to the MR 290 version; for the bigger pumps, spring-loaded flat-seat valves are used. For viscous media of 400 mPas and more, spring-loaded single-ball valves are recommended for the suction and the discharge side. The opening pressure of the valve is about 0.1 bar.

Separating chamber

The diaphragm flanges have been designed so that, in the case of a diaphragm rupture due to wear, no chemical can escape randomly from the pump or enter the gear. The leakage is routed downwards through a drain pipe. The diaphragm flanges thus function as a separating chamber and are protected against aggressive media by means of powdery epoxy coating. The escaping leakage can be detected by a leakage probe causing the pump to be stopped (see MB 1 31 01).

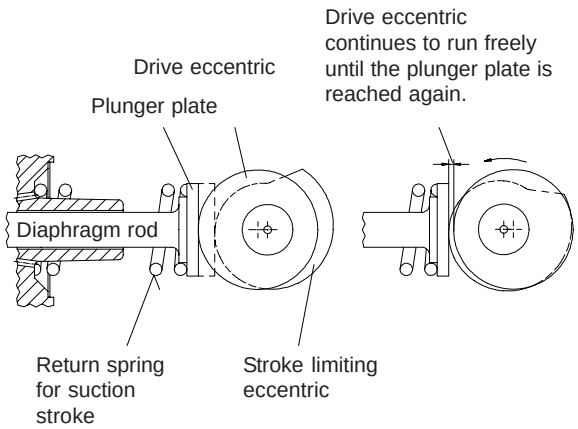
Drive

The drive unit consists of an oil-filled worm gear. The stroke is generated by an eccentric which moves back and forth a spring-loaded plunger fixed to the diaphragm. The metering stroke is achieved by the pushing force of the eccentric, the resetting of the spring causes the suction stroke. The stroke length is set by limiting the plunger return by means of a manually adjustable eccentric disk used as a stop.

The stroke length which determines the metering capacity can be adjusted manually during operation between 0 and 100 %.

The standard version is equipped with manual adjustment. Upon request, an automatic remote adjustment (ATE) can be supplied.

Functional diagram



Diaphragm metering pump MEMDOS MR

Technical data

The capacity is valid at 50 Hz operation.

Simplex metering pumps

Memdos MR		400	600	980
max. pressure	bar	5	5	4
at max.	l/h	440	640	990
pressure	ml/stroke	165	165	165
strokes/min		47	70	101
diaphragm ø	mm	185	185	185
weight	kg plastic	38	38	38
	SS	48	48	48

Duplex metering pumps with equal heads

Memdos ZMR		50/50	75/75	115/115	140/140	210/210	290/290	400/400	600/600	980/980
max. pressure	bar	10	10	10	10	10	10	5	5	4
at max.	l/h	50/50	90/90	135/135	160/160	240/240	290/290	440/440	640/640	990/990
pressure	ml/stroke	20	20	20	37	37	48	165	165	165
strokes/min		47	70	101	70	101	101	47	70	101
diaphragm ø	mm	90	90	90	120	120	150	185	185	185
weight	kg plastic	38	38	38	38	38	40	50	50	50
	SS	48	48	48	48	48	53	60	60	60

Duplex metering pumps with different heads

Memdos ZMR		50/400		75/140		75/600		115/210		115/290		115/980		140/600		210/290		210/980		290/980	
max. press.	bar	10	5	10	10	10	5	10	10	10	10	10	4	10	5	10	10	10	4	10	4
at max.	l/h	55	440	90	160	90	640	135	240	135	290	135	990	160	640	240	290	240	990	290	990
pressure	ml/stroke	20	165	20	37	20	165	20	37	20	48	20	165	37	165	37	48	37	165	48	165
strokes/min.		47		70		70		101		101		101		70		101		101		101	
diaphragm ø	mm	90	185	90	120	90	185	90	120	90	150	90	185	120	185	120	150	120	185	150	185
weight	kg plastic	49		38		49		38		40		41		41		40		49		49	
	SS	55		48		55		48		53		55		55		50		55		55	

Additional components

Upon request, the metering pump can be supplied with an inductive sensor for the eccentric shaft allowing to use the number of strokes for batch processes.

