

2PBA Series

Hydraulic Piston Pump



2PBA Hydraulic Piston Pump have the following advantages;

- Compact Design,
- Economical Conception,
- High Power Density,
- High Overall Efficiency,
- High Rotating Speeds,
- High Output Pressure,
- 400 bar Cont. Work. Pressure,
- 450 bar Peak Pressure,
- From 12cc to 130cc,
- Reduced Noise Level,
- Increased Reliability,
- No Drain Line Necessary,
- Smaller Installation Dimensions,
- One Piece Pistons with Piston Rings,
- Special Inlet Fittings & Accesories,
- Simple Change of Direction of Rotation

Ordering Code of 2PBA Hydraulic Piston Pump

Pump Code	Displacement (cm3)	Direction of Rotation	Version	Sealing	Inlet Fittings					
2PBA	108	L	S	N	A					
					A Suction Fittings Included					
				N Nitrile	V Viton					
			S Special Version		C Classic Version					
		L Rotation : Left / CCW			R Rotation : Right / CW					
	12	18	25	32	40	50	63	80	108	130

2PBA Hydraulic Piston Pump, Fixed Displacement, 400 / 450 bar.

Special Version; BRONZE EDITION

Classic Version



Special Version



Technical Data I

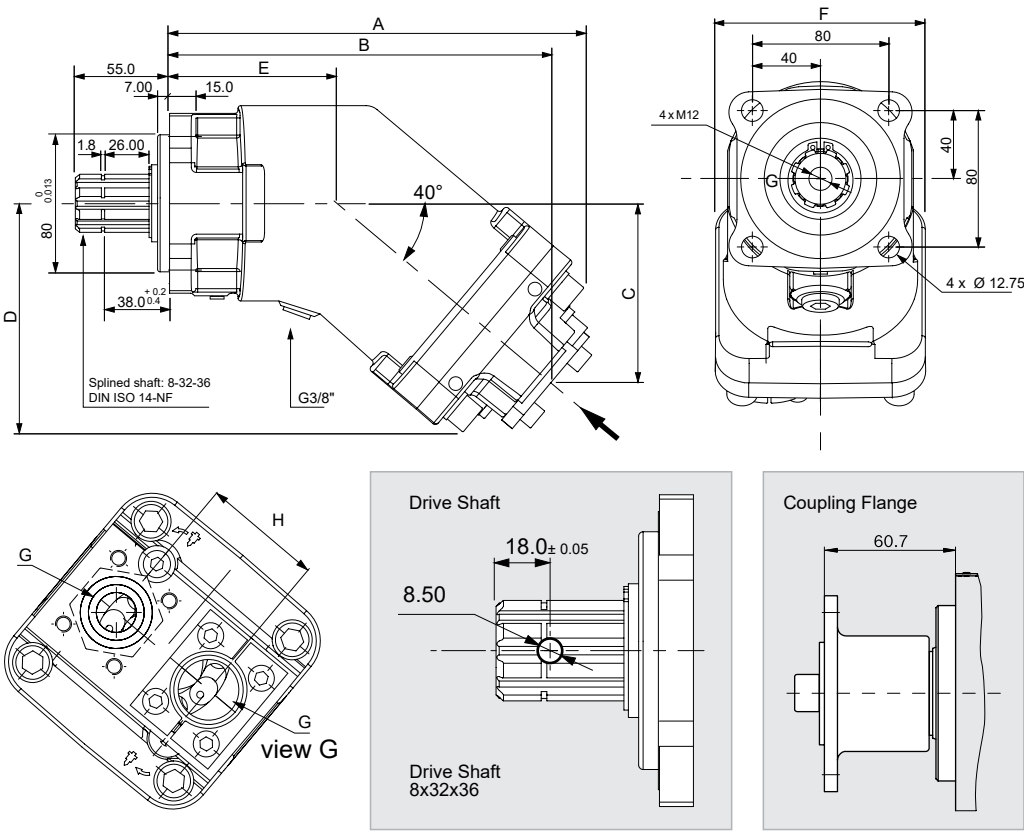
		12	18	25	32	40	50	63	80	108	130
Displacement	cc	12,00	18,00	25,00	32,00	40,20	50,00	63,00	80,00	108,4	130,0
Theoretical oil flow l/min at pump speed	1000 rpm	12,00	18,00	25,00	32,00	40,20	50,00	63,00	80,00	108,4	130,0
	1500 rpm	18,00	27,00	37,50	48,00	60,30	75,00	94,50	120,0	162,6	195,0

Maximum Pump Speed											
- Continuous	rpm	2300	2300	2300	2250	1900	1900	1900	1700	1700	1600
- Limited	rpm	3100	2900	2700	2700	2500	2500	2300	2100	1900	1750
Max. Continuous Pressure	bar	400	400	400	400	400	400	400	400	400	400
Max. Intermit. Peak Pressure	bar	450	450	450	450	450	450	450	450	450	450
Max. Torque at 350 bar	Nm	71	105	146	190	240	292	360	460	620	746

Weight											
- Without inlet fitting	kg	9,00	9,00	9,50	10,50	10,50	11,00	11,50	15,00	15,50	16,50
- With inlet fitting	kg	9,40	9,40	9,90	10,90	10,90	11,40	11,90	15,40	15,90	17,00

Rotation		CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW
Fluid		Mineral Based Hydraulic Oils									
Inlet & Outlet		3/4"	3/4"	3/4"	1"	1"	1"	1"	1"	1"	1"

Technical Data II



	12	18	25	32	40	50	63	80	108	130
cc	12,00	18,00	25,00	32,00	40,20	50,00	63,00	80,00	108,4	130,0
A	195,0	195,0	195,0	202,0	202,0	215,0	215,0	242,0	242,0	242,0
B	176,0	176,0	176,0	183,0	183,0	196,0	196,0	221,0	223,0	223,0
C	76,0	76,0	76,0	82,0	82,0	94,0	94,0	104,0	105,0	105,0
D	104,0	104,0	104,0	108,0	108,0	118,0	118,0	132,0	132,0	132,0
E	86,0	86,0	86,0	86,0	86,0	86,0	86,0	98,0	98,0	98,0
F	108,0	108,0	108,0	108,0	108,0	108,0	108,0	122,0	122,0	122,0
G	3/4"	3/4"	3/4"	1"	1"	1"	1"	1"	1"	1"
H	54	54	54	54	54	54	54	60	60	60

2PBA Series Hydraulic Piston Pump

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Installation & User Guide

The 2PBA Hydraulic Piston Pump fitted with a rubber front seal.

INSTALLATION

2PBA Hydraulic Piston Pump are direct mounting on the PTO.

Grease the splined shaft before installation. Do not tap the gear wheel/driver into position.

Remove any mounted screws on the pump.

The 2PBA was delivered with protective covers and plastic/threaded plugs.

It should be removed before of install. Please check seals and surfaces. If sealing or other surfaces damaged please contact your responsible Service Partner.

Start up and run the pump at medium speed (800 to 1000 rpm at the PTO) until the oil flowing out of the pump. (There are no more air bubbles.)

OIL SUPPLY

Oil and supply line should be clean, and the supply line is airtight.

SUCTION LINE

Connect the suction line, tighten the suction connection bolts in diametric pairs.

Connect the pressure line.

REPAIR

We offers a comprehensive range of services for the repair of our Hydraulic Piston Pump.

Repairs to the 2PBA Hydraulic Piston Pump may only be performed by authorized, skilled and instructed personnel.

Only use original and pre-installed our 2PBA spare parts from supplied to Manufacturer.

Tested and pre-installed 2PBA Hydraulic Piston Pump successful repair requiring only little time.

SPARE PARTS

The spare parts list and the 2PBA Hydraulic Piston Pump order specific.

When ordering spare parts, quote the material and complete Ordering code number of the 2PBA Hydraulic Piston Pump as well as the right numbers of the spare parts.

RISK OF DAMAGE!

Do not touch the drive shaft of the 2PBA Hydraulic Piston Pump

Do not touch sensor, valves and fittings

Do not touch sealing surfaces.

Weight												
- Without inlet fitting	kg	9,00	9,00	9,50	10,50	10,50	11,00	11,50	15,00	15,50	16,50	
- With inlet fitting	kg	9,40	9,40	9,90	10,90	10,90	11,40	11,90	15,40	15,90	17,00	

Address all questions regarding spare parts to your responsible Our Service Partner or the technical service department of the manufacture's plant / factory for the 2PBA Hydraulic Piston Pump.

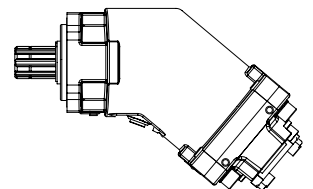
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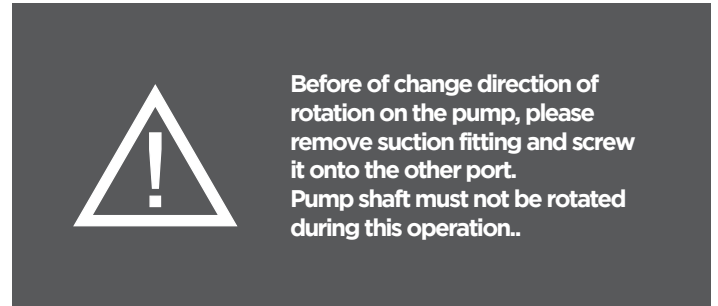
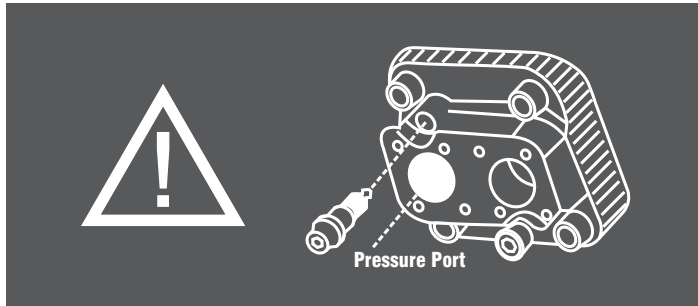
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2PBA Series Hydraulic Piston Pump

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Changing the Direction of Rotation



!! CHECK THE ROTATION FROM THE POWER TAKE OFF

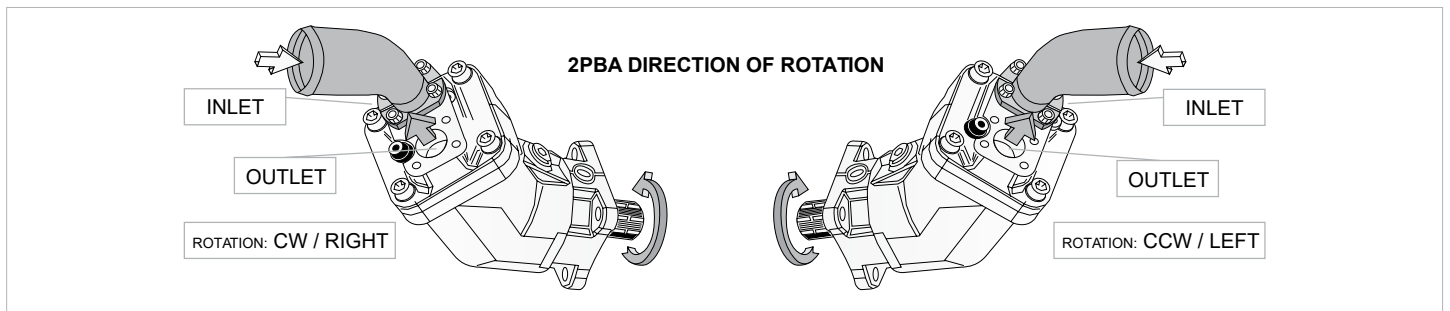
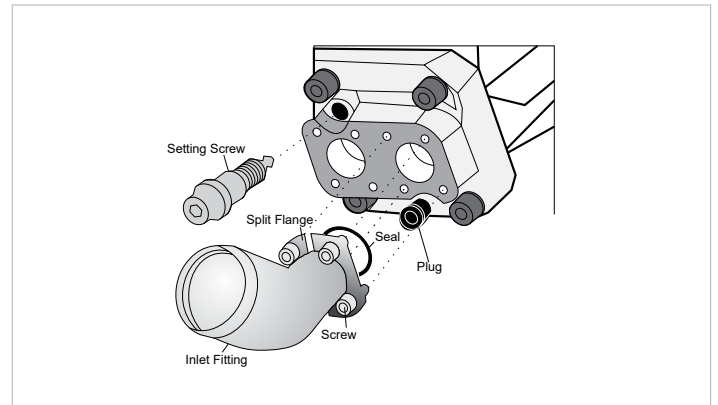
!! THE ROTATION DIRECTION OF THE PUMP

Left
Default delivered.

Right
Change rotation.

HOW TO CHANGE ROTATION OF THE 2PBA HYDRAULIC PISTON PUMP;

- » Remove the inlet fitting with split flange,
- » Remove the setting screw,
- » Remove the plug,
- » Put the setting screw where the plug was,
- » Put the plug where the setting screw was,
- » Put seal on the inlet fitting, then the inlet fitting on the side where the plug is, and fix with the split flange,
- » Tighten with the screws.



NOTE I

The Inlet Fitting is pre-assembled on delivery and must be tightened to the torque specified for the thread size before installation.

NOTE II

To change the direction of rotation of the 2PBA Hydraulic Piston Pump, you must change the pressure connection from to right port to the left port.

NOTE III

If the pump drive shaft moves while making the change, the 2PBA Hydraulic Piston Pump may be damaged. After unscrewing the pressure connection, do not turn the drive shaft of the pump!

FLUID

Please check the following recommendations:
Mineral oil

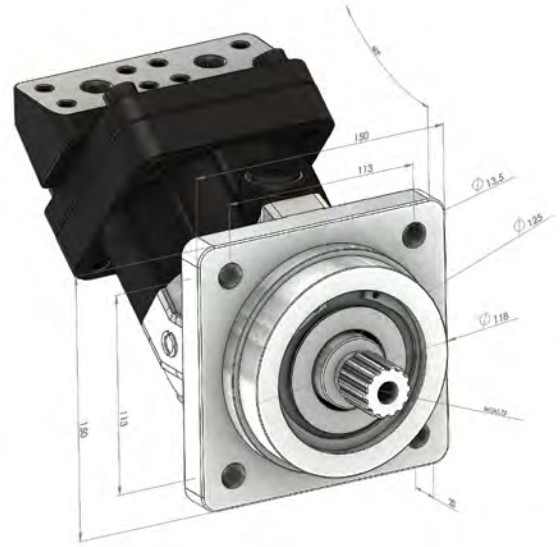
Viscosity	20 to 40 cSt
Min. viscosity	5 cSt
Viscosity for correct operation	10 to 400 cSt
Recommended filtration	10Q absolute class 9 NAS 1638 class 6 SAE class 18/15 ISO
Max temp.	100 oC



For detailed information about 2PBA Hydraulic Piston Pump, please contact with Technical Department !!!

2PS Series

Hydraulic Piston Pump ISO



2PS Hydraulic Piston Pump have the following advantages;

- Compact Design,
- Economical Conception,
- High Power Density,
- High Overall Efficiency,
- High Rotating Speeds,
- High Output Pressure,
- From 12cc to 130cc,
- One Piece Pistons with Piston Rings,
- Special Inlet Fittings & Accesories,
- Simple Change of Direction of Rotation,
- For Industrial & Mobile Market.
- Splined or Keyed Shaft

Ordering Code of 2PS Hydraulic Piston Pump

Motor Code	Displacement (cm3)	Drive Shafts	Mounting Flange	Inlet & Outlet Port	Direction of Rotation	Sealing							
2PS	108	K2	A	12	R	H							
						S Standart							
						H High Pressure							
						V Viton							
					L Left/CCW	R Right/CW							
				11 Threaded (12-18cc)	12 SAE (25-108cc)								
			A ISO 3019-2 , 4 BOLT										
				12	18	25	32	40	50	63	80	108	130
		DIN 5480 SPLINED	S1	•	•	•	•	•	•	•	•	•	•
			S2	•	•	•	—	—	•	—	•	•	•
		DIN 6885 PARALLEL	K1	•	•	•	•	—	•	—	•	•	•
			K2	•	•	•	—	•	•	•	•	•	•
	12	18	25	32	40	50	63	80	108	130			
2PS Hydraulic Piston Pump - ISO, Fixed Displacement.													

Technical Data

		12	18	25	32	40	50	63	80	108	130
Displacement	cc	12,00	18,00	25,00	32,00	40,20	50,00	63,00	80,00	108,4	130,0
Theoretical oil flow l/min at pump speed	1000 rpm	12,00	18,00	25,00	32,00	40,20	50,00	63,00	80,00	108,4	130,0
	1500 rpm	18,00	27,00	37,50	48,00	60,30	75,00	94,50	120,0	162,6	195,0

Maximum Speed											
- Continuous	rpm	3100	3100	2500	2500	2300	2300	2300	2300	2000	1900
Max. Continuous Pressure	bar	400	400	400	400	400	400	400	400	400	400
Max. Peak Pressure	bar	450	450	450	450	450	450	450	450	450	450
Torque at 350 bar	m.N	66	98	141	174	225	280	350	445	600	726
Max. Flow	l/mn.	37,20	55,80	62,50	80	92,46	115,0	144,9	184,0	216,0	247,0

Weight											
- Without accessories	kg	6,00	6,00	11,50	11,50	11,50	17,50	18,00	22,00	22,50	23,50
- With accessories	kg	6,20	6,20	11,80	11,90	11,90	18,00	18,50	22,50	23,00	24,00

Pump Temperature											
- Minimum	°C	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
- Maximum	°C	110	110	110	110	110	110	110	110	110	110

Rotation		CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW
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Quick Calculation

Q = flow, l/min
T = torque, N•m
N = power, kW
V_g = displacement, ccm/rev
n = shaft speed, rpm
ΔP = pressure difference, bar
η_v = volume efficiency
η_{mh} = hydraulic mechanical efficiency
η_{te} = η_v•η_{mh} = full efficiency coeffcient

Flow Q= $\frac{V_g \cdot n \cdot \eta_v}{1000}$ l/min

Torque T= $\frac{V_g \cdot \Delta P}{20 \cdot \pi \cdot \eta_{mh}}$ N.m

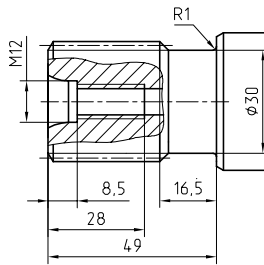
Power N= $\frac{Q \cdot \Delta P}{612 \cdot \eta_t}$ kW

2PS Series Hydraulic Piston Pump

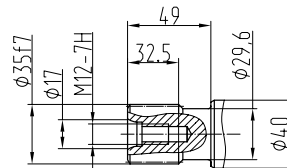
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Special Shaft Drive & Special Back Cover

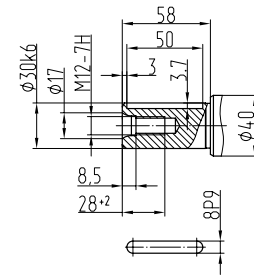
Splined shaft
35xf7x2x9g GOST 6033-80



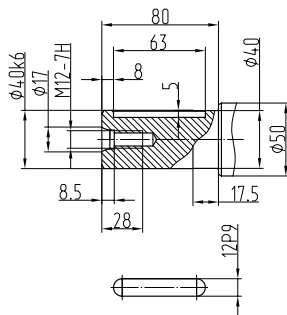
35xf7x2x9g ГOCT6033



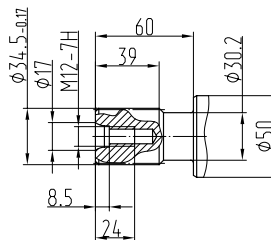
Parallel keyed shafts



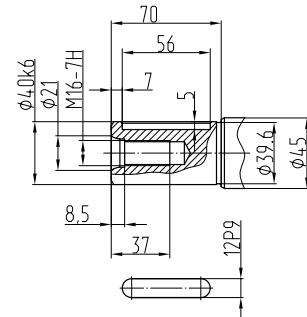
Parallel keyed shafts



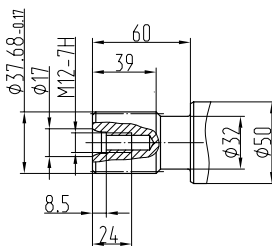
1 3/8' 21T 16/32DP ANSI B92



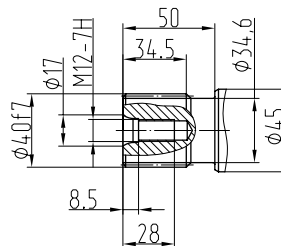
Parallel keyed shafts



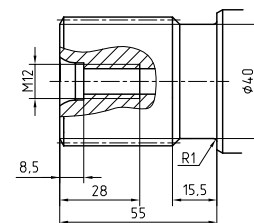
1 1/2' 23T 16/32DP ANSI B92



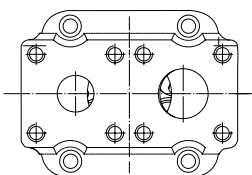
40xf7x2x9g GOST6033



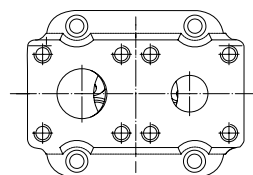
45xh8x2x9g GOST 6033-80



Special Cover / Rotation : LEFT



Special Cover / Rotation : RIGHT

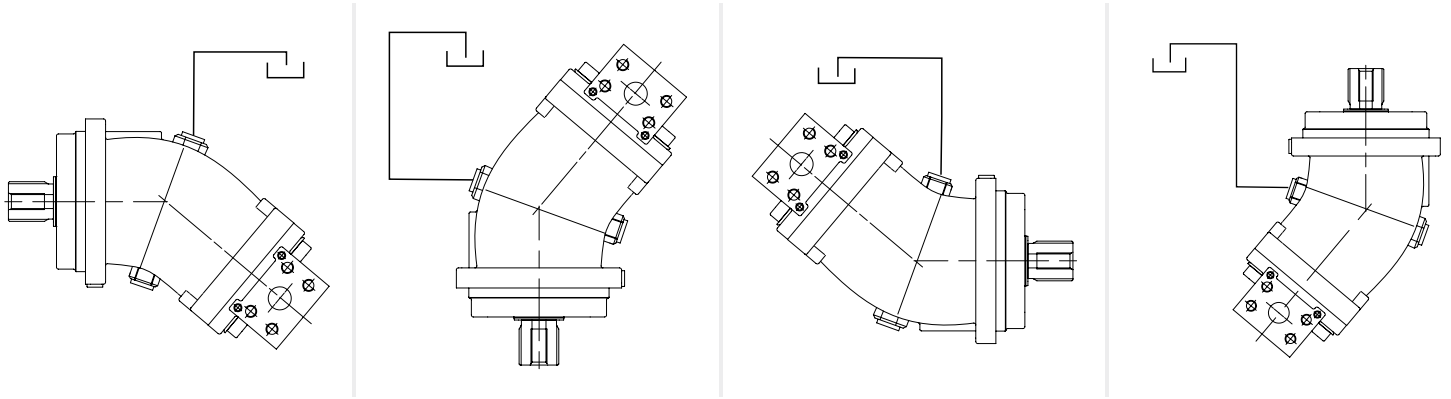


2PS Series Hydraulic Piston Pump

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Installation

The 2PS Pumps can be operate any position.
See following examples.



OIL SUPPLY

Oil and supply line should be clean, and the supply line is airtight.

SUCTION LINE

Connect the suction line, tighten the suction connection bolts in diametric pairs.
Connect the pressure line.

REPAIR

We offers a comprehensive range of services for the repair of our Hydraulic Piston Pump.
Repairs to the 2PS Hydraulic Piston Pump may only be performed by authorized, skilled and instructed personnel.
Only use original and pre-installed our 2PS spare parts from supplied to Manufacturer..
Tested and pre-installed 2PS pumps successful repair requiring only little time.

SPARE PARTS

The spare parts list and the 2PS pump order specific.
When ordering spare parts, quote the material and complete Ordering code number of the 2PS Hydraulic Piston Pump as well as the right numbers of the spare parts.

RISK OF DAMAGE!

Do not touch the drive shaft of the 2PS Hydraulic Piston Pump
Do not touch sensor, valves and fittings
Do not touch sealing surfaces.

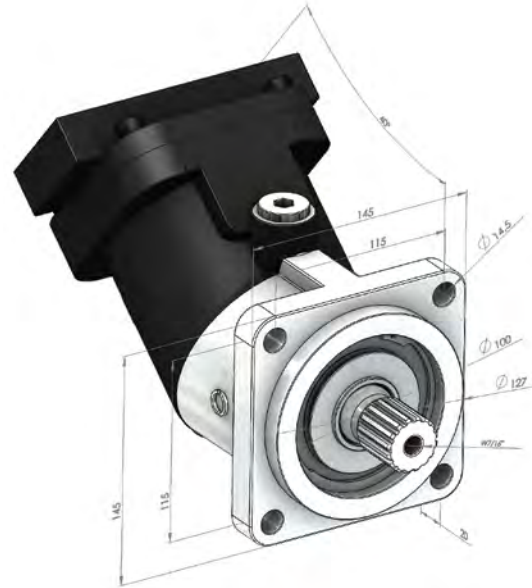
Address all questions regarding spare parts to your responsible Our Service Partner or the technical service department of the manufacture's plant / factory for the 2PS Hydraulic Piston Pump.

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hidrocel@hidrocel.com.tr

2PE Series

Hydraulic Piston Pump SAE



 2PE Hydraulic Piston Pump have the following advantages;

- Compact Design,
- Economical Conception,
- High Power Density,
- High Overall Efficiency,
- High Rotating Speeds,
- High Output Pressure,
- 350 bar Cont. Work. Pressure,
- 400 bar Peak Pressure,
- From 12cc to 130cc,
- Reduced Noise Level,
- Increased Reliability,
- No Drain Line Necessary,
- Smaller Installation Dimensions,
- One Piece Pistons with Piston Rings,
- Special Inlet Fittings & Accesories,
- Simple Change of Direction of Rotation

2PE Series Hydraulic Piston Pump

Ordering Code of 2PE Hydraulic Piston Pump

Pump Code	Displacement (cm3)	Direction of Rotation	Version	Sealing	Inlet Fittings					
2PE	108	L	S	N	A					
					A Suction Fittings Included					
				N Nitrile						
			S Special Version		C Classic Version					
		L Rotation : Left / CCW			R Rotation : Right / CW					
	12 SAE B	18 SAE B	25 SAE C	32 SAE C	40 SAE C	50 SAE C	63 SAE C	80 SAE C	108 SAE C-D	130 SAE D
2PE Hydraulic Piston Pump, Fixed Displacement, 350 / 400 bar.										

Special Version; BLACK COVER, DRIVE SHAFT, MOUNTING FLANGE

Technical Data

		12	18	25	32	40	50	63	80	108	130
Displacement	cc	12,00	18,00	25,00	32,00	40,20	50,00	63,00	80,00	108,4	130,0
Theoretical oil flow l/min at pump speed	1000 rpm	12,00	18,00	25,00	32,00	40,20	50,00	63,00	80,00	108,4	130,0
	1500 rpm	18,00	27,00	37,50	48,00	60,30	75,00	94,50	120,0	162,6	195,0

Maximum Pump Speed											
- Continuous	rpm	2300	2300	2300	2250	1900	1900	1900	1700	1700	1600
- Limited	rpm	3100	2900	2700	2700	2500	2500	2300	2100	1900	1750
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Max. Intermit. Peak Pressure	bar	400	400	400	400	400	400	400	400	400	400
Max. Torque at 350 bar	Nm	71	105	146	190	240	292	360	460	620	746

Weight											
- Without inlet fitting	kg	10,00	10,00	10,50	11,50	11,50	1200	12,50	16,00	16,50	21,50
- With inlet fitting	kg	10,40	10,40	10,90	11,90	11,90	12,40	12,90	16,40	16,90	22,00

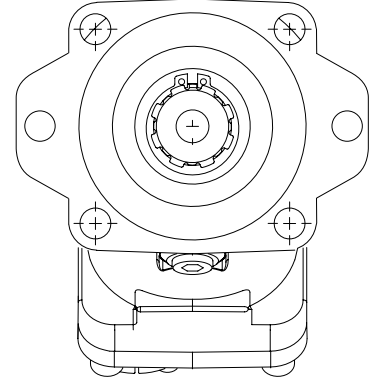
Rotation		CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW
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2PE Series Hydraulic Piston Pump

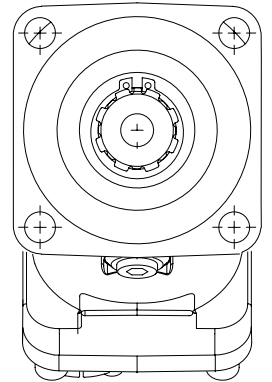
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Special Mounting Flanges

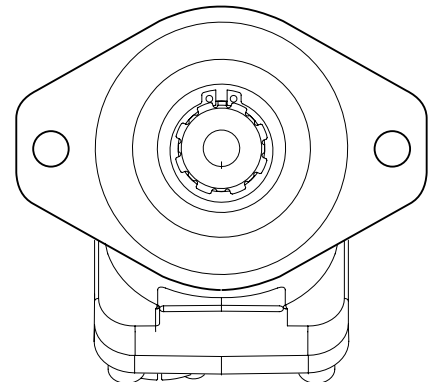
6 BOLT Mounting Flange



SAE B4 BOLT (SAE J744)



SAE B2 BOLT (SAE J744)



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Installation & User Guide

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INSTALLATION

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OIL SUPPLY

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Do not touch sensor, valves and fittings

Do not touch sealing surfaces.

Weight												
- Without inlet fitting	kg	10,00	10,00	10,50	11,50	11,50	1200	12,50	16,00	16,50	21,50	
- With inlet fitting	kg	10,40	10,40	10,90	11,90	11,90	12,40	12,90	16,40	16,90	22,00	

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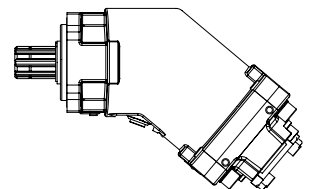
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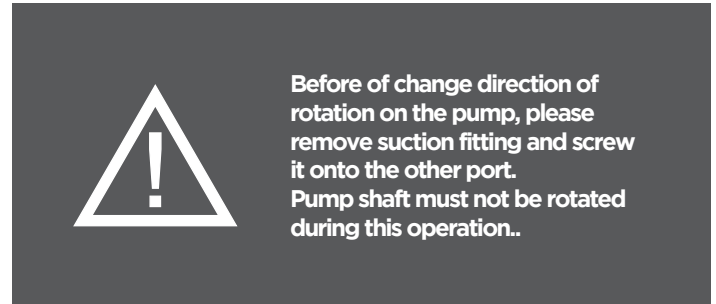
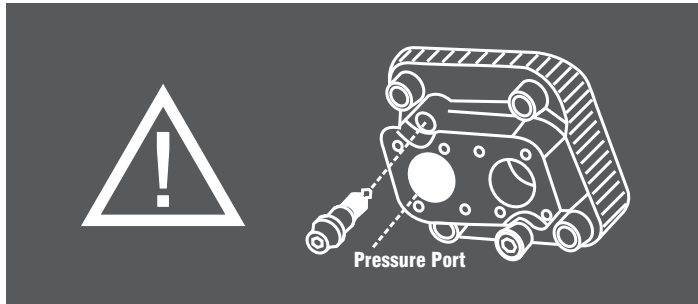
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2PE Series Hydraulic Piston Pump

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Changing the Direction of Rotation



!! CHECK THE ROTATION FROM THE POWER TAKE OFF

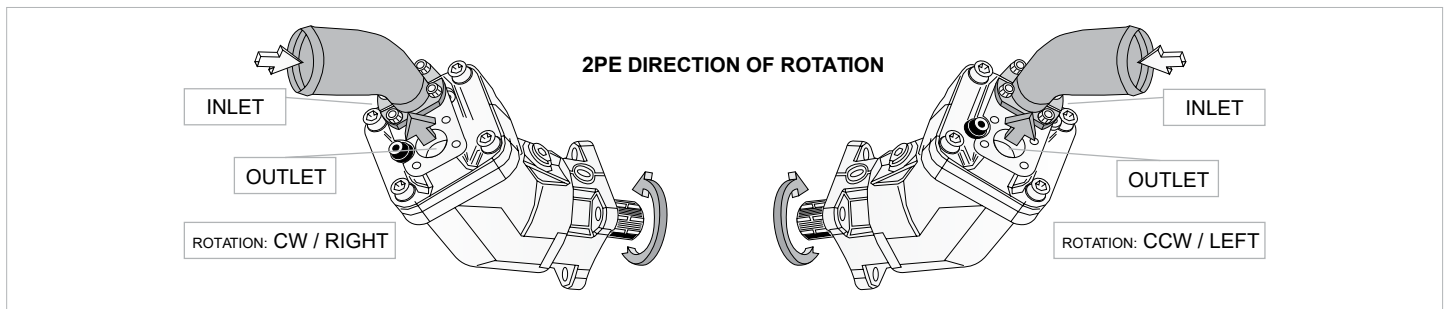
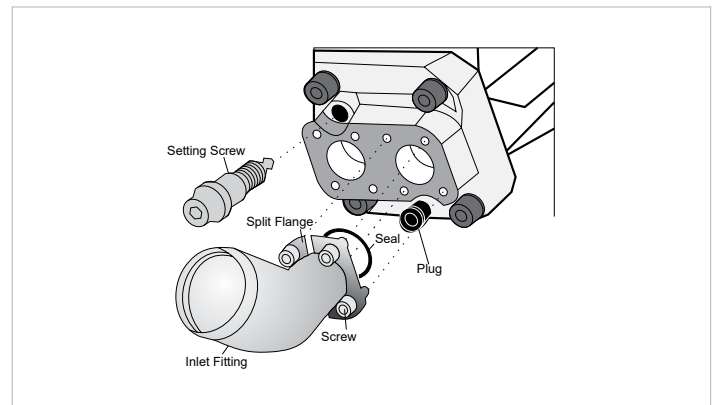
!! THE ROTATION DIRECTION OF THE PUMP

Left
Default delivered.

Right
Change rotation.

HOW TO CHANGE ROTATION OF THE 2PE HYDRAULIC PISTON PUMP;

- » Remove the inlet fitting with split flange,
- » Remove the setting screw,
- » Remove the plug,
- » Put the setting screw where the plug was,
- » Put the plug where the setting screw was,
- » Put seal on the inlet fitting, then the inlet fitting on the side where the plug is, and fix with the split flange,
- » Tighten with the screws.



NOTE I

The Inlet Fitting is pre-assembled on delivery and must be tightened to the torque specified for the thread size before installation.

NOTE II

To change the direction of rotation of the 2PE Hydraulic Piston Pump, you must change the pressure connection from to right port to the left port.

NOTE III

If the pump drive shaft moves while making the change, the 2PE Hydraulic Piston Pump may be damaged. After unscrewing the pressure connection, do not turn the drive shaft of the pump!

FLUID

Please check the following recommendations:
Mineral oil

Viscosity	20 to 40 cSt
Min. viscosity	5 cSt
Viscosity for correct operation	10 to 400 cSt
Recommended filtration	10Q absolute class 9 NAS 1638 class 6 SAE class 18/15 ISO
Max temp.	100 oC



For detailed information about 2PE Hydraulic Piston Pump, please contact with Technical Department !!!

