

General

KARDOS stands for a group of precision metering pumps which have been developed especially for applications with a high demand for accuracy, reliability and flexibility in a wide performance range.

Versions

The symmetrically designed gearbox allows the arrangement of two metering heads on the same level and the stacking of three heads above one another, thus enabling a maximally 6-head pump. Each metering head is 100% adjustable independently. Any speed adjustment to the main drive has a simultaneous effect on all metering heads, but the relative volume ratios remain unchanged.

Standard versions have the metering head on the left-hand side.

Type N...L (Symbol )

Upon request, pumps with the metering head on the right-hand side are available. Type designation

Type N... R (Symbol )

Duplex metering pumps are available with the metering heads opposite to each other.

Type ZN... (Symbol )

Metering head

The correct choice of the metering head depends on the aggressivity of the chemical, its temperature and viscosity, and on the system pressure.

Environmental factors (rough operating conditions, radiant heat, etc.) must also be taken into consideration.

Plastic metering heads can be used up to 10 bar ; stainless steel metering heads allow operating pressures of up to max. 400 bar. Metering head pistons are available in ceramic or stainless steel material (see selection table).



Suction and discharge valves

Suction and discharge valves can be supplied as double-ball or spring-loaded single-ball valves. Spring-loaded valves are to be recommended if the chemical used has a viscosity exceeding 400 mPas.

Flushing attachment

As a standard the metering heads are provided with a flushing lantern. Flushing water should be connected if the chemical is very aggressive, in order not to cause any corrosion damage due to unavoidable leakages.

If the medium is abrasive, the flushing water will prevent premature failure of the piston and packing in the event of severe leakage. In this case, the pressure of the flushing water should be higher than that of the medium.

Technical data

KARDOS N...		16	36	56	72	130	225	320	530	750	1300	2500	4200
Max. pressure [bar]	plastic	10										65	3
	SS	400	325	250	130	80	52	32	24	13	6.5	3	
Flow rate at max. pressure	[l/h]	15	34	53	68	125	215	306	500	715	1225	2400	4400
	[ml/stroke]	2.5	5.6	8.8	11.3	20.7	35	51	83	119	204	392	733
Piston- ø	[mm]	8	12	15	17	23	30	36	46	55	72	100	135
Stroke frequency	[1/min]	100											
Suction lift	[mbar]	120											
Motor power	[kW]	selectable 0.55 - 0.75 - 1.1 - 1.5 - 2.2											
Weight [kg]	Metering head	plastic	4				8			15	20	30	
		SS	7				17		34	38	45	78	
	Simplex gear	manual	95				96			97	98	99	
		ATE	100				101			102	103	104	
	Duplex gear	manual	135				137			139	141	143	
		ATE	145				147			149	151	153	

Abrasive media

Piston packings are available as:

1. PTFE-braided packing and
2. Aramid-kevlar packing

The standard PTFE packing can be used for basically all chemicals up to a pressure of 100 bar. At higher pressures, leakage may become more severe.

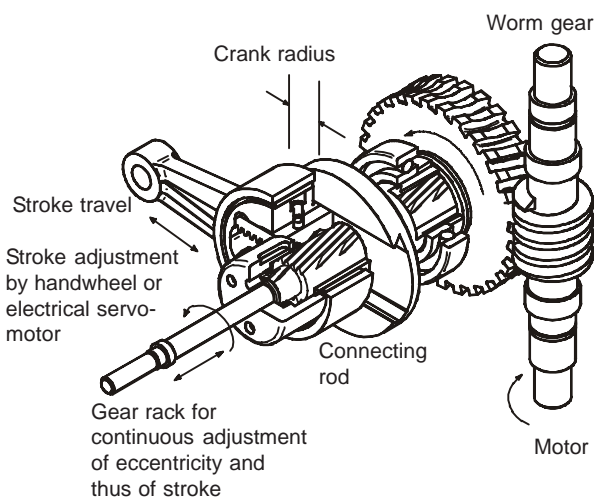
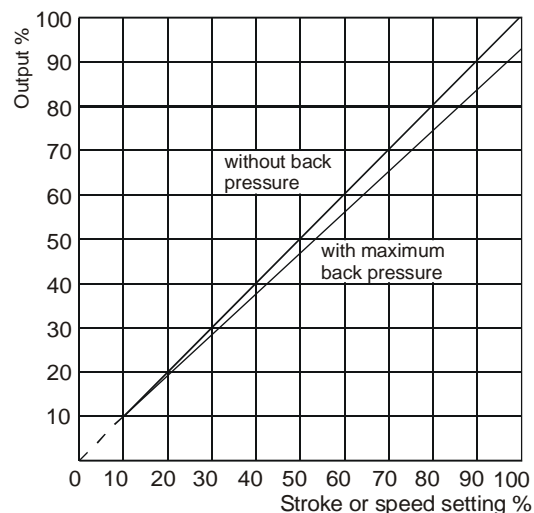
In the case of abrasive media or pressures much higher than 100 bar, it is advisable to use aramid-kevlar packings if compatible with the chemical used. Aramid-kevlar is not resistant to concentrated acids or alkalis. If these are to be metered against higher pressures, the PTFE packing must be used despite the more severe leakage, and, possibly, the flushing attachment must be connected.

