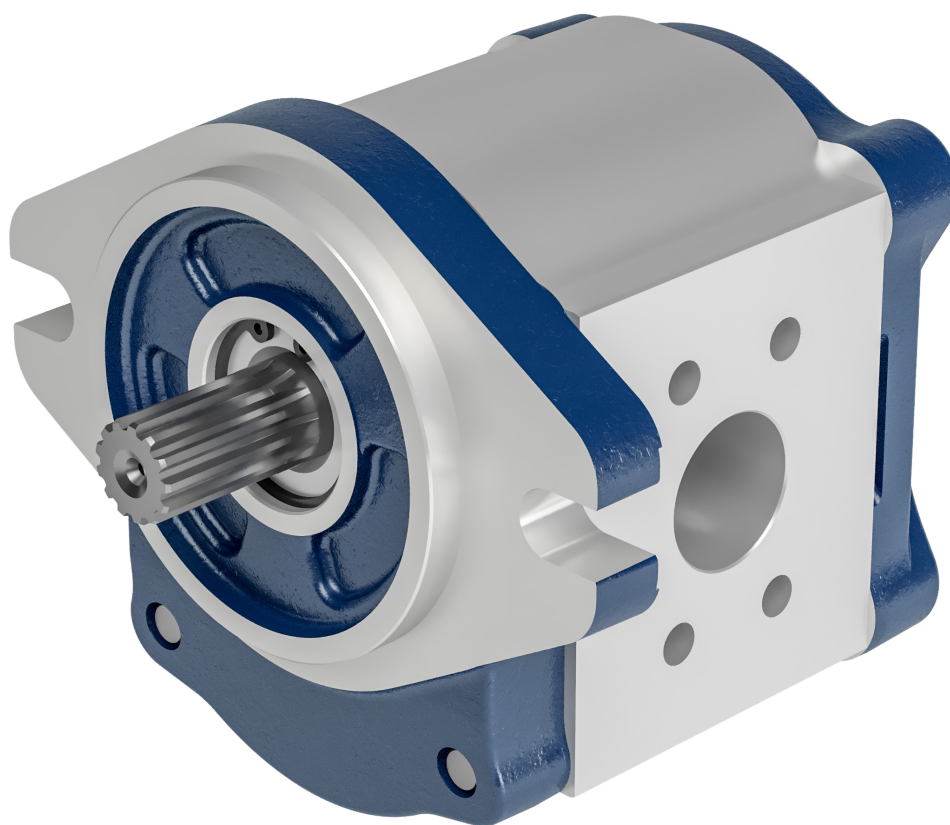


## HPL Series





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Introduction	4
HPL..1	5
HPL..2	23
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HPL..4	67

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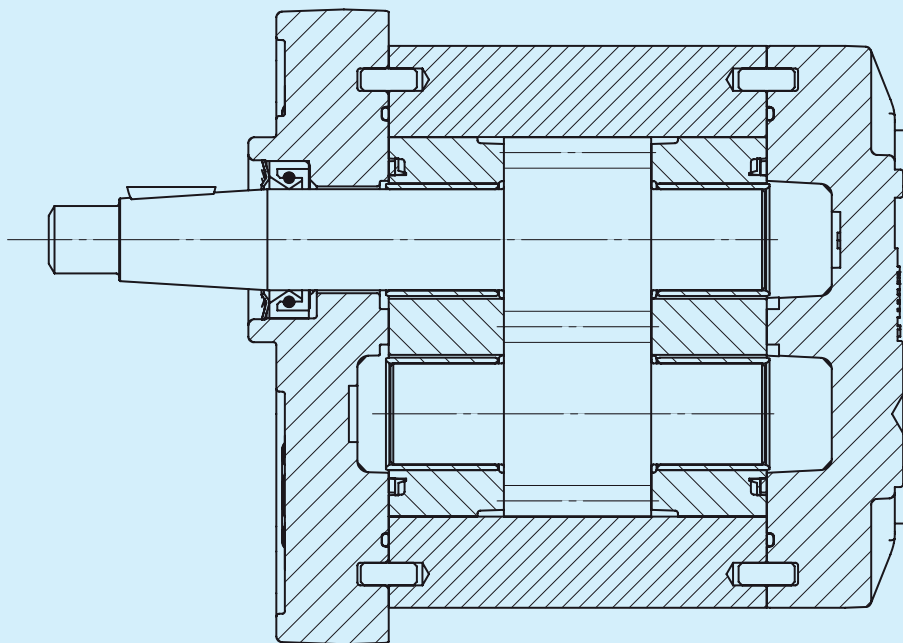
**Introduction** Gear pumps and motors are among the most popularly produced and utilized hydrostatic units. Some of their many characteristics are: robust design, profitable price/performance ratio, easy installation, suitability for customized solutions, possible integration with control devices (valves).

HP Hydraulic offers decades of well consolidated experience in the development and production of gear units with a constant approach towards innovation of design and of manufacturing process.

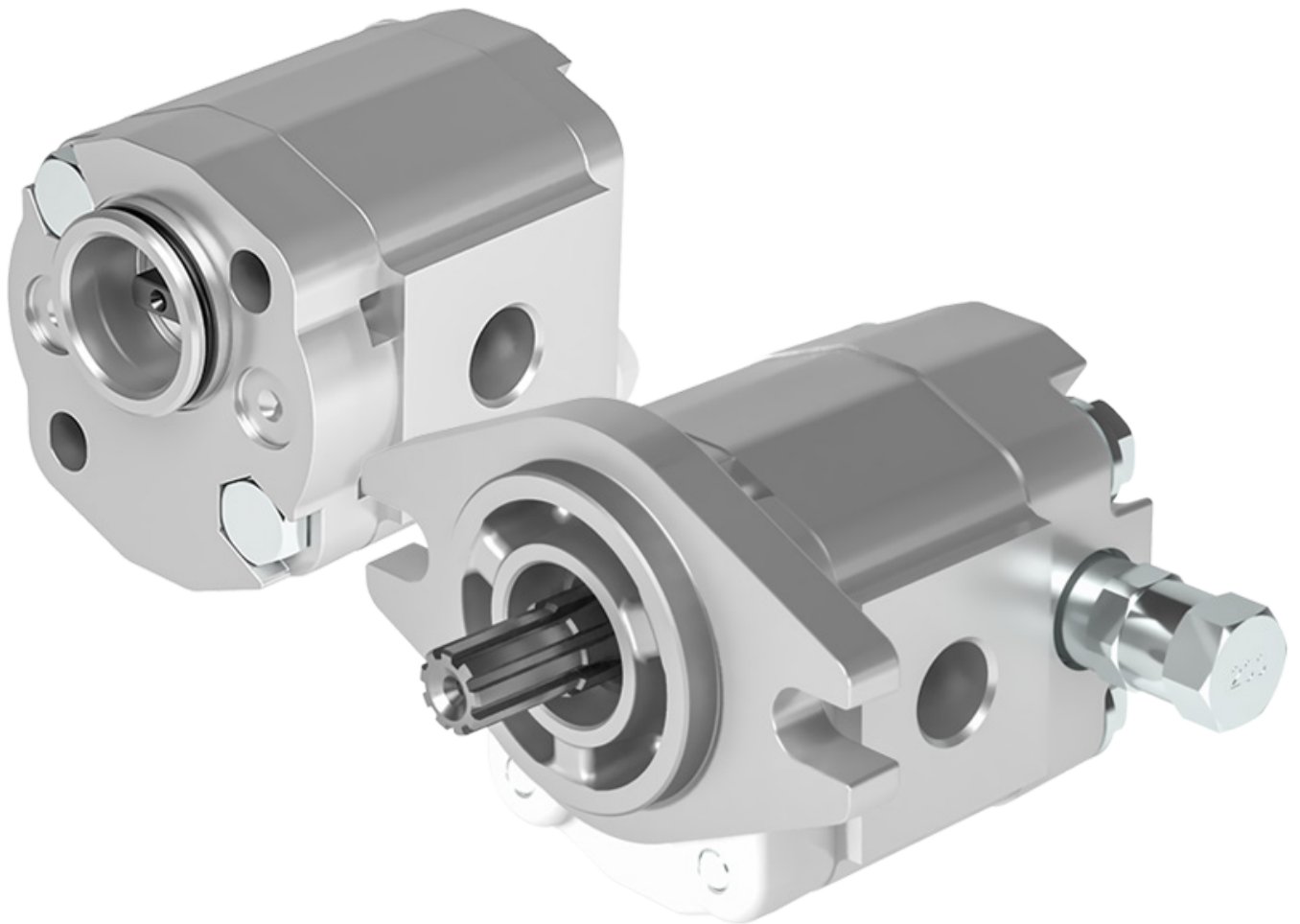
This same experience enables us today to offer a gear pumps range with aluminium body, grouped according to their capacity (from 0,37 to 90 cc/rev.), whose main features can be devised and varied to best respond to customer's requirements and whose performance permits use in any kind of application.

HP Hydraulic series L pumps are supplied in five groups, different in size (1,2,3,4). Various capacities will be determined within each group.

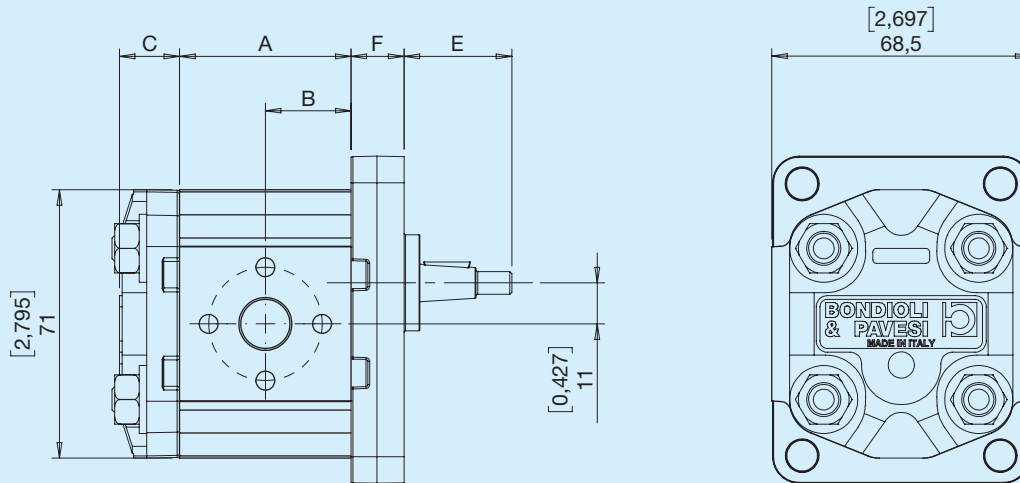
The series of products is even further completed with a full range of flanges, shaft ends, and available multiple pumps with or without valves integrated into the back cover.



## HPL Series Group 1

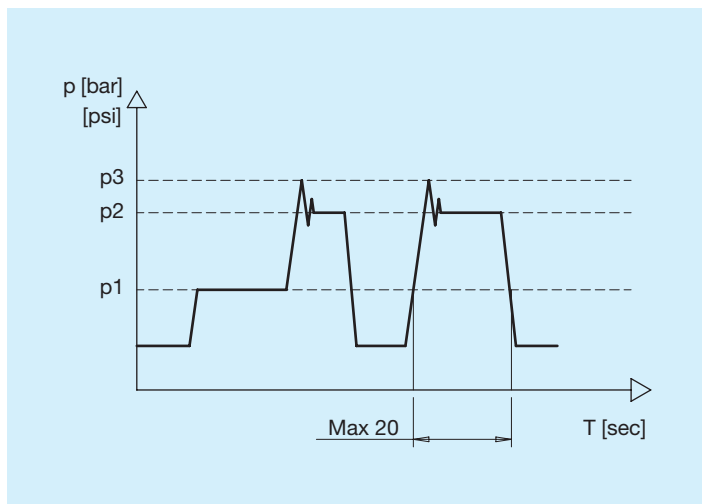


Before use, carefully read the GENERAL INSTRUCTIONS FOR USE OF GEAR PUMPS AND MOTORS.



C - See section on covers E - See section on shafts F - See section on flanges

## Pressure definition



$p_1$	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 pressure of $V_{max}$

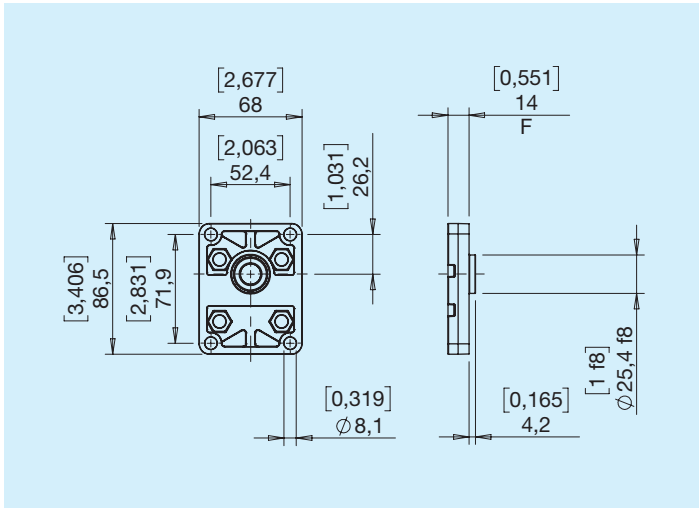
## Pump dimensions and technical data

HPLPA1	Nominal displacement		Continuous pressure		Intermittent pressure		Peak pressure		Rotational speed		Weight		A		B	
	cm <sup>3</sup>	in <sup>3</sup>	bar	psi	bar	psi	bar	psi	min <sup>-1</sup>	min <sup>-1</sup>	kg	lbs	mm	in	mm	in
<b>14</b>	1.37	0.08	220	3191	260	3771	280	4061	3500	700	0.90	1.98	38.70	1.524	19.4	0.762
<b>19</b>	1.90	0.12	220	3191	260	3771	280	4061	3500	700	0.95	2.09	38.70	1.524	19.4	0.762
<b>24</b>	2.53	0.15	210	3046	250	3626	260	3771	3500	700	0.95	2.09	38.70	1.524	19.4	0.762
<b>31</b>	3.17	0.19	210	3046	250	3626	260	3771	3500	700	0.95	2.09	38.70	1.524	19.4	0.762
<b>36</b>	3.73	0.23	210	3046	250	3626	260	3771	3500	700	1.05	2.31	45.35	1.785	22.7	0.893
<b>44</b>	4.35	0.27	210	3046	250	3626	260	3771	3500	700	1.05	2.31	45.35	1.785	22.7	0.893
<b>48</b>	4.97	0.30	210	3046	250	3626	260	3771	3500	700	1.05	2.31	45.35	1.785	22.7	0.893
<b>60</b>	6.08	0.37	210	3046	250	3626	260	3771	3000	700	1.20	2.65	56.05	2.207	28.0	1.103
<b>70</b>	7.00	0.43	190	2756	210	3046	230	3336	3000	700	1.20	2.65	56.05	2.207	28.0	1.103
<b>80</b>	7.87	0.48	160	2321	180	2611	200	2901	3000	700	1.20	2.65	56.05	2.207	28.0	1.103

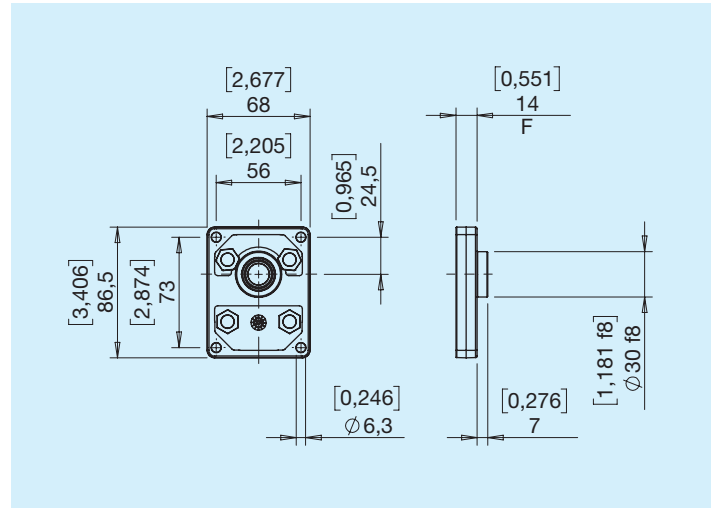
## Motor dimensions and technical data

HPLMA1	Nominal displacement		Continuous pressure		Intermittent pressure		Peak pressure		Rotational speed		Weight		A		B	
	cm <sup>3</sup>	in <sup>3</sup>	bar	psi	bar	psi	bar	psi	min <sup>-1</sup>	min <sup>-1</sup>	kg	lbs	mm	in	mm	in
<b>19</b>	1.90	0.12	220	3191	260	3771	280	4061	4000	700	0.95	2.09	38.70	1.524	19.4	0.762
<b>24</b>	2.53	0.15	210	3046	250	3626	260	3771	4000	700	0.95	2.09	38.70	1.524	19.4	0.762
<b>31</b>	3.17	0.19	210	3046	250	3626	260	3771	4000	700	0.95	2.09	38.70	1.524	19.4	0.762
<b>36</b>	3.73	0.23	210	3046	250	3626	260	3771	4000	700	1.05	2.31	45.35	1.785	22.7	0.893
<b>44</b>	4.35	0.27	210	3046	250	3626	260	3771	4000	700	1.05	2.31	45.35	1.785	22.7	0.893
<b>48</b>	4.97	0.30	210	3046	250	3626	260	3771	4000	700	1.05	2.31	45.35	1.785	22.7	0.893
<b>60</b>	6.08	0.37	210	3046	250	3626	260	3771	3500	700	1.20	2.65	56.05	2.207	28.0	1.103
<b>70</b>	7.00	0.43	190	2756	210	3046	230	3336	3500	700	1.20	2.65	56.05	2.207	28.0	1.103
<b>80</b>	7.87	0.48	160	2321	180	2611	200	2901	3500	700	1.20	2.65	56.05	2.207	28.0	1.103

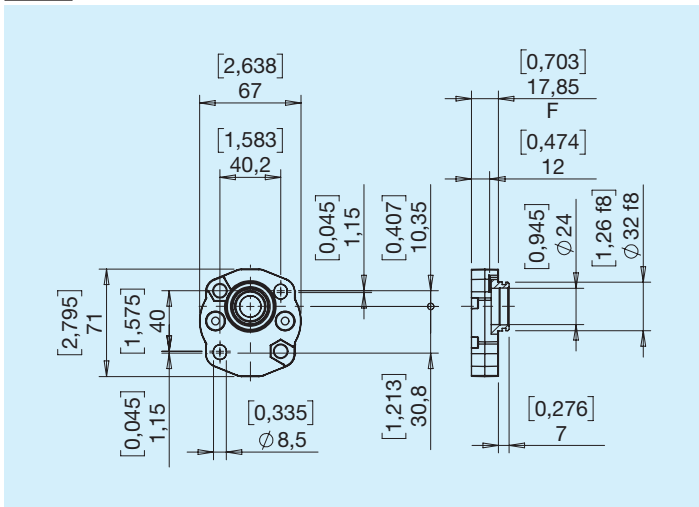
**D** European D25.4



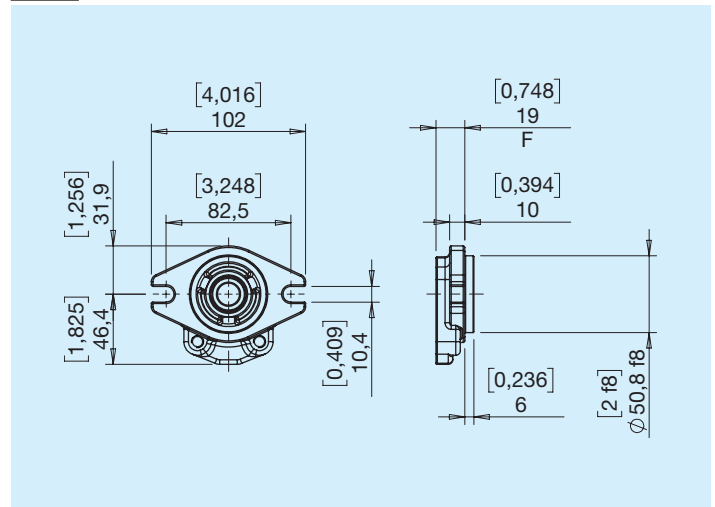
**E** European D30



**G** German

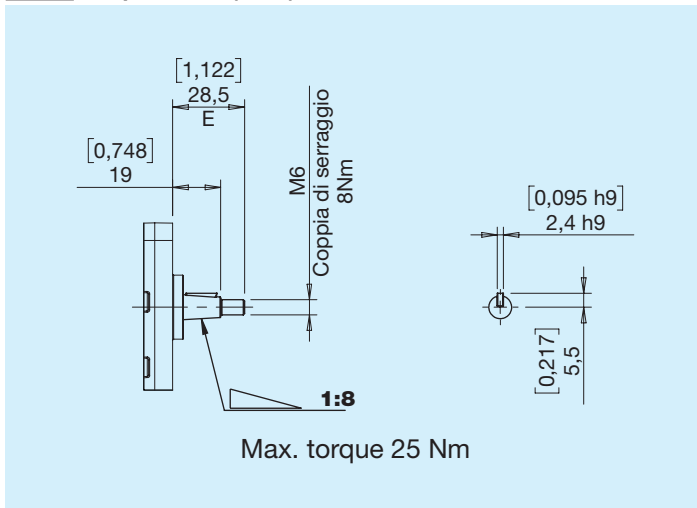


**J** SAE AA

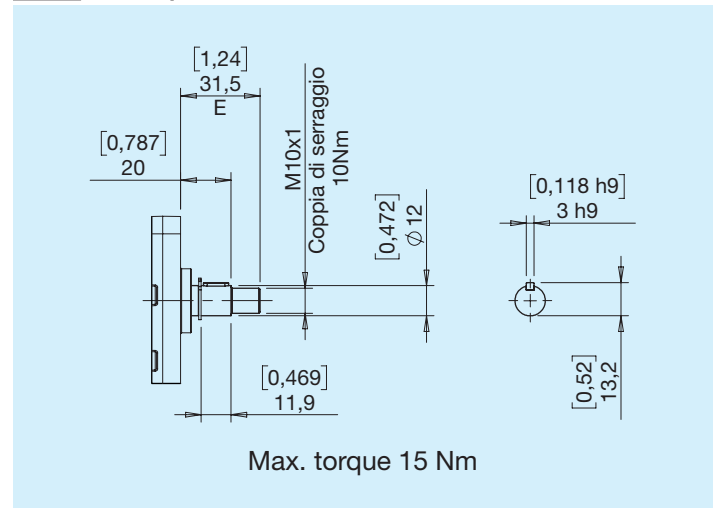




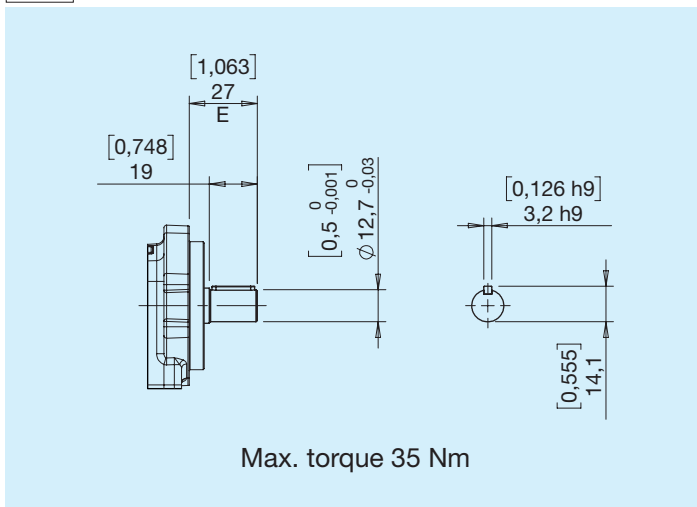
## D Tapered (1:8)



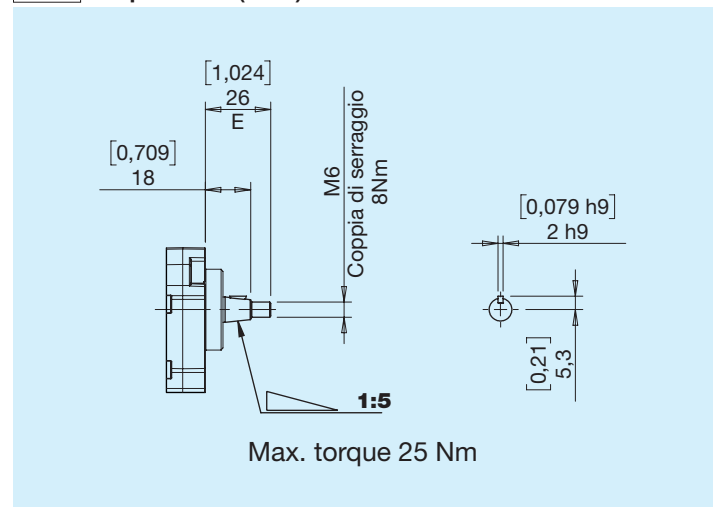
## E European round



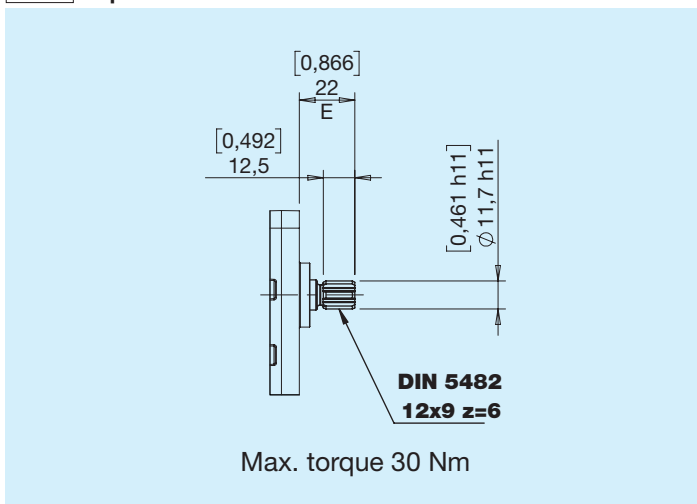
## F Round SAE AA



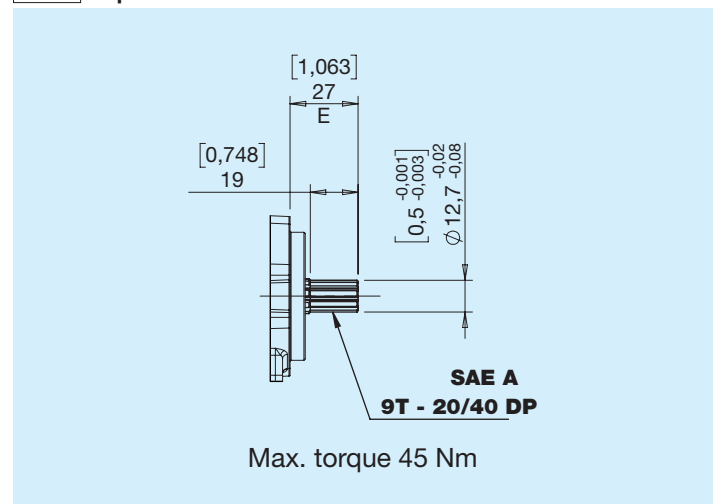
## G Tapered (1:5)



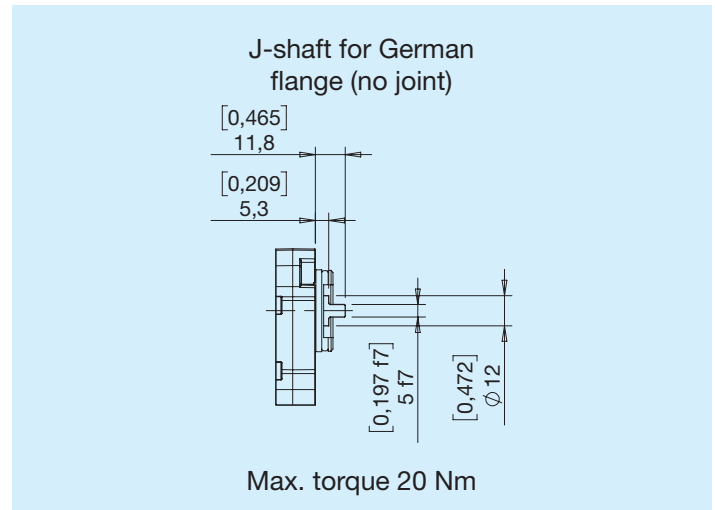
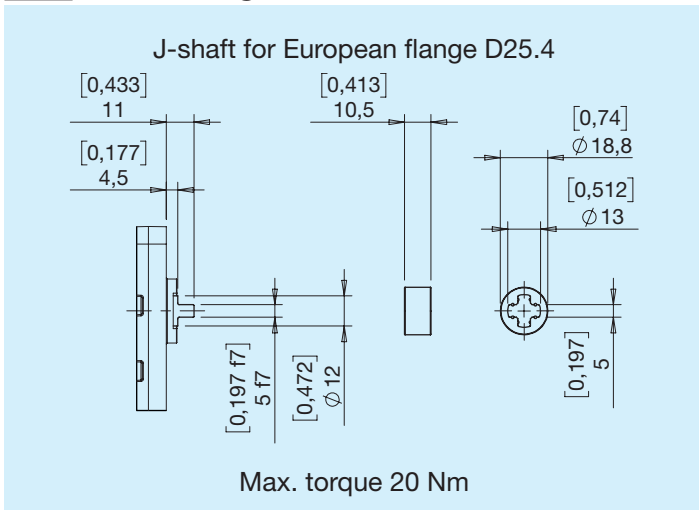
## H Splined DIN 5482