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

HA10V Series 3 Hydraulic Piston Pump

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		•	•	•	•	•	•	•
		U = 24 V			•	•	•	•	•	•	•	•	EN24
		electrical	positive control	U = 12 V		•	•	•	•	•	•	•	EP12
				U = 24 V		•	•	•	•	•	•	•	•
	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

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

HA10V Series 3 Hydraulic Piston Pump

www.hidrocel.com.tr

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

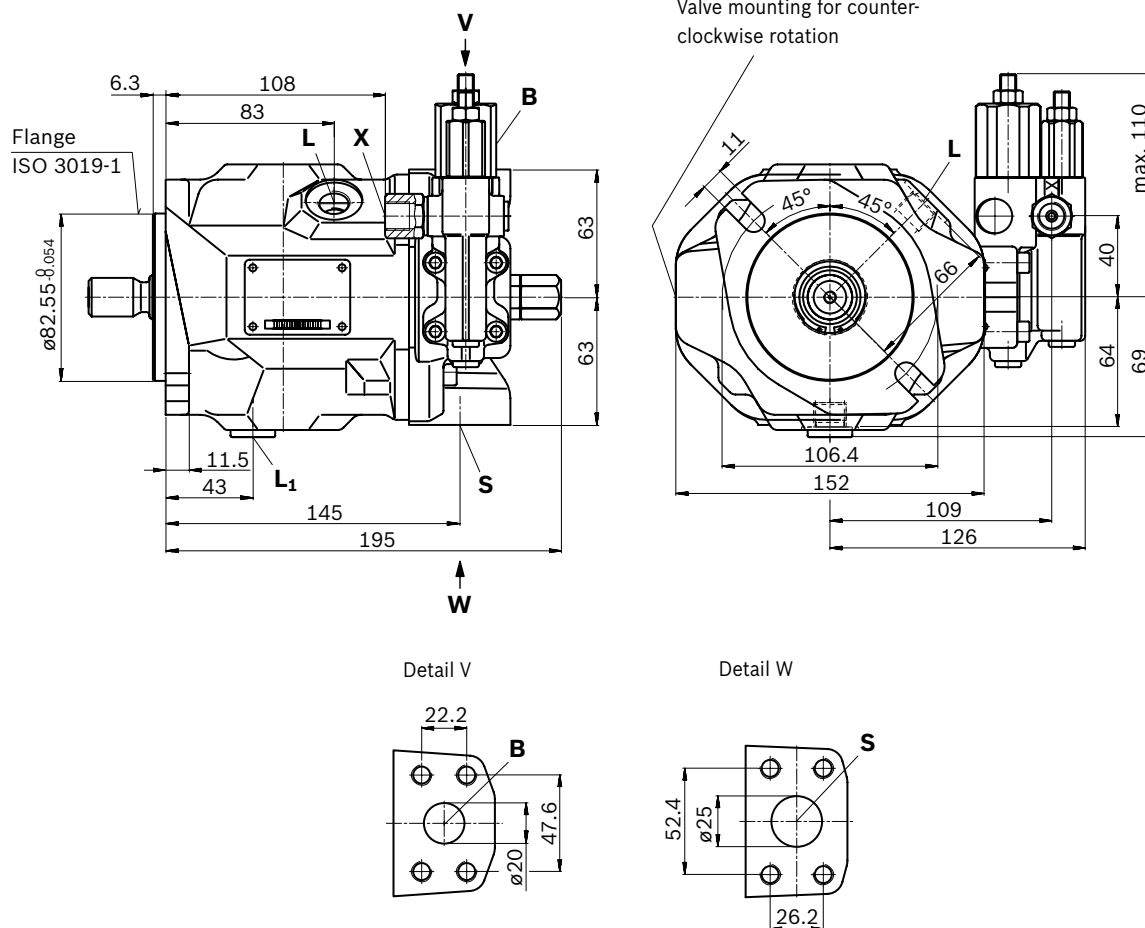
- Operation above the maximum values or below the minimum values may result in a loss of function, a reduced service life or in the destruction of the axial piston unit.

t

Dimensions, displacement 18

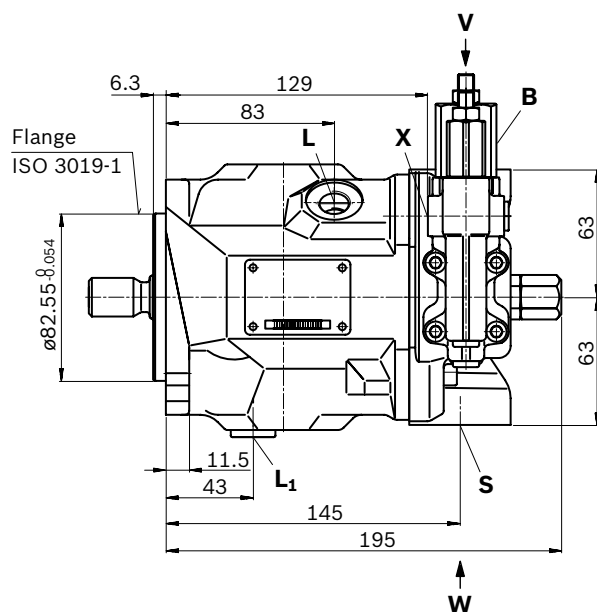
LS / LS1 / LS-C - Pressure and flow control, hydraulic; clockwise rotation, version: Ports metric

▼ Port plate 12

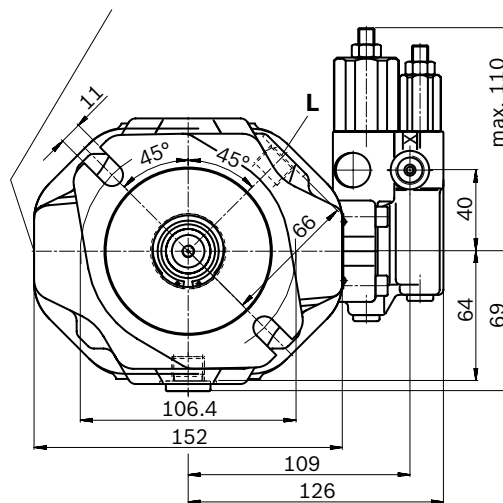


Dimensions, displacement 18**LS / LS1 / LS-C - Pressure and flow control, hydraulic; clockwise rotation, version: SAE ports**

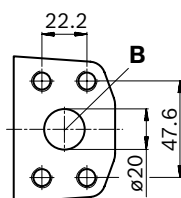
▼ Port plate 62



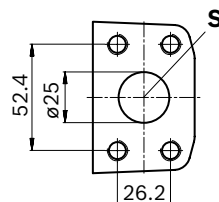
Valve mounting for counter-clockwise rotation



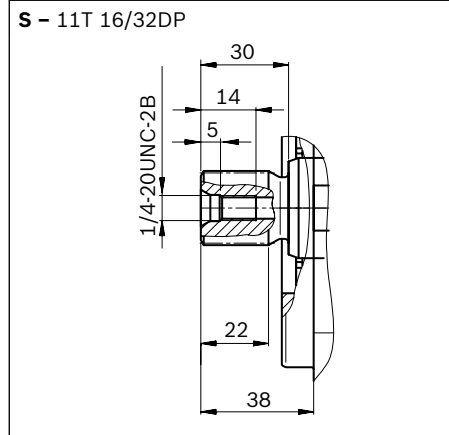
Detail V



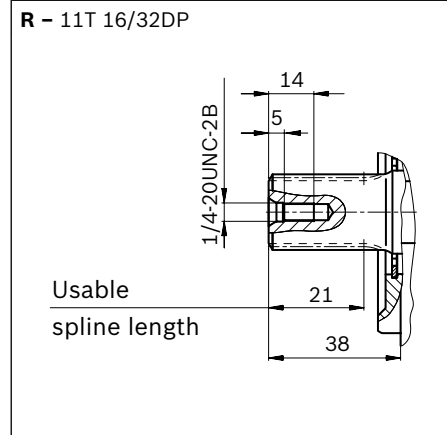
Detail W



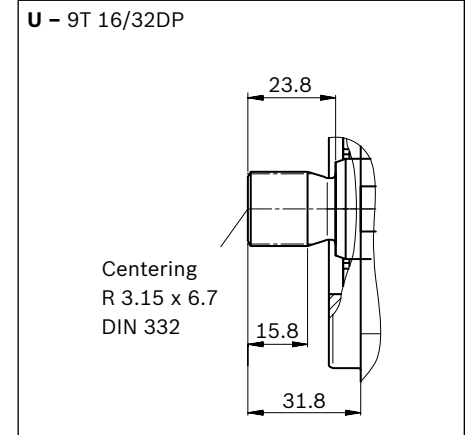
▼ Splined shaft 3/4 in (SAE J744)



▼ Splined shaft 3/4 in (SAE J744)



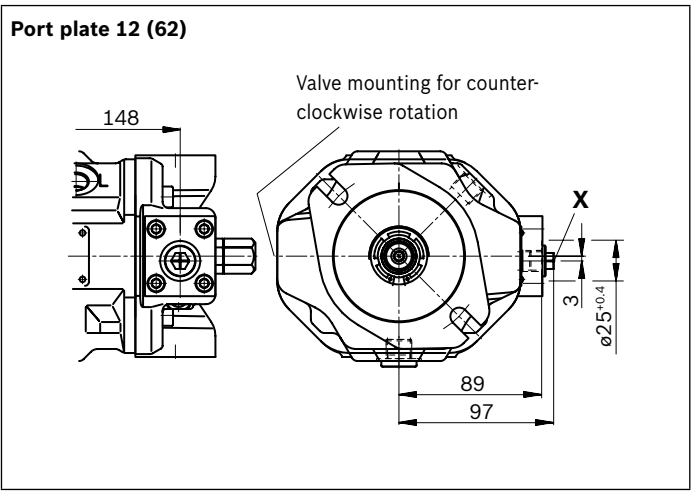
▼ Splined shaft 5/8 in (SAE J744)



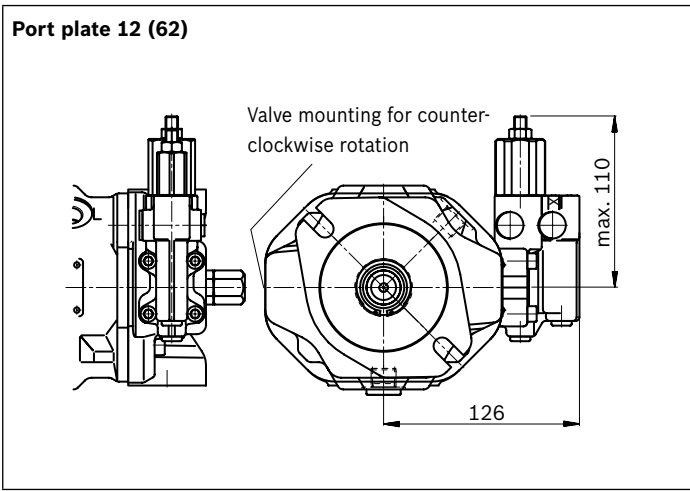
Ports - version metric port plate 12		Standard	Displacement	$p_{\max \text{ abs}}$ [bar]	State
B	Working port (standard pressure series) Fastening thread	SAE J518 DIN 13	3/4 in M10 × 1.5; 17 deep	350	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 DIN 13	1 in M10 × 1.5; 17 deep	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

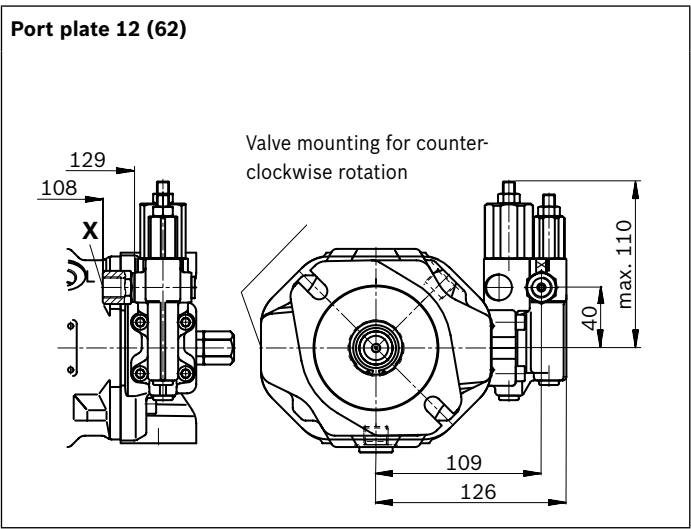
▼TTP - Two-point control, direct operated



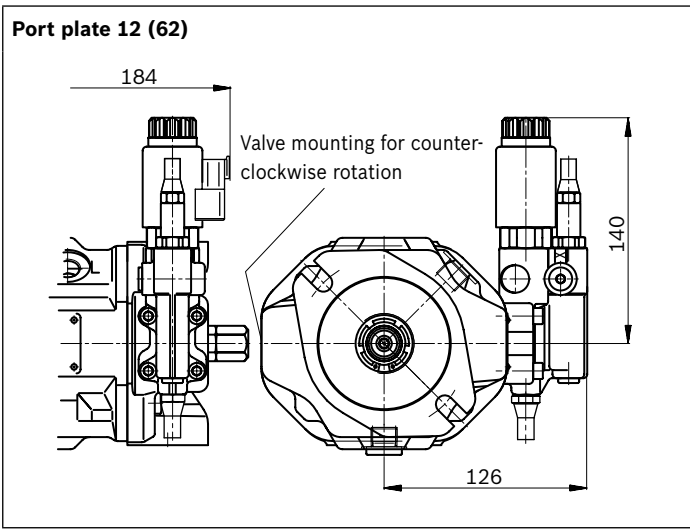
▼PR - Pressure controller



▼PRR - Pressure controller, remote controlled



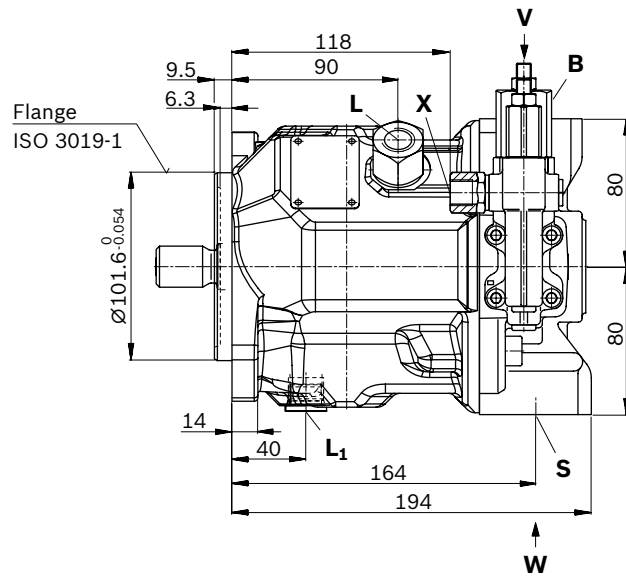
▼EN12/EN24 / EP12/EP24 - Electro-hydraulic pressure control



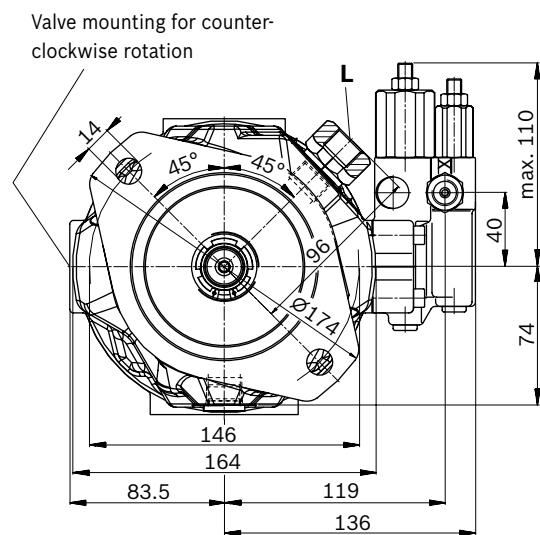
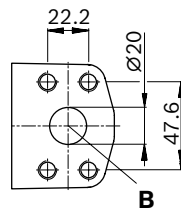
Dimensions, displacement 28

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

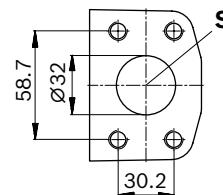
▼ Port plate 12



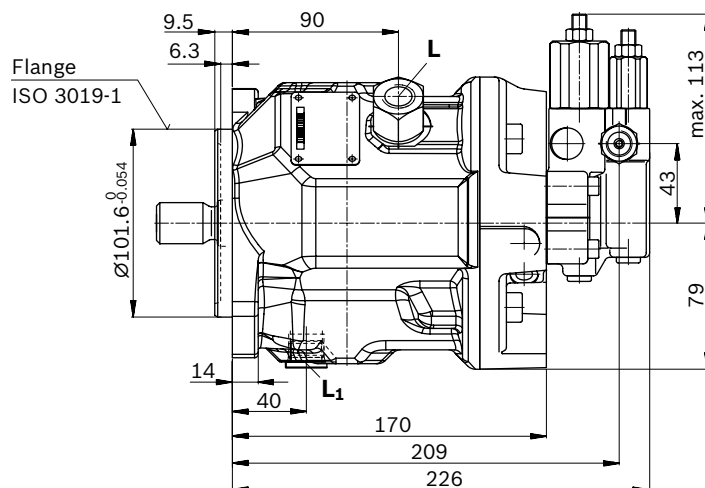
Detail V



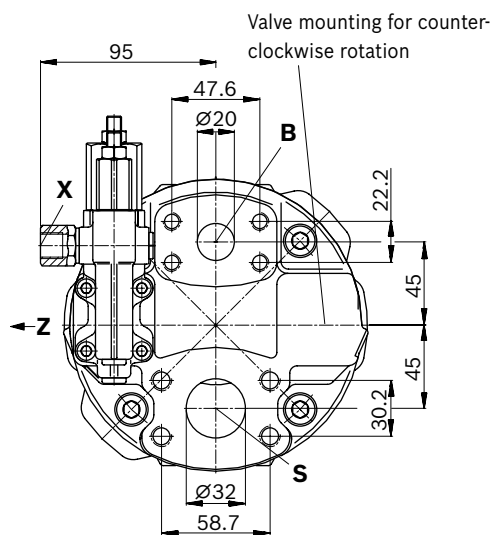
Detail W



▼ Port plate 11



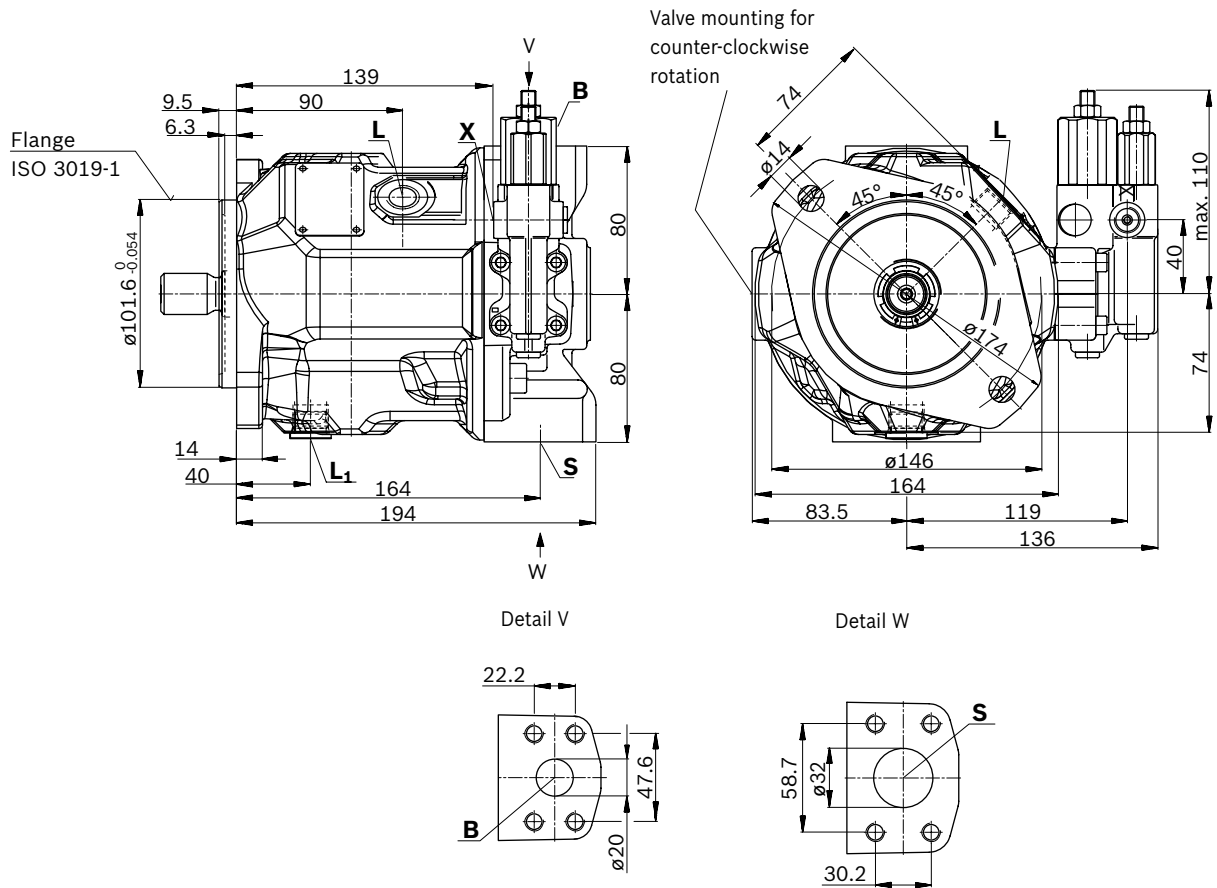
View Z



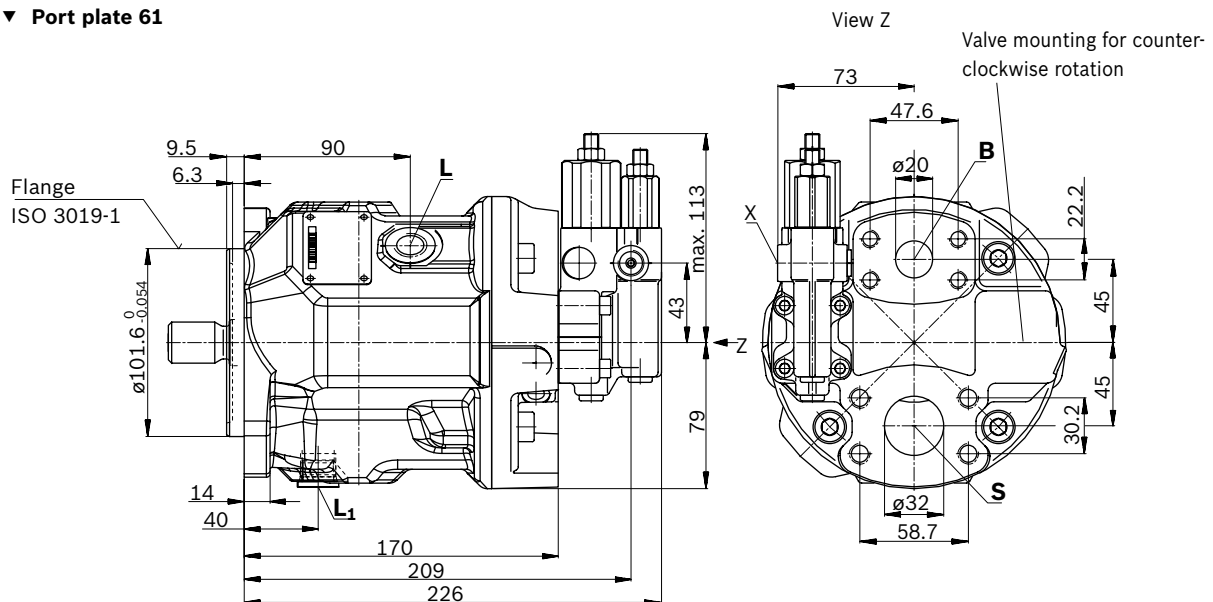
Dimensions, displacement 28

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

▼ Port plate 62

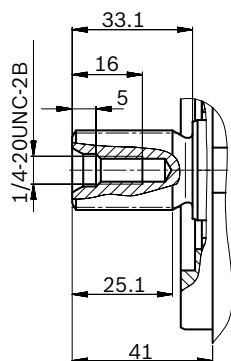


▼ Port plate 61



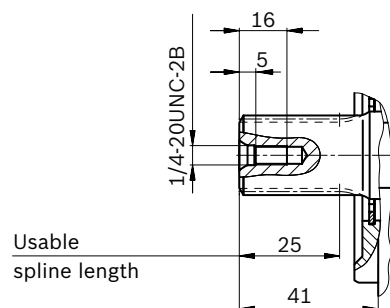
▼ Splined shaft 7/8 in (SAE J744)

S – 13T 16/32DP



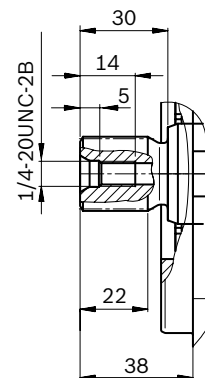
▼ Splined shaft 7/8 in (SAE J744)

R – 13T 16/32DP



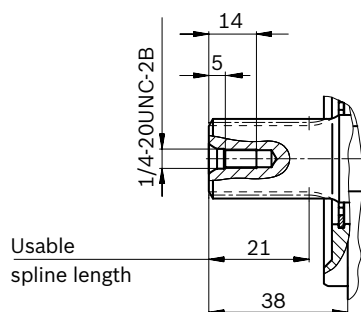
▼ Splined shaft 3/4 in (SAE J744)

U – 11T 16/32DP



▼ Splined shaft 3/4 in (SAE J744)

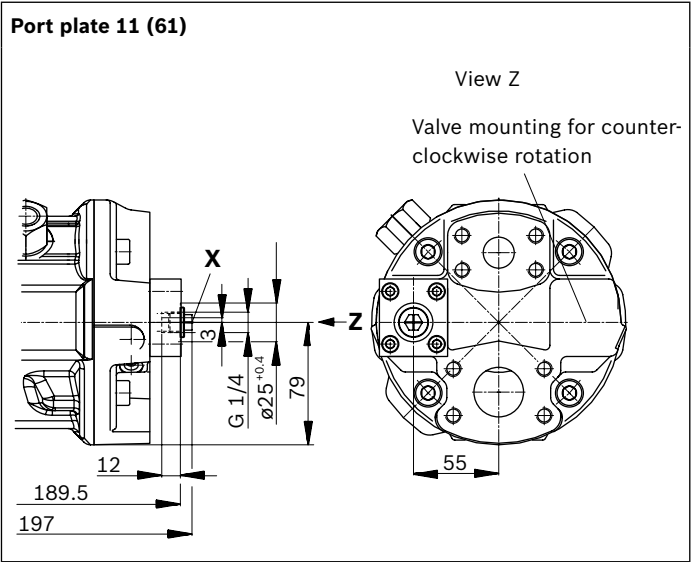
W – 11T 16/32DP



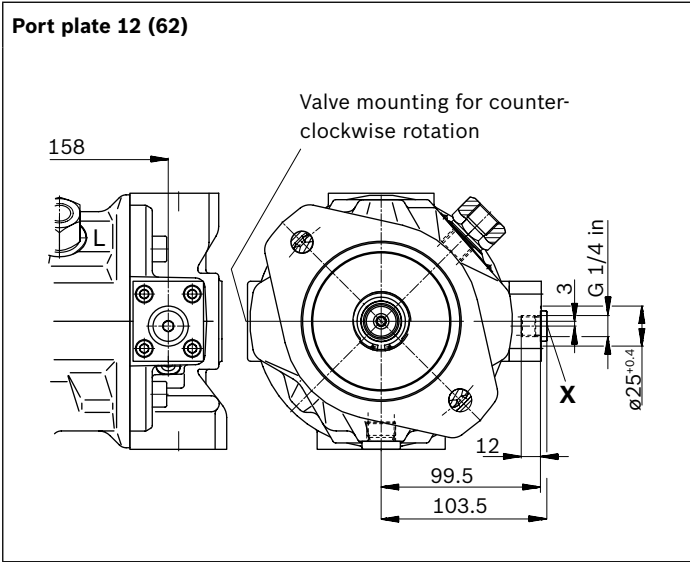
Ports - version metric port plate 11/12		Standard	Displacement	$p_{\max \text{ abs}}$ [bar]	State
B	Working port (standard pressure series) Fastening thread	SAE J518 DIN 13	3/4 in M10 × 1.5; 17 deep	350	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 DIN 13	1 1/4 in M10 × 1.5; 17 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

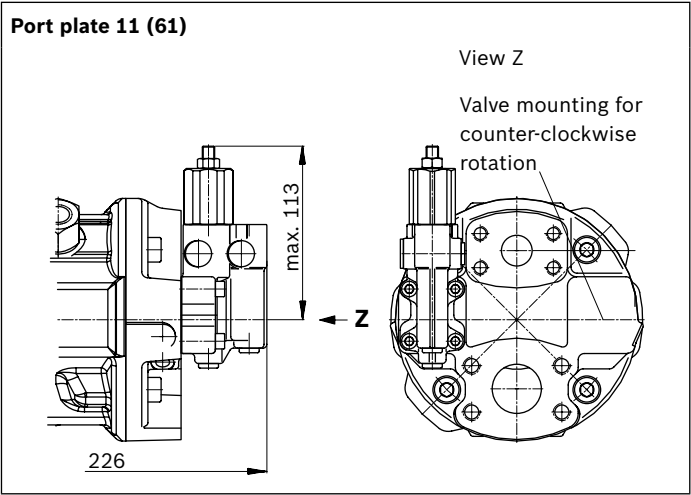
▼TP - Two-point control, direct operated



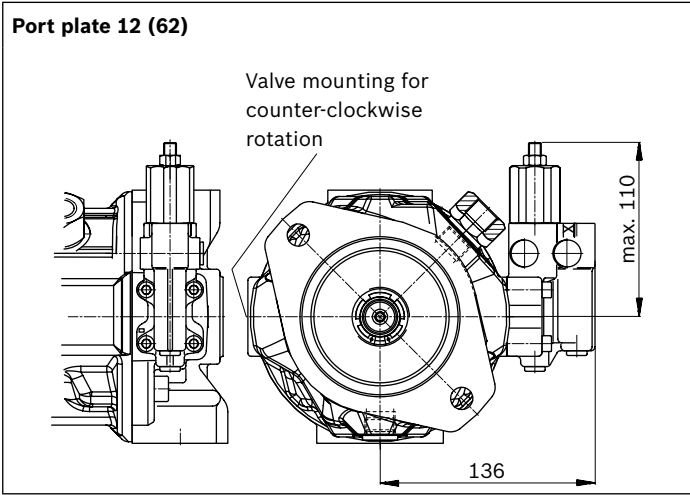
▼TP - Two-point control, direct operated



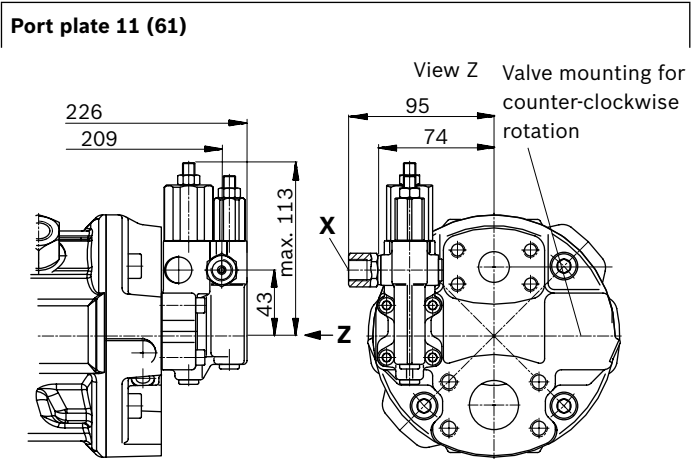
▼PR - Pressure controller



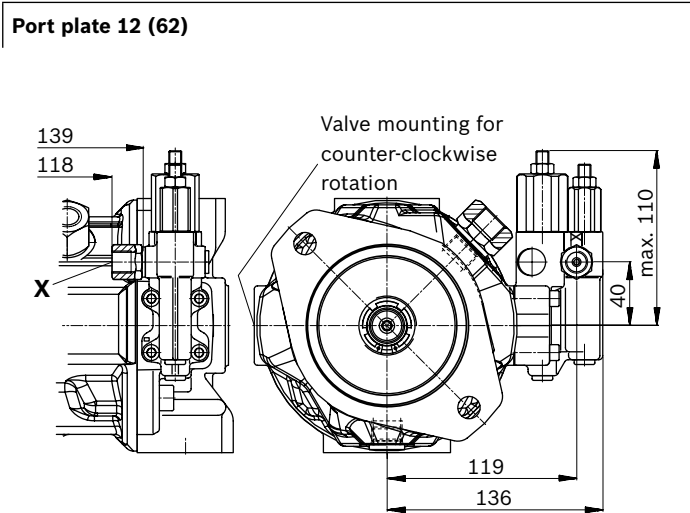
▼PR - Pressure controller



▼PRR - Pressure controller, remote controlled

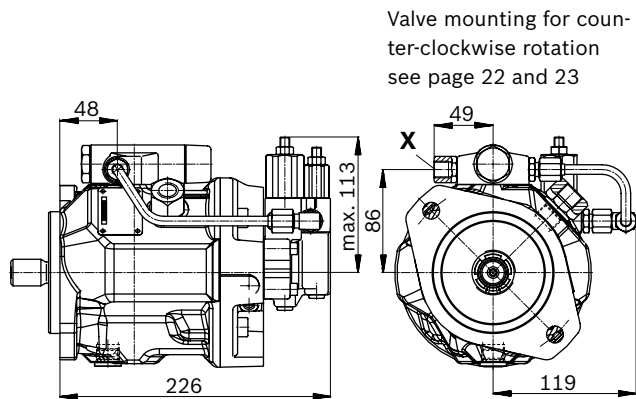


▼PRR - Pressure controller, remote controlled



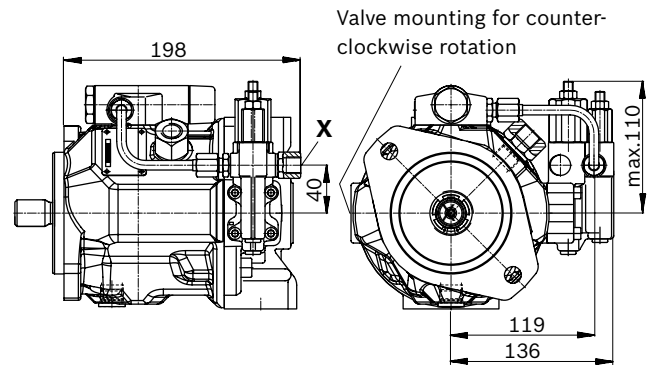
▼PFP - Pressure, flow and power controller

Port plate 11 (61)



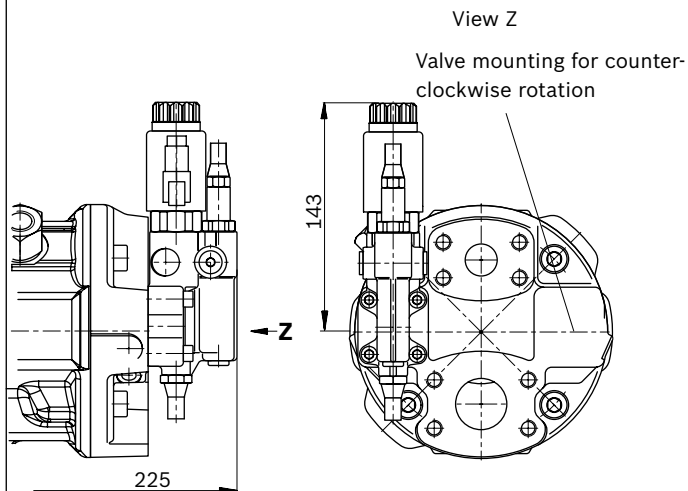
▼PFP - Pressure, flow and power controller

Port plate 12 (62)



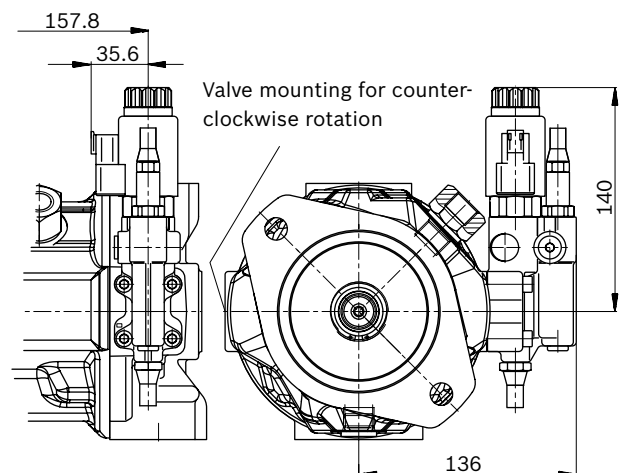
▼EN12/EN24 / EP12/EP24 - Electro-hydraulic pressure control

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

103

52.4

$\varnothing 25$

X

B

26.2

50

Z

50

S

$\varnothing 40$

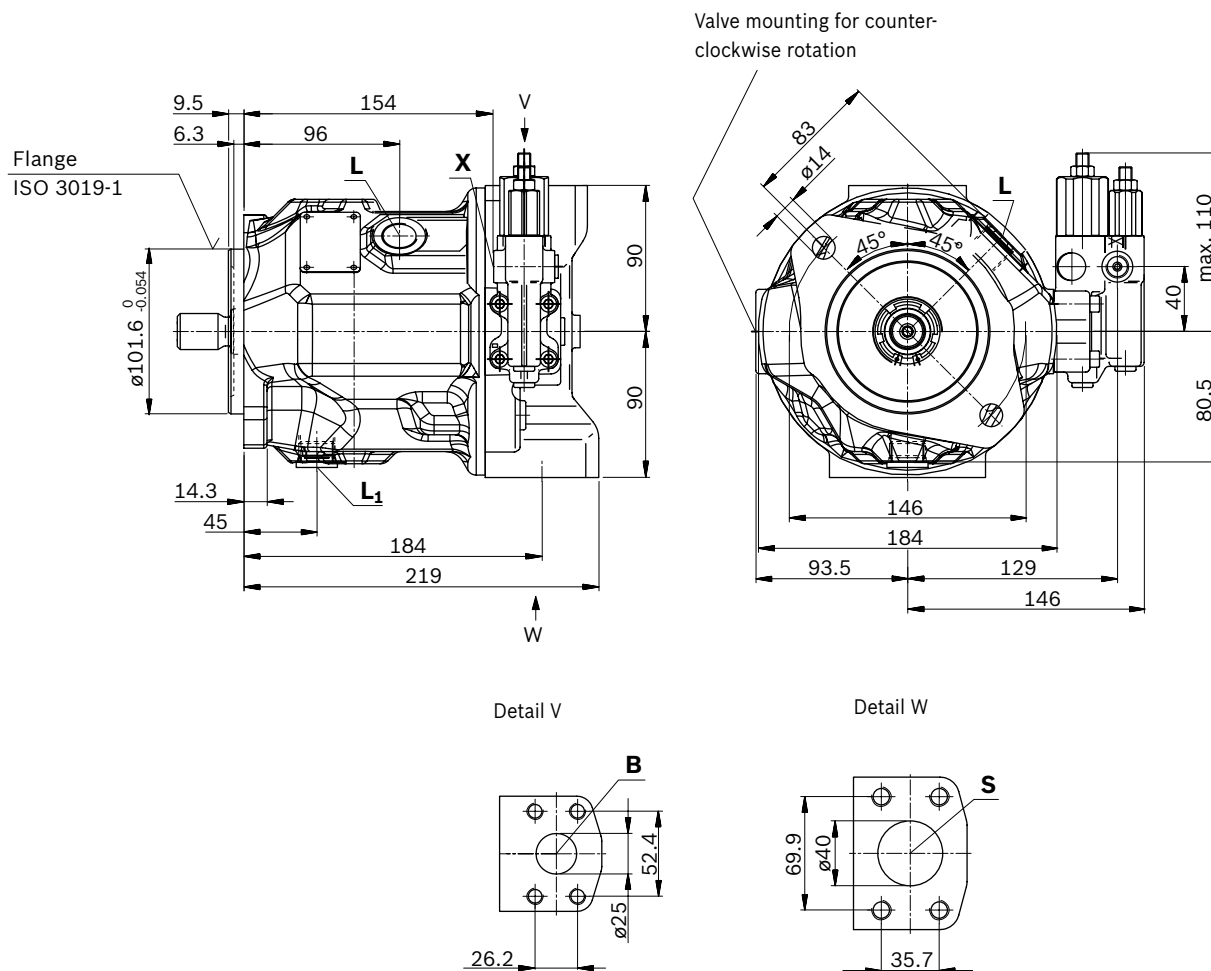
35.7

69.9

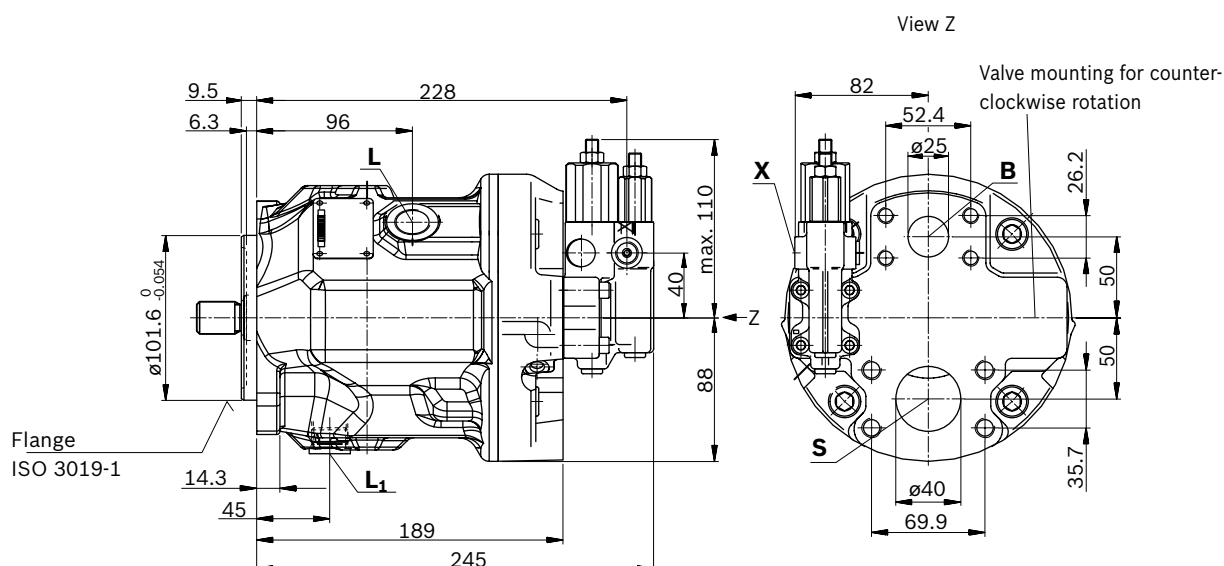
Dimensions, displacement 45

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

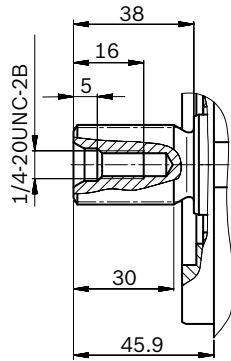
▼ Port plate 62



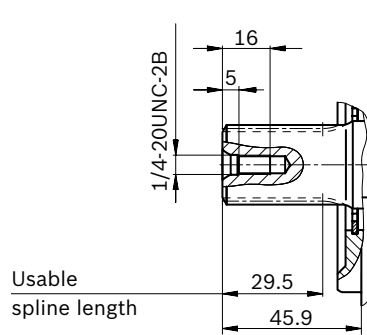
▼ Port plate 61



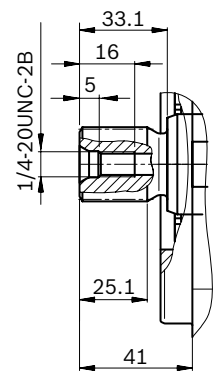
▼ Splined shaft 1 in (SAE J744)

S – 15T 16/32DP


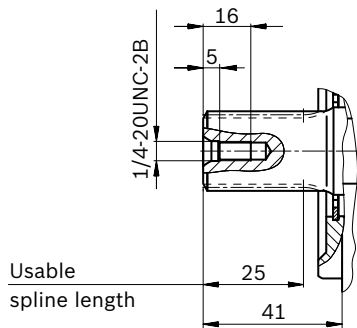
▼ Splined shaft 1 in (SAE J744)

R – 15T 16/32DP


▼ Splined shaft 7/8 in (SAE J744)

U – 13T 16/32DP


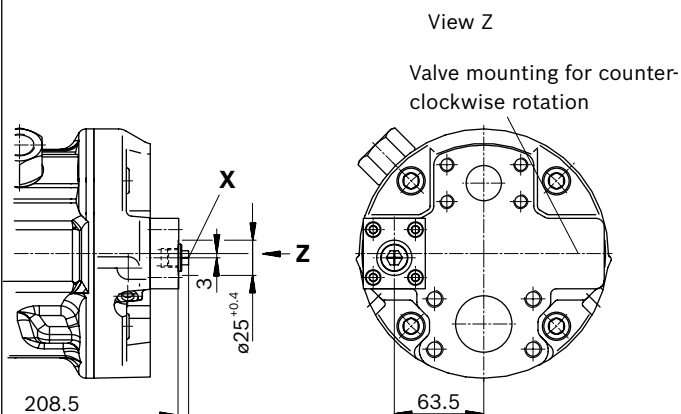
▼ Splined shaft 7/8 in (SAE J744)

