

General

The FEDOS E / DX combines the properties of the FEDOS series working reliably for many years with the latest requirements in metering technology.

Advantages of piston metering pumps:

- little dependency on back pressure
 - linear flow variation as a function of stroke length
- Due to an improved flexibility and the further development of individual components, the FEDOS E / DX pumps can be integrated even more efficiently in metering processes. Heads and pistons are the same as for the previous pumps so that the continuity of spare parts keeping and service is ensured. The FEDOS is available for capacities from 0.17 to 31.5 l/h, with or without microprocessor control. Pressures are admissible between 25 and 100 bar, depending on the size and packing material.

If no control is required for constant metering, the motor is connected directly to the terminal box. In this case, FEDOS E pumps are used.

Three-phase and a.c. motors are available. 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 microprocessor-based FEDOS DX is used if the pump is to be integrated in controls or automatic control systems. The intelligence of the FEDOS DX is derived from the well-proved series of MEMDOS E/DX diaphragm metering pumps. It allows the adaption to a large number of different control signals and system monitoring equipment. It controls the chemical supply in two ways. 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 FEDOS DX can be adjusted continuously between 0 and 142 strokes/min. for internal control. A single stroke follows each contact. In addition, the stroke frequency can be changed by pulse division or multiplication.

**Metering Head**

Metering heads are supplied in stainless steel for max. 100 bar. As a standard, 1.4571-type stainless steel heads with PTFE packings are used for up to 40 bar. In the case of higher pressures, Aramid-reinforced packings are preferred.

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

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

Valves

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

Drive

To operate the pump three-phase or a.c. motors can be used for FEDOS E pumps. The intelligent FEDOS DX pumps with control unit are always equipped with a single-phase a.c. motor.

The gearbox is made of light but inherently stable and high-alloyed cast aluminum. It contains a single-stage worm wheel set running in an oil bath just as the roller bearings. Metering happens while the push rod is displaced by means of an eccentric. The suction stroke is caused by the resetting of the spring.

To set the metering capacity by manual stroke adjustment, the spring-loaded piston rod is locked at the corresponding position. Thus an adjustment range from 0 to 100 % is possible.

Abrasive media

Piston packings can be supplied in the form of Teflon/silk packings and Aramid packings.

The Teflon/silk packing supplied as a standard can be used with nearly all types of chemicals and up to 40 bar.

Where abrasive media are concerned it may be advisable to use Aramid-Keflar packings if the chemical employed allows it. Aramid-Keflar is not resistant to concentrated acids or alkalis.

Control unit

In general the following functions are possible with the control unit:

- Indication of operating states and menu guidance on 3-digit LC display.
- Operating panel with four pressure-sensitive keys and three LEDs.
- Internal control of stroke frequency, continuously adjustable between 0...142 strokes/min., depending on the gear reduction.
- External control by
 - a) voltage-free contacts (mechanical or semiconductors).
 - b) analog 0...20 and 4...20 mA signal.
- External pump stop by voltage-free opening contact.
- Warning alarm relay with voltage-free changeover contact (signaling of (almost) low level, life zero error with 4...20 mA, remote switchoff).
- Pulse multiplication for contact control with factor 2 / 4 / 8 / 16 / 32 / 64.
- Pulse division for contact control with divisor 2 / 4 / 8 / 16 / 32 / 64.
- Chemical tank level control with alarm signal and main alarm (pump stops).

Technical data

FEDOS E/DX		01	03	06	1	2*	5*	8*	17*	30*	
Power at maximum pressure	[bar]	100	100	100	100	100	100	80	40	25	
	[l/h]	0.17	0.31	0.63	1.42	2.13	4.8	8.5	17	31.5	
	[ml/stroke]	0.11	0.11	0.11	0.25	0.25	0.56	1.0	2.0	3.7	
Piston-Ø	[mm]	4	4	4	6	6	9	12	17	23	
Stroke frequency	[1/min]	26	48	95		142					
Stroke length	[mm]	9									
Suction lift	[mbar]	800									
Power E (3~)	[W]	50					250				
Power DX (1~)	[W]	120									
Weight	[kg]	11			16						

* E/DX 2...30 are not suitable for 60 Hz operation; the special sizes E/DX 2A-30A are available for 60 Hz operation. Flow rate and stroke frequency data also apply for 60 Hz operation.

