

HA10V Series 3

Hydraulic Variable Piston Pump SAE



HA10V Series 3 Hydraulic Piston Pump have the following advantages;

- Compact Design,
- Economical Conception,
- High Power Density,
- High Overall Efficiency,
- High Rotating Speeds,
- High Output Pressure,
- 280 bar Cont. Work. Pressure,
- 350 bar Peak Pressure,
- From 18cc to 140cc,
- Reduced Noise Level,
- Increased Reliability,
- 100% compatible interchangeability
- Smaller Installation Dimensions,
- Extremely fast response time,
- Long service life



ISO 9001:2015 - ISO 14001:2015

Ordering Code of HA10V Series 3 Hydraulic Piston Pump

01	02	03	04	05	06	07	08	09	10	11	12	13						
	HA10V				/	Series 3	-	V										
Version								18	28	45	71	88	100	140				
01	Standard version (without code)							•	•	•	•	•	•					
	High-speed version (external dimensions are the same as the standard version)							-	-	•	•	-	•	•	H			
Axial piston unit																		
02	Swashplate design, variable, nominal pressure 280 bar, maximum pressure 350 bar							•	-	-	-	-	-	-	HA10V(S)			
								-	•	•	•	•	•	•	•	HA10V		
Operating mode																		
03	Open circuit standard																	
Size (Displacement)																		
04	Geometric displacement, see table of values on pages 6 and 7							18	28	45	71	88	100	140				
Control device																		
05	Two-point control, direct operated							•	•	•	•	•	•	•	TP			
	Pressure controller		hydraulic					•	•	•	•	•	•	•	PR			
	with flow controller		hydraulic		X-T open			•	•	•	•	•	•	•	LS			
					X-T plugged with flushing function			•	•	•	•	•	•	•	LS1			
					X-T plugged without flushing function			•	•	•	•	•	•	•	•	LS-C		
	with flow and differential pressure control, electrically variable							•	•	•	•	•	•	•	ELS			
	with pressure cut-off		hydraulic		remote controlled			•	•	•	•	•	•	•	•	PRR		
			electrical		negative control		U = 12 V			•	•	•	•	•	•	•	•	EN12
							U = 24 V			•	•	•	•	•	•	•	•	EN24
							electrical		positive control		U = 12 V			•	•	•	•	•
			U = 24 V			•					•	•	•	•	•	•	•	EP24
	Pressure-flow power control							-	•	•	•	•	•	•	•	PFP		
	Series																	
	06	Series 3													3			
	Direction of rotation																	
07	Viewed on drive shaft					clockwise								R				
						counter-clockwise								L				
Sealing material																		
08	FKM (fluoroelastomer)													V				
Drive shaft																		
09	Splined shaft ANSI B92.1a			standard shaft				•	•	•	•	•	•	•	S			
Mounting flange																		
10	ISO 3019-1 (SAE)					2-hole			•	•	•	•	•	•	•	S		
						4-hole			•	•	•	•	•	-	-	•	R	

HA10V Series 3 Hydraulic Piston Pump

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Ordering Code of HA10V Series 3 Hydraulic Piston Pump

01	02	03	04	05	06	07	08	09	10	11	12	13
	HA10V				/	Series 3	-	V				

Working port				18	28	45	71	88	100	140	
11	SAE flange ports according to J518 Working ports metric	Fastening thread metric; rear	not for tandem	-	•	•	-	-	•	•	11
				-	-	-	•	•	-	-	41
		Fastening thread metric; lateral top bottom	for tandem	•	•	•	-	-	•	•	12
				-	-	-	•	•	-	-	42
	SAE flange ports according to J518 Working ports UNF	Fastening thread UNF; rear	not for tandem	-	•	•	-	-	•	•	61
				-	-	-	•	•	-	-	91
		Fastening thread UNF; lateral top bottom	for tandem	•	•	•	-	-	•	•	62
				-	-	-	•	•	-	-	92

Through drive				18	28	45	71	88	100	140	
12	Flange ISO 3019-1 Diameter	Hub for splined shaft Diameter									
	without tandem			•	•	•	•	•	•	•	N00
	82-2 (A)	5/8 in	9T 16/32DP	•	•	•	•	•	•	•	K01
		3/4 in	11T 16/32DP	•	•	•	•	•	•	•	K52
	101-2 (B)	7/8 in	13T 16/32DP	-	•	•	•	•	•	•	K68
		1 in	15T 16/32DP	-	-	•	•	•	•	•	K04
	127-2 (C)	1 1/4 in	14T 12/24DP	-	-	-	•	•	•	•	K07
		1 1/2 in	17T 12/24DP	-	-	-	-	-	•	•	K24
	152-4 (D)	1 3/4 in	13T 8/16DP	-	-	-	-	-	-	•	K17

Connectors for solenoids											
13	Without connector (without solenoid, with hydraulic control only, without code)							•	•	•	•

● = Available ○ = On request - = Not available



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Technical data of HA10V Series 3 Hydraulic Piston Pump

Technical data, standard unit

Size	NG	18	28	45	71	88	100	140
Displacement, geometric, per revolution	V_{gmax} cm ³	18	28	45	71	88	100	140
Rotational speed maximum)	at V_{gmax}	n_{nom} rpm	3300	3000	2600	2200	2100	2000
	at $V_g < V_{gmax}$	$n_{max perm}$ rpm	3900	3600	3100	2600	2500	2400
Flow	at n_{nom} and V_{gmax}	q_{vmax} l/min	59	84	117	156	185	200
	at $n_E = 1500$ rpm and V_{gmax}	$q_{vE max}$ l/min	27	42	68	107	132	150
Power at $\Delta p = 280$ bar	at n_{nom} , V_{gmax}	P_{max} kW	28	39	55	73	86	93
	at $n_E = 1500$ rpm and V_{gmax}	P_{Emax} kW	12.6	20	32	50	62	70
Torque at V_{gmax} and	$\Delta p = 280$ bar	T_{max} Nm	80	125	200	316	392	445
	$\Delta p = 100$ bar	T Nm	30	45	72	113	140	159
Rotary stiffness of drive shaft	S	c Nm/rad	11087	22317	37500	71884	71884	121142
	R	c Nm/rad	14850	26360	41025	76545	76545	-
	U	c Nm/rad	8090	16695	30077	52779	52779	91093
	W	c Nm/rad	-	19898	34463	57460	57460	101847
Moment of inertia for rotary group	J_{TW} kgm ²	0.00093	0.0017	0.0033	0.0083	0.0083	0.0167	0.0242
Maximum angular acceleration)	α rad/s ²	6800	5500	4000	2900	2600	2400	2000
Case volume	V l	0.4	0.7	1.0	1.6	1.6	2.2	3.0
Weight (without tandem)	m kg	12.9	18	23.5	35.2	35.2	49.5	65.4
Weight (with tandem)		13.8	19.3	25.1	38	38	55.4	74.4

Determining the operating characteristics		
Flow	$q_v = \frac{V_g \times n \times \eta_v}{1000}$	[l/min]
Torque	$T = \frac{V_g \times \Delta p}{20 \times \pi \times \eta_{hm}}$	[Nm]
Power	$P = \frac{2 \pi \times T \times n}{60000} = \frac{q_v \times \Delta p}{600 \times \eta_t}$	[kW]
Key		
V_g Displacement per revolution [cm ³]		
Δp Differential pressure [bar]		
n Rotational speed [rpm]		
η_v Volumetric efficiency		
η_{hm} Hydraulic-mechanical efficiency		
η Total efficiency ($\eta_t = \eta_v \times \eta_{hm}$)		

Notice

• Theoretical values, without efficiency and tolerances; values rounded

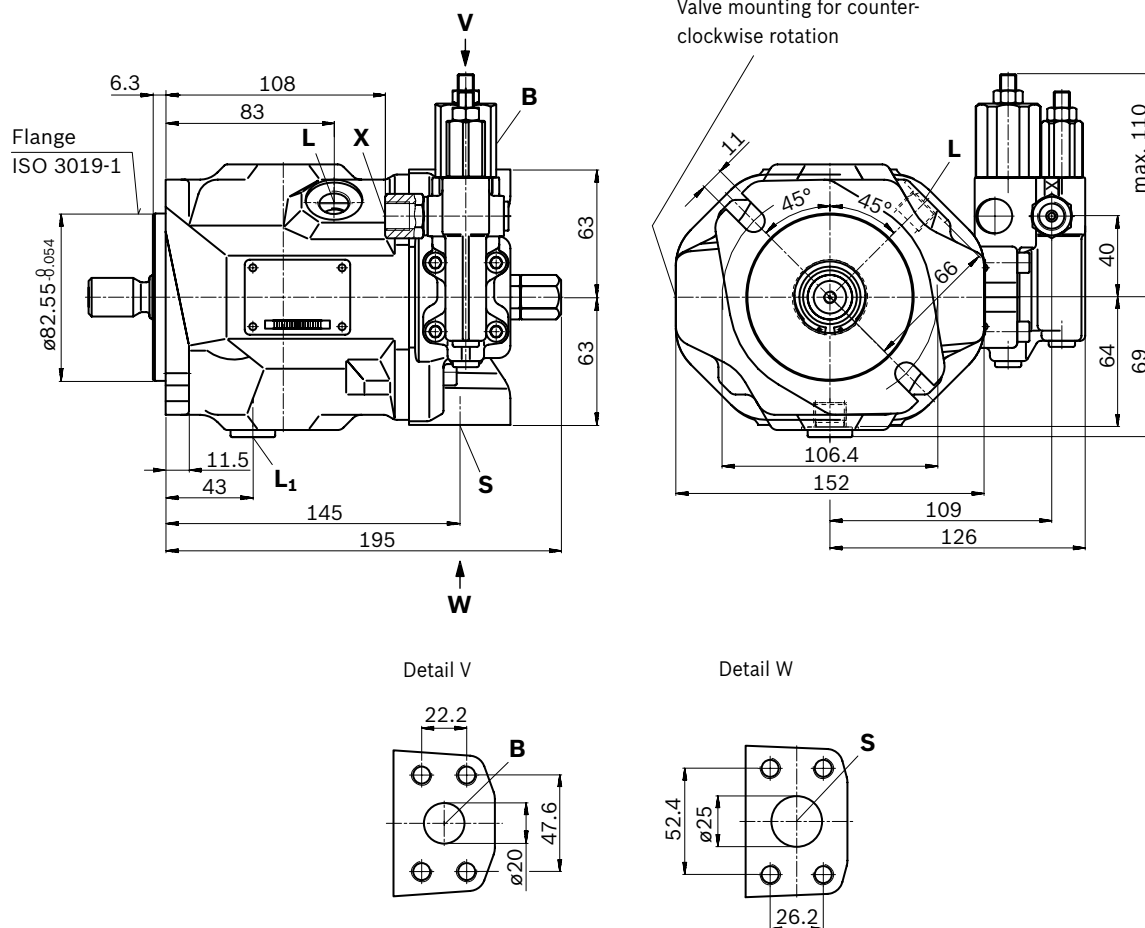
- Operation above the maximum values or below the minimum values may result in a loss of function, a reduced service life or in the destruction of the axial piston unit.

t

Dimensions, displacement 18

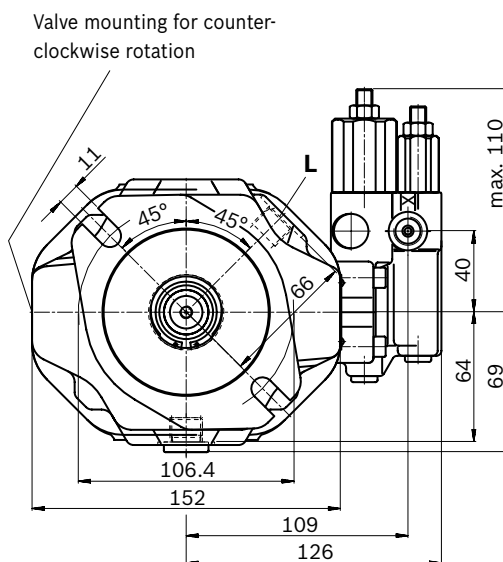
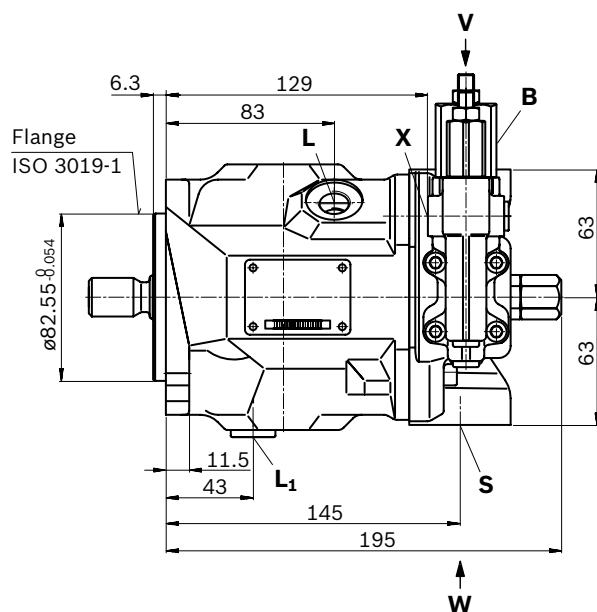
LS / LS1 / LS-C - Pressure and flow control, hydraulic; clockwise rotation, version: Ports metric

▼ Port plate 12

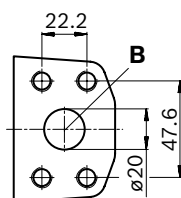


Dimensions, displacement 18**LS / LS1 / LS-C - Pressure and flow control, hydraulic; clockwise rotation, version: SAE ports**

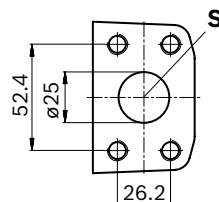
▼ Port plate 62



Detail V

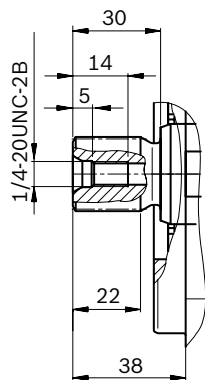


Detail W



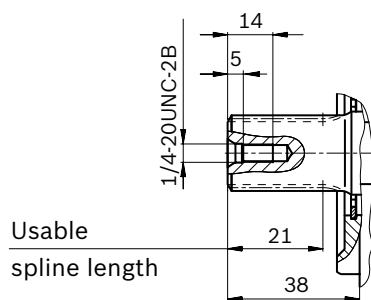
▼ Splined shaft 3/4 in (SAE J744)

S – 11T 16/32DP



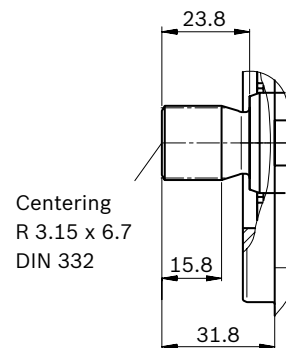
▼ Splined shaft 3/4 in (SAE J744)

R – 11T 16/32DP



▼ Splined shaft 5/8 in (SAE J744)

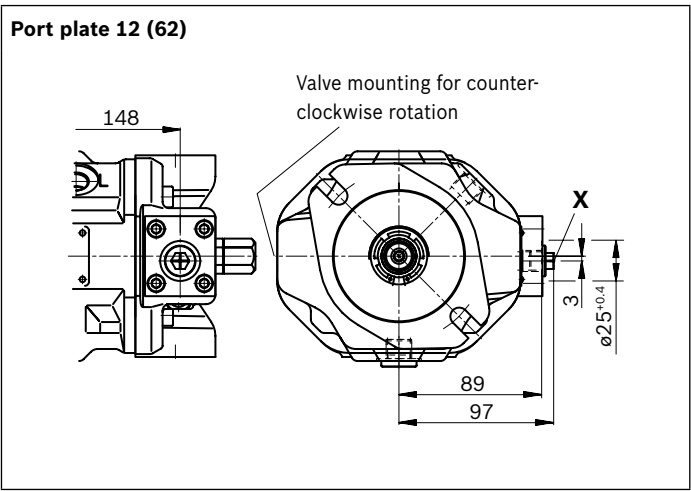
U – 9T 16/32DP



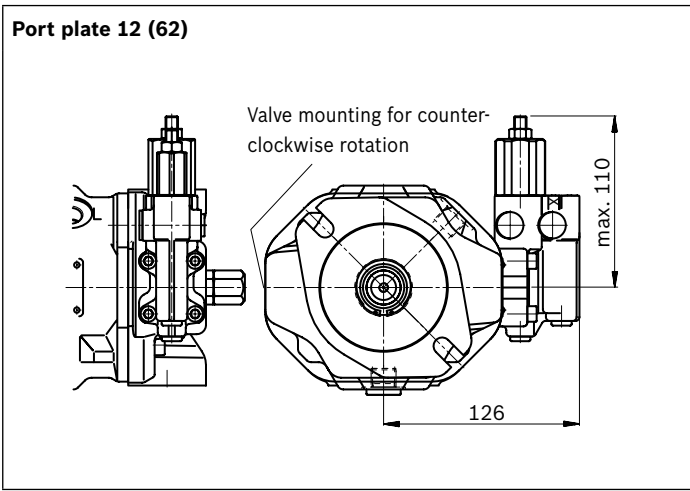
Ports - version metric port plate 12		Standard	Displacement	$p_{\max \text{ abs}}$ [bar]	State
B	Working port (standard pressure series) Fastening thread	SAE J518 DIN 13	3/4 in M10 × 1.5; 17 deep	350	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 DIN 13	1 in M10 × 1.5; 17 deep	10	O
L	Drain port	DIN 3852	M16 × 1.5; 12 deep	2	O
L₁	Drain port	DIN 3852	M16 × 1.5; 12 deep	2	X
X	Pilot pressure	DIN 3852	M14 × 1.5; 12 deep	350	O
X	Pilot pressure with TP-control	DIN ISO 228	G1/4 in; 12 deep	350	O

Ports - version SAE port plate 62		Standard	Displacement	$p_{\max \text{ abs}}$ [bar]	State
B	Working port (standard pressure series) Fastening thread	SAE J518 ASME B1.1	3/4 in 3/8-16 UNC-2B; 20 deep	350	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 ASME B1.1	1 in 3/8-16 UNC-2B; 20 deep	10	O
L	Drain port	ISO 11926	9/16-18 UNF-2B; 12 deep	2	O
L₁	Drain port	ISO 11926	9/16-18 UNF-2B; 12 deep	2	X
X	Pilot pressure	ISO 11926	7/16-20 UNF-2B; 11.5 deep	350	O
X	Pilot pressure with TP-control	DIN ISO 228	G1/4 in; 12 deep	350	O