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

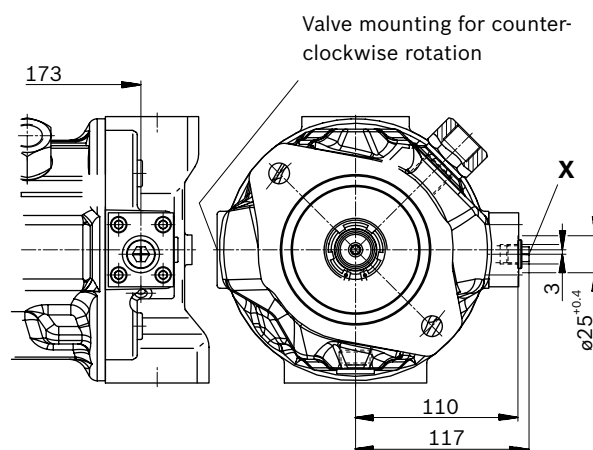
▼TP - Two-point control, direct operated

Port plate 11 (61)



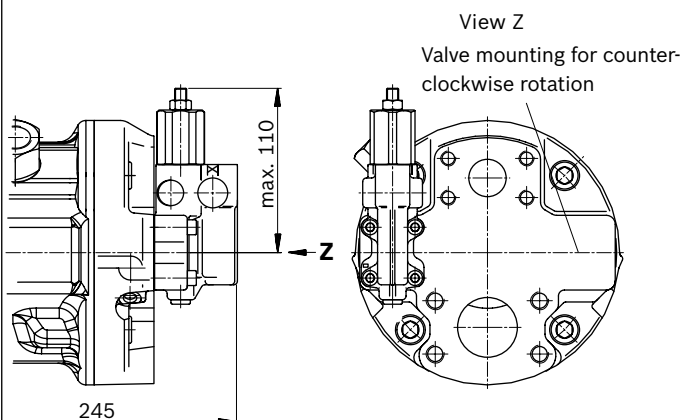
▼TP - Two-point control, direct operated

Port plate 12 (62)



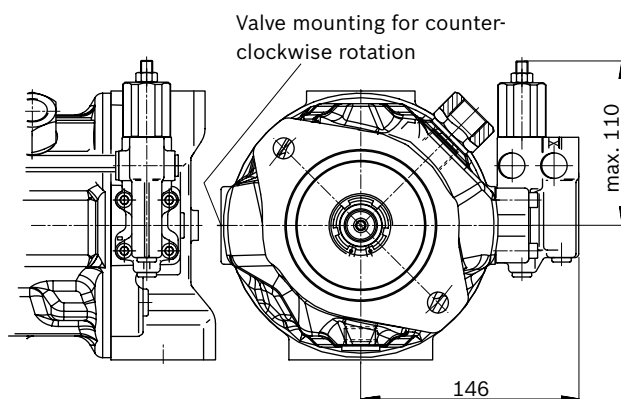
▼PR - Pressure controller

Port plate 11 (61)



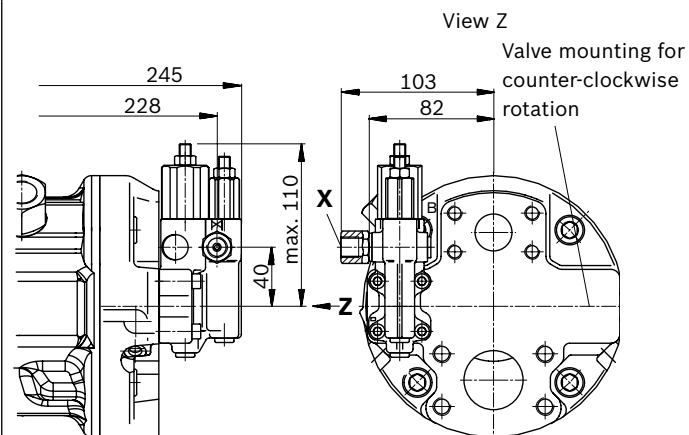
▼PR - Pressure controller

Port plate 12 (62)



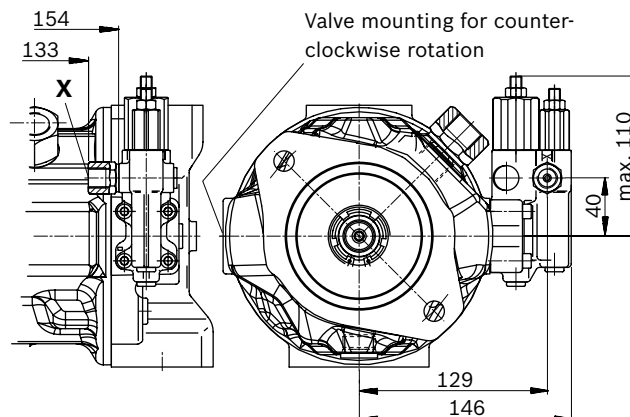
▼PRR - Pressure controller, remote controlled

Port plate 11 (61)



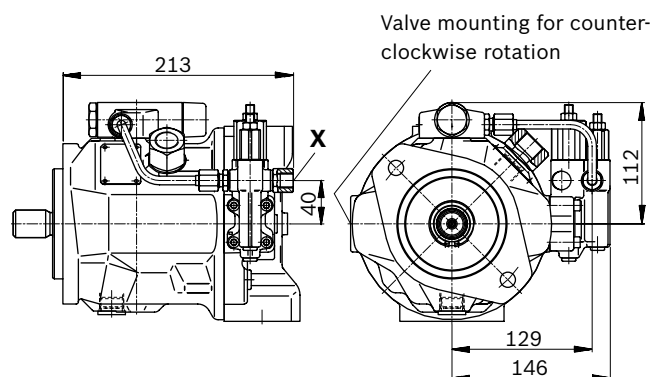
▼PRR - Pressure controller, remote controlled

Port plate 12 (62)



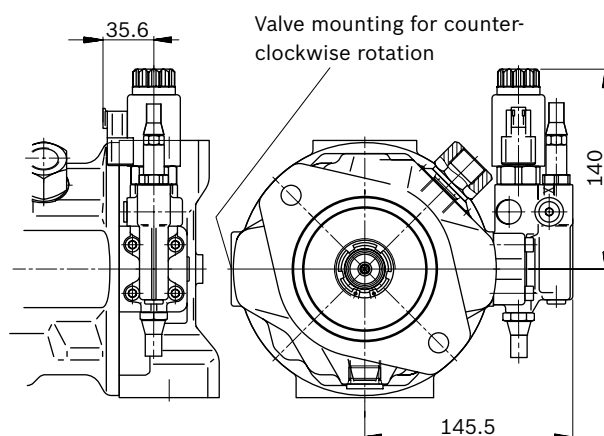
▼PFP - Pressure, flow and power controller

Port plate 12 (62)



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

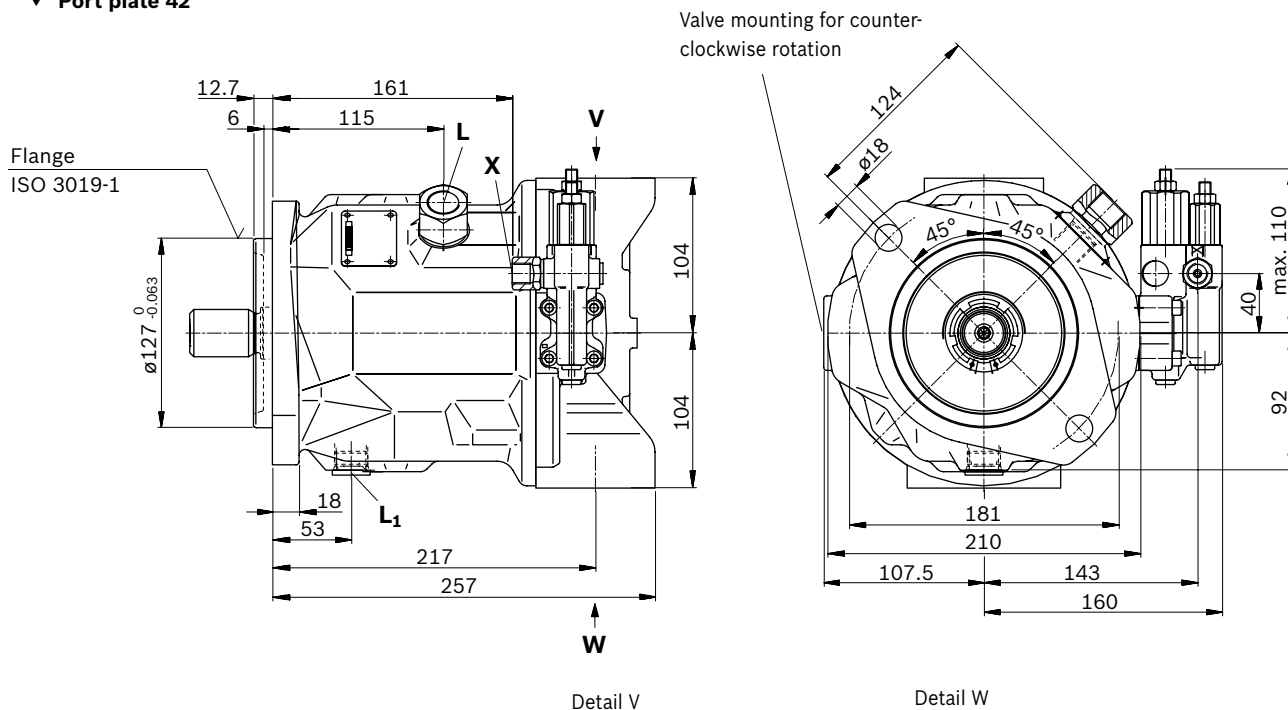
Port plate 12 (62)



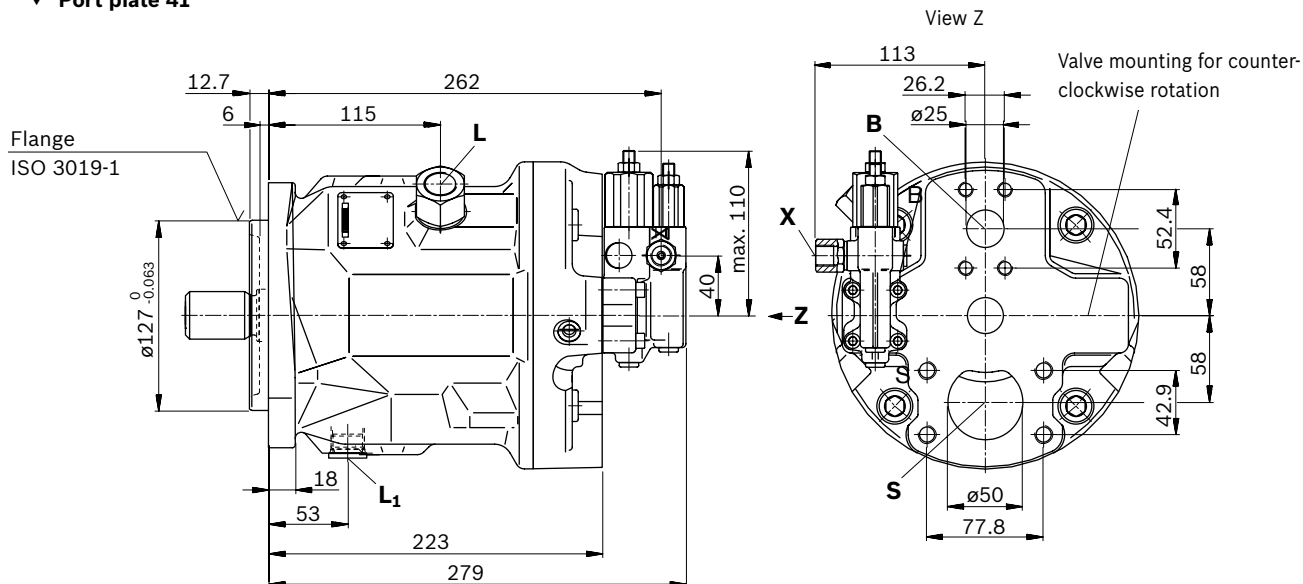
Dimensions displacements 71 and 88

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

▼ Port plate 42



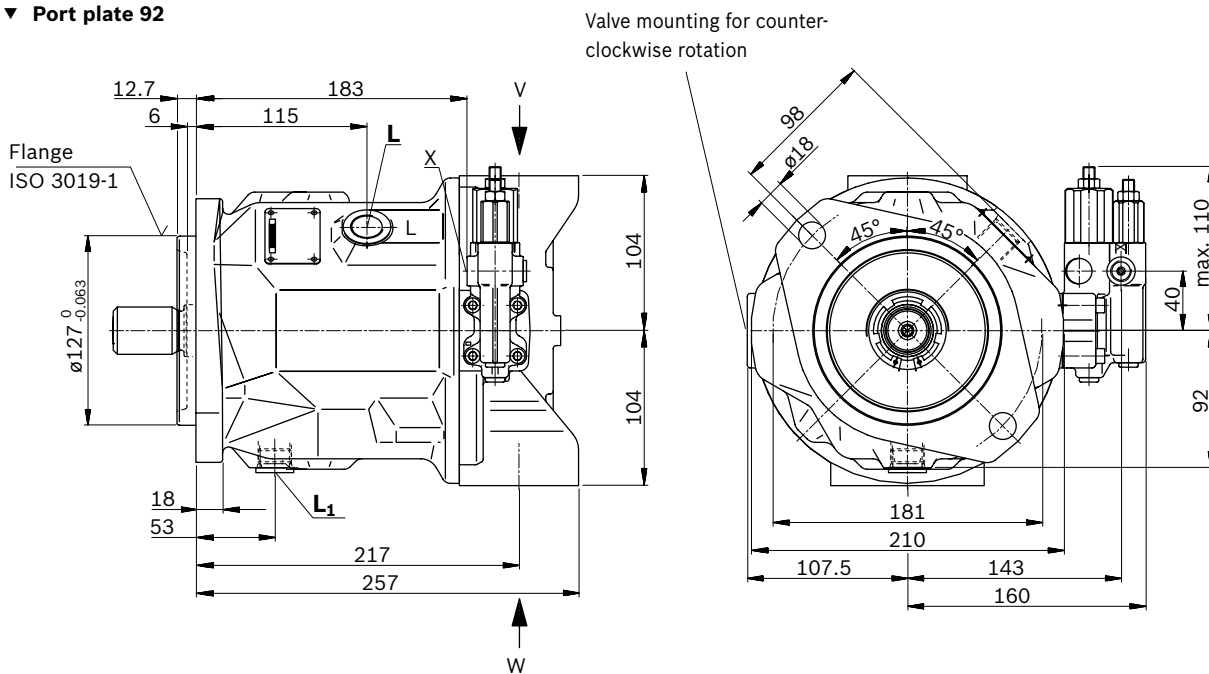
▼ Port plate 41



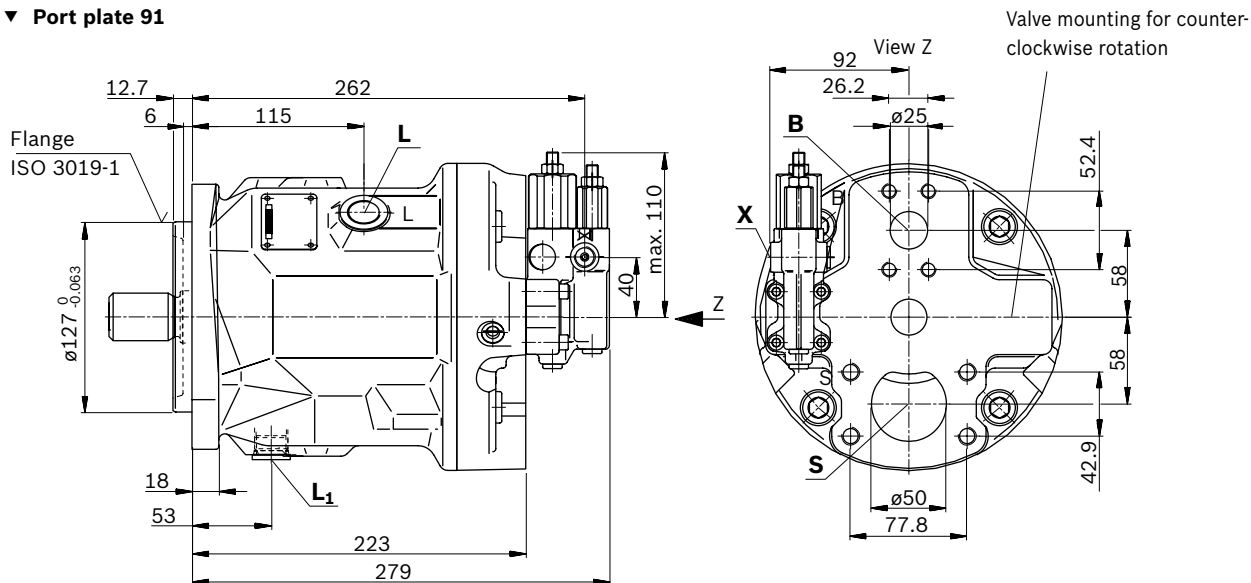
Dimensions displacements 71 and 88

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

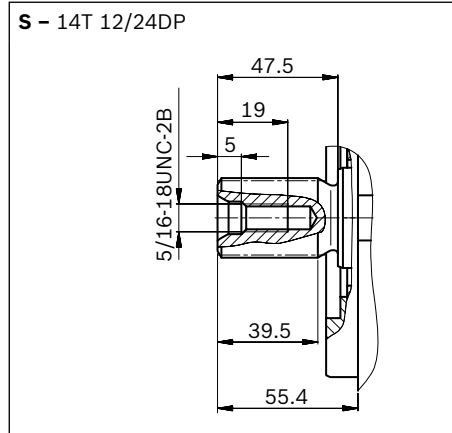
▼ Port plate 92



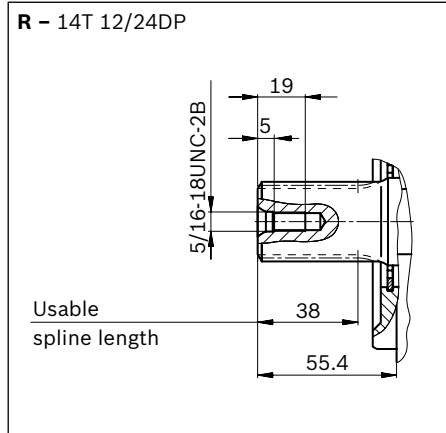
▼ Port plate 91



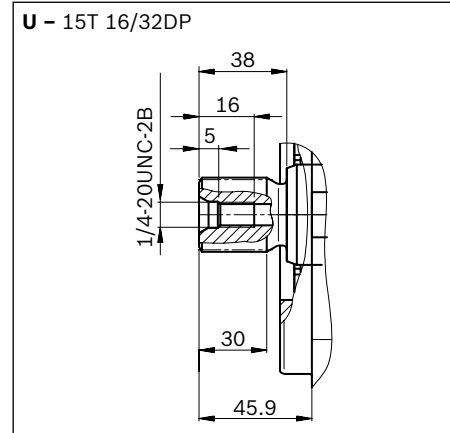
▼ Splined shaft 1 1/4 in (SAE J744)



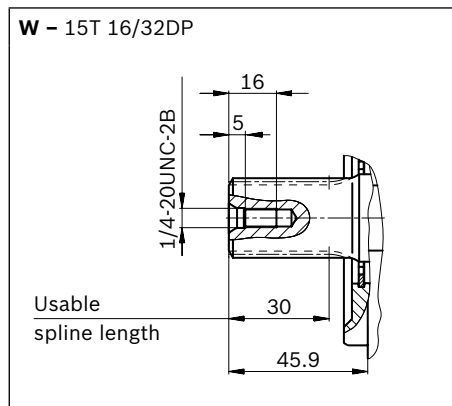
▼ Splined shaft 1 1/4 in (SAE J744)



▼ Splined shaft 1 in (SAE J744)



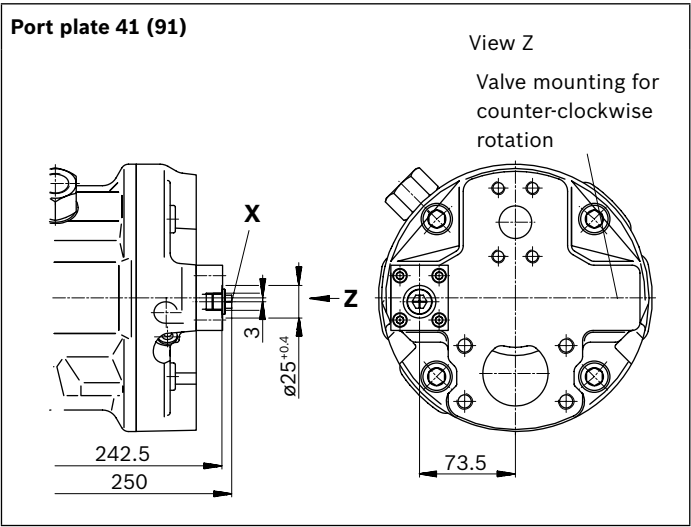
▼ Splined shaft 1 in (SAE J744)



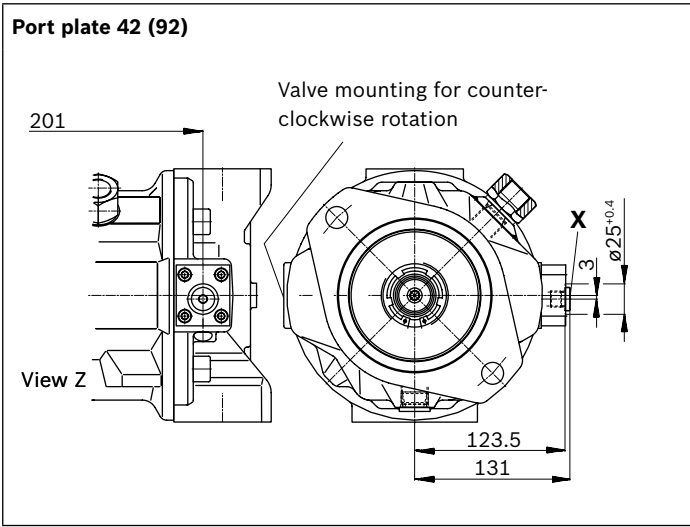
Ports - version metric port plate 41/42		Standard	Displacement	$p_{\max \text{ abs}}$ [bar]	State
B	Working port (standard pressure series) Fastening thread	SAE J518 DIN 13	1 in M10 × 1.5; 17 deep	350	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 DIN 13	2 in M12 × 1.75; 20 deep	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

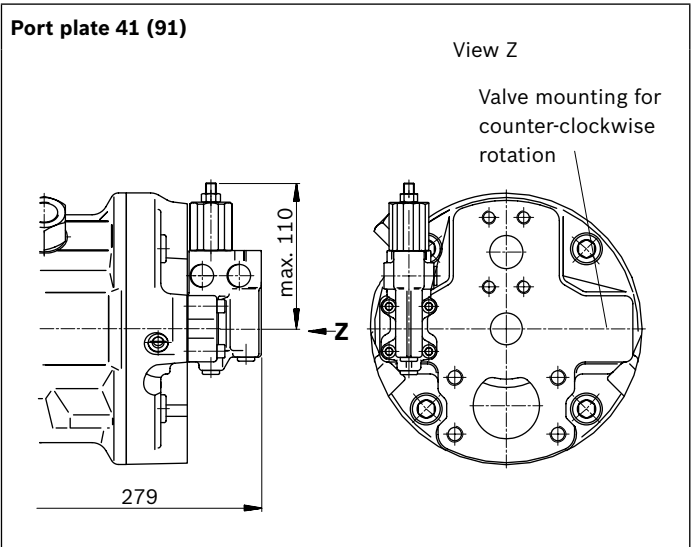
▼TP - Two-point control, direct operated



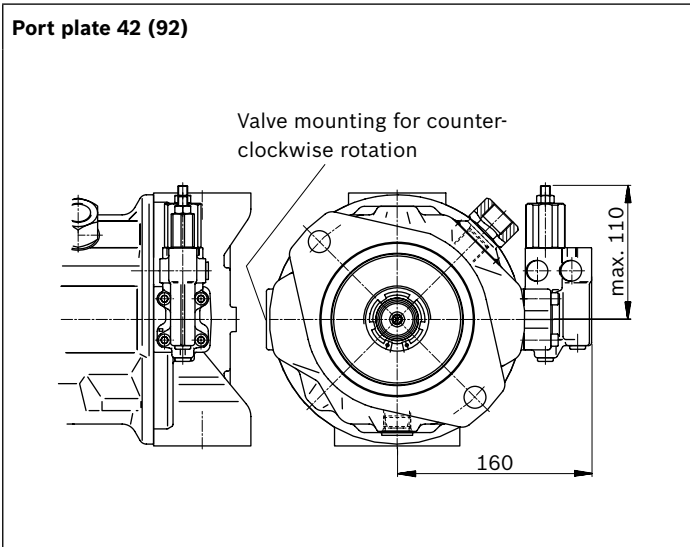
▼TP - Two-point control, direct operated



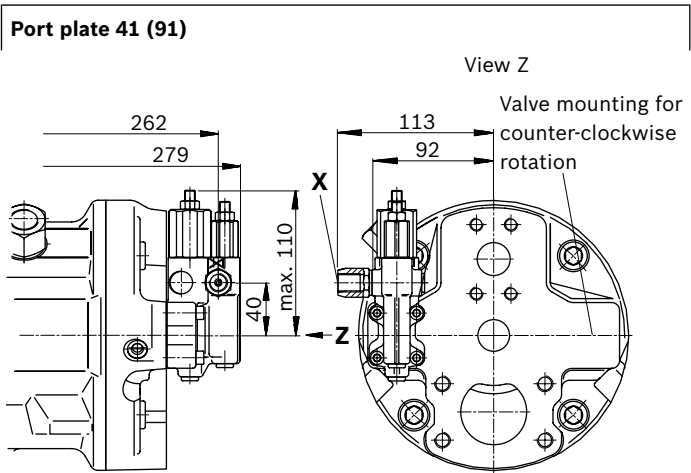
▼PR - Pressure controller



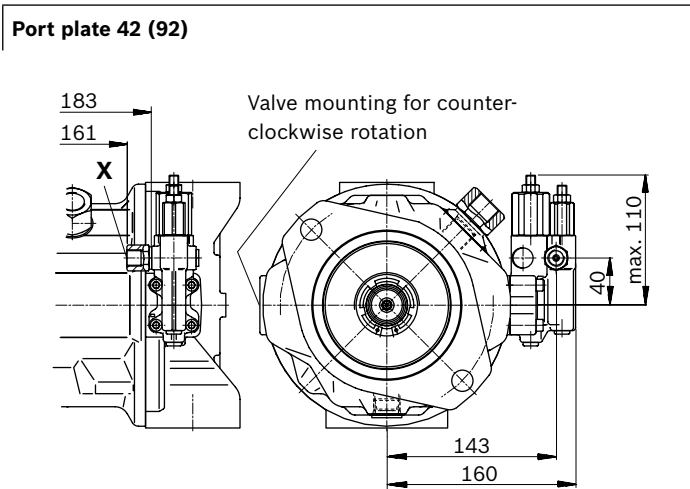
▼PR - Pressure controller



▼PRR - Pressure controller, remote controlled

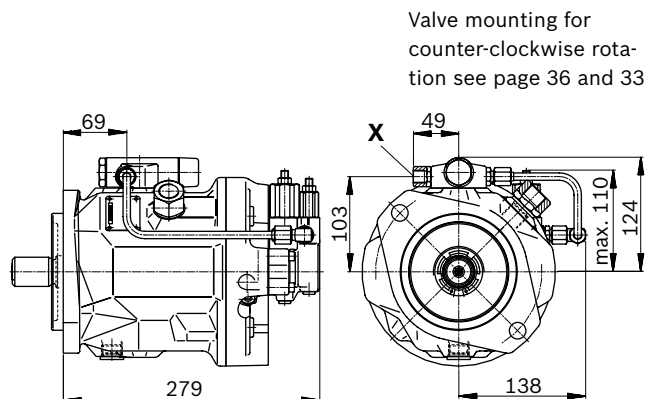


▼PRR - Pressure controller, remote controlled



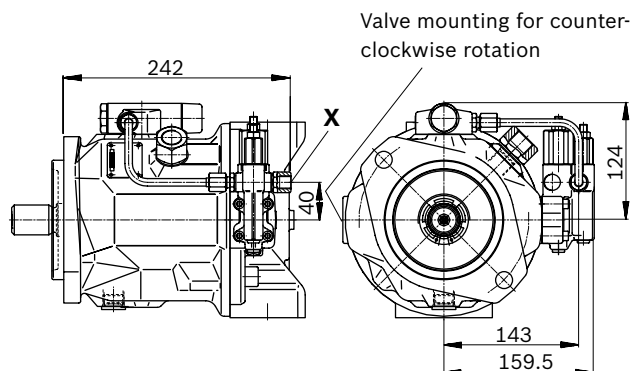
▼PFP - Pressure, flow and power controller

Port plate 41 (91)



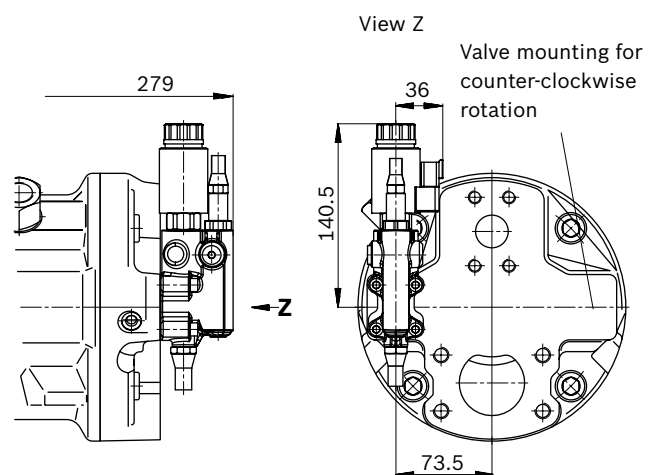
▼PFP - Pressure, flow and power controller

Port plate 42 (92)



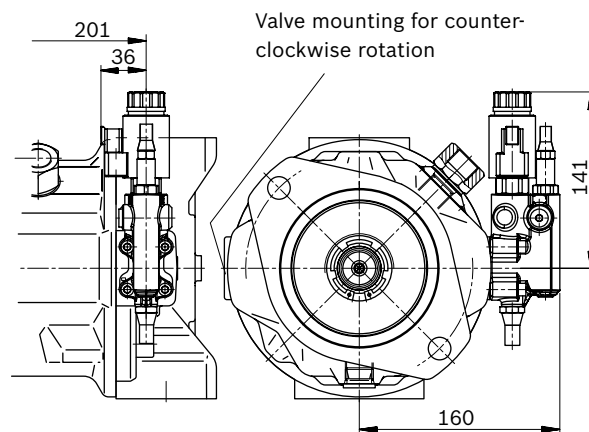
▼EN12/EN24 / EP12/EP24 - Electro-hydraulic pressure control

Port plate 41 (91)



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

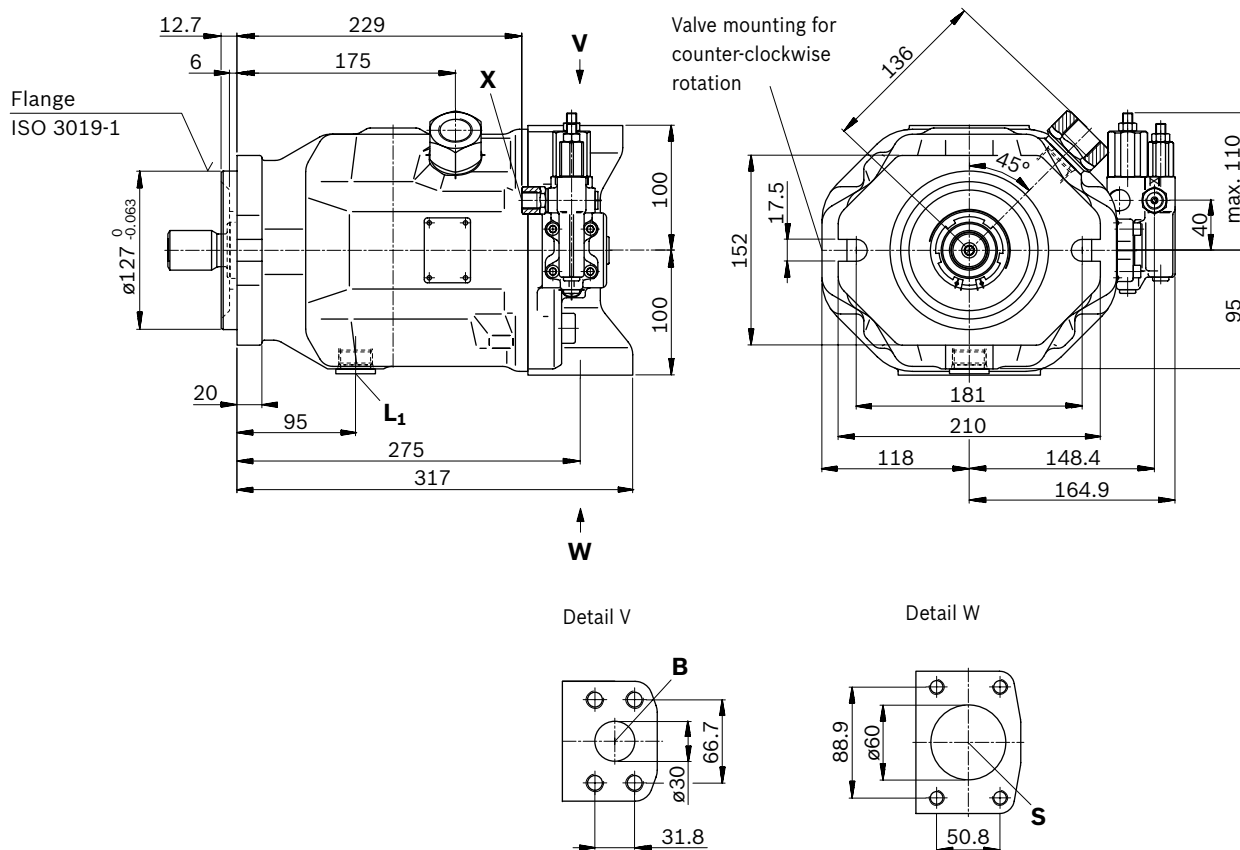
Port plate 42 (92)



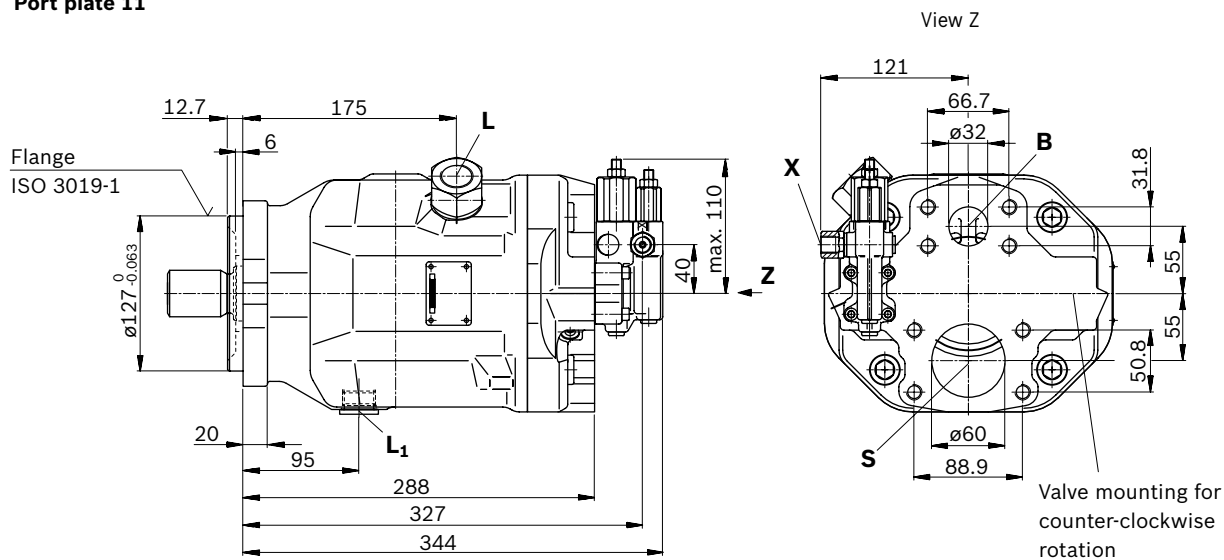
Dimensions, displacement 100

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

▼ Port plate 12



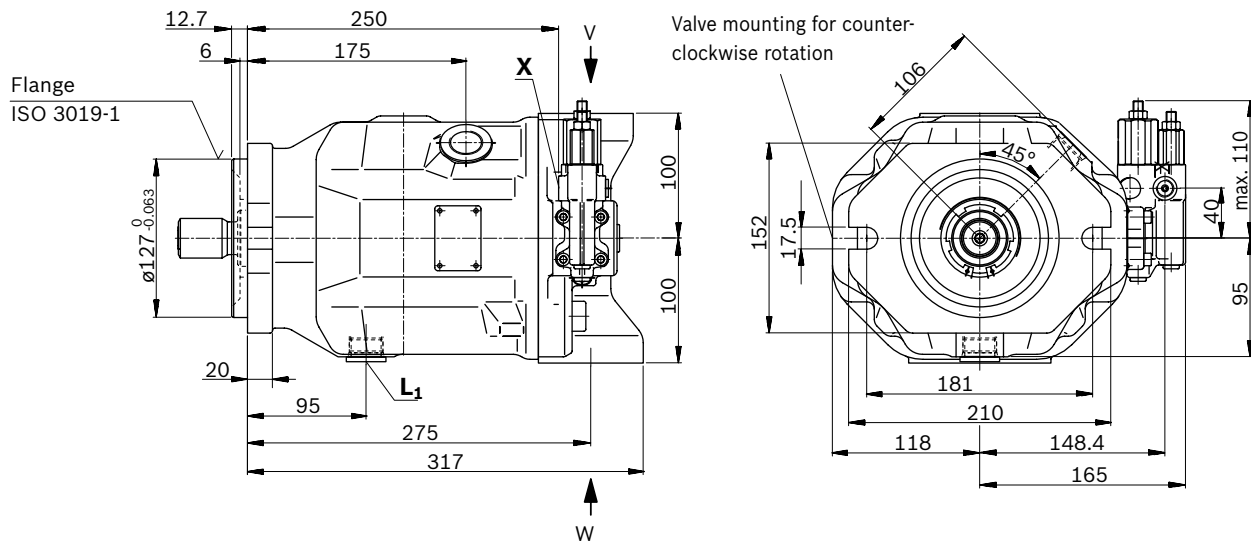
▼ Port plate 11



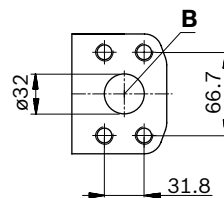
Dimensions, displacement 100

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

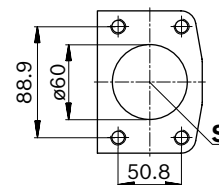
▼ Port plate 62



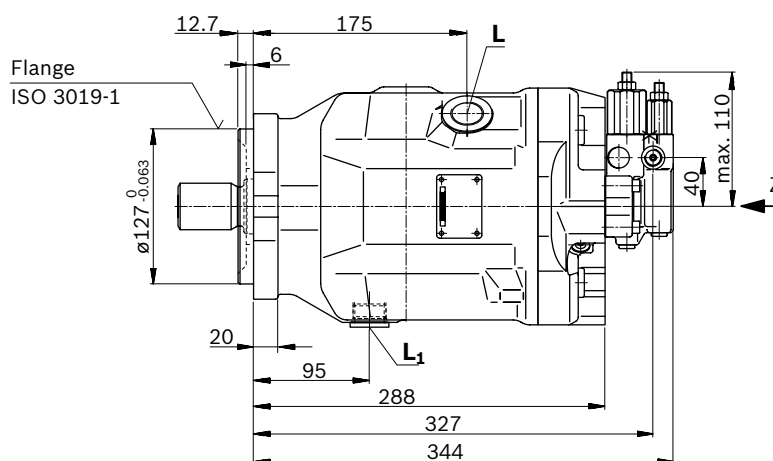
Detail V



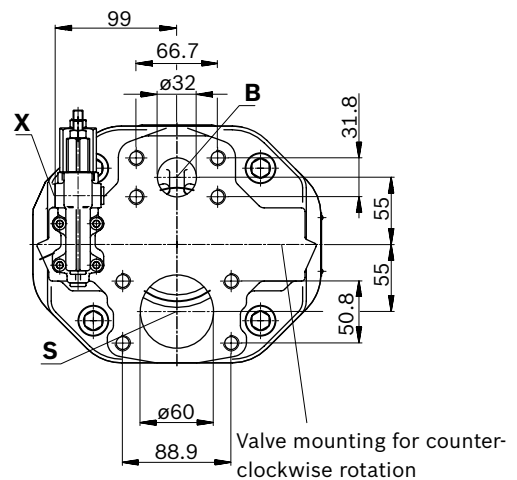
Detail W



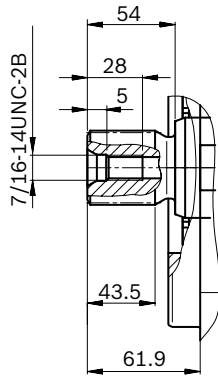
▼ Port plate 61



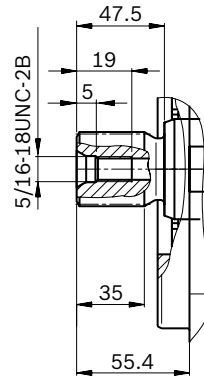
View Z



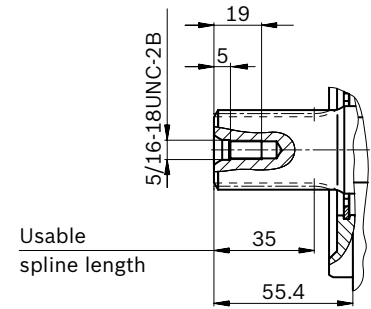
▼ Splined shaft 1 1/2 in (SAE J744)

