

**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 four metering heads on the same level and the stacking of three heads above one another, thus enabling a maximally 12-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 KN...L** (Symbol )

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

**Type KN...R** (Symbol )

Duplex metering pumps are available with head combinations as indicated in the tables. In the standard version the heads are arranged opposite to each other.

**Type ZKN...** (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.


**KMS piston-diaphragm system**

Piston-diaphragm heads are also available in three sizes. These are recommended if, despite higher pressures, leakage-free metering is required because the chemical is toxic, aggressive or abrasive. Piston-diaphragm heads are separated from the gear oil, and have their own hydraulic system (glycerine).

Piston-diaphragm heads may also be retrofitted in existing installations (see data sheets MB 1 40 01).

**Technical data**

<b>KARDOS KN</b>		10	23	35	45	85	150	210	350	500	850	1460	
Max. pressure [bar]	Plastic	10										6.5	3
	SS	400	250	160	125	65	40	25	16	11	6.5	3	
Flow rate at max. pressure	[l/h]	9,9	22	35	45	82	140	200	325	465	800	1550	
	[ml/stroke]	1.5	3.4	5.3	6.8	12.5	21.2	30.5	50	71.3	122	235	
Piston ø	[mm]	8	12	15	17	23	30	36	46	55	72	100	
Stroke frequency	[1/min]	110											
Suction lift	[mbar]	120											
Motor power	[kW]	0.55 - 0.75 - 1.1 depending on power consumption											
Weight (kg)	Metering head	Plastic	2				3				4	5	
		SS	7				10				15	18	
	Simplex gear	manual	45				46				47	48	
		ATE	49				50				51	52	
	Duplex gear	manual	55				57				59	61	
		ATE	63				65				67	69	

### Suction and discharge valves

Suction and discharge valves can be supplied as double-ball, single-ball or spring-loaded single-ball valves, depending on the size of the metering head. 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 attachment. 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.

### Abrasive media

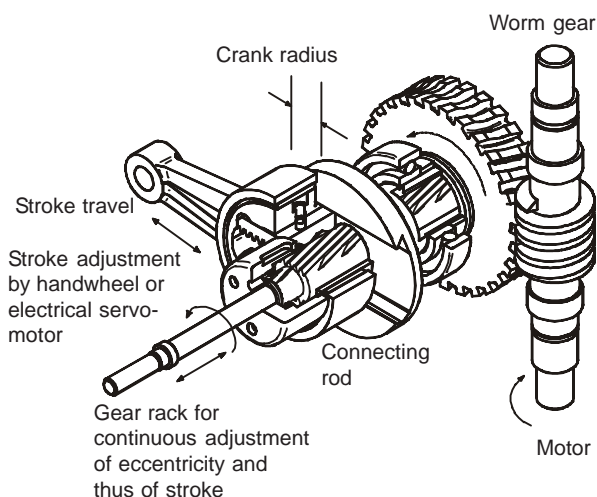
Piston packings are available as:

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 and a special enclosure necessary.

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.

### Functional diagram



### 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 and pneumatic (ATP) remote adjustment (ATE) are 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 superposition in automatic control systems.

### Accessories

#### Stroke counter

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

#### Metering head heating

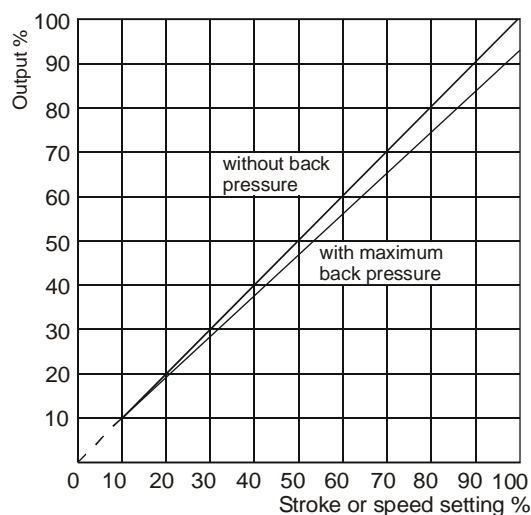
For fluids which are solid when cold the metering head can be fitted with a warm water, steam or electrical heating.

