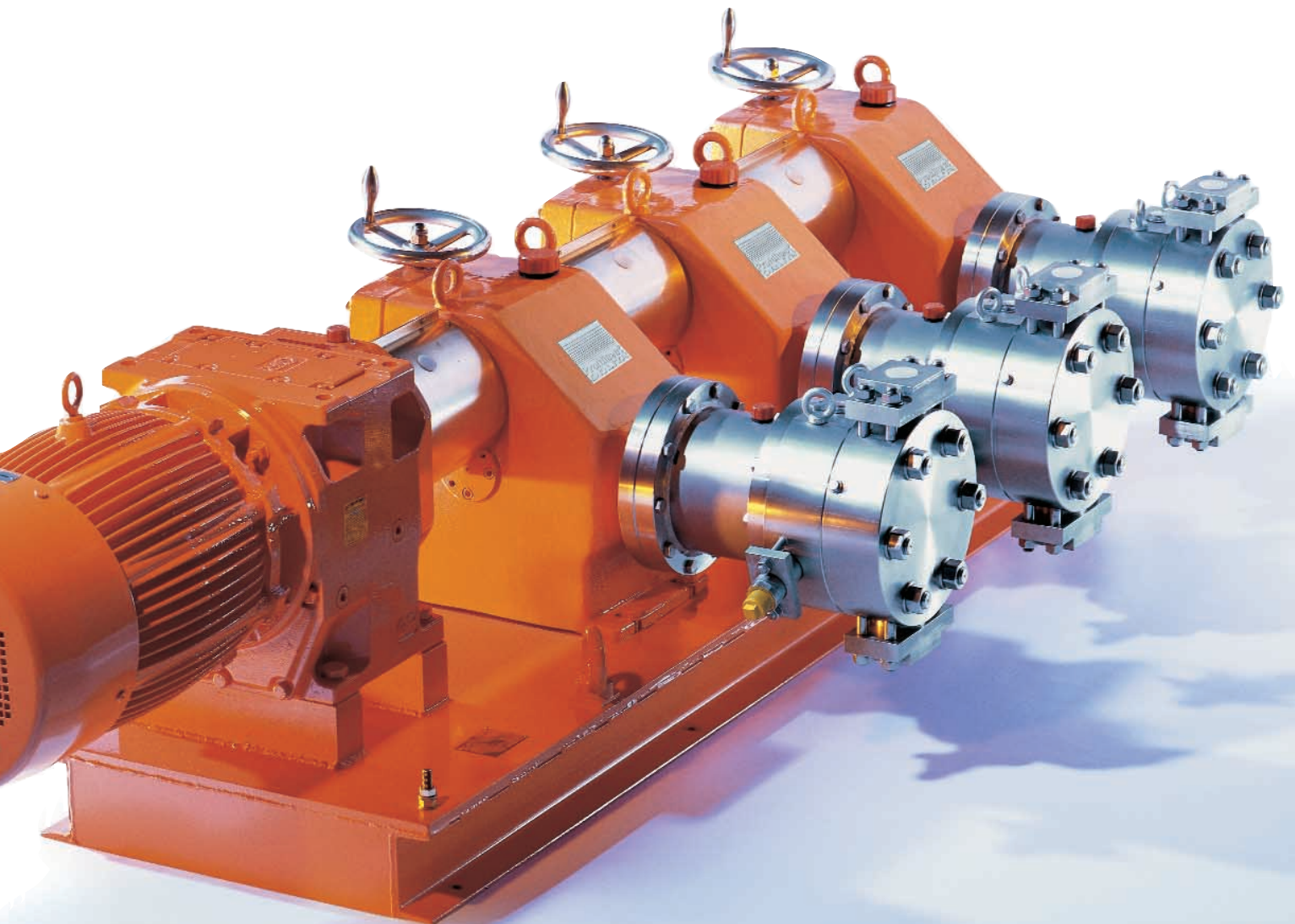


HIGH-END METERING PUMPS



HIGH-END METERING PUMPS

ORLITA®, one of the world's leading manufacturers of intelligent metering technology, designs, develops and produces reciprocating positive-displacement pumps that

combine metering functions such as delivery, measurement and control in one machine. An outstanding feature of metering pumps is their pressure-consistent

characteristic that ensures the delivery capacity is virtually independent of the backpressure. The delivery capacity of a metering pump is linear dependent on the set

stroke length and stroke rate, thus allowing for exact adjustment of the delivery volume.



ORLITA® pumps (MfS 600/44 with electric stroke adjustment) in a glycol regeneration plant.

APPLICATIONS OF ORLITA® METERING PUMPS

ORLITA® pumps are completely versatile in use as they can be tailored, in part, to specific

customer application requirements – a feature greatly appreciated by our customers.

Our pumps are used by satisfied customers throughout the world involved in the

following branches:

- Oil/gas production (onshore/offshore)
- Refineries
- Chemicals/petrochemicals

- Pharmaceuticals
- Food production
- Packing industry (filler pumps)

- Cosmetics
- Water treatment
- Power generators
- Plant construction

- Medical industry
- Environmental technology
- Research

ATEX



Conforming to the Directive 94/9/EC, ORLITA® type Mf and Mh metering pumps are suitable for use in zones 1 and 2. Combustible liquids can also be metered in the zones using diaphragm pumps.

Accessories

The following accessories are available to ensure optimum metering results and process reliability and to effectively protect the plant in which the pump is installed:

- Pulsation dampeners (with bladder)
- Safety valves
- Pressure control valves
- Dirt traps
- Electric stroke adjustment systems
- Diaphragm failure indicators
- Electronic speed adjustment systems

MODULAR DESIGN

ORLITA® pumps are based on a modular design and essentially comprise the three function assemblies:

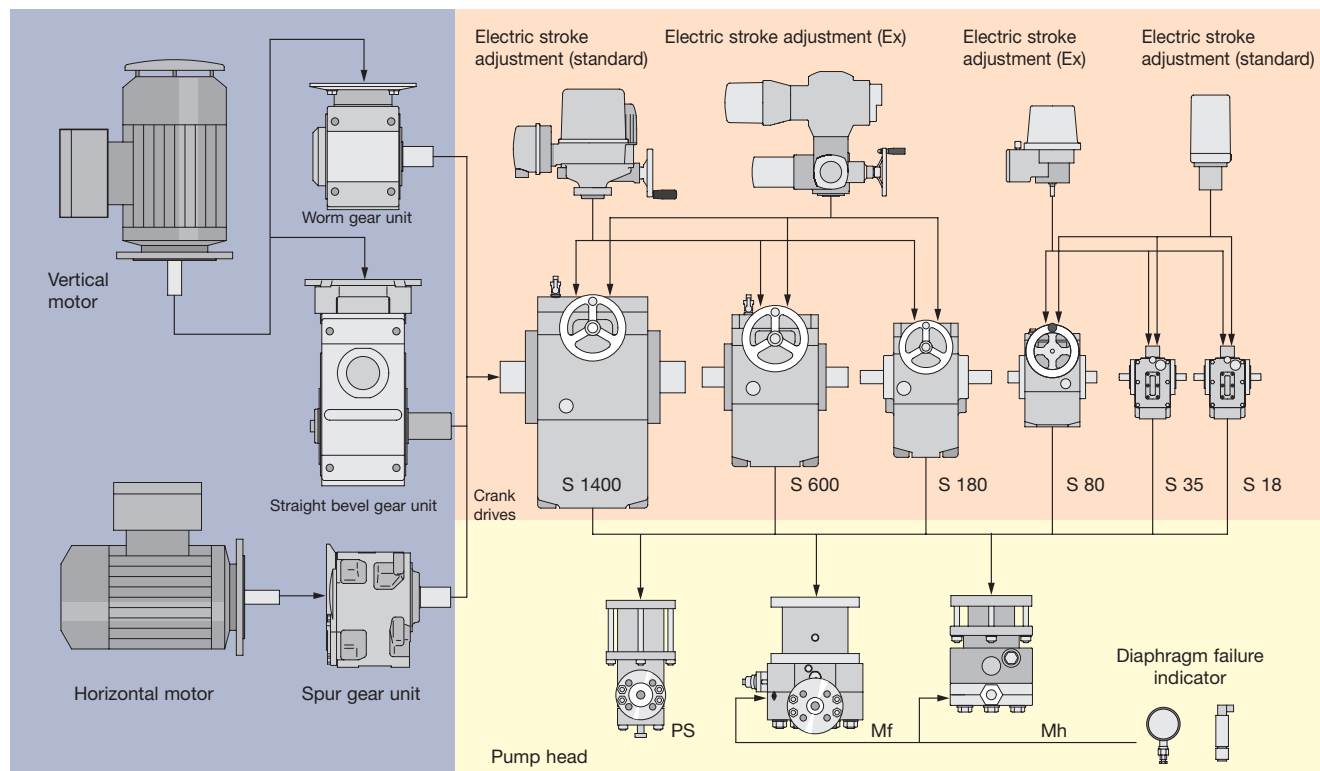
- 1) Drive motor unit
- 2) Crank drive
- 3) Pump head

Thanks to this modular system, the various types of pump heads can be mounted on any drive unit.