Additional modules

The precision and operational life of metering pumps can be increased considerably if the appropriate fittings are used.

These are among others:

- Pulsation dampeners for suction and discharge side.
- ATE servomotors for electrical metering capacity

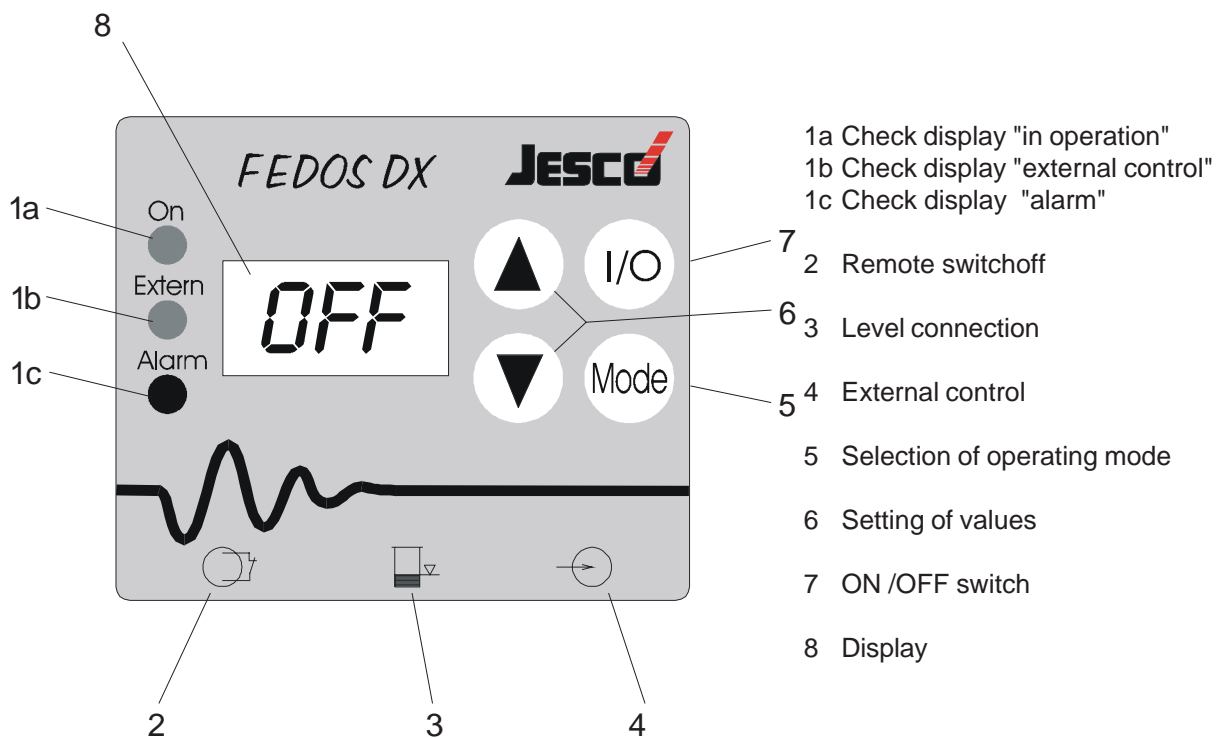
adjustment.

- Approximation initiators for indicating individual strokes, e.g. counters.
- Application-oriented suction lines, also with level control for the medium to be metered.
- Relief valves as safety valves to protect pump and system.