#### Remote control

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

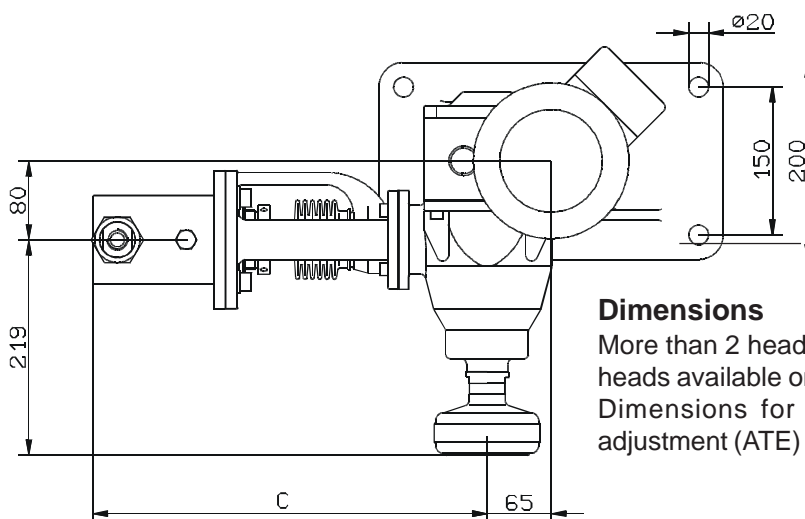
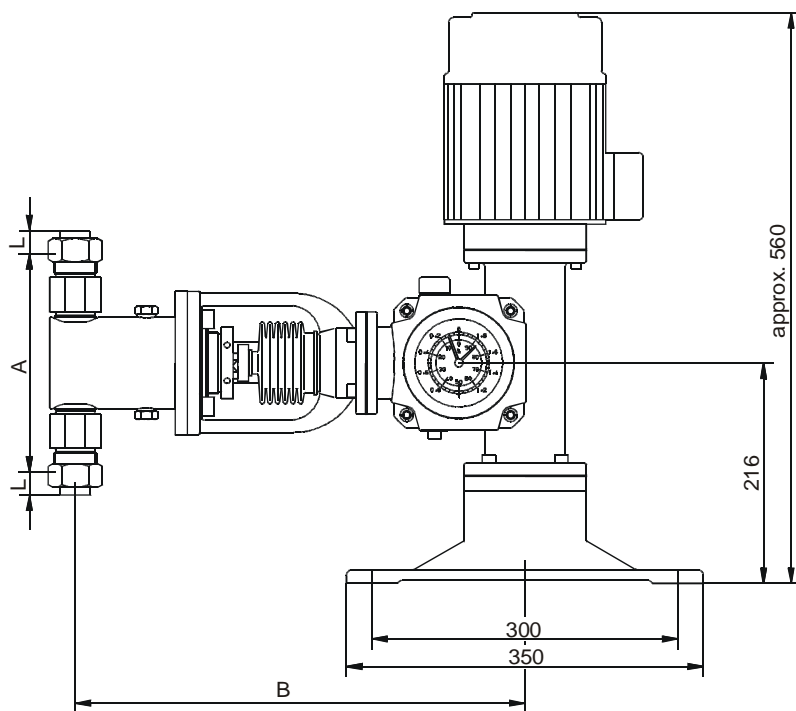
See data sheet MB 1 09 01 / 9 for details.