The drive unit that converts the rotary motion of the motors into the reciprocating stroke

motion for the pump head can be freely combined with each other, making it possible, for example, to meter different delivery volumes and media at various operating pressures with only one pump. In addition, ORLITA® pumps can be optionally equipped with

electric precision-controlled stroke adjustment and diaphragm failure signalling facilities to ensure efficient pump operation while effectively increasing process reliability.



S-drive unit series as an example of modular design

Drive motor unit

A large number of options can be used as the drive unit for ORLITA® metering pumps. The choice is aimed at meeting specific customer requirements.

The options include:

- Standard motors with IEC or NEMA connection
- Explosion proof motors
- Frequency converter controlled motors

Special drive options are also available on request.

Pump heads

A choice of four different types of pumps are available:

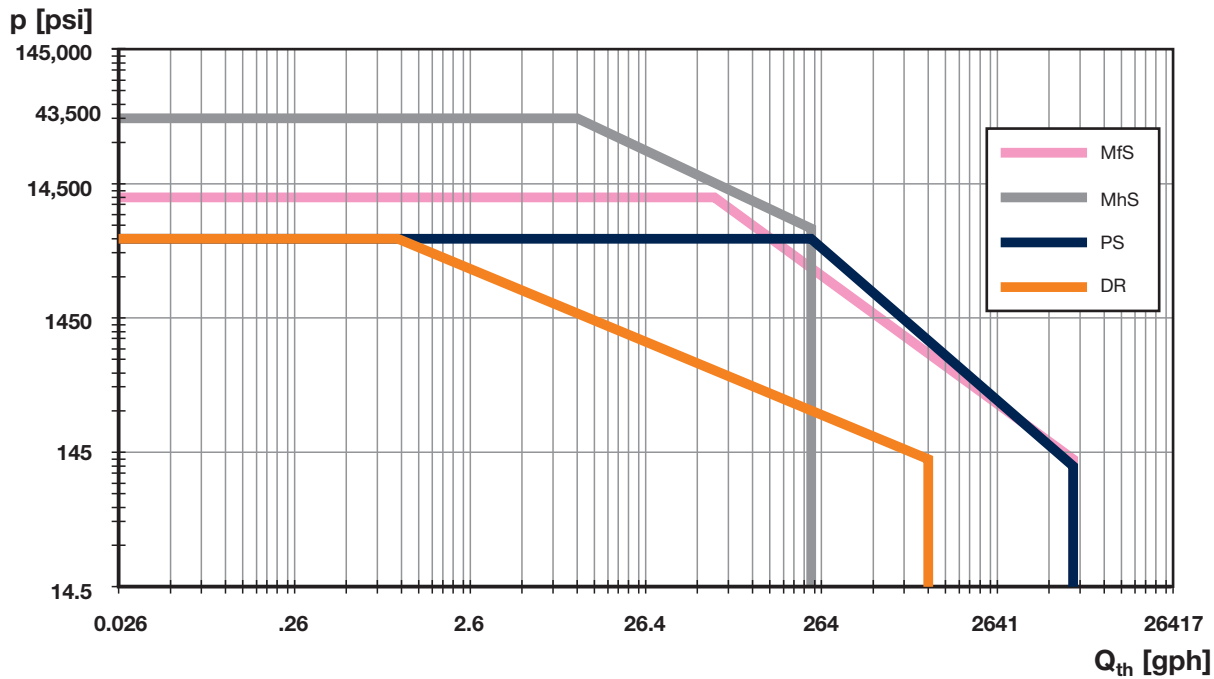
- Mf Diaphragm metering pump** with hydraulically driven double PTFE diaphragm
- Mh Diaphragm metering pump** with hydraulically driven metal diaphragm
- PS Plunger metering pump** with stuffing box packing
- DR Valveless plunger metering pump**



Combination of MfS 180/46, MfS 80/22 and MfS 18/10

PERFORMANCE OVERVIEW OF ORLITA® METERING PUMPS

Performance diagram of single-head pumps



The special ORLITA® valves

With the exception of DR pumps that operate using a VALVELESS system, for virtually all types of pumps, ORLITA® uses as standard specially designed non-spring-loaded cone valves. Other valves can, of course, be supplied on customer request – however, the advantages of cone valves cannot be denied as they provide:

- Longer lifecycle through “wings” on the valve guides that additionally promote rotation of the valve during each stroke. As a result, the valve cleans itself during operation ensuring particles cannot become engrained while making the valve much less susceptible to the effects of soiling.
- Particularly good intake capacity (low NPSH_r value) as the weight of the valve body is much less compared to a ball valve with the same nominal diameter.



CRANK DRIVES

ORLITA® metering pumps are equipped with robust and proven crank drives. Two different series are available. Both are of positive return type and guarantee a reliable operation of the total pump unit.

The stroke length is adjustable both during operation and stationary – manually or optionally electric.

The stroke is infinitely variable from zero stroke to maximum stroke.

The actual setting can be read from a counter or mechanical display.

Multiplex pumps can be configured using either similar or dissimilar drives depending on the application need.

Crank drives series S

Crank drives of series **S** are used for all ORLITA® plunger type and diaphragm metering pumps. The various sizes allow a modular combination of different pump heads to an economic solution.

The crank drives of series **S** do not have internal reduction gears. Different stroke

frequencies are achieved by using external reduction gears. A high efficiency is yielded especially with multi headed pumps.

The stroke adjustment of the crank drives type **S** is achieved by a lever mechanism with a constant bottom dead center. This characteristics offers advantages especially for high pressure applications.

Except for the crank shaft the lever mechanism only has swivelling components where by a wear-resistant operation

and a high overload safety is guaranteed.

Crank drives series Rb

Crank drives of series **Rb** are designed to operate the valve-less plunger metering pump **DR**.

The special construction of the crank mechanism combines two movements:

- **reciprocating movement** (piston stroke)
- **rotation** (control of inlet and outlet)

An internal worm gear reduces the speed of the drive motor to the stroke frequency of the pump.



Injection Skid with 6 headed pump, 6 x 79 gph at 588 psig (300 l/h at 40 bar)

Highlights

- stroke adjustment 0 – 100 % in operation and stationary
- easy to combine
- high efficiency
- positive return mechanism
- electric stroke adjustment available
- proven, robust and reliable

ORLITA® crank drives

type	S 18	S 35	S 80	S 180	S 600	S 1400	Rb 15	Rb 150
stroke length (mm)	0-15	0-20	0-20	0-40	0-40	0-60	0-15	0-32
stroke length (in)	0-0.59	0-0.79	0-0.79	0-1.58	0-1.58	0-2.36	0-0.59	0-1.26
piston rod load (N)	1 750	3 500	14 000	18 000	40 000	60 000	1 800	15 000
hydraulic power kW/100 min ⁻¹	0.044	0.117	0.467	1.200	2.667	6.000	0.045	0.800

DIAPHRAGM HEAD MF

Hydraulic actuated diaphragm head. A double PTFE diaphragm hermetically separates the wetted area from the hydraulic chamber.

