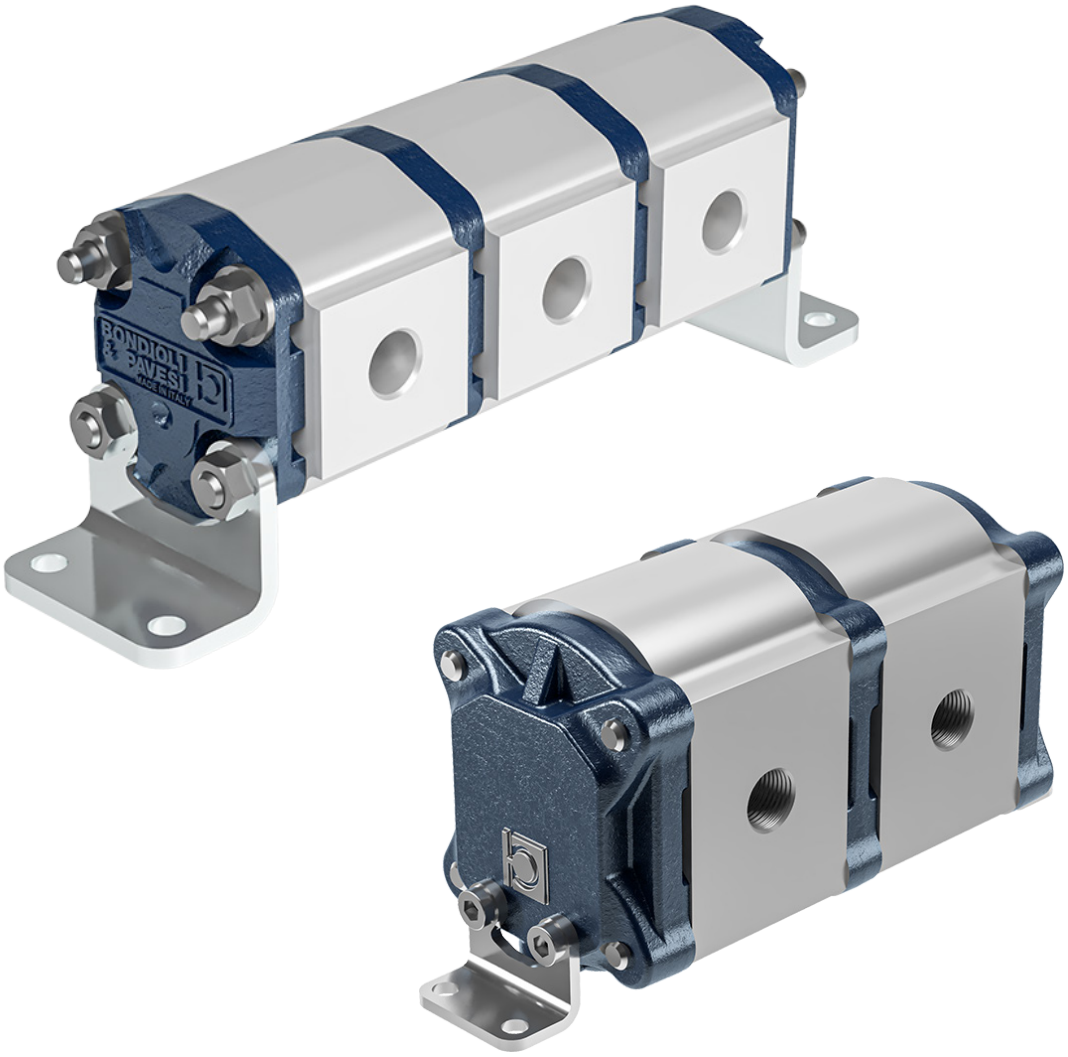
HPLDF series

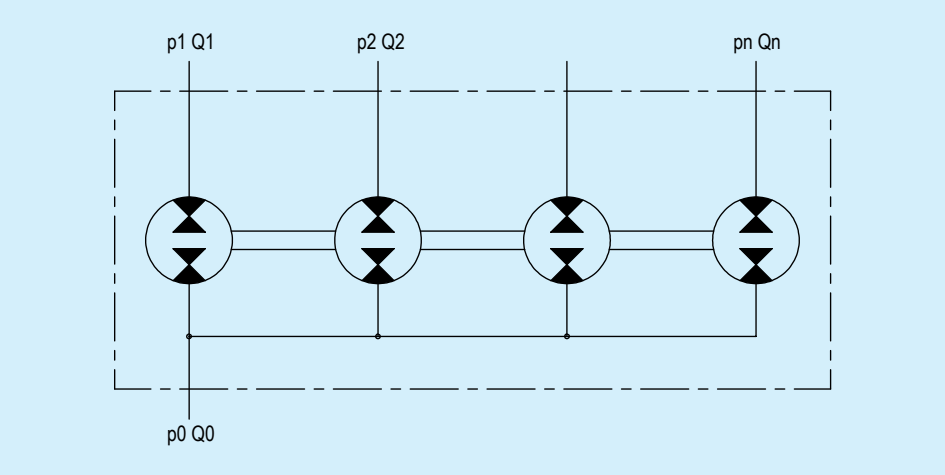


Contents

HPLDF

Introduction

The gear flow dividers consist of several gear sections connected to each other along a common shaft and divide the incoming flow rate Q0 into equal or proportional parts Qi so that the actuators connected to them can effect synchronous movements (excluding small losses in volumetric efficiency).



$Q0 = Q1 + Q2 + ... Qn$
$p0Q0 = p1Q1 + p2Q2 + ... pnQn$

where:

Q = flow rate [l/min]
p = pressure [bar]

They are theoretically non-dissipative components because if the pressure at the outlet of a section is lower than the inlet pressure, the section itself behaves like a motor and feeds the other sections in which the outlet pressure is greater than the inlet one through the common shaft. This exchange of energy takes place inside the divider without any help from outside. The flow dividers can also be used as pressure intensifiers to increase the working pressure of a system.
The flow dividers can be fitted with relief valves that allow the actuators to be rephased at the end of their extension stroke (positive). Sometimes, the actuators in parallel powered by the flow divider do not reach the end of stroke at the same time. For this reason, the valve in the section that first reaches the positive end of stroke opens, operating as a pressure limiter device, and drains its section while waiting for the other actuators to reach the end of stroke. If the relief valves have anti-cavitation, rephasing also takes place during stem retraction when one actuator reaches the end of stroke (negative) before the others. The valve acts as a one-way valve sucking oil and thereby avoiding cavitation problems.
The HPL series flow dividers are group 1, 2 and 3 and different configurations are available for each group.
To calculate the largest displacements of a flow divider, you must know the inlet flow rate Q0 and the number of sections n. The best rotation speed range for operation is between 1500 and 2500 rpm. We therefore use a

speed of 2000 rpm:

$$V_t = \frac{0.5 \cdot Q_0}{n}$$

The nearest displacement can then be selected from the technical data table. The standard configuration has inlet and outlet ports on each section of the divider (fig. 1).
The single inlet configuration is divided into the version with a side inlet on the cover (fig. 2) or with an inlet on the body (fig. 3). The number of inlet ports depends on the number of stages based on the following relationship:

for **n** < 4 ⟶ Number of inputs I = 1
for **n** > 4 ⟶ Number of inputs I=INT(n/4+1)

Example: divider with **n** = 5 stages ⟶ no. of inputs I = INT(2.25) = 2

The inlet ports for **n** > 4 are the same size.

fig. 1

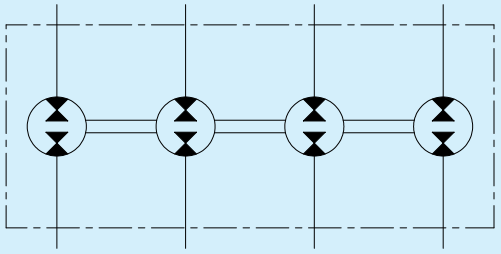


fig. 2

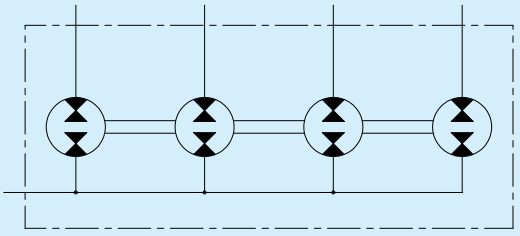
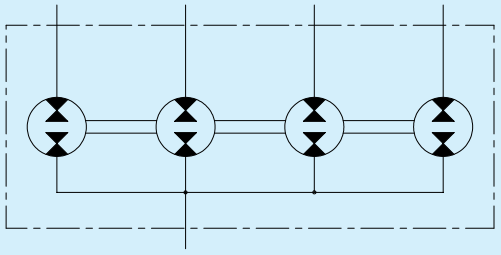


fig. 3



The flow dividers in groups 1 and 2 can be supplied with pressure relief valves to allow rephasing of the actuators at the end of the stroke. The valves can be calibrated and positioned on each section of the divider whereas the

drain is external and common to all valves.
The version with fixed setting pressure relief and external discharge anti-cavitation valves is only available for group 2. The valved versions are available in the standard configuration (fig. 4) with a single inlet on the cover (fig. 5) and body (fig. 6).

fig. 4

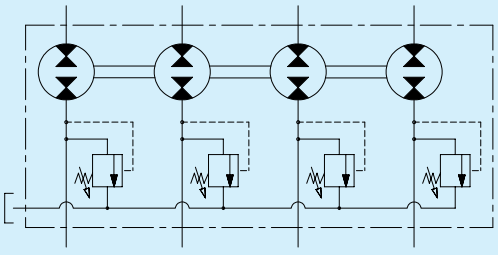


fig. 5

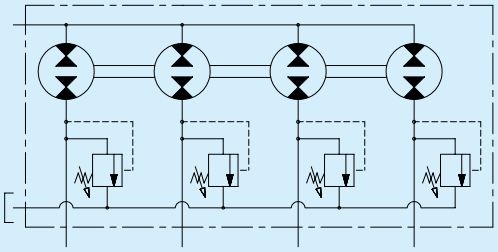
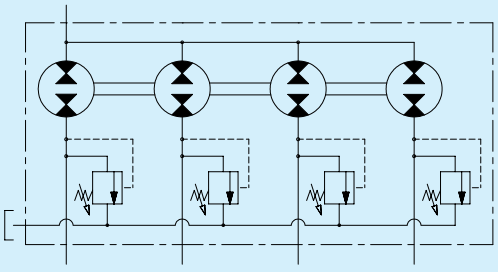
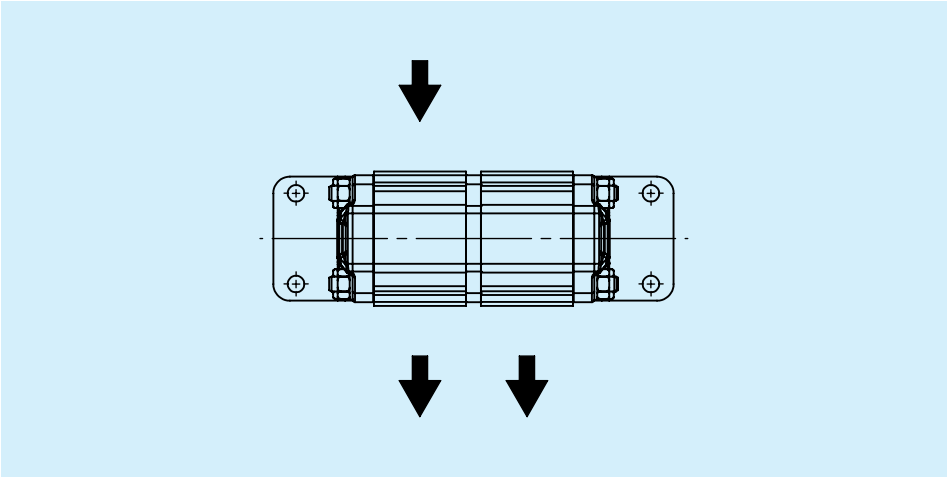