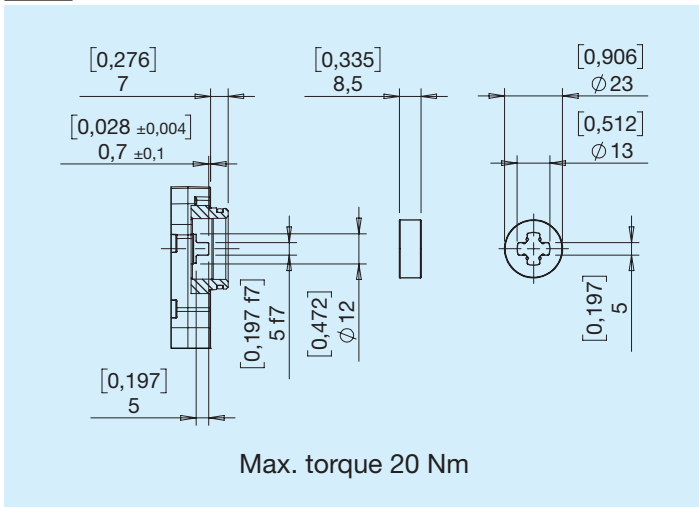
## I Splined SAE AA



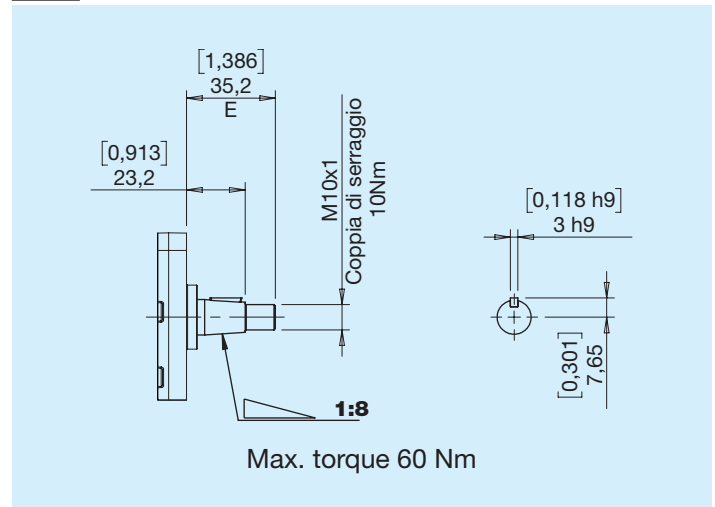
## J Protruding front tooth



## K Front tooth

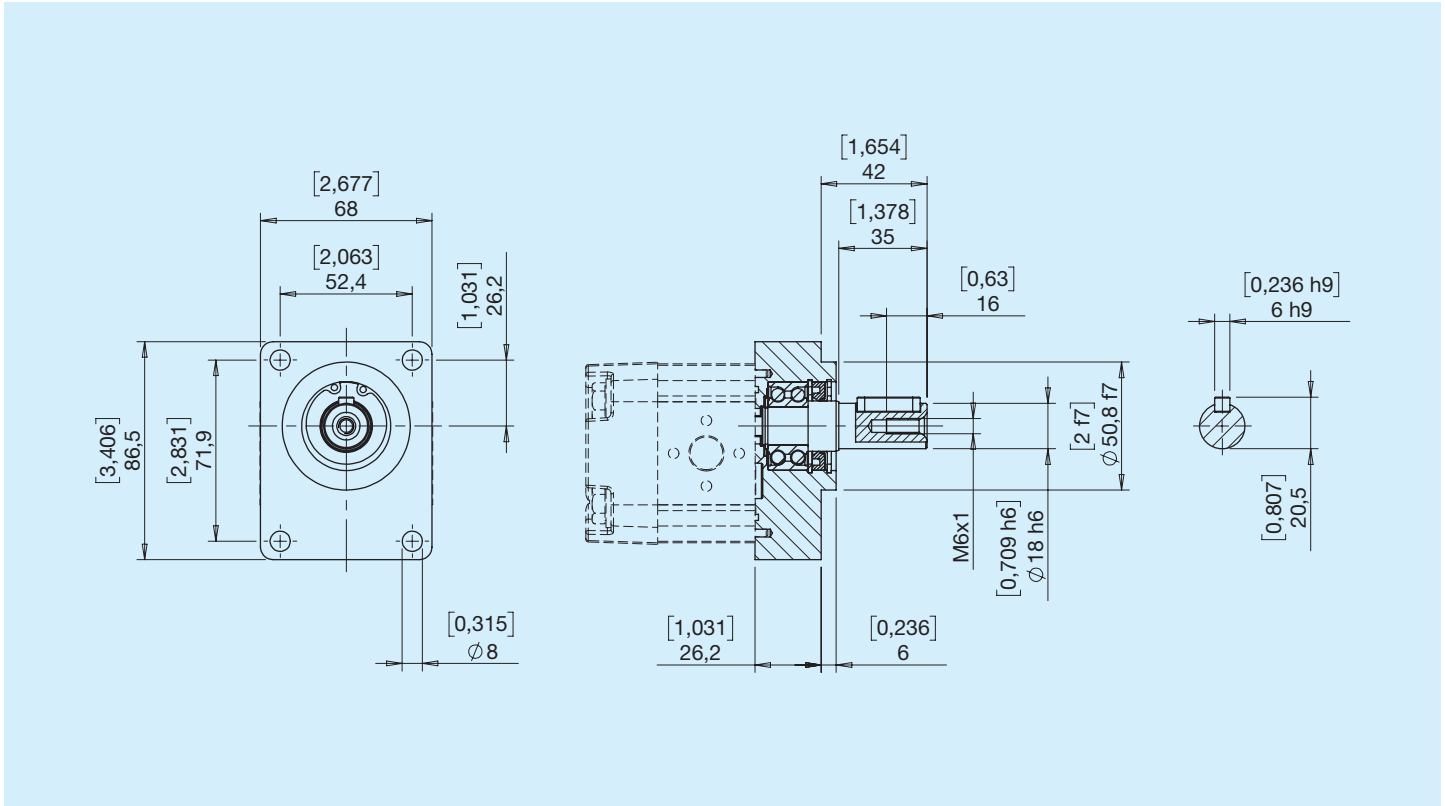


## T High torque tapered (1:8)



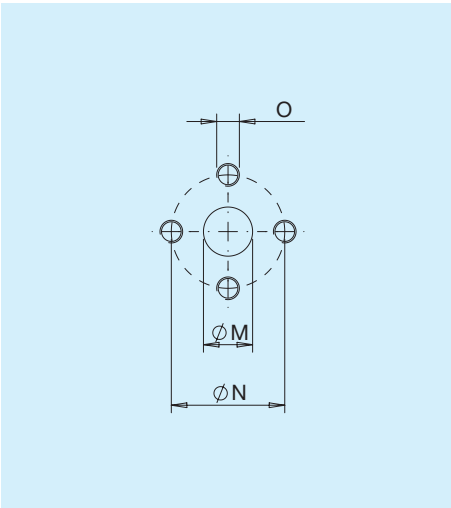
Shafts	Flanges			
	D	E	G	J
D	•	•		
E	•	•		
F				•
G			•	
H	•			
I				•
J	•		•	
K			•	
T	•	•		

## I5 Standard European flange round shaft D18



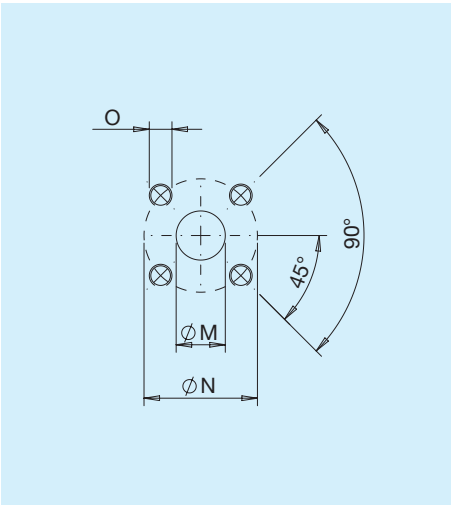


## E Lateral



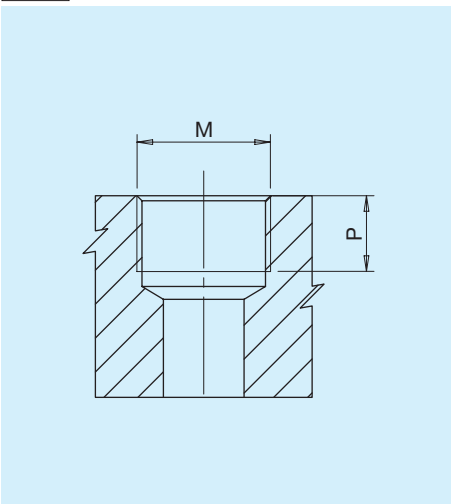
Type	M		N		O	
	mm	in	mm	mm		Nm
E2	13	0.51	26	1.02	M5	6
E3	13	0.51	30	1.18	M6	10

## X Lateral



Type	M		N		O	
	mm	in	mm	mm		Nm
X3	13	0.51	30	1.18	M6	10

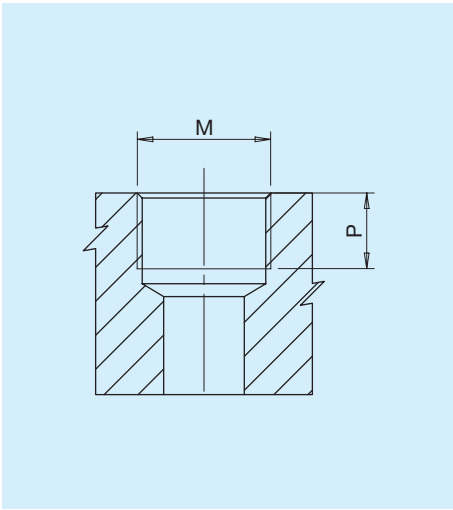
## G Lateral / Drain



Type	M	Nm	P	
			mm	in
G2*	PORT ISO 1179-1-G 1/4	17	12	0.47
G3	PORT ISO 1179-1-G 3/8	38	12	0.47
G4	PORT ISO 1179-1-G 1/2	50	14.5	0.57

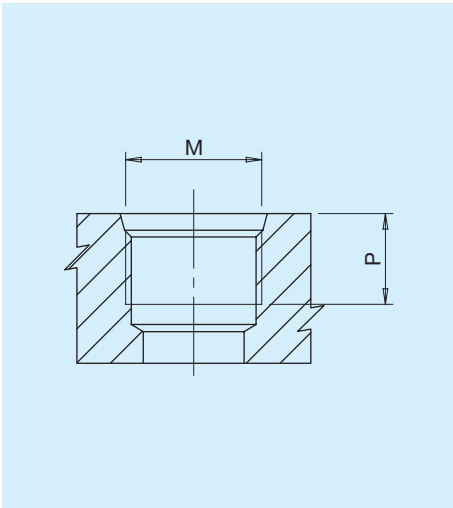
\*Drain

## T Rear



Type	M	Nm	P	
			mm	in
T3	PORT ISO 1179-1-G 3/8	38	12	0.47

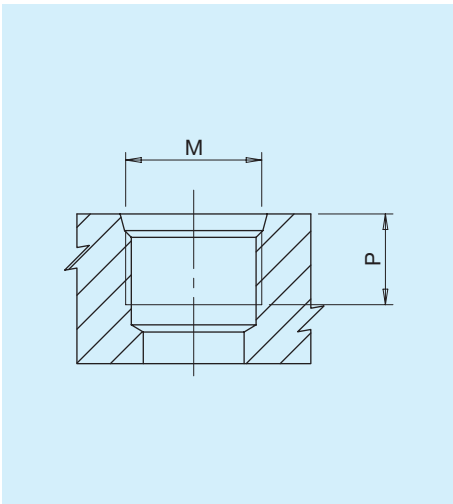
## U Lateral / Drain



Type	Dim.	M	Nm	P	
				mm	in
U2*	1/4'	PORT ISO 11926-1 - 7/16-20	17	12	0.47
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

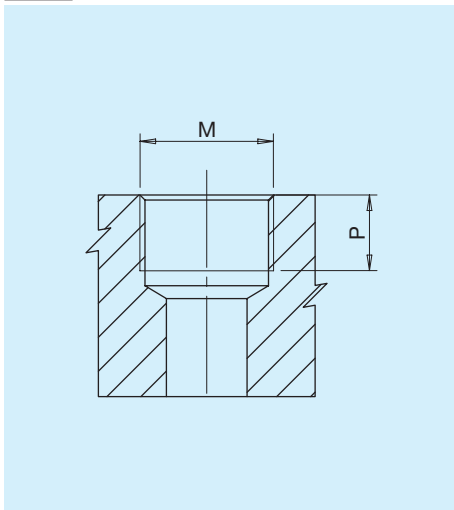
\*Drain

## C Rear



Type	Dim.	M	Nm	P	
				mm	in
C3	3/8'	PORT ISO 11926-1 - 9/16-18	25	13	0.51

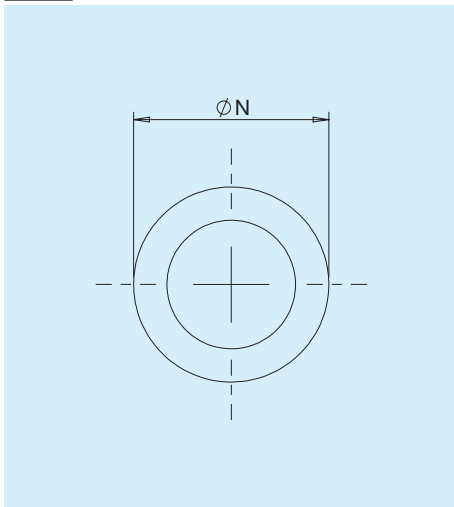
## M Lateral / Drain



Type	M	Nm	P	
			mm	in
M1*	PORT ISO 6149 - 1 - M12x1.5	15	12	0.47
M2	PORT ISO 6149 - 1 - M14x1.5	17	12	0.47
M4	PORT ISO 6149 - 1 - M18x1.5	40	14.5	0.57

\*Drain

## H Front



Type	Front seal	N	
		mm	in
H1	Port ISO 1179-1 - G 1/4	12.7	0.50



## Combination of ports/flanges

Ports	Flanges			
	D	E	G	J
E	•	•		
X	•	•	•	
G	•	•	•	•
T	•	•	•	
U				•
C				•
M	•	•	•	
H			•	

## Combination of round ports for one-way pumps/motors

Ports	Round		
	14 19 24 31	36 44 48	60 70 80
	IN/OUT ports	IN/OUT ports	IN/OUT ports
E	E2 E2	E3 E3	E3 E3
X	X3 X3	X3 X3	X3 X3
G	G3 G3	G3 G3	G4 G4
T	T3 T3	T3 T3	-
U	U3 U3	U3 U3	U4 U4
C	C3 C3	C3 C3	-
M	M4 M2	M4 M2	M4 M4
HT	T3 H1	T3 H1	-

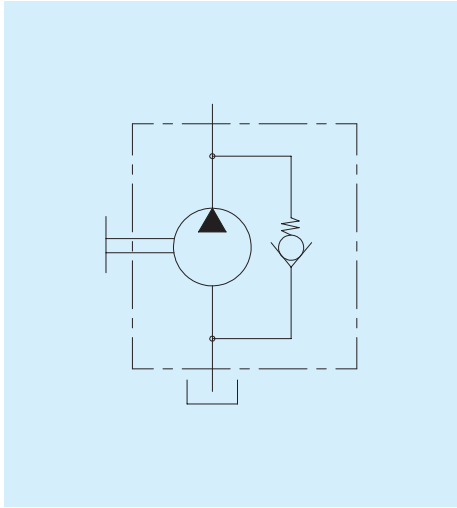
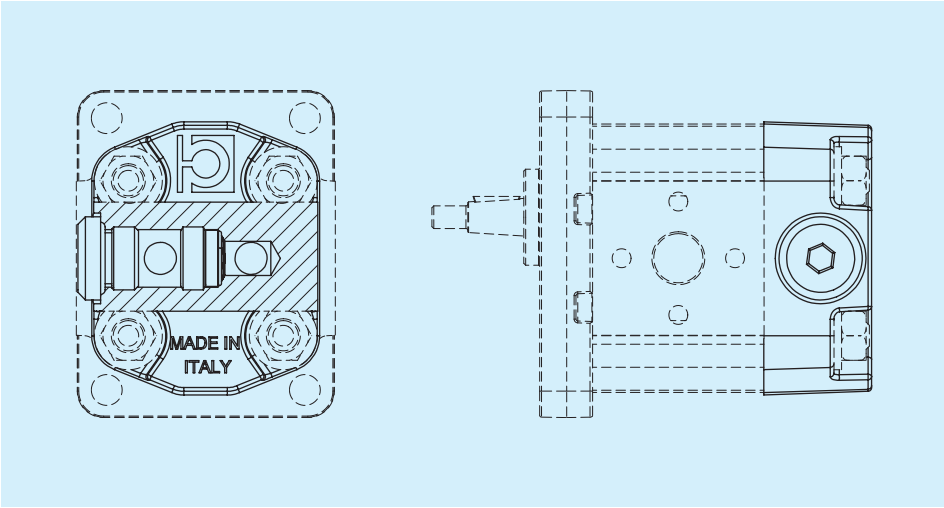
## Combination of round ports for bidirectional pumps/motors

Ports	Round			
	19 24 31	36 44 48	60 70 80	
	IN/OUT ports	IN/OUT ports	IN/OUT ports	Drain line
<b>E</b>	E2 E2	E3 E3	E3 E3	M1
<b>X</b>	X3 X3	X3 X3	X3 X3	M1
<b>G</b>	G3 G3	G3 G3	G4 G4	G2
<b>T</b>	T3 T3	T3 T3	-	G2
<b>U</b>	U3 U3	U3 U3	U4 U4	U2
<b>C</b>	C3 C3	C3 C3	-	U2
<b>M</b>	M2 M2	M4 M4	M4 M4	M1

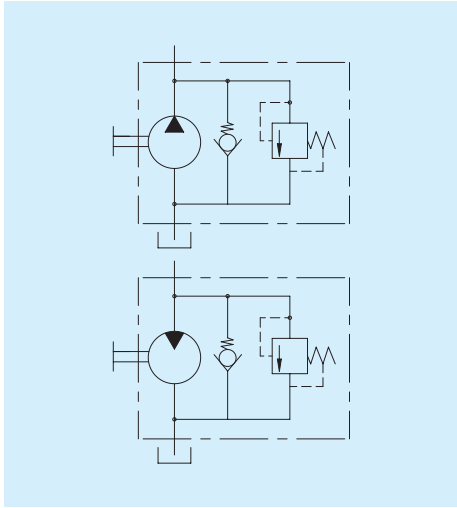
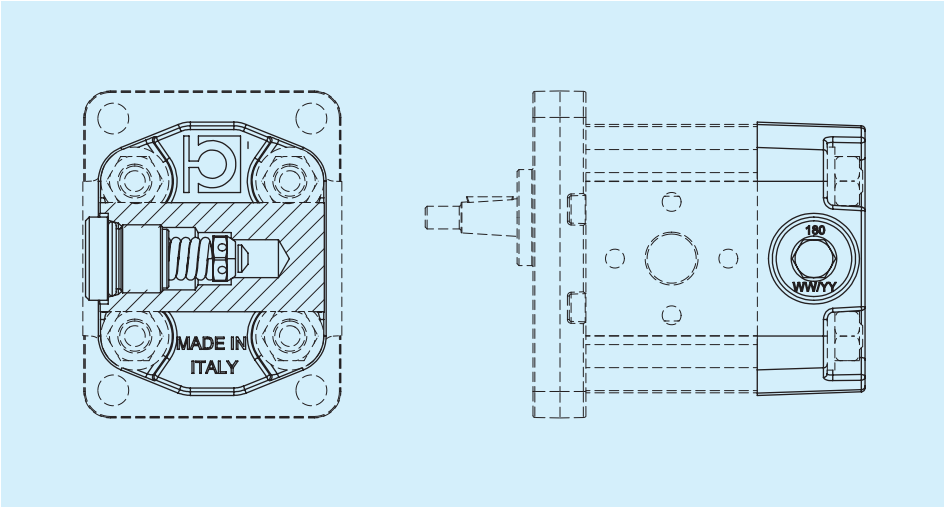
Other combinations of ports are available. For more information, please contact our technical sales department.



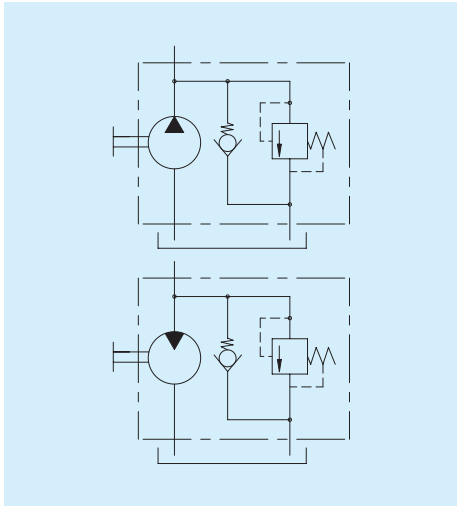
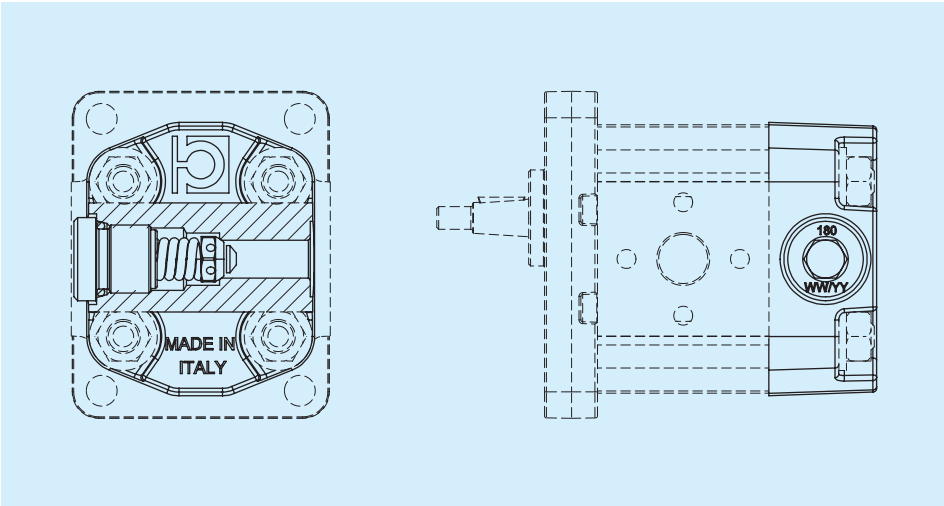
**VA** Check valve



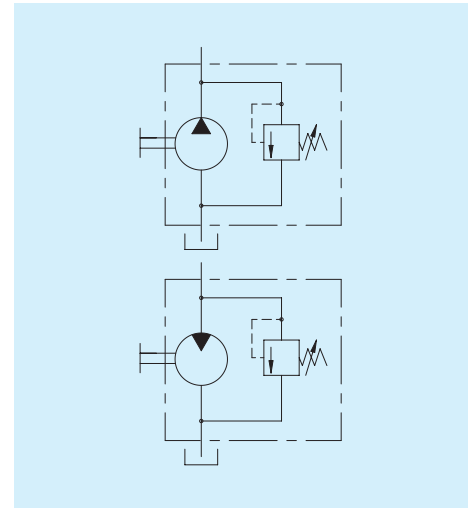
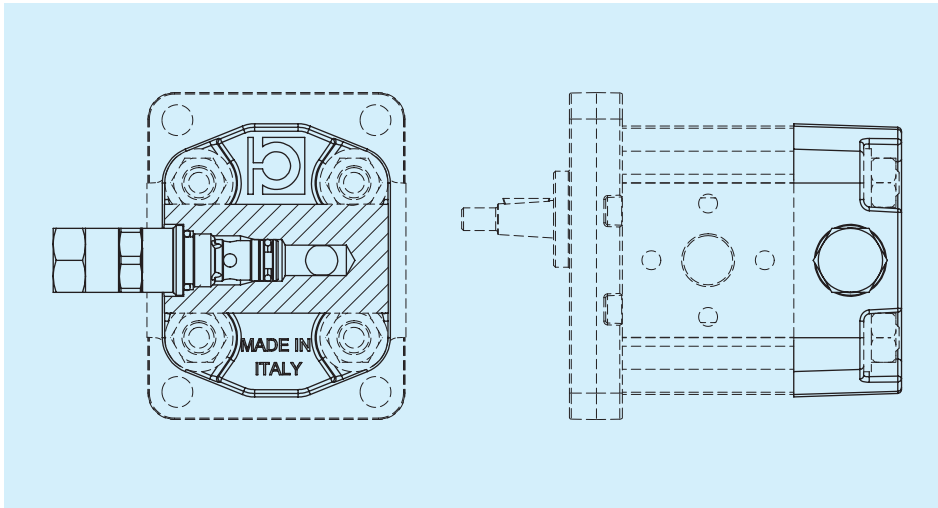
**VB** Fixed setting pressure relief valve with internal drain



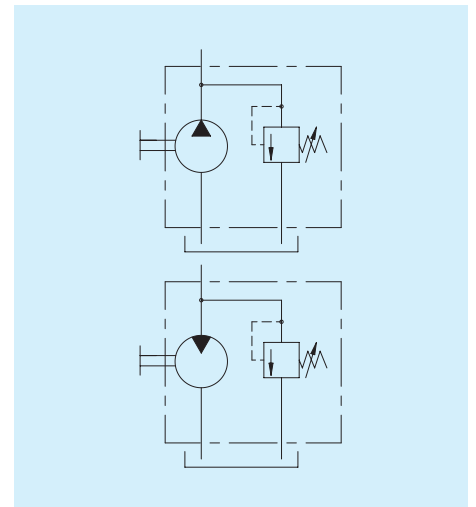
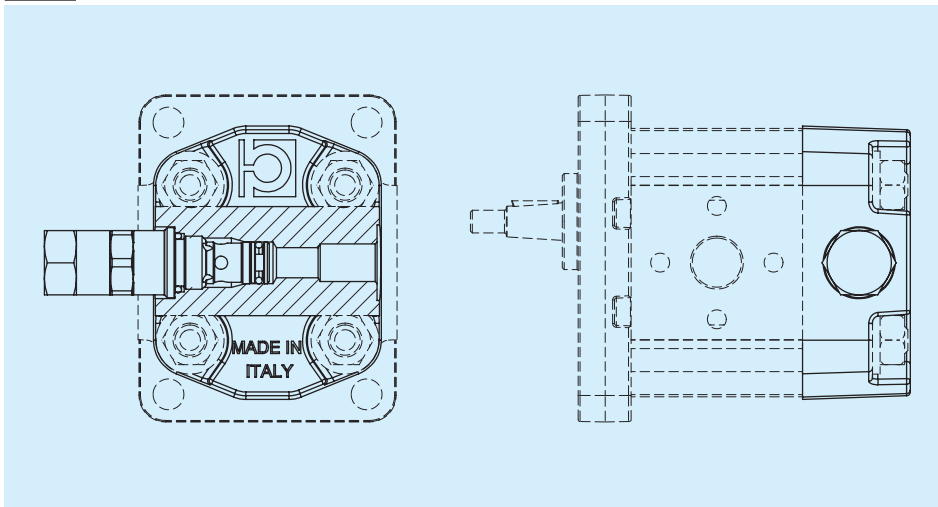
**VC** Fixed setting pressure relief valve with external drain



**VD** Adjustable pressure relief valve with internal drain



**VE** Adjustable pressure relief valve with external drain

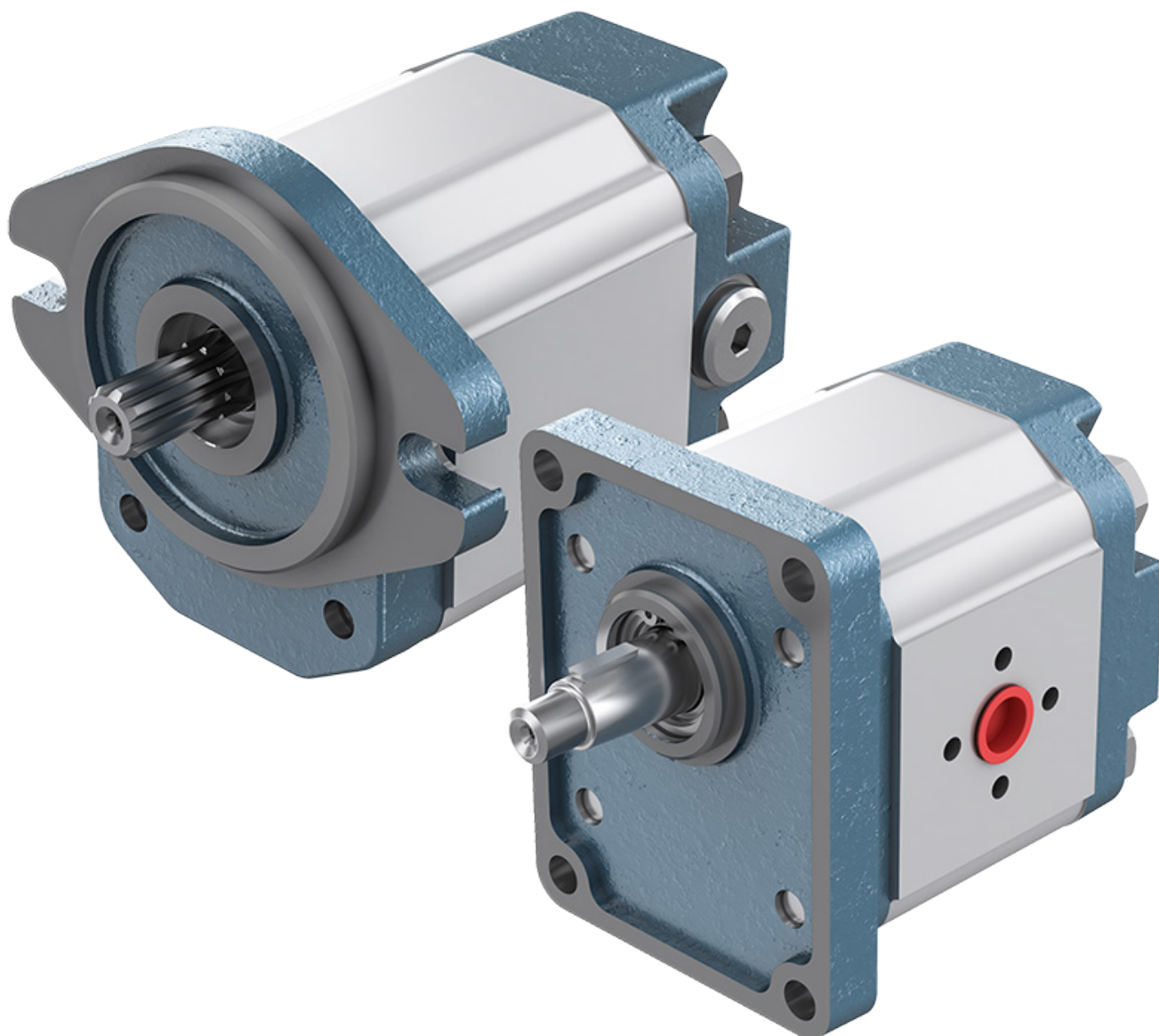


For more information, please contact the technical sales department

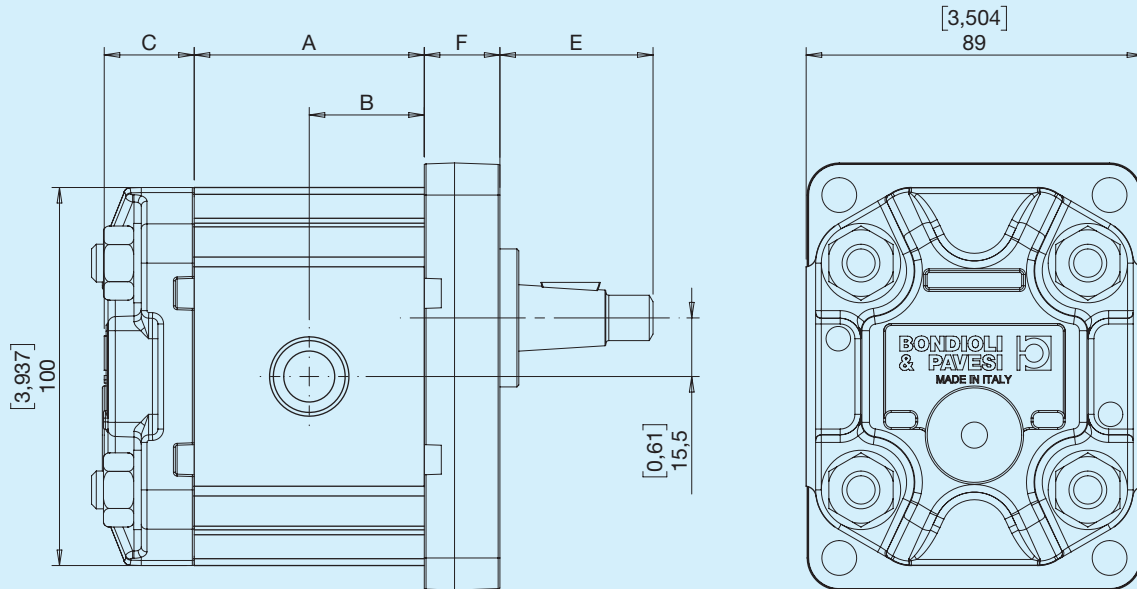
For pressure relief valves, please indicate the setting

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<b>HPL</b>														
<b>Series</b>														
<b>PA1</b> Gear pump Group 1			<b>MA1</b> Gear motor Group 1											
<b>Displacement</b>														
14			31			48			80					
19			36			60								
24			44			70								
<b>Direction of rotation</b>														
<b>S</b> Anti-clockwise/left					<b>D</b> Clockwise/right					<b>H</b> Bidirectional internal drainage			<b>B</b> Bidirectional rear external drainage	
<b>Front flanges - Shafts</b>														
<b>DD</b> European D25.4 - Tapered (1:8)			<b>DT</b> European D25.4 - High torque tapered (1:8)			<b>GG</b> German - Tapered (1:5)			<b>JI</b> SAE AA - Splined SAE AA					
<b>DE</b> European D25.4 - European round			<b>ED</b> European D30 - Tapered (1:8)			<b>GJ</b> German - Protruding front tooth without joint								
<b>DH</b> European D25.4 - Splined DIN 5482			<b>EE</b> European D30 - European round			<b>GK</b> German - Front tooth								
<b>DJ</b> European D25.4 - Protruding front tooth			<b>ET</b> European D30 - High torque tapered (1:8)			<b>JF</b> SAE AA - SAE AA round								
<b>I5</b> European flange - Round D18														
<b>C1</b> Centring D50.80 - Tapered (1:8)					<b>C2</b> Centring D50.80 - Round D18									
<b>IN - Inlet ports</b>														
... See tables Ports and Combinations														
<b>OUT - Output ports</b>														
... See tables Ports and Combinations														
<b>Seals</b>														
<b>B</b> NBR Pump					<b>R</b> NBR Motor / Bid. pump High pressure pump					<b>V</b> Viton Pump			<b>W</b> Viton Motor / Bid. pump High pressure pump	
<b>Covers</b>														
<b>ST</b> Standard			<b>VB</b> Fixed setting pressure relief valve with internal drain			<b>VD</b> Adjustable pressure relief valve with internal drain								
<b>VA</b> Check valve			<b>VC</b> Fixed setting pressure relief valve with external drain			<b>VE</b> Adjustable pressure relief valve with external drain								

## HPL Series Group 2

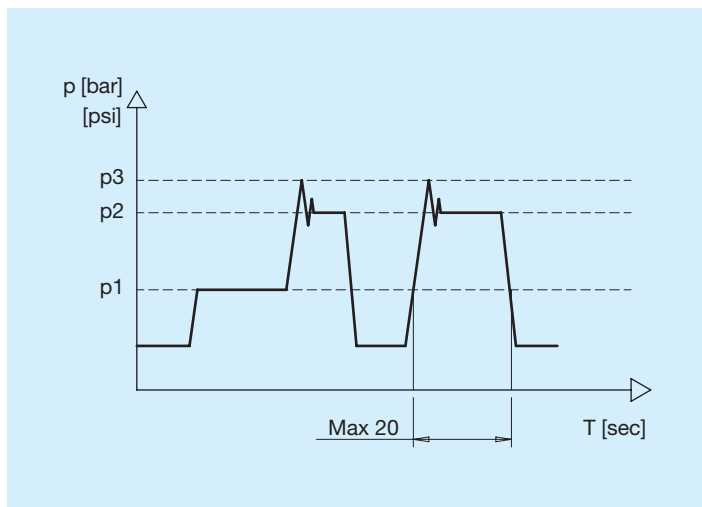


Before use, carefully read the GENERAL INSTRUCTIONS FOR USE OF GEAR PUMPS AND MOTORS.