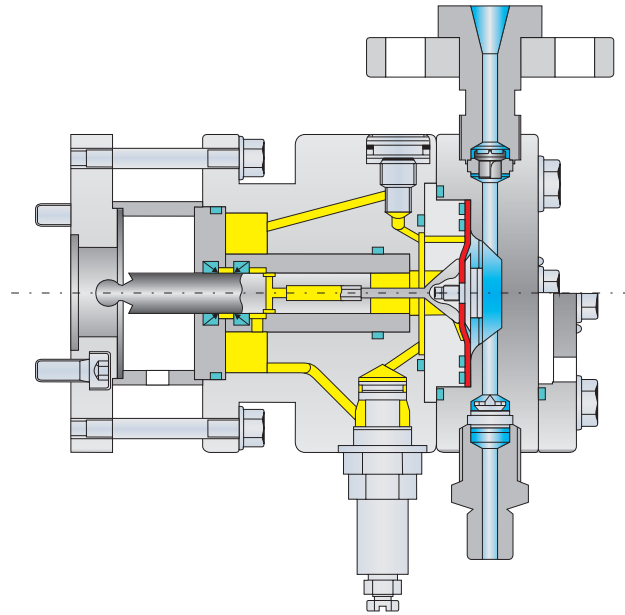
During the discharge stroke the diaphragm is balanced by the hydraulic liquid only. During the suction stroke the diaphragm operation is aided by the mechanical coupling. This combined principle offers an extraordinary suction lift capability of the Mf pump.

Integrated in the hydraulic chamber are the pressure relief valve and an automatic venting valve. The valveless forced reflow of the internal oil leakage operates wearfree and

guarantees optimum metering accuracy.

The pump check valves are of cone type. This guarantees low wear, minimal pressure loss (NPSH_R) and self-cleaning.

All wetted parts (except for the PTFE-diaphragm) are fabricated from stainless steel.



Highlights

- hermetically tight
- pressure up to 10,150 psi
- temperature range
-40 °F to 320 °F
(-40 °C to 160 °C)
- PTFE double diaphragm
- suction lift up to 26 ft.
- accuracy ±0.5 %
- diaphragm rupture control



Pump with metal- and PTFE-diaphragm pump liquid ends
type MhS 35/7 - MfS 18/10



Three headed PTFE-diaphragm pump
Mf3S 80/22-22-22a

Options

- special materials like
Hastelloy, zirconia, titanium,
and tantalum
- diaphragm failure indication
- heatable or coolable pump
head
- other type of valve
arrangements e.g. double
ball valves, ruby balls, and
ceramic balls
- special nozzles on request
- specified coating for
offshore applications
- design acc. to API 675
- other options on request

DIAPHRAGM HEAD MH

Hydraulic actuated diaphragm head. A metal diaphragm hermetically separates the wetted area from the hydraulic chamber.

During both discharge and suction stroke the diaphragm is balanced by the hydraulic liquid which has been displaced by the piston.

Integrated in the hydraulic chamber are the pressure relief valve and an automatic venting valve.

The valveless forced reflow of the internal oil leakage operates wearfree and guarantees optimum metering accuracy.

The pump check valves are of cone, ball or prismatic type depending on size and design pressure.

All wetted parts are fabricated from stainless steel.



Stainless steel diaphragm pump MhS 80/25



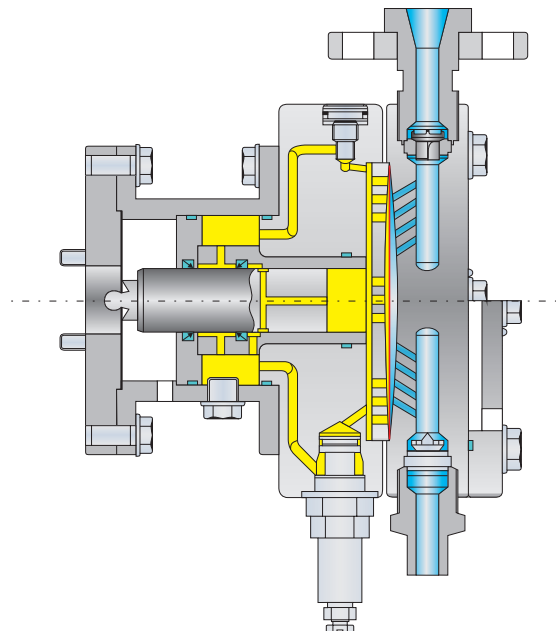
4-headed pump Mh4S 600/26-26-26-26 on an oil and gas platform

Highlights

- hermetically tight
- pressure up to 58,000 psi
- temperature range
-40 °F to 392 °F
(-40 °C to 200 °C)
- accuracy ± 0.5 %
- diaphragm rupture control

Options

- special materials like
Hastelloy, zirconia, titanium
- multi diaphragm with failure
indication
- heatable or coolable pump
head
- other type of valve
arrangements e.g. double
ball valves, etc.
- special nozzles on request
- specified coating for
offshore applications
- design acc. to API 675
- other options on request



PLUNGER HEAD PS

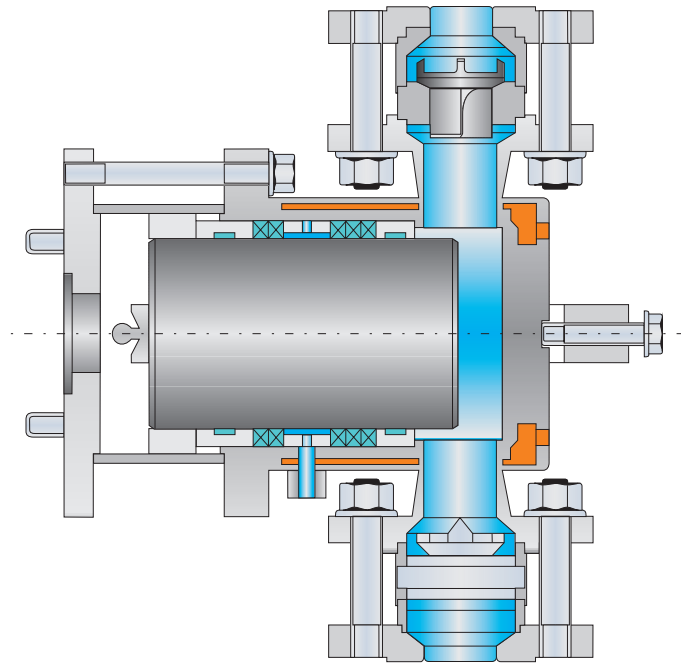
Plunger head with stuffing box packing. The plunger oscillates in the cylinder and displaces the liquid.

The packing adjustment is achieved by the front-sided adjusting screw, which is also possible during operation.

The lantern on the rear head end serves to drain the leakage or can be used as an area to flush, lubricate or seal the pump with suitable media.

The pump check valves are of cone type. This guarantees low wear, minimal pressure loss ($NPSH_P$) and self-cleaning.

All wetted parts are fabricated from stainless steel and sealed by PTFE.



Highlights

- best hydraulic efficiency
- pressure up to 5800 psi
- temperature range
-40 °F to 752 °F
(-40 °C to 400 °C)
- accuracy $\pm 0.5\%$
- easy to maintain by central packing adjustment



Plunger metering pump P2S 80/60-60

Options

- | | | | |
|--|--|---|----------------------------|
| ■ special materials like Hastelloy, titanium, ceramics | ■ pump head with heating/cooling jacket | ■ special nozzles on request | ■ design acc. to API 675 |
| ■ special seal materials | ■ other type of valve arrangements e.g. double ball valves, etc. | ■ specified coating for offshore applications | ■ other options on request |

VALVELESS PLUNGER METERING PUMP DR

The DR is a valveless plunger type metering pump with rotary control piston. It works by the combined oscillating and rotating movement of the piston. Thus the displacer itself opens and closes discharge and suction. Valves are not required. The pump can be operated through a very wide range of stroke frequencies.

This principle enables the exact metering of highly viscous liquids which also might contain large solids.