fig. 6

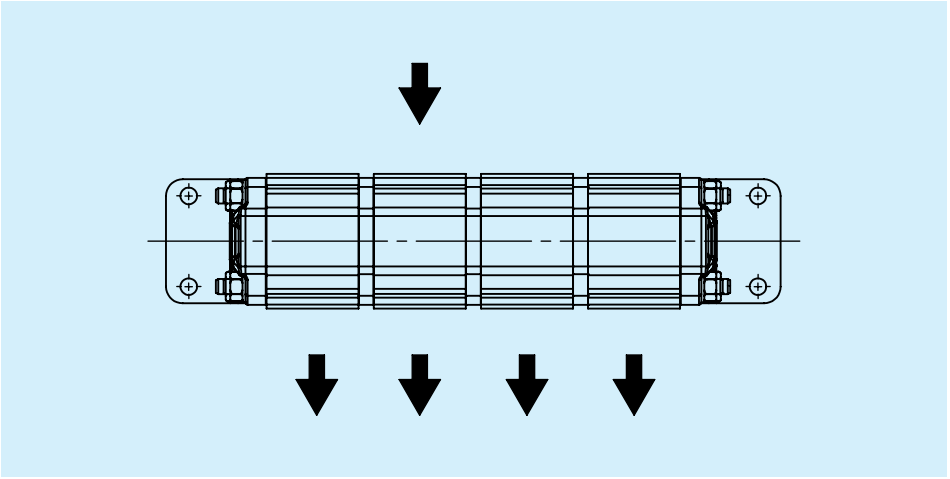


Body single inlet configuration

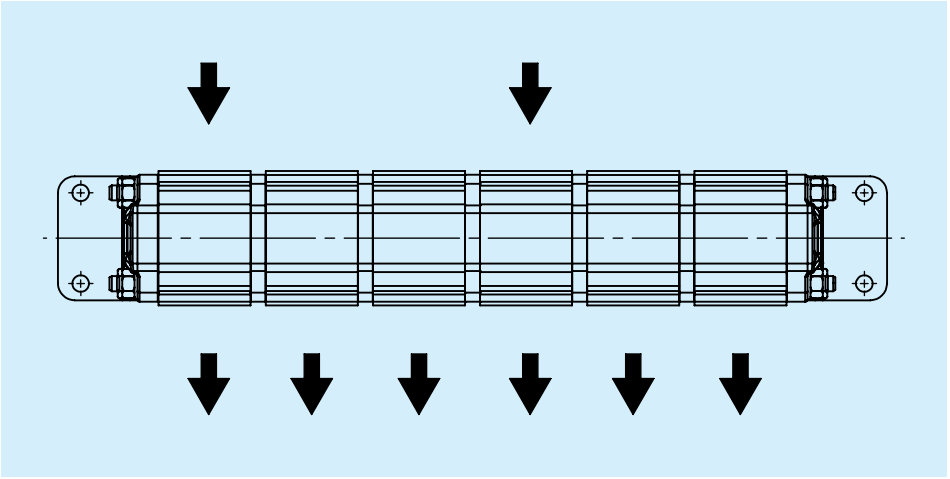
2-stage divider



3- and 4-stage divider

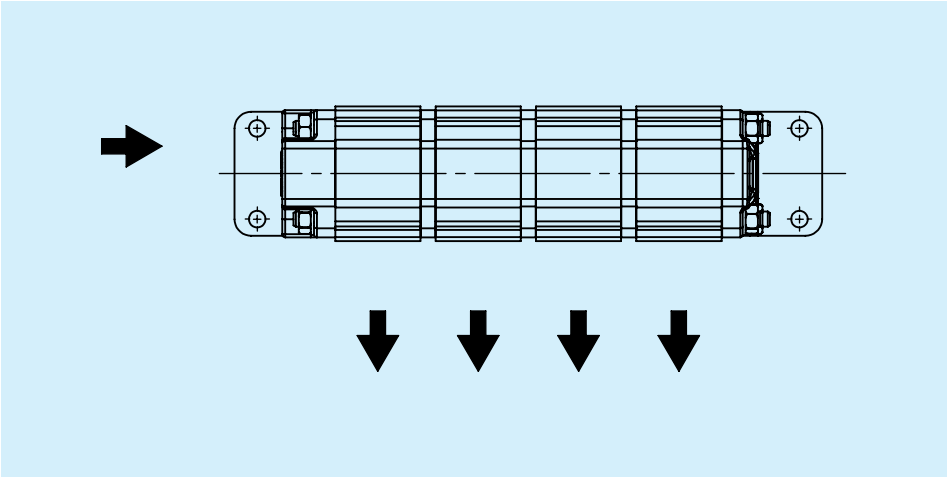


5- and 6-stage divider

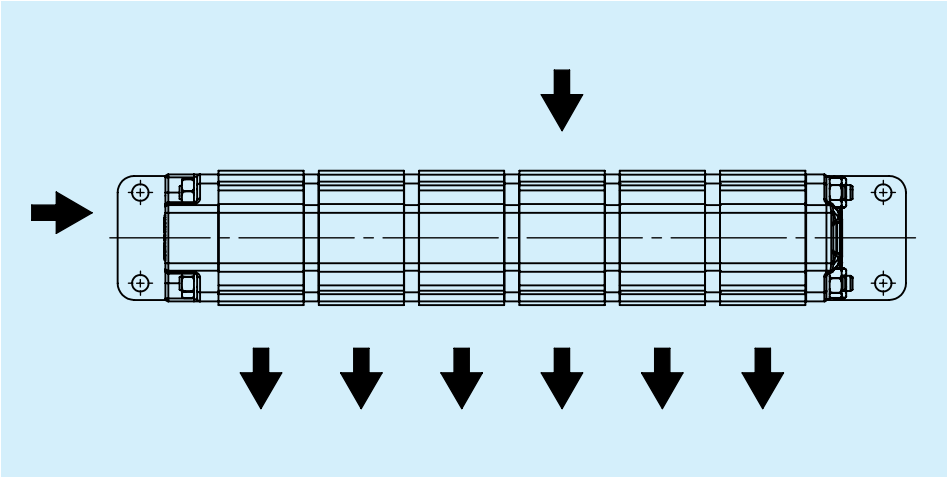


Cover single inlet configuration

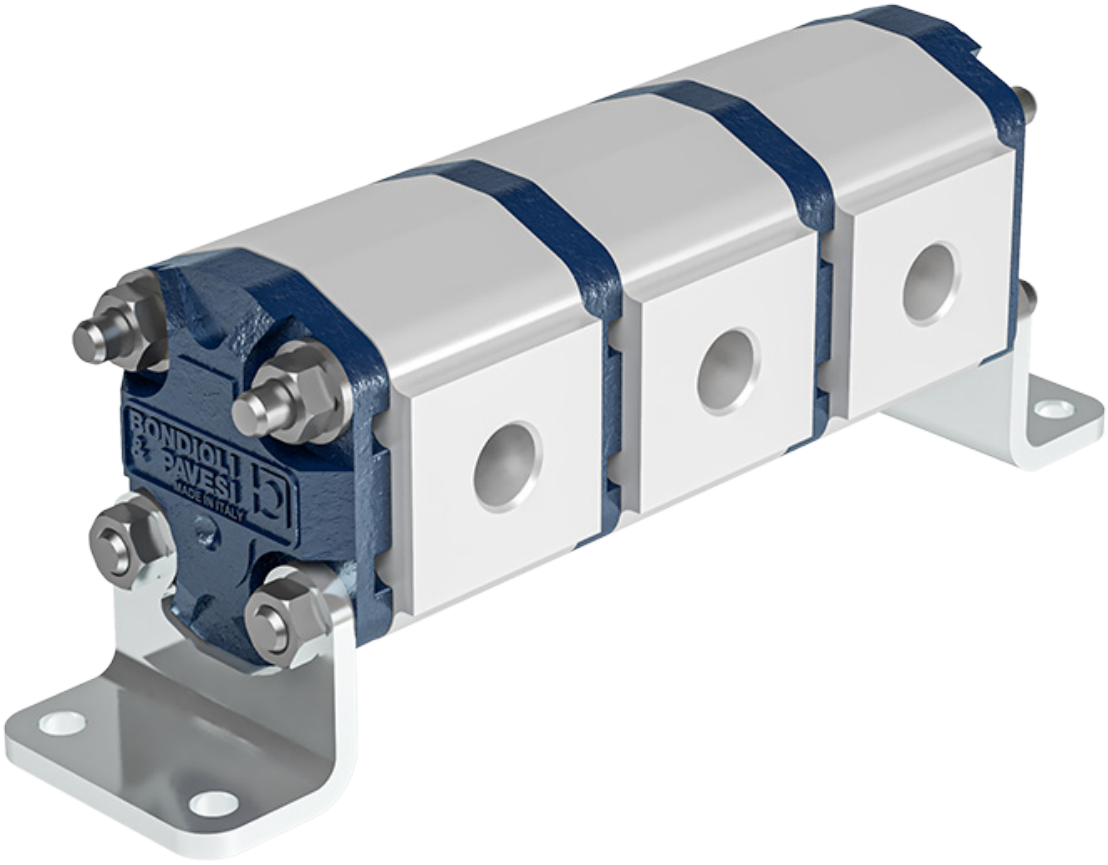
2- to 4-stage divider



5- and 6-stage divider



HPLDF Series Group 1



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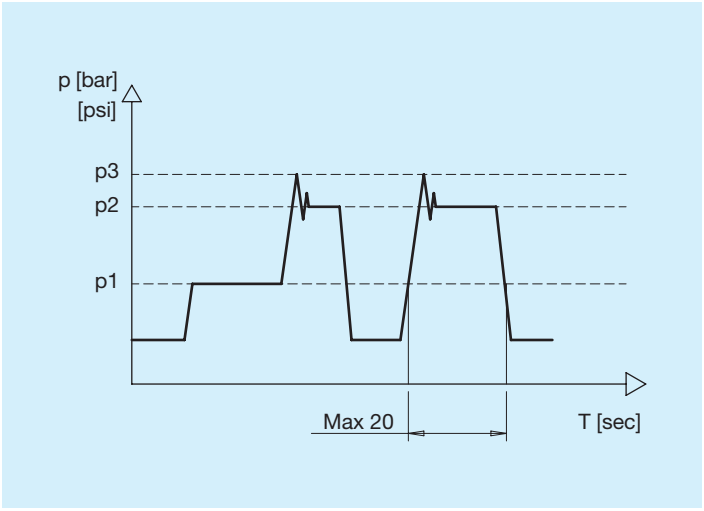
Pressure definition



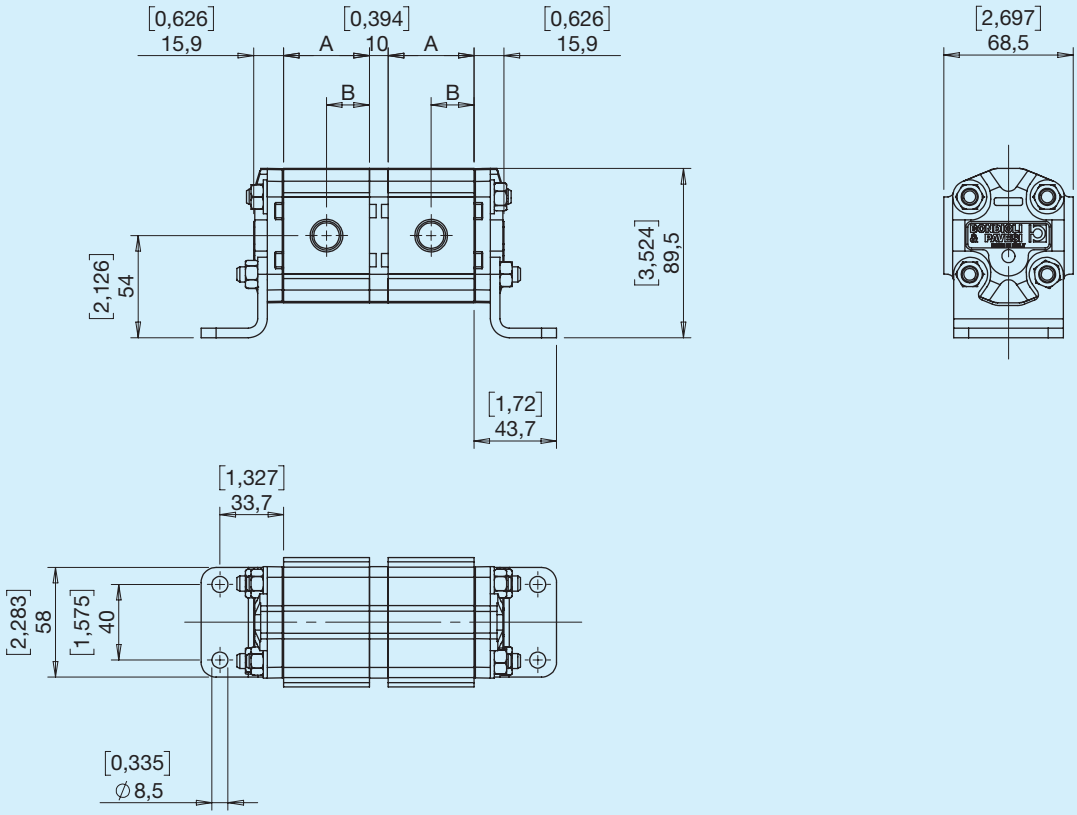
p1	Continuous Pressure
A,B - Use	Intermittent pressure Maximum pressure permitted for short periods (max. 20 sec)
L1, L2 - Drain port	Peak pressure Maximum permitted pressure intended as peak Vmax pressure

Dimensions and technical data

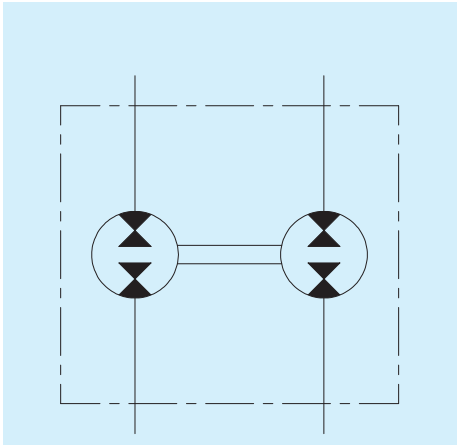
HPLDF.1	Nominal displacement		Continuous Pressure		Intermittent pressure		ΔP MAX between sections		Rotational speed		A		B	
	cm^3	**in^3**	**bar**	**psi**	**bar**	**psi**	**bar**	**psi**	**MIN min^{-1}**	**MAX min^{-1}**	**mm**	**in**	**mm**	**in**
31	3.17	0.19	210	3046	250	3626	280	2611	700	4800	38.70	1.524	19.4	0.762
36	3.73	0.23	210	3046	250	3626	280	2611	700	4800	45.35	1.785	22.7	0.893
44	4.35	0.27	210	3046	250	3626	260	2611	700	4800	45.35	1.785	22.7	0.893
48	4.97	0.30	210	3046	250	3626	260	2611	700	4800	45.35	1.785	22.7	0.893
60	6.08	0.37	210	3046	250	3626	260	2611	700	3600	56.05	2.207	28.0	1.103
70	7.00	0.43	190	2756	210	3046	260	2321	700	3600	56.05	2.207	28.0	1.103
80	7.87	0.48	160	2321	180	2611	260	1885	700	3600	56.05	2.207	28.0	1.103

Other displacements are available.
For more information, contact our technical sales department.