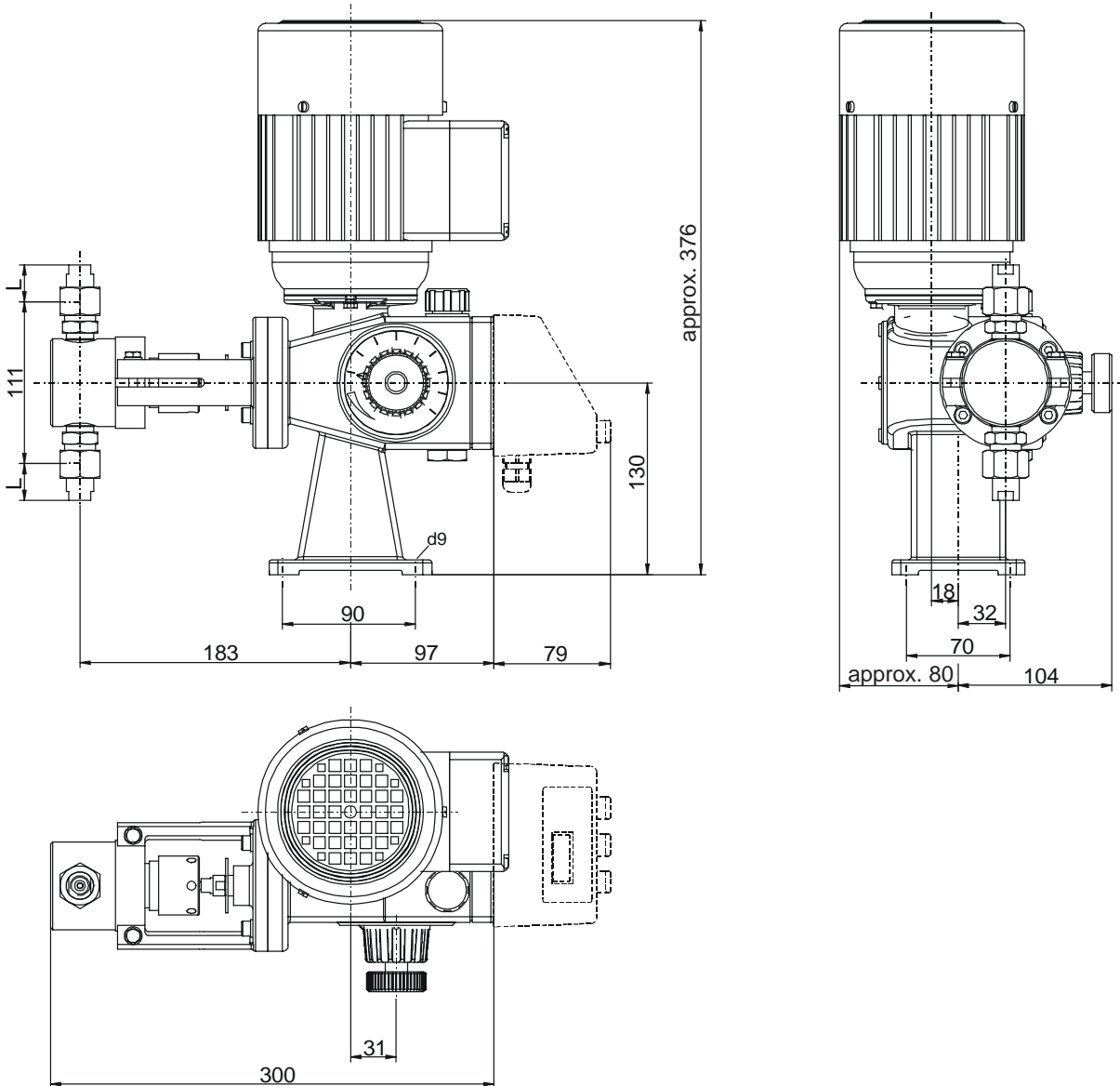
Technical data of the control unit

Mains voltage	95...264V AC, 48...63 Hz
Electrical connection	Safety plug with 2.5 m cable
Power consumption (without motor)	10 W
Insulation class	F
Protective class	IP 65 *
Pulse for contact activation	min. 30 ms
Voltage at pulse input	5V DC (must be voltage-free for contact making)
Multiplication / division of contacts	1 / 2 / 4 / 8 / 16 / 32 / 64
Load for 0(4)...20 mA input	150 Ohm
Voltage at level connection	5V DC (level probe w/break contact for alarm/empty)
Alarm relay, voltage-free changeover contact	250V AC, 2.5 A or 30V DC, 2.5A
Remote pump switchoff	by voltage-free break contact (on site)
Max. admissible ambient temperature	40°C
Digital display	3-digit display for stroke frequency and level state
LEDs for functional display, 3 off	green = in operation, red = trouble, green = external control
Pressure-sensitive keypad	4 keys for programming and operation
Weight	0.8 kg

* if ports protected by caps or with serial plug-in connectors.