S – 17T 12/24DP


▼ Splined shaft 1 1/4 in (SAE J744)

U – 14T 12/24DP


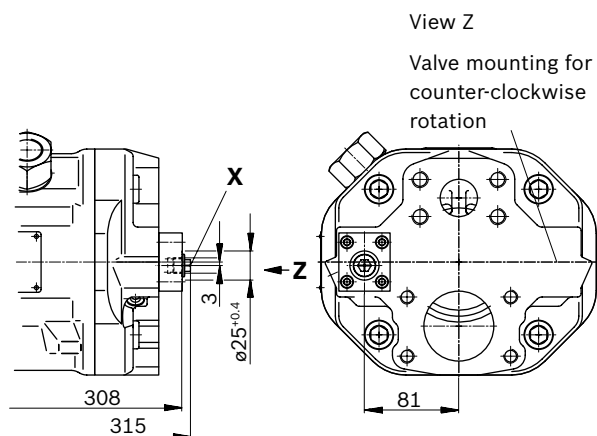
▼ Splined shaft 1 1/4 in (SAE J744)

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

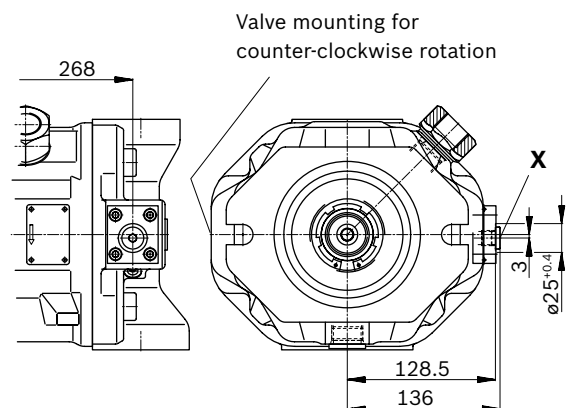
▼TTP - Two-point control, direct operated

Port plate 11 (61)



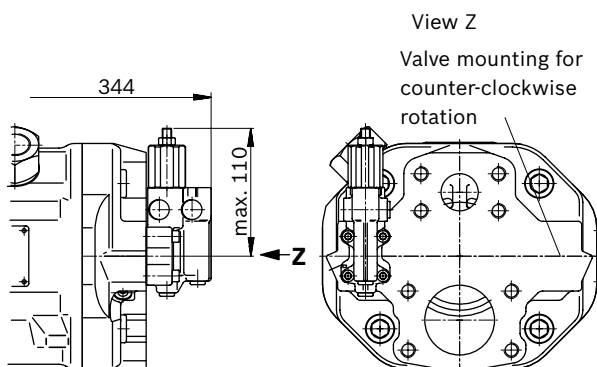
▼TTP - Two-point control, direct operated

Port plate 12 (62)



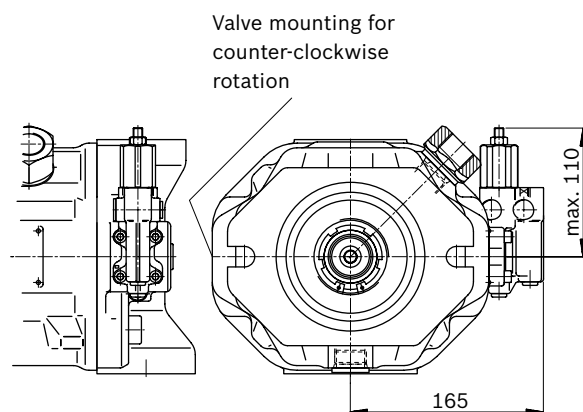
▼PR - Pressure controller

Port plate 11 (61)



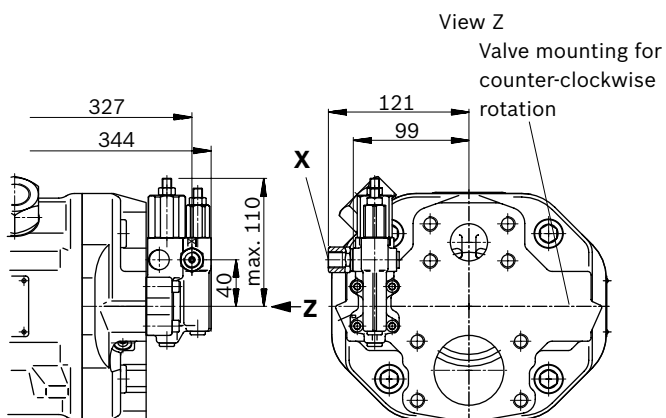
▼PR - Pressure controller

Port plate 12 (62)



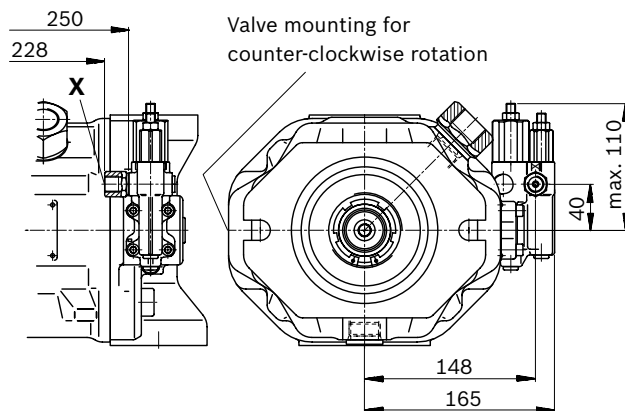
▼PRR - Pressure controller, remote controlled

Port plate 11 (61)

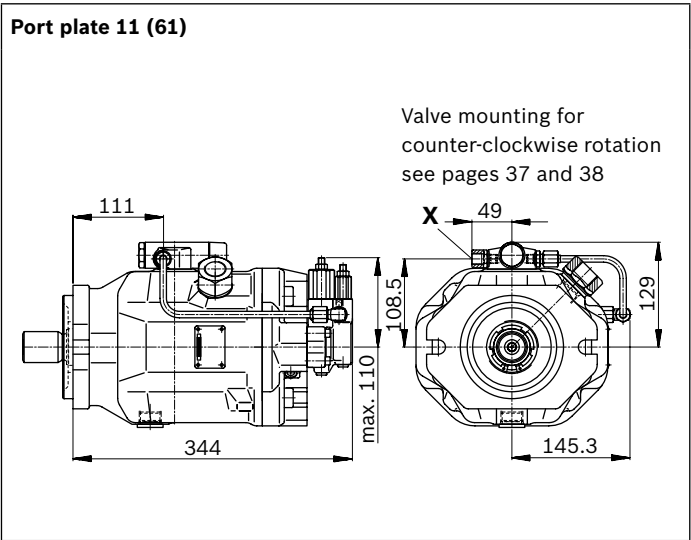


▼PRR - Pressure controller, remote controlled

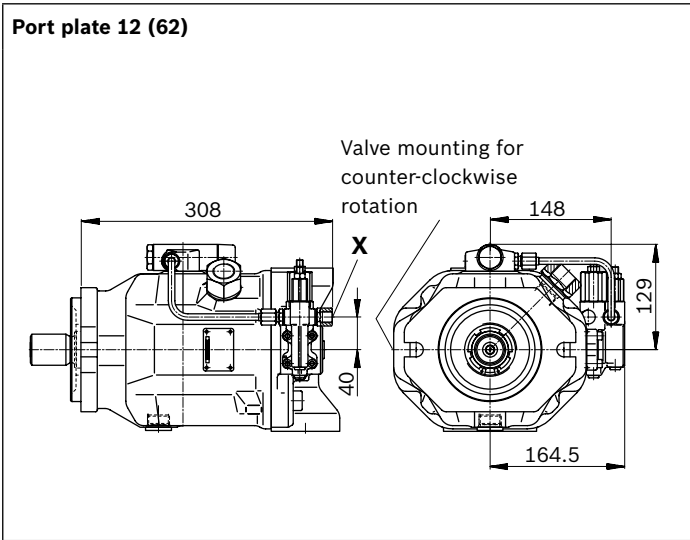
Port plate 12 (62)



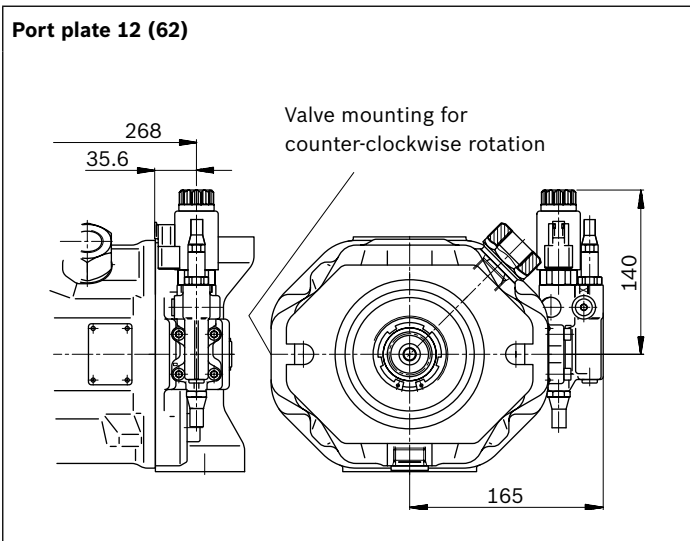
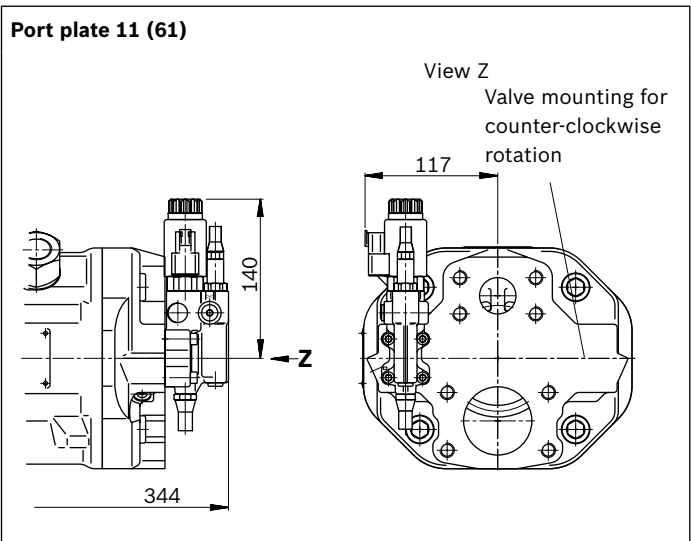
▼PFP - Pressure, flow and power controller



▼PFP - Pressure, flow and power controller



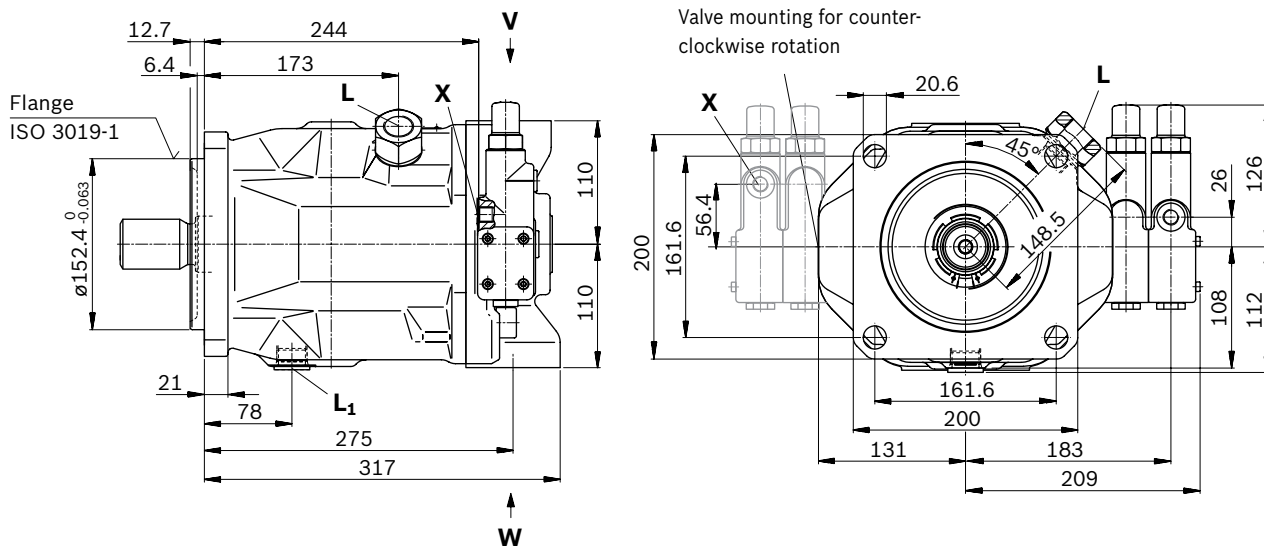
▼EN12/EN24 / EP12/EP24 - Electro-hydraulic pressure control ▼EN12/EN24 / EP12/EP24 - Electro-hydraulic pressure control



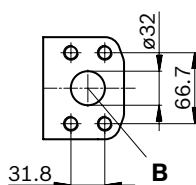
Dimensions, displacement 140

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

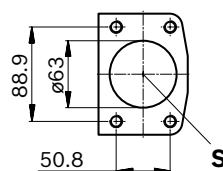
▼ Port plate 12



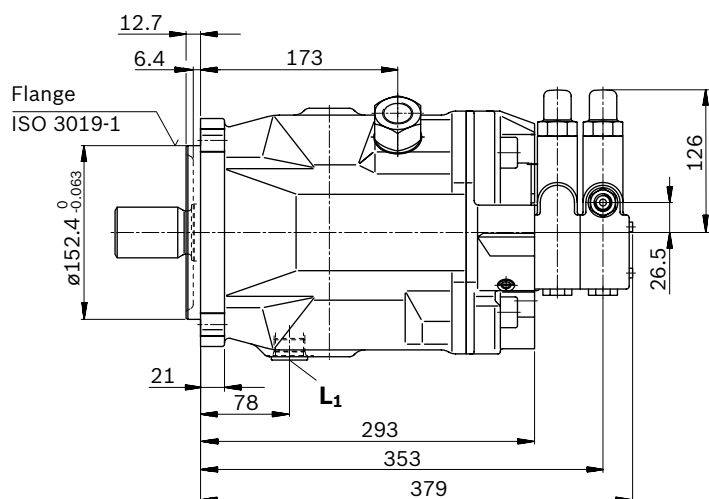
Detail V



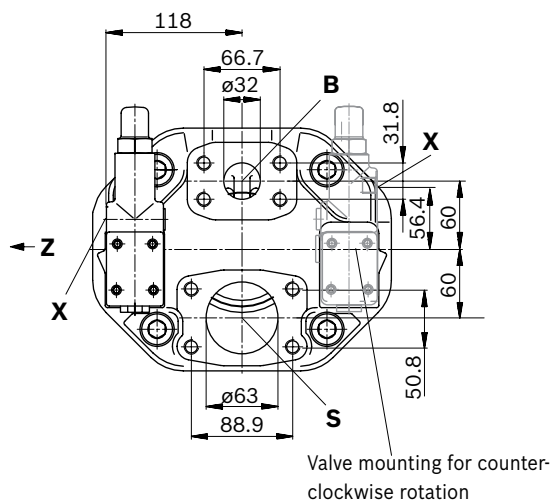
Detail W

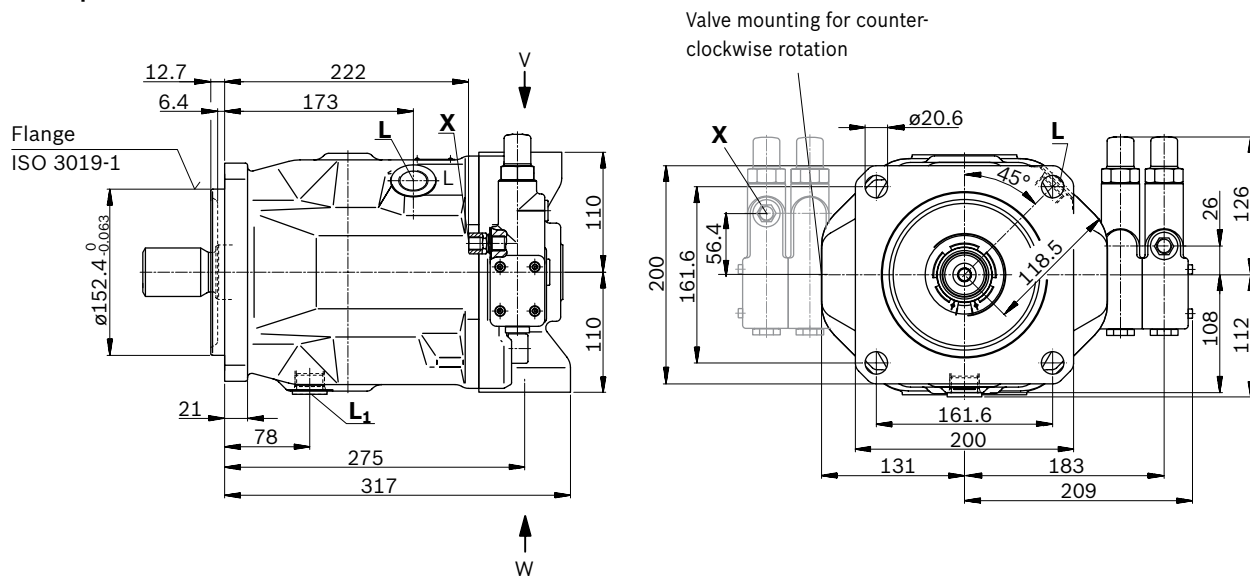


▼ Port plate 11

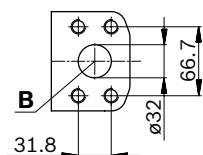


View Z

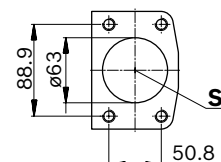
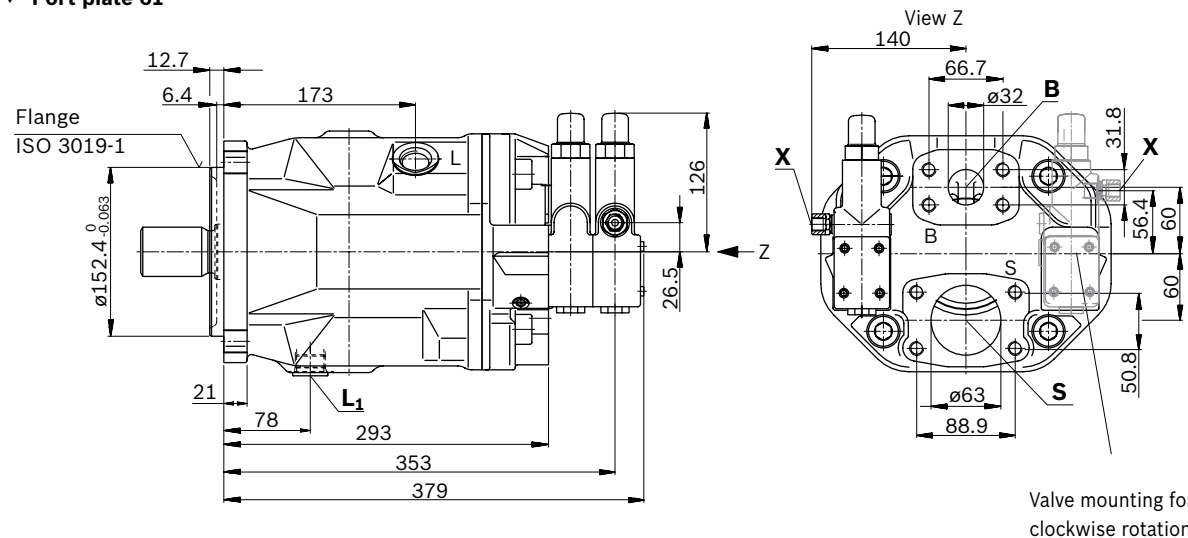


LS / LS1 / LS-C - Pressure and flow control, hydraulic, clockwise rotation, mounting flange D, version SAE**▼ Port plate 62**

Detail V

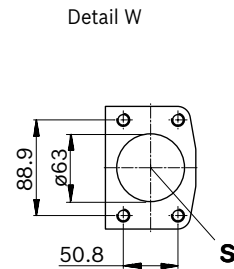
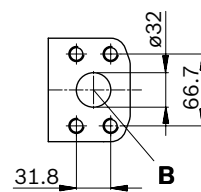


Detail W

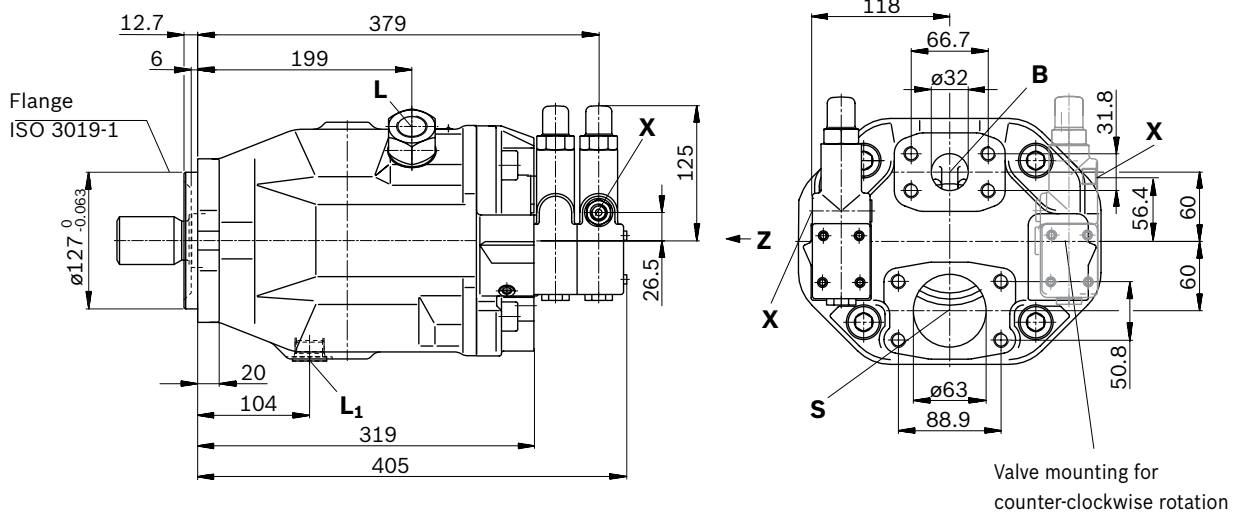
**▼ Port plate 61**

Valve mounting for counter-clockwise rotation

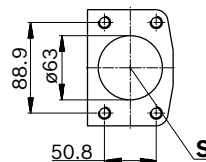
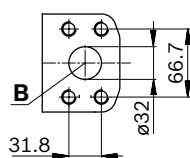
▼ **Port plate 12**



View Z



▼ Port plate 62



Technical drawing of the 3019-1 valve, showing front and top views with dimensions in millimeters.

Front View Dimensions:

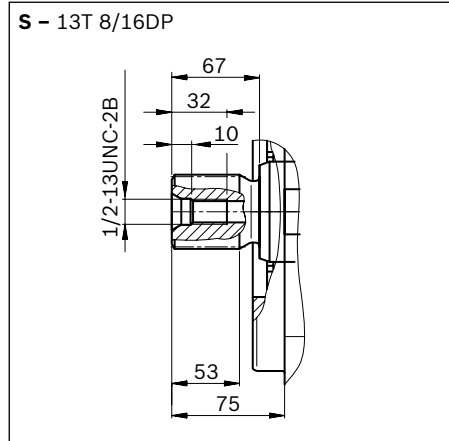
- Flange ISO 3019-1
- 12.7
- 6
- 379
- 199
- L
- 125
- X
- 26.5
- 20
- 104
- L₁
- 319
- 405
- Ø127⁰_{-0.063}

Top View Dimensions:

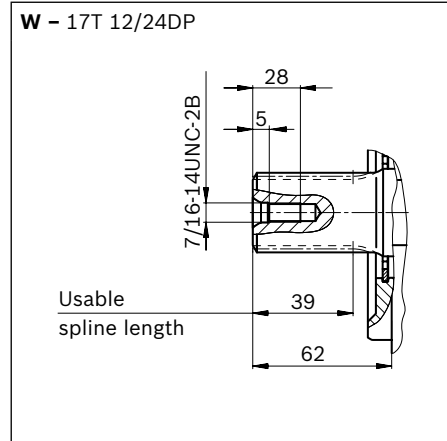
- View Z
- 140
- 66.7
- Ø32
- B
- 31.8
- X
- 56.4
- 60
- 60
- 50.8
- Ø63
- 88.9
- S
- S

Valve mounting for counter-clockwise rotation

▼ Splined shaft 1 3/4 in (SAE J744)



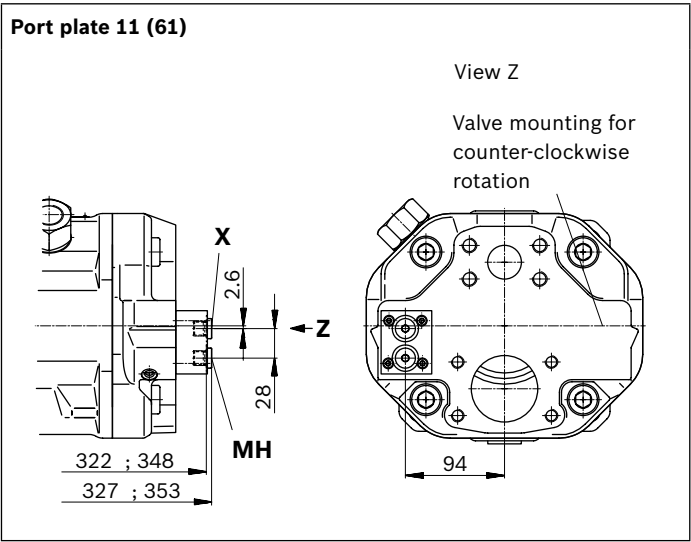
▼ Splined shaft 1 1/2 in (SAE J744)



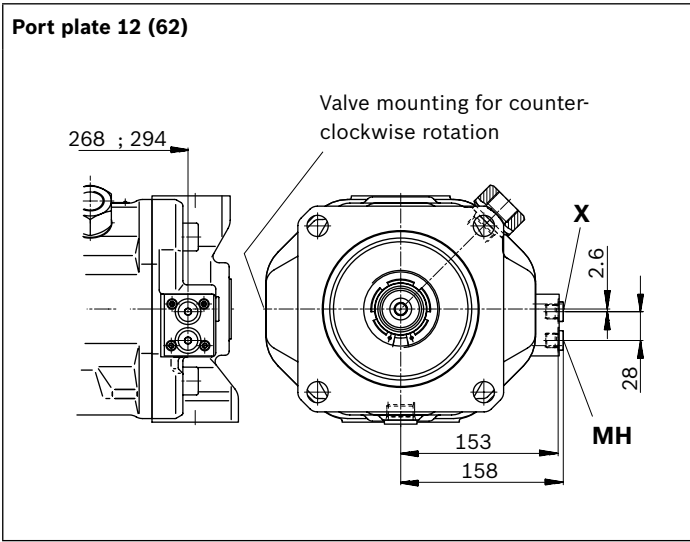
Ports - version metric port plate 11/12		Standard	Displacement	$p_{\max \text{ abs}}$ [bar]	State
B	Working port (high-pressure series) Fastening thread	SAE J518 DIN 13	1 1/4 in M14 × 2; 19 deep	350	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 DIN 13	2 1/2 in M12 × 1.75; 17 deep	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

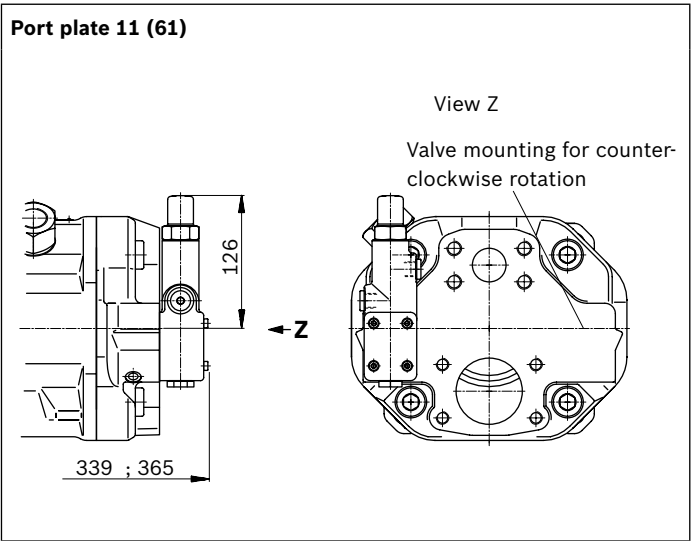
▼TP - Two-point control, direct operated



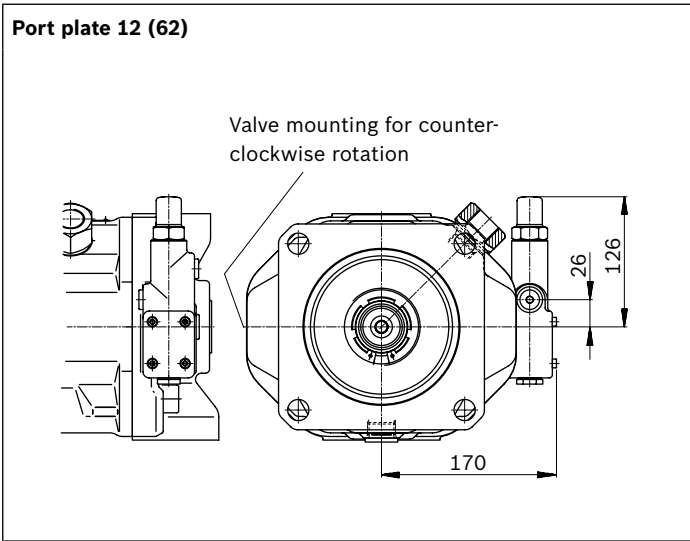
▼TP - Two-point control, direct operated



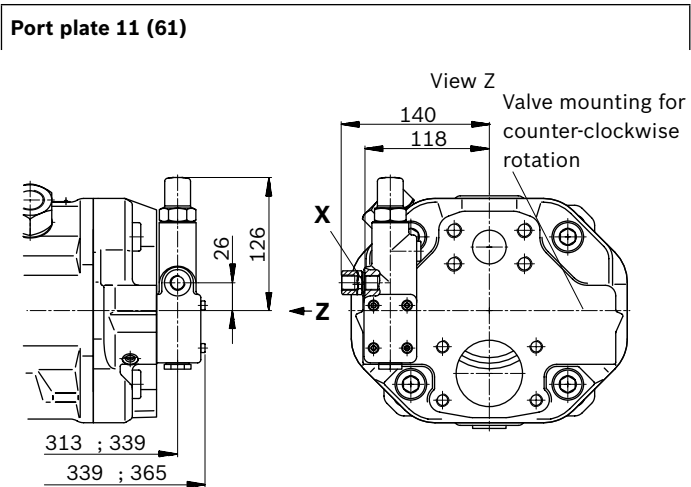
▼PR - Pressure controller



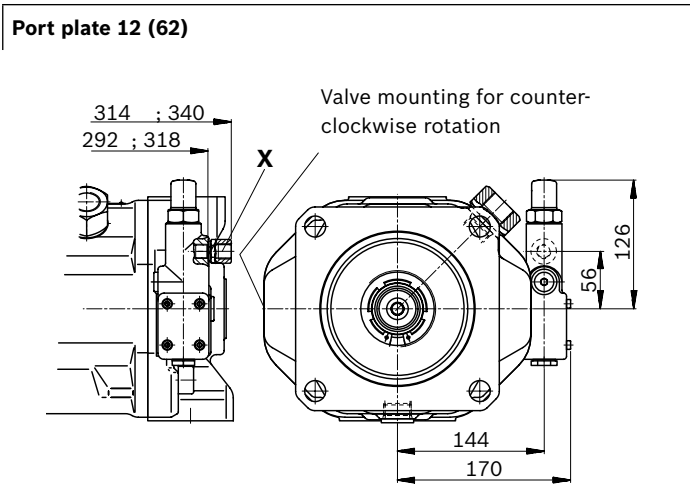
▼PR - Pressure controller



▼PRR - Pressure controller, remote controlled

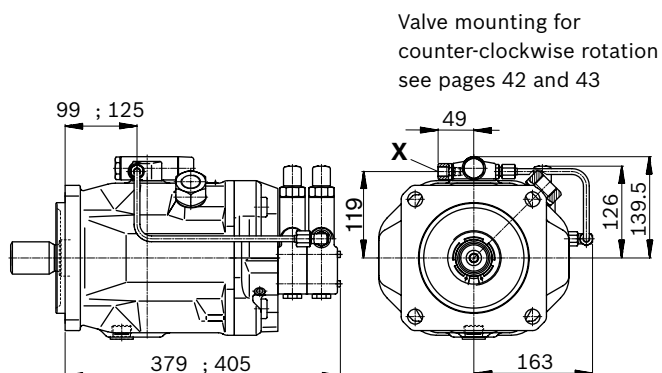


▼PRR - Pressure controller, remote controlled



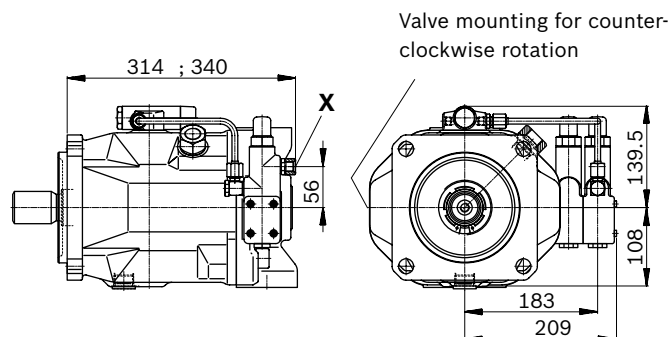
▼PFP - Pressure, flow and power controller

Port plate 11 (61)



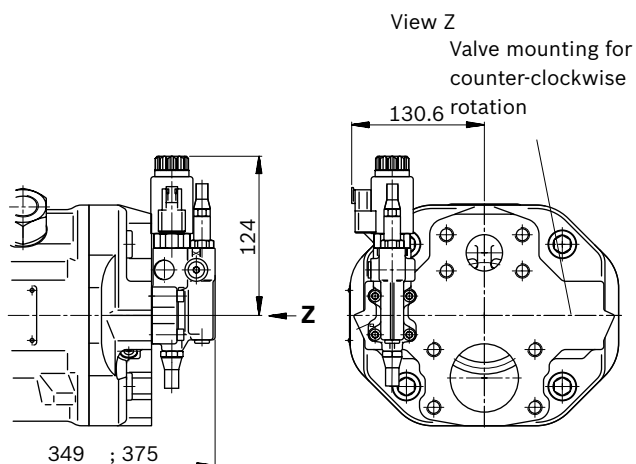
▼PFP - Pressure, flow and power controller

Port plate 12 (62)



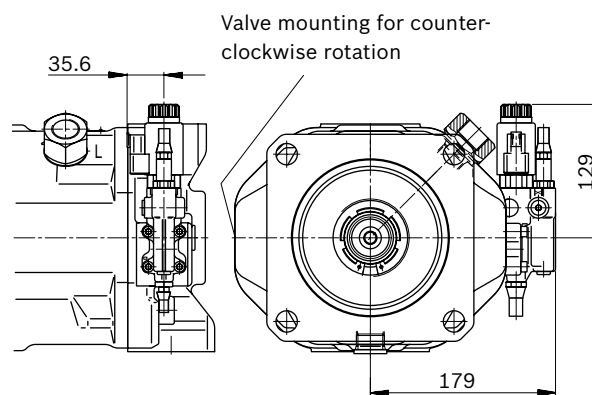
▼EN12/EN24 / EP12/EP24 - Electro-hydraulic pressure control

Port plate 11 (61)



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

Port plate 12 (62)

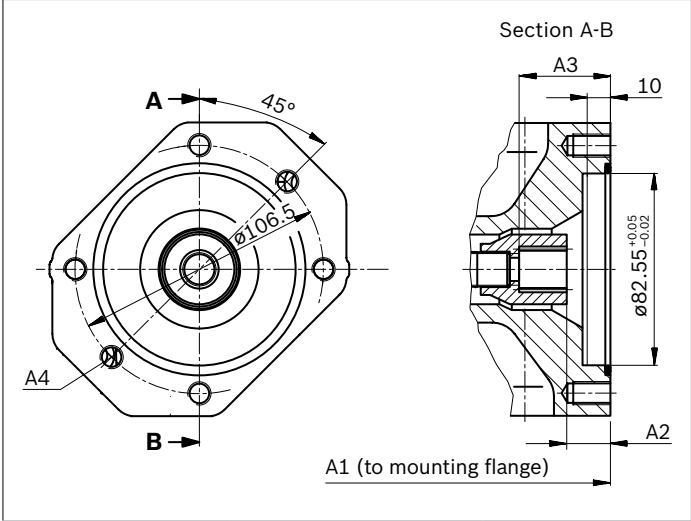
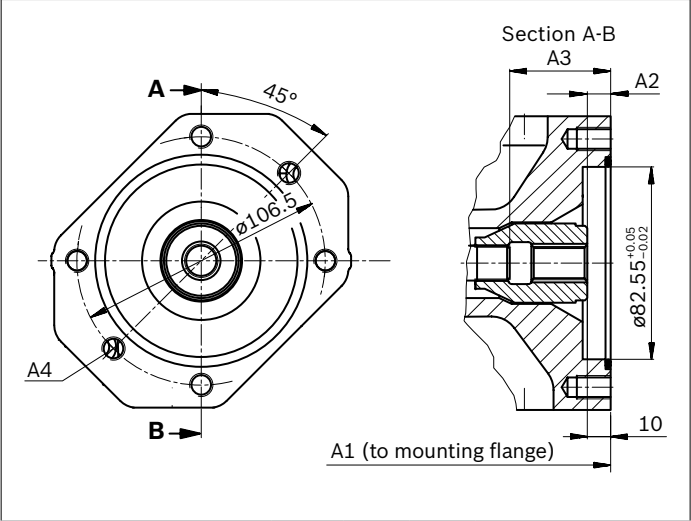


Dimensions, tandem

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)	8, 8°, 8°	5/8 in	9T 16/32DP	•	•	•	•	•	•	•	K01
		3/4 in	11T 16/32DP	•	•	•	•	•	•	•	K52

• = Available - = Not available

▼ 82-2



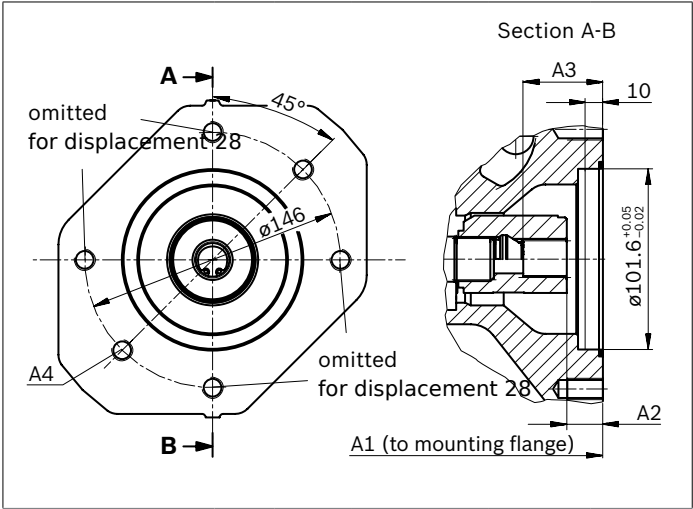
K01	NG	A1	A2	A3	A4
(SAE J744 16-4 (A))					
18	182	10	43.3	M10×1.5; 14.5 deep	
28	204	10	33.7	M10×1.5; 16 deep	
45	229	10.7	53.4	M10×1.5; 16 deep	
71	267	11.8	61.3	M10×1.5; 20 deep	
88	267	11.8	61.3	M10×1.5; 20 deep	
100	338	10.5	65	M10×1.5; 16 deep	
140	350	10.8	77.3	M10×1.5; 16 deep	
	376				