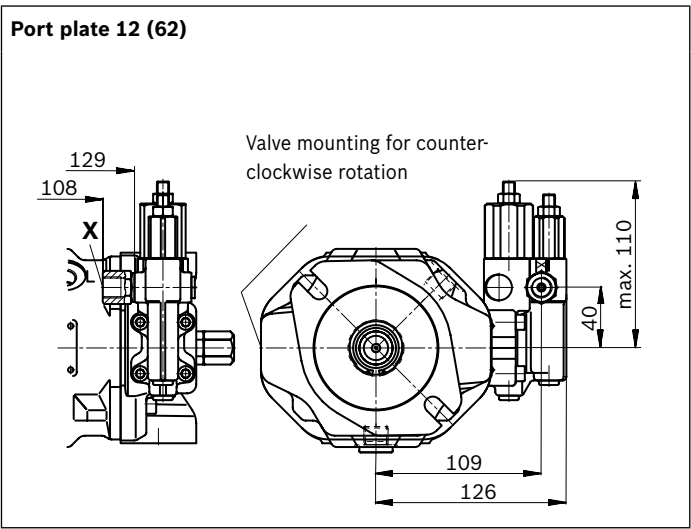
▼TTP - Two-point control, direct operated



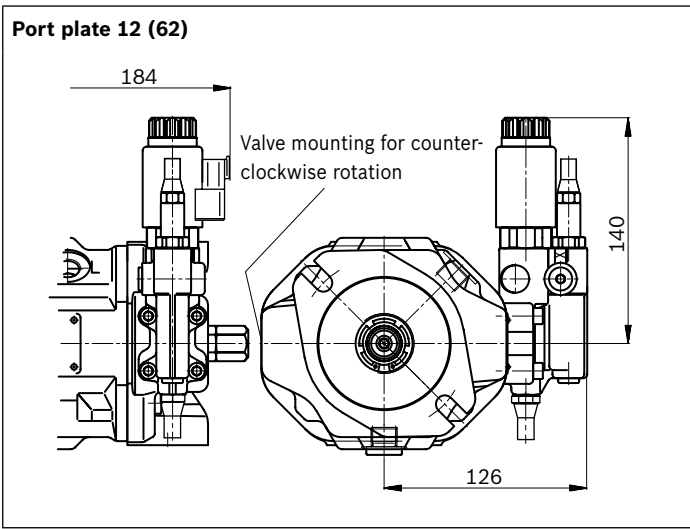
▼PR - Pressure controller



▼PRR - Pressure controller, remote controlled



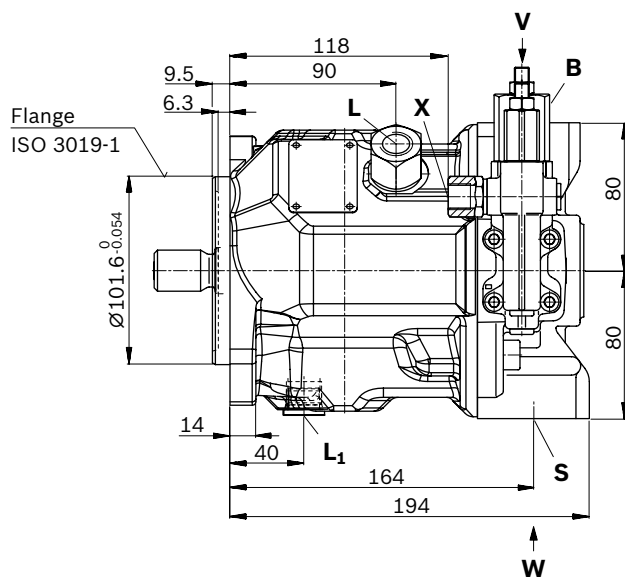
▼EN12/EN24 / EP12/EP24 - Electro-hydraulic pressure control



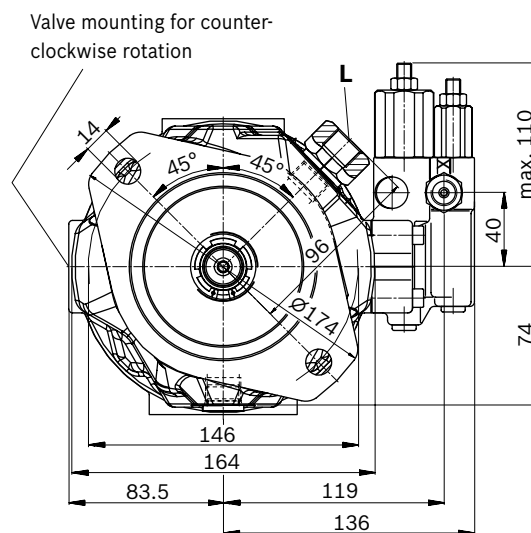
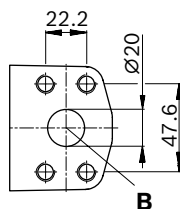
Dimensions, displacement 28

LS / LS1 / LS-C - Pressure and flow control, hydraulic; clockwise rotation, version: Ports metric

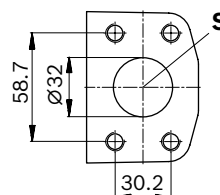
▼ Port plate 12



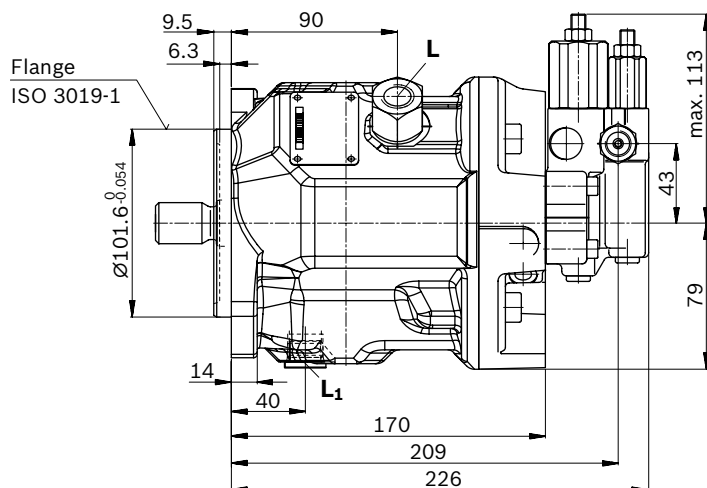
Detail V



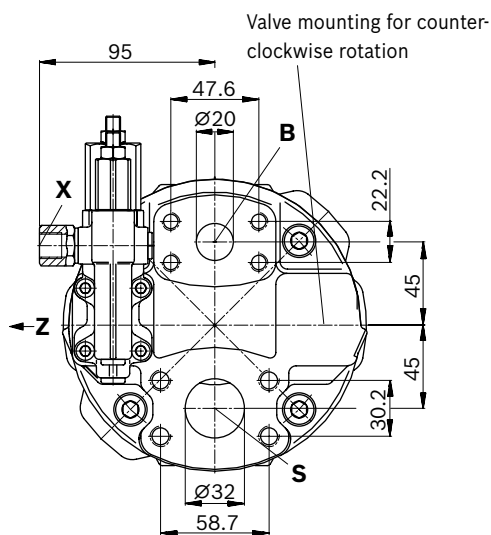
Detail W



▼ Port plate 11



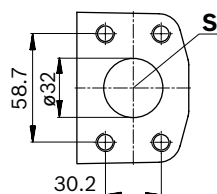
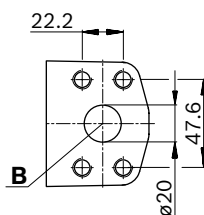
View Z



LS / LS1 / LS-C - Pressure and flow control, hydraulic; clockwise rotation, version: SAE ports

[illegible]

Detail W



Technical drawing of the 61 Port plate valve, showing side and end views with dimensions.

Side View Dimensions:

- Flange ISO 3019-1
- 9.5
- 6.3
- 90
- 14
- 40
- 170
- 209
- 226
- max. 113
- 43
- 79

End View Dimensions (View Z):

- 73
- 47.6
- $\varnothing 20$
- 22.2
- 45
- 30.2
- $\varnothing 32$
- 58.7

Labels:

- L
- L₁
- X
- B
- S

Notes:

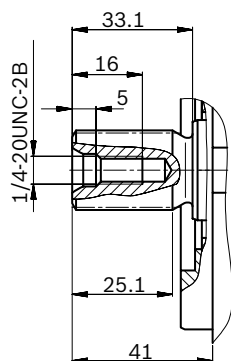
- Valve mounting for counter-clockwise rotation

View Z

Valve mounting for counter-clockwise rotation

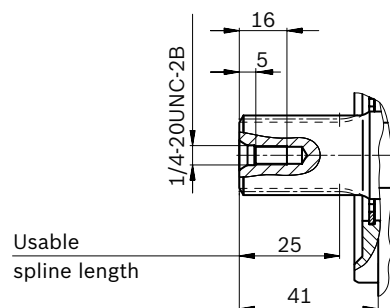
▼ Splined shaft 7/8 in (SAE J744)

S – 13T 16/32DP



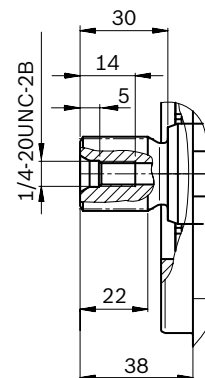
▼ Splined shaft 7/8 in (SAE J744)

R – 13T 16/32DP



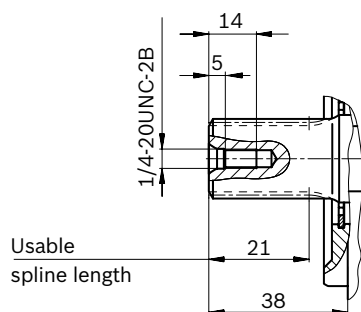
▼ Splined shaft 3/4 in (SAE J744)

U – 11T 16/32DP



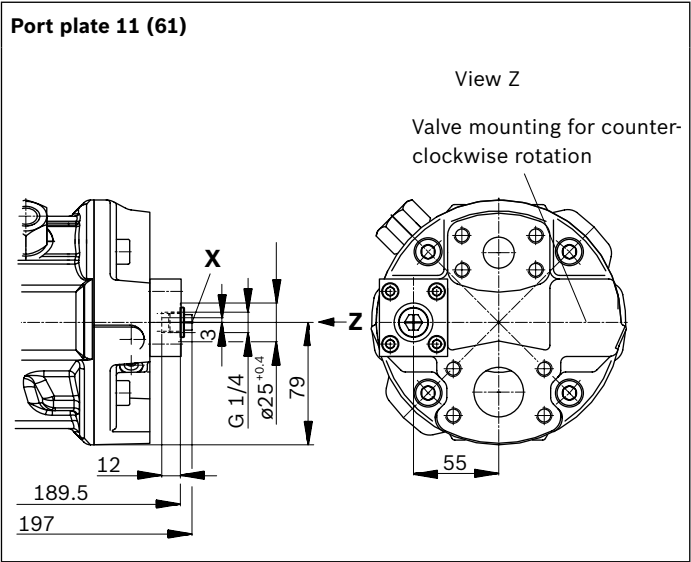
▼ Splined shaft 3/4 in (SAE J744)

W – 11T 16/32DP

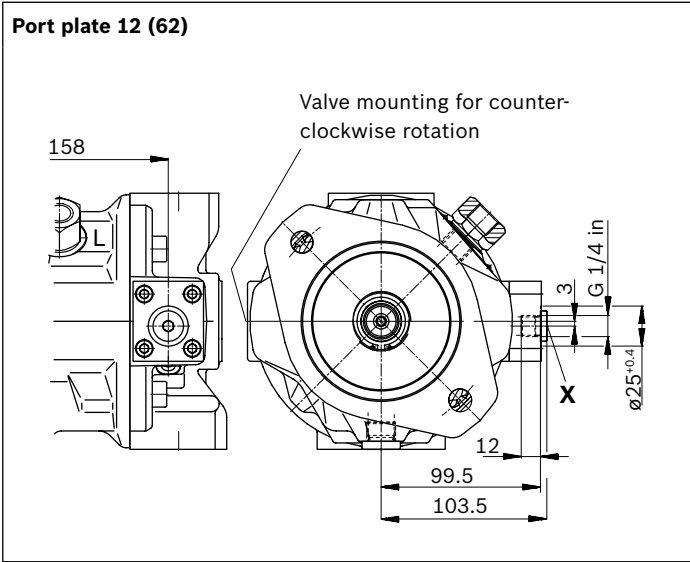


Ports - version metric port plate 11/12		Standard	Displacement	$p_{\max \text{ abs}}$ [bar]	State
B	Working port (standard pressure series) Fastening thread	SAE J518 DIN 13	3/4 in M10 × 1.5; 17 deep	350	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 DIN 13	1 1/4 in M10 × 1.5; 17 deep	10	O
L	Drain port	DIN 3852	M18 × 1.5; 12 deep	2	O
L₁	Drain port	ISO 11926	3/4-16 UNF-2B; 14 deep	2	X
X	Pilot pressure	DIN 3852	M14 × 1.5; 12 deep	350	O
X	Pilot pressure with TP-control	DIN ISO 228	G1/4 in; 12 deep	350	O
Ports - version SAE port plate 61/62		Standard	Displacement	$p_{\max \text{ abs}}$ [bar]	State
B	Working port (standard pressure series) Fastening thread	SAE J518 ASME B1.1	3/4 in 3/8-16 UNC-2B; 20 deep	350	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 ASME B1.1	1 1/4 in 7/16-14 UNC-2B; 24 deep	10	O
L	Drain port	ISO 11926	3/4-16 UNF-2B; 14 deep	2	O
L₁	Drain port	ISO 11926	3/4-16 UNF-2B; 14 deep	2	X
X	Pilot pressure	ISO 11926	7/16-20 UNC-2B; 11.5 deep	350	O
X	Pilot pressure with TP-control	DIN ISO 228	G1/4 in; 12 deep	350	O

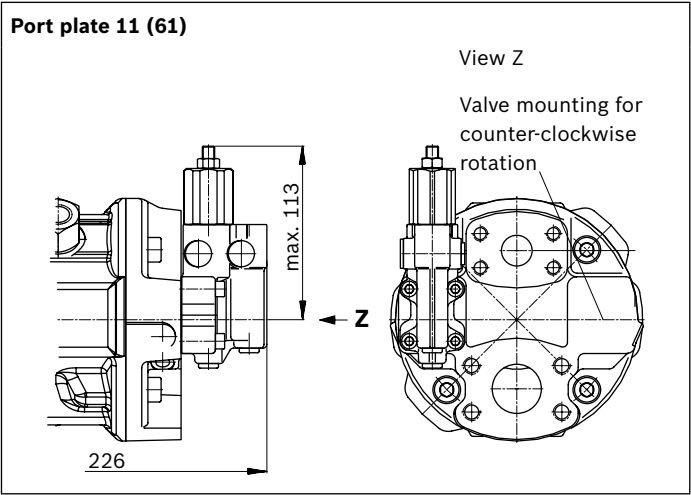
▼TP - Two-point control, direct operated



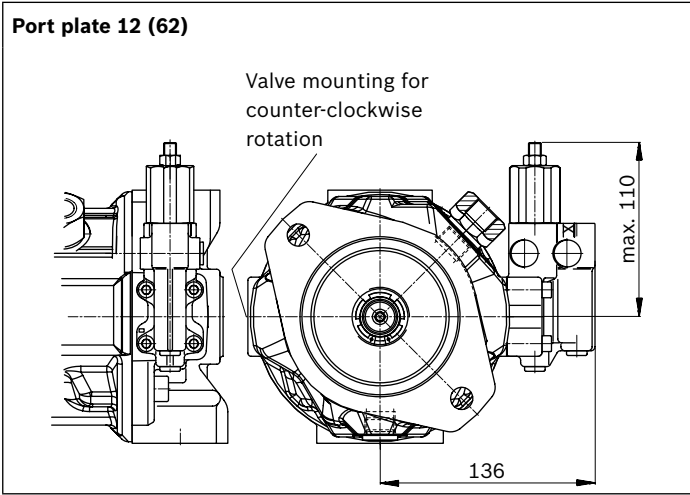
▼TP - Two-point control, direct operated



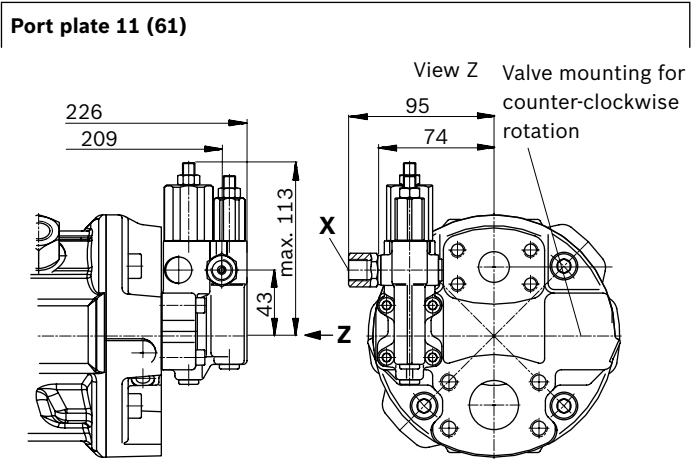
▼PR - Pressure controller



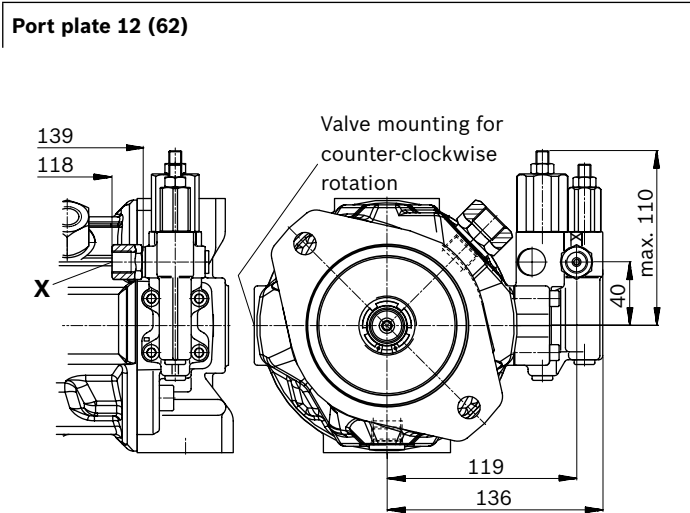
▼PR - Pressure controller



▼PRR - Pressure controller, remote controlled

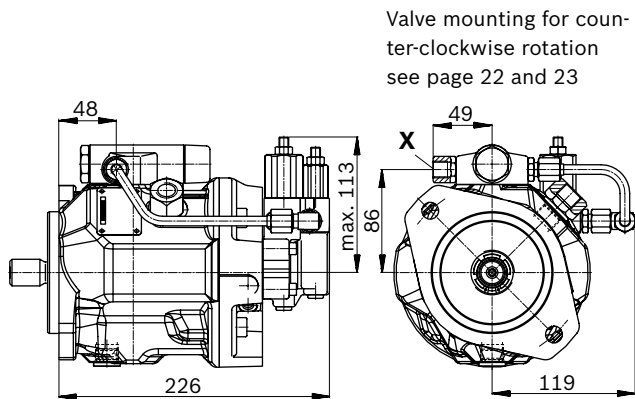


▼PRR - Pressure controller, remote controlled



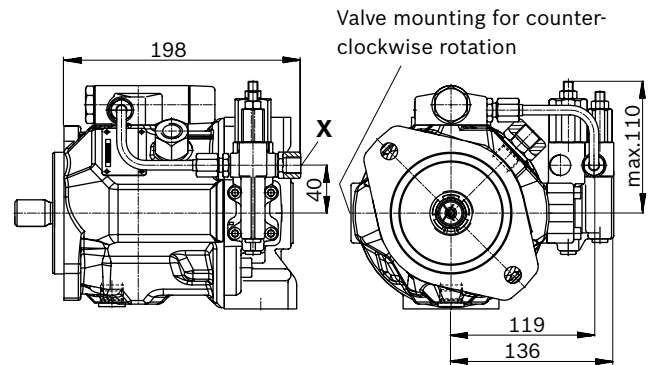
▼PFP - Pressure, flow and power controller