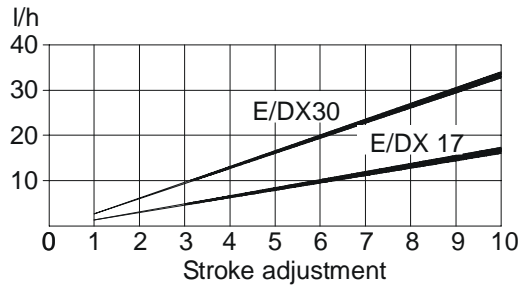
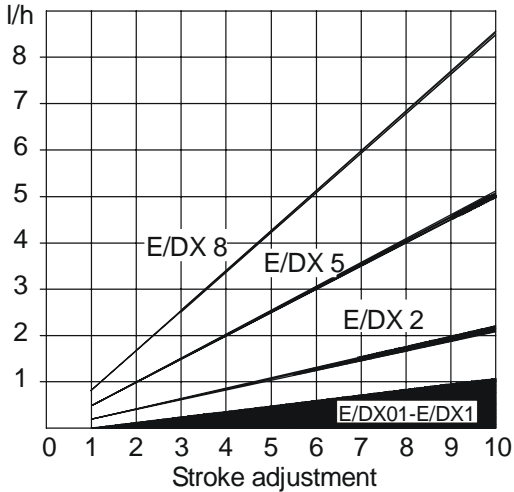
Operating panel


Dimensions FEDOS E / DX 01...30

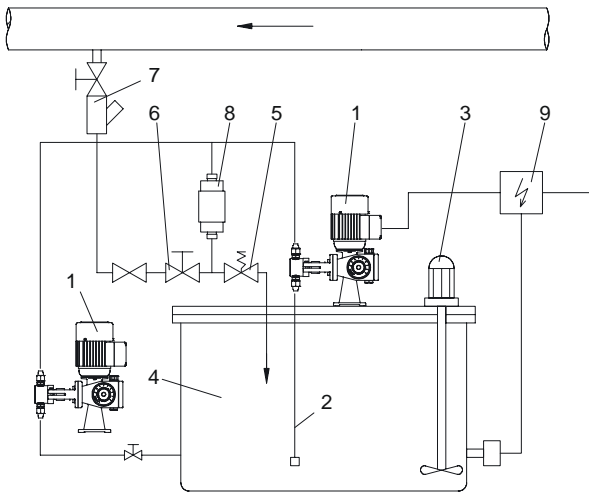
Dimension L refer to table **5** on MB 1 07 06 / 7**Piston Metering Pump FEDOS E / DX**

Performance curves

The upper limit of the area represents pressureless operation, the lower limit represents maximum backpressure. The performance curves refer to water at 20° C and a suction lift of 0.5m. Output valid for 50 Hz; at 60 Hz higher by factor 1.2.



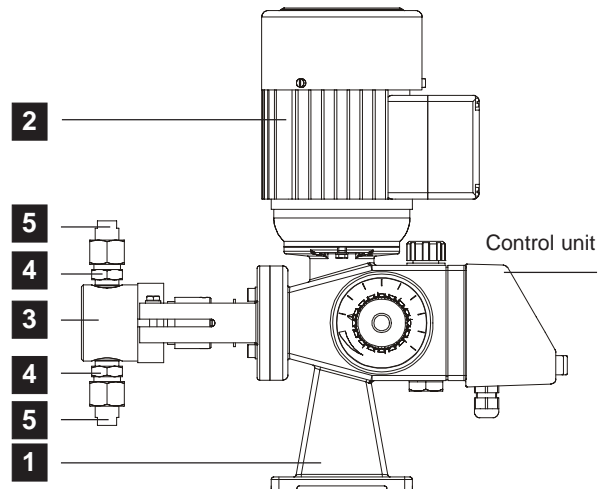
Installation example



Legend

- | | |
|---------------------------|--------------|
| 1 Metering pump E / DX | MB 1 04 20 |
| 2 Suction line | MB 1 22 01 |
| 3 Electric agitator | MB 1 36 01 |
| 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 | upon request |

Selection tables



In order to be able to offer the user a variety of pumps, these have been divided into the main functional groups. They can thus be assembled according to the user's individual requirements:

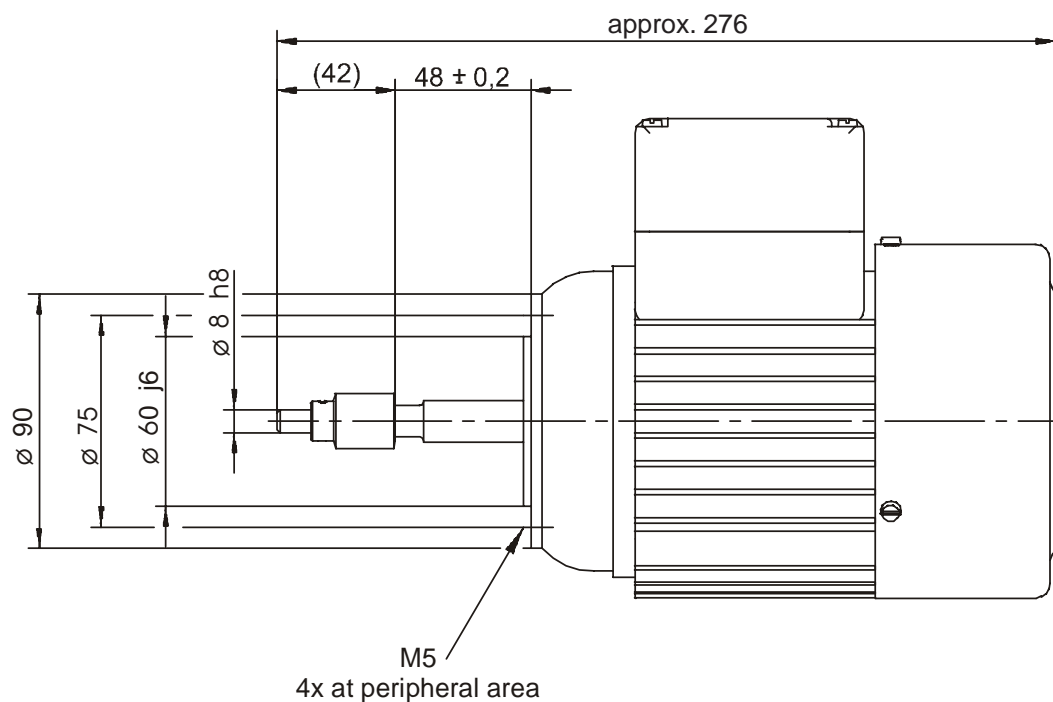
- | | | |
|-----------------|----------------------|------------------------|
| 1 Drive | 2 Motor | 3 Metering head |
| 4 Valves | 5 Connections | |

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

1		
Pump type	man.	
	E	DX
01	35743	35745
03	35744	35746
06	35715	35747
1	35715	35747
2	35714	35748
5	35714	35748
8	35714	35748
17	35714	35748
30	35714	35748
2A...30A	35777	35776

2				
Pump type	Motor type	Transformation	Pump type	Part No.
E / DX 01...30	Three-phase current 400 / 230 V, Bg 63 0.05 kW, 50 Hz, IP 55, ISO-F	55:1	E01	27522
		30:1	E03	31431
		15:1	E06 / 1	27697
		12:1	E2A	35237
		10:1	E2	34884
		10:1	E5...30	34913
	A.C. 230 V, Bg 63 0.12 kW, 50 Hz, IP 55, ISO-F	12:1	E5A...30A	35238
		55:1	E/DX01	35639
		30:1	E/DX03	35749
		15:1	E/DX06/1	34917
		12:1	DX2A...30A	35240
		10:1	E/DX2...30	34915