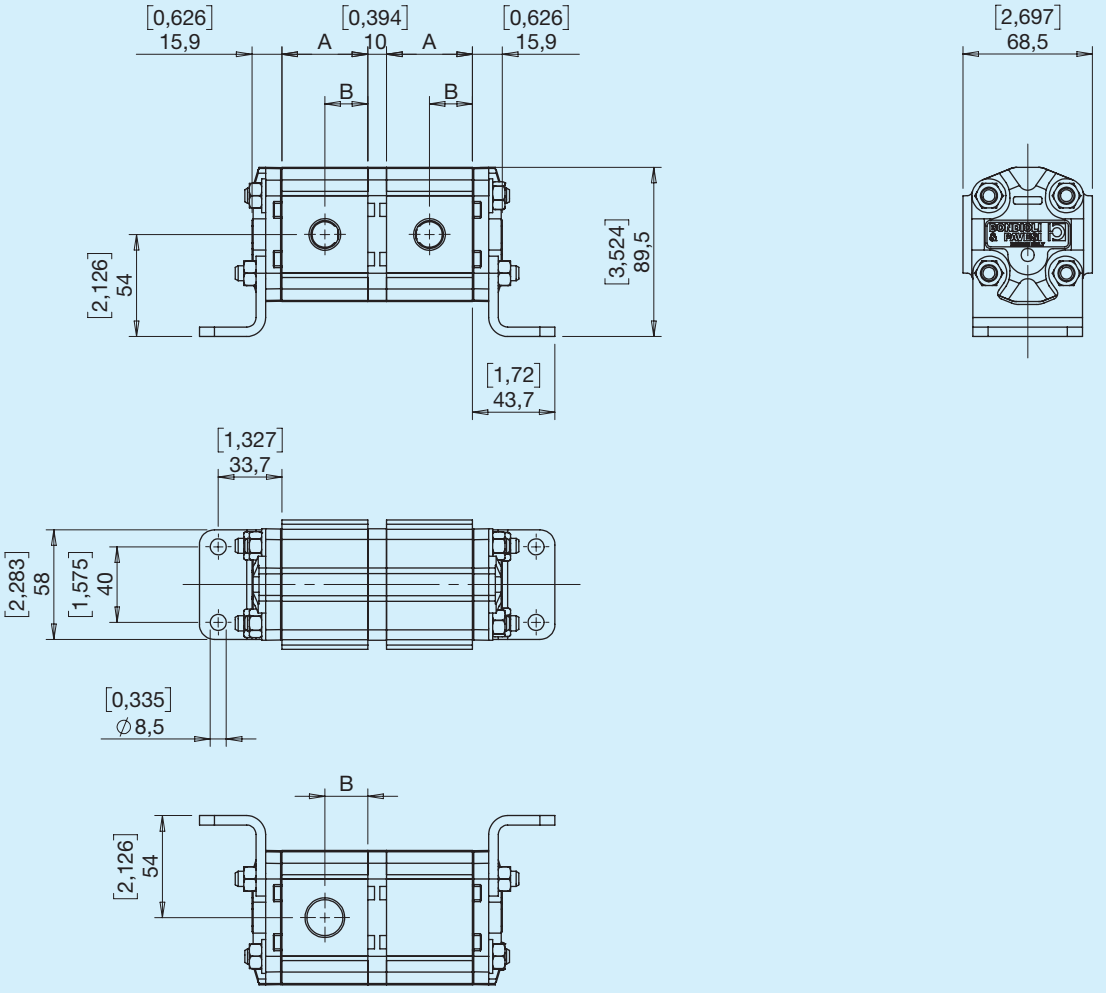
ST Standard



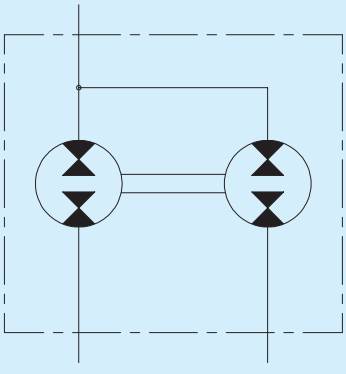
Hydraulic diagram



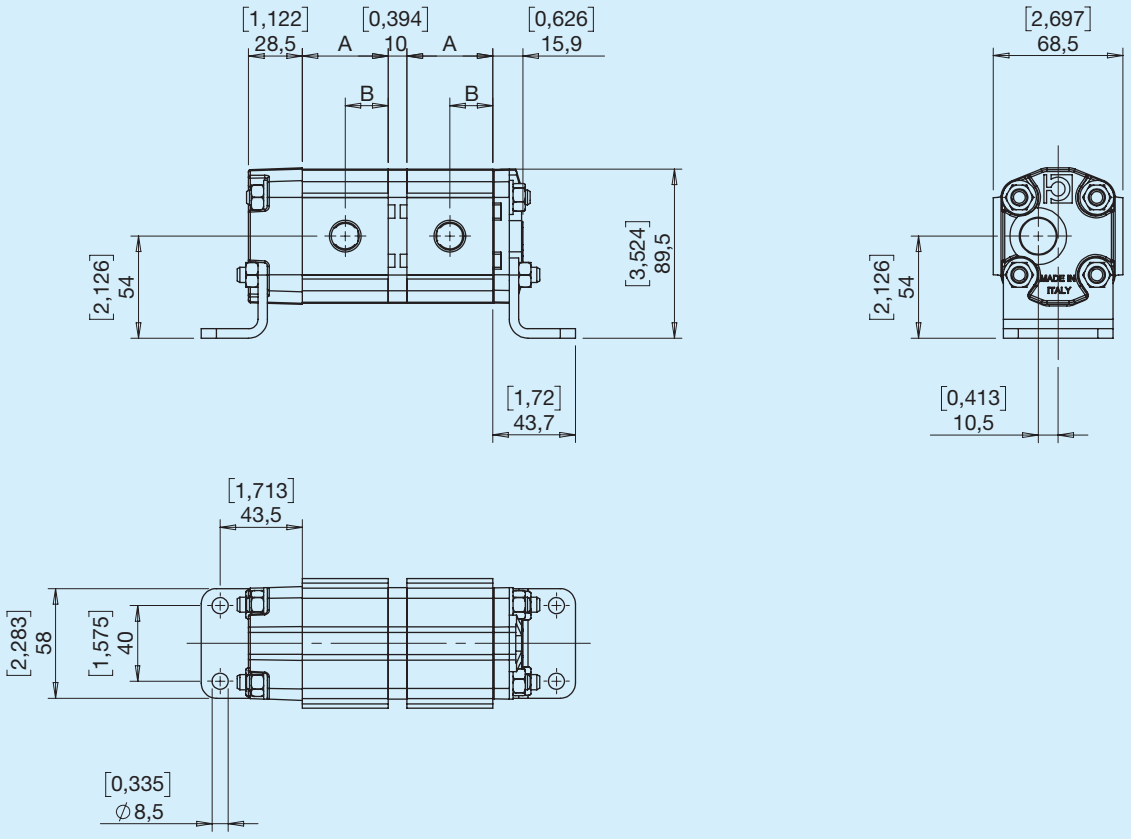
ST Single inlet on the body



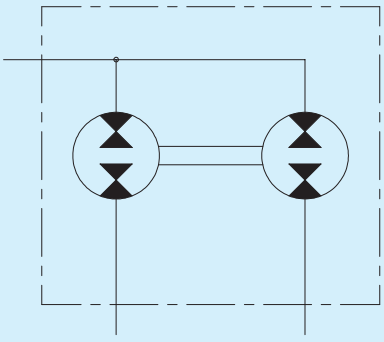
Hydraulic diagram



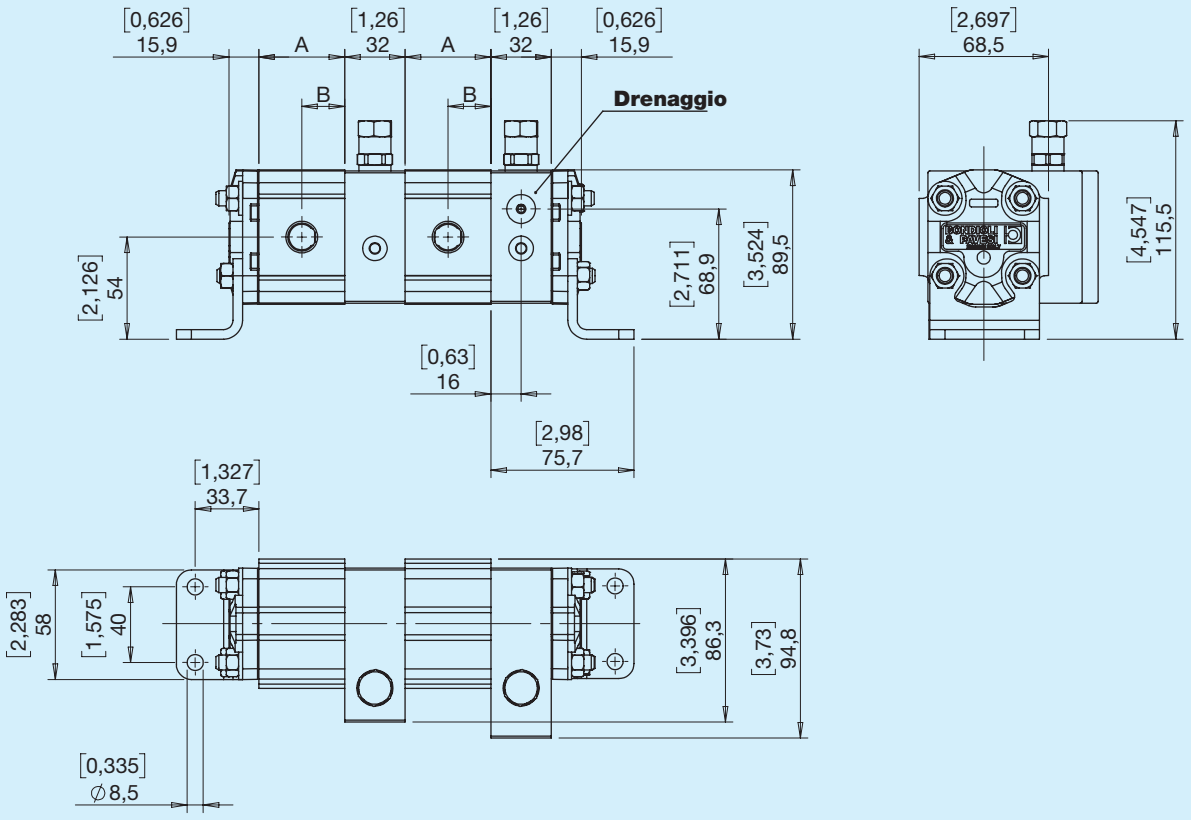
ST Single inlet on the cover



Hydraulic diagram

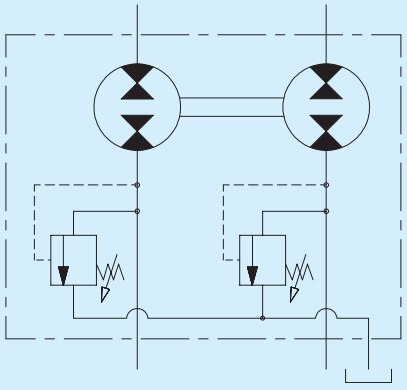


VE With adjustable pressure relief valves

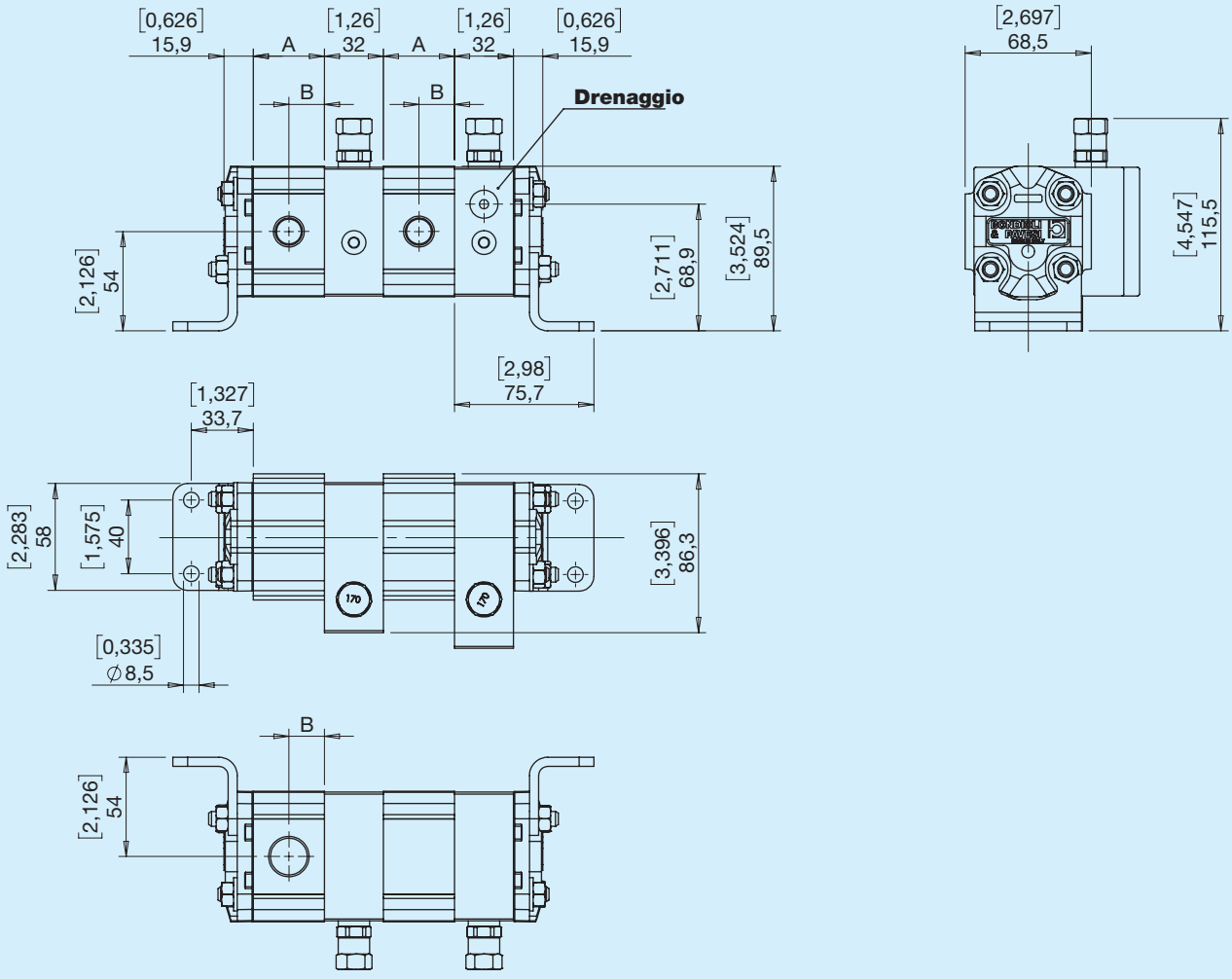


For pressure relief valves, indicate the calibration value

Hydraulic diagram

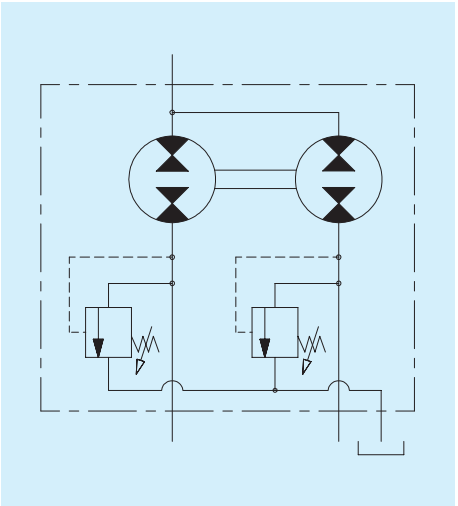


VE With adjustable pressure relief valves and single inlet on the body

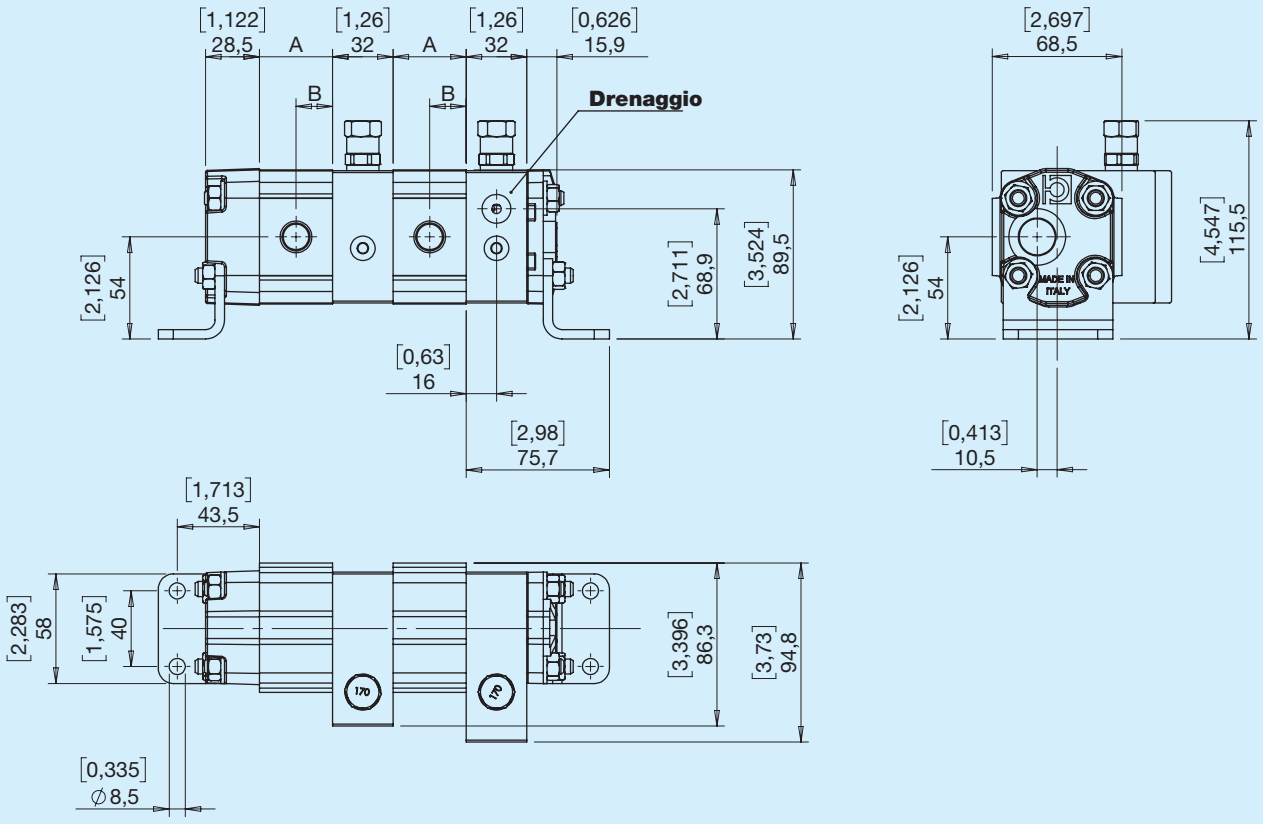


For pressure relief valves, indicate the calibration value

Hydraulic diagram

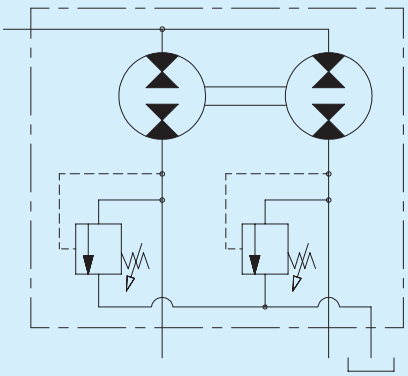


VE With adjustable pressure relief valves and single inlet on the cover

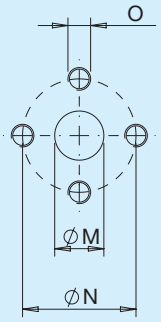


For pressure relief valves, indicate the calibration value

Hydraulic diagram

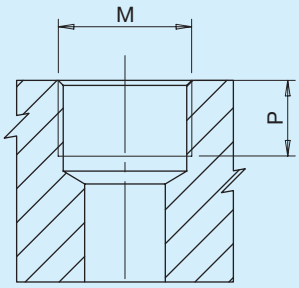


E Lateral



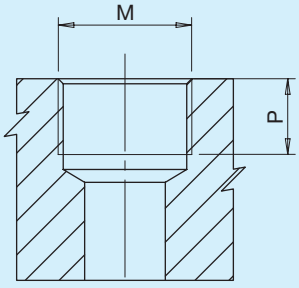
Type	M		N		O	
	mm	in	mm	mm		Nm
E3	13	0.51	30	1.18	M6	10

G Lateral / Drain



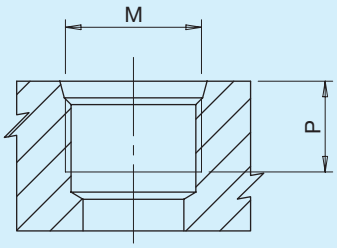
Type	M		P	
		Nm	mm	in
G3	PORT ISO 1179-1-G 3/8	38	12	0.47
G4	PORT ISO 1179-1 - G 1/2	50	16	0.63
G6	PORT ISO 1179-1-G 3/4	90	19	0.75

T Rear



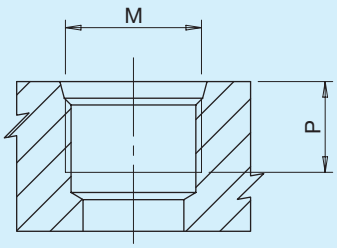
Type	M		P	
		Nm	mm	in
T4	PORT ISO 1179-1 - G 1/2	50	16	0.63

U Lateral / Drain



Type	Dim.	M	P		
			Nm	mm	in
U3	3/8'	PORT ISO 11926-1 - 9/16-18	25	13	0.51
U4	1/2'	PORT ISO 11926-1 - 3/4-16	47	15	0.59