Port plate 11 (61)



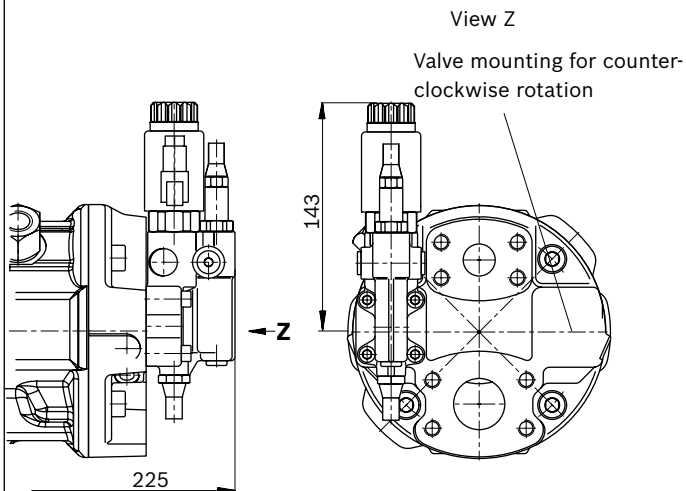
▼PFP - Pressure, flow and power controller

Port plate 12 (62)



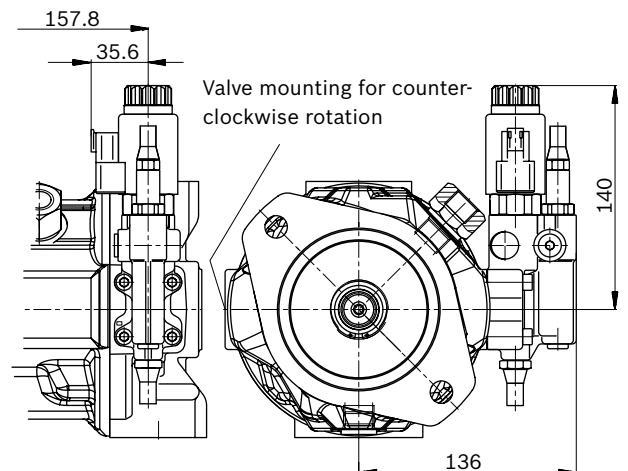
▼EN12/EN24 / EP12/EP24 - Electro-hydraulic pressure control

Port plate 11 (61)



▼EN12/EN24 / EP12/EP24 - Electro-hydraulic pressure control

Port plate 12 (62)



LS / LS1 / LS-C - Pressure and flow control, hydraulic; clockwise rotation, version: Ports metric

Valve mounting for counter-clockwise rotation

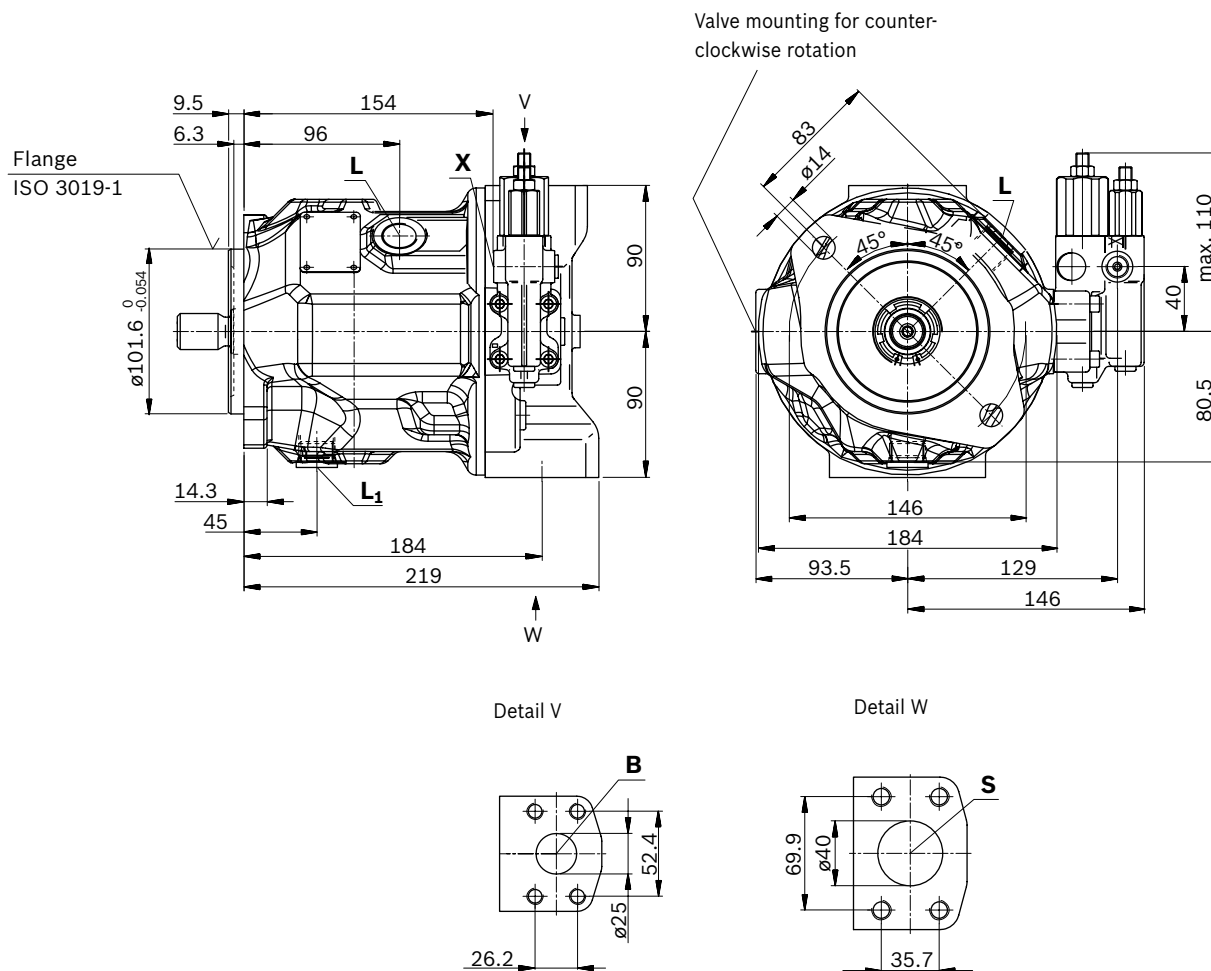
Technical drawing of a circular valve mounting flange. The drawing shows a top view of the flange with a central valve assembly. Key dimensions and labels include:

- 103**: Overall diameter of the flange.
- 52.4**: Distance from the center to the center of the valve assembly.
- Ø25**: Diameter of the central valve assembly.
- B**: Label for the central valve assembly.
- 26.2**: Distance from the center to the center of the mounting holes.
- 50**: Distance from the center to the outer edge of the mounting holes.
- 50**: Distance from the center to the outer edge of the mounting holes.
- 35.7**: Distance from the center to the outer edge of the mounting holes.
- Ø40**: Diameter of the mounting holes.
- 69.9**: Distance from the center to the outer edge of the mounting holes.
- S**: Label for the mounting holes.
- X**: Label for the valve assembly.
- Z**: Label for the valve assembly.

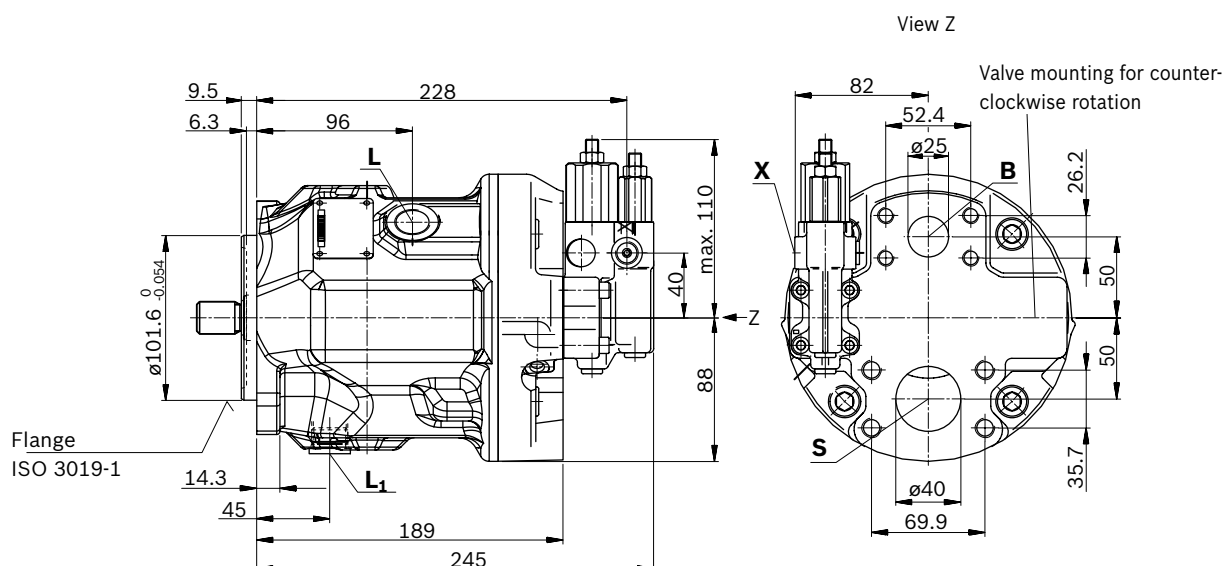
Dimensions, displacement 45

LS / LS1 / LS-C - Pressure and flow control, hydraulic; clockwise rotation, version: SAE ports

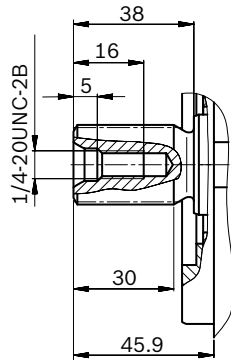
▼ Port plate 62



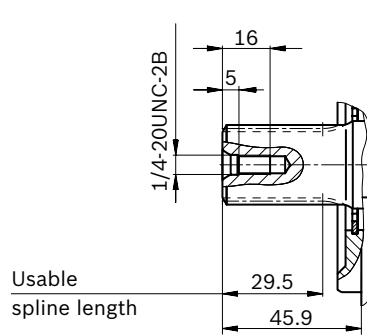
▼ Port plate 61



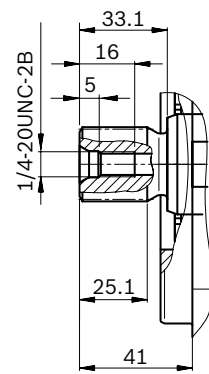
▼ Splined shaft 1 in (SAE J744)

S – 15T 16/32DP


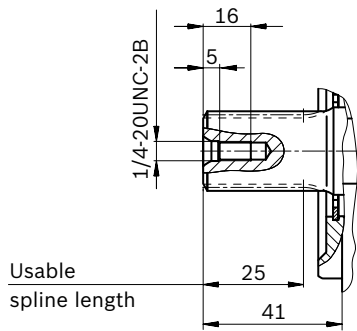
▼ Splined shaft 1 in (SAE J744)

R – 15T 16/32DP


▼ Splined shaft 7/8 in (SAE J744)

U – 13T 16/32DP


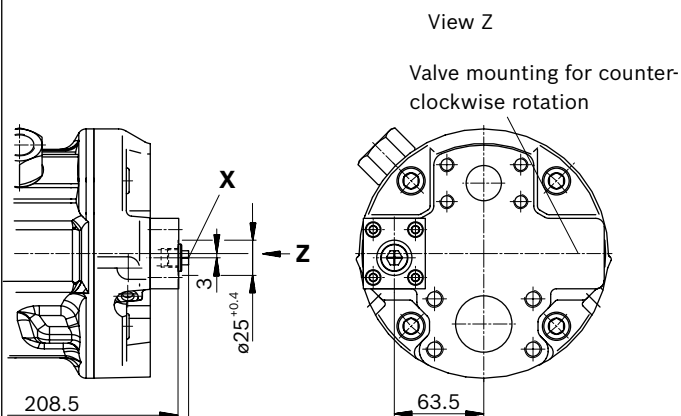
▼ Splined shaft 7/8 in (SAE J744)

W – 13T 16/32DP


Ports - version metric port plate 11/12		Standard	Displacement	$p_{\max \text{ abs}}$ [bar]	State
B	Working port (standard pressure series) Fastening thread	SAE J518 DIN 13	1 in M10 × 1.5; 17 deep	350	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 DIN 13	1 1/2 in M12 × 1.75; 20 deep	10	O
L	Drain port	DIN 3852	M22 × 1.5; 14 deep	2	O
L₁	Drain port	ISO 11926	7/8-14 UNF-2B; 16 deep	2	X
X	Pilot pressure	DIN 3852	M14 × 1.5; 12 deep	350	O
X	Pilot pressure with TP-control	DIN ISO 228	G1/4 in; 12 deep	350	O
Ports - version SAE port plate 61/62		Standard	Displacement	$p_{\max \text{ abs}}$ [bar]	State
B	Working port (standard pressure series) Fastening thread	SAE J518 ASME B1.1	1 in 3/8-16 UNC-2B; 17 deep	350	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 ASME B1.1	1 1/2 in 1/2-13 UNC-2B; 20 deep	10	O
L	Drain port	ISO 11926	7/8-14 UNF-2B; 16 deep	2	O
L₁	Drain port	ISO 11926	7/8-14 UNF-2B; 16 deep	2	X
X	Pilot pressure	ISO 11926	7/16-20 UNF-2B; 11.5 deep	350	O
X	Pilot pressure with TP-control	DIN ISO 228	G1/4 in; 12 deep	350	O

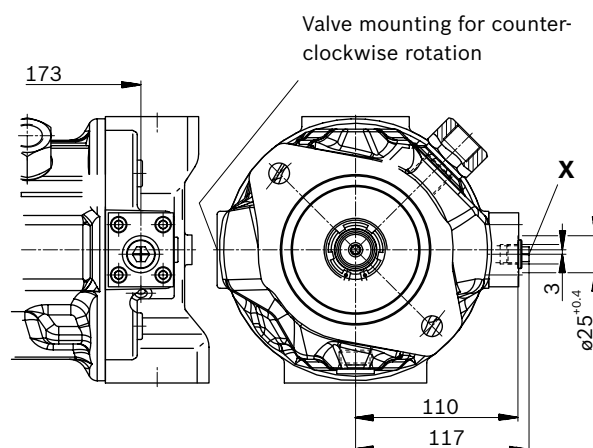
▼TP - Two-point control, direct operated

Port plate 11 (61)



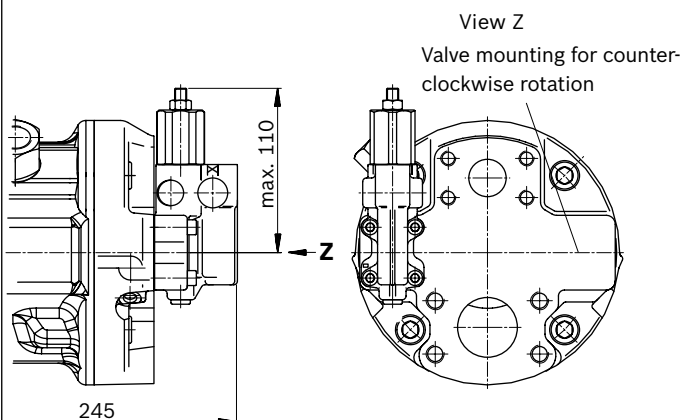
▼TP - Two-point control, direct operated

Port plate 12 (62)



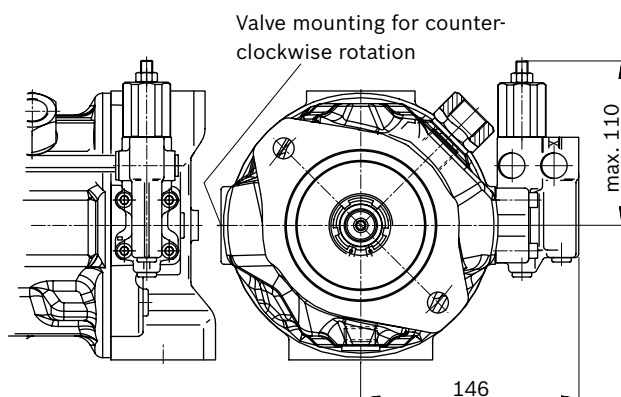
▼PR - Pressure controller

Port plate 11 (61)