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				

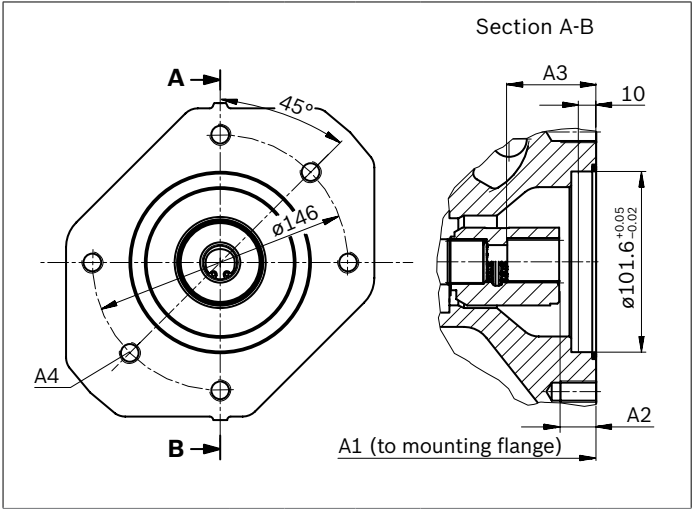
Flange ISO 3019-1 (SAE)		Hub for splined shaft		Availability over displacements							Code
Diameter	Symbol	Diameter		18	28	45	71	88	100	140	
101-2 (B)	⌀, ⌀, ∞	7/8 in	13T 16/32DP	-	•	•	•	•	•	•	K68
		1 in	15T 16/32DP	-	-	•	•	•	•	•	K04

• = 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				

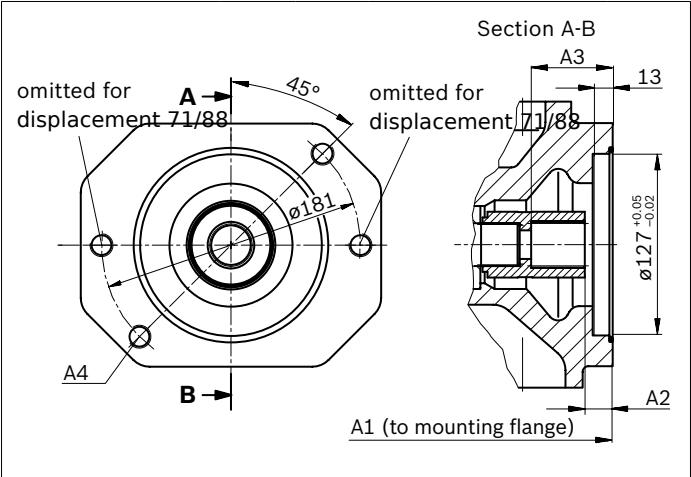


K04	NG	A1	A2	A3	A4
(SAE J744 25-4 (B-B))					
45	229	18.4	46.7	M12×1.75; 18 deep	
71	267	20.8	49.1	M12×1.75; 20 deep	
88	267	20.8	49.1	M12×1.75; 20 deep	
100	338	18.2	46.6	M12×1.75; 20 deep	
140	350	18.3	45.9	M12×1.75; 20 deep	
	376				

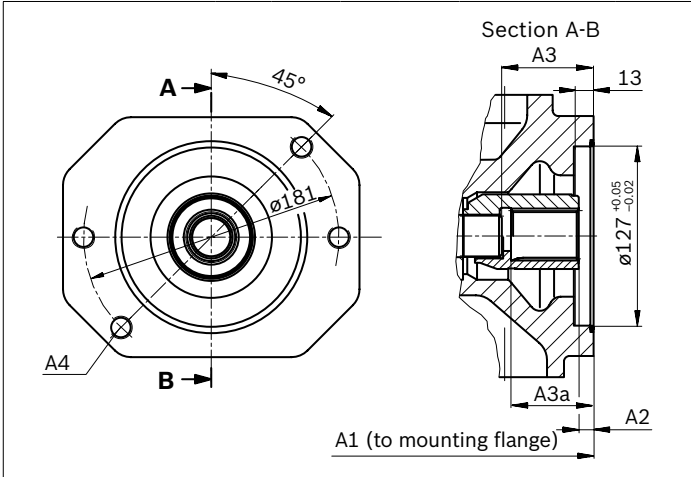
Flange ISO 3019-1 (SAE)		Hub for splined shaft		Availability over displacements							Code
Diameter	Symbol	Diameter		18	28	45	71	88	100	140	
127-2 (C)	ø, ∞	1 1/4 in	14T 12/24DP	-	-	-	•	•	•	•	K07
		1 1/2 in	17T 12/24DP	-	-	-	-	-	•	•	K24

• = 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			

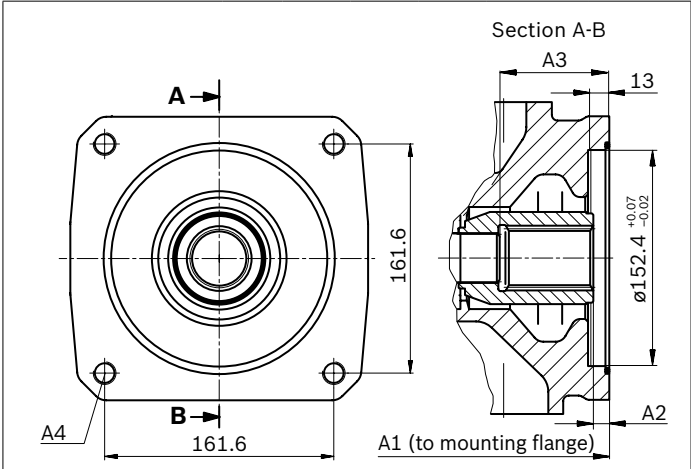


K24	NG	A1	A2	A3	A3a	A4
(SAE J744 38-4 (C-C))						
	100	338	9.9	65	-	M16×2;
	140	350	9.7	-	69.1	M16×2; 24 deep
		376				

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+

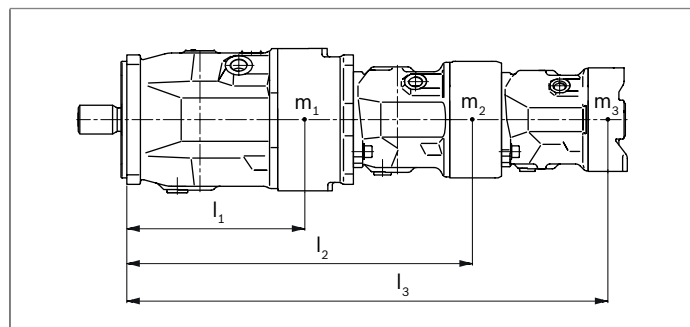
HA10V Series 3 45LS/3R-VSC12N00

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).



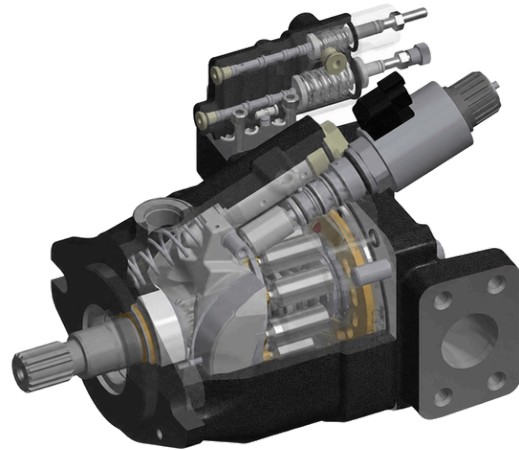
m_1, m_2, m_3	Weight of pump	[kg]
l_1, l_2, l_3	Distance, center of gravity	[mm]
$T_m = (m_1 \times l_1 + m_2 \times l_2 + m_3 \times l_3) \times \frac{1}{102} \text{ [Nm]}$		

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_l	mm	92	100	113	127	127	161	159	
Distance, center of gravity with tandem K..	l_l	mm	98	107	120	137	137	178	180	

HA10V Series 5 & Series 5 SUPER

Hydraulic Variable Piston Pump SAE



HA10V Series 5 Hydraulic Piston Pump have the following advantages;

- Compact Design,
- Economical Conception,
- High Power Density,
- High Overall Efficiency,
- High Rotating Speeds,
- High Output Pressure,
- 260 bar Cont. Work. Pressure,
- 320 bar Peak Pressure,
- From 18cc to 100cc,
- Reduced Noise Level,
- Increased Reliability,
- 100% compatible interchangeability
- Smaller Installation Dimensions,
- Extremely fast response time,
- Long service life
- Series 5 SUPER available with 280/350 bar pressure limits.



ISO 9001:2015 - ISO 14001:2015

HA10V Series 5 Hydraulic Piston Pump

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Ordering Code of HA10V Series 5 Hydraulic Piston Pump

01	02	03	04	05	06	07	08	09	10	11	12	13
HA10V				/	Series 5	-	V					

Axial piston unit

01	18	28	45	63	72	85	100	
Swashplate design, variable, nominal pressure 260 bar, maximum pressure 320 bar	•	•	•	•	•	•	•	HA10V

Operation mode

02	Standard, Open circuit	
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Size (NG)

03	Geometric displacement, see table of values on page 10	18	28	45	63	72	85	100
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Control devices

04	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	•	•	•	•	•	•	•	LSC		
	with pressure cut-off	hydraulic	remotely operated	•	•	•	•	•	•	•	PRR		
		electric	negative control	U = 12 V	–	•	–	•	•	•	•	EN12	
				U = 24 V	–	•	–	•	•	•	•	EN24	
		electric	positive control	U = 12 V	–	•	–	•	•	•	•	EP12	
				U = 24 V	–	•	–	•	•	•	•	EP24	
		Pressure-flow power control		electric control (negative control)		○	○	○	○	○	•	•	EPFP
		Power control with pressure cut-off	hydraulic	start of control from	10 to 35 bar	•	•	•	•	•	•	•	L5D
	36 to 70 bar				•	•	•	•	•	•	•	L6D	
	71 to 105 bar				•	•	•	•	•	•	•	L7D	
	106 to 140 bar				•	•	•	•	•	•	•	L8D	
	141 to 230 bar				•	•	•	•	•	•	•	L9D	
	remotely operated	hydraulic	start of control	see L.D	•	•	•	•	•	•	•	L.DG	
	flow control, X-T plugged	hydraulic	start of control	see L.D	•	•	•	•	•	•	•	L.DS	
		electrically overridable (negative control)	start of control	see L.D	•	•	•	•	•	•	•	LN.S	
	Electro-proportional control		positive control										
	with pressure control			U = 12 V	•	•	•	•	•	•	•	•	E1D
				U = 24 V	•	•	•	•	•	•	•	•	•
	with pressure and flow control (load-sensing)		X-T open	U = 12 V	•	•	•	•	•	•	•	•	E1DF
				U = 24 V	•	•	•	•	•	•	•	•	•
	with pressure and flow control (load-sensing)		X-T plugged	U = 12 V	•	•	•	•	•	•	•	•	E1DS
				U = 24 V	•	•	•	•	•	•	•	•	•
with electro-hydraulic pressure control			U = 12 V	•	•	•	•	•	•	•	•	E1ED	
			U = 24 V	•	•	•	•	•	•	•	•	•	E2ED

HA10V Series 5 Hydraulic Piston Pump

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Ordering Code of HA10V Series 5 Hydraulic Piston Pump

Control devices			18	28	45	63	72	85	100	
04	Electro-proportional control	positive control								
	with pressure control		U = 12 V	•	•	•	•	•	•	E1D
			U = 24 V	•	•	•	•	•	•	E2D
	with pressure and flow control (load-sensing)	X-T open	U = 12 V	•	•	•	•	•	•	E1DF
			U = 24 V	•	•	•	•	•	•	E2DF
	with pressure and flow control (load-sensing)	X-T plugged	U = 12 V	•	•	•	•	•	•	E1DS
			U = 24 V	•	•	•	•	•	•	E2DS
	electro-hydraulic pressure control with controller cut-off		U = 12 V	•	•	•	•	•	•	E1ED
		U = 24 V	•	•	•	•	•	•	E2ED	

Series

05	Series 5	•	•	•	•	•	•	•	5
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Direction of rotation

06	View on drive shaft	clockwise							R
		counter-clockwise							L

Sealing material

07	FKM (fluor-caoutchouc)								V
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Drive shaft

08	Splined shaft ANSI B92.1a	standard shaft	•	•	•	•	•	•	S
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Mounting flange

09	ISO 3019-1 (SAE)	2-hole	•	•	•	•	•	•	C
		4-hole	–	–	–	•	•	•	D

Working port

10	SAE flange port fastening thread, metric	rear	not for tandem	•	•	•	•	•	•	11
		at side, opposite	for tandem	•	•	•	•	•	•	12
		at side, offset 90°	not for tandem; available only for counter-clockwise direction of rotation	–	–	•	–	–	–	13

HA10V Series 5 Hydraulic Piston Pump

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Ordering Code of HA10V Series 5 Hydraulic Piston Pump

01	02	03	04	05	06	07	08	09	10	11	12	13
HA10V				/	Series 5	-	V					

Tandem

11	Flange ISO 3019-1 Diameter	Hub for splined shaft Diameter	18	28	45	63	72	85	100	
	without tandem		•	•	•	•	•	•	•	N00
	82-2 (A)	5/8 in	•	•	•	•	•	•	•	K01
		3/4 in	•	•	•	•	•	•	•	K52
	101-2 (B)	7/8 in	-	•	•	•	•	•	•	K68
		1 in	-	-	•	•	•	•	•	K04
	127-4 (C)	1 1/4 in	-	-	-	•	•	•	•	K15
		1 1/2 in	-	-	-	-	-	•	•	K16
	127-2 (C)	1 1/4 in	-	-	-	-	-	•	•	K07
		1 1/2 in	-	-	-	-	-	•	•	K24

Connectors for solenoids

12	Without connector (without solenoid, with hydraulic control only, without code)	•	•	•	•	•	•	•	
	DEUTSCH - molded connector, 2-pin - without suppressor diode (for electric controls)	•	•	•	•	•	•	•	P

● = Available ○ = On request - = Not available

HA10V Series 5 Hydraulic Piston Pump

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Technical data of HA10V Series 5 Hydraulic Piston Pump

Technical data, standard unit

Size		NG		10	18	28	45	60	63	72	85	100
Displacement, geometric, per revolution		V_g max	cm ³	10.5	18	28	45	60	63	72	85	100
Speed maximum	at V_g max	n_{nom}	rpm	3600	3300	3000	2600	2700	2600	2600	2500	2300
	at $V_g < V_{gmax}$	$n_{max perm}$	rpm	4320	3960	3600	3120	3140	3140	3140	3000	2500
Flow	at n_{nom} and V_g max	q_v max	l/min	37	59	84	117	162	163	187	212	230
	at $n_E = 1500$ rpm	q_{vE} max	l/min	15	27	42	68	90	95	108	128	150
Power	at n_{nom} , V_g max $\Delta p = 250$ bar	P_{max}	kW	16	25	35	49	65	68	77	89	96
	at $n_E = 1500$ rpm	P_{Emax}	kW	7	11	18	28	37	39	45	53	62
Torque	at V_g max $\Delta p = 250$ bar	T_{max}	Nm	42	71	111	179	238	250	286	338	398
	at V_g max $\Delta p = 100$ bar	T	Nm	17	29	45	72	95	100	114	135	159
Rotary stiffness of drive shaft	S	c	Nm/rad	9200	11000	22300	37500	65500	65500	65500	143000	143000
	R	c	Nm/rad	-	14800	26300	41000	69400	69400	69400	152900	-
	U	c	Nm/rad	6800	8000	16700	30000	49200	49200	49200	102900	102900
	W	c	Nm/rad	-	-	19900	34400	54000	54000	54000	117900	117900
	P	c	Nm/rad	10700	-	-	-	-	-	-	-	-
Moment of inertia for rotary group		J_{TW}	kgm ²	0.0006	0.0009	0.0017	0.003	0.0056	0.0056	0.0056	0,012	0,012
Maximum angular acceleration		α	rad/s ²	8000	6800	5500	4000	3300	3300	3300	2700	2700
Case volume		V'	l	0.2	0.25	0.3	0.5	0.8	0.8	0.8	1	1
Weight without tandem (approx.)		m	kg	8	11.5	15	18	22	22	22	36	36
Weight with tandem (approx.)				-	13	18	24	28	28	28	45	45

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_t 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.

HA10V Series 5 Hydraulic Piston Pump

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Technical data II of HA10V Series 5 SUPER Hydraulic Piston Pump

Technical data, SUPER unit

HA10V Series 5 SUPER

Technical data, standard unit | 280 bar nominal • 350 bar peak

Size	NG		18	28	45	63	72	85	100
Displacement, geometric, per revolution	V_g max	cm ³	18	28	45	63	72	85	100
Speed maximum	at V_g max	n_{nom}	rpm	3300	3000	2600	2600	2500	2300
	at $V_g < V_g$ max	n_{max}	rpm	3960	3600	3120	3140	3000	2500
Flow	at n_{nom} and V_g max	q_v max	l/min	59	84	117	163	187	212
	at $n_E = 1500$ rpm	q_{vE} max	l/min	27	42	68	95	108	150
Power	at n_{nom} and V_g max $\Delta p = 280$ bar	P_{cont}	kW	28	39	55	76	87	99
	at n_{max} and V_g max $\Delta p = 350$ bar (peak)	P_{peak}	kW	42	59	82	115	132	149
Torque	at V_g max $\Delta p = 280$ bar	T_{cont}	Nm	80	125	201	281	321	379
	at V_g max $\Delta p = 350$ bar (peak)	T_{peak}	Nm	100	156	251	351	401	473
Case volume	V	l	0,25	0,3	0,5	0,8	0,8	1	1
Weight without tandem (approx.)	m	kg	11,5	15	18	22	22	36	36
Weight with tandem (approx.)	m	kg	13	18	24	28	28	45	45

CALCULATION BASIS	Continuous pressure	280	bar	Peak pressure	350	bar
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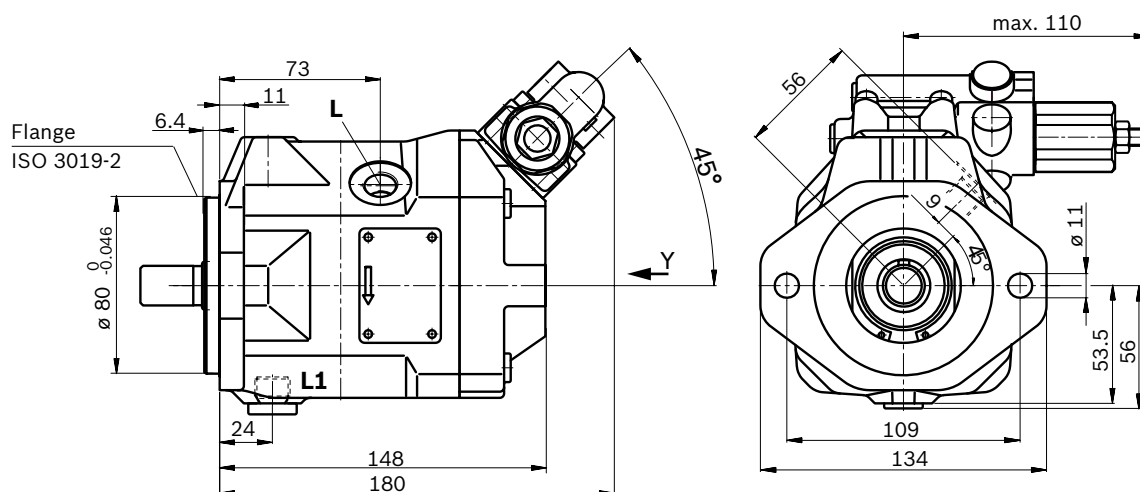
Continuous power uses n_{nom} ; peak power uses n_{max} . Power and torque are theoretical hydraulic values; volumetric and mechanical efficiencies are not applied.

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_t Total efficiency ($\eta_t = \eta_v \times \eta_{hm}$)		

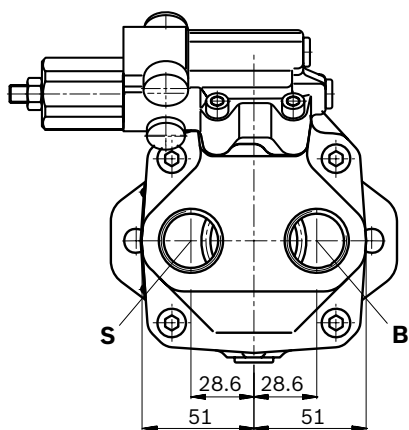
Notice

- 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.

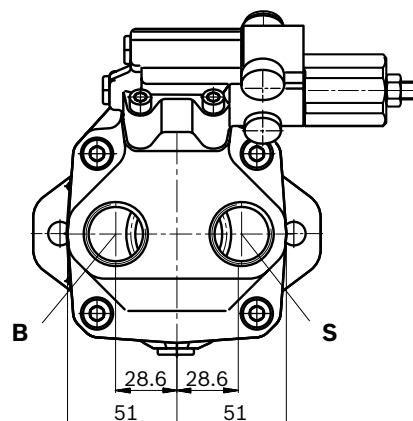
* 5.2 design: No longer in production. Please see the 5.3 design.

Dimensions - Displacement 10**PR - Pressure controller; metric A mounting flange; 5.2 design*****▼ View Y**

Valve mounting
for clockwise
rotation

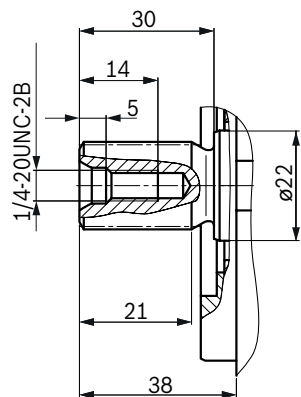
**▼ View Y**

Valve mounting
for counter-clockwise
rotation



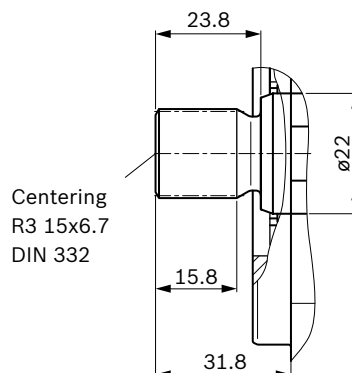
▼ Splined shaft 3/4 in (SAE J744)

S – 11T 16/32DP



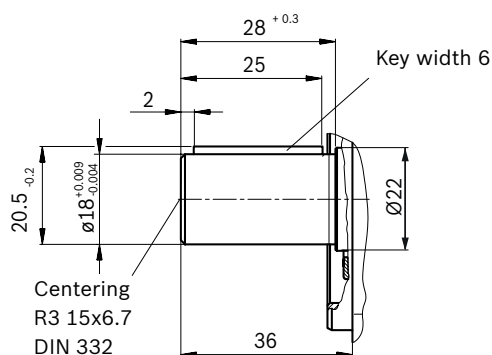
▼ Splined shaft 5/8 in (SAE J744)

U – 9T 16/32DP



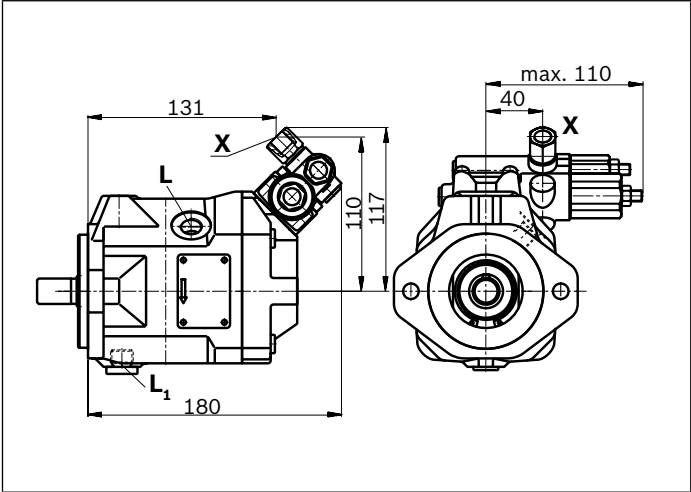
▼ Parallel keyed shaft DIN 6885

P – A6x6x25

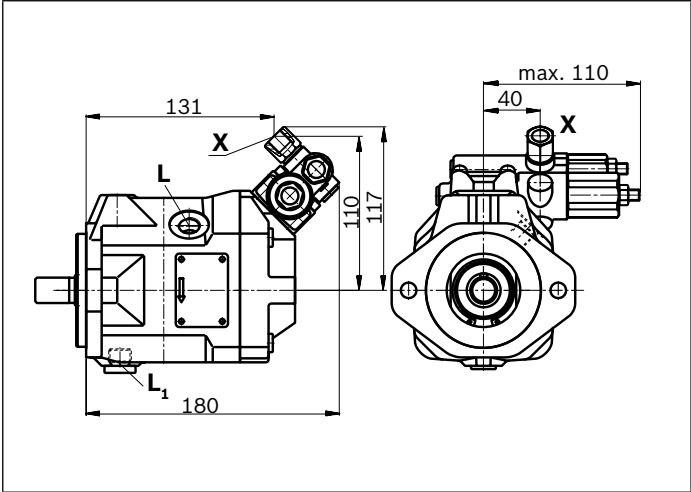


Ports		Standard	Displacement	$p_{\max \text{ abs}}$ [bar]	State
B	Working port	DIN 3852	M27 × 2; 16 deep	315	O
S	Suction port	DIN 3852	M27 × 2; 16 deep	5	O
Ports at mounting flange A metric					
L	Drain port	DIN 3852	M16 × 1.5; 12 deep	2	O
L₁	Drain port	DIN 3852	M16 × 1.5; 12 deep	2	X
X with adapter	Control pressure	DIN 3852	M14 × 1.5; 12 deep	315	O
Ports at mounting flange C SAE					
L	Drain port	DIN 11926	9/16-18UNF-2B; 10 deep	2	O
L₁	Drain port	DIN 11926	9/16-18UNF-2B; 10 deep	2	X
X without adapter	Control pressure	DIN 11926	7/16-20UNF-2B; 11.5 deep	315	O

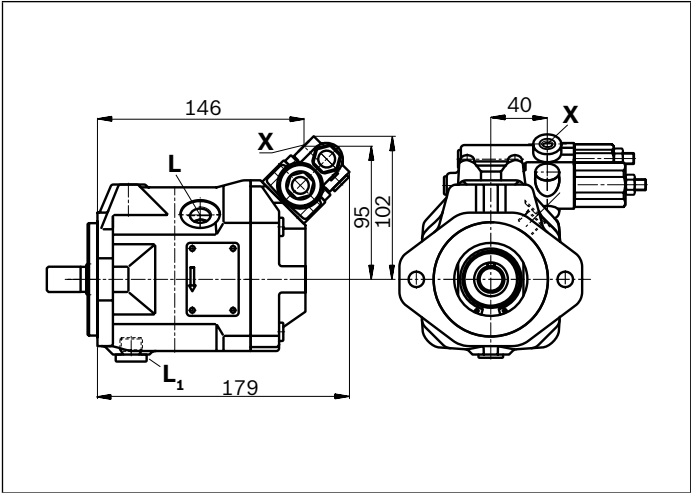
▼PRR - Pressure controller, remotely operated (metric)



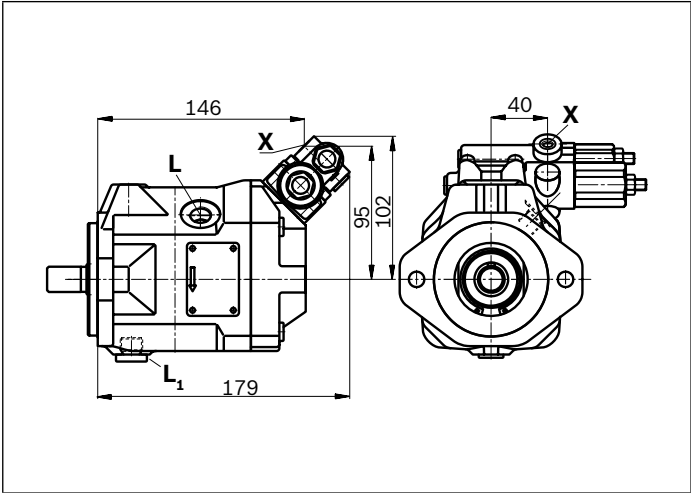
▼LS/LS1 - Pressure/flow control (load-sensing, metric)



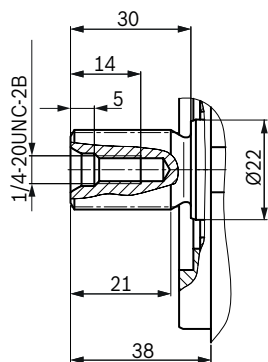
▼PRR - Pressure controller, remotely operated (SAE)



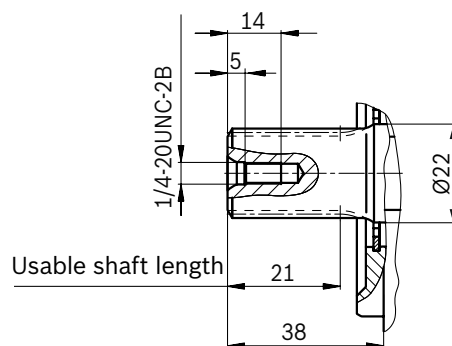
▼LS/LS1 - Pressure/flow control (load-sensing, SAE)



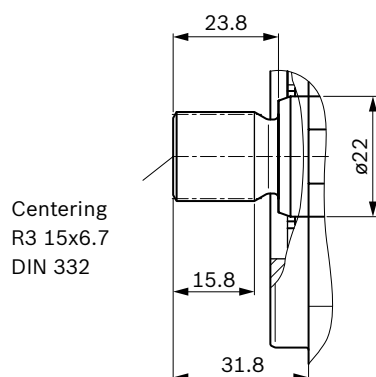
▼ Splined shaft 3/4 in (SAE J744)

S – 11T 16/32DP

▼ Splined shaft 3/4 in (SAE J744)

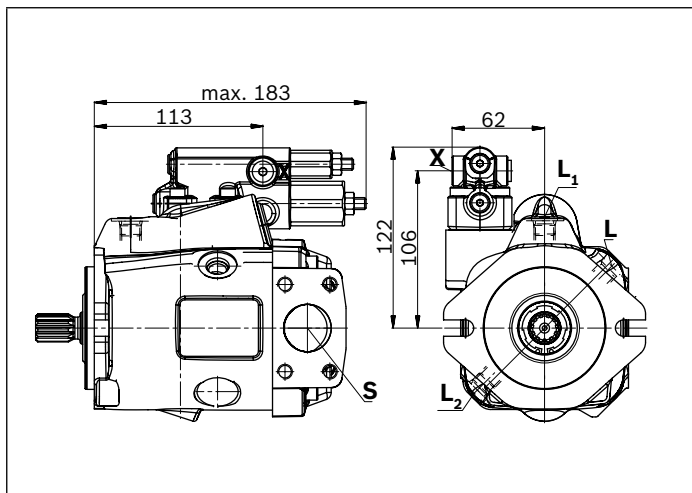
R – 11T 16/32DP

▼ Splined shaft 5/8 in (SAE J744)

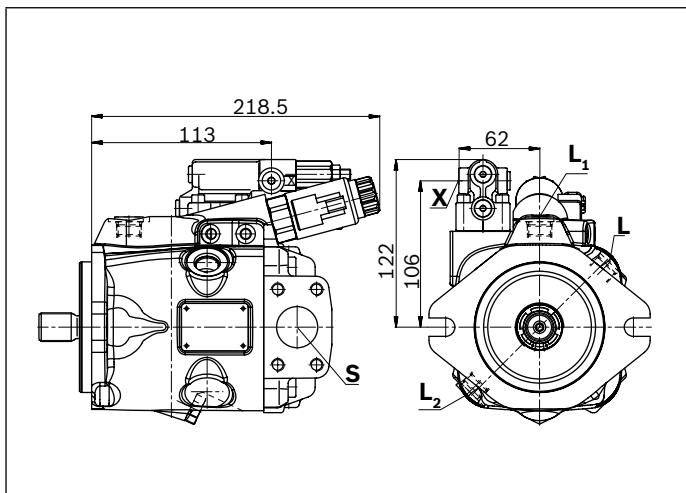
U – 9T 16/32DP

Ports		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	315	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 DIN 13	1 1/4 in M10 × 1.5; 17 deep	5	O
L	Drain port	DIN 11926	3/4-16UNF-2B; 12 deep	2	O
L₁, L₂	Drain port	DIN 11926	3/4-16UNF-2B; 12 deep	2	X
X	Control pressure	DIN 11926	7/16-20UNF-2A; 11.5 deep	315	O

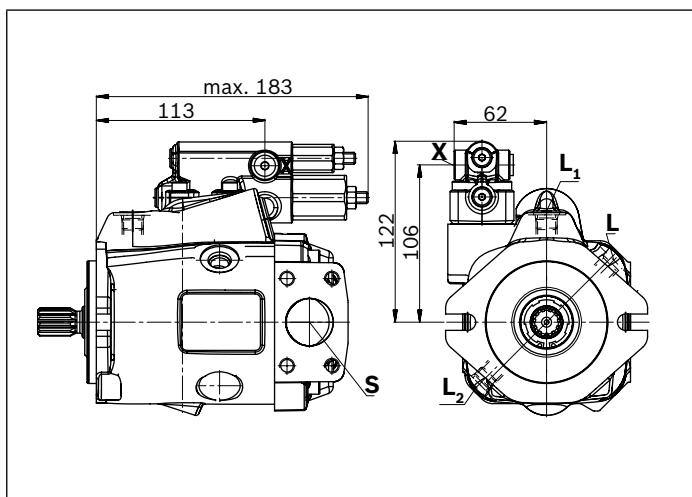
▼PRR - Pressure controller, remotely operated, 5.3 design



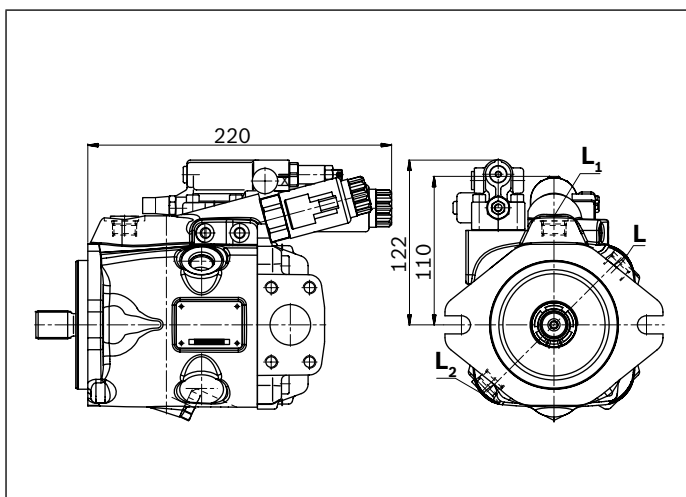
▼E1D / E2D - Electro-proportional pressure control, 5.3 design



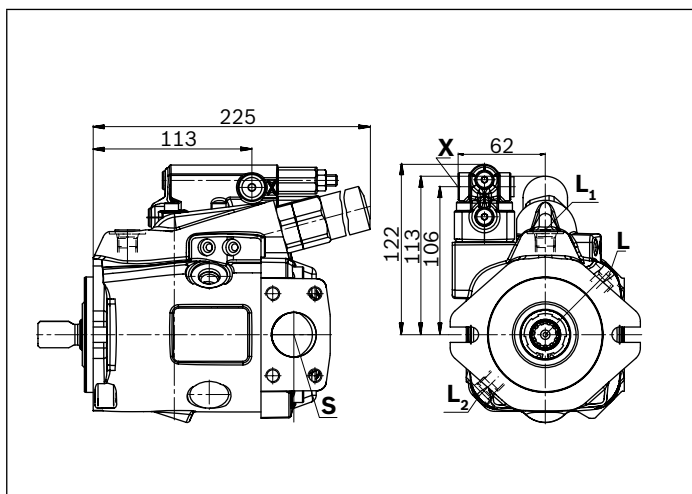
▼LS/L.DS/LSC - Pressure/flow control (load-sensing), 5.3 design



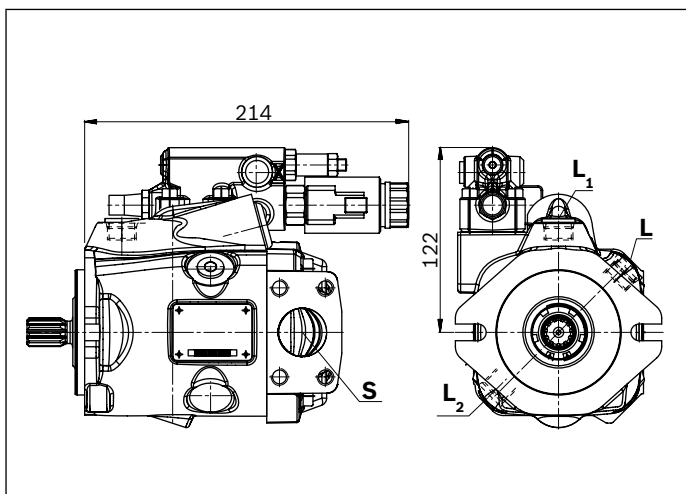
▼E1ED / E2ED - Electro-hydraulic pressure control, 5.3 design

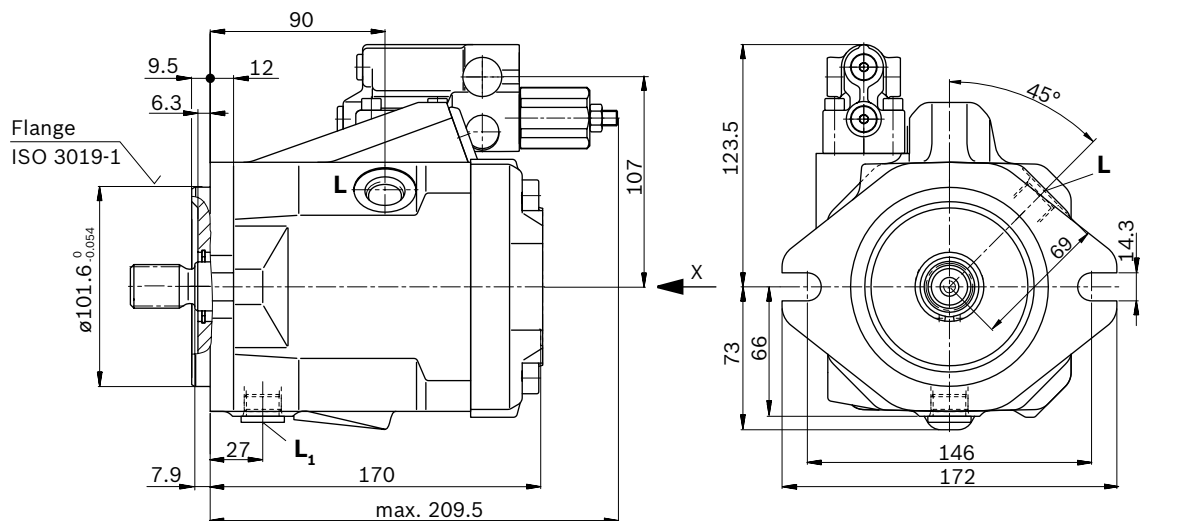


▼L5D-L9D - Power control with pressure cut-off, 5.3 design

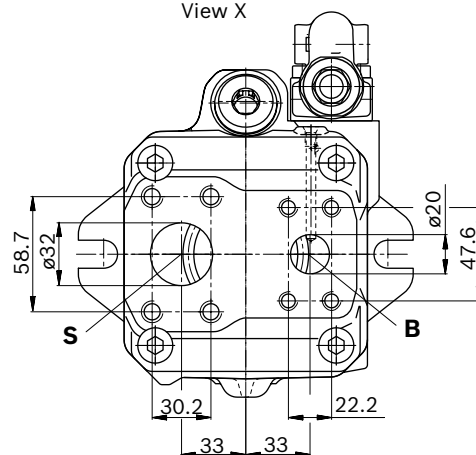


▼EN12/EN24 / EP12/EP24 - Electric pressure cut-off control, 5.3 design

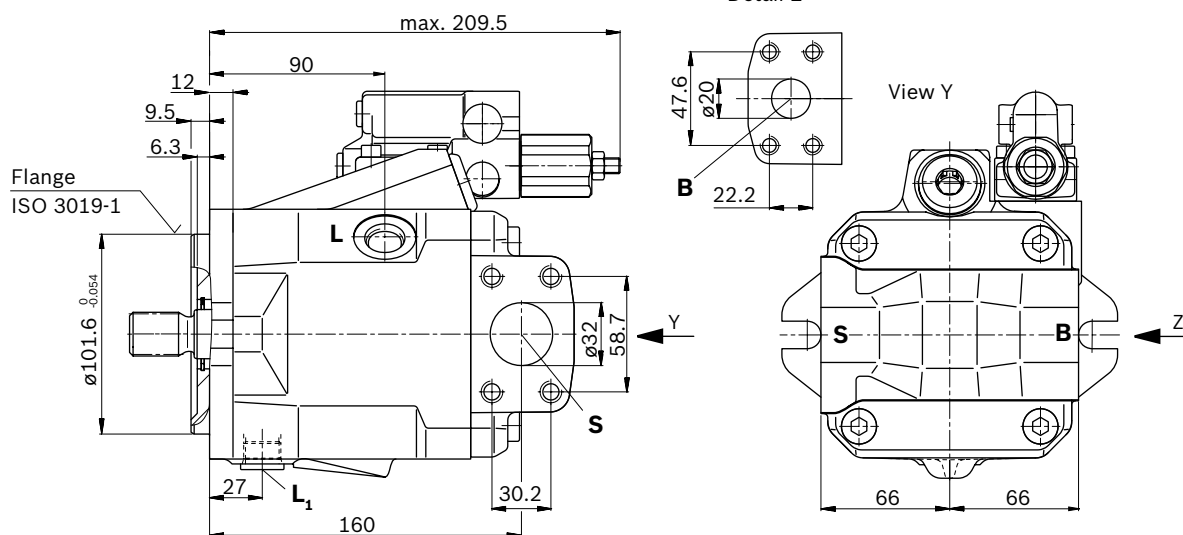


Dimensions - Displacement 28**PR - Hydraulic pressure controller, clockwise rotation, 5.2 design*****▼ Port plate 11**

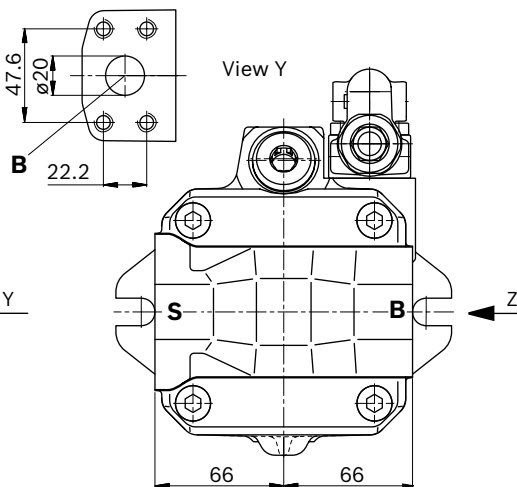
View X



Detail Z

▼ Port plate 12

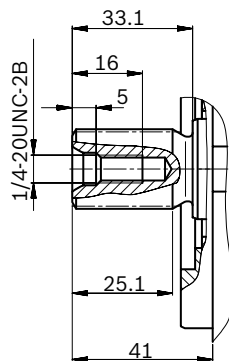
View Y



* 5.2 design: No longer in production. Please see the 5.3 design.