U5	5/8'	PORT ISO 11926-1 - 7/8-14	70	17	0.67

C Rear



Type	Dim.	M	P		
			Nm	mm	in
C5	5/8'	PORT ISO 11926-1 - 7/8-14	70	17	0.67

Combination with standard ports

Ports	Round 31 ... 48 IN/OUT ports	60 70 80 IN/OUT ports	Drain line
E	E3 E3	E3 E3	G3
G	G3 G3	G4 G4	G3
U	U3 U3	U4 U4	U3

Combination with single inlet on the cover

Ports	Round 31 ... 48 IN/OUT ports	60 70 80 IN/OUT ports	Drain line
T	T4 G3	T4 G4	G3
C	C5 U3	C5 U4	U3

Combination with single inlet on the body

Ports	Round 31 ... 48 IN/OUT ports	60 70 80 IN/OUT ports	Drain line
G	G4 G3	G6 G4	G3
U	U4 U3	U5 U4	U3

Other combinations of ports are available. For more information, contact our technical sales department.

HPLDF.1	1 2	3	4	5 6	7 8	9 10	11	12 13

1 2

Series

DF flow dividers

3

Number of stages

2	2 stages	**4**	4 stages	**6**	6 stages
3	3 stages	**5**	5 stages		

4

Group

1 Group 1

5 6

Displacement

31	**44**	**60**	**80**
36	**48**	**70**	

7 8

IN - Inlet ports

... See tables Ports and Combinations

9 10

OUT - Output ports

... See tables Ports and Combinations

11

Seals

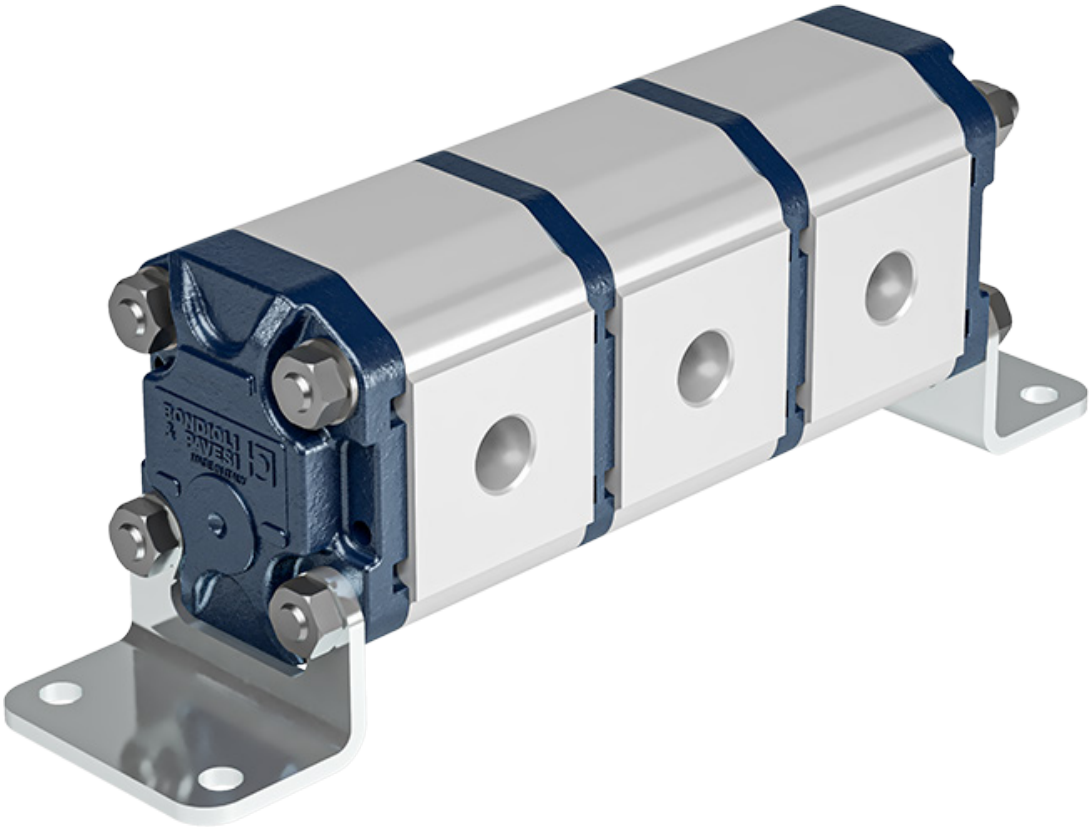
B	NBR Pump	**V**	Viton Pump

12 13

Covers

ST	Standard	**VE**	With valves (see valves section)

HPLDF Series Group 2



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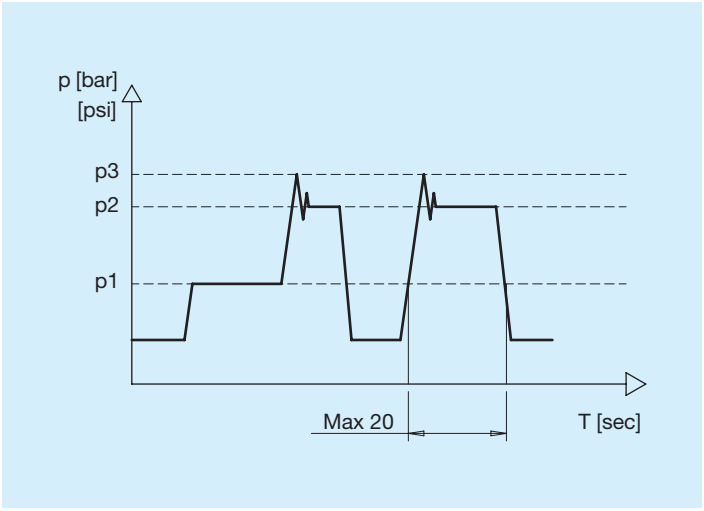
Pressure definition

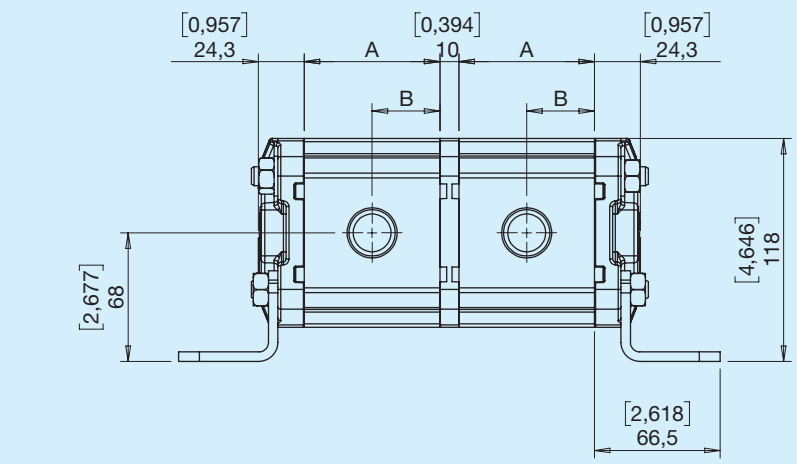


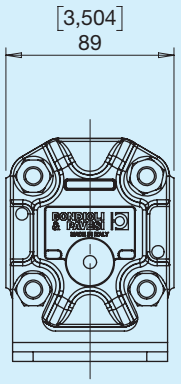
p1	Continuous Pressure
A,B - Use	Intermittent pressure Maximum pressure permitted for short periods (max. 20 sec)
L1, L2 - Drain port	Peak pressure Maximum permitted pressure intended as peak Vmax pressure