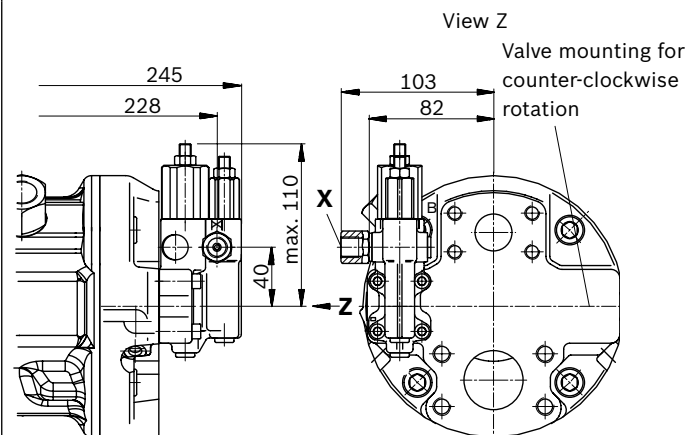
▼PR - Pressure controller

Port plate 12 (62)



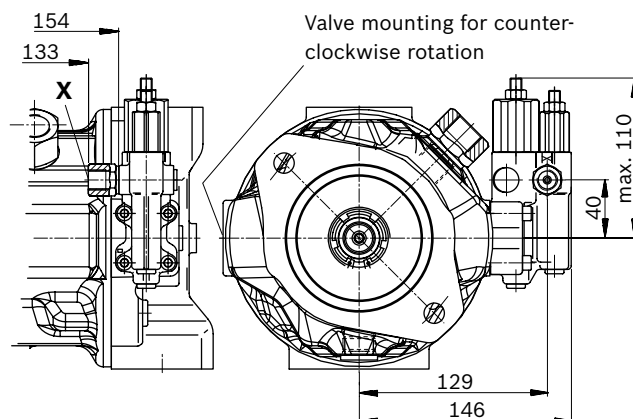
▼PRR - Pressure controller, remote controlled

Port plate 11 (61)



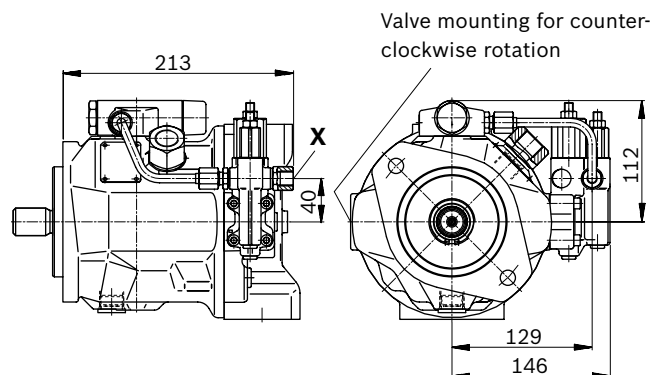
▼PRR - Pressure controller, remote controlled

Port plate 12 (62)



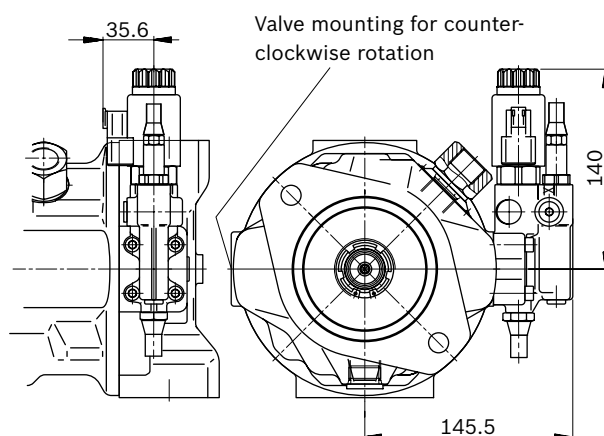
▼PFP - Pressure, flow and power controller

Port plate 12 (62)



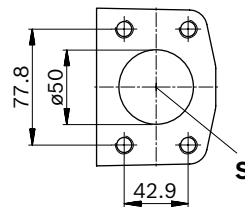
▼EN12/EN24 / EP12/EP24 - Electro-hydraulic pressure control

Port plate 12 (62)

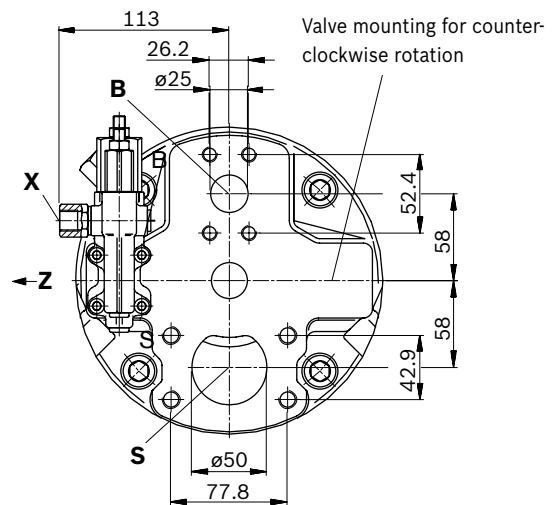


LS / LS1 / LS-C - Pressure and flow control, hydraulic; clockwise rotation, version: Ports metric

Valve mounting for counter-clockwise rotation



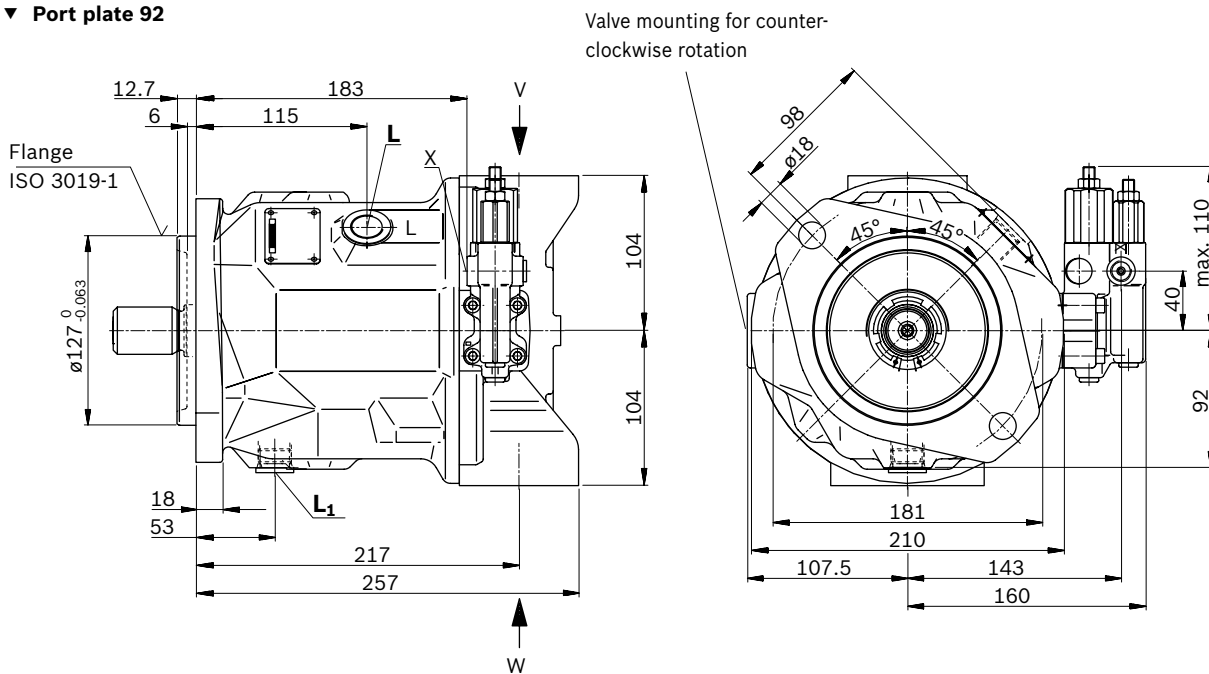
View Z



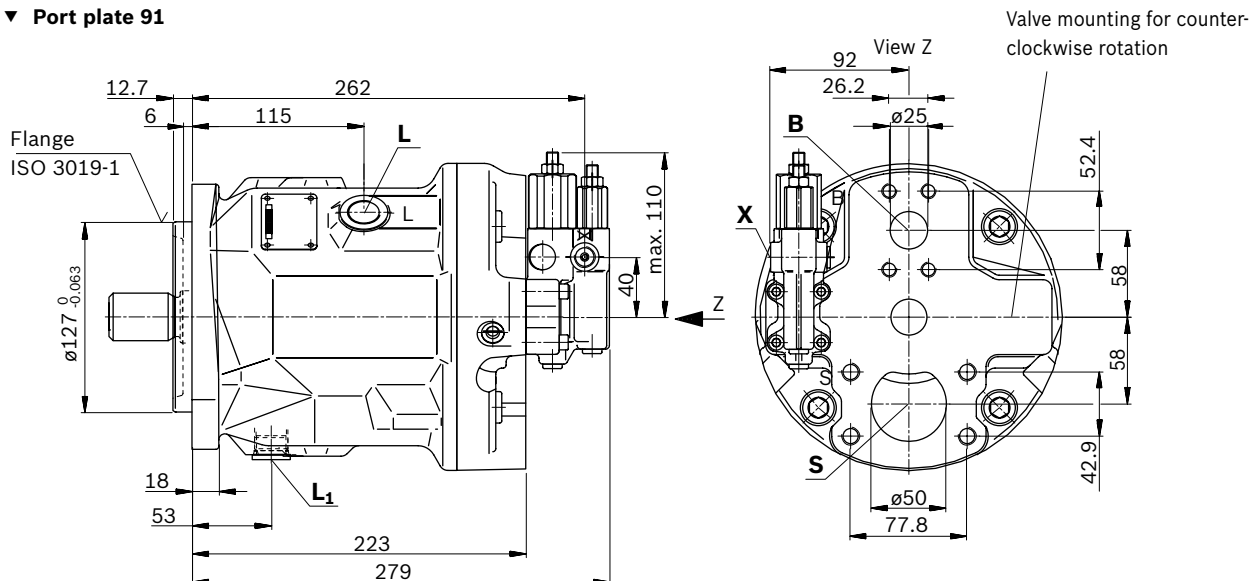
Dimensions displacements 71 and 88

LS / LS1 / LS-C - Pressure and flow control, hydraulic; clockwise rotation, version: SAE ports

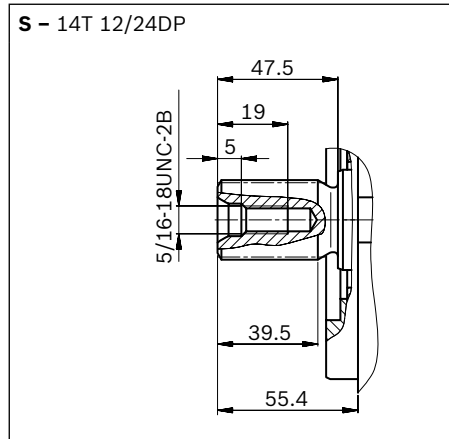
▼ Port plate 92



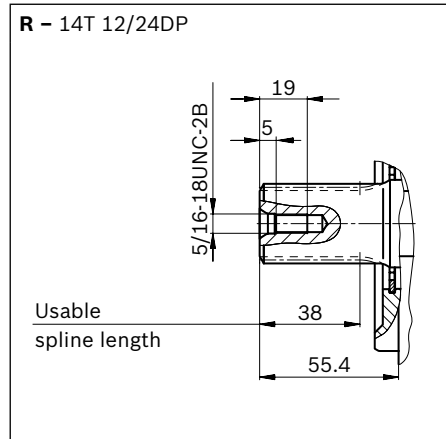
▼ Port plate 91



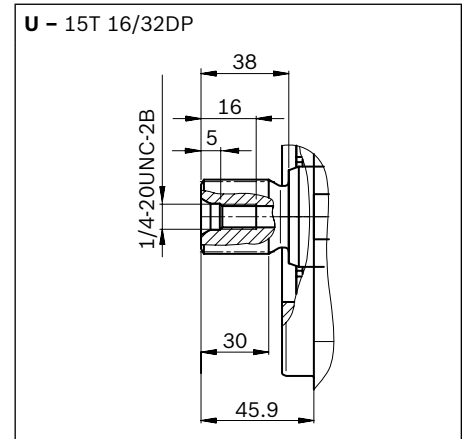
▼ Splined shaft 1 1/4 in (SAE J744)



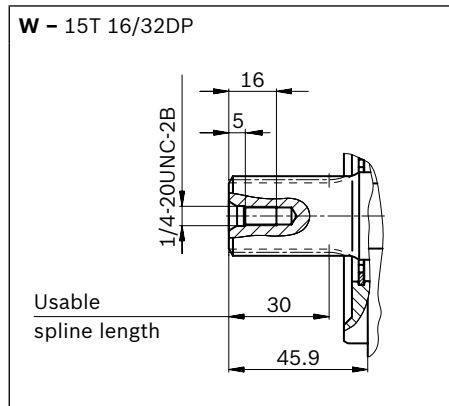
▼ Splined shaft 1 1/4 in (SAE J744)



▼ Splined shaft 1 in (SAE J744)



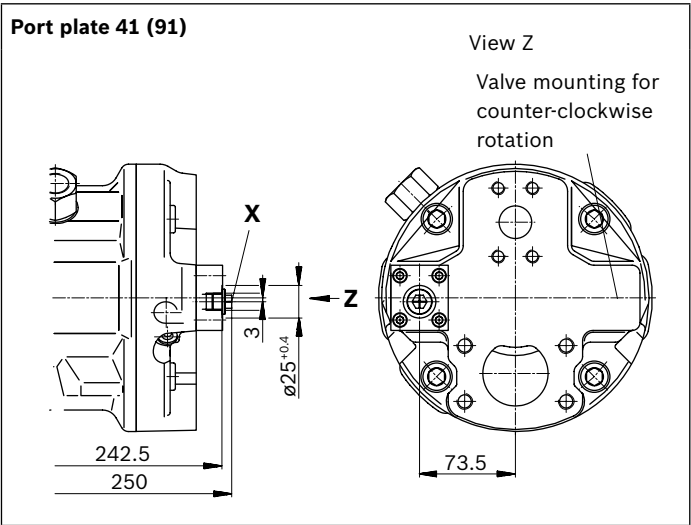
▼ Splined shaft 1 in (SAE J744)



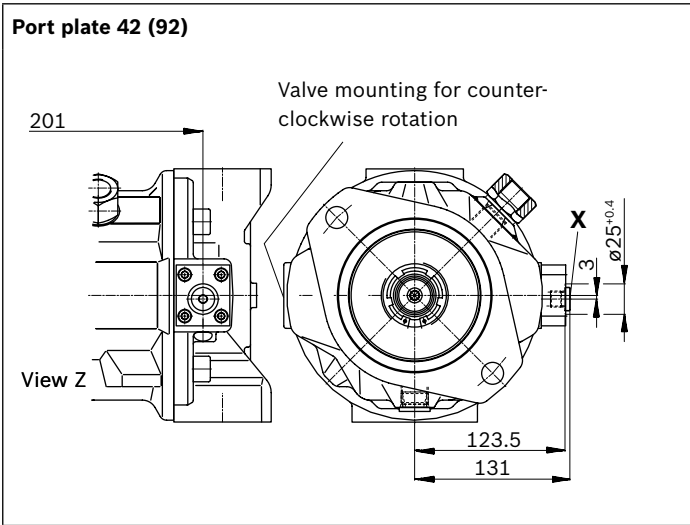
Ports - version metric port plate 41/42		Standard	Displacement	$p_{\max \text{ abs}}$ [bar]	State
B	Working port (standard pressure series) Fastening thread	SAE J518 DIN 13	1 in M10 × 1.5; 17 deep	350	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 DIN 13	2 in M12 × 1.75; 20 deep	10	O
L	Drain port	DIN 3852	M22 × 1.5; 14 deep	2	O
L₁	Drain port	ISO 11926	7/8-14 UNF-2B; 16 deep	2	X
X	Pilot pressure	DIN 3852	M14 × 1.5; 12 deep	350	O
X	Pilot pressure with TP-control	DIN ISO 228	G1/4 in; 12 deep	350	O

Ports - version SAE port plate 91/92		Standard	Displacement	$p_{\max \text{ abs}}$ [bar]	State
B	Working port (standard pressure series) Fastening thread	SAE J518 ASME B1.1	1 in 3/8-16 UNC-2B; 18 deep	350	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 ASME B1.1	2 in 1/2-13UNC-2B; 22 deep	10	O
L	Drain port	ISO 11926	7/8-14 UNF-2B; 16 deep	2	O
L₁	Drain port	ISO 11926	7/8-14 UNF-2B; 16 deep	2	X
X	Pilot pressure	ISO 11926	7/16-20 UNF-2B; 11.5 deep	350	O
X	Pilot pressure with TP-control	DIN ISO 228	G1/4 in; 12 deep	350	O

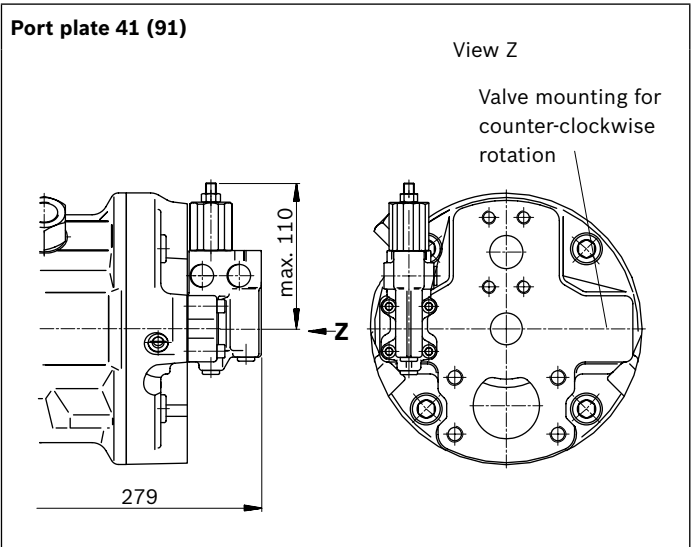
▼TP - Two-point control, direct operated