### Performance curves



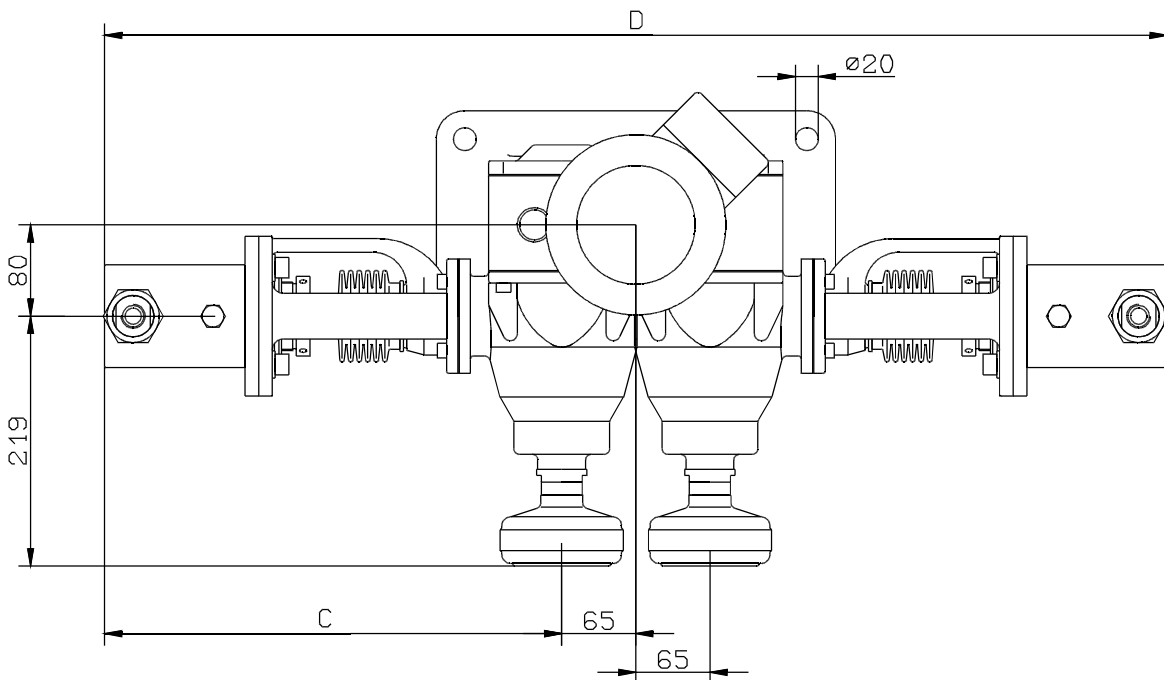
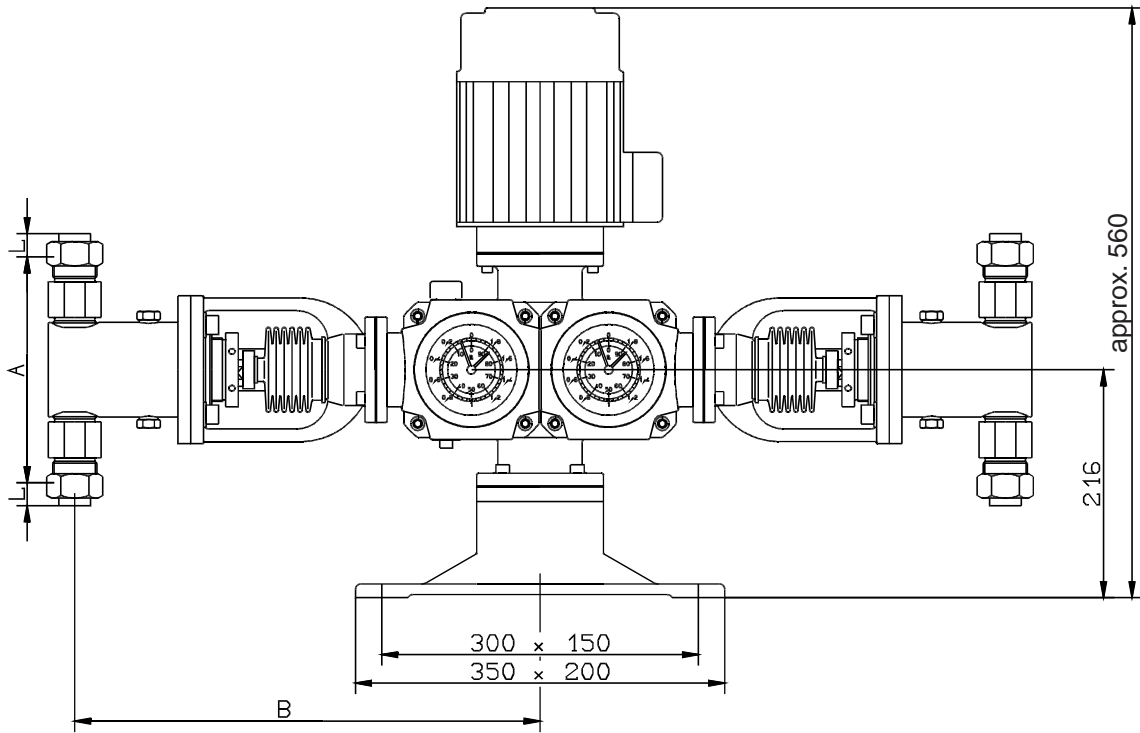
**Dimensions**