Drive

The drive consists of an oil-filled worm gear with single-stage reduction.

The heart of the KARDOS drive is the radially displaceable cam. It can be adjusted via the helical gear rack according to the desired flow rate. An advantage of this system is that, after stroke adjustment, there is no relative movement of the sliding parts. The cam acts like a rigid crank pin.

The drive is normally a 3-phase motor, although variable DC motors and explosion-proof motors are available. The stroke length, which determines the flow rate, can be varied linearly during operation between 0 and 100%. The standard version is equipped with manual adjustment. Upon request, electrical remote adjustment (ATE) is available. By combining the variable drive motor and the remotely settable stroke length adjustment, two independent control points for the metering pump are available, and enable disturbance variable superimposition in automatic control systems.

Functional diagram

Performance curves


Accessories

Stroke counter

Upon request, the metering pump can be fitted with an inductive scanner button to count the strokes.

Proportional metering

e.g. as a function of water meter contacts, where every contact initiates a positively adjustable pump running time of 1 to 30 seconds (see data sheets MB 1 34 01).

Metering head heating

For fluids which are solid when cold the metering head can be fitted with a warm water, steam or electrical heating.

Remote control

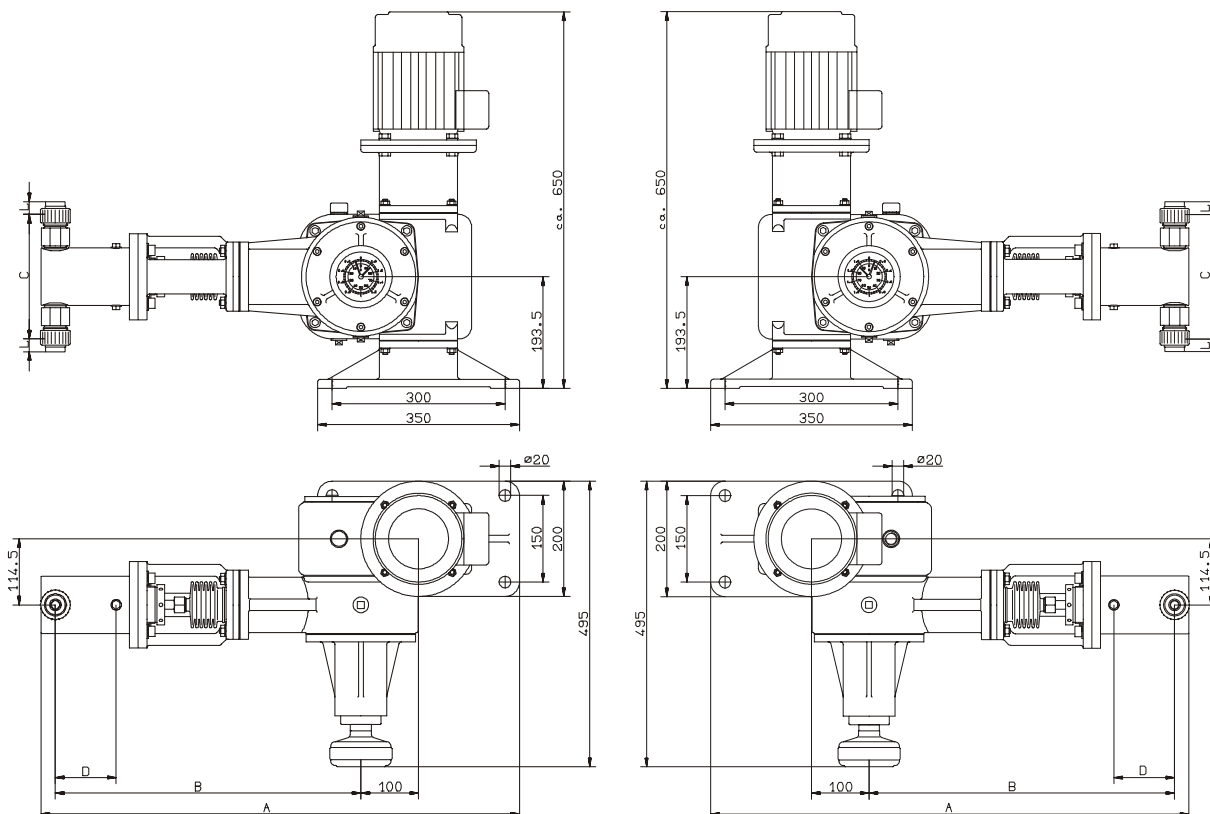
Electrical, reversible servomotor for remote adjustment of the stroke length via a manual key or via a 3-point step controller.