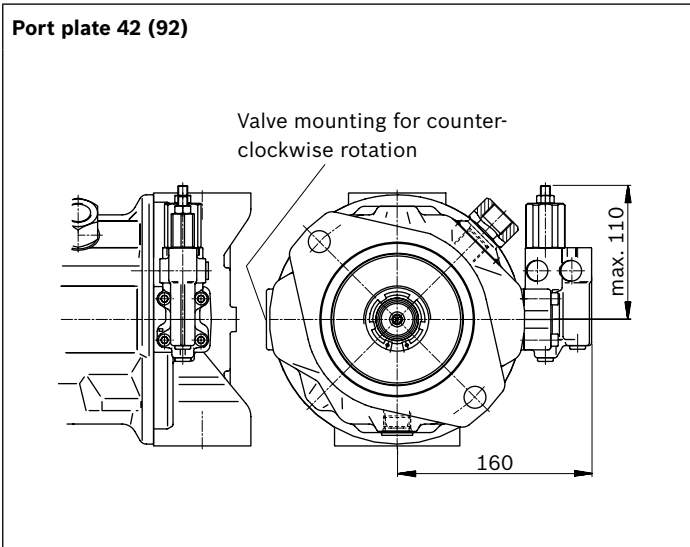
▼TP - Two-point control, direct operated



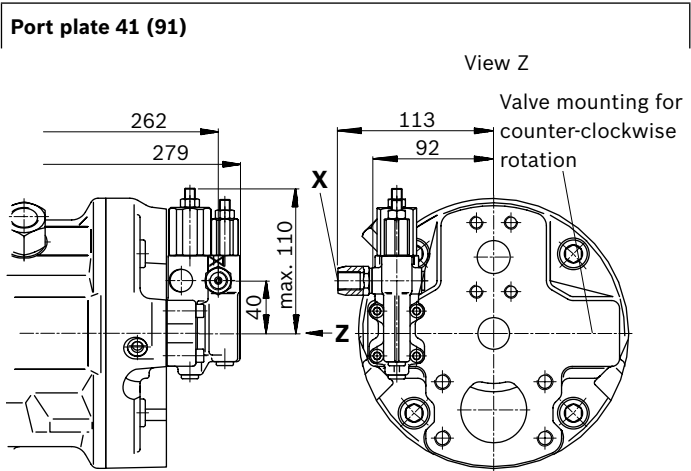
▼PR - Pressure controller



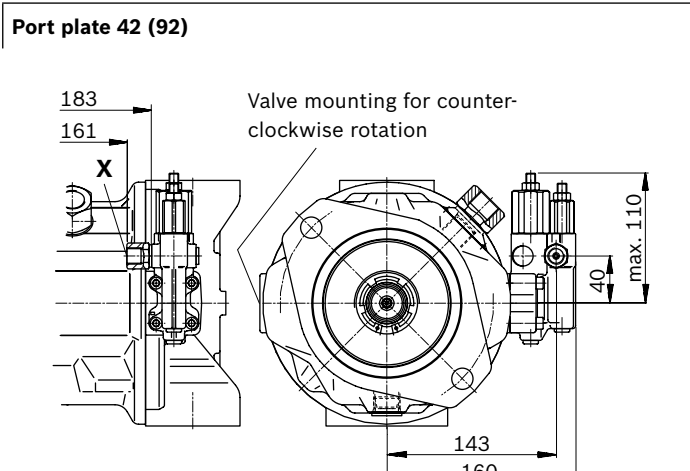
▼PR - Pressure controller



▼PRR - Pressure controller, remote controlled

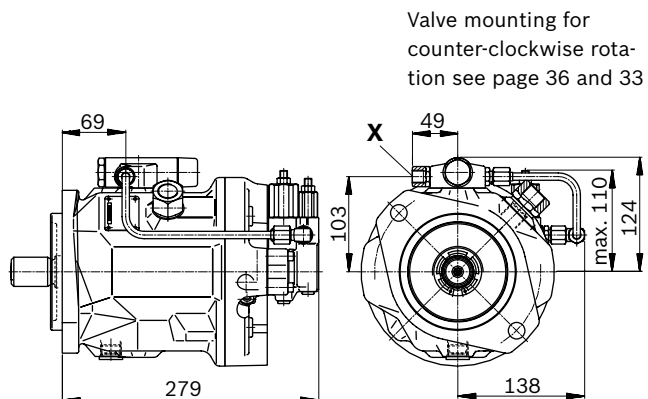


▼PRR - Pressure controller, remote controlled



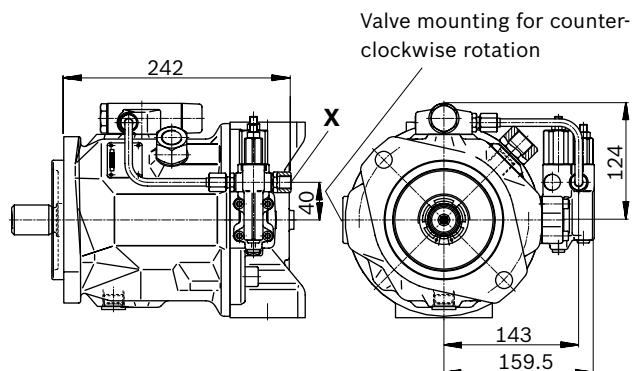
▼PFP - Pressure, flow and power controller

Port plate 41 (91)



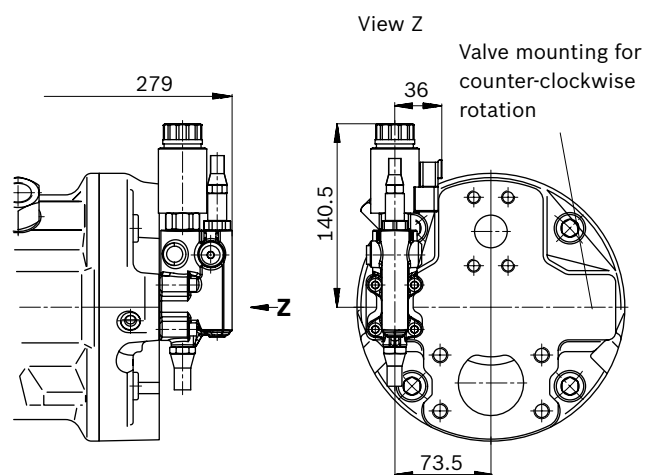
▼PFP - Pressure, flow and power controller

Port plate 42 (92)



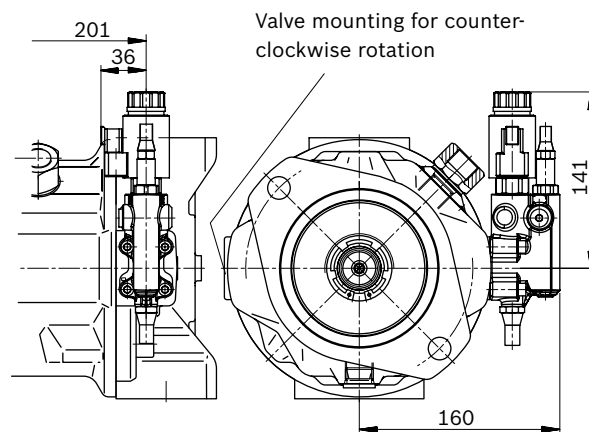
▼EN12/EN24 / EP12/EP24 - Electro-hydraulic pressure control

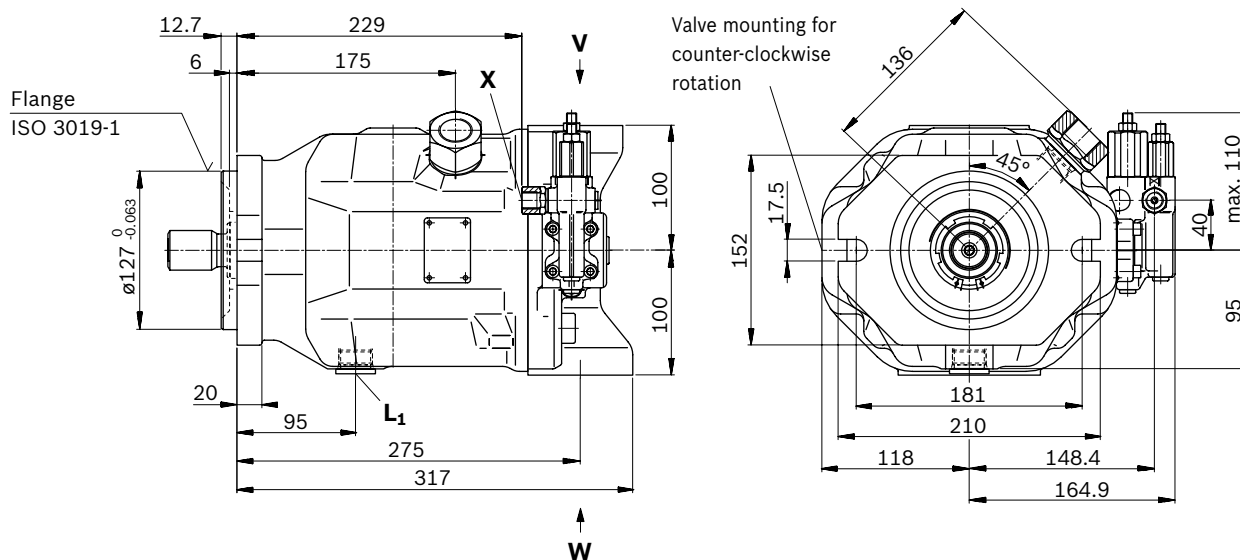
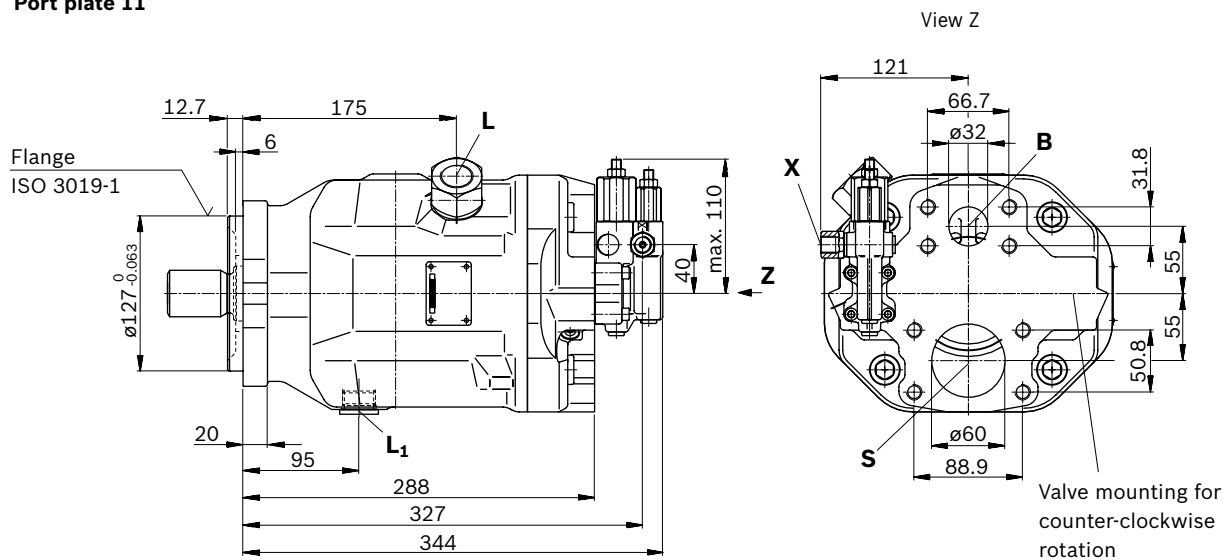
Port plate 41 (91)



▼EN12/EN24 / EP12/EP24 - Electro-hydraulic pressure control

Port plate 42 (92)

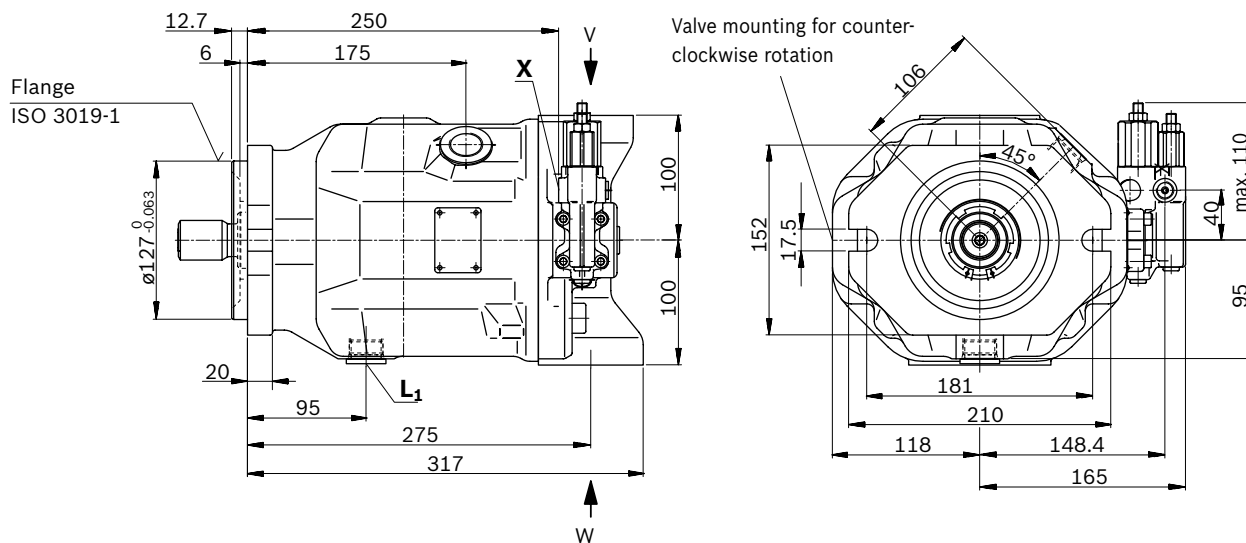


Dimensions, displacement 100**LS / LS1 / LS-C - Pressure and flow control, hydraulic; clockwise rotation, version: Ports metric**▼ **Port plate 12**▼ **Port plate 11**

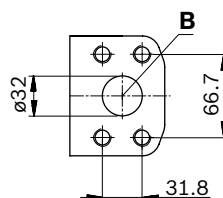
Dimensions, displacement 100

LS / LS1 / LS-C - Pressure and flow control, hydraulic; clockwise rotation, version: SAE ports

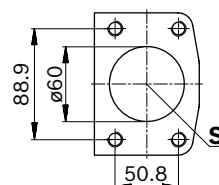
▼ Port plate 62



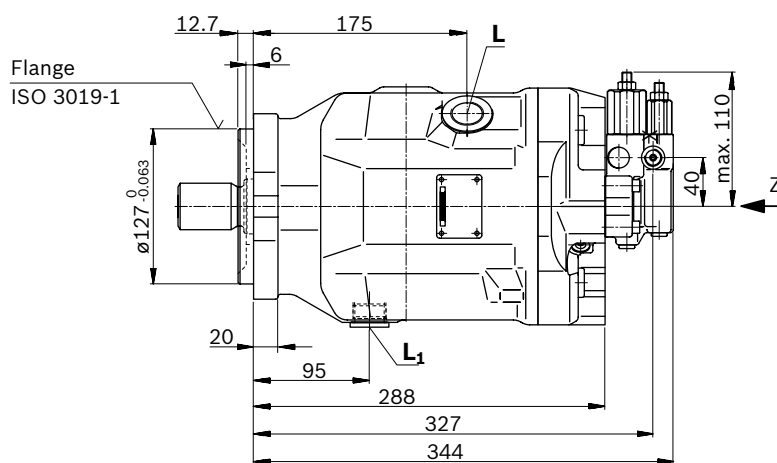
Detail V



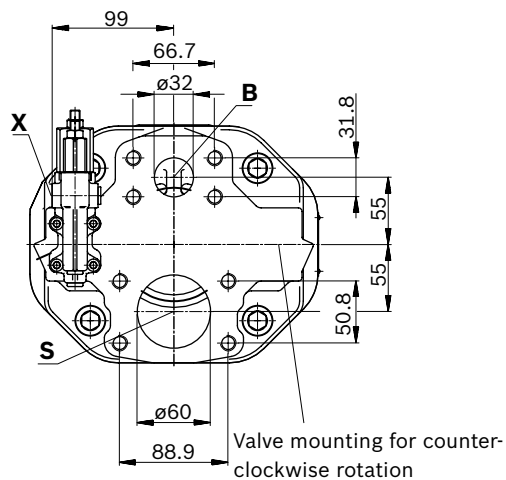
Detail W



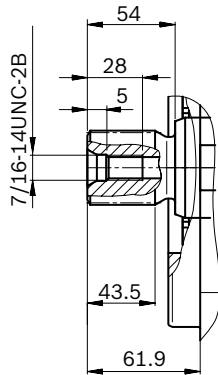
▼ Port plate 61



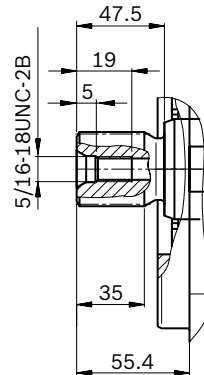
View Z



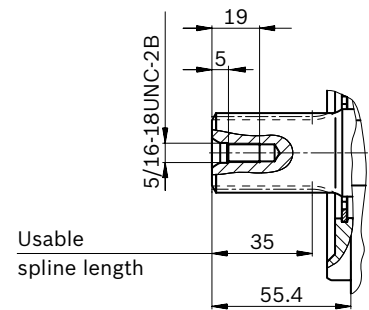
▼ Splined shaft 1 1/2 in (SAE J744)

S – 17T 12/24DP

▼ Splined shaft 1 1/4 in (SAE J744)

U – 14T 12/24DP

▼ Splined shaft 1 1/4 in (SAE J744)

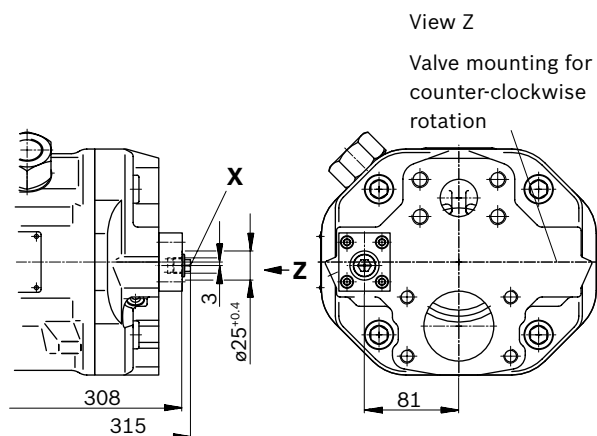
W – 14T 12/24DP

Ports - version metric port plate 11/12		Standard	Displacement	$p_{\max \text{ abs}}$ [bar]	State
B	Working port (high-pressure series) Fastening thread	SAE J518 DIN 13	1 1/4 in M14 × 2; 19 deep	350	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 DIN 13	2 1/2 in M12 × 1.75; 17 deep	10	O
L	Drain port	DIN 3852	M27 × 2; 16 deep	2	O
L₁	Drain port	ISO 11926	1 1/16-12 UNF-2B; 18 deep	2	X
X	Pilot pressure	DIN 3852	M14 × 1.5; 12 deep	350	O
X	Pilot pressure with TP-control	DIN ISO 228	G1/4 in; 12 deep	350	O