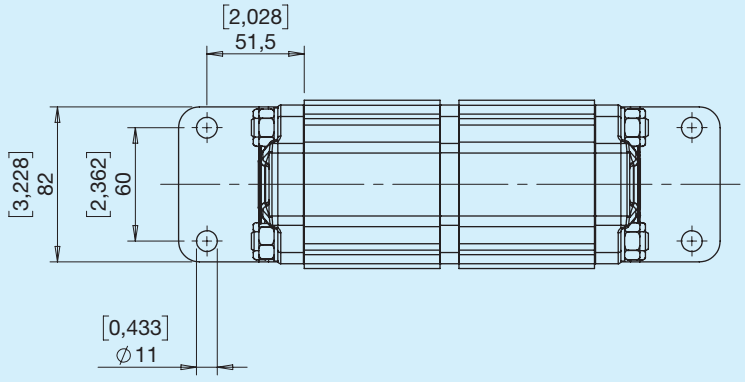
Dimensions and technical data

HPLDF.2	Nominal displacement		Continuous Pressure		Intermittent pressure		ΔP MAX between sections		Rotational speed		A		B	
	cm^3	**in^3**	**bar**	**psi**	**bar**	**psi**	**bar**	**psi**	**MIN min^{-1}**	**MAX min^{-1}**	**mm**	**in**	**mm**	**in**
06	6.00	0.37	240	3481	260	3771	280	3046	700	4000	51.85	2.041	25.9	1.021
08	8.50	0.52	230	3336	250	3626	280	2901	700	4000	56.35	2.219	28.2	1.109
11	11.00	0.67	230	3336	250	3626	260	2901	700	4000	60.85	2.396	30.4	1.198
14	14.50	0.88	230	3336	250	3626	260	2901	700	4000	67.25	2.648	33.6	1.324
17	17.00	1.04	230	3336	250	3626	260	2901	700	4000	71.75	2.825	35.9	1.412
20	19.50	1.19	200	2901	220	3191	260	2446	700	3400	76.25	3.002	38.1	1.501
26	26.00	1.59	180	2611	190	2756	260	2176	700	3400	88.55	3.486	44.3	1.743