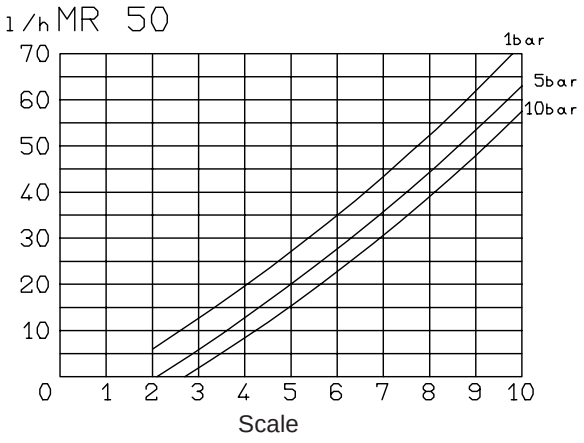
Accessories

Thyristor controller
for the control of a d.c. drive
(see MB 4 20 01).
For further accessories see "Installation example".

Frequency converter
for the control of 3-phase motors. In the case frequency converter operation, a 0.75 kW motor and an external vent must be used.

Performance curves

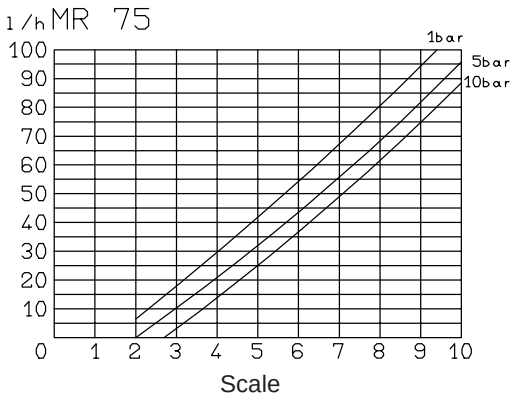
run with water, suction lift about 0.5 m

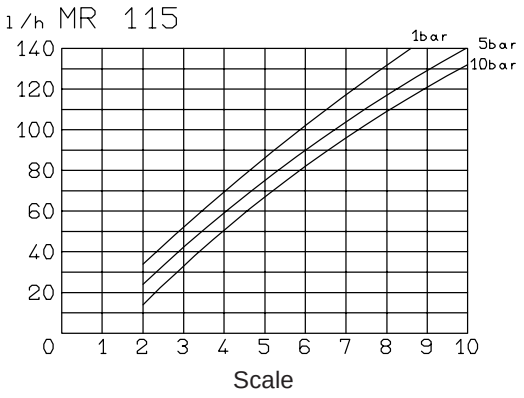


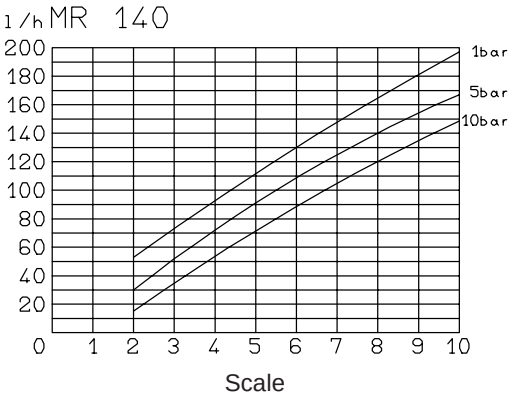
Diaphragm metering pump MEMDOS MR

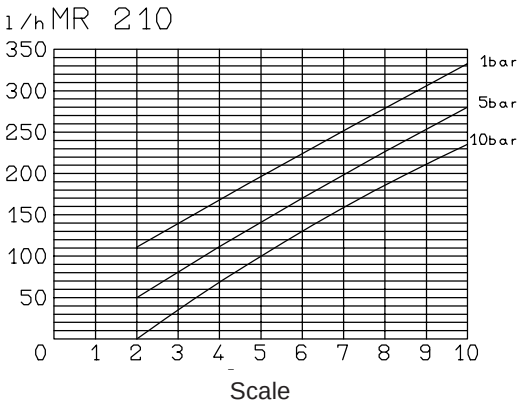
Performance curves

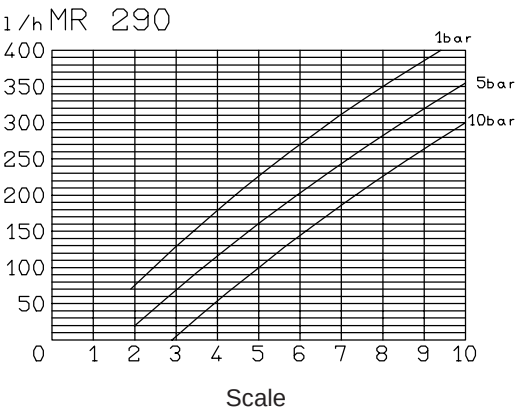
run with water, suction lift approx. 0.5 m