C - See section on covers E - See section on shafts F - See section on flanges

## Pressure definition



$p_1$	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 pressure of $V_{max}$



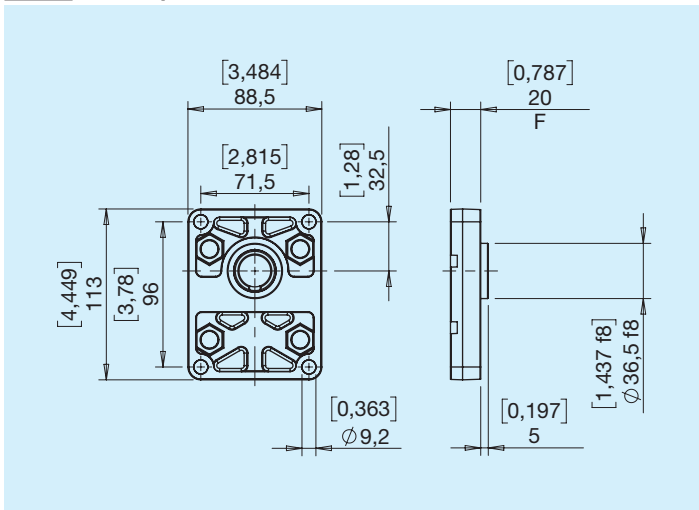
## Pump dimensions and technical data

HPLPA2	Nominal displacement		Continuous pressure		Intermittent pressure		Peak pressure		Rotational speed		Weight		A		B	
	cm <sup>3</sup>	in <sup>3</sup>	bar	psi	bar	psi	bar	psi	min <sup>-1</sup>	min <sup>-1</sup>	kg	lbs	mm	in	mm	in
<b>05</b>	4.50	0.27	240	3481	260	3771	300	4351	3500	700	2.30	5.07	49.15	1.935	24.6	0.968
<b>06</b>	6.00	0.37	240	3481	260	3771	300	4351	3500	700	2.40	5.29	51.85	2.041	25.9	1.021
<b>08</b>	8.50	0.52	230	3336	250	3626	280	4061	3500	700	2.40	5.29	56.35	2.219	28.2	1.109
<b>11</b>	11.00	0.67	230	3336	250	3626	280	4061	3500	700	2.40	5.29	60.85	2.396	30.4	1.198
<b>14</b>	14.50	0.88	230	3336	250	3626	280	4061	3500	700	2.80	6.17	67.25	2.648	33.6	1.324
<b>17</b>	17.00	1.04	230	3336	250	3626	280	4061	3500	700	2.80	6.17	71.25	2.825	35.9	1.412
<b>20</b>	19.50	1.19	200	2901	220	3191	250	3626	3500	700	2.80	6.17	76.25	3.002	38.1	1.501
<b>26</b>	26.00	1.59	180	2611	190	2756	210	3046	3000	700	3.10	6.83	88.55	3.486	44.3	1.743
<b>34</b>	34.00	2.07	150	2175	170	2466	190	2756	3000	700	3.40	7.50	102.55	4.037	51.3	2.019
<b>40</b>	40.50	2.47	140	2031	160	2321	180	2611	2500	700	3.60	7.94	115.07	4.530	57.5	2.265

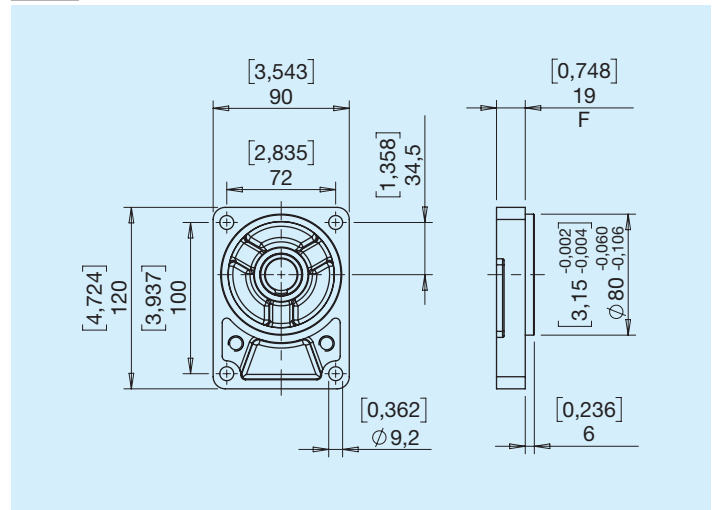
## Motor dimensions and technical data

HPLMA2	Nominal displacement		Continuous pressure		Intermittent pressure		Peak pressure		Rotational speed		Weight		A		B	
	cm <sup>3</sup>	in <sup>3</sup>	bar	psi	bar	psi	bar	psi	min <sup>-1</sup>	min <sup>-1</sup>	kg	lbs	mm	in	mm	in
<b>06</b>	6.00	0.37	240	3481	260	3771	300	4351	4000	700	2.40	5.29	51.85	2.041	25.9	1.021
<b>08</b>	8.50	0.52	230	3336	250	3626	280	4061	4000	700	2.40	5.29	56.35	2.219	28.2	1.109
<b>11</b>	11.00	0.67	230	3336	250	3626	280	4061	4000	700	2.40	5.29	60.85	2.396	30.4	1.198
<b>14</b>	14.50	0.88	230	3336	250	3626	280	4061	4000	700	2.80	6.17	67.25	2.648	33.6	1.324
<b>17</b>	17.00	1.04	230	3336	250	3626	280	4061	4000	700	2.80	6.17	71.25	2.825	35.9	1.412
<b>20</b>	19.50	1.19	200	2901	220	3191	250	3626	4000	700	2.80	6.17	76.25	3.002	38.1	1.501
<b>26</b>	26.00	1.59	180	2611	190	2756	210	3046	3400	700	3.10	6.83	88.55	3.486	44.3	1.743

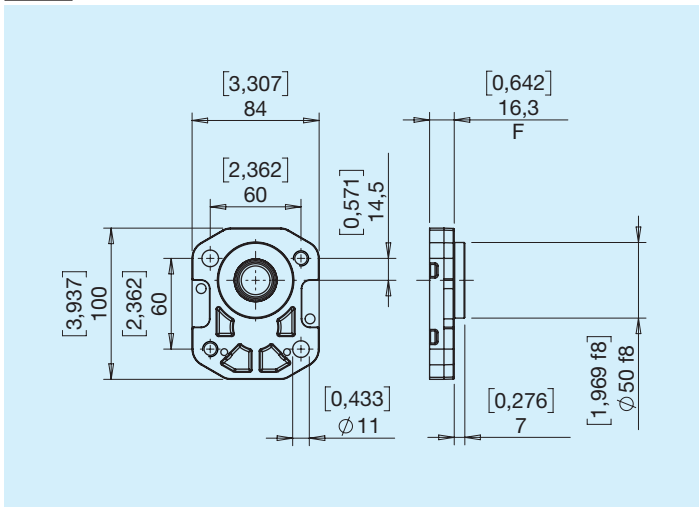
**M** European



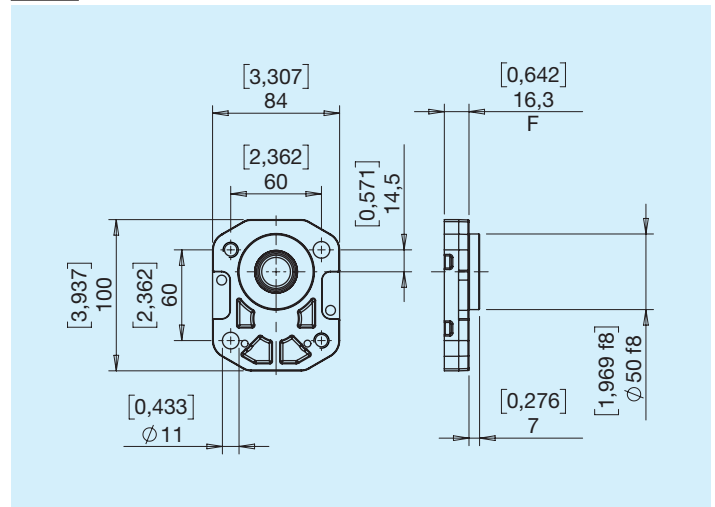
**N** German



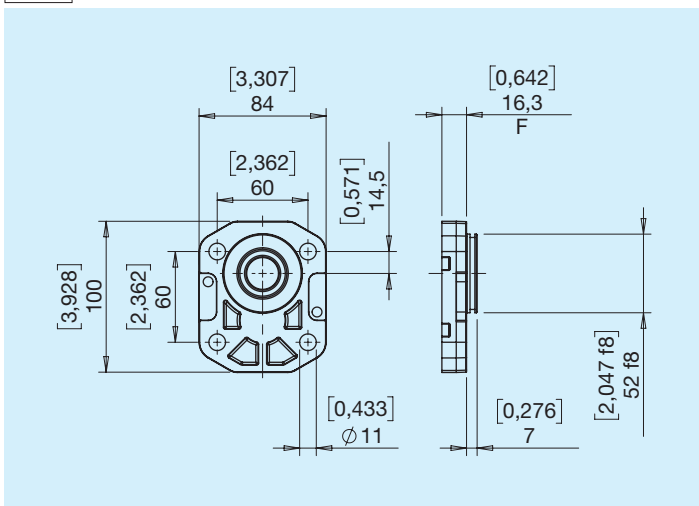
**O** German D50 2 holes RH



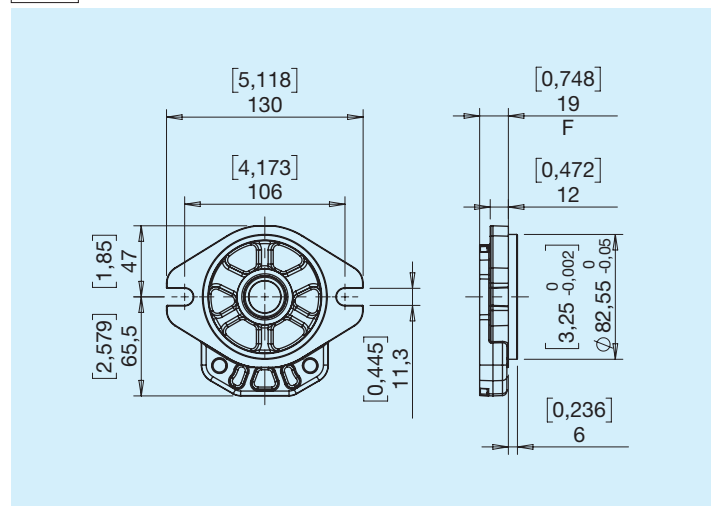
**P** German D50 2 holes LH



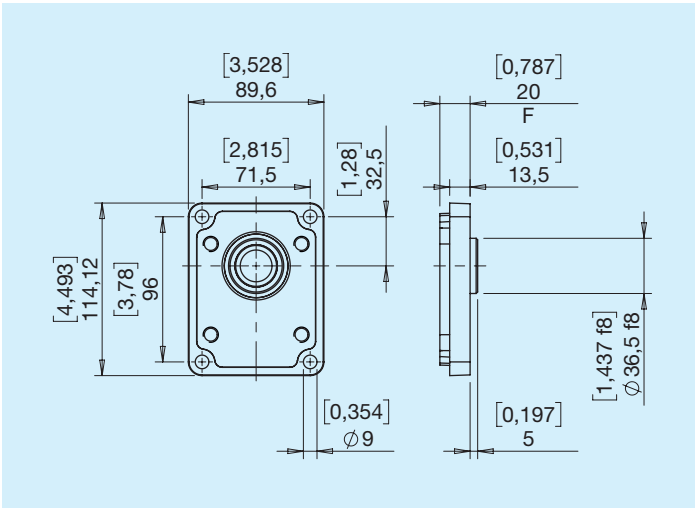
**R** German D52



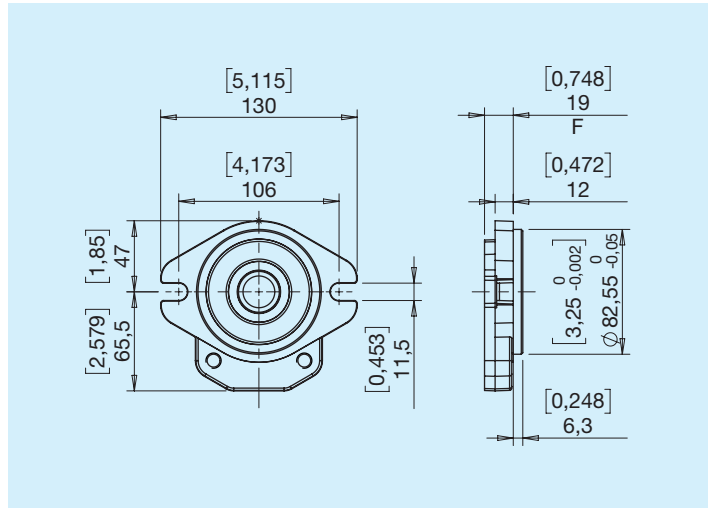
**S** SAE A 2 holes



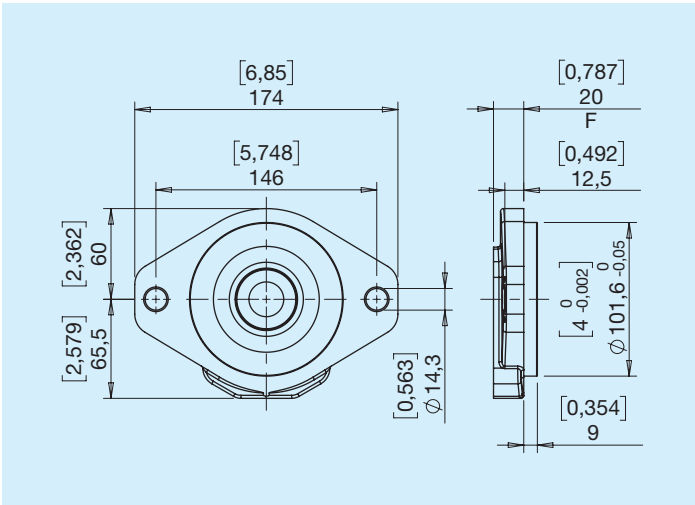
## L European



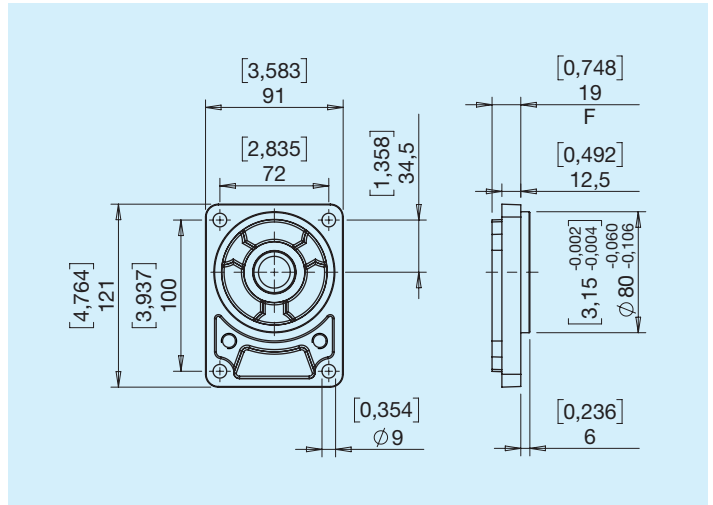
## Q SAE A 2 holes



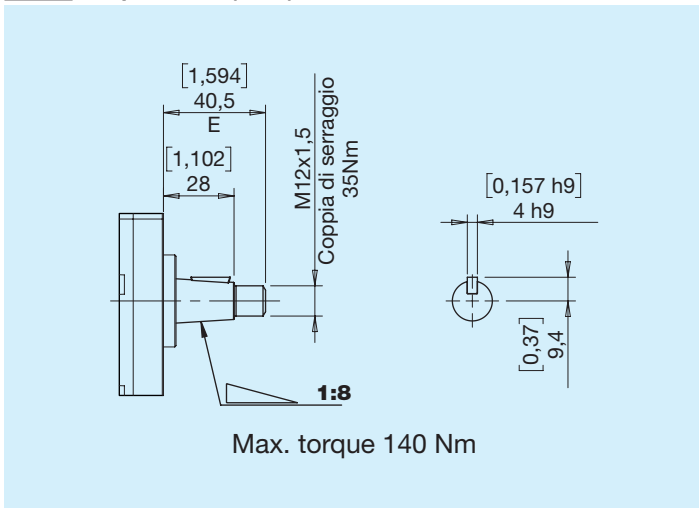
## T SAE B 2 holes



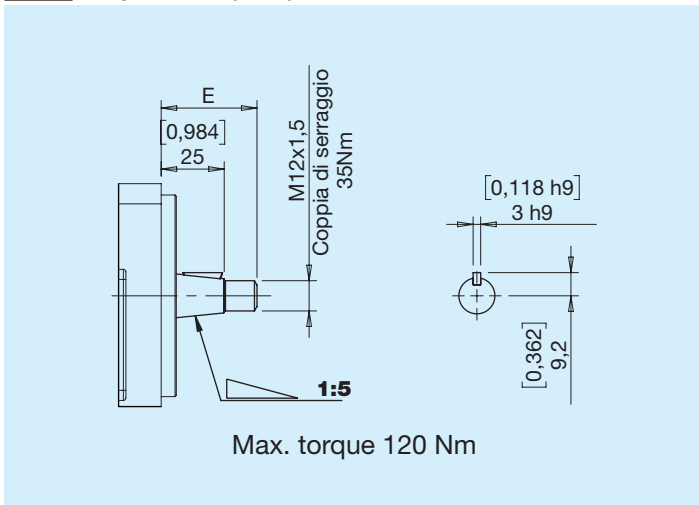
## V German



## L Tapered (1:8)



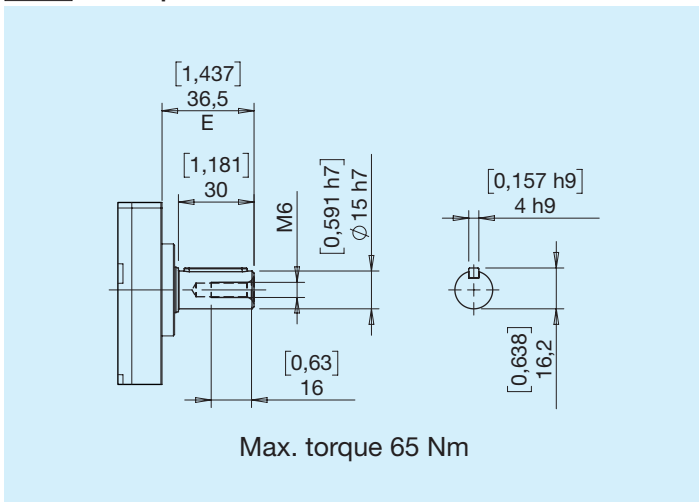
## M Tapered (1:5)



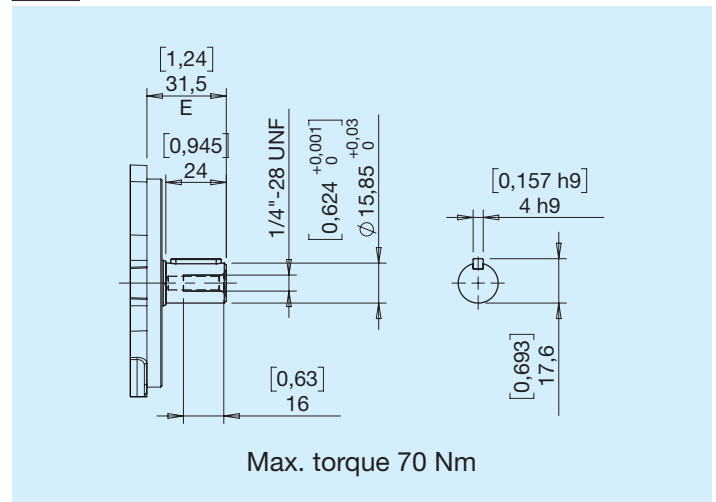
## M shaft extension table

	Flange N/V		Flange O/P	
	mm	in	mm	in
N6	19	0.75	50.8	2

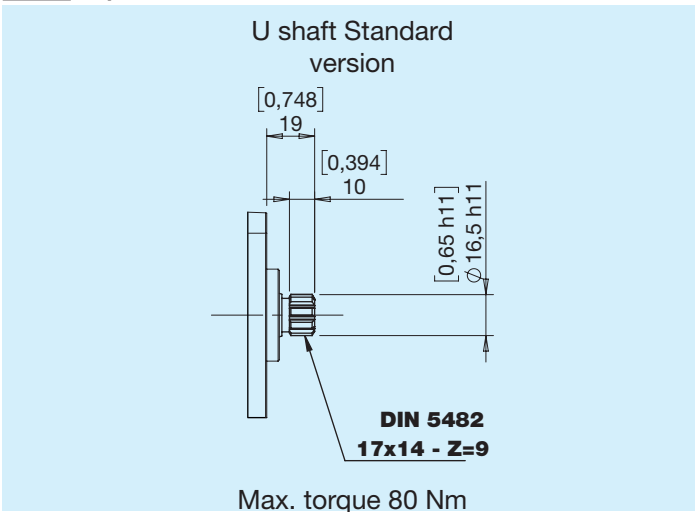
## N European round D15



## P Round SAE A

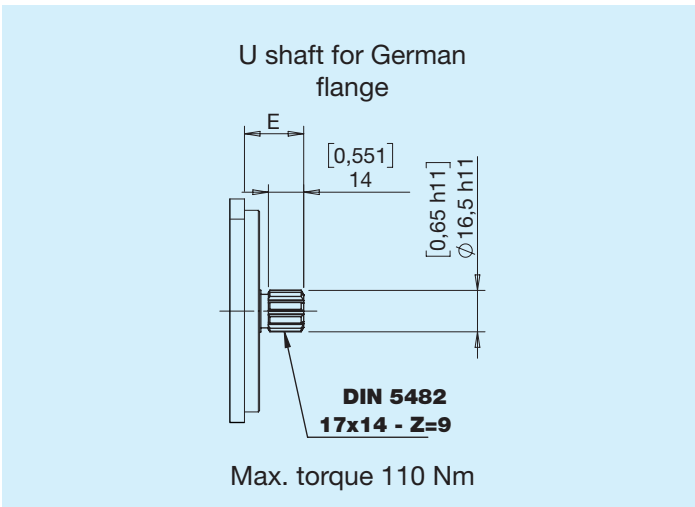


## U Splined DIN 5482

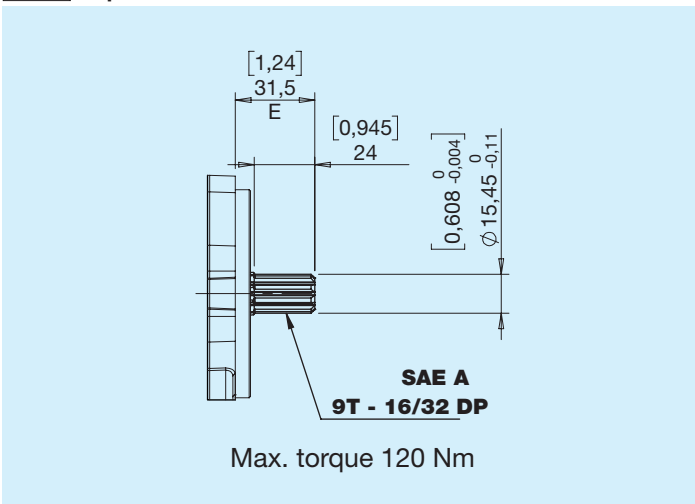


## U shaft extension for German flange table

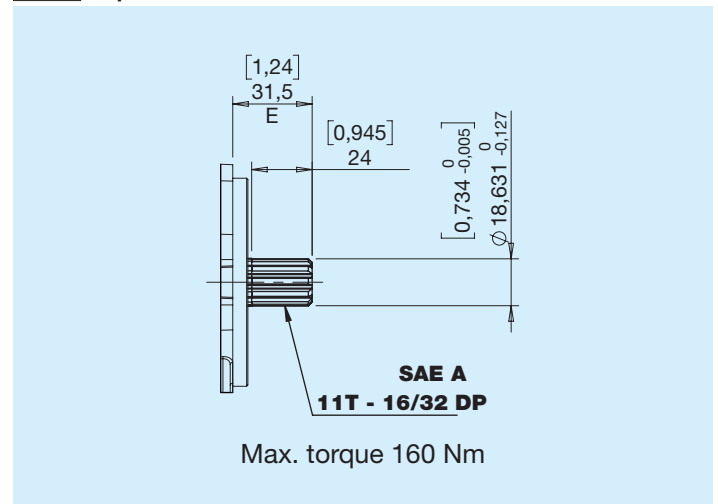
	Flange N/V		Flange O/P	
	mm	in	mm	in
N6	19	0.75	50.8	2