See data sheet MB 1 09 02 / 9 for details.

Dimension table for simplex and duplex pumps

Pump	A		B		C		D		E	
Type	Plastic	SS	Plastic	SS	Plastic	SS	Plastic	SS	Plastic	SS
N 16 ... 72	782	782	482	482	138	108	80	80	1215	1215
N 130 ... 530	840	830	530	530	258	219	115.5	105.5	1330	1310
N 750	860	835	492	505	226	218	70	83	1370	1320
N 1300	885	835	517	505	230	218	95	83	1420	1320
N 2500 ... 4200	900	875	530	530	330	308	108.5	108.5	1450	1400

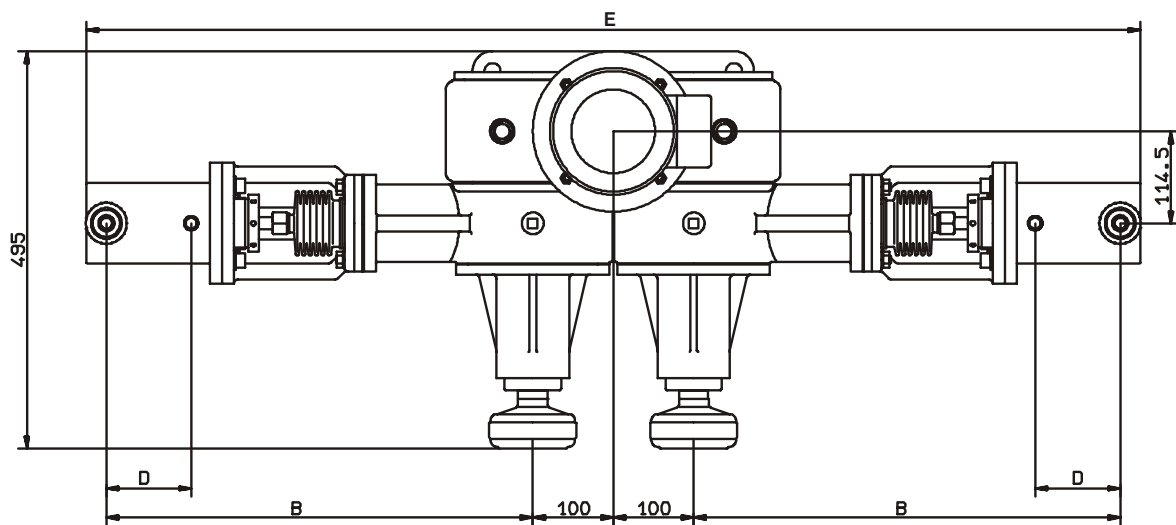
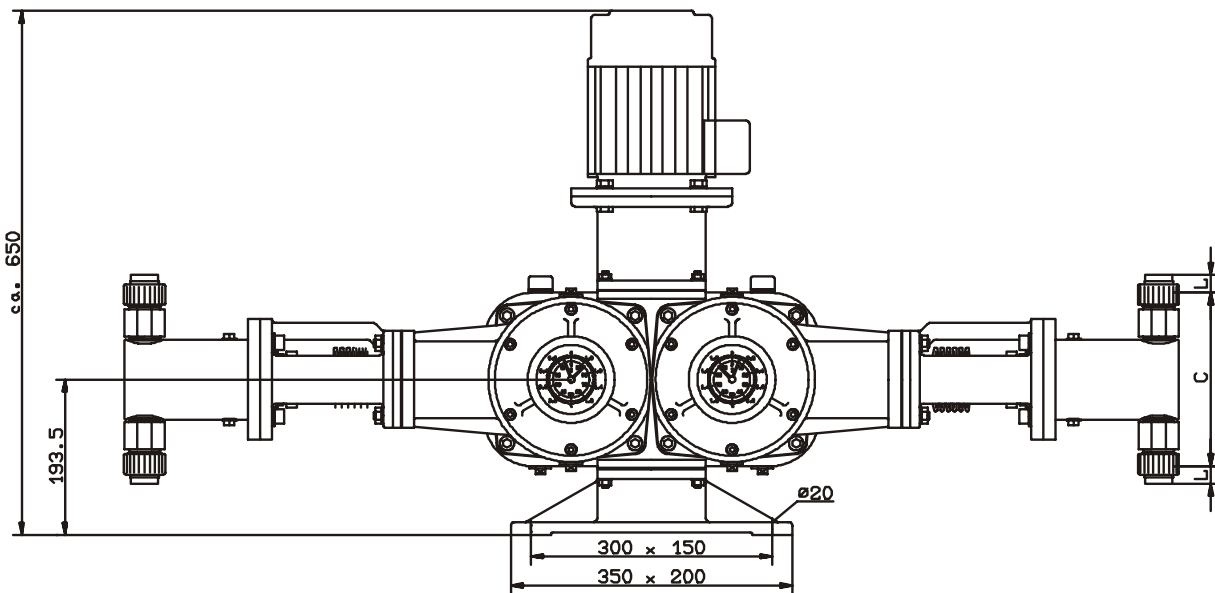
Simplex pump