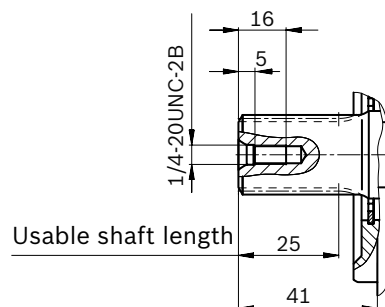
▼ Splined shaft 7/8 in (SAE J744)

S – 13T 16/32DP



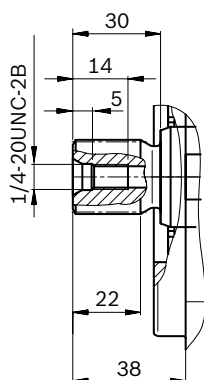
▼ Splined shaft 7/8 in (SAE J744)

R – 13T 16/32DP



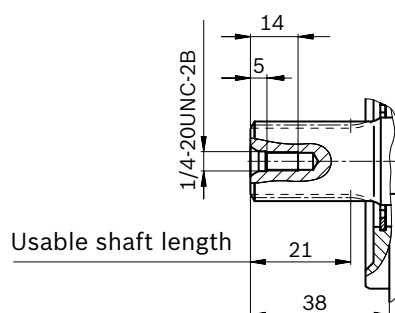
▼ Splined shaft 3/4 in (SAE J744)

U – 11T 16/32DP



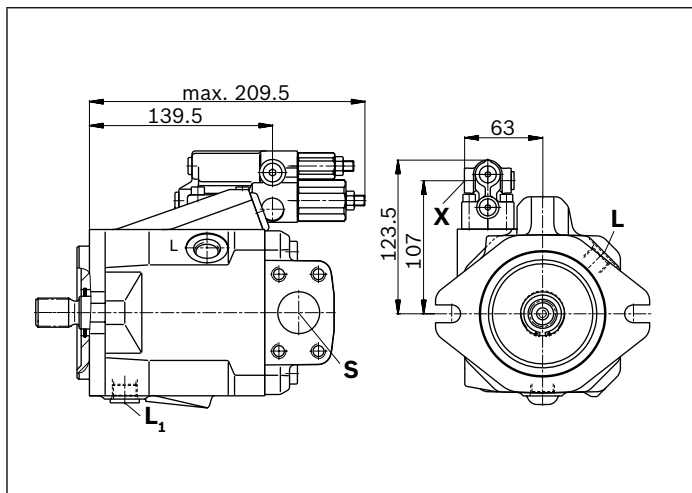
▼ Splined shaft 3/4 in (SAE J744)

W – 11T 16/32DP

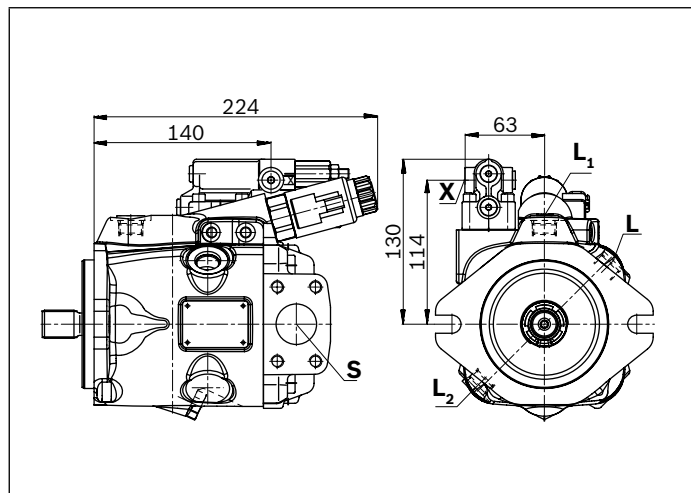


Ports		Standard	Displacement	$p_{\max \text{ abs}}$ [bar]	State
B	Working port (Standard pressure series) Fastening thread	SAE J518 DIN 13	3/4 in M10 × 1.5; 17 deep	315	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 DIN 13	1 1/4 in M10 × 1.5; 17 deep	5	O
L	Drain port	ISO 11926	3/4-16UNF-2B; 12 deep	2	O
L₁, L₂	Drain port	ISO 11926	3/4-16UNF-2B; 12 deep	2	X
X	Control pressure	ISO 11926	7/16-20UNF-2B; 11.5 deep	315	O

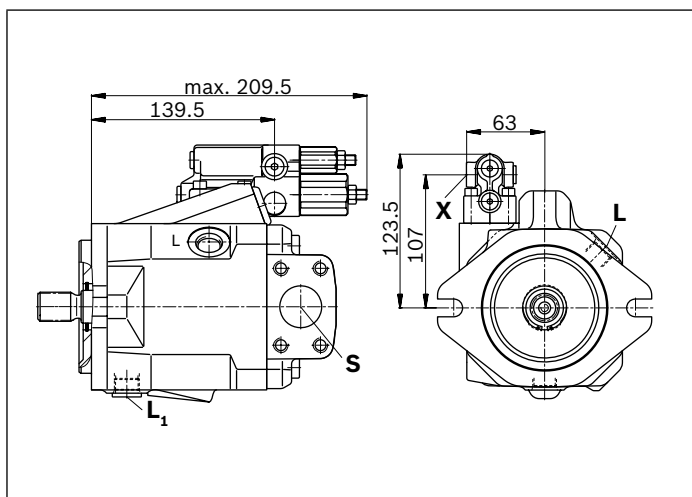
▼PRR - Pressure controller, remotely operated, 5.2 design* / 5.3 design



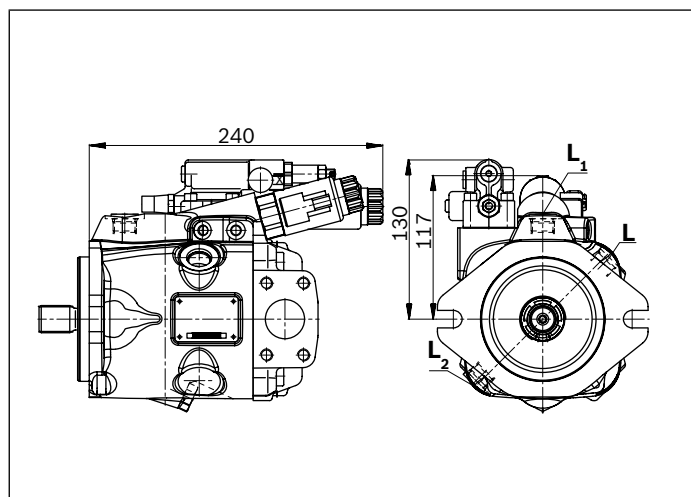
▼E1D / E2D - Electro-proportional pressure control, 5.3 design



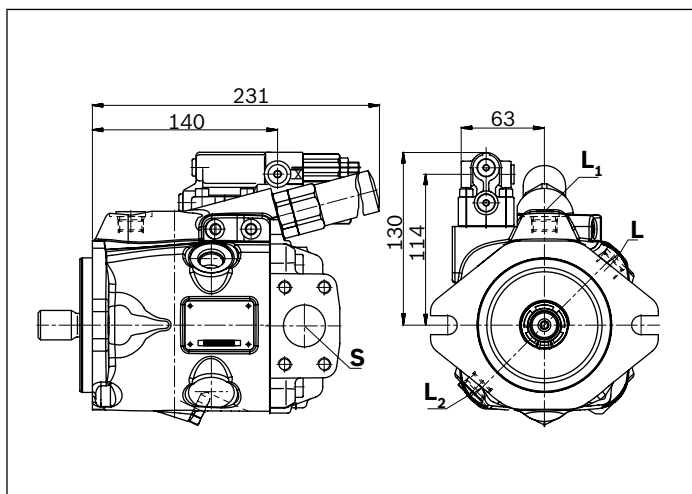
▼LS/LS1/LSC - Pressure/flow control (load-sensing), 5.2 design* / 5.3 design



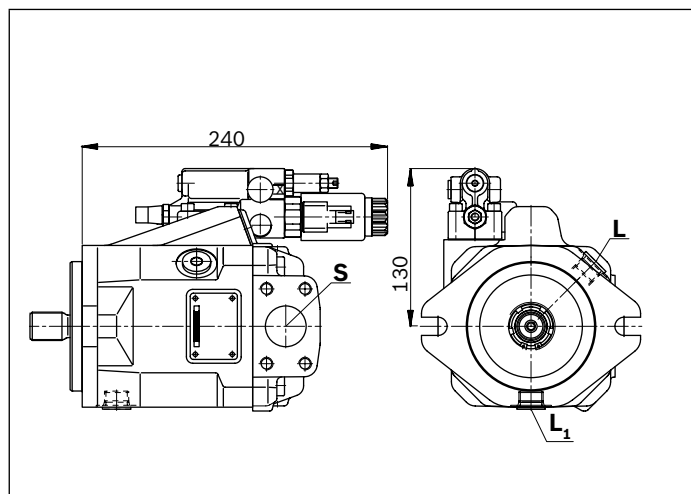
▼E1ED / E2ED - Electro-hydraulic pressure control, 5.3 design



▼L5D-L9D - Power control with pressure cut-off, 5.3 design



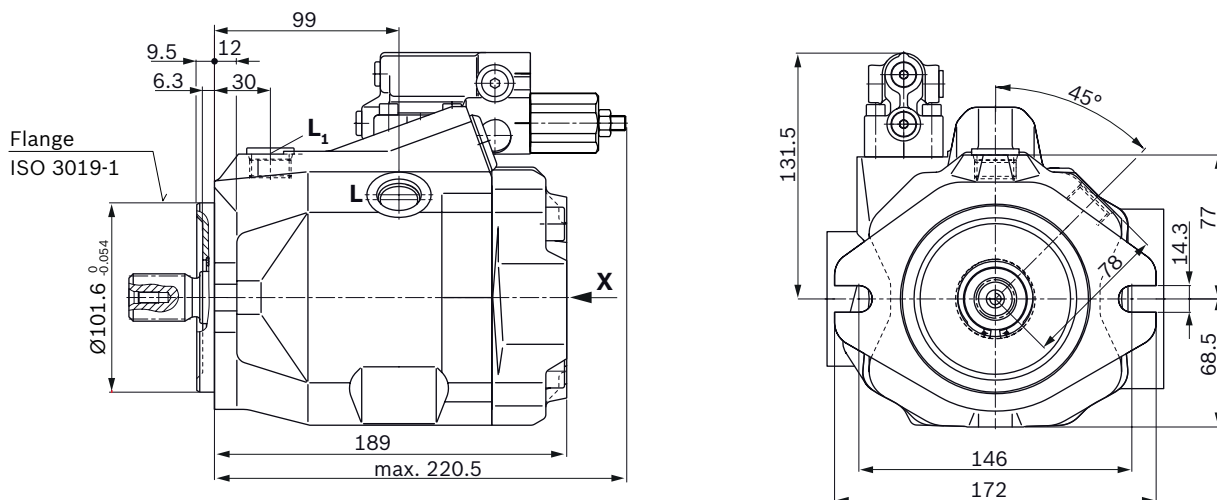
▼EN12/EN24 / EP12/EP24 - Electric pressure cut-off control, 5.2 design* / 5.3 design



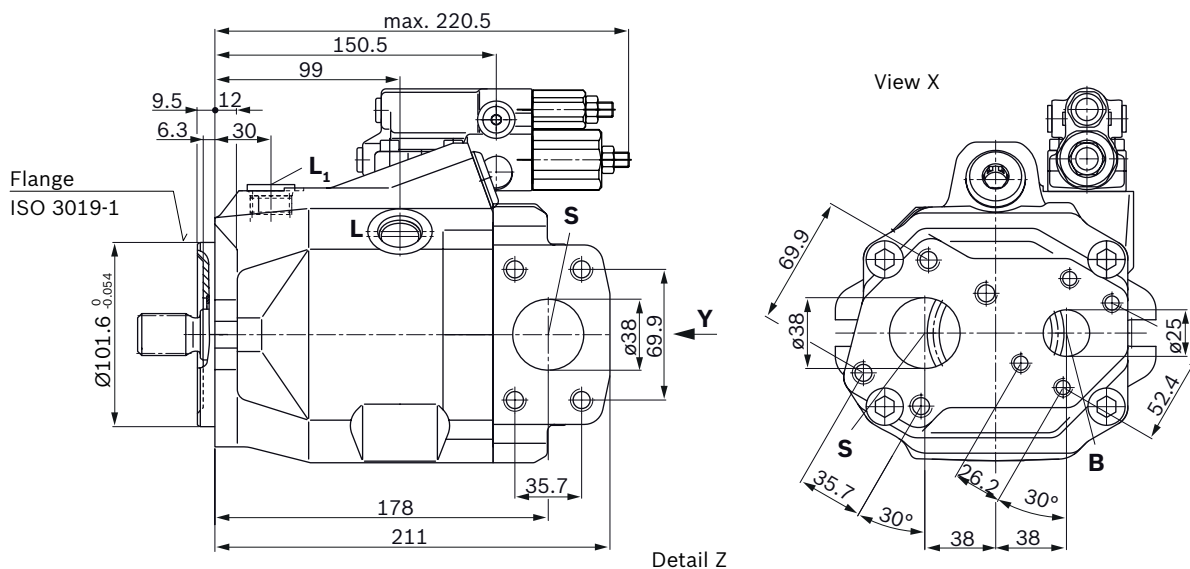
Dimensions - Displacement 45

PR - Hydraulic pressure controller, clockwise rotation, 5.2 design*

▼ Port plate 11

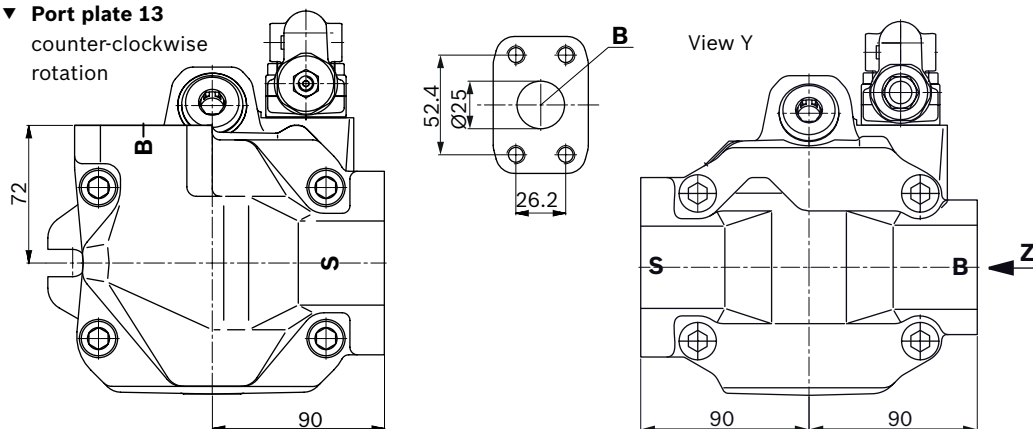


▼ Port plate 12



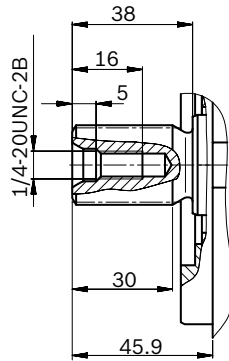
▼ Port plate 13

counter-clockwise rotation

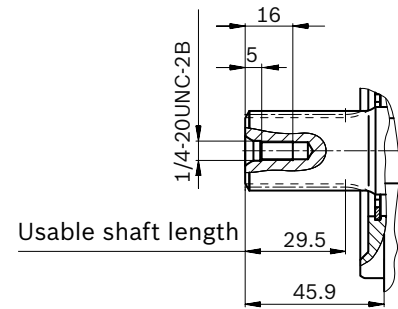


* 5.2 design: No longer in production. Please see the 5.3 design.

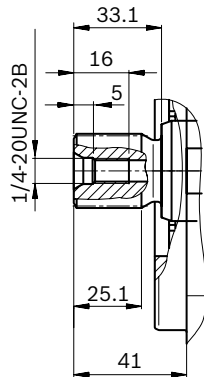
▼ Splined shaft 1 in SAE J744

S – 15T 16/32DP


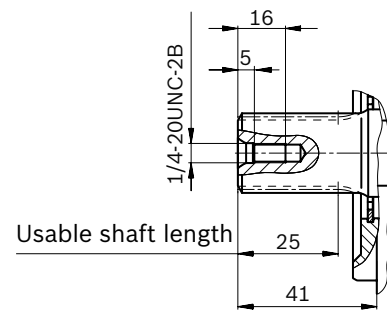
▼ Splined shaft 1 in SAE J744

R – 15T 16/32DP


▼ Splined shaft 7/8 in SAE J744

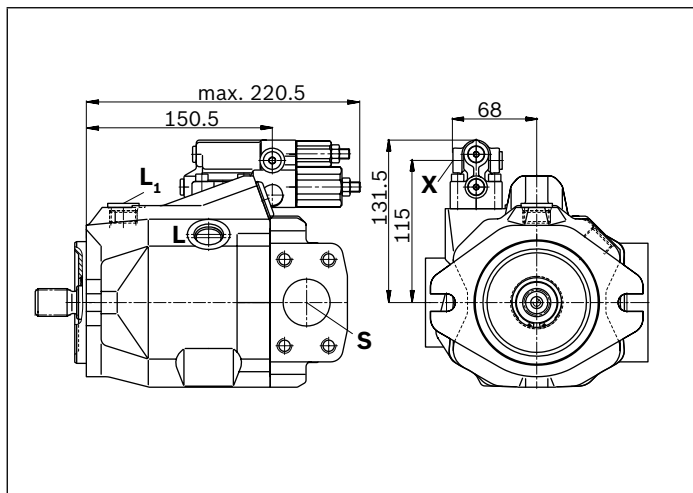
U – 13T 16/32DP


▼ Splined shaft 7/8 in SAE J744

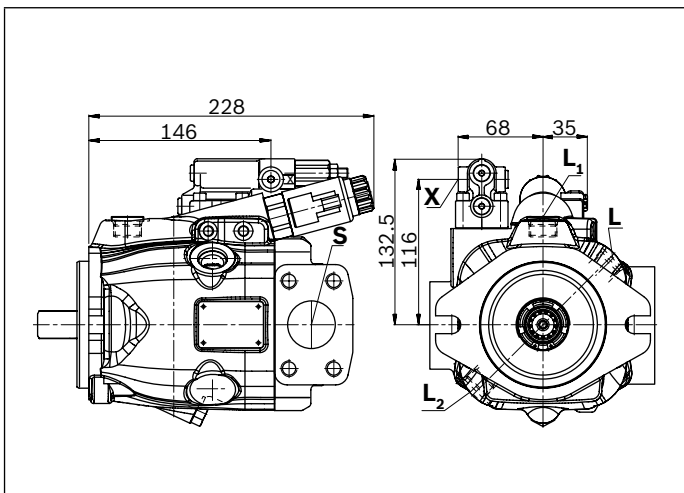
W – 13T 16/32DP


Ports		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	315	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 DIN 13	1 1/2 in M12 × 1.75; 20 deep	5	O
L	Drain port	ISO 11926	7/8-14UNF-2B; 13 deep	2	O
L₁, L₂	Drain port	ISO 11926	7/8-14UNF-2B; 13 deep	2	X
X	Control pressure	ISO 11926	7/16-20UNF-2A; 11.5 deep	315	O

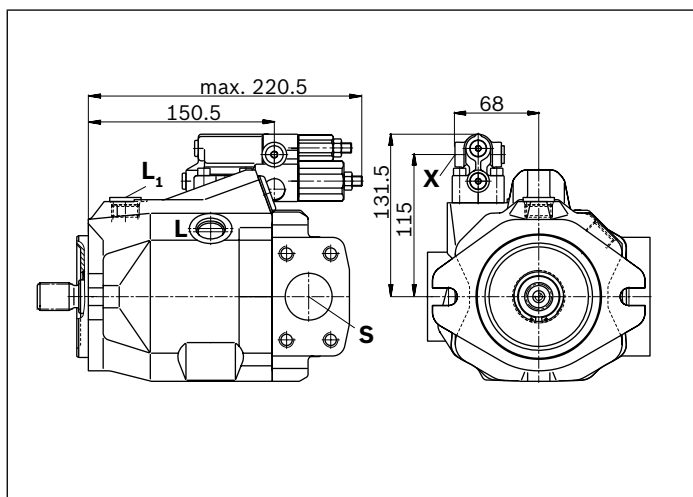
▼PRR - Pressure controller, remotely operated, 5.2 design* / 5.3 design



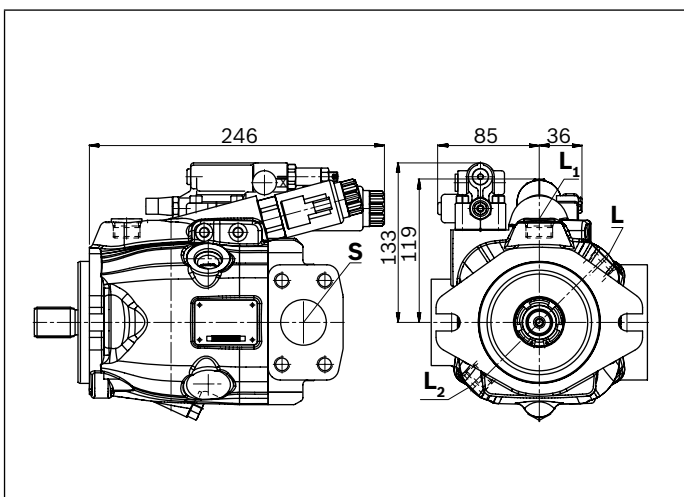
▼E1D / E2D - Electro-proportional pressure control, 5.3 design



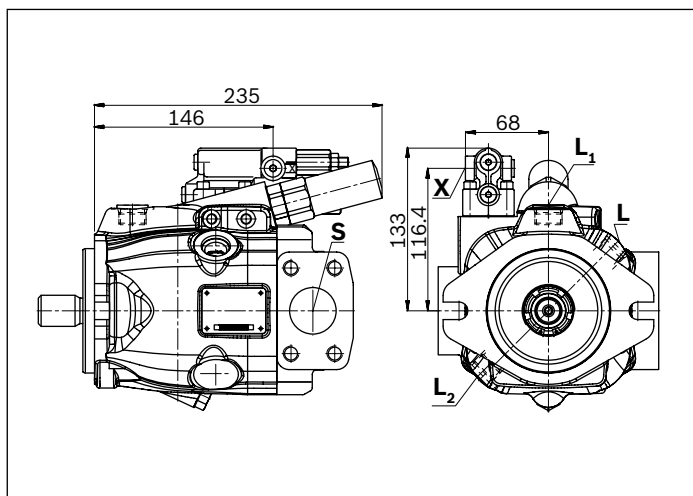
▼LS/LS1/LSC - Pressure/flow control (load-sensing), 5.2 design* / 5.3 design



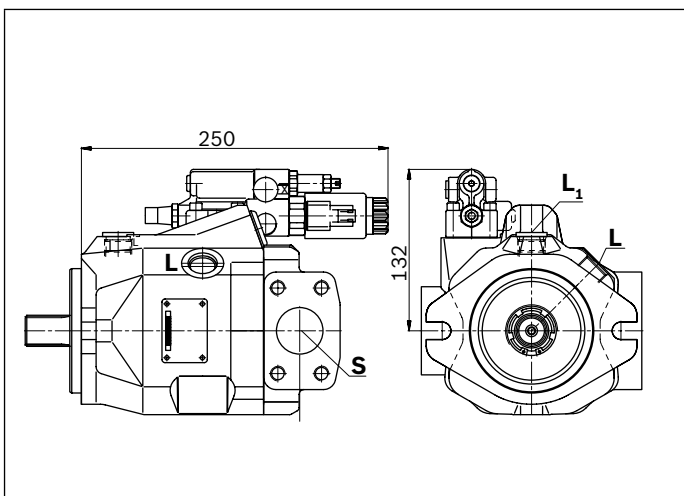
▼E1ED / E2ED - Electro-hydraulic pressure control, 5.3 design

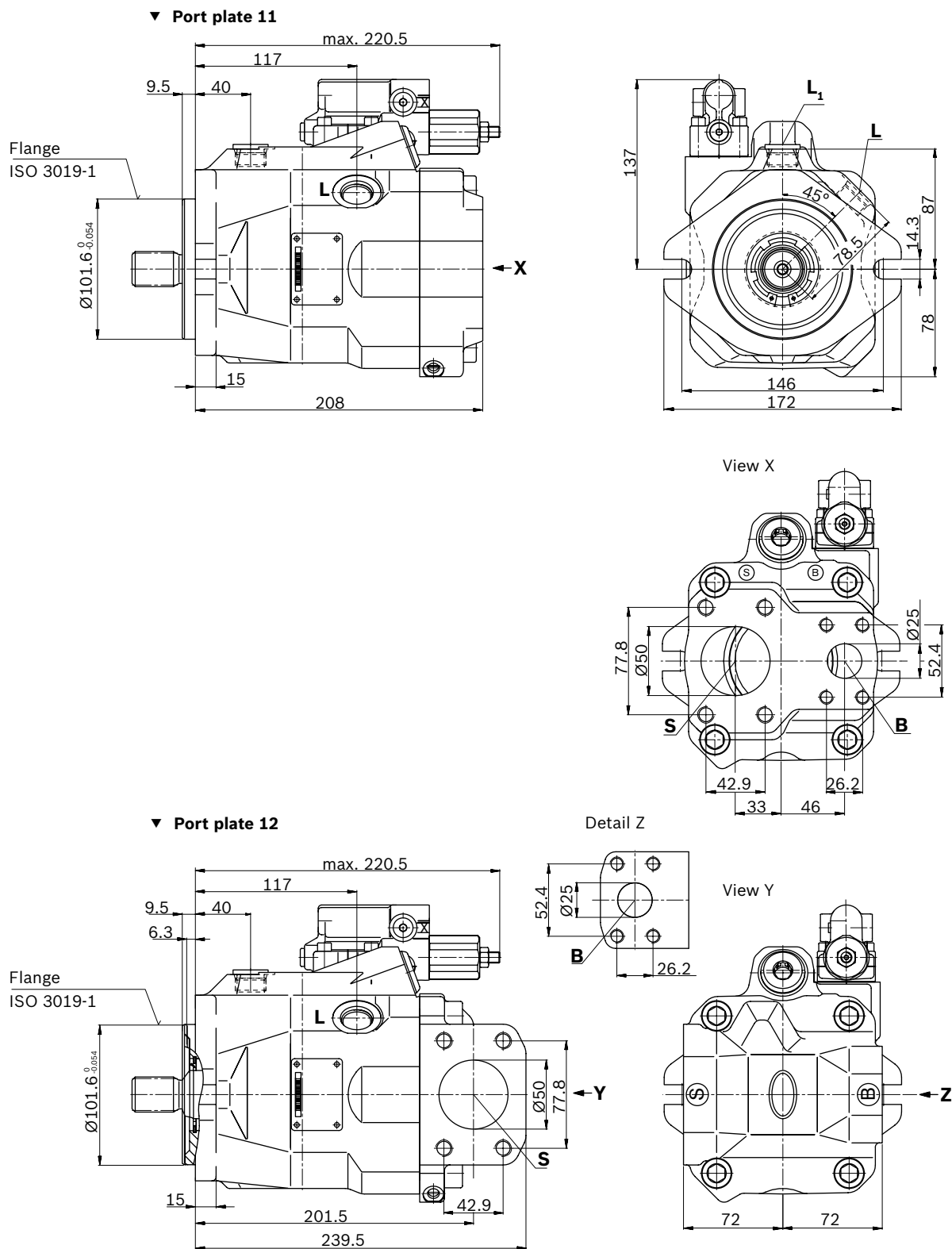


▼L5D-L9D - Power control with pressure cut-off, 5.3 design



▼EN12/EN24 / EP12/EP24 - Electric pressure cut-off control, 5.2 design*



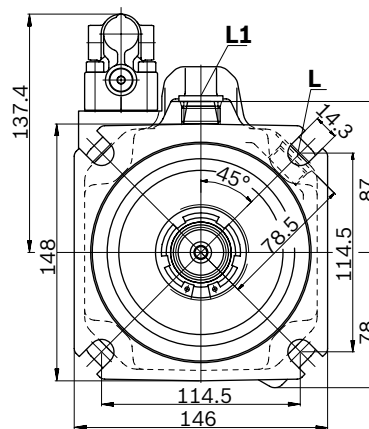
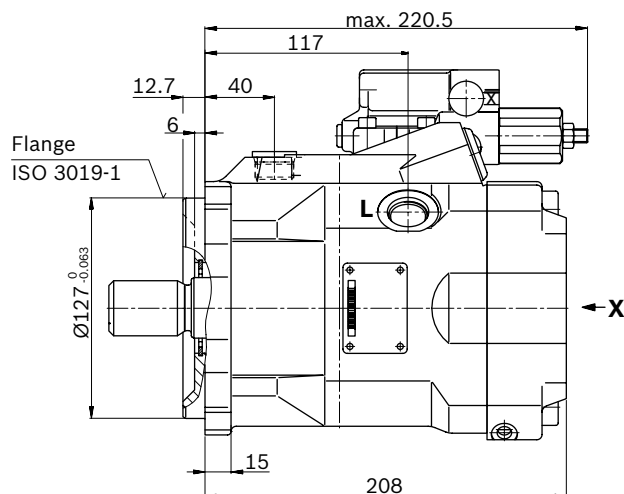
Dimensions - Displacement 60**PR - Hydraulic pressure controller, clockwise rotation, mounting flange C, 5.2 design***

* 5.2 design: No longer in production. Please see the 5.3 design.

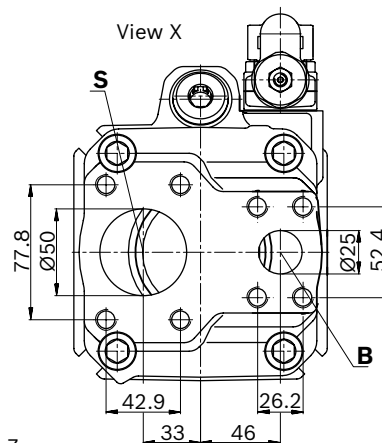
Dimensions - Displacement 60

PR - Hydraulic pressure controller, clockwise rotation, mounting flange D, 5.2 design*

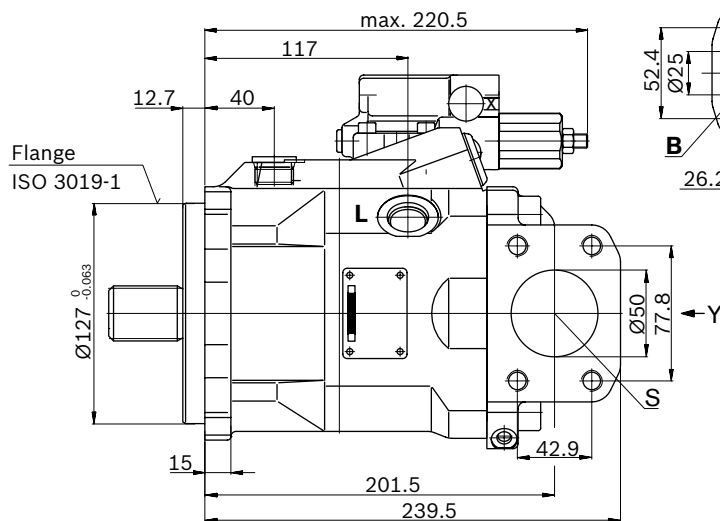
▼ Port plate 11



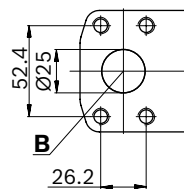
View X



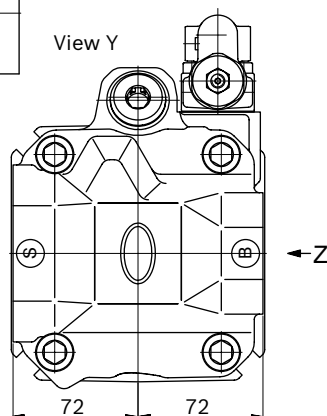
▼ Port plate 12



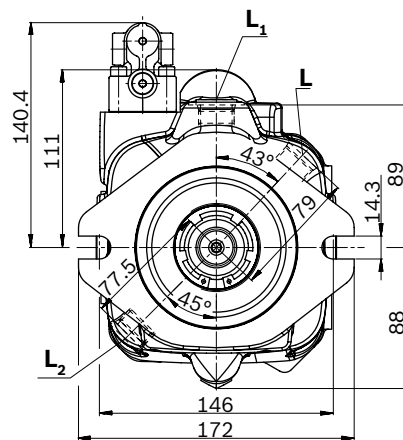
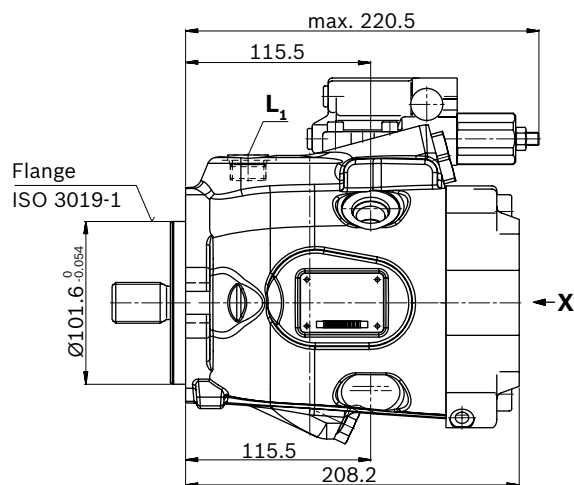
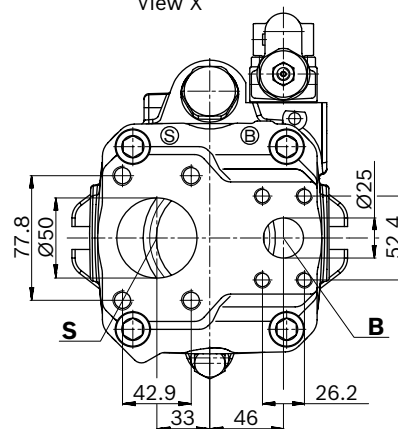
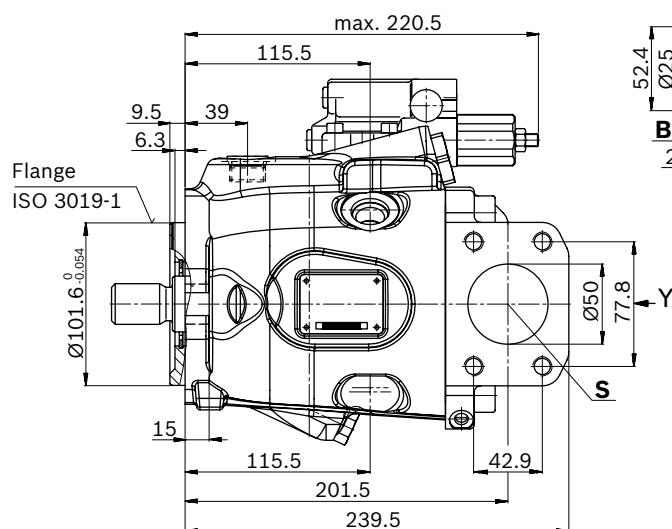
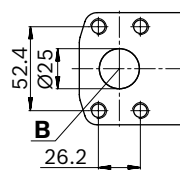
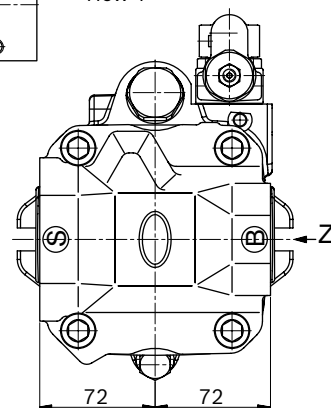
Detail Z



View Y



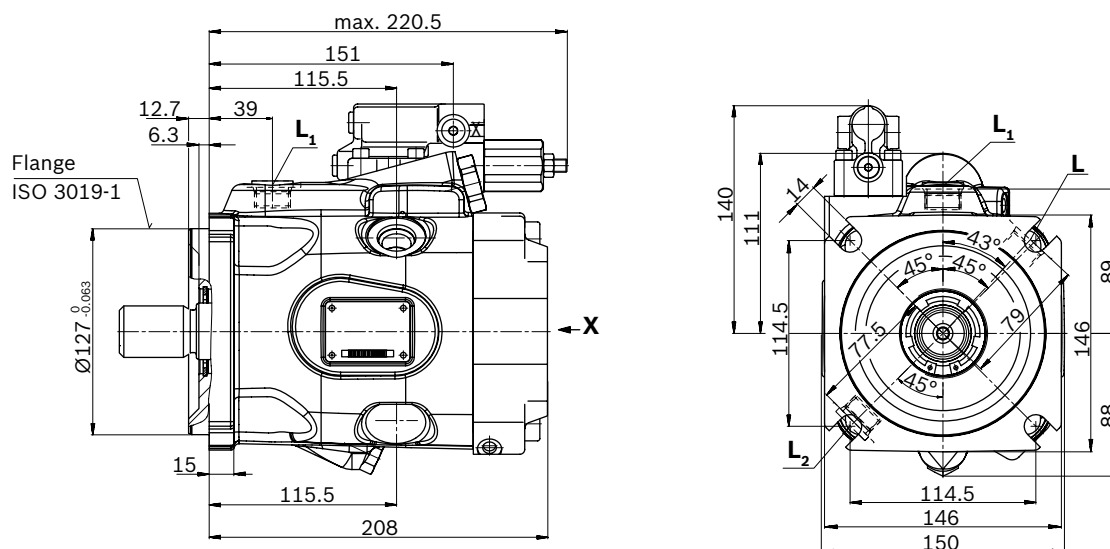
* 5.2 design: No longer in production. Please see the 5.3 design.