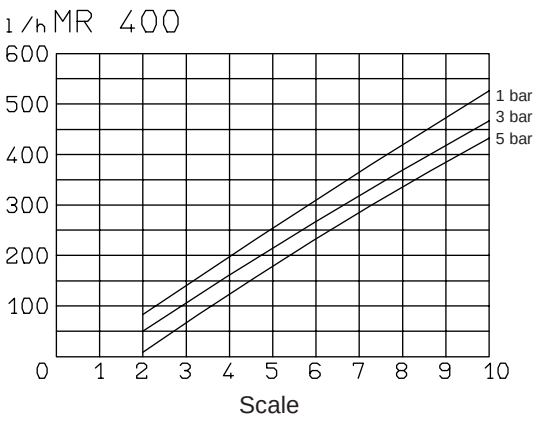


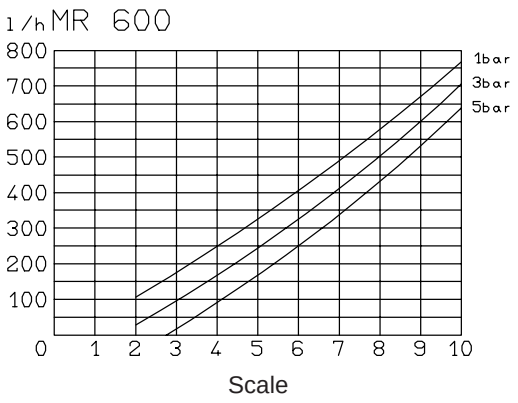


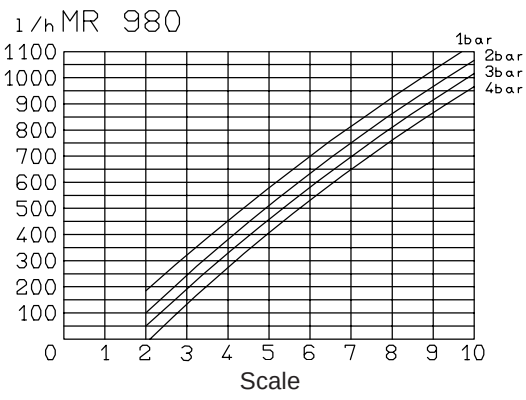












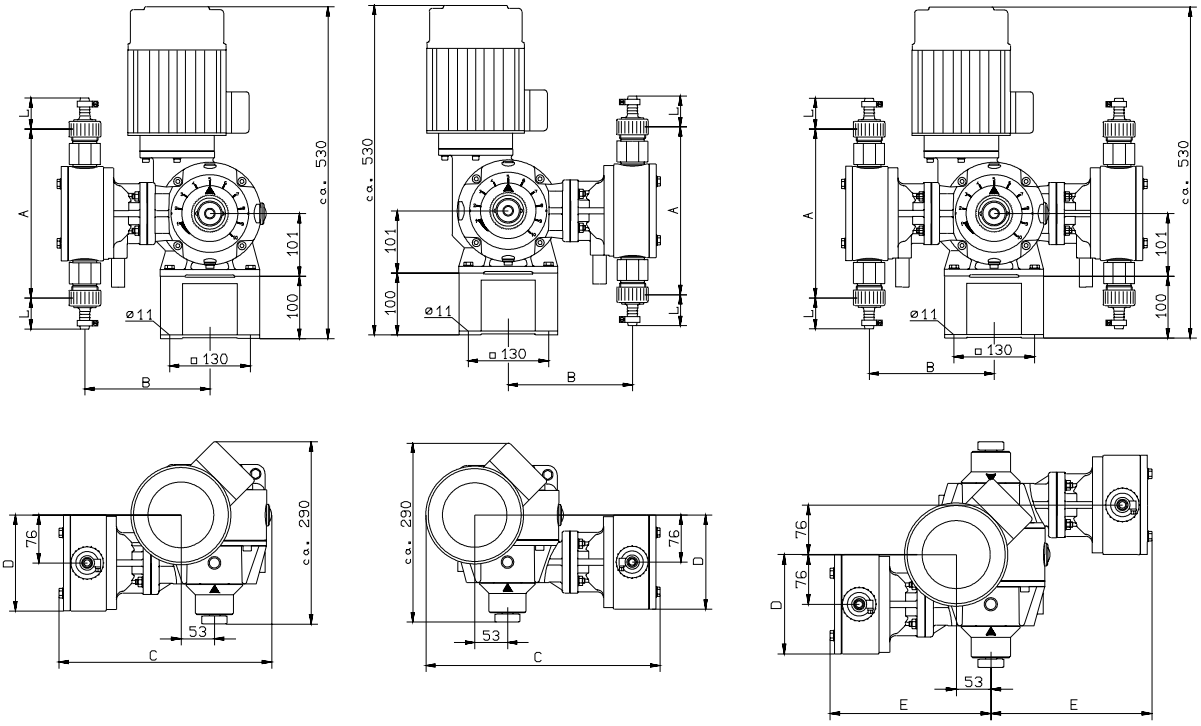
Diaphragm metering pump MEMDOS MR

Simplex pumps

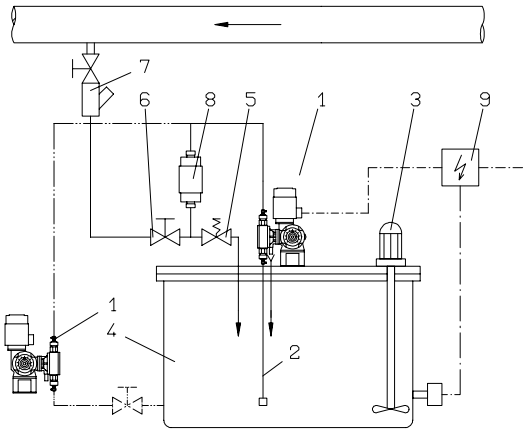
Left-hand version
MR 50 L . . . MR 980 L

Right-hand version
MR 50 R . . . MR 980 R

Duplex pumps



Installation example



Legend

1 Metering pump MEMDOS MR	**MB 1 05 02**
2 Suction line	MB 1 22 01
3 Electric agitator	MB 1 36 03
4 Tank	MB 1 20 01
5 Relief valve	MB 1 25 01
6 Diaphragm shutoff valve	MB 1 24 01
7 Injection nozzle	MB 1 23 01
8 Pulsation dampener	MB 1 27 01
9 Switchbox	

In the case of duplex pumps with different metering heads the larger head must always be located on the left-hand side (L); for possible head combinations see table MB 1 05 02 / 5.