Ports - version SAE port plate 61/62		Standard	Displacement	$p_{\max \text{ abs}}$ [bar]	State
B	Working port (high-pressure series) Fastening thread	SAE J518 ASME B1.1	1 1/4 in 1/2-13 UNC-2B; 19 deep	350	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 ASME B1.1	2 1/2 in 1/2-13 UNC-2B; 22 deep	10	O
L	Drain port	ISO 11926	1 1/16-12 UNF-2B; 18 deep	2	O
L₁	Drain port	ISO 11926	1 1/16-12 UNF-2B; 18 deep	2	X
X	Pilot pressure	ISO 11926	7/16-20 UNF-2B; 11.5 deep	350	O
X	Pilot pressure with TP-control	DIN ISO 228	G1/4 in; 12 deep	350	O

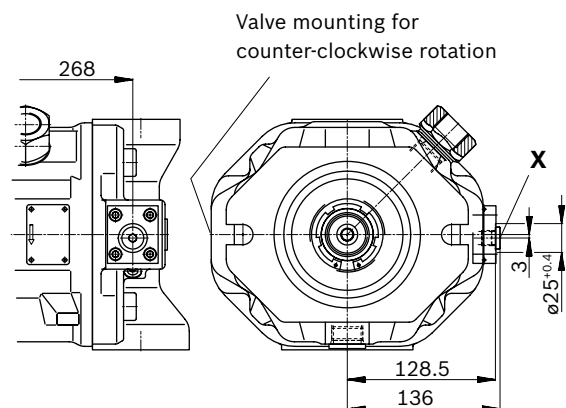
▼TTP - Two-point control, direct operated

Port plate 11 (61)



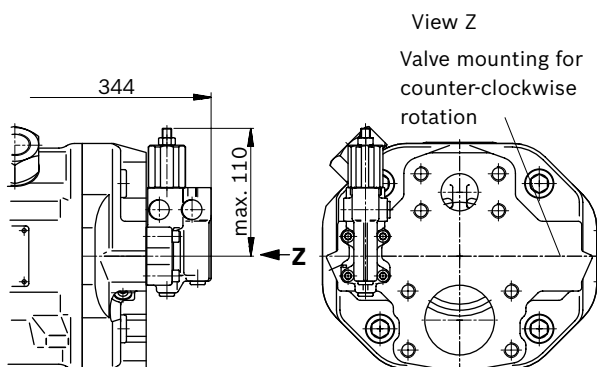
▼TTP - Two-point control, direct operated

Port plate 12 (62)



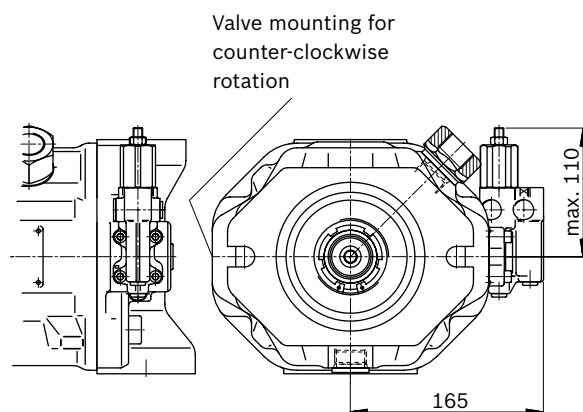
▼PR - Pressure controller

Port plate 11 (61)



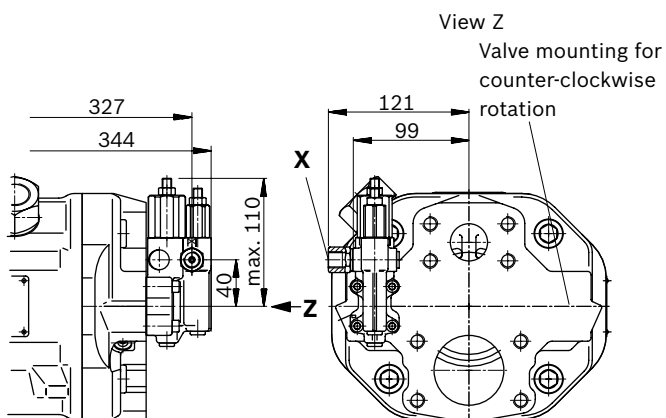
▼PR - Pressure controller

Port plate 12 (62)



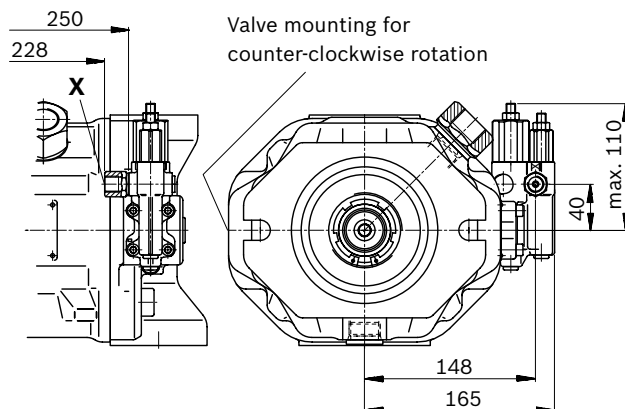
▼PRR - Pressure controller, remote controlled

Port plate 11 (61)



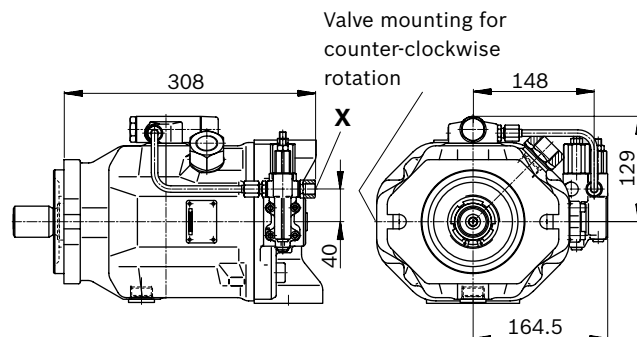
▼PRR - Pressure controller, remote controlled

Port plate 12 (62)



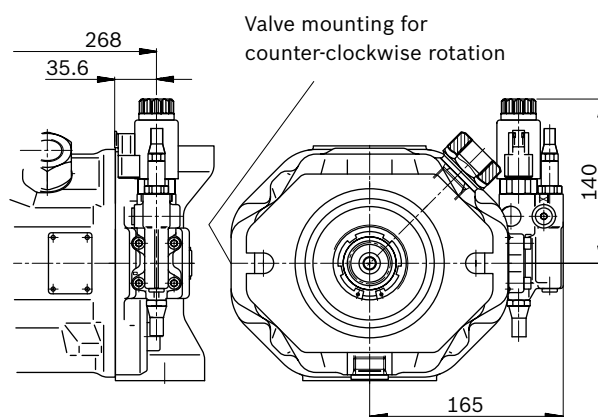
▼PFP - Pressure, flow and power controller

Port plate 12 (62)



▼EN12/EN24 / EP12/EP24 - Electro-hydraulic pressure control

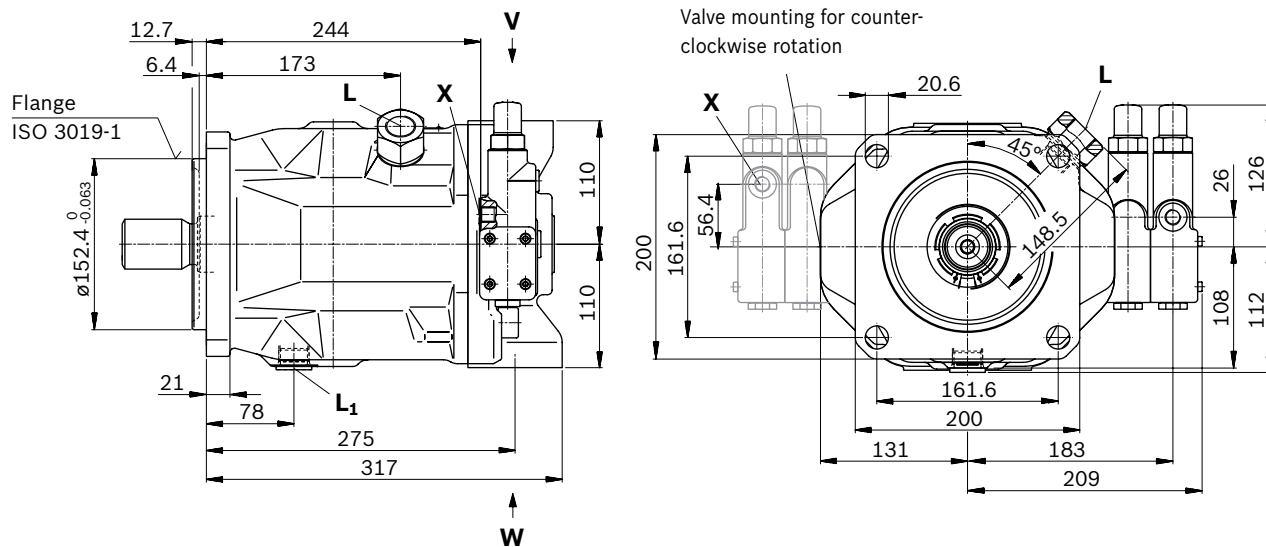
Port plate 12 (62)



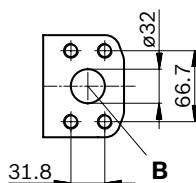
Dimensions, displacement 140

LS / LS1 / LS-C - Pressure and flow control, hydraulic, clockwise rotation, mounting flange D, version metric

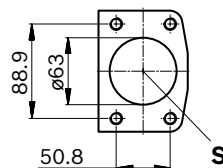
▼ Port plate 12



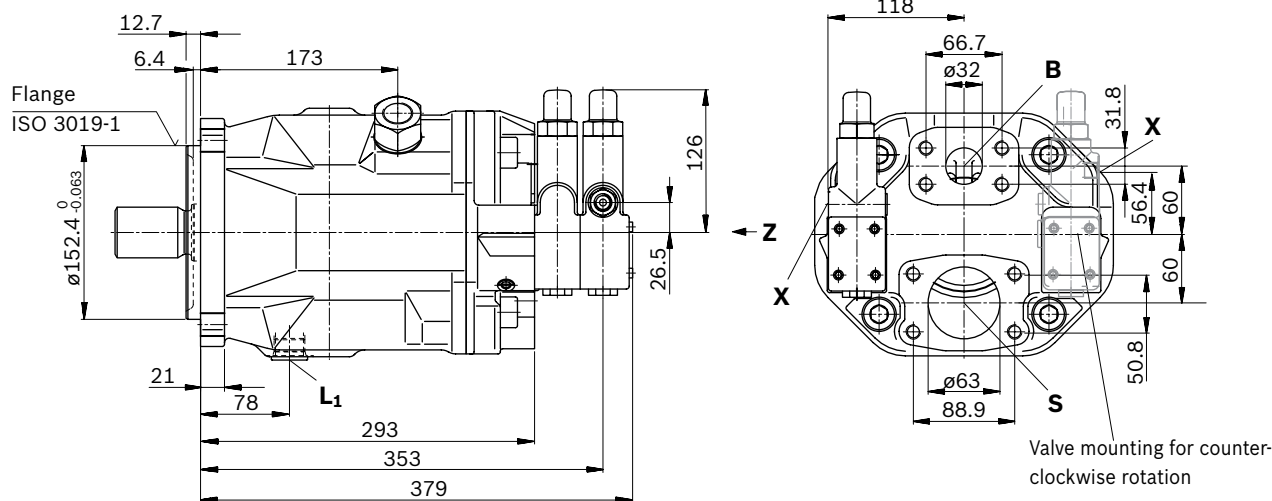
Detail V



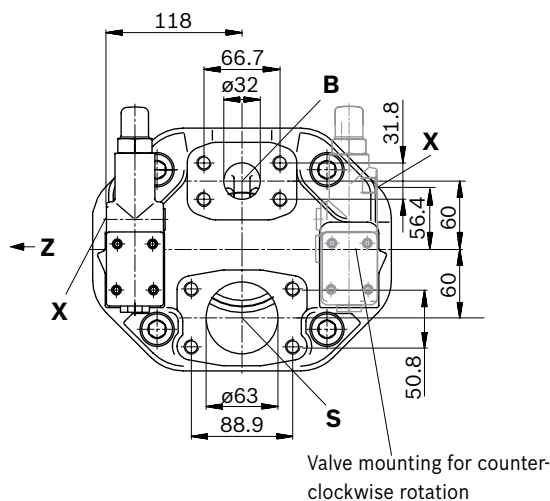
Detail W



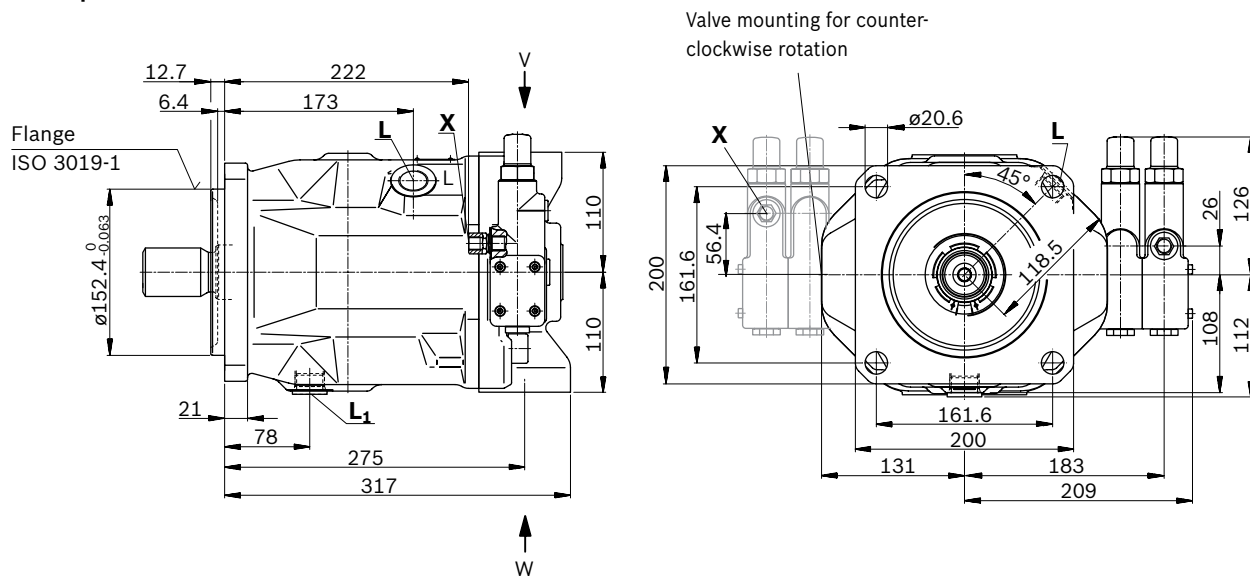
▼ Port plate 11



View Z

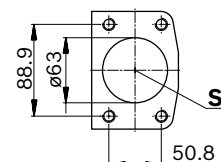
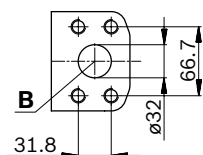


▼ Port plate 62

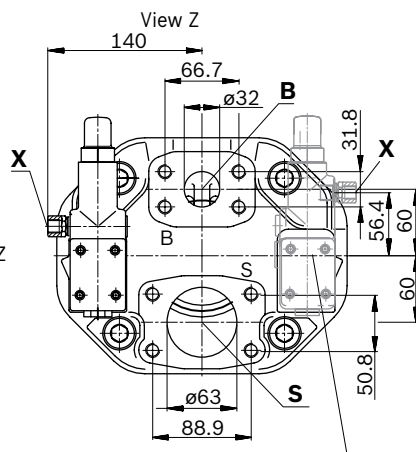


Detail V

Detail W

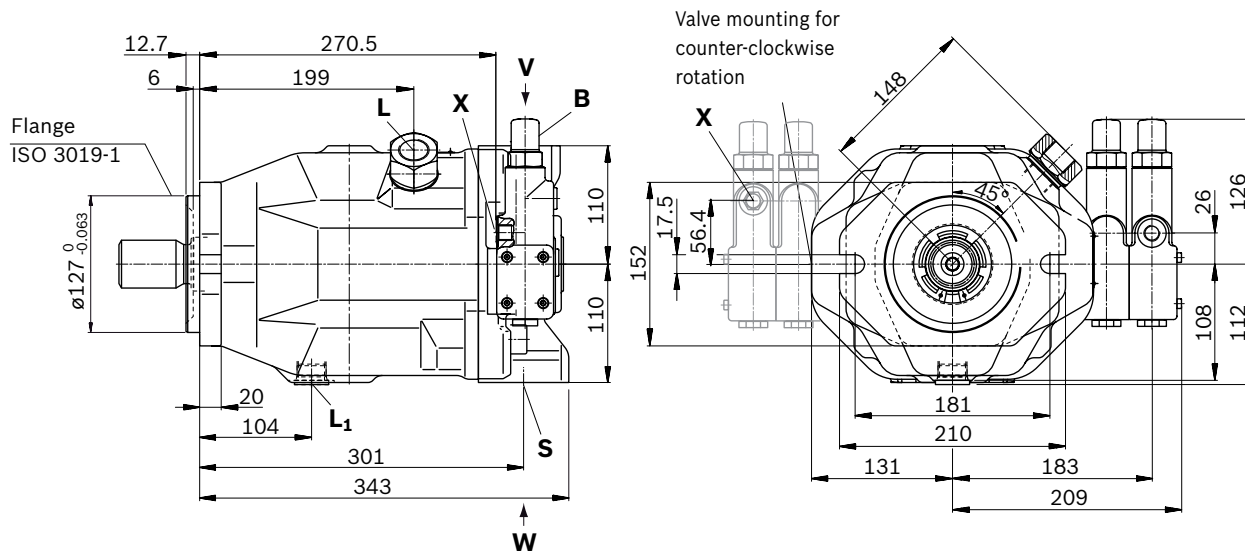


Technical drawing of the front view of a 4-way ball valve. The drawing shows a symmetrical design with a central body and two handle assemblies on the right. Key dimensions include a total width of 379, a body length of 293, and a handle length of 126. The flange on the left is labeled "Flange ISO 3019-1" and has a diameter of 152.4 with a tolerance of 0 to -0.063. Other dimensions include 12.7, 6.4, 173, 21, 78, 353, 26.5, and 126. A Z-axis arrow points to the right.