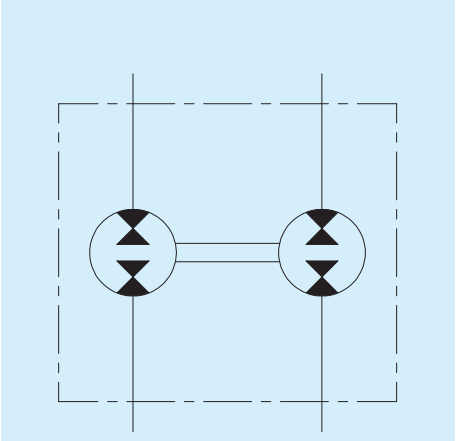
ST Standard



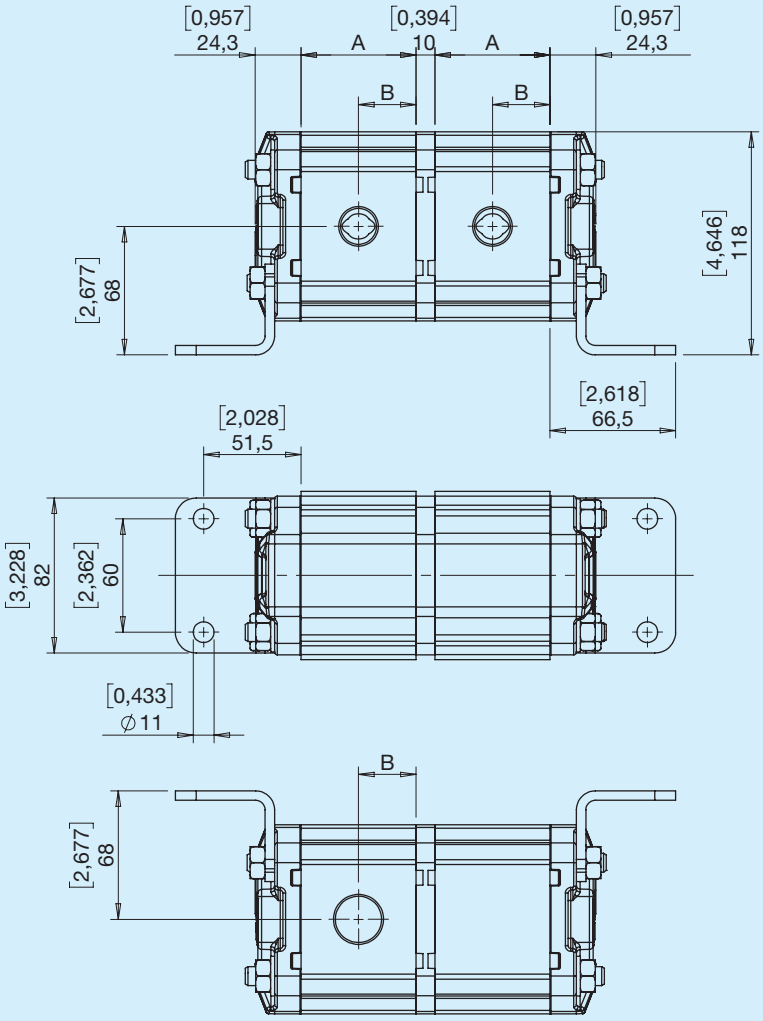


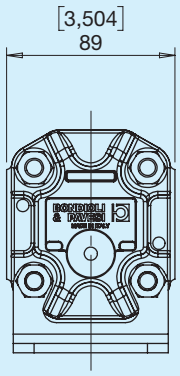


Hydraulic diagram

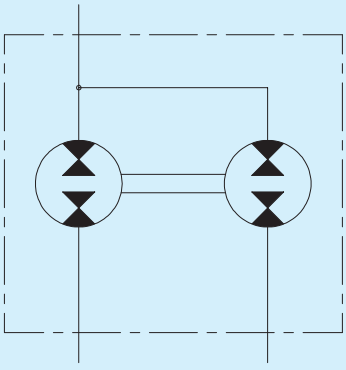


ST Single inlet on the body

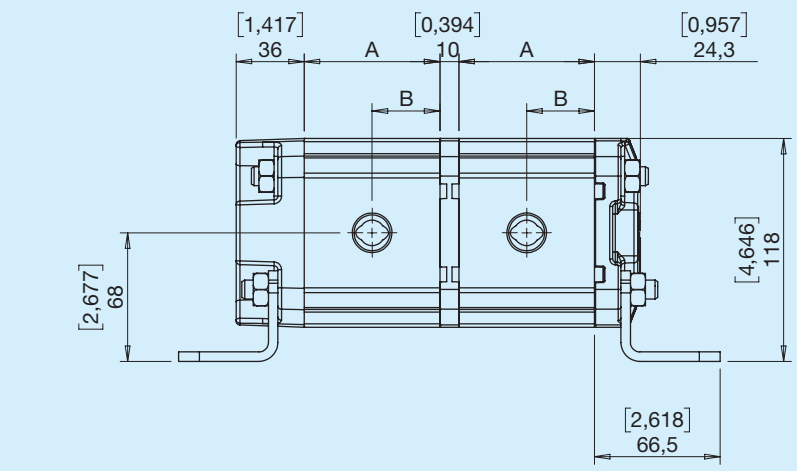


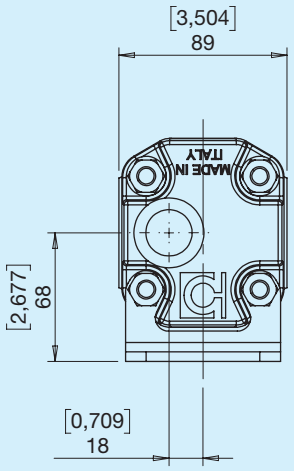


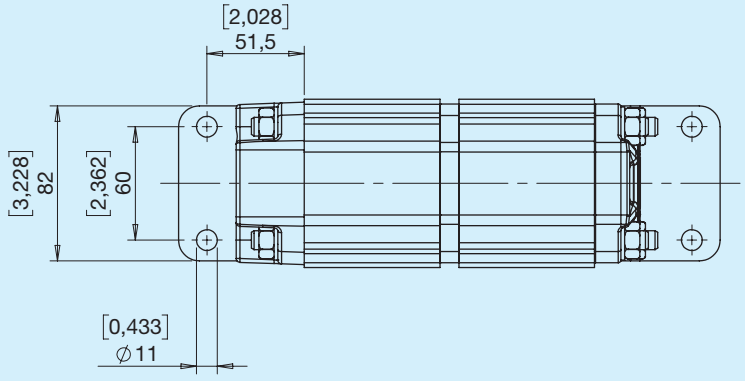
Hydraulic diagram



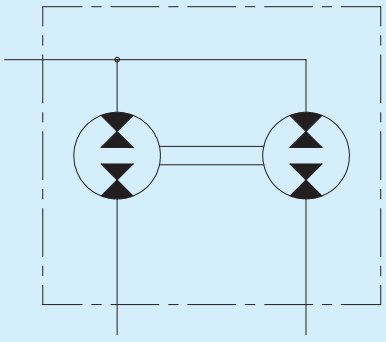
ST Single inlet on the cover



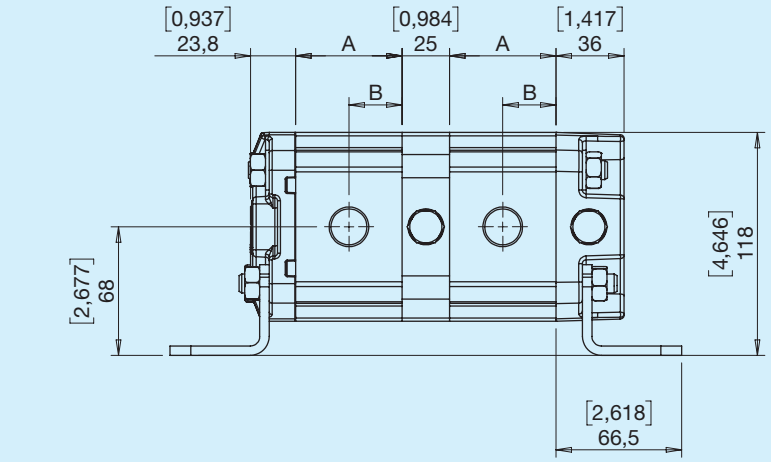


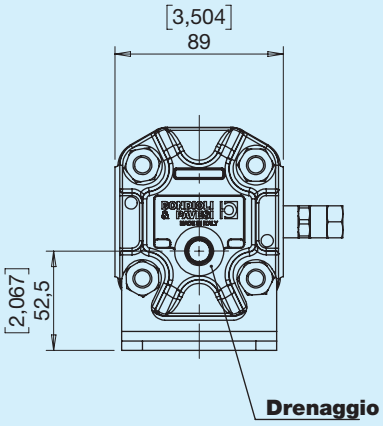


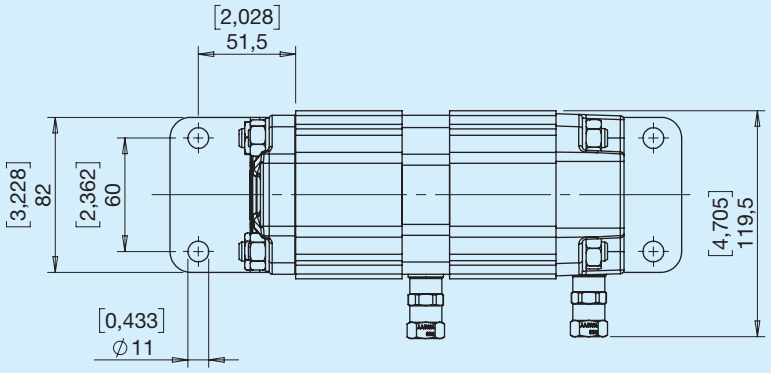
Hydraulic diagram



VE with adjustable pressure relief valves

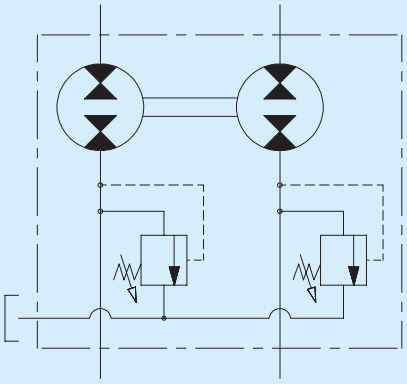




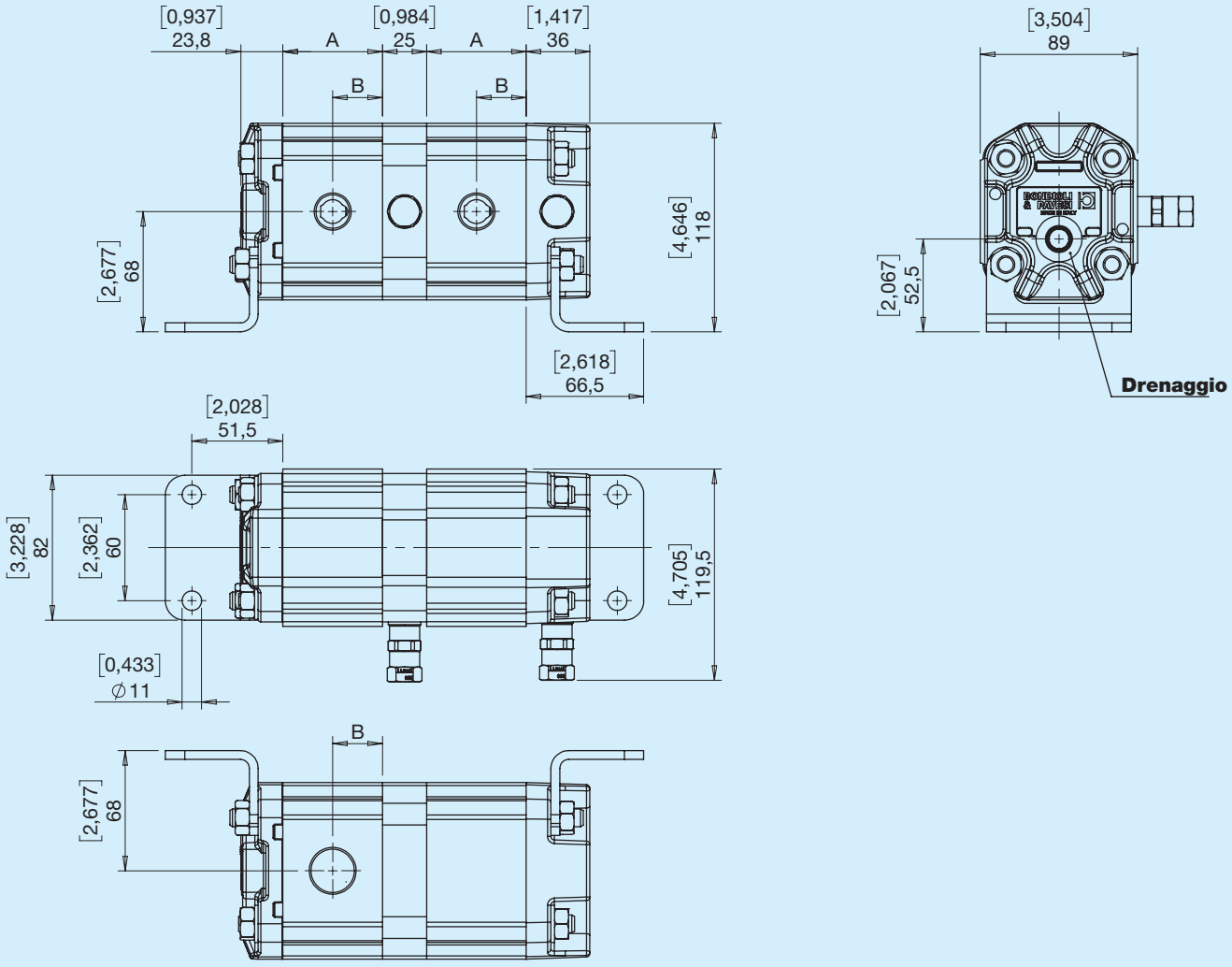


For pressure relief valves, indicate the calibration value

Hydraulic diagram

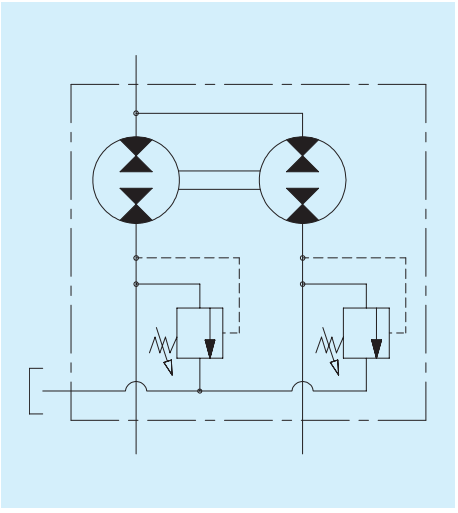


VE With adjustable pressure relief valves and single inlet on the body

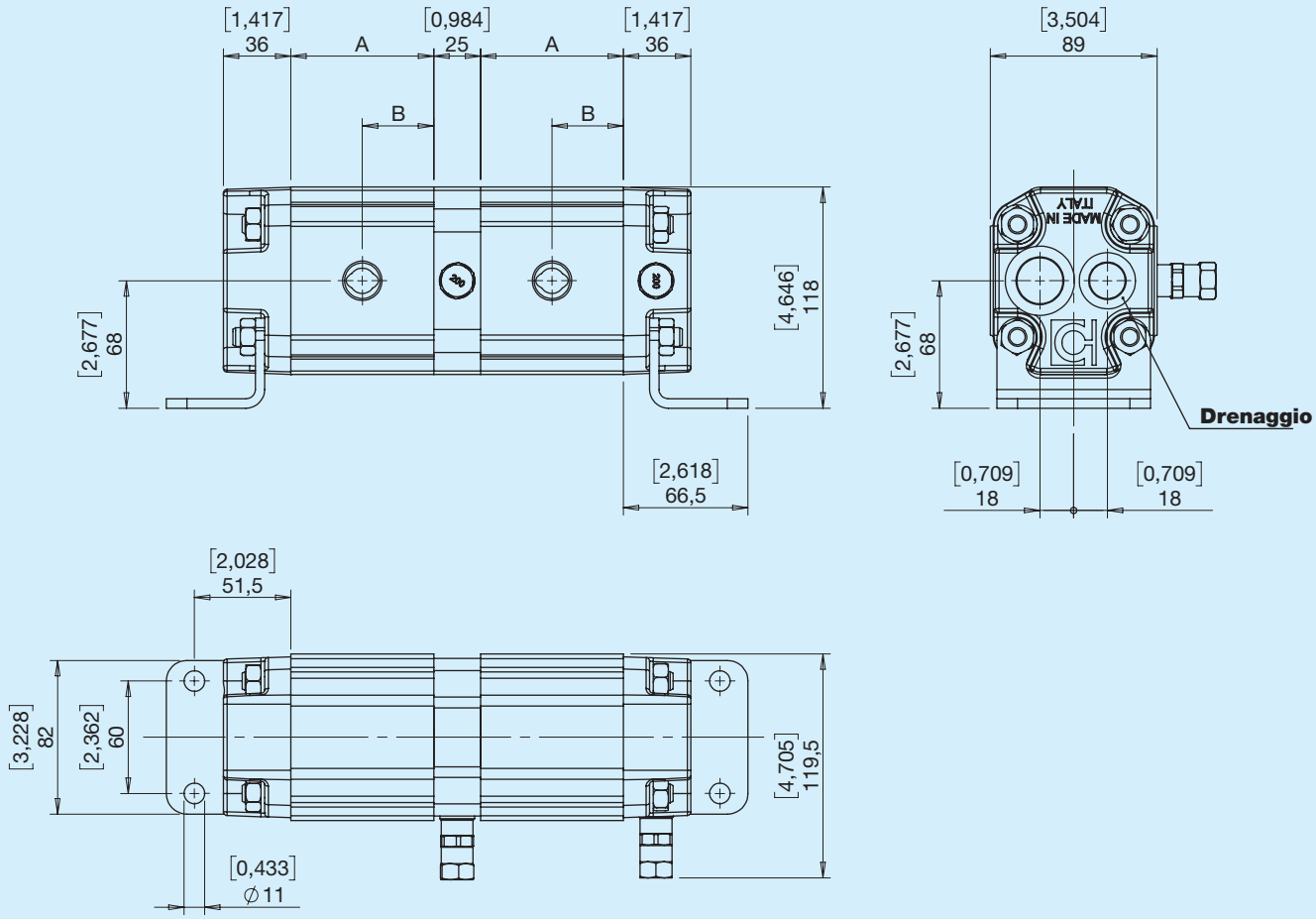


For pressure relief valves, indicate the calibration value

Hydraulic diagram

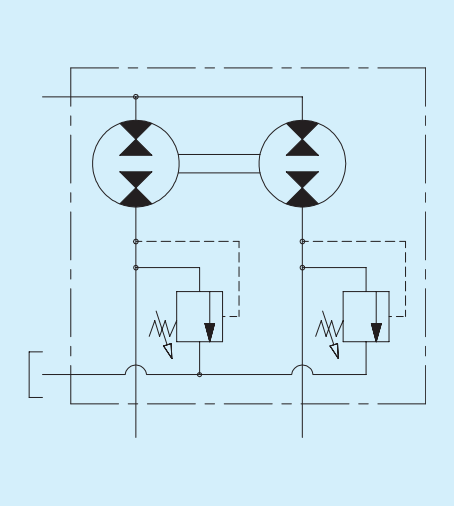


VE With adjustable pressure relief valves and single inlet on the cover

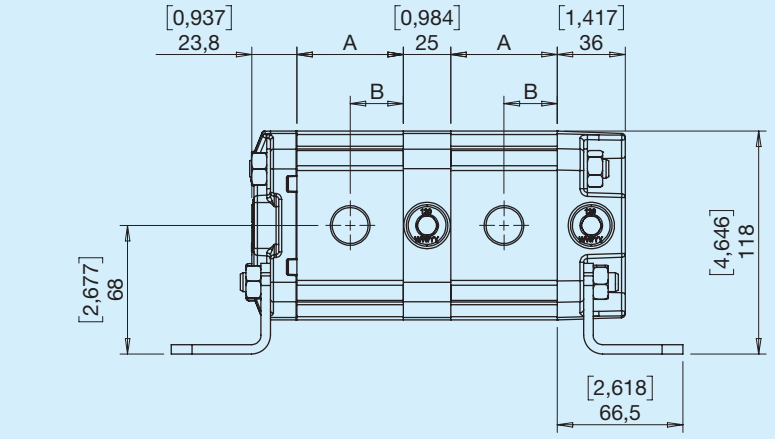


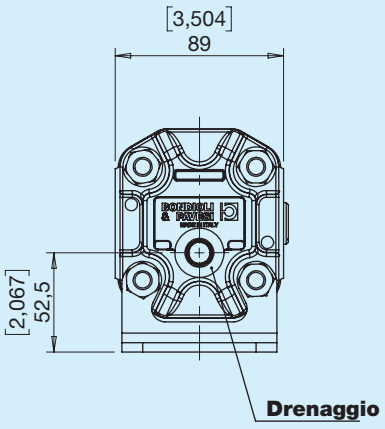
For pressure relief valves, indicate the calibration value