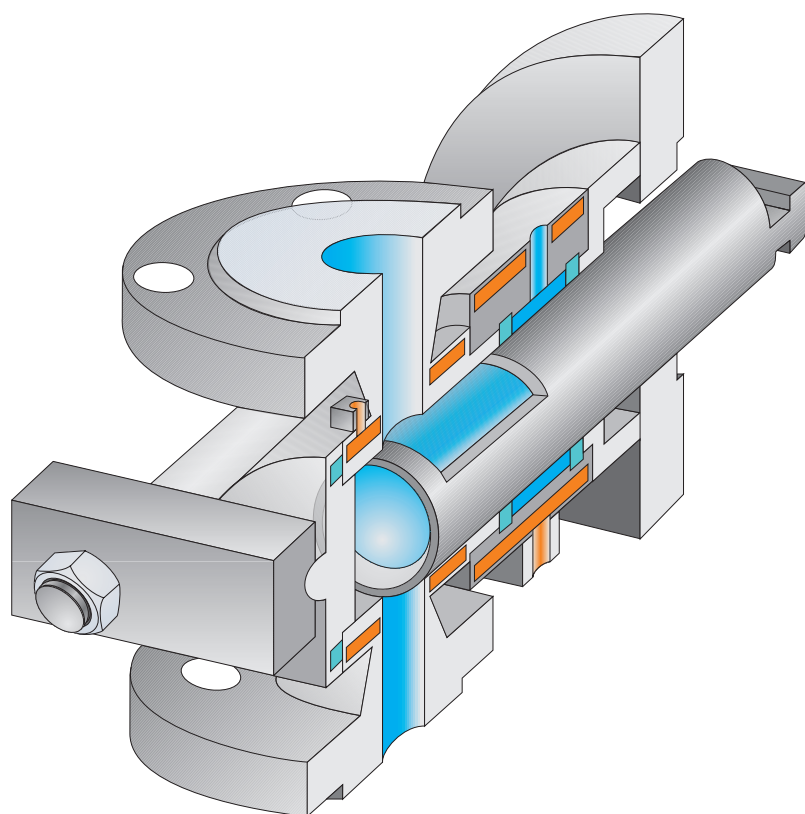
The pump head is fabricated from stainless steel. Piston and liner are treated by a special wear-resistant coating. Depending on the application the pump head also is available with other high performance materials.

The clearance between piston and liner which mainly seals the pump is adapted to the viscosity of the liquid. The lantern on the rear head end serves to drain the leakage or can be used as an area to flush, lubricate or seal the pump with suitable media.

The lantern is sealed by elastomer lip rings. The flow direction is selectable by the assembly position of the piston. By turning the head 180° around its horizontal axis the suction and discharge ports can be reversed.



Valveless plunger metering pump DR 150/70



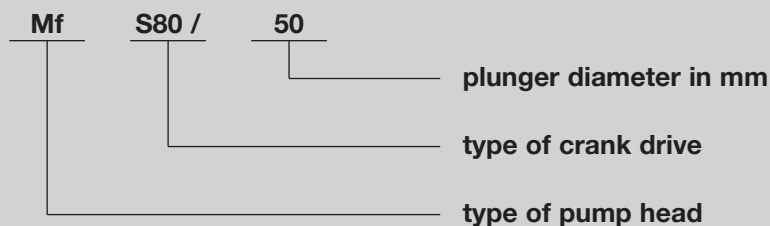
Highlights

- valveless
- viscosities up to 1,000,000 cps
- pressure up to 9100 psi
- temperature range
-40 °F to 752 °F
(-40 °C to 400 °C)
- accuracy ± 0.5 %
- wide range of stroke frequency

Options

- piston and liner from ceramics or hard metal
- sealless with metallically sealed lantern
- other options on request

CLASSIFICATION OF ORLITA® PUMPS



Example for a 2 headed stainless steel diaphragm pump:

Mh2S 600/32-32

Example of a 3-head valveless control plunger pump:

D3R 150/90-90-90

PERFORMANCE OVERVIEW ARRANGED ACCORDING TO DRIVE UNIT SIZES

Piston Diameter	Stroke Volume	Pumps with S 18 crank drive								PS Pumps max. pressure	Nozzles	MfS Pumps max. pressure	Nozzles	MhS Pumps max. pressure	Nozzles
		Theoretic flow in gph at strokes/min. (spm)/ Gear Ratio (gr) and 60 Hz for (1) pump head Calculated required power in HP													
		(spm/gr)		(spm/gr)		(spm/gr)		(spm/gr)							
		88 20	HP	109 16	HP	135 13	HP	175 10	HP						
[mm]	[cu. in.]									[psi]		[psi]		[psi]	
5	0.018	0.4	0.08	0.5	0.10	0.6	0.12	0.8	0.15	2900	1/4" NPT	na	na	7250	1/4" NPT
6	0.026	0.6	0.11	0.7	0.14	0.9	0.17	1.2	0.22	2900	1/4" NPT	na	na	7250	1/4" NPT
7	0.035	0.8	0.12	1.0	0.15	1.2	0.18	1.6	0.24	2900	1/4" NPT	5800	1/4" NPT	5800	1/4" NPT
8	0.046	1.0	0.14	1.3	0.17	1.6	0.21	2.1	0.27	2900	1/4" NPT	5046	1/4" NPT	4640	1/4" NPT
10	0.072	1.6	0.14	2.0	0.17	2.5	0.21	3.3	0.27	2900	1/4" NPT	3219	1/4" NPT	3219	1/4" NPT
12	0.104	2.4	0.14	2.9	0.17	3.6	0.21	4.7	0.27	2016	1/4" NPT	2233	1/4" NPT	2233	1/4" NPT
16	0.184	4.2	0.14	5.2	0.17	6.4	0.21	8.4	0.27	1131	1/4" NPT	1262	1/4" NPT	1262	1/4" NPT
20	0.288	6.5	0.13	8.2	0.17	10.1	0.21	13.1	0.27	725	1/4" NPT	798	1/4" NPT	798	1/4" NPT
22	0.348	7.9	0.14	9.9	0.17	12.2	0.21	15.8	0.27	na	na	667	1/2" NPT	na	na
25	0.449	10.2	0.13	12.8	0.17	15.7	0.21	20.4	0.27	464	3/8" NPT	508	1/2" NPT	na	na
30	0.647	14.7	0.13	18.4	0.16	22.6	0.20	29.4	0.26	319	3/8" NPT	348	1/2" NPT	na	na
36	0.932	21.2	0.13	26.5	0.17	32.6	0.21	42.4	0.27	218	3/8" NPT	247	1/2" NPT	na	na
40	1.150	26.1	0.13	32.7	0.16	40.2	0.20	52.3	0.25	174	1/2" #300RF	189	1/2" NPT	na	na
44	1.392	31.6	0.13	39.5	0.16	48.7	0.20	63.3	0.26	na	na	160	3/4" NPT	na	na
50	1.797	40.9	0.12	51.1	0.15	62.8	0.19	81.7	0.24	116	1/2" #300RF	116	3/4" NPT	na	na
65	3.037	69.0	0.13	86.3	0.16	106.2	0.20	138.1	0.26	58	1/2" #300RF	73	3/4" NPT	na	na

Notes:

1) All stated flow rates are theoretical flow rates! The effective flow rate is lower depending on discharge pressure.

2) Stated piston diameters are selected values. Others on request.