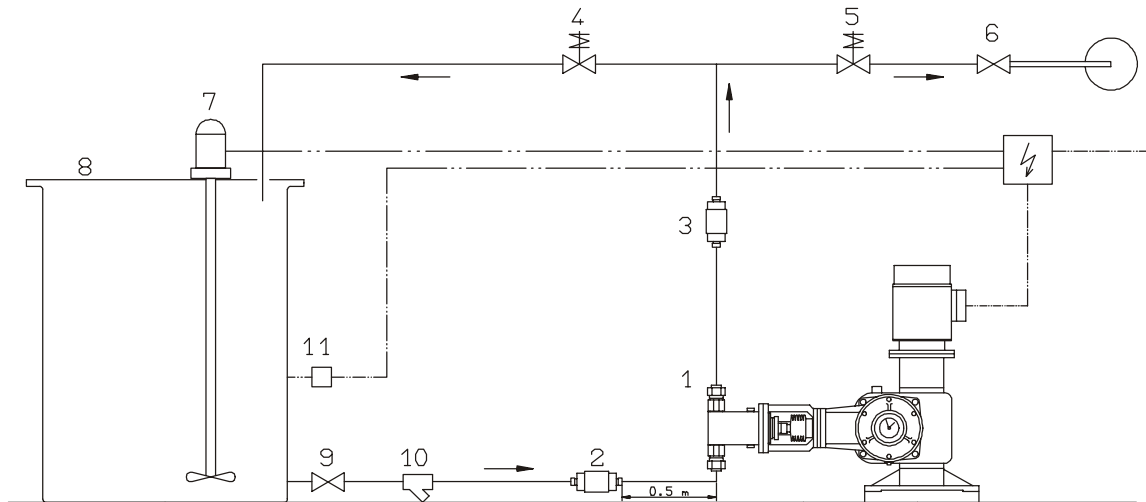


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Duplex pump





1. Metering pump KARDOS N	MB 1 09 02	7. Electric agitator	MB 1 36 01
2. Pulsation dampener for suction line	MB 1 27 01	8. Polyethylene tank	MB 1 20 01
3. Pulsation dampener for discharge line	MB 1 27 01	9. Shutoff valve	MB 1 24 01
4. Relief valve	MB 1 25 01	10. Dirt trap	MB 1 22 02
5. Backpressure valve	MB 1 25 01	11. Low level protection	MB 4 10 01
6. Injection nozzle	MB 1 23 01		

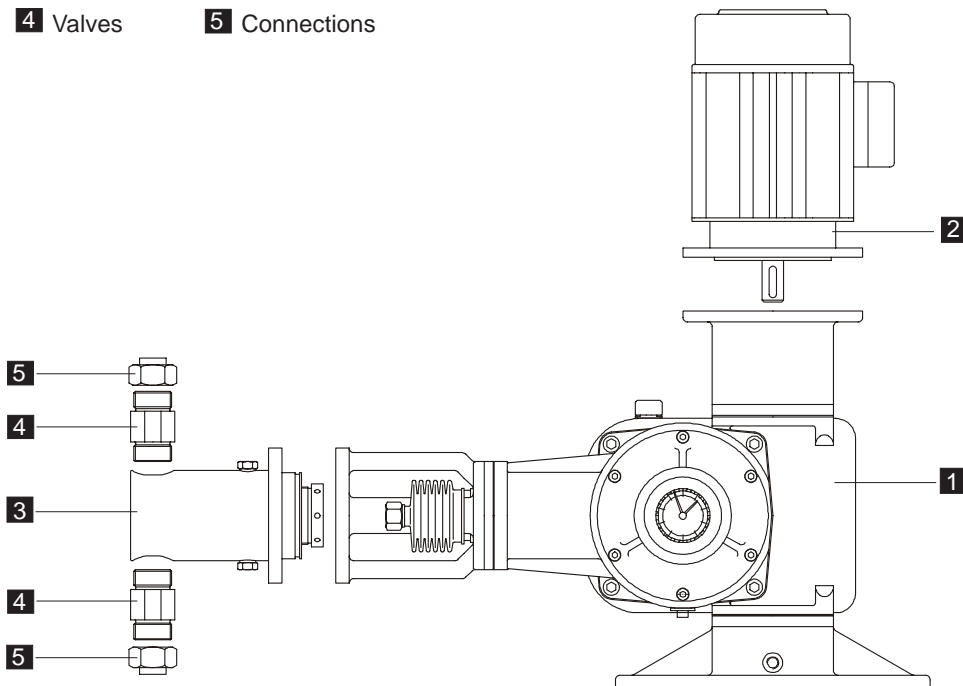
The accessories shown may be fitted as required.