Motor FEDOS E / DX 01...30

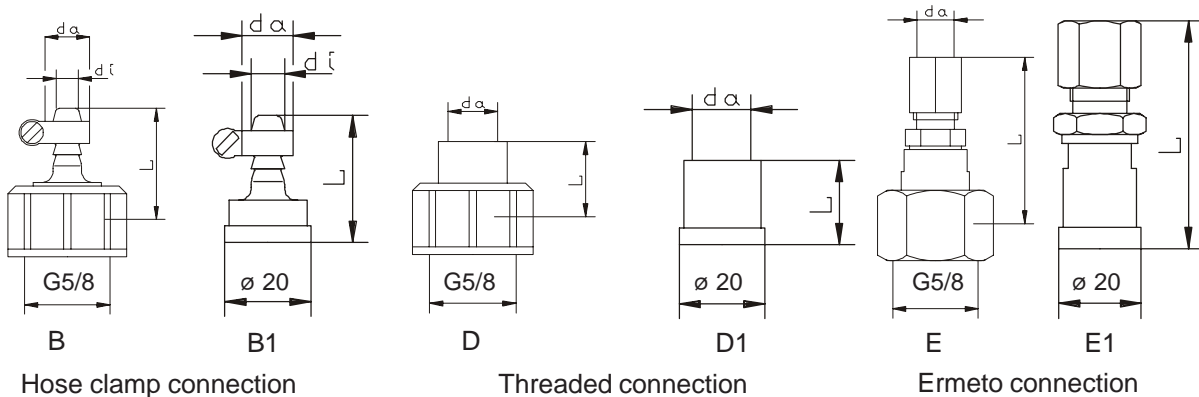


3		
Pump type	Piston diameter	Metering head with PTFE silk packing
		1.4571
E / DX 01	4	29234
E / DX 03	4	29234
E / DX 06	4	29234
E / DX 1	6	23313
E / DX 2	6	23313
E / DX 5	9	23316
E / DX 8	12	23317
E / DX 17	17	23318
E / DX 30	23	23320

4		
Housing material		1.4571
Packing material		AF*
Double-ball valves (DN3)	suction valve	35274
	discharge valve	35275
Double-ball valves (DN6)	suction valve	26967
	discharge valve	26968
Spring-loaded valves (DN6)	suction valve	28775
	discharge valve	28776

* Asbestos-free fiber packing

5					
Pict.	DN	di	da	L	St. steel
B	6	6	12	30	23093
B1	6	6	12	30	23425
D	6	-	G 1/4	20	22999
D1	6	-	G 1/4	20	82105
E	4	4	6	45	24959
E	8	8	10	54	23090
E	10	10	12	55	23091
E1	6	6	8	25	27519
E1	8	8	10	50	23427
E1	10	10	12	50	23428



Order example case 1

The requirement is for 17 l/h of aluminium sulphate to be metered against a pressure of 6 bar.

Drive via 400 V three-phase current motor. The injection point is 45 meters away from the metering pump.

Because of the long distance between the metering pump and the injection point, without a pulsation dampener, acceleration pressure peaks would occur which would affect not only the metering pump but also the flow rate and the metering process. The installation of a PDM 160 pulsation damper is therefore recommended (for details see data sheet MB 1 27 02).

Solution:

The requirements stated can be met with the standard piston metering pump type FEDOS E17. Standard materials can be used for the packings. The pump consists of the following modules:

1 Drive	33714
2 Three-phase current motor	34913
3 Metering head (stainless steel)	28318
4 Valves (stainless steel / AF)	
suction valve	26967
discharge valve	26968
5 Connections	
suction side	82105
discharge side	82105

Order example case 2

1 l/h of a coloring substance are to be added proportionally to a process line. An analog 4...20 mA signal or 6000 contacts per hour are available as flow-proportional signal. The system pressure is 6 bar. No aggressive medium is used. The viscosity is, however, 500 mPa*s.

Solution:

As the viscosity exceeds 400 mPa*s, spring-loaded valves are required.

Due to the type of control, a FEDOS DX 1 (0...1.42 l/h) is chosen.

As the pump is able to carry out 95 strokes/min., 5700 metering strokes are maximally possible per hour. This is insufficient compared to the incoming 0...6000. Therefore the pump is set to activation by the analog signal.

It consists of the following modules:

1 Drive	35747
2 A.C.	34917
3 Metering head (stainless steel)	23313
4 Spring-loaded valves (stainless steel / AF)	
suction valve	28775
discharge valve	28776
5 Connections	
suction side	82105
discharge side	82105

Note:

If only contact making can be used, the pump must be selected as follows:

With the help of the pulse division function, divisor 2, the aforementioned pump would have to carry out max. 6000/2=3000 strokes. As a result the flow rate would be reduced to 1.42/5700x3000=0.75 l/h < 1 l/h.

Now choose the next larger pump size. The FEDOS DX2 can carry out 142 strokes/min with a capacity of 2.13 l/h. 6000 pulses/h correspond to 100 pulses/min, i.e.: the DX 2 would supply

100 pulses/min. $\boxed{2.13\text{l/h} \times \frac{100}{142}} = 1.5\text{ l/h.}$

To achieve 1 l/h, the stroke is reduced to approx. 66% by means of the stroke length adjustment.