3) S 18 based pumps have 1/3 (= 0.33) hp motors with NEMA flange 56C

4) Based motor speed: 1750 rpm

5) Other speeds on request

6) Other nozzles and connections available on request

SELECTION GUIDE

TECHNICAL TABLES

Piston Diam.	Stroke Volume	Pumps with S 35 crank drive								PS Pumps max. pressure	Nozzles	MfS Pumps max. pressure	Nozzles	MhS Pumps max. pressure	Nozzles
		Theoretic flow in GPH at strokes/min. (spm)/ Gear Ratio (gr) and 60 Hz for one (1) pump head Calculated required motor power in HP													
		(spm/gr)		(spm/gr)		(spm/gr)		(spm/gr)							
		88 20	HP	109 16	HP	135 13	HP	175 10	HP						
[mm]	[cu. in.]								[psi]		[psi]		[psi]		
5	0.024	0.5	0.36	0.7	0.45	0.8	0.56	1.1	0.73	na	na	na	na	25839	3/8" NPT
7	0.047	1.1	0.36	1.3	0.45	1.6	0.55	2.1	0.72	na	na	5800	1/4" NPT	13050	3/8" NPT
8	0.061	1.4	0.33	1.7	0.41	2.2	0.51	2.8	0.66	3625	1/4" NPT	5800	1/4" NPT	9135	3/8" NPT
10	0.096	2.2	0.36	2.7	0.45	3.4	0.56	4.4	0.72	3625	1/4" NPT	5800	1/4" NPT	6453	1/4" NPT
12	0.138	3.1	0.36	3.9	0.45	4.8	0.56	6.3	0.72	3625	1/4" NPT	4481	1/4" NPT	4481	1/4" NPT
14	0.188	4.3	0.36	5.3	0.45	6.6	0.56	8.5	0.72	na	na	na	na	3292	1/4" NPT
16	0.245	5.6	0.36	6.9	0.45	8.6	0.56	11.2	0.73	2262	1/4" NPT	2523	1/4" NPT	2523	1/4" NPT
18	0.311	7.1	0.36	8.8	0.45	10.9	0.56	14.1	0.72	na	na	na	na	1987	1/4" NPT
20	0.383	8.7	0.36	10.9	0.45	13.4	0.56	17.4	0.72	1450	1/4" NPT	1610	1/4" NPT	1610	1/4" NPT
22	0.464	10.5	0.36	13.1	0.45	16.3	0.56	21.1	0.73	na	na	1334	1/2" NPT	na	na
25	0.599	13.6	0.36	17.0	0.45	21.0	0.56	27.2	0.72	928	3/8" NPT	1030	1/2" NPT	1030	1/4" NPT
30	0.863	19.6	0.36	24.4	0.45	30.3	0.55	39.2	0.72	638	3/8" NPT	711	1/2" NPT	na	na
32	0.982	22.3	0.33	27.8	0.42	34.4	0.51	44.6	0.67	na	na	na	na	580	1/4" NPT
36	1.242	28.2	0.36	35.2	0.45	43.6	0.55	56.5	0.72	435	3/8" NPT	493	1/2" NPT	na	na
40	1.534	34.9	0.35	43.4	0.44	53.8	0.54	69.7	0.70	363	1/2" #300RF	392	1/2" NPT	na	na
44	1.856	42.2	0.36	52.5	0.45	65.1	0.56	84.4	0.73	na	na	334	1/2" NPT	na	na
45	1.941	44.1	0.36	55.0	0.45	68.1	0.56	88.2	0.73	na	na	na	na	319	1/4" NPT
50	2.396	54.5	0.35	67.9	0.43	84.0	0.53	108.9	0.69	232	1/2" #300RF	247	3/4" NPT	na	na
65	4.050	92.1	0.34	114.7	0.43	142.0	0.53	184.1	0.69	131	1/2" #300RF	145	3/4" NPT	na	na
80	6.135	139.4	0.31	173.7	0.39	215.1	0.48	278.9	0.63	87	1-1/2" #150RF	na	na	na	na
100	9.586	217.9	0.33	271.4	0.41	336.2	0.50	435.8	0.65	58	1-1/2" #150RF	na	na	na	na

Notes:

- 1) All stated flow rates are theoretical flow rates! The effective flow rate is lower depending on discharge pressure.
- 2) Stated piston diameters are selected values. Others on request.
- 3) S 35 based pumps have 1 hp motors with NEMA flange 143TC
- 4) Based motor speed: 1750 rpm
- 5) Other speed on request
- 6) Other nozzles and connections available on request

Piston Diam.	Stroke Volume	Pumps with S 80 crank drive										PS Pumps max. pressure	Nozzles	MfS Pumps max. pressure	Nozzles	MhS Pumps max. pressure	Nozzles
		Theoretic flow in GPH at strokes/min. (spm)/ Gear Ratio (gr) and 60 Hz for one (1) pump head Calculated required motor power in HP															
		(spm/gr)		(spm/gr)		(spm/gr)		(spm/gr)		(spm/gr)							
		85 20.69	HP	106 16.46	HP	141 12.4	HP	182 9.62	HP	193 9.06	HP						
[mm]	[cu. in.]											[psi]					
10	0.096	2.1	1.3	2.6	1.6	3.5	2.1	4.5	2.7	4.8	2.9	na	na	na	na	23200	1/2" NPT
11	0.116	2.6	1.4	3.2	1.8	4.2	2.3	5.5	3.0	5.8	3.2	na	na	na	na	21359	1/2" NPT
12	0.138	3.0	1.4	3.8	1.7	5.1	2.3	6.5	2.9	6.9	3.1	na	na	na	na	17400	1/2" NPT
14	0.188	4.1	1.4	5.2	1.7	6.9	2.3	8.9	3.0	9.4	3.2	na	na	na	na	13050	1/2" NPT
16	0.245	5.4	1.4	6.8	1.8	9.0	2.3	11.6	3.0	12.3	3.2	na	na	5800	1/4" NPT	10092	1/2" NPT
18	0.311	6.9	1.4	8.6	1.8	11.4	2.3	14.7	3.0	15.6	3.2	na	na	na	na	7975	1/2" NPT
20	0.383	8.5	1.4	10.6	1.8	14.0	2.3	18.1	3.0	19.2	3.2	3625	1/4" NPT	5800	1/4" NPT	6453	1/2" NPT
22	0.464	10.2	1.0	12.8	1.3	17.0	1.7	21.9	2.2	23.3	2.3	na	na	5220	1/2" NPT	5336	1/2" NPT
25	0.599	13.2	1.4	16.5	1.8	21.9	2.3	28.3	3.0	30.0	3.2	3625	1/2" NPT	4133	1/2" NPT	4133	1/2" NPT
30	0.863	19.0	1.4	23.8	1.8	31.6	2.3	40.8	3.0	43.3	3.2	2581	1/2" NPT	2871	1/2" NPT	na	na
36	1.242	27.4	1.4	34.2	1.8	45.5	2.3	58.7	3.0	62.3	3.2	1784	1/2" NPT	1987	1/2" NPT	na	na
40	1.534	33.9	1.4	42.2	1.8	56.2	2.3	72.5	3.0	76.9	3.2	1450	3/4" #600RF	1610	1/2" NPT	na	na
44	1.856	41.0	1.5	51.1	1.9	68.0	2.5	87.7	3.2	93.0	3.4	na	na	1421	3/4" #600RF	na	na
50	2.396	52.9	1.4	66.0	1.8	87.8	2.3	113.3	3.0	120.1	3.2	928	3/4" #600RF	1030	3/4" #300RF	na	na
60	3.451	76.2	1.1	95.0	1.4	126.4	1.9	163.1	2.4	173.0	2.6	580	1" NPT	na	na	na	na
65	4.050	89.4	1.3	111.5	1.7	148.3	2.2	191.5	2.9	203.0	3.0	537	3/4" #300RF	580	3/4" #300RF	na	na
80	6.135	135.5	1.3	168.9	1.6	224.7	2.1	290.0	2.7	307.6	2.9	363	1-1/2" #300RF	363	1" #300RF	na	na
100	9.586	211.7	1.3	263.9	1.7	351.1	2.2	453.2	2.9	480.6	3.1	232	1-1/2" #300RF	247	1-1/2" #150RF	na	na
120	13.803	304.8	1.4	380.1	1.7	505.6	2.3	652.6	2.9	692.0	3.1	na	na	174	1-1/2" #150RF	na	na
125	14.977	330.7	1.2	412.4	1.5	548.6	2.1	708.1	2.6	na	na	145	1-1/2" #300RF	na	na	na	na
140	18.788	414.8	1.4	517.3	1.7	688.1	2.3	888.2	3.0	na	na	116	1-1/2" #150RF	131	1-1/2" #150RF	na	na
150	21.568	476.2	1.2	593.9	1.6	790.0	2.1	1019.7	2.7	na	na	na	na	102	1-1/2" #150RF	na	na
160	24.539	541.8	1.2	675.7	1.5	898.8	2.0	1160.2	2.6	na	na	87	1-1/2" #150RF	87	1-1/2" #150RF	na	na

Notes:

- 1) All stated flow rates are theoretical flow rates! The effective flow rate is lower depending on discharge pressure.
- 2) Stated stroke frequencies are selected values at 60 Hz. Others on request.
- 3) S 80 based pumps motors have a NEMA flange of 145TC up to 184TC
- 4) Based motor speed: 1750 rpm
- 5) Other speed on request
- 6) Other nozzles and connections available on request