Dimensions - Displacement 63**PR - Hydraulic pressure controller, clockwise rotation, mounting flange C, 5.3 design****▼ Port plate 11****View X****▼ Port plate 12****Detail Z****View Y**

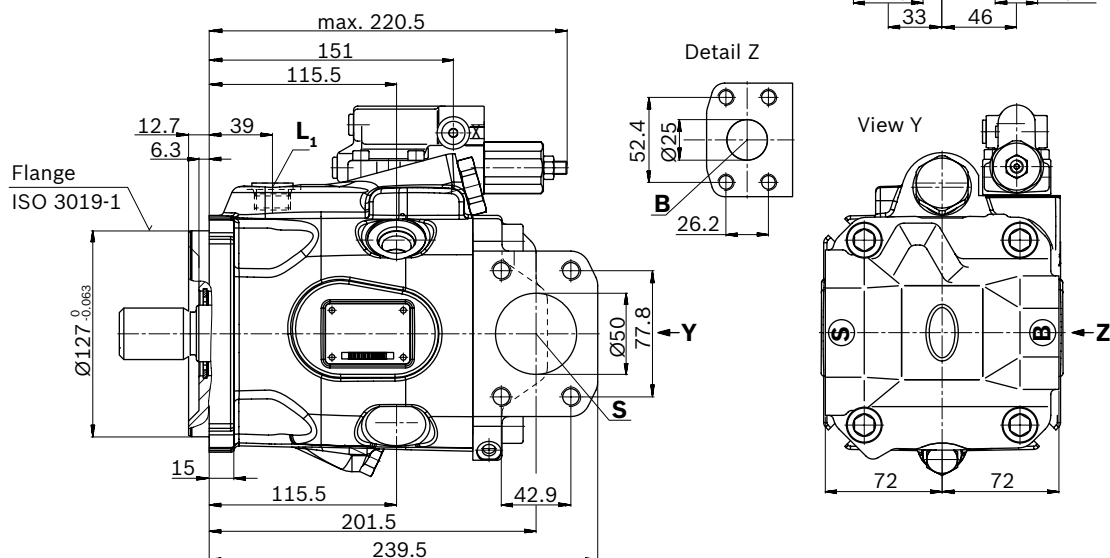
Dimensions - Displacement 63

PR - Hydraulic pressure controller, clockwise rotation, mounting flange D, 5.3 design

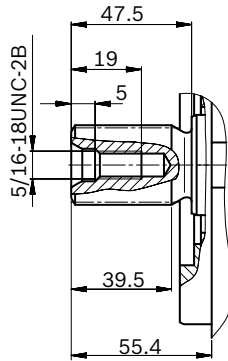
▼ Port plate 11



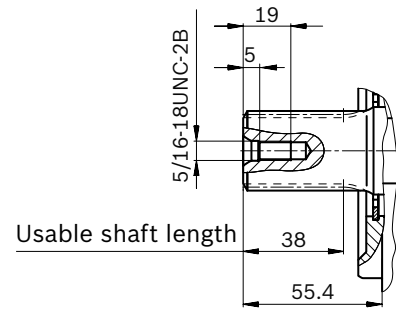
▼ Port plate 12



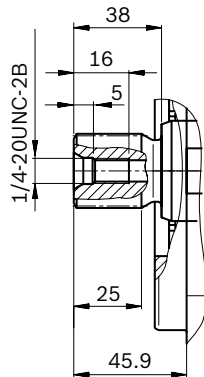
▼ Splined shaft 1 1/4 in SAE J744

S – 14T 12/24DP


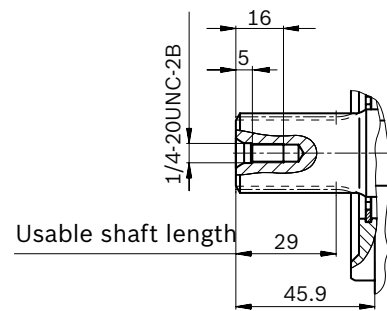
▼ Splined shaft 1 1/4 in SAE J744

R – 14T 12/24DP


▼ Splined shaft 1 in SAE J744

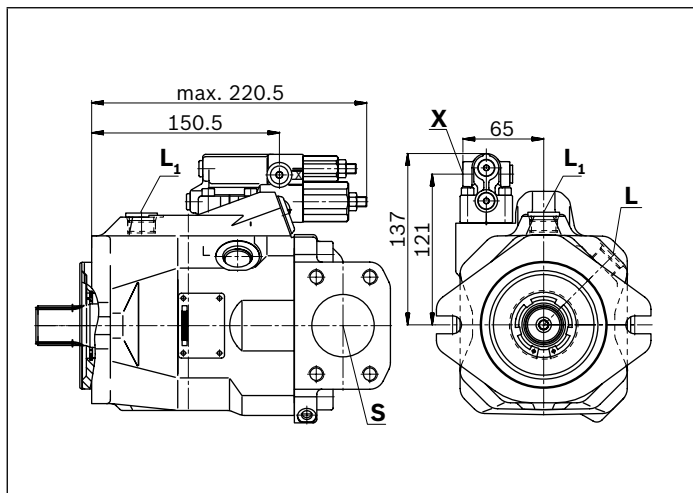
U – 15T 16/32DP


▼ Splined shaft 1 in SAE J744

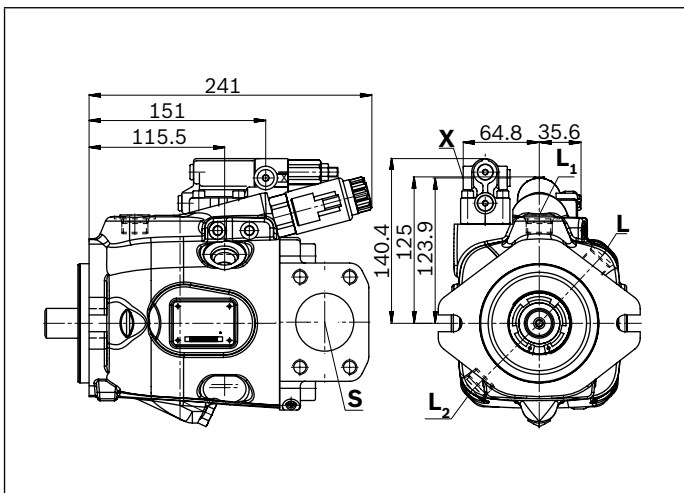
W – 15T 16/32DP


Ports		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	315	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 DIN 13	2 in M12 × 1.75; 20 deep	5	O
L	Drain port	ISO 11926	7/8-14UNF-2B; 13 deep	2	O
L₁, L₂	Drain port	ISO 11926	7/8-14UNF-2B; 13 deep	2	X
X	Control pressure	ISO 11926	7/16-20UNF-2A; 11.5 deep	315	O

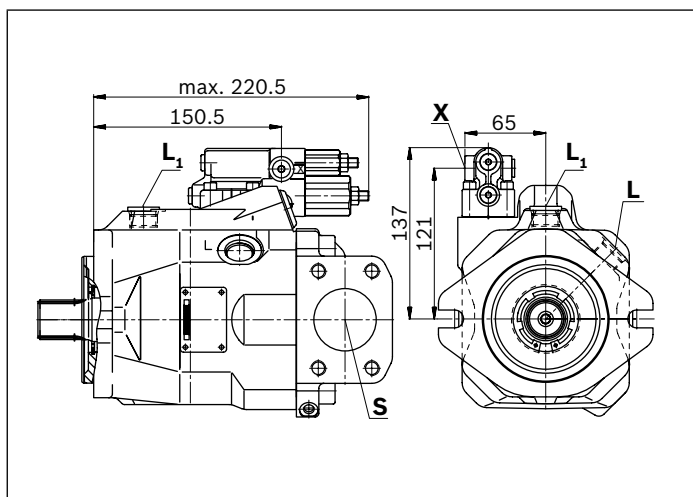
▼PRR - Pressure controller, remotely operated, 5.3 design / 5.2 design*



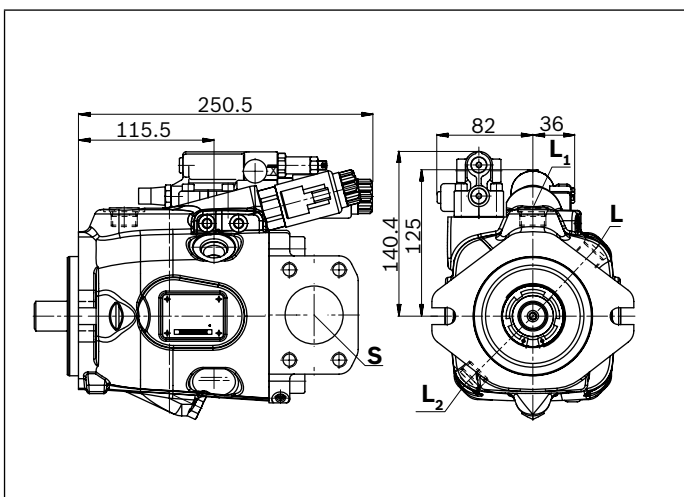
▼E1D / E2D - Electro-proportional pressure control, 5.3 design



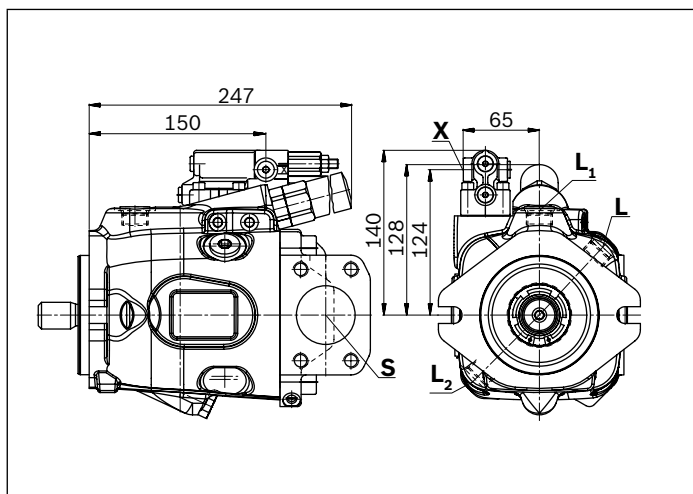
▼LS/LS1/LSC - Pressure/flow control (load-sensing), 5.3 design / 5.2 design*



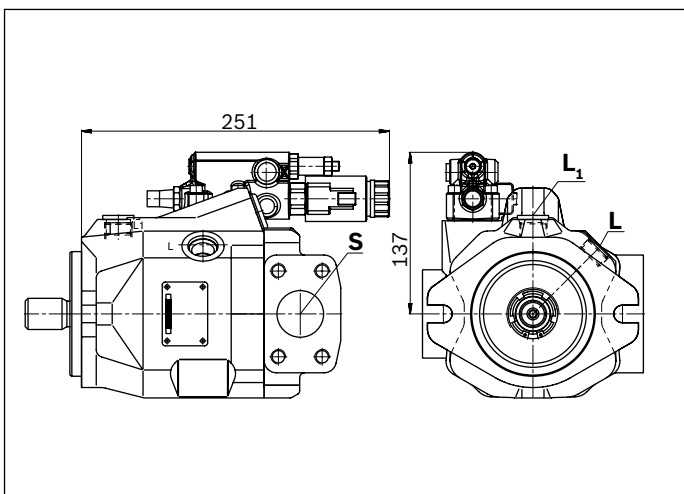
▼E1ED / E2ED - Electro-hydraulic pressure control, 5.3 design

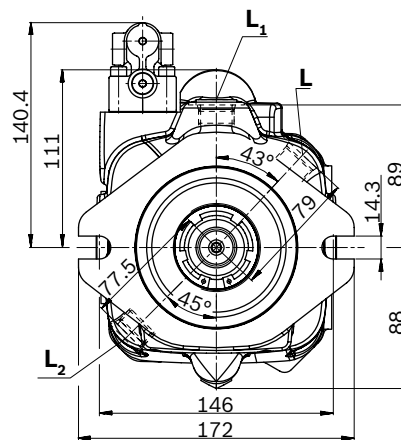
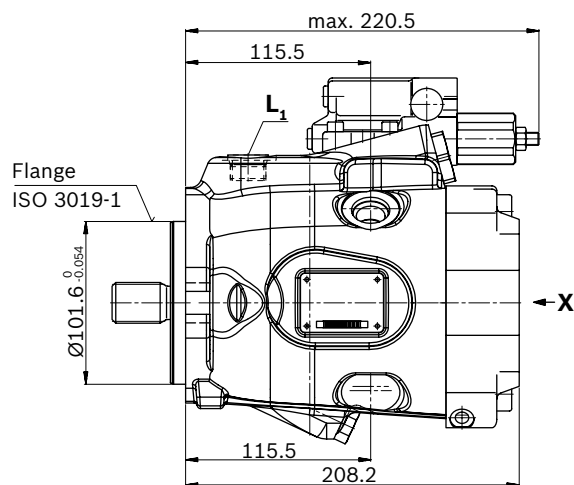
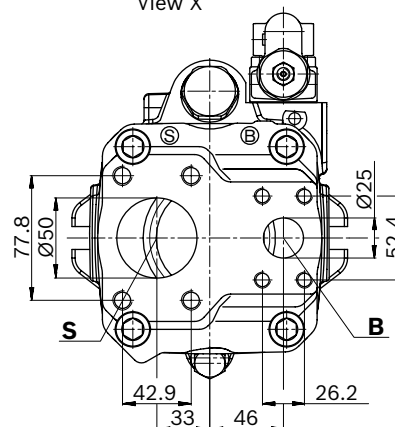
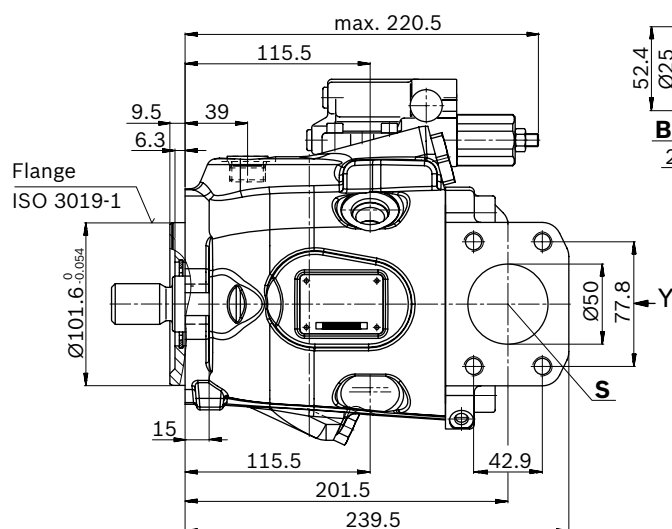
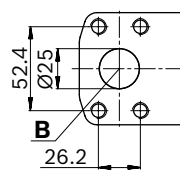
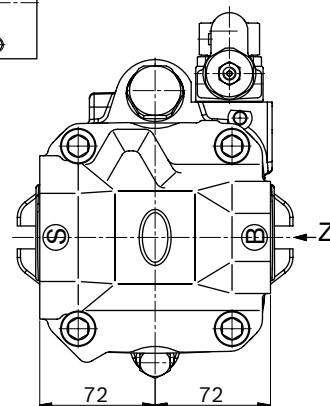


▼L5D-L9D - Power control with pressure cut-off, 5.3 design



▼EN12/EN24 / EP12/EP24 - Electric pressure cut-off control, 5.3 design / 5.2 design*

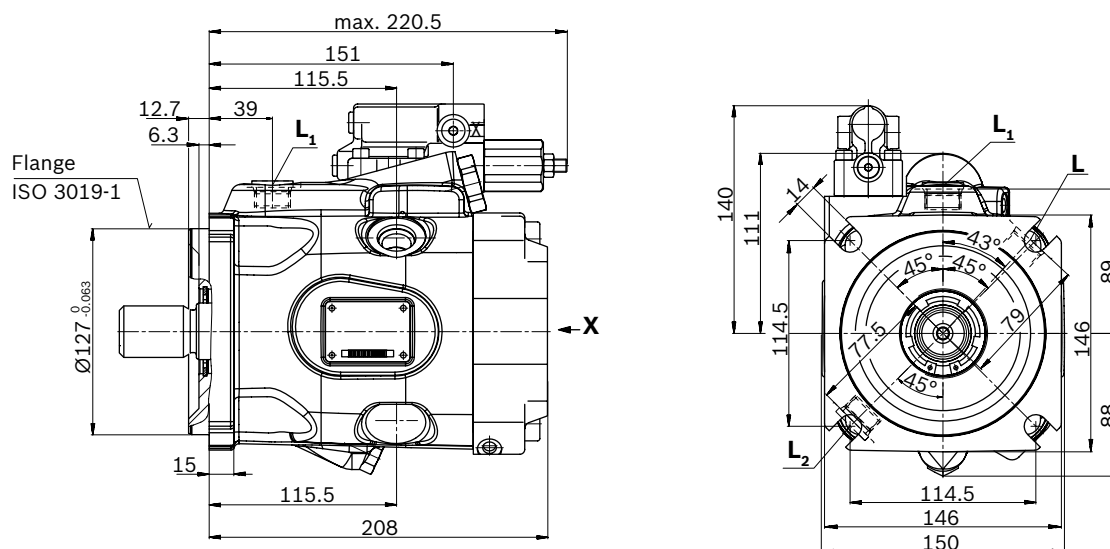


Dimensions - Displacement 72**PR - Hydraulic pressure controller, clockwise rotation, mounting flange C, 5.3 design****▼ Port plate 11****View X****▼ Port plate 12****Detail Z****View Y**

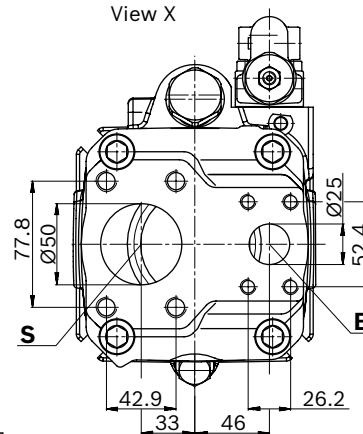
Dimensions - Displacement 72

PR - Hydraulic pressure controller, clockwise rotation, mounting flange D, 5.3 design

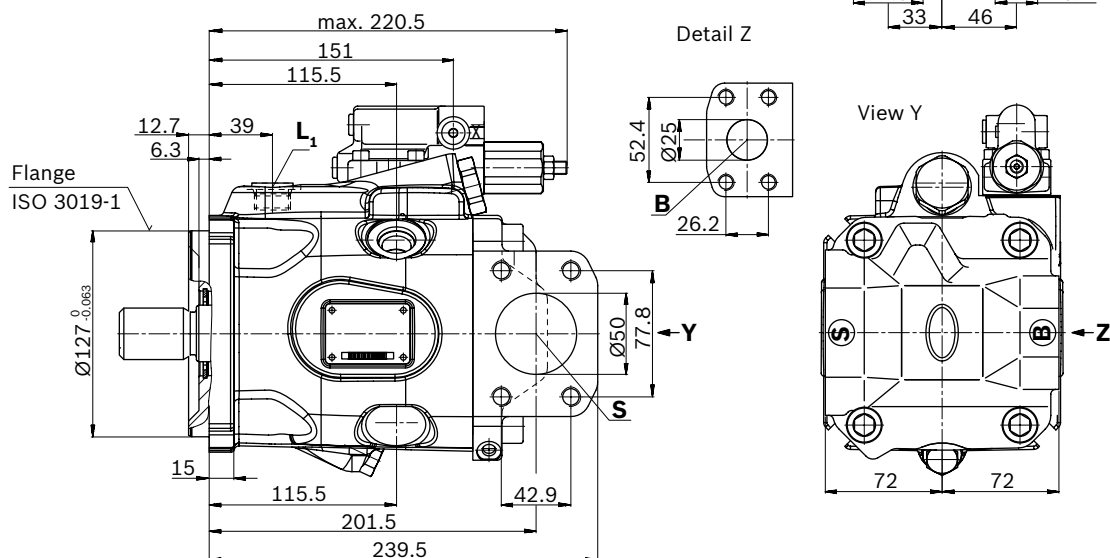
▼ Port plate 11



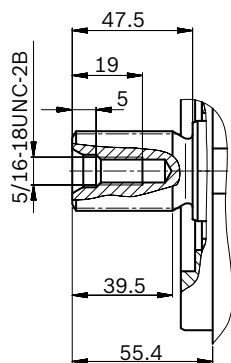
View X



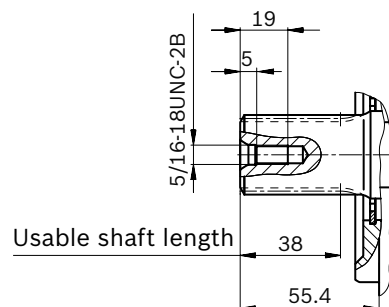
▼ Port plate 12



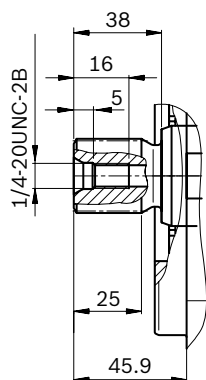
▼ Splined shaft 1 1/4 in SAE J744

S – 14T 12/24DP

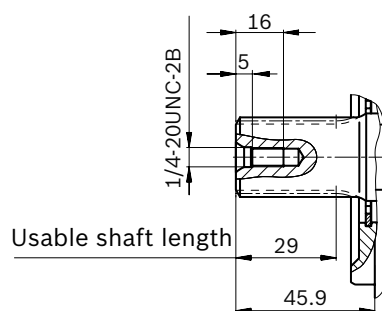
▼ Splined shaft 1 1/4 in SAE J744

R – 14T 12/24DP

▼ Splined shaft 1 in SAE J744

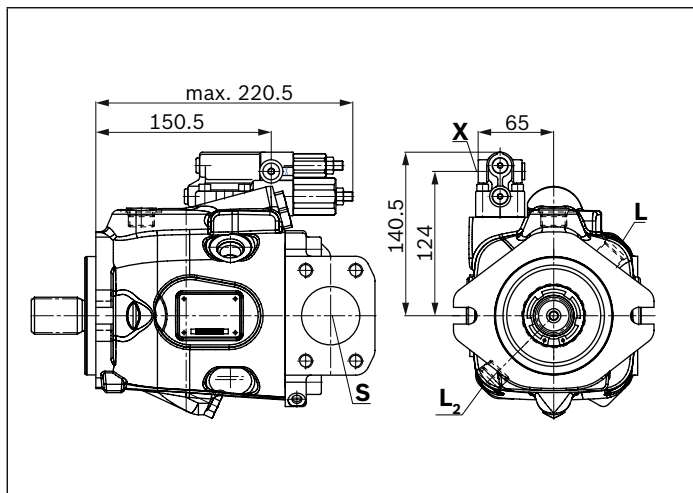
U – 15T 16/32DP

▼ Splined shaft 1 in SAE J744

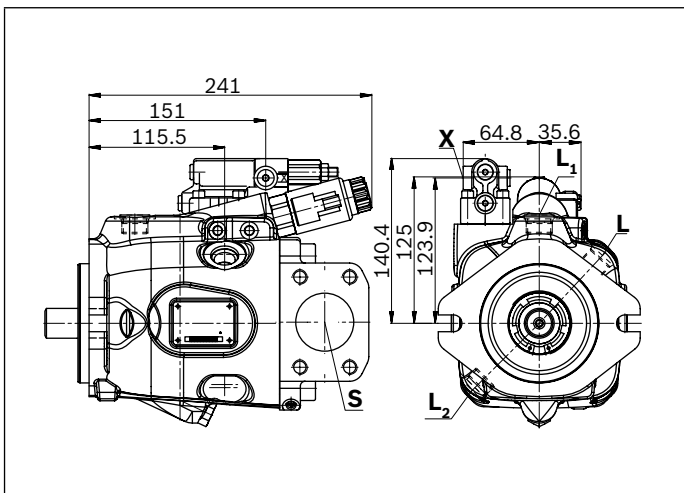
W – 15T 16/32DP

Ports		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	315	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 DIN 13	2 in M12 × 1.75; 20 deep	5	O
L	Drain port	ISO 11926	7/8-14UNF-2B; 13 deep	2	O
L₁, L₂	Drain port	ISO 11926	7/8-14UNF-2B; 13 deep	2	X
X	Control pressure	ISO 11926	7/16-20UNF-2A; 11.5 deep	315	O

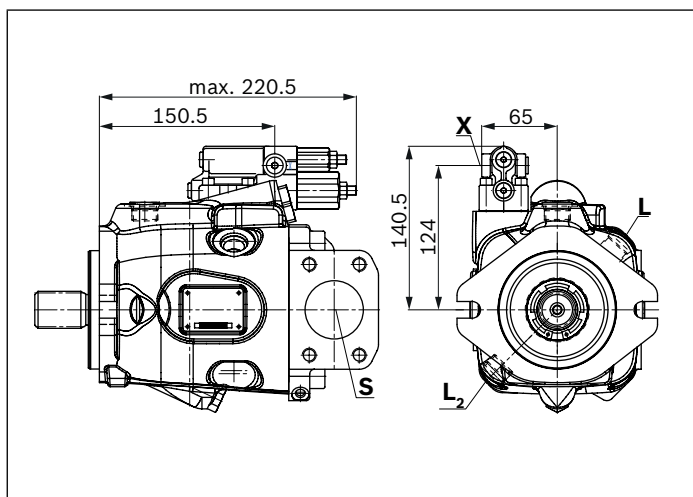
▼PRR - Pressure controller, remotely operated, 5.3 design



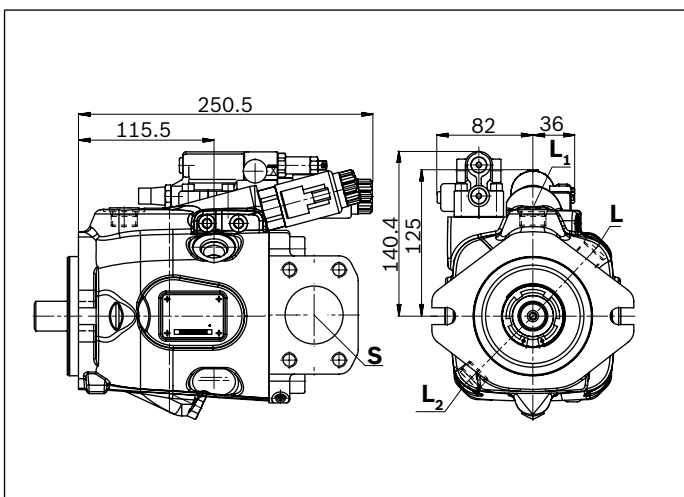
▼E1D / E2D - Electro-proportional pressure control, 5.3 design



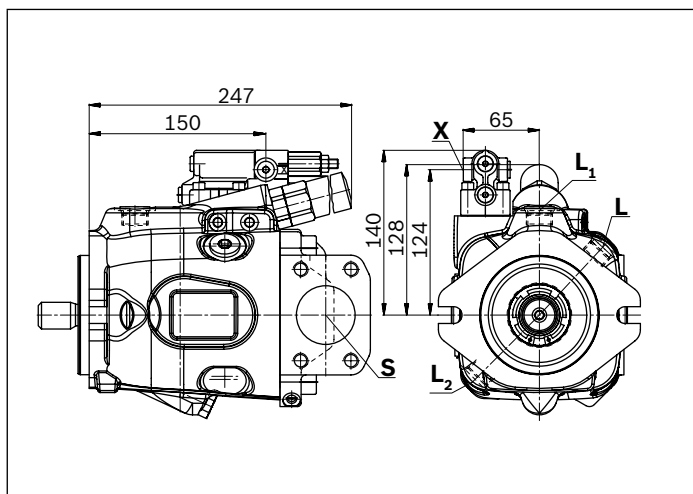
▼LS/L.DS/LSC - Pressure/flow control (load-sensing), 5.3 design



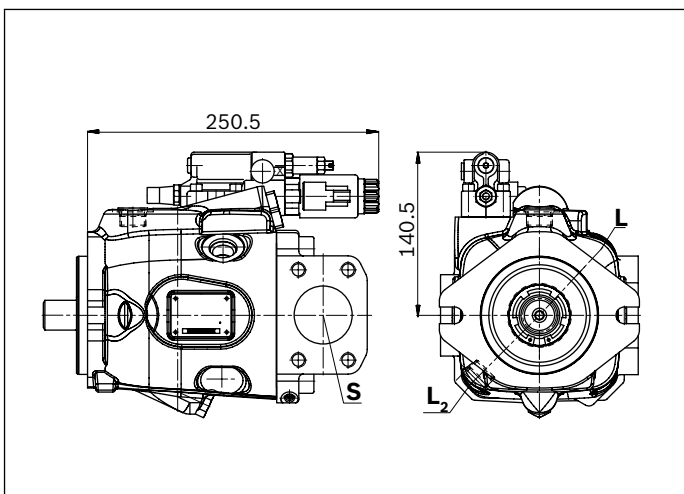
▼E1ED / E2ED - Electro-hydraulic pressure control, 5.3 design

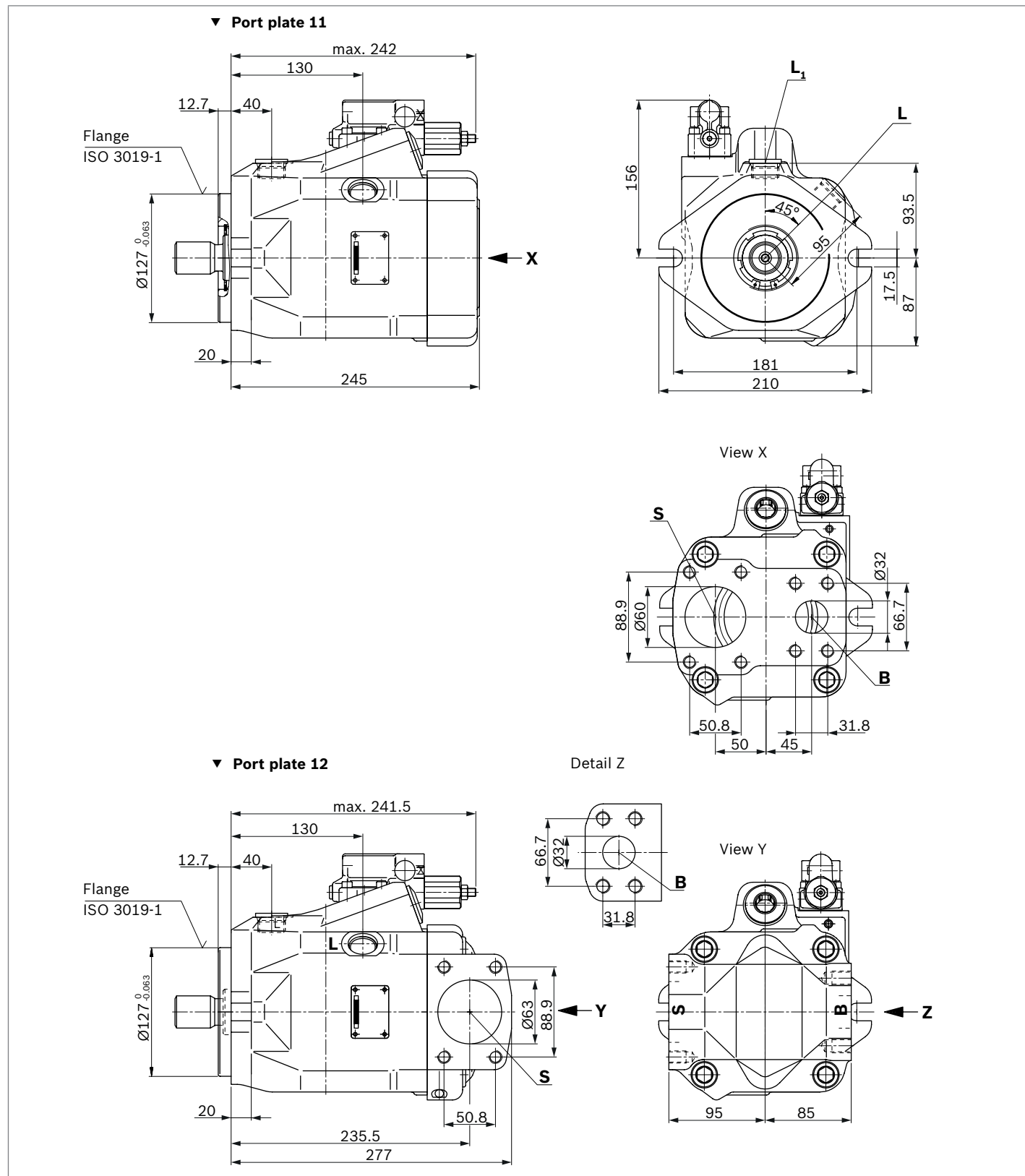


▼L5D-L9D - Power control with pressure cut-off, 5.3 design



▼EN12/EN24 / EP12/EP24 - Electric pressure cut-off control, 5.3 design



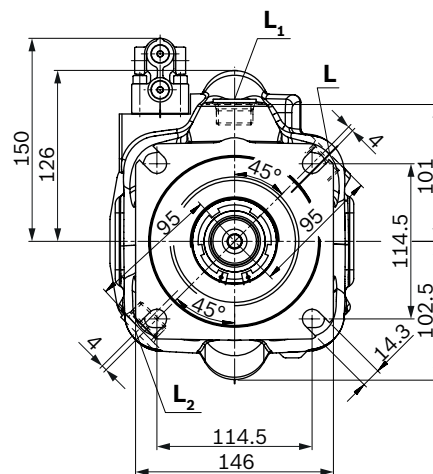
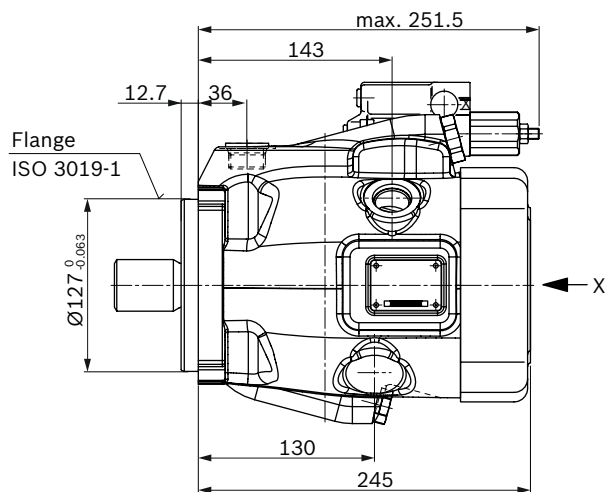
Dimensions - Displacement 85**PR - Hydraulic pressure controller, clockwise rotation, mounting flange C, 5.2 design***

* 5.2 design: No longer in production. Please see the 5.3 design.