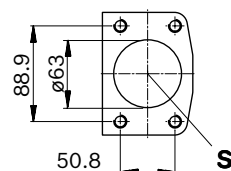
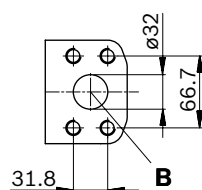
Valve mounting for counter-clockwise rotation

▼ Port plate 12



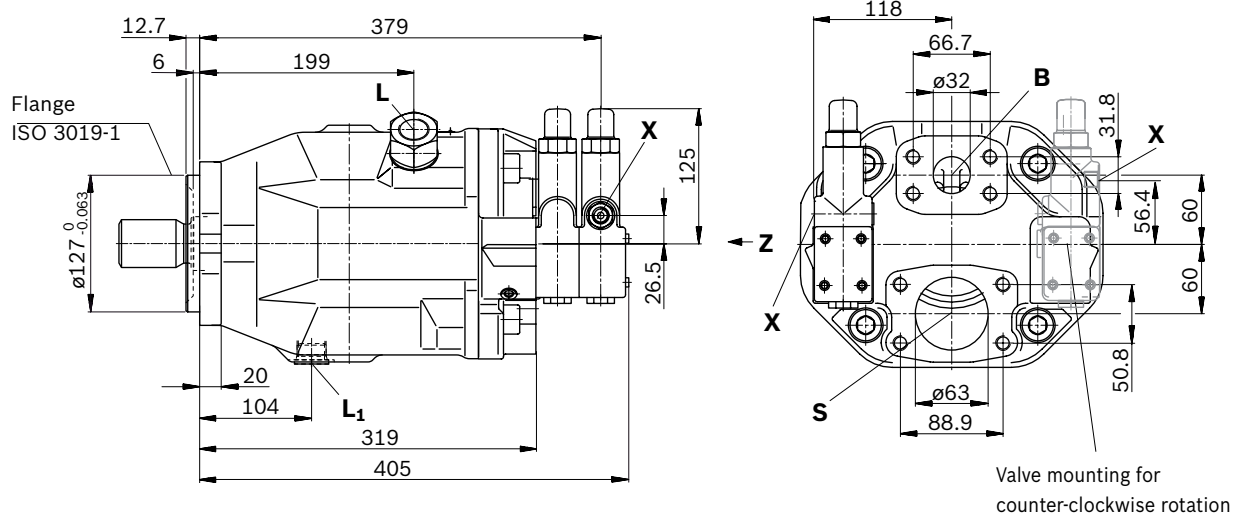
Detail V

Detail W



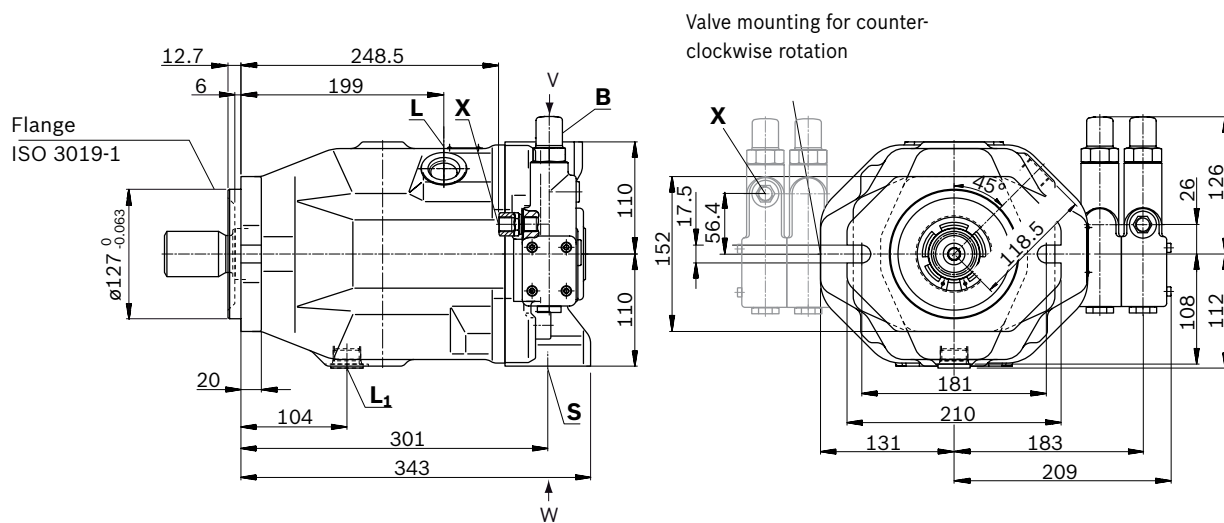
View Z

▼ Port plate 11



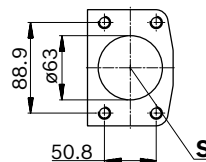
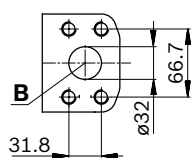
LS / LS1 / LS-C - Pressure and flow control, hydraulic, clockwise rotation, mounting flange C, version SAE

▼ Port plate 62

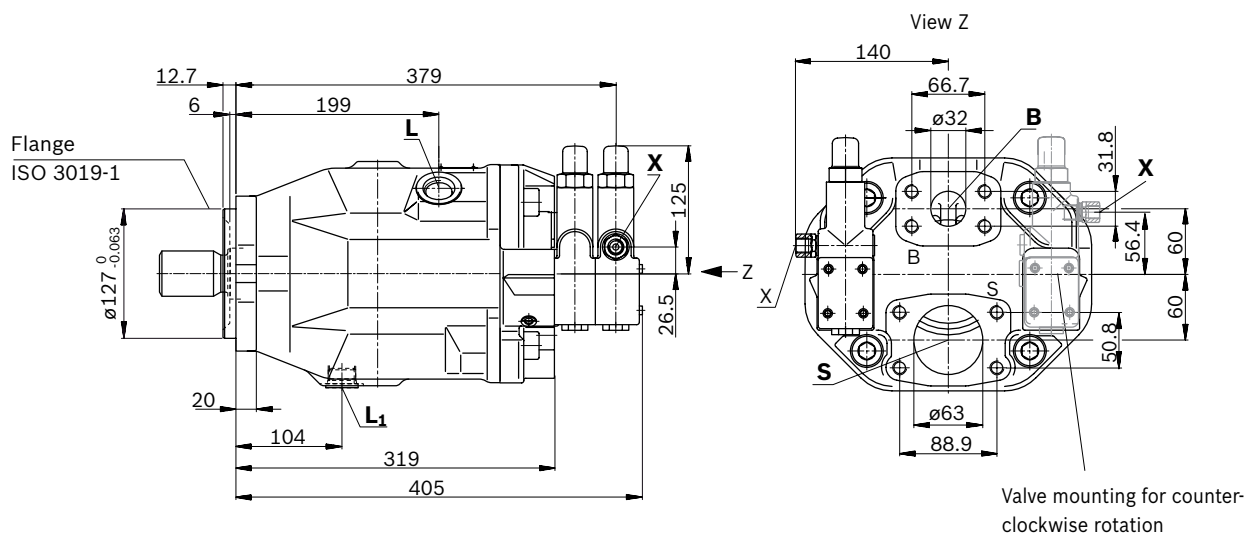


Detail V

Detail W



▼ Port plate 61

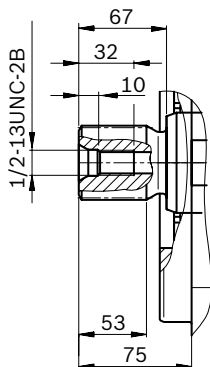


View Z

Valve mounting for counter-clockwise rotation

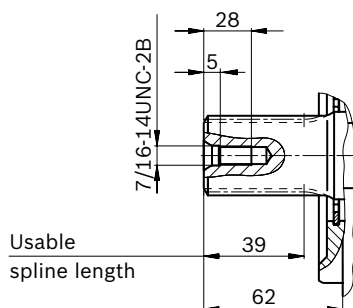
▼ Splined shaft 1 3/4 in (SAE J744)

S – 13T 8/16DP



▼ Splined shaft 1 1/2 in (SAE J744)

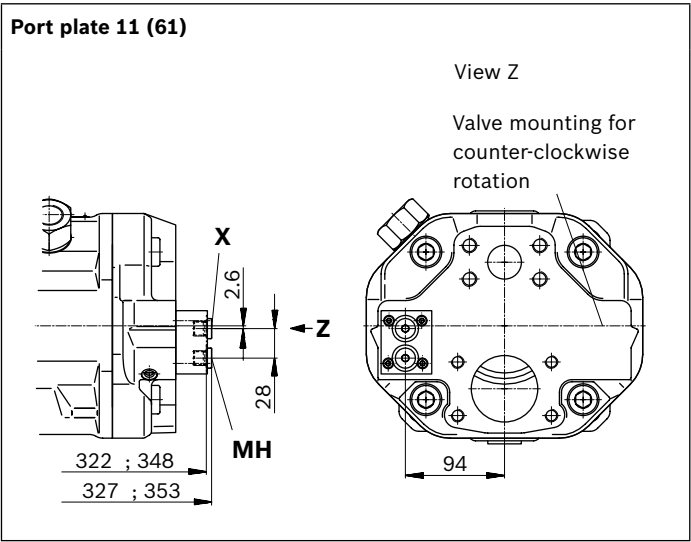
W – 17T 12/24DP



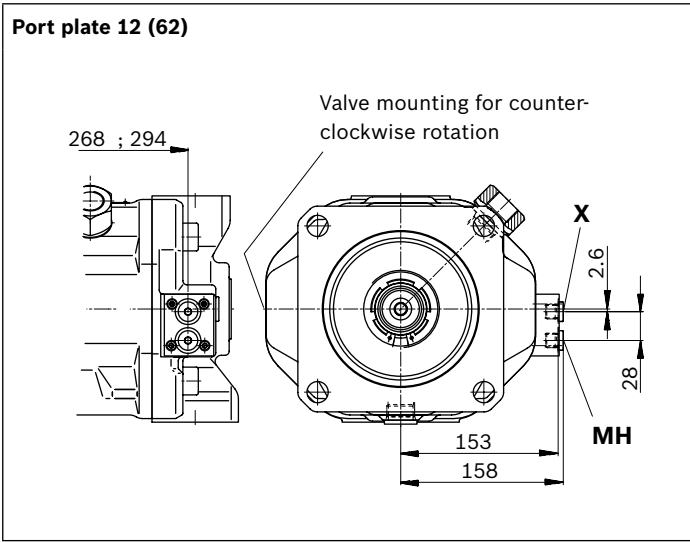
Ports - version metric port plate 11/12		Standard	Displacement	$p_{\max \text{ abs}}$ [bar]	State
B	Working port (high-pressure series) Fastening thread	SAE J518 DIN 13	1 1/4 in M14 × 2; 19 deep	350	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 DIN 13	2 1/2 in M12 × 1.75; 17 deep	10	O
L	Drain port	DIN 3852	M27 × 2; 16 deep	2	O
L₁	Drain port	ISO 11926	1 1/16-12 UNF-2B; 18 deep	2	X
X	Pilot pressure	DIN 3852	M14 × 1.5; 12 deep	350	O
X	Pilot pressure with TP-control	DIN 3852	M14 × 1.5; 12 deep	350	O
M_H	High pressure measurement (only with control TP)	DIN 3852	M14 × 1.5; 12 deep	350	X

Ports - version SAE port plate 61/62		Standard	Displacement	$p_{\max \text{ abs}}$ [bar]	State
B	Working port (high-pressure series) Fastening thread	SAE J518 ASME B1.1	1 1/4 in 1/2-13 UNC-2B; 24 deep	350	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 ASME B1.1	2 1/2 in 1/2-13 UNC-2B; 24 deep	10	O
L	Drain port	ISO 11926	1 1/16-12 UNF-2B; 18 deep	2	O
L₁	Drain port	ISO 11926	1 1/16-12 UNF-2B; 18 deep	2	X
X	Pilot pressure	ISO 11926	9/16-18 UNF-2B; 13 deep	350	O
X	Pilot pressure with TP-control	DIN 3852	M14 × 1.5; 12 deep	350	O
M_H	High pressure measurement (only with control TP)	DIN 3852	M14 × 1.5; 12 deep	350	X

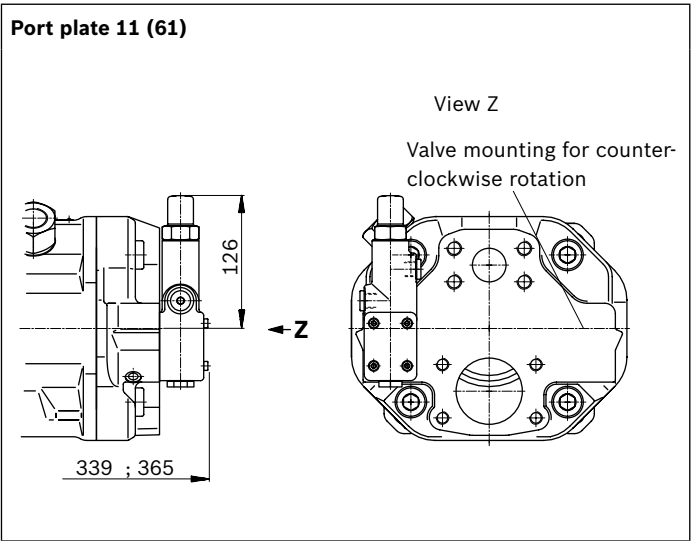
▼TP - Two-point control, direct operated



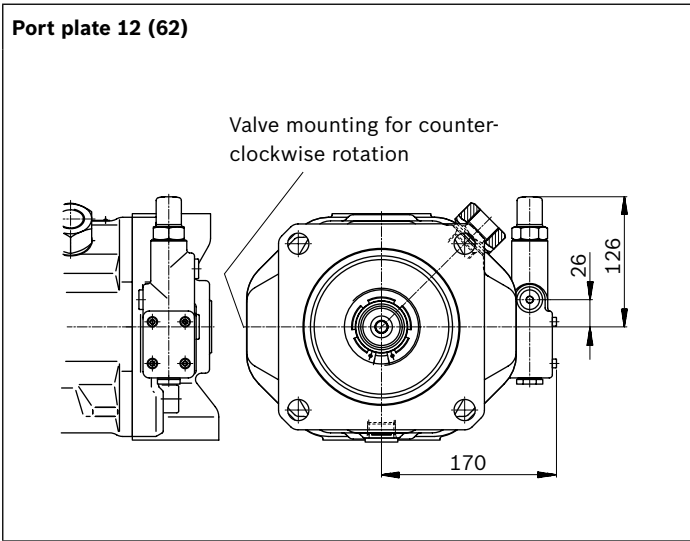
▼TP - Two-point control, direct operated



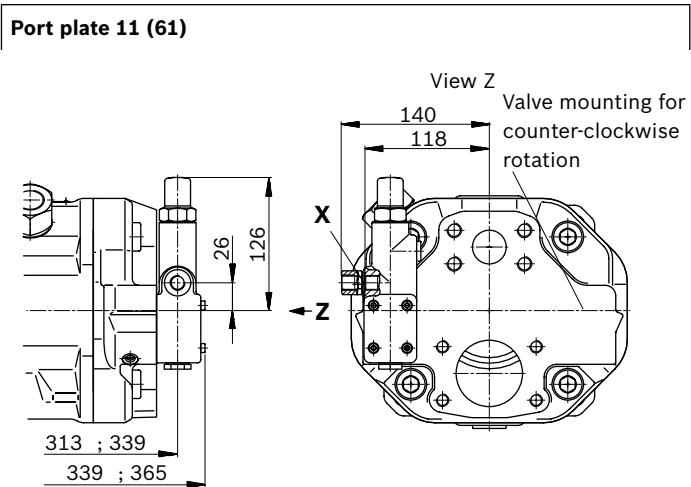
▼PR - Pressure controller



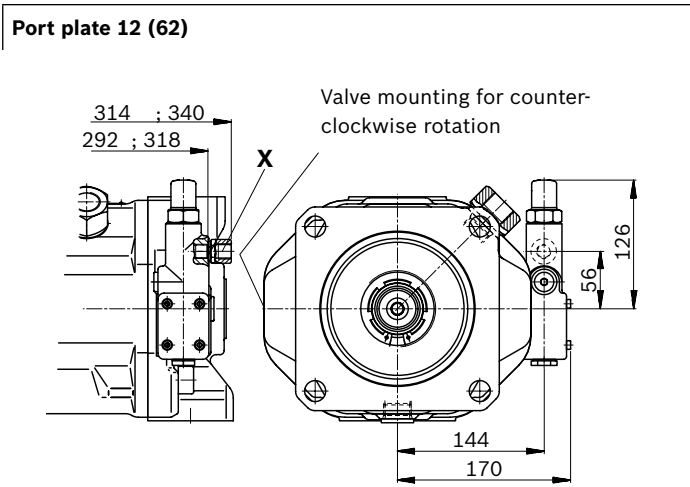
▼PR - Pressure controller



▼PRR - Pressure controller, remote controlled

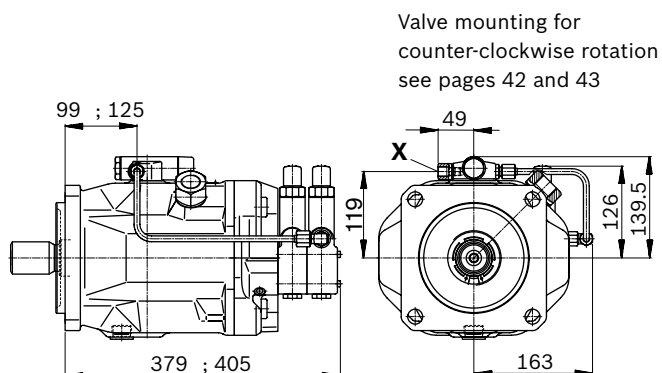


▼PRR - Pressure controller, remote controlled



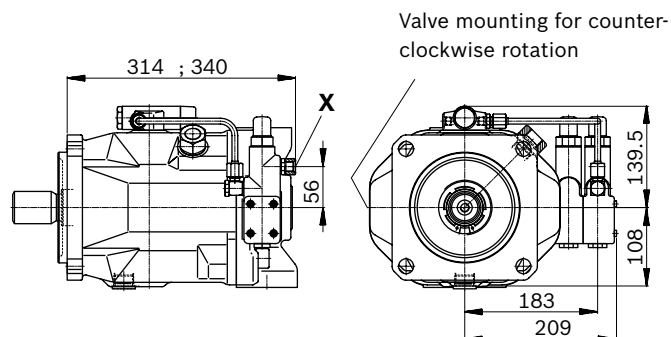
▼PFP - Pressure, flow and power controller