SELECTION GUIDE

TECHNICAL TABLES

Piston Diam.	Stroke Volume	Pumps with S 180 crank drive										PS Pumps max. pressure	Nozzles	MfS Pumps max. pressure	Nozzles	
		Theoretic flow in GPH at strokes/min. (spm)/ Gear Ratio (gr) and 60 Hz for one (1) pump head Calculated required motor power in HP														
		(spm/gr)		(spm/gr)		(spm/gr)		(spm/gr)		(spm/gr)						[psi]
		90	HP	110	HP	153	HP	172	HP	197	HP					
[mm]	[cu. in.]	19.41		15.87		11.41		10.18		8.88				[psi]		
30	1.73	40	3.5	49	4.2	69	5.9	77	6.6	88	7.6	3321	3/4" NPT	na	na	
36	2.48	58	3.8	71	4.7	99	6.5	111	7.3	127	8.4	2306	1" #2500RTJ	2552	1" #2500RTJ	
38	2.77	65	3.8	79	4.7	110	6.5	124	7.3	142	8.4	na	na	2291	1" #2500RTJ	
40	3.07	72	3.8	88	4.7	122	6.5	137	7.3	157	8.4	1856	3/4" NPT	2074	3/4" NPT	
44	3.71	87	3.8	106	4.7	148	6.5	166	7.3	190	8.4	na	na	1711	1" NPT	
46	4.06	95	3.8	116	4.7	162	6.5	181	7.3	208	8.4	na	na	1566	1" NPT	
50	4.79	112	3.8	137	4.7	191	6.5	214	7.3	245	8.3	1189	1" NPT	1320	1" NPT	
54	5.59	131	3.4	160	4.2	223	5.8	250	6.5	286	7.5	1015	1" NPT	na	na	
55	5.80	136	3.8	166	4.7	231	6.5	259	7.3	297	8.3	na	na	1088	1" NPT	
60	6.90	162	3.8	198	4.7	275	6.5	308	7.3	353	8.3	na	na	914	1-1/4" NPT	
65	8.10	190	3.8	232	4.7	323	6.5	362	7.3	415	8.4	696	1-1/4" NPT	783	1-1/4" NPT	
70	9.39	220	3.8	269	4.6	374	6.4	419	7.2	481	8.3	609	1-1/2" #600RF	667	1-1/2" #600RF	
75	10.78	253	3.8	309	4.6	430	6.4	482	7.2	552	8.3	na	na	580	1-1/2" #600RF	
80	12.27	287	3.8	351	4.6	489	6.4	548	7.2	628	8.2	464	1-1/2" #600RF	508	1-1/2" #600RF	
85	13.85	324	3.8	397	4.6	552	6.4	619	7.2	709	8.2	na	na	450	1-1/2" #600RF	
90	15.53	364	3.8	445	4.7	619	6.5	693	7.3	795	8.3	na	na	406	1-1/2" #600RF	
100	19.17	449	3.7	549	4.5	764	6.3	856	7.0	981	8.1	na	na	319	2" #600RF	
115	25.35	594	3.8	726	4.6	1010	6.4	1132	7.2	1298	8.2	na	na	247	2-1/2" #300RF	
125	29.95	702	3.4	858	4.2	1193	5.8	1338	6.5	1533	7.5	189	2-1/2" #300RF	na	na	
140	37.58	880	3.6	1076	4.4	1497	6.2	1678	6.9	1924	7.9	145	2-1/2" #300RF	160	2-1/2" #300RF	
160	49.08	1149	3.9	1406	4.7	1955	6.6	2192	7.4	na	na	116	2-1/2" #150RF	131	2-1/2" #150RF	
200	76.68	1796	3.4	2197	4.1	3055	5.7	3424	6.4	na	na	73	2-1/2" #150RF	73	2-1/2" #150RF	

- Notes:
- 1) All stated flow rates are theoretical flow rates! The effective flow rate is lower depending on discharge pressure.

2) Stated stroke frequencies are selected values at 60 Hz. Others on request.

3) S 180 based pumps motors have a NEMA flange of 184TC up to 215TC

4) Based motor speed: 1750 rpm

5) Other speed on request

6) #2500 RTJ is an ANSI B16.5 flange with a metal ring as sealing

7) Other nozzles and connections available on request

Piston Diam.	Stroke Volume	Pumps with S 600 crank drive										PS Pumps max. pressure	Nozzles	MfS Pumps max. pressure	Nozzles	MhS Pumps max. pressure	Nozzles
		Theoretic flow in GPH at strokes/min. (spm)/ Gear Ratio (gr) and 60 Hz for one (1) pump head Calculated required motor power in HP															
		(spm/gr)		(spm/gr)		(spm/gr)		(spm/gr)		(spm/gr)							
		89 19.63	HP	116 15.12	HP	158 11.1	HP	175 9.99	HP	197 8.89	HP						
[mm]	[cu. In.]										[psi]		[psi]		[psi]		
10	0.19	4.4	5.0	5.8	6.5	7.9	8.8	8.7	9.8	9.8	11.0	na	na	na	na	43500	3/8" NPT
11	0.23	5.4	6.0	7.0	7.8	9.5	10.7	10.5	11.8	11.9	13.3	na	na	na	na	43500	3/8" NPT
12	0.28	6.4	7.2	8.3	9.3	11.3	12.7	12.5	14.1	14.1	15.8	na	na	na	na	43500	3/8" NPT
14	0.38	8.7	8.1	11.3	10.6	15.4	14.4	17.1	16.0	19.2	18.0	na	na	na	na	36250	3/8" NPT
16	0.49	11.3	8.5	14.8	11.0	20.1	14.9	22.3	16.6	25.1	18.7	na	na	na	na	28841	3/4" NPT
18	0.62	14.4	8.4	18.7	11.0	25.5	14.9	28.2	16.6	31.8	18.7	na	na	na	na	22780	3/4" NPT
20	0.77	17.7	8.0	23.1	10.3	31.5	14.1	34.9	15.7	39.2	17.6	na	na	na	na	17400	3/4" NPT
22	0.93	21.5	8.0	28.0	10.4	38.1	14.2	42.2	15.8	47.5	17.7	na	na	na	na	14500	3/4" NPT
26	1.30	30.0	8.8	39.1	11.4	53.2	15.5	58.9	17.3	66.3	19.4	na	na	11354	3/4" NPT	11020	1-1/4" NPT
28	1.50	34.7	8.2	45.3	10.6	61.7	14.5	68.3	16.1	76.9	18.1	na	na	na	na	9135	1-1/4" NPT
30	1.73	39.9	8.4	52.0	11.0	70.8	14.9	78.4	16.6	88.3	18.6	5800	3/4" #2500RTJ	8193	3/4" NPT	8193	1-1/4" NPT
32	1.96	45.4	8.4	59.2	11.0	80.6	14.9	89.2	16.6	100.5	18.7	na	na	na	na	7207	1-1/4" NPT
36	2.48	57.4	8.4	74.9	10.9	102.0	14.9	112.9	16.6	127.1	18.6	5119	3/4" #2500RTJ	5684	1" #2500RTJ	na	na
38	2.77	64.0	8.4	83.4	11.0	113.6	14.9	125.8	16.6	141.7	18.6	na	na	5104	1" #2500RTJ	na	na
40	3.07	70.9	8.4	92.4	11.0	125.9	14.9	139.4	16.6	157.0	18.6	4147	3/4" NPT	4611	3/4" NPT	na	na
44	3.71	85.8	8.5	111.8	11.0	152.3	14.9	168.7	16.6	189.9	18.7	na	na	3814	1" NPT	na	na
46	4.06	93.8	8.4	122.2	10.9	166.5	14.9	184.4	16.6	207.6	18.6	na	na	3480	1" NPT	na	na
50	4.79	110.8	8.3	144.4	10.8	196.7	14.7	217.9	16.3	245.3	18.3	2654	1" #1500RF	2900	1" NPT	na	na
54	5.59	129.2	7.6	168.5	9.9	229.4	13.4	254.1	14.9	286.1	16.8	2277	1" #1500RF	na	na	na	na
55	5.80	134.1	8.4	174.8	11.0	238.0	14.9	263.6	16.6	296.8	18.6	na	na	2436	1" NPT	na	na
60	6.90	159.6	8.4	208.0	10.9	283.3	14.9	313.7	16.6	353.2	18.6	na	na	2045	1-1/4" NPT	na	na
65	8.10	187.3	8.4	244.1	10.9	332.4	14.9	368.2	16.5	414.5	18.6	1566	1" #1500RF	1740	1-1/4" NPT	na	na
70	9.39	217.2	8.4	283.1	10.9	385.6	14.8	427.0	16.5	480.7	18.5	1349	1-1/2" #600RF	1494	1-1/2" #600RF	na	na
75	10.78	249.3	8.4	324.9	10.9	442.6	14.9	490.2	16.5	551.9	18.6	na	na	1305	1-1/2" #600RF	na	na
80	12.27	283.7	8.4	369.7	10.9	503.6	14.8	557.8	16.5	627.9	18.5	1030	1-1/2" #600RF	1146	1-1/2" #600RF	na	na
85	13.85	320.2	8.4	417.4	10.9	568.5	14.8	629.7	16.5	708.8	18.5	na	na	1015	1-1/2" #600RF	na	na
90	15.53	359.0	8.3	467.9	10.8	637.3	14.7	705.9	16.4	794.7	18.4	na	na	899	1-1/2" #600RF	na	na
94	16.94	391.6	7.5	510.4	9.7	695.3	13.2	770.1	14.7	866.9	16.5	740	2" #600RF	na	na	na	na
100	19.17	443.2	8.3	577.7	10.8	786.9	14.7	871.5	16.3	981.1	18.3	na	na	725	2" #600RF	na	na
115	25.35	586.2	8.3	764.0	10.8	1040.6	14.8	1152.6	16.4	1297.5	18.4	na	na	551	2-1/2" #300RF	na	na
125	29.95	692.5	7.5	902.6	9.8	1229.5	13.3	1361.7	14.8	1532.9	16.6	421	2" #300RF	na	na	na	na
140	37.58	868.7	8.1	1132.3	10.6	1542.2	14.4	1708.2	16.0	na	na	334	2-1/2" #300RF	363	2-1/2" #300RF	na	na
160	49.08	1134.7	8.1	1478.9	10.5	2014.3	14.3	2231.1	15.9	na	na	247	2-1/2" #150RF	276	2-1/2" #150RF	na	na
200	76.68	1772.9	8.0	2310.8	10.3	3147.4	14.1	3486.0	15.7	na	na	160	2-1/2" #150RF	174	2-1/2" #150RF	na	na
240	110.43	2553.0	7.6	3327.5	9.9	4532.3	13.5	5019.9	15.0	na	na	na	na	116	2-1/2" #150RF	na	na