Dimensions

Model MR	A	B	C	D	E
50	272	201	370	ø152	228
75	272	201	370	ø152	228
115	272	201	370	ø152	228
140	272	201	370	ø152	228
210	272	201	370	ø152	228
290	296	201	370	□170	225
400	265	225	425	ø230	300
600	265	225	425	ø230	300
980	265	225	425	ø230	300

Dimension L see selection table 5, page 7.

Selection tables

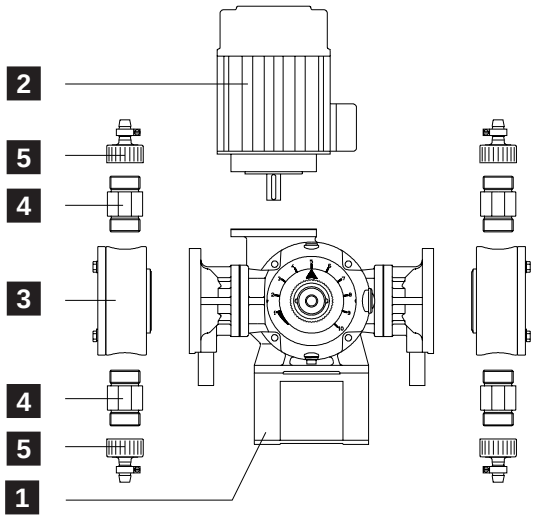
In order to offer the user a wide variety of pumps, the metering pumps have been divided into the most important functional groups. The pump can be made up according to the individual requirements.

Select the pump from the following modules:

1 Gear **2** Motor **3** Head

4 Valves **5** Connections

The numbers on the pump drawing refer to the corresponding selection tables.