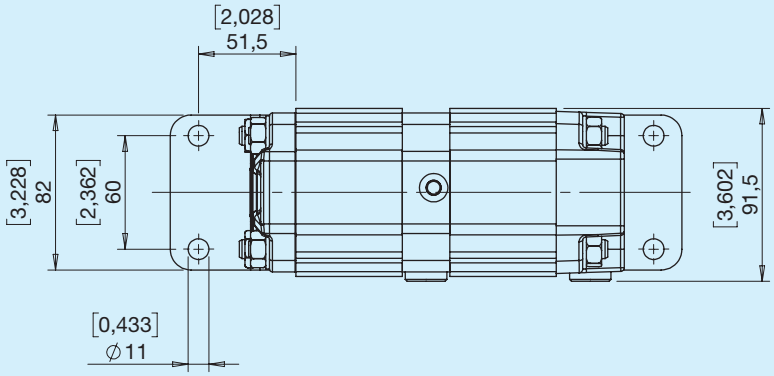
Hydraulic diagram



VC With fixed setting pressure relief valves

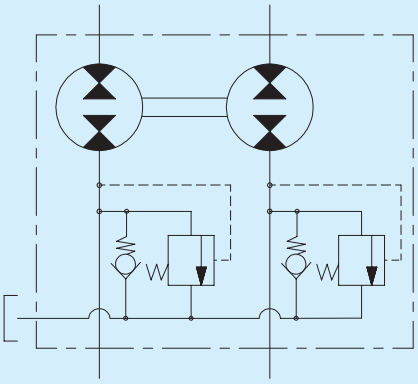




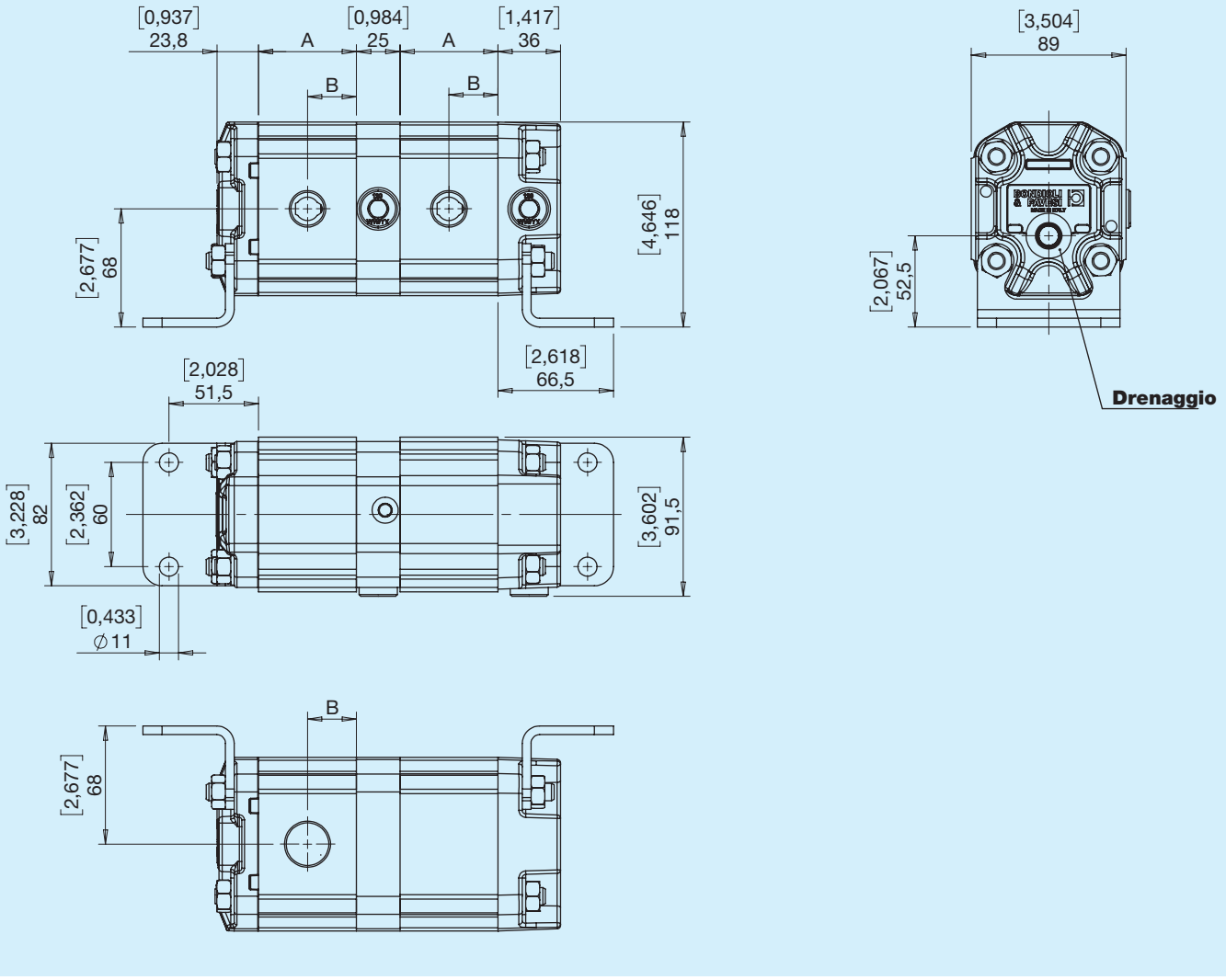


For pressure relief valves, indicate the calibration value

Hydraulic diagram

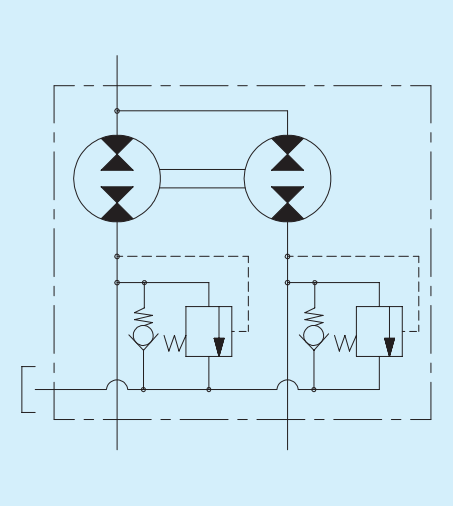


VC With fixed pressure relief valves and single inlet on the body

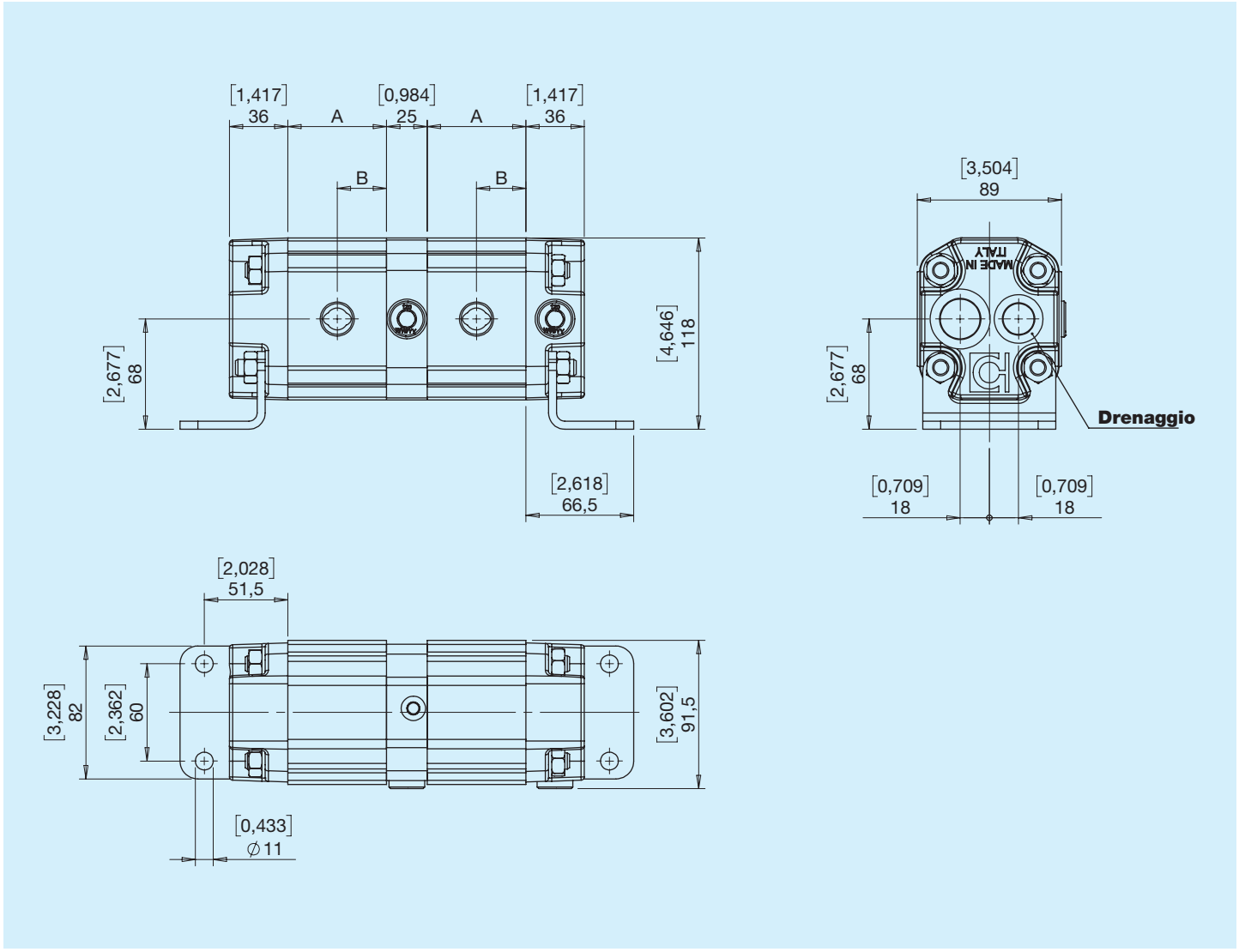


For pressure relief valves, indicate the calibration value

Hydraulic diagram

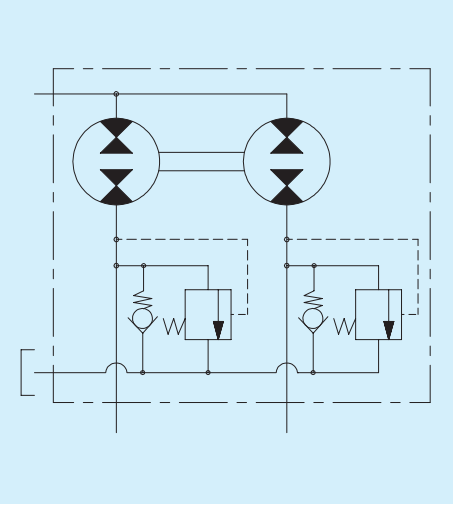


VC With fixed pressure relief valves and single inlet on the cover

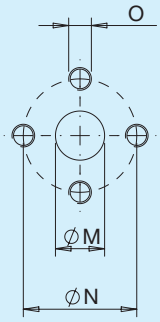


For pressure relief valves, indicate the calibration value

Hydraulic diagram

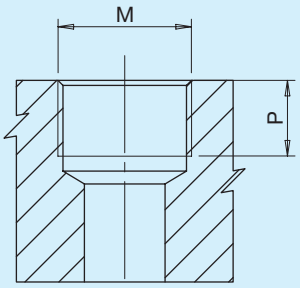


E Lateral



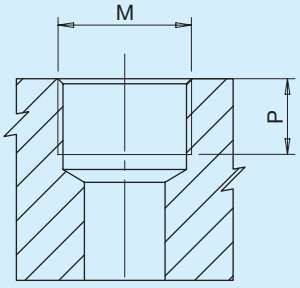
Type	M		N		O	
	mm	in	mm	mm		Nm
E3	13	0.51	30	1.18	M6	10
E5	20	0.79	40	1.57	M8	15

G Lateral / Drain



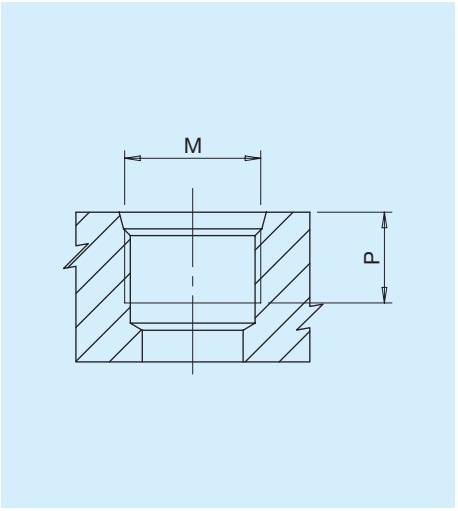
Type	M		P	
		Nm	mm	in
G4	PORT ISO 1179-1 - G 1/2	50	16	0.63
G6	PORT ISO 1179-1-G 3/4	90	19	0.75
G7	PORT ISO 1179-1-G 1	130	21	0.83

T Rear



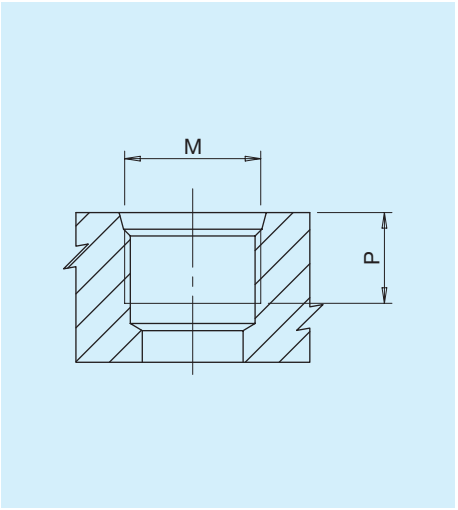
Type	M		P	
		Nm	mm	in
T6	PORT ISO 1179-1-G 3/4	90	19	0.75

U Lateral / Drain



Type	Dim.	M	P		
			Nm	mm	in
U4	1/2'	PORT ISO 11926-1 - 3/4-16	47	15	0.59
U5	5/8'	PORT ISO 11926-1 - 7/8-14	70	17	0.67
U6	3/4'	PORT ISO 11926-1 - 1 1/16-12	90	19	0.75
U7	1'	PORT ISO 11926-1 - 1 5/16-12	130	20	0.79

C Rear



Type	Dim.	M	P		
			Nm	mm	in
C6	3/4'	PORT ISO 11926-1 - 1 1/16-12	90	19	0.75

Combination with standard ports

Ports	Round		
	06 ... 11	14 ... 26	
	IN/OUT ports	IN/OUT ports	Drain line
E	E3 E3	E5 E5	G4
G	G4 G4	G6 G6	G4
U	U5 U5	U6 U6	U4

Combination with single inlet on the cover

Ports	Round	
	06 ... 26	
	IN/OUT ports	Drain line
T	T6 G4	G4
C	C6 U5	U4

Combination with single inlet on the body

Ports	Round			
	06 ... 11	14 ... 20	26	
	IN/OUT ports	IN/OUT ports	IN/OUT ports	Drain line
G	G6 G4	G6 G4	G7 G6	G4
U	U6 U4	U6 U5	U7 U6	U4

Other combinations of ports are available. For more information, contact our technical sales department.