- Notes:
- 1) All stated flow rates are theoretical flow rates! The effective flow rate is lower depending on discharge pressure.

2) Stated stroke frequencies are selected values at 60 Hz. Others on request.

3) S 600 based pumps motors have a NEMA flange of 213TC up to 256TC

4) Based motor speed: 1750 rpm

5) Other speed on request

6) #2500 RTJ is an ANSI B16.5 flange with a metal ring as sealing

7) Other nozzles and connections available on request

SELECTION GUIDE

TECHNICAL TABLES

Piston Diam.	Stroke Volume	Pumps with S 1400 crank drive										PS Pumps max. pressure	Nozzles	MfS Pumps max. pressure	Nozzles	MhS Pumps max. pressure	Nozzles
		Theoretic flow in GPH at strokes/min. (spm)/ Gear Ratio (gr) and 60 Hz for one (1) pump head Calculated required motor power in HP															
		(spm/gr)		(spm/gr)		(spm/gr)		(spm/gr)		(spm/gr)							
		86	127	157	177	191											
		[mm]	[cu. in.]	20.3	HP	13.8	HP	11.1	HP	9.89	HP						
30	2.59	58	17.3	85	25.6	106	31.6	119	35.6	128	38.4	na	na	9135	3/4" #2500RTJ	11600	1-1/4" NPT
32	2.94	66	17.2	97	25.5	120	31.4	135	35.4	146	38.2	na	na	na	na	10150	1-1/4" NPT
36	3.73	83	18.4	123	27.1	152	33.5	171	37.7	185	40.7	na	na	na	na	8541	1-1/4" NPT
40	4.60	103	18.4	152	27.1	188	33.5	212	37.7	228	40.7	5800	1" #2500RTJ	5800	1" #2500RTJ	6917	1-1/4" NPT
44	5.57	124	18.4	184	27.1	227	33.5	256	37.7	276	40.7	na	na	5713	1" #2500RTJ	na	na
46	6.08	136	18.4	201	27.1	248	33.5	280	37.7	302	40.8	na	na	5235	1" #2500RTJ	na	na
50	7.19	161	18.3	237	27.1	293	33.4	331	37.7	357	40.7	3988	1" #2500RTJ	4423	1" #2500RTJ	na	na
55	8.70	194	18.2	287	26.9	355	33.2	400	37.4	432	40.3	na	na	3625	1" #1500RTJ	na	na
60	10.35	231	18.4	342	27.1	422	33.5	476	37.7	514	40.7	2755	1" #1500RF	3074	1" #1500RTJ	na	na
65	12.15	271	18.3	401	27.0	496	33.4	559	37.6	603	40.6	na	na	2610	1-1/2" #1500RF	na	na
70	14.09	315	18.3	465	27.0	575	33.3	648	37.5	699	40.5	2030	1-1/2" #1500RF	2248	1-1/2" #1500RF	na	na
75	16.18	361	18.3	534	27.0	660	33.3	744	37.5	803	40.5	na	na	1958	1-1/2" #1500RTJ	na	na
80	18.40	411	18.3	607	27.0	751	33.4	846	37.6	913	40.6	1450	1-1/2" #1500RF	1726	1-1/2" #1500RTJ	na	na
90	23.29	520	18.3	768	27.0	950	33.4	1071	37.6	1156	40.6	na	na	1363	2" #600RF	na	na
94	24.41	568	16.4	838	24.2	1036	29.8	1168	37.6	1261	36.3	1117	2" #600RF	na		na	na
100	28.76	642	18.3	949	27.0	1173	33.3	1322	37.6	1427	40.5	na	na	1102	2-1/2" #600RF	na	na
115	38.03	850	18.1	1255	26.8	1551	33.1	1749	37.2	1887	40.2	na	na	827	2-1/2" #600RF	na	na
125	44.93	1004	15.0	1482	22.2	1833	27.4	2066	30.9	na	na	580	2-1/2" #300RF	na		na	na
140	56.36	1259	17.9	1859	26.5	2299	32.7	2592	36.8	na	na	508	2-1/2" #300RF	551	2-1/2" #300RF	na	na
160	73.62	1645	17.9	2429	26.4	3002	32.6	3385	36.7	na	na	363	3" #300RF	421	3" #300RF	na	na
200	115.03	2570	18.3	3795	27.0	4691	33.3	5289	37.6	na	na	247	3" #150RF	276	4" #150RF	na	na
280	225.45	5037	17.0	7438	25.1	9195	31.0	na	na	na	na	116	4" #150RF	na	na	na	na

- Notes:
- 1) All stated flow rates are theoretical flow rates! The effective flow rate is lower depending on discharge pressure.
 - 2) Stated stroke frequencies are selected values at 60 Hz. Others on request.
 - 3) S 1400 based pumps motors have a NEMA flange of 256TC up to 326TC
 - 4) Based motor speed: 1750 rpm
 - 5) Other speed on request
 - 6) #2500RTJ is an ANSI B16.5 flange with a metal ring as sealing
 - 7) Other nozzles and connections on request

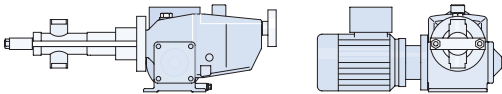
Piston Diam.	Stroke Volume	Pumps with Rb 15 crank drive						DR pump max. pressure	Nozzles
		Theoretic flow in GPH at strokes/min. (spm)/ Gear Ratio (gr) and 60 Hz for one (1) pump head Calculated required motor power in HP							
		(spm/gr)		(spm/gr)		(spm/gr)			
		66 12.5	HP	90 12.5	HP	140 12.5	HP		
[mm]	[cu. in.]							[psi]	
5	0.018	0.3	0.01	0.4	0.01	0.6	0.02	1450	1/4" NPT
7	0.035	0.5	0.08	0.7	0.11	1.1	0.17	5800	1/4" NPT
12	0.104	1.5	0.09	2.1	0.12	3.3	0.19	2306	3/8" NPT
18	0.233	3.5	0.09	4.7	0.12	7.3	0.19	1015	3/8" NPT
25	0.449	6.7	0.09	9.1	0.12	14.2	0.19	522	1/2" #600RF
36	0.932	13.8	0.09	18.9	0.12	29.4	0.19	247	1" #300RF
50	1.797	26.7	0.09	36.4	0.12	56.6	0.19	131	1-1/2" #150RF
70	3.523	52.3	0.08	71.4	0.11	111.0	0.17	58	2" #150RF