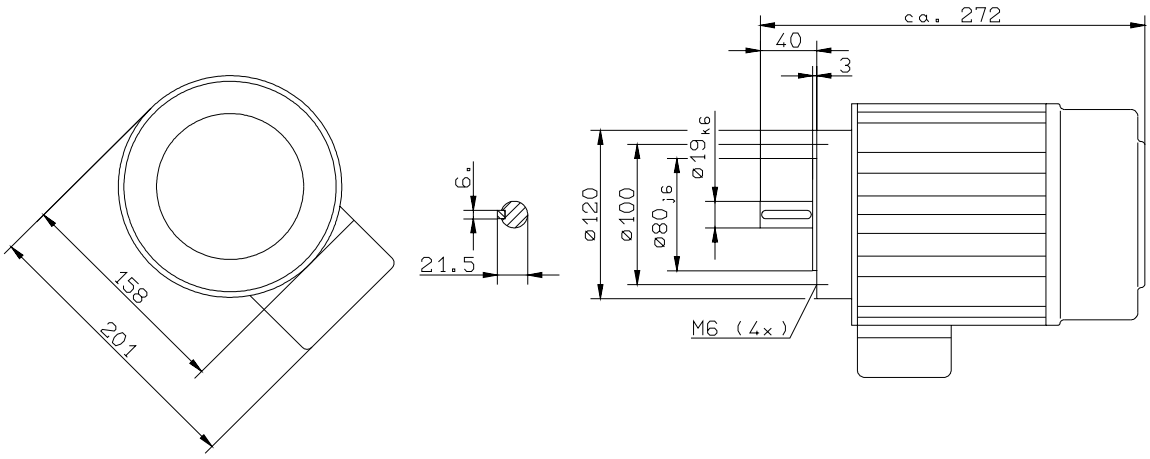


1				
Pump model MR	Simplex pumps			
	Left-hand version L		Right-hand version R	
	Capacity adjustment			
	manual	ATE	manual	ATE
400	31247	31248	31440	31441
600	31249	31250	31442	31443
980	31251	31252	31444	31445

1			
Pump model ZMR	Duplex pumps with different heads		
	Capacity adjustment		
	Symbol	manual	ATE
400/50		31653	31654
140/75		31655	31656
600/75		31657	31658
210/115		31659	31660
290/115		31661	31662
980/115		31663	31664
600/140		31665	31666
290/210		31667	31668
980/210		31669	31670
980/290		31671	31672

1			
Pump model ZMR	Duplex pumps with equal heads		
	Capacity adjustment		
	Symbol	manual	ATE
50/50		31253	31254
75/75		31647	31648
115/115		31681	31682
140/140		31649	31650
210/210		31683	31684
290/290		31251	31652
400/400		31261	31262
600/600		31267	31268
980/980		31271	31272

3			
Pump model MR	Heads		
	Diaphragm ø	PP	1.4571
50	90	23721	23727
75		23721	23727
115		23721	23727
140	120	23722	23728
210		23722	22728
290	150	23723	22334
400	185	23735	23736
600		23735	23736
980		23735	23736



2

E. motor type	Part No.	Circuit	Voltage V	Current consumption A	Power kW	Speed 1/min	Frequency Hz	Prot. Class ISO Cl.	Prot. Class IP
AF 80 / 4A-11	78629	Δ Y	230/400	2.6 / 1.55	0.55	1390	50	F	55
AF 80 / 4B-11	78903	Δ Y	230/400	3.5 / 2.0	0.75	1400	50	F	55
AF 80 / 4B-11	78982	Δ Y	230/400	3.5 / 2.0	0.75	1400	50	F*	55

* Motor fitted with cold-conductor thermometer probe

4

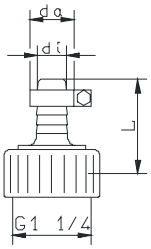
Pump model MR	Standard valves									
	MR 50...290: double-ball MR 400...980: spring-loaded with Hastelloy spring (disk valves as of 08.97)									
	Suction valve assembly					Discharge valve assembly				
	PP			1.4571		PP			1.4571	
	Seals of:									
	Hypalon	Viton	AF	Hypalon	Viton	Hypalon	Viton	AF	Hypalon	Viton
50 ... 290	26841	26842	29694	—	—	27356	27357	29695	—	—
400 ... 980	23703	23704	—	23705	25681	23703	23704	—	23705	25681

Pump model MR	Spring-loaded valves with Hastelloy spring									
	Suction valve assembly					Discharge valve assembly				
	PP			1.4571		PP			1.4571	
	Seals of:									
	Hypalon	Viton	AF	Hypalon	Viton	Hypalon	Viton	AF	Hypalon	Viton
50 ... 290	26845	25707	29696	—	—	27353	27354	29697	—	—

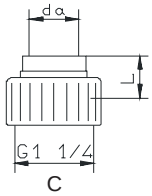
AF = asbestos-free

Diaphragm metering pump MEMDOS MR

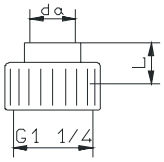
5								
Pump Model	Dimensions					Part No. Version		
MR	DN	Abb.	di	da	L	PVC	PP	St. steel
50	8	C	-	12	22	25923	-	-
75		E	-	10	51	-	-	25926
115	10	B	9	15	41	25921	-	25925
		C	-	16	22	27672	27664	-
		D	-	G 3/8	22	25930	33797	27037
50	15	B	16	26	50	25936	35649	25935
75		C	-	20	22	25937	35490	-
115		D	-	G 1/2	22	25943	33798	25944
140		E	-	18	44	-	-	25939
210		F	-	-	47	25956	-	-
290		F	-	-	53	-	-	25957
400	20	D1	-	G 3/4	40	24076	-	24065
400	25	B1	25	34	70	24034	-	24063
600		C1	-	32	40	21488	33770	-
980		D1	-	G1	40	28458	34717	27040
		E1	-	28	80	-	-	27852
		F1	-	-	60	25622	-	25623
		G1	-	32	75	34050	34570	-
	32	C1	-	40	44	21491	34828	-
		D1	-	G 1 1/4	40	-	32759	25252