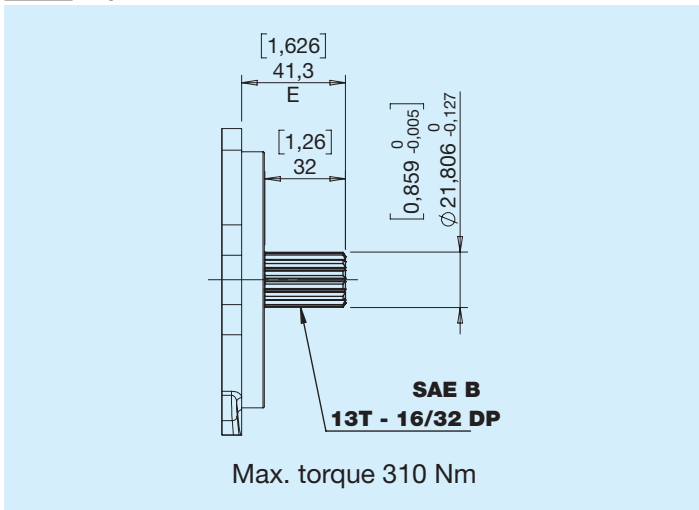
## V Splined SAE A 9T



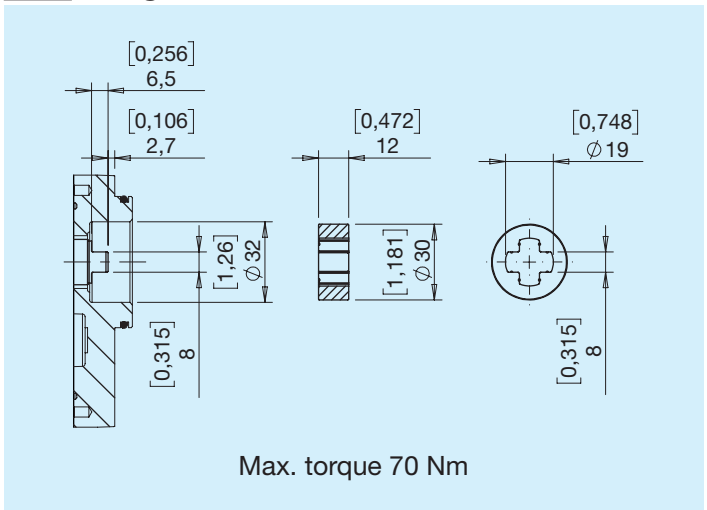
## X Splined SAE A 11T



## Y Splined SAE B 13T



## Z Tang drive

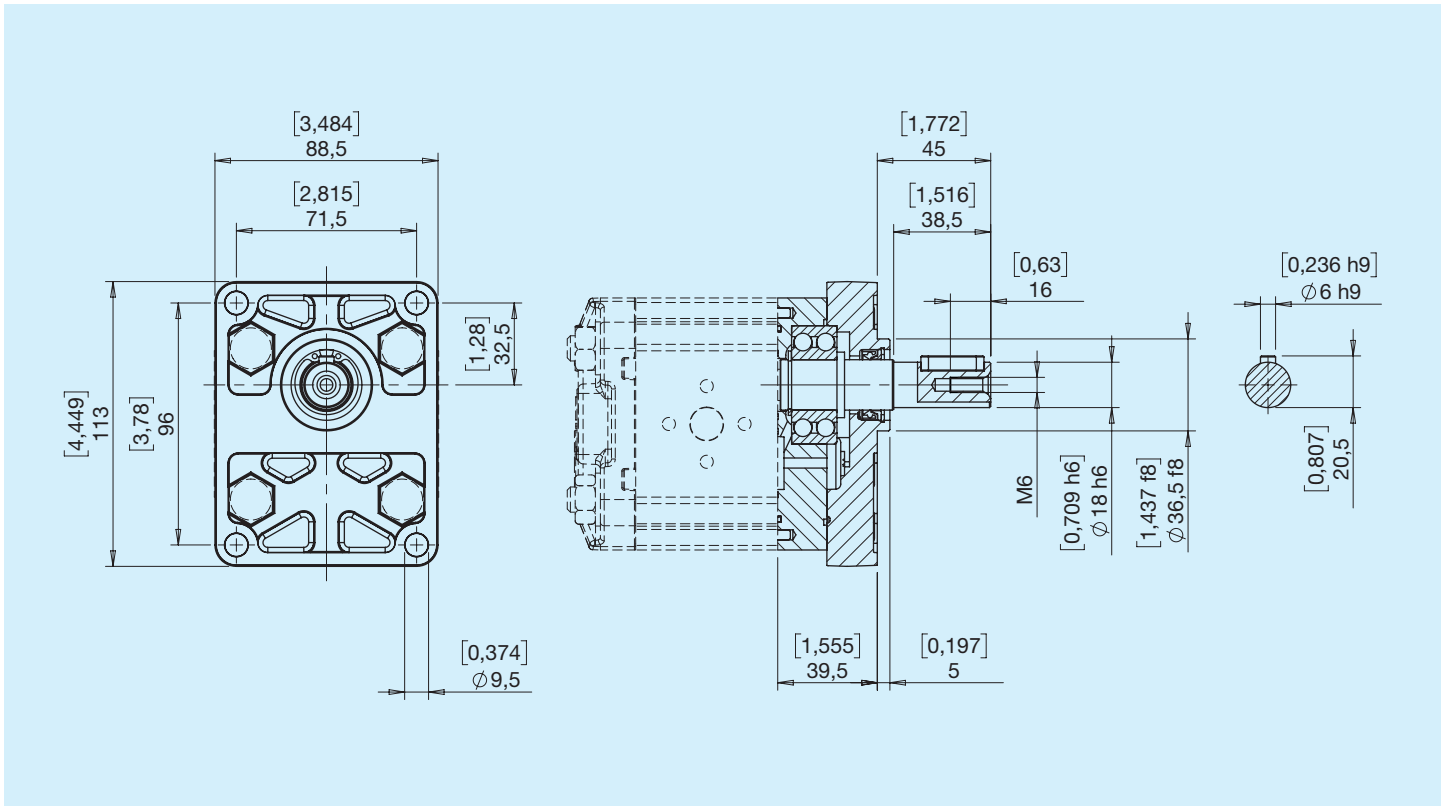


For more information, please contact the technical sales department

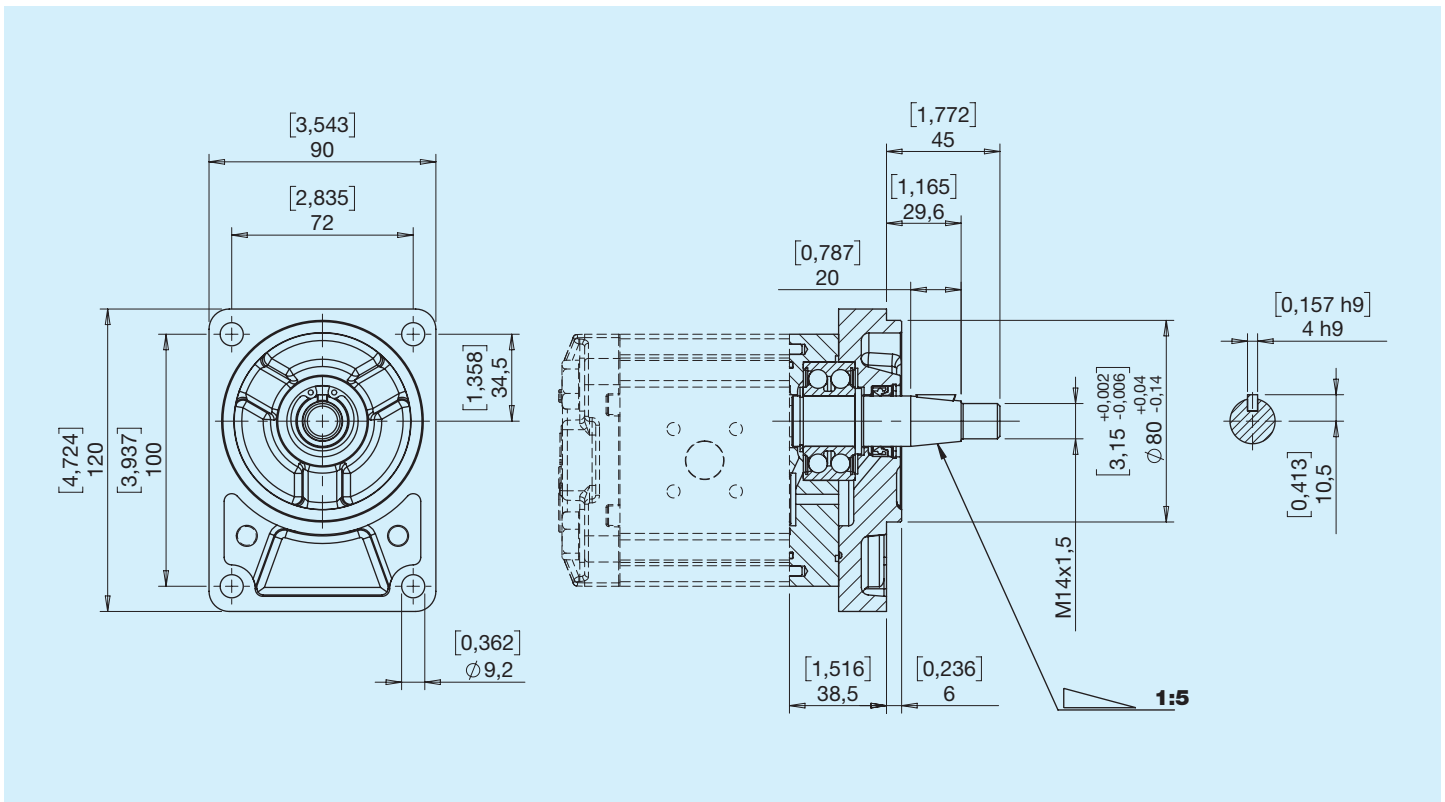
For pressure relief valves, please indicate the setting

Shafts	Flanges									
	M	L	N	V	O	P	R	S	Q	T
L	•	•								
M			•	•	•	•				
N	•	•								
P								•	•	
U	•	•	•	•	•	•				
V								•	•	
X								•	•	
Y										•
Z							•			

## I1 Standard European flange round shaft D18



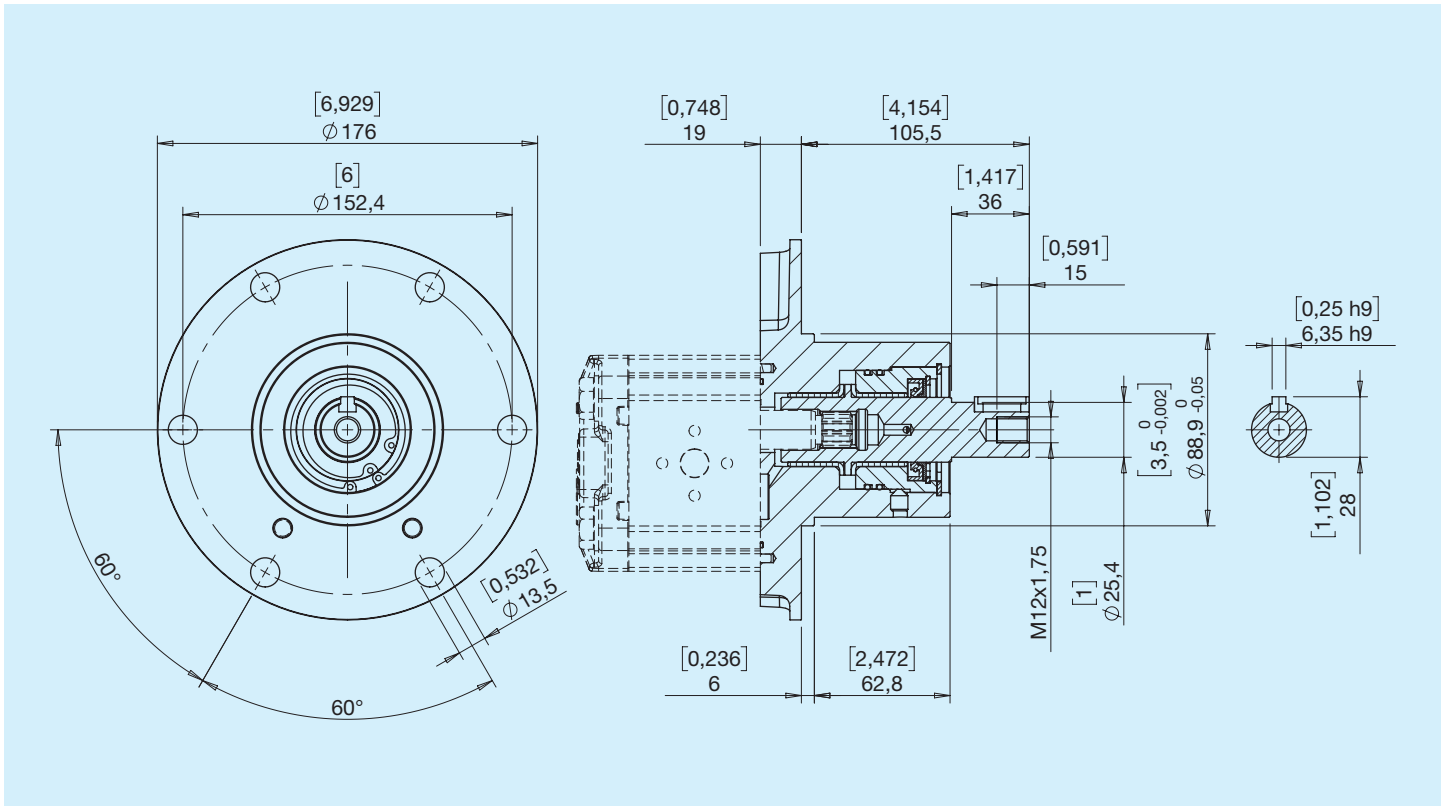
## I2 German flange tapered shaft (1:5)





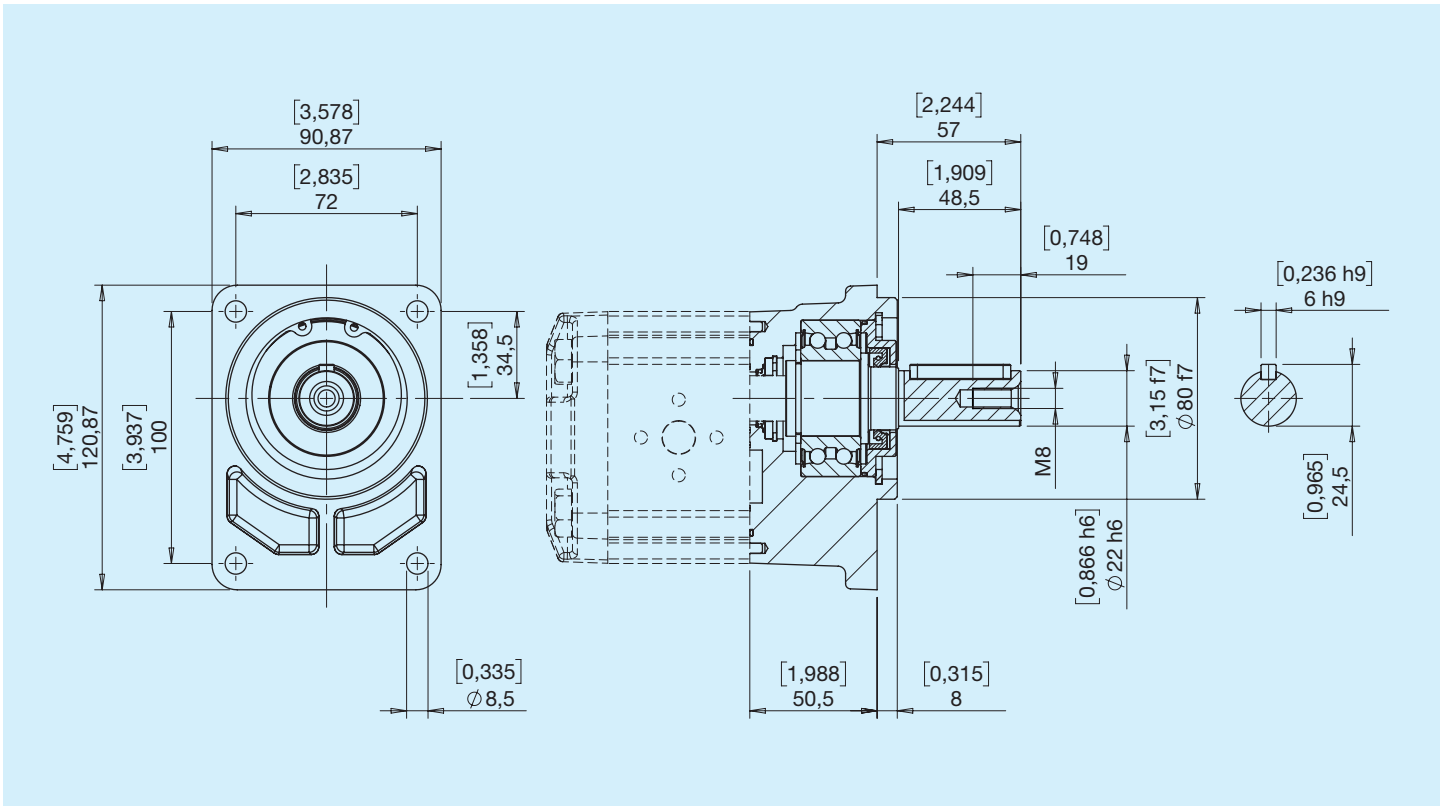


## IS Special flange round shaft D25.40

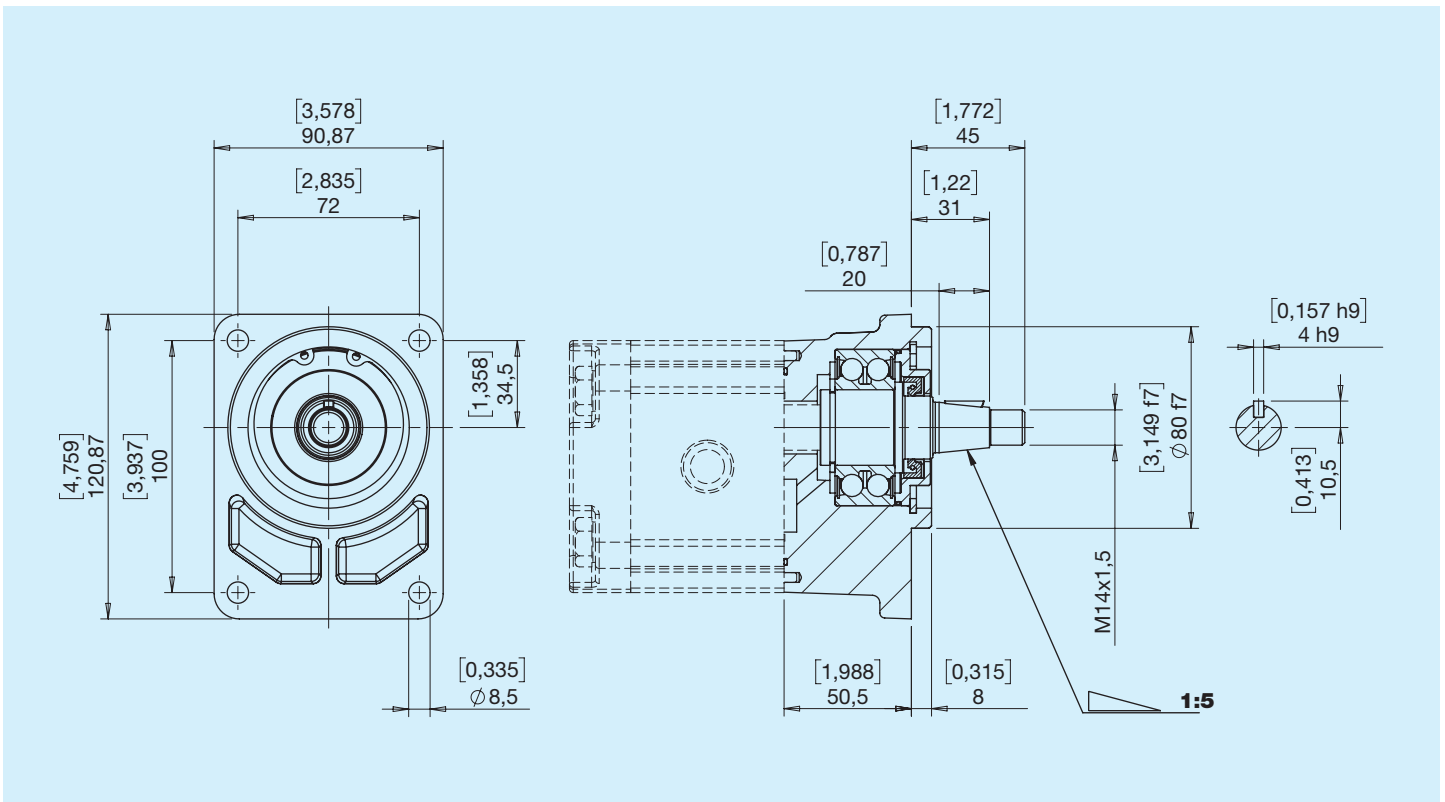


Integrated supports I1 - I2 - I3 - I7 are available in cast iron. For more information, please contact our technical sales department.

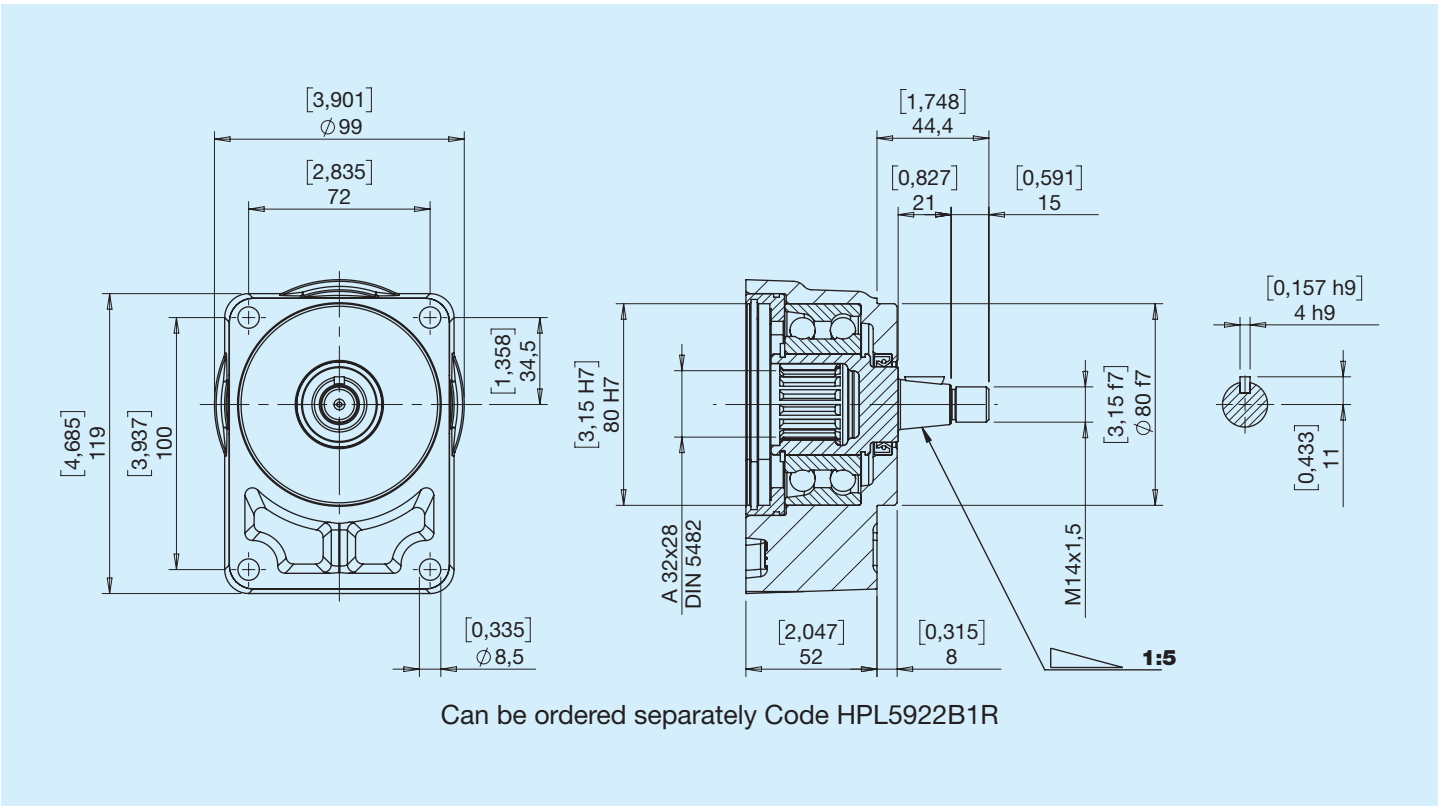
## IB German flange round shaft D22



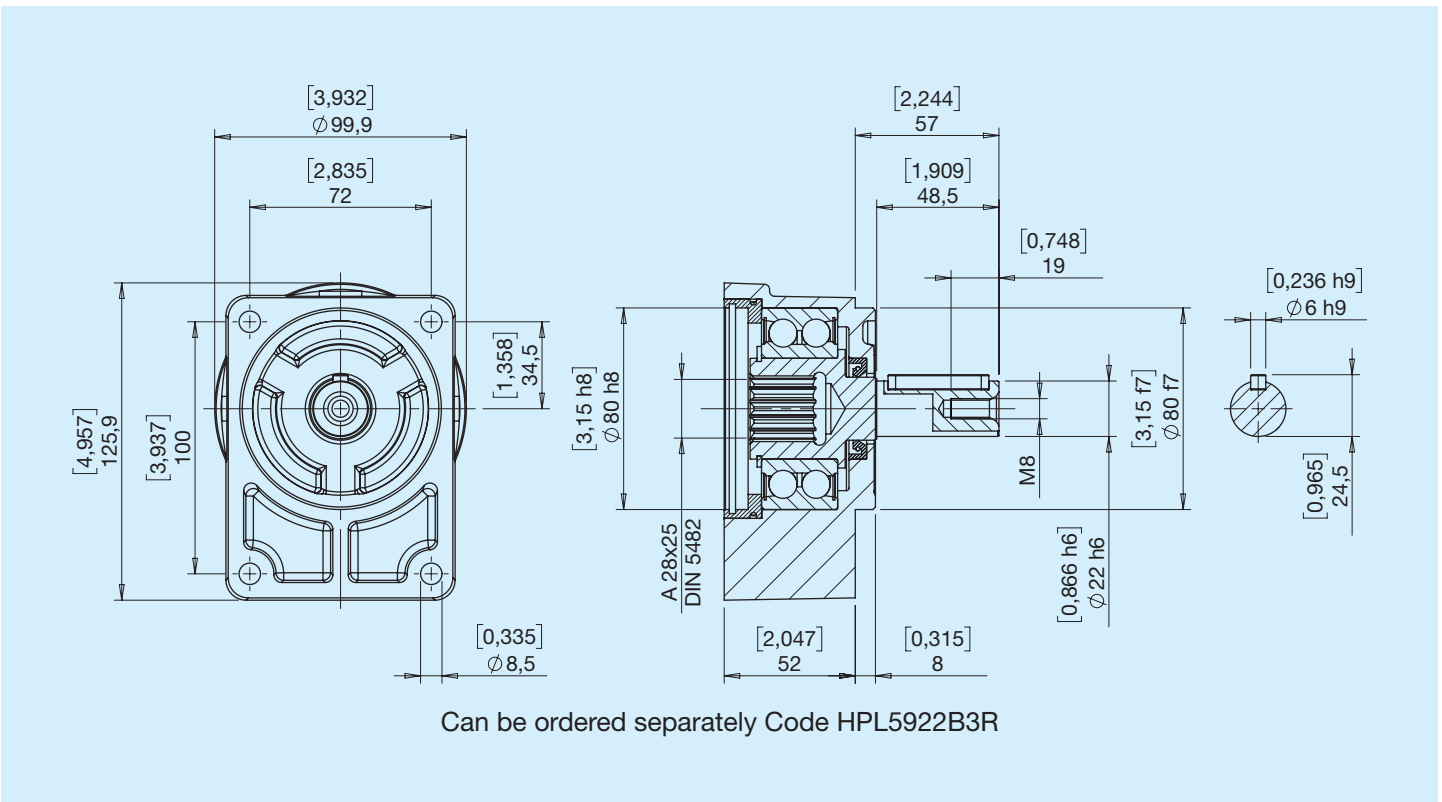
## IC German flange tapered shaft (1:5)



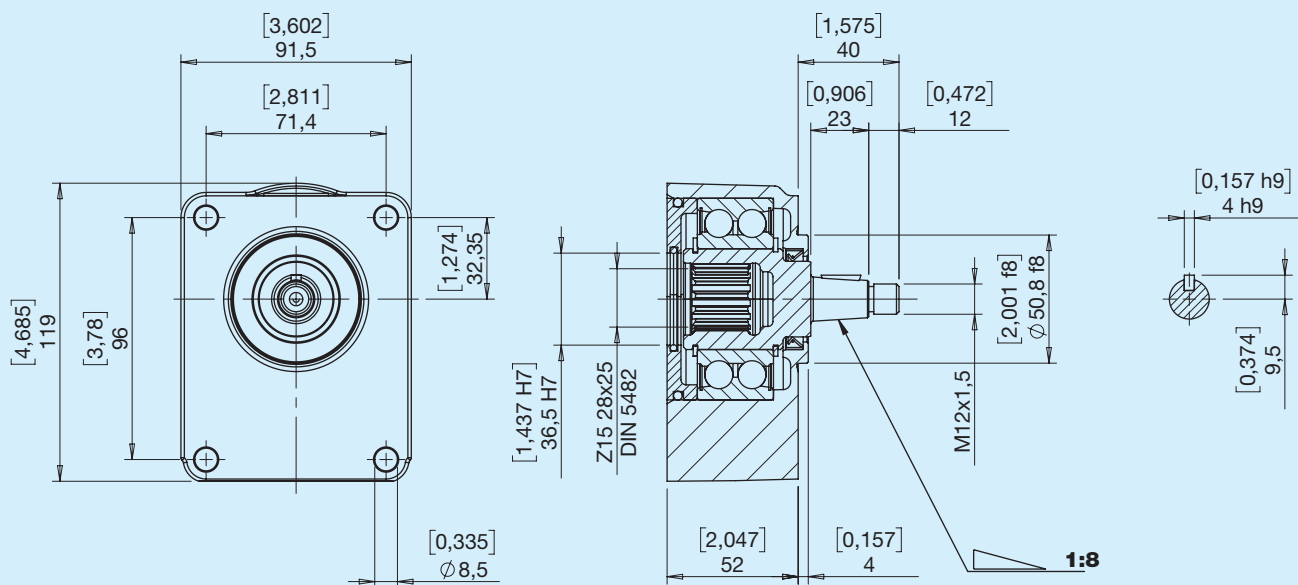
## B1 Centring D80 tapered shaft (1:5)



## B3 Centring D80 round shaft D22

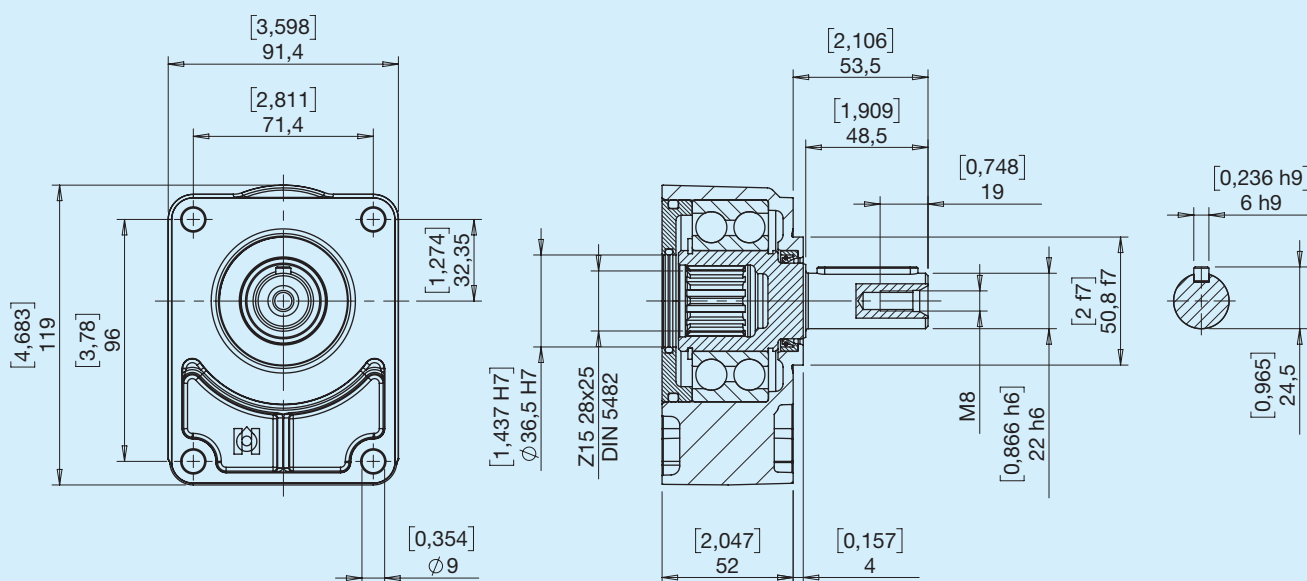


## C3 Centring D50.80 tapered shaft (1:8)



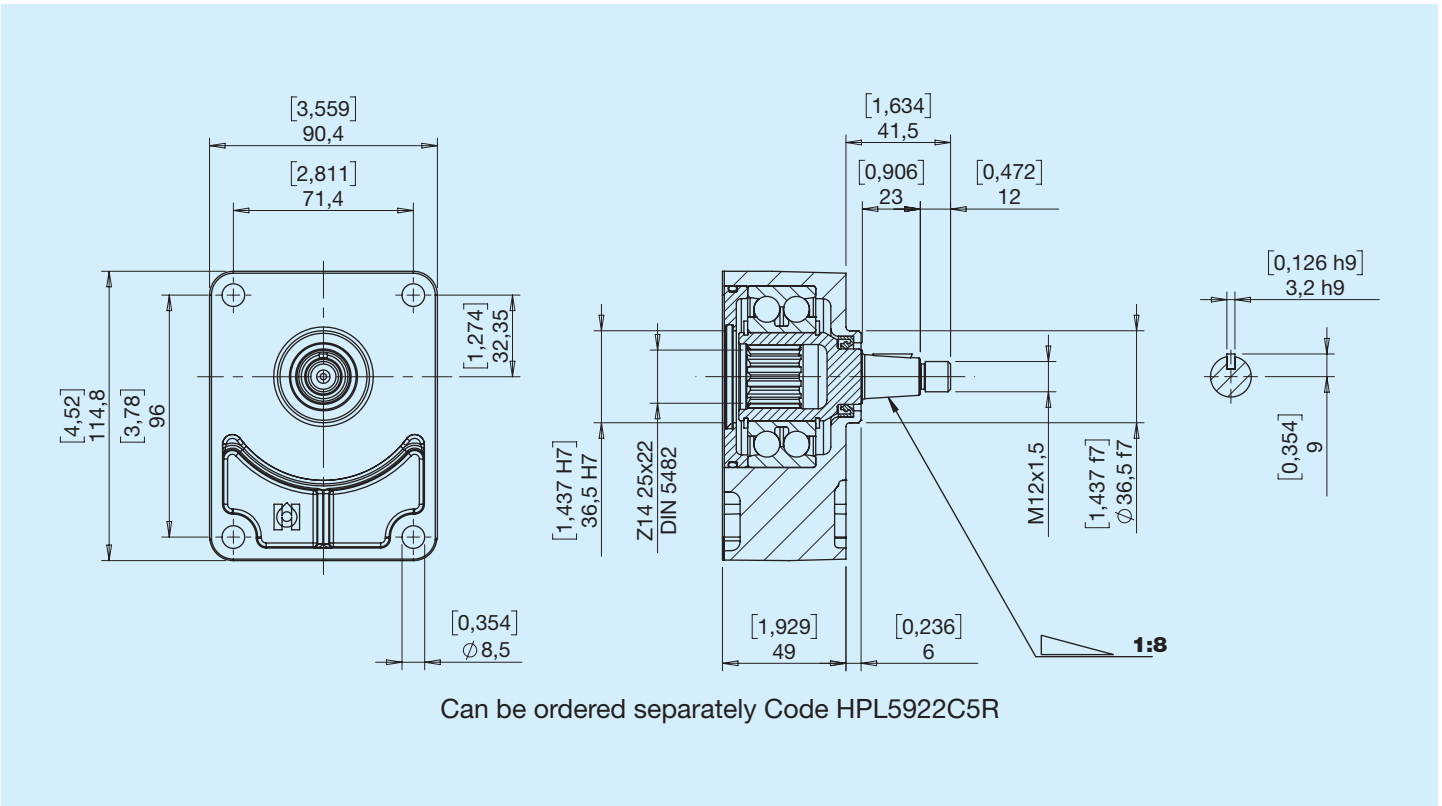
Can be ordered separately Code HPL5922C3R