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. These can be combined individually as required.

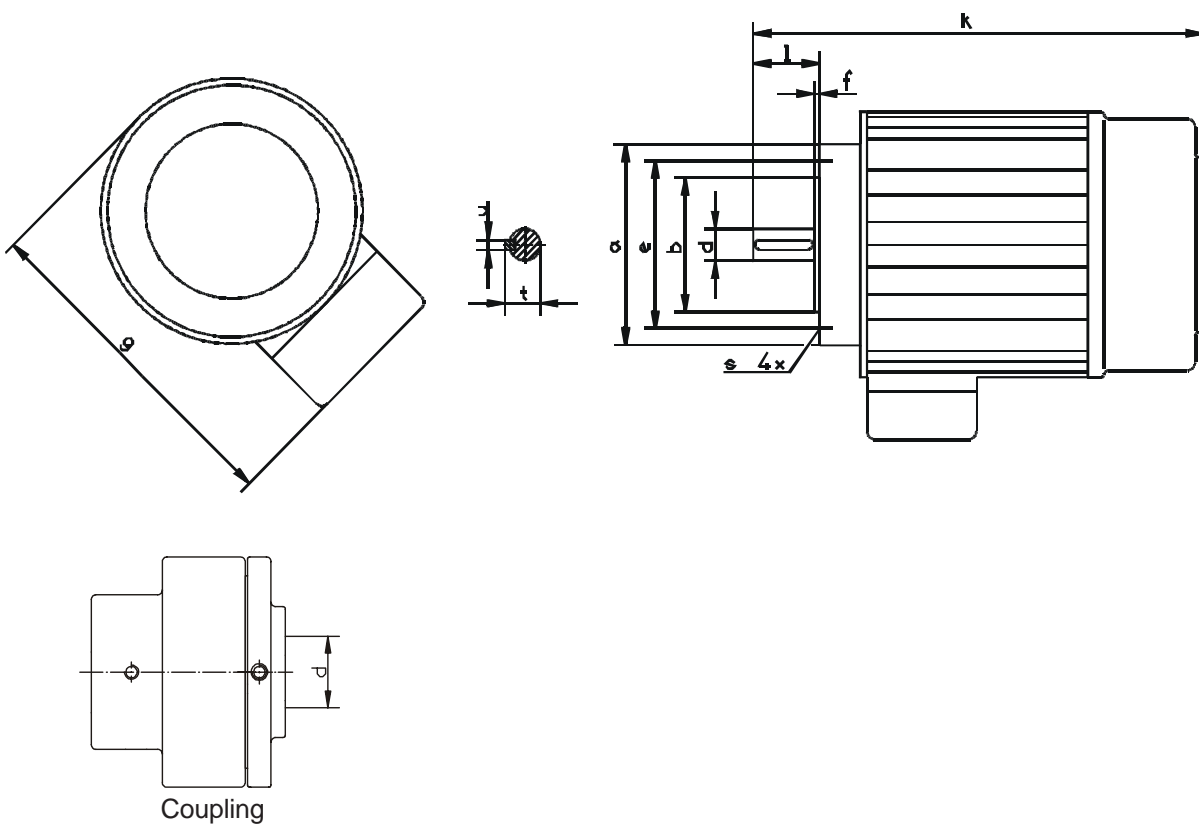
The numbers of the pump drawing refer to the corresponding selection tables. More than 2 metering heads or superimposed metering heads on request.

- 1** Gear
- 2** Motor
- 3** Metering head
- 4** Valves
- 5** Connections



1 Gear				
Pump type	Left-hand version		Right-hand version	
	Output adjustment			
	manual	ATE	manual	ATE
N 16 ... 72	29661	29671	29666	29676
N 130 ... 530	29662	29672	29667	29677
N 750 ... 1300	29663	29673	29668	29678
N 2500	29664	29674	29669	29679
N 4200	29665	29675	29670	29680

Gear for multiple-head pumps upon request.



Coupling

2 Motor																
Voltage 380/220 V, frequency 50 Hz, Y circuit, ISO class B, IP 54																
Motor type	Motor Assbly PartNo	Motor Part No	Current consumpt. [A]	Power [kW]	Speed [1/min]	Dimensions [mm]										
						a	g~	s	e	f	b	d	l	u	t	k~
RF0.55/4-7	31068	77687	2.6/1.55	0.55	1410	200	219	11.5	165	3.5	130	19	40	6	21.5	267
RF0.75/4-7	31069	77689	3.4/2.0	0.75	1400	200	219	11.5	165	3.5	130	19	40	6	21.5	267
RF1.1/4-72	31070	77137	4.8/2.8	1.1	1420	200	239	11.5	165	3.5	130	24	50	8	27	318
RF1.5/4-72	31071	77133	6.3/3.7	1.5	1420	200	239	11.5	165	3.5	130	24	50	8	27	318
RF2.2/4-75	31072	78632	8.5/4.9	2.2	1440	200	253	M10	165	3.5	130	28	60	8	31	365

Other motor versions upon request.

$$P = a \times Q \times (p+l)$$

P [Watt] p [bar] pressure

Determination of motor power (approximation values for single and duplex pumps).