Pump type	A		B		C		D	
	Plastic	SS	Plastic	SS	Plastic	SS	Plastic	SS
KN 10 ... 45	138	101	413	413	376	368	882	866
KN 85	148	111	413	413	376	368	882	866
KN 150 ... 350	248	215	431	441	407	401	944	932
KN 500 ... 850	218	198	446	454	464	444	1058	1018
KN 1460	233	238	460	457	479	454	1088	1038

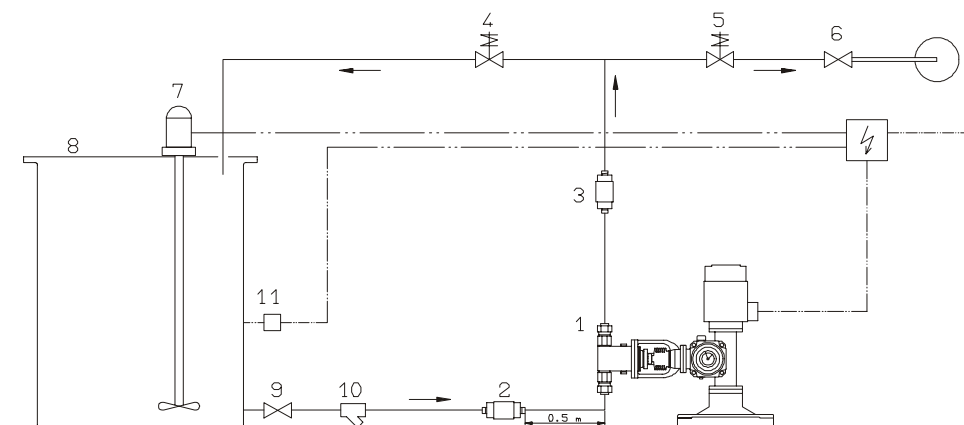
**Simplex pump**

**Dimensions**

More than 2 heads or superimposed heads available on request.  
 Dimensions for electrical remote adjustment (ATE) see MB 1 09 01 / 9.

## Duplex pumps

**KARDOS KN**

Installation example



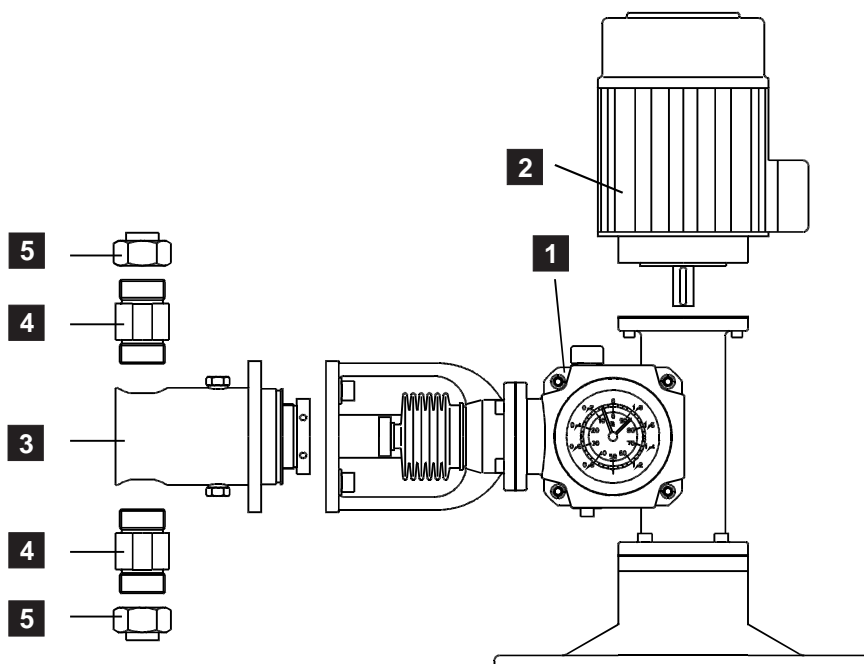
- |  |            |  |            |
|--|------------|--|------------|
| 1. Metering pump KARDOS KN               | MB 1 09 01 | 7. Electric agitator                             | MB 1 36 01 |
| 2. Pulsation dampener for suction line   | MB 1 27 01 | 8. Polyethylene tank                             | 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.