## C4 Centring D50.80 round shaft D22

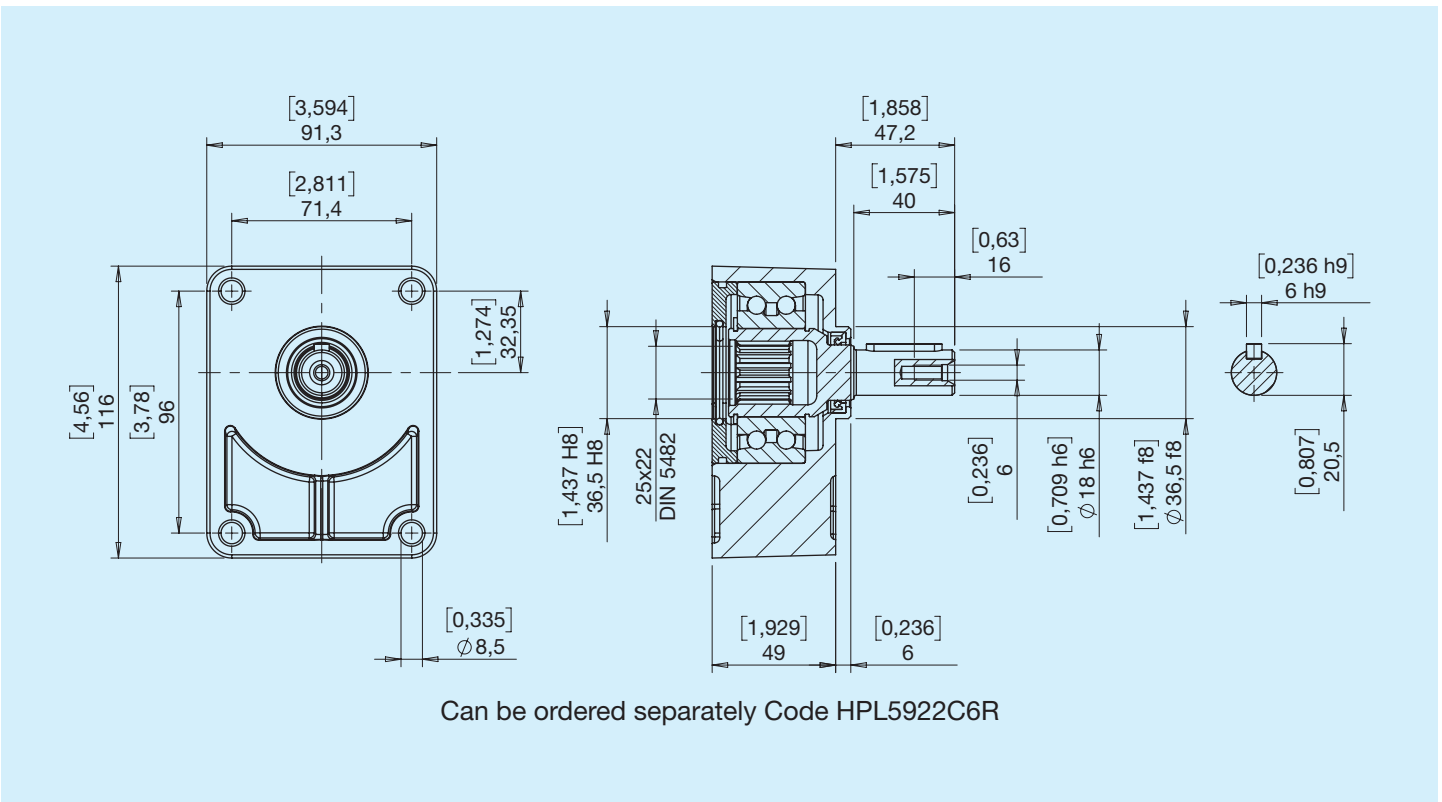


Can be ordered separately Code HPL5922C4R

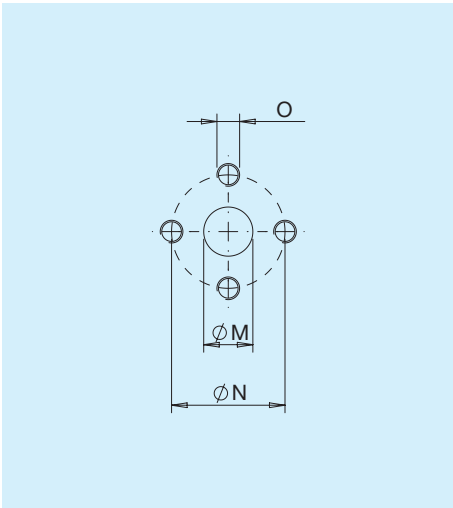
## C5 Centring D36.50 tapered shaft (1:8)



## C6 Centring D36.50 round shaft D18

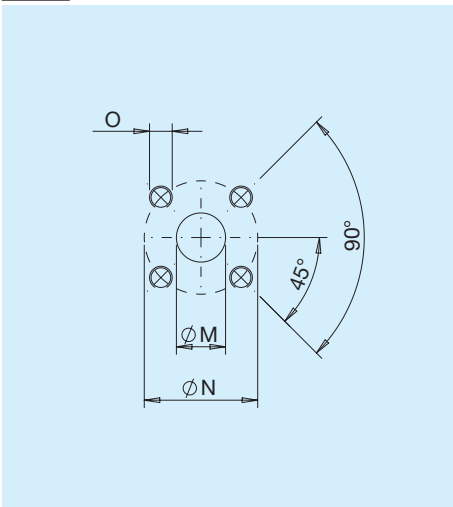


## E Lateral



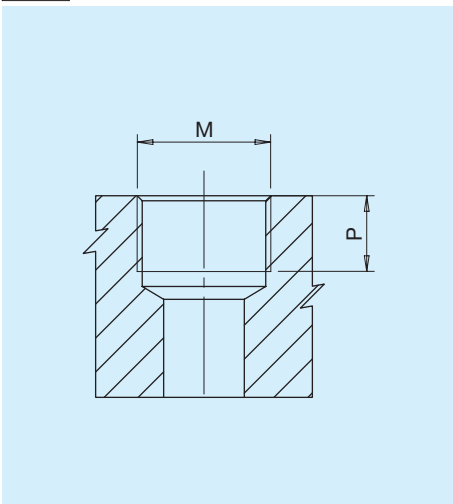
Type	M		N		O	
	mm	in	mm	mm	M	Nm
E3	13	0.51	30	1.18	M6	10
E5	20	0.79	40	1.57	M8	15

## X Lateral



Type	M		N		O	
	mm	in	mm	mm	M	Nm
X4	15	0.59	35	1.38	M6	10
X5	15	0.59	40	1.57	M6	10
X6	20	0.79	40	1.57	M6	10
X8	27	1.06	55	2.17	M8	15

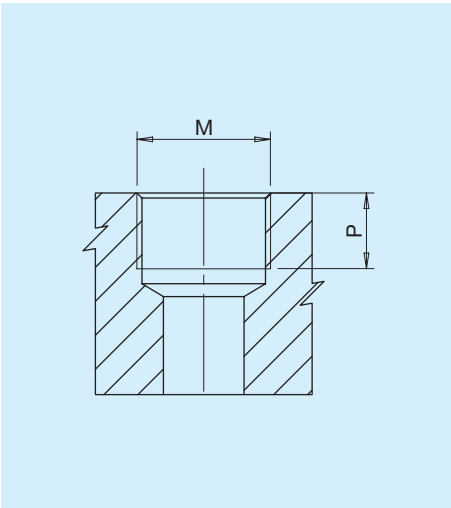
## G Lateral / Drain



Type	M	Nm	P	
			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-G3/4	90	19	0.75
G7	PORT ISO 1179-1-G 1	130	19	0.75
G7	PORT ISO 1179-1-G 1	130	19	0,75

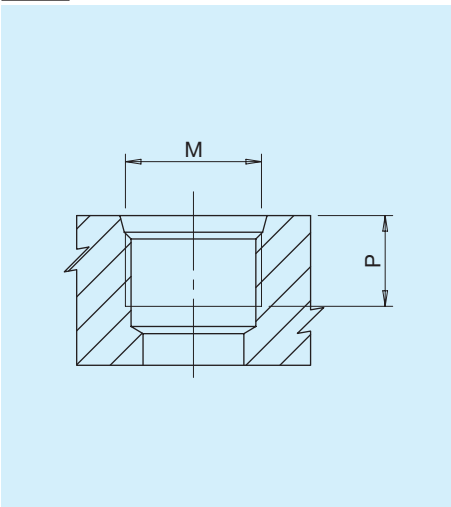
\*Drain

## T Rear



Type	M	Nm	P	
			mm	in
T4	PORT ISO 1179-1-G 1/2	50	16	0.63
T6	PORT ISO 1179-1-G3/4	90	19	0.75

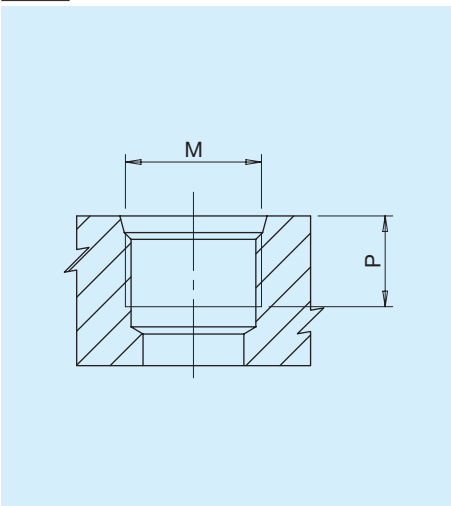
## U Lateral / Drain



Type	Dim.	M	Nm	P	
				mm	in
U3*	3/8'	PORT ISO 11926-1 - 9/16-18	25	13	0.51
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
U7	1'	PORT ISO 11926-1 - 1 5/16-12	130	20	0,79

\*Drain

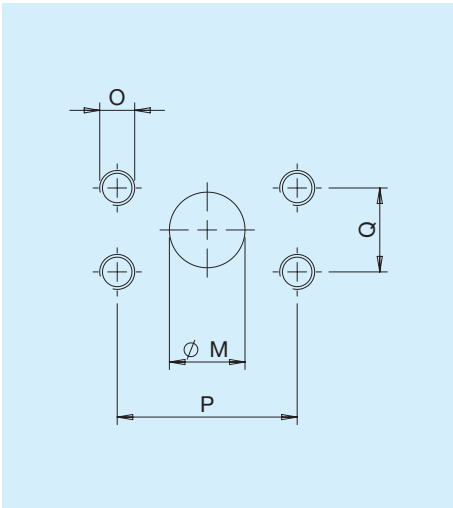
## C Rear



Type	Dim.	M	Nm	P	
				mm	in
C5	5/8'	PORT ISO 11926-1 - 7/8-14	70	17	0.67
C6	3/4'	PORT ISO 11926-1 - 1 1/16-12	90	19	0.75

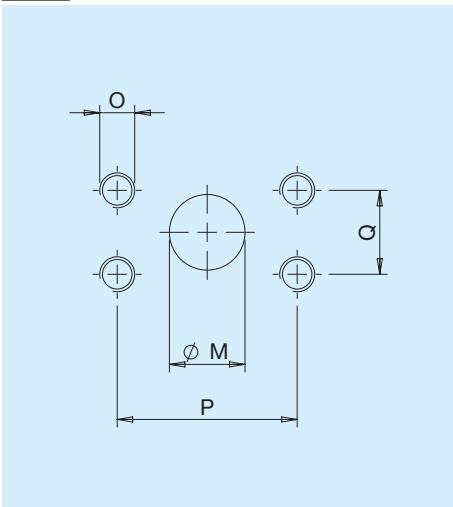


## N Lateral



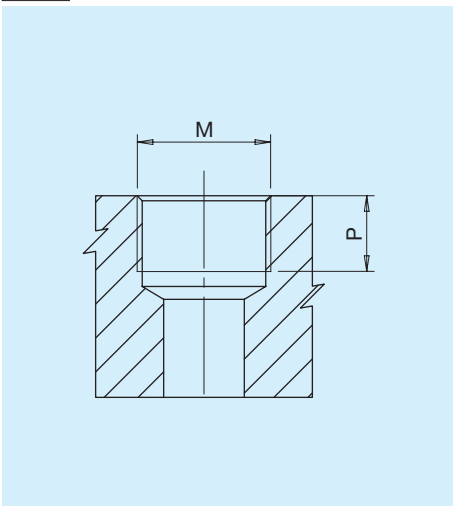
Type	Dim.	M		P		Q		O	Nm
		mm	in	mm	in	mm	in		
N4	1/2'	13	0.51	38.1	1.49	17.5	0.68	5/16-18 UNC-2B	17
N6	3/4'	20	0.79	47.6	1.87	22.2	0.87	3/8-16 UNC-2B	38
N7	1'	27	1.06	52.4	2.60	26.2	1.03	3/8-16 UNC-2B	38

## F Lateral



Type	Dim.	M		P		Q		O	Nm
		mm	in	mm	in	mm	in		
F4	1/2'	13	0.51	38.1	1.49	17.5	0.68	M8	17
F6	3/4'	20	0.79	47.6	1.87	22.2	0.87	M10	38
F7	1'	25.4	1	52.4	2.60	26.2	1.03	M10	38

## M Drain



Type	M	Nm	P	
			mm	in
M2*	PORT ISO 6149 - 1 - M14x1.5	17	12	0.47

\*Drain

## Combination of ports/flanges

Ports	Flanges									
	M	L	N	V	O	P	R	S	Q	T
E	•	•								
G	•	•						•	•	•
X			•	•	•	•	•			
U								•	•	•
F								•	•	•
N								•	•	•
C								•	•	•
T	•	•	•	•	•	•	•	•	•	•

## Combination of round ports for one-way pumps/motors

Ports	Round				
	5 6 8	11	14 17 20	26	34 40
	IN/OUT ports	IN/OUT ports	IN/OUT ports	IN/OUT ports	IN/OUT ports
E	E3 E3	E3 E3	E5 E3	E5 E5	E5 E5
G	G4 G4	G4 G4	G6 G4	G6 G6	G7 G6
X	X5 X4	X6 X4	X6 X4	X6 X5	X8 X6
U	U6 U5	U6 U5	U6 U5	U6 U5	U7 U6
F	-	F4 F4	F6 F4	F7 F6	F7 F6
N	-	N4 N4	N6 N4	N7 N6	N7 N6
C	C6 C5	C6 C5	C6 C5	C6 C5	-
T	T6 T4	T6 T4	T6 T4	T6 T4	-

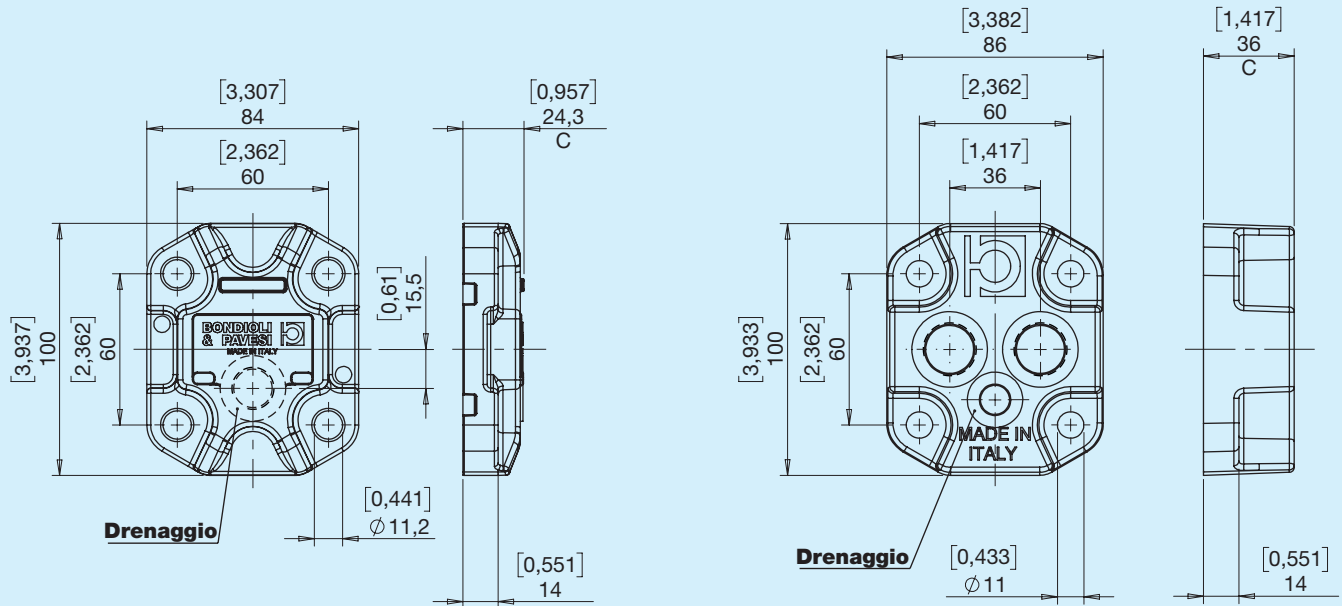
## Combination of round ports for bidirectional pumps/motors

Ports	Round					
	6 8	11	14 17	20	26	Drain line
	IN/OUT ports	IN/OUT ports	IN/OUT ports	IN/OUT ports	IN/OUT ports	
<b>E</b>	E3 E3	E3 E3	E3 E3	E5 E5	E5 E5	M2
<b>G</b>	G4 G4	G4 G4	G4 G4	G6 G6	G6 G6	G3
<b>X</b>	X4 X4	X4 X4	X4 X4	X6 X6	X6 X6	M2
<b>U</b>	U5 U5	U5 U5	U5 U5	U6 U6	U6 U6	U3
<b>F</b>	-	F4 F4	F4 F4	F6 F6	F6 F6	M2
<b>N</b>	-	N4 N4	N4 N4	N6 N6	N6 N6	U3
<b>C</b>	C5 C5	C5 C5	C5 C5	-	-	U3
<b>T</b>	T4 T4	T4 T4	T4 T4	-	-	G3

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

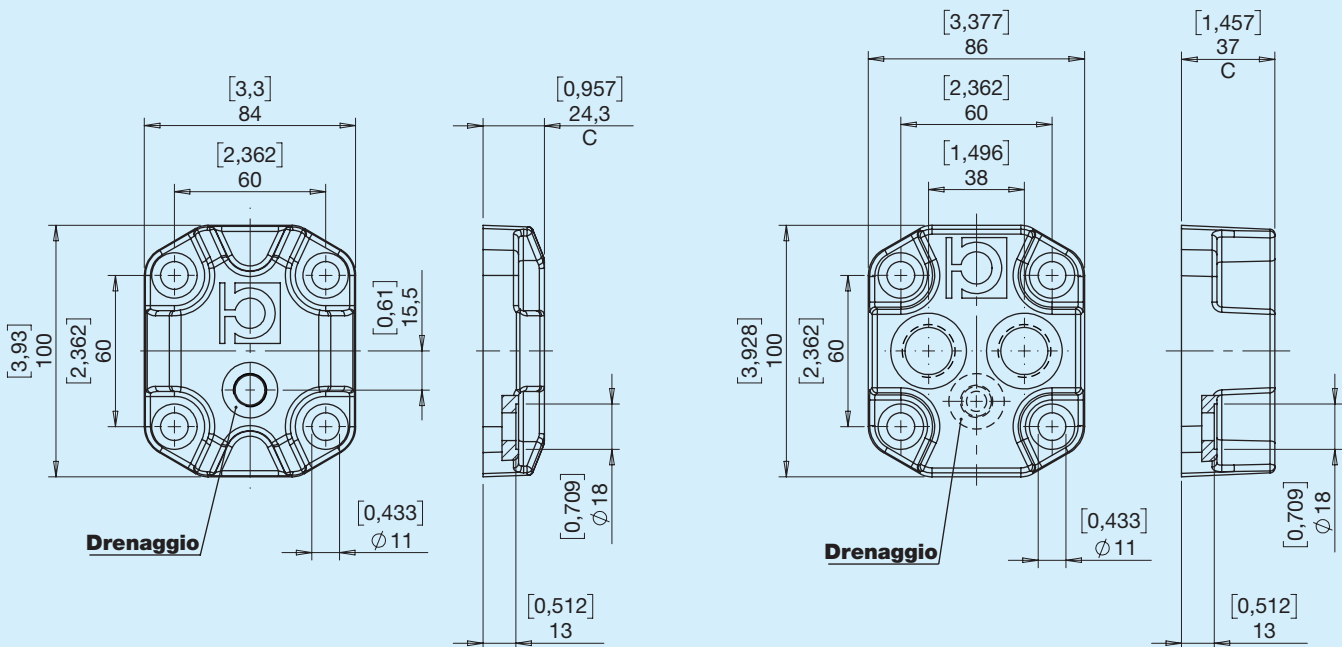
## ST Aluminium

Standard version

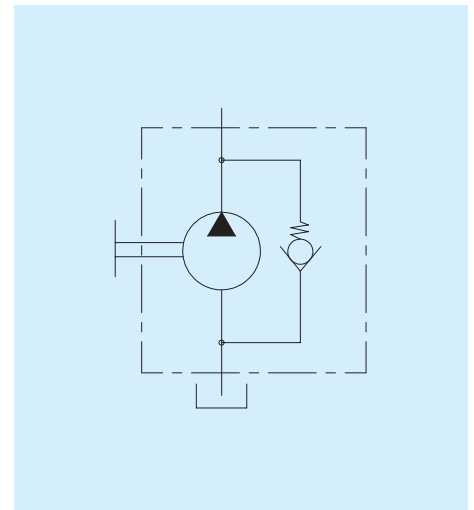
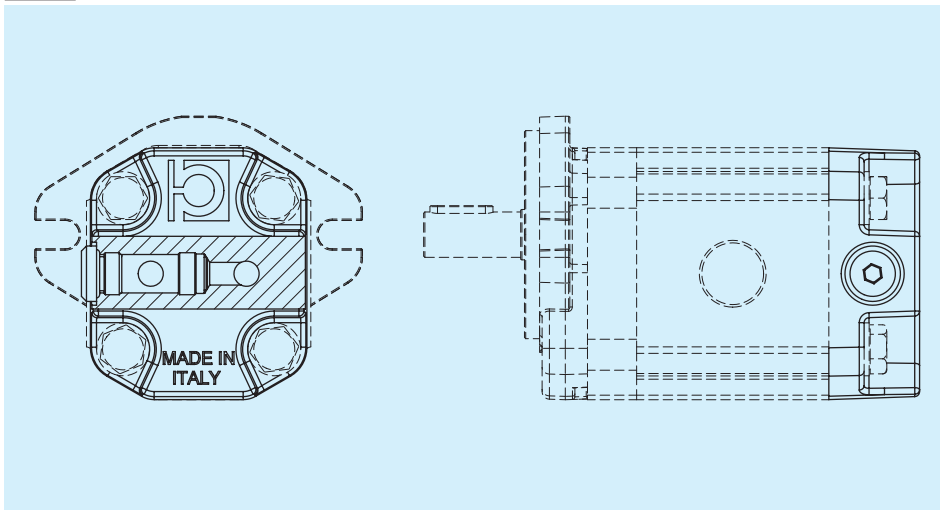


## SG Cast iron

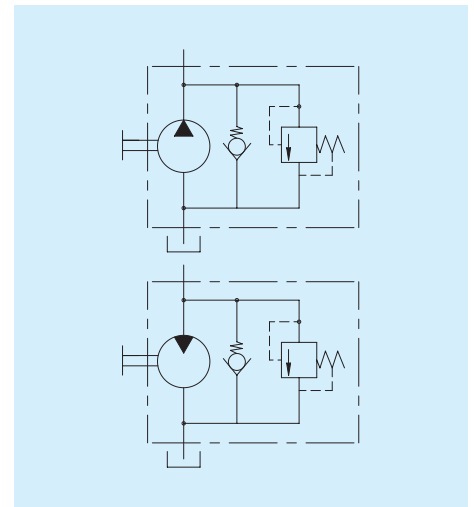
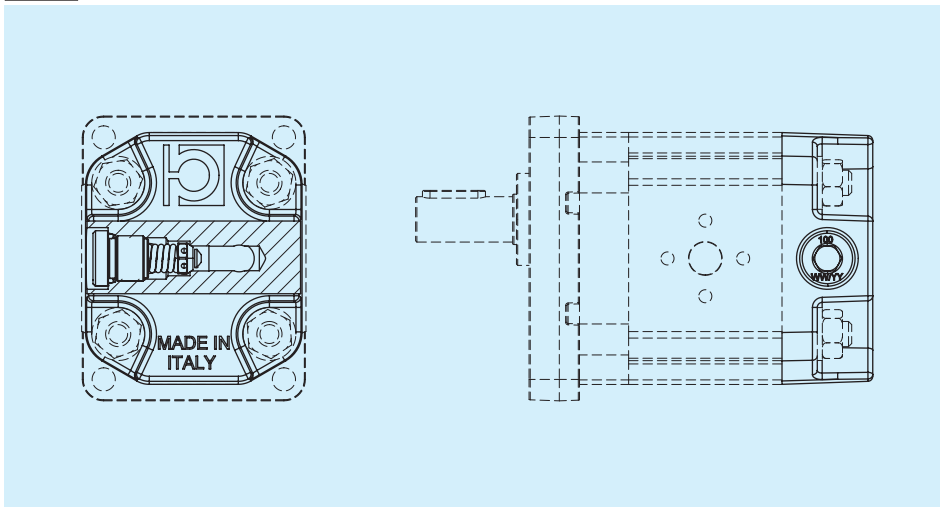
Standard version



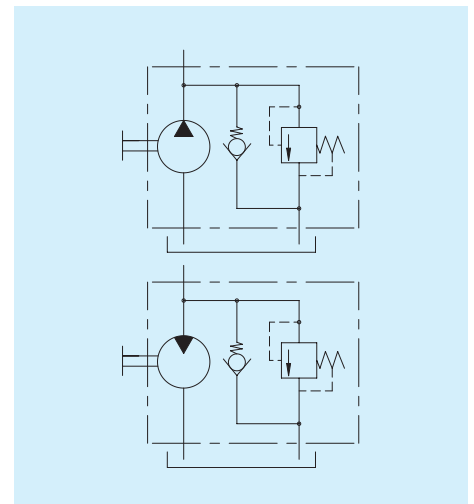
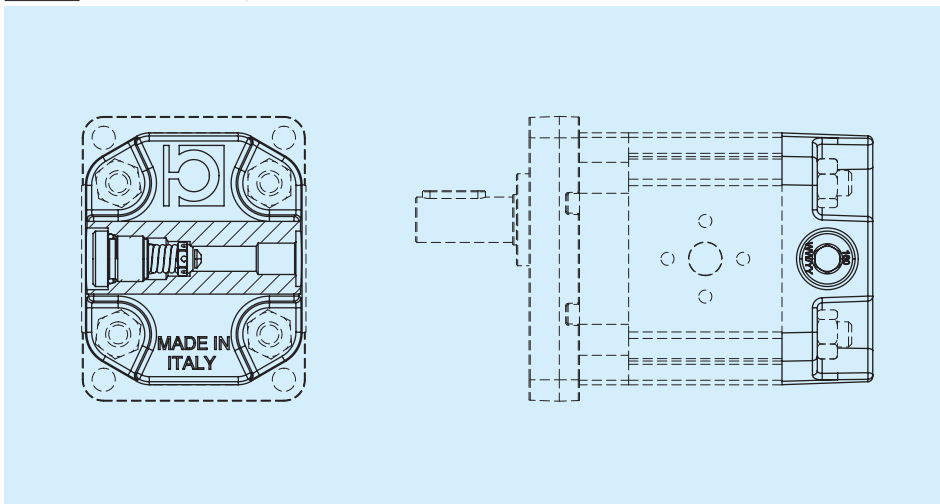
**VA** Check valve



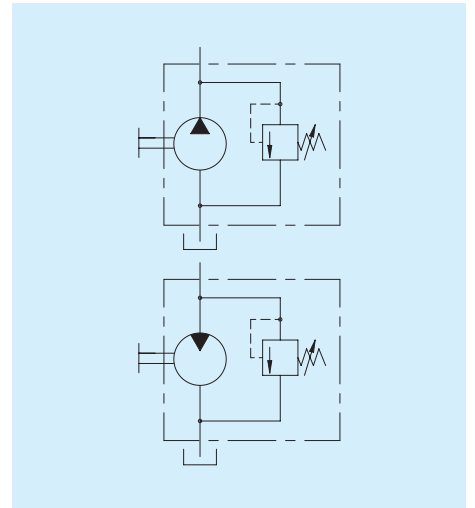
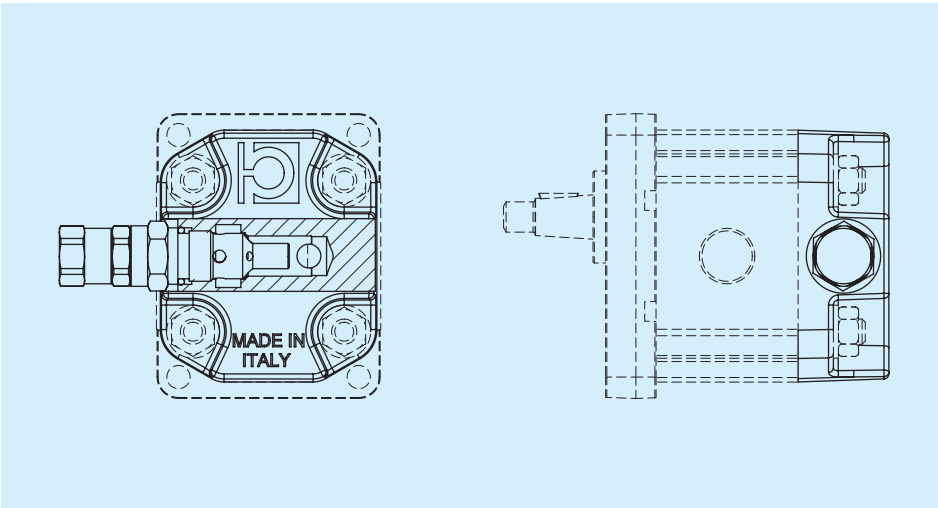
**VB** Fixed setting pressure relief valve with internal drain