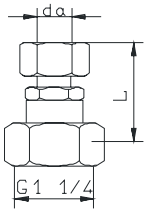
B
Tubing connection



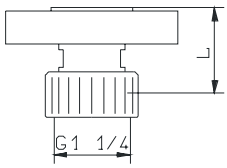
C
PVC pipe cemented connection



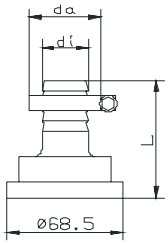
D
Threaded connection



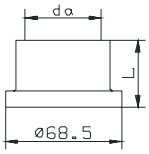
E
Screwed (Ermeto) connection



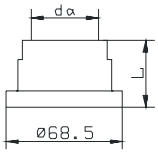
F
Flange connection



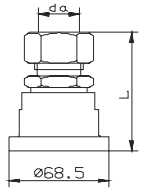
B 1
Tubing connection



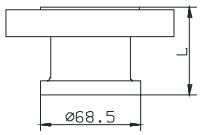
C 1
PVC pipe cemented connection



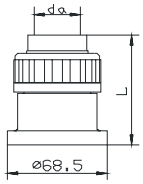
D 1
Threaded connection



E 1
Screwed (Ermeto) connection



F 1
Flange connection



G 1
PVC pipe cemented connection

Order example

For metering aluminum sulfate and sodium hypochlorite, metering pumps are required.
Given operating data:
380 l/h aluminum sulfate, max. pressure 4 bar
45 l/h sodium hypochlorite, max. pressure 3 bar
Mains voltage: 230/400 V, 50 Hz

In this example, both chemicals shall be metered at a fixed ratio. Therefore a manually adjustable duplex pump ZMR 400/50 should be ordered.
Resistant head material: PP

The suction and discharge valves are determined according to the resistance of the sealing materials. Hypalon is resistant to aluminum sulfate. Viton is resistant to sodium hypochlorite.

The order reads as follows:

The metering pump is made up of the following modules:

		Part No.
1	Gear ZMR 400/50	31653
2	Drive motor	78629
3	Head for MR 400	23735
	Head for MR 50	23721
4	Suction valve for MR 400	23703
	Discharge valve for MR 400	23703
	Suction valve for MR 50	26842
	Discharge valve for MR 50	27357
5	Suction connection for MR 400	24034
	Discharge connection for MR 400	24076
	Suction connection for MR 50	25936
	Discharge connection for MR 50	27672

Diaphragm metering pump MEMDOS MR-ATE

General

Metering pumps for use as correcting elements in automatic control systems or control lines are equipped with electrical servomotors. Thus the stroke length can be adjusted by sender-key contacts or controllers with relay output. In the case of duplex pumps, each head may be fitted with a separate servomotor and adjusted independently.

The pumps are identified by the letters ATE added to the model:

e.g. MR 50 L - ATE

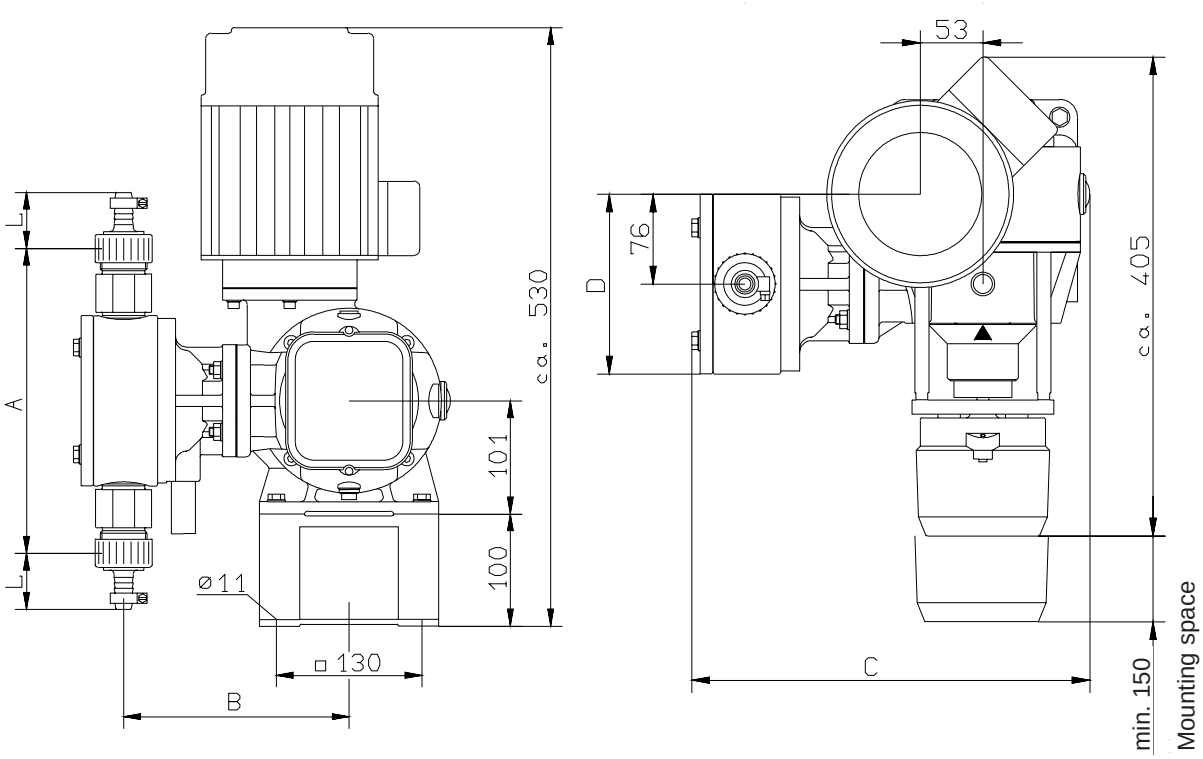
Mechanical manual adjustment of the pumps with ATE drive is possible by using a separate hand crank.

The non-linear performance curve of the diaphragm metering pumps remains despite all linear mechanics of the stroke adjustment. Therefore the performance curve of the pump must be taken into consideration in the case of controls without feedback of the metering result (proportional metering).

Two products with different technical data are available (see pages 10 and 11).

Upon request, also "increased safety"-type or "air-tight" servomotors can be supplied.

Dimensions



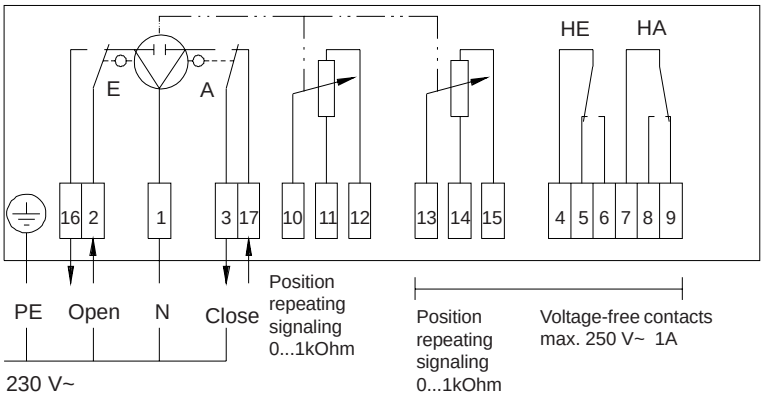
Dimension A, B, C, D, see MB 1 05 02 / 4

Technical data, types AR 30W23 and AR 30W23S

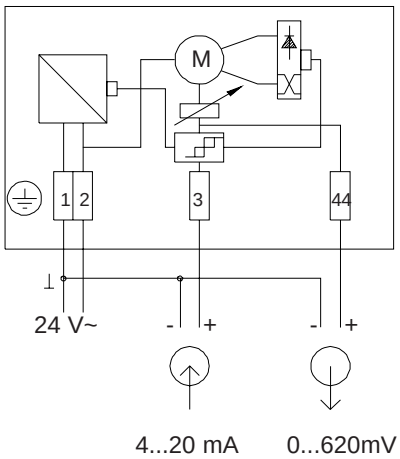
Type	AR 30W..	AR 30W..S
Design	Reversible a.c. motor with self-locking reduction gear	
Use	for controllers with switching output (3-point control)	for controllers with continous output (2...10V or 4...20mA)
Auxiliary voltage	230V~ ± 15% 50...60 Hz	24V ~ ± 20% 50...60 Hz
Control		2...10V or 4...20mA
Power consumption	2 W	7 W
Regulating time/bevel	360s / 270° = 0...100%	
Position repeating signaling for remote display	Potentiometer 0.5 W 0...1000 Ω = 0...100%	0...620mV = 0...100%
Limit switch	Internal limit switches for limiting angle of rotation. Signaling of final position via terminals 16 and 17	Internal limit switches for limiting angle of rotation.
Protection class	IP 55 (EN 60529)	
Ambient temperature	-20 ... 60°C	
Options		
2nd potentiometer	0...1000 Ω 0.5 W	
Limit switches (2 off)	max. 250V 1A	