HPLDF.2 | 1 2 | 3 | 4 | 5 6 | 7 8 | 9 10 | 11 | 12 13 |

1 2

Series

DF flow dividers

3

Number of stages

2	2 stages	**4**	4 stages	**6**	6 stages
3	3 stages	**5**	5 stages		

4

Group

2 Group 2

5 6

Displacement

06	**11**	**17**	**26**
08	**14**	**20**	

7 8

IN - Inlet ports

... See tables Ports and Combinations

9 10

OUT - Output ports

... See tables Ports and Combinations

11

Seals

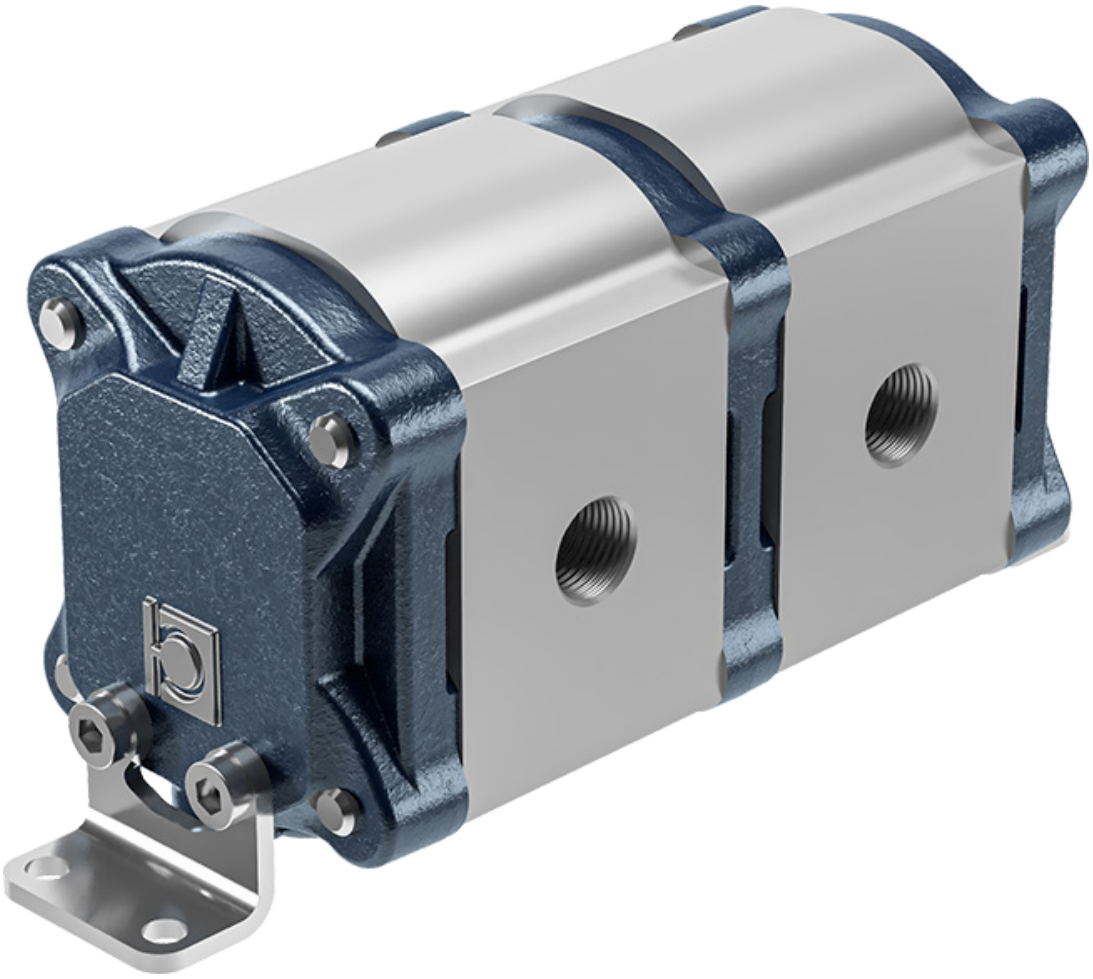
B	NBR Pump	**V**	Viton Pump

12 13

Covers

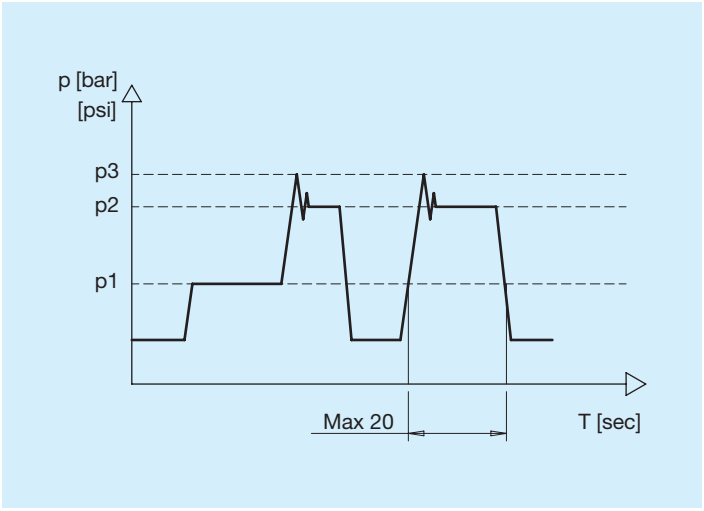
ST	Standard	**VE**	With adjustable pressure relief valves	**VC**	With fixed setting pressure relief valves

HPLDF Series Group 3



Before use, carefully read the GENERAL INSTRUCTIONS FOR USE OF GEAR PUMPS AND MOTORS.

Pressure definition

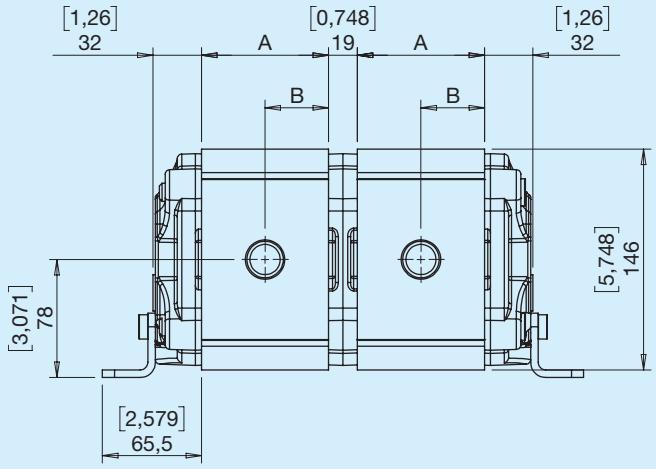


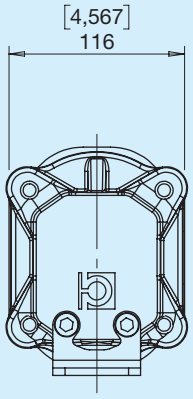
p1	Continuous Pressure
A,B - Use	Intermittent pressure Maximum pressure permitted for short periods (max. 20 sec)
L1, L2 - Drain port	Peak pressure Maximum permitted pressure intended as peak Vmax pressure

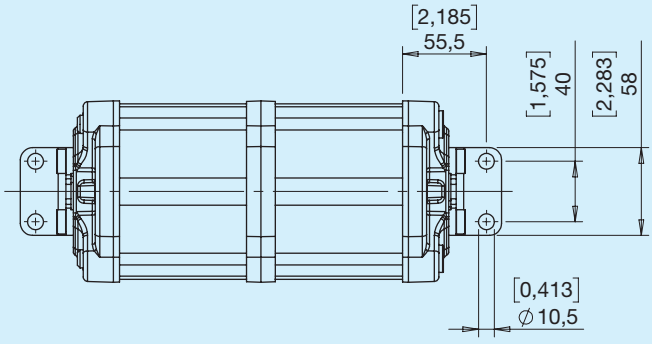
Dimensions and technical data

HPLDF.3	Theoretical displacement		Continuous Pressure		Intermittent pressure		ΔP MAX between sections		Rotational speed		A		B	
	cm^3	**in^3**	**bar**	**psi**	**bar**	**psi**	**bar**	**psi**	**MIN min^{-1}**	**MAX min^{-1}**	**mm**	**in**	**mm**	**in**
22	21.50	1.31	220	3191	250	3626	280	2756	700	3500	81.07	3.192	40.5	1.594
26	26.00	1.59	210	3046	250	3626	280	2611	700	3500	84.07	3.310	42.0	1.654
31	30.50	1.86	210	3046	250	3626	260	2611	700	3500	87.07	3.428	43.5	1.714
36	36.00	2.20	210	3046	250	3626	260	2611	700	3500	91.07	3.585	45.5	1.793
41	41.50	2.53	210	3046	250	3626	260	2611	700	3500	95.07	3.743	47.5	1.870
47	46.50	2.84	180	2611	210	3046	260	2176	700	3500	98.07	3.861	49.0	1.929
51	50.50	3.08	180	2611	210	3046	260	2176	700	3500	101.07	3.979	50.5	1.990

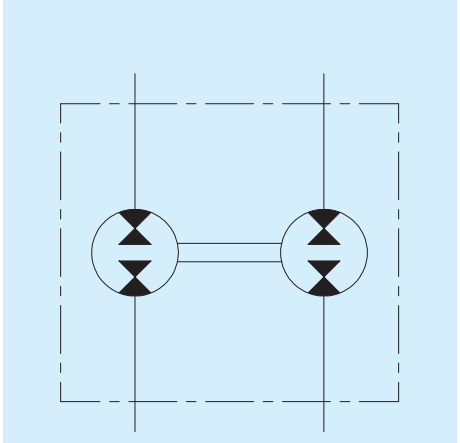
SG Standard cast iron



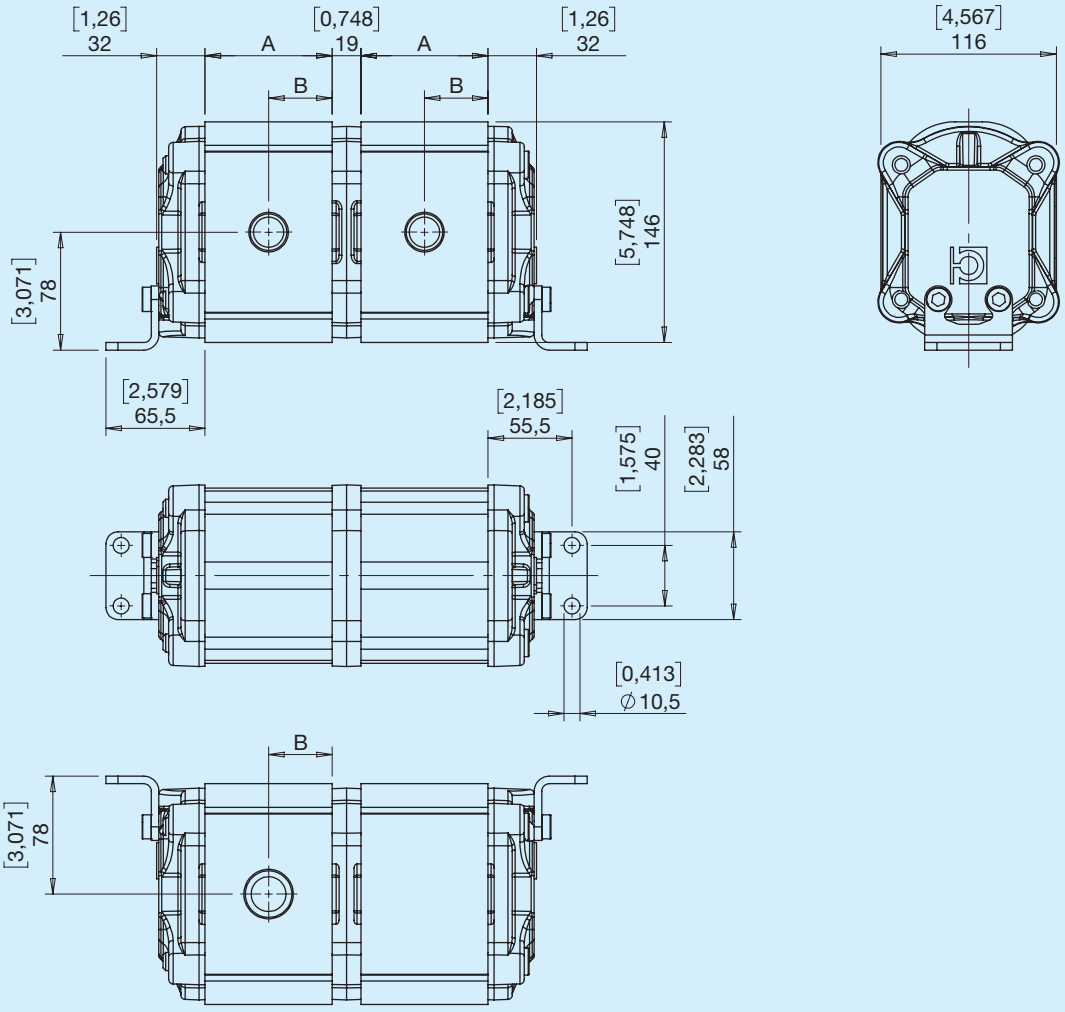




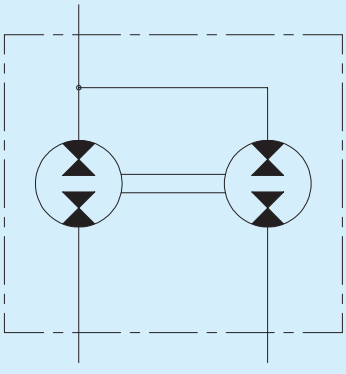
Hydraulic diagram



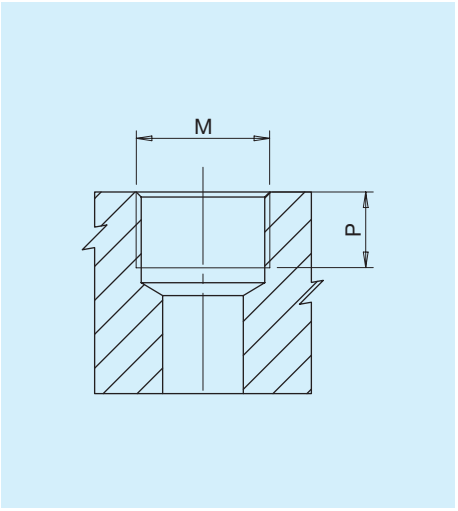
SG Standard cast iron



Hydraulic diagram

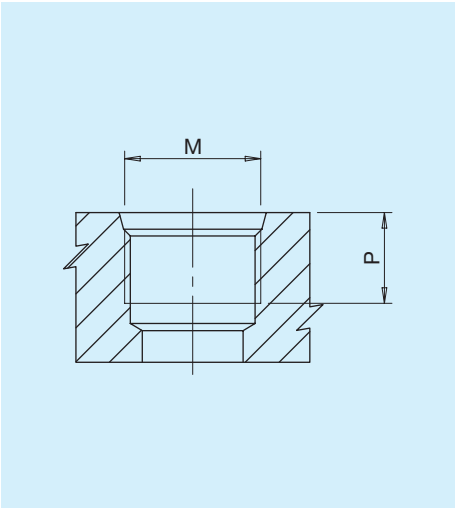


G Lateral



Type	M		P	
		Nm	**mm**	**in**
G6	PORT ISO 1179-1-G 3/4	90	19	0.75
G7	PORT ISO 1179-- -G 1	160	21	0,83
G8	PORT ISO 1179-- -G 1 1/4	200	21	0,83

U Lateral



Type	Dim.	M		P	
			Nm	**mm**	**in**
U6	3/4'	PORT ISO 11926-1 - 1 1/16-12	90	19	0.75
U7	1'	PORT ISO 11926-1 - 1 5/16-12	160	20	0,79
U8	1 1/4'	PORT ISO 11926-1 - 1 5/8-12	200	20	0,79

Combination with standard ports

Ports	Round	
	22 ... 51	36 ... 51
	IN/OUT ports	Bocche IN/OUT
G	G6 G6	G7 G7
U	U6 U6	U7 U7

Combination with standard ports

Ports	Round	
	22 ... 51	36 ... 51
	IN/OUT ports	Bocche IN/OUT
G	G6 G6	G8 G7
U	U6 U6	U8 U7

Other combinations of ports are available. For more information, contact our technical sales department.

HPLDF.3	1 2	3	4	5 6	7 8	9 10	11	12 13

1 2

Series

DF flow dividers

3

Number of stages

2 2 stages
3 3 stages
4 4 stages
... For higher number of stages, contact the technical sales office.

4

Group

3 Group 3

5 6

Displacement

22 **31** **41** **51**
26 **36** **47**

7 8

IN - Inlet ports

... See tables Ports and Combinations

9 10

OUT - Output ports

... See tables Ports and Combinations

11

Seals

B NBR Pump
V Viton Pump

12 13

Covers

SG Standard cast iron