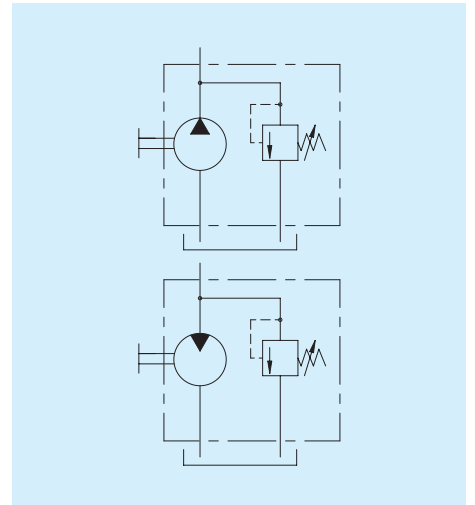
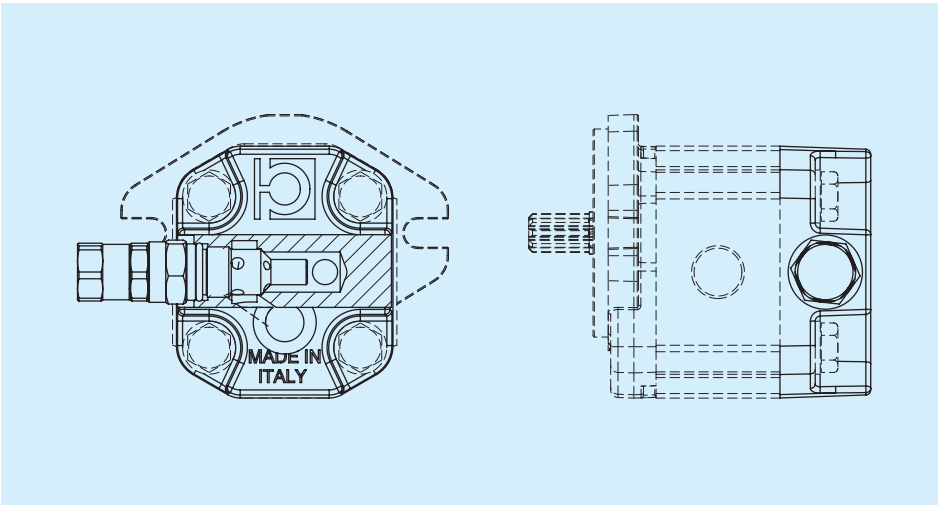
**VC** Fixed setting pressure relief valve with external drain



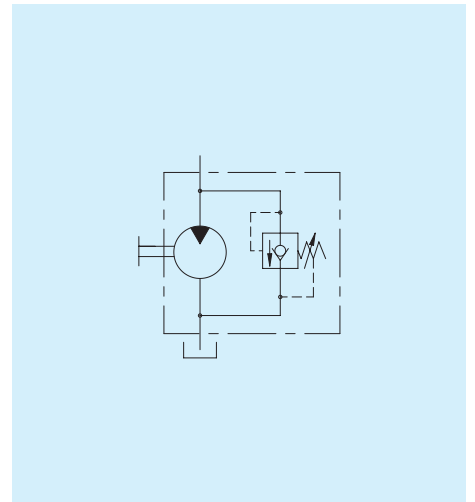
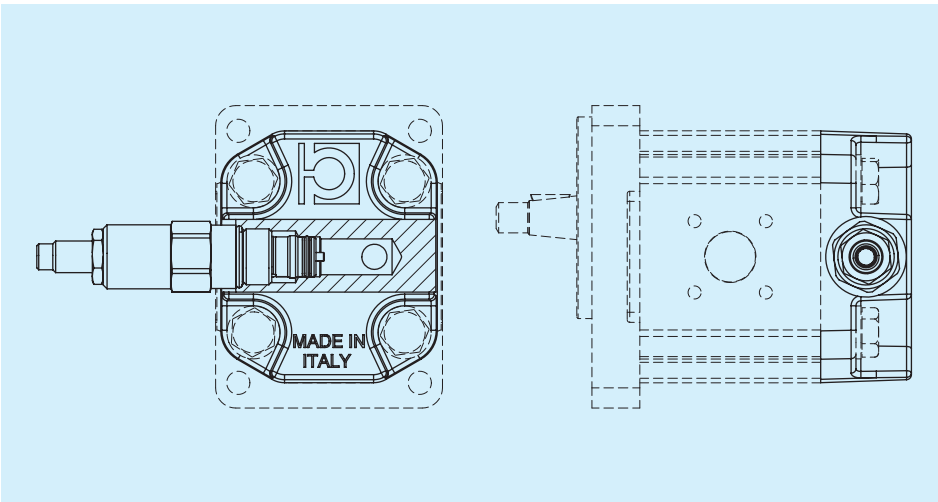
**VD** Adjustable pressure relief valve with internal drain



**VE** Adjustable pressure relief valve with external drain

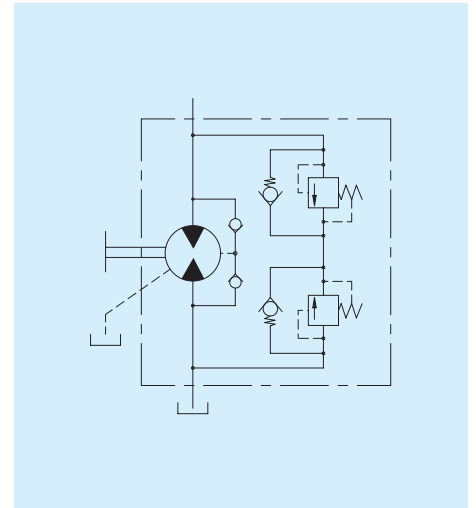
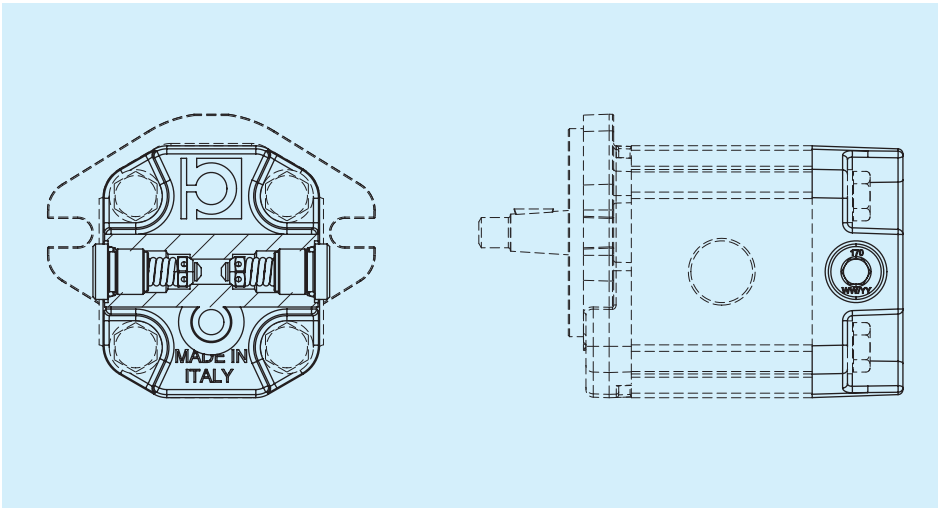


**VT** Adjustable max. pressure valve with internal drain with anti-cavitation





Double fixed setting max. pressure valve with internal drain and anti-cavitation check valve with external drain



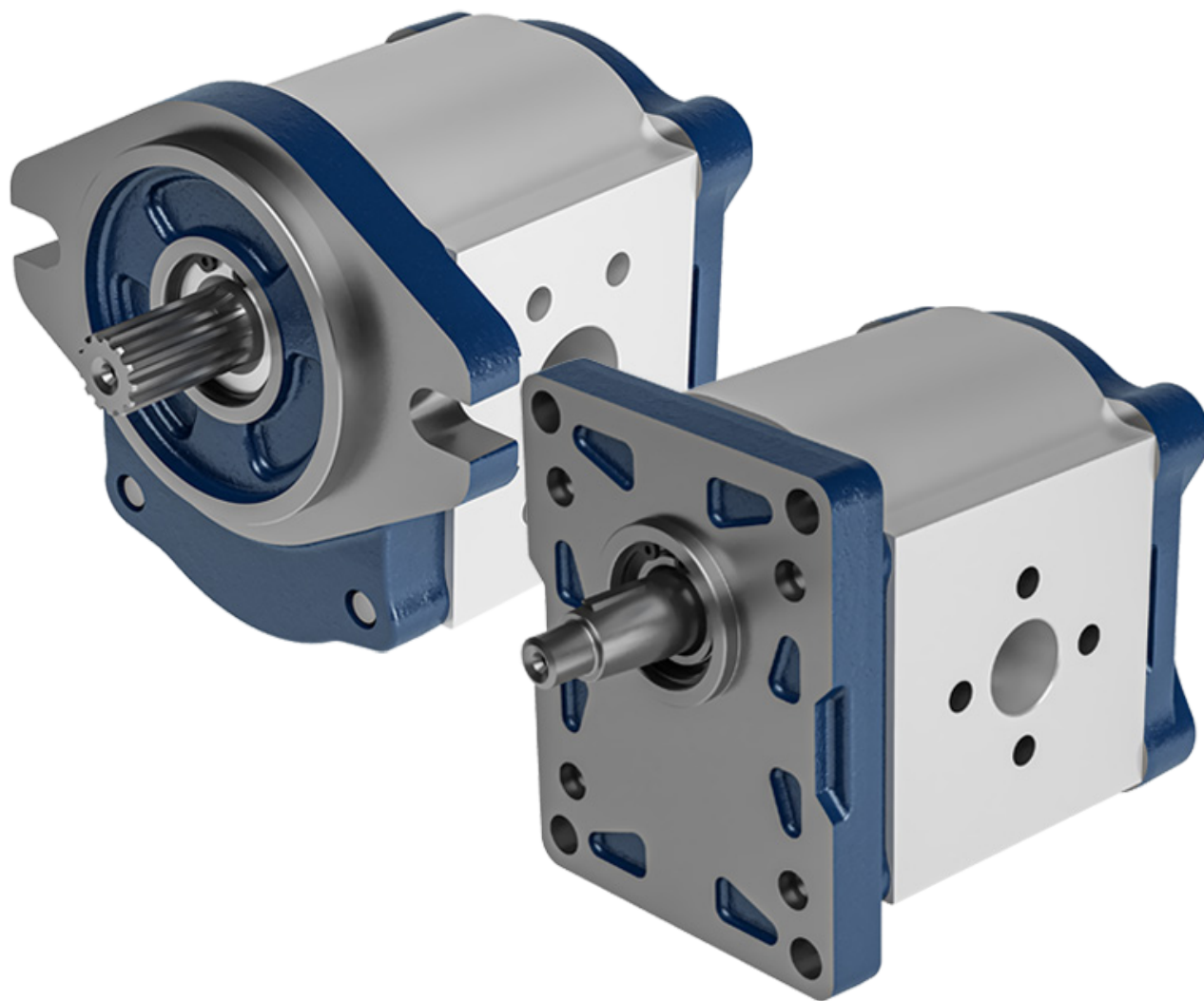
For more information, please contact the technical sales department

For pressure relief valves, please indicate the setting

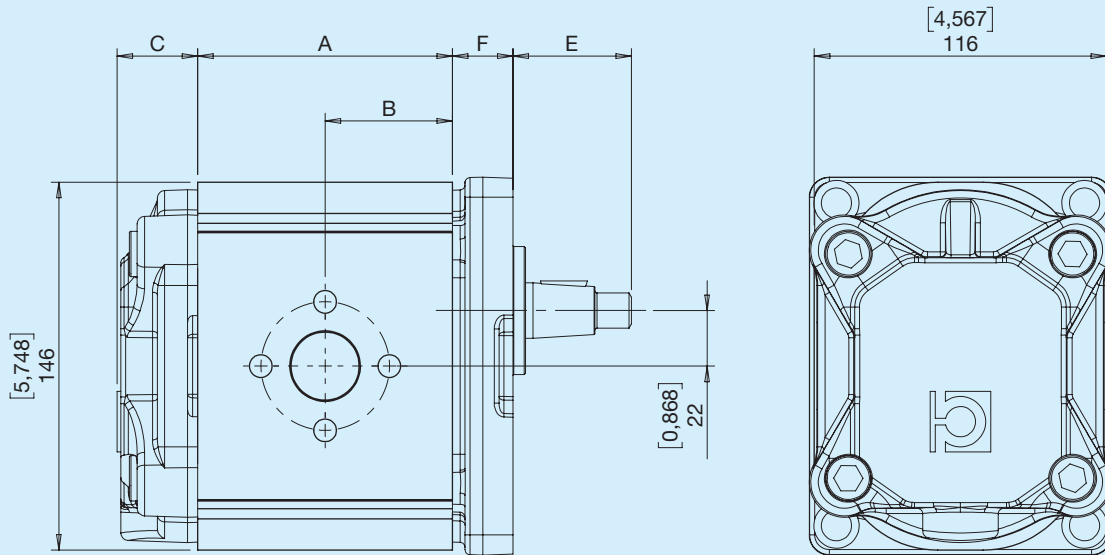
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
<b>HPL</b>																			
<b>Series</b>																			
<b>PA2</b> Gear pump Group 2			<b>MA2</b> Gear motor Group 2																
<b>Displacement</b>																			
<b>05</b>					<b>11</b>					<b>20</b>					<b>40</b>				
<b>06</b>					<b>14</b>					<b>26</b>					<b>34</b>				
<b>08</b>					<b>17</b>					<b>34</b>									
<b>Direction of rotation</b>																			
<b>S</b> Anti-clockwise/left					<b>D</b> Clockwise/right					<b>H</b> Bidirectional internal drainage (with cast iron flange/cover only)					<b>B</b> Bidirectional rear external drainage				
<b>Front flanges - Shafts</b>																			
<b>LL</b> European in cast iron - Tapered (1:8)				<b>NM</b> German - Tapered (1:5)				<b>QP</b> SAE A 2 cast iron holes - Round SAE A				<b>SX</b> SAE A 2 holes - Splined SAE A 11T							
<b>LN</b> European in cast iron - European round D15				<b>NU</b> German - Splined DIN 5482				<b>QV</b> SAE A 2 cast iron holes - Splined SAE A 9T				<b>TY</b> SAE B 2 cast iron holes - Splined SAE B 13T *							
<b>LU</b> European in cast iron - Splined DIN 5482				<b>OM</b> German D50 2 holes RH - Tapered (1:5)				<b>QX</b> SAE A 2 cast iron holes - Splined SAE B 11T				<b>VM</b> German in cast iron - Tapered (1:5)							
<b>ML</b> European - Tapered (1:8)				<b>OU</b> German D50 2 holes RH - Splined DIN 5482, German vers.				<b>RZ</b> German D52 - Front tooth				<b>VU</b> German in cast iron - Splined DIN 5482, German vers.							
<b>MN</b> European - European round D15				<b>PM</b> German D50 2 holes LH - Tapered (1:5)				<b>SP</b> SAE A 2 holes - Round SAE A											
<b>MU</b> European - Splined DIN 5482				<b>PU</b> German D50 2 holes LH - Splined DIN 5482, German vers.				<b>SV</b> SAE A 2 holes - Splined SAE A 9T											
<b>I1</b> European flange - Round D18				<b>I3</b> SAE A flange - Round D18				<b>IB</b> German flange in cast iron - Round D22				<b>IS</b> Special flange - Round D25.40							
<b>I2</b> German flange - Tapered (1:5)				<b>I7</b> European flange - Tapered (1:8)				<b>IC</b> German flange in cast iron - Tapered (1:5)											
<b>B1</b> Centring D80 - Tapered (1:5)				<b>C3</b> Centring D50.80 - Tapered (1:8)				<b>C5</b> Centring D36.50 - Tapered (1:8)											
<b>B3</b> Centring D80 - Round D22				<b>C4</b> Centring D50.80 - Round D22				<b>C6</b> Centring D36.50 - Round D18											
<b>IN - Inlet ports</b>																			
... See tables Ports and Combinations																			
<b>OUT - Output ports</b>																			
... See tables Ports and Combinations																			
<b>Seals</b>																			
<b>B</b> NBR Pump					<b>R</b> NBR Motor / Bid. pump High pressure pump					<b>V</b> Viton Pump					<b>W</b> Viton Motor / Bid. pump High pressure pump				
<b>Covers</b>																			
<b>ST</b> Standard				<b>VB</b> Fixed setting pressure relief valve with internal drain				<b>VE</b> Adjustable pressure relief valve with external drain											
<b>SG</b> Cast iron version				<b>VC</b> Fixed setting pressure relief valve with external drain				<b>VT</b> Adjustable max. pressure valve with internal drain with anti-cavitation											
<b>VA</b> Check valve				<b>VD</b> Adjustable pressure relief valve with internal drain				<b>W</b>											



## HPL Series Group 3

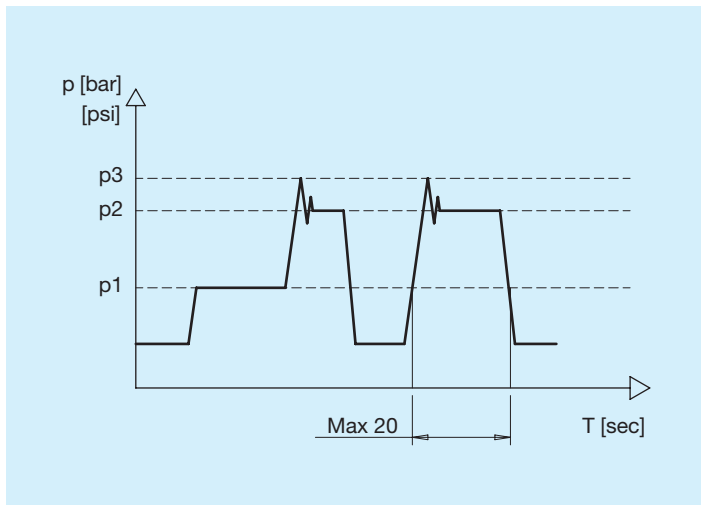


Before use, carefully read the GENERAL INSTRUCTIONS FOR USE OF GEAR PUMPS AND MOTORS.



C - See section on covers E - See section on shafts F - See section on flanges

## Pressure definition



$p_1$	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 pressure of $V_{max}$

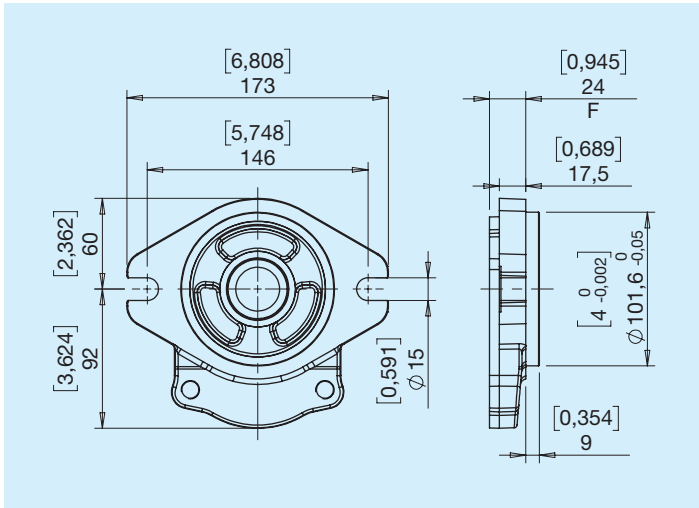
## Pump dimensions and technical data

HPLPA3	Nominal displacement		Continuous pressure		Intermittent pressure		Peak pressure		Rotational speed		Weight		A		B	
	cm <sup>3</sup>	in <sup>3</sup>	bar	psi	bar	psi	bar	psi	min <sup>-1</sup>	min <sup>-1</sup>	kg	lbs	mm	in	mm	in
<b>22</b>	21.50	1.31	220	3191	250	3626	310	4496	3000	700	6.20	13.67	81.07	3.192	40.5	1.594
<b>26</b>	26.00	1.59	210	3046	250	3626	300	4351	3000	700	6.20	13.67	84.07	3.310	42.0	1.654
<b>31</b>	30.50	1.86	210	3046	250	3626	280	4061	3000	700	6.20	13.67	87.07	3.428	43.5	1.714
<b>36</b>	36.00	2.20	210	3046	250	3626	280	4061	3000	700	6.50	14.33	91.07	3.585	45.5	1.793
<b>41</b>	41.50	2.53	210	3046	250	3626	280	4061	3000	700	7.20	15.87	95.07	3.743	47.5	1.870
<b>47</b>	46.50	2.84	230	3336	250	3626	270	3916	3000	700	7.20	15.87	98.07	3.861	49.0	1.929
<b>51</b>	50.50	3.08	200	2901	220	3191	270	3916	3000	700	7.20	15.87	101.07	3.979	50.5	1.990
<b>56</b>	55.50	3.39	180	2611	190	2756	230	3336	2500	600	7.40	16.31	104.57	4.117	52.3	2.059
<b>61</b>	61.00	3.72	150	2175	170	2466	200	2901	2500	600	7.60	16.76	108.57	4.274	54.3	2.137
<b>73</b>	72.00	4.39	140	2031	160	2321	180	2611	2500	600	8.00	17.64	116.07	4.570	58.0	2.285
<b>90</b>	88.00	5.37	110	1595	120	1740	170	2466	2500	600	8.60	18.96	127.07	5.003	63.5	2.501

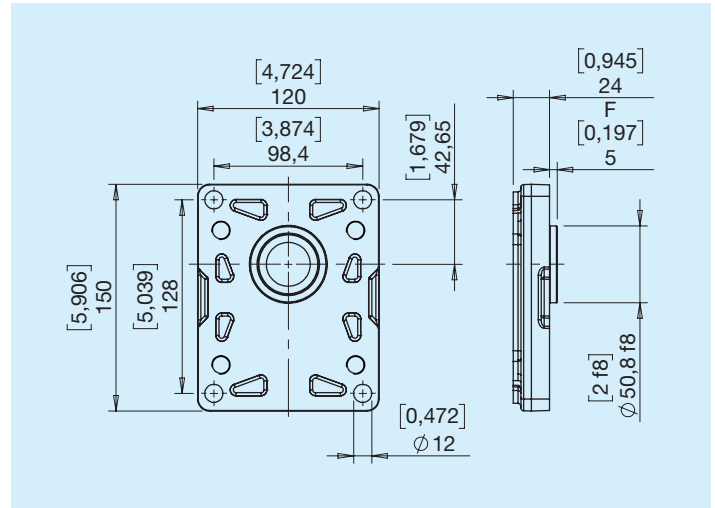
## Motor dimensions and technical data

HPLMA3	Nominal displacement		Continuous pressure		Intermittent pressure		Peak pressure		Rotational speed		Weight		A		B	
	cm <sup>3</sup>	in <sup>3</sup>	bar	psi	bar	psi	bar	psi	min <sup>-1</sup>	min <sup>-1</sup>	kg	lbs	mm	in	mm	in
<b>22</b>	21.50	1.31	220	3191	250	3626	310	4496	3500	700	6.20	13.67	81.07	3.192	40.5	1.594
<b>26</b>	26.00	1.59	210	3046	250	3626	300	4351	3500	700	6.20	13.67	84.07	3.310	42.0	1.654
<b>31</b>	30.50	1.86	210	3046	250	3626	280	4061	3500	700	6.20	13.67	87.07	3.428	43.5	1.714
<b>36</b>	36.00	2.20	210	3046	250	3626	280	4061	3500	700	6.50	14.33	91.07	3.585	45.5	1.793
<b>41</b>	41.50	2.53	210	3046	250	3626	280	4061	3500	700	7.20	15.87	95.07	3.743	47.5	1.870
<b>47</b>	46.50	2.84	230	3336	250	3626	270	3916	3500	700	7.20	15.87	98.07	3.861	49.0	1.929
<b>51</b>	50.50	3.08	200	2901	220	3191	270	3916	3500	700	7.20	15.87	101.07	3.979	50.5	1.990
<b>56</b>	55.50	3.39	180	2611	190	2756	230	3336	3000	600	7.40	16.31	104.57	4.117	52.3	2.059
<b>61</b>	61.00	3.72	150	2175	170	2466	200	2901	3000	600	7.60	16.76	108.57	4.274	54.3	2.137
<b>73</b>	72.00	4.39	140	2031	160	2321	180	2611	3000	600	8.00	17.64	116.07	4.570	58.0	2.285

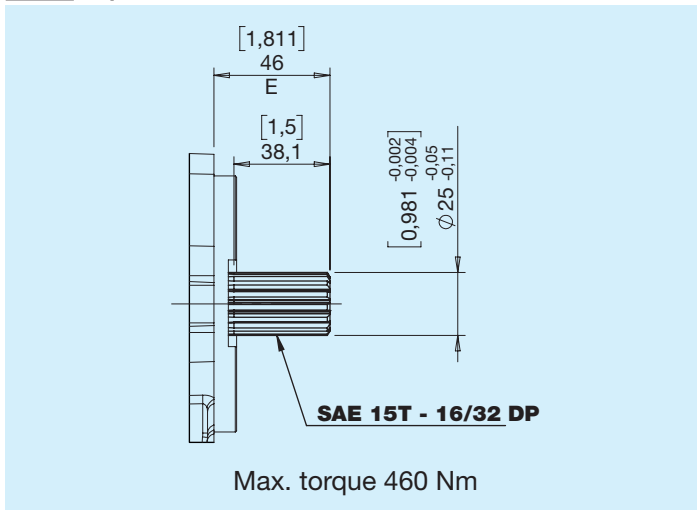
## 2 SAE B 2 holes



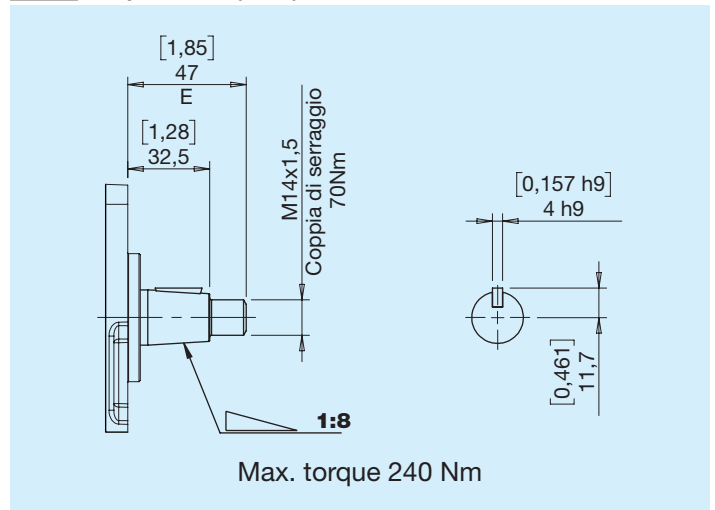
## 3 European D50.8



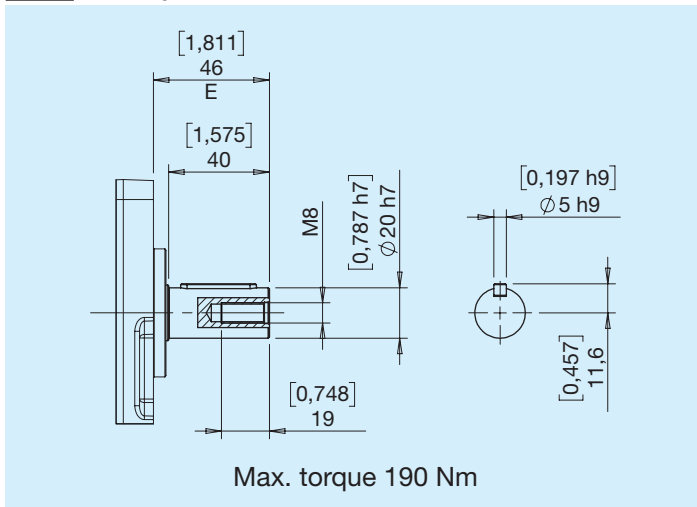
## 1 Splined SAE BB 15T



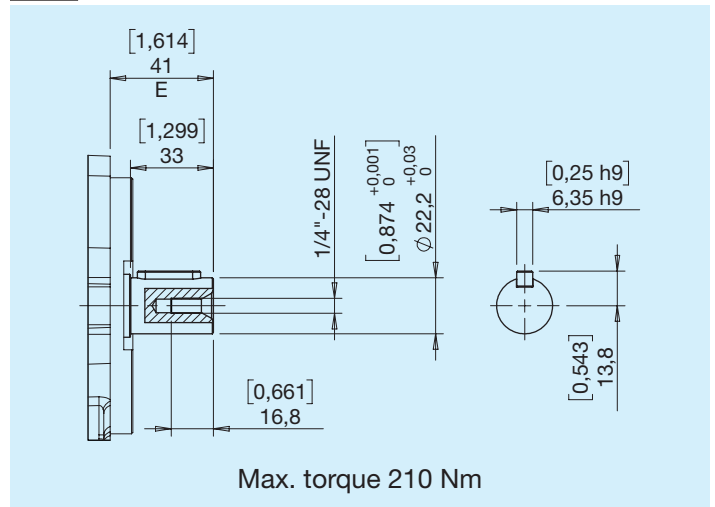
## 2 Tapered (1:8)