- |                 |                     |                        |
|-----------------|---------------------|------------------------|
| <b>1</b> Gear   | <b>2</b> Motor      | <b>3</b> Metering head |
| <b>4</b> Valves | <b>5</b> Connection |                        |

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



Gear <b>1</b>						
Pump type	Gear with output adjustment		KMS size*	I	II	III
	manual	ATE	Head combinations **			
			KN 10...85	KN 150...350	KN 500...850	KN 1460
KN ... L 	29594	29598				
	29595	29599				
	29596	29600				
	29597	29601				
KN ... R 	29602	29606				
	29603	29607				
	29604	29608				
	29605	29609				
ZKN ... 	29610	29620				
	29611	29621				
	29612	29622				
	29613	29623				
	29614	29624				
	29615	29625				
	29616	29626				
	29617	29627				
	29618	29628				
29619	29629					

\* Usable optional piston-diaphragm system heads. See MB 1 40 01 for explanations.

\*\* The heads on duplex pumps can be combined as required. With different head sizes, the larger head should be located on the left side.

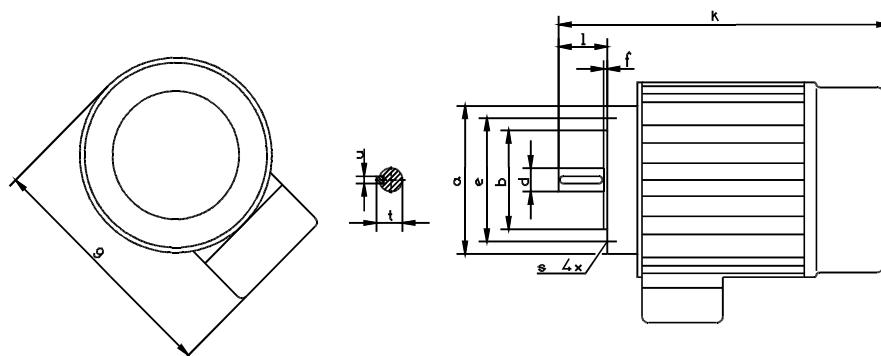
Motor <b>2</b>															
1) E-motor type	Voltage 220/380 V, frequency 50 Hz; connection Y Δ, ISO Cl. B, IP 54														
	Part No.	Current consumpt. [A]	Power [kW]	Speed [1/min]	Dimensions [mm]										
					a	g	s	e	f	b	d	l	u	t	k
80-AF 0.55/4-11	78629	2.6/1.55	0.55	1410	120	199	M6	100	3	80	19	40	6	21.5	267
80-AF 0.75/4-11	78903	3.4/2.0	0.75	1400	120	199	M6	100	3	80	19	40	6	21.5	267
90-AF 1.1/4-11	77137 <sup>2</sup>	4.8/2.8	1.1	1420	200	239	11.5	165	3.5	130	24	50	8	27	293

1) Motor size as required. Other motor models on request.