Q [l/h] a = 0.125

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3 Metering head			
Packing material*		PTFE silk packing	
Metering head material		Plastic	1.4571
Piston material		Ceramic	1.4571
Pump type	Piston- \varnothing		
16	8	25272	25296
36	12	25273	25303
56	15	25274	25310
72	17	25275	25317
130	23	29721	25348
225	30	29722	26272
320	36	29723	26276
530	46	29725	26284
750	55	29726	26296
1300	72	29728	26306
2500	100	29730	29737
4200	135	29733 ¹⁾	29740

* Other materials upon request.

¹⁾ Piston material SS 1.4571

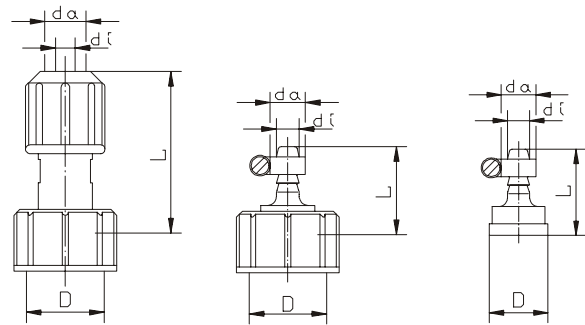
4 Valves											
Seal material		Viton				Hypalon				AF	
Valve material		Plastic		1.4571		Plastic		1.4571		1.4571	
Valve type	Pump type	S	D	S	D	S	D	S	D	S	D
Double-ball valves	N 16 ... N 72	18185	18186	26967	26968	18187	18188	24035	24036	26967	26968
	N 130 ... N 530	23698	23701	29785	29786	26697	23700	23699	23702	28839	28640
Spring-loaded single-ball valves	N 16 ... N 72	25162	27517	25408	23409	25161	27516	25163	25164	26775	28776
	N 130 ... N 530	24112	24113	29787	29788	24114	24115	22880	24102	28841	28842
	N 750 ... N 1300	23704	23704	25681	25681	23703	23703	23705	23705	—	—
	N 2500 ... N 4200	24073	24073	29961	29961	24072	24072	24071	24071	—	—

S = Suction valve

D = Discharge valve

AF = asbestos-free fiber packing

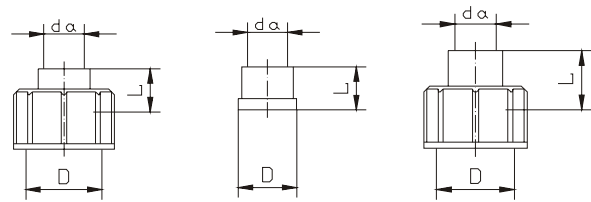
5 Connections								
Pump type	Dimensions						Part No. material	
	DN	Abb.	ø D	di	da	L	Plastic	1.4571
N 16 - 72	4	A	G 3/4	4	6	35	19480	—
	6	A	G 3/4	6	12	55	19175	—
	6	A	G 3/4	6	8	30	28159	—
	6	B	G 3/4	6	12	30	23342	—
	6	B1	ø 20	6	12	29	—	23426
	8	C	G 3/4	—	10	15	25167	—
	10	C	G 3/4	—	12	15	27518	—
	6	D	G 3/4	—	G 1/4	20	25165	—
	6	D1	ø 20	—	G 1/4	20	—	82105
	6	E1	ø 20	—	8	20	—	27519
	8	E1	ø 20	—	10	20	—	23427
10	E1	ø 20	—	12	20	—	23428	
N 130 - 530	10	B	G 1 1/4	9	15	41	25921	25925
	15	B	G 1 1/4	16	26	50	25936	25935
	10	C	G 1 1/4	—	16	22	27672	—
	15	C	G 1 1/4	—	20	22	25937	—
	20	C	G 1 1/4	—	25	22	33318	—
	10	D	G 1 1/4	—	G 3/8	22	25930	27037
	15	D	G 1 1/4	—	G 1/2	22	25943	25944
N 750 - 1300	25	B1	68	25	34	95	24034	24063
	25	C1	68	—	32	40	21488	—
	32	C1	68	—	40	40	21491	—
	25	D1	68	—	G 1	40	—	27040
	32	D1	68	—	G 1 1/4	40	32759	25252
	25	E1	68	—	28	60	—	27852
	25	F1	68	—	—	64	25622	25623
	N 2500 - 4200	40	C1	100	—	50	100	21548
40		D1	100	—	G 1 1/2	100	—	25255
40		F1	100	—	—	100	27100	27101
50		C1	100	—	63	100	21529	—
50		F1	100	—	—	100	27103	27104
50		D1	100	—	G2	100	—	27046