Wiring diagrams

Types AR 30W23 F001 230V~
and AR 30W23 F020 24V ~



Type AR 30W23S F020 24V~

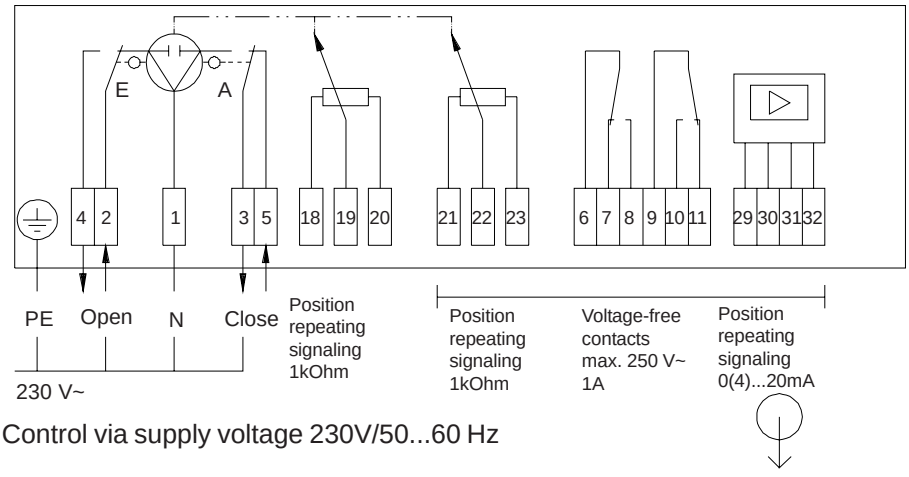


Technical data, types WAN 1 and WAN 1-S

Type	WAN 1	WAN 1-S
Design	Reversible a.c. motor with self-locking reduction gear	
Use	for controllers with switching output (3-point control)	for controllers with continuous output 0(4)...20mA
Auxiliary voltage	230V~ ± 10% 50...60 Hz Other voltages upon request	230V~ ± 10% 50...60Hz
Control		0(4)...20mA
Power consumption	approx. 11.5 W	
Regulating time/bevel	360s / 270° = 0...100%	
Position repeating signaling for remote display	Potentiometer 0.5 W 0...1000 Ω = 0...100%	0(4)...20mA (as an option only)
Limit switch	Internal limit switches for limiting the angle of rotation. Signaling of the final position via terminals 4 and 5	
Protection class	IP 54 according to DIN 40050	
Ambient temperature	max. 60°C	
Options		
2nd potentiometer	0...1000 Ω 0.5 W	
Limit switches (2 off)	max. 250V 1A	

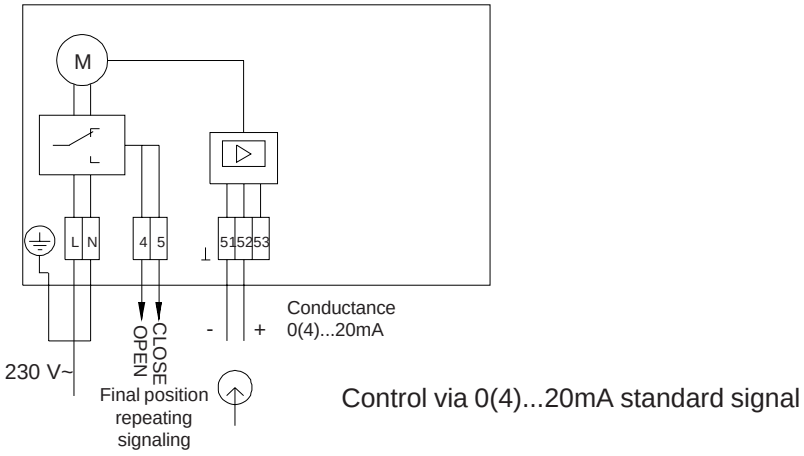
Electrical wiring diagrams

WAN 1



Control via supply voltage 230V/50...60 Hz

WAN 1-S



Control via 0(4)...20mA standard signal