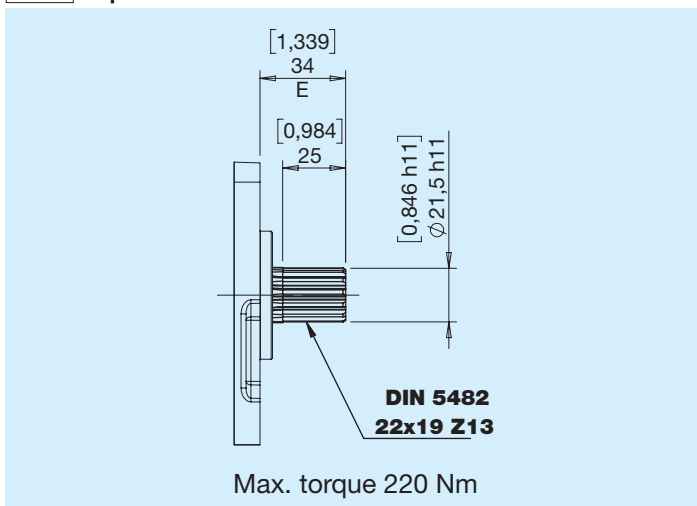
## 4 European round



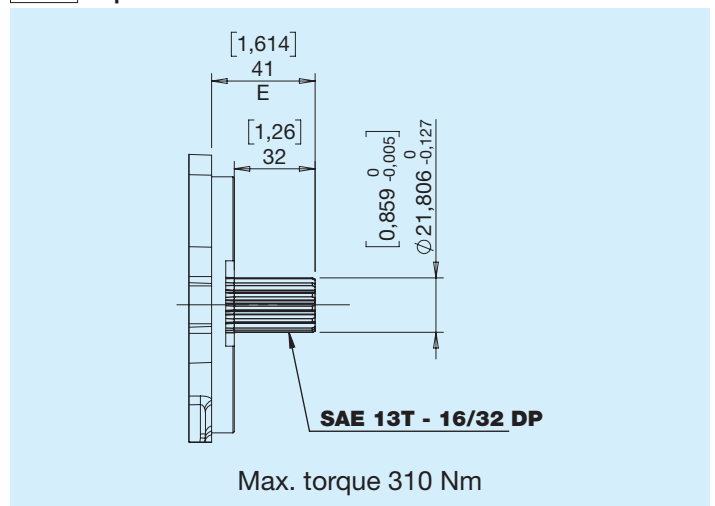
## 6 Round SAE B



## 7 Splined DIN 5482

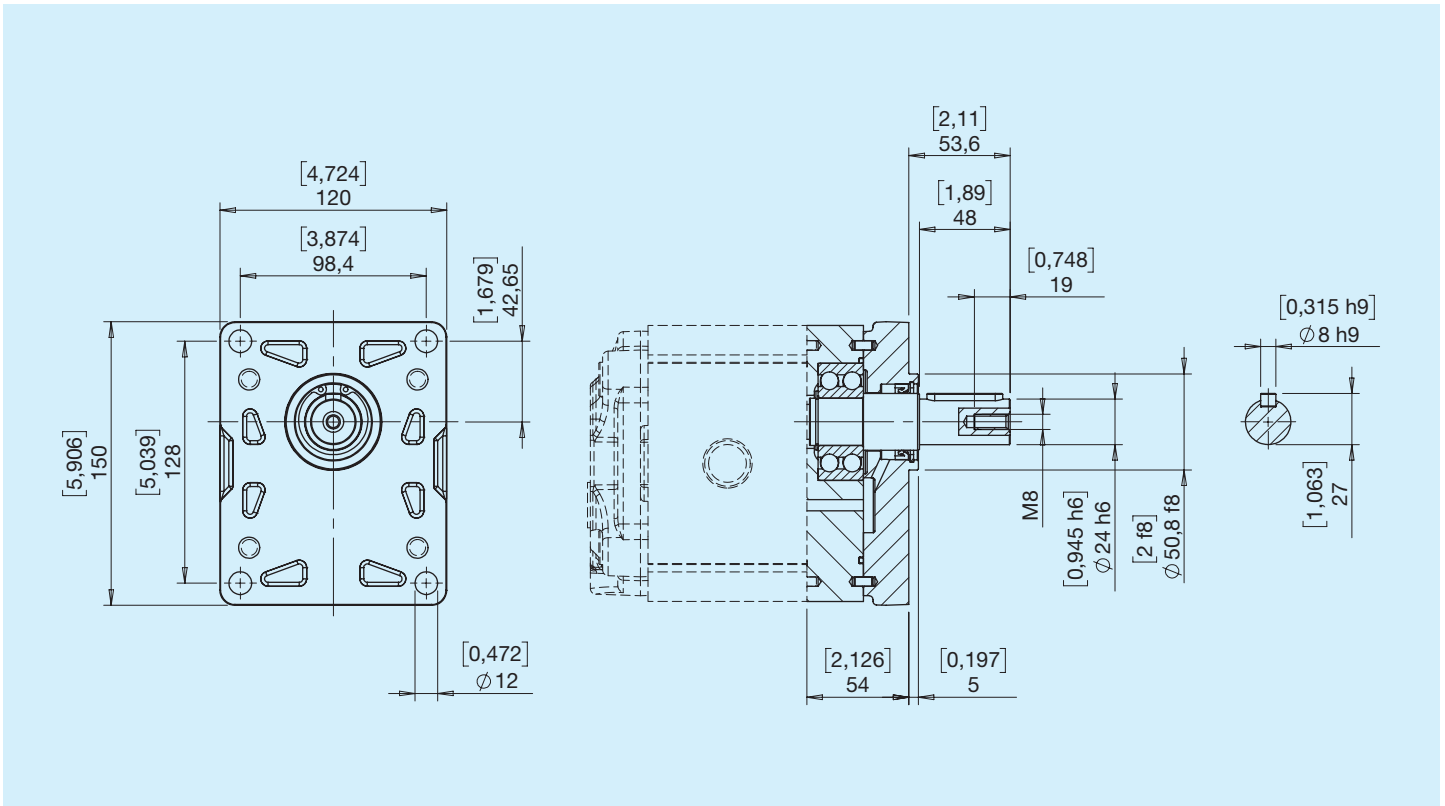


## 9 Splined SAE B 13T

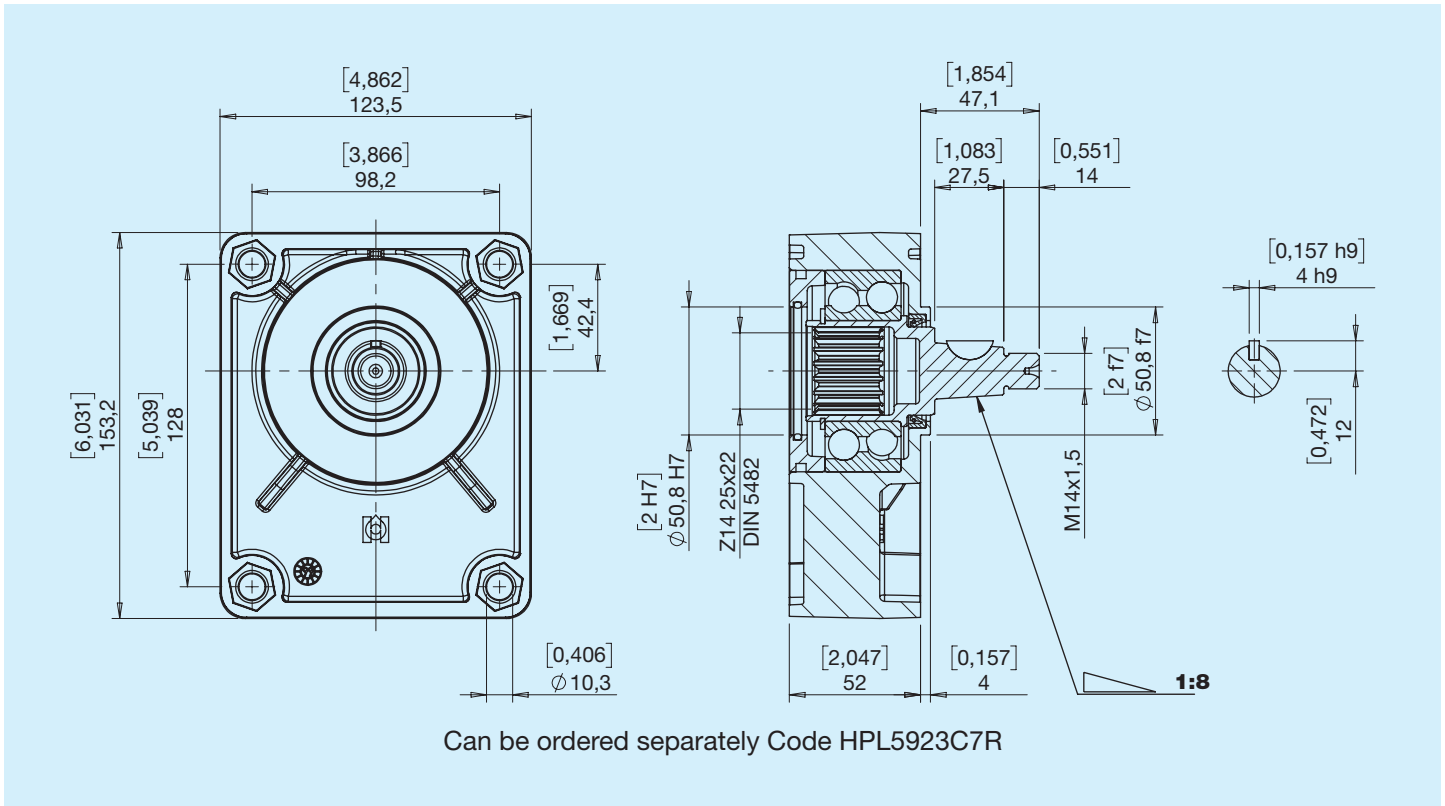


Shafts	Flanges	
	2	3
1	•	
2		•
4		•
6	•	
7		•
9	•	

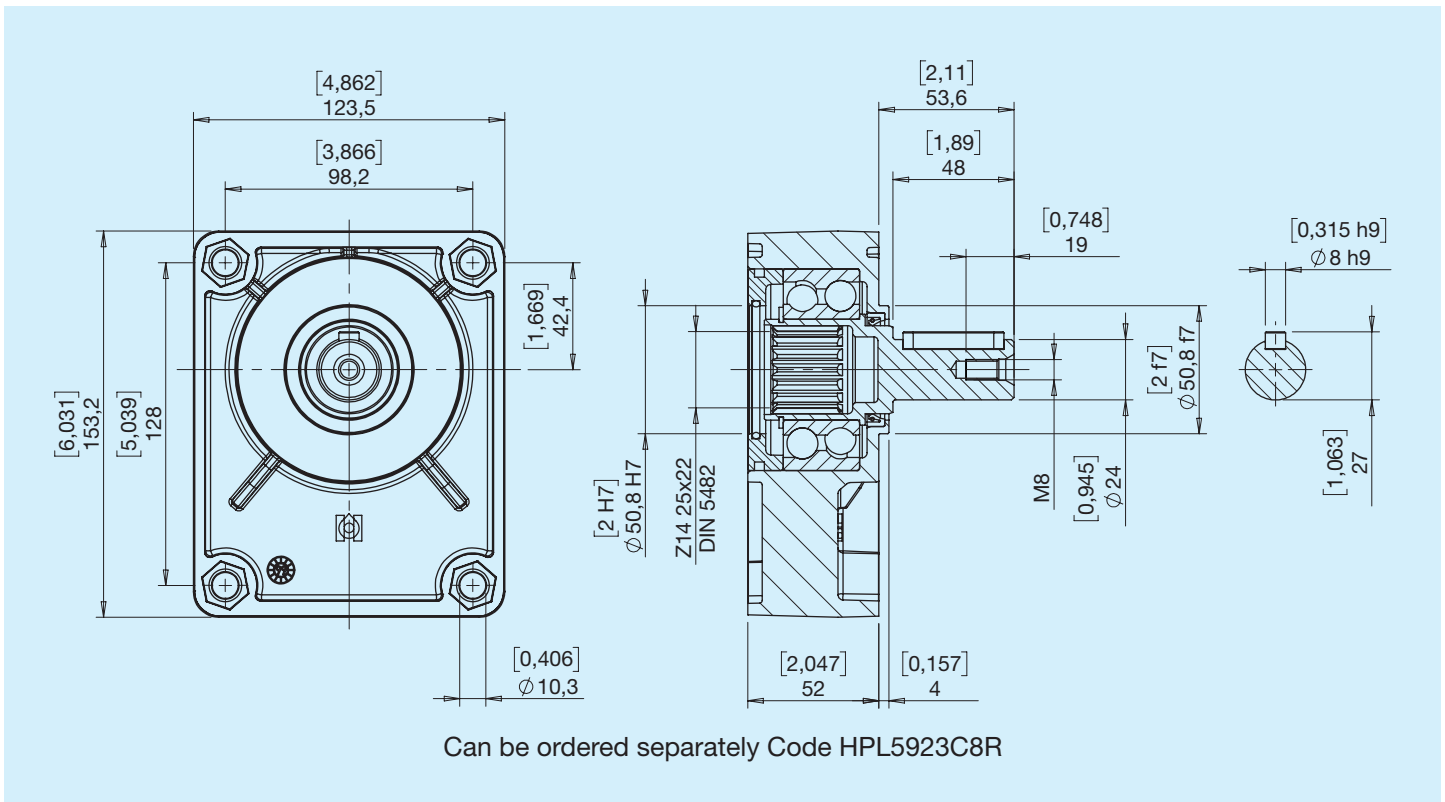
## 16 European flange D50.8 round shaft D24



## C7 Centring D50.8 tapered shaft (1:8)

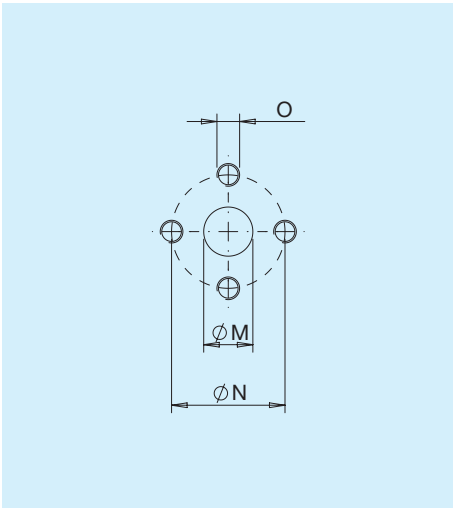


## C8 Centring D50.8 round shaft D24



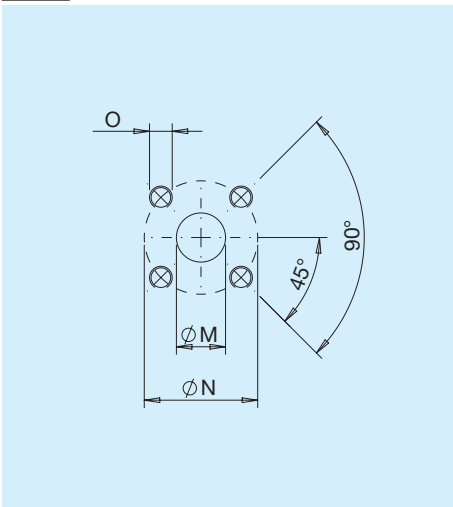


## E Lateral



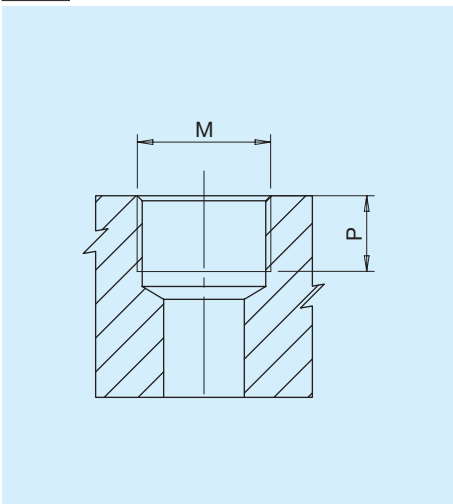
Type	M		N		O	
	mm	in	mm	in		Nm
E5	20	0.79	40	1,57	M8	17
E7	27	1,06	51	2,01	M10	38
E8	34	1,34	62	2,44	M10	38

## X Lateral



Type	M		N		O	
	mm	in	mm	in	mm	in
X7	19	0.75	55	2,17	M8	15
X8	27	1,06	55	2,17	M8	15

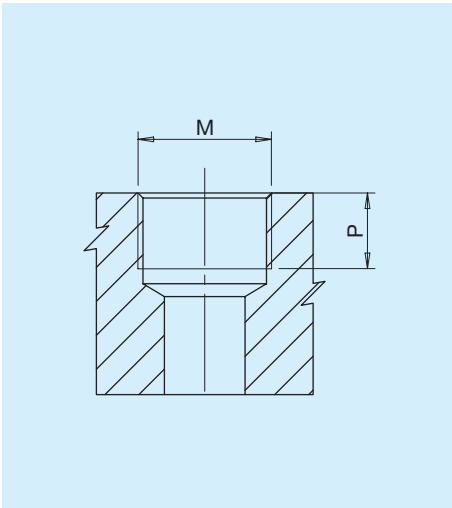
## G Lateral / Drain



Type	M	Nm	P	
			mm	in
G3*	PORT ISO 1179-1-G 3/8	38	12	0.47
G6	Port ISO 1179-1 - G 3/4	90	15	0.59
G7	PORT ISO 1179-1-G 1	160	21	0,83
G8	PORT ISO 1179-1-G 1 1/4	200	21	0,83

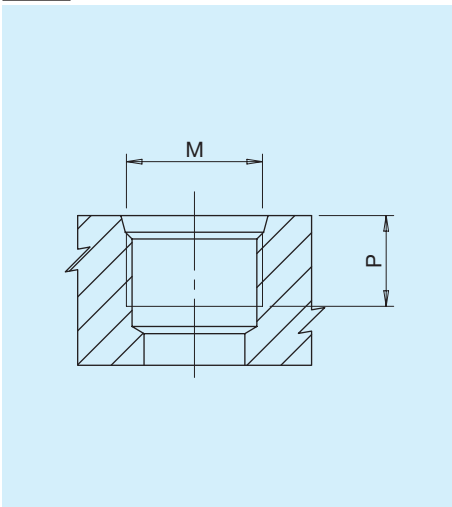
\*Drain

## T Rear



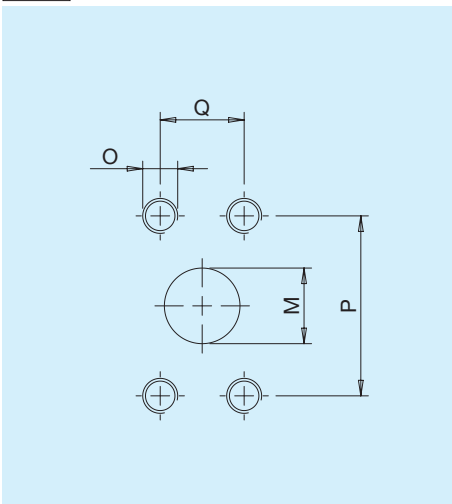
Type	M		P		
	mm	in	mm	in	
T6	PORT ISO 1179-1-G3/4		90	19	0,75

## U Lateral / Drain



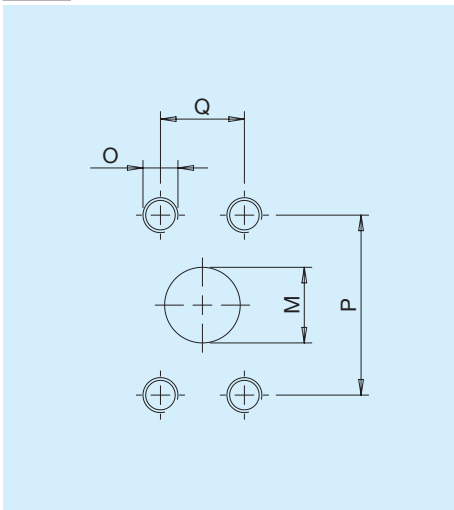
Type	Dim.	M		P		
		mm	in	mm	in	
U6	3/4'	PORT ISO 11926-1 - 1 1/16-12		90	20	0,79
U7	1'	PORT ISO 11926-1 - 1 5/16-12		160	20	0,79
U8	1 1/4'	PORT ISO 11926-1 - 1 5/8-12		200	20	0,79

## N Lateral



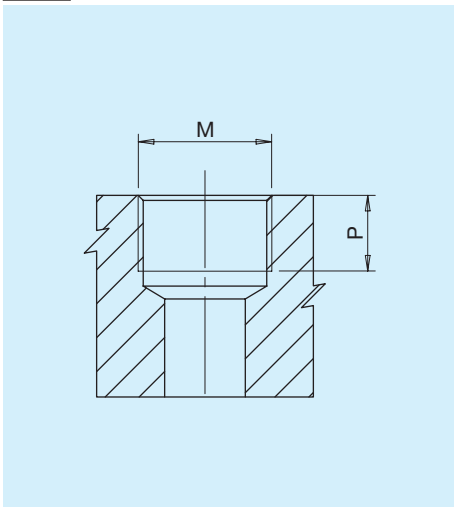
Type	Dim.	M		P		Q		O	Nm
		mm	in	mm	in	mm	in		
N6	3/4'	20	0,79	47,6	1,87	22,2	0,87	3/8-16 UNC-2B	38
N7	1'	27	1,06	52,4	2,60	26,2	1,03	3/8-16 UNC-2B	38
N8	1 1/4'	34	1,34	58,7	2,31	30,2	1,19	7/16-14 UNC-2B	45

## F Lateral



Type	Dim.	M		P		Q		O	Nm
		mm	in	mm	in	mm	in		
F6	3/4"	20	0,79	47,6	1,87	22,2	0,87	M10	38
F7	1"	25,4	1	52,4	2,60	26,2	1,03	M10	38
F8	1 1/4"	30,5	1,2	58,7	2,31	30,2	1,19	M10	38

## M Drain



Type	M	Nm	P	
			mm	in
M3*	PORT ISO 6149 - 1 - M16x1,5	35	14	0,55

\*Drain

## Combination of ports/flanges

Ports	Flanges	
	2	3
<b>E</b>		•
<b>X</b>		•
<b>G</b>	•	•
<b>T</b>	•	•
<b>U</b>	•	
<b>N</b>	•	
<b>F</b>	•	

## Combination of round ports for one-way pumps/motors

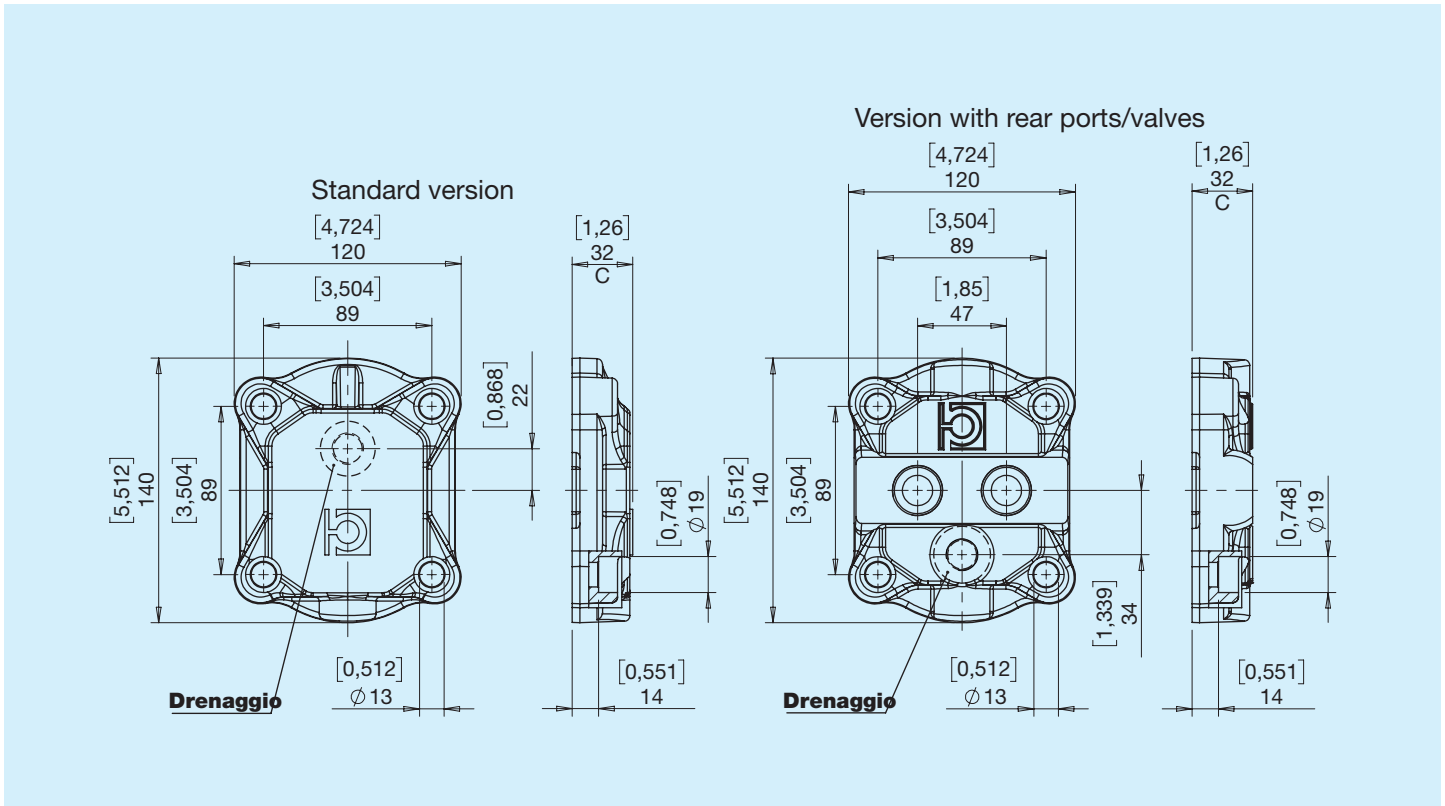
Ports	Round		
	22 26 31	36 41 47 51 56 61	73 90
	IN/OUT ports	IN/OUT ports	IN/OUT ports
<b>E</b>	E5 E5	E7 E5	E8 E7
<b>X</b>	X8 X7	X8 X7	X8 X7
<b>G</b>	G6 G6	G7 G6	G8 G7
<b>T</b>	T6 T6	-	-
<b>U</b>	U7 U6	U8 U7	U8 U7
<b>N</b>	N7 N6	N7 N6	N8 N7
<b>F</b>	F7 F6	F7 F6	F8 F7

## Combination of round ports for bidirectional pumps/motors

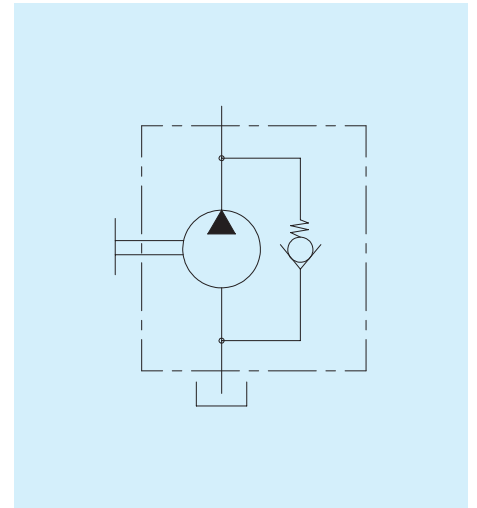
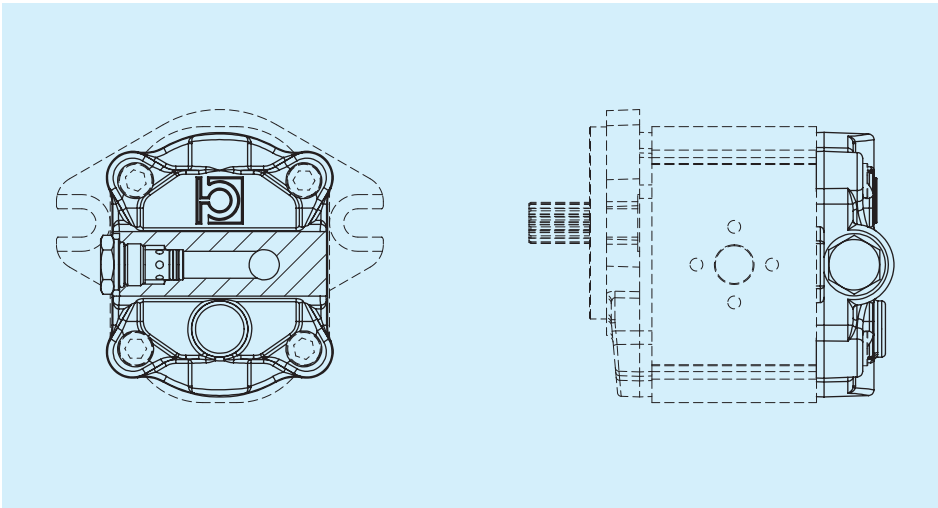
Ports	Round			
	22 26 31	36 41 47 51 56 61	73	
	IN/OUT ports	IN/OUT ports	IN/OUT ports	Drain line
<b>E</b>	E5 E5	E7 E7	E8 E8	M3
<b>X</b>	X7 X7	X8 X8	X8 X8	M3
<b>G</b>	G6 G6	G7 G7	G8 G8	G3
<b>T</b>	T6 T6	-	-	G3
<b>U</b>	U6 U6	U7 U7	U8 U8	M3
<b>N</b>	N6 N6	N7 N7	N8 N8	M3
<b>F</b>	F6 F6	F7 F7	F8 F8	M3

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

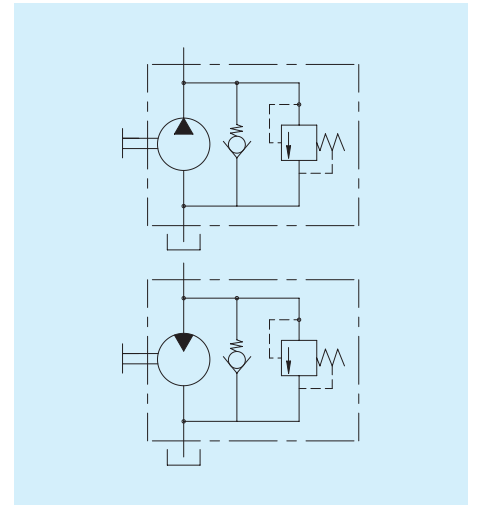
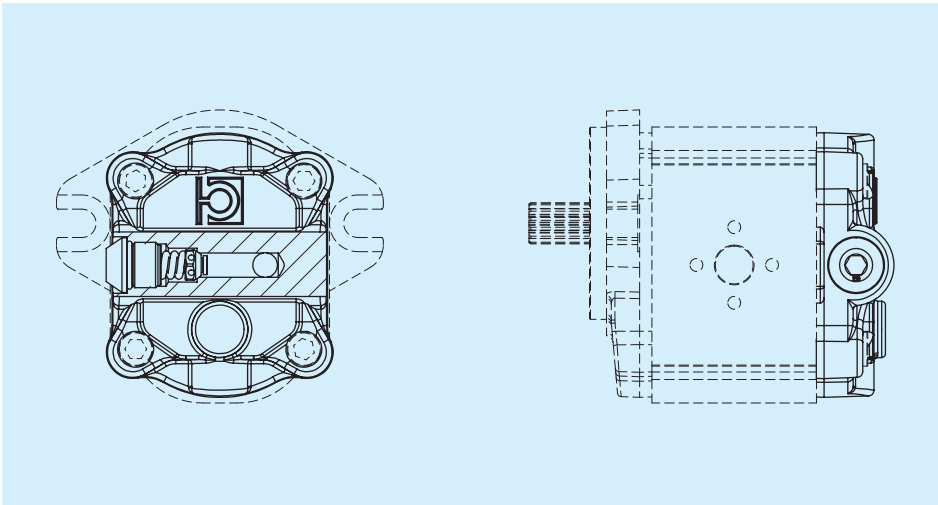
**SG** Cast iron



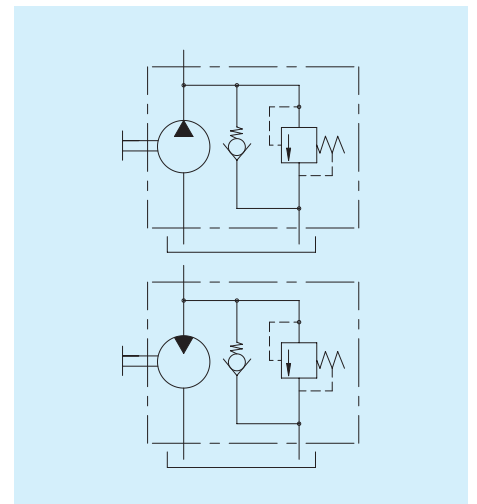
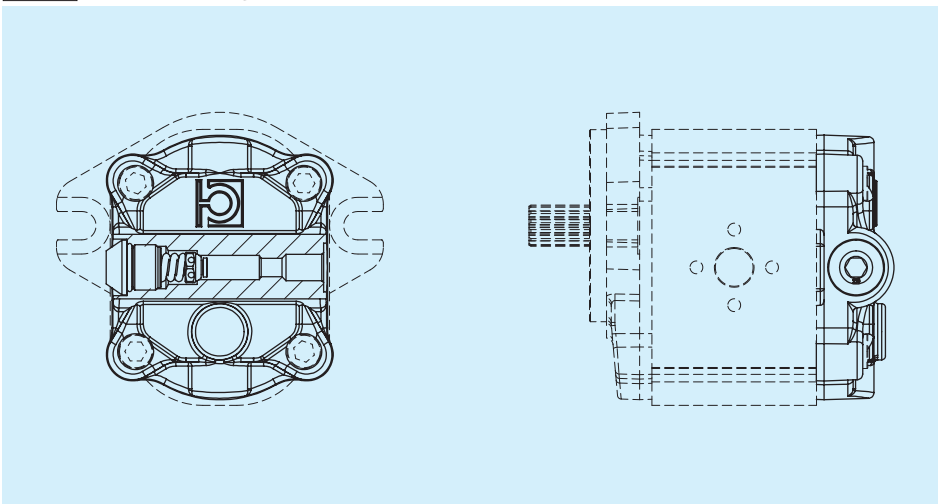
**VA** Check valve