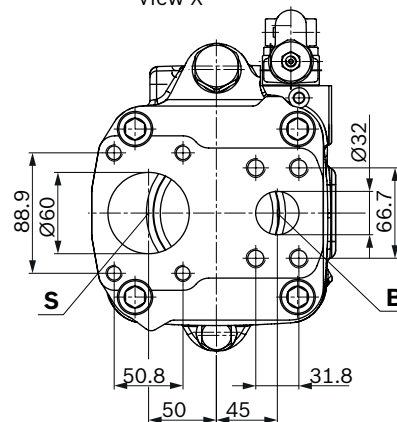
Dimensions - Displacement 85

PR - Hydraulic pressure controller, clockwise rotation, mounting flange D, 5.3 design

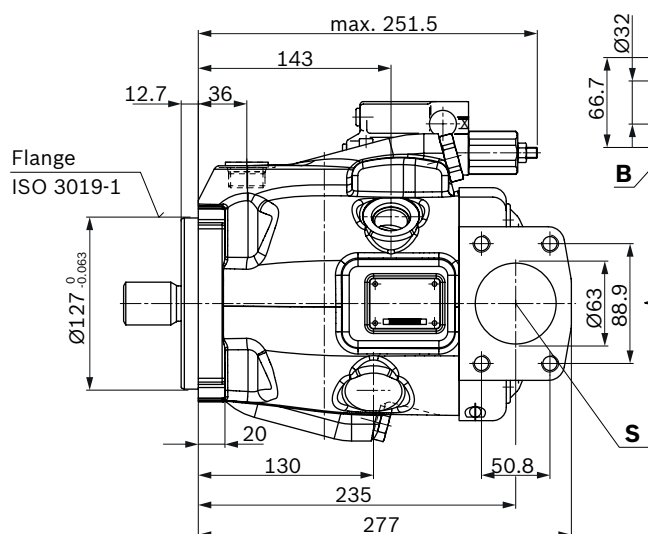
▼ Port plate 11



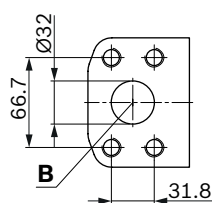
View X



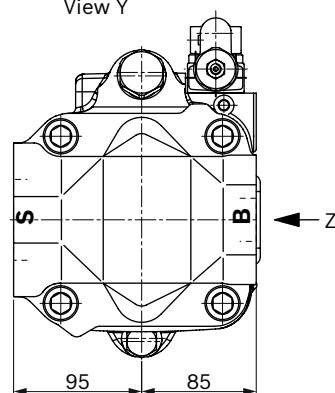
▼ Port plate 12



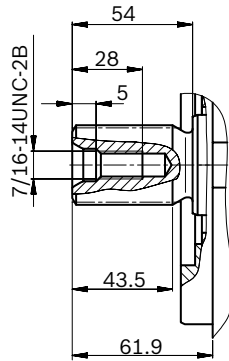
Detail Z



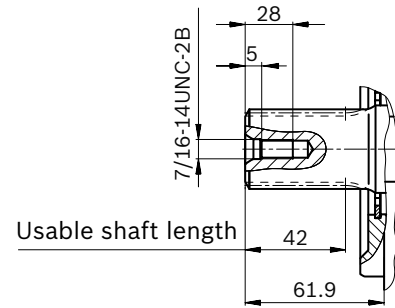
View Y



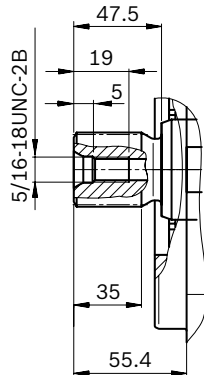
▼ Splined shaft 1 1/2 in SAE J744

S – 17T 12/24DP


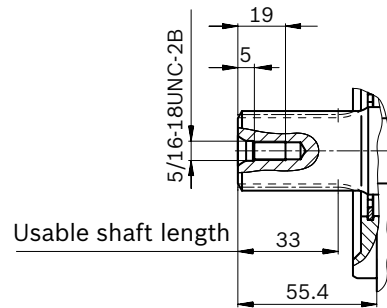
▼ Splined shaft 1 1/2 in SAE J744

R – 17T 12/24DP


▼ Splined shaft 1 1/4 in SAE J744

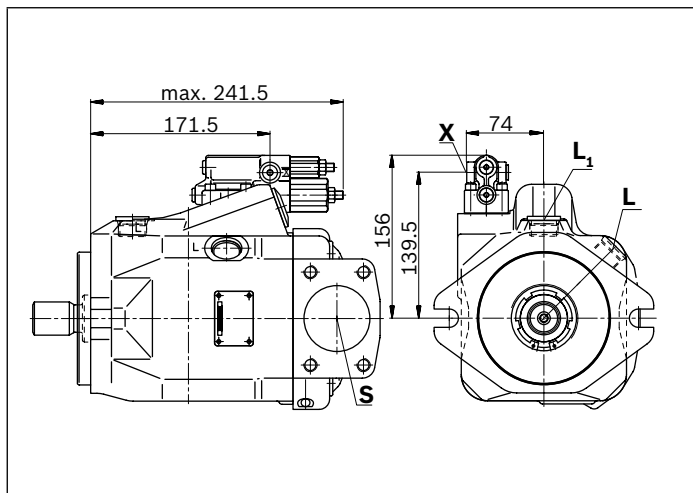
U – 14T 12/24DP


▼ Splined shaft 1 1/4 in SAE J744

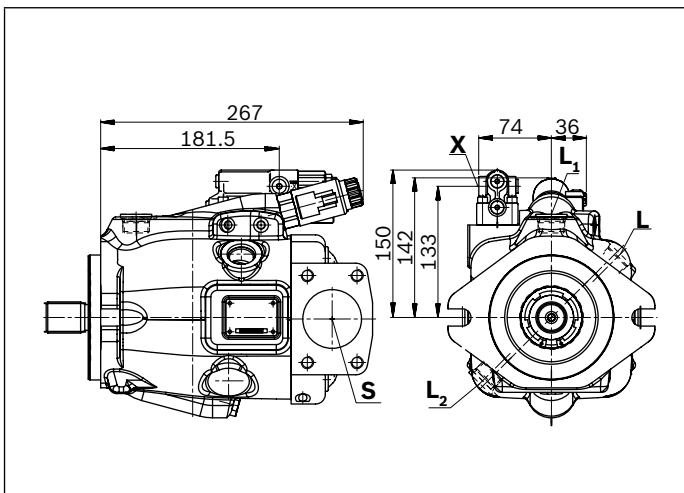
W – 14T 12/24DP


Ports		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	315	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 DIN 13	2 1/2 in M12 × 1.75; 17 deep	5	O
L	Drain port	ISO 11926	1 1/16-12UNF-2B; 15 deep	2	O
L₁, L₂	Drain port	ISO 11926	1 1/16-12UNF-2B; 15 deep	2	X
X	Control pressure	ISO 11926	7/16-20UNF-2A; 11.5 deep	315	O

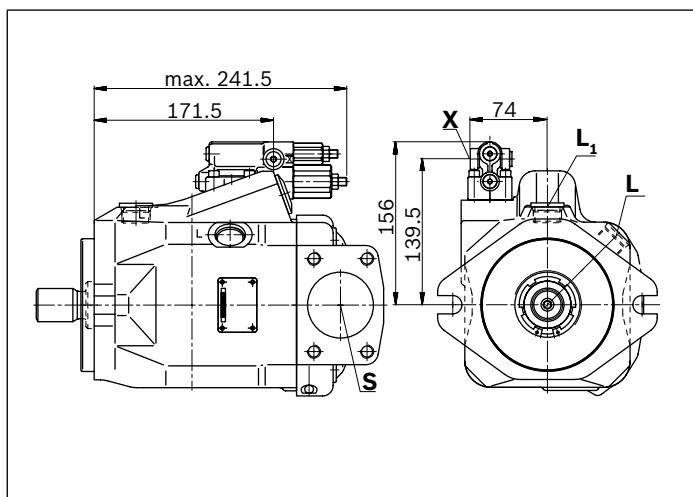
▼PRR - Pressure controller, remotely operated, 5.2 design* / 5.3 design



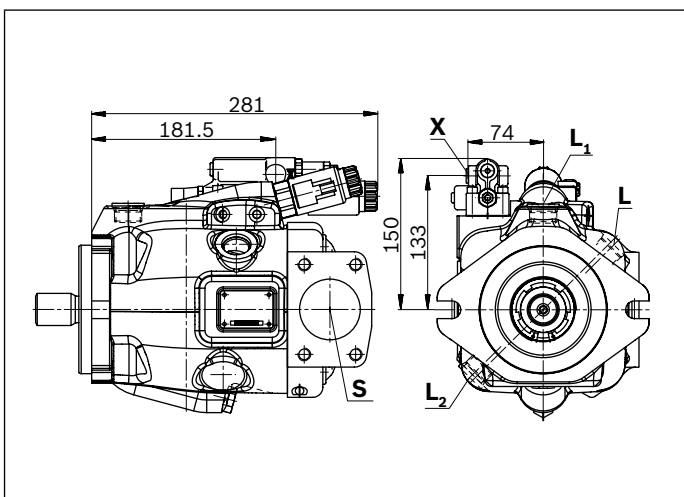
▼E1D / E2D - Electro-proportional pressure control, 5.3 design



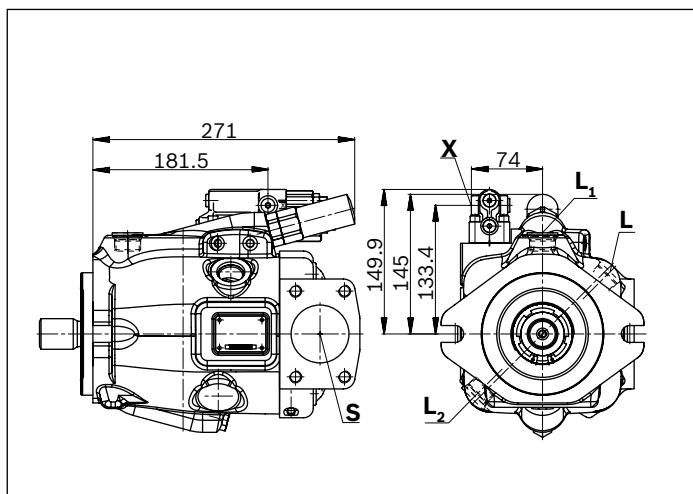
▼LS/L.DS/LSC - Pressure/flow control (load-sensing), 5.2 design* / 5.3 design



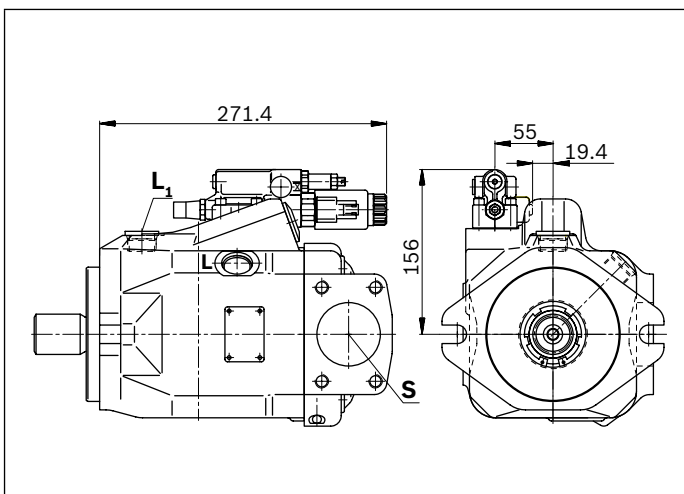
▼E1ED / E2ED - Electro-hydraulic pressure control, 5.3 design



▼L5D-L9D - Power control with pressure cut-off, 5.3 design

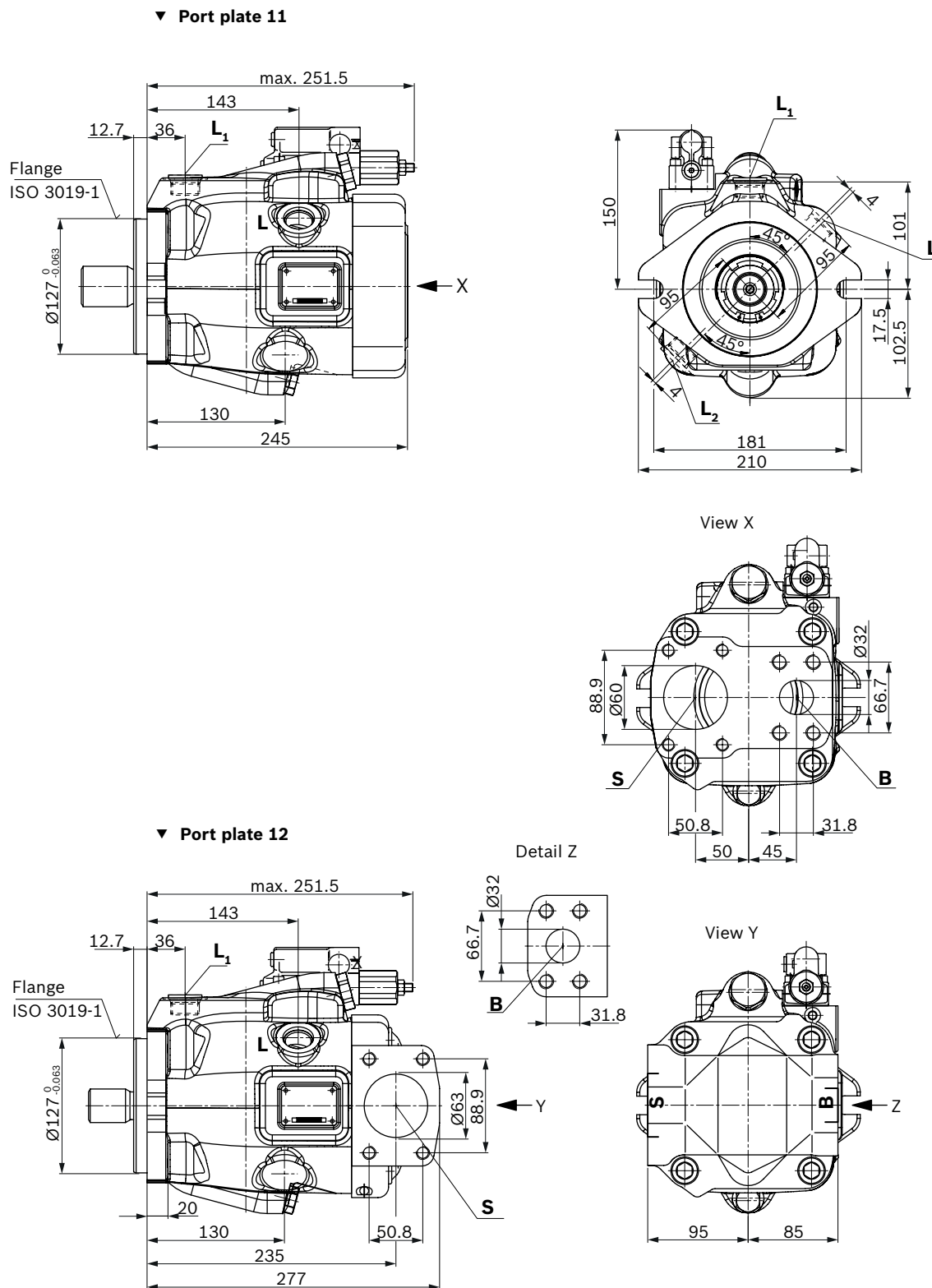


▼EN12/EN24 / EP12/EP24 - Electric pressure cut-off control, 5.2 design* / 5.3 design



Dimensions - Displacement 100

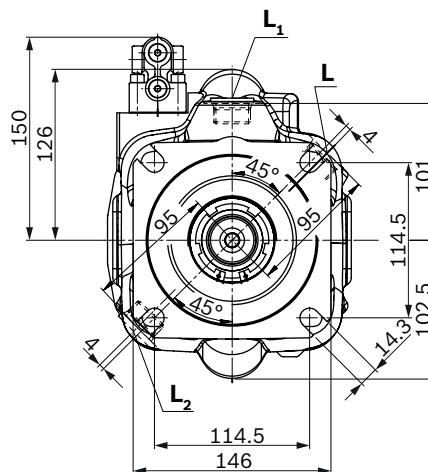
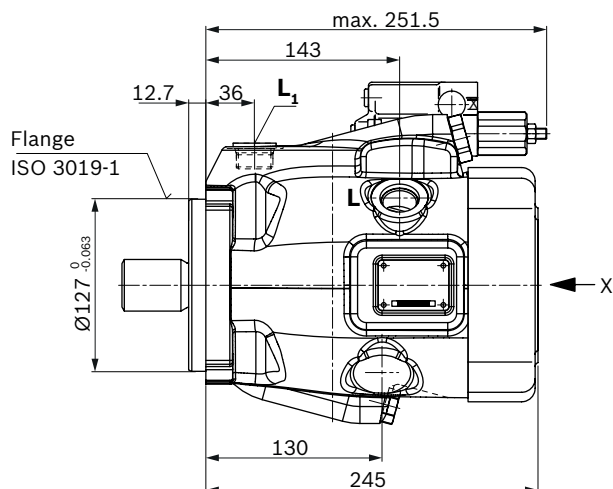
PR - Hydraulic pressure controller, clockwise rotation, mounting flange C, 5.3 design



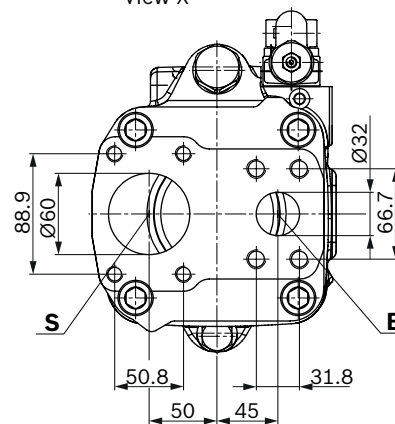
Dimensions - Displacement 100

PR - Hydraulic pressure controller, clockwise rotation, mounting flange D, 5.3 design

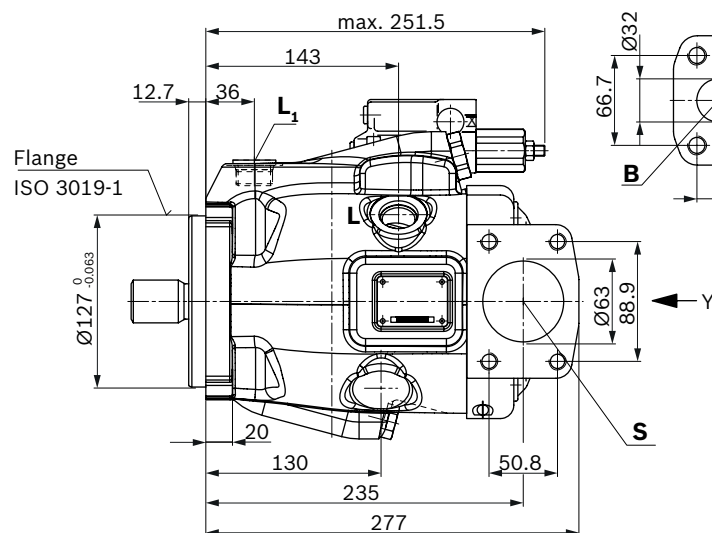
▼ Port plate 11



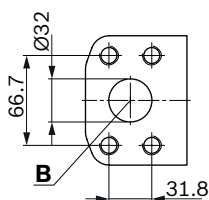
View X



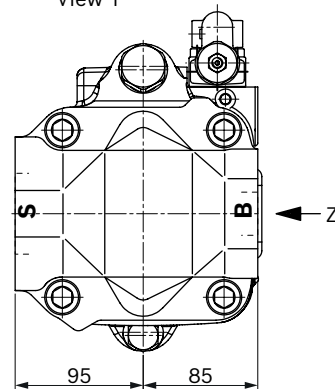
▼ Port plate 12



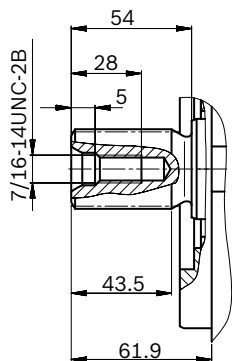
Detail Z



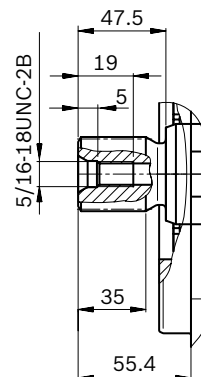
View Y



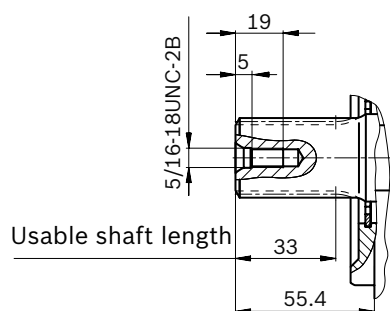
▼ Splined shaft 1 1/2 in SAE J744

S – 17T 12/24DP


▼ Splined shaft 1 1/4 in SAE J744

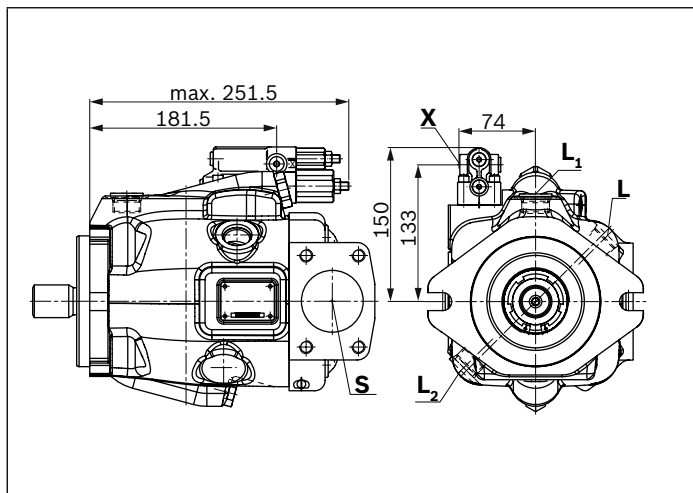
U – 14T 12/24DP


▼ Splined shaft 1 1/4 in SAE J744

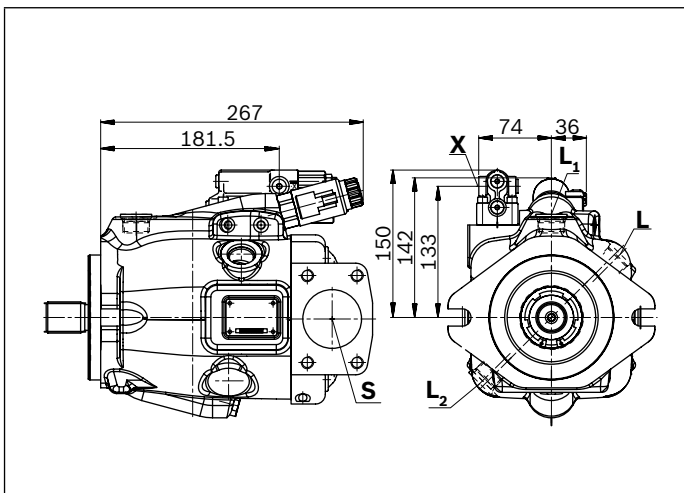
W – 14T 12/24DP


Ports		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	315	O
S	Suction port (standard pressure series) Fastening thread	SAE J518 DIN 13	2 1/2 in M12 × 1.75; 17 deep	5	O
L	Drain port	ISO 11926	1 1/16-12UNF-2B; 15 deep	2	O
L₁, L₂	Drain port	ISO 11926	1 1/16-12UNF-2B; 15 deep	2	X
X	Control pressure	ISO 11926	7/16-20UNF-2A; 11.5 deep	315	O

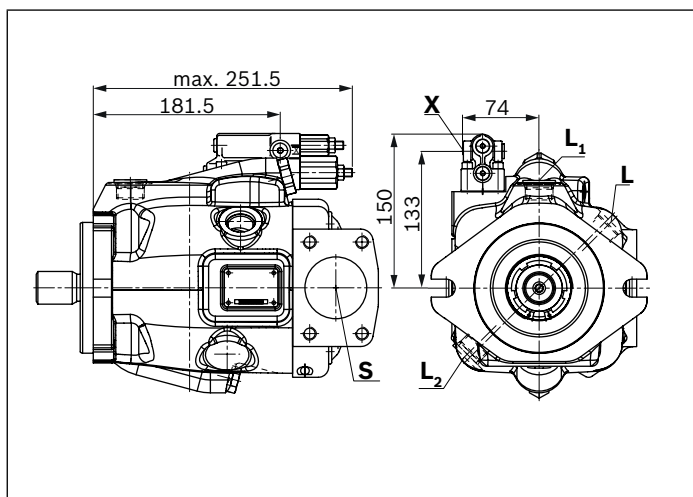
▼PRR - Pressure controller, remotely operated, 5.3 design



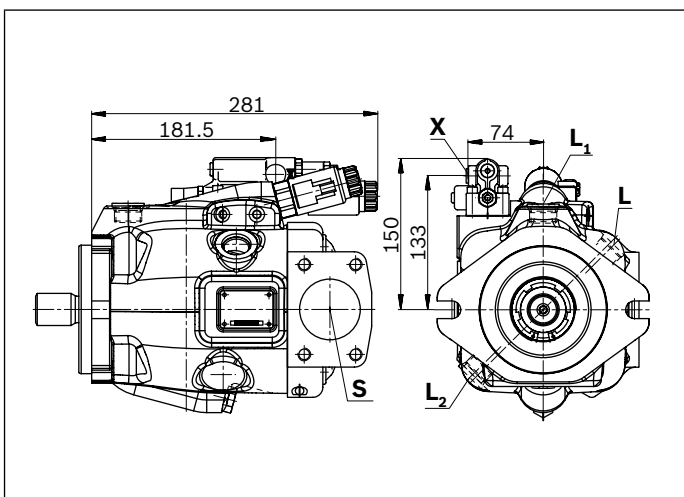
▼E1D / E2D - Electro-proportional pressure control, 5.3 design



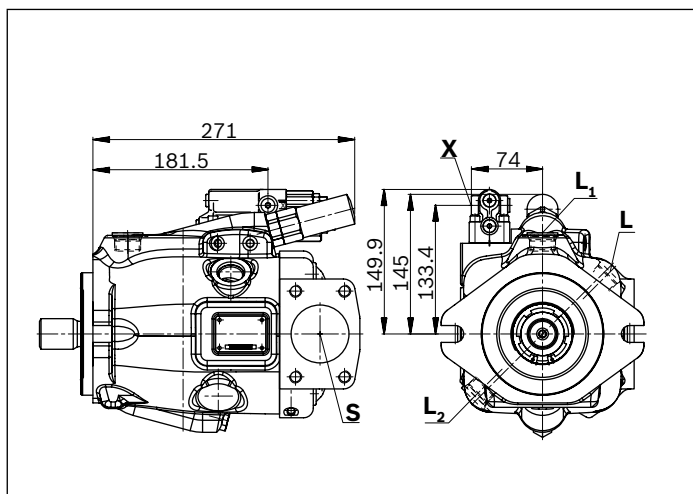
▼LS/L.DS/LSC - Pressure/flow control (load-sensing), 5.3 design



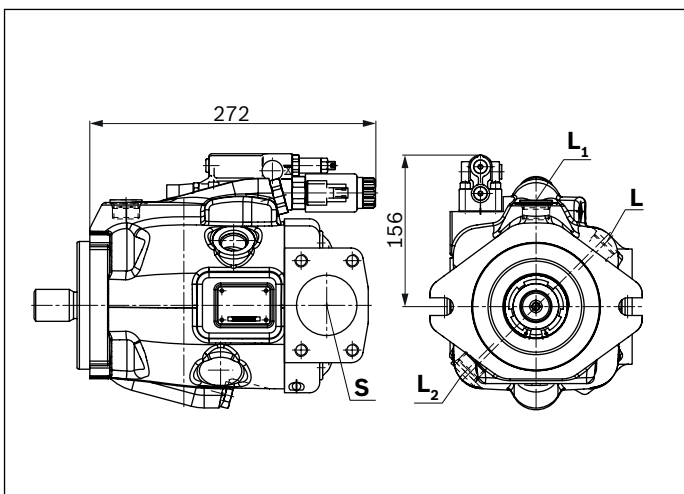
▼E1ED / E2ED - Electro-hydraulic pressure control, 5.3 design



▼L5D-L9D - Power control with pressure cut-off, 5.3 design



▼EN12/EN24 / EP12/EP24 - Electric pressure cut-off control, 5.3 design

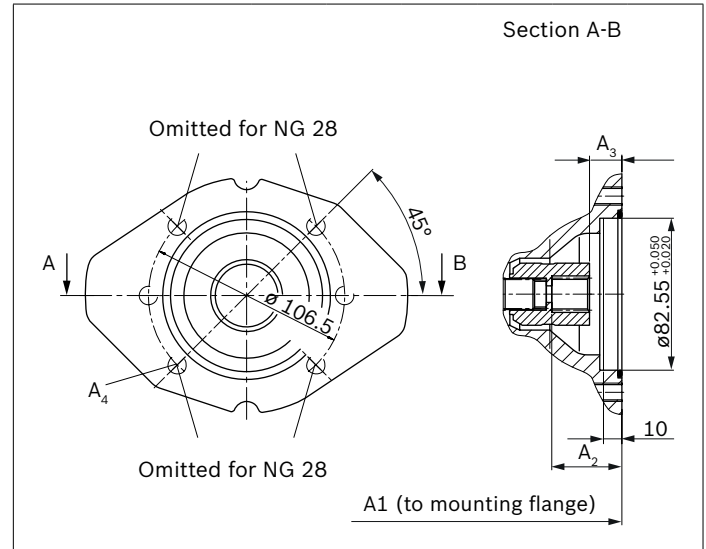
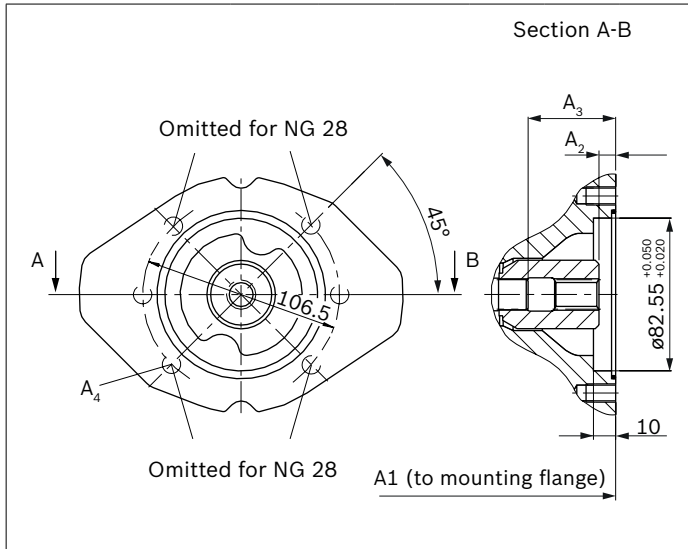


Tandem dimensions

Flange ISO 3019-1 (SAE)		Hub for splined shaft		Availability by displacement							Code
Diameter	Attachment	Diameter		18	28	45	60/63	72	85	100	
82-2 (A)	ϕ , ∞	5/8 in	9T 16/32DP	●	●	●	●	●	●	●	K01
		3/4 in	11T 16/32DP	●	●	●	●	●	●	●	K52

● = Available ○ = On request

▼ 82/-2



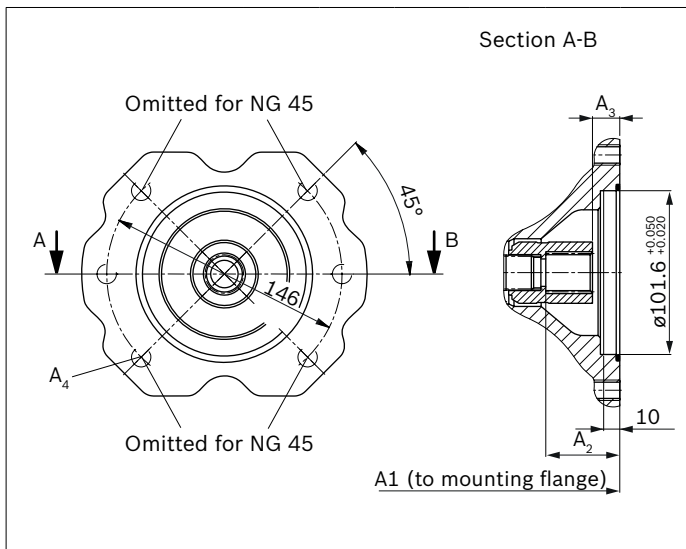
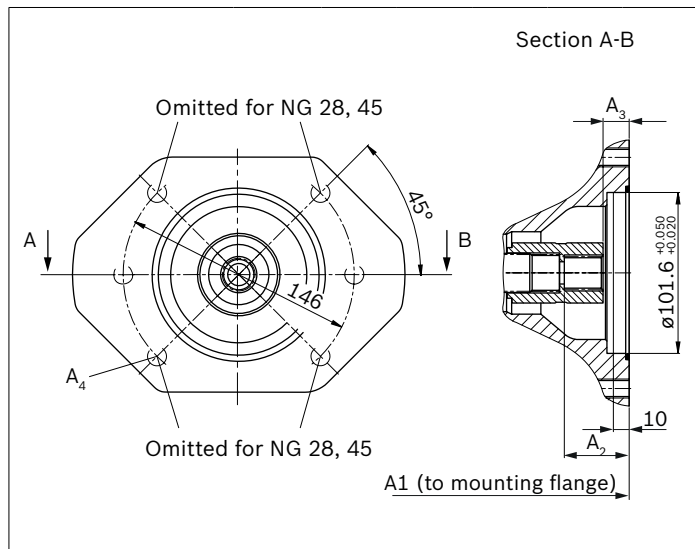
K01 (SAE J744 16-4 (A))	NG	A1	A2	A3	A4
	18	182	9.3	43.3	M10×1.5; 14.5 deep
	28	204	9.9	47	M10×1.5; 16 deep
	45	229	10.7	53	M10×1.5; 16 deep
	60 63	255	9.5	59	M10×1.5; 16 deep
	72	255	9.5	59	M10×1.5; 16 deep
	85	302	13.4	68	M10×1.5; 20 deep
	100	302	13.4	68	M10×1.5; 20 deep

K52 (SAE J744 19-4 (A-B))	NG	A1	A2	A3	A4
	18	182	39	18.8	M10×1.5; 14.5 deep
	28	204	39.3	18.8	M10×1.5; 16 deep
	45	229	39.4	18.9	M10×1.5; 16 deep
	60 63	255	39.4	18.9	M10×1.5; 16 deep
	72	255	39.4	18.9	M10×1.5; 16 deep
	85	302	44.1	23.6	M10×1.5; 20 deep
	100	302	44.1	23.6	M10×1.5; 20 deep

Flange ISO 3019-1 (SAE)		Hub for splined shaft		Availability by displacement							Code
Diameter	Attachment	Diameter		18	28	45	60/63	72	85	100	
101-2 (B)	⌀, ∞	7/8 in	13T 16/32DP	-	●	●	●	●	●	●	K68
		1 in	15T 16/32DP	-	-	●	●	●	●	●	K04

● = Available ○ = On request

▼ 101/-2



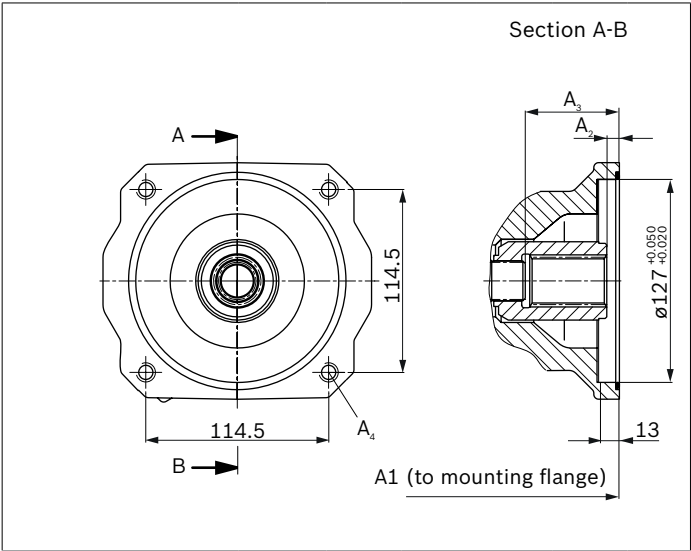
K68 (SAE J744 22-4 (B))	NG	A1	A2	A3	A4
	28	204	42.3	17.8	M12×1.75; 18 deep
	45	229	42.4	17.9	M12×1.75; 18 deep
	60 63	255	42.4	17.9	M12×1.75; 18 deep
	72	255	42.4	17.9	M12×1.75; 18 deep
	85	302	46.5	22	M12×1.75; 20 deep
	100	302	46.5	22	M12×1.75; 20 deep

K04 (SAE J744 25-4 (B-B))	NG	A1	A2	A3	A4
	45	229	47.9	18.9	M12×1.75; 18 deep
	60 63	255	47.4	18.4	M12×1.75; 18 deep
	72	255	47.4	18.4	M12×1.75; 18 deep
	85	302	51.2	22.2	M12×1.75; 20 deep
	100	302	51.2	22.2	M12×1.75; 20 deep

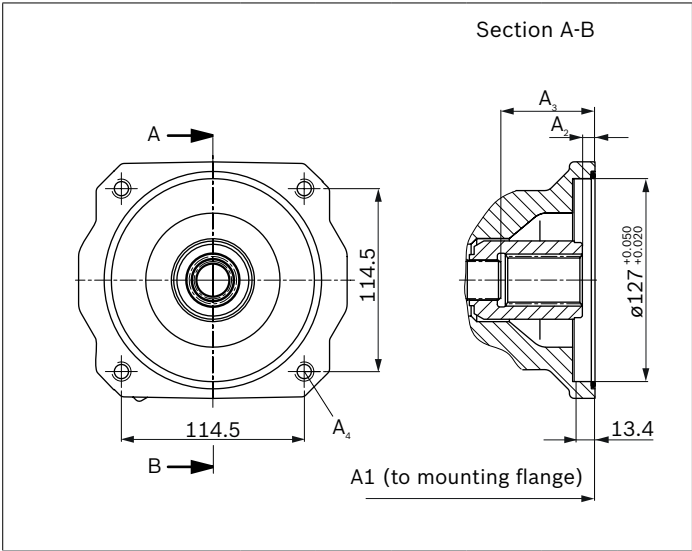
Flange ISO 3019-1 (SAE)		Hub for splined shaft		Availability by displacement							Code
Diameter	Attachment	Diameter		18	28	45	60/63	72	85	100	
127-4 (C)		1 1/4 in	14T 12/24DP	-	-	-	●	●	●	●	K15
		1 1/2 in	17T 12/24DP	-	-	-	-	-	●	●	K16

● = Available ○ = On request

▼ 127/-4



K15	NG	A1	A2	A3	A4
(SAE J744 32-4 (C))					
60/63	255	8	59	M12×1.75; 16 deep	
72	255	8	59	M12×1.75; 16 deep	
85	301.5	13	67.9	M12×1.75; through	
100	301.5	13	67.9	M12×1.75; through	

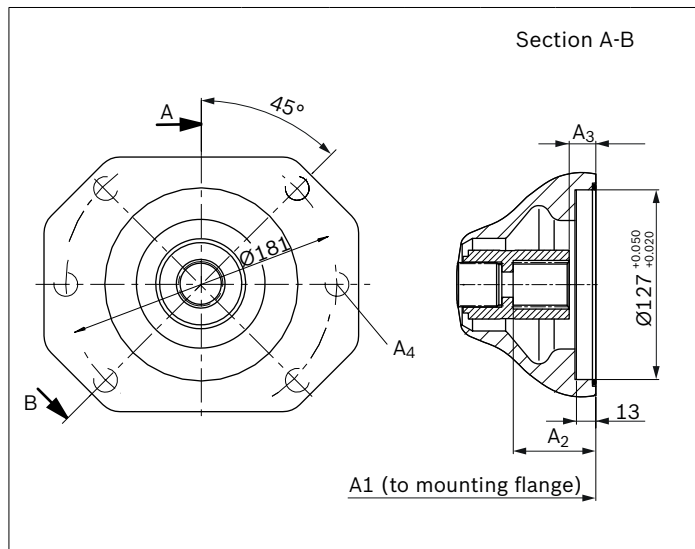


K16	NG	A1	A2	A3	A4
(SAE J744 32-4 (C))					
85	301.5	13	67.9	M12×1.75; through	
100	301.5	13	67.9	M12×1.75; through	

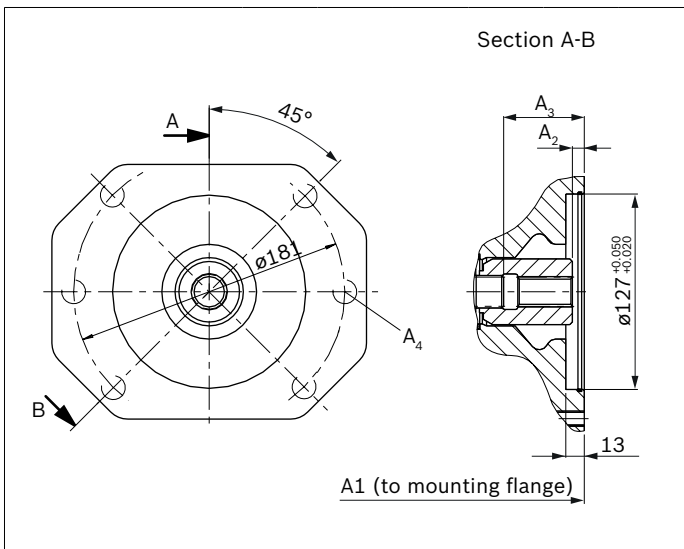
Flange ISO 3019-1 (SAE)		Hub for splined shaft		Availability by displacement							Code
Diameter	Attachment	Diameter		18	28	45	60/63	72	85	100	
127-2 (B)	⌀, ∞	1 1/4 in	14T 12/24DP	-	-	-	-	-	●	●	K07
		1 1/2 in	17T 12/24DP	-	-	-	-	-	●	●	K24

● = Available ○ = On request

▼ 127/-2



K07 (SAE J744 32-4 (C))	NG	A1	A2	A3	A4
	85	301.5	13	67.9	M16×2; 24 deep
	100	301.5	13	67.9	M16×2; 24 deep



K24 (SAE J744 38-4 (C-C))	NG	A1	A2	A3	A4
	85	302	8	68	M16×2; 24deep
	100	302	8	68	M16×2; 24deep

Overview of attachment options

Tandem		Attachment options – 2nd pump				
Flange ISO 3019-1	Hub for splined shaft	Code	HA10V Series 5 NG (shaft)	HA10V Series 5 NG (shaft)	A1VO/10 NG (shaft)	External gear
82-2 (A)	5/8 in	K01	10 (U), 18 (U)	18 (U)	18 (S2)	AZPF
	3/4 in	K52	10 (S), 18 (S, R)	18 (S, R)	18 (S3)	
101-2 (B)	7/8 in	K68	28 (S, R) 45 (U, W)	28 (S, R) 45 (U, W)	35 (S4)	AZPN/AZPG
	1 in	K04	45 (S, R) 60, 63 (U, W) 72 (U, W)	45 (S, R)	35 (S5)	–
127-4 (C)	1 1/4 in	K15	60, 63 (S, R) 72 (S, R)	–	–	–
	1 1/2 in	K16	85 (S) 100 (S)	–	–	–
127-2 (C)	1 1/4 in	K07	85 (U, W) 100 (U, W)	71 (S, R)	–	PGH5
	1 1/2 in	K24	85 (S) 100 (S)	–	–	–

Combination pumps HA10V Series 5 + HA10V Series 5

By using combination pumps, it is possible to have independent circuits without the need for splitter gearboxes. When ordering a combination pump, use the designations of the first and second pumps, joined by a "+".

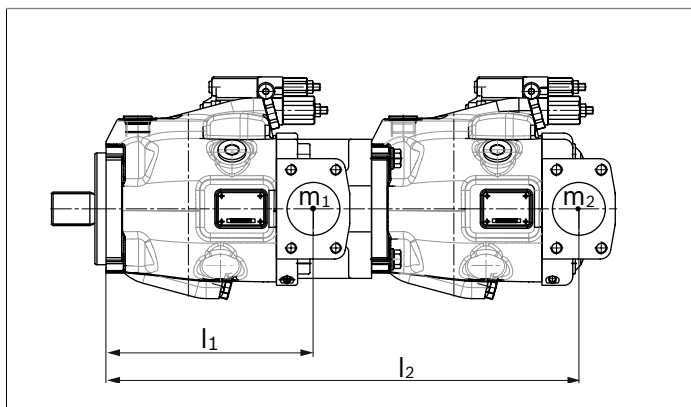
Order example:

HA10V Series 5 85L.DS/5.3R-VSC12K04+

HA10V Series 5 45LS/5.3R-VSC11N00

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.

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



m_1, m_2, m_3	Weight of pump	[kg]
l_1, l_2, l_3	Center of gravity	[mm]

$$T_m = (m_1 \times l_1 + m_2 \times l_2 + m_3 \times l_3) \times \frac{1}{102} \quad [\text{Nm}]$$

Permissible mass moment of inertia

NG				10	18	28	45	60/63	72	85	100
static	T_m	Nm	–	–	–	890	900	1370	1370	3080	3080
dynamic at 10 g (98.1 m/s ²)	T_m	Nm	–	–	–	89	90	137	137	308	308
Weight with tandem plate	m	kg	–	13	18	24	28	28	28	45	45
Weight without tandem plate (e.g. second pump)			8	11.5	15	18	22	22	22	36	36
Center of gravity	without tandem	l_l	mm	–	78	85	96	105	105	122	122
Center of gravity	with tandem	l_l	mm	–	87	99	115	127	127	150	150



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