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

2) The 1.1 kW motor requires an intermediate flange (29522) and an intermediate shaft (29521)  
Assembly No. 29554

$P = a \cdot Q \cdot (p + 1)$     P (watt)    p (bar) pressure  
 Q (l/hr)    a=0.125  
 (Q=Output for only one head at the ZKN)



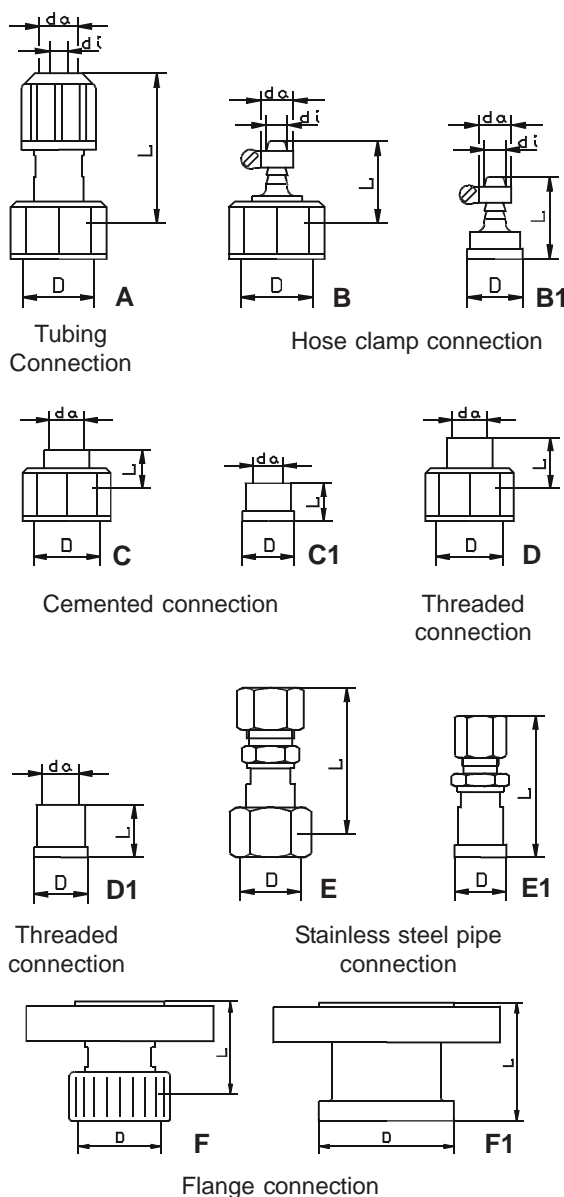
Head <b>3</b>			
Packing material*		PTFE-silk packing	
Head material		Plastic	1.4571
Pump type	Piston material		Ceramic
	Piston dia.		
			1.4571
KN 10	8	25983	26005
KN 23	12	25984	26009
KN 35	15	25985	26013
KN 45	17	25986	26017
KN 85	23	29631	26025
KN 150	30	29632	26036
KN 210	36	29633	26042
KN 350	46	29635	26063
KN 500	55	29636	29854
KN 850	72	29638	26088
KN 1460	100	29640	29644

Valves <b>4</b>											
Pump type	KMS size	Standard Valves									
		KN 10 ... KN 350 duplex ball / KN 500 ... KN 1460 single ball spring-loaded									
		Plastic				1.4571				IT C	
		Hypalon		Viton		Hypalon		Viton		S	D
		S	D	S	D	S	D	S	D	S	D
KN 10 ... KN 85	I	18187	18188	18185	18186	—	—	—	—	26967	26968
KN 150 ... KN 350	II	26841	27356	26842	27357	—	—	—	—	29694	29695
KN 500 ... KN 1460	III	23703	23703	23704	23704	23705	23705	25681	25681	—	—
Spring loaded valves											
KN 10 ... KN 85	I	25161	27516	25162	27517	—	—	—	—	28775	28776
KN 150 ... KN 350	II	26845	27353	25707	27354	—	—	—	—	29696	29697