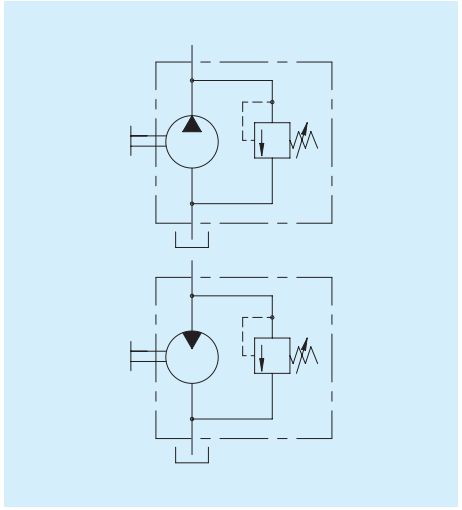
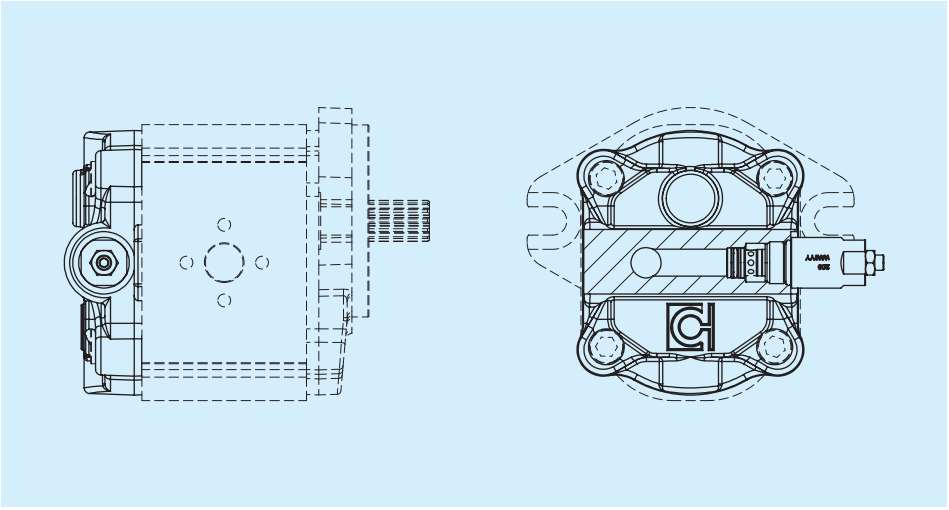
**VB** Fixed setting pressure relief valve with internal drain



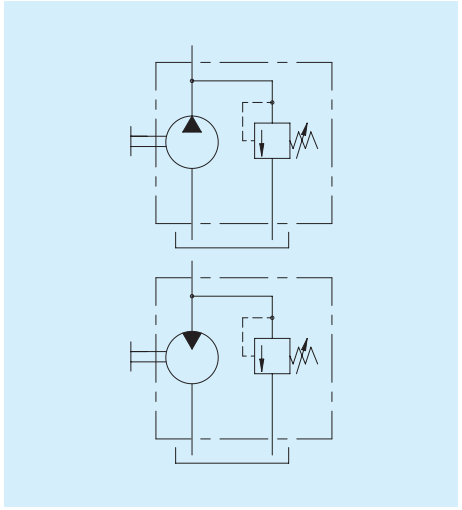
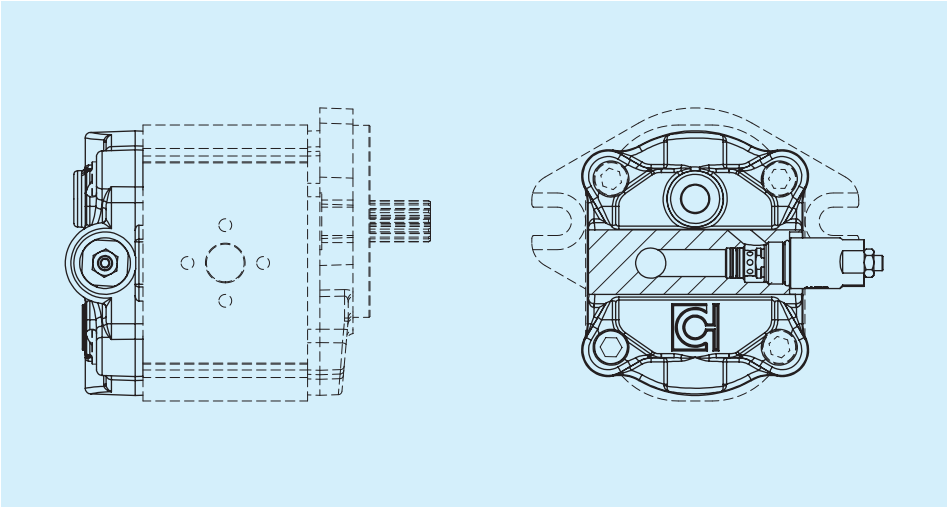
**VC** Fixed setting pressure relief valve with external drain



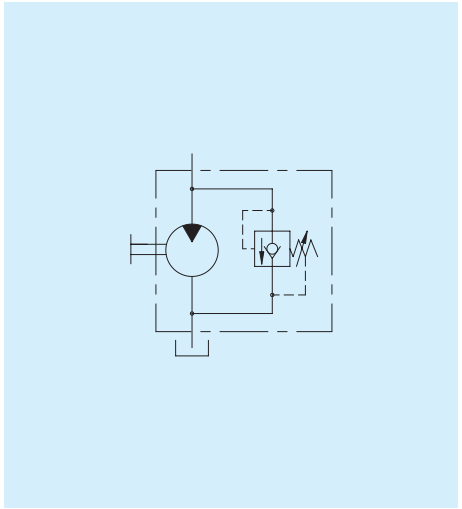
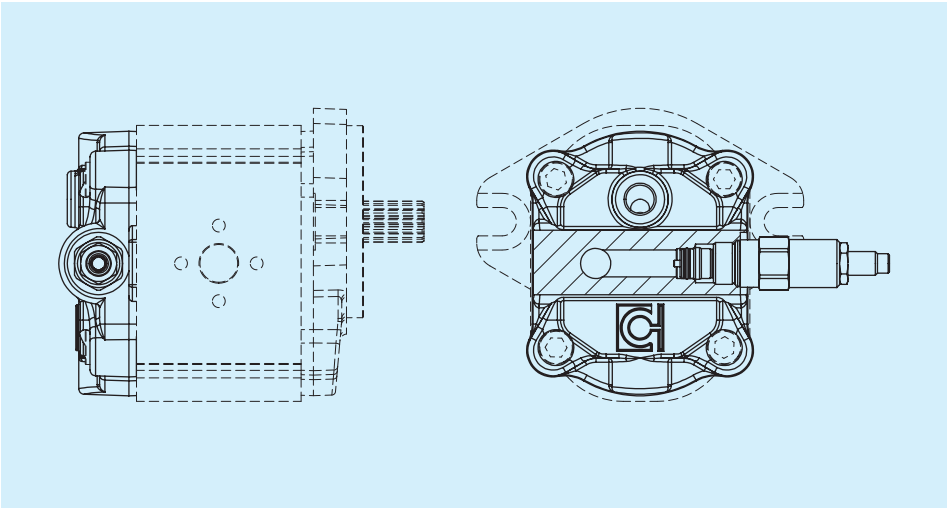
**VD** Adjustable pressure relief valve with internal drain



**VE** Adjustable pressure relief valve with external drain



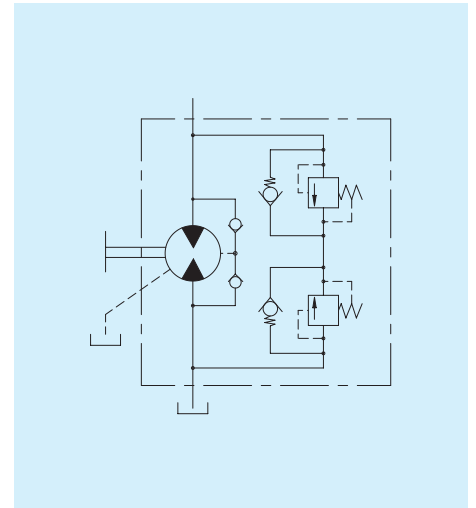
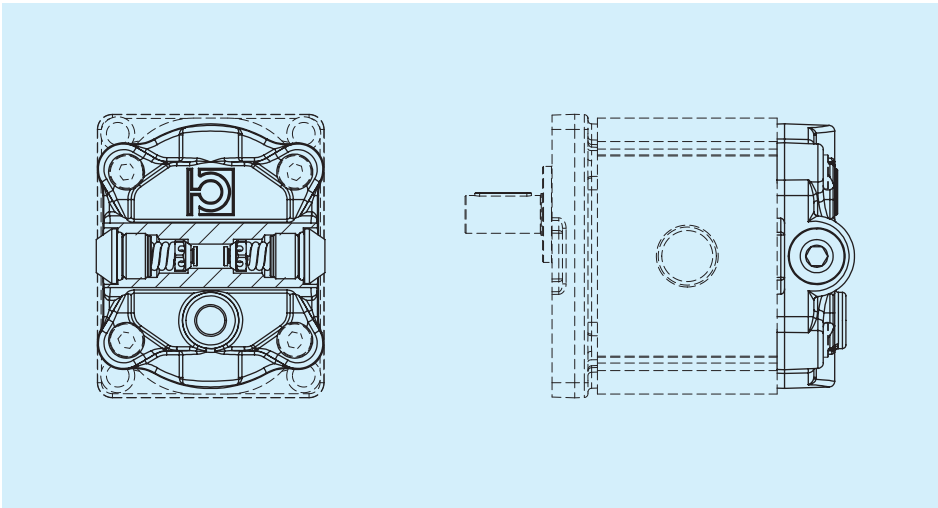
**VT** Adjustable max. pressure valve with internal drain with anti-cavitation





**VV**

Double fixed setting max. pressure valve with internal drain and anti-cavitation check valve with external drain

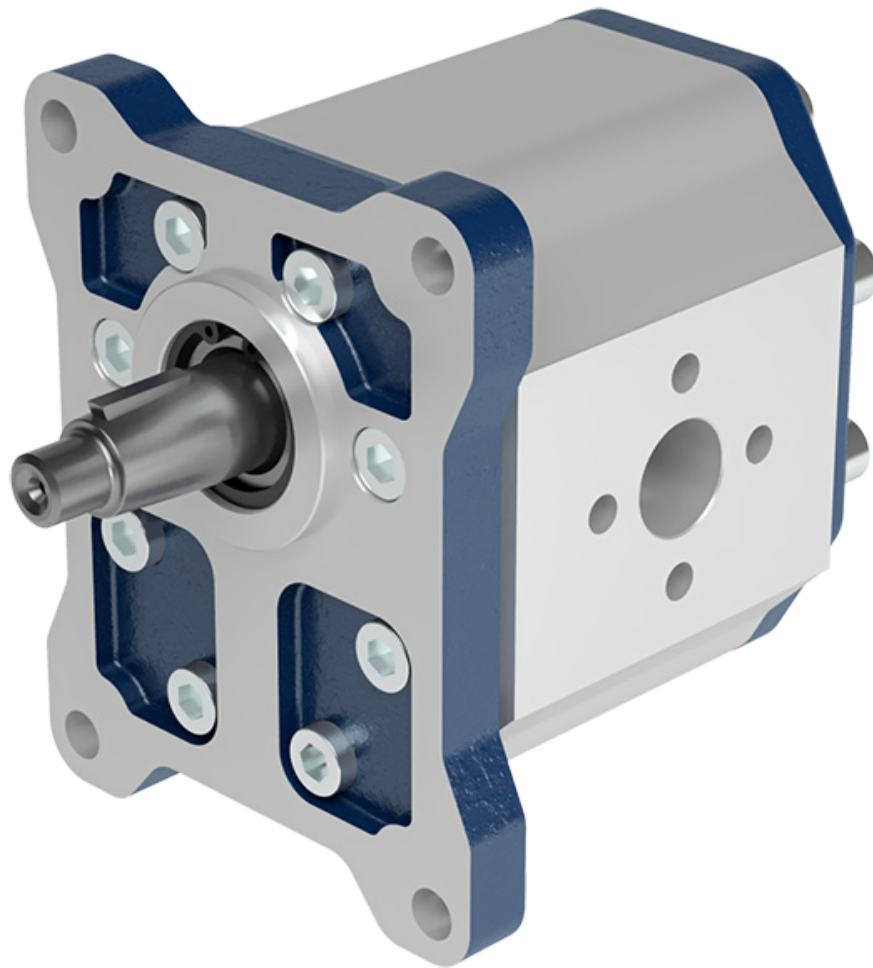


For more information, please contact the technical sales department

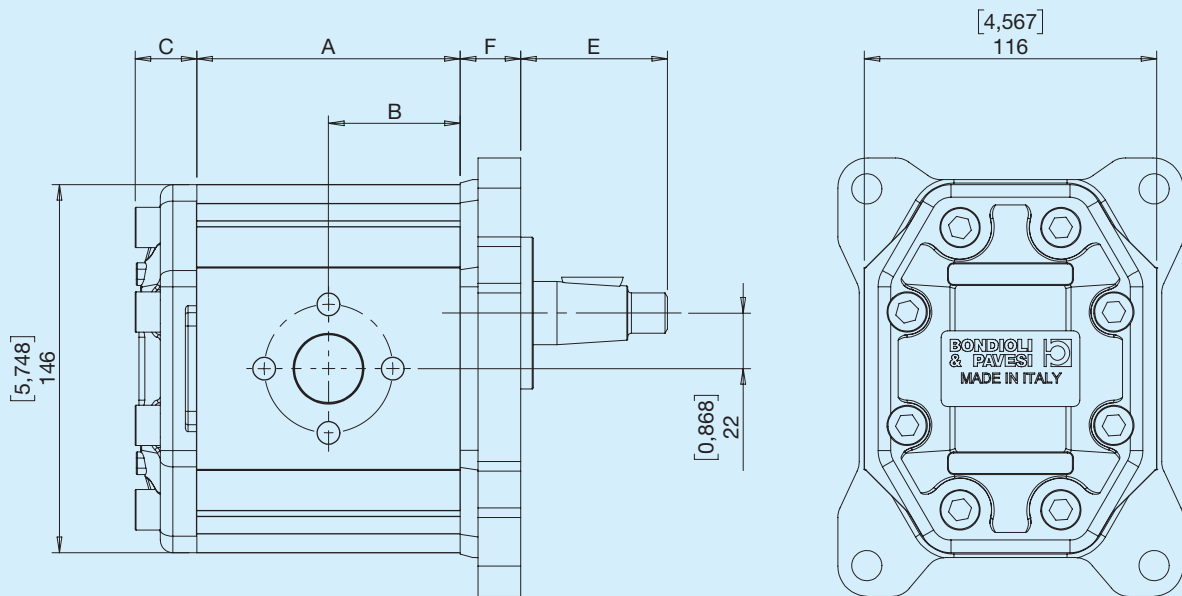
For pressure relief valves, please indicate the setting

<b>HPL</b>	1	2	3	4	5	6	7	8			9	10	11	12	13	14	15	
	1	2	3	<b>Series</b>														
				<b>PA3</b> Gear pump Group 3						<b>MA3</b> Gear motor Group 3								
	4	5	<b>Displacement</b>															
			<b>22</b>							<b>36</b>					<b>51</b>			<b>73</b>
			<b>26</b>							<b>41</b>					<b>56</b>			<b>90</b>
			<b>31</b>							<b>47</b>					<b>61</b>			
	6	<b>Direction of rotation</b>																
		<b>S</b> Anti-clockwise/left					<b>D</b> Clockwise/right					<b>H</b> Bidirectional internal drainage			<b>B</b> Bidirectional rear external drainage			
	7	8	<b>Front flanges - Shafts</b>															
			<b>21</b> SAE B 2 holes - Splined SAE BB 15T					<b>29</b> SAE B 2 holes - Splined SAE B 13T					<b>34</b> European D50.8 - European round					
			<b>26</b> SAE B 2 holes - Round SAE B					<b>32</b> European D50.8 - Tapered (1:8)					<b>37</b> European D50.8 - Splined DIN 5482					
			<b>I6</b> European flange D50.8 - round shaft D24															
			<b>C7</b> Centring D50.80 - Tapered (1:8)						<b>C8</b> Centring D50.80 - Round D24									
	9	10	<b>IN - Inlet ports</b>															
			... See tables on pages 12 and 13															
	11	12	<b>OUT - Output ports</b>															
			... See tables Ports and Combinations															
	13	<b>Seals</b>																
		<b>1</b> NBR Pump				<b>2</b> Viton Pump				<b>3</b> NBR Motor / Bid. pump High pressure pump				<b>4</b> Viton Motor / Bid. pump High pressure pump				
	14	15	<b>Covers</b>															
			<b>SG</b> Cast iron version				<b>VB</b> Fixed setting pressure relief valve with internal drain				<b>VD</b> Adjustable pressure relief valve with internal drain				<b>VT</b> Adjustable max. pressure valve with internal drain with anti-cavitation			
			<b>VA</b> Check valve				<b>VC</b> Fixed setting pressure relief valve with external drain				<b>VE</b> Adjustable pressure relief valve with external drain				<b>VV</b>			

## HPL Series Group 4

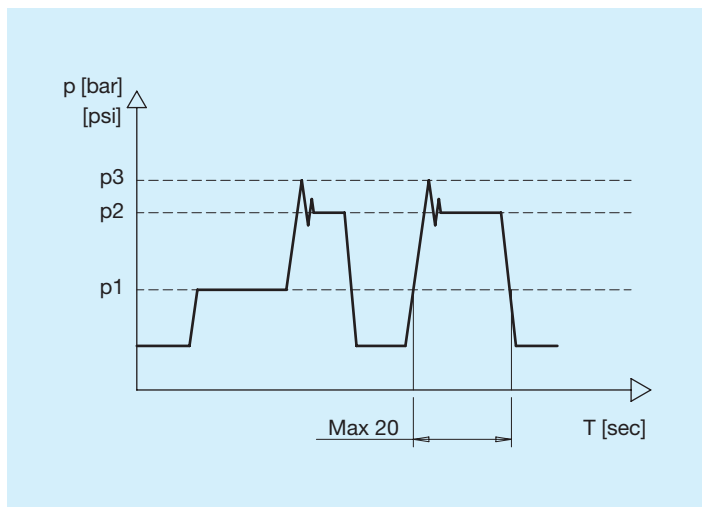


Before use, carefully read the GENERAL INSTRUCTIONS FOR USE OF GEAR PUMPS AND MOTORS.



C - See section on covers E - See section on shafts F - See section on flanges

## Pressure definition



$p_1$	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 pressure of $V_{max}$

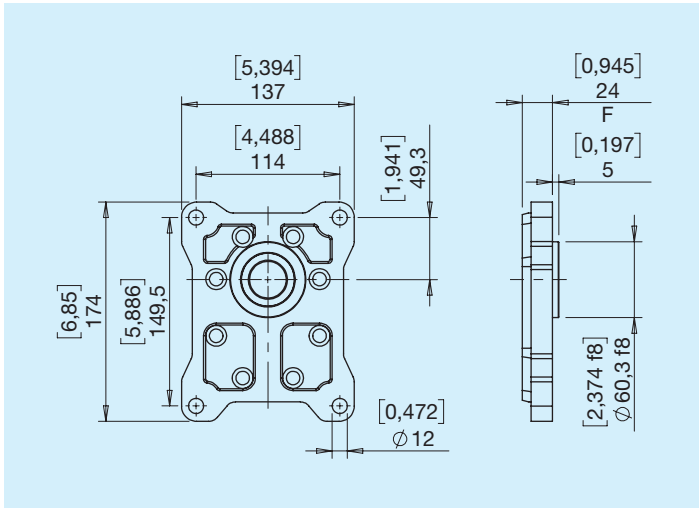
## Pump dimensions and technical data

HPLPA4	Nominal displacement		Continuous pressure		Intermittent pressure		Peak pressure		Rotational speed		Weight		A		B	
	cm <sup>3</sup>	in <sup>3</sup>	bar	psi	bar	psi	bar	psi	min <sup>-1</sup>	min <sup>-1</sup>	kg	lbs	mm	in	mm	in
<b>41</b>	41.50	2.53	220	3191	250	3626	300	3561	3000	700	9.20	20.58	95.07	3.743	47.5	1.870
<b>51</b>	50.50	3.08	190	2756	210	3046	280	4061	3000	700	9.20	20.58	101.07	3.979	50.5	1.990
<b>61</b>	61.00	3.72	160	2321	180	2611	200	2901	2500	600	9.60	21.16	108.57	4.274	54.3	2.137
<b>73</b>	72.00	4.39	150	2176	160	2321	180	2611	2500	600	9.60	21.16	116.07	4.570	58.0	2.285
<b>90</b>	88.00	5.37	120	1740	130	1885	170	2466	2500	600	9.60	21.16	127.07	5.003	63.5	2.501

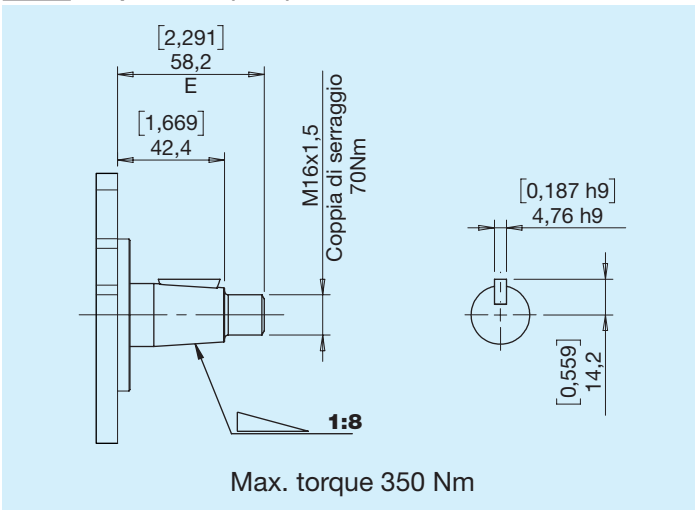
## Motor dimensions and technical data

HPLMA4	Nominal displacement		Continuous pressure		Intermittent pressure		Peak pressure		Rotational speed		Weight		A		B	
	cm <sup>3</sup>	in <sup>3</sup>	bar	psi	bar	psi	bar	psi	min <sup>-1</sup>	min <sup>-1</sup>	kg	lbs	mm	in	mm	in
<b>41</b>	41.50	2.53	220	3191	250	3626	300	3561	2800	600	9.20	20.58	95.07	3.743	47.5	1.870
<b>51</b>	50.50	3.08	190	2756	210	3046	280	4061	2800	600	9.20	20.58	101.07	3.979	50.5	1.990
<b>61</b>	61.00	3.72	160	2321	180	2611	200	2901	2800	600	9.60	21.16	108.57	4.274	54.3	2.137
<b>73</b>	72.00	4.39	150	2176	160	2321	180	2611	2800	600	9.60	21.16	116.07	4.570	58.0	2.285
<b>90</b>	88.00	5.37	120	1740	130	1885	170	2466	2800	600	9.60	21.16	127.07	5.003	63.5	2.501

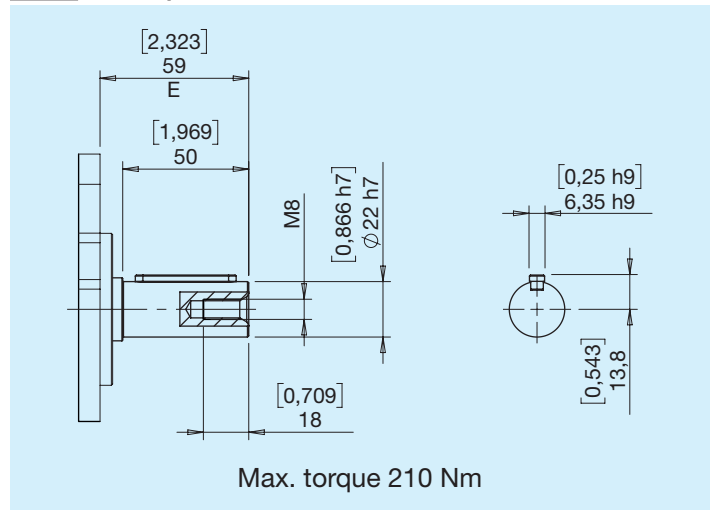
## European D60.3



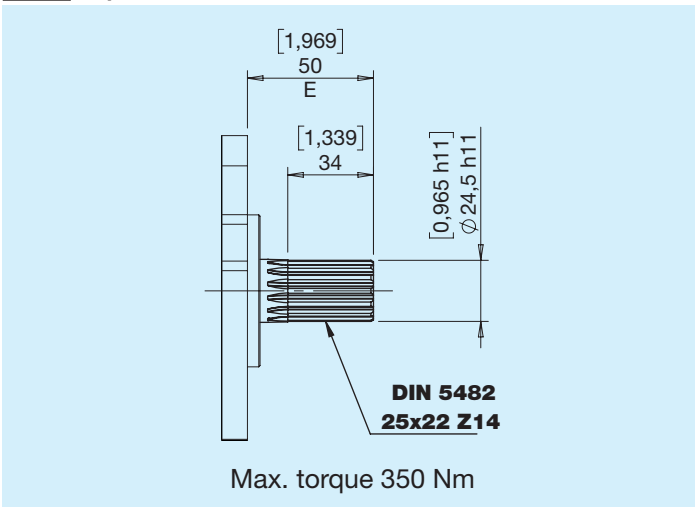
### 3 Tapered (1:8)



### 5 European round



### 8 Splined DIN 5482



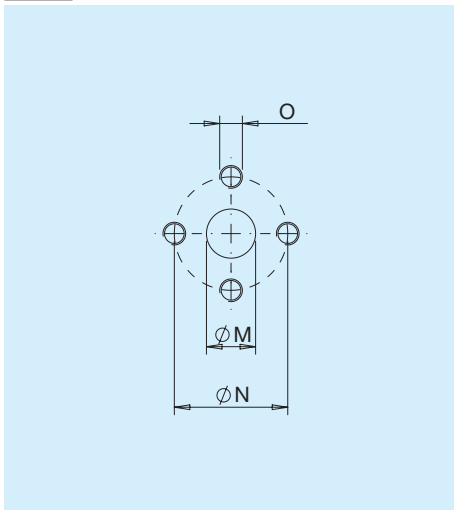
Shafts | Flanges

Shafts	Flanges
	X
3	•
5	•
8	•



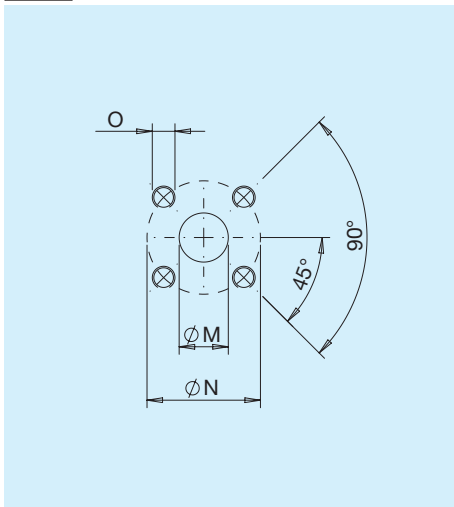


## E Lateral



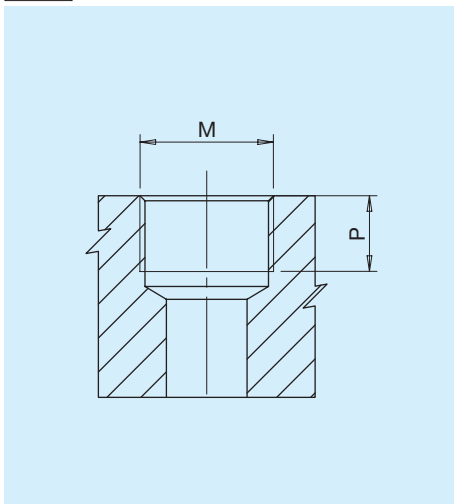
Type	M		N		O	
	mm	in	mm	mm		Nm
E7	27	1.06	51	2.01	M10	30
E8	34	1.34	62	2.44	M10	30

## X Lateral



Type	M		N		O	
	mm	in	mm	mm		Nm
X7	19	0.75	55	2.17	M8	15
X8	27	1.06	55	2.17	M8	15

## G Lateral / Drain



Type	M		P	
		Nm	mm	in
G3*	PORT ISO 1179-1-G 3/8	38	12	0.47
G7	PORT ISO 1179-1-G 1	130	21	0.83
G8	PORT ISO 1179-1-G 1 1/4	170	21	0.83

\*Drain

## Combination of ports/flanges

Ports	Flanges
	<b>X</b>
<b>E</b>	•
<b>X</b>	•
<b>G</b>	•

## Combination of round ports for one-way pumps/motors

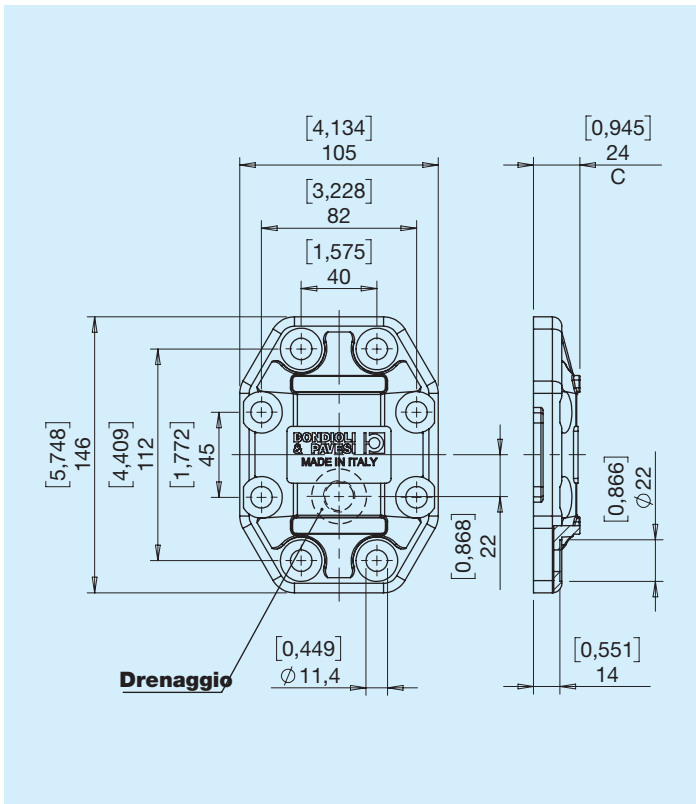
Ports	41 51 61	73 90
	IN/OUT ports	IN/OUT ports
<b>E</b>	E7 E7	E8 E7
<b>X</b>	X8 X7	X8 X7
<b>G</b>	G7 G7	G8 G7

## Combination of round ports for bidirectional pumps/motors

Ports	41 51 61	73 90	
	IN/OUT ports	IN/OUT ports	Drain line
<b>E</b>	E7 E7	E8 E8	G3
<b>X</b>	X7 X7	X8 X8	G3
<b>G</b>	G7 G7	G8 G8	G3

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

## SG Cast iron



<b>HPL</b>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
1	2	3	<b>Series</b>														
			<b>PA4</b> Gear pump Group 4						<b>MA4</b> Gear motor Group 4								
4	5	<b>Displacement</b>															
		<b>41</b>				<b>61</b>				<b>90</b>							
		<b>51</b>				<b>73</b>											
6	<b>Direction of rotation</b>																
	<b>S</b> Anti-clockwise/left				<b>D</b> Clockwise/right				<b>H</b> Bidirectional internal drainage				<b>B</b> Bidirectional rear external drainage				
7	8	<b>Front flanges - Shafts</b>															
		<b>X3</b> European D60.3 - Tapered (1:8)				<b>X5</b> European D60.3 - European round				<b>X8</b> European D60.3 - Splined DIN 5482							
		<b>C9</b> Centring D60.30 - Tapered (1:8)				<b>C0</b> Centring D60.30 - Round D28											
9	10	<b>IN - Inlet ports</b>															
		... See tables Ports and Combinations															
11	12	<b>OUT - Output ports</b>															
		... See tables Ports and Combinations															
13	<b>Seals</b>																
	<b>B</b> NBR Pump				<b>R</b> NBR Motor / Bid. pump High pressure pump				<b>V</b> Viton Pump				<b>W</b> Viton Motor / Bid. pump High pressure pump				
14	15	<b>Covers</b>															
		<b>SG</b> Cast iron version															