A
Tubing
connection

B
Hose clamp
connection

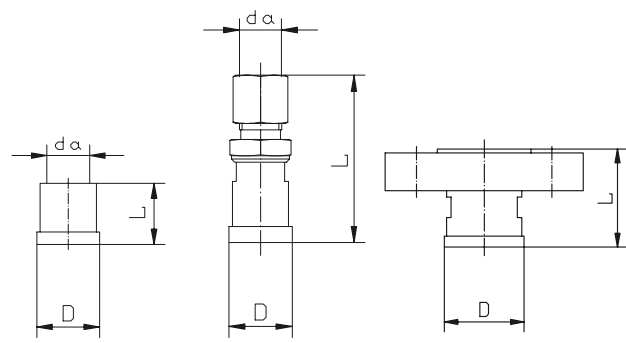
B1



C
Cemented connection

C1
Threaded connection

D



D1
Threaded
connection

E1
Stainless steel pipe
connection

F1
Flange
connection

Pump selection

It can be seen from MB 1 09 02 / 1 that the KARDOS N 4200 metering pump is suitable for this application. Since an abrasive medium is involved, the packing material should be aramid and the metering head and piston should be made of stainless steel 1.4571. Hypalon seals are resistant to this medium and are therefore satisfactory.

Order example

A metering pump is required for injecting lime slurry. The 3.400 l/h of lime slurry at 20° C have to be metered against 3bar. The output has to be manually adjustable.

Order

The metering pump consists of the following modules:

- 1 Gear: Part No. 29665
- 2 Drive motor: Part No. 31072
- 3 Metering head: Part No. 29740 with aramid kevlar packing
- 4 Suction valve: Part No. 24071
Discharge valve: Part No. 24071
- 5 Connections suction and discharge side, 2 off Part No. 27101

General

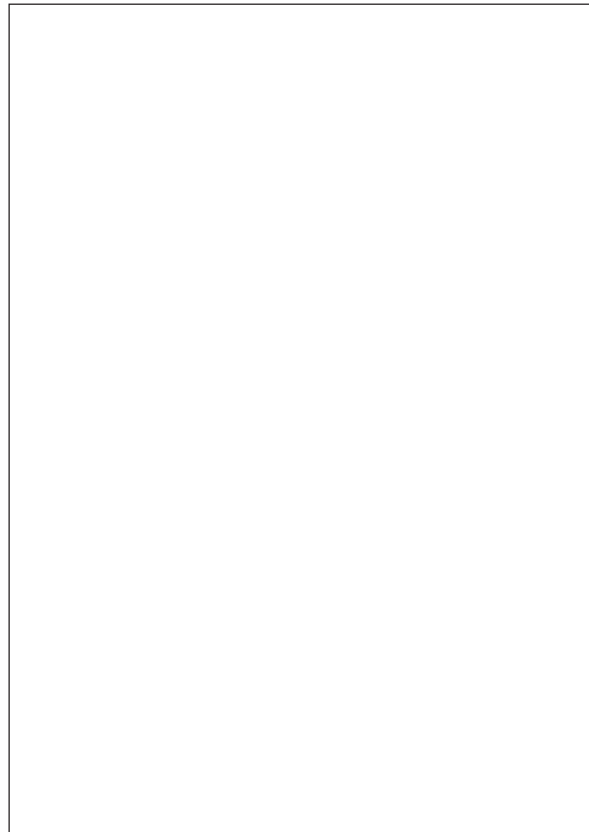
Metering heads with a servomotor are used as correcting elements in automatic control systems or control lines.

A reversible AC motor allows to adjust the stroke length for each metering head, in the case of multiple-head pumps separately for each head. Manual adjustment is possible by using the hand wheel.

This type of pump is specified by adding "ATE" to the name, e.g. KARDOS N 65-ATE.

Technical data of the servomotor

Design: reversible AC motor with reduction gear
 Mains connection: 220 V, 50 Hz approx. 10 VA
 Protection class: IP 54 ISO Cl. B
 Ambient temperature: - 15°C ... + 60°C
 Regulating distance: 50 rotations
 Regulating time: 2 minutes
 Position indication: mounted handwheel with scale
 Remote display: integrated potentiometer with 1000 Ohm overall resistance
 Weight: extra weight 3 kg



Other versions of power supply or possibilities of control upon request.