Port plate 11 (61)



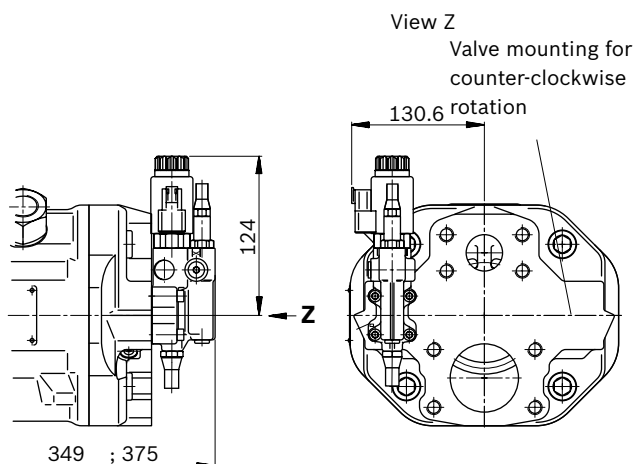
▼PFP - Pressure, flow and power controller

Port plate 12 (62)



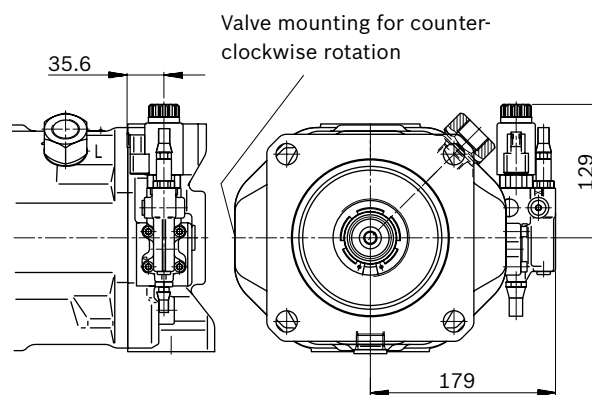
▼EN12/EN24 / EP12/EP24 - Electro-hydraulic pressure control

Port plate 11 (61)



▼EN12/EN24 / EP12/EP24 - Electro-hydraulic pressure control

Port plate 12 (62)

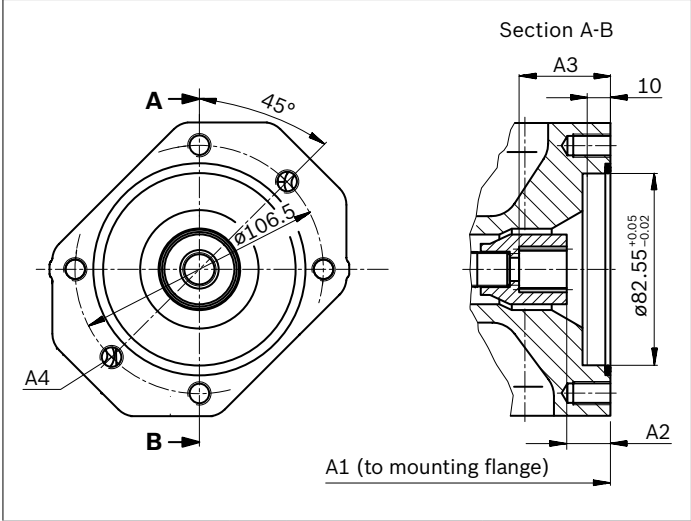
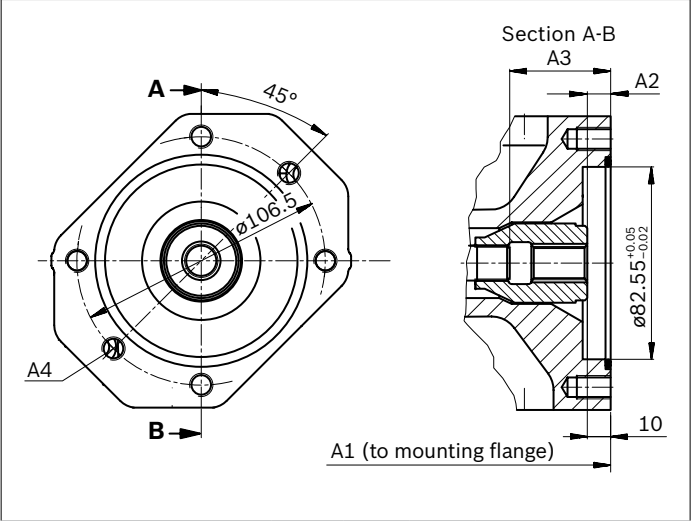


Dimensions, tandem

Flange ISO 3019-1 (SAE)		Hub for splined shaft		Availability over displacements							Code
Diameter	Symbol	Diameter		18	28	45	71	88	100	140	
82-2 (A)	⌀, ♂, ∞	5/8 in	9T 16/32DP	•	•	•	•	•	•	•	K01
		3/4 in	11T 16/32DP	•	•	•	•	•	•	•	K52

• = Available - = Not available

▼ 82-2



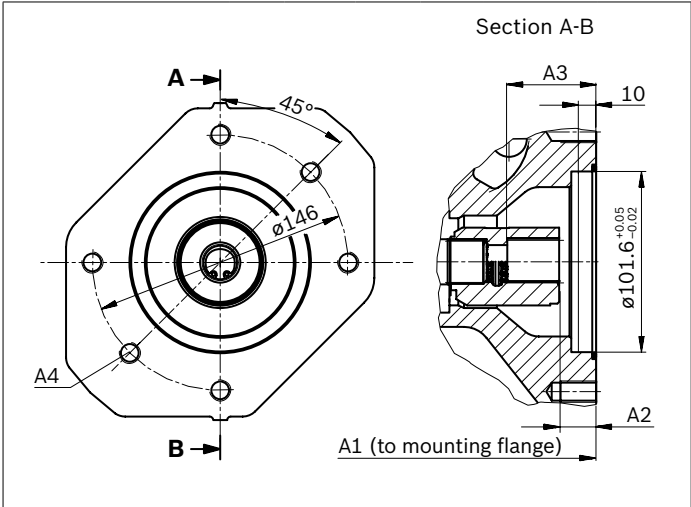
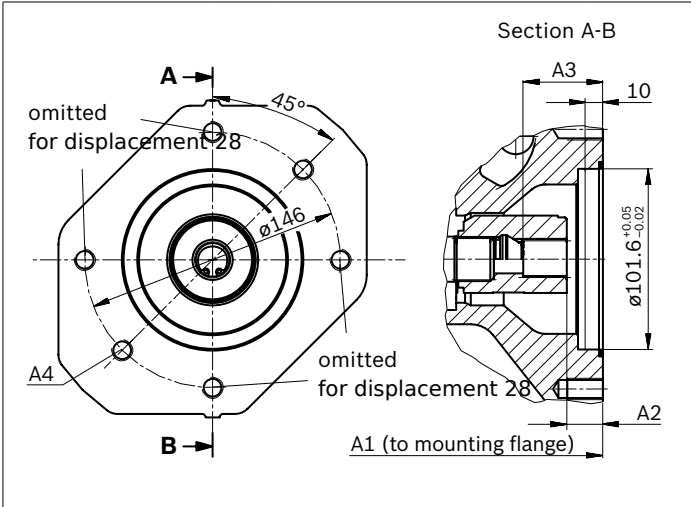
K01	NG	A1	A2	A3	A4
(SAE J744 16-4 (A))					
18	182	10	43.3	M10×1.5; 14.5 deep	
28	204	10	33.7	M10×1.5; 16 deep	
45	229	10.7	53.4	M10×1.5; 16 deep	
71	267	11.8	61.3	M10×1.5; 20 deep	
88	267	11.8	61.3	M10×1.5; 20 deep	
100	338	10.5	65	M10×1.5; 16 deep	
140	350	10.8	77.3	M10×1.5; 16 deep	
	376				

K52	NG	A1	A2	A3	A4
(SAE J744 19-4 (A-B))					
18	182	18.8	38.7	M10×1.5; 14.5 deep	
28	204	18.8	38.7	M10×1.5; 16 deep	
45	229	18.9	38.7	M10×1.5; 16 deep	
71	267	21.3	41.4	M10×1.5; 20 deep	
88	267	21.3	41.4	M10×1.5; 20 deep	
100	338	19	38.9	M10×1.5; 16 deep	
140	350	18.9	38.6	M10×1.5; 16 deep	
	376				

Flange ISO 3019-1 (SAE)		Hub for splined shaft		Availability over displacements							Code
Diameter	Symbol	Diameter		18	28	45	71	88	100	140	
101-2 (B)	⌀, ⌀, ∞	7/8 in	13T 16/32DP	-	•	•	•	•	•	•	K68
		1 in	15T 16/32DP	-	-	•	•	•	•	•	K04

• = Available - = Not available

▼ 101-2



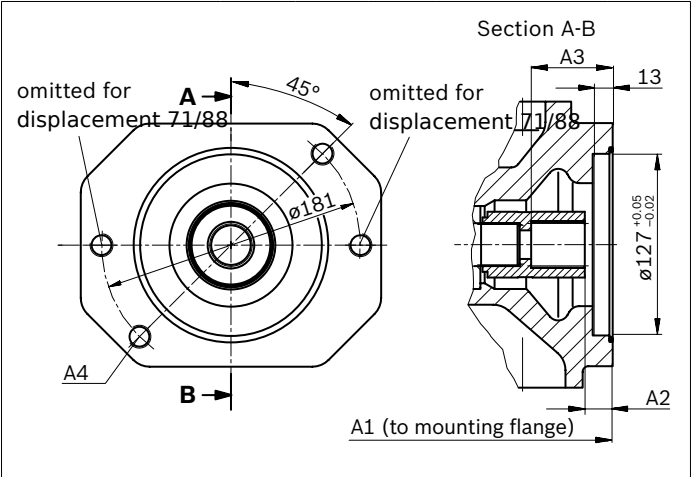
K68	NG	A1	A2	A3	A4
(SAE J744 22-4 (B))					
28	204	17.8	41.7	M12×1.75;	
45	229	17.9	41.7	M12×1.75; 18 deep	
71	267	20.3	44.7	M12×1.75; 20 deep	
88	267	20.3	44.7	M12×1.75; 20 deep	
100	338	18	41.9	M12×1.75; 20 deep	
140	350	17.8	41.6	M12×1.75; 20 deep	
	376				

K04	NG	A1	A2	A3	A4
(SAE J744 25-4 (B-B))					
45	229	18.4	46.7	M12×1.75; 18 deep	
71	267	20.8	49.1	M12×1.75; 20 deep	
88	267	20.8	49.1	M12×1.75; 20 deep	
100	338	18.2	46.6	M12×1.75; 20 deep	
140	350	18.3	45.9	M12×1.75; 20 deep	
	376				

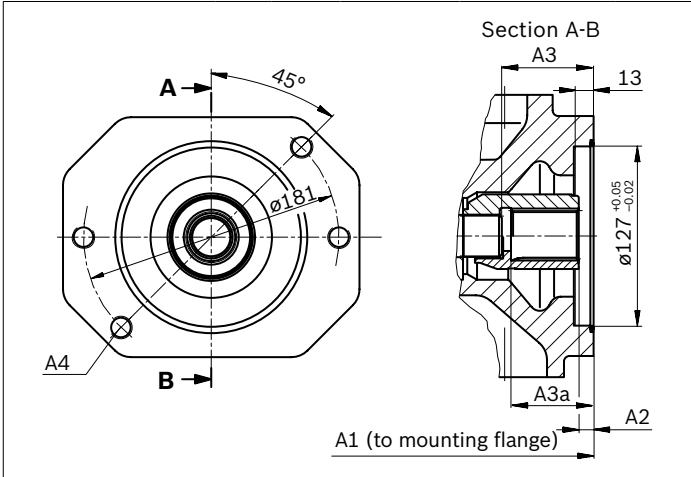
Flange ISO 3019-1 (SAE)		Hub for splined shaft		Availability over displacements							Code
Diameter	Symbol	Diameter		18	28	45	71	88	100	140	
127-2 (C)	ϕ, ∞	1 1/4 in	14T 12/24DP	-	-	-	•	•	•	•	K07
		1 1/2 in	17T 12/24DP	-	-	-	-	-	•	•	K24

• = Available - = Not available

▼ 127-2



K07	NG	A1	A2	A3	A4
(SAE J744 32-4 (C))					
	71	267	21.8	58.6	M16×2;
	88	267	21.8	58.6	M16×2;
	100	338	19.5	56.4	M16×2;
	140	350	19.3	56.1	M16×2; 24 deep
		376			

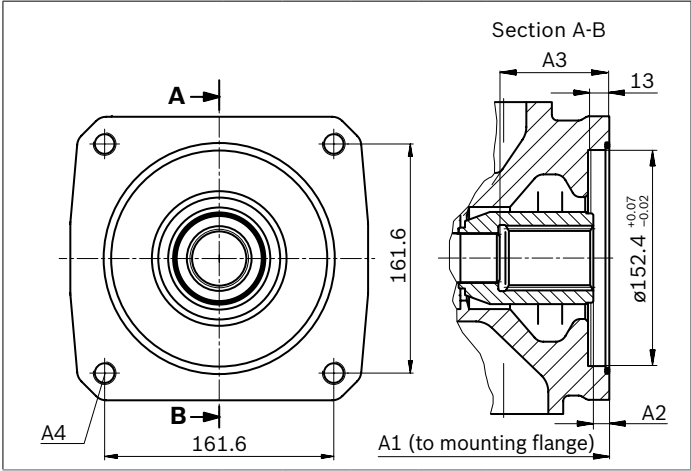


K24	NG	A1	A2	A3	A3a	A4
(SAE J744 38-4 (C-C))						
	100	338	9.9	65	-	M16×2;
	140	350	9.7	-	69.1	M16×2; 24 deep
		376				

Flange ISO 3019-1 (SAE)		Hub for splined shaft		Availability over displacements						Code
Diameter	Symbol	Diameter		18	28	45	71 /88	100	140	
152-4 (D)	⊗	1 3/4 in	13T 8/16DP	-	-	-	-	-	●	K17

● = Available - = Not available

▼ 152-4



K17	NG	A1	A2	A3	A4
(SAE J744 44-4 (D))	140	350	11	77.3	M16×2;

Only available with housing with mounting flange D.

Overview of mounting options

SAE – mounting flange

Tandem		Mounting options – 2nd pump				
Flange ISO 3019-1	Hub for splined shaft	Code	HA10V Series 3 NG (shaft)	HA10V Series 3 NG (shaft)	External gear pump design (displacement)	Tandem available for displacement
82-2 (A)	5/8 in	K01	18 (U)	10 (U), 18 (U)	Series F	18 to 140
	3/4 in	K52	18 (S, R)	10 (S) 18 (S, R)	–	18 to 140
101-2 (B)	7/8 in	K68	28 (S, R) 45 (U, W)	28 (S, R) 45 (U, W)	Series N/G	28 to 140
	1 in	K04	45 (S, R) –	45 (S, R) 60, 63, 72 (U, W)	–	45 to 140
127-2 (C)	1 1/4 in	K07	71 (S, R) 88 (S, R) 100 (U, W)	85 (U, W) 100 (U, W)	–	71 to 140
	1 1/2 in	K24	100 (S)	85 (S) 100 (S)	–	100 to 140
152-4 (4-hole D)	1 3/4 in	K17	140 (S)	–	–	140

Combination pumps HA10V Series 3 + HA10V Series 3

By using combination pumps, it is possible to have independent circuits without the need for splitter gearboxes. When ordering combination pumps, the type designations of the 1st and 2nd pumps must be linked by a “+”.

Order example:

HA10V Series 3 100LS1/3R-VSC12K04+

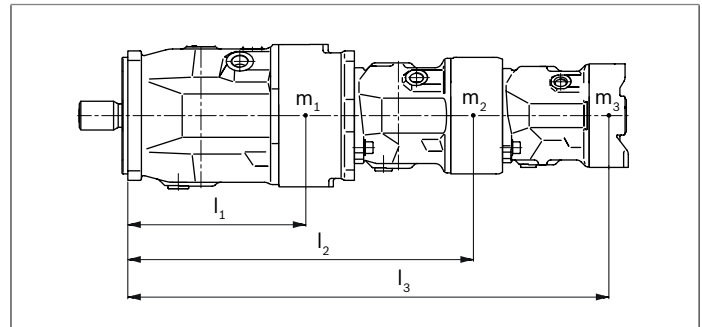
HA10V Series 3 45LS/3R-VSC12N00

If no further pumps are to be mounted at the factory, the simple type designation is sufficient.

It is permissible to use a combination of two single pumps of equal displacement (tandem pump), with a dynamic mass acceleration of maximum 10 g (= 98.1 m/s²) without additional support brackets.

Each tandem is plugged with a **non-pressure-resistant** cover. Before commissioning the units, they must therefore be equipped with a pressure-resistant cover. Tandems can also be ordered with pressure-resistant covers. Please specify in plain text.

For combination pumps consisting of more than two pumps, the mounting flange must be rated for the permissible mass torque (please contact us).



m_1, m_2, m_3	Weight of pump	[kg]
l_1, l_2, l_3	Distance, center of gravity	[mm]
$T_m = (m_1 \times l_1 + m_2 \times l_2 + m_3 \times l_3) \times \frac{1}{102} \text{ [Nm]}$		

Permissible mass moment of inertia

Displacement			18	28	45	71	88	100	140	
static	T_m	Nm	500	880	1370	2160	2160	3000	4500	3000
dynamic at 10 g (98.1 m/s ²)	T_m	Nm	50	88	137	216	216	300	450	300
Weight without tandem and N00	m	kg	12.9	18	23.5	35.2	35.2	49.5	65.4	
Weight with tandem and K..			13.8	19.3	25.1	38	38	55.4	74.4	
Distance, center of gravity without tandem N00	l_I	mm	92	100	113	127	127	161	159	
Distance, center of gravity with tandem K..	l_I	mm	98	107	120	137	137	178	180	



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