Piston Diam.	Stroke Volume	Pumps with Rb 150 crank drive								DR pump max. pressure	Nozzles	MhR pump max. pressure	Nozzles	
		Theoretic flow in GPH at strokes/min. (spm)/ Gear Ratio (gr) and 60 Hz for one (1) pump head Calculated required motor power in HP												
		(spm/gr) 66		(spm/gr) 90		(spm/gr) 140		(spm/gr) 175						
		12.5	HP	1.25	HP	12.5	HP	10	HP					
[mm]	[cu. in.]									[psi]		[psi]		
6	0.055	0.9	1.1	1.3	1.4	2.0	2.3	2.5	2.8	na	na	43500	3/8" NPT	
7	0.075	1.3	1.5	1.8	2.0	2.7	3.1	3.4	3.8	na	na	43500	3/8" NPT	
12	0.221	3.8	0.6	5.2	0.8	8.0	1.2	10.0	1.5	5800	1/2" NPT	na	na	
18	0.497	8.5	1.3	11.6	1.7	18.1	2.7	22.6	3.4	5800	1/2" #1500RF	na	na	
25	0.959	16.4	1.5	22.4	2.1	34.9	3.3	43.6	4.1	3625	1/2" #2500RTJ	na	na	
36	1.988	34.1	1.9	46.5	2.5	72.3	4.0	90.4	5.0	2132	1" #1500RF	na	na	
50	3.834	65.7	1.9	89.6	2.5	139	4.0	174	5.0	1102	1-1/2" #600RF	na	na	
70	7.515	129	1.8	176	2.5	273	3.9	342	4.9	551	2" #300RF	na	na	
90	12.423	213	1.8	290	2.5	452	3.9	565	4.9	334	2-1/2" #300RF	na	na	
120	22.085	379	1.9	516	2.5	803	3.9	1004	4.9	189	3" #150RF	na	na	
140	30.060	515	1.7	703	2.4	1093	3.7	1367	4.9	131	4" #150RF	na	na	

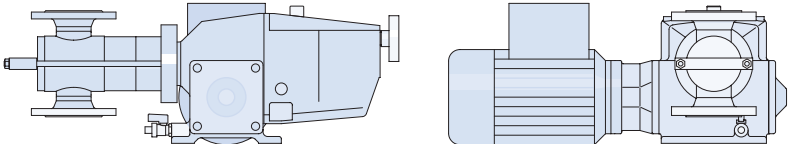
- Notes:
- 1) All stated flow rates are theoretical flow rates! The effective flow rate is lower depending on discharge pressure.
 - 2) Stated stroke frequencies are selected values at 60 Hz. Other on request.
 - 3) DR pumps are available with two gear ratios only. Different speeds come for different motor speeds.
 - 3) DR 15 based pumps motors have a NEMA flange of 56C
 - 4) DR 150 based pumps motors have a NEMA flange of 184TC
 - 5) Based motor speed for 4 pole motors: 1750 rpm
 - 7) Based motor speed for 8 pole motors: 830 rpm
 - 8) Other nozzles and connections available on request

SIDE VIEW OF ORLITA® PUMPS

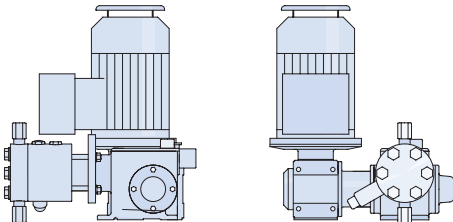
DR 15/25



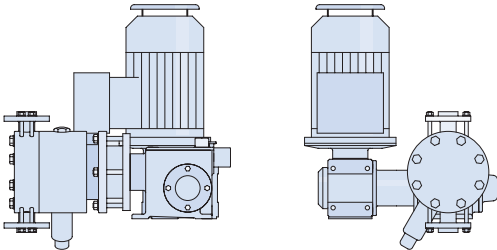
DR 150/90



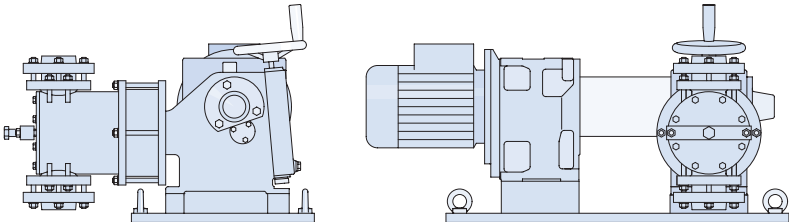
MfS 18/10



MfS 35/44



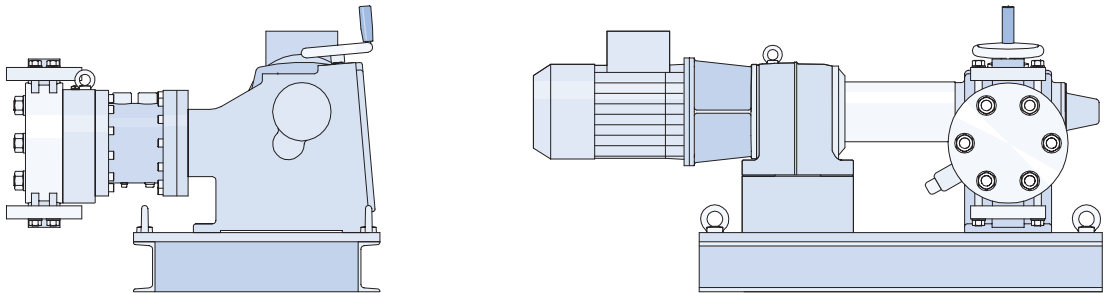
PS 80/125



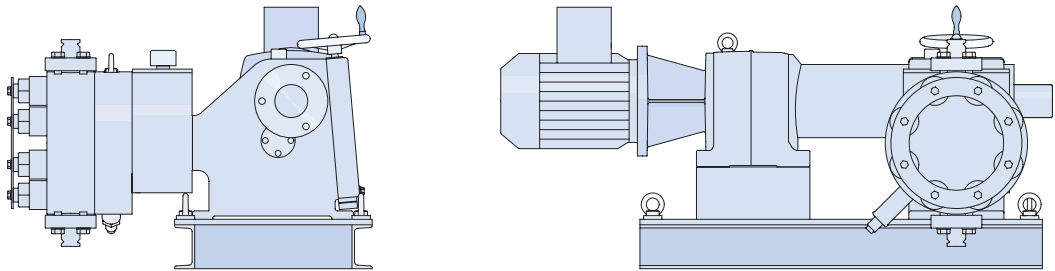
0 20 in.

SIDE VIEW OF ORLITA® PUMPS

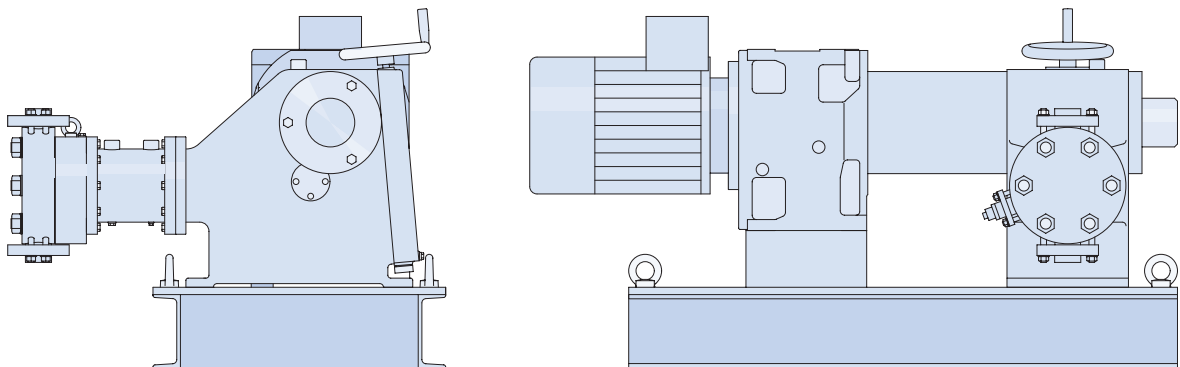
MfS 180/44



MhS 600/26



MfS 1400/60



0 20 in.

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