S=suction valve / D= discharge valve

**5 Connections**

Pump type	Dimensions					Part No. model:			
	DN	Abb.	ø D	di	da	L	PVC	1.4571	
KN 10-85 KMS I	6	A	G 3/4	6	12	55	19175	—	
	4	A	G 3/4	4	6	35	19480	—	
	6	A	G 3/4	6	8	30	28159	—	
	6	B	G 3/4	6	12	30	23342	—	
	6	B1	ø20	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	—	G1/4	20	25165	—	
	6	D1	ø20	—	G1/4	20	—	82105	
	6	E1	ø20	—	8	20	—	27519	
	6	E1	ø20	—	10	20	—	23427	
	10	E1	ø20	—	12	20	—	23428	
	KN 150-350 KMS II	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	—	G3/8	22	25930	27037	
15		D	G 1 1/4	—	G1/2	22	25943	25944	
20		D	G 1 1/4	—	G3/4	22	—	27689	
10		E	G 1 1/4	—	10	41	—	25926	
15		E	G 1 1/4	—	18	44	—	25939	
15		F	G 1 1/4	—	15	53	25956	25957	
KN 500-1460 KMS III		25	B1	68	25	34	95	24034	24063
		25	C1	68	—	32	40	21488	—
	32	C1	68	—	40	40	21491	—	
	25	D1	68	—	G1	40	28458	27040	
	32	D1	68	—	G1 1/4	40	—	25252	
	25	E1	68	—	28	60	—	27852	
25	F1	68	—	25	64	25622	25623		


**Example order**

For pulp treatment of a paper machine, a metering pump for dispersant and polymer is required, which is to be metered proportionally to the paper speed. Since both components are to be added at a fixed ratio of 1:5, independent of speed, it is advisable to use a duplex pump with central drive. The pump can be fitted with a normal 3-phase motor, because the latter is controlled by a frequency converter (provided by the customer) which receives the speed proportional signal from the paper machine. Note: It is recommended to select a motor which is one size larger than required and / or to use a separate fan for speed below 25 Hz. The reachable backpressure decreases.

**Determining the wetted end components**

40 l/h dispersant and 200 l/h polymer are to be metered against 10 bar.

Because of the high viscosity, the head for polymer is to be fitted with spring-loaded valves.

All components into contact with the medium must be made of stainless steel.

Seal elastomers should be made of It.

**Order**

The metering pump consists of the following modules:

- |          |                          |                       |
|----------|--------------------------|-----------------------|
| <b>1</b> | Gear ZKN 45/210          | Part No. 29611        |
| <b>2</b> | Drive motor 0.55-kW      | Part No. 78629        |
| <b>3</b> | Metering head for        | KN 45 Part No. 26017  |
|          | Metering head for        | KN 210 Part No. 26042 |
| <b>4</b> | Suction valve for        | KN 45 Part No. 28775  |
|          | Discharge valve for      | KN 45 Part No. 28776  |
|          | Suction valve for        | KN 210 Part No. 29696 |
|          | Discharge valve for      | KN 210 Part No. 29697 |
| <b>5</b> | Suction connection for   | KN 45 Part No. 82105  |
|          | Discharge connection for | KN 45 Part No. 82105  |
|          | Suction connection for   | KN 210 Part No. 25944 |
|          | Discharge connection for | KN 210 Part No. 25944 |



### 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. In addition, manual adjustment is possible by using the hand wheel.

This type of pump is specified by adding "ATE" to the name, e.g. KARDOS KN 23-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.

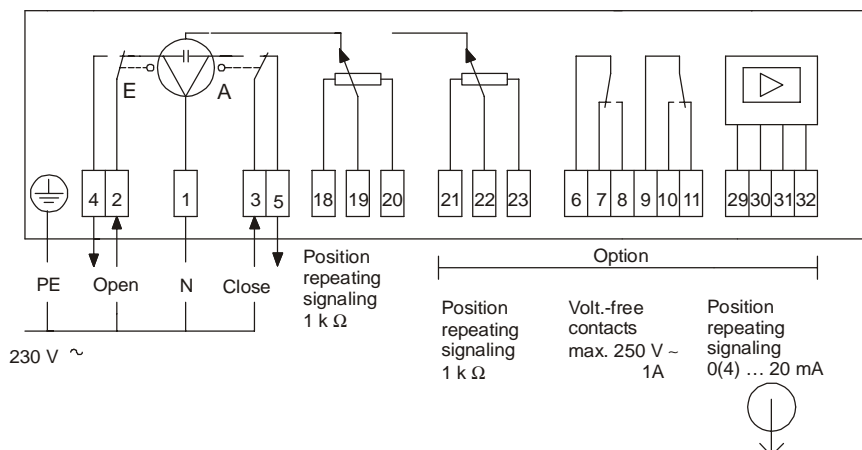
### Additional equipment:

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

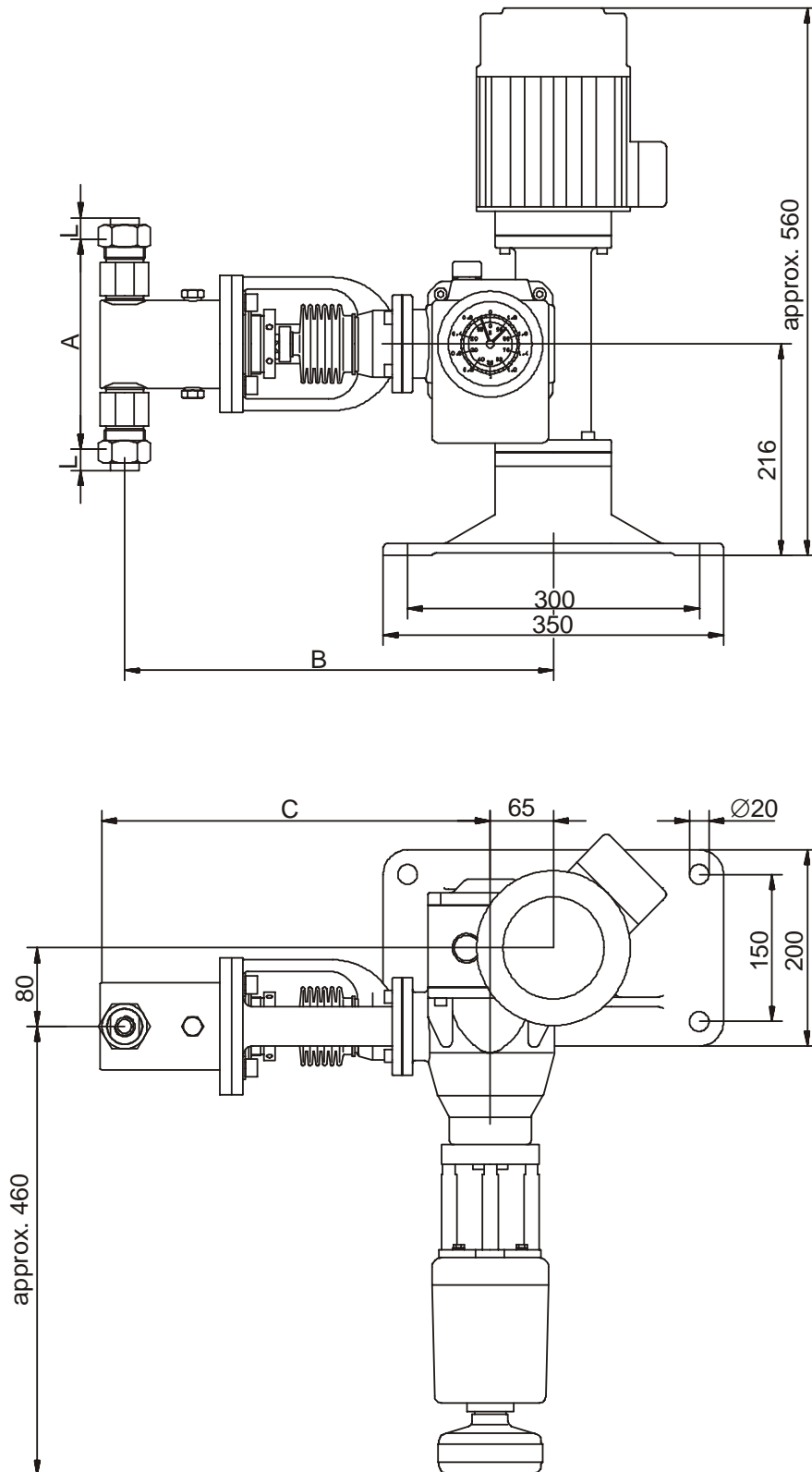
### Wiring diagram

#### 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 KN - ATE

**KARDOS KN-ATE**

Dimensions a,b,c,d see MB 1 09 01 / 3

Lutz-Jesco GmbH

Improved changes are always reserved without notice.