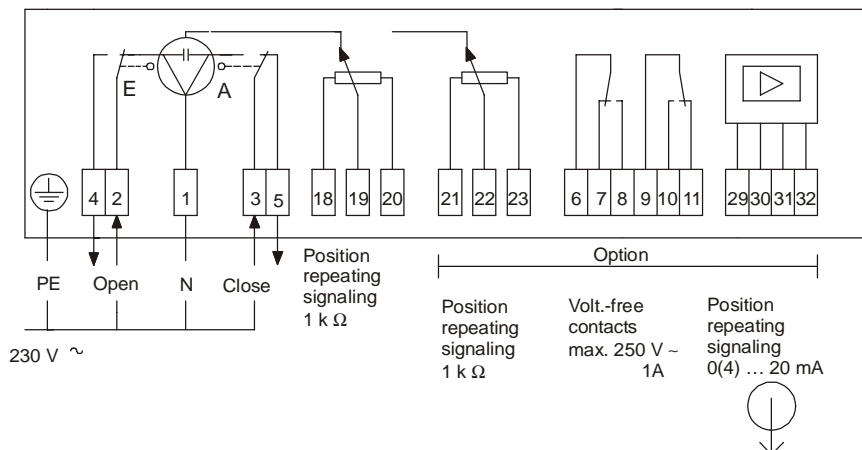
Additional equipment:

1. other repeating signaling resistance than 1000 Ohm
2. higher protection class IP 65
3. other power supply

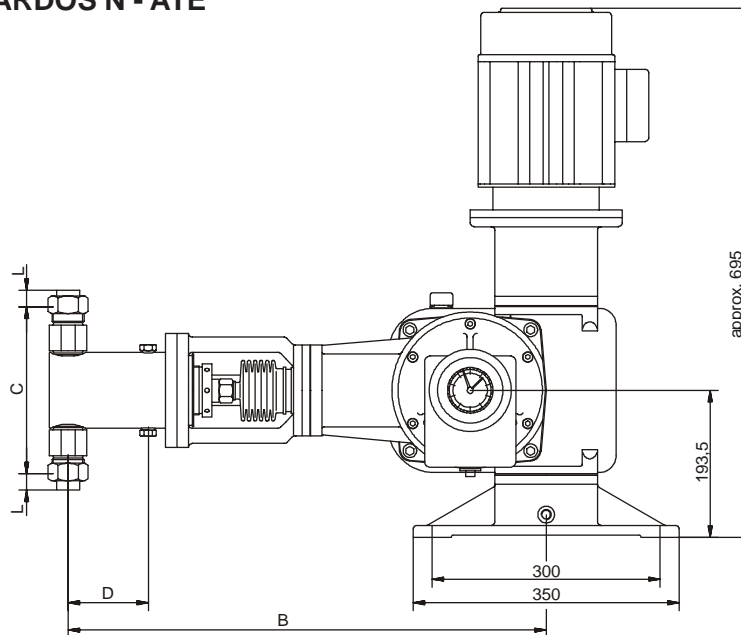
Wiring diagram

Caution!

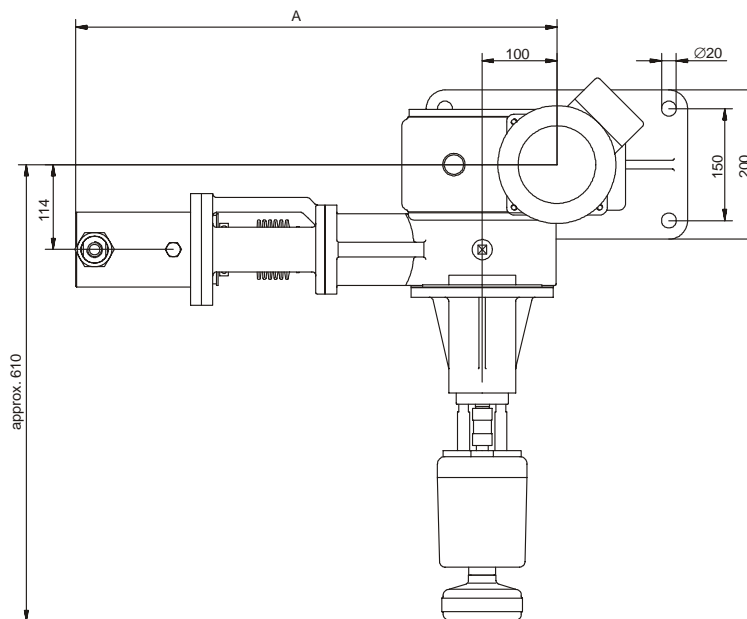
The ATE servomotor must not be in operation when the pump motor is not working. Therefore the main motor is to be locked electrically.



Dimensions KARDOS N - ATE



For dimension L refer to table 5



Pumpe type	Stainless steel metering head				Plastic metering head			
	Dimensions							
	A	B	C	D	A	B	C	D
N 16 ... 72	782	482	108	80	782	482	138	80
N 130 ... 530	830	530	219	105.5	840	530	258	115.5
N 750 ... 1300	855	530	198	108.5	885	530	246	108.5
N 2500 ... 4200	875	530	308	108.5	900